JUNIPER NETWORKS | Engineering Simplicity

EX9253 Switch Hardware Guide

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EX9253 Switch Hardware Guide

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About This Guide

Use this guide to install hardware and perform initial software configuration, routine maintenance, and troubleshooting for the EX9253 switch. After completing the installation and basic configuration procedures covered in this guide, refer to the Junos OS documentation for information about further software configuration.

RELATED DOCUMENTATION

- EX9253 Switch Quick Start

CHAPTER 1

Overview

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EX9253 System Overview

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EX9253 Switch Hardware Overview

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Juniper Networks EX9253 Ethernet Switches provide high performance, scalable connectivity, and carrier-class reliability for high-density environments such as campus-aggregation and data-center networks. The EX9253 switch has a throughput of up to 2.4 terabits per second (Tbps). The EX9253 switch is a modular system that provides redundancy for all major hardware components, including Routing Engine and power supplies.

You can manage EX9253 switches by using the CLI.

Software

The Juniper Networks EX Series Ethernet Switches run Junos OS, which provides Layer 2 and Layer 3 switching, routing, and security services.

Benefits of the EX9253 Switch

Simplified network architecture—EX9253 switches deliver a simple, secure, virtualized network environment that increases business agility. They are ideal for simplifying campus, data center, and combined campus and data center network environments by collapsing network layers. In a multichassis link aggregation (MC-LAG) configuration in the campus, you can use EX9253 switches along with EX4300, EX3400, and EX2300 switches to eliminate Spanning Tree Protocol (STP); they collapse the core and aggregation layers, thereby simplifying the network architecture and network operations. In a data center, you can use EX9253 switches to collapse core and aggregation layers. In combined campus and data center environments, EX9253 switches consolidate network layers to simplify the network architecture and operations.

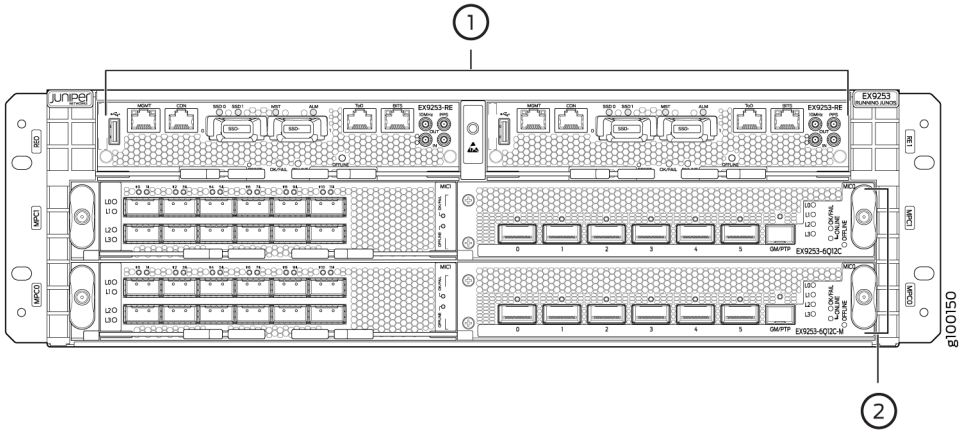
MACsec support—EX9253-12C8Q-M line card supports IEEE 802.1AE MACsec with AES-256 bit encryption, ensuring link-layer data confidentiality, data integrity, and data origin authentication.

Chassis Physical Specifications

The EX9253 switch is three rack units (3 U) in size. Each EX9253 switch is designed to optimize rack space and cabling.

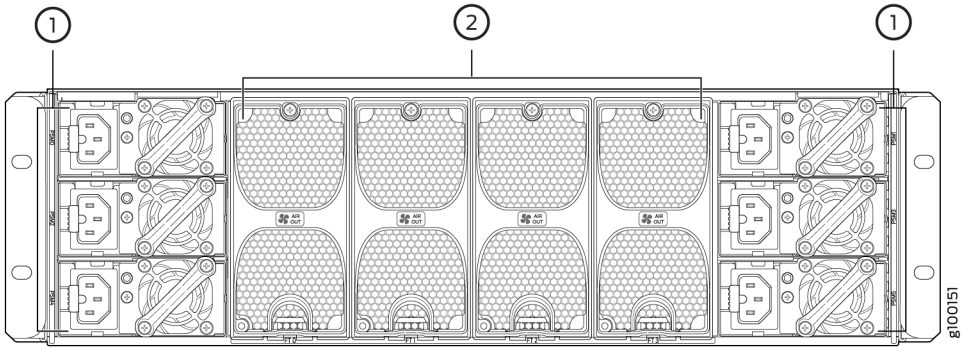
See Figure 1 on page 3, Figure 2 on page 4, and Figure 3 on page 4.

Figure 1: Front View of an EX9253 Switch



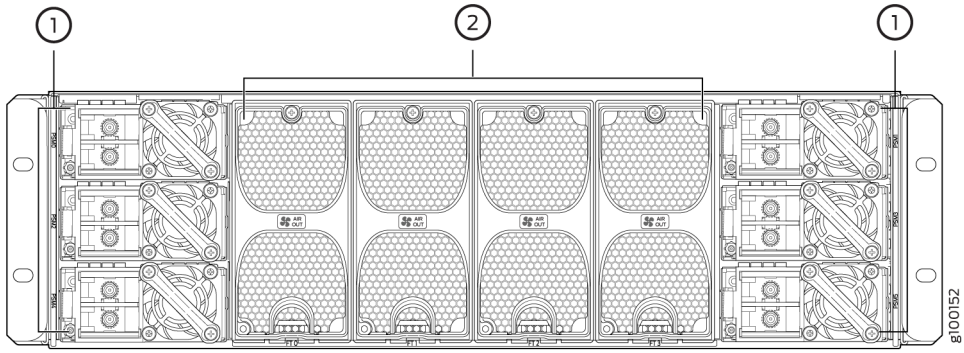
1– Host subsystem	2– Line card installed in line card slots **MPC0** and **MPC1**

Figure 2: Rear View of an EX9253 Switch with AC Power Supplies



1– AC power supplies	2– Fan trays

Figure 3: Rear View of an EX9253 Switch with DC Power Supplies



1– DC power supplies	2– Fan trays

Host Subsystem

Switching and routing functionality, system management, and system control functions of an EX9253 switch are performed by the host subsystem. The host subsystem consists of two Routing Engines.

You must install either one or two Routing Engines in slots labeled **RE0** and **RE1** on the front panel of the chassis. A base configuration EX9253 switch has one Routing Engine. A redundant configuration

EX9253 switch has two Routing Engines. For more information, see "EX9253 Switch Configurations" on page 7.

Line Cards

The EX9253 switch has two horizontal line card slots. The line cards for EX9253 switches combine a Packet Forwarding Engine and Ethernet interfaces in a single assembly. Line cards are field-replaceable units (FRUs) that you can install in the line card slots labeled **MPC0** and **MPC1** on the front panel of the switch chassis.

Table 1 on page 5 lists the line cards available for EX9253 switches.

Table 1: Line Cards for EX9253 Switches

Model	Description	Additional Information
EX9253-6Q12C	A line card with six built-in QSFP+ ports, each of which can house QSFP+ pluggable transceivers and 12 built-in QSFP28 ports, each of which can house QSFP28 pluggable transceivers	"EX9253-6Q12C Line Card" on page 35
EX9253-6Q12C-M	A line card with six built-in QSFP+ ports, each of which can house QSFP+ pluggable transceivers and 12 built-in QSFP28 ports with Media Access Control Security (MACsec) capability, each of which can house QSFP28 pluggable transceivers	"EX9253-6Q12C-M Line Card" on page 41

Cooling System

The cooling system consists of four hot-removable and hot-insertable fan trays and an air filter and provides front-to-back chassis cooling (see "EX9253 Cooling System" on page 21).

Power Supplies

Power supplies for the EX9253 switch are fully redundant, load-sharing, and hot-removable and hot-insertable FRUs. Each EX9253 switch chassis can hold up to six AC or DC power supplies. The power

supplies connect to the midplane, which distributes the power to the switch components depending on their voltage requirements.

Table 2 on page 6 shows the details of the power supplies supported on EX9253 switches.

Table 2: Power Supplies Supported on EX9253 Switches

Power Supply	Input Voltage
800 W AC	90–140 VAC
1600 W AC	180–260 VAC
1100 W DC	–40 VDC through –72 VDC

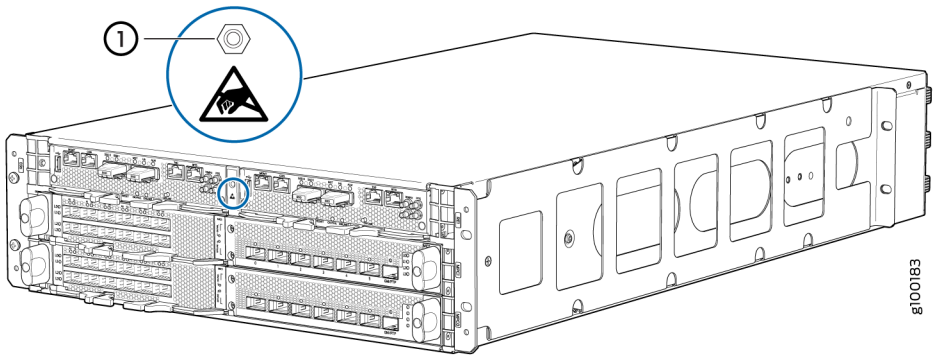
A base configuration EX9253 switch ships with three power supplies. A redundant configuration EX9253 switch ships with four power supplies. See "EX9253 Power System" on page 27 and "EX9253 Switch Configurations" on page 7.

CAUTION: Do not mix different types of power supplies (AC and DC) in the same chassis.

ESD Point

The ESD point on the EX9253 switch is on the front panel (see Figure 4 on page 6).

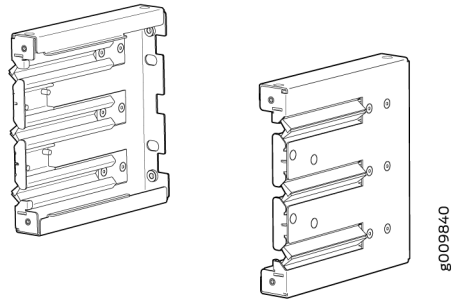
Figure 4: ESD Point Location



Cable Management Brackets

The cable management brackets (see Figure 5 on page 7) consists of dividers and are installed on the front of the chassis. The cable management bracket enables you to route the cables outside the switch and away from the components on the front panel.

Figure 5: Cable Management Bracket



The air filter unit is installed on the cable management brackets.

EX9253 Switch Configurations

Table 3 on page 7 lists the hardware configurations for an EX9253 switch and the components included in each configuration.

Table 3: EX9253 Switch Hardware Configurations

Switch Configuration	Configuration Components	Model Number	First Junos OS Release
EX9253-BASE-AC	Chassis	EX9253-CHAS-3RU	18.2R1
	One routing engine	EX9253-RE	
	Four fan trays	JNP-FAN-3RU	
	Three AC power supplies	JNP-PWR1600-AC	

Table 3: EX9253 Switch Hardware Configurations *(Continued)*

Switch Configuration	Configuration Components	Model Number	First Junos OS Release
	Cable management bracket and air filter unit	JNP-CM-3RU	
	Blank panels for empty slots	EX9253-LC-BLNK	
EX9253-BASE-DC	Chassis	EX9253-CHAS-3RU	18.2R1
	One routing engine	EX9253-RE	
	Four fan trays	JNP-FAN-3RU	
	Three DC power supplies	JNP-PWR1100-DC	
	Cable management bracket and air filter unit	JNP-CM-3RU	
	Blank panels for empty slots	EX9253-LC-BLNK	
EX9253-RED-AC	Chassis	EX9253-CHAS-3RU	18.2R1
	Two routing engines	EX9253-RE	
	Four fan trays	JNP-FAN-3RU	
	Four AC power supplies	JNP-PWR1600-AC	
	Cable management bracket and air filter unit	JNP-CM-3RU	
	Blank panels for empty slots	EX9253-LC-BLNK	

Table 3: EX9253 Switch Hardware Configurations *(Continued)*

Switch Configuration	Configuration Components	Model Number	First Junos OS Release
EX9253-RED-DC	Chassis	EX9253-CHAS-3RU	18.2R1
	Two routing engines	EX9253-RE	
	Four fan trays	JNP-FAN-3RU	
	Four DC power supplies	JNP-PWR1100-DC	
	Cable management bracket and air filter unit	JNP-CM-3RU	
	Blank panels for empty slots	EX9253-LC-BLNK	

NOTE: You can install up to two line cards (in any combination) in the switch.

NOTE: Line cards are not part of the base or redundant configuration. You must order them separately.

NOTE: Additional power supplies (AC or DC) must be purchased separately.

SEE ALSO

EX9253 Power System | **27**

EX9253 Cooling System | **21**

EX9253 Switch Hardware and CLI Terminology Mapping

This topic describes the hardware terms used in EX9253 switch documentation and the corresponding terms used in the Junos OS CLI. See Table 4 on page 10.

Table 4: CLI Equivalents of Terms Used in Documentation for EX9253 Switches

Hardware Item (CLI)	Description (CLI)	Value (CLI)	Item in Documentation	Additional Information
Chassis	EX9253	EX9253	Switch chassis	"Chassis Physical Specifications of an EX9253 Switch" on page 12
PEM (*n*)	One of the following: • JNP-PWR1600-AC • JNP-PWR1100-DC	*n* is a value in the range 0-3. The value corresponds to the power supply slot number.	AC or DC power supply	"EX9253 Power System" on page 27
Routing Engine (*n*)	EX9253-RE	*n* is a value in the range 0-1. In base configuration, only one entry appears. In redundant configuration, two entries appear; one for each Routing Engine installed in the chassis.	Routing Engine	"Host Subsystem in an EX9253 Switch" on page 15

Table 4: CLI Equivalents of Terms Used in Documentation for EX9253 Switches *(Continued)*

Hardware Item (CLI)	Description (CLI)	Value (CLI)	Item in Documentation	Additional Information
FPC (*n*)	Abbreviated name of the line card. One of the following: • EX9253-6Q12C • EX9253-6Q12C-M	*n* is a value in the range of 0-1. The value corresponds to the line card slot number in which the line card is installed.	Line card (The switch does not have actual FPCs—the line cards are the FPC equivalents on the switch)	• "EX9253-6Q12C Line Card" on page 35 • "EX9253-6Q12C-M Line Card" on page 41
PIC (*n*)	Abbreviated name of the Physical Interface Card (PIC).	*n* is a value in the range 0-1. The value corresponds to the slot number in which the PIC is installed.	Abbreviated name of the Physical Interface Card (PIC)	• "EX9253-6Q12C Line Card" on page 35 • "EX9253-6Q12C-M Line Card" on page 41
Xcvr (*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	"Pluggable Transceivers Supported on an EX9253 Switch" on page 57
Fan tray (*n*)	JNP FAN 3RU	*n* is a value equivalent to the number of the port in which the fan tray is installed.	Fan tray	"EX9253 Cooling System" on page 21

EX9253 Chassis

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- Chassis Physical Specifications of an EX9253 Switch | 12
- Field-Replaceable Units in an EX9253 Switch | 13
- Host Subsystem in an EX9253 Switch | 15
- Understanding EX9253 Switch Component and Functionality Redundancy | 20

Chassis Physical Specifications of an EX9253 Switch

The EX9253 switch chassis is a rigid sheet-metal structure that houses all components of the switch. EX9253 is available in two variants—with AC power supply and with DC power supply. Table 5 on page 12 summarizes the physical specifications of the EX9253 switch chassis.

Table 5: Physical Specifications of the EX9253 Switch Chassis

Description	Weight	Width	Depth	Height
AC-powered chassis fully loaded with all FRUs	157.4 lb (71.4 kg)	19 in. (48.26 cm)	36.5 in. (92.7 cm) with the cable management brackets, air filter unit, and handles for fans and power supplies	5.21 in. (13.23 cm; 3 U)
DC-powered chassis fully loaded with all FRUs	163.4 lb (74.11 kg)	19 in. (48.26 cm)	38.5 in. (97.79 cm) with the cable management brackets, air filter unit, and handles for fans and power supplies	5.21 in. (13.23 cm; 3 U)

Table 5: Physical Specifications of the EX9253 Switch Chassis *(Continued)*

Description	Weight	Width	Depth	Height
Chassis without any FRU installed	50 lb (22.68 kg)	19 in. (48.26 cm)	30 in. (76.2 cm) without the cable management brackets, air filter unit, and handles for fans and power supplies	5.21 in. (13.23 cm; 3 U)
Fan tray	1.5 lb (0.68 kg)	2.46 in. (6.25 cm)	9.27 in. (23.54 cm)	4.99 in. (12.6 cm)
Routing and Control Board	7.5 lb (3.4 kg)	7.98 in. (20.27 cm)	22.12 in. (56.18 cm)	1.66 in. (4.21 cm)
Air filter unit and cable management brackets	5.51 lb (2.5 kg)	19 in. (48.26 cm)	5.43 in. (13.79 cm)	5.19 in. (13.18 cm)
Line card	33 lb (14.97 kg)	16.5 in. (41.91 cm)	22.37 in. (56.82 cm)	1.65 in. (4.19 cm)
AC power supply	3.4 lb (1.54 kg)	3.53 in. (8.67 cm)	9.26 in. (23.52 cm)	1.63 in. (4.14 cm)
DC power supply	4.4 lb (1.99 kg)	3.53 in. (8.67 cm)	10.8 in. (27.43 cm)	1.63 in. (4.14 cm)

You can mount an EX9253 switch on four posts of a 19-in. rack or cabinet.

Field-Replaceable Units in an EX9253 Switch

Field-replaceable units (FRUs) are components that you can replace at your site. The FRUs in EX9253 switches are hot-removable and hot-insertable. You can remove and replace them without powering off the switch. The FRUs in EX9253 switches are:

- Routing Engines
- Power supplies
- Fan trays
- Air filter unit

- Air filter
- Line cards
- Transceivers

The fan trays and power supplies are hot-removable and hot-insertable field-replaceable units installed in the rear panel of the switch. You can replace them without powering off the switch or disrupting switch functions. In a switch powered by AC power supplies, a minimum of two high line power supplies or three low line must be installed in the switch for non-redundant operation. To ensure proper operation of the switch, you must install a replacement power supply shortly after removing a power supply from the chassis. To maintain proper cooling, you must install a replacement fan tray or a blank panel in the fan tray slot shortly after removing a fan tray from the chassis.

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/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.

To install a Routing and Control Board in an EX9253 switch, follow instructions in "Installing a Routing Engine in an EX9253 Switch" on page 135. To remove a Routing and Control Board from an EX9253 switch, follow instructions in "Removing a Routing Engine from an EX9253 Switch" on page 133.

To install an AC power supply in an EX9253 switch, follow instructions in "Installing an AC Power Supply in an EX9253 Switch" on page 126. To remove an AC power supply from an EX9253 switch, follow instructions in "Removing an AC Power Supply from an EX9253 Switch" on page 125.

To install a DC power supply in an EX9253 switch, follow instructions in "Installing a DC Power Supply in an EX9253 Switch" on page 130. To remove a DC power supply from an EX9253 switch, follow instructions in "Removing a DC Power Supply in an EX9253 Switch" on page 128.

To install a fan tray in an EX9253 switch, follow instructions in "Installing a Fan Tray in an EX9253 Switch" on page 113. To remove a fan tray from an EX9253 switch, follow instructions in "Removing a Fan Tray from an EX9253 Switch" on page 112.

To install the air filter unit in an EX9253 switch, follow instructions in "Installing the Air Filter Unit in an EX9253 Switch" on page 118. To remove the air filter unit from an EX9253 switch, follow instructions in "Removing the Air Filter Unit from an EX9253 Switch" on page 117.

To install the air filter in the air filter unit in an EX9253 switch, follow instructions in "Installing the Air Filter in the Air Filter Unit in an EX9253 Switch" on page 121. To remove the air filter from the air filter unit in an EX9253 switch, follow instructions in "Removing the Air Filter from the Air Filter Unit in an EX9253 Switch" on page 119.

To install a line card in an EX9253 switch, follow instructions in "Installing a Line Card in an EX9253 Switch" on page 144. To remove a line card from an EX9253 switch, follow instructions in "Removing a Line Card from an EX9253 Switch" on page 141.

To install a transceiver in an EX9253 switch, follow instructions in *Install a Transceiver* or *Install a QSFP28 Transceiver*. To remove a transceiver from an EX9253 switch, follow instructions in *Remove a Transceiver* or *Remove a QSFP28 Transceiver*.

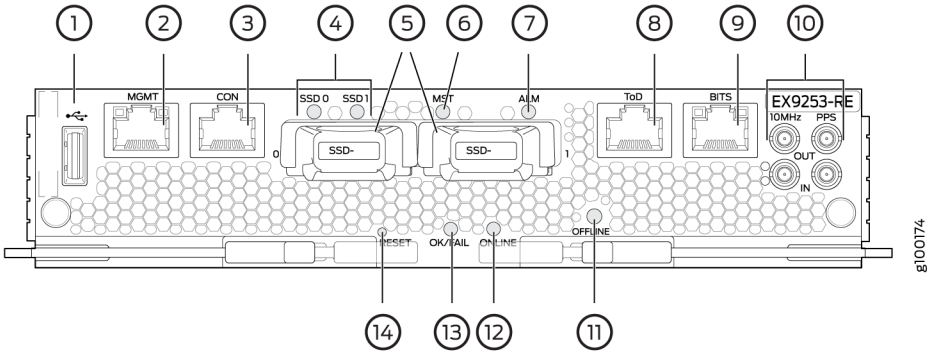
Host Subsystem in an EX9253 Switch

The host subsystem provides switching protocol processes as well as software processes that control the switch' s interface, the chassis components, system management, and user access to the switch. These switching processes run on top of a kernel that interacts with the Packet Forwarding Engine. The host subsystem consists of two Routing Engines (REs). The RE is an integrated board that provides Routing Engine and Control Board functionality and supports virtualization. If two REs are installed, one functions as the primary and the other functions as the backup. If the primary host subsystem (or either of its components) fails, the backup can take over as the primary.

The RE is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. At least one RE must be installed in the switch. To ensure proper operation of the switch, you must install a replacement RE shortly after removing an RE from the chassis. The REs are installed in the slots labeled **RE0** and **RE1** on the front panel of the chassis.

Figure 6 on page 15 shows the components on the faceplate of an RE.

Figure 6: Components on the Faceplate of an RE



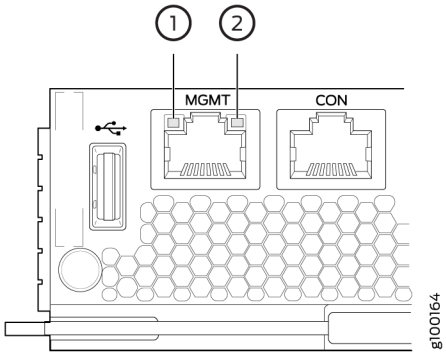
1– USB port	8– Time of day port with LEDs (**ToD**) (This port is reserved for future use)

2– Management port (**MGMT**)	9– **BITS** port with LEDs
3– Console port (**CON**)	10– Clocking ports
4– SSD LEDs	11– **OFFLINE** button
5– SSDs	12– **ONLINE** LED
6– Master LED (**MST**)	13– **OK/FAIL** LED
7– Alarm LED (**ALM**)	14– **RESET** button

The ports on the RE connect the switch to external devices on which system administrators can issue Junos OS CLI commands to manage the switch and to external clocking and timing devices. The functions of the ports are:

- **CON**—Connects the switch to a system console through a serial cable with an RJ-45 connector attached.
- **MGMT**—Connects the switch to a management device 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 on the port (see Figure 7 on page 16) indicate the connection in use: the Speed LED blinks in amber color when the speed is 1000 Mbps, in green color when the speed is 100 Mbps, and is unlit when the speed is 10 Mbps; the Link/Activity LED is lit green when traffic is passing through the port.

Figure 7: LEDs on the Management Port



1– Speed LED	2– Link/Activity LED

- **BITS**—Building-integrated timing supply (BITS) external clocking interface to connect to external clocking devices.
- **ToD**—Time-of-day (TOD) port to connect external timing signal sources. This port is reserved for future use.

- **10MHZ** (one input and one output)—The 10-MHz timing connectors connect the switch 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) connectors connect the switch 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—The USB port provides a removable media interface. Junos OS supports USB version 1.0 and later.

Table 6 on page 17 describes the functions of the LEDs on the REs.

Table 6: LEDs on the Routing Engines in an EX9253 Switch

LED	Color	State	Description
ONLINE	Green	On steadily	Both Junos OS and Linux are successfully loaded on the switch.
		Blinking	The switch is starting Junos OS.
	Red	On steadily	The switch has loaded Linux.
		Blinking	The switch is starting Linux.
	–	Off	The switch is offline.
OK/FAIL	Green	On steadily	The switch is functioning normally.
	Red	Blinking	The switch has failed.
	–	Off	The switch is not powered on.

Table 6: LEDs on the Routing Engines in an EX9253 Switch *(Continued)*

LED	Color	State	Description
ALM	Red	On steadily	Major—Indicates a critical condition that can cause the switch to stop functioning. Possible causes include component removal, failure, or overheating, or any major software failure.
	Red	Blinking	Indicates that there is a major alarm and a minor alarm at the same time. • Major alarm—Indicates a critical condition that can cause the switch to stop functioning. Possible causes include component removal, failure, or overheating, or any major software failure. • Minor alarm—Indicates a serious but nonfatal error condition, such as a maintenance alert or a significant increase in component temperature.
	Yellow	On steadily	Minor alarm—Indicates a serious but nonfatal error condition, such as a maintenance alert or a significant increase in component temperature.

Table 6: LEDs on the Routing Engines in an EX9253 Switch *(Continued)*

LED	Color	State	Description
	–	Off	There is no alarm.
SSD0	Green	Blinking	SSD0 is being accessed by the switch.
	–	Off	SSD0 is not active or not being accessed.
SSD1	Green	Blinking	SSD1 is being accessed by the switch.
	–	Off	SSD1 is not active or not being accessed.
Link/Activity LED on the **MGMT** port	Green	Blinking	The port and the link are active, and there is link activity.
		On steadily	The port and the link are active, but there is no link activity.
		Off	The port is not active.
Speed LED on the **MGMT** port	Green	On steadily	Link speed is 1000 Mbps.
	Amber	On steadily	Link speed is 100 Mbps.
	–	Off	Link speed is 10 Mbps.
Activity LED on the **BITS** port	Green	On steadily	There is no loss (BITS is in locked state).

Table 6: LEDs on the Routing Engines in an EX9253 Switch *(Continued)*

LED	Color	State	Description
	–	Off	There is loss of signal or loss of line.
Link LED on the **BITS** port	Amber	On steadily	There is loss of signal or loss of line.
	–	Off	There is no loss (BITS is in locked state).

Understanding EX9253 Switch Component and Functionality Redundancy

The Juniper Networks EX9253 Ethernet Switches are available as fully redundant system. A redundant EX9253 switch configuration is designed so that no single point of failure can cause the entire switch to fail. See "EX9253 Switch Configurations" on page 7.

The following hardware components provide redundancy to an EX9253 switch:

- Host Subsystem—The host subsystem provides switching protocol processes as well as software processes that control the switch' s interface, the chassis components, system management, and user access to the switch. These switching processes run on top of a kernel that interacts with the Packet Forwarding Engine. The host subsystem consists of two Routing Engines (REs). The RE is an integrated board that provides Routing Engine and Control Board functionality and supports virtualization. If two REs are installed, one functions as the primary and the other functions as the backup. If the primary host subsystem (or either of its components) fails, the backup can take over as the primary.

  If the Routing Engines are configured for graceful switchover, the backup Routing Engine automatically synchronizes its configuration and state with the primary Routing Engine. Any update to the primary Routing Engine state is replicated on the backup Routing Engine. If the backup Routing Engine assumes primary role, packet forwarding continues through the switch without interruption. See "Host Subsystem in an EX9253 Switch" on page 15.

- Power supplies—The switch supports six power supplies, installed on the rear panel of the chassis in slots **PEM0** through **PEM5** (left to right). In a switch powered by AC power supplies, a minimum of

two high line power supplies or three low line must be installed in the switch for non-redundant operation. In a redundant configuration, if one power supply fails or is removed, the remaining power supplies assume the entire electrical load without interruption. In a base configuration, if one power supply fails or is removed, one of the line cards is disabled. See "EX9253 Power System" on page 27.

- Cooling system—The cooling system consists of four fan trays and an air filter unit. Each fan tray contains two counter-rotating fans. The fan trays are installed on the rear panel of the chassis. A fully configured switch needs all the four fan trays to operate normal. In the event of any fan failure, the fan tray with the faulty fan must be replaced immediately. You cannot replace a single fan. If one or more fans fail, you must replace the entire fan tray. Under normal operating conditions, the fans in the fan trays run at less than full speed. If a fan tray fails or the ambient temperature rises above a threshold, the speed of the remaining fan trays is automatically adjusted to keep the temperature within the acceptable range. If the ambient maximum temperature specification is exceeded and the system cannot be adequately cooled, the Routing Engine shuts down the line card that cannot be cooled adequately is disabled. If the fire threshold temperature is exceeded, the Routing Engine shuts down the system by disabling output power from each power supply. See "EX9253 Cooling System" on page 21.

EX9253 Cooling System

IN THIS SECTION

- Fan Tray | **22**
- Air Filter Unit | **24**
- Fan Tray Status LEDs | **25**
- Cooling System in the Power Supplies | **26**
- Airflow Direction in the EX9253 Switch Chassis | **26**

The cooling system in an EX9253 switch consists of four fan trays and an air filter unit. The cooling system components work together to keep all switch components within the acceptable temperature range.

Fan Tray

The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU) and contains two counter-rotating fans (see Figure 8 on page 22 and Figure 9 on page 23). The fan trays install vertically in the rear of the switch.

Figure 8: Fan Tray

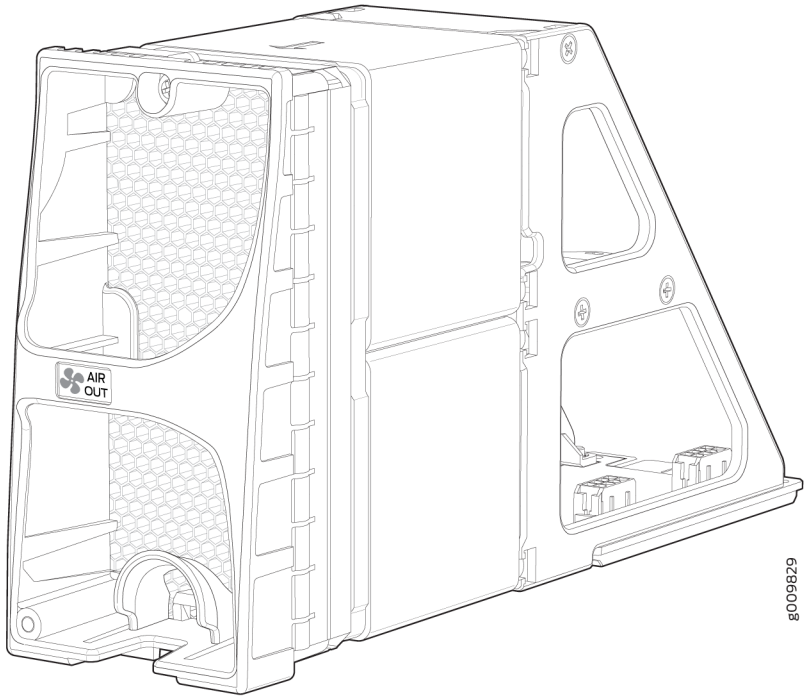
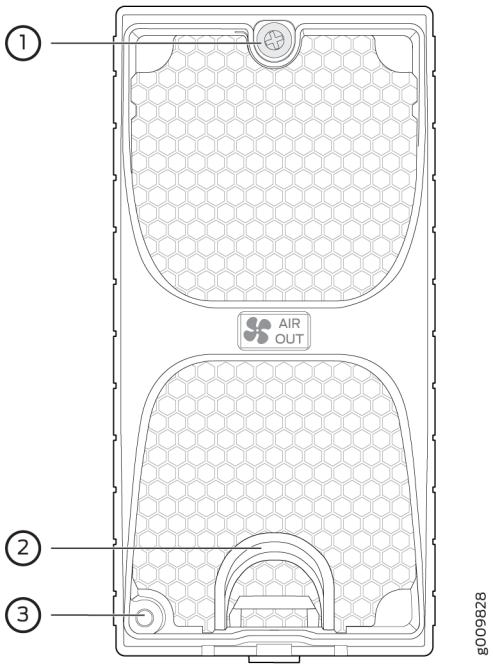


Figure 9: Faceplate of the Fan Tray



1– Captive screw	3– Status LED
2– Latch	

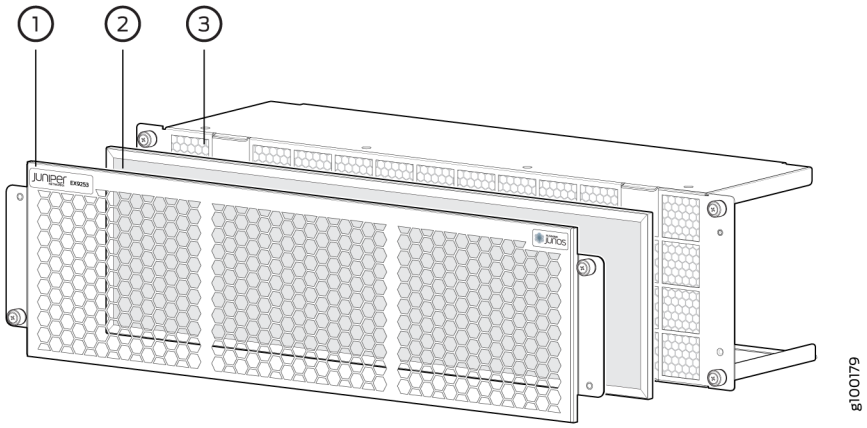
The fan trays and power supplies are hot-removable and hot-insertable field-replaceable units installed in the rear panel of the switch. You can replace them without powering off the switch or disrupting switch functions. In a switch powered by AC power supplies, a minimum of two high line power supplies or three low line must be installed in the switch for non-redundant operation. To ensure proper operation of the switch, you must install a replacement power supply shortly after removing a power supply from the chassis. To maintain proper cooling, you must install a replacement fan tray or a blank panel in the fan tray slot shortly after removing a fan tray from the chassis.

