



EX4200 Switch Hardware Guide



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EX4200 Switch Hardware Guide

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Documentation and Release Notes

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Supported Platforms

For the features described in this document, the following platforms are supported:

- EX4200

Documentation Conventions

Table 1 on page xviii defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page xviii defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active
<i>Italic text like this</i>	- Introduces or emphasizes important new terms. - Identifies guide names. - Identifies RFC and Internet draft titles.	- A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS CLI User Guide</i> - RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	- To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level. - The console port is labeled CONSOLE.
< > (angle brackets)	Encloses optional keywords or variables.	stub <default-metric <i>metric</i>>;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast (<i>string1</i> <i>string2</i> <i>string3</i>)
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Encloses a variable for which you can substitute one or more values.	community name members [<i>community-ids</i>]
Indentation and braces ({ })	Identifies a level in the configuration hierarchy.	<pre>[edit] routing-options { static { route default { nexthop <i>address</i>; retain; } } }</pre>
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	- In the Logical Interfaces box, select All Interfaces. - To cancel the configuration, click Cancel.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select Protocols>Ospf .

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Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

PART 1

Overview

- [System Overview on page 3](#)
- [Chassis Components and Descriptions on page 9](#)
- [Cooling System and Airflow on page 31](#)
- [Power Supplies on page 33](#)
- [Viewing System Information on page 39](#)

CHAPTER 1

System Overview

- [EX4200 Switches Hardware Overview on page 3](#)
- [EX4200 Switch Models on page 5](#)
- [EX4200 Switch Hardware and CLI Terminology Mapping on page 6](#)

EX4200 Switches Hardware Overview

Juniper Networks EX Series Ethernet Switches provide scalable connectivity for the enterprise market, including branch offices, campus locations, and data centers. The switches run the Juniper Networks Junos operating system (Junos OS), which provides Layer 2 and Layer 3 switching, routing, and security services. The same Junos OS code base that runs on EX Series switches also runs on all Juniper Networks M Series, MX Series, and T Series routers and SRX Series devices.

- [EX4200 Switches on page 3](#)
- [Uplink Modules on page 4](#)
- [Power over Ethernet Ports on page 4](#)

EX4200 Switches

Juniper Networks EX4200 Ethernet Switches provide connectivity for medium- and high-density environments and scalability for growing networks. These switches can be deployed wherever you need high density of Gigabit Ethernet ports (24 to 480 ports) or redundancy. Typically, EX4200 switches are used in large branch offices, campus wiring closets, and data centers where they can be positioned as the top device in a rack to provide connectivity for all the devices in the rack.

You can connect individual EX4200 switches together to form one unit and manage the unit as a single chassis, called a *Virtual Chassis*. You can add more member switches to the Virtual Chassis as needed, up to a total of 10 members.

EX4200 switches are available in models with 24 or 48 ports with either all ports equipped for Power over Ethernet (PoE/PoE+) or only 8 ports equipped for PoE. All models provide ports that have 10/100/1000Base-T Gigabit Ethernet connectors and optional 1-gigabit small form-factor pluggable (SFP) transceivers, 10-gigabit small form-factor pluggable (SFP+) transceivers, or 10-gigabit small form-factor pluggable (XFP) transceivers for use with fiber connections.

Additionally, a 24-port model provides 100Base-FX/1000Base-X SFP ports. This model is typically used as a small distribution switch.

All EX4200 switches have dedicated 64-Gbps Virtual Chassis ports (VCPs) that enable you to connect the switches to each other. You can also use optional uplink module ports to connect members of a Virtual Chassis across multiple wiring closets.

To provide carrier-class reliability, EX4200 switches include:

- Dual redundant power supplies that are field-replaceable and hot-swappable. An optional additional connection to an external power source is also available.
- A field-replaceable fan tray with three fans. The switch remains operational if a single fan fails.
- Redundant Routing Engines in a Virtual Chassis configuration. This redundancy enables graceful Routing Engine switchover (GRES) and nonstop active routing (NSR).
- Junos OS with its modular design that enables failed system processes to gracefully restart.

EX4200 switches have these features:

- Run under Junos OS for EX Series switches
- Have options of 24-port and 48-port models
- Have options of full (all ports) PoE/PoE+ capability or partial (8 ports) PoE capability
- Have optional uplink modules that provide connection to distribution switches

Uplink Modules

Optional uplink modules are available for all EX4200 switches. Uplink modules provide two ports for installing 10-gigabit small form-factor pluggable (XFP) transceivers, four ports for installing 1-gigabit small form-factor pluggable (SFP) transceivers, two ports for installing 10-gigabit small form-factor pluggable (SFP+) transceivers. You can use XFP, SFP, or SFP+ ports to connect an access switch to a distribution switch or to interconnect member switches of a Virtual Chassis across multiple wiring closets.

EX4200 switches also support an SFP+ Media Access Control Security (MACsec) uplink module starting in Junos OS Release 13.2X50-D10. The SFP+ MACsec module provides four MACsec-capable ports and can be configured to support up to four 1-gigabit SFP transceivers or up to two 10-gigabit small form-factor pluggable (SFP+) transceivers.

Power over Ethernet Ports

PoE ports provide electrical current to devices through the network cables so that separate power cords for devices such as IP phones, wireless access points, and security cameras are unnecessary.

PoE was first defined in the IEEE 802.3af standard. Starting with Junos OS Release 11.1, EX4200 switches support enhanced PoE, a Juniper Networks extension to the IEEE 802.3af PoE standard that increases the amount of power per PoE port. A later standard,

IEEE 802.3at, defined PoE+. An IEEE 802.3af powered device operates normally when connected to an IEEE 802.3at (PoE+) power sourcing equipment.

EX4200 switches with an AC power supply installed have options of full (all 24 or 48 ports) PoE/PoE+ capability or partial (8 ports) PoE capability. EX4200 switches with a DC power supply installed do not provide PoE. For more information, see [“EX4200 Switch Models” on page 5](#).

Full PoE/PoE+ models are primarily used in IP telephony environments. Partial PoE models are used in environments where, for example, only a few ports for wireless access points or security cameras are required.

Related Documentation

- [EX4200 Switch Models on page 5](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Site Preparation Checklist for EX4200 Switches on page 61](#)
- [Understanding PoE on EX Series Switches](#)

EX4200 Switch Models

The EX4200 switch is available with 24 or 48 ports and with partial or full Power over Ethernet (PoE) capability. EX4200 switches with a DC power supply installed do not provide PoE.



NOTE: This topic uses the term PoE to refer to both PoE and PoE+ unless there is a need to distinguish between the two.

[Table 3 on page 5](#) lists the EX4200 switch models.

Table 3: EX4200 Switch Models

Model	Number and Type of Ports	Number of PoE-enabled Ports	Fan Tray	Power Supply (Minimum)	Junos OS Release Required
EX4200-24T	24 Gigabit Ethernet	First 8 ports	One fan tray with three fans.	320 W	9.0R2 or later
EX4200-24T-DC	24 Gigabit Ethernet	—	One fan tray with three fans.	190 W	9.0R2 or later
EX4200-24P	24 Gigabit Ethernet	All 24 ports	One fan tray with three fans.	600 W	9.0R2 or later
EX4200-24PX	24 Gigabit Ethernet	All 24 ports (PoE+)	One fan tray with three fans.	930 W	11.2R1 or later
EX4200-24F	24 small form-factor pluggable (SFP)	—	One fan tray with three fans.	320 W	9.0R2 or later

Table 3: EX4200 Switch Models (*continued*)

Model	Number and Type of Ports	Number of PoE-enabled Ports	Fan Tray	Power Supply (Minimum)	Junos OS Release Required
EX4200-24F-S	24 SFP	–	Fan tray for this model is not shipped by default; you must order it separately.	Power supplies for this model are not shipped by default; you must order them separately.	12.3R4 or later
EX4200-24F-DC	24 SFP	–	One fan tray with three fans.	190 W	9.0R2 or later
EX4200-48T	48 Gigabit Ethernet	First 8 ports	One fan tray with three fans.	320 W	9.0R2 or later
EX4200-48T-S	48 Gigabit Ethernet	First 8 ports	Fan tray for this model is not shipped by default; you must order it separately.	Power supplies for this model are not shipped by default; you must order them separately.	12.3R4 or later
EX4200-48T-DC	48 Gigabit Ethernet	–	One fan tray with three fans.	190 W	9.0R2 or later
EX4200-48P	48 Gigabit Ethernet	All 48 ports	One fan tray with three fans.	930 W	9.0R2 or later
EX4200-48PX	48 Gigabit Ethernet	All 48 ports (PoE+)	One fan tray with three fans.	930 W	11.2R1 or later



CAUTION: Mixing different types (AC and DC) of power supplies in the same chassis is not supported.

Related Documentation

- [Front Panel of an EX4200 Switch on page 11](#)
- [Rear Panel of an EX4200 Switch on page 12](#)
- [EX4200 Switches Hardware Overview on page 3](#)

EX4200 Switch Hardware and CLI Terminology Mapping

This topic describes the hardware terms used in EX4200 switch documentation and the corresponding terms used in the Junos OS CLI. See [Table 4 on page 7](#).

Table 4: CLI Equivalents of Terms Used in Documentation for EX4200 Switches

Hardware Item (CLI)	Description (CLI)	Value (CLI)	Item in Documentation	Additional Information
Chassis	One of the following: - EX4200-24T - EX4200-24P - EX4200-24PX - EX4200-24F - EX4200-48T - EX4200-48P - EX4200-48PX	—	Switch chassis	“Chassis Physical Specifications for EX4200 Switches” on page 9
Routing Engine (<i>n</i>)	One of the following: - EX4200-24T, 8 PoE - EX4200-24P, 24 PoE - EX4200-24PX, 24 PoE+ - EX4200-24F - EX4200-48T, 8 PoE - EX4200-48P, 24 PoE - EX4200-48PX, 48 PoE+	<i>n</i> is a value in the range of 0–1. The value corresponds to the slot number.	Routing Engine	—
FPC (<i>n</i>)	On EX4200 standalone switches: Abbreviated name of the Flexible PIC Concentrator (FPC) One of the following: - EX4200-24T - EX4200-24P - EX4200-24PX - EX4200-24F - EX4200-48T - EX4200-48P - EX4200-48PX	Value of <i>n</i> is always 0.	The switch does not have actual FPCs. In this case, the FPC refers to the switch itself.	<i>Understanding Interface Naming Conventions on EX Series Switches</i>
	On EX4200 Virtual Chassis: Member ID of the switch within the Virtual Chassis	<i>n</i> is a value in the range of 0–9.	In this case, the FPC number refers to the member ID assigned to the switch.	<i>Understanding EX Series Virtual Chassis Components</i>

Table 4: CLI Equivalents of Terms Used in Documentation for EX4200 Switches (*continued*)

Hardware Item (CLI)	Description (CLI)	Value (CLI)	Item in Documentation	Additional Information
PIC (<i>n</i>)	Abbreviated name of the Physical Interface Card (PIC).	<i>n</i> is a value in the range of 0–1.	The switch does not have actual PIC devices; see entries for PIC 0 through PIC 1 for the equivalent item on the switch.	<i>Understanding Interface Naming Conventions on EX Series Switches</i>
	One of the following: 24x 10/100/1000 Base-T 24x 100 Base-FX/1000 Base-X 48x 10/100/1000 Base-T	PIC 0	Built-in network ports on the front panel of the switch	“Front Panel of an EX4200 Switch” on page 11
	One of the following: 2x 10GE SFP+ 4x GE SFP 2x 10GE XFP	PIC 1	Uplink module installed on the front panel of the switch	“Uplink Modules in EX4200 Switches” on page 18
Xcvr (<i>n</i>)	Abbreviated name of the transceiver	<i>n</i> is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	“Pluggable Transceivers Supported on EX4200 Switches” on page 79
Power supply (<i>n</i>)	One of the following: - PS 320W AC - PS 600W AC - PS 930W AC - PS 190W DC	<i>n</i> is a value in the range of 0–1. The value corresponds to the power supply slot number.	AC or DC power supply	“Power Supply in EX4200 Switches” on page 33
Fan tray	Fan tray	–	Fan tray	“Cooling System and Airflow in an EX4200 Switch” on page 31

Related Documentation • [EX4200 Switches Hardware Overview on page 3](#)

CHAPTER 2

Chassis Components and Descriptions

- [Chassis Physical Specifications for EX4200 Switches on page 9](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Front Panel of an EX4200 Switch on page 11](#)
- [Rear Panel of an EX4200 Switch on page 12](#)
- [LCD Panel in EX4200 Switches on page 13](#)
- [Uplink Modules in EX4200 Switches on page 18](#)
- [Chassis Status LEDs in EX4200 Switches on page 21](#)
- [Management Port LEDs in EX4200 Switches on page 23](#)
- [Network Port LEDs in EX4200 Switches on page 24](#)

Chassis Physical Specifications for EX4200 Switches

The EX4200 switch chassis is a rigid sheet-metal structure that houses the hardware components. [Table 5 on page 9](#) summarizes the physical specifications of the EX4200 switch chassis.

Table 5: Physical Specifications of the Switch Chassis

Description	Value
Chassis height	1.75 in. (4.45 cm)
Chassis width	• 17.25 in. (43.82 cm) • 19 in. (48.2 cm) with mounting brackets attached
Chassis depth	• Without power supply installed—17 in. (43.18 cm) • With power supply installed: • 320 W AC power supply or 190 W DC power supply installed—17 in. (43.18 cm) • 600 W or 930 W AC power supply installed—19.25 in. (48.9 cm)
Weight	• 320 W AC power supply: 2.5 lb (1.1 kg) • 600 W and 930 W AC power supplies: 3.1 lb (1.4 kg) • 190 W DC power supply: 2.5 lb (1.1 kg)



NOTE: The weight of an EX4200 switch with one power supply installed is between 16–18 lb (7.2–8.2 kg).

**Related
Documentation**

- [Rack Requirements on page 68](#)
- [Cabinet Requirements on page 68](#)
- [Mounting an EX4200 Switch on page 128](#)
- [Installing and Connecting an EX4200 Switch on page 127](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)

Field-Replaceable Units in EX4200 Switches

Field-replaceable units (FRUs) are components that you can replace at your site. The FRUs in the switch are:

- Power supply
- Fan tray
- Uplink module
- Transceivers



NOTE: Uplink modules are not part of the standard package and must be ordered separately.

The fan tray, uplink module, and transceivers are hot-removable and hot-insertable: You can remove and replace them without powering off the switch or disrupting switch functions.



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.

**Related
Documentation**

- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Installing a Power Supply in an EX4200 Switch on page 183](#)
- [Removing a Power Supply from an EX4200 Switch on page 185](#)
- [Installing a Fan Tray in an EX4200 Switch on page 179](#)

- [Removing a Fan Tray from an EX4200 Switch on page 180](#)
- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Removing an Uplink Module from an EX4200 Switch on page 189](#)
- [Installing a Transceiver on page 193](#)
- [Removing a Transceiver on page 195](#)

Front Panel of an EX4200 Switch

The front panel of an EX4200 switch consists of the following components:

- Network ports—depending on the switch model, either:
 - 10/100/1000Base-T Gigabit Ethernet ports, some or all of which are enabled for Power over Ethernet (PoE)
 - 100Base-FX/1000Base-X SFP ports for use with fiber-optic connections
- Uplink module ports—SFP, SFP+, or XFP ports (Installing the uplink module is an optional.)
- LCD panel and the LCD navigation buttons
- Chassis status LEDs
- Network port LEDs

[Figure 1 on page 11](#) shows the front panel of an EX4200 switch with 48 Gigabit Ethernet ports. [Figure 2 on page 11](#) shows the front panel of an EX4200 switch with 24 Gigabit Ethernet ports. [Figure 3 on page 12](#) shows the front panel of an EX4200-24F switch with 24 SFP ports for use with fiber-optic connectors.

Figure 1: EX4200 Switch with 48 Gigabit Ethernet Ports

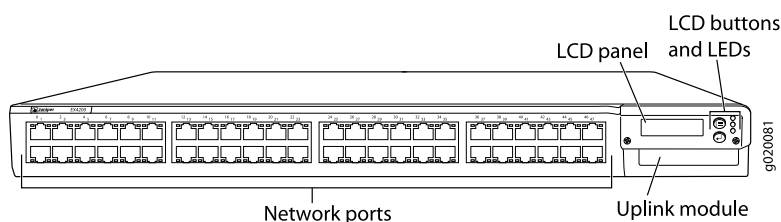


Figure 2: EX4200 Switch with 24 Gigabit Ethernet Ports

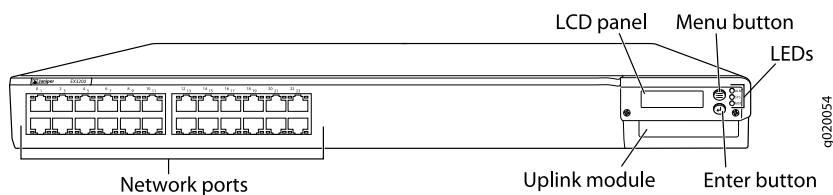
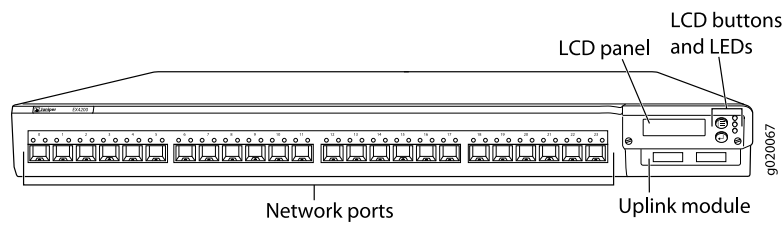


Figure 3: EX4200-24F Switch with 24 SFP Ports



Related Documentation

- [Chassis Status LEDs in EX4200 Switches on page 21](#)
- [Rear Panel of an EX4200 Switch on page 12](#)
- [Network Port LEDs in EX4200 Switches on page 24](#)
- [RJ-45 Port, QSFP+ Port, SFP+ Port, and SFP Port Connector Pinout Information on page 94](#)
- [LCD Panel in EX4200 Switches on page 13](#)
- [Pluggable Transceivers Supported on EX4200 Switches on page 79](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Removing an Uplink Module from an EX4200 Switch on page 189](#)

Rear Panel of an EX4200 Switch

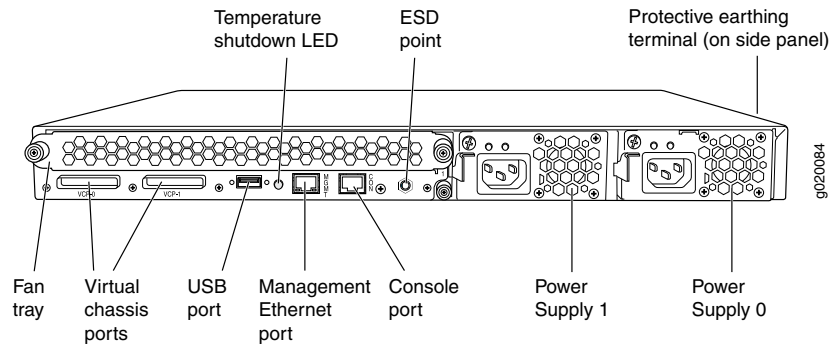
The rear panel of the EX4200 switch accommodates the following components:

- Fan tray
- Virtual Chassis ports (VCPs)
- USB port
- Temperature shutdown LED
- Management Ethernet port
- Console port
- ESD point
- Power supply or power supplies

[Figure 4 on page 13](#) shows the rear panel of an EX4200 switch with power supplies and fan tray installed. The rear panel of all the EX4200 switches except EX4200-24F-S and EX4200-48T-S switches are similar. All EX4200 switches except the EX4200-24F-S and EX4200-48T-S switches are shipped with the power supplies and fan tray pre-installed in the rear panel of the switch. The power supplies and the fan tray for the EX4200-24F-S and EX4200-48T-S models are not shipped by default; you must order them separately and install them in the rear panel. The 320 W AC power supply and the 190 W DC are flush with the chassis. The 600 W AC power supply and 930 W AC power

supply extend out of the chassis by 2.25 in. Power cord retainer clips extend out of the power supply by 3 in.

Figure 4: EX4200 Switch Rear Panel



Related Documentation

- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Front Panel of an EX4200 Switch on page 11](#)
- [USB Port Specifications for an EX Series Switch on page 92](#)
- [Cooling System and Airflow in an EX4200 Switch on page 31](#)
- [Power Supply in EX4200 Switches on page 33](#)
- [Prevention of Electrostatic Discharge Damage on page 273](#)
- [Connecting Earth Ground to an EX Series Switch on page 143](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)

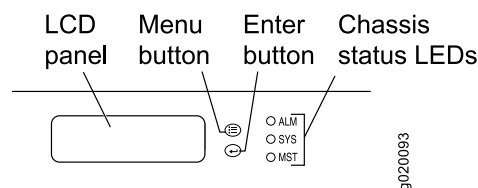
LCD Panel in EX4200 Switches

The LCD panel on the front panel of the switch shows two lines of text, each of which can contain a maximum of 16 characters. The LCD panel displays a variety of information about the switch and also provides a menu to perform basic operations such as initial setup and reboot.

There are two navigation buttons—**Menu** and **Enter**—to the right of the LCD panel.

See [Figure 5 on page 13](#).

Figure 5: LCD Panel



You can configure the second line of the LCD panel to display a custom message. If the LCD panel is configured to display a custom message, the **Menu** button and the **Enter** button are disabled. See [“Configuring the LCD Panel on EX Series Switches \(CLI Procedure\)” on page 173](#).

The LCD panel has a backlight. If the LCD panel is idle for 60 seconds, the backlight turns off. You can turn on the backlight by pressing the **Menu** or **Enter** button once. After turning on the backlight, you can toggle between the LCD panel menus by pressing the **Menu** button and navigate through the menu options by pressing the **Enter** button.



NOTE: The chassis viewer in the J-Web interface also displays the LCD panel. From the J-Web interface, you can view real-time status information in the LCD panel. See [“Dashboard for EX Series Switches” on page 39](#).

This topic describes:

- [LCD Panel Modes on page 14](#)
- [LCD Panel Menus on page 15](#)

LCD Panel Modes

The LCD panel operates in four modes: boot, idle, status, and maintenance.

The LCD panel operates in boot mode during switch reboot. The boot mode displays the key milestones in the switch boot process. The boot mode does not have any menu options. After the boot process is complete, the LCD panel automatically reverts to the Idle menu.

In an EX4200 switch that is not a member of a Virtual Chassis, the first line of the LCD panel displays the slot number, the role of the switch, and hostname. For a standalone EX4200 switch, the slot number is always **00** and the role is always **RE** (for master).

In an EX4200 switch that is a member of a Virtual Chassis, the first line of the LCD panel displays:

- The slot number (the member ID for the Virtual Chassis member)
- Role of the switch in a Virtual Chassis (**RE** for master, **BK** for backup, and **LC** for linecard member)
- Hostname

In the idle mode, the second line displays the mode of the network ports' Status LED and the number of chassis alarms. The number of alarms is updated every second.

In the status mode, the second line displays:

- Virtual Chassis port (VCP) status (for an EX4200 switch that is a member of a Virtual Chassis)
- Status of the power supply

- Status of the fan and temperature
- Version of Junos OS for EX Series switches loaded on the switch

In the maintenance mode, the second line displays one of the following options that you can use to configure and troubleshoot the switch:

- System halt
- System reboot
- Load rescue
- Request VC port (for an EX4200 switch that is a member of a Virtual Chassis)
- Factory default
- System EZSetup

LCD Panel Menus

The LCD panel has three menus: Idle, Status, and Maintenance. Toggle between the LCD panel menus by pressing the **Menu** button. Navigate through the menu options by pressing the **Enter** button.

[Table 6 on page 15](#) describes the LCD panel menu options.

Table 6: LCD Panel Menu Options

Menu	Description
IDLE	In the Idle menu: • Press Enter to cycle through the Status LED modes: • SPD (speed) • ADM (administrative status) • DPX (duplex) • POE (Power over Ethernet) See <i>Network Port LEDs in EX3200 Switches</i> or "Network Port LEDs in EX4200 Switches" on page 24 for information about the Status LED modes. • Press Menu to exit the Idle menu and go to the Status menu.

Table 6: LCD Panel Menu Options (*continued*)

Menu	Description
STATUS	The Status menu has the following options: • Show VCP status—Choose one of the following: • Press the Enter button to display the Virtual Chassis port (VCP) status: Up, Down, Disabled. NOTE: This option is available only for an EX4200 switch that is a member of a Virtual Chassis configuration. It is not available for an EX3200 switch. • Press the Menu button to go to the next option in the Status menu. • Show PSU status—Choose one of the following: • Press the Enter button to display the status of the power supply: OK, Failed, Absent. • Press the Menu button to go to the next option in the Status menu. • Show Environment status—Choose one of the following: • Press the Enter button to display the status of the fan and temperature: • Fan status: OK, Failed, Absent • Temp status: OK, High, Shutdown • Press the Menu button to go to the next option in the Status menu. • Show Junos version—Choose one of the following: • Press the Enter button to display the version of Junos OS for EX Series switches loaded on the switch. • Press the Menu button to go to the next option in the Status menu. • EXIT STAT MENU?—Choose one of the following: • Press the Enter button to exit the Status menu. Then press the Menu button to go to the Maintenance menu. • On an EX4200 switch that is a member of a Virtual Chassis configuration, press the Menu button to return to the Show VCP status option. NOTE: This option is available only for an EX4200 switch that is a member of a Virtual Chassis configuration. It is not available for an EX3200 switch. If you do not want users to use Status menu options, disable the entire menu or individual menu options. See “Configuring the LCD Panel on EX Series Switches (CLI Procedure)” on page 173.

Table 6: LCD Panel Menu Options (*continued*)

Menu	Description
MAINT (Maintenance Menu)	The Maintenance menu has the following options to configure and troubleshoot the switch: • SYSTEM HALT?—Choose one of the following: • Press the Enter button to halt the switch. Press the Enter button again to confirm the halt. • Press the Menu button to go to the next option in the Maintenance menu. • SYSTEM REBOOT?—Choose one of the following: • Press the Enter button to reboot the switch. Press the Enter button again to confirm the reboot. • Press the Menu button to go to the next option in the Maintenance menu. • LOAD RESCUE?—Choose one of the following: • Press the Enter button to roll back the switch to the rescue configuration. Press the Enter button again to confirm the rollback. • Press the Menu button to go to the next option in the Maintenance menu. • REQUEST VC PORT?—Choose one of the following: • Press the Enter button to configure an uplink module port or an EX4200-24F network port to be a Virtual Chassis port (VCP) or to delete a VCP from the switch configuration (when you delete the VCP, the port is reset to an uplink module port or an EX4200-24F network port). NOTE: This option is available only for an EX4200 switch that is a member of a Virtual Chassis configuration. It is not available for an EX3200 switch. • Press the Menu button to go to the next option in the Maintenance menu. • FACTORY DEFAULT?—Choose one of the following: • Press the Enter button to restore the switch to the factory default configuration. Press the Enter button again to confirm the restoration. • Press the Menu button to go to the next option in the Maintenance menu. • ENTER EZSETUP?—Choose one of the following: • Press the Enter button to launch EZSetup. Press the Enter button again to confirm the launch. NOTE: You can use the ENTER EZSETUP option only if the switch is in the factory default configuration. For information about EZSetup, see “Connecting and Configuring an EX Series Switch (J-Web Procedure)” on page 168. • Press the Menu button to go to the next option in the Maintenance menu. • EXIT MAINT MENU?—Choose one of the following: • Press the Enter button to exit the Maintenance menu. Then press the Menu button to go to the Idle menu. • Press the Menu button to go to the System Halt option. If you do not want users to use Maintenance menu options, disable the entire menu or individual menu options. See “Configuring the LCD Panel on EX Series Switches (CLI Procedure)” on page 173.

- Related Documentation**
- [Front Panel of an EX4200 Switch on page 11](#)
 - [Field-Replaceable Units in EX4200 Switches on page 10](#)
 - [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)

- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\)](#) on page 168

Uplink Modules in EX4200 Switches

EX4200 switches support four types of uplink modules:

- SFP uplink module—Provides four ports for 1-gigabit small form-factor pluggable (SFP) transceivers. The model number of the uplink module is EX-UM-4SFP.
- SFP+ uplink module—Provides two ports for 10-gigabit small form-factor pluggable (SFP+) transceivers when configured to operate in 10-gigabit mode or four ports for 1-gigabit small form-factor pluggable (SFP) transceivers when configured to operate in 1-gigabit mode. The model number of the uplink module is EX-UM-2X4SFP.
- SFP+ Media Access Control Security (MACsec) uplink module—Provides two ports for 10-gigabit small form-factor pluggable (SFP+) transceivers when configured to operate in 10-gigabit mode or four ports for 1-gigabit small form-factor pluggable (SFP) transceivers when configured to operate in 1-gigabit mode. All four ports on the uplink module are MACsec-capable. The model number of the uplink module is EX-UM-2X4SFP-M.
- XFP uplink module—Provides two ports for 10-gigabit small form-factor pluggable (XFP) transceivers. The model number of the uplink module is EX-UM-2XFP.



NOTE: When a new uplink module is installed in the switch or an existing uplink module is replaced with another uplink module, the switch detects the newly installed uplink module. The switch creates the required interfaces if the uplink module has transceivers in its ports and when new transceivers are installed in uplink module ports.



NOTE: The packet forwarding process (pfem) restarts and causes traffic loss, if you:

- Install an uplink module (SFP, SFP+, SFP+ MACsec, or XFP)
 - Replace an existing uplink module with another uplink module
 - Change the operating mode of an SFP+ or an SFP+ MACsec uplink module (10-gigabit to 1-gigabit or 1-gigabit to 10-gigabit) installed in the switch
-

When connecting uplink module ports, you can install an SFP uplink module at one end of the connection and install an SFP+ uplink module configured to operate in the 1-gigabit mode at the other end. Likewise, you can install an XFP uplink module at one end of the connection and install an SFP+ uplink module configured to operate in the 10-gigabit mode at the other end.