The switch monitors the temperature of switch components. Under normal operating conditions, the fans in the fan trays run at less 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 ambient maximum temperature specification is exceeded and the system cannot be adequately cooled, the Routing Engine shuts down the line card that cannot be cooled adequately is disabled. If the fire threshold temperature is exceeded, the Routing Engine shuts down the system by disabling output power from each power supply. You cannot replace a single fan. If one or more fans fail, you must replace the entire fan tray.

Air Filter Unit

The air filter unit has three parts–the outer filter cover, the air filter, and the inner cage that form the body (see Figure 10 on page 24). The air filter is in between the outer filter cover and the inner cage. The air filter unit is mounted on the cable management brackets, and are held tightly by captive screws.

Figure 10: Air Filter Unit

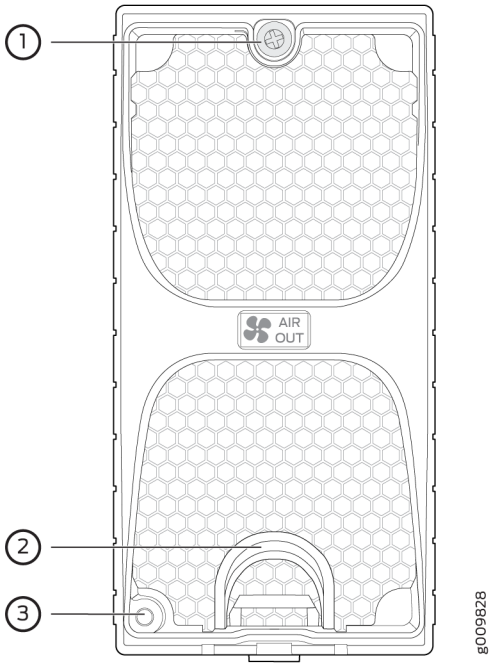


1– Outer filter cover	3– Inner cage
2– Air filter	

Fan Tray Status LEDs

The LEDs indicating the state of the fan trays are located adjacent to the fan tray slots on the rear panel of the chassis (see Figure 11 on page 25 and Table 7 on page 25).

Figure 11: Fan Tray Status LEDs



1– Captive screw	3– Status LED
2– Latch	

Table 7 on page 25 describes the behavior of the fan tray LEDs.

Table 7: Fan Tray LED

Color	State	Description
Green	Blinking	Fan tray hardware initialization is complete and software initialization is pending.
	On steadily	Fan tray software initialization is complete and the fan is functioning normally.

Table 7: Fan Tray LED *(Continued)*

Color	State	Description
Red	On steadily	The fan tray is faulty and not functioning normally.

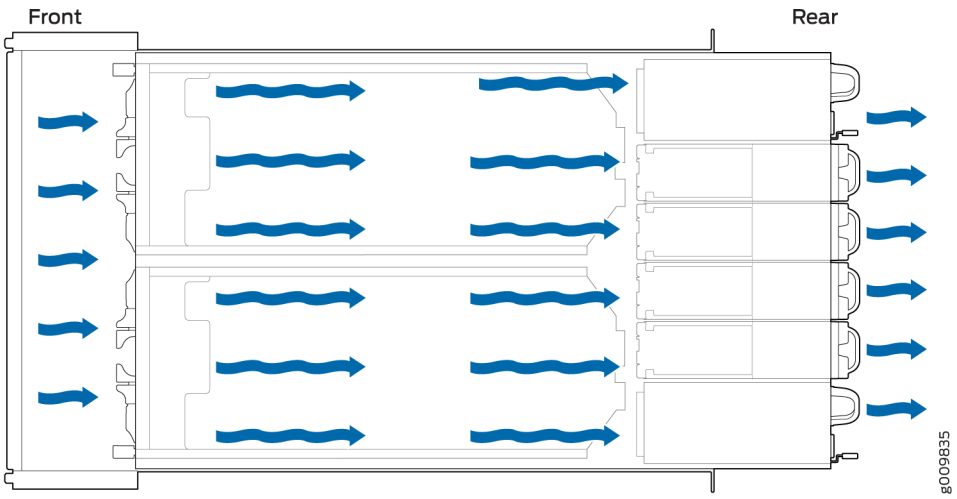
Cooling System in the Power Supplies

The power supplies are self-cooling and are installed in the rear panel of the switch. The exhaust for the power supplies are also located on the rear of the chassis.

Airflow Direction in the EX9253 Switch Chassis

The switch has front-to-back (AIR OUT) airflow (see Figure 12 on page 26). The air intake to cool the chassis is located on the front of the chassis. Air is pulled through the chassis toward the fan tray, where it is exhausted out through the rear of the chassis. The air intake to cool the power supplies is also located in the front of the chassis.

Figure 12: Airflow Through the EX9253 Switch Chassis



RELATED DOCUMENTATION

Clearance Requirements for Airflow and Hardware Maintenance for an EX9253 Switch | 53

EX9253 Power System

IN THIS SECTION

- AC Power Supply Description | 27
- AC Power Cord Specifications for an EX9253 Switch | 29
- AC Power Supply Specifications for EX9253 Switches | 31
- DC Power Supply Description | 32
- DC Power Supply Specifications for EX9253 Switches | 33
- Power Requirements for EX9253 Components | 34
- Calculating System Thermal Output | 34

EX9253 switches uses either AC or DC power supply (see Figure 13 on page 28 and Figure 16 on page 32). The switch can support up to six power supplies installed at the rear panel of the chassis in slots labeled **PSM0** through **PSM5**.

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

AC Power Supply Description

Each AC power supply weighs approximately 3.4 lb (1.54 kg) and consists of a handle, an ejector lever, an AC appliance inlet, a fan, and an LED to monitor the status of the power supply. Figure 13 on page 28 shows the power supply and Figure 14 on page 28 shows the power supply components.

WARNING: The switch is a pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal (sized for M5 hex screws)

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.

Figure 13: AC Power Supply

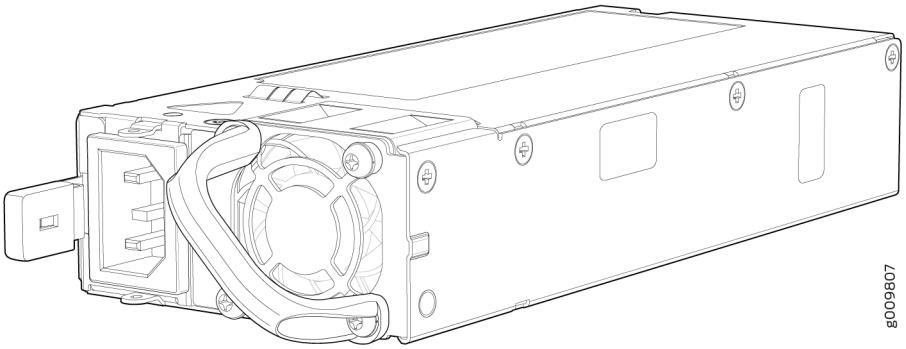
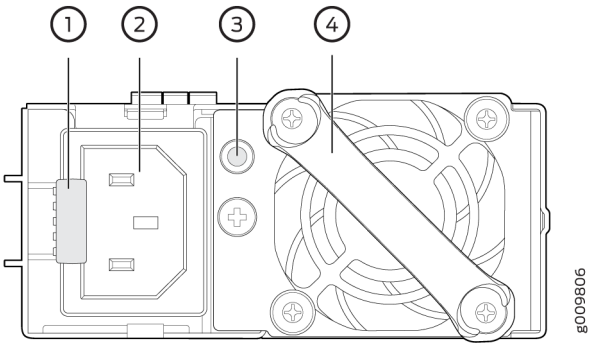


Figure 14: AC Power Supply Components



1– Ejector lever	3– Status LED
2– AC power cord inlet	4– Handle

Each power supply has its own fan and is cooled by its own internal cooling system. EX9253 switches support 800 W and 1600 W AC power supply. The AC power supply supports the low line (90 through 140 VAC) and the high line (180 through 264 VAC) AC power configurations. Each AC power supply has a single AC appliance inlet located on the power supply that requires a dedicated AC power feed. We recommend that you use a customer site circuit breaker rated for 15 A @ 100 VAC or 16 A @ 200 VAC circuit breaker minimum for each AC power supply, or as required by local code. Doing so enables you to operate the switch in any configuration without upgrading the power infrastructure.

AC Power Cord Specifications for an EX9253 Switch

A detachable AC power cord is supplied with the AC power supplies. The coupler is type C13 as described by International Electrotechnical Commission (IEC) standard 60320. The plug end of the power cord fits into the power source outlet that is standard for your geographical location.

CAUTION: The AC power cord provided with each power supply is intended for use with that power supply only and not for any other use.

NOTE: In North America, AC power cords must not exceed 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 supplied with the switch are in compliance.

Table 8 on page 29 gives the AC power cord specifications for the countries and regions listed in the table.

Table 8: AC Power Cord Specifications

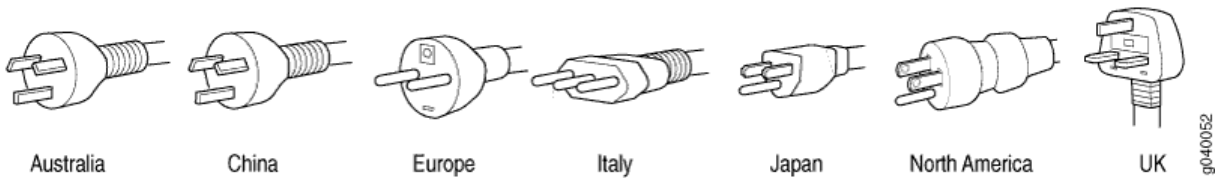
Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	CBL-EX-PWR-C13-AR
Australia	250 VAC, 10 A, 50 Hz	AS/NZZS 3112 Type SAA/3	CBL-EX-PWR-C13-AU
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	CBL-EX-PWR-C13-BR
China	250 VAC, 10 A, 50 Hz	GB 1002-1996 Type PRC/3	CBL-EX-PWR-C13-CH
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CBL-EX-PWR-C13-EU
India	250 VAC, 10 A, 50 Hz	IS 1293 Type IND/3	CBL-EX-PWR-C13-IN

Table 8: AC Power Cord Specifications *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Israel	250 VAC, 10 A, 50 Hz	SI 32/1971 Type IL/3G	CBL-EX-PWR-C13-IL
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16 Type I/3G	CBL-EX-PWR-C13-IT
Japan	125 VAC, 12 A, 50 Hz or 60 Hz	SS-00259 Type VCTF	CBL-EX-PWR-C13-JP
Korea	250 VAC, 10 A, 50 Hz or 60 Hz	CEE (7) VII Type VIIGK	CBL-EX-PWR-C13-KR
North America	125 VAC, 13 A, 60 Hz	NEMA 5-15 Type N5-15	CBL-EX-PWR-C13-US
South Africa	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/13	CBL-EX-PWR-C13-SA
Switzerland	250 VAC, 10 A, 50 Hz	SEV 6534-2 Type 12G	CBL-EX-PWR-C13-SZ
Taiwan	125 VAC, 11 A and 15 A, 50 Hz	NEMA 5-15P Type N5-15P	CBL-EX-PWR-C13-TW
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363/A Type BS89/13	CBL-EX-PWR-C13-UK

Figure 15 on page 30 illustrates the plug on the power cord for some of the countries or regions listed in Table 8 on page 29.

Figure 15: AC Plug Types



AC Power Supply Specifications for EX9253 Switches

Table 9 on page 31 lists the AC power system electrical specifications.

Table 9: AC Power System Electrical Specifications

Item	Specification
AC input voltage	Operating range: • AC low line: 90 through 140 VAC • AC high line: 180 through 264 VAC
AC input line frequency	50 through 60 Hz (nominal)
AC system current rating	25 A
AC system input power	2500 W

Table 10 on page 31 lists the AC power supply electrical specifications.

Table 10: AC Power Supply Electrical Specifications

Item	Specification
Maximum output power	• AC low line: 800 W • AC high line: 1600 W
AC input voltage	Operating range: • 90 through 140 VAC: 800 W • 180 through 264 VAC: 1600 W
AC input line frequency	50 through 60 Hz (nominal)
AC input current rating	10 A@100 VAC through 240 VAC

DC Power Supply Description

Each DC power supply weighs approximately 4.4 lb (1.99 kg) and consists of a handle, an ejector lever, a status LED, and a terminal block that provides a single DC input (–48- VDC and return) that requires a dedicated customer-site circuit breaker. We recommend that you use a dedicated customer-site circuit breaker rated for 40 A (–48 VDC) minimum, or as required by local code.

Figure 16 on page 32 shows the power supply and Figure 17 on page 32 shows the power supply components.

Figure 16: DC Power Supply

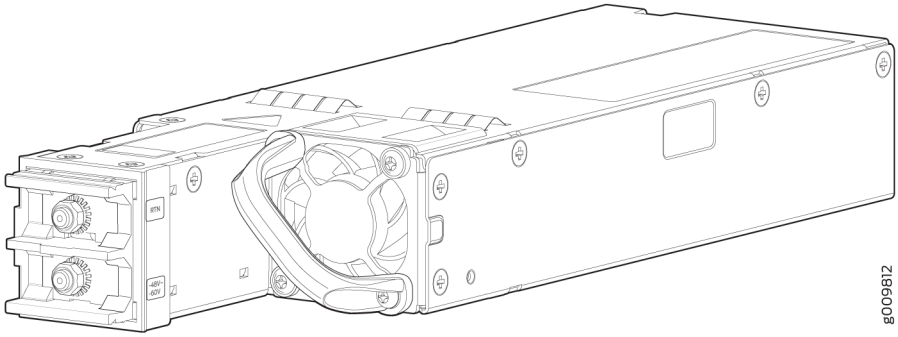
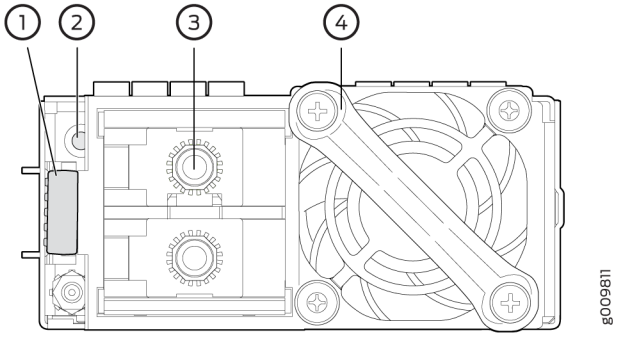


Figure 17: DC Power Supply Components



1– Ejector lever	3– DC power terminals
2– Status LED	4– Handle

Each power supply has its own fan and is cooled by its own internal cooling system. EX9253 switches support 1100 W DC power supply. Each DC power supply has terminals located on the power supply

that require dedicated feeds. We recommend that you use a dedicated customer-site circuit breaker rated for 40 A (–48 VDC) minimum, or as required by local code. Doing so enables you to operate the switch in any configuration without upgrading the power infrastructure.

DC Power Supply Specifications for EX9253 Switches

Table 11 on page 33 lists the DC power system electrical specifications.

Table 11: DC Power System Electrical Specifications

Item	Specification
DC input voltage	Operating range: –40 through –72 VDC
DC system input current rating	54 A @ –48 VDC (maximum)
DC system input power	2500 W

Table 12 on page 33 lists the DC power supply electrical specifications.

Table 12: DC Power Supply Electrical Specifications

Item	Specification
Maximum output power	1100 W
DC input voltage	Minimum: –40 VDC Nominal: –48 VDC, –60 VDC Operating range: –40 through –72 VDC
DC input current rating	32 A @ –48 VDC

Power Requirements for EX9253 Components

Table 13 on page 34 lists the power requirements for various hardware components when the switch is operating under typical and maximum voltage conditions.

Table 13: Power Requirements for EX9253 Components

Component	Power Requirement at 25° C (Watts; Typical)	Power Requirement at 55° C (Watts; Maximum)
EX9253-6Q12C line card	740 W	800 W
EX9253-6Q12C-M line card	770 W	835 W
Routing Engine	58 W	65 W
Fan tray	20 W	95 W

Calculating System Thermal Output

After you have calculated the power consumption for your configuration, you can use that information to determine the system thermal output (BTUs per hour). Multiply the power consumption in watts by 3.41 to compute the system thermal output.

EX9253 Line Cards

IN THIS SECTION

- EX9253-6Q12C Line Card | 35
- EX9253-6Q12C-M Line Card | 41

EX9253-6Q12C Line Card

IN THIS SECTION

- Line Card Models | 35
- Line Card Components | 36
- Port LEDs and Lane LEDs on EX9253-6Q12C Line Card | 37
- OK/FAIL LED and ONLINE LED on EX9253-6Q12C Line Card | 40

The line cards in EX9253 switches combine a Packet Forwarding Engine and Ethernet interfaces in a single assembly. Line cards are field-replaceable units (FRUs) that you can install in the line card slots on the front of the switch chassis. Line cards are hot-insertable and hot-removable: You can remove and replace them without powering off the switch or disrupting switch functions. To maintain proper cooling, you must install a replacement line card or a blank panel in the line card slot shortly after removing a line card from the chassis.

Line Card Models

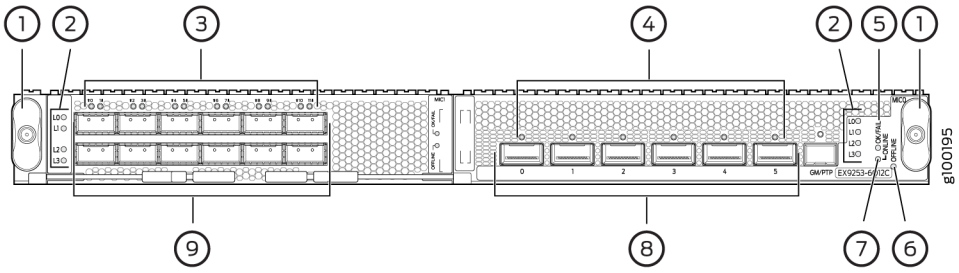
Table 14 on page 35 shows the model number, description of the line card model, and the Junos OS release in which the line card was first supported.

Table 14: EX9253-6Q12C Line Card

Model	Description	Junos OS Release Required
EX9253-6Q12C	A line card with six built-in QSFP+ ports, each of which can house QSFP+ pluggable transceivers and 12 built-in QSFP28 ports, each of which can house QSFP28 pluggable transceivers	18.2R1 or later

See Figure 18 on page 36.

Figure 18: EX9253-6Q12C Line Card



1– Ejector levers	6– ONLINE LED
2– Lane LEDs	7– OFFLINE button
3– LEDs for the QSFP28 ports	8– QSFP+ ports
4– LEDs for the QSFP+ ports	9– QSFP28 ports
5– OK/FAIL LED	

You can use the `show version` command to see the version of Junos OS for EX Series switches loaded on the switch.

Line Card Components

The EX9253-6Q12C line card has:

- Six built-in QSFP+ ports, each of which can house a combination of QSFP+ transceivers or breakout cables. These ports operate at 40 Gbps speed. By default, the ports operate with 4x10 Gbps interfaces and support breakout cables. If you need to connect a QSFP+ transceiver to the port, you must configure a 40 Gbps interface on the port by using the command `set chassis fpc` *`fpc-slot`* `pic` *`pic-slot port port-number 40g`*. The ports are labeled **0** through **5**. The ports support rate selectability and remote port identification.

- 12 built-in QSFP28 ports, each of which can house a combination of QSFP28 transceivers, QSFP+ transceivers, or breakout cables. These ports can operate at 40 Gbps and 100 Gbps speeds. By default, the ports operate with 4x10 Gbps interfaces and support breakout cables. If you need to connect a QSFP+ transceiver to the port, you must configure a 40 Gbps interface on the port. If you need to connect a QSFP28 transceiver to the port, you must configure a 100 Gbps interface on the port by using the command `set chassis fpc` *`fpc-slot`* `pic` *`pic-slot port port-number 100g`*. The ports are labeled **0** through **11**. The ports support rate selectability and remote port identification.

- Port LEDs—One LED on each QSFP+ port and two LEDs on each QSFP28 port, which indicates the link status and activity on the port. See MPC and MIC Lane LED Scheme Overview.

- Lane LEDs
- Line card LED—An LED labeled **OK/FAIL**, which indicates the status of the line card.
- ONLINE LED—An LED labeled **ONLINE**, which indicates if the line card is online.
- OFFLINE button—A button to take the line card offline before removing it

The ports are divided into two port groups. The six QSFP+ ports labeled **0** through **5** form one port group, `PIC 0`. The 12 QSFP28 ports labeled **0** through **11** form the other port group, `PIC 1`. The ports in each group share 1.2 terabits of bandwidth. Thus, you can transmit up to 1.2 terabits of traffic through a port group, without packet drop.

Port LEDs and Lane LEDs on EX9253-6Q12C Line Card

You can select a port operating in a breakout mode for an individual lane display, either periodically or when the `request chassis port-led` command is executed. Similar to the port status LEDs, the lane LED supports four states defined by the color or the LED status—Off, Green, Amber, and Red.

The following are the port LED display modes:

- Normal—The port status LED represents port state or a breakout port state. By default, the port status display mode is Normal.
- Lane display—An array of lane status LEDs displays the status of each individual lane for the selected port. The lane display is ON when the software cycles through ports for lane status display. One port is selected at a time, and the display mode for that particular port switches to lane display mode. The other ports remain in normal display mode.
- Port location—The port location mode is *ON* when a remote operator initiates a port location command for a port or a group of ports. The `request chassis port-led` command temporarily overrides periodic software port selection for the lane display; all ports on an interface card that are not selected for port location switch to Normal mode, and selected ports switch to port location mode. If only one port is selected for port location, then the corresponding lane LEDs are applicable. However, if the selected port is in breakout mode, then all lane LEDs are applicable. If not in breakout mode, only lane 0 LED displays the port status. If more than one port is selected for port location, then the lane LEDs are disabled.

The following factors trigger a change in the port LED color:

- Change in the port state. For example, loss of signal (LOS) to no LOS, remote fault, or local fault.
- Insertion or removal or a transceiver
- Change in configuration
- Activation or deactivation of port location feature

- Selection of breakout port for lane display

> **NOTE**: Ports with all individual links in *Up* state are skipped and are not considered for lane display, thereby reducing the time needed to cycle through all the ports.

Table 15 on page 38 describes the state and color rules for the port LEDs. These rules help in determining the port LED color. When port location mode is activated, the port LED state or color can be determined from the column titled *Port Location ON*. If the breakout port is selected for the lane status display, then port LED state or color can be determined from the column titled *Lane Display*.

Table 15: Port LED State and Color Rules

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Normal	Port Location ON	Lane Display
Yes	No breakout	No	Up	Green	Blinking green	–
Yes	No breakout	No	Down; loss of signal (LOS) detected	Off	Blinking green	–
Yes	No breakout	No	Down; transceiver hardware failure	Red	Blinking red	–
Yes	No breakout	No	Down; any other fault other than LOS and transceiver hardware failure	Amber	Blinking amber	–
Any	No breakout	Yes	Port is disabled by CLI	Amber	Blinking amber	–
No	Any	No	Anything except disabled port; however, transceiver not present	Off	Blinking green	–

Table 15: Port LED State and Color Rules *(Continued)*

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Normal	Port Location ON	Lane Display
Yes	Breakout	No	All breakout ports are up	Green	Blinking green	Blinking green
Yes	Breakout	No	All breakout ports are down with LOS	Off	Blinking green	Blinking green
Yes	Breakout	No	Hardware failure; transceiver initialization error at the port level (not individual lane)	Red	Blinking red	Blinking red
Yes	Breakout	Any	In all other cases the port LED color is amber	Amber	Blinking amber	Blinking amber

The following factors trigger a change in the lane LED color:

- A breakout port is selected for a lane display.
- Port location mode is activated for a port on a given interface card.

Table 16 on page 39 describes the state and color rules for the lane LEDs.

Table 16: Lane LEDs Color Rules

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Order	LED Color
Yes	Breakout	No	Up	1	Green
Yes	Breakout	No	Down; loss of signal (LOS) detected	2	Off

Table 16: Lane LEDs Color Rules *(Continued)*

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Order	LED Color
Yes	Breakout	No	Down; transceiver hardware failure	3	Red
Yes	Breakout	No	Down; fault other than LOS and transceiver hardware failure	4	Amber
Yes	Breakout	Yes	Breakout port is disabled in the CLI	5	Amber

OK/FAIL LED and ONLINE LED on EX9253-6Q12C Line Card

Table 17 on page 40 describes the **OK/FAIL** LED and the **ONLINE** LED on EX9253-6Q12C line card, their colors and state, and the status they indicate.

Table 17: OK/FAIL LED and ONLINE LED on EX9253-6Q12C Line Card

LED	Color	State and Description
OK/FAIL	Green	On steadily—The line card is functioning normally and the link is up.
	Unlit	The line card is not powered on.
	Red	The line card has failed.
ONLINE	Green	The line card is online.

EX9253-6Q12C-M Line Card

IN THIS SECTION

- Line Card Models | 41
- Line Card Components | 42
- Port LEDs and Lane LEDs on EX9253-6Q12C-M Line Card | 43
- OK/FAIL LED and ONLINE LED on EX9253-6Q12C-M Line Card | 46

The line cards in EX9253 switches combine a Packet Forwarding Engine and Ethernet interfaces in a single assembly. Line cards are field-replaceable units (FRUs) that you can install in the line card slots on the front of the switch chassis. Line cards are hot-insertable and hot-removable: You can remove and replace them without powering off the switch or disrupting switch functions. To maintain proper cooling, you must install a replacement line card or a blank panel in the line card slot shortly after removing a line card from the chassis.

Line Card Models

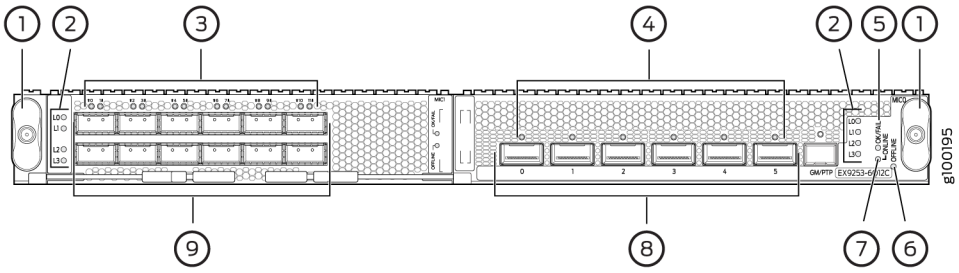
Table 18 on page 41 shows the model number, description of the line card model, and the Junos OS release in which the line card was first supported.

Table 18: EX9253-6Q12C-M Line Card

Model	Description	Junos OS Release Required
EX9253-6Q12C-M	A line card with six built-in QSFP+ ports, each of which can house QSFP+ pluggable transceivers and 12 built-in QSFP28 ports with Media Access Control Security (MACsec) capability, each of which can house QSFP28 pluggable transceivers	18.2R1 or later

See Figure 19 on page 42.

Figure 19: EX9253-6Q12C-M Line Card



1– Ejector levers	6– ONLINE LED
2– Lane LEDs	7– OFFLINE button
3– LEDs for the QSFP28 ports	8– QSFP+ ports
4– LEDs for the QSFP+ ports	9– QSFP28 ports (with MACsec capability)
5– OK/FAIL LED	

You can use the `show version` command to see the version of Junos OS for EX Series switches loaded on the switch.

Line Card Components

The EX9253-6Q12C-M line card has:

- Six built-in QSFP+ ports, each of which can house a combination of QSFP+ transceivers or breakout cables. These ports operate at 40 Gbps speed. By default, the ports operate with 4x10 Gbps interfaces and support breakout cables. If you need to connect a QSFP+ transceiver to the port, you must configure a 40 Gbps interface on the port by using the command `set chassis fpc` *`fpc-slot`* `pic` *`pic-slot port port-number 40g`*. The ports are labeled **0** through **5**. The ports support rate selectability and remote port identification.

- 12 built-in QSFP28 ports with MACsec capability, each of which can house a combination of QSFP28 transceivers, QSFP+ transceivers, or breakout cables. These ports can operate at 40 Gbps and 100 Gbps speeds. By default, the ports operate with 4x10 Gbps interfaces and support breakout cables. If you need to connect a QSFP+ transceiver to the port, you must configure a 40 Gbps interface on the port. If you need to connect a QSFP28 transceiver to the port, you must configure a 100 Gbps interface on the port by using the command `set chassis fpc` *`fpc-slot`* `pic` *`pic-slot port port-number 100g`*. The ports are labeled **0** through **11**. The ports support rate selectability and remote port identification.

- Port LEDs—One LED on each QSFP+ port and two LEDs on each QSFP28 port, which indicates the link status and activity on the port. See MPC and MIC Lane LED Scheme Overview.
- Lane LEDs
- Line card LED—An LED labeled **OK/FAIL**, which indicates the status of the line card.
- ONLINE LED—An LED labeled **ONLINE**, which indicates if the line card is online.
- OFFLINE button—A button to take the line card offline before removing it

The ports are divided into two port groups. The six QSFP+ ports labeled **0** through **5** form one port group, `PIC 0`. The 12 QSFP28 ports labeled **0** through **11** form the other port group, `PIC 1`. The ports in each group share 1.2 terabits of bandwidth. Thus, you can transmit up to 1.2 terabits of traffic through a port group, without packet drop.

Port LEDs and Lane LEDs on EX9253-6Q12C-M Line Card

You can select a port operating in a breakout mode for an individual lane display, either periodically or when the `request chassis port-led` command is executed. Similar to the port status LEDs, the lane LED supports four states defined by the color or the LED status—Off, Green, Amber, and Red.

The following are the port LED display modes:

- Normal—The port status LED represents port state or a breakout port state. By default, the port status display mode is Normal.
- Lane display—An array of lane status LEDs displays the status of each individual lane for the selected port. The lane display is ON when the software cycles through ports for lane status display. One port is selected at a time, and the display mode for that particular port switches to lane display mode. The other ports remain in normal display mode.
- Port location—The port location mode is *ON* when a remote operator initiates a port location command for a port or a group of ports. The `request chassis port-led` command temporarily overrides periodic software port selection for the lane display; all ports on an interface card that are not selected for port location switch to Normal mode, and selected ports switch to port location mode. If only one port is selected for port location, then the corresponding lane LEDs are applicable. However, if the selected port is in breakout mode, then all lane LEDs are applicable. If not in breakout mode, only lane 0 LED displays the port status. If more than one port is selected for port location, then the lane LEDs are disabled.

The following factors trigger a change in the port LED color:

- Change in the port state. For example, loss of signal (LOS) to no LOS, remote fault, or local fault.
- Insertion or removal or a transceiver

- Change in configuration
- Activation or deactivation of port location feature
- Selection of breakout port for lane display

NOTE: Ports with all individual links in *Up* state are skipped and are not considered for lane display, thereby reducing the time needed to cycle through all the ports.

Table 19 on page 44 describes the state and color rules for the port LEDs. These rules help in determining the port LED color. When port location mode is activated, the port LED state or color can be determined from the column titled *Port Location ON*. If the breakout port is selected for the lane status display, then port LED state or color can be determined from the column titled *Lane Display*.

Table 19: Port LED State and Color Rules

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Normal	Port Location ON	Lane Display
Yes	No breakout	No	Up	Green	Blinking green	–
Yes	No breakout	No	Down; loss of signal (LOS) detected	Off	Blinking green	–
Yes	No breakout	No	Down; transceiver hardware failure	Red	Blinking red	–
Yes	No breakout	No	Down; any other fault other than LOS and transceiver hardware failure	Amber	Blinking amber	–
Any	No breakout	Yes	Port is disabled by CLI	Amber	Blinking amber	–

Table 19: Port LED State and Color Rules *(Continued)*

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Normal	Port Location ON	Lane Display
No	Any	No	Anything except disabled port; however, transceiver not present	Off	Blinking green	–
Yes	Breakout	No	All breakout ports are up	Green	Blinking green	Blinking green
Yes	Breakout	No	All breakout ports are down with LOS	Off	Blinking green	Blinking green
Yes	Breakout	No	Hardware failure; transceiver initialization error at the port level (not individual lane)	Red	Blinking red	Blinking red
Yes	Breakout	Any	In all other cases the port LED color is amber	Amber	Blinking amber	Blinking amber

The following factors trigger a change in the lane LED color:

- A breakout port is selected for a lane display.
- Port location mode is activated for a port on a given interface card.

Table 20 on page 45 describes the state and color rules for the lane LEDs.

Table 20: Lane LEDs Color Rules

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Order	LED Color
Yes	Breakout	No	Up	1	Green

Table 20: Lane LEDs Color Rules *(Continued)*

Pluggable Inserted	Breakout Configuration State	Explicitly Disabled	Port State	Order	LED Color
Yes	Breakout	No	Down; loss of signal (LOS) detected	2	Off
Yes	Breakout	No	Down; transceiver hardware failure	3	Red
Yes	Breakout	No	Down; fault other than LOS and transceiver hardware failure	4	Amber
Yes	Breakout	Yes	Breakout port is disabled in the CLI	5	Amber

OK/FAIL LED and ONLINE LED on EX9253-6Q12C-M Line Card

Table 21 on page 46 describes the **OK/FAIL** LED and the **ONLINE** LED on EX9253-6Q12C-M line card, their colors and state, and the status they indicate.