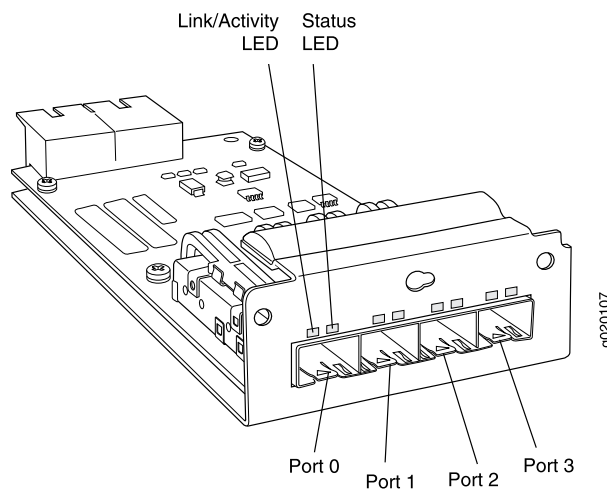
This topic describes:

- [SFP Uplink Module on page 19](#)
- [SFP+ Uplink Module and SFP+ MACsec Uplink Module on page 19](#)
- [XFP Uplink Module on page 21](#)

SFP Uplink Module

[Figure 6 on page 19](#) shows the SFP uplink module, which provides four ports for 1-gigabit SFP transceivers.

Figure 6: SFP Uplink Module



SFP uplink modules are shipped with dust covers preinstalled in the ports.

The SFP uplink module requires Junos OS for EX Series switches, Release 9.0 or later.

SFP+ Uplink Module and SFP+ MACsec Uplink Module

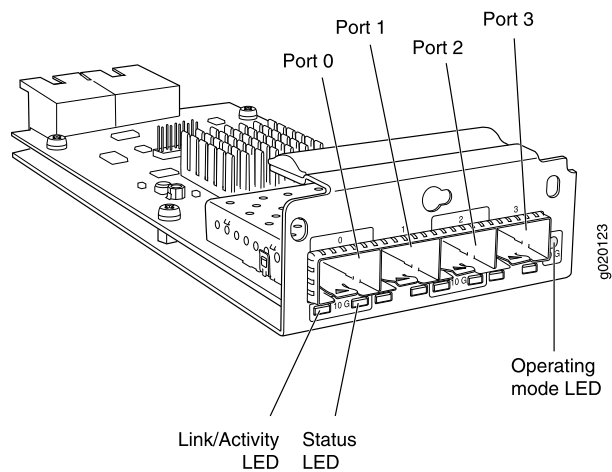
The SFP+ uplink module and the SFP+ MACsec uplink module can be used for either SFP+ or SFP transceivers. You configure the operating mode on the module to match the type of transceiver you want to use—for SFP+ transceivers, you configure the 10-gigabit operating mode, and for SFP transceivers, you configure the 1-gigabit operating mode. See *Setting the Mode on an SFP+ or SFP+ MACSec Uplink Module (CLI Procedure)*.

By default, the SFP+ uplink module and the SFP+ MACsec uplink module operate in the 10-gigabit mode and support only SFP+ transceivers. If you have not changed the module from the default setting and you want to use SFP+ transceivers, you do not need to configure the operating mode.

If the operating mode and the configured mode for the uplink module are different, it is shown in the output of **show chassis pic fpc-slot slot number pic-slot 1**.

[Figure 7 on page 20](#) shows the SFP+ uplink module and the SFP+ MACsec uplink module.

Figure 7: SFP+ and SFP+ MACsec Uplink Module



The following transceivers can be installed in the uplink module ports:

- SFP+ transceivers are supported in ports 0 and 2.
- SFP transceivers are supported in all four ports.

The ports that support SFP+ transceivers are labeled 10 G on the uplink module's faceplate (see [Figure 7 on page 20](#)).



NOTE: When an SFP+ uplink module or an SFP+ MACsec uplink module is operating in 10-gigabit mode:

- Only the 10-gigabit ports (ports 0 and 2) are enabled.
- You can use only SFP+ transceivers in those ports.

When an SFP+ uplink module or an SFP+ MACsec uplink module is operating in 1-gigabit mode:

- All four ports are enabled.
- You can use only SFP transceivers in all four ports.

The SFP+ uplink module and the SFP+ MACsec uplink module have an LED on the faceplate (labeled Operating mode LED in [Figure 7 on page 20](#)) that indicates the operating mode. If the uplink module is operating in the 10-gigabit mode, the LED is lit. If the uplink module is operating in the 1-gigabit mode, the LED is unlit.

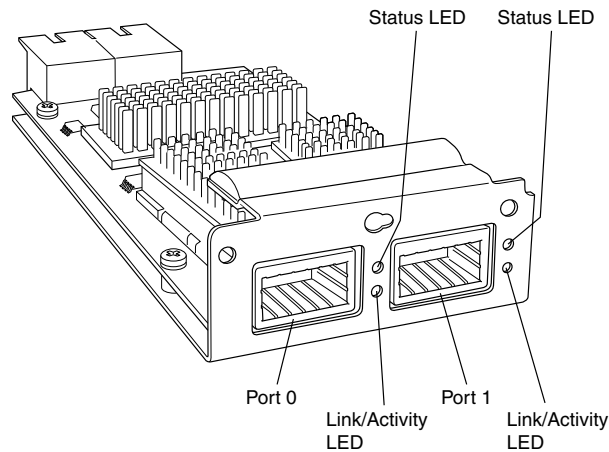
SFP+ uplink modules and the SFP+ MACsec uplink modules are shipped with dust covers preinstalled in the ports.

The SFP+ uplink module requires Junos OS for EX Series switches, Release 9.4 or later. The SFP+ MACsec uplink module requires Junos OS for EX Series switches, Release 13.2X50-D10 or later.

XFP Uplink Module

Figure 8 on page 21 shows the XFP uplink module, which provides two ports for 10-gigabit XFP transceivers.

Figure 8: XFP Uplink Module



XFP uplink modules are shipped with a dust cover preinstalled in one port.

The XFP uplink module requires Junos OS for EX Series switches, Release 9.0 or later.

Related Documentation

- [Network Port LEDs in EX4200 Switches on page 24](#)
- [Uplink Modules Connector Pinout Information for EX4200 Switches on page 99](#)
- [Pluggable Transceivers Supported on EX4200 Switches on page 79](#)
- [SFP+ Direct Attach Copper Cables for EX Series Switches on page 81](#)
- [Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch](#)
- [Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch](#)
- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch on page 238](#)

Chassis Status LEDs in EX4200 Switches

The front panel of an EX4200 switch has three LEDs on the far right side of the panel, next to the LCD panel (see [Figure 9 on page 22](#)).

Figure 9: Chassis Status LEDs in an EX4200 Switch

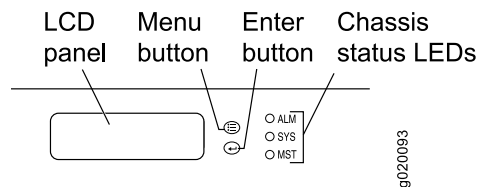


Table 7 on page 22 describes the chassis status LEDs in an EX4200 switch, their colors and states, and the status they indicate. You can view the colors of the three LEDs remotely through the CLI by issuing the operational mode command *show chassis lcd*.

Table 7: Chassis Status LEDs in an EX4200 Switch

LED Label	Color	State and Description
ALM (Alarm)	Unlit	There is no alarm or the switch is halted.
	Red	There is a major alarm. NOTE: When you connect power to the switch, the Alarm (ALM) LED lights red. This behavior is normal. Plugging an active Ethernet cable into the management (MGMT) port on the switch completes the network link and turns off the ALM LED. (See “Connecting a Device to a Network for Out-of-Band Management” on page 157.) Connecting the switch to a dedicated management console instead of a network does not affect the ALM LED. The LED remains red until the switch is connected to a network.
	Amber	There is a minor alarm. NOTE: The Alarm (ALM) LED lights amber if you commit a configuration to make it active on the switch and do not also create a rescue configuration to back it up. To save the most recently committed configuration as the rescue configuration, enter the operational mode command request system configuration rescue save.
SYS (System)	Green	- On steadily—Junos OS for EX Series switches has been loaded on the switch. - Blinking—The switch is booting. - Off—The switch is powered off or is halted.

Table 7: Chassis Status LEDs in an EX4200 Switch (*continued*)

LED Label	Color	State and Description
MST (Master)	Green	In a standalone EX4200 switch: - On steadily—The switch is functioning normally. - Off—The switch is powered off or is halted. In a Virtual chassis configuration: - On steadily—The switch is the master in the Virtual Chassis configuration. - Blinking—The switch is the backup in the Virtual Chassis configuration. - Off—The switch is a linecard member in the Virtual Chassis configuration or is halted.

A major alarm (red) indicates a critical error condition that requires immediate action.

A minor alarm (amber) indicates a noncritical condition that requires monitoring or maintenance. A minor alarm that is left unchecked might cause interruption in service or performance degradation.



NOTE: The amber glow of the Alarm LED that indicates a minor alarm closely resembles the red glow that indicates a major alarm.

All three LEDs can be lit simultaneously.

Related Documentation

- [show chassis lcd](#)
- [Front Panel of an EX4200 Switch on page 11](#)
- [Chassis Component Alarm Conditions on EX4200 Switches on page 226](#)
- [Checking Active Alarms with the J-Web Interface on page 231](#)
- [Understanding Alarm Types and Severity Levels on EX Series Switches on page 225](#)

Management Port LEDs in EX4200 Switches

The management port on EX4200 switches has two LEDs that indicate link/activity and port status (see [Figure 10 on page 24](#)). The management port is set to full-duplex and the speed is set to 100 Mbps.

Figure 10: LEDs on the Management Port on an EX4200 Switch

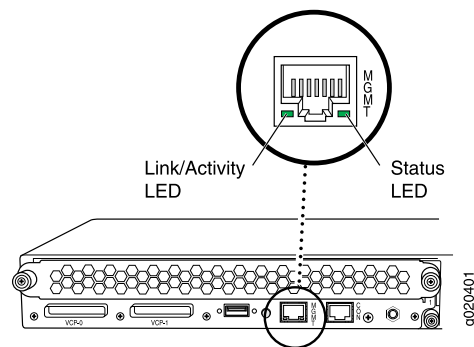


Table 8 on page 24 describes the Link/Activity LED.

Table 8: Link/Activity LED on the Management Port on EX4200 Switches

LED	Color	State and Description
Link/Activity	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.

Table 9 on page 24 describes the Status LED (administrative status).

Table 9: Status LED on the Management Port on EX4200 Switches

LED	Color	State and Description
Status	Green	- On steadily—Administrative status is enabled. - Off—Administrative status is disabled.

- Related Documentation**
- See [Rear Panel of an EX4200 Switch on page 12](#) for port location.
 - [Connecting a Device to a Network for Out-of-Band Management on page 157](#)

Network Port LEDs in EX4200 Switches

Each network port on the switch has two LEDs. The four figures in this topic show the location of those LEDs:

- [Figure 11 on page 25](#) shows the location of the LEDs on the network ports on the front panel.
- [Figure 12 on page 25](#) shows the location of the LEDs on the uplink module ports on the SFP uplink module.

- [Figure 13 on page 26](#) shows the location of the LEDs on the uplink module ports on the SFP+ and SFP+ MACsec uplink modules.
- [Figure 14 on page 26](#) shows the location of the LEDs on the uplink module ports on the XFP uplink module.

Figure 11: LEDs on the Network Ports on the Front Panel

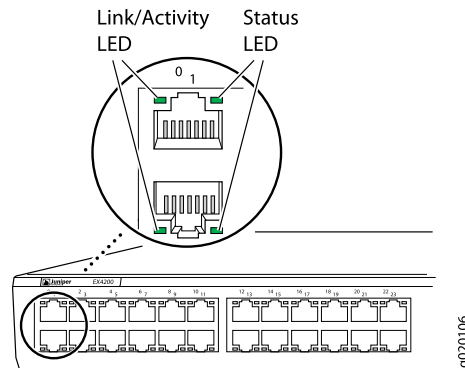


Figure 12: LEDs on the Uplink Module Ports on the SFP Uplink Module

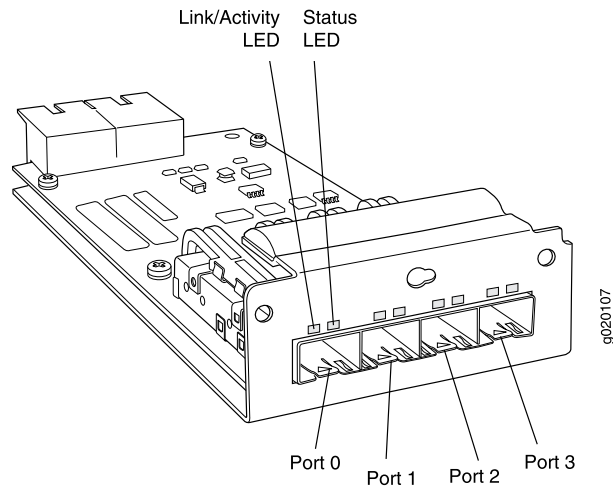


Figure 13: LEDs on the Uplink Module Ports on the SFP+ and SFP+ MACsec Uplink Modules

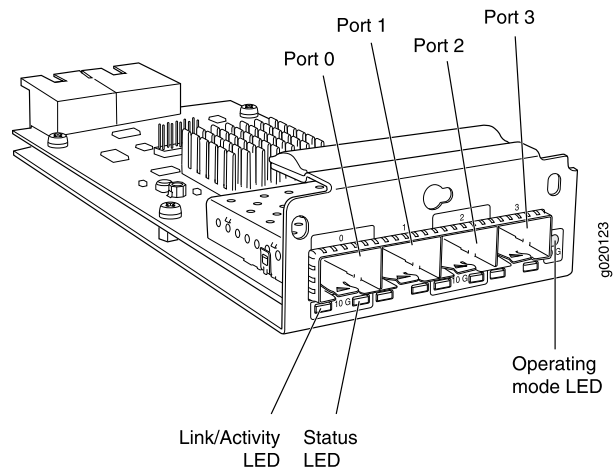
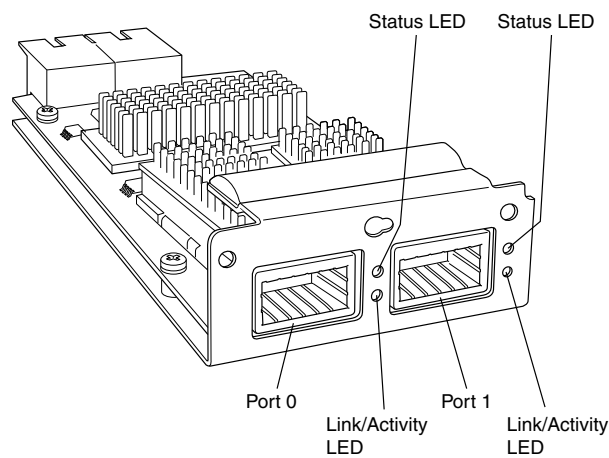


Figure 14: LEDs on the Uplink Module Ports on the XFP Uplink Module



The LEDs labeled Link/Activity LED in [Figure 11 on page 25](#), [Figure 12 on page 25](#), [Figure 13 on page 26](#), and [Figure 14 on page 26](#) indicate link activity. The LEDs labeled Status LED in [Figure 11 on page 25](#), [Figure 12 on page 25](#), [Figure 13 on page 26](#), and [Figure 14 on page 26](#) indicate the status of one of the four port parameters. The port parameters are administrative status, duplex mode, Power over Ethernet (PoE) status, and speed.

[Table 10 on page 26](#) describes the Link/Activity LED.

Table 10: Link/Activity LED on Network Ports

LED	Color	State and Description
Link/Activity	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.

[Table 11 on page 28](#) describes the Status LED. From the Idle menu of the LCD, use the **Enter** button on the LCD panel to toggle between the ADM, DPX, POE, and SPD indicators.

Table 11: Status LED on Network Ports

LED	LCD Indicator	State and Description
Status	LED: ADM	Indicates the administrative status (enabled or disabled). The status indicators are: - Green—Administrative status enabled. - Unlit—Administrative status disabled.
	LED: DPX	Indicates the duplex mode. The uplink module ports are always set to full-duplex; therefore, the LED is always green. The status indicators for network ports on the front panel are: - Green—Port is set to full-duplex mode. - Unlit—Port is set to half-duplex mode.
	LED: MACsec	Indicates the MACsec status (enabled or disabled). MACsec can be enabled only if you have installed the SFP+ MACsec uplink module. The status indicators are: - Green—MACsec is enabled on the port. - Unlit—MACsec is disabled on the port.
	LED: POE	Indicates the PoE status on switches with PoE-enabled ports. Here the term POE refers to both PoE and PoE+ as applicable. PoE is not enabled on uplink module ports; therefore, the LED for those ports is always unlit. The status indicators for network ports on the front panel are: - Green—PoE is enabled on the port. - Amber—PoE is enabled on the port, but no power is drawn from the port because of one of the following: - No device that draws power from the port is connected to the port. - A device that draws power from the port is connected to the port, but the device is not drawing any power from the port. - Unlit—PoE is not enabled on the port.
	LED: SPD	Indicates the speed. The speed indicators for network ports on the front panel are: - One blink per second—10 Mbps - Two blinks per second—100 Mbps - Three blinks per second—1000 Mbps The speed indicators for network ports on the SFP uplink module are: - Green—1000 Mbps - Unlit—10/100 Mbps

Table 11: Status LED on Network Ports *(continued)*

LED	LCD Indicator	State and Description
		The speed indicators for network ports on the SFP+ and SFP+ MACsec uplink module are: • Green—The speed of the transceiver installed in the port is the same as the speed at which the uplink module port is configured to operate. • Unlit—The speed of the transceiver installed in the port is not the same as the speed at which the uplink module port is configured to operate. The speed of the XFP uplink module ports is always 10 Gbps, which is also the speed of XFP transceivers, therefore, this LED is always green on an XFP uplink module..

- Related Documentation**
- [Front Panel of an EX4200 Switch on page 11](#)
 - [Uplink Modules in EX4200 Switches on page 18](#)
 - [LCD Panel in EX4200 Switches on page 13](#)

CHAPTER 3

Cooling System and Airflow

- [Cooling System and Airflow in an EX4200 Switch on page 31](#)

Cooling System and Airflow in an EX4200 Switch

The cooling system in an EX4200 switch consists of a field-replaceable unit (FRU) fan tray with three fans (see [Figure 15 on page 31](#)). All the EX4200 switch models, except the EX4200-24F-S and EX4200-48T-S switches are shipped with one fan tray pre-installed in the rear panel of the switches. EX4200-24F-S and EX4200-48T-S switches are not shipped with pre-installed fan tray; you must order them separately.

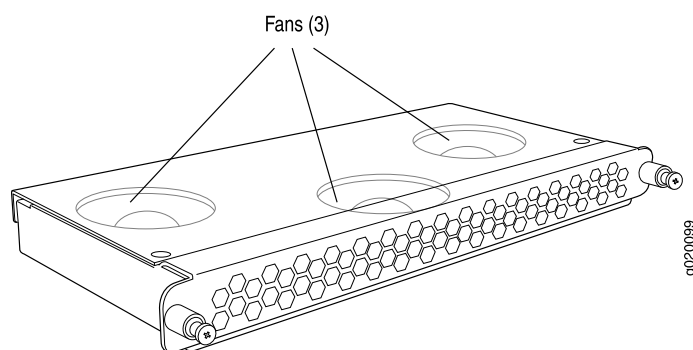
This topic describes:

- [Fan Tray on page 31](#)
- [Airflow Direction in the EX4200 Switch Chassis on page 31](#)

Fan Tray

The fan tray is located at the rear of the chassis.

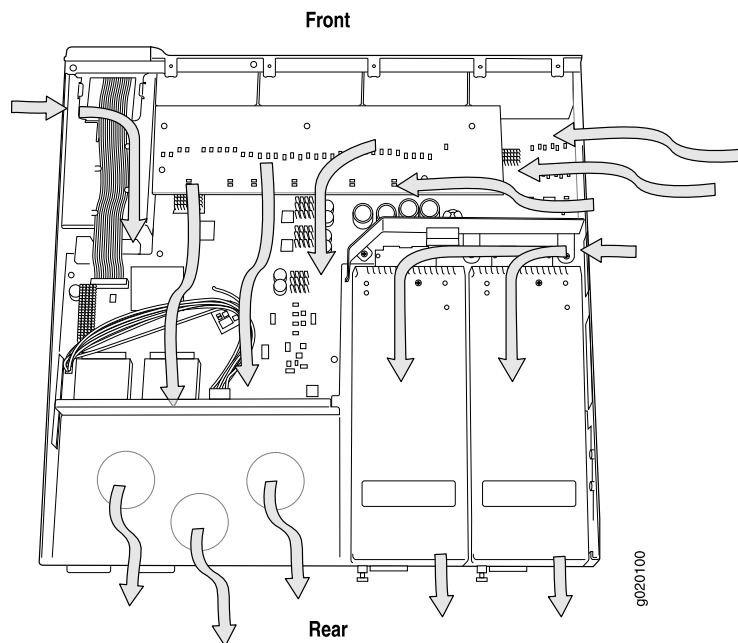
Figure 15: Fan Tray Used in an EX4200 Switch



Airflow Direction in the EX4200 Switch Chassis

The fan tray located at the rear of the chassis provides side-to-rear chassis cooling (see [Figure 16 on page 32](#)).

Figure 16: Airflow Through the EX4200 Switch Chassis



The fan tray used in an EX4200 switch comes with load-sharing redundancy that can tolerate a single fan failure at room temperature (below 45° C/113° F) to still provide sufficient cooling.

Temperature sensors in the chassis monitor the temperature within the chassis. The system raises an alarm if the fan fails or if the temperature inside the chassis rises above permitted levels. If the temperature inside the chassis rises above the threshold, the system shuts down automatically and the temperature shutdown LED on the rear panel is lit. You can see the status of fans and the temperature from the **Show Environment Status** option in the Status menu in the LCD panel.

Related Documentation

- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Rear Panel of an EX4200 Switch on page 12](#)
- [Prevention of Electrostatic Discharge Damage on page 273](#)
- [Installing a Fan Tray in an EX4200 Switch on page 179](#)
- [Removing a Fan Tray from an EX4200 Switch on page 180](#)

CHAPTER 4

Power Supplies

- [Power Supply in EX4200 Switches on page 33](#)
- [AC Power Supply LEDs in EX4200 Switches on page 37](#)
- [DC Power Supply LEDs in EX4200 Switches on page 38](#)

Power Supply in EX4200 Switches

The power supply in EX4200 switches is a hot-removable and hot-insertable field-replaceable unit (FRU) that you can install on the rear panel without powering off the switch or disrupting the switching function. EX4200 switches have an internal redundant power supply, making the power supply in EX4200 switches fully redundant.

All the EX4200 switch models, except the EX4200-24F-S and EX4200-48T-S switches are shipped with one power supply pre-installed in the rear panel of the switches. EX4200-24F-S and EX4200-48T-S switches are not shipped with pre-installed power supplies; you must order them separately.



NOTE: This topic uses the term PoE to refer to both PoE and PoE+ unless there is a need to distinguish between the two.

EX4200 switches use power supplies that provides two DC output voltages: 12 V for system and logic power and 48–51 V (or higher, to compensate for voltage drops along the path from the power supplies to the RJ-45 connector) for PoE ports.



NOTE: After powering on the switch, wait for at least 60 seconds before powering it off. After powering off the switch, wait for at least 60 seconds before powering it back on.

After the switch has been powered on, it can take up to 60 seconds for status indicators—such as LEDs on the power supply, show chassis command output, and messages on the LCD panel—to indicate that the power supply is functioning normally. Ignore error indicators that might appear during the first 60 seconds.



NOTE: EX4200-24PX and EX4200-48PX switches do not support the 930 W (EX-PWR-930-AC) or the 600 W (EX-PWR-600-AC) AC power supplies that are used in the EX4200-48P and the EX4200-24P switch models. EX4200-24PX and EX4200-48PX switches work only with the power supplies labeled EX-PWR2-930-AC or EX-PWR3-930-AC. All EX4200 switches support EX-PWR2-930-AC and EX-PWR3-930-AC power supplies. You can find the label on the top of the power supply (see [“Removing a Power Supply from an EX4200 Switch” on page 185](#)).

This topic describes:

- [AC Power Supplies on page 34](#)
- [DC Power Supplies on page 35](#)
- [PoE Power Budget and AC Power Supplies on page 36](#)

AC Power Supplies

All the EX4200 switches that are powered by AC power supplies except the EX4200-24F-S and EX4200-48T-S switches are shipped with one AC power supply pre-installed in the rear panel of the switches. EX4200-24F-S and EX4200-48T-S switches are not shipped with pre-installed power supplies; you must order them separately.

The AC power supply for the switch is available in 320 W, 600 W, and 930 W models (see [Figure 17 on page 34](#) and [Figure 18 on page 35](#)). The exterior of the 600 W model is identical in appearance to that of the 930 W model. The 320 W power supply is flush with the chassis. The 600 W power supply and 930 W power supply extend out of the chassis by 2.25 in. The power cord retainer clips extend out of the power supply by 3 in. The number of ports on which PoE is enabled determines the minimum power requirements of different switch models.

Figure 17: 320 W AC Power Supply

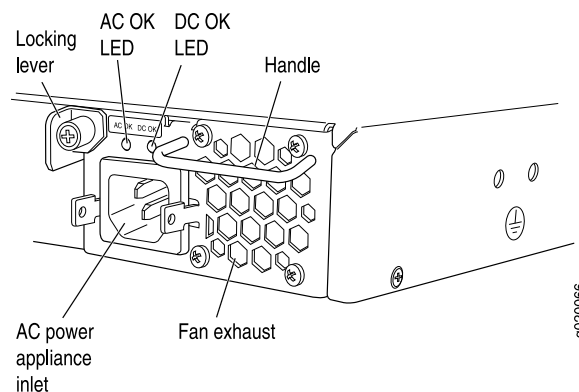
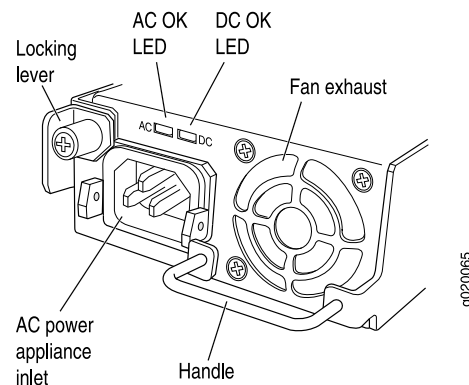


Figure 18: 600 W and 930 W AC Power Supplies



To avoid electrical injury, follow instructions in *Installing a Power Supply in an EX3200 Switch* and *Removing a Power Supply from an EX3200 Switch* or “[Installing a Power Supply in an EX4200 Switch](#)” on page 183 or “[Removing a Power Supply from an EX4200 Switch](#)” on page 185 carefully.

DC Power Supplies

All the EX4200 switches that are powered by DC power supplies except the EX4200-24F-S and EX4200-48T-S switches are shipped with one DC power supply pre-installed in the rear panel of the switches. EX4200-24F-S and EX4200-48T-S switches are not shipped with pre-installed power supplies; you must order them separately.

The DC power supply for the switch is available in a 190 W model, with dual input feeds for power resiliency (see [Figure 19 on page 36](#)).



NOTE: The DC power supply in the switch does not support Power over Ethernet (PoE); you can use either an external power injector or an AC power supply to supply power to PoE devices that you connect to the switch.

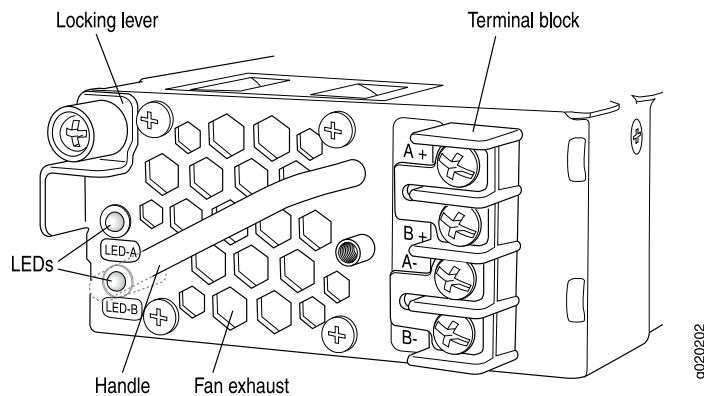


NOTE: The DC power supply in the switch has four terminals labeled A+, B+, A–, and B– (see [Figure 19 on page 36](#)) for connecting DC power source cables labeled positive (+) and negative (–). The DC power supplies are shipped with jumpers from A+ input to B+ input tied together and jumpers from A– input to B– input tied together.



NOTE: The A+ and B+ terminals are referred to as +RTN and A– and B– terminals are referred to as –48 V in “[DC Power Wiring Sequence Warning](#)” on page 281 and “[DC Power Electrical Safety Guidelines for Switches](#)” on page 276.

Figure 19: DC Power Supply



To avoid electrical injury, follow instructions in *Installing a Power Supply in an EX3200 Switch* and *Removing a Power Supply from an EX3200 Switch* or *Installing a Power Supply in an EX4200 Switch* on page 183 or *Removing a Power Supply from an EX4200 Switch* on page 185 carefully.

PoE Power Budget and AC Power Supplies

The PoE power budget for a PoE switch model is determined by the capacity of its power supply. For EX4200 switches, the capacity of the power supply provided with a PoE model is sufficient to supply each PoE-capable port with up to 15.4 W in compliance with the IEEE 802.3af PoE standard. Table 12 on page 36 lists the power supply ratings, and the associated PoE power budgets for EX4200 switch models that support PoE.

Starting with Junos OS Release 11.1, EX4200 switches support enhanced PoE, a Juniper Networks extension to the IEEE 802.3af PoE standard. Enhanced PoE permits up to 18.6 W per PoE port. Because the power supply provided with a switch is designed to supply a maximum of 15.4 W per PoE port, if you connect a powered device that draws more than 15.4 W, the PoE power budget might not be sufficient to supply a full 15.4 W to the remaining PoE ports.



NOTE: Switches upgraded to Junos OS Release 11.1 from a previous release require a separate upgrade of the PoE controller software to enable enhanced PoE support.

EX4200-24PX and EX4200-48PX switches support PoE+, the IEEE 802.3at PoE standard, and permit up to 30 W per port.

Table 12: Power Supply Rating and PoE Power Budget for EX4200 Switch Models

Switch Model Number	Number of PoE-enabled Ports	Power Supply Rating	PoE Power Budget
EX4200-24T	8	320 W	130 W
EX4200-48T	8	320 W	130 W

Table 12: Power Supply Rating and PoE Power Budget for EX4200 Switch Models (*continued*)

Switch Model Number	Number of PoE-enabled Ports	Power Supply Rating	PoE Power Budget
EX4200-48T-S	8	320 W	130 W
EX4200-24P	24	600 W	410 W
EX4200-48P	48	930 W	740 W
EX4200-24PX	24	930 W	740 W
EX4200-48PX	48	930 W	740 W

Related Documentation

- [AC Power Cord Specifications for EX4200 Switches on page 74](#)
- [AC Power Supply LEDs in EX4200 Switches on page 37](#)
- [DC Power Supply LEDs in EX4200 Switches on page 38](#)
- [Rear Panel of an EX4200 Switch on page 12](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Power Specifications for EX4200 Switches on page 73](#)
- [Prevention of Electrostatic Discharge Damage on page 273](#)
- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- [Connecting Earth Ground to an EX Series Switch on page 143](#)

AC Power Supply LEDs in EX4200 Switches

Table 13 on page 37 describes the LEDs on the AC power supplies.

Table 13: AC Power Supply LEDs

LED	State and Description
AC OK	• Off—Disconnected from power or power is not coming into the power supply. • On—Power is coming into the power supply.
DC OK	• Off—Power supply is not sending out power correctly. • On—Power supply is sending out power correctly.



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

- Related Documentation**
- [Power Supply in EX4200 Switches on page 33](#)
 - [Connecting AC Power to an EX4200 Switch on page 149](#)

DC Power Supply LEDs in EX4200 Switches

. [Table 14 on page 38](#) describes the LEDs on the DC power supplies.

Table 14: DC Power Supply LEDs

LED Label	Color	Description
LED A	Red	Inputs A and B are normal, but there is no output.
LED B	Red	
LED A	Green	Inputs A and B are normal; output is normal.
LED B	Green	
LED A	Flash Red	Input A has failed because the power supply fuse has failed, input voltage is low, or there is a loose connection; output is normal.
LED B	Green	
LED A	Green	Input B has failed because the power supply fuse has failed, input voltage is low, or there is a loose connection; output is normal.
LED B	Flash Red	
LED A	Flash Red	Both inputs have failed because the power supply fuse has failed, input voltage is low, or there is a loose connection; output is normal.
LED B	Flash Red	
LED A	Off	There is no input; there is no output.
LED B	Off	

- Related Documentation**
- [Power Supply in EX4200 Switches on page 33](#)
 - [Connecting DC Power to an EX4200 Switch on page 152](#)

CHAPTER 5

Viewing System Information

- [Dashboard for EX Series Switches on page 39](#)

Dashboard for EX Series Switches



NOTE: This topic applies only to the J-Web Application package.

When you log in to the J-Web user interface, the dashboard for the Juniper Networks EX Series Ethernet Switches appears. Use the dashboard to view system information.

The Update Available window appears if there is a latest update of the J-Web Application package available on the Juniper Networks server. This window is enabled by the auto update feature of J-Web.



NOTE:

- The Update Available window will *not* appear when you log in, if you have not selected the *Check for updates automatically on every login* in the *Update Preference* section in the *Maintain > Update J-Web* side pane. By default, the *Check for update automatically on every login* is selected.
- If you choose *Update Later*, you can update to the latest J-Web Application package by clicking the orange icon next to *Update Available* on the top pane of the J-Web interface or through *Maintain > Update J-Web*.

The dashboard comprises a graphical chassis viewer and four panels.

This topic describes:

- [Graphical Chassis Viewer on page 40](#)
- [System Information Panel on page 41](#)
- [Health Status Panel on page 43](#)
- [Capacity Utilization Panel on page 45](#)
- [Alarms Panel on page 45](#)

- [File System Usage on page 46](#)
- [Chassis Viewer on page 46](#)

Graphical Chassis Viewer

The Dashboard panel displays a graphical view of the chassis of a switch. In a Virtual Chassis, it displays a graphical view of each member switch.

In a Virtual Chassis, the default values are shown on the Dashboard panel when no chassis image is clicked. The panel displays the value for a switch if you click its image.



NOTE: If the member switch is not present, inactive, or not provisioned, you cannot expand the member switch image.

In J-Web Application package Release 14.1X53-A2, you can form a Virtual Chassis using EX4600 and EX4300 switches. When in a mixed Virtual Chassis consisting of EX4600 switches and EX4300 switches, the EX4600 switches can be the master, backup, or in the linecard role, while the EX4300 switches must be in the linecard role.

[Table 15 on page 40](#) lists the details that are displayed on each member switch.

Table 15: Details of a Virtual Chassis Member Switch

Details	Example
Model number of the member switch	EX3300
Assigned ID that applies to the entire Virtual Chassis configuration	ID 2 NOTE: If the member switch is not provisioned, the serial number of the switch is displayed instead of its ID.
Role of the member switch	Master Possible roles are: Master , Backup , or Linecard
Status of the member switch	Prsnt Possible statuses are: Prsnt , NotPrsnt , Inactive , or Unprvsnd

The status of the member switch is displayed on the image of the switch. If the member switch appears dimmed, it means the switch is not present, is inactive, or is not provisioned in the Virtual Chassis. If the member switch does not appear dimmed, it means the switch is present and is active.

[Table 16 on page 41](#) describes the possible status of a member switch.

Table 16: Status of a Member Switch in a Virtual Chassis

If the member switch is	It appears as	It means the member switch
Present	Prsnt	Has established physical and logical connections with Virtual Chassis member switches.
Not present	dimmed and NotPrsnt	Has been disconnected from the existing Virtual Chassis.
Inactive	dimmed and Inactive	Has established physical connections, but is unable to establish logical connections.
Not provisioned	dimmed and Unprvsnd	Cannot synchronize with the existing preprovisioned Virtual Chassis.

Click **Rear View** for a graphical view of the rear panel of the switch.

Click **Preferences** to choose which panels must be displayed and set the refresh interval for chassis viewer information. Click **OK** to save your changes and return to the dashboard or click **Cancel** to return to the dashboard without saving changes.



NOTE: You can drag the various panels to different locations in the J-Web window.

System Information Panel

Table 17: System Information

Field	Description
System name	Indicates the local name of the EX Series switch. The local name of the EX Series switches changes when an individual image is clicked.
Device model	Indicates the model of the EX Series switch. In a Virtual Chassis configuration, to indicate the model of a switch, click the image of that switch. NOTE: In a Virtual Chassis setup for an EX6210, EX8208, or EX8216 switch, the Device model field displays details of the master Routing Engine. To view details of a member, select it.

Table 17: System Information (*continued*)

Field	Description
Inventory details	Indicates the following: - For EX3200 switches; and for EX2200, EX2200-C, EX3300, EX4200, EX4300, EX4500, EX4550, and EX4600 switches that are not configured as Virtual Chassis, the value displayed in Inventory details field is always 1 FPC. FPC is a legacy term for a slot in a large Juniper Networks chassis; which simply refers to the standalone switch. - For EX2200 and EX2200-C switches configured as a Virtual Chassis, the value displayed in the Inventory details field is 1–4 FPC, with the number corresponding to the number of member switches. - For EX3300 switches configured as a Virtual Chassis, the value displayed in the Inventory details field is 1–6 FPC, with the number corresponding to the number of member switches. NOTE: For Junos OS Release 14.1X53-D10 and later, EX3300 switches configured as a Virtual Chassis display the value 1–10 FPC in the Inventory details field. - For EX4200, EX4500, EX4550, and EX4600 switches configured as a Virtual Chassis, the value displayed in the Inventory details field is 1–10 FPC, with the number corresponding to the number of member switches. - For EX6210 switches, the values displayed in the Inventory details field are 1–2 CB and 1–9 FPC. CB, or Control Board, refers to the SRE module. FPC refers to line cards and the FPC within the CB. - For an EX8208 switch, the values displayed in Inventory details field are 1–3 CB and 0–8 FPC. CB, or Control Board, refers to SRE and SF modules. FPC refers to line cards. - For EX8216 switches, the values displayed in Inventory details field are 1–2 CB and 0–16 FPC. CB, or Control Board, refers to RE modules and FPC refers to line cards. - For an XRE200 External Routing Engine in an EX8200 Virtual Chassis, the value displayed in Inventory details is 1 XRE. XRE refers to RE modules. For XRE200 External Routing Engines configured as a Virtual Chassis, the values displayed in Inventory details are 1–2 XRE and 0–4 LCC, where LCC refers to the EX8200 line card chassis.
Junos image	Indicates the version of the Junos OS image. In a Virtual Chassis configuration, the Junos OS image of the master switch is displayed by default. To display the Junos OS image of a specific switch, click the image of that switch.
Boot image	Indicates the version of the boot image that is used. In a Virtual Chassis configuration, the boot image of the master switch is displayed by default. To display the boot image of a specific switch, click the image of that switch.

Table 17: System Information (*continued*)

Field	Description
Device uptime	Indicates the time since the last reboot. In a Virtual Chassis configuration, to display the uptime of the specific switch, click the image of that switch.
Last configured time	Indicates the time when the switch was last configured.

Health Status Panel

Table 18: Health Status

Field	Description
EX2200, EX2200-C, EX3200, EX3300, EX4200, and EX4300 Switches	
Memory util.	Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the master Routing Engine is displayed. NOTE: In EX4300 and EX4600 Virtual Chassis, to display the Routing Engine memory utilization of the master or backup, click the respective image. J-Web is supported on EX4600 switches only in J-Web Application package Release 14.1X53-A2.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive. NOTE: In EX4300 Virtual Chassis, the flash memory utilization of the master switch is displayed by default. To display the flash memory utilization along with the internal and external flash memory utilization details for each switch or line card, mouse over individual switch or line card images. In EX4600 Virtual Chassis, to display the flash memory utilization along with the internal and external flash memory utilization details of each switch or line card mouse over the green-colored indicator.
Temp.	Indicates the chassis temperature status. Temperatures are listed in Celsius and the corresponding Fahrenheit values. NOTE: The Temp field is unavailable for a standalone EX2200-C switch. The Temp field is dynamically available for an EX2200 Virtual Chassis switch based on the model of the member clicked. NOTE: In EX4300 Virtual Chassis, the temperature of the master Routing Engine is displayed by default. To display the temperature of the Routing Engine of any switch, click the image of that switch. In EX4600 Virtual Chassis, to display the temperature of the Routing Engine of each switch, mouse over the green-colored indicator.
CPU load	Indicates the average CPU usage over 15 minutes. In a Virtual Chassis configuration, on loading the master or backup switch, the CPU load for that switch's Routing Engine is displayed by default. To display the CPU load for a specific switch's Routing Engine, click the image of that switch.

Table 18: Health Status (*continued*)

Field	Description
Fan status	Indicates the status of the fans in the fan tray. The possible values are OK, Failed, and Absent. In a Virtual Chassis configuration, the fan status of the master switch is displayed by default. To display the fan status for any switch, click the image of that switch. NOTE: The Fan status field is unavailable for a standalone EX2200-C switch. The Fan status field is dynamically available for an EX2200 Virtual Chassis switch based on the model of the member clicked. In EX4600 Virtual Chassis, mouse over the fan icon to display the fan status of all the switches.
EX4500 and EX4550 Switches	
Memory util.	Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the master Routing Engine is displayed.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Temp.	Indicates the chassis temperature status. Temperatures in the dashboard are listed in Celsius and the corresponding Fahrenheit values. NOTE: The Temp field is unavailable for an EX4500 switch.
CPU load	Indicates the average CPU usage over 15 minutes.
Fan status	Indicates the status of the fans in the fan tray. The possible values are OK , Failed , and Absent . This field also indicates the direction of airflow of the fan tray. The possible values are Front to back and Back to front .
EX6210 Switches	
Memory util.	Indicates the memory used in the master Routing Engine. Click the backup Routing Engine to view the memory used in the backup Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Fan status	Indicates the status of the fans in the fan tray. The possible values are OK , Failed , and Absent .
EX8208 Switches	
Memory util.	Indicates the memory used in the external Routing Engine. In an EX8200 Virtual Chassis, the memory utilization value of the XRE200 External Routing Engine in the master role is displayed. Click the XRE200 External Routing Engine in the backup role to view the memory used in the backup external Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
EX8216 Switches	

Table 18: Health Status (*continued*)

Field	Description
Memory util.	Indicates the memory used in the external Routing Engine. In an EX8200 Virtual Chassis, the memory utilization value of the XRE200 External Routing Engine in the master role is displayed. Click the XRE200 External Routing Engine in the backup role to view the memory used in the backup external Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
XRE200 External Routing Engines	
Memory util.	Indicates the memory used in the external Routing Engine. In an EX8200 Virtual Chassis, the memory utilization value of the XRE200 External Routing Engine in the master role is displayed. Click the backup XRE200 External Routing Engine to view the memory used in backup external Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Fan Status	Indicates the status of the fans in the fan tray. The possible values are OK , Failed , and Absent .

Capacity Utilization Panel

Table 19: Capacity Utilization

Field	Description
Number of active ports	Indicates the number of active ports in the switch. Configured Virtual Chassis ports (VCPs) are considered as active ports.
Total number of ports	Indicates the number of ports in the switch. NOTE: In EX3300 and EX4600 Virtual Chassis, the total number of ports of all of the switches is displayed.
Used-up MAC-Table entries	Indicates the number of MAC table entries.
Supported MAC-Table entries	Indicates the maximum number of MAC table entries permitted.
Number of VLANs configured	Indicates the number of VLANs configured. NOTE: Only tagged VLANs are counted.
Number of VLANs supported	Indicates the maximum number of VLANs supported.

Alarms Panel

Displays information about the last five alarms raised in the system. For example, if there are 5 major alarms, then details of all 5 major alarms are displayed. If there are 4 major

alarms and 3 minor alarms, then details of the 4 major alarms and 1 minor alarm are displayed. Major alarms are displayed in red and minor alarms are displayed in yellow.

In an EX8200 Virtual Chassis, the top 5 alarms for the master external Routing Engine are displayed by default. If you select an EX8200 member switch of the Virtual Chassis, the top 5 alarms for that member switch are displayed.

File System Usage

To display the file system storage details of a switch in the backup or linecard role, click the image of that switch.

Chassis Viewer

Click the **Rear View** button to see the back of the chassis image. Click the **Front View** button to see the front of the chassis image. In a Virtual Chassis configuration, the **Rear View** button is disabled if the switch is not selected.

- [Table 20 on page 46](#)—Describes the chassis viewer for EX2200 switches.
- [Table 21 on page 47](#)—Describes the chassis viewer for EX2200-C switches.
- [Table 22 on page 47](#)—Describes the chassis viewer for EX3200, EX3300, and EX4200 switches.
- [Table 23 on page 49](#)—Describes the chassis viewer for EX4300 switches.
- [Table 24 on page 50](#)—Describes the chassis viewer for EX4500 switches.
- [Table 25 on page 51](#)—Describes the chassis viewer for EX4550 switches.
- [Table 26 on page 53](#)—Describes the chassis viewer for EX4600 switches.
- [Table 27 on page 53](#)—Describes the chassis viewer for EX6210 switches.
- [Table 28 on page 54](#)—Describes the chassis viewer for EX8208 switches.
- [Table 29 on page 56](#)—Describes the chassis viewer for EX8216 switches.
- [Table 30 on page 56](#)—Describes the chassis viewer for the XRE200 External Routing Engines.

Table 20: Chassis Viewer for EX2200 Switches

Field	Description
Front View	
Interface status	In the image, the following colors denote the interface status: • Green—Interface is up and operational. • Yellow—Interface is up but is nonoperational. • Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information.
Rear View	

Table 20: Chassis Viewer for EX2200 Switches (*continued*)

Field	Description
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Fan tray	Mouse over the fan tray icon to display name, status, and description information.
Power supply	Mouse over the power outlet icon to display name, status, and description information.

Table 21: Chassis Viewer for EX2200-C Switches

Field	Description
Front View	
Interface status	In the image, the following colors denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Rear View	
Power supply	Mouse over the power outlet icon to display name, status, and description information.

Table 22: Chassis Viewer for EX3200, EX3300, and EX4200 Switches

Field	Description
Front View	

Table 22: Chassis Viewer for EX3200, EX3300, and EX4200 Switches (*continued*)

Field	Description
Interface status	In the image, the following colors denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. For a Virtual Chassis configuration, select the switch to view the interface status. If an SFP+ uplink module is installed in the switch, mouse over the port icon to display whether the module is configured to operate in 1-gigabit mode or in 10-gigabit mode. If the module is configured to operate in 1-gigabit mode, the tool tip information is displayed for all 4 ports. If the module is configured to operate in 10-gigabit mode, the tool tip information is displayed only for 2 ports. On an EX3300 switch with the 4x GE/XE SFP+ module, mouse over the port icon to display whether the module is configured to operate in 1-gigabit mode or 10-gigabit mode. For SFP, SFP+, and XFP ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged-in when you mouse over the port icon.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Rear View of the EX3200 Switch	
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Fan tray	Mouse over the fan tray icon to display name, status, and description information.
Power supply	Mouse over the power supply icon to display name, status, and description information.
Rear View of the EX3300 and EX4200 Switch	
Fan tray	Mouse over the fan tray icon to display name, status, and description information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Virtual Chassis port	Displayed only when EX4200 switches are configured as a Virtual Chassis. The following colors denote the Virtual Chassis port (VCP) status: - Green—VCP is up and operational. - Yellow—VCP is up but is nonoperational. - Gray—VCP is down and nonoperational.

Table 22: Chassis Viewer for EX3200, EX3300, and EX4200 Switches (*continued*)

Field	Description
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
Power supplies	Mouse over the power supply icons to display name, status, and description information.

Table 23: Chassis Viewer for EX4300 Switches

Field	Description
Front View	
Interface status	In the image, the colors listed below denote the interface status for both copper and fiber media type of ports: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Mini USB console	The mini console port is used to connect the switch to the management console.
PIC 2 slot	You can install an uplink module in the PIC 2 slot. Mouse over the ports in the module to view the details of the ports in module. 24-port and 48-port EX4300 switches support the 4-port 10-Gigabit SFP+ uplink module. EX4300-32F switches support the 2-port 40-Gigabit QSFP+ uplink module and the 8-port 10-Gigabit SFP+ uplink module. When you install a transceiver in the port, the following colors denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is not operational. - Gray—Interface is down and not operational.

NOTE: In EX4300 switches the LEDs are seen in the front panel, these are not active.

Rear View of the EX4300 Switch

Management port	The management port is used to connect the switch to a management device for out-of-band management.
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Table 23: Chassis Viewer for EX4300 Switches (*continued*)

Field	Description
Console port	The Console port (RJ-45) is used to connect the switch to a management console or to a console server.
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Fan tray	Mouse over the fan tray icons to display name, status, and description information.
Power supplies	Mouse over the power supply icons to display name, status, and description information.
PIC 1 slot	The rear panel of a 24-port and a 48-port EX4300 switch has four (built-in) 40-Gigabit QSFP+ ports, and the rear panel of an EX4300-32F switch has two (built-in) 40-Gigabit QSFP+ ports, in which you can install QSFP+ transceivers. Mouse over the ports to view the details of the ports. After you install a transceiver in the port, the following colors denote the interface status: • Green—Interface is up and operational. • Yellow—Interface is up but is not operational. • Gray—Interface is down and not operational. For QSFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged in when you mouse over the port. When a QSFP+ port is configured as a Virtual Chassis Port (VCP), the following colors denote the VCP status: • Green—VCP is up and operational. • Yellow—VCP is up but is not operational. • Gray—VCP is down and not operational.

Table 24: Chassis Viewer for EX4500 Switches

Field	Description
Front View	
Interface status	In the image, the colors listed below denote the interface status: • Green—Interface is up and operational. • Yellow—Interface is up but is nonoperational. • Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. For a Virtual Chassis configuration, select the switch to view the interface status. If an SFP+ uplink module is installed in the switch, mouse over the interface (ports) on the module for more information. For SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged-in when you mouse over the port icon.

Table 24: Chassis Viewer for EX4500 Switches (*continued*)

Field	Description
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Console port	The console port is used to connect the switch to a management console or to a console server.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Rear View of the EX4500 Switch	
Fan tray	Mouse over the fan tray icon to display status of the fans and airflow direction information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Virtual Chassis port	Displayed only when switches are configured as a Virtual Chassis. The colors listed below denote the Virtual Chassis port (VCP) status: - Green—VCP is up and operational. - Yellow—VCP is up but is nonoperational. - Gray—VCP is down and nonoperational.
Power supplies	Mouse over the power supply icons to display name, status, and description information.
Intraconnect module	Mouse over the module to display details of the intraconnect module. The intraconnect module helps the switch achieve line rate on all its ports.
Virtual Chassis module	Mouse over to display details of the switches in the Virtual Chassis configuration.

Table 25: Chassis Viewer for EX4550 Switches

Field	Description
Front View	

Table 25: Chassis Viewer for EX4550 Switches (*continued*)

Field	Description
Interface status	In the image, the colors listed below denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. For a Virtual Chassis configuration, select the switch to view the interface status. If an expansion module or a Virtual Chassis module is installed in the switch, mouse over the interface (ports) on the module for more information. On an EX4550-32F switch, for SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver (1G/10G) not plugged in when you mouse over the port icon.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Console port	The console port is used to connect the switch to a management console or to a console server.
Mini Console port	The mini console port is used to connect the switch to the management console.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.
PIC1 slot	You can insert an uplink module or a Virtual Chassis module in the PIC1 slot. Mouse over to display the details of the module inserted (uplink or Virtual Chassis).
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Rear View of the EX4550 Switch	
Fan tray	Mouse over the fan tray icon to display the status of the fans and airflow direction information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Virtual Chassis port	Displayed only when switches are configured as a Virtual Chassis. In the image, the colors listed below denote the Virtual Chassis port (VCP) status: - Green—VCP is up and operational. - Yellow—VCP is up but is nonoperational. - Gray—VCP is down and nonoperational.
Power supplies	Mouse over the power supply icons to display name, status, and description information.
PIC2 slot	You can insert an uplink module or a Virtual Chassis module into the PIC2 slot. Mouse over to display the details of the module inserted (uplink or Virtual Chassis).

Table 26: Chassis Viewer for EX4600 Switches

Field	Description
Front View	
NOTE: J-Web is supported on EX4600 switches only in J-Web Application package Release 14.1X53-A2.	
Interface status	In the image, the colors listed below denote the interface status for both copper and fiber media type of ports: • Green—Interface is up and operational. • Yellow—Interface is up but is nonoperational. • Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information.
PIC 1 and PIC 2 slots	You can install an expansion module in the PIC 1 and PIC 2 slots. If you have installed an expansion module, mouse over the ports in the module to view the details of the ports in module. When you install a transceiver in the port, the following colors denote the interface status: • Green—Interface is up and operational. • Yellow—Interface is up but is not operational. • Gray—Interface is down and not operational.
NOTE: • In EX4600 switches the LEDs are seen in the front panel; these are not active. • In EX4600 switches there is no LCD panel.	
Rear View of the EX4600 Switch	
Management port	The management ports (RJ-45 and SFP) is used to connect the switch to a management device for out-of-band management.
Console port	The Console port (RJ-45) is used to connect the switch to a management console or to a console server.
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Fan tray	Mouse over the fan tray icons to display name, status, and description information.
Power supplies	Mouse over the power supply icons to display name, status, and description information.

Table 27: Chassis Viewer for EX6210 Switches

Field	Description
Front View	
Temperature	Mouse over the temperature icon to display the temperature of the CB or line card.

Table 27: Chassis Viewer for EX6210 Switches (*continued*)

Field	Description
Interface status	Select the CB or line card. In the image, the colors listed below denote the interface status: • Green—Interface is up and operational. • Yellow—Interface is up but is nonoperational. • Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. You can view status for the following ports on the SRE module: • USB port—Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch. • Management (me0) port—The management port is used to connect the switch to a management device for out-of-band management. There are 2 management ports: fiber and copper. The same status is displayed for both the me0 ports. • Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.) CBs support 4 SFP+ uplink ports. Mouse over the interface on the CB for more information. For SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged-in when you mouse over the port icon.
Power supplies	Mouse over the power supply icons to display name, status, and description information.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display of the master Routing Engine. The EX6210 switch has 2 LCD panels, one for each Routing Engine. The backup Routing Engine LCD displays Backup .
Rear View of the EX6210 Switch	
Fan tray	Mouse over the fan tray icon to display information regarding the cooling fans.

Table 28: Chassis Viewer for EX8208 Switches

Field	Description
Front View	

Table 28: Chassis Viewer for EX8208 Switches (*continued*)

Field	Description
Interface status	In the image, click any line card, SRE module, or SF module to view the front view of the selected component. In the image, the colors listed below denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. You can view status for the following ports on the SRE module: - USB port—Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch. - Auxiliary port—This port is unavailable. - Management (me0) port—The management port is used to connect the switch to a management device for out-of-band management. - Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.) Because the SF module has no ports, no status information is displayed.
Slot numbers	Slots on the switch are labeled, from the top of the switch down: 0–3 (line cards) - SRE0, SF, SRE1 (SRE and SF modules) 4–7 (line cards)
Temperature	The active slots contain a gray temperature icon. Mouse over the icon to display temperature information for the slot.
Fan status	Mouse over the fan tray icon to display name, status, and description information.
Power supplies	Mouse over the power supply icons to display name, status, and description information.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Rear View	The EX8208 switch does not have any components on the rear of the chassis.

Table 29: Chassis Viewer for EX8216 Switches

Field	Description
Front View	
Interface status	In the image, click any line card or RE module to display the front view of the selected component. In the image, the colors listed below denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. You can view status for the following ports on the RE module: - USB port—Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch. - Auxiliary port—This port is unavailable. - Management (me0) port—The management port is used to connect the switch to a management device for out-of-band management. - Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
Slot numbers	Slots on the switch are labeled, from the top of the switch down: - RE0 (RE module) - RE1 (RE module) 0–15 (line cards)
Temperature	The active slots contain a gray temperature icon. Mouse over the icon to display temperature information for the slot.
Fan status	Mouse over the fan tray icon to display consolidated information about the fans.
Power supplies	Mouse over the power supply icons to display name, status, and description information.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Rear View	
SF modules	Mouse over the SF module icons in their respective slots to display information. Slots are numbered SF7–SF0, from left to right.

Table 30: Chassis Viewer for XRE200 External Routing Engines

Field	Description
Front View	

Table 30: Chassis Viewer for XRE200 External Routing Engines (*continued*)

Field	Description
Interface status	In the image, the colors listed below denote the interface status: - Green—Interface is up and operational. - Yellow—Interface is up but is nonoperational. - Gray—Interface is down and nonoperational. Mouse over the interface (port) to view more information. For a Virtual Chassis configuration, select the switch to view the interface status.
Console port	The console port is used to connect the switch to a management console or to a console server.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.
Virtual Chassis port	In the image, the colors listed below denote the Virtual Chassis port (VCP) status: - Green—VCP is up and operational. - Yellow—VCP is up but is nonoperational. - Gray—VCP is down and nonoperational. Mouse over the interface (port) to view more information.
LCD panel	LCD panel configured for the LEDs on the ports. Mouse over the icon to view the current character display.
Temperature	The active slots contain a gray temperature icon. Mouse over the icon to display temperature information for the slot.
USB port	Indicates the USB port for the switch. NOTE: We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
PIC1 slot	You can install a Virtual Chassis module in the PIC1 slot. Mouse over the Virtual Chassis ports to display the port status details.
PIC2 slot	You can install a Virtual Chassis module in the PIC2 slot. Mouse over the Virtual Chassis ports to display the port status details.
Rear View of the XRE200 External Routing Engine	
Fan modules	Mouse over the fan modules to display status of the fans and airflow direction information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Power supplies	Mouse over the power supply icons to display name, status, and description information.

Release History Table

Release	Description
14.1X53-D10	For Junos OS Release 14.1X53-D10 and later, EX3300 switches configured as a Virtual Chassis display the value 1–10 FPC in the Inventory details field.
14.1X53-A2	In J-Web Application package Release 14.1X53-A2, you can form a Virtual Chassis using EX4600 and EX4300 switches.
14.1X53-A2	J-Web is supported on EX4600 switches only in J-Web Application package Release 14.1X53-A2.

**Related
Documentation**

- *J-Web User Interface for EX Series Switches Overview*
- *EX2200 Switches Hardware Overview*
- *EX2300 Switches Hardware Overview*
- *EX3200 Switches Hardware Overview*
- *EX3300 Switches Hardware Overview*
- [EX4200 Switches Hardware Overview on page 3](#)
- *EX4300 Switches Hardware Overview*
- *EX4500 Switches Hardware Overview*
- *EX6210 Switch Hardware Overview*
- *EX8208 Switch Hardware Overview*
- *EX8216 Switch Hardware Overview*
- [Checking Active Alarms with the J-Web Interface on page 231](#)
- *XRE200 External Routing Engine Hardware Guide*

PART 2

Site Planning, Preparation, and Specifications

- [Preparation Overview on page 61](#)
- [Power Specifications and Requirements on page 73](#)
- [Transceiver and Cable Specifications on page 79](#)
- [Pinout Specifications on page 91](#)
- [Planning the Virtual Chassis on page 111](#)

CHAPTER 6

Preparation Overview

- [Site Preparation Checklist for EX4200 Switches on page 61](#)
- [Environmental Requirements and Specifications for EX Series Switches on page 62](#)
- [General Site Guidelines on page 66](#)
- [Site Electrical Wiring Guidelines on page 67](#)
- [Rack Requirements on page 68](#)
- [Cabinet Requirements on page 68](#)
- [Requirements for Mounting an EX4200 Switch on a Desktop or Wall on page 69](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches on page 70](#)

Site Preparation Checklist for EX4200 Switches

The checklist in [Table 31 on page 61](#) summarizes the tasks you need to perform when preparing a site for EX4200 switch installation.