Table 21: OK/FAIL LED and ONLINE LED on EX9253-6Q12C-M Line Card

LED	Color	State and Description
OK/FAIL	Green	On steadily—The line card is functioning normally and the link is up.
	Unlit	The line card is not powered on.
	Red	The line card has failed.
ONLINE	Green	The line card is online.

CHAPTER 2

Site Planning, Preparation, and Specifications

Site Preparation Checklist for an EX9253 Switch | 48

EX9253 Site Guidelines and Requirements | 50

EX9253 Network Cable and Transceiver Planning | 57

EX9253 Management Cable Specifications and Pinouts | 67

Site Preparation Checklist for an EX9253 Switch

The checklist in Table 22 on page 48 summarizes the tasks you need to perform to prepare a site for installing an EX9253 switch.

Table 22: Site Preparation Checklist

Item or Task	For More Information	Performed by	Date
Environment			
Verify that environmental factors such as temperature and humidity do not exceed switch tolerances.	"Environmental Requirements and Specifications for an EX9253 Switch" on page 50		
Power			
Measure distance between external power sources and switch installation site.			
Calculate the power consumption and requirements.	"EX9253 Power System" on page 27 *Calculating the Fiber-Optic Cable Power Budget for EX Series Devices* *Calculating the Fiber-Optic Cable Power Margin for EX Series Devices*		
Rack or Cabinet			
Select the type of rack or cabinet and verify that it meets the minimum requirements for the installation of the switch.	"Rack and Cabinet Requirements for EX9253 Switches" on page 54		

Table 22: Site Preparation Checklist *(Continued)*

Item or Task	For More Information	Performed by	Date
Plan rack or cabinet location, ensuring the required space clearances.	"Clearance Requirements for Airflow and Hardware Maintenance for an EX9253 Switch" on page 53		
Secure the rack or cabinet to the floor and building structure.	"Rack and Cabinet Requirements for EX9253 Switches" on page 54		
Cables			
Plan the cable routing and management. Acquire cables and connectors: • Determine the number of cables needed based on your planned configuration. • Ensure that the distance between hardware components to be connected allows for cable lengths to be within the specified maximum limits.			

RELATED DOCUMENTATION

General Safety Guidelines and Warnings

EX9253 Site Guidelines and Requirements

IN THIS SECTION

- Environmental Requirements and Specifications for an EX9253 Switch | 50
- General Site Guidelines | 51
- Site Electrical Wiring Guidelines | 52
- Clearance Requirements for Airflow and Hardware Maintenance for an EX9253 Switch | 53
- Rack and Cabinet Requirements for EX9253 Switches | 54

Environmental Requirements and Specifications for an EX9253 Switch

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

Ensure that these environmental guidelines are followed:

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

Table 23 on page 50 provides the required environmental conditions for normal switch operation.

Table 23: EX9253 Switch Environmental Tolerances

Description	Value
Altitude	No performance degradation up to 10,000 ft (3048 m)
Relative humidity	Normal operation ensured in relative humidity range of 5% through 90%, noncondensing

Table 23: EX9253 Switch Environmental Tolerances *(Continued)*

Description	Value
Temperature	Normal operation ensured in temperature range of 32° F (0° C) through 104° F (40°C) Nonoperating storage temperature in shipping container: – 40° F (–40°C) through 158° F (70°C)
Seismic	Designed to meet Telcordia Technologies Zone 4 earthquake requirements
Maximum thermal output (500 W)	1705 BTU/hour

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

General Site Guidelines

Efficient device operation requires proper site planning and maintenance. It also requires proper layout of the equipment, rack or cabinet, and wiring closet.

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

- Keep the area around the chassis free from dust and conductive material, such as metal flakes.
- Follow prescribed airflow guidelines to ensure that the cooling system functions properly. Ensure that exhaust from other equipment does not blow into the intake vents of the device.
- Follow the prescribed electrostatic discharge (ESD) prevention procedures to prevent damaging the equipment. Static discharge can cause components to fail completely or intermittently over time.
- Install the device in a secure area, so that only authorized personnel can access the device.

Site Electrical Wiring Guidelines

Table 24 on page 52 describes the factors you must consider while planning the electrical wiring at your site.

WARNING: You must provide a properly grounded and shielded environment and use electrical surge-suppression devices.

Avertissement Vous devez établir un environnement protégé et convenablement mis à la terre et utiliser des dispositifs de parasurtension.

Table 24: Site Electrical Wiring Guidelines

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

Clearance Requirements for Airflow and Hardware Maintenance for an EX9253 Switch

When planning the site for installing an EX9253 switch, you must allow sufficient clearance around the switch.

- For the cooling system to function properly, the airflow around the chassis must be unrestricted. Allow at least 6 in. (15.2 cm) of clearance between side-cooled switches. Allow 2.8 in. (7.1 cm) between the side of the chassis and any non-heat-producing surface such as a wall. See Figure 20 on page 54.

- If you are mounting the switch on a rack or cabinet along with other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.

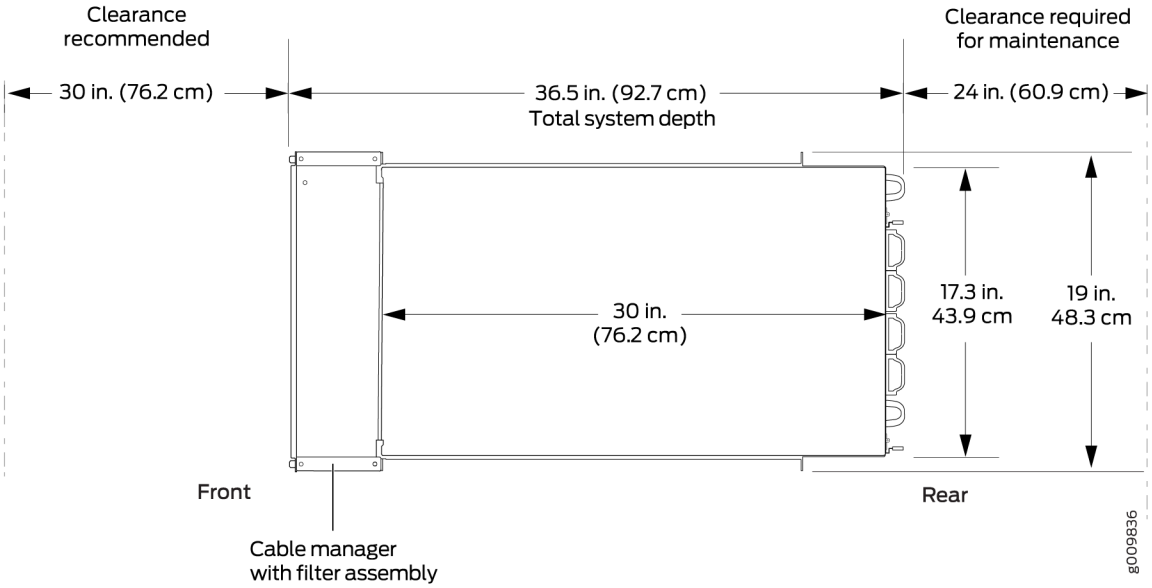
  Airflow must always be from front-to-back with respect to the rack. The switch must not interfere with the cooling of other systems in the rack. Fillers must be used as appropriate in the rack to ensure there is no recirculation of heated exhaust air back to the front of the rack. Care must also be taken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

- To accommodate power cable bend radius at the rear of the chassis and the interface cable bend radius at the front of the chassis, provide at least 2.75 in. (7 cm) at the rear and 3.5 in. (8.9 cm) at the front.

- For service personnel to remove and install hardware components, there must be adequate space at the front and back of the switch. At least 24 in. (61 cm) is required both in front of and behind the switch. NEBS GR-63 recommends that you allow at least 30 in. (76.2 cm) in front of the rack and 24 in. (61.0 cm) behind the rack.

Figure 20 on page 54 shows the clearance requirement for an EX9253 switch chassis.

Figure 20: Clearance Requirements for Airflow and Hardware Maintenance for an EX9253 Switch Chassis



Rack and Cabinet Requirements for EX9253 Switches

You can mount an EX9253 switch on four-posts of a 19-in rack or in a cabinet that contains a 19-in. rack.

Rack requirements consist of:

- Rack type
- Mounting bracket hole spacing
- Rack size and strength
- Rack connection to the building structure

Table 25 on page 55 provides the rack requirements and specifications.

Table 25: Rack Requirements and Specifications

Rack Requirement	Guidelines
Rack type	You can mount the device on a rack that provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments and meets the size and strength requirements to support the weight. A U is the standard rack unit defined by the Electronic Components Industry Association (http://www.ecianow.org).
Mounting bracket hole spacing	The holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm), so that the device can be mounted in any rack that provides holes spaced at that distance.
Rack size and strength	• Ensure that the rack complies with the size and strength standards of a 19-in. rack as defined by the Electronic Components Industry Association (http://www.ecianow.org). • Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the device chassis. The outer edges of the front-mounting brackets extend the width of the chassis to 19 in. (48.2 cm). • The rack must be strong enough to support the weight of the device. • Ensure that the spacing of rails and adjacent racks provides for proper clearance around the device and rack.
Rack connection to building structure	• Secure the rack to the building structure. • If earthquakes are a possibility in your geographical area, secure the rack to the floor. • Secure the rack to the ceiling brackets as well as wall or floor brackets for maximum stability.

Cabinet requirements consist of:

- Cabinet size
- Clearance requirements
- Cabinet airflow requirements

Table 26 on page 56 provides the cabinet requirements and specifications.

Table 26: Cabinet Requirements and Specifications

Cabinet Requirement	Guidelines
Cabinet size	• You can mount the device in a cabinet that contains a 19-in. rack as defined by the Electronic Components Industry Association (http://www.ecianow.org). • The minimum cabinet size must be able to accommodate the maximum external dimensions of the device.
Cabinet clearance	The minimum total clearance inside the cabinet is 30 in. (76.2 cm) between the inside of the front door and the inside of the rear door.
Cabinet airflow requirements	When you mount the device in a cabinet, ensure that ventilation through the cabinet is sufficient to prevent overheating. • Ensure adequate cool air supply to dissipate the thermal output of the device or devices. • Ensure that the hot air exhaust of the chassis exits the cabinet without recirculating into the device. An open cabinet (without a top or doors) that employs hot air exhaust extraction from the top ensures the best airflow through the chassis. If the cabinet contains a top or doors, perforations in these elements assist with removing the hot air exhaust. • Install the device in the cabinet in a way that maximizes the open space on the side of the chassis that has the hot air exhaust. • Route and dress all cables to minimize the blockage of airflow to and from the chassis. • Ensure that the spacing of rails and adjacent cabinets is such that there is proper clearance around the device and cabinet. • A cabinet larger than the minimum required provides better airflow and reduces the chance of overheating.

SEE ALSO

Rack-Mounting and Cabinet-Mounting Warnings | 208

EX9253 Network Cable and Transceiver Planning

IN THIS SECTION

- Pluggable Transceivers Supported on an EX9253 Switch | 57
- SFP+ Direct Attach Copper Cables for EX Series Switches | 58
- QSFP+ Direct Attach Copper Cables for EX Series Switches | 61
- Overview of EX Series Switches: Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 62
- Calculate the Fiber-Optic Cable Power Budget for EX Series Devices | 64
- Calculating the Fiber-Optic Cable Power Margin for EX Series Devices | 65

Pluggable Transceivers Supported on an EX9253 Switch

The line cards in EX9253 switches support transceivers. You can find the list of transceivers supported on EX9253 switches and information about those transceivers at the Hardware Compatibility Tool page for EX9253.

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

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

Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of

the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

The Gigabit Ethernet transceivers installed in EX9253 switches support digital optical monitoring (DOM): You can view the diagnostic details for these transceivers by issuing the operational mode CLI command `show interfaces diagnostics optics`.

SEE ALSO

Connecting the EX2300 to the Network

Remove a Transceiver

Replacing a QSFP28 Transceiver on an SRX4600 Services Gateway

Replacing a QSFP28 Transceiver on an SRX4600 Services Gateway

EX9253-6Q12C Line Card | **35**

EX9253-6Q12C-M Line Card | **41**

SFP+ Direct Attach Copper Cables for EX Series Switches

IN THIS SECTION

- Cable Specifications | **59**
- List of DAC Cables Supported on EX Series Switches | **60**
- Standards Supported by These Cables | **60**

Small form-factor pluggable plus transceiver (SFP+) direct attach copper (DAC) cables, also known as Twinax cables, are suitable for in-rack connections between servers and switches. They are suitable for short distances, making them ideal for highly cost-effective networking connectivity within a rack and between adjacent racks.

NOTE: We recommend that you use only SFP+ DAC cables purchased from Juniper Networks with your Juniper Networks device.

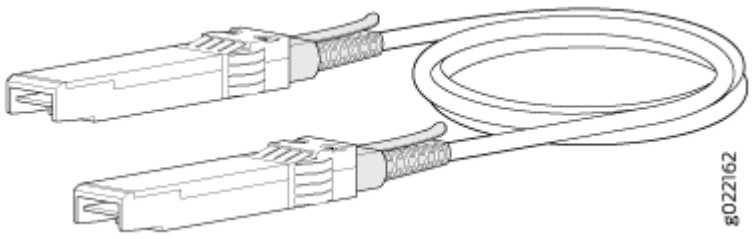
CAUTION: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running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

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

Cable Specifications

EX Series switches support SFP+ passive DAC cables. The passive Twinax cable is a straight cable with no active electronic components. EX Series switches support 1 m, 3 m, 5 m, and 7 m long SFP+ passive DAC cables. See Figure 21 on page 59.

Figure 21: SFP+ Direct Attach Copper Cables for EX Series Switches



The cables are hot-removable and hot-insertable: You can remove and replace them without powering off the switch or disrupting switch functions. A cable comprises a low-voltage cable assembly that connects directly into two 10-Gigabit Ethernet (GbE) ports, one at each end of the cable. The cables use high-performance integrated duplex serial data links for bidirectional communication and are designed for data rates of up to 10 Gbps.

List of DAC Cables Supported on EX Series Switches

For the list of DAC cables supported on EX Series switches and the specifications of these cables, see the following references:

- EX2300—Hardware Compatibility Tool page for EX2300
- EX3200—Hardware Compatibility Tool page for EX3200
- EX3300—Hardware Compatibility Tool page for EX3300
- EX3400—Hardware Compatibility Tool page for EX3400
- EX4100 —Hardware Compatibility Tool for EX4100
- EX4200—Hardware Compatibility Tool page for EX4200
- EX4300—Hardware Compatibility Tool page for EX4300
- EX4400—Hardware Compatibility Tool page for EX4400
- EX4500—Hardware Compatibility Tool page for EX4500
- EX4550—Hardware Compatibility Tool page for EX4550
- EX4600—Hardware Compatibility Tool page for EX4600
- EX8208—Hardware Compatibility Tool page for EX8208
- EX8216—Hardware Compatibility Tool page for EX8216
- EX9251—Hardware Compatibility Tool page for EX9251
- EX9253—Hardware Compatibility Tool page for EX9253

Standards Supported by These Cables

The cables comply with the following standards:

- SFP mechanical standard SFF-843— see ftp://ftp.seagate.com/sff/SFF-8431.PDF.
- Electrical interface standard SFF-8432— see ftp://ftp.seagate.com/sff/SFF-8432.PDF.
- SFP+ Multi-Source Alliance (MSA) standards

QSFP+ Direct Attach Copper Cables for EX Series Switches

IN THIS SECTION

- Cable Specifications | 61
- DAC Cables Supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 Switches | 62

Quad small form-factor pluggable plus (QSFP+) direct attach copper (DAC) cables are suitable for in-rack connections between QSFP+ ports on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 switches. They are suitable for short distances, making them ideal for highly cost-effective networking connectivity within a rack and between adjacent racks.

NOTE: We recommend that you use only QSFP+ DAC cables purchased from Juniper Networks with your Juniper Networks device.

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

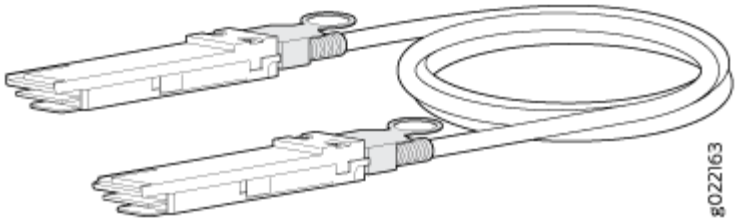
Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility.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

Cable Specifications

QSFP+ passive DAC cables are hot-removable and hot-insertable. A cable consists of a cable assembly that connects directly into two QSFP+ modules, one at each end of the cable. The cables use integrated duplex serial data links for bidirectional communication and are designed for data rates up to 40 Gbps.

Passive DAC cables have no signal amplification built into the cable assembly. See Figure 22 on page 62.

Figure 22: QSFP+ Direct Attach Copper Cables



DAC Cables Supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 Switches

For the list of DAC cables supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 switches and the specifications of these cables, see:

- EX3400—Hardware Compatibility Tool page for EX3400
- EX4300—Hardware Compatibility Tool page for EX4300
- EX4550—Hardware Compatibility Tool page for EX4550
- EX4600—Hardware Compatibility Tool page for EX4600
- EX9251—Hardware Compatibility Tool page for EX9251
- EX9253—Hardware Compatibility Tool page for EX9253

Overview of EX Series Switches: Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion

IN THIS SECTION

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable | 63
- Attenuation and Dispersion in Fiber-Optic Cable | 63

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. EX Series switches use various types of network cables, including multimode and single-mode fiber-optic cable.

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

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 reflects 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), higher-order mode loss (HOL) occurs. (Cladding consists of layers of lower-refractive index material in close contact with a core material of higher refractive index.) 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. Single-mode fiber is consequently more expensive than multimode fiber.

Exceeding the maximum transmission distances can result in significant signal loss, which causes unreliable transmission.

Attenuation and Dispersion in Fiber-Optic Cable

An optical data link functions correctly provided that modulated light reaching the receiver has enough power to be demodulated correctly. *Attenuation* is the reduction in strength of the light signal during transmission. Passive media components such as cables, cable splices, and connectors cause attenuation. Although attenuation is significantly lower for optical fiber than for other media, it still occurs in both multimode and single-mode 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 the spreading of the signal over time caused by the different speeds of light rays
- Modal dispersion, which is the spreading of the signal over time caused by the different propagation modes in the fiber

For multimode transmission, modal dispersion usually limits the maximum bit rate and link length. Chromatic dispersion or attenuation is not a factor.

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 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, you can consider its effect 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 power loss.

Calculate the Fiber-Optic Cable Power Budget for EX Series Devices

To ensure that fiber-optic connections have sufficient power for correct operation, calculate the link's power budget when planning fiber-optic cable layout and distances. This planning helps you 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. You use a worst-case analysis even though not all the parts of an actual system operate at the worst-case levels.

To calculate the worst-case estimate for a 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). In the following example, we measure both (P_T) and (P_R) in decibels relative to one milliwatt (dBm).

   P_T = – 15 dBm

   P_R = – 28 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 dBm – (–28 dBm) = 13 dBm

Calculating the Fiber-Optic Cable Power Margin for EX Series Devices

Before calculating the power margin, calculate the power budget (see *Calculating the Fiber-Optic Cable Power Budget for EX Series Devices*).

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 loss 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 you subtract attenuation or link loss (LL) 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 not all parts of an actual system 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 that 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 link loss (LL) by adding estimated values for applicable link-loss factors—for example, use the sample values for various factors as provided in Table 27 on page 65 (here, the link is 2 km long and multimode, and the (P_B) is 13 dBm):

   Table 27: Estimated Values for Factors Causing Link Loss

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Higher-order mode losses (HOL)	• Multimode—0.5 dBm • Single mode—None	• 0.5 dBm • 0 dBm
Modal and chromatic dispersion	• Multimode—None, if product of bandwidth and distance is less than 500 MHz/km • Single mode—None	• 0 dBm • 0 dBm
Connector	0.5 dBm	This example assumes 5 connectors. Loss for 5 connectors: (5) * (0.5 dBm) = 2.5 dBm

Table 27: Estimated Values for Factors Causing Link Loss *(Continued)*

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Splice	0.5 dBm	This example assumes 2 splices. Loss for two splices: (2) * (0.5 dBm) = 1 dBm
Fiber attenuation	• Multimode—1 dBm/km • Single mode—0.5 dBm/km	This example assumes the link is 2 km long. Fiber attenuation for 2 km: • (2 km) * (1.0 dBm/km) = 2 dBm • (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 dBm) – (0.5 dBm [HOL]) – ((5) * (0.5 dBm)) – ((2) * (0.5 dBm)) – ((2 km) * (1.0 dBm/km)) – (1 dB [CRM]) = P_M

   13 dBm – 0.5 dBm – 2.5 dBm – 1 dBm – 2 dBm – 1 dBm = P_M

   P_M = 6 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 specification for your receiver to find the maximum receiver input power.

EX9253 Management Cable Specifications and Pinouts

IN THIS SECTION

- Management Cable Specifications | 67
- Console Port Connector Pinout Information | 68
- USB Port Specifications for an EX Series Switch | 69
- RJ-45 to DB-9 Serial Port Adapter Pinout Information | 69
- RJ-45 Management Port Connector Pinout Information | 70

Management Cable Specifications

Table 28 on page 67 lists the specifications for the cables that connect the console and management ports to management devices.

Table 28: Specifications of Cables to Connect to Management Devices

Ports	Cable Specifications	Receptacle	Additional Information
RJ-45 Console port	CAT5e UTP (unshielded twisted pair) cable	RJ-45	*Connect a Device to a Management Console Using an RJ-45 Connector*
Management Ethernet port	Ethernet cable with an RJ-45 connector	RJ-45	*Connect a Device to a Network for Out-of-Band Management*
Mini-USB Type-B Console port	Mini-USB cable with standard-A and Mini-USB Type-B (5-pin) connector	Mini-USB	

Console Port Connector Pinout Information

The console port on a Juniper Networks device is an RS-232 serial interface that uses an RJ-45 connector to connect to a console management device. The default baud rate for the console port is 9600 baud.

Table 29 on page 68 provides the pinout information for the RJ-45 console connector.

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

Table 29: Console Port Connector Pinout Information

Pin	Signal	Description
1	RTS Output	Request to send
2	DTR Output	Data terminal ready
3	TxD Output	Transmit data
4	Signal Ground	Signal ground
5	Signal Ground	Signal ground
6	RxD Input	Receive data
7	CD Input	Data carrier detect
8	NC	CTS input

USB Port Specifications for an EX Series Switch

Juniper Networks tested and officially supports the following USB flash drives for the USB port on all EX Series switches:

- RE-USB-1G-S
- RE-USB-2G-S
- RE-USB-4G-S

> ⚠ **CAUTION**: Any USB memory product not listed as supported for EX Series switches has not been tested by Juniper Networks. The use of any unsupported USB memory product could expose your EX Series switch 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.

All USB flash drives used on EX Series switches must have the following features:

- USB 2.0 or later.
- Formatted with a FAT or MS-DOS file system.
- If the switch is running Junos OS Release 9.5 or earlier, the formatting method must use a primary boot record. Microsoft Windows formatting, by default, does not use a primary boot record. See the documentation for your USB flash drive for information about how your USB flash drive is formatted.

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

The console port on a Juniper Networks device is an RS-232 serial interface that uses an RJ-45 connector to connect to a 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.

Table 30 on page 70 provides the pinout information for the RJ-45 to DB-9 serial port adapter.

Table 30: RJ-45 to DB-9 Serial Port Adapter Pinout Information

RJ-45 pin	Signal	DB-9 pin	Signal
1	RTS	8	CTS
2	DTR	6	DSR
3	TxD	2	RxD
4	GND	5	GND
6	RxD	3	TxD
7	DSR	4	DTR
8	CTS	7	RTS

RJ-45 Management Port Connector Pinout Information

Table 31 on page 70 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 31: RJ-45 Management Port Connector Pinout Information

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

Table 31: RJ-45 Management Port Connector Pinout Information *(Continued)*

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

CHAPTER 3

Initial Installation and Configuration

Unpacking and Mounting the EX9253 Switch | 73

Connecting the EX9253 to Power | 82

Connecting the EX9253 to External Devices | 91

Connecting the EX9253 to the Network | 100

Configuring Junos OS on the EX9253 | 104

Unpacking and Mounting the EX9253 Switch

IN THIS SECTION

- Unpacking an EX9253 Switch | 73
- Parts Inventory (Packing List) for an EX9253 Switch | 74
- Unpacking a Line Card Used in an EX9253 Switch | 76
- Register Products—Mandatory to Validate SLAs | 77
- Installing and Connecting an EX9253 Switch | 77
- Mounting an EX9253 Switch on a Rack or Cabinet | 78

Unpacking an EX9253 Switch

The switch is shipped in a cardboard carton and secured with foam packing material. The carton also contains an accessory box.

NOTE: The switch is maximally protected inside the shipping box. Do not unpack it until you are ready to begin installation.

Ensure that you have the following parts and tools available:

- A Phillips (+) screwdrivers, number 2 (not provided)
- Cover panels to cover any slots not occupied by a component

To unpack the switch:

1. Move the shipping carton to a staging area as close to the installation site as possible, where you have enough room to remove the switch.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Remove the accessory box, and verify the contents against the parts inventory on the label attached to the carton.
5. Pull out the packing material holding the chassis in place.

6. Verify the contents of the carton against the packing list included with the switch.
7. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Parts Inventory (Packing List) for an EX9253 Switch

The switch shipment includes a packing list. Check the parts you receive in the switch shipping crate against the items on the packing list. The packing list specifies the part number and provides description of each part in your order. The parts shipped depend on the configuration you order. See "EX9253 Switch Configurations" on page 7 for more information.

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

NOTE: All line cards ordered are shipped separately. Line cards are not listed on the switch's packing list.

Table 32 on page 74 lists the parts and their quantities in the packing list for a base configuration and a redundant configuration switch.

Table 32: Parts List for Different EX9253 Switch Configurations

Component	Base Configuration Quantity	Redundant Configuration Quantity
Chassis	1	1
Routing Engine	1	2
Power supplies	One of the following: • Three AC power supplies • Three DC power supplies	One of the following: • Four AC power supplies • Four DC power supplies
Fan trays	Four	Four

Table 32: Parts List for Different EX9253 Switch Configurations *(Continued)*

Component	Base Configuration Quantity	Redundant Configuration Quantity
Cable management bracket	1	1
Air filter unit	1	1
Blank panels for empty slots	One blank panel for each slot not occupied by a component	One blank panel for each slot not occupied by a component

Table 33 on page 75 lists the parts contained in the accessory box. The same accessories ship with both configurations of the switch.

Table 33: Accessory Box Parts List

Part	Quantity
M5 Pan Head screws to secure the grounding lug	2
14 AWG ground terminal lug sized for #10 screw (Panduit LCD10-14B-L or equivalent)	1
16-14 AWG ring lugs sized for #6 screws (Panduit PN10-10R or equivalent) to connect DC power source cables	2
Label, “Small Parts Enclosed”	1
Label, “Accessories Contents”	1
USB flash drive with Junos OS	1
Read me first document	1
Affidavit for T1 connection	1

Table 33: Accessory Box Parts List *(Continued)*

Part	Quantity
Juniper Networks Product Warranty	1
Documentation roadmap card	1
End User License Agreement	1
Document sleeve	1
3 in. x 5 in. pink bag	2
9 in. x 12 in. pink bag, ESD	2
Ethernet cable with an RJ-45 connector attached	1
RJ-45 to DB-9 serial port adapter	1
ESD wrist strap with cable	1

Unpacking a Line Card Used in an EX9253 Switch

Before you begin to unpack a line card:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).
- Ensure that you know how to handle and store the line card (see *Handling and Storing Line Cards*).

The line cards for EX9253 switches are rigid sheet-metal structures that house the line card components including network ports. The line cards are shipped in a cardboard carton, secured with foam packing material.

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

To unpack a line card:

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, which holds the line card in place.
5. Remove the line card from the antistatic bag.
6. Save the shipping carton and packing materials in case you need to move or ship the line card later.

SEE ALSO

Installing a Line Card in an EX9253 Switch | 144

Register Products—Mandatory to Validate SLAs

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

CAUTION: Register product serial numbers on the Juniper Networks website. Update the installation base data if any addition or change to the installation base occurs or if the installation base is moved. Juniper Networks is not responsible for not meeting the hardware replacement service-level agreement for products that do not have registered serial numbers or accurate installation base data.

Register your product(s) at https://tools.juniper.net/svcreg/SRegSerialNum.jsp.
Update your installation base at https://www.juniper.net/customers/csc/management/updateinstallbase.jsp.

Installing and Connecting an EX9253 Switch

The EX9253 switch chassis is a rigid sheet-metal structure that houses the other hardware components such as Routing Engine, line cards, power supplies, fan trays, and air filter.

To install and connect an EX9253 switch:

1. Follow instructions in "Unpacking an EX9253 Switch" on page 73.
2. Mount the switch by following instructions in "Mounting an EX9253 Switch on a Rack or Cabinet" on page 78.
3. Connect earth ground to the switch by following instructions in "Connecting Earth Ground to an EX9253 Switch" on page 82.
4. Follow instructions for connecting power as appropriate for your site:
   - "Connecting AC Power to an EX9253 Switch and Powering on the Switch" on page 85
   - "Connecting DC Power to an EX9253 Switch and Powering on the Switch" on page 87
5. Perform initial configuration of the switch by following instructions in "Connecting and Configuring an EX9253 Switch" on page 105.
6. Set the switch' s management options by following the appropriate instructions:
   - *Connect a Device to a Network for Out-of-Band Management*
   - *Connect a Device to a Management Console Using an RJ-45 Connector*

SEE ALSO

Rack and Cabinet Requirements for EX9253 Switches | **54**

Clearance Requirements for Airflow and Hardware Maintenance for an EX9253 Switch | **53**

Chassis and Component Lifting Guidelines | **206**

Mounting an EX9253 Switch on a Rack or Cabinet

Before mounting the switch:

- Verify that the site meets the requirements described in "Site Preparation Checklist for an EX9253 Switch" on page 48.
- Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
- Read *General Safety Guidelines and Warnings*, with particular attention to *Chassis and Component Lifting Guidelines*.
- Remove the switch from the shipping carton (see "Unpacking an EX9253 Switch" on page 73).

WARNING: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

CAUTION: Have a qualified technician verify that the rack is strong enough to support the switch's weight.

Ensure that the rack is in its permanent location, allowing adequate clearance for airflow and maintenance, and secured to the building structure.

If you are mounting multiple switches on a rack, mount a switch in the bottom of the rack first and proceed to mount the rest of the switches from bottom to top.

NOTE: The weight of an AC-powered chassis fully loaded with all FRUs is 157.4 lb (71.4 kg) and the weight of a DC-powered chassis fully loaded with all FRUs is 163.4 lb (74.11 kg). You must use material-handling systems (such as levers, slings, lifts, and so on) to lift any equipment that weighs above 121.2 lb (55 kg). When this is not practical, you must use specially trained persons (such as riggers or movers) to lift the switch. Mounting an EX9253 switch requires one person to guide the switch in place and a second person to install the mounting screws to secure the switch to the rack if you are using material-handling systems or two people to lift the switch and a third person to install the mounting screws to secure the switch to the rack if you are using specially trained persons.

We recommend that you install cover panels in the unused slots.

Ensure that you have the following parts and tools available:

- A Phillips (+) screwdriver, number 2 (not provided)
- Two rear mounting brackets—preinstalled
- Cable management brackets and screws to attach the brackets to the chassis—provided
- Air filter unit—provided
- Cover panels for empty slots
- Eight screws to secure the switch to the rack—not provided

You can mount an EX9253 switch on four posts of a 19-in. (450 mm) rack as defined by the Electronic Components Industry Association (http://www.ecianow.org) by using the mounting brackets provided with the switch.

The remainder of this topic uses *rack* to mean *rack* or *cabinet*.

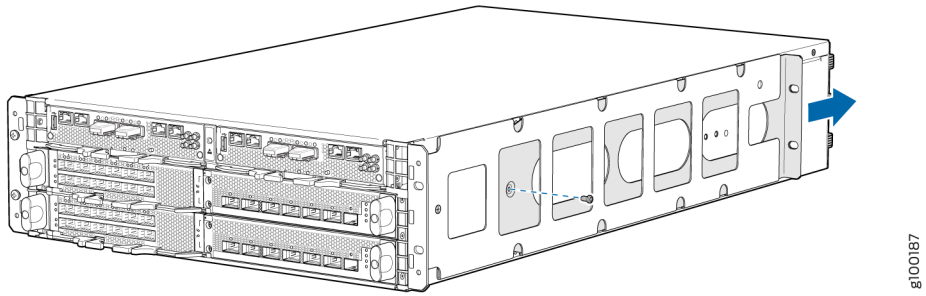
To mount the switch on a rack:

1. Position the switch in front of the rack.
2. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

> **NOTE**: The rear mounting brackets on either side of the chassis are movable; you can adjust the brackets according to the depth of the rack. However, the front mounting brackets on either side of the chassis are fixed to the chassis.

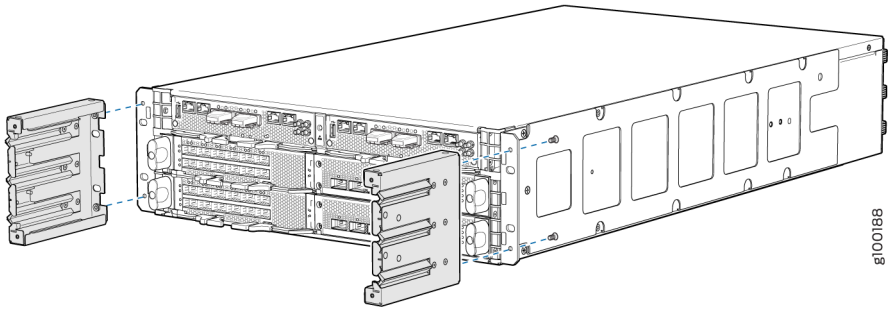
3. Remove the screw on either side of the chassis that holds the rear mounting brackets by using a Phillips (+), number 2 screwdriver, and slide the brackets out of the chassis (see Figure 23 on page 80). Save the brackets.