Table 31: 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 EX Series Switches” on page 62		
Power			
Measure distance between external power sources and switch installation site.			
Locate sites for connection of system grounding.			
Calculate the power consumption and requirements.	“Power Specifications for EX4200 Switches” on page 73		
Hardware Configuration			

Table 31: Site Preparation Checklist (*continued*)

Item or Task	For More Information	Performed by	Date
Choose the number and types of switches you want to install.	"EX4200 Switches Hardware Overview" on page 3		
Rack or Cabinet			
Verify that your rack or cabinet meets the minimum requirements for the installation of the switch.	"Rack Requirements" on page 68 "Cabinet Requirements" on page 68		
Plan rack or cabinet location, including required space clearances.	"Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches" on page 70		
Secure the rack or cabinet to the floor and building structure.			
Wall			
Verify that the wall meets the minimum requirements for the installation of the switch.	"Requirements for Mounting an EX4200 Switch on a Desktop or Wall" on page 69		
Verify that there is appropriate clearance in your selected location.	"Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches" on page 70		
Cables			
Acquire cables and connectors:			
- Determine the number of cables needed based on your planned configuration. - Review the maximum distance supported for each cable. Choose the length of cable based on the distance between the hardware components being connected.			
Plan the cable routing and management.			

- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [General Site Guidelines on page 66](#)
 - [Installing and Connecting an EX4200 Switch on page 127](#)
 - [Mounting an EX4200 Switch on page 128](#)

Environmental Requirements and Specifications for EX Series Switches

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 32 on page 63 provides the required environmental conditions for normal switch operation.

Table 32: EX Series Switch Environmental Tolerances

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX2200-C	No performance degradation up to 5,000 feet (1524 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 104° F (40° C) at altitudes up to 5,000 ft (1,524 m). For information about extended temperature SFP transceivers supported on EX2200 switches, see <i>Pluggable Transceivers Supported on EX2200 Switches</i> .	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX2200 (except EX2200-C switches)	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX2300-C	No performance degradation up to 5,000 feet (1524 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX2300 (except EX2300-C switches)	No performance degradation up to 13,000 feet (3962.4 meters) at 104° F (40° C) as per GR-63	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX3200	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX3300	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.

Table 32: EX Series Switch Environmental Tolerances (*continued*)

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX3400	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4200	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4300	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4500	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4550	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	- EX4550-32F switches—Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C) - EX4550-32T switches—Normal operation is ensured in the temperature range 32° F through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4600	No performance degradation to 6,562 feet (2000 meters)	Normal operation ensured in the relative humidity range 5% through 90%, noncondensing Short-term operation ensured in the relative humidity range 5% through 93%, noncondensing NOTE: As defined in NEBS GR-63-CORE, Issue 4, short-term events can be up to 96 hours in duration but not more than 15 days per year.	- Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C) - Nonoperating storage temperature in shipping container: -40° F (-40° C) through 158° F (70° C)	Designed to comply with Zone 4 earthquake requirements per NEBS GR-63-CORE, Issue 4.

Table 32: EX Series Switch Environmental Tolerances (*continued*)

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX6210	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX8208	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX8216	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX9204	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C) Nonoperating storage temperature in shipping container: –40° F (–40° C) to 158° F (70° C)	Complies with Zone 4 earthquake requirements as per GR-63.
EX9208	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C) Nonoperating storage temperature in shipping container: –40° F (–40° C) to 158° F (70° C)	Complies with Zone 4 earthquake requirements as per GR-63.
EX9214	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C) Nonoperating storage temperature in shipping container: –40° F (–40° C) through 158° F (70° C)	Complies with Zone 4 earthquake requirements as per GR-63.
XRE200	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 41° F (5° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.



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.

**Related
Documentation**

- *Clearance Requirements for Airflow and Hardware Maintenance for EX2200 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for EX2300 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for EX3200 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for EX3300 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches*
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches on page 70](#)
- *Clearance Requirements for Airflow and Hardware Maintenance for EX4300 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX4600 Switch*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX Series Redundant Power System*
- *Clearance Requirements for Airflow and Hardware Maintenance for EX4500 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for EX4550 Switches*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX6210 Switch*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX8208 Switch*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX8216 Switch*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX9204 Switch*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX9208 Switch*
- *Clearance Requirements for Airflow and Hardware Maintenance for an EX9214 Switch*

General Site Guidelines

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

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

- Keep the area around the chassis free from dust and conductive material, such as metal flakes.
- Follow prescribed airflow guidelines to ensure that the cooling system functions properly and that exhaust from other equipment 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.

**Related
Documentation**

- [Prevention of Electrostatic Discharge Damage on page 273](#)

Site Electrical Wiring Guidelines

Table 33 on page 67 describes the factors you must consider while planning the electrical wiring at your site.



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

Table 33: 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. Some of the problems caused by strong sources of electromagnetic interference (EMI) are: • 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

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [Prevention of Electrostatic Discharge Damage on page 273](#)

Rack Requirements

You can mount the device on two-post racks or four-post racks.

Rack requirements consist of:

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

[Table 34 on page 68](#) provides the rack requirements and specifications.

Table 34: 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 Electronics Industry Association.
Mounting bracket hole spacing	The holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm), so that the 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 Electronics Industry Association. • 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.

Related Documentation • [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)

Cabinet Requirements

You can mount the device in a cabinet that contains a 19-in. rack.

Cabinet requirements consist of:

- Cabinet size

- Clearance requirements
- Cabinet airflow requirements

[Table 35 on page 69](#) provides the cabinet requirements and specifications.

Table 35: 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 Electronics Industry Association. • The minimum cabinet size must be able to accommodate the maximum external dimensions of the device.
Cabinet clearance	• The outer edges of the mounting brackets extend the width of the chassis to 19 in. (48.2 cm). • 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.

Related Documentation • [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)

Requirements for Mounting an EX4200 Switch on a Desktop or Wall

You can install the switch on or under a desk or other level surface or on a wall. When choosing a location, allow at least 6 in. (15.2 cm) of clearance between the front and back of the chassis and adjacent equipment or walls.

Ensure that the wall onto which the switch is installed is stable and securely supported.

If you are mounting the switch in sheetrock (wall board with a gypsum plaster core) or in wall board not backed by wall studs, use hollow wall anchors capable of supporting the combined weight of two fully loaded chassis. Insert the screws into wall studs wherever possible to provide added support for the chassis.

Use the wall-mount kit from Juniper Networks to mount the switch on a wall. The wall-mount kit is not part of the standard package and must be ordered separately.

Related Documentation

- [Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches on page 70](#)
- [Wall-Mounting Warning for EX4200 Switches on page 258](#)
- [Mounting an EX4200 Switch on a Desk or Other Level Surface on page 129](#)
- [Mounting an EX4200 Switch on a Wall on page 138](#)

Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches

When planning the site for installing an EX4200 switch, you must allow sufficient clearance around the installed switch (see [Figure 20 on page 70](#)).

Figure 20: Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches

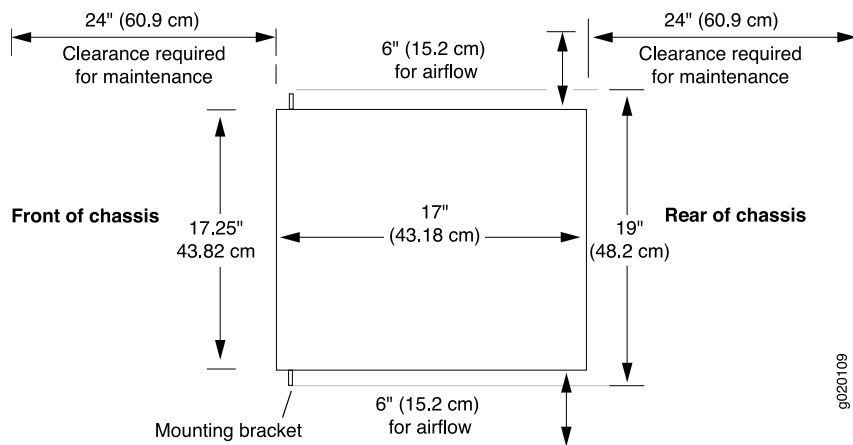
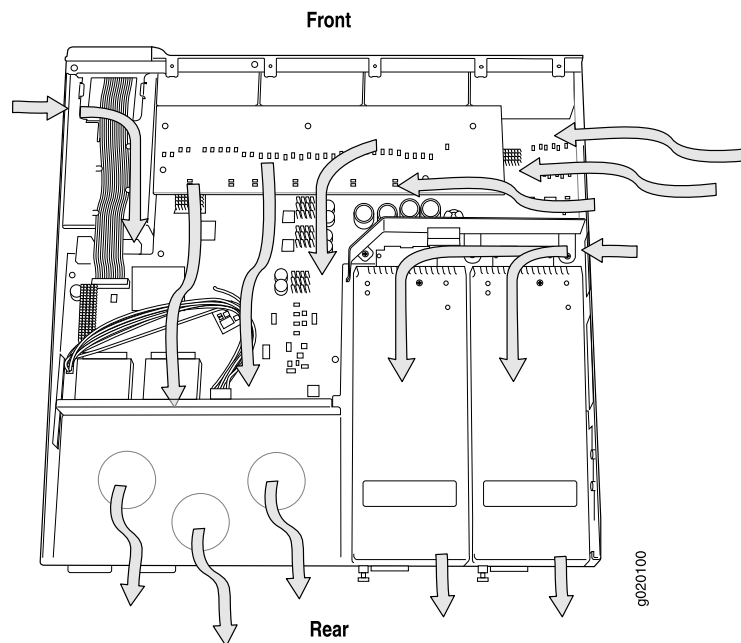


Figure 21: Airflow Through the EX4200 Switch Chassis



- Allow at least 6 in. (15.2 cm) of clearance on the side between devices that have fans or blowers installed. Allow 2.8 in. (7 cm) between the side of the chassis and any non-heat-producing surface such as a wall.
- If you are mounting the switch on a rack or cabinet with other equipment, or if you are placing it on the desktop or floor near other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.
- Leave at least 24 in. (61 cm) both in front of and behind the switch. For service personnel to remove and install hardware components, you must leave adequate space at the front and back of the switch. NEBS GR-63 recommends at least 30 in. (76.2 cm) in front of the rack or cabinet and 24 in. (61 cm) behind the rack or cabinet.

Related Documentation

- [Rack Requirements on page 68](#)
- [Cabinet Requirements on page 68](#)
- [General Site Guidelines on page 66](#)
- [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)
- [Cooling System and Airflow in an EX4200 Switch on page 31](#)

CHAPTER 7

Power Specifications and Requirements

- [Power Specifications for EX4200 Switches on page 73](#)
- [AC Power Cord Specifications for EX4200 Switches on page 74](#)
- [Calculating the EX Series Switch Fiber-Optic Cable Power Budget on page 76](#)
- [Calculating the EX Series Switch Fiber-Optic Cable Power Margin on page 76](#)

Power Specifications for EX4200 Switches

This topic describes power specifications for power supplies for EX4200 switches.

[Table 36 on page 73](#) provides the AC power supply electrical specifications for EX4200 switches.

[Table 37 on page 73](#) provides the DC power supply electrical specifications for EX4200 switches.



NOTE: This topic uses the term PoE to refer to both PoE and PoE+ unless there is a need to distinguish between the two.

Table 36: AC Power Supply Electrical Specifications

Item	Specification
AC input voltage	100 through 240 VAC
AC input line frequency	50 through 60 Hz
AC system current rating	• 4 A (for switches with 8 ports equipped for Power over Ethernet (PoE) or the switch with 24 100Base-FX/1000Base-SX SFP ports) • 7 A (for switches with 24 ports equipped for PoE) • 12 A (for switches with 48 ports equipped for PoE)

Table 37: DC Power Supply Electrical Specifications

Item	Specification
DC input voltage	36 through 72 VDC

Table 37: DC Power Supply Electrical Specifications (*continued*)

Item	Specification
DC input current	7 A maximum
Power supply output	190 W
Output holdup time	1 ms minimum



NOTE: The DC power supply in EX4200 switches does not support Power over Ethernet (PoE); you can use either an external power injector or an AC power supply to supply power to PoE devices that you connect to the switch.



NOTE: For DC power supplies, we recommend that you provide at least 7.5 A at 48 VDC and use a facility circuit breaker rated for 10 A minimum. Doing so enables you to operate the switch in any configuration without upgrading the power infrastructure, and ensures that the switch functions at full capacity using multiple power supplies.

Related Documentation

- [AC Power Cord Specifications for EX4200 Switches on page 74](#)
- [Power Supply in EX4200 Switches on page 33](#)
- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)

AC Power Cord Specifications for EX4200 Switches

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 at the male 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 (approximately 14.75 feet) 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.

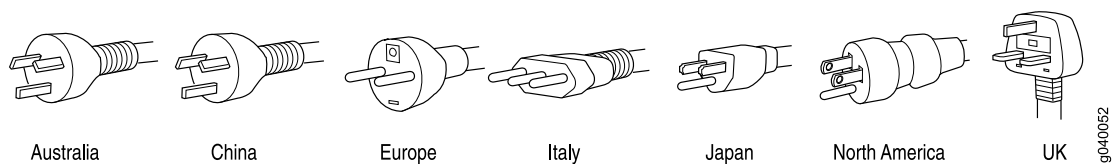
Table 38 on page 75 gives the AC power cord specifications for the countries and regions listed in the table.

Table 38: 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/NZS 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
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 22 on page 75 illustrates the plug on the power cord for some of the countries or regions listed in Table 38 on page 75.

Figure 22: AC Plug Types



Related Documentation • [Power Supply in EX4200 Switches on page 33](#)

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [Prevention of Electrostatic Discharge Damage on page 273](#)

Calculating the EX Series Switch Fiber-Optic Cable Power Budget

Calculate the link's power budget when planning fiber-optic cable layout and distances to ensure that fiber-optic connections have sufficient power for correct operation. The power budget is the maximum amount of power the link can transmit. When you calculate the power budget, you use a worst-case analysis to provide a margin of error, even though all the parts of an actual system do not operate at the worst-case levels.

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

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

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

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



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

2. Calculate the power budget (P_B) by subtracting (P_R) from (P_T):
$$-15 \text{ dBm} - (-28 \text{ dBm}) = 13 \text{ dBm}$$

Related Documentation

- [Calculating the EX Series Switch Fiber-Optic Cable Power Margin on page 76](#)
- [Understanding EX Series Switches Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion on page 88](#)
- [Pluggable Transceivers Supported on EX Series Switches on page 80](#)

Calculating the EX Series Switch Fiber-Optic Cable Power Margin

Calculate the link's power margin when planning fiber-optic cable layout and distances to ensure that fiber-optic connections have sufficient signal power to overcome system losses and still satisfy the minimum input requirements of the receiver for the required performance level. The power margin (P_M) is the amount of power available after attenuation or link loss (LL) has been subtracted from the power budget (P_B).

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

Before you begin to calculate the power margin:

- Calculate the power budget. See [“Calculating the EX Series Switch Fiber-Optic Cable Power Budget” on page 76](#).

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 39 on page 77](#) (here, the link is 2 km long and multimode, and the (P_B) is 13 dBm):

Table 39: 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: $(5) * (0.5 \text{ dBm}) = 2.5 \text{ dBm}$
Splice	0.5 dBm	This example assumes 2 splices. Loss for two splices: $(2) * (0.5 \text{ dBm}) = 1 \text{ dBm}$
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: • $(2 \text{ km}) * (1.0 \text{ dBm/km}) = 2 \text{ dBm}$ • $(2 \text{ km}) * (0.5 \text{ dBm/km}) = 1 \text{ dBm}$
Clock Recovery Module (CRM)	1 dBm	1 dBm



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

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

$$P_B - LL = P_M$$

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

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

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

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

**Related
Documentation**

- [Calculating the EX Series Switch Fiber-Optic Cable Power Budget on page 76](#)
- [Understanding EX Series Switches Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion on page 88](#)
- [Pluggable Transceivers Supported on EX Series Switches on page 80](#)

CHAPTER 8

Transceiver and Cable Specifications

- [Pluggable Transceivers Supported on EX4200 Switches on page 79](#)
- [Pluggable Transceivers Supported on EX Series Switches on page 80](#)
- [SFP+ Direct Attach Copper Cables for EX Series Switches on page 81](#)
- [Management Cable Specifications on page 87](#)
- [Understanding EX Series Switches Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion on page 88](#)

Pluggable Transceivers Supported on EX4200 Switches

Optional uplink modules for EX4200 switches support SFP, SFP+, or XFP transceivers. You can find the list of transceivers supported on EX4200 switches and information about those transceivers at the [Hardware Compatibility Tool page for EX4200](#).



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



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

The Gigabit Ethernet SFP, SFP+, or XFP transceivers installed in EX4200 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**.



NOTE: The transceivers support DOM even if they are installed in uplink module ports configured as Virtual Chassis ports.

- Related Documentation**
- [Uplink Modules in EX4200 Switches on page 18](#)
 - [Installing a Transceiver on page 193](#)
 - [Removing a Transceiver on page 195](#)

Pluggable Transceivers Supported on EX Series Switches

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



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

Use only optical transceivers and optical connectors purchased from Juniper Networks for your EX Series switches.

- For the list and specifications of transceivers supported on EX2200 switches, see *Pluggable Transceivers Supported on EX2200 Switches*.
- For the list and specifications of transceivers supported on EX2300 switches, see *Pluggable Transceivers Supported on EX2300 Switches*.
- For the list and specifications of transceivers supported on EX3200 switches, see *Pluggable Transceivers Supported on EX3200 Switches*.
- For the list and specifications of transceivers supported on EX3300 switches, see *Pluggable Transceivers Supported on EX3300 Switches*.
- For the list and specifications of transceivers supported on EX3400 switches, see *Pluggable Transceivers Supported on EX3400 Switches*.
- For the list and specifications of transceivers supported on EX4200 switches, see [“Pluggable Transceivers Supported on EX4200 Switches” on page 79](#).
- For the list and specifications of transceivers supported on EX4300 switches, see *Pluggable Transceivers Supported on EX4300 Switches*.
- For the list and specifications of transceivers supported on EX4500 switches, see *Pluggable Transceivers Supported on EX4500 Switches*.
- For the list and specifications of transceivers supported on EX4550 switches, see *Pluggable Transceivers Supported on EX4550 Switches*.
- For the list and specifications of transceivers supported on EX4600 switches, see *Determining Interface Support for an EX4600 Switch*.
- For the list and specifications of transceivers supported on EX6200 switches, see *Pluggable Transceivers Supported on EX6200 Switches*.

- For the list and specifications of transceivers supported on EX8200 switches, see *Pluggable Transceivers Supported on EX8200 Switches*.
- For the list and specifications of transceivers supported on EX9200 switches, see *Pluggable Transceivers Supported on EX9200 Switches*.

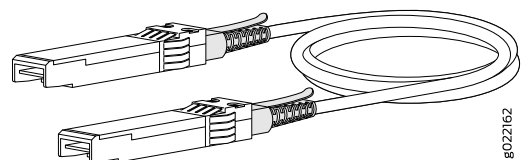
Related Documentation

- [Installing a Transceiver on page 193](#)
- [Removing a Transceiver on page 195](#)
- [Connecting a Fiber-Optic Cable on page 159](#)

SFP+ Direct Attach Copper Cables for EX Series Switches

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. See [Figure 23 on page 81](#).

Figure 23: SFP+ Direct Attach Copper Cables for EX Series Switches



This topic describes:

- [Cable Specifications on page 81](#)
- [Standards Supported by These Cables on page 87](#)

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. For the full specifications of these cables, see [The Hardware Compatibility Tool](#).

[Table 40 on page 81](#) describes the support for SFP+ passive DAC cable lengths on EX Series switches for Junos OS releases.

Table 40: Software Support for SFP+ Passive Direct Attach Copper Cables for EX Series Switches

Switch	Software Support Added	Cable Length
EX2300 switches	Junos OS Release 15.1X53-D50	3 ft (1 m), 10 ft (3 m), and 16 ft (5 m)
EX3200 switches	Junos OS Release 10.3	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)

Table 40: Software Support for SFP+ Passive Direct Attach Copper Cables for EX Series Switches *(continued)*

Switch	Software Support Added	Cable Length
EX3300 switches	Junos OS Release 11.3	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX3400 switches	Junos OS Release 15.1X53-D50	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4200-24T, EX4200-24T-DC, EX4200-24P, EX4200-24PX, EX4200-24F, EX4200-24F-DC, EX4200-48T, EX4200-48T-DC, EX4200-48P, and EX4200-48PX switches	Junos OS Release 10.3	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4200-24F-S and EX4200-48T-S switches	Junos OS Release 12.3R4	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4300-24T, EX4300-24P, EX4300-48T, EX4300-48T-AFI, EX4300-48P, EX4300-48T-DC, and EX4300-48T-DC-AFI switches	Junos OS Release 13.2X50-D10	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4300-32F switches	Junos OS Release 13.2X51-D15	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4300-24T-S, EX4300-24P-S, EX4300-48T-S, and EX4300-48P-S switches	Junos OS Release 13.2X51-D26	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4300-32F-S switches	Junos OS Release 13.2X51-D26	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4500 switches	Junos OS Release 10.2	3 ft (1 m), 10 ft (3 m), and 23 ft (7 m)
	Junos OS Release 11.2	16 ft (5 m)

Table 40: Software Support for SFP+ Passive Direct Attach Copper Cables for EX Series Switches *(continued)*

Switch	Software Support Added	Cable Length
EX4550-32T-AFI, EX4550-32T-AFO, EX4550-32T-DC-AFI, EX4550-32T-DC-AFO, EX4550-32F-AFI, EX4550-32F-AFO, EX4550-32F-DC-AFI, and EX4550-32F-DC-AFO switches	Junos OS Release 12.2	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX4550-32F-S switches	Junos OS Release 12.3R5	3 ft (1 m), 10 ft (3 m), 16 ft (5 m), and 23 ft (7 m)
EX8200 8-port SFP+ line cards (EX8200-8XS)	Junos OS Release 10.0	3 ft (1 m), 10 ft (3 m), and 23 ft (7 m)
	Junos OS Release 10.3	16 ft (5 m)
EX8200 40-port SFP+ line cards (EX8200-40XS)	Junos OS Release 10.3	3 ft (1 m), 10 ft (3 m), and 23 ft (7 m)
	Junos OS Release 11.1	16 ft (5 m)



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



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

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 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.

Table 41 on page 84 describes the cable specifications.

Table 41: SFP+ Direct Attach Copper Cable Specifications

Model Number	Specification	Value
EX-SFP-10GE-DAC-1M	Rate	10-Gbps full-duplex serial transmission
	Connector type	SFP+ passive Twinax cable assembly
	Supply voltage	3.3 V
	Power consumption (per end)	0.57 W
	Storage temperature	–40° F (–40° C) through 185° F (85° C)
	Cable type	Twinax
	Wire AWG	30 AWG
	Minimum cable bend radius	1 in. (2.54 cm)
	Cable characteristic impedance	100 ohms
	Crosstalk between pairs	2% maximum
	Time delay	1.31 nsec/ft
	Length	3.3 ft (1 m)
	Support for Virtual Chassis configuration	Yes

Table 41: SFP+ Direct Attach Copper Cable Specifications (*continued*)

Model Number	Specification	Value
EX-SFP-10GE-DAC-3M	Rate	10-Gbps full-duplex serial transmission
	Connector type	SFP+ passive Twinax cable assembly
	Supply voltage	3.3 V
	Power consumption (per end)	0.57 W
	Storage temperature	–40° F (–40° C) through 185° F (85° C)
	Cable type	Twinax
	Wire AWG	30 AWG
	Minimum cable bend radius	1 in. (2.54 cm)
	Cable characteristic impedance	100 ohms
	Crosstalk between pairs	2% maximum
	Time delay	1.31 nsec/ft
	Length	9.9 ft (3 m)
	Support for Virtual Chassis configuration	Yes

Table 41: SFP+ Direct Attach Copper Cable Specifications (*continued*)

Model Number	Specification	Value
EX-SFP-10GE-DAC-5M	Rate	10-Gbps full-duplex serial transmission
	Connector type	SFP+ passive Twinax cable assembly
	Supply voltage	3.3 V
	Power consumption (per end)	0.57 W
	Storage temperature	–40° F (–40° C) through 185° F (85° C)
	Cable type	Twinax
	Wire AWG	24 AWG
	Minimum cable bend radius	1 in. (2.54 cm)
	Cable characteristic impedance	100 ohms
	Crosstalk between pairs	2% maximum
	Time delay	1.31 nsec/ft
	Length	16.4 ft (5 m)
	Support for Virtual Chassis configuration	Yes

Table 41: SFP+ Direct Attach Copper Cable Specifications (*continued*)

Model Number	Specification	Value
EX-SFP-10GE-DAC-7M	Rate	10-Gbps full-duplex serial transmission
	Connector type	SFP+ passive Twinax cable assembly
	Supply voltage	3.3 V
	Power consumption (per end)	0.57 W
	Storage temperature	–40° F (–40° C) through 185° F (85° C)
	Cable type	Twinax
	Wire AWG	24 AWG
	Minimum cable bend radius	1 in. (2.54 cm)
	Cable characteristic impedance	100 ohms
	Crosstalk between pairs	2% maximum
	Time delay	1.31 nsec/ft
	Length	23 ft (7 m)
	Support for Virtual Chassis configuration	Yes

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

Related Documentation

- [Pluggable Transceivers Supported on EX Series Switches on page 80](#)
- [Installing a Transceiver on page 193](#)
- [Removing a Transceiver on page 195](#)

Management Cable Specifications

Table 42 on page 88 lists the specifications for the cables that connect the console (**CON**) and management (**MGMT**) ports to management devices.

Table 42: Specifications of Cables to Connect to Management Devices

Ports	Cable Specifications	Receptacle	Additional Information
RJ-45 Console (CON2) port	CAT5e UTP (unshielded twisted pair) cable	RJ-45	"Connecting a Device to a Management Console by Using an RJ-45 Connector" on page 158
Management (MGMT) Ethernet port (10/100/1000)	—	—	"Connecting a Device to a Network for Out-of-Band Management" on page 157
Mini-USB Type-B Console (CON1) port	—	—	

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

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 cable, including multimode and single-mode fiber-optic cable.

- [Signal Loss in Multimode and Single-Mode Fiber-Optic Cable on page 88](#)
- [Attenuation and Dispersion in Fiber-Optic Cable on page 89](#)

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 cladding (layers of lower refractive index material in close contact with a core material of higher refractive index), higher-order mode loss (HOL) occurs. Together, these factors reduce the transmission distance of multimode fiber compared to that of single-mode fiber.

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

Exceeding the maximum transmission distances can result in significant signal loss, which causes unreliable transmission. For information about the maximum transmission distance and supported wavelength range for the types of single-mode and multimode fiber-optic cables that are used on different EX Series switches see ["Pluggable Transceivers Supported on EX Series Switches" on page 80](#).

Attenuation and Dispersion in Fiber-Optic Cable

An optical data link functions correctly provided that modulated light reaching the receiver has enough power to be demodulated correctly. *Attenuation* is the reduction in strength of the light signal during transmission. Passive media components such as cables, cable splices, and connectors cause attenuation. Although attenuation is significantly lower for optical fiber than for other media, it still occurs in both multimode and single-mode transmission. An efficient optical data link must transmit enough light to overcome attenuation.

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

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

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

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

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

Related Documentation

- [Calculating the EX Series Switch Fiber-Optic Cable Power Budget on page 76](#)
- [Calculating the EX Series Switch Fiber-Optic Cable Power Margin on page 76](#)

Pinout Specifications

- [Console Port Connector Pinout Information on page 91](#)
- [USB Port Specifications for an EX Series Switch on page 92](#)
- [RJ-45 Management Port Connector Pinout Information on page 93](#)
- [RJ-45 Port, QSFP+ Port, SFP+ Port, and SFP Port Connector Pinout Information on page 94](#)
- [RJ-45 to DB-9 Serial Port Adapter Pinout Information on page 98](#)
- [Uplink Modules Connector Pinout Information for EX4200 Switches on page 99](#)
- [Virtual Chassis Ports Connector Pinout Information for EX4200 Switches on page 107](#)

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 43 on page 91](#) provides the pinout information for the RJ-45 console connector.



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

Table 43: 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

Table 43: Console Port Connector Pinout Information (*continued*)

Pin	Signal	Description
6	RxD Input	Receive data
7	CD Input	Data carrier detect
8	CTS Input	Clear to send

- Related Documentation**
- [Connecting a Device to a Management Console by Using an RJ-45 Connector on page 158](#)
 - [Configuring the Console Port Type \(CLI Procedure\)](#)

USB Port Specifications for an EX Series Switch

The following Juniper Networks USB flash drives have been tested and are officially supported 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 master boot record. Microsoft Windows formatting, by default, does not use a master boot record. See the documentation for your USB flash drive for information about how your USB flash drive is formatted.

- Related Documentation**
- [EX2200 Switches Hardware Overview](#)
 - [EX2300 Switches Hardware Overview](#)
 - [Rear Panel of an EX3200 Switch](#)
 - [Rear Panel of an EX3300 Switch](#)

- *Rear Panel of an EX3400 Switch*
- [Rear Panel of an EX4200 Switch on page 12](#)
- *EX4300 Switches Hardware Overview*
- *Front Panel of an EX4500 Switch*
- *Management Panel of an EX4600 Switch*
- *EX4550 Switches Hardware Overview*
- *Switch Fabric and Routing Engine (SRE) Module in an EX6200 Switch*
- *Switch Fabric and Routing Engine (SRE) Module in an EX8208 Switch*
- *Routing Engine (RE) Module in an EX8216 Switch*
- *Routing Engine Module in an EX9200 Switch*
- *Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive*

RJ-45 Management Port Connector Pinout Information

[Table 44 on page 93](#) provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 44: RJ-45 Management Port Connector Pinout Information

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

Related Documentation

- [Connecting a Device to a Network for Out-of-Band Management on page 157](#)

RJ-45 Port, QSFP+ Port, SFP+ Port, and SFP Port Connector Pinout Information

Tables in this topic describe the connector pinout information for the RJ-45, QSFP+, SFP+, and SFP ports.

- [Table 45 on page 94](#)—10/100/1000BASE-T Ethernet network port connector pinout information
- [Table 46 on page 94](#)—SFP network port connector pinout information
- [Table 47 on page 95](#)—SFP+ network port connector pinout information
- [Table 48 on page 96](#)—QSFP+ network module port connector pinout information

Table 45: 10/100/1000BASE-T Ethernet Network Port Connector Pinout Information

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1 Negative Vport (in PoE models)
2	TRP1-	Transmit/receive data pair 1 Negative Vport (in PoE models)
3	TRP2+	Transmit/receive data pair 2 Positive Vport (in PoE models)
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2 Positive Vport (in PoE models)
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Table 46: SFP Network Port Connector Pinout Information

Pin	Signal	Description
1	VeeT	Module transmitter ground
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disabled
4	SDA	2-wire serial interface data line

Table 46: SFP Network Port Connector Pinout Information (*continued*)

Pin	Signal	Description
5	SCL-	2-wire serial interface clock
6	MOD_ABS	Module absent
7	RS	Rate select
8	RX_LOS	Receiver loss of signal indication
9	VeeR	Module receiver ground
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver noninverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3 V supply
16	VccT	Module transmitter 3.3 V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter noninverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

Table 47: SFP+ Network Port Connector Pinout Information

Pin	Signal	Description
1	VeeT	Module transmitter ground
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disabled
4	SDA	2-wire serial interface data line
5	SCL-	2-wire serial interface clock
6	MOD_ABS	Module absent

Table 47: SFP+ Network Port Connector Pinout Information (*continued*)

Pin	Signal	Description
7	RS0	Rate select 0, optionally controls SFP+ module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1, optionally controls SFP+ transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver noninverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3 V supply
16	VccT	Module transmitter 3.3 V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter noninverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

Table 48: QSFP+ Network Port Connector Pinout Information

Pin	Signal
1	GND
2	TX2n
3	TX2p
4	GND
5	TX4n
6	TX4p
7	GND
8	ModSelL

Table 48: QSFP+ Network Port Connector Pinout Information (*continued*)

Pin	Signal
9	LPMode_Reset
10	VccRx
11	SCL
12	SDA
13	GND
14	RX3p
15	RX3n
16	GND
17	RX1p
18	RX1n
19	GND
20	GND
21	RX2n
22	RX2p
23	GND
24	RX4n
25	RX4p
26	GND
27	ModPrsL
28	IntL
29	VccTx
30	Vcc1
31	Reserved
32	GND

Table 48: QSFP+ Network Port Connector Pinout Information (*continued*)

Pin	Signal
33	TX3p
34	TX3n
35	GND
36	TX1p
37	TX1n
38	GND

Related Documentation • [Installing a Transceiver on page 193](#)

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

The console port is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a PC or a laptop. If your laptop or PC does not have a DB-9 male connector pin and you want to connect your laptop or PC to the device, use a combination of the RJ-45 to DB-9 female adapter along with a USB to DB-9 male adapter.

[Table 49 on page 98](#) provides the pinout information for the RJ-45 to DB-9 serial port adapter.

Table 49: 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

Related Documentation • [Connecting a Device to a Management Console by Using an RJ-45 Connector on page 158](#)

Uplink Modules Connector Pinout Information for EX4200 Switches

EX4200 switches have a field-replaceable unit (FRU) uplink module on the front panel. [Table 50 on page 99](#) provides the uplink modules connector pinout information.



NOTE: You can use these ports to connect an access switch to a distribution switch. You can also use optional uplink module ports to connect members of a Virtual Chassis across multiple wiring closets.

Table 50: Uplink Modules Connector Pinout Information

Pin Number	Pin Name
A1	GND
A2	GND
A3	GND
A4	GND
A5	GND
A6	GND
A7	GND
A8	GND
A9	GND
A10	GND
A11	GND
A12	GND
A13	GND
A14	GND
A15	Uplink_I2C_SCK
A16	GND
A17	Uplink_PD

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
A18	GND
A19	POWER (12V)
A20	GND
B1	GND
B2	XAUI0_RX0N
B3	GND
B4	XAUI0_RX2N
B5	Uplink_P25_LED2
B6	XAUI1_RX0N
B7	Uplink_P27_LED2
B8	XAUI1_RX2N
B9	GND
B10	SRX28N
B11	Uplink_XAUI_XMDIO
B12	SRX26N
B13	GND
B14	SGMII_RXN
B15	Uplink_I2C_Rst
B16	Uplink_Intr
B17	Uplink_Pwr_En
B18	Uplink_P26_LED0
B19	POWER (12V)
B20	POWER (12V)
C1	GND

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
C2	XAU10_RX0P
C3	GND
C4	XAU10_RX2P
C5	GND
C6	XAU11_RX0P
C7	GND
C8	XAU11_RX2P
C9	GND
C10	SRX28P
C11	GND
C12	SRX26P
C13	GND
C14	SGMIIRXP
C15	CPU_UPLINK_MDC
C16	Uplink_I2C_SDA
C17	CPU_UPLINK_MDIO
C18	Uplink_P26_LED1
C19	UPLNK_PWR_OK
C20	POWER (12V)
D1	GND
D2	GND
D3	XAU10_TX1N
D4	GND
D5	XAU10_TX3N

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
D6	GND
D7	XAU1I_TX1N
D8	GND
D9	XAU1I_TX3N
D10	GND
D11	STX27N
D12	GND
D13	STX25N
D14	GND
D15	Uplink_Rst
D16	GND
D17	Uplink_Status_LED0
D18	GND
D19	POWER (12V)
D20	GND
E1	GND
E2	XAU1O_TX0N
E3	XAU1O_TX1P
E4	XAU1O_TX2N
E5	XAU1O_TX3P
E6	XAU1I_TX0N
E7	XAU1I_TX1P
E8	XAU1I_TX2N
E9	XAU1I_TX3P

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
E10	STX28N
E11	STX27P
E12	STX26N
E13	STX25P
E14	SGMIITXN
E15	Uplink_Hotswap_LED
E16	Uplink_Spare_Intr
E17	Uplink_Status_LED1
E18	Uplink_P27_LED0
E19	POWER (12V)
E20	POWER (12V)
F1	GND
F2	XAU10_TX0P
F3	GND
F4	XAU10_TX2P
F5	GND
F6	XAU11_TX0P
F7	GND
F8	XAU1_TX2P
F9	GND
F10	STX28P
F11	GND
F12	STX26P
F13	GND

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
F14	SGMIITXP
F15	GND
F16	Uplink_Expander_Intr
F17	GND
F18	Uplink_P27_LED1
F19	GND
F20	POWER (12V)
G1	GND
G2	GND
G3	XAUI0_RX1N
G4	GND
G5	XAUI0_RX3N
G6	GND
G7	XAUI1_RX1N
G8	GND
G9	XAUI1_RX3N
G10	GND
G11	SRX27N
G12	GND
G13	SRX25N
G14	GND
G15	GND
G16	GND
G17	Uplink_P25_LED0

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
G18	GND
G19	POWER (12V)
G20	GND
H1	Uplink_PD_Loopback
H2	GND
H3	XAUI0_RX1P
H4	GND
H5	XAUI0_RX3P
H6	Uplink_P26_LED2
H7	XAUI1_RX1P
H8	Uplink_P28_LED2
H9	XAUI1_RX3P
H10	GND
H11	SRX27P
H12	Uplink_XAUI_MDC
H13	SRX25P
H14	GND
H15	Serial_RX
H16	GND
H17	Uplink_P25_LED1
H18	Uplink_P28_LED0
H19	POWER (12V)
H20	POWER (12V)
I1	GND

Table 50: Uplink Modules Connector Pinout Information (*continued*)

Pin Number	Pin Name
I2	GND
I3	GND
I4	GND
I5	GND
I6	GND
I7	GND
I8	GND
I9	GND
I10	GND
I11	GND
I12	GND
I13	GND
I14	GND
I15	GND
I16	Serial_TX
I17	GND
I18	Uplink_P28_LED1
I19	GND
I20	POWER (12V)

**Related
Documentation**

- [Uplink Modules in EX4200 Switches on page 18](#)
- [Front Panel of an EX4200 Switch on page 11](#)
- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Removing an Uplink Module from an EX4200 Switch on page 189](#)

Virtual Chassis Ports Connector Pinout Information for EX4200 Switches

EX4200 switches use a 68-pin connector cable to interconnect switches to form a Virtual Chassis. The cable is provided with the switch. [Table 51 on page 107](#) provides the Virtual Chassis ports (VCPs) connector pinout information.

Table 51: Virtual Chassis Ports (VCPs) Connector Pinout Information

Pin Number	Pin Name
A1	GND
A2	P1TXP0
A3	P1TXN0
A4	GND
A5	P1TXP1
A6	P1TXN1
A7	GND
A8	P1TXP2
A9	P1TXN2
A10	GND
A11	P1TXP3
A12	P1TXN3
A13	GND
A14	NC
A15	NC
A16	GND
A17	NC
A18	NC
A19	NC
A20	NC

Table 51: Virtual Chassis Ports (VCPs) Connector Pinout Information (*continued*)

Pin Number	Pin Name
A21	NC
A22	GND
A23	P2TXP0
A24	P2TXN0
A25	GND
A26	P2TXP1
A27	P2TXN1
A28	GND
A29	P2TXP2
A30	P2TXN2
A31	GND
A32	P2TXP3
A33	P2TXN3
A34	GND
B1	GND
B2	P1RXP0
B3	P1RXN0
B4	GND
B5	P1RXP1
B6	P1RXN1
B7	GND
B8	P1RXP2
B9	P1RXN2
B10	GND

Table 51: Virtual Chassis Ports (VCPs) Connector Pinout Information (*continued*)

Pin Number	Pin Name
B11	P1RXP3
B12	P1RXN3
B13	GND
B14	NC
B15	NC
B16	NC
B17	NC
B18	NC
B19	NC
B20	NC
B21	NC
B22	GND
B23	P2RXP0
B24	P2RXN0
B25	GND
B26	P2RXP1
B27	P2RXN1
B28	GND
B29	P2RXP2
B30	P2RXN2
B31	GND
B32	P2RXP3
B33	P2RXN3
B34	GND

**Related
Documentation**

- [Virtual Chassis Cabling Configuration Examples for EX4200 Switches on page 116](#)
- [Planning EX4200, EX4500, and EX4550 Virtual Chassis on page 114](#)
- [*Understanding EX Series Virtual Chassis Components*](#)
- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)
- [Connecting a Virtual Chassis Cable to an EX4200 Switch on page 213](#)

CHAPTER 10

Planning the Virtual Chassis

- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)
- [Planning EX4200, EX4500, and EX4550 Virtual Chassis on page 114](#)
- [Virtual Chassis Cabling Configuration Examples for EX4200 Switches on page 116](#)

Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations

You can interconnect EX4200 switches together to form a Virtual Chassis composed exclusively of EX4200 switches. You can interconnect EX4500 switches together to form a Virtual Chassis composed exclusively of EX4500 switches. You can interconnect EX4550 switches together to form a Virtual Chassis composed exclusively of EX4550 switches. You can also interconnect EX4200 switches with EX4500 switches or with EX4550 switches or with both switches to form a mixed Virtual Chassis.

This topic covers:

- [Ports Used to Interconnect Virtual Chassis Members on page 111](#)
- [Number of Switches, Required Software Releases, and Member Roles That You Configure in the Virtual Chassis on page 112](#)
- [Virtual Chassis Module on page 113](#)
- [Switch Role and Member ID on the LCD Panel on page 114](#)

Ports Used to Interconnect Virtual Chassis Members

You can use the following ports to connect Virtual Chassis members:

- On EX4200 switches:
 - The dedicated Virtual Chassis ports (VCPs) on each switch
 - SFP, SFP+, or XFP uplink module ports configured as VCPs
 - SFP network ports on EX4200-24F switches configured as VCPs
- On EX4500 switches:
 - The dedicated VCPs on the Virtual Chassis module
 - SFP+ network ports configured as VCPs

- SFP+ uplink module ports configured as VCPs
- On EX4550 switches:
 - The dedicated VCPs on the Virtual Chassis module
 - SFP+ network ports configured as VCPs
 - SFP+ expansion module ports configured as VCPs
 - 10GBASE-T network ports configured as VCPs
 - 10GBASE-T expansion module ports configured as VCPs
 - 40G QSFP+ expansion module ports configured as VCPs



NOTE: You can use the 10GBASE-T Ethernet network ports, 10GBASE-T expansion module ports, and QSFP+ expansion module ports configured as VCPs to interconnect only EX4550 switches in a Virtual Chassis. These ports cannot be used to connect an EX4550 switch with an EX4200 switch or an EX4500 switch in a Virtual Chassis.

Number of Switches, Required Software Releases, and Member Roles That You Configure in the Virtual Chassis

A Virtual Chassis must have one member designated as the master switch and one member designated as the backup switch. All other switches in the configuration are designated as being in the linecard role. You manage Virtual Chassis operation through the master switch.

The number of switches that you can configure in a Virtual Chassis and the role that can be assigned to each switch in a Virtual Chassis depend on the Juniper Networks Junos operating system (Junos OS) release that is running on the switches.

See the following tables:

- [Table 52 on page 112](#)—EX4200 Virtual Chassis
- [Table 53 on page 113](#)—EX4500 Virtual Chassis
- [Table 54 on page 113](#)—EX4550 Virtual Chassis
- [Table 55 on page 113](#)—Mixed EX4200, EX4500, and EX4550 Virtual Chassis

Table 52: Number of Switches and Switch Roles for an EX4200 Virtual Chassis, per Junos OS Release

Junos OS Release	Number of Switches	Role
9.0 or later	Up to 10 EX4200 switches	There must be a master and a backup; the remaining switches must be in the linecard role.

Table 53: Number of Switches and Switch Roles for an EX4500 Virtual Chassis, per Junos OS Release

Junos OS Release	Number of Switches	Role
11.1–11.3	Up to 2 EX4500 switches	There must be a master and a backup.
11.4 or later	Up to 10 EX4500 switches	There must be a master and a backup; the remaining switches must be in the linecard role.

Table 54: Number of Switches and Switch Roles for an EX4550 Virtual Chassis, per Junos OS Release

Junos OS Release	Number of Switches	Role
12.2 or later	Up to 10 EX4550 switches	There must be a master and a backup; the remaining switches must be in the linecard role.

Table 55: Number of Switches and Switch Roles for a Mixed EX4200, EX4500, and EX4550 Virtual Chassis, per Junos OS Release

Junos OS Release	Number of Switches	Role
11.1	Up to 2 EX4500 switches and up to 8 EX4200 switches	EX4500 switches must be in the master and backup roles and EX4200 switches in the linecard role.
11.2, 11.3	Up to 2 EX4500 switches and up to 8 EX4200 switches	Master and backup must be of the same switch type—either both EX4200 or both EX4500 switches. The remaining switches must be in the linecard role.
11.4 or later	Up to 10 total of both EX4200 and EX4500 switches	Any switch type in any role. There must be a master and a backup and the remaining switches must be in the linecard role.
12.2 or later	Up to 10 total of EX4200, EX4500, and EX4550 switches	Any switch type in any role. There must be a master and a backup and the remaining switches must be in the linecard role.

Virtual Chassis Module

Virtual Chassis modules are available for EX4500 and EX4550 switches. However, installing a Virtual Chassis module is not mandatory for using these switches in a Virtual Chassis configuration.



NOTE: On EX4500 switches that are running Junos OS releases earlier than Release 11.4R1, you must install a Virtual Chassis module for using the switch in a Virtual Chassis configuration. Starting with Release 11.4R1, you can use uplink port connections to interconnect EX4500 member switches into a Virtual Chassis.

Switch Role and Member ID on the LCD Panel

For each switch in the Virtual Chassis, the LCD panel of the switch displays:

- Role of the switch—**RE** for master, **BK** for backup, and **LC** for linecard member
- Member ID for the Virtual Chassis member—A number in the range 0 through 9

Related Documentation

- *Understanding EX Series Virtual Chassis Components*
- [Planning EX4200, EX4500, and EX4550 Virtual Chassis on page 114](#)
- *EX Series Virtual Chassis Overview*

Planning EX4200, EX4500, and EX4550 Virtual Chassis

Before interconnecting EX4200, EX4500, and EX4550 switches in a Virtual Chassis configuration:

- Verify that the rack in which you will install the switches meets the requirements described in [“Rack Requirements” on page 68](#). You can mount the switches in a Virtual Chassis on a single rack or on multiple racks.
- Verify that the installation site meets the power requirements of the switches in a Virtual Chassis.
- Verify that you have installed a Virtual Chassis module in an EX4500 switch running Junos OS releases earlier than Release 11.4R1. The Virtual Chassis module must be installed in an EX4500 switch to form a Virtual Chassis.

[Table 56 on page 114](#) describes the Virtual Chassis components and the Junos OS release running on switches that you need to consider when you plan your EX4200, EX4500, and EX4550 Virtual Chassis configuration.

Table 56: Virtual Chassis Components to Consider When Planning an EX4200, EX4500, and EX4550 Virtual Chassis

Virtual Chassis Components	Junos OS Release Running on the Member Switches	Virtual Chassis Details
EX4200 switches only	Junos OS Release 9.0 and later	You can interconnect two to ten EX4200 switches to form a Virtual Chassis composed exclusively of EX4200 switches.
EX4500 switches only	Junos OS Releases 11.1, 11.2, and 11.3	You can interconnect two EX4500 switches into a Virtual Chassis composed exclusively of EX4500 switches.
	Junos OS Release 11.4 or later	You can interconnect up to ten EX4500 switches into a Virtual Chassis composed exclusively of EX4500 switches.
EX4550 switches only	Junos OS Release 12.2 or later	You can interconnect up to ten EX4550 switches into a Virtual Chassis composed exclusively of EX4550 switches.

Table 56: Virtual Chassis Components to Consider When Planning an EX4200, EX4500, and EX4550 Virtual Chassis (*continued*)

Virtual Chassis Components	Junos OS Release Running on the Member Switches	Virtual Chassis Details
EX4200, EX4500, and EX4550 switches	Junos OS Release 11.1	You can interconnect up to two EX4500 switches and up to eight EX4200 switches into a mixed Virtual Chassis. EX4500 switches must always be configured in the master and backup roles.
	Junos OS Releases 11.2 and 11.3	You can interconnect up to two EX4500 switches and up to eight EX4200 switches into a mixed Virtual Chassis. The same type of switch must act in the master and backup roles.
	Junos OS Release 11.4 or later	You can interconnect up to ten total EX4200 and EX4500 switches into a mixed Virtual Chassis. Any switch can be configured in any role in any configuration.
	Junos OS Release 12.2 or later	You can interconnect up to ten total EX4200, EX4500, and EX4550 switches into a mixed Virtual Chassis. Any switch can be configured in any role in any configuration.

Table 57 on page 115 describes the cabling requirements for a Virtual Chassis.

Table 57: Cabling Requirements for a Virtual Chassis

Distance Between Virtual Chassis Members	Virtual Chassis Cable Lengths Supported	Details
Up to 0.5 m	0.5 m	You can interconnect EX4200, EX4500, and EX4550 switches into a Virtual Chassis through Virtual Chassis ports (VCPs) using the 0.5-meter Virtual Chassis cable. - This Virtual Chassis cable is supplied with an EX4200 switch. - You must order this cable separately for EX4500 and EX4550 switches, including EX4500 switches that are shipped with a preinstalled Virtual Chassis module.
0.5 m through 5 m	1 m, 3 m, and 5 m	You must order these cables separately for EX4200, EX4500, and EX4550 switches, including EX4500 switches that are shipped with a preinstalled Virtual Chassis module.

Table 57: Cabling Requirements for a Virtual Chassis (*continued*)

Distance Between Virtual Chassis Members	Virtual Chassis Cable Lengths Supported	Details
Greater than 5 m	—	- To interconnect EX4200 switches that are installed farther apart than 5 m, you must configure the SFP, SPF+, or XFP uplink module ports or the SFP network ports in the EX4200-24F switch as VCPs and use them to interconnect the switches. - To interconnect EX4500 switches that are installed farther apart than 5 m, you must configure either the uplink module ports or the SFP+ network ports as VCPs and use them to interconnect the switches. - To interconnect EX4550 switches that are installed farther apart than 5 m, you must configure either the expansion module ports or the network ports as VCPs and use them to interconnect the switches.



NOTE: With separately ordered Virtual Chassis cables, you can use the cable connector retainers provided with the original cable; you can also use separately ordered Virtual Chassis cable connector retainers.

Related Documentation

- [Understanding EX Series Virtual Chassis Components](#)
- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)
- [Virtual Chassis Cabling Configuration Examples for EX4200 Switches on page 116](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches on page 70](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4500 Switches](#)

Virtual Chassis Cabling Configuration Examples for EX4200 Switches

You can install EX4200 switches in a single rack or multiple racks, or in different wiring closets, and interconnect them to form a Virtual Chassis. There are two dedicated Virtual Chassis ports (VCPs) on the rear panel of the EX4200 switch that are used exclusively to interconnect EX4200 switches as a Virtual Chassis. The physical location of the switches in a Virtual Chassis is restricted only by the maximum length supported for cables to connect the VCPs. The maximum cable length for interconnecting the dedicated VCPs is 5 meters. If you want to interconnect EX4200 switches that are located beyond the reach of the dedicated VCP cables, you can install the XFP uplink module, the SFP uplink module, or the SFP+ uplink module and set the uplink module ports as VCP interfaces. See *Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port (CLI Procedure)*.



NOTE: The interfaces for the two dedicated VCPs are operational by default. However, if you are using the uplink module ports as VCPs, you must explicitly set the uplink module ports to function as VCPs.

The following illustrations describe various Virtual Chassis cabling configuration examples.



NOTE: For increased availability and redundancy, we recommend that you always configure your Virtual Chassis in a ring topology.

Figure 24 on page 117 and Figure 25 on page 117 show five EX4200 switches stacked vertically in a rack and interconnected in a ring topology using four short Virtual Chassis cables and one long Virtual Chassis cable.

Figure 24: EX4200 Switches Mounted on a Single Rack and Connected in a Ring Topology Using Short and Long Cables: Option 1

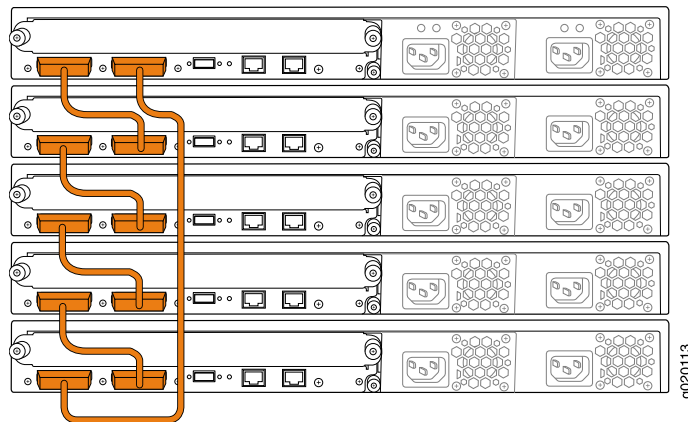


Figure 25: EX4200 Switches Mounted on a Single Rack and Connected in a Ring Topology Using Short and Long Cables: Option 2

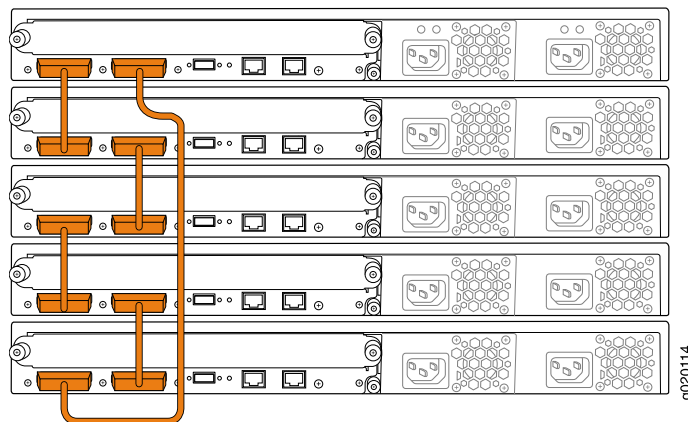


Figure 26 on page 118 shows five EX4200 switches stacked vertically in a rack and interconnected in a ring topology using short-length and medium-length Virtual Chassis cables.

Figure 26: EX4200 Switches Mounted on a Single Rack and Connected in a Ring Topology Using Short and Medium Cables

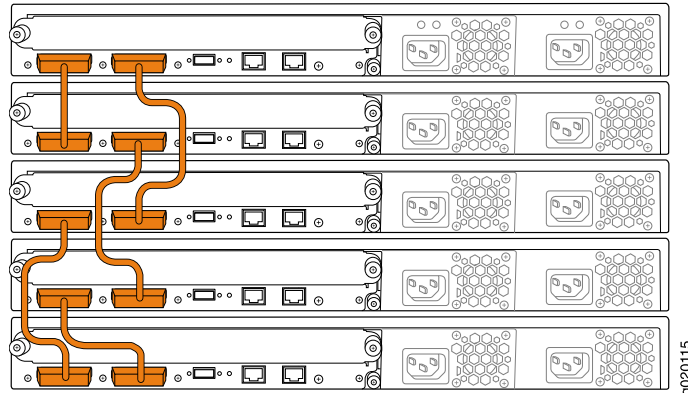


Figure 27 on page 118 and Figure 28 on page 118 show five EX4200 switches mounted on the top rows of adjacent racks and interconnected in a ring topology using medium-length and long-length Virtual Chassis cables.

Figure 27: EX4200 Switches Mounted on Adjacent Racks and Connected in a Ring Topology Using Medium and Long Cables: Option 1

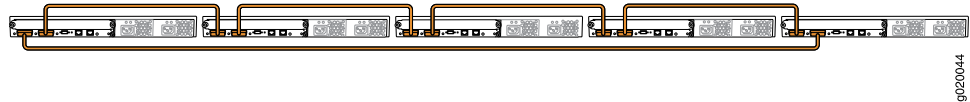
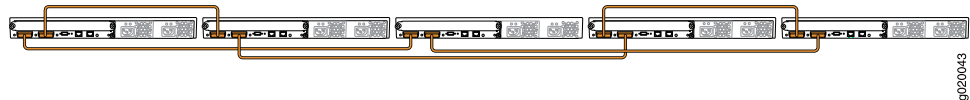


Figure 28: EX4200 Switches Mounted on Adjacent Racks and Connected in a Ring Topology Using Medium and Long Cables: Option 2



Related Documentation

- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)
- [Understanding EX Series Virtual Chassis Components](#)
- [Planning EX4200, EX4500, and EX4550 Virtual Chassis on page 114](#)
- [Virtual Chassis Ports Connector Pinout Information for EX4200 Switches on page 107](#)
- [Example: Configuring an EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets](#)

PART 3

Initial Installation and Configuration

- [Unpacking the Switch on page 121](#)
- [Installing the Switch on page 127](#)
- [Connecting the Switch to Power on page 143](#)
- [Connecting the Switch to the Network on page 157](#)
- [Performing Initial Configuration on page 161](#)

CHAPTER 11

Unpacking the Switch

- [Unpacking an EX4200 Switch on page 121](#)
- [Parts Inventory \(Packing List\) for an EX4200 Switch on page 122](#)
- [Registering Products—Mandatory for Validating SLAs on page 124](#)

Unpacking an EX4200 Switch

The EX4200 switch chassis is a rigid sheet-metal structure that houses the hardware components. EX4200 switches are shipped in a cardboard carton, secured with foam packing material. The carton also contains an accessory box.

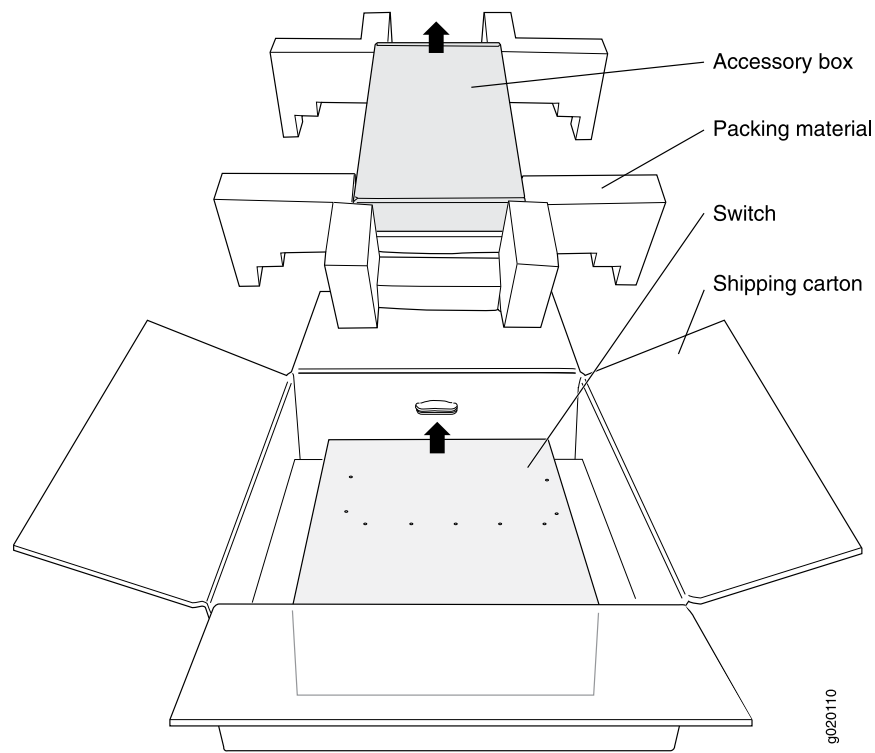


CAUTION: EX4200 switches are maximally protected inside the shipping carton. Do not unpack the switches until you are ready to begin installation.

To unpack the switch (see [Figure 29 on page 122](#)):

1. Move the shipping carton to a staging area as close to the installation site as possible, but where you have enough room to remove the system components.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Remove the accessory box and verify the contents in it against the parts inventory on the label attached to the carton.
5. Pull out the packing material holding the switch in place.
6. Verify the chassis components received against the packing list included with the switch. An inventory of parts provided with the switch is provided in [“Parts Inventory \(Packing List\) for an EX4200 Switch” on page 122](#).
7. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Figure 29: Unpacking an EX4200 Switch


**Related
Documentation**

- [Mounting an EX4200 Switch on page 128](#)
- [Installing and Connecting an EX4200 Switch on page 127](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)

Parts Inventory (Packing List) for an EX4200 Switch

The EX4200 switches are shipped in a cardboard carton, secured with foam packing material. The carton contains an accessory box.

The switch shipment includes a packing list. Check the parts you receive in the switch shipping carton against the items on the packing list. The parts shipped depend on the configuration you order.

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

[Table 58 on page 123](#) lists the parts and their quantities in the packing list.