Figure 23: Removing the Rear Mounting Brackets



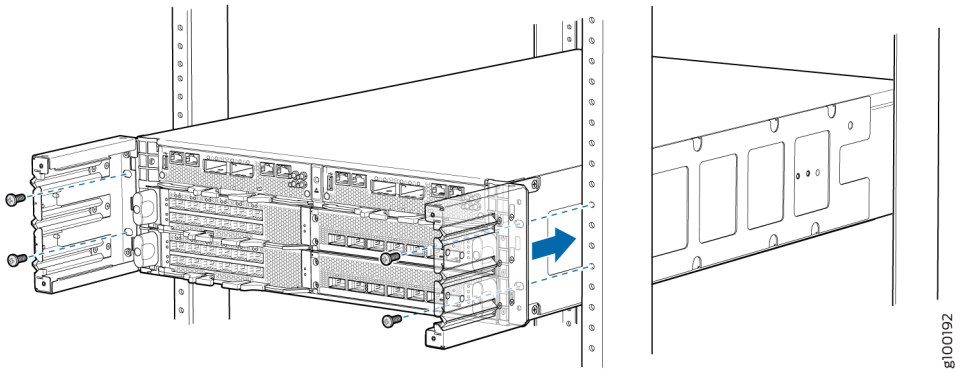
4. Position the cable management brackets on each side of the front of the chassis. Attach the brackets to the chassis by using the screws provided with the brackets (see Figure 24 on page 80).

Figure 24: Installing the Cable Management Brackets



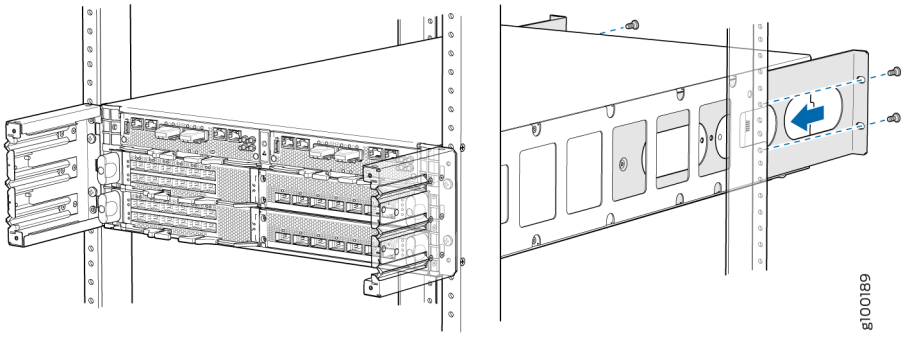
5. Lift the switch by using material-handling systems (such as levers, slings, lifts, and so on). If that is not practical, have a specially trained person hold on to the bottom of the chassis on each side and carefully lift it. The front mounting brackets must contact the rack rails and the holes on the front mounting brackets must align with the threaded holes on the rack. Align the bottom hole in each front mounting bracket with a hole in each post of the rack, making sure that the chassis is level.
6. Have another person secure the switch to the rack by inserting the screws appropriate for your rack through the holes in the bracket and the threaded holes on the rack (see Figure 25 on page 81). Tighten the screws.

Figure 25: Inserting the Screws Through the Front Mounting Brackets



7. On the rear of the chassis, slide the rear mounting brackets on either side of the chassis until the rear mounting brackets contact the rack rails (see Figure 26 on page 81).

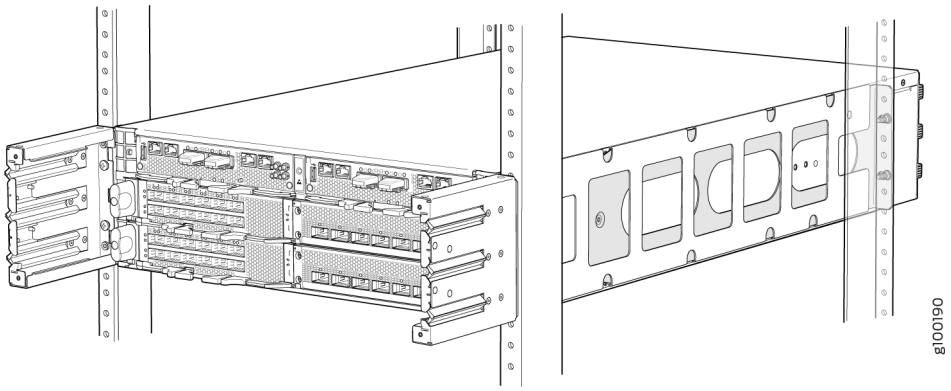
Figure 26: Sliding the Rear Mounting Brackets



8. Install mounting screws into each of the open rear mounting holes aligned with the rack, starting from the bottom, and secure them tightly.
9. Visually inspect the alignment of the chassis. If the chassis is installed 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 27 on page 82 shows the switch fully secured and installed on four posts of a rack.

Figure 27: EX9253 Switch Mounted on Four Posts of a Rack



SEE ALSO

- Installing the Air Filter Unit in an EX9253 Switch | **118**
- Rack-Mounting and Cabinet-Mounting Warnings | **208**

Connecting the EX9253 to Power

IN THIS SECTION

- Connecting Earth Ground to an EX9253 Switch | **82**
- Connecting AC Power to an EX9253 Switch and Powering on the Switch | **85**
- Connecting DC Power to an EX9253 Switch and Powering on the Switch | **87**

Connecting Earth Ground to an EX9253 Switch

Before you begin to connect earth ground, ensure that you have the following parts and tools available:

- A grounding cable (minimum 14– 10 AWG (2– 5.3 mm^2), minimum 60° C wire or as permitted by local code)— not provided
- Two M5 Pan Head screws to secure the grounding lug— provided in the accessory box shipped with the switch
- A 14 AWG ground terminal lug sized for #10 screw (Panduit LCD10-14B-L or equivalent)— provided
- A Phillips (+) screwdrivers, numbers 2 (not provided)
- An electrostatic discharge (ESD) grounding wrist strap

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect an EX9253 switch to earth ground before you connect power to the switch. You must use the protective earthing terminal on the switch chassis to connect the switch to earth ground (see Figure 28 on page 84).

You must install the EX9253 switch in a restricted–access location and ensure that the chassis is always properly grounded. EX Series switches have a two–hole protective grounding terminal provided on the chassis. We recommend that you use the protective grounding terminal as the preferred method for grounding the chassis regardless of the power supply configuration. However, if additional grounding methods are available, you can also use those methods. For example, you can use the grounding wire in the power cord of an AC power supply or use the grounding terminal or lug on a DC power supply. This system was tested to meet or exceed all applicable EMC regulatory requirements with the two-hole protective grounding terminal connected correctly.

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.

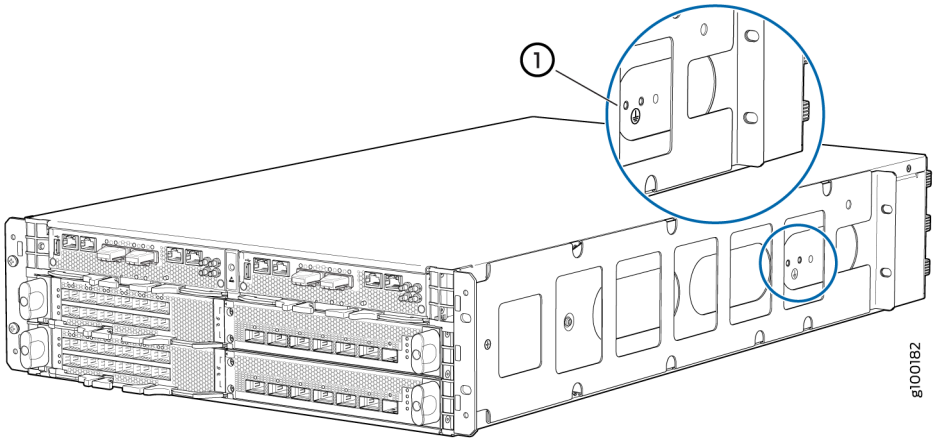
To connect earth ground to a switch:

CAUTION: A licensed electrician must attach the grounding lug to the grounding cable.

1. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Ensure that all grounding surfaces are clean and brought to a bright finish before grounding connections are made.
3. Connect the grounding cable to a proper earth ground.
4. Detach the ESD grounding strap from the ESD point on the switch.

5. Place the grounding cable lug over the grounding point on the side of the chassis (see Figure 28 on page 84).

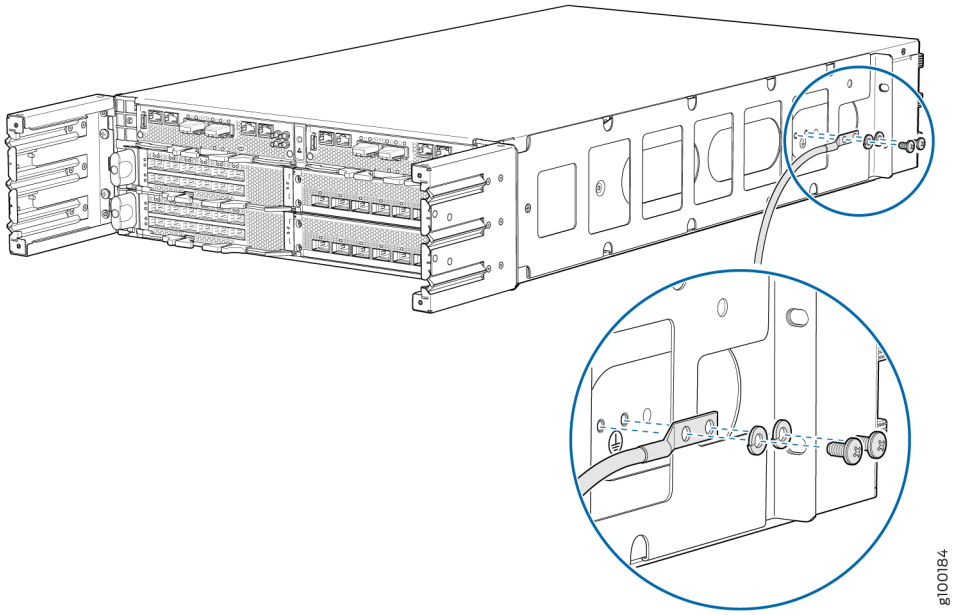
Figure 28: Grounding Point on an EX9253 Switch



1– Grounding point

6. Secure the grounding lug on the grounding cable to the protective earthing terminal on the switch by using the screws (see Figure 29 on page 84).

Figure 29: Connecting a Grounding Cable to an EX9253 Switch



7. Connect the other end of the grounding cable to a proper earth ground.
8. Dress the grounding cable appropriately. Ensure that it does not touch the switch components, block the air exhaust and access to the switch components, or drape where people could trip on it.

Connecting AC Power to an EX9253 Switch and Powering on the Switch

Before you begin to connect AC power and power on the switch, ensure that you have the following parts and tools available:

- An AC power cord with a plug appropriate for your geographical location— provided
- A power cord retainer— provided
- An electrostatic discharge (ESD) grounding wrist strap— not provided
- An external management device— not provided

WARNING: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

Depending on the model, you can use either AC or DC power supplies. The power supplies are hot-removable and hot-insertable field-replaceable units installed in the rear panel of the switch. You can replace them without powering off the switch or disrupting switch functions.

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

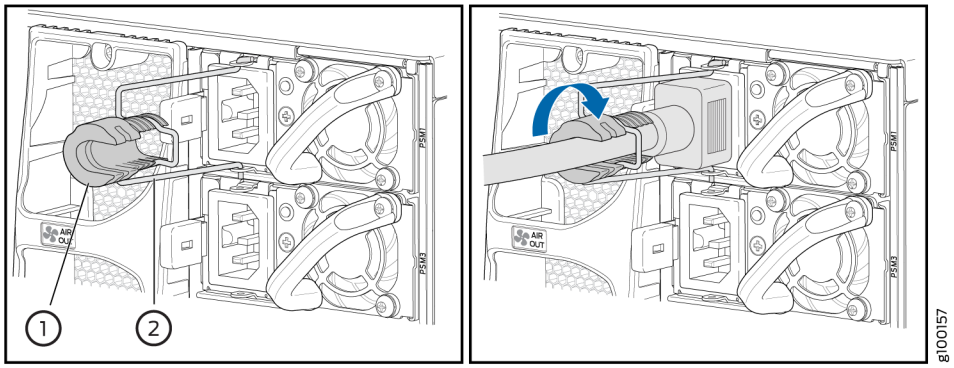
NOTE: An AC-powered switch gets additional grounding when you connect the power supply in the switch to a grounded AC power source outlet by using the power cord.

To connect power to an AC-powered switch (for each power supply):

1. Locate the power cord that has a plug appropriate for your geographic location (see "EX9253 Power System" on page 27).
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. Insert the coupler end of the power cord into the AC power cord inlet on the power supply.

4. Push the power cord into the slot in the adjustment nut of the power cord retainer clip. Turn the nut until it is tight against the base of the coupler (see Figure 30 on page 86).

Figure 30: Connecting Power to an AC-Powered Switch



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

> **NOTE**: Each power supply must be connected to a dedicated AC power feed with a dedicated customer-site circuit breaker. We recommend that you use a dedicated customer-site circuit breaker rated for either 15 A (110 VAC) minimum or 10 A (220 VAC) minimum, or as required by local code.

6. Insert the power cord plug into the power source outlet.
7. Dress the power cord appropriately. Ensure that it does not touch the switch components, block the air exhaust and access to switch components, or drape where people could trip on it.

> **NOTE**: After powering off a power supply, wait at least 60 seconds before turning it back on. After powering on a power supply, wait at least 60 seconds before turning it off.
>
> If the system is completely powered off when you power on the power supply, the Routing Engine boots as the power supply completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system again, first issue the CLI `request system halt` command.
>
> After a power supply is powered on, it can take up to 60 seconds for status indicators—such as the status LED on the power supply and the `show chassis` command display—to

indicate that the power supply is functioning normally. Ignore error indicators that appear during the first 60 seconds.

8. Connect an external management device to the port labeled **CON** on one of the Routing Engines.
9. Turn on power to the external management device.
10. Switch on the dedicated customer-site circuit breaker for the power supplies.
11. If the AC power source outlet has a power switch, set it to the on position.
12. Verify that the status LED on the power supply faceplate is on and steadily lit green.
13. On the external management device, monitor the startup process to verify that the switch has booted properly.

Connecting DC Power to an EX9253 Switch and Powering on the Switch

Before you begin to connect DC power and power on the switch, ensure that you have the following parts and tools available:

- Two DC power source cables (minimum 10 AWG (1.3 mm^2), minimum 60° C wire or as permitted by local code)—not provided
- Two 16-14 AWG ring lugs sized for #6 screws (Panduit PN10-10R or equivalent)—provided
- A torque-controlled socket nut driver, with a maximum torque capacity of 6 lb-in. (0.68 Nm), for tightening the screws on the terminals on each power supply—not provided
- A wire cutter
- An electrostatic discharge (ESD) grounding wrist strap—provided
- An external management device—not provided

WARNING: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

Depending on the model, you can use either AC or DC power supplies. The power supplies are hot-removable and hot-insertable field-replaceable units installed in the rear panel of the switch. You can replace them without powering off the switch or disrupting switch functions.

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

NOTE: Grounding is required for models that use DC power supplies.

You connect DC power to the switch by attaching power cables from the DC power source to the terminals on the power supply faceplate.

CAUTION: A licensed electrician must attach the ring lugs to the DC power cables.

WARNING: Before connecting the switch to a DC power source, ensure that the cable leads will not become active while you are connecting DC power and that the voltage across the DC power source cable leads is 0 V. Locate the input circuit breaker on the panel board that provides DC power, set the circuit breaker to the off position, and tape the switch handle of the circuit breaker in the off position. We recommend that you use a dedicated customer-site circuit breaker rated for 40 A (–48 VDC) minimum, or as required by local code. If you plan to operate a DC-powered switch at less than the maximum configuration and do not provision a 40 A (– 48 VDC) circuit breaker, we recommend that you provision a dedicated customer-site circuit breaker for each DC power supply rated for at least 125 percent of the continuous current that the system draws at – 48 VDC.

Before you connect power to the switch, 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.

To connect power to a DC-powered switch (for each power supply):

1. Switch off the dedicated customer-site circuit breakers. Ensure that the voltage across the DC power source cable leads is 0 V and that the cable leads do not become active during installation.
2. Verify that the DC power cables are correctly labeled before making connections to the power supply. In a typical power distribution scheme where the return is connected to chassis ground at the battery plant, you can use a multimeter to verify the resistance of the **– 48V** and **RTN** DC cables to chassis ground:
   - The cable with very large resistance (indicating an open circuit) to chassis ground is – 48V.
   - The cable with very low resistance (indicating a closed circuit) to chassis ground is RTN.

   CAUTION: You must ensure that power connections maintain proper polarity. The power source cables might be labeled **(+)** and **(–)** to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the

external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

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

   To install heat-shrink tubing:

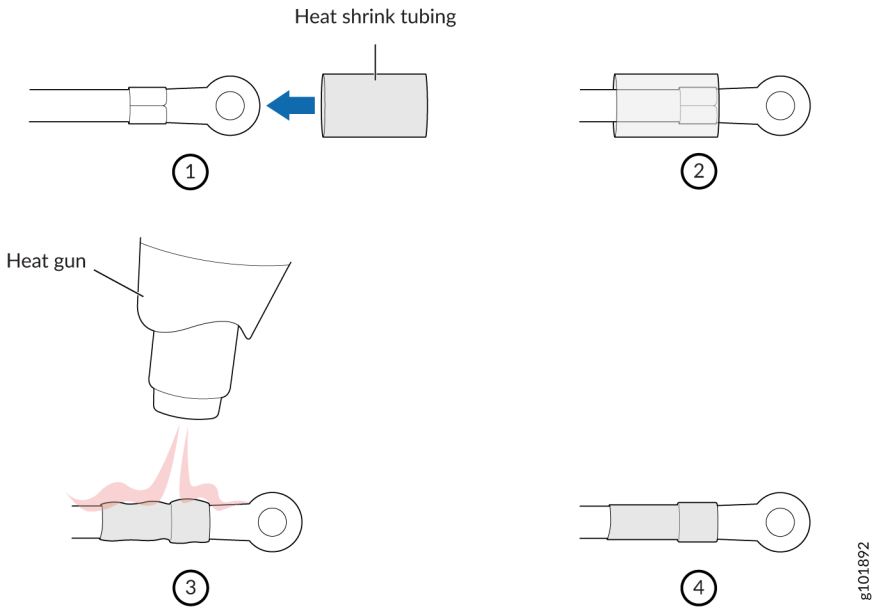
   a. Slide the tubing over the portion of the cable where it is attached to the lug barrel. Ensure that tubing covers the end of the wire and the barrel of the lug attached to it.

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

   Figure 31 on page 89 shows the steps to install heat-shrink tubing.

NOTE: Do not overheat the tubing.

Figure 31: How to Install Heat-Shrink Tubing



4. Remove the nuts from the terminals. Save the nuts.

CAUTION: Ensure that each power cable lug seats flush against the surface of the terminal block as you are tightening the nuts. Ensure that each nut is properly

threaded into the terminal. Applying installation torque to the nuts when improperly threaded can result in damage to the terminal.

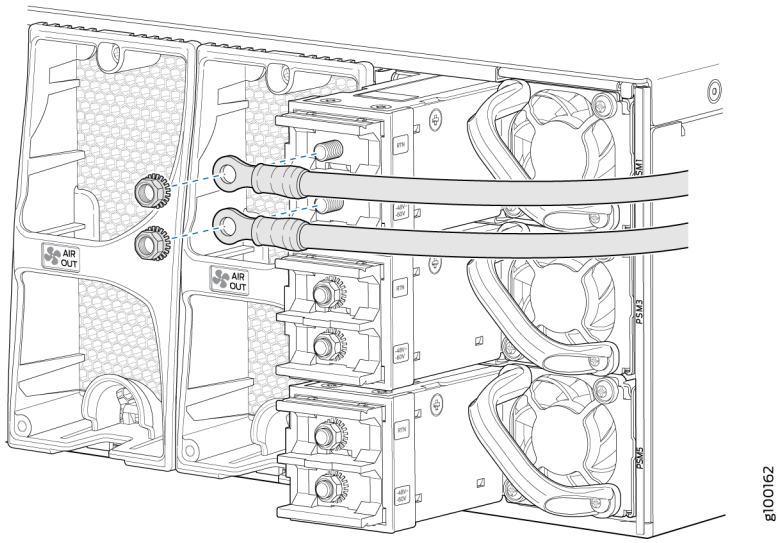
CAUTION: The maximum torque rating of the terminal screws on the DC power supply is 6 lb-in. (0.68 Nm). The terminal screws might be damaged if excessive torque is applied. Use only a torque-controlled driver to tighten screws on the DC power supply terminals. Use an appropriately sized driver, with a maximum torque capacity of 6 lb-in. (0.68 Nm) or less. Ensure that the driver is undamaged and properly calibrated and that you have been trained in its use. You may want to use a driver that is designed to prevent overtorque when the preset torque level is achieved.

5. Secure each power cable lug to the terminal with the nuts by using a socket nut driver (see Figure 32 on page 90). Do not overtighten the nuts. Apply between 5 lb-in. (0.6 Nm) and 6 lb-in. (0.68 Nm) of torque to the nuts.

   a. Secure the positive (+) DC source power cable lug to the return terminal (labeled **RTN**).

   b. Secure the negative (–) DC source power cable lug to the – 48V terminal (labeled **–48V**).

Figure 32: Connecting Power to a DC-Powered Switch



6. Verify that the power cabling is correct. Ensure that cables do not touch the switch components, block the air exhaust and access to switch components, or drape where people could trip on them.
7. Connect each DC power cable to the appropriate external DC power source.

8. Dress the power cord appropriately. Ensure that it does not touch the switch components, block the air exhaust and access to switch components, or drape where people could trip on it.

   NOTE: After powering off a power supply, wait at least 60 seconds before turning it back on. After powering on a power supply, wait at least 60 seconds before turning it off.

   If the system is completely powered off when you power on the power supply, the Routing Engine boots as the power supply completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system again, first issue the CLI `request system halt` command.

   After a power supply is powered on, it can take up to 60 seconds for status indicators—such as the status LEDs on the power supply and the `show chassis` command display—to indicate that the power supply is functioning normally. Ignore error indicators that appear during the first 60 seconds.

9. Connect an external management device to the port labeled **CON** on one of the Routing Engines.
10. Turn on power to the external management device.
11. Switch on the dedicated customer-site circuit breakers.
12. Verify that the status LED on the power supply faceplate is on and steadily lit green. If the LED is not lit green:
    - Verify that the fuse is installed correctly, and turn on the breaker at the battery distribution fuse board or fuse bay.
    - Check the voltage with a meter at the terminals of the power supply for correct voltage level and polarity.
13. On the external management device, monitor the startup process to verify that the switch has booted properly.

Connecting the EX9253 to External Devices

IN THIS SECTION

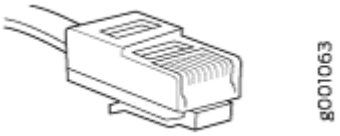
- Connect a Device to a Network for Out-of-Band Management | **92**
- Connect a Device to a Management Console Using an RJ-45 Connector | **93**
- Connecting the EX9253 Switch to External Clocking and Timing Devices | **94**

- Configuring Clock Synchronization Interface on EX9251 and EX9253 Switches | 96

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

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end. Figure 33 on page 92 shows the RJ-45 connector of the Ethernet cable supplied with the device.

Figure 33: RJ-45 Connector on an Ethernet Cable

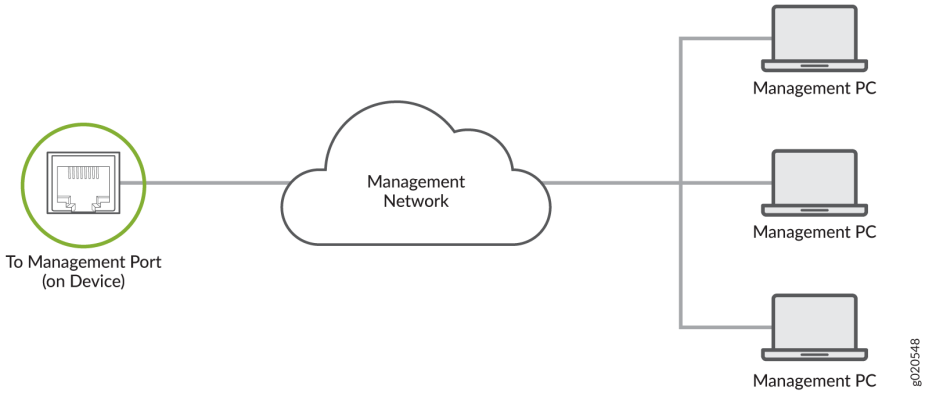


You can monitor and manage these devices by using a dedicated management channel. Each device has a management port to which you can connect an Ethernet cable with an RJ-45 connector. Use the management port to connect the device to the management device.

To connect a device to a network for out-of-band management (see Figure 34 on page 92):

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

Figure 34: Connect a Device to a Network for Out-of-Band Management

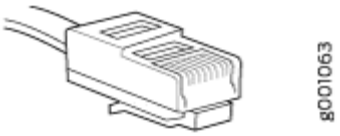


Connect a Device to a Management Console Using an RJ-45 Connector

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end. One such cable and an RJ-45-to-DB-9 serial port adapter are supplied with the device.

Figure 35 on page 93 shows the RJ-45 connector on the Ethernet cable.

Figure 35: RJ-45 Connector on an Ethernet Cable



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

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

To connect the device to a management console (see Figure 36 on page 94 and Figure 37 on page 94):

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

2. Connect the other end of the Ethernet cable to the console server (see Figure 36 on page 94) or management console (see Figure 37 on page 94).

Figure 36: Connect a Device to a Management Console Through a Console Server

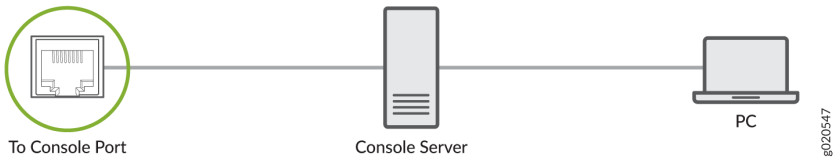


Figure 37: Connect a Device Directly to a Management Console

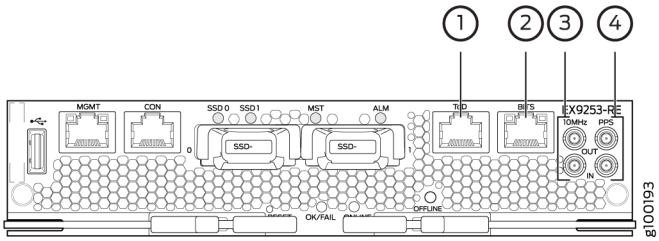
Connecting the EX9253 Switch to External Clocking and Timing Devices

IN THIS SECTION

- Connecting 1-PPS and 10-MHz Timing Devices to the Switch | **95**
- Connecting a BITS External Clocking Device to the Switch | **95**

The switch supports external clock synchronization for Synchronous Ethernet and external inputs. The connections to the switch are made through the ports on the front panel. Figure 38 on page 95 shows the ports that are used to connect the switch to external clocking and timing devices.

Figure 38: Ports Used to Connect the Switch to External Clocking and Timing Devices



1– Time-of-day (ToD) port with LED. Support for this port is not available in this release.	3– 10-MHz input and output timing ports
2– BITS ports with LEDs	4– 1-PPS input and output timing ports

Connecting 1-PPS and 10-MHz Timing Devices to the Switch

The switch has four SubMiniature B (SMB) connectors that support 1-PPS and 10-MHz timing devices (see Figure 38 on page 95).

NOTE: Ensure that a cable of 3 m or less in length is used for the 10-MHz and 1-PPS connectors.

To connect the SMB coaxial cable to the external clocking input port:

1. Connect one end of the SMB coaxial cable to either the socket labeled **IN** on the 1-PPS SMB connector or the 10-MHz SMB connector on the switch.
2. Connect the other end of the SMB coaxial cable to the 1-PPS or 10-MHz source network equipment.

NOTE: Ensure that the 1-PPS or 10-MHz source network equipment contains low voltage complementary metal oxide semiconductor (LVCMOS) or is compatible with low-voltage (3.3 V) transistor– transistor logic (LVTTL).

Connecting a BITS External Clocking Device to the Switch

The switch has an external building-integrated timing supply (BITS) port, labeled **BITS**, on the front panel of the switch (see Figure 38 on page 95).

To connect the switch to a BITS external clocking device:

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 switch.
2. Plug one end of an RJ-45 cable into the internal clock port on the front panel.
3. Plug the other end of the RJ-45 cable into the BITS external clocking device.
4. Verify that the LEDs for the **BITS** port are lit steadily green.
5. Configure the port.

Configuring Clock Synchronization Interface on EX9251 and EX9253 Switches

IN THIS SECTION

- Configuring Clock Synchronization Options | 96

Starting with Junos OS Release 18.1R1, EX9251 switches support external clock synchronization for Synchronous Ethernet, T1 or E1 line timing sources, and external inputs. Starting with Junos OS Release 18.2R1, EX9253 switches support external clock synchronization for Synchronous Ethernet, T1 or E1 line timing sources, and external inputs. Configuring external clock synchronization requires making clock selection, quality level, and priority considerations. The clock source selection algorithm is used to pick the two best upstream clock sources from among the various sources on the basis of system configuration and execution criteria such as quality level, priority, and hardware restrictions.

Configuring Clock Synchronization Options

To configure the clock synchronization options.

1. In configuration mode, go to the `[edit chassis synchronization]` hierarchy level.

```
[edit]
user@host# edit chassis synchronization
```

2. Configure the Synchronous Ethernet clock selection mode as `auto-select` or `free-run` to select the clock source either from an external qualified clock or from a free-run local oscillator.

```
[edit chassis synchronization]
user@host# set clock-mode (auto-select | free-run)
```

3. Enable Ethernet Synchronization Message Channel (ESMC) packet transmission on all interfaces or on a specific interface.

```
[edit chassis synchronization]
user@host# set esmc-transmit interfaces (all | interface-name)
```

4. Configure the hold interval as configuration-change, which is the wait time (from 15 seconds through 60 seconds) after a change in configuration; restart, which is the wait time (from 60 seconds through 180 seconds) after reboot of the switch; and switchover, which is the switchover wait time (from 30 seconds through 60 seconds) after clock recovery.

```
[edit chassis synchronization]
user@host# set hold-interval configuration-change secs
user@host# set hold-interval restart secs
user@host# set hold-interval switchover secs
```

5. Configure the EEC synchronization networking type as option-1 or option-2.

```
[edit chassis synchronization]
user@host# set network-option (option-1 | option-2)
```

6. Configure the `quality-mode-enable` statement to enable Synchronous Ethernet ESMC quality mode.

```
[edit chassis synchronization]
user@host# set quality-mode-enable
```

7. Configure the selection mode for the incoming ESMC quality as configured-quality or received-quality. Specify the `configured-quality` option to enable the clock source selection algorithm to use the ESMC or SSM quality level that is configured for a qualifying interface or the `received-quality` option to use the ESMC or SSM quality that is received on the qualifying interface.

```
[edit chassis synchronization]
user@host# set selection-mode (configured-quality | received-quality)
```

8. Configure the switchover mode as revertive or non-revertive. The `revertive` option enables the device to automatically switch from a lower to a higher quality clock source whenever the higher clock source becomes available. On the other hand, the `non-revertive` option enables the device to continue using the current clock source as long as it is valid.

```
[edit chassis synchronization]
user@host# set switchover-mode (non-revertive | revertive)
```

9. Configure the options for the ESMC source related external clock source interface.

   a. Go to the `[edit chassis synchronization source interfaces external]` hierarchy level or the `[edit chassis synchronization source interfaces ethernet-interface-name]` hierarchy level.

```
[edit chassis synchronization]
user@host# edit source interfaces external
```

   OR

```
[edit chassis synchronization]
user@host# edit source interfaces ethernet-interface-name
```

   b. Configure the external clock interface and the Ethernet interface with their options. Configure the `priority` statement from 1 through 5; the `quality-level` statement as prc, prs, sec, ssu-a, ssu-b, st2, st3e, stu, or tnc; the `request` statement as force-switch or lockout; the `wait-to-restore` statement from 0 minutes to 12 minutes; and the `hold-off-time` statement from 300 through 1800 milliseconds. You can configure the same options for the Ethernet interfaces as well.

```
[edit chassis synchronization source interfaces (external            | ethernet-
interface-name)]
user@host# set priority value
user@host# set quality-level (prc | prs |            sec | ssu-a | ssu-b | st2 | st3e |
stu | tnc)
user@host# set request (force-switch | lockout)
user@host# set wait-to-restore minutes
user@host# set hold-off-time time
```

10. Configure the options for the external interfaces.

a. Go to the `[edit chassis synchronization interfaces external]` hierarchy level.

```
[edit chassis synchronization]
user@host# edit interfaces external
```

b. Configure the frequency for the provided reference clock.

```
[edit chassis synchronization interfaces external]
user@host# set signal-type ( 2048KHZ |e1 | t1)
```

c. For BITS interface, configure options for the e1 signal type— the `framing` statement as g704 or g704-no-crc, and the `line-encoding` statement as ami or hdb3.

```
[edit chassis synchronization interfaces external]
user@host# set e1-options framing (g704 | g704-no-crc)
user@host# set e1-options line-encoding (ami | hdb3)
```

d. For BITS interface, configure options for the t1 signal type— the `framing` statement as esf or sf and the `line-encoding` statement as ami or b8zs.

```
[edit chassis synchronization interfaces external]
user@host# set t1-options framing (esf | sf)
user@host# set t1-options line-encoding (ami | b8zs)
```

11. Configure the options for the external clock interface output.

a. Go to the `[edit chassis synchronization output interfaces external]` hierarchy level.

```
[edit chassis synchronization]
user@host# edit output interfaces external
```

b. Configure all the external clock interface output options. The options include the `holdover-mode-disable` statement; the `minimum-quality` statement, which can be set as prc, prs, sec, ssu-a, ssu-b, st2, st3e, stu, or tnc; the `source-mode` statement, which can be set as chassis or line; the `tx-dnu-to-line-source-enable` statement; and the `wander-filter-disable` statement.

```
[edit chassis synchronization output interfaces external]
user@host# set holdover-mode-disable
```

```
user@host# set minimum-quality (prc | prs | sec | ssu-a | ssu-b | st2 | st3e | stu | tnc)
user@host# set source-mode (chassis | line)
user@host# set tx-dnu-to-line-source-enable
user@host# set wander-filter-disable
```

RELATED DOCUMENTATION

- Centralized Clocking Overview
- Example: Configuring Synchronous Ethernet on MX Series Routers
- request chassis synchronization mode
- show chassis synchronization (MX Series Routers)
- synchronization
- Understanding Clock Synchronization

Connecting the EX9253 to the Network

IN THIS SECTION

- Install a Transceiver | 100
- Connect a Fiber-Optic Cable | 103

Install a Transceiver

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

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

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

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

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

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

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

Figure 39 on page 103 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers. Note that this procedure is the same for SFP+ and SFP28 transceivers which will be used in EX4100.