Table 58: Packing List for an EX4200 Switch

Component		Quantity
Switch		1
Fan tray	EX4200-24T, EX4200-24T-DC, EX4200-24P, EX4200-24PX, EX4200-24F, EX4200-24F-DC, EX4200-48T, EX4200-48T-DC, EX4200-48P, and EX4200-48PX switches.	1 preinstalled
	EX4200-24F-S and EX4200-48T-S switches	Fan tray for these models are not shipped by default; you must order them separately.
Power supply	EX4200-24T, EX4200-24T-DC, EX4200-24P, EX4200-24PX, EX4200-24F, EX4200-24F-DC, EX4200-48T, EX4200-48T-DC, EX4200-48P, and EX4200-48PX switches.	1 (preinstalled only if your system order includes a 320 W AC power supply)
	EX4200-24F-S and EX4200-48T-S switches	Power supplies for these models are not shipped by default; you must order them separately.
AC power cord appropriate for your geographical location (only for AC switch models)	EX4200-24T, EX4200-24T-DC, EX4200-24P, EX4200-24PX, EX4200-24F, EX4200-24F-DC, EX4200-48T, EX4200-48T-DC, EX4200-48P, and EX4200-48PX switches.	1
	EX4200-24F-S and EX4200-48T-S switches	AC power cord for these models is not shipped by default; you must order it separately.
Power cord retainer clip (only for AC switch models)	EX4200-24T, EX4200-24T-DC, EX4200-24P, EX4200-24PX, EX4200-24F, EX4200-24F-DC, EX4200-48T, EX4200-48T-DC, EX4200-48P, and EX4200-48PX switches.	1
	EX4200-24F-S and EX4200-48T-S switches	Power cord retainer clip for these models is not shipped by default; you must order it separately.
Mounting brackets		2
Mounting screws to attach the mounting brackets to the switch chassis		8
Rubber feet		4
RJ-45 cable and RJ-45 to DB-9 serial port adapter		1

Table 58: Packing List for an EX4200 Switch (*continued*)

Component	Quantity
Virtual Chassis cable	1
Virtual Chassis cable connector retainers	2
Cover panels for slots without installed components (preinstalled)	- Power supply cover panel: 1 - Uplink module cover panel: 1
Dust covers for ports (for an EX4200-24F switch)	24
Quick Start installation instructions	1
Juniper Networks Product Warranty	1
End User License Agreement	1



NOTE: You must provide mounting screws that are appropriate for your rack or cabinet to mount the chassis on a rack or a cabinet.

**Related
Documentation**

- [Unpacking an EX4200 Switch on page 121](#)
- [EX4200 Switches Hardware Overview on page 3](#)

Registering Products—Mandatory for Validating 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 and update the installation base data if there is any addition or change to the installation base or if the installation base is moved. Juniper Networks will not be held accountable 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 install base at:
<https://www.juniper.net/customers/csc/management/updateinstallbase.jsp>.

**Related
Documentation**

- [Contacting Customer Support to Obtain Return Material Authorization on page 219](#)

- *Contacting Customer Support to Obtain a Return Materials Authorization for an NFX250 Device*

CHAPTER 12

Installing the Switch

- [Installing and Connecting an EX4200 Switch on page 127](#)
- [Mounting an EX4200 Switch on page 128](#)
- [Mounting an EX4200 Switch on a Desk or Other Level Surface on page 129](#)
- [Mounting an EX4200 Switch on Two Posts in a Rack or Cabinet on page 130](#)
- [Mounting an EX4200 Switch on Four Posts in a Rack or Cabinet on page 133](#)
- [Mounting an EX4200 Switch in a Recessed Position in a Rack or Cabinet on page 137](#)
- [Mounting an EX4200 Switch on a Wall on page 138](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)

Installing and Connecting an EX4200 Switch

The EX4200 switch chassis is a rigid sheet-metal structure that houses the hardware components.

To install and connect an EX4200 switch:

1. Follow instructions in [“Unpacking an EX4200 Switch” on page 121](#).
2. Install a power supply if it is not pre-installed; see [“Installing a Power Supply in an EX4200 Switch” on page 183](#).
3. Install a fan tray if it is not pre-installed; see [“Installing a Fan Tray in an EX4200 Switch” on page 179](#).
4. Mount the switch by following instructions appropriate for your site:
 - [“Mounting an EX4200 Switch on Two Posts in a Rack or Cabinet” on page 130](#) (using the mounting brackets provided)
 - [“Mounting an EX4200 Switch on Four Posts in a Rack or Cabinet” on page 133](#) (using the separately orderable four-post rack-mount kit)
 - [“Mounting an EX4200 Switch in a Recessed Position in a Rack or Cabinet” on page 137](#) (using the 2-in.-recess front brackets from the separately orderable four-post rack-mount kit)

- [“Mounting an EX4200 Switch on a Desk or Other Level Surface” on page 129](#) (using the rubber feet provided)
 - [“Mounting an EX4200 Switch on a Wall” on page 138](#) (using the separately orderable wall-mount kit)
5. Follow instructions in [“Connecting Earth Ground to an EX Series Switch” on page 143](#).
 6. Follow instructions for connecting power as appropriate for your site:
 - [Connecting AC Power to an EX4200 Switch on page 149](#)
 - [Connecting DC Power to an EX4200 Switch on page 152](#)
 7. Perform initial configuration of the switch by following instructions in [“Connecting and Configuring an EX Series Switch \(CLI Procedure\)” on page 165](#) or [“Connecting and Configuring an EX Series Switch \(J-Web Procedure\)” on page 168](#).
 8. Set the switch's management options by following the appropriate instructions:
 - [Connecting a Device to a Network for Out-of-Band Management on page 157](#)
 - [Connecting a Device to a Management Console by Using an RJ-45 Connector on page 158](#)

Related Documentation

- [Rack Requirements on page 68](#)
- [Cabinet Requirements on page 68](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches on page 70](#)

Mounting an EX4200 Switch

You can mount the switch:

- On two posts in a 19-in. rack or cabinet by using the mounting brackets provided with the switch.
- On four posts in a 19-in. rack or cabinet by using the separately orderable four-post rack-mount kit.
- In a position recessed 2 in. from the front of a 19-in. rack or cabinet by using the 2-in.-recess front brackets in the separately orderable four-post rack-mount kit. You can mount the switch in this recessed position on two-post or four-post racks and cabinets.
- On a desk or other level surface by using rubber feet. The switch is shipped with four rubber feet to be used to stabilize the chassis on a desk or other level surface.
- On a wall by using the separately orderable wall-mount kit.

The holes in the mounting brackets are placed at 1 U (1.75 in. or 4.45 cm.) apart so that the switch can be mounted in any rack or cabinet that provides holes spaced at that distance.

See the Related Documentation for detailed descriptions of the various rack or cabinet mounting options.

**Related
Documentation**

- [Mounting an EX4200 Switch on Two Posts in a Rack or Cabinet on page 130](#)
- [Mounting an EX4200 Switch on Four Posts in a Rack or Cabinet on page 133](#)
- [Mounting an EX4200 Switch in a Recessed Position in a Rack or Cabinet on page 137](#)
- [Mounting an EX4200 Switch on a Desk or Other Level Surface on page 129](#)
- [Mounting an EX4200 Switch on a Wall on page 138](#)
- [Connecting Earth Ground to an EX Series Switch on page 143](#)

Mounting an EX4200 Switch on a Desk or Other Level Surface

You can mount an EX4200 switch on a desk or other level surface by using the 4 rubber feet that are shipped with the switch. The rubber feet stabilize the chassis.

Before mounting an EX4200 switch on a desk or other level surface:

- Verify that the site meets the requirements described in “[Site Preparation Checklist for EX4200 Switches](#)” on page 61.
- Place the desk in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
- Read “[General Safety Guidelines and Warnings](#)” on page 243, with particular attention to “[Chassis Lifting Guidelines](#)” on page 252.
- Remove the switch from the shipping carton (see “[Unpacking an EX4200 Switch](#)” on page 121).

Ensure that you have the following parts and tools available:

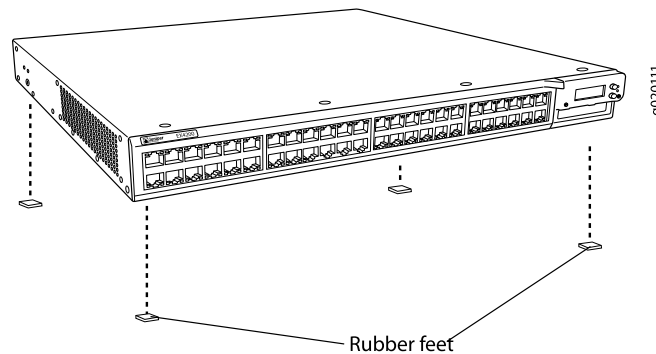
- 4 rubber feet to stabilize the chassis on the a desk or other level surface (provided in the accessory box shipped with the switch)
- Dust covers for ports (for EX4200-24F switches only; optional)

To mount the switch on a desk or other level surface:

1. Turn the chassis upside down on the desk or the level surface where you intend to mount the switch.
2. Attach the rubber feet to the bottom of the chassis, as shown in [Figure 30 on page 130](#).

3. Turn the chassis right side up on the desk or the level surface.
4. If it is an EX4200-24F switch, we recommend you insert dust covers in unused SFP ports.

Figure 30: Attaching Rubber Feet to an EX4200 Switch Chassis



Related Documentation

- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4200 Switches on page 70](#)

Mounting an EX4200 Switch on Two Posts in a Rack or Cabinet

You can mount an EX4200 switch on two posts of a 19-in. rack (either a two-post or a four-post rack) or a 19-in. cabinet by using the mounting brackets provided with the switch. (The remainder of this topic uses “rack” to mean “rack or cabinet.”)

You can mount the switch on four posts of a four-post rack by using the mounting brackets provided with the separately orderable four-post rack-mount kit. See [“Mounting an EX4200 Switch on Four Posts in a Rack or Cabinet” on page 133](#).



NOTE: If you need to mount the switch in a recessed position on either a two-post rack or a four-post rack, you can use the 2-in.-recess front brackets provided in the separately orderable four-post rack-mount kit.

Before mounting the switch on two posts in a rack:

- Verify that the site meets the requirements described in “[Site Preparation Checklist for EX4200 Switches](#)” on page 61.
- 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](#)” on page 243, with particular attention to “[Chassis Lifting Guidelines](#)” on page 252.
- Remove the switch from the shipping carton (see “[Unpacking an EX4200 Switch](#)” on page 121).

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- 2 mounting brackets and 8 mounting screws (provided in the accessory box shipped with the switch)
- Screws to secure the chassis to the rack (not provided)
- 2-in.-recess front brackets if you will mount the switch in a recessed position (brackets are from the separately orderable four-post rack-mount kit).
- Dust covers for ports (for EX4200-24F switches only; optional)



NOTE: One person must be available to lift the switch while another secures the switch to the rack.

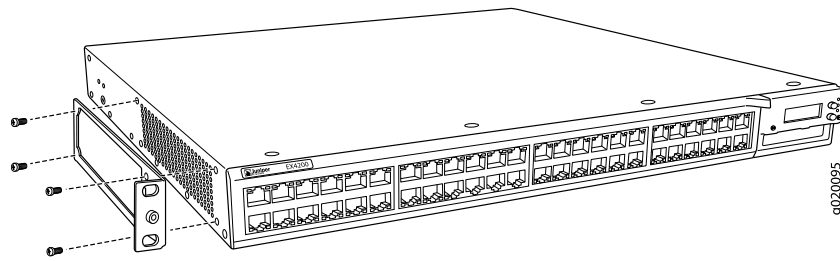


CAUTION: If you are mounting multiple switches on a rack, mount a switch in the bottom of the rack first and proceed to mount the rest of the switches from bottom to top.

To mount the switch on two posts in a rack:

1. Place the switch on a flat, stable surface.
2. Align the mounting brackets along the front, rear, or center of the side panels of the switch chassis depending on how you want to mount the switch. For example, if you want to front-mount the switch, align the brackets along the front of the side panel. See [Figure 31 on page 132](#).

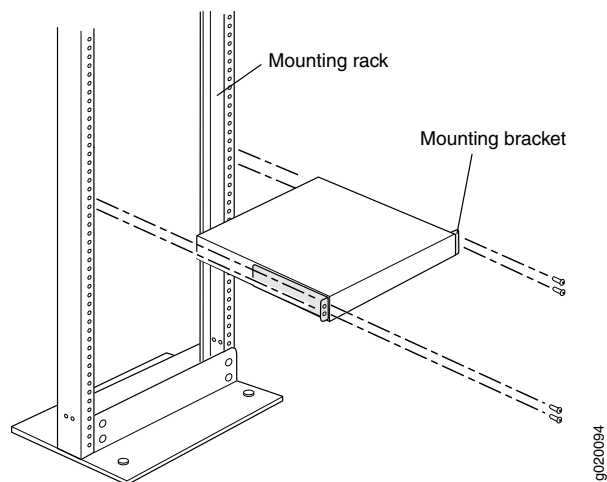
Figure 31: Attaching the Mounting Bracket to the Side Panel of the Switch



NOTE: If you need to mount the switch in a recessed position, use the 2-in.-recess front mount brackets from the separately orderable four-post rack-mount kit.

3. Align the bottom holes in the mounting brackets with holes on the side panels of the switch chassis.
4. Insert mounting screws into the aligned holes. Tighten the screws.
5. Ensure that the other holes in the mounting brackets are aligned with the holes in the side panels. Insert a screw in each hole and tighten the screws.
6. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the mounting bracket holes with the threaded holes in the rack or cabinet rail. Align the bottom hole in both the mounting brackets with a hole in each rack rail, making sure the chassis is level. See [Figure 32 on page 132](#).

Figure 32: Mounting the Switch on Two Posts in a Rack



7. Have a second person secure the switch to the rack by using the appropriate screws. Tighten the screws.
8. Ensure that the switch chassis is level by verifying that all screws on one side of the rack are aligned with the screws on the other side.



NOTE: If the switch is an EX4200-24F model, we recommend that you insert dust covers in any unused SFP ports.

Related Documentation

- [Connecting Earth Ground to an EX Series Switch on page 143](#)
- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Mounting an EX4200 Switch in a Recessed Position in a Rack or Cabinet on page 137](#)
- [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)

Mounting an EX4200 Switch on Four Posts in a Rack or Cabinet

You can mount an EX4200 switch on four posts of a 19-in. rack or cabinet by using the separately orderable four-post rack-mount kit. (The remainder of this topic uses “rack” to mean “rack or cabinet.”)

You can mount the switch on two posts in either a two-post rack or a four-post rack by using the mounting brackets provided with the switch. See [“Mounting an EX4200 Switch on Two Posts in a Rack or Cabinet” on page 130](#).



NOTE: If you need to mount the switch in a recessed position on either a two-post rack or a four-post rack, you can use the 2-in.-recess front-mounting brackets provided in the separately orderable four-post rack-mount kit.



NOTE: If you are mounting an EX4200 switch on four posts, ensure that the rack is 27.5 in. through 30.5 in. deep if you will mount the switch flush with the rack front and that the rack is 29.5 in. through 32.5 in. deep if you will mount the switch 2 in. recessed from the rack front, thus ensuring that the protective earthing terminal is accessible through the opening in the rear mounting-blade.

Before mounting the switch on four posts in a rack:

- Verify that the site meets the requirements described in [“Site Preparation Checklist for EX4200 Switches” on page 61](#).
- 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” on page 243](#), with particular attention to [“Chassis Lifting Guidelines” on page 252](#).
- Remove the switch from the shipping carton (see [“Unpacking an EX4200 Switch” on page 121](#)).

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- 6 flat-head 4-40 mounting screws (provided with the four-post rack-mount kit)
- 12 flat-head 4x6-mm Phillips mounting screws (provided with the four-post rack-mount kit)
- One pair each of flush or 2-in.-recess front-mounting brackets (provided with the four-post rack-mount kit)
- One pair of side mounting-rails
- One pair of rear mounting-blades (provided with the four-post rack-mount kit)
- Screws to secure the chassis and the rear mounting-blades to the rack (not provided)
- Dust covers for ports (for EX4200-24F switches only; optional)



NOTE: One person must be available to lift the switch while another secures it to the rack.

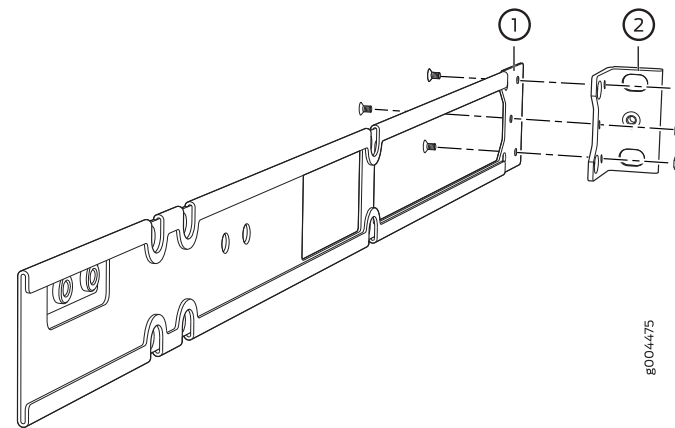


CAUTION: If you are mounting multiple units on a rack, mount the heaviest unit at the bottom of the rack and mount the other units from the bottom of the rack to the top in decreasing order of the weight of the units.

To mount the switch on four posts in a rack:

1. Attach the front-mounting brackets (either the flush or the 2-in.-recess brackets) to the side mounting-rails using six 4-40 flat-head Phillips mounting screws. See [Figure 33 on page 135](#).

Figure 33: Attaching the Front-Mounting Bracket to the Side Mounting-Rail

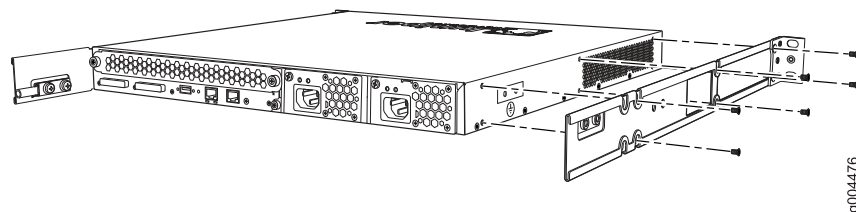


1—Side mounting-rail

2—Front-mounting bracket

2. Place the switch on a flat, stable surface.
3. Align the side mounting-rails along the side panels of the switch chassis. Align the two holes in the rear of the side mounting-rails with the two holes on the rear of the side panel.
4. Insert 4x6-mm Phillips flat-head mounting screws into the two aligned holes and tighten the screws. Ensure that the remaining four holes in the side mounting-rails are aligned with the four holes in the side panel. See [Figure 34 on page 135](#).

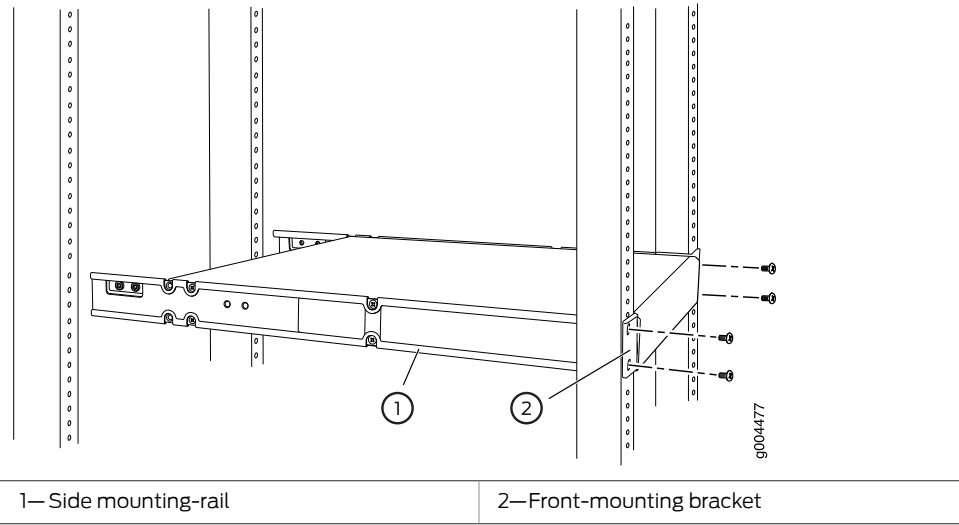
Figure 34: Attaching the Side Mounting-Rail to the Switch Chassis



5. Insert the 4x6-mm Phillips flat-head mounting screws into the remaining four holes in the side mounting-rails and tighten the screws.
6. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the side mounting-rail holes with the threaded holes in the front post

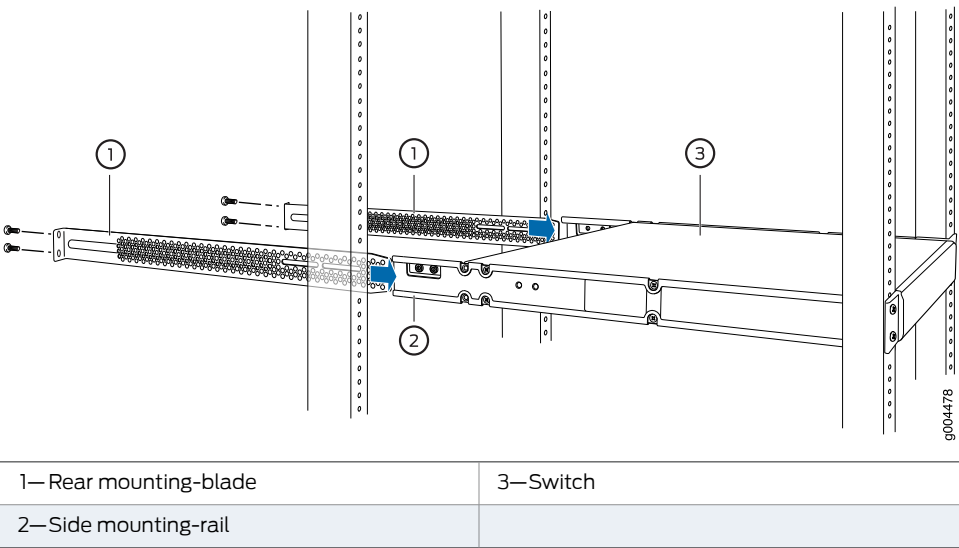
of the rack. Align the bottom hole in both the front-mounting brackets with a hole in each rack rail, making sure the chassis is level. See [Figure 35 on page 136](#).

Figure 35: Mounting the Switch to the Front Posts in a Rack



7. Have a second person secure the front of the switch to the rack by using the appropriate screws for your rack.
8. Slide the rear mounting-blades into the side mounting-rails. See [Figure 36 on page 136](#).

Figure 36: Sliding the Rear Mounting-Blades into the Side-Mounting Rail



9. Attach the rear mounting-blades to the rear post by using the appropriate screws for your rack. Tighten the screws.
10. Ensure that the switch chassis is level by verifying that all the screws on the front of the rack are aligned with the screws at the back of the rack.



NOTE: If the switch is an EX4200-24F model, we recommend that you insert dust covers in any unused SFP ports.

Related Documentation

- [Connecting Earth Ground to an EX Series Switch on page 143](#)
- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Mounting an EX4200 Switch in a Recessed Position in a Rack or Cabinet on page 137](#)
- [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)

Mounting an EX4200 Switch in a Recessed Position in a Rack or Cabinet

You can mount an EX4200 switch in a rack or cabinet such that the switch is recessed inside the rack from the rack front by 2 inches. You can use the 2-in.-recess front brackets provided in the separately orderable four-post rack-mount kit to mount the switch in a recessed position.

Reasons that you might want to mount the switch in a recessed position include:

- You are mounting the switch in a cabinet and the cabinet doors will not close completely unless the switch is recessed.
- The switch you are mounting has an uplink module with transceivers installed in it—the transceivers in the uplink module ports protrude from the front of the switch.

To mount the switch in a recessed position on four posts, follow the instructions in [“Mounting an EX4200 Switch on Four Posts in a Rack or Cabinet” on page 133](#). To mount the switch in a recessed position on two posts, follow the instructions in [“Mounting an EX4200 Switch on Two Posts in a Rack or Cabinet” on page 130](#).

Related Documentation

- [Connecting Earth Ground to an EX Series Switch on page 143](#)
- [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)

Mounting an EX4200 Switch on a Wall

You can mount an EX4200 switch on a wall by using the separately orderable wall-mount kit.

Before mounting the switch on a wall:

- Verify that the site meets the requirements described in [“Site Preparation Checklist for EX4200 Switches” on page 61](#).
- Read [“General Safety Guidelines and Warnings” on page 243](#), with particular attention to [“Chassis Lifting Guidelines” on page 252](#).
- Remove the switch from the shipping carton (see [“Unpacking an EX4200 Switch” on page 121](#)).

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- 2 wall-mount brackets (provided with the wall-mount kit)
- 12 wall-mount bracket screws (provided with the wall-mount kit)
- 4 mounting screws (8-32 x 1.25 in. or M4 x 30 mm) (not included)
- Dust covers for ports (for EX4200-24F switches only; optional)
- Hollow wall anchors capable of supporting the combined weight of two fully loaded switches, up to 44 lb (20 kg) (not included)—if you are mounting the switch in sheetrock (wall board with a gypsum plaster core) or in wall board not backed by wall studs



WARNING: When mounted in a vertical position, an EX4200 switch must be oriented with the front panel of the chassis pointing down in order to ensure proper airflow and meet safety requirements in the event of a fire.

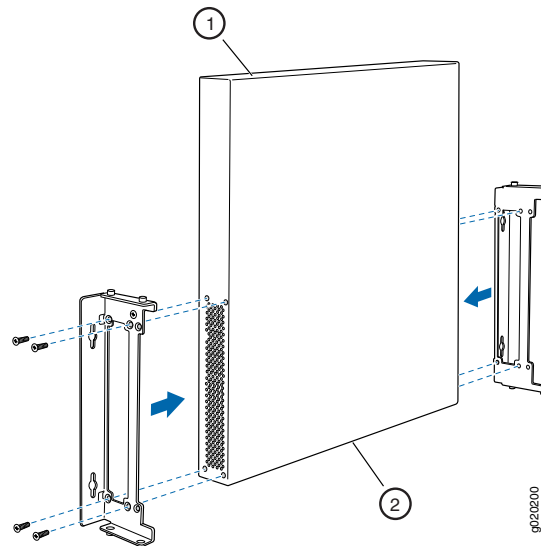


NOTE: For easier lifting, install any additional power supplies only after you mount the switch on the wall.

To mount the switch on a wall:

1. Attach the wall-mount brackets to the sides of the chassis using four of the wall-mount bracket screws on each side, as shown in [Figure 37 on page 139](#).

Figure 37: Attaching Wall-Mount Brackets to the Switch Chassis



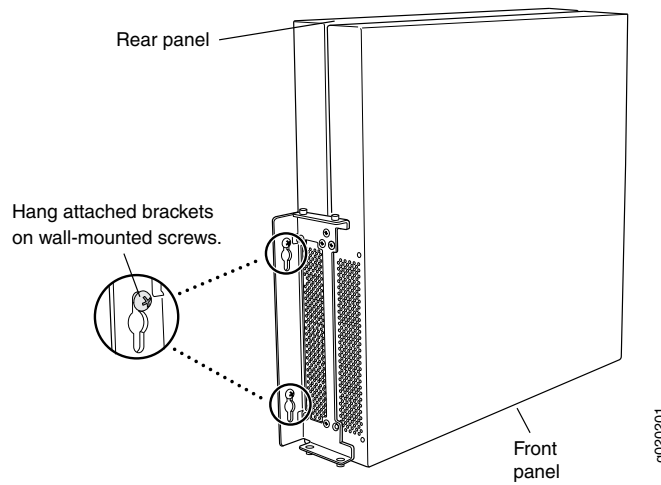
2. If you are mounting two switches together, line the second switch on top of the first and attach it to the mounting brackets using two wall-mount bracket screws on each side (see [Figure 38 on page 140](#)).

3. Insert the mounting screws in the wall. Insert the top pair of mounting screws 474.35 mm apart, and insert the second pair of mounting screws 151.81 mm directly below the first set.

If the mounting screws are inserted in wall board with no stud behind it, you must use dry wall anchors rated to support 75 lb (34 kg). Insert the screws into wall studs wherever possible to provide added support for the chassis.

Screw the screws only part way in, leaving about 1/4 in. (6 mm) distance between the head of the screw and the wall.

4. Grasp each side of the switch or switches, lift the switch or switches, and hang the brackets from the mounting screws as shown in [Figure 38 on page 140](#).

Figure 38: Mounting the Switch on a Wall

5. Tighten the mounting screws.



NOTE: If it is an EX4200-24F switch, we recommend you insert dust covers in unused SFP ports.

Related Documentation

- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Wall-Mounting Warning for EX4200 Switches on page 258](#)

Installing and Removing EX4200 Switch Hardware Components

The EX4200 switch chassis is a rigid sheet-metal structure that houses the hardware components. The field-replaceable units (FRUs) in EX4200 switches are:

- Power supply
- Fan tray
- Uplink module
- Transceivers

The power supply, fan tray, uplink module, and transceivers are hot-removable and hot-insertable: You can remove and replace them without powering off the switch or disrupting switch functions.

To install a power supply in an EX4200 switch, follow instructions in [“Installing a Power Supply in an EX4200 Switch” on page 183](#). To remove a power supply from an EX4200 switch, follow instructions in [“Removing a Power Supply from an EX4200 Switch” on page 185](#).

To install a fan tray in an EX4200 switch, follow instructions in [“Installing a Fan Tray in an EX4200 Switch” on page 179](#). To remove a fan tray from an EX4200 switch, follow instructions in [“Removing a Fan Tray from an EX4200 Switch” on page 180](#).

To install an uplink module in an EX4200 switch, follow instructions in [“Installing an Uplink Module in an EX4200 Switch” on page 187](#). To remove an uplink module from an EX4200 switch, follow instructions in [“Removing an Uplink Module from an EX4200 Switch” on page 189](#).

To install an SFP, SFP+, or XFP transceiver in an EX4200 switch, follow instructions in [“Installing a Transceiver” on page 193](#). To remove an SFP, SFP+, or XFP transceiver from an EX4200 switch, follow instructions in [“Removing a Transceiver” on page 195](#).

**Related
Documentation**

- [Cooling System and Airflow in an EX4200 Switch on page 31](#)
- [Power Supply in EX4200 Switches on page 33](#)
- [Uplink Modules in EX4200 Switches on page 18](#)
- [Pluggable Transceivers Supported on EX4200 Switches on page 79](#)

Connecting the Switch to Power

- [Connecting Earth Ground to an EX Series Switch on page 143](#)
- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)

Connecting Earth Ground to an EX Series Switch

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect an EX Series 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 40 on page 148](#)).



WARNING: The switch is installed in a restricted-access location. It has a separate protective earthing terminal on the chassis that must be permanently connected to earth ground to adequately ground the chassis and protect the operator from electrical hazards.



CAUTION: Before switch installation begins, ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable that you supply. Using a grounding cable with an incorrectly attached lug can damage the switch.

This topic describes:

- [Parts and Tools Required for Connecting an EX Series Switch to Earth Ground on page 143](#)
- [Special Instructions to Follow Before Connecting Earth Ground to a Switch on page 146](#)
- [Connecting Earth Ground to an EX Series Switch on page 148](#)

Parts and Tools Required for Connecting an EX Series Switch to Earth Ground

[Table 59 on page 144](#) lists the earthing terminal location, grounding cable requirements, grounding lug specifications, screws and washers required, and the screwdriver needed

for connecting a switch to earth ground. Before you begin connecting a switch to earth ground, ensure you have the parts and tools required for your switch.

Table 59: Parts and Tools Required for Connecting an EX Series Switch to Earth Ground

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Screwdriver	Additional Information
EX2200	Rear panel of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	
EX2300-C	Rear panel of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	
EX2300	Rear panel of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	
EX3200	Rear panel of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	See “Special Instructions to Follow Before Connecting Earth Ground to a Switch” on page 146.
EX3300	Rear panel of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	
EX3400	Rear panel of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	

Table 59: Parts and Tools Required for Connecting an EX Series Switch to Earth Ground (*continued*)

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Screwdriver	Additional Information
EX4200	Left side of the chassis	14 WG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	See “Special Instructions to Follow Before Connecting Earth Ground to a Switch” on page 146.
EX4300	Left side of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	See “Special Instructions to Follow Before Connecting Earth Ground to a Switch” on page 146.
EX4500	Left side of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	See “Special Instructions to Follow Before Connecting Earth Ground to a Switch” on page 146.
EX4550	Left side of the chassis	14 AWG (2 mm ²), minimum 90°C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	- Two 10-32 x .25 in. screws with #10 split-lock washer—not provided - Two #10 flat washers—not provided	Phillips (+) number 2	See “Special Instructions to Follow Before Connecting Earth Ground to a Switch” on page 146.
EX6210	Rear panel of the chassis (on lower left side)	The grounding cable must be the same gage as the power feed cables and as permitted by the local code.	Panduit LCD2-14A-Q or equivalent—provided	- Two ¼-20 x 0.5 in. screws with #¼” split-washer—provided - Two #¼” flat washers—provided	Phillips (+) number 2	
EX8208	Left side of the chassis	6 AWG (13.3 mm ²), minimum 60°C wire, or as permitted by the local code	Panduit LCD2-14A-Q or equivalent—provided	- Two ¼-20 x 0.5 in. screws with #¼” split-washer—provided - Two #¼” flat washers—provided	Phillips (+) number 2	

Table 59: Parts and Tools Required for Connecting an EX Series Switch to Earth Ground (continued)

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Screwdriver	Additional Information
EX8216	Two earthing terminals: - Left side of the chassis - Rear panel of the chassis	2 AWG (33.6 mm ²), minimum 60°C wire, or as permitted by the local code	Panduit LCD2-14A-Q or equivalent—provided	- Two ¼-20 x 0.5 in. screws with #¼" split-washer—provided - Two #¼" flat washers—provided	Phillips (+) number 2	See “Special Instructions to Follow Before Connecting Earth Ground to a Switch” on page 146.
EX9204	Rear panel of the chassis	One 6 AWG (13.3 mm ²), minimum 60°C wire, or one that complies with the local code	Thomas&Betts LCN6-14 or equivalent—provided	- Two ¼-20 x 0.5 in. screws with #¼" split-washer—provided - Two #¼" flat washers—provided	Phillips (+) number 2	See Grounding Cable and Lug Specifications for EX9200 Switches .
EX9208	Rear panel of the chassis	One 6 AWG (13.3 mm ²), minimum 60°C wire, or one that complies with the local code	Thomas&Betts LCN6-14 or equivalent—provided	- Two ¼-20 x 0.5 in. screws with #¼" split-washer—provided - Two #¼" flat washers—provided	Phillips (+) number 2	See Grounding Cable and Lug Specifications for EX9200 Switches .
EX9214	Rear panel of the chassis	One 6 AWG (13.3 mm ²), minimum 60°C wire, or one that complies with the local code	Thomas&Betts LCN6-14 or equivalent—provided	- Two ¼-20 x 0.5 in. screws with #¼" split-washer—provided - Two #¼" flat washers—provided	Phillips (+) number 2	See Grounding Cable and Lug Specifications for EX9200 Switches .

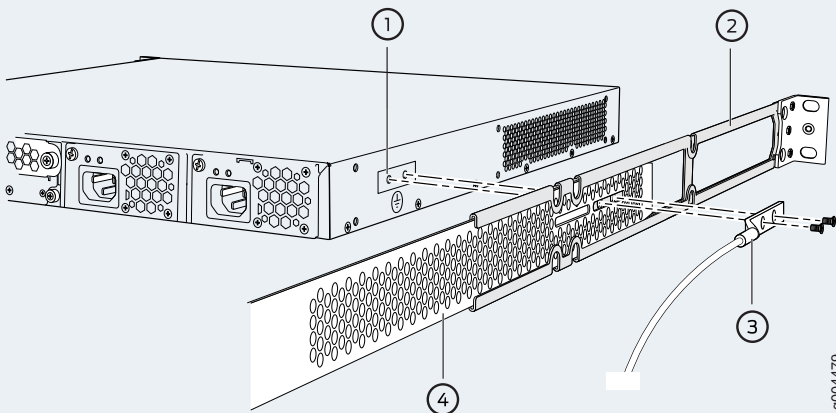
Special Instructions to Follow Before Connecting Earth Ground to a Switch

[Table 60 on page 146](#) lists the special instructions that you might need to follow before connecting earth ground to a switch.

Table 60: Special Instructions to Follow Before Connecting Earth Ground to a Switch

Switch	Special Instructions
EX3200	NOTE: Some early variants of EX3200 switches for which the Juniper Networks model number on the label next to the protective earthing terminal is from 750-021xxx through 750-030xxx require 10-24x.25 in. screws.

Table 60: Special Instructions to Follow Before Connecting Earth Ground to a Switch (*continued*)

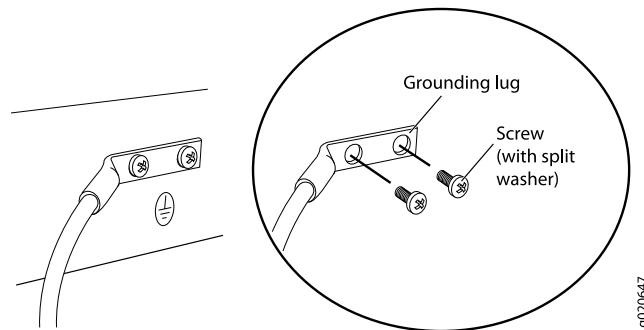
Switch	Special Instructions				
EX4200	NOTE: Some early variants of EX4200 switches for which the Juniper Networks model number on the label next to the protective earthing terminal is from 750-021xxx through 750-030xxx require 10-24x.25 in. screws. NOTE: The protective earthing terminal on an EX4200 switch mounted on four posts of a rack is accessible through the slot on the left rear bracket only if the rack is 27.5 in. (69.85 cm) through 30.5 in. (77.47 cm) deep for a switch mounted flush with the rack front and 29.5 in. (74.93 cm) through 32.5 in. (82.55 cm) deep for a switch mounted 2 in. (5.08 cm) recessed from the rack front. See Figure 39 on page 147. Figure 39: Connecting the Grounding Lug to a Switch Mounted on Four Posts of a Rack  <table border="1"> <tbody> <tr> <td>1— Protective earthing terminal</td><td>3—Grounding lug</td></tr> <tr> <td>2—Side mounting-rail</td><td>4—Rear mounting-blade</td></tr> </tbody> </table> NOTE: The brackets must be attached to the chassis before the grounding lug is attached. (The brackets are shown pulled away from the chassis so that the protective earthing terminal is seen.)	1— Protective earthing terminal	3—Grounding lug	2—Side mounting-rail	4—Rear mounting-blade
1— Protective earthing terminal	3—Grounding lug				
2—Side mounting-rail	4—Rear mounting-blade				
EX4300	NOTE: The protective earthing terminal on an EX4300 switch mounted on four posts of a rack is accessible through the slot on the left rear bracket only if the rack is 27.5 in. (69.85 cm) through 30.5 in. (77.47 cm) deep for a switch mounted flush with the rack front and 29.5 in. (74.93 cm) through 32.5 in. (82.55 cm) deep for a switch mounted 2 in. (5.08 cm) recessed from the rack front.				
EX4500	NOTE: If you plan to mount your switch on four posts of a rack or cabinet, mount your switch in the rack or cabinet before attaching the grounding lug to the switch. See <i>Mounting an EX4500 Switch on Four Posts in a Rack or Cabinet</i>. NOTE: The protective earthing terminal on an EX4500 switch mounted on four posts of a rack is accessible through the slot on the left rear bracket only if the rack is 27.5 in. (69.85 cm) through 30.5 in. (77.47 cm) deep for a switch mounted flush with the rack front and 29.5 in. (74.93 cm) through 32.5 in. (82.55 cm) deep for a switch mounted 2 in. (5.08 cm) recessed from the rack front.				
EX4550	NOTE: The protective earthing terminal on an EX4550 switch mounted on four posts of a rack is accessible through the slot on the left rear bracket only if the rack is 27.5 in. (69.85 cm) through 30.5 in. (77.47 cm) deep for a switch mounted flush with the rack front and 29.5 in. (74.93 cm) through 32.5 in. (82.55 cm) deep for a switch mounted 2 in. (5.08 cm) recessed from the rack front.				
EX8216	NOTE: Only one of the two protective earthing terminals needs to be permanently connected to earth ground.				

Connecting Earth Ground to an EX Series Switch

To connect earth ground to a switch:

1. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.
2. Place the grounding lug attached to the grounding cable over the protective earthing terminal. See [Figure 40 on page 148](#).

Figure 40: Connecting a Grounding Cable to an EX Series Switch



3. Secure the grounding lug to the protective earthing terminal with the washers and screws.
4. Dress the grounding cable and ensure that it does not touch or block access to other switch components.



WARNING: Ensure that the cable does not drape where people could trip over it.

Related Documentation

- [Connecting AC Power to an EX2200 Switch](#)
- [Connecting DC Power to an EX2200 Switch](#)
- [Connecting AC Power to an EX2300 Switch](#)
- [Connecting AC Power to an EX3200 Switch](#)
- [Connecting DC Power to an EX3200 Switch](#)
- [Connecting AC Power to an EX3300 Switch](#)
- [Connecting DC Power to an EX3300 Switch](#)
- [Connecting AC Power to an EX3400 Switch](#)
- [Connecting AC Power to an EX4200 Switch on page 149](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)

- *Connecting AC Power to an EX4300 Switch*
- *Connecting DC Power to an EX4300 Switch*
- *Connecting AC Power to an EX4500 Switch*
- *Connecting DC Power to an EX4500 Switch*
- *Connecting AC Power to an EX4550 Switch*
- *Connecting DC Power to an EX4550 Switch*
- *Connecting AC Power to an EX6200 Switch*
- *Connecting DC Power to an EX6200 Switch*
- *Connecting AC Power to an EX8200 Switch*
- *Connecting DC Power to an EX8200 Switch*
- *Connecting AC Power to an EX9204 Switch*
- *Connecting DC Power to an EX9204 Switch*
- *Connecting AC Power to an EX9208 Switch*
- *Connecting DC Power to an EX9208 Switch*
- *Connecting AC Power to an EX9214 Switch*
- *Connecting DC Power to an EX9214 Switch*
- [General Safety Guidelines and Warnings on page 243](#)
- [Grounded Equipment Warning on page 258](#)

Connecting AC Power to an EX4200 Switch

The power supply in an EX4200 switch is a hot-removable and hot-insertable field-replaceable unit (FRU) located on the rear panel: You can remove and replace it without powering off the switch or disrupting switch functions.

Before you begin connecting AC power to an EX4200 switch:

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



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

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect EX4200 switches to earth ground before you connect them to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. For instructions on connecting earth ground, see [“Connecting Earth Ground to](#)

an [EX Series Switch](#)” on page 143. An EX4200 switch gets additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location (see [“AC Power Cord Specifications for EX4200 Switches”](#) on page 74).

- Install the power supply in the chassis. For instructions on installing a power supply in an EX4200 switch, see [“Installing a Power Supply in an EX4200 Switch”](#) on page 183.



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

Ensure that you have the following parts and tools available:

- A power cord appropriate for your geographical location

To connect AC power to the switch:

1. Ensure that the power supplies are fully inserted in the chassis and the screws on their faceplates are tightened.
2. Squeeze the two sides of the power cord retainer clip and insert the L-shaped ends of the wire clip into the holes in the bracket on each side of the AC power cord inlet on the AC power supply faceplate (see [Figure 41 on page 151](#)).
3. Locate the power cord or cords shipped with the switch; the cords have plugs appropriate for your geographical location.



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

4. Insert the coupler end of the power cord into the AC power cord inlet on the AC power supply faceplate.
5. Push the cord into the slot in the adjustment nut of the power cord retainer. Turn the nut until it is tight against the base of the coupler and the slot in the nut is turned 90° from the top of the switch (see [Figure 42 on page 151](#)).
6. If the AC power source outlet has a power switch, set it to the OFF (0) position.
7. Insert the power cord plug into an AC power source outlet.

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

9. Verify that the **AC OK** LED on the power supply is lit and is on steadily.



NOTE: When you connect power to the switch, the Alarm (ALM) LED lights red. This behavior is normal. Plugging an active Ethernet cable into the management (MGMT) port on the switch completes the network link and turns off the ALM LED. (See [“Connecting a Device to a Network for Out-of-Band Management”](#) on page 157.)

Connecting the switch to a dedicated management console instead of a network does not affect the ALM LED. The LED remains red until the switch is connected to a network.

Figure 41: Connecting the AC Power Cord Retainer Clip to an AC Power Supply in an EX4200 Switch

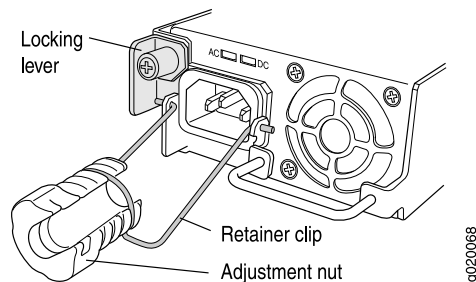
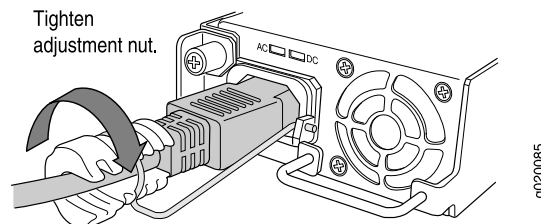


Figure 42: Connecting an AC Power Cord to an AC Power Supply in an EX4200 Switch



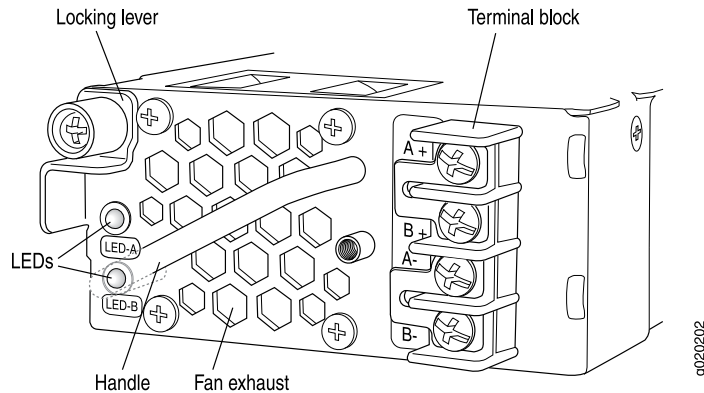
Related Documentation

- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- [Power Supply in EX4200 Switches on page 33](#)
- [AC Power Supply LEDs in EX4200 Switches on page 37](#)

Connecting DC Power to an EX4200 Switch

The power supply in an EX4200 switch is a hot-removable and hot-insertable field-replaceable unit (FRU) located on the rear panel: You can remove and replace it without powering off the switch or disrupting switch functions.

Figure 43: DC Power Supply in an EX4200 Switch



WARNING: DC-powered EX4200 switches are intended for installation only in a restricted access location.

Before you begin connecting DC power to an EX4200 switch:

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



CAUTION: Ensure that you install the power supply module first and then install the DC input wire, before closing input breaker ON.



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

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect EX4200 switches to earth ground before you connect them to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. For instructions on connecting earth ground, see [“Connecting Earth Ground to an EX Series Switch” on page 143](#).

- Install the power supply in the chassis. For instructions on , see [“Installing a Power Supply in an EX4200 Switch” on page 183](#).

Ensure that you have the following parts and tools available:

- DC power source cables (12–14 AWG) with ring lug (Molex 190700067 or equivalent) (not provided)
- Phillips (+) screwdriver, number 2

To connect DC power to the switch:

1. Ensure that the power supplies are fully inserted in the chassis and the screws on their faceplates are tightened.
2. Ensure that the input circuit breaker is open so that the voltage across the DC power source cable leads is 0 V and that the cable leads will not become active while you are connecting DC power.



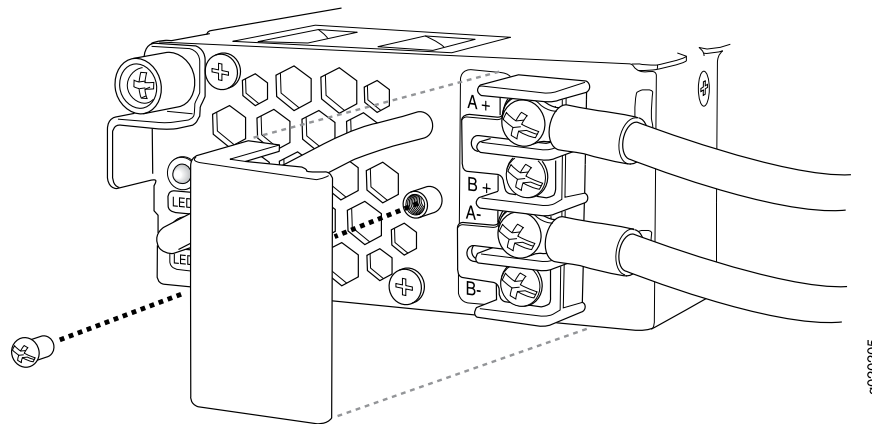
NOTE: The DC power supply in the switch has four terminals labeled A+, B+, A–, and B– (see [Figure 43 on page 152](#)) for connecting DC power source cables labeled positive (+) and negative (–). The DC power supplies are shipped with jumpers from A+ input to B+ input tied together and jumpers from A– input to B– input tied together.



NOTE: The A+ and B+ terminals are referred to as +RTN and A– and B– terminals are referred to as –48 V in “[DC Power Wiring Sequence Warning](#)” on [page 281](#) and “[DC Power Electrical Safety Guidelines for Switches](#)” on [page 276](#).

3. Remove the screw securing the terminal block cover using the screwdriver and remove the terminal block cover (see [Figure 44 on page 153](#)). Save the screw.

Figure 44: Removing the Terminal Block Cover from a DC Power Supply



4. Remove the screws on the terminals using the screwdriver. Save the screws.



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

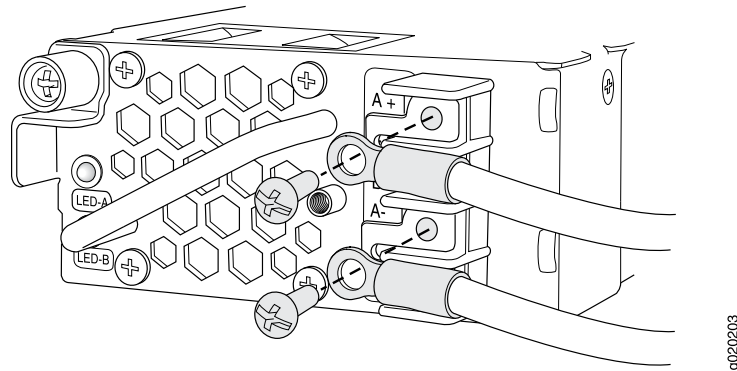
5. Connect the power supplies to the power sources. Secure power source cables to the power supplies by screwing the ring lugs attached to the cables to the appropriate terminals by using the screw from the terminals (see [Figure 45 on page 155](#)).

- To connect a power supply to a power source:
 - a. Leave the jumpers on the power supply terminals in place.
 - b. Secure the ring lug of the positive (+) DC power source cable to the A+ or B+ terminal on the DC power supply.
 - c. Secure the ring lug of the negative (–) DC power source cable to the A– or B– terminal on the DC power supply.
 - d. Tighten the screws on the power supply terminals until snug using the screwdriver. Do not overtighten—apply between 8 lb-in. (0.9 Nm) and 9 lb-in. (1.02 Nm) of torque to the screws.

If you have a second installed power supply, connect it in the same way you did the first.

- To connect one power supply to two power sources:
 - a. Remove the jumpers on the power supply terminal block.
 - b. Secure the ring lug of the positive (+) DC power source cable from the first DC power source to the A+ terminal on the first DC power supply.
 - c. Secure the ring lug of the negative (–) DC power source cable from the first DC power source to the A– terminal on the first DC power supply.
 - d. Secure the ring lug of the positive (+) DC power source cable from the second DC power source to the A+ terminal on the second DC power supply.
 - e. Secure the ring lug of the negative (–) DC power source cable from the second DC power source to the A– terminal on the second DC power supply.
 - f. Tighten the screws on the power supply terminals on both the power supplies until snug using the screwdriver. Do not overtighten—apply between 8 lb-in. (0.9 Nm) and 9 lb-in. (1.02 Nm) of torque to the screws.

Figure 45: Securing Ring Lugs to the Terminals on the DC Power Supply



6. Replace the terminal block cover and secure it using the screw. Use the screwdriver to tighten the screw.
7. Close the input circuit breaker.
8. Verify that the LEDs on the power supply are lit green and are on steadily.

**Related
Documentation**

- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Power Supply in EX4200 Switches on page 33](#)
- [DC Power Supply LEDs in EX4200 Switches on page 38](#)

Connecting the Switch to the Network

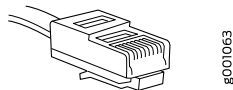
- [Connecting a Device to a Network for Out-of-Band Management on page 157](#)
- [Connecting a Device to a Management Console by Using an RJ-45 Connector on page 158](#)
- [Connecting a Fiber-Optic Cable on page 159](#)

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

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.

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end. [Figure 46 on page 157](#) shows the RJ-45 connector of the Ethernet cable supplied with the device.

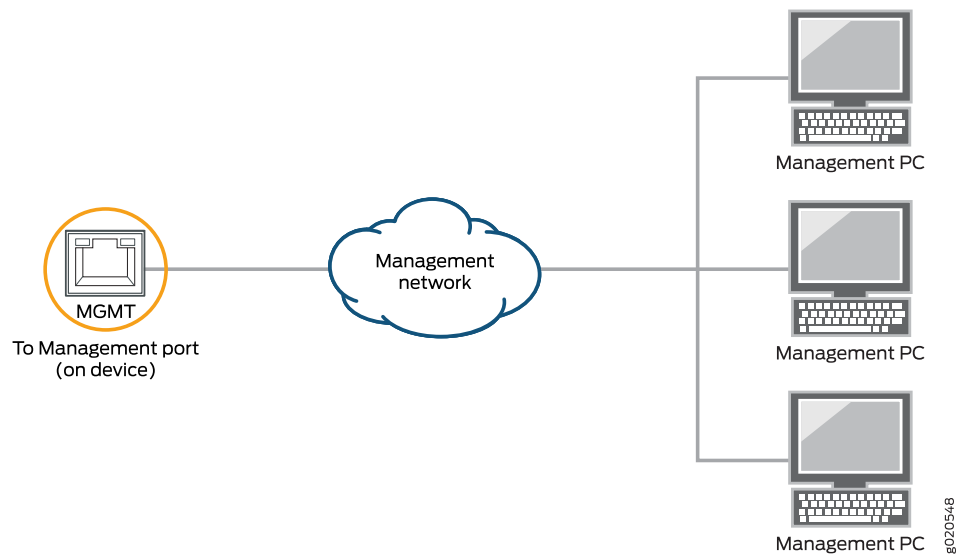
Figure 46: RJ-45 Connector on an Ethernet Cable



To connect a device to a network for out-of-band management (see [Figure 47 on page 158](#)):

1. Connect one end of the Ethernet cable to the management port (labeled **MGMT** or **ETHERNET**) on the device.
2. Connect the other end of the Ethernet cable to the management device.

Figure 47: Connecting a Device to a Network for Out-of-Band Management



Related Documentation

- [Connecting a Device to a Management Console by Using an RJ-45 Connector on page 158](#)

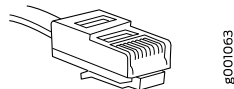
Connecting a Device to a Management Console by Using an RJ-45 Connector

You can configure and manage these devices by using a dedicated management channel. Each device has a console port to which you can connect 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.

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 48 on page 158](#) shows the RJ-45 connector of the Ethernet cable.

Figure 48: RJ-45 Connector on an Ethernet Cable



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

To connect the device to a management console (see [Figure 49 on page 159](#) and [Figure 50 on page 159](#)):

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 49 on page 159](#)) or management console (see [Figure 50 on page 159](#)).

Figure 49: Connecting a Device to a Management Console Through a Console Server

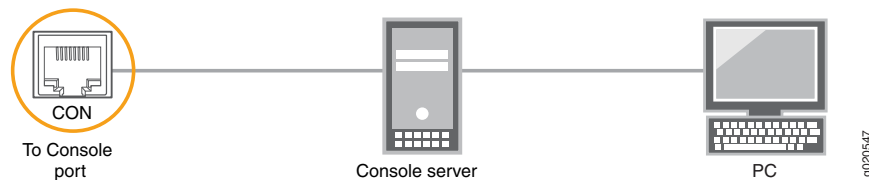


Figure 50: Connecting a Device Directly to a Management Console



Related Documentation

- [Connecting a Device to a Network for Out-of-Band Management on page 157](#)

Connecting a Fiber-Optic Cable

Before you begin connecting 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](#)” on page 261).

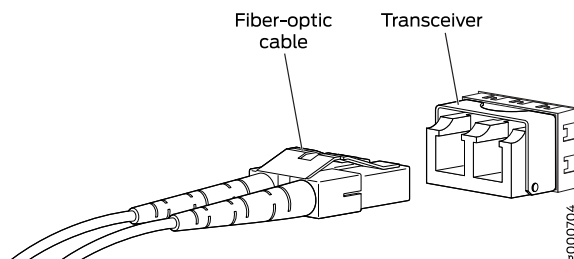
To connect a fiber-optic cable to an optical transceiver installed in a device:



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 51 on page 160](#)).

Figure 51: Connecting 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.

Related Documentation

- [Disconnecting a Fiber-Optic Cable from a Device on page 200](#)
- [Installing a Transceiver on page 193](#)
- [Maintaining Fiber-Optic Cables on page 201](#)

Performing Initial Configuration

- [EX4200 Default Configuration on page 161](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Configuring the LCD Panel on EX Series Switches \(CLI Procedure\) on page 173](#)

EX4200 Default Configuration

Each EX Series 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 **syslog** and **commit**; configures Power over Ethernet (PoE), storm control, and Ethernet switching on all interfaces; and enables the LLDP and RSTP protocols.

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*.

The following factory default configuration file is for an EX4200 switch with 24 ports (for models that have more ports, this default configuration file has more interfaces):



NOTE: In this example, `ge-0/0/0` through `ge-0/0/23` are the network interface ports. Optional uplink modules provide either two 10-gigabit small form-factor pluggable (XFP) transceivers (`xe-0/1/0` and `xe-0/1/1`) or four 1-gigabit SFP transceivers (`ge-0/1/0` through `ge-0/1/3`). Although you can install only one uplink module, the interfaces for both are shown below.

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

```
        interactive-commands any;
    }
}
commit {
    factory-settings {
        reset-chassis-lcd-menu;
        reset-virtual-chassis-configuration;
    }
}
}
interfaces {
    ge-0/0/0 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/1 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/2 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/3 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/4 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/5 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/6 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/7 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/8 {
        unit 0 {
            family ethernet-switching;
        }
    }
}
```

```
ge-0/0/9 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/10 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/11 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/12 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/13 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/14 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/15 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/16 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/17 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/18 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/19 {  
  unit 0 {  
    family ethernet-switching;  
  }  
}  
ge-0/0/20 {
```

```
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/21 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/22 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/0/23 {
        unit 0 {
            family ethernet-switching;
        }
    }
    xe-0/1/0 {
        unit 0 {
            family ethernet-switching;
        }
    }
    xe-0/1/1 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/1/0 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/1/1 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/1/2 {
        unit 0 {
            family ethernet-switching;
        }
    }
    ge-0/1/3 {
        unit 0 {
            family ethernet-switching;
        }
    }
}
protocols {
    igmp-snooping {
        vlan all;
    }
    lldp {
        interface all;
    }
}
```

```

    }
    lldp-med {
        interface all;
    }
    rstp;
}
ethernet-switching-options {
    storm-control {
        interface all;
    }
}
poe {
    interface all;
}

```

Related Documentation

- [Reverting to the Default Factory Configuration for the EX Series Switch](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- [Understanding Configuration Files for EX Series Switches](#)
- [EX Series Switches Interfaces Overview](#)

Connecting and Configuring an EX Series Switch (CLI Procedure)

There are two ways to connect and configure an EX Series switch: one method is through the console by using the CLI and the other is by using the J-Web interface.



NOTE: EX2200-24T-4G-DC switches do not support switch connection and configuration through the J-Web interface.

This topic describes the CLI procedure.