To install a transceiver:

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

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

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

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

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

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

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

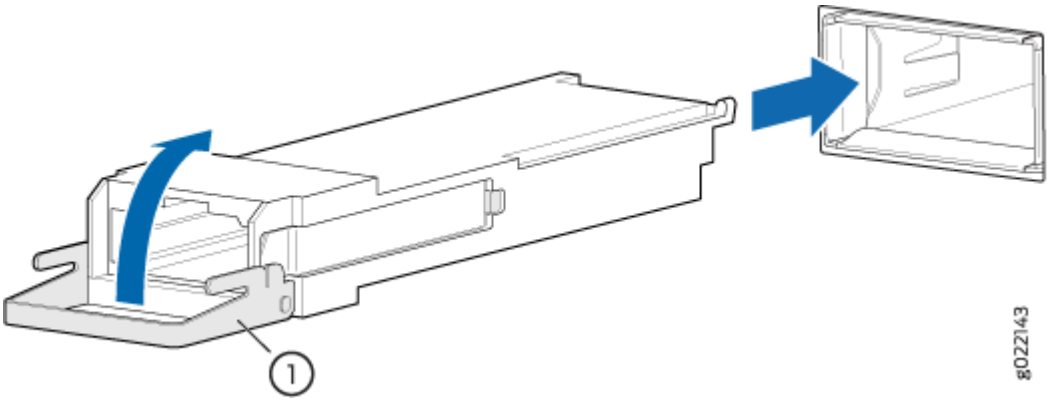
CAUTION: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

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

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

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

Figure 39: Install a Transceiver



1– Ejector lever

Connect a Fiber-Optic Cable

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

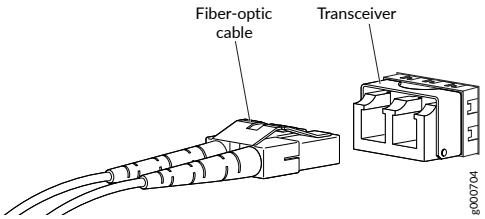
To connect a fiber-optic cable to an optical transceiver installed in a device:

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

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

2. Remove the rubber safety cap from the optical transceiver. Save the cap.
3. Insert the cable connector into the optical transceiver (see Figure 40 on page 104).

Figure 40: Connect a Fiber-Optic Cable to an Optical Transceiver Installed in a Device



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

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

Configuring Junos OS on the EX9253

IN THIS SECTION

- EX9253 Switch Default Configuration | **104**
- Connecting and Configuring an EX9253 Switch | **105**

EX9253 Switch Default Configuration

Each EX9253 switch is programmed with a factory default configuration that contains the values set for each configuration parameter when a switch is shipped. The default configuration file sets values for system parameters such as the system log and file messages.

When you commit changes to the configuration, a new configuration file is created that becomes the active configuration. You can always revert to the factory default configuration (see *Reverting to the Default Factory Configuration for the EX Series Switch*).

This topic shows the factory default configuration file of an EX9253 switch:

```
system {
    commit {
        factory-settings;
    }
    syslog {
        user * {
            any emergency;
        }
        file messages {
            any notice;
            authorization info;
        }
        file interactive-commands {
            interactive-commands any;
        }
    }
}
```

Connecting and Configuring an EX9253 Switch

Before you begin to connect and configure the switch, gather the following information:

- Name the switch will use on the network
- Domain name the switch will use
- IP address and prefix length information for the Ethernet interface
- IP address of a default switch
- IP address of a DNS server
- Password for the root user

The EX9253 switch is shipped with the Junos OS preinstalled and ready to be configured when the switch is powered on. There are two 16-MB internal NAND Flash memory devices located on the

baseboard for BIOS storage. You can insert the USB storage device into the USB slot on the front panel. The switch also has two built-in M.2-based solid-state drives (SSDs) (labeled **SSD0** and **SSD1**). There are three copies of the software: one each on the SSD drives and one on a USB flash drive that can be inserted into the slot in the faceplate of the Routing Engine.

When the switch boots, it first attempts to start the image on the USB flash drive. If there is no USB flash drive installed or if the attempt otherwise fails, the switch next attempts to start the software from the SSD drive installed in slot **SSD0**, and finally from the SSD drive installed in slot **SSD1**.

You configure the switch by issuing Junos OS command-line interface (CLI) commands, either on a console device attached to the console (**CON**) port on the front panel, or over a telnet connection to a network connected to the Ethernet management (**MGMT**) port on the front panel.

This procedure connects the switch to the network, but does not enable it to forward traffic. For complete information about enabling the switch to forward traffic, including examples, see the Junos OS configuration guides.

To perform initial configuration:

1. Log in as the root user. There is no password.
2. Start the CLI.

```
root# cli
root@>
```

3. Enter the configuration mode.

```
cli> configure
[edit]
root@#
```

4. Configure the name of the switch. If the name includes spaces, enclose the name in double quotation marks (“ ”).

```
[edit]
root@# set system host-name host-name
```

5. Configure the switch’s domain name.

```
[edit]
root@# set system domain-name domain-name
```

6. Configure the IP address and prefix length for the switch's management Ethernet interface.

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

7. Configure the IP address of a backup router, which is used only when the routing protocol is not running.

```
[edit]
root@# set system backup-router address
```

8. Configure the IP address of a Domain Name System (DNS) server.

```
[edit]
root@# set system name-server address
```

9. Set the root authentication password by entering either a plain-text password, an encrypted password, or an SSH public key string (DSA or RSA).

```
[edit]
root@# set system root-authentication plain-text-password
New password: password
Retype new password: password
```

or

```
[edit]
root@# set system root-authentication encrypted-password encrypted-password
```

or

```
[edit]
root@# set system root-authentication ssh-dsa public-key
```

or

```
[edit]
root@# set system root-authentication ssh-rsa public-key
```

10. (Optional) Configure the static routes to remote subnets with access to the management port. Access to the management port is limited to the local subnet. To access the management port from a remote subnet, you must add a static route to that subnet within the routing table.

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

11. Configure the Telnet service.

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

12. (Optional) Display the configuration to verify that it is correct.

```
[edit]
root@# show
system {
    host-name host-name;
    domain-name domain-name;
    backup-router address;
    root-authentication {
        authentication-method (password | public-key);
    }
    name-server {
        address;
    }
}
interfaces {
    fxp0 {
        unit 0 {
            family inet {
                address address/prefix-length;
            }
        }
    }
}
```

13. (Optional) Configure additional properties by adding the necessary configuration statements.

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

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

15. Exit the configuration mode.

```
[edit]
root@host# exit
root@host>
```

NOTE: Ensure that the removable storage media that contains a copy of Junos OS is not installed in the switch except when you want to install Junos OS from the storage media. If the storage media is installed during normal operation and if the switch is rebooted intentionally or accidentally (for example, as a result of a power outage), the configuration in the switch is deleted and the copy of the software in the storage media is installed in the switch.

CHAPTER 4

Maintaining Components

Routine Maintenance Procedures for EX9253 Switches | 111

Maintaining the EX9253 Cooling System | 111

Maintaining the EX9253 Power System | 123

Maintaining the EX9253 Routing Engine | 133

Maintaining the EX9253 Line Cards | 137

Maintaining Transceivers | 146

Maintain Fiber-Optic Cables | 156

Routine Maintenance Procedures for EX9253 Switches

IN THIS SECTION

- Purpose | 111
- Action | 111

Purpose

For optimum performance of an EX9253 switch, perform preventive maintenance procedures.

Action

- Inspect the installation site for moisture, loose wires or cables, and excessive dust. Make sure that airflow is unobstructed around the switch and into the air intake vents.
- Check the status-reporting devices on the switch—alarms and LEDs.
- Inspect the air filter and fan tray, replacing the air filter every 6 months for optimum cooling system performance. Do not run the switch for more than a few minutes without the air filter or fan trays in place.

Maintaining the EX9253 Cooling System

IN THIS SECTION

- Removing a Fan Tray from an EX9253 Switch | 112

- Installing a Fan Tray in an EX9253 Switch | **113**
- Maintaining the Fan Tray in EX9253 Switches | **115**
- Removing the Air Filter Unit from an EX9253 Switch | **117**
- Installing the Air Filter Unit in an EX9253 Switch | **118**
- Removing the Air Filter from the Air Filter Unit in an EX9253 Switch | **119**
- Installing the Air Filter in the Air Filter Unit in an EX9253 Switch | **121**
- Maintaining the Air Filter in EX9253 Switches | **122**

Removing a Fan Tray from an EX9253 Switch

Before you begin to remove a fan tray:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A Phillips (+) screwdriver, number 2 (not provided)
- A replacement fan tray

The fan trays are hot-removable and hot-insertable field-replaceable units installed in the rear panel of the switch. You can replace them without powering off the switch or disrupting switch functions.

CAUTION: You must replace the fan tray within two minutes of removing the fan tray to prevent the chassis from overheating.

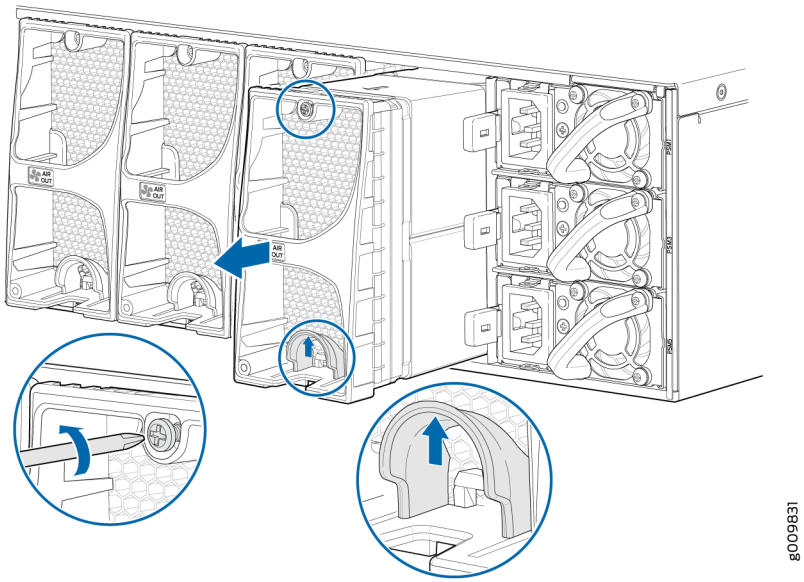
To remove a fan tray from an EX9253 switch chassis (see Figure 41 on page 113):

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 switch.
2. Loosen the screw on the fan tray faceplate using the Phillips (+) screwdriver, number 2.

WARNING: To avoid injury, keep tools and your fingers away from the fans as you slide the fan tray out of the chassis. The fans might still be spinning.

3. Hold and lift the latch located on the inside of the fan tray to release it from the chassis.
4. Grasp the fan tray and pull it out approximately 1 to 3 inches.
5. Place one hand under the fan tray to support it, and pull the fan tray completely out of the chassis.

Figure 41: Removing a Fan Tray



SEE ALSO

EX9253 Cooling System | **21**

Installing a Fan Tray in an EX9253 Switch

Before you begin to install a fan tray:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (ee *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A Phillips (+) screwdriver, number 2 (not provided)

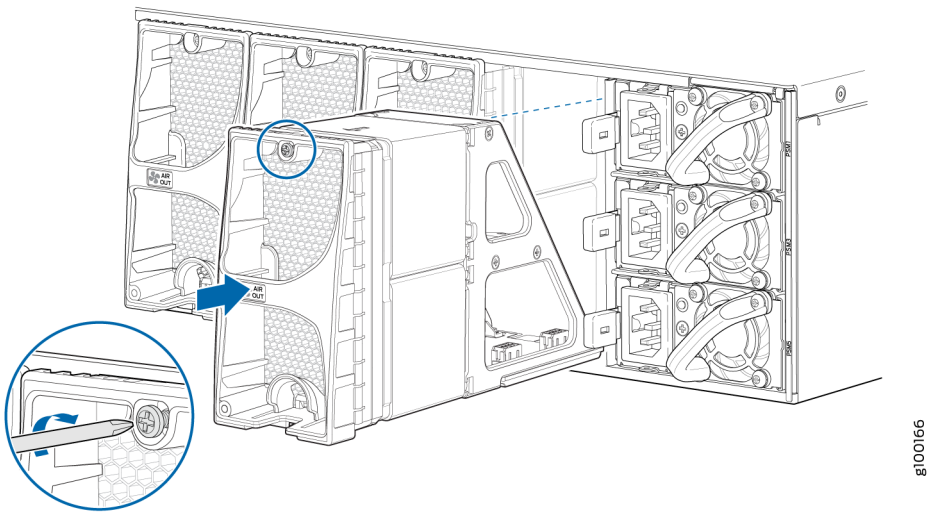
The fan trays are hot-removable and hot-insertable field-replaceable units installed in the rear panel of the switch. You can replace them without powering off the switch or disrupting switch functions.

CAUTION: You must replace the fan tray within two minutes of removing the fan tray to prevent the chassis from overheating.

To install a fan tray in an EX9253 switch (see Figure 42 on page 114):

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 switch.
2. Grasp the fan tray and place one hand under the fan tray for support.
3. Place the fan tray on the respective slot, and carefully push the fan tray into the chassis until the socket lock snaps into place and holds it.
4. Tighten the screw on the fan tray faceplate using the Phillips (+) screwdriver, number 2 to secure the fan tray in the chassis.

Figure 42: Installing a Fan Tray



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/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.

Maintaining the Fan Tray in EX9253 Switches

IN THIS SECTION

- Purpose | 115
- Action | 115

Purpose

For optimum cooling, verify the condition of the fans.

Action

- Monitor the status of the fans. A fan tray contains multiple fans that work in unison to cool the switch components. If one fan fails, the speed of the remaining fans is adjusted to maintain proper cooling. A major alarm is triggered when a fan fails and a minor alarm and a major alarm are triggered when a fan tray is removed.
- To display the status of the cooling system, issue the `show chassis environment` command.

```
user@switch> show chassis environment
Class Item                           Status     Measurement
Temp  CB 0 Exhaust Temp Sensor       OK         41 degrees C / 105 degrees F
      CB 0 Inlet Temp Sensor         OK         37 degrees C / 98 degrees F
      CB 0 CPU DIE Temp Sensor       OK         54 degrees C / 129 degrees F
      FPC 0 Intake Temp Sensor       OK         44 degrees C / 111 degrees F
      FPC 0 Exhaust-A Temp Sensor    OK         51 degrees C / 123 degrees F
      FPC 0 Exhaust-B Temp Sensor    OK         47 degrees C / 116 degrees F
      FPC 0 EA0 Chip                 OK         68 degrees C / 154 degrees F
      FPC 0 EA0-XR0 Chip             OK         79 degrees C / 174 degrees F
      FPC 0 EA0-XR1 Chip             OK         83 degrees C / 181 degrees F
      FPC 0 EA1 Chip                 OK         77 degrees C / 170 degrees F
      FPC 0 EA1-XR0 Chip             OK         82 degrees C / 179 degrees F
      FPC 0 EA1-XR1 Chip             OK         86 degrees C / 186 degrees F
      FPC 0 EA2 Chip                 OK         62 degrees C / 143 degrees F
      FPC 0 EA2-XR0 Chip             OK         74 degrees C / 165 degrees F
      FPC 0 EA2-XR1 Chip             OK         74 degrees C / 165 degrees F
      FPC 0 PF Chip                  OK         63 degrees C / 145 degrees F
```

```
       FPC 0 EA0_HMC0 Logic die       OK         84 degrees C / 183 degrees F
       FPC 0 EA0_HMC0 DRAM botm       OK         81 degrees C / 177 degrees F
       FPC 0 EA0_HMC1 Logic die       OK         86 degrees C / 186 degrees F
       FPC 0 EA0_HMC1 DRAM botm       OK         83 degrees C / 181 degrees F
       FPC 0 EA0_HMC2 Logic die       OK         87 degrees C / 188 degrees F
       FPC 0 EA0_HMC2 DRAM botm       OK         84 degrees C / 183 degrees F
       FPC 0 EA1_HMC0 Logic die       OK         91 degrees C / 195 degrees F
       FPC 0 EA1_HMC0 DRAM botm       OK         88 degrees C / 190 degrees F
       FPC 0 EA1_HMC1 Logic die       OK         91 degrees C / 195 degrees F
       FPC 0 EA1_HMC1 DRAM botm       OK         88 degrees C / 190 degrees F
       FPC 0 EA1_HMC2 Logic die       OK         90 degrees C / 194 degrees F
       FPC 0 EA1_HMC2 DRAM botm       OK         87 degrees C / 188 degrees F
       FPC 0 EA2_HMC0 Logic die       OK         87 degrees C / 188 degrees F
       FPC 0 EA2_HMC0 DRAM botm       OK         84 degrees C / 183 degrees F
       FPC 0 EA2_HMC1 Logic die       OK         81 degrees C / 177 degrees F
       FPC 0 EA2_HMC1 DRAM botm       OK         78 degrees C / 172 degrees F
       FPC 0 EA2_HMC2 Logic die       OK         79 degrees C / 174 degrees F
       FPC 0 EA2_HMC2 DRAM botm       OK         76 degrees C / 168 degrees F
Power  PEM 0                          Absent
       PEM 1                          Absent
       PEM 2                          OK         49 degrees C / 120 degrees F
       PEM 3                          OK         48 degrees C / 118 degrees F
       PEM 4                          Absent
       PEM 5                          Absent
Fans   Fan Tray 0 Fan 0               OK         Spinning at normal speed
       Fan Tray 0 Fan 1               OK         Spinning at normal speed
       Fan Tray 0 Fan 2               OK         Spinning at normal speed
       Fan Tray 0 Fan 3               OK         Spinning at normal speed
       Fan Tray 1 Fan 0               OK         Spinning at normal speed
       Fan Tray 1 Fan 1               OK         Spinning at normal speed
       Fan Tray 1 Fan 2               OK         Spinning at normal speed
       Fan Tray 1 Fan 3               OK         Spinning at normal speed
       Fan Tray 2 Fan 0               OK         Spinning at normal speed
       Fan Tray 2 Fan 1               OK         Spinning at normal speed
       Fan Tray 2 Fan 2               OK         Spinning at normal speed
       Fan Tray 2 Fan 3               OK         Spinning at normal speed
       Fan Tray 3 Fan 0               OK         Spinning at normal speed
       Fan Tray 3 Fan 1               OK         Spinning at normal speed
       Fan Tray 3 Fan 2               OK         Spinning at normal speed
       Fan Tray 3 Fan 3               OK         Spinning at normal speed
```

Removing the Air Filter Unit from an EX9253 Switch

Before you begin to remove the air filter unit, ensure that you have the following parts and tools available:

- A Phillips (+) screwdriver, number 2 (not provided)
- A replacement air filter unit

WARNING: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

The air filter unit consists of three parts–the outer filter cover, the air filter, and the inner cage. The air filter sits between the outer cover and the inner cage. The air filter unit is installed into the cable management brackets, and are held tightly by captive screws.

Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, producing a negative effect on the ventilation of the chassis.

CAUTION: Do not operate the switch for more than two minutes without the air filter unit installed on it. Because the fans are very powerful, they could pull small bits of wire or other materials into the switch chassis through the unfiltered air intake. This could damage the switch and its components.

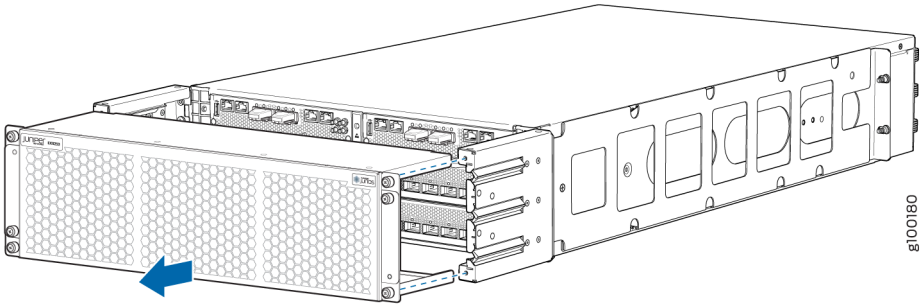
To remove the air filter unit:

1. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Loosen the captive screws located on either side of the air filter unit attached to the cable management brackets on the front of the switch.

NOTE: It is not necessary to remove the cables from the cable management brackets to access the air filter unit or the air filter.

3. Grasp the air filter unit and gently pull the air filter unit out of the cable management brackets (see Figure 43 on page 118).

Figure 43: Removing the Air Filter Unit



Installing the Air Filter Unit in an EX9253 Switch

Before you begin to install the air filter unit, ensure that you have a Phillips (+) screwdriver, number 2 available.

WARNING: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

NOTE: The air filter unit is installed on the cable management brackets. Before installing the air filter unit, ensure that the cable management brackets are installed on front of the switch.

The air filter unit consists of three parts–the outer filter cover, the air filter, and the inner cage. The air filter sits between the outer cover and the inner cage. The air filter unit is installed into the cable management brackets, and are held tightly by captive screws.

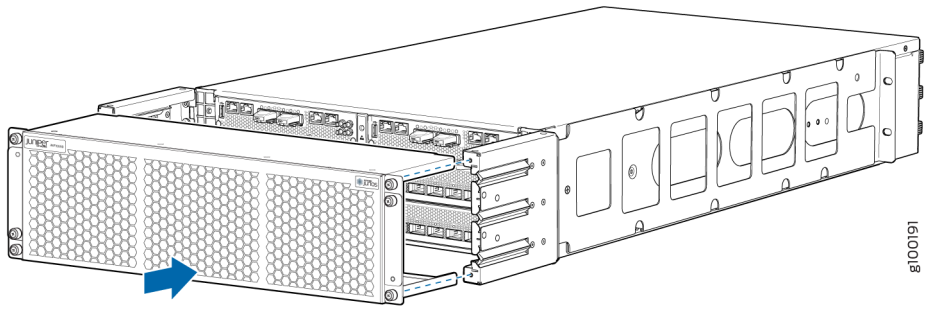
Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, producing a negative effect on the ventilation of the chassis.

To install the air filter unit:

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

2. Ensure that the air filter is right-side up.
3. Grasp the air filter unit and slide into the rails on the cable management brackets until it fits snugly on the cable management brackets (see Figure 44 on page 119).

Figure 44: Installing the Air Filter Unit



4. Tighten the captive screws to secure the air filter unit.

Removing the Air Filter from the Air Filter Unit in an EX9253 Switch

Before you begin to remove the air filter, ensure that you have the following parts and tools available:

- A Phillips (+) screwdriver, number 2 (not provided)
- A replacement air filter

WARNING: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

The air filter unit consists of three parts–the outer filter cover, the air filter, and the inner cage. The air filter sits between the outer cover and the inner cage. The air filter unit is installed into the cable management brackets, and are held tightly by captive screws.

Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, producing a negative effect on the ventilation of the chassis.

CAUTION: Do not operate the switch for more than two minutes without the air filter unit installed on it. Because the fans are very powerful, they could pull small bits of wire

or other materials into the switch chassis through the unfiltered air intake. This could damage the switch and its components.

To remove the air filter:

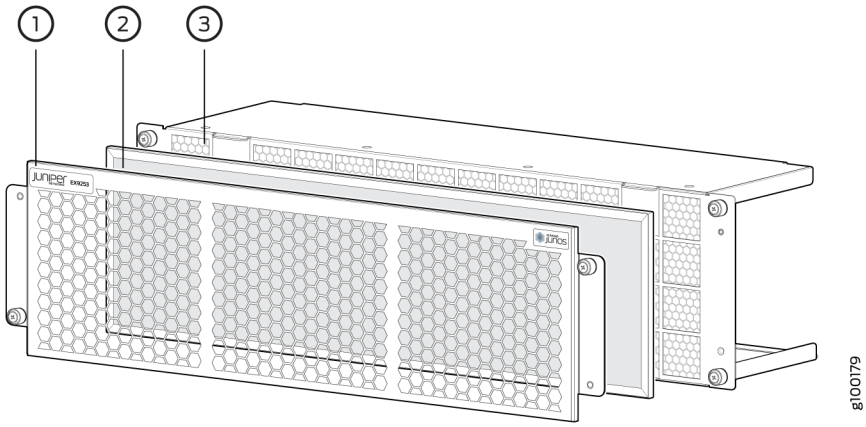
1. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Loosen the captive screws located on either side of the air filter unit attached to the cable management brackets on the front of the switch.

   NOTE: It is not necessary to remove the cables from the cable management brackets to access the air filter unit or the air filter.

3. Grasp the head of the loosened screws and pull the screws to remove the outer cover of the air filter unit.

   The air filter is installed at the center of the air filter unit, behind the outer cover (see Figure 45 on page 120.

Figure 45: Removing the Air Filter from the Air Filter Unit



1– Outer cover	3– Inner cage
2– Air filter	

4. Grasp the air filter and pull it straight out of the air filter unit.

Installing the Air Filter in the Air Filter Unit in an EX9253 Switch

Before you begin to install the air filter, ensure that you have a Phillips (+) screwdriver, number 2 available.

> **WARNING**: Ensure that you understand how to prevent ESD damage (see *Prevention of Electrostatic Discharge Damage*).

The air filter unit consists of three parts–the outer filter cover, the air filter, and the inner cage. The air filter sits between the outer cover and the inner cage. The air filter unit is installed into the cable management brackets, and are held tightly by captive screws.

Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, producing a negative effect on the ventilation of the chassis.

To install the air filter:

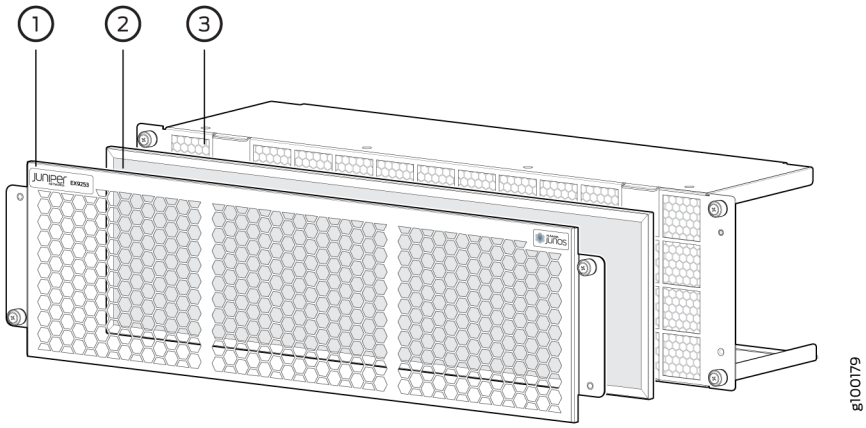
1. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Loosen the captive screws located on either side of the air filter unit attached to the cable management brackets on the front of the switch.

   > **NOTE**: It is not necessary to remove the cables from the cable management brackets to access the air filter unit or the air filter.

3. Grasp the head of the loosened screws and pull the screws to remove the outer cover of the air filter unit.

The air filter must be installed at the center of the air filter unit, behind the outer cover (see Figure 46 on page 122.

Figure 46: Installing the Air Filter in the Air Filter Unit



1– Outer cover	3– Inner cage
2– Air filter	

4. Grasp the air filter, and place the air filter straight in front of the inner cage.
5. Place the outer cover back in its place.
6. Tighten the captive screws to secure the air filter unit.

Maintaining the Air Filter in EX9253 Switches

IN THIS SECTION

- Purpose | 122
- Action | 123

Purpose

For optimum cooling, verify the condition of the air filters.

Action

- Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, producing a negative effect on the ventilation of the chassis. The filter degrades over time. You must replace the filter every six months.

  CAUTION: Always keep the air filter in place while the switch is operating. Because the fans are very powerful, they could pull small bits of wire or other materials into the switch through the unfiltered air intake. This could damage the switch components.

- EX9253 switches ship with one air filter. Spare air filters are separately orderable. The shelf life of the air filters vary from two to five years depending on the storage conditions. Store spare air filters in a dark, cool, and dry place. Wrap the air filters separately using plastic wraps and store them in an environment with RH between 40% to 80% and temperature between 40° F to 90° F. Storing air filters at higher temperatures or where they can be exposed to ultraviolet (UV) radiation, hydrocarbon emissions, or vapors from solvents can significantly reduce their life. If an air filter develops flakes or becomes brittle when rubbed or deformed, you must not use it.

Maintaining the EX9253 Power System

IN THIS SECTION

- Powering Off an EX9253 Switch | **123**
- Removing an AC Power Supply from an EX9253 Switch | **125**
- Installing an AC Power Supply in an EX9253 Switch | **126**
- Removing a DC Power Supply in an EX9253 Switch | **128**
- Installing a DC Power Supply in an EX9253 Switch | **130**
- Maintaining Power Supplies in EX9253 Switches | **132**

Powering Off an EX9253 Switch

Before you begin to power off the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (See *Prevention of Electrostatic Discharge Damage*).
- Ensure that you have the following parts and tools available to power off an EX9253 switch:
  - An ESD wrist strap
  - An external management device such as a PC
  - The appropriate cable to connect the external management device to the console port labeled **CON** on the switch

NOTE: After powering off a power supply, wait at least five seconds before turning it back on.

To power off the switch:

1. Connect a management device to the console (see *Connect a Device to a Management Console Using an RJ-45 Connector*).
2. Take the line cards offline by issuing the following CLI command on the external management device connected to the switch:

```
user@switch>request
chassis fpc slot slot-number offline
```

3. Power off the backup RE by issuing the following CLI command on the primary RE:

```
user@switch> request vmhost power-off other-routing-engine
```

4. Power off the primary RE by issuing the following CLI command on the primary RE:

```
user@switch> request vmhost power-off
```

   The switch shuts down and the console displays the message `Power down.`

To power on the switch again, press the button labeled **OFFLINE** on the primary Routing Engine of the switch for one second or remove the RE and install it.

You can take the switch offline by pressing the button labeled **OFFLINE** on the primary Routing Engine of the switch for three seconds.

Removing an AC Power Supply from an EX9253 Switch

Before you begin to remove an AC power supply:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A replacement power supply or a cover panel for the power supply slot

The AC power supply in an EX9253 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. A minimum of two high line power supplies or three low line must be installed in the switch for non-redundant operation. To ensure proper operation of the switch, you must install a replacement power supply shortly after removing a power supply from the chassis. The power supplies are installed in the slots labeled **PSM0** through **PSM5** on the rear of the chassis.

CAUTION: Before you remove a power supply, ensure that you have power supplies sufficient to power the switch that remains in the chassis (see "EX9253 Power System" on page 27).

CAUTION: Do not leave the power supply slot empty for a long time while the switch is operational. Either replace the power supply unit promptly or install a cover panel over the empty slot.

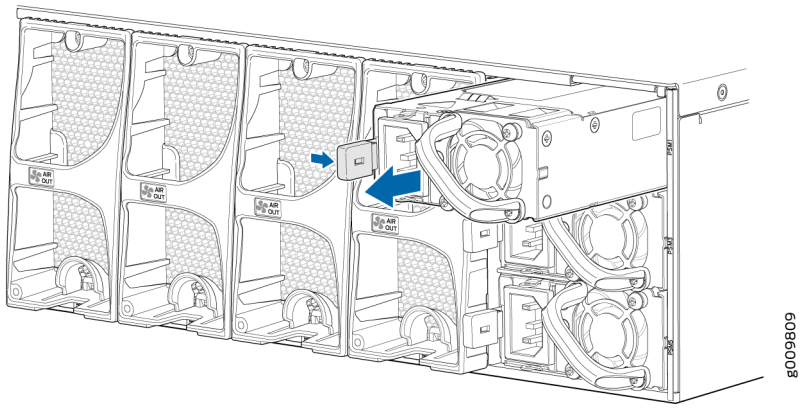
NOTE: After powering off a power supply, wait for at least 60 seconds before turning it back on.

To remove an AC power supply from an EX9253 switch (see Figure 47 on page 126):

1. Switch off the dedicated customer-site circuit breaker for the power supply, and remove the power cord from the AC power source. Follow the instructions for your site.
2. Verify that the input status LED on the power supply is not lit.
3. 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.
4. Remove the power cord from the AC appliance inlet on the AC power supply faceplate.
5. Press the ejector lever on the side of the AC power supply to disconnect the power supply from the chassis.

6. Pull the power supply straight out of the chassis by using the handle.
7. Either replace the power supply promptly or install a cover panel over the empty slot.

Figure 47: Removing an AC Power Supply



SEE ALSO

EX9253 Power System | 27

Installing an AC Power Supply in an EX9253 Switch

Before you begin to install an AC power supply:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A Phillips (+) screwdriver, number 2 (not provided)

The AC power supply in an EX9253 switch is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. You can install up to six power supplies in an EX9253 switch. A minimum of two high line power supplies or three low line must be installed in the switch for non-redundant operation. The power supplies are installed in the slots labeled **PSM0** through **PSM5** on the rear of the chassis.

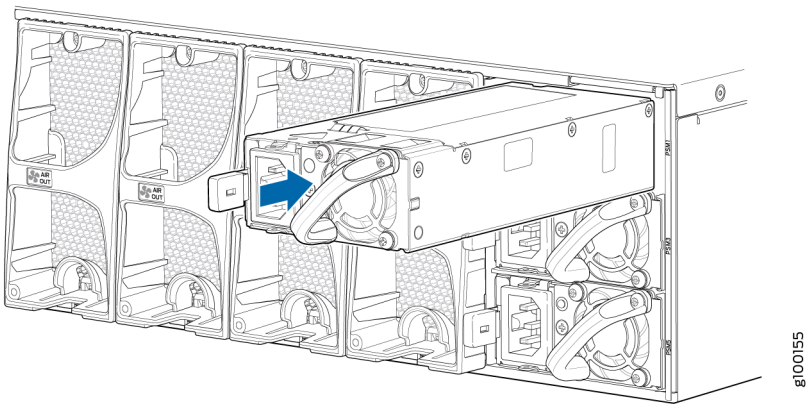
CAUTION: EX9253 switches use either AC or DC power supplies. Do not mix AC and DC power supplies in a switch.

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

To install an AC power supply in an EX9253 switch (see Figure 48 on page 127):

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 switch.
2. If the power supply slot has a cover panel on it, remove the cover panel, and save the cover panel for later use.
3. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag by using the handle.
4. Using both hands, hold and slide the AC power supply straight into the chassis until the power supply is fully seated in the power supply slot. The power supply faceplate must align with the power supply faceplate or the cover panel installed in the adjacent power supply slot.

Figure 48: Installing an AC Power Supply



5. Press the latch located on the left side of the power supply to slide it into the chassis.

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/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.

To connect power to an AC power supply, see "Connecting AC Power to an EX9253 Switch and Powering on the Switch" on page 85.

Removing a DC Power Supply in an EX9253 Switch

Before you begin to remove a DC power supply:

- Ensure that you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A socket screwdriver
- A replacement power supply or cover panel for the power supply slot

The DC power supply in an EX9253 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. To ensure proper operation of the switch, you must install a replacement power supply shortly after removing a power supply from the chassis. The power supplies are installed in the slots labeled **PSM0** through **PSM5** on the rear of the chassis.

CAUTION: Before you remove a power supply, ensure that you have power supplies sufficient to power the switch that remains in the chassis (see "EX9253 Power System" on page 27).

CAUTION: Do not leave the power supply slot empty for a long time while the switch is operational. Either replace the power supply unit promptly or install a cover panel over the empty slot.

WARNING: Before you perform DC power procedures, ensure there is no power to the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board

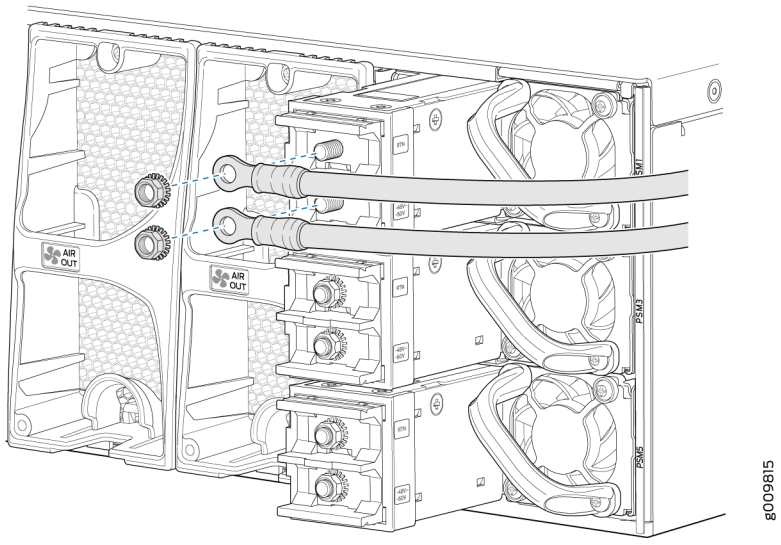
that services the DC circuit, switch the circuit breaker to the off position, and tape the switch handle of the circuit breaker in the off position.

NOTE: After powering off a power supply, wait for at least 60 seconds before turning it back on.

To remove a DC power supply from an EX9253 switch:

1. Switch off the dedicated customer site circuit breaker for the power supply being removed. Follow your site's procedures for ESD.
2. Make sure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cables might become active during the removal process.
3. Verify that the input status LED on the power supply is not lit.
4. 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.
5. Move the DC circuit breaker on the DC power supply faceplate to the off position.
6. Remove the clear plastic cover protecting the terminal studs on the faceplate.
7. Using a socket screwdriver, remove the screws from the DC power terminals.
8. Remove the cable lugs from the terminal studs (see Figure 49 on page 129).

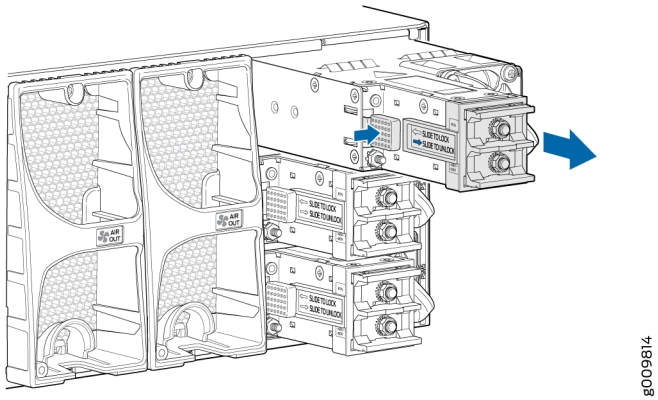
Figure 49: Removing DC Power Cables



9. Carefully move the power cables out of the way .
10. Press the latch located on the DC power supply, to release it from the chassis.

11. Pull the power supply straight out of the chassis (see Figure 50 on page 130).

Figure 50: Removing a DC Power Supply



12. Either replace a power supply promptly or install a cover panel over the empty slot.

Installing a DC Power Supply in an EX9253 Switch

Before you begin to install a DC power supply:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).
- Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A Phillips (+) screwdriver, number 2 (not provided)

The DC power supply in an EX9253 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. You can install up to six DC power supplies in an EX9253 switch. The power supplies are installed in the slots labeled **PSM0** through **PSM5** on the rear of the chassis.

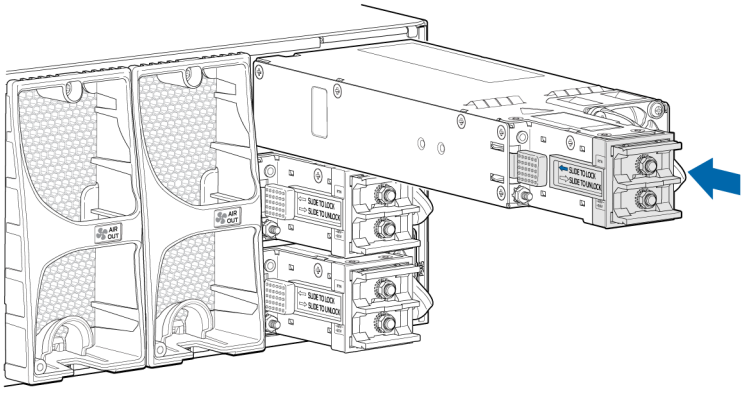
CAUTION: EX9253 switches use either AC or DC power supplies. Do not mix AC and DC power supplies in a switch.

WARNING: Before you perform DC power procedures, ensure there is no power to 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 switch handle of the circuit breaker in the off position.

To install a DC power supply in an EX9253 switch (see Figure 51 on page 131):

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 switch.
2. If the power supply slot has a cover panel on it, remove the cover panel, and save the cover panel for later use.
3. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.
4. Move the DC circuit breaker on the power supply faceplate to the off position.
5. Using both hands, hold and slide the DC power supply straight into the chassis until the power supply is fully seated in the power supply slot. The power supply faceplate must align with the power supply faceplate or the cover panel installed in the adjacent power supply slot.

Figure 51: Installing a DC Power Supply



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/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.

To connect power to a DC power supply, see "Connecting DC Power to an EX9253 Switch and Powering on the Switch" on page 87.

Maintaining Power Supplies in EX9253 Switches

IN THIS SECTION

- Purpose | 132
- Action | 132

Purpose

For optimum switch performance, verify the condition of the power supplies installed in the chassis.

Action

On a regular basis:

- Check the status of the power supplies by issuing the `show chassis environment pem` command. The output for EX9253 switches is similar to the following:

```
user@switch> show chassis environment pem
```

- Make sure that the power and grounding cables are arranged so that they do not obstruct access to other switch components.
- Routinely check the status LEDs on the power supply faceplate to determine whether the power supplies are functioning normally.
- Check the alarm LED on the front panel. Power supply failure or removal triggers an alarm that causes the LED to light. You can display the associated error messages by issuing the following command:

```
user@switch> show chassis alarms
```

- Periodically inspect the site to ensure that the grounding and power cables connected to the switch are securely in place and that there is no moisture accumulating near the switch.

Maintaining the EX9253 Routing Engine

IN THIS SECTION

- Removing a Routing Engine from an EX9253 Switch | 133
- Installing a Routing Engine in an EX9253 Switch | 135

Removing a Routing Engine from an EX9253 Switch

Before you begin to remove an RE:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A replacement RE or a cover panel for the RE slot

The Routing Engine (RE) in an EX9253 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions if RE graceful switchover is configured in the CLI. The REs are installed on the front panel. At least one RE must be installed in the switch. To ensure proper operation of the switch, you must install a replacement RE shortly after removing an RE from the chassis. The REs are installed in the slots labeled **RE0** and **RE1** on the front panel of the chassis.

CAUTION: Do not leave the RE slot empty for a long time while the switch is operational. Either replace the RE promptly or install a cover panel over the empty slot.

To remove an RE from an EX9253 switch (see Figure 52 on page 134):

1. Take the RE offline by issuing one of the following commands:

- To remove the primary RE:

```
user@switch>request vmhost halt
```

- To remove the backup RE:

```
user@switch>request vmhost halt slot-number
```

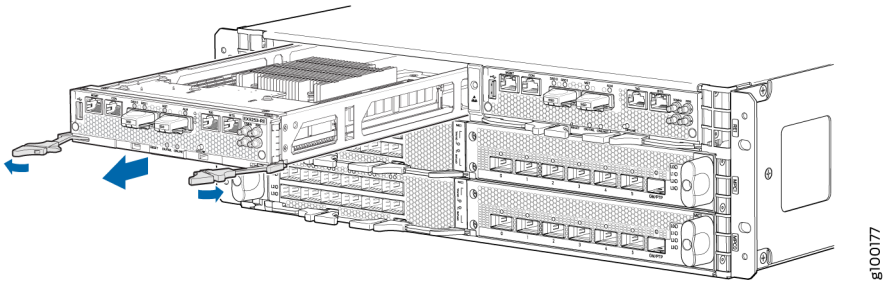
  You must specify the number of the slot in which the RE is installed—RE0 or RE1.

- To remove both the REs:

```
user@switch>request vmhost halt routing-engine
both
```

2. Place an electrostatic bag or antistatic mat on a flat, stable surface.
3. 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.
4. Open the ejector handle on the RE outward to unseat the RE.
5. Grasp the ejector handle, and slide the RE about halfway out of the chassis.

Figure 52: Removing an RE



6. Place one hand underneath the RE to support it, and slide it completely out of the chassis.
7. Place the RE on the antistatic mat or into an antistatic bag.
8. Either replace the RE promptly or install a cover panel over the empty slot.

SEE ALSO

Host Subsystem in an EX9253 Switch | 15

Installing a Routing Engine in an EX9253 Switch

Before you begin to install an RE:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap
- A Phillips (+) screwdriver, number 2

The Routing Engine (RE) in an EX9253 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. The REs are installed on the front panel. The REs are installed in the slots labeled **RE0** and **RE1** on the front panel of the chassis.

To install an RE:

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 switch.
2. Taking care not to touch RE components, remove the RE from its bag.
3. Lift the RE, and position it in the chassis with the faceplate facing you and the sides of the RE aligned with the guides in the RE slot on the switch chassis (see Figure 53 on page 137).
4. Slide the RE into the chassis until you feel resistance, carefully ensuring that it is correctly aligned.
5. Grasp the ejector handle and gently slide the RE fully into the slot using both hands until the RE is fully seated.
6. Verify that the **OK/FAIL** LED on the RE faceplate is lit steadily. If the **OK/FAIL** LED is lit red, remove and install the RE again.
7. Check the status of the RE by issuing the CLI command `show chassis routing-engine` command:

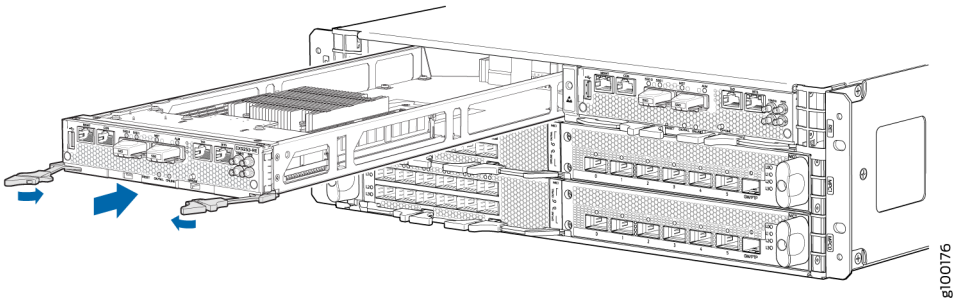
```
user@host> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state                  Master
    Election priority              Master (default)
    Temperature                 46 degrees C / 114 degrees F
```

```
    CPU temperature             46 degrees C / 114 degrees F
    DRAM                      49103 MB (49152 MB installed)
    Memory utilization           6 percent
    5 sec CPU utilization:
      User                       1 percent
      Background                 0 percent
      Kernel                     1 percent
      Interrupt                  0 percent
      Idle                      99 percent
    1 min CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     0 percent
      Interrupt                  0 percent
      Idle                      99 percent
    5 min CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     0 percent
      Interrupt                  0 percent
      Idle                      99 percent
    15 min CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     0 percent
      Interrupt                  0 percent
      Idle                      99 percent
    Model                        EX9253-RE
    Start time                   2018-04-29 20:19:29 PDT
    Uptime                       56 days, 10 hours, 22 minutes, 39 seconds
    Last reboot reason           0x2000:hypervisor reboot
    Load averages:               1 minute   5 minute  15 minute
                                     0.08       0.14       0.15
                                     0.08       0.14       0.15

Routing Engine status:
  Slot 1:
    Current state                Backup
    Election priority            Backup (default)
    Temperature                 45 degrees C / 113 degrees F
    CPU temperature             45 degrees C / 113 degrees F
    DRAM                      49103 MB (49152 MB installed)
    Memory utilization           3 percent
```

```
5 sec CPU utilization:
  User                      0 percent
  Background                0 percent
  Kernel                    0 percent
  Interrupt                 0 percent
  Idle                    100 percent
Model                       EX9253-RE
Start time                  2018-05-24 02:26:20 PDT
Uptime                      32 days, 4 hours, 15 minutes, 34 seconds
Last reboot reason          0x2000:hypervisor reboot
Load averages:              1 minute   5 minute  15 minute
                                0.03       0.05       0.07
```

Figure 53: Installing an RE



Maintaining the EX9253 Line Cards

IN THIS SECTION

- Handling and Storing Line Cards | **138**
- Maintaining Line Card Cables | **141**
- Removing a Line Card from an EX9253 Switch | **141**
- Installing a Line Card in an EX9253 Switch | **144**

Handling and Storing Line Cards

IN THIS SECTION

- Holding a Line Card | 138
- Storing a Line Card | 140

Components in the line cards are fragile. To avoid damaging the line cards, follow the procedures in this topic. The procedures use the following terms to describe the four edges of the line cards:

- Faceplate—Edge of the line card that has connectors into which you insert the transceivers.
- Connector edge—Edge opposite the faceplate.
- Top edge—Edge at the top of the line card when the line card is vertical.
- Bottom edge—Edge at the bottom of the line card when the line card is vertical.

CAUTION: Failure to handle line cards as specified in these procedures can cause irreparable damage to them.

Holding a Line Card

You must hold a line card horizontally when installing it in the chassis. You may hold a line card vertically or horizontally when carrying it.

CAUTION: Be prepared to support the full weight as you slide the line card into the chassis.

To hold a line card vertically:

1. Orient the line card so that the faceplate faces you. To verify the orientation, confirm that the text on the line card is right-side up.
2. Place one hand around the line card faceplate about a quarter of the way down from the top edge. Do not press hard on it.
3. Place the other hand at the bottom edge of the line card.

If the line card is horizontal before you grasp it, place your left hand around the faceplate and your right hand along the bottom edge.

To hold a line card horizontally:

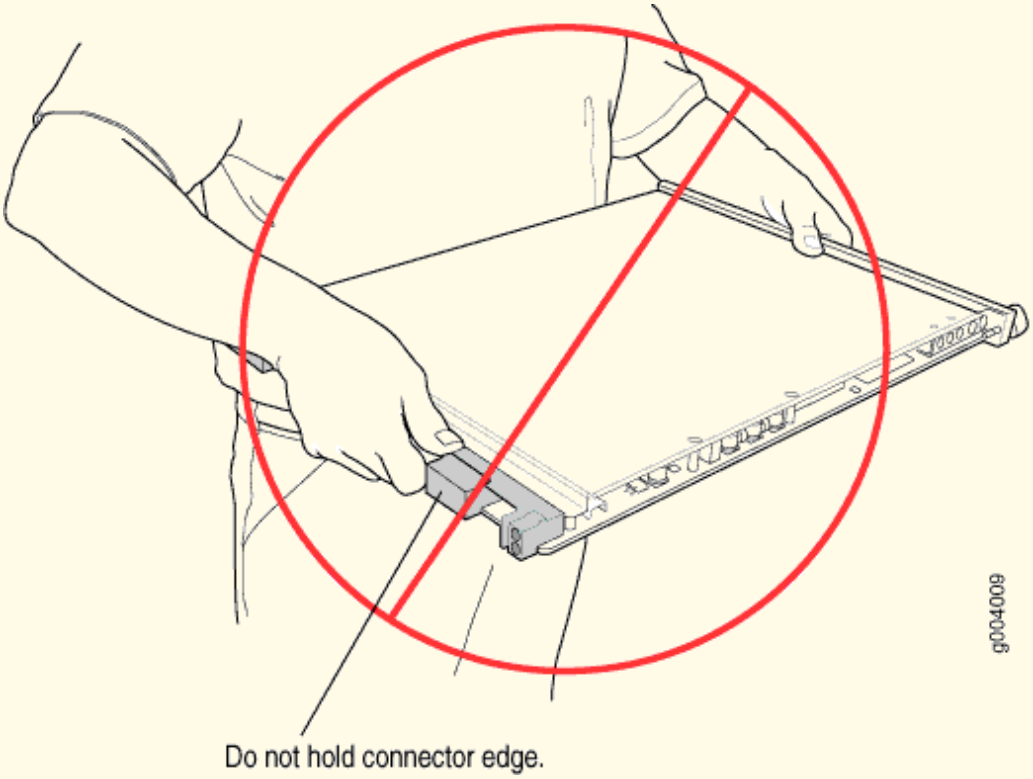
1. Orient the line card so that the faceplate faces you.
2. Grasp the top edge with your left hand and the bottom edge with your right hand.

You can rest the faceplate of the line card against your body as you carry it.

CAUTION: Take care not to hit the line card against any object as you carry it. Line card components are fragile.

Never hold or grasp the line card anywhere except the places mentioned in these procedures. In particular, never grasp the connector edge. See Figure 1.

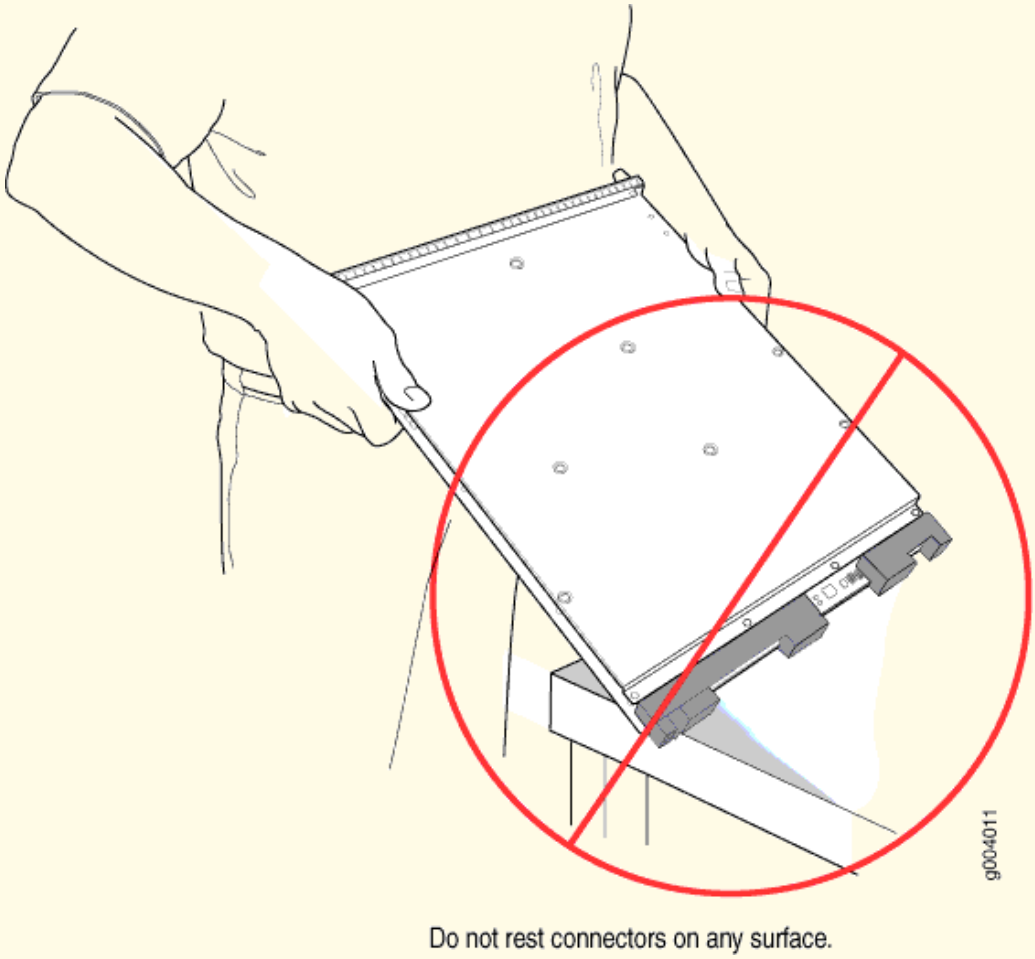
Figure 54: Do Not Grasp the Connector Edge



Never carry the line card while holding the faceplate with only one hand.

Do not rest any edge of a line card directly against a hard surface. See Figure 2.

Figure 55: Do Not Rest the Edge of a Line Card on a Hard Surface



If you must rest a line card temporarily on an edge, place a cushion between the edge and the surface.

Do not stack line cards on top of one another or on top of any other component. Place each line card separately in an antistatic bag or on an antistatic mat placed on a flat, stable surface.

Storing a Line Card

You must store a line card in the chassis or in a spare shipping container, horizontally and sheet metal side down. Do not stack line cards on top of one another or on top of any other component. Place each line card separately in an antistatic bag or on an antistatic mat placed on a flat, stable surface.

NOTE: Because a line card is heavy, and because antistatic bags are fragile, inserting the line card into the bag is best done with two people, each to do one of the following steps.

To insert a line card into an antistatic bag:

1. Hold the line card in the horizontal position with the faceplate facing you.
2. Slide the opening of the bag over the line card connector edge.

If you must insert the line card into a bag by yourself:

1. Lay the line card horizontally on a flat, stable surface, sheet metal side down.
2. Orient the line card with the faceplate facing you.
3. Carefully insert the line card connector edge into the opening of the bag and pull the bag toward you to cover the line card.

Maintaining Line Card Cables

Components in the line cards are fragile. To extend the lives of your line card cables and to avoid problems that can result from cable damage, follow these procedures:

To maintain line card cables:

- Place excess cable out of the way. Do not allow fastened loops of cable to dangle from the connector. Placing fasteners on the loops helps retain their shape.
- Keep the cable connections clean and free of dust and other particles, which can cause drops in the received power level. Always inspect cables and clean them if necessary before connecting a port.
- Label both ends of line card cables to identify them.

Removing a Line Card from an EX9253 Switch

Before you begin to remove a line card from an EX9253 switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

- If there are any transceivers installed in the line card, remove them before you remove the line card (see *Remove a Transceiver* or *Remove a QSFP28 Transceiver*).
- Ensure that you know how to handle and store the line card (see *Handling and Storing Line Cards*) and maintain line card cables (see *Maintaining Line Card Cables*).

Ensure that you have the following parts and tools available to remove a line card from an EX9253 switch chassis:

- ESD grounding strap
- An antistatic bag or an antistatic mat
- Replacement line card or a cover panel and its screws to cover the empty slot

EX9253 switches have field-replaceable unit (FRU) line cards that can be installed in the line card slots on the front of the switch chassis. The line cards are hot-insertable and hot-removable: You can remove and replace them without powering off the switch or disrupting switch functions. However, we recommend that you take them offline before removing them. To maintain proper cooling, you must install a replacement line card or a blank panel in the line card slot shortly after removing a line card from the chassis.

To remove a line card from an EX9253 switch (see Figure 56 on page 143):

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 cables connected to each port on the line card so you can reconnect the cables to the correct ports.
4. Use one of the following methods to take the line card offline:
   - Press and hold the **OFFLINE** button on the line card by using a narrow-ended tool that fits inside the opening that leads to the button until the **OK/FAIL** LED next to the button is unlit. You must not use any sharp object to press the **OFFLINE** button.
   - Issue the following CLI command:

     ```
     user@switch>request chassis fpc slot slot-number offline
     ```
5. Rotate the ejector handles simultaneously counterclockwise to unseat the line card.

> **CAUTION**: Do not lift the line card by holding the ejector handles on the faceplate or the edge connectors. A fully configured line card can weigh up to 18.35 lb (8.3 kg). The ejector handles cannot support the weight of the line card. Lifting the line card by the

ejector handles might bend them. Bent ejector handles prevent line cards from being properly seated in the chassis.

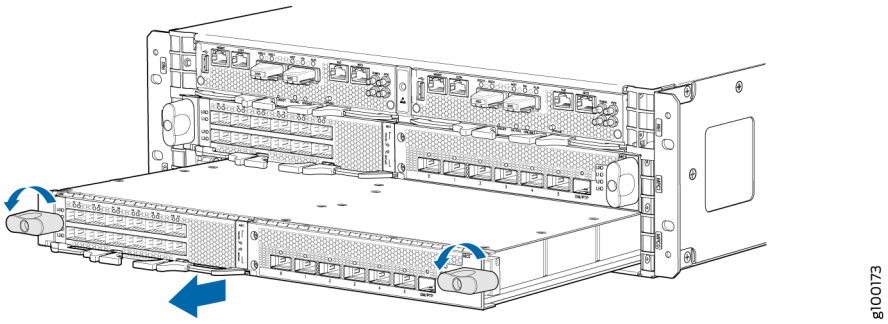
CAUTION: Do not stack line cards on top of one another or on top of any other component. Place each line card separately in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

6. Grasp the handles and gently slide the line card halfway out of the chassis (see *Handling and Storing Line Cards*).
7. Place one hand around the faceplate of the line card and the other hand under the line card to support it. Taking care not to touch line card components, pins, leads, or solder connections, gently slide the line card completely out of the chassis and place it in an antistatic bag or on its own antistatic mat placed on a flat, stable surface.

CAUTION: After the **OK/FAIL** LED is unlit, wait at least 30 seconds before inserting the line card, removing a line card from a different slot, or inserting a line card in another slot.

8. If you are not installing a line card in the emptied line card slot within a short time, install a cover panel over the slot. Do this to protect the interior of the chassis from dust or other foreign substances and to ensure that the airflow inside the chassis is not disrupted.

Figure 56: Removing a Line Card



SEE ALSO

EX9253-6Q12C Line Card | 35

Installing a Line Card in an EX9253 Switch

Before you begin to install a line card:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).
- If there are any transceivers installed in the line card, remove them before you install the line card. For instructions on removing transceivers, see *Remove a Transceiver* or *Remove a QSFP28 Transceiver*.
- Ensure that you know how to handle and store the line card (see *Handling and Storing Line Cards*) and maintain line card cables (see *Maintaining Line Card Cables*).

Ensure that you have the following parts and tools available to install a line card in the switch:

- ESD grounding strap

NOTE: A fully configured line card can weigh up to 18.35 lb (8.3 kg). Be prepared to support the full weight.

EX9253 switches have field-replaceable unit (FRU) line cards that can be installed in the line card slots on the front of the switch chassis. The line cards are hot-insertable and hot-removable: You can remove and replace them without powering off the switch or disrupting switch functions. However, we recommend that you take them offline before removing them.

To install a line card in the switch (see Figure 57 on page 146):

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 switch.
2. If the line card slot has a cover panel on it, rotate the ejector handles simultaneously counterclockwise to unseat the cover panel.
3. Grasp the ejector handles, and slide the cover panel out of the chassis. Save the cover panel for later use.
4. Taking care not to touch line card components, pins, leads, or solder connections, remove the line card from its bag.

CAUTION: Do not lift the line card by holding the ejector handles on the faceplate or the edge connectors. A fully configured line card can weigh up to 18.35 lb (8.3 kg). The ejector handles cannot support the weight of the line card. Lifting the line card by the ejector handles might bend them. Bent ejector handles prevent line cards from being properly seated in the chassis.

5. Place one hand around the faceplate of the line card and the other hand under the line card to support it.

CAUTION: Before you slide the line card into the slot on the switch chassis, ensure the line card is aligned correctly. Misalignment might cause the pins to bend, making the line card unusable.

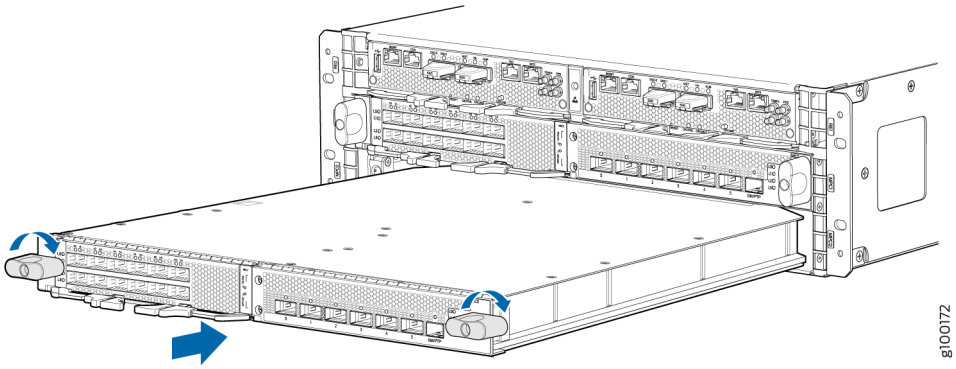
6. Lift the line card, and position it in the chassis with the faceplate facing you and the sides of the line card aligned with the guides in the line card slot on the switch chassis.
7. Make sure the handles stay in the open position and gently slide the line card fully into the slot using both hands.
8. Rotate both the ejector handles clockwise simultaneously to seat the line card.
9. Use one of the following methods to bring the line card online:
   - Press and hold the **OFFLINE** button on the line card by using a narrow-ended tool that fits inside the opening that leads to the button for about 5 seconds until the **OK/FAIL** LED next to the button is lit steadily. You must not use any sharp object to press the **OFFLINE** button.
   - Issue the following CLI command:

```
user@switch>request chassis fpc slot slot-number online
```

NOTE: When a line card is brought online, if the aggregate interface is initialized before the child interface is marked as part of the aggregate interface, there might be a loss of traffic from the aggregate interface for up to 30 seconds and the CPU usage of the line card installed on the switch might go up to 100%.

CAUTION: After the **OK/FAIL** LED is lit steadily, wait at least 30 seconds before removing the line card, removing a line card from a different slot, or inserting a line card in another slot.

Figure 57: Installing a Line Card



You can verify that the line card is functioning correctly by issuing the `show chassis fpc` and `show chassis fpc pic-status` commands.

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/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.

Maintaining Transceivers

IN THIS SECTION

- Remove a Transceiver | **147**
- Install a Transceiver | **149**
- Remove a QSFP28 Transceiver | **152**

Install a QSFP28 Transceiver | 154

Remove a Transceiver

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

Ensure that you have the following parts and tools available:

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

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

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

Figure 58 on page 149 shows how to remove a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers. Note that this procedure is the same for SFP+ and SFP28 transceivers which will be used in EX4100.

To remove a transceiver from a device:

1. Place the antistatic bag or antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the 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 protects your eyes from accidental exposure to laser light.

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

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

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

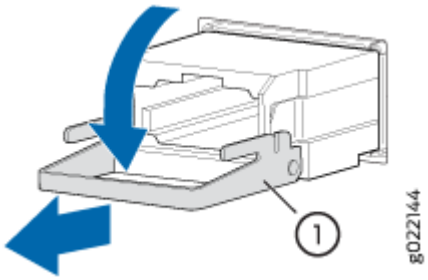
6. To remove an SFP, SFP+, XFP, or a QSFP+ transceiver:
   a. Using your fingers, pull open the ejector lever on the transceiver to unlock the transceiver.

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

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

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

Figure 58: Remove a QSFP+ Transceiver



1– Ejector lever

To remove a CFP transceiver:

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

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

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

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

Install a Transceiver

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

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

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

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

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

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

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

Figure 59 on page 152 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers. Note that this procedure is the same for SFP+ and SFP28 transceivers which will be used in EX4100.

To install a transceiver:

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

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Remove the transceiver from its bag.

3. Check to see whether the transceiver is covered with a rubber safety cap. If it is not, cover the transceiver with a rubber safety cap.

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

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

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

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

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

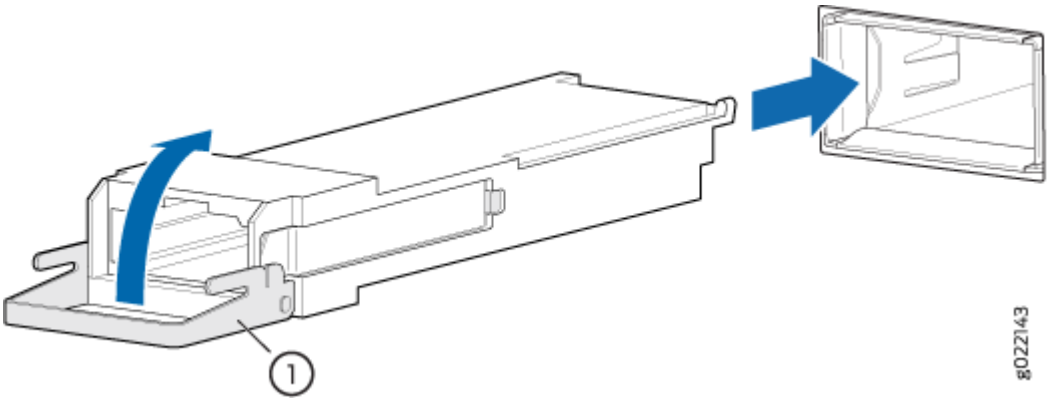
CAUTION: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

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

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

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

Figure 59: Install a Transceiver



1– Ejector lever

Remove a QSFP28 Transceiver

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

Ensure that you have the following parts and tools available:

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

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

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

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

To remove a QSFP28 transceiver (see Figure 60 on page 154):

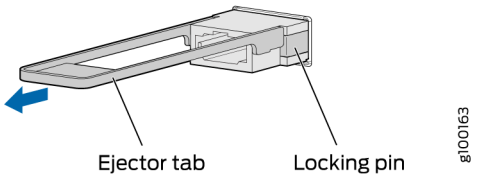
1. Place an antistatic bag or antistatic mat on a flat, stable surface to receive the QSFP28 transceiver. Have a rubber safety cap ready for the QSFP28 transceiver and the cable.
2. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
3. Label the cable connected to the QSFP28 transceiver so that you can later reconnect it to the correct QSFP28 transceiver.
4. Disconnect the cable from the transceiver. Immediately cover the transceiver and the end of the cable with a rubber safety cap.

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

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

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

Figure 60: Remove a QSFP28 Transceiver



6. Pull the ejector tab straight back. The locking pins on the transceiver automatically release the transceiver.
7. Place the transceiver on the antistatic mat or in the antistatic bag.
8. Place the dust cover over the empty port, or install the replacement transceiver.

Install a QSFP28 Transceiver

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

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

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

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

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

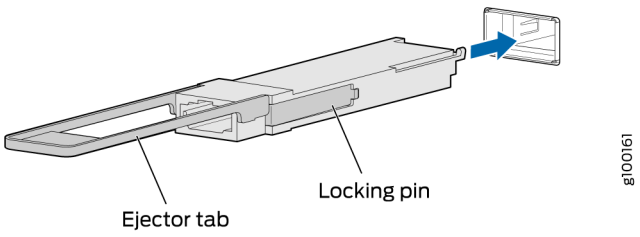
CAUTION: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running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

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

To install a QSFP28 transceiver (see Figure 61 on page 155):

1. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Verify that a rubber safety cap covers the QSFP28 transceiver.
3. Position the transceiver in front of the port on the device so that the QSFP28 connector faces the port.

Figure 61: Install a QSFP28 Transceiver



4. Slide the transceiver into the port until the locking pins lock in place. If there is resistance, remove the transceiver and flip it so that the connector faces the other direction.
5. Remove the rubber safety cap from the transceiver and the end of the cable, and insert the cable into the transceiver.

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

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

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

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

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

Maintain Fiber-Optic Cables

IN THIS SECTION

- Connect a Fiber-Optic Cable | **157**
- Disconnect a Fiber-Optic Cable | **158**
- How to Handle Fiber-Optic Cables | **158**

Connect a Fiber-Optic Cable

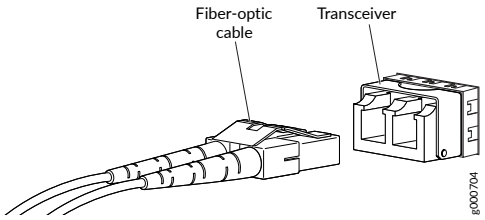
Before you connect a fiber-optic cable to an optical transceiver installed in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

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

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

1. If the fiber-optic cable connector is covered with a rubber safety cap, remove the cap. Save the cap.
2. Remove the rubber safety cap from the optical transceiver. Save the cap.
3. Insert the cable connector into the optical transceiver (see Figure 62 on page 157).

Figure 62: Connect a Fiber-Optic Cable to an Optical Transceiver Installed in a Device



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

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

Disconnect a Fiber-Optic Cable

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

Ensure that you have the following parts and tools available:

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

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

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

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

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

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

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

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

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

How to Handle Fiber-Optic Cables

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

Follow these guidelines when handling fiber-optic cables:

- When you unplug a fiber-optic cable from a transceiver, place rubber safety caps over the transceiver and on the end of the cable.
- Anchor fiber-optic cables to prevent stress on the connectors. When attaching a fiber-optic cable to a transceiver, be sure to secure the fiber-optic cable so that it does not support its own weight as it hangs to the floor. Never let a fiber-optic cable hang free from the connector.
- Avoid bending fiber-optic cables beyond their minimum bend radius. Bending fiber-optic cables into arcs smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.
- Frequent plugging and unplugging of fiber-optic cables in and out of optical instruments can damage the instruments, which are expensive to repair. To prevent damage from overuse, attach a short fiber extension to the optical equipment. The short fiber extension absorbs wear and tear due to frequent plugging and unplugging, 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 instructions in the cleaning kit you use.
    - After cleaning the transceiver, make sure that the connector tip of the fiber-optic cable is clean. Use only an approved alcohol-free fiber-optic cable cleaning kit such as the Opptex Cletop-S®Fiber Cleaner. Follow the instructions in the cleaning kit you use.

5
CHAPTER

Troubleshooting Hardware

Troubleshooting EX9253 Components | 161

Troubleshooting EX9253 Components

IN THIS SECTION

- Troubleshooting the Cooling System in an EX9253 Switch | **161**
- Troubleshooting the Power Supply in an EX9253 Switch | **162**
- Troubleshooting Line Cards in an EX9253 Switch | **164**
- Troubleshoot Temperature Alarms in EX Series Switches | **166**
- Understand Alarm Types and Severity Levels on EX Series Switches | **172**
- Chassis Component Alarm Conditions on EX9253 Switches | **174**
- Monitor System Log Messages | **181**

Troubleshooting the Cooling System in an EX9253 Switch

IN THIS SECTION

- Problem | **161**
- Cause | **161**
- Solution | **162**

Problem

Description

The fans in the fan tray are not functioning normally.

Cause

Solution

Follow these guidelines to troubleshoot the fans:

- Check the status LED on the fan tray and the alarm LED on the front panel.

  If the alarm LED on the front panel glows, use the CLI to get information about the source of an alarm condition:

  ```
  user@switch> show chassis alarms
  ```

  If the CLI output lists only one fan failure and the other fans are functioning normally, the fan is most likely faulty and you must replace the fan tray. You cannot replace a single fan. If one or more fans fail, you must replace the entire fan tray.

- Place your hand near the exhaust vents at the side of the chassis to determine whether the fans are pushing air out of the chassis.
- If a fan tray is removed, both a minor alarm and a major alarm occur.
- The following conditions automatically cause the fans to run at full speed and also trigger the indicated alarm:
  - A fan fails (major alarm).
  - The switch temperature exceeds the *temperature warm* threshold (minor alarm).
  - The temperature of the switch exceeds the *temperature hot* threshold (major alarm and automatic shutdown of the power supplies).

Troubleshooting the Power Supply in an EX9253 Switch

IN THIS SECTION

- Problem | **163**
- Cause | **163**
- Solution | **163**

Problem

Description

The power system is not functioning normally.

Cause

Solution

- Check the LEDs on each power supply faceplate. If a power supply is installed correctly and is functioning normally, the status LED lights steadily.
- Issue the CLI `show chassis environment pem` command to check the status of the power supplies. As shown in the sample output, the value `Online` in the rows labeled `State` must indicate that each of the power supplies is functioning normally.

```
user@switch> show chassis environment pem
```

If a power supply is not functioning normally, perform the following steps to diagnose and correct the problem:

- If a major alarm condition occurs, issue the `show chassis alarms` command to determine the source of the problem.
- If all power supplies have failed, the system temperature might have exceeded the threshold, causing the system to shut down.

> **NOTE**: If the system temperature exceeds the threshold, Junos OS shuts down all power supplies so that no status is displayed.
>
> Junos OS also can shut down one of the power supplies for other reasons. In this case, the remaining power supplies provide power to the switch, and you can still view the system status through the CLI or display.

- Check that the DC circuit breaker or AC input switch is in the on position and that the power supply is receiving power.
- Verify that the source circuit breaker has the proper current rating. Each power supply must be connected to a separate source circuit breaker.

- Verify that the AC power cord or DC power cables from the power source to the switch are not damaged. If the insulation is cracked or broken, immediately replace the cord or cable.
- Connect the power supply to a different power source with a new power cord or power cables. If the power supply status LEDs indicate that the power supply is not operating normally, the power supply is the source of the problem. Replace the power supply with a spare.

Troubleshooting Line Cards in an EX9253 Switch

IN THIS SECTION

Problem | 164
Solution | 164

Problem

Description

Line card is not functioning normally.

Solution

- The Routing Engine downloads the line card software to it under two conditions: the line card is present when the Routing Engine boots Junos OS, and the line card is installed and requested online through the CLI or the button on the front panel. The line card then runs diagnostics. When the line card is online and functioning normally, the **OK/FAIL** LED is lit green steadily.
- Make sure the line card is properly seated in the chassis. Check that each ejector handle is tight.
- Check the **OK/FAIL** LED on the line card. When the line card is online and functioning normally, the **OK/FAIL** LED is lit green steadily.

- Issue the `show chassis fpc` command to check the status of installed line cards. As shown in the sample output, the value `Online` in the column labeled `Slot State` indicates that the line card is functioning normally:

```
user@switch> show chassis fpc
                    Temp  CPU Utilization (%)   CPU Utilization (%)  Memory    Utilization
(%)

       Slot State            (C)  Total  Interrupt      1min   5min   15min  DRAM (MB)
Heap     Buffer
0  Online            52     17          0       20     22     23    3136       12         11
1  Empty
```

NOTE: The `show chassis fpc` command displays the status of the line cards.

For more detailed output, add the `detail` option. The following example does not specify a slot number, which is optional:

```
user@switch> show chassis fpc detail
Slot 0 information:
State                                Online
Total CPU DRAM                   3136 MB
Total RLDRAM                      771 MB
Total DDR DRAM                  18432 MB
Temperature                        52 degrees C / 125 degrees F
Start time                         2018-06-14 00:37:49 UTC
Uptime                             30 minutes, 35 seconds
Max MPC base power consumption   910 Watts
Max MIC1 power consumption       155 Watts
Max MPC total power consumption 1065 Watts
```

Troubleshoot Temperature Alarms in EX Series Switches

IN THIS SECTION

- Problem | 166
- Cause | 166
- Solution | 166

Problem

Description

EX Series switches trigger a temperature alarm `FPC 0 EX-PFE1 Temp Too Hot` when the switch temperature becomes too hot.

Cause

Temperature sensors in the chassis monitor the temperature of the chassis. The switch triggers an alarm if a fan fails or if the temperature of the chassis exceeds permissible levels for some other reason.

Solution

When the switch triggers a temperature alarm such as the `FPC 0 EX-PFE1 Temp Too Hot` alarm, use the `show chassis environment` and the `show chassis temperature-thresholds` commands to identify the condition that triggered the alarm.

CAUTION: To prevent the switch from overheating, operate it in an area with an ambient temperature within the recommended range. To prevent airflow restriction, allow at least 6 inches (15.2 cm) of clearance around the ventilation openings.

1. Connect to the switch by using Telnet, and issue the `show chassis environment` command. This command displays environmental information about the switch chassis, including the temperature. The command also displays information about the fans, power supplies, and Routing Engines. Following is a sample output on an EX9208 switch. The output is similar on other EX Series switches.

show chassis environment (EX9208 Switch)

```
user@switch> show chassis environment

Class Item                           Status     Measurement
Temp  PEM 0                          OK         40 degrees C / 104 degrees F
      PEM 1                          OK         40 degrees C / 104 degrees F
      PEM 2                          Absent
      PEM 3                          Absent
      Routing Engine 0               OK         37 degrees C / 98 degrees F
      Routing Engine 0 CPU           OK         35 degrees C / 95 degrees F
      Routing Engine 1               Absent
      Routing Engine 1 CPU           Absent
      CB 0 Intake                    OK         36 degrees C / 96 degrees F
      CB 0 Exhaust A                 OK         34 degrees C / 93 degrees F
      CB 0 Exhaust B                 OK         40 degrees C / 104 degrees F
      CB 0 ACBC                      OK         39 degrees C / 102 degrees F
      CB 0 XF A                      OK         46 degrees C / 114 degrees F
      CB 0 XF B                      OK         45 degrees C / 113 degrees F
      CB 1 Intake                    Absent
      CB 1 Exhaust A                 Absent
      CB 1 Exhaust B                 Absent
      CB 1 ACBC                      Absent
      CB 1 XF A                      Absent
      CB 1 XF B                      Absent
      FPC 3 Intake                   OK         48 degrees C / 118 degrees F
      FPC 3 Exhaust A                OK         46 degrees C / 114 degrees F
      FPC 3 Exhaust B                OK         51 degrees C / 123 degrees F
      FPC 3 XL TSen                  OK         67 degrees C / 152 degrees F
      FPC 3 XL Chip                  OK         58 degrees C / 136 degrees F
      FPC 3 XL_XR0 TSen              OK         67 degrees C / 152 degrees F
      FPC 3 XL_XR0 Chip              OK         51 degrees C / 123 degrees F
      FPC 3 XL_XR1 TSen              OK         67 degrees C / 152 degrees F
      FPC 3 XL_XR1 Chip              OK         63 degrees C / 145 degrees F
      FPC 3 XQ TSen                  OK         67 degrees C / 152 degrees F
      FPC 3 XQ Chip                  OK         63 degrees C / 145 degrees F
      FPC 3 XQ_XR0 TSen              OK         67 degrees C / 152 degrees F
      FPC 3 XQ_XR0 Chip              OK         68 degrees C / 154 degrees F
      FPC 3 XM TSen                  OK         67 degrees C / 152 degrees F
      FPC 3 XM Chip                  OK         76 degrees C / 168 degrees F
      FPC 3 XF TSen                  OK         67 degrees C / 152 degrees F
      FPC 3 XF Chip                  OK         75 degrees C / 167 degrees F
```

```
        FPC 3 PLX PCIe Switch TSe      OK          51 degrees C / 123 degrees F
        FPC 3 PLX PCIe Switch Chi      OK          54 degrees C / 129 degrees F
        FPC 3 Aloha FPGA 0 TSen        OK          51 degrees C / 123 degrees F
        FPC 3 Aloha FPGA 0 Chip        OK          70 degrees C / 158 degrees F
        FPC 3 Aloha FPGA 1 TSen        OK          51 degrees C / 123 degrees F
        FPC 3 Aloha FPGA 1 Chip        OK          75 degrees C / 167 degrees F
        FPC 5 Intake                   Testing
        FPC 5 Exhaust A                Testing
        FPC 5 Exhaust B                Testing
Fans    Top Rear Fan                   OK          Spinning at intermediate-speed
        Bottom Rear Fan                OK          Spinning at intermediate-speed
        Top Middle Fan                 OK          Spinning at intermediate-speed
        Bottom Middle Fan              OK          Spinning at intermediate-speed
        Top Front Fan                  OK          Spinning at intermediate-speed
        Bottom Front Fan               OK          Spinning at intermediate-speed
```

Table 34 on page 168 lists the output fields for the `show chassis environment` command. The table lists output fields in the approximate order in which they appear.

Table 34: `show chassis environment` Output Fields

Field Name	Field Description
`Class`	Information about the category or class of chassis component: • `Temp`: Temperature of air flowing through the chassis in degrees Celsius (°C) and degrees Fahrenheit (°F) • `Fans`: Information about the status of fans and blowers
`Item`	Information about the chassis components: • Flexible PIC Concentrators (FPCs)—that is, the line cards • Control Boards (CBs) • Routing Engines • Power entry modules (PEMs)—that is, the power supplies

Table 34: `show chassis environment` Output Fields *(Continued)*

Field Name	Field Description
`Status`	Status of the specified chassis component. For example, if `Class` is `Fans`, the fan status can be: • `OK`: The fans are operational. • `Testing`: The fans are being tested during initial power-on. • `Failed`: The fans have failed or the fans are not spinning. • `Absent`: The fan tray is not installed.
`Measurement`	Depends on the Class. For example, if `Class` is `Temp`, indicates the temperature in degrees Celsius (°C) and degrees Fahrenheit (°F). If the `Class` is `Fans`, indicates actual fan RPM.

2. Issue the command `show chassis temperature-thresholds` . This command displays the chassis temperature threshold settings. Following is a sample output on an EX9208 switch. The output is similar on other EX Series switches.

`show chassis temperature-thresholds` (EX9208 Switch)

```
user@ host> show chassis temperature-thresholds
                 Fan speed      Yellow alarm      Red alarm      Fire Shutdown
                (degrees C)      (degrees C)     (degrees C)      (degrees C)
Item             Normal  High    Normal  Bad fan   Normal  Bad fan     Normal
Chassis default  48    54        65       55        80       65        100
Routing Engine 0 70    80        95       95       110      110        112
FPC 3            55    60        75       65       105       80        110
FPC 5            55    60        75       65        90       80         95
```

Table 35 on page 170 lists the output fields for the `show chassis temperature-thresholds` command. The table lists output fields in the approximate order in which they appear.

Table 35: `show chassis temperature-thresholds` Output Fields

Field Name	Field Description
Item	Chassis component. You can configure the threshold information for components such as the chassis, the Routing Engines, and FPC for each slot in each FRU to display in the output. By default, information is displayed only for the chassis and the Routing Engines.
Fan speed	Temperature thresholds, in degrees Celsius, for the fans to operate at normal and at high speed. • **Normal**—The temperature threshold at which the fans operate at normal speed and when all the fans are present and functioning normally. • **High**—The temperature threshold at which the fans operate at high speed or when a fan has failed or is missing. **NOTE**: An alarm is triggered when the temperature exceeds the threshold settings for a yellow, amber, or red alarm.
Yellow or amber alarm	Temperature threshold, in degrees Celsius, that triggers a yellow or amber alarm. • **Normal**—The temperature threshold that must be exceeded on the device to trigger a yellow or amber alarm when the fans are running at full speed. • **Bad fan**—The temperature threshold that must be exceeded on the device to trigger a yellow or amber alarm when one or more fans have failed or are missing.
Red alarm	Temperature threshold, in degrees Celsius, that triggers a red alarm. • **Normal**—The temperature threshold that must be exceeded on the device to trigger a red alarm when the fans are running at full speed. • **Bad fan**—The temperature threshold that must be exceeded on the device to trigger a red alarm when one or more fans have failed or are missing.

Table 35: `show chassis temperature-thresholds` Output Fields *(Continued)*

Field Name	Field Description
Fire shutdown	Temperature threshold, in degrees Celsius, at which the switch shuts down in case of fire.

When a temperature alarm is triggered, you can identify the condition that triggered it by running the `show chassis environment` command to display the chassis temperature values for each component and comparing those with the temperature threshold values. You can display the temperature threshold values by running the `show chassis temperature-thresholds` command.

For example, for `FPC 3`:

- If the temperature of `FPC 3` exceeds 55° C, the output indicates that the fans are operating at a high speed (no alarm is triggered).
- If the temperature of `FPC 3` exceeds 65° C, a yellow alarm is triggered to indicate that one or more fans have failed.
- If the temperature of `FPC 3` exceeds 75° C, a yellow alarm is triggered to indicate that the temperature threshold limit is exceeded.
- If the temperature of `FPC 3` exceeds 80° C, a red alarm is triggered to indicate that one or more fans have failed.
- If the temperature of `FPC 3` exceeds 105° C, a red alarm is triggered to indicate that the temperature threshold limit is exceeded.
- If the temperature of `FPC 3` exceeds 110° C, the switch is powered off.

Table 36 on page 171 lists the possible causes for the switch to generate a temperature alarm. It also lists the respective remedies.

Table 36: Causes and Remedies for Temperature Alarms

Cause	Remedy
Ambient temperature is above threshold temperature.	Ensure that the ambient temperature is within the threshold temperature limit. See *Environmental Requirements and Specifications for EX Series Switches*.

Table 36: Causes and Remedies for Temperature Alarms *(Continued)*

Cause	Remedy
Fan module or fan tray has failed.	Perform the following steps: 1. Check the fan. 2. Replace the faulty fan module or fan tray. 3. If the above two checks show no problems, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).
Restricted airflow through the switch due to insufficient clearance around the installed switch.	Ensure that there is sufficient clearance around the installed switch.

Understand Alarm Types and Severity Levels on EX Series Switches

NOTE: This topic applies only to the J-Web Application package.

Alarms alert you to conditions that might prevent normal operation of the switch. Before monitoring alarms on a Juniper Networks EX Series Ethernet switch, become familiar with the terms defined in Table 37 on page 172.

Table 37: Alarm Terms

Term	Definition
alarm	Signal alerting you to conditions that might prevent normal operation. On a switch, the alarm signal is the **ALM** LED lit on the front of the chassis.
alarm condition	Failure event that triggers an alarm.

Table 37: Alarm Terms *(Continued)*

Term	Definition
alarm severity	Seriousness of the alarm. If the Alarm (**ALM**) LED is red, this indicates a major alarm. If the Alarm LED is yellow or amber, this indicates a minor alarm. If the Alarm LED is unlit, there is no alarm or the switch is halted.
chassis alarm	Preset alarm triggered by a physical condition on the switch such as a power supply failure, excessive component temperature, or media failure.
system alarm	Preset alarm triggered by a missing rescue configuration or failure to install a license for a licensed software feature. **NOTE**: On EX6200 switches, a system alarm can be triggered by an internal link error.

Alarm Types

The switch supports these alarms:

- Chassis alarms indicate a failure on the switch or one of its components. Chassis alarms are preset and cannot be modified.
- System alarms indicate a missing rescue configuration. System alarms are preset and cannot be modified, although you can configure them to appear automatically in the J-Web interface display or the CLI display.

Alarm Severity Levels

Alarms on switches have two severity levels:

- Major (red)—Indicates a critical situation on the switch that has resulted from one of the following conditions. A red alarm condition requires immediate action.
  - One or more hardware components have failed.
  - One or more hardware components have exceeded temperature thresholds.
  - An alarm condition configured on an interface has triggered a critical warning.
- Minor (yellow or amber)—Indicates a noncritical condition on the switch that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow or amber alarm condition requires monitoring or maintenance.

  A missing rescue configuration generates a yellow or amber system alarm.

SEE ALSO

Dashboard for EX Series Switches

Chassis Component Alarm Conditions on EX9253 Switches

IN THIS SECTION

- Backup Routing Engine Alarms | 179

This topic describes the chassis component alarm conditions on EX9253 switches.

Table 38 on page 174 lists the alarms that the chassis components can generate on EX9253 switches.

Table 38: Chassis Component Alarm Conditions on EX9253 Switches

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Alternative media	The switch boots from an alternate boot device, the secondary SSD. The primary SSD (**SSD0**) is typically the primary boot device. The Routing Engine boots from the secondary SSD (**SSD1**) when the primary boot device fails.	Minor (yellow)	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).
Line Cards	A line card is offline.	Minor (yellow)	Check the line card. Remove and reinstall the line card. If this fails, replace the failed card.
	A line card has failed.	Major (red)	Replace the failed line card.
	A line card has been removed.	Major (red)	Install a line card in the empty slot.

Table 38: Chassis Component Alarm Conditions on EX9253 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Fan trays	A fan tray has been removed from the chassis.	Major (red)	Install the missing fan tray.
	One fan in the chassis is not spinning or is spinning below required speed.	Major (red)	Replace the fan tray.
Hot swapping	Too many hot-swap interrupts are occurring. This message generally indicates that a hardware component that plugs into the switch's backplane from the front (generally, an FPC) is broken.	Major (red)	Replace the failed components.
Power supplies	A power supply has been removed from the chassis.	Minor (yellow)	Install a power supply in the empty slot.
	A power supply has a high temperature.	Major (red)	Replace the failed power supply.
	A power supply input has failed.	Major (red)	Check power supply input connection.
	A power supply output has failed.	Major (red)	Check power supply output connection.
	A power supply has failed.	Major (red)	Replace the failed power supply.
	AC and DC power supplies are installed.	Major (red)	Do not mix AC and DC power supplies.
	Inadequate number of power supplies.	Major (red)	Install an additional power supply.

Table 38: Chassis Component Alarm Conditions on EX9253 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Routing Engine	Excessive framing errors on console port. An excessive framing error alarm is triggered when the default framing error threshold of 20 errors per second on a serial port is exceeded. A faulty serial console port cable might be connected to the device.	Minor (yellow)	Replace the serial cable connected to the device. If the cable is replaced and no excessive framing errors are detected within five minutes from the last detected framing error, the alarm is cleared automatically.
	Error in reading or writing SSD.	Minor (yellow)	Reformat the SSD and install the bootable image. If this fails, replace the failed Routing Engine.
	System booted from the default backup Routing Engine. If you manually switched primary role, ignore this alarm condition.	Minor (yellow)	Install the bootable image on the default primary Routing Engine. If this fails, replace the failed Routing Engine.
	System booted from SSD.	Minor (yellow)	Install the bootable image on the SSD. If this fails, replace failed the Routing Engine.
	SSD missing in boot list.	Major (red)	Replace the failed Routing Engine.
	Routing Engine failed to boot.	Major (red)	Replace the failed Routing Engine.

Table 38: Chassis Component Alarm Conditions on EX9253 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
	The Ethernet management interface (fxp0 or em0) on the Routing Engine is down.	Major (red)	• Check the interface cable connection. • Reboot the system. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).
	/var partition usage is high.	Minor (yellow)	Clean up the system file storage space on the switch. For more information, see Freeing Up System Storage Space.
	/var partition is full.	Major (red)	Clean up the system file storage space on the switch. For more information, see Freeing Up System Storage Space.
	Rescue configuration is not set.	Minor (yellow)	Use the `request system configuration rescue save` command to set the rescue configuration.
	Feature usage requires a license or the license for the feature usage has expired.	Minor (yellow)	Install the required license for the feature specified in the alarm. For more information, see Understanding Software Licenses for EX Series Switches.
Temperature	The temperature has exceeded the defined threshold for the `Bad fan` condition listed in the output of show chassis temperature-thresholds command.	Minor (yellow)	• Check room temperature. • Check air filter and replace it, if required. • Check airflow. • Replace the fan tray.

Table 38: Chassis Component Alarm Conditions on EX9253 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
	The temperature has exceeded the defined threshold for the `Normal` condition listed in the output of `show chassis temperature-thresholds` command.	Minor (yellow)	• Check room temperature. • Check air filter and replace it, if required. • Check airflow. • Check the fans.
	The temperature has exceeded the defined threshold for the `Red alarm` condition listed in the output of `show chassis temperature-thresholds` command.	Major (red)	• Check room temperature. • Check air filter and replace it, if required. • Check airflow. • Check the fans.
	The temperature has exceeded the defined threshold for the `Fire Shutdown` condition listed in the output of `show chassis temperature-thresholds` command.	Major (red)	• Check room temperature. • Check air filter and replace it, if required. • Check airflow. • Check fans.
	The temperature sensor has failed.	Major (red)	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).

Backup Routing Engine Alarms

For switches with primary and backup Routing Engines, a primary Routing Engine can generate alarms for events that occur on a backup Routing Engine. Table 39 on page 179 lists chassis alarms generated for events that occur on a backup Routing Engine.

NOTE: Because the failure occurs on the backup Routing Engine, alarm severity for some events (such as Ethernet interface failures) is yellow instead of red.

NOTE: For information about configuring redundant Routing Engines, see the Junos OS High Availability Library for Routing Devices.

Table 39: Backup Routing Engine Alarms

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Alternative media	The backup Routing Engine boots from an alternate boot device, the SSD. The primary SSD (**SSD0**) is typically the primary boot device. The Routing Engine boots from the secondary SSD (**SSD1**) when the primary boot device fails.	Minor (yellow)	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).
Boot Device	The boot device is missing in boot list on the backup Routing Engine.	Major (red)	Replace the failed backup Routing Engine.

Table 39: Backup Routing Engine Alarms *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Ethernet	The Ethernet management interface (fxp0 or em0) on the backup Routing Engine is down.	Minor (yellow)	• Check the interface cable connection. • Reboot the system. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).
FRU Offline	The backup Routing Engine has stopped communicating with the primary Routing Engine.	Minor (yellow)	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).
Multibit Memory ECC	The backup Routing Engine reports a multibit ECC error.	Minor (yellow)	• Reboot the system with the board reset button on the backup Routing Engine. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).

SEE ALSO

Field-Replaceable Units in an EX9253 Switch | 13

Monitor System Log Messages

IN THIS SECTION

- Purpose | 181
- Action | 181
- Meaning | 185

Purpose

NOTE: This topic applies only to the J-Web Application package.

Use the monitoring functionality to filter and view system log messages for EX Series switches.

Action

To view events in the J-Web interface, select **Monitor** > **Events and Alarms** > **View Events**.

Apply a filter or a combination of filters to view messages. You can use filters to display relevant events. Table 40 on page 182 describes the different filters, their functions, and the associated actions.

To view events in the CLI, enter the following command:

```
show log
```

Table 40: Filtering System Log Messages

Field	Function	Your Action
System Log File	Specifies the name of a system log file for which you want to display the recorded events. Lists the names of all the system log files that you configure. By default, a log file, `messages`, is included in the `/var/log/` directory.	To specify events recorded in a particular file, select the system log filename from the list— for example, **messages**. Select **Include archived files** to include archived files in the search.
Process	Specifies the name of the process generating the events you want to display. To view all the processes running on your system, enter the CLI command `show system processes`. For more information about processes, see the *Junos OS Installation and Upgrade Guide*.	To specify events generated by a process, type the name of the process. For example, type `mgd` to list all messages generated by the management process.
Date From To	Specifies the time period in which the events you want displayed are generated. Displays a calendar that allows you to select the year, month, day, and time. It also allows you to select the local time. By default, the messages generated during the last one hour are displayed. End Time shows the current time and Start Time shows the time one hour before End Time.	To specify the time period: • Click the **Calendar** icon and select the year, month, and date— for example, **02/10/2007**. • Click the **Calendar** icon and select the year, month, and date— for example, **02/10/2007**. • Click to select the time in hours, minutes, and seconds.

Table 40: Filtering System Log Messages *(Continued)*

Field	Function	Your Action
Event ID	Specifies the event ID for which you want to display the messages. Allows you to type part of the ID and completes the remainder automatically. An event ID, also known as a system log message code, uniquely identifies a system log message. It begins with a prefix that indicates the generating software process or library.	To specify events with a specific ID, type the partial or complete ID— for example, **TFTPD_AF_ERR**.
Description	Specifies text from the description of events that you want to display. Allows you to use regular expressions to match text from the event description. **NOTE**: Regular expression matching is case-sensitive.	To specify events with a specific description, type a text string from the description with regular expression. For example, type **^Initial*** to display all messages with lines beginning with the term *Initial*.
Search	Applies the specified filter and displays the matching messages.	To apply the filter and display messages, click **Search**.
Reset	Resets all the fields in the Events Filter box.	To reset the field values that are listed in the Events Filter box, click **Reset**.

Table 40: Filtering System Log Messages *(Continued)*

Field	Function	Your Action
Generate Raw Report **NOTE**: • Starting in Junos OS Release 14.1X53, a Raw Report can be generated from the log messages being loaded in the Events Detail table. The Generate Raw Report button is enabled after the event log messages start loading in the Events Detail table. • After the log messages are completely loaded in the Events Detail table, Generate Raw Report changes to Generate Report.	Generates a list of event log messages in nontabular format.	To generate a raw report: 1. Click **Generate Raw Report**. The *Opening filteredEvents.html* window appears. 2. Select **Open with** to open the HTML file or select **Save File** to save the file. 3. Click **OK**.

Table 40: Filtering System Log Messages *(Continued)*

Field	Function	Your Action
Generate Report **NOTE**: Starting in Junos OS Release 14.1X53, a Formatted Report can be generated from event log messages being loaded in an Events Detail table. The Generate Report button appears only after event log messages are completely loaded in the Events Detail table. The Generate Raw Report button is displayed while event log messages are being loaded.	Generates a list of event log messages in tabular format, which shows system details, events filter criteria, and event details.	To generate a formatted report: 1. Click **Generate Report**. The *Opening Report.html* window appears. 2. Select **Open with** to open the HTML file or select **Save File** to save the file. 3. Click **OK**.

Meaning

Table 41 on page 186 describes the Event Summary fields.

NOTE: By default, the View Events page in the J-Web interface displays the most recent 25 events, with severity levels highlighted in different colors. After you specify the filters, Event Summary displays the events matching the specified filters. Click the **First**, **Next**, **Prev**, and **Last** links to navigate through messages.

Table 41: Viewing System Log Messages

Field	Function	Additional Information
Process	Displays the name and ID of the process that generated the system log message.	The information displayed in this field is different for messages generated on the local Routing Engine than for messages generated on another Routing Engine (on a system with two Routing Engines installed and operational). Messages from the other Routing Engine also include the identifiers **re0** and **re1** that identify the Routing Engine.
Severity	Severity level of a message is indicated by different colors. • **Unknown**—Gray—Indicates no severity level is specified. • **Debug/Info/Notice**—Green—Indicates conditions that are not errors but are of interest or might warrant special handling. • **Warning**—Yellow or Amber—Indicates conditions that warrant monitoring. • **Error**—Blue—Indicates standard error conditions that generally have less serious consequences than errors in the emergency, alert, and critical levels. • **Critical**—Pink—Indicates critical conditions, such as hard-drive errors. • **Alert**—Orange—Indicates conditions that require immediate correction, such as a corrupted system database. • **Emergency**—Red—Indicates system panic or other conditions that cause the switch to stop functioning.	A severity level indicates how seriously the triggering event affects switch functions. When you configure a location for logging a facility, you also specify a severity level for the facility. Only messages from the facility that are rated at that level or higher are logged to the specified file.

Table 41: Viewing System Log Messages *(Continued)*

Field	Function	Additional Information
Event ID	Displays a code that uniquely identifies the message. The prefix on each code identifies the message source, and the rest of the code indicates the specific event or error.	The event ID begins with a prefix that indicates the generating software process. Some processes on a switch do not use codes. This field might be blank in a message generated from such a process. An event can belong to one of the following type categories: • **Error**—Indicates an error or failure condition that might require corrective action. • **Event**—Indicates a condition or occurrence that does not generally require corrective action.
Event Description	Displays a more detailed explanation of the message.	
Time	Displays the time at which the message was logged.	

SEE ALSO

Check Active Alarms with the J-Web Interface

Understand Alarm Types and Severity Levels on EX Series Switches

Release History Table

Release	Description
14.1X53	Starting in Junos OS Release 14.1X53, a Raw Report can be generated from the log messages being loaded in the Events Detail table.
14.1X53	Starting in Junos OS Release 14.1X53, a Formatted Report can be generated from event log messages being loaded in an Events Detail table.

CHAPTER 6

Contacting Customer Support and Returning the Chassis or Components

Returning an EX9253 Chassis or Components | 189

Returning an EX9253 Chassis or Components

IN THIS SECTION

- Returning an EX9253 Switch or Component for Repair or Replacement | 189
- Locating the Serial Number on an EX9253 Switch or Component | 190
- Contact Customer Support to Obtain a Return Material Authorization | 194
- Packing an EX9253 Switch or Component | 195

Returning an EX9253 Switch or Component for Repair or Replacement

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

1. Determine the serial number of the chassis if you need to return the switch. If you need to return one or more components, determine the serial number for each component. For instructions, see "Locating the Serial Number on an EX9253 Switch or Component" on page 190.
2. Obtain an RMA number from 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 as described in "Packing an EX9253 Switch or Component" on page 195.

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

Locating the Serial Number on an EX9253 Switch or Component

IN THIS SECTION

- Locating the Serial Number ID Label on an EX9253 Switch Chassis | **191**
- Locating Serial Number ID Labels on FRU Components | **191**

If you are returning a switch or hardware component to Juniper Networks for repair or replacement, you must locate the serial number of the switch or component. You must provide the serial number to the Juniper Networks Technical Assistance Center (JTAC) when you contact them to obtain Return Materials Authorization (RMA). See *Contact Customer Support to Obtain Return Material Authorization*.

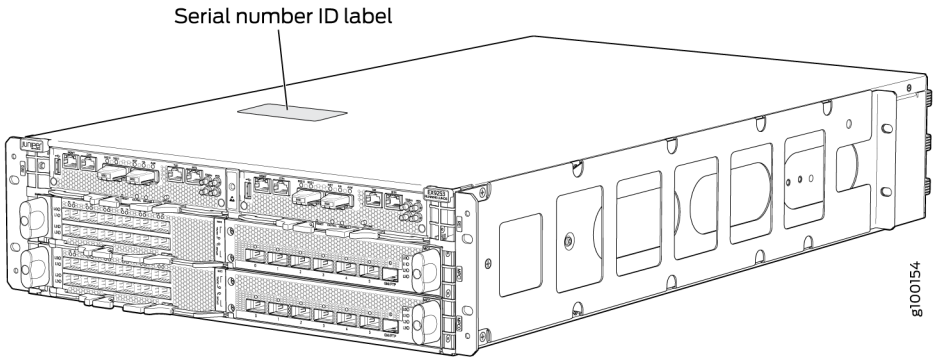
If the switch is operational and you can access the command-line interface (CLI), you can list serial numbers for the switch and for some components with a CLI command. If you do not have access to the CLI or if the serial number for the component does not appear in the command output, you can locate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

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

Locating the Serial Number ID Label on an EX9253 Switch Chassis

The serial number ID label is located on the top of the chassis on an EX9253 switch (see Figure 1).

Figure 63: Location of the Serial Number ID Label on EX9253 Switch Chassis



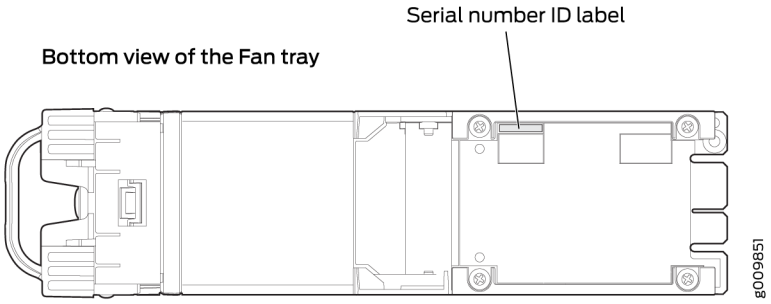
Locating Serial Number ID Labels on FRU Components

Field-replaceable units (FRUs) are components that you can replace at your site. The FRUs in EX9253 switches are hot-removable and hot-insertable. You can remove and replace them without powering off the switch. For each of these FRUs, you must remove the FRU from the switch chassis to see the FRU' s serial number ID label. The FRUs in EX9253 switches are:

- Routing Engine
- Power supplies
- Fan trays
- Air filter unit
- Air filter
- Line cards
- Transceivers

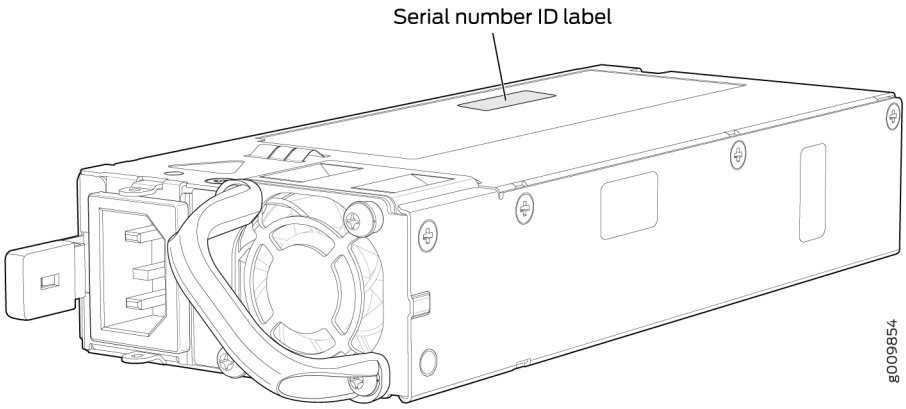
- Fan tray— The serial number ID label is on the base of the fan tray (see Figure 64 on page 192).

Figure 64: Location of the Serial Number ID Label on a Fan Tray



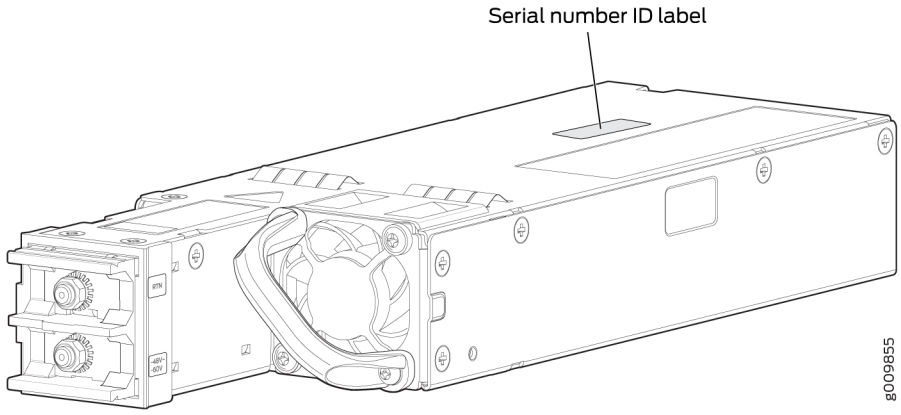
- AC power supply—The serial number ID label is on the top of the AC power supply (see Figure 65 on page 192).

Figure 65: Location of the Serial Number ID Label on an AC Power Supply



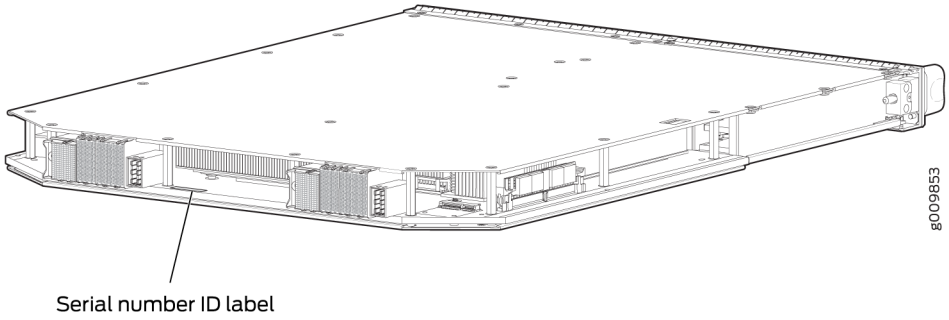
- DC power supply—The serial number ID label is on the top of the DC power supply (see Figure 66 on page 193).

Figure 66: Location of the Serial Number ID Label on a DC Power Supply



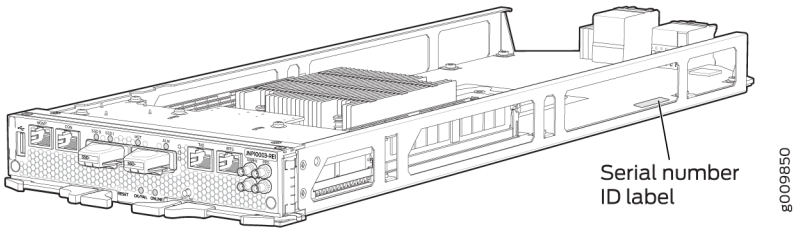
- Line card—The serial number ID label is on the connector end (see Figure 67 on page 193).

Figure 67: Location of the Serial Number ID Label on a Line Card



- Routing Engine—The serial number ID label is on the connector end (see Figure 68 on page 194).

Figure 68: Location of the Serial Number ID Label on a Routing Engine



RELATED DOCUMENTATION

Removing a Fan Tray from an EX9253 Switch | **112**

Removing the Air Filter Unit from an EX9253 Switch | **117**

Removing an AC Power Supply from an EX9253 Switch | **125**

Removing a DC Power Supply in an EX9253 Switch | **128**

Removing a Routing Engine from an EX9253 Switch | **133**

Removing a Line Card from an EX9253 Switch | **141**

Remove a Transceiver

Replacing a QSFP28 Transceiver on an SRX4600 Services Gateway

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 an EX9253 Switch or Component

IN THIS SECTION

- Packing an EX9253 Switch | **196**
- Packing EX9253 Switch Components for Shipping | **197**

If you are returning an EX9253 switch or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you begin to pack the switch or component, ensure you have:

- Followed all the steps listed in *Contact Customer Support to Obtain Return Material Authorization*.

- Retrieved the original shipping carton and packing materials. Contact your JTAC representative if you do not have these materials, to learn about approved packing materials. See *Contact Customer Support to Obtain Return Material Authorization*.
- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

Packing an EX9253 Switch

If you need to transport the switch to another location or return the switch to Juniper Networks, you need to pack the switch securely in its original packaging to prevent damage during transportation.

Before you begin packing a switch, ensure that you have the following parts and tools available:

- The shipping carton and packing materials in which the switch was originally shipped.
- An ESD wrist strap

To pack the switch for shipment:

1. Retrieve the shipping carton and packing materials in which the switch was originally shipped. If you do not have these materials, contact your Juniper Networks representative about approved packaging materials.
2. On the console or other management device connected to the switch, enter CLI operational mode and issue the following command to shut down the switch software.

   ```
   user@switch> request system halt
   ```

   Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see the CLI Explorer.
3. 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.
4. Shut down power to the switch by pressing the AC input switch or DC circuit breaker for all power supplies to the off position.
5. Disconnect power from the switch.
6. Remove the cables that connect to all external devices.
7. Remove all field replaceable units (FRUs) from the switch (see "Field-Replaceable Units in an EX9253 Switch" on page 13).
8. Remove the switch from the rack.
9. Place the switch in the shipping carton or onto the pallet. If on a pallet, bolt the switch to the pallet.
10. Cover the switch with an antistatic bag and place the packing foam on top of and around the switch.

11. Replace the accessory box on top of the packing foam.
12. Securely tape the box closed or place the carton cover over the switch.
13. Write the RMA number on the exterior of the box to ensure proper tracking.

Packing EX9253 Switch Components for Shipping

Before you begin to pack a switch component, ensure that you have the following parts and tools available:

- Antistatic bag, one for each component
- An ESD wrist strap

To pack EX9253 switch components, follow the instructions here.

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

To pack EX9253 switch components:

- Place individual components in antistatic bags.
- Use the original packing materials if they are available. If the original packing materials are not available, ensure the component is adequately packed to prevent damage during transit. The packing material you use must be able to support the weight of the component.
- Ensure that the components are adequately protected by wrapping them well with packing materials. Pack the component in an oversized box (if the original box is not available) with extra packing material around the unit so that the component is prevented from moving around inside the box.
- Securely tape the box closed.
- Write the RMA number on the exterior of the box to ensure proper tracking.

RELATED DOCUMENTATION

Parts Inventory (Packing List) for an EX9253 Switch | 74

CHAPTER 7

Safety and Compliance Information

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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 vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

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

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

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

Qualified Personnel Warning

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

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

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

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

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

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

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

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

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

Warning Statement for Norway and Sweden

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

Varning! Apparaten skall anslutas till jordat nätuttag.

Fire Safety Requirements

IN THIS SECTION

- Fire Suppression | 204
- Fire Suppression Equipment | 204

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

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

Fire Suppression

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

Fire Suppression Equipment

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

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

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

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

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

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

Installation Instructions Warning

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

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

Varoitus Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.

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

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

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

Advarsel Les installasjonsinstruksjonene før systemet kobles til strømkilden.

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

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

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

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 het rek voorzien is van stabiliseringshulpmiddelen, dient u de stabilisatoren te monteren voordat u het toestel in het rek monteert of het daar een servicebeurt geeft.

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

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

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

- Le rack sur lequel est monté le Juniper Networks switch doit être fixé à la structure du bâtiment.

- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

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

- Der Juniper Networks switch muß in einem Gestell installiert werden, das in der Gebäudestruktur verankert ist.
- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.
- Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.
- Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.

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

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

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

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

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

- O Juniper Networks switch deverá ser instalado numa prateleira fixa à estrutura do edificio.
- Esta unidade deverá ser montada na parte inferior da estante, caso seja esta a única unidade a ser montada.
- Ao montar esta unidade numa estante parcialmente ocupada, coloque os itens mais pesados na parte inferior da estante, arrumando-os de baixo para cima.
- Se a estante possuir um dispositivo de estabilização, instale-o antes de montar ou reparar a unidade.

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

- El Juniper Networks switch debe instalarse en un bastidor fijado a la estructura del edificio.
- Colocar el equipo en la parte inferior del bastidor, cuando sea la única unidad en el mismo.

- Cuando este equipo se vaya a instalar en un bastidor parcialmente ocupado, comenzar la instalación desde la parte inferior hacia la superior colocando el equipo más pesado en la parte inferior.
- Si el bastidor dispone de dispositivos estabilizadores, instalar éstos antes de montar o proceder al mantenimiento del equipo instalado en el bastidor.

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

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

Grounded Equipment Warning

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

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

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

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

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

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

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

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

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

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

Radiation from Open Port Apertures Warning

LASER WARNING: Because invisible radiation might be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures.

Waarschuwing Aangezien onzichtbare straling vanuit de opening van de poort kan komen als er geen fiberkabel aangesloten is, dient blootstelling aan straling en het kijken in open openingen vermeden te worden.

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

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

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

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

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

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

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

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

Laser and LED Safety Guidelines and Warnings

IN THIS SECTION

- General Laser Safety Guidelines | **215**
- Class 1 Laser Product Warning | **215**
- Class 1 LED Product Warning | **216**
- Laser Beam Warning | **216**

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

Observe the following guidelines and warnings:

General Laser Safety Guidelines

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

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

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

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

Class 1 Laser Product Warning

LASER WARNING: Class 1 laser product.
Waarschuwing Klasse-1 laser produkt.

Varoitus Luokan 1 lasertuote.

Avertissement Produit laser de classe I.

Warnung Laserprodukt der Klasse 1.

Avvertenza Prodotto laser di Classe 1.

Advarsel Laserprodukt av klasse 1.

Aviso Produto laser de classe 1.

¡Atención! Producto láser Clase I.

Varning! Laserprodukt av klass 1.

Class 1 LED Product Warning

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

Varoitus Luokan 1 valodiodituote.

Avertissement Alarme de produit LED Class I.

Warnung Class 1 LED-Produktwarnung.

Avvertenza Avvertenza prodotto LED di Classe 1.

Advarsel LED-produkt i klasse 1.

Aviso Produto de classe 1 com LED.

¡Atención! Aviso sobre producto LED de Clase 1.

Varning! Lysdiodprodukt av klass 1.

Laser Beam Warning

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

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

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

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

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

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

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

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

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

Maintenance and Operational Safety Guidelines and Warnings

IN THIS SECTION

- Battery Handling Warning | **217**
- Jewelry Removal Warning | **218**
- Lightning Activity Warning | **220**
- Operating Temperature Warning | **221**
- Product Disposal Warning | **222**

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

Battery Handling Warning

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

Waarschuwing Er is ontploffingsgevaar als de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type dat door de fabrikant

aanbevolen is. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften weggeworpen te worden.

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

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

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

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

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

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

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

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

Jewelry Removal Warning

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

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

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

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

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

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

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

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

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

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

Lightning Activity Warning

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

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

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

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

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

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

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

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

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

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

Operating Temperature Warning

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

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

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

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

Warnung Um einen Router der switch vor Überhitzung zu schützen, darf dieser nicht in einer Gegend betrieben werden, in der die Umgebungstemperatur das empfohlene Maximum von 40° C überschreitet. Um Lüftungsverschluß zu verhindern, achten Sie darauf, daß mindestens 15,2 cm lichter Raum um die Lüftungsöffnungen herum frei bleibt.

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

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

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

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

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

Product Disposal Warning

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

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

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

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

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

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

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

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

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

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

General Electrical Safety Guidelines and Warnings

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

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

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

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

- Install the device in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.

  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
  - Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

    Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

- Locate the emergency power-off switch for the room in which you are working so that if an electrical accident occurs, you can quickly turn off the power.
- Make sure that you clean grounding surface and give them a bright finish before making grounding connections.
- Do not work alone if potentially hazardous conditions exist anywhere in your workspace.
- Never assume that power is disconnected from a circuit. Always check the circuit before starting to work.
- Carefully look for possible hazards in your work area, such as moist floors, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the device and peripheral equipment function safely and correctly, use the cables and connectors specified for the attached peripheral equipment, and make certain they are in good condition.

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

Action to Take After an Electrical Accident

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

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

Prevention of Electrostatic Discharge Damage

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

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

  If a grounding strap is not available, hold the component in its antistatic bag (see Figure 69 on page 226) 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).

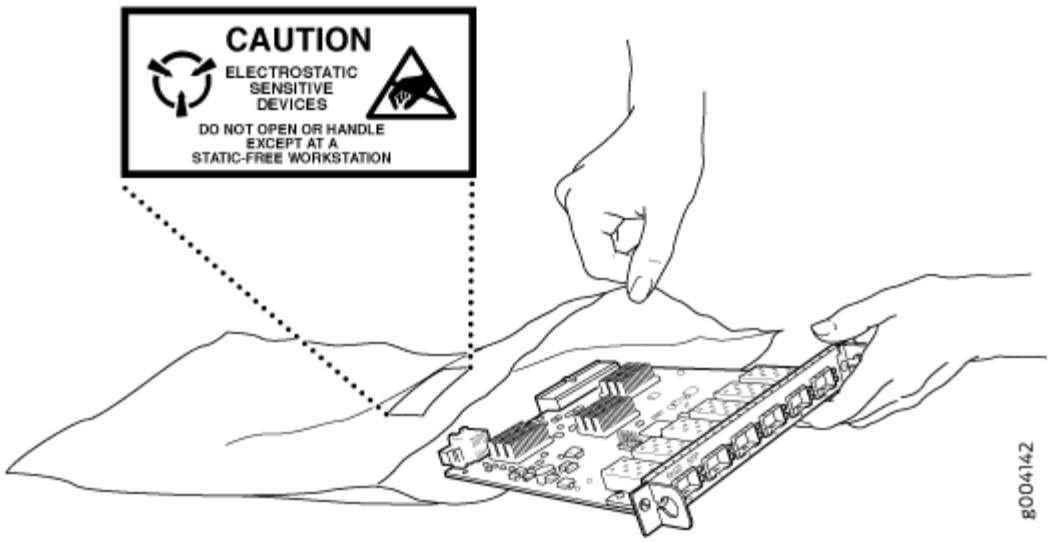
- When handling any component that is subject to ESD damage and that is removed from the device, make sure the equipment end of your ESD wrist strap is attached to the ESD point on the chassis.

  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 69 on page 226). If you are returning a component, place it in an antistatic bag before packing it.

Figure 69: Placing a Component into an Antistatic Bag



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

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

AC Power Electrical Safety Guidelines

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

- Note the following warnings printed on the device:

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

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

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

Power Cable Warning (Japanese)

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

注意

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

AC Power Disconnection Warning

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

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

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

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

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

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

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

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

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

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

DC Power Electrical Safety Guidelines

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

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

- Ensure that the polarity of the DC input wiring is correct. Under certain conditions, connections with reversed polarity might trip the primary circuit breaker or damage the equipment.
- The marked input voltage of –48 VDC for a DC-powered device is the nominal voltage associated with the battery circuit, and any higher voltages are only to be associated with float voltages for the charging function.
- Because the device is a positive ground system, you must connect the positive lead to the terminal labeled **RTN**, the negative lead to the terminal labeled –48 VDC, and the earth ground to the device grounding points.

DC Power Disconnection Warning

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

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

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

Avertissement Avant de pratiquer l'une quelconque des procédures ci-dessous, vérifier que le circuit en courant continu n'est plus sous tension. Pour en être sûr, localiser le disjoncteur situé sur le panneau de service du circuit en courant continu, placer le

disjoncteur en position fermée (OFF) et, à l'aide d'un ruban adhésif, bloquer la poignée du disjoncteur en position OFF.

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

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

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

Aviso Antes de executar um dos seguintes procedimentos, certifique-se que desligou a fonte de alimentação de energia do circuito de corrente contínua. Para se assegurar que toda a corrente foi DESLIGADA, localize o disjuntor no painel que serve o circuito de corrente contínua e coloque-o na posição OFF (Desligado), segurando nessa posição a manivela do interruptor do disjuntor com fita isoladora.

¡Atención! Antes de proceder con los siguientes pasos, comprobar que la alimentación del circuito de corriente continua (CC) esté cortada (OFF). Para asegurarse de que toda la alimentación esté cortada (OFF), localizar el interruptor automático en el panel que alimenta al circuito de corriente continua, cambiar el interruptor automático a la posición de Apagado (OFF), y sujetar con cinta la palanca del interruptor automático en posición de Apagado (OFF).

Varning! Innan du utför någon av följande procedurer måste du kontrollera att strömförsörjningen till likströmskretsen är bruten. Kontrollera att all strömförsörjning är BRUTEN genom att slå AV det överspänningsskydd som skyddar likströmskretsen och tejpa fast överspänningsskyddets omkopplare i FRÅN-läget.

DC Power Grounding Requirements and Warning

An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors but is identifiable by green and yellow stripes is installed as part of the branch circuit that supplies the device. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When you install the device, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

Avertissement Lors de l'installation de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.

Warnung Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.

Avvertenza In fase di installazione dell'unità, eseguire sempre per primo il collegamento a massa e disconnetterlo per ultimo.

Advarsel Når enheten installeres, må jordledningen alltid tilkobles først og frakobles sist.

Aviso Ao instalar a unidade, a ligação à terra deverá ser sempre a primeira a ser ligada, e a última a ser desligada.

¡Atención! Al instalar el equipo, conectar la tierra la primera y desconectarla la última.

Varning! Vid installation av enheten måste jordledningen alltid anslutas först och kopplas bort sist.

DC Power Wiring Sequence Warning

WARNING: Wire the DC power supply using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then –48 V to –

48 V. When disconnecting power, the proper wiring sequence is –48 V to –48 V, +RTN to +RTN, then ground to ground. Note that the ground wire must always be connected first and disconnected last.

Waarschuwing De juiste bedradingsvolgorde verbonden is aarde naar aarde, +RTN naar +RTN, en –48 V naar – 48 V. De juiste bedradingsvolgorde losgemaakt is en –48 naar – 48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, –48 V varten – 48 V. Oikea irrotettava kytkentajarjestys on –48 V varten – 48 V, +RTN varten +RTN, maajohto maajohtoon.

Avertissement Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis –48 V à –48 V. En débranchant la puissance, l'ordre approprié de câblage est –48 V à –48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, –48 V til – 48 V. Riktig frakoples tilkoplingssekvens er –48 V til – 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se muele para moler, +RTN a +RTN, entonces –48 V a –48 V. Al desconectar potencia, la secuencia apropiada del cableado es –48 V a –48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados nan EXtremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então −48 V a −48 V. Ao desconectar a potência, a seqüência apropriada da fiação é −48 V a −48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

Varning! Korrekt kopplingssekvens ar jord till jord, +RTN till +RTN, −48 V till −48 V. Korrekt kopplas kopplingssekvens ar −48 V till −48 V, +RTN till +RTN, jord till jord.

DC Power Wiring Terminations Warning

WARNING: When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations must be the appropriate size for the wires and must clamp both the insulation and conductor.

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

Avertissement Quand des fils torsadés sont nécessaires, utiliser des douilles terminales homologuées telles que celles à circuit fermé ou du type à plage ouverte avec cosses rebroussées. Ces douilles terminales doivent être de la taille qui convient aux fils et doivent être refermées sur la gaine isolante et sur le conducteur.

Warnung Wenn Litzenverdrahtung erforderlich ist, sind zugelassene Verdrahtungsabschlüsse, z.B. für einen geschlossenen Regelkreis oder gabelförmig, mit nach oben gerichteten Kabelschuhen zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

Avvertenza Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Multiple Power Supplies Disconnection Warning

WARNING: The network device has more than one power supply connection. All connections must be removed completely to remove power from the unit completely.

Waarschuwing Deze eenheid heeft meer dan één stroomtoevoerverbinding; alle verbindingen moeten volledig worden verwijderd om de stroom van deze eenheid volledig te verwijderen.

Varoitus Tässä laitteessa on useampia virtalähdekytkentöjä. Kaikki kytkennät on irrotettava kokonaan, jotta virta poistettaisiin täysin laitteesta.

Avertissement Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.

Warnung Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

Avvertenza Questa unità ha più di una connessione per alimentatore elettrico; tutte le connessioni devono essere completamente rimosse per togliere l'elettricità dall'unità.

Advarsel Denne enheten har mer enn én strømtilkobling. Alle tilkoblinger må kobles helt fra for å eliminere strøm fra enheten.

Aviso Este dispositivo possui mais do que uma conexão de fonte de alimentação de energia; para poder remover a fonte de alimentação de energia, deverão ser desconectadas todas as conexões existentes.

¡Atención! Esta unidad tiene más de una conexión de suministros de alimentación; para eliminar la alimentación por completo, deben desconectarse completamente todas las conexiones.

Varning! Denna enhet har mer än en strömförsörjningsanslutning; alla anslutningar måste vara helt avlägsnade innan strömtillförseln till enheten är fullständigt bruten.

TN Power Warning

WARNING: The device is designed to work with a TN power system.
Waarschuwing Het apparaat is ontworpen om te functioneren met TN energiesystemen.

Varoitus Koje on suunniteltu toimimaan TN-sähkövoimajärjestelmien yhteydessä.

Avertissement Ce dispositif a été conçu pour fonctionner avec des systèmes d'alimentation TN.

Warnung Das Gerät ist für die Verwendung mit TN-Stromsystemen ausgelegt.

Avvertenza Il dispositivo è stato progettato per l'uso con sistemi di alimentazione TN.

Advarsel Utstyret er utfomet til bruk med TN-strømsystemer.

Aviso O dispositivo foi criado para operar com sistemas de corrente TN.

¡Atención! El equipo está diseñado para trabajar con sistemas de alimentación tipo TN.

Varning! Enheten är konstruerad för användning tillsammans med elkraftssystem av TN-typ.

Agency Approvals for EX9253 Switches

IN THIS SECTION

- Compliance Statement for Argentina | 237

EX9253 switches comply with the following standards:

- Safety
  - DCAN/CSA-C22.2 No. 60950-1 Information Technology Equipment - Safety
  - DUL 60950-1 (2nd Edition) Information Technology Equipment - Safety
  - EN 60950-1: 2006/A2:2013 Information Technology Equipment - Safety
  - DIEC 60950-1: 2005/A2:2013 Information Technology Equipment - Safety (All country deviations): CB Scheme
  - DEN 60825-1 Safety of Laser Products - Part 1: Equipment classification and requirements
- EMC
  - EN 300 386 V1.6.1 (2012-09) Electromagnetic compatibility and Radio spectrum Matters (ERM) Telecommunication network equipment
  - EN 300 386 V2.1.1 (2016-07) Telecommunication network equipment; EMC requirements; Harmonized Standard covering the essential requirements of the Directive 2014/30/EU
  - EN 55032:2012 (CISPR 32:2012) Electromagnetic compatibility of multimedia equipment – Emission requirements

- EN 55022:2010 (CISPR 22:2008) Electromagnetic compatibility of multimedia equipment – Emission requirements
- AS/NZS CISPR 32:2015 Australia/New Zealand Radiated and Conducted Emissions
- FCC 47 CFR Part 15 USA Radiated and Conducted Emissions
- ICES-003 Issue 6 : 2015 Canada Radiated and Conducted Emissions
- VCCI-CISPR 32:2016 Japanese Radiated and Conducted Emissions
- BSMI CNS 13438 Taiwan Radiated and Conducted Emissions (at 10 Meter)
- KN32/KN35 Korea Radiated Emission and Immunity Characteristics (at 10 Meter)
- KN61000 Korea Immunity Test
- TEC/EMI/TEL-001/01/FEB-09 India EMC standard
- EN 55024:2010 (CISPR 24:2010) Information technology equipment - Immunity characteristics - Limits and methods of measurement
- IEC/EN 61000 Immunity Test
- EN-61000-3-2 (2014) Power Line Harmonics
- EN-61000-3-3 +A1 +A2 +A3 (2013) Power Line Voltage Fluctuations

The switch is designed to comply with the following standards:

- GR-1089-Core Issue 6 (May, 2011) EMC and Electrical Safety for Network Telecommunications Equipment
- AT& T TP-76200 Issue 17 (2012) Network Equipment Power, Grounding, Environmental, and Physical Design Requirements
- Verizon TPR.9305 Issue 5 (2012) Verizon NEBS Compliance: NEBS Compliance Clarification Document
- British Telecom EMC Immunity Requirements (2007)
- Juniper Inductive GND (JIG)

Compliance Statement for Argentina

EQUIPO DE USO IDÓNEO.

Compliance Statements for EMC Requirements for EX Series Switches

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This topic applies to hardware devices in the EX Series product family, which includes EX Series switches, the EX Series Redundant Power System (RPS), and the XRE200 External Routing Engine.

This topic describes the EMC requirements for these hardware devices.

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 can be extended by means of a certified connector assembly. The customer should be

aware that compliance with the above conditions might 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, might 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 might be particularly important in rural areas.

Taiwan

此為甲類資訊技術設備。於一般家居環境使用時，本設備可能導致射頻干擾，用□請採取相應措施。

The preceding translates as follows:

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

European Community

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

Israel

אזהרה

מוצר זה הוא מוצר Class A.
בסביבה ביתית,מוצר זה עלול לגרום הפרעות בתדר רדיו,ובמקרה זה ,המשתמש עשוי להידרש לנקוט אמצעים מתאימים.

The preceding translates as follows:

Warning: This product is Class A. In residential environments, the product may cause radio interference, and in such a situation, the user may be required to take adequate measures.

Japan

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

The preceding translates as follows:

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

VCCI-A

Korea

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Korean Class A Warning g040913

The preceding translates as follows:

This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home

United States

The device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users need to correct the interference at their own expense.

FCC Part 15 Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, might cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.

Compliance Statements for Acoustic Noise for EX Series Switches

This topic applies to hardware devices in the EX Series product family, which includes EX Series switches, the EX Series Redundant Power System (RPS), and the XRE200 External Routing Engine.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäss EN ISO 7779

Translation: The emitted sound pressure is below 70 dB(A) per EN ISO 7779.