NOTE: To run the `ezsetup` script, the switch must have the factory-default configuration as the active configuration. If you have configured anything on the switch and want to run `ezsetup`, revert to the factory-default configuration. See [Reverting to the Default Factory Configuration for the EX Series Switch](#).

Using the CLI, set the following parameter values in the console server or PC:

- Baud rate—9600
- Flow control—None
- Data—8
- Parity—None

- Stop bits—1
- DCD state—Disregard

To connect and configure the switch from the console by using the CLI:

1. Connect the console port to a laptop or PC by using the RJ-45 to DB-9 serial port adapter. An Ethernet cable that has an RJ-45 connector at either end and an RJ-45 to DB-9 serial port adapter are supplied with the switch.

For the location of the console port on different EX Series switches:

- See *EX2200 Switches Hardware Overview*.
- See *EX2300 Switches Hardware Overview*.
- See *Rear Panel of an EX3200 Switch*.
- See *Rear Panel of an EX3300 Switch*.
- See *Rear Panel of an EX3400 Switch*.
- See [“Rear Panel of an EX4200 Switch” on page 12](#).
- See *EX4300 Switches Hardware Overview*.
- See *Front Panel of an EX4500 Switch*.
- See *EX4550 Switches Hardware Overview*.
- See *Switch Fabric and Routing Engine (SRE) Module in an EX6200 Switch*.
- See *Switch Fabric and Routing Engine (SRE) Module in an EX8208 Switch*.
- See *Routing Engine (RE) Module in an EX8216 Switch*.



NOTE: In EX2200-C, EX2300, EX3400, EX4300, and EX4550 switches, you can also use the Mini-USB Type-B console port to connect to a laptop or PC. See *Connecting an EX Series Switch to a Management Console by Using the Mini-USB Type-B Console Port*.

2. At the Junos OS shell prompt **root%**, type **ezsetup**.
3. Enter the hostname. This is optional.
4. Enter the root password you want to use for the device. Reenter the root password when prompted.

5. Enable services such as SSH and Telnet.



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

- The default option for SSH is **yes**. Select this to enable SSH.
 - The default option for Telnet is **no**. Change this to **yes** to enable Telnet.
6. Use the Management Options page to select the management scenario:



NOTE: On EX4500, EX6200, and EX8200 switches, only the out-of-band management option is available.

- *Configure in-band management.* In in-band management, you configure a network interface or an uplink module (expansion module) interface as the management interface and connect it to the management device.
In this scenario, you have the following two options:
 - Use the automatically created VLAN *default* for management—Select this option to configure all data interfaces as members of the default VLAN. Specify the management IP address and the default gateway.
 - Create a new VLAN for management—Select this option to create a management VLAN. Specify the VLAN name, VLAN ID, management IP address, and default gateway. Select the ports that must be part of this VLAN.
 - *Configure out-of-band management*—Configure the management port. In out-of-band management, you use a dedicated management channel (**MGMT** port) to connect to the management device. Specify the IP address and gateway of the management interface. Use this IP address to connect to the switch.
7. Specify the SNMP read community, location, and contact to configure SNMP parameters. These parameters are optional.
 8. Specify the system date and time. Select the time zone from the list. These options are optional.
 9. The configured parameters are displayed. Enter **yes** to commit the configuration. The configuration is committed as the active configuration for the switch.
 10. (For EX4500 switches only) Enter the operational mode command **request chassis pic-mode intraconnect** to set the PIC mode to intraconnect.

You can now log in with the CLI or the J-Web interface to continue configuring the switch. If you use the J-Web interface to continue configuring the switch, the Web session is redirected to the new management IP address. If the connection cannot be made, the J-Web interface displays instructions for starting a J-Web session.

Related Documentation

- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) on page 168](#)
- *Installing and Connecting an EX2200 Switch*
- *Installing and Connecting an EX2300 Switch*
- *Installing and Connecting an EX3200 Switch*
- *Installing and Connecting an EX3300 Switch*
- *Installing and Connecting an EX3400 Switch*
- [Installing and Connecting an EX4200 Switch on page 127](#)
- *Installing and Connecting an EX4300 Switch*
- *Installing and Connecting an EX4550 Switch*
- *Installing and Connecting an EX4500 Switch*
- *Installing and Connecting an EX6210 Switch*
- *Installing and Connecting an EX8208 Switch*
- *Installing and Connecting an EX8216 Switch*

Connecting and Configuring an EX Series Switch (J-Web Procedure)

There are two ways to connect and configure an EX Series switch: one method is through the console by using the CLI and the other is by using the J-Web interface.



NOTE: You cannot connect to and perform initial configuration of EX2200-24T-4G-DC and EX4600 switches using EZSetup procedure from the J-Web interface. For EX2200-24T-4G-DC switches, you must use EZSetup from the switch console, and for EX4600 switches, you must use the CLI procedure through the switch console.

This topic describes the J-Web procedure.



NOTE: Before you begin the configuration, enable a DHCP client on the management PC that you will connect to the switch so that the PC can obtain an IP address dynamically.



.....

NOTE: Read the following steps before you begin the configuration. You must complete the initial configuration by using EZSetup within 10 minutes. The switch exits EZSetup after 10 minutes and reverts to the factory default configuration, and the PC loses connectivity to the switch.

- EX2200 and EX2200-C switch—The LEDs on the network ports on the front panel blink when the switch is in the initial setup mode.
 - EX3200, EX3300, EX4200, EX4300, EX4500, EX4550, EX6200, or EX8200 switch—The LCD panel displays a count-down timer when the switch is in initial setup mode.
-

To connect and configure the switch by using the J-Web interface:

1. Transition the switch into initial setup mode:
 - EX2200 and EX2200-C switch—Press the mode button located on the lower right corner of the front panel for 10 seconds.
 - EX3200, EX3300, EX4200, EX4300, EX4500, EX4550, EX6200, or EX8200 switch—Use the **Menu** and **Enter** buttons located to the right of the LCD panel (see [Figure 52 on page 170](#) or [Figure 53 on page 170](#)):

Figure 52: LCD Panel in an EX3200, EX4200, EX4500, EX4550, or EX8200 Switch

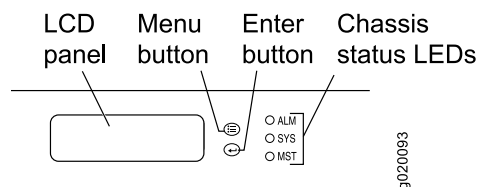
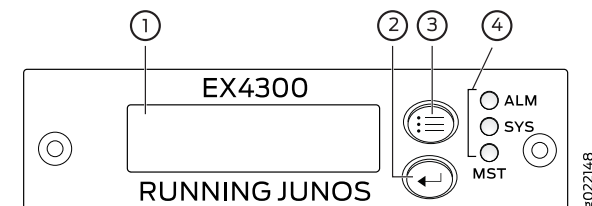


Figure 53: LCD Panel in an EX4300 Switch



1—LCD panel	3—LCD panel Menu button
2—LCD panel Enter button	4—Chassis status LEDs

1. Press the **Menu** button until you see **MAINTENANCE MENU**. Then press the **Enter** button.
 2. Press **Menu** until you see **ENTER EZSetup**. Then press **Enter**.

If EZSetup does not appear as an option in the menu, select **Factory Default** to return the switch to the factory default configuration. EZSetup is displayed in the menu of standalone switches only when a switch is set to the factory default configuration.
 3. Press **Enter** to confirm setup and continue with EZSetup.
2. Connect the Ethernet cable from the Ethernet port on the PC to the switch.
 - EX2200, EX3200, or EX4200 switch—Connect the cable to port 0 (ge-0/0/0) on the front panel of the switch.
 - EX3300, EX4500, or EX4550 switch—Connect the cable to the port labeled **MGMT** on the front panel (LCD panel side) of the switch.
 - EX4300 switch—Connect the cable to the port labeled **MGMT** on the rear panel of the switch.

- EX6200 switch—Connect the cable to one of the ports labeled **MGMT** on the Switch Fabric and Routing Engine (SRE) module in slot 4 or 5 in an EX6210 switch.
- EX8200 switch—Connect the cable to the port labeled **MGMT** on the Switch Fabric and Routing Engine (SRE) module in slot SRE0 in an EX8208 switch or on the Routing Engine (RE) module in slot RE0 in an EX8216 switch.

These ports are configured as the DHCP server with the default IP address, 192.168.1.1. The switch can assign an IP address to the management PC in the IP address range 192.168.1.2 through 192.168.1.253.

3. From the PC, open a Web browser, type **http://192.168.1.1** in the address field, and press **Enter**.
4. On the J-Web login page, type **root** as the username, leave the password field blank, and click **Login**.
5. On the Introduction page, click **Next**.
6. On the Basic Settings page, modify the hostname, the root password, and date and time settings:
 - Enter the hostname. This is optional.
 - Enter a password and reenter the password.
 - Specify the time zone.
 - Synchronize the date and time settings of the switch with the management PC or set them manually by selecting the appropriate option button. This is optional.

Click **Next**.

7. Use the Management Options page to select the management scenario:



NOTE: On EX4500, EX6210, and EX8200 switches, only the out-of-band management option is available.

- **In-band Management—Use VLAN 'default' for management.**

Select this option to configure all data interfaces as members of the default VLAN. Click **Next**. Specify the management IP address and the default gateway for the default VLAN.

- **In-band Management—Create new VLAN for management.**

Select this option to create a management VLAN. Click **Next**. Specify the VLAN name, VLAN ID, member interfaces, management IP address, and default gateway for the new VLAN.

- **Out-of-band Management—Configure management port.**

Select this option to configure only the management interface. Click **Next**. Specify the IP address and default gateway for the management interface.

8. Click **Next**.
9. On the Manage Access page, you can select options to enable Telnet, SSH, and SNMP services. For SNMP, you can configure the read community, location, and contact.
10. Click **Next**. The Summary screen displays the configured settings.
11. Click **Finish**. The configuration is committed as the active switch configuration.



NOTE: After the configuration is committed, the connectivity between the PC and the switch might be lost. To renew the connection, release and renew the IP address by executing the appropriate commands on the management PC or by removing and reinserting the Ethernet cable.

12. (For EX4500 switches only) In the CLI, enter the **request chassis pic-mode intraconnect** operational mode command to set the PIC mode to intraconnect.

You can now log in by using the CLI or the J-Web interface to continue configuring the switch.

If you use the J-Web interface to continue configuring the switch, the Web session is redirected to the new management IP address. If the connection cannot be made, the J-Web interface displays instructions for starting a J-Web session.

Related Documentation

- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) on page 165](#)
- *Installing and Connecting an EX2200 Switch*
- *Installing and Connecting an EX2300 Switch*
- *Installing and Connecting an EX3200 Switch*
- *Installing and Connecting an EX3300 Switch*
- [Installing and Connecting an EX4200 Switch on page 127](#)
- *Installing and Connecting an EX4300 Switch*
- *Installing and Connecting an EX4500 Switch*
- *Installing and Connecting an EX4550 Switch*
- *Installing and Connecting an EX4600 Switch*
- *Installing and Connecting an EX6210 Switch*
- *Installing and Connecting an EX8208 Switch*
- *Installing and Connecting an EX8216 Switch*

Configuring the LCD Panel on EX Series Switches (CLI Procedure)

This topic applies to hardware devices in the EX Series product family, which includes switches and the XRE200 External Routing Engine, that support the LCD panel interface.

The LCD panel on the front panel of EX Series switches displays a variety of information about the switch in the Status menu and provides the Maintenance menu to enable you to perform basic operations such as initial setup and reboot. You can disable these menus or individual menu options if you do not want switch users to use them. You can also set a custom message that will be displayed on the panel.

This topic describes:

- [Disabling or Enabling Menus and Menu Options on the LCD Panel on page 173](#)
- [Configuring a Custom Display Message on page 174](#)

Disabling or Enabling Menus and Menu Options on the LCD Panel

By default, the Maintenance menu, the Status menu, and the options in those menus in the LCD panel are enabled. Users can configure and troubleshoot the switch by using the Maintenance menu and view certain details about the switch by using the Status menu.

If you do not want users to be able to use those menus or some of the menu options, you can disable the menus or individual menu options. You can reenable the menus or menu options.

Issue the **show chassis lcd menu** operational mode command to see the menus or menu options that are currently enabled.



NOTE: On some platforms, you must specify an FPC slot number in these commands. See the *lcd-menu* statement for details.

To disable a menu:

```
[edit]
user@switch# set chassis lcd-menu menu-item menu-name disable
```

To enable a menu:

```
[edit]
user@switch# delete chassis lcd-menu menu-item menu-name disable
```

To disable a menu option:

```
[edit]
user@switch# set chassis lcd-menu menu-item menu-option disable
```

To enable a menu option:

```
[edit]
user@switch# delete chassis lcd-menu menu-item menu-option disable
```

Configuring a Custom Display Message

You can configure the second line of the LCD to display a custom message temporarily for 5 minutes or permanently.

To display a custom message temporarily:

- On an EX3200 switch, a standalone EX3300 switch, a standalone EX4200 switch, a standalone EX4300 switch, a standalone EX4500 switch, a standalone EX4550 switch, an EX6200 switch, an EX8200 switch, or an XRE200 External Routing Engine:

```
user@switch> set chassis display message message
```

- On an EX3300, EX4200, EX4300, EX4500, or EX4550 switch in a Virtual Chassis configuration:

```
user@switch> set chassis display message message fpc-slot slot-number
```

To display a custom message permanently:

- On an EX3200 switch, a standalone EX3300 switch, a standalone EX4200 switch, a standalone EX4300 switch, a standalone EX4500 switch, a standalone EX4550 switch, an EX6200 switch, an EX8200 switch, or an XRE200 External Routing Engine:

```
user@switch> set chassis display message message permanent
```

- On an EX3300, EX4200, EX4300, EX4500, or EX4550 switch in a Virtual Chassis configuration:

```
user@switch> set chassis display message message fpc-slot slot-number permanent
```



NOTE: The buttons on the LCD panel are disabled when the LCD is configured to display a custom message.

To disable the display of the custom message:

```
user@switch> clear chassis display message
```

You can view the custom message by issuing the **show chassis lcd** command.

Related Documentation

- [LCD Panel in EX3200 Switches](#)
- [LCD Panel in EX3300 Switches](#)
- [LCD Panel in EX4200 Switches on page 13](#)
- [LCD Panel in EX4300 Switches](#)

- *LCD Panel in EX4500 Switches*
- *LCD Panel in EX4550 Switches*
- *LCD Panel in an EX6200 Switch*
- *LCD Panel in an EX8200 Switch*
- *LCD Panel in an XRE200 External Routing Engine*

PART 4

Installing, Maintaining, and Replacing Components

- [Replacing Cooling System Component on page 179](#)
- [Replacing Power Supply on page 183](#)
- [Replacing Uplink Module on page 187](#)
- [Replacing Transceiver on page 193](#)
- [Maintaining and Replacing Fiber-Optic Cable on page 199](#)
- [Replacing a Member Switch to Virtual Chassis on page 203](#)
- [Maintaining and Replacing Virtual Chassis Cable on page 213](#)
- [Contacting Customer Support and Returning the Chassis or Components on page 217](#)

Replacing Cooling System Component

- [Installing a Fan Tray in an EX4200 Switch on page 179](#)
- [Removing a Fan Tray from an EX4200 Switch on page 180](#)

Installing a Fan Tray in an EX4200 Switch

The fan tray is a hot-removable and hot-insertable field-replaceable unit (FRU) installed in the rear panel of the switch: You can remove and replace it without powering off the switch or disrupting switch functions.

All the EX4200 switch models, except the EX4200-24F-S and EX4200-48T-S switches are shipped with one fan tray pre-installed in the rear panel of the switches. EX4200-24F-S and EX4200-48T-S switches are not shipped with pre-installed fan tray; you must order them separately.

Ensure that you have the following parts and tools available:

- A Phillips (+) screwdriver, number 2

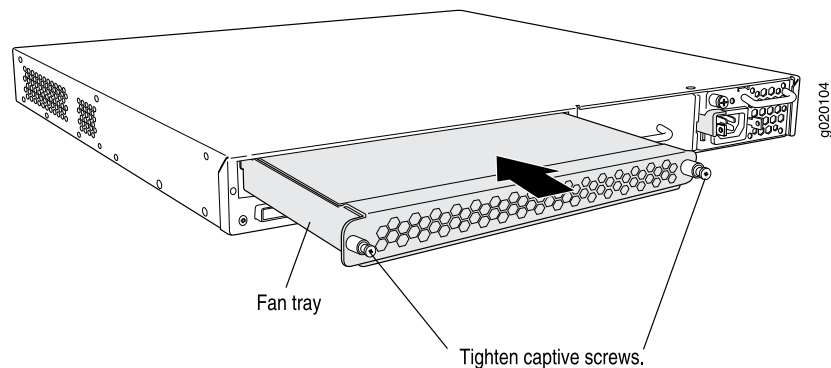
To install a fan tray in an EX4200 switch chassis (see [Figure 54 on page 180](#)):



CAUTION: If you are installing a fan tray in an EX4200 switch, ensure the fans face downwards.

1. Remove the fan tray from its bag. Using both hands, align the tray with the fan tray guides on the fan tray slot on the rear panel of the chassis and slide it in until it is fully seated.
2. Tighten the screw or screws on the fan tray by using the screwdriver.

Figure 54: Installing a Fan Tray in an EX4200 Switch



Related Documentation

- [Removing a Fan Tray from an EX4200 Switch on page 180](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Cooling System and Airflow in an EX4200 Switch on page 31](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Rear Panel of an EX4200 Switch on page 12](#)

Removing a Fan Tray from an EX4200 Switch

The fan tray in an EX4200 switch is a hot-removable and hot-insertable field-replaceable unit (FRU) located on the rear panel of the switch: You can remove and replace it without powering off the switch or disrupting switch functions.

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- An antistatic bag or an antistatic mat

To remove a fan tray from the switch:

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Loosen the screw or screws securing the fan tray by using the screwdriver.

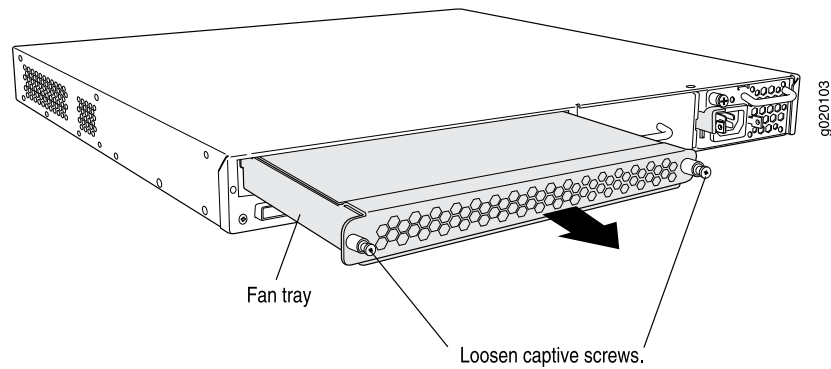


WARNING: To avoid injury, do not touch the fan with your hands or any tools as you slide the fan tray out of the chassis—the fan may still be running.

3. Grasp the handle on the fan tray and pull firmly to slide the fan tray halfway out of the chassis.

4. When the fan stops spinning, slide the fan tray completely out of the chassis.
5. Place the fan tray in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

Figure 55: Removing a Fan Tray from an EX4200 Switch



NOTE: When a fan tray is removed, **Fan/Blower is Absent** is logged in the system log and the system raises a minor alarm.

Related Documentation

- [Installing a Fan Tray in an EX4200 Switch on page 179](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Cooling System and Airflow in an EX4200 Switch on page 31](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Rear Panel of an EX4200 Switch on page 12](#)

Replacing Power Supply

- [Installing a Power Supply in an EX4200 Switch on page 183](#)
- [Removing a Power Supply from an EX4200 Switch on page 185](#)

Installing a Power Supply in an EX4200 Switch

The power supply in EX4200 switches is a hot-removable and hot-insertable field-replaceable unit (FRU): You can remove and replace it without powering off the switch or disrupting switch functions.

All the EX4200 AC powered or DC powered switches, except the EX4200-24F-S and EX4200-48T-S switches are shipped with one AC or DC power supply pre-installed in the rear panel of the switches. EX4200-24F-S and EX4200-48T-S switches are not shipped with pre-installed power supplies; you must order them separately.

Ensure that you have the following parts and tools available:

- A Phillips (+) screwdriver, number 2

To install a power supply in the switch (see [Figure 56 on page 184](#)):

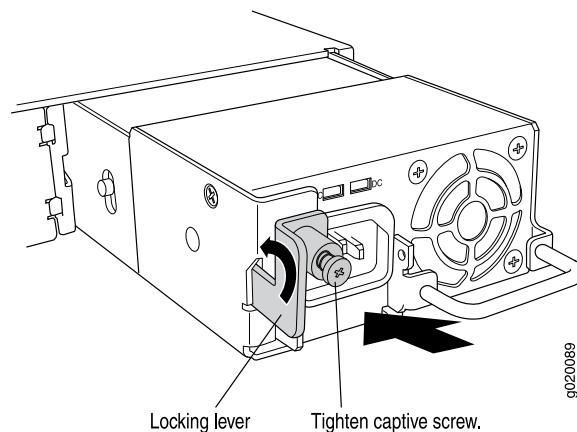
1. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.
2. Loosen the locking lever screw on the left front of the power supply by using the screwdriver.
3. Push down on the locking lever until it is in its lowest position.
4. Using both hands, place the power supply in the power supply slot on the rear panel of the switch and slide it in until it is fully seated.



NOTE: The handle on the 320 W AC power supply is at the bottom of the power supply faceplate, while the handle on the 600 W and the 930 W AC power supplies is at the top of the faceplate. The handle on the 190 W DC power supply runs across the faceplate.

5. Push the locking lever up to its highest position (this action might pull the power supply in).
6. Tighten the locking lever screw by using the screwdriver.

Figure 56: Installing a Power Supply in an EX4200 Switch



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



NOTE: EX4200-24PX and EX4200-48PX switches do not support the 930 W (EX-PWR-930-AC) or the 600 W (EX-PWR-600-AC) AC power supplies that are used in the EX4200-48P and the EX4200-24P switch models. EX4200-24PX and EX4200-48PX switches work only with the power supply labeled EX-PWR2-930-AC. You can find the label on the top of the power supply (see “[Removing a Power Supply from an EX4200 Switch](#)” on page 185). The EX-PWR2-930-AC power supply is supported across the EX4200 product line.



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.

Related Documentation

- [Removing a Power Supply from an EX4200 Switch on page 185](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Power Supply in EX4200 Switches on page 33](#)

- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [AC Power Cord Specifications for EX4200 Switches on page 74](#)
- [Rear Panel of an EX4200 Switch on page 12](#)
- [Troubleshooting Power Supply Installation Alarms on EX4200 Switches on page 238](#)

Removing a Power Supply from an EX4200 Switch

The power supply in an EX4200 switch is a hot-removable and hot-insertable field-replaceable unit (FRU) located on the rear panel of the switch: You can remove and replace it without powering off the switch or disrupting switch functions.

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- An antistatic bag or an antistatic mat



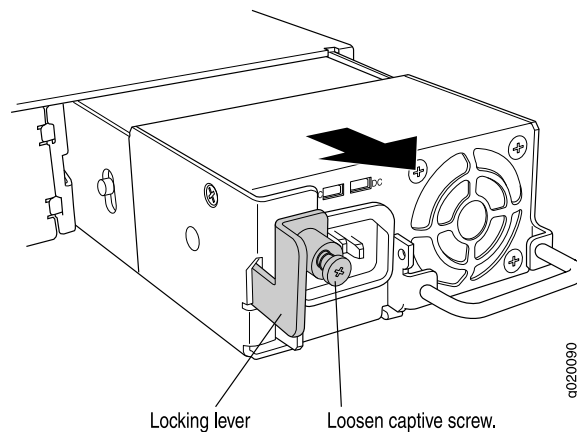
CAUTION: Do not leave the power supply slot empty for a long time while the switch is on. The power supply must remain in the chassis for proper airflow.

To remove a power supply from the switch (see [Figure 57 on page 186](#)):

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Disconnect power to the switch by performing one of the following:
 - AC power supply—If the AC power source outlet has a power switch, set it to the OFF (0) position. If the AC power source outlet does not have a power switch, gently pull out the male end of the power cord connected to the power source outlet.
 - DC power supply—Switch the circuit breaker on the panel board that services the DC circuit to the OFF position.
3. Remove the power source cable from the power supply faceplate:
 - AC power supply—Gently pull out the female end of the power cord connected to the power supply faceplate.
 - DC power supply—Remove the screws securing the ring lugs attached to the power source cables to the power supply using the screwdriver, and remove the power source cables from the power supply. Replace the screws on the terminals and tighten them.
4. Loosen the locking lever screw on the left front of the power supply by using the screwdriver.
5. Push down on the locking lever until it is in its lowest position.

6. Grasp the power supply handle and pull firmly to slide it halfway out of the chassis.
7. Place one hand under the power supply to support it and slide it completely out of the chassis. Take care not to touch power supply components, pins, leads, or solder connections.
8. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

Figure 57: Removing a Power Supply from the Switch



Related Documentation

- [Installing a Power Supply in an EX4200 Switch on page 183](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Power Supply in EX4200 Switches on page 33](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [AC Power Cord Specifications for EX4200 Switches on page 74](#)
- [Rear Panel of an EX4200 Switch on page 12](#)

Replacing Uplink Module

- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Removing an Uplink Module from an EX4200 Switch on page 189](#)

Installing an Uplink Module in an EX4200 Switch

If your EX4200 switch includes an optional uplink module, you install it in the switch's front panel. The different types of uplink modules are described in [“Uplink Modules Connector Pinout Information for EX4200 Switches” on page 99](#).

The uplink module in EX4200 switches is a hot-removable and hot-insertable unit (FRU): You can remove and replace it without powering off the switch.



NOTE: The packet forwarding process (pfem) restarts and causes traffic loss, if you:

- Install an uplink module (SFP, SFP+, SFP+ MACsec, or XFP)
- Replace an existing uplink module with another uplink module
- Change the operating mode of an SFP+ or SFP+ MACsec uplink module (10-gigabit to 1-gigabit or 1-gigabit to 10-gigabit) installed in the switch



NOTE: If you have set an uplink module port as a Virtual Chassis port (VCP), removing the uplink module breaks the setting. You must reset the port as a VCP after you replace the module. See [Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port \(CLI Procedure\)](#).

Before you begin installing an uplink module in the switch:

- Ensure that you have taken the necessary precautions to prevent ESD damage (see [“Prevention of Electrostatic Discharge Damage” on page 273](#)).

Ensure that you have the following parts and tools available:

- Electrostatic discharge (ESD) grounding strap (If a grounding strap is not available, follow the alternative grounding method described in Step 1 of the following procedure.)

- Cross-head screwdriver (provided in the uplink module kit)

To install an uplink module in the switch (see [Figure 58 on page 189](#)):

1. Attach the electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.

If a grounding strap is not available, hold the uplink module in its antistatic bag in one hand and touch the exposed, bare metal of the switch with the other hand to ground yourself and the component.

2. Loosen the screws that secure the flip-up door covering the empty uplink module slot on the front panel of the switch by using the cross-head screwdriver, flip the door upward, and remove the blanking panel covering the empty uplink module slot.



NOTE: If you are removing an uplink module and installing another uplink module, wait for at least 10 seconds after removing the uplink module before installing the new or the same uplink module. If you do not wait for at least 10 seconds, the interfaces on the uplink module might not come up.

3. Taking care not to touch module components, pins, leads, or solder connections, remove the uplink module from its bag.



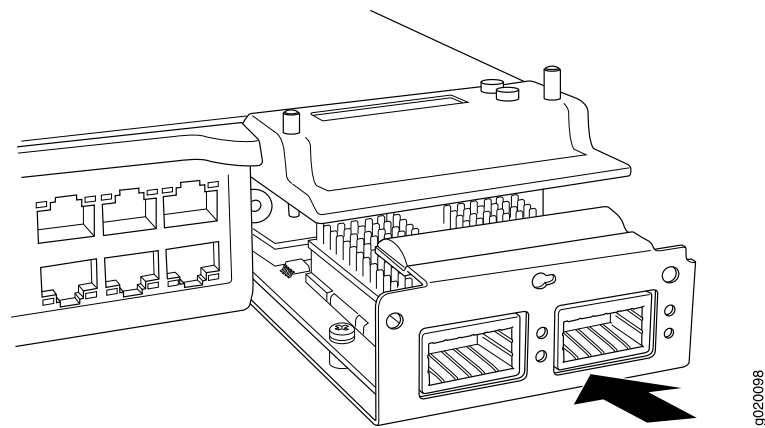
CAUTION: Before you slide the uplink module into the slot on the switch chassis, ensure the uplink module is aligned correctly. Misalignment might cause the pins to bend, making the uplink module unusable.

4. Using both hands, place the module in the empty slot and slide it in gently until it is fully seated.
5. Flip the door down and tighten the screws by using the cross-head screwdriver.



NOTE: If the switch does not detect the uplink module, see [“Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch” on page 238](#).

Figure 58: Installing an Uplink Module in an EX4200 Switch



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.

Related Documentation

- [Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch on page 238](#)
- [Removing an Uplink Module from an EX4200 Switch on page 189](#)
- [Installing a Transceiver on page 193](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)
- [Front Panel of an EX4200 Switch on page 11](#)

Removing an Uplink Module from an EX4200 Switch

If your EX4200 switch includes an optional uplink module, it is installed in the switch's front panel. The different types of uplink modules are described in [“Uplink Modules in EX4200 Switches” on page 18](#).

The uplink module in EX4200 switches is a hot-removable and hot-insertable unit (FRU): You can remove and replace it without powering off the switch.



NOTE: The packet forwarding process (pfem) restarts and causes traffic loss, if you:

- Install an uplink module (SFP, SFP+, or XFP)
- Replace an existing uplink module with another uplink module
- Change the operating mode of an SFP+ or SFP+ MACsec uplink module (10-gigabit to 1-gigabit or 1-gigabit to 10-gigabit) installed in the switch



NOTE: If you have set an uplink module port as a Virtual Chassis port (VCP), removing the uplink module breaks the setting. You must reset the port as a VCP after you replace the module. See *Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port (CLI Procedure)*.

Before you begin removing an uplink module from the switch:

- Ensure that you have taken the necessary precautions to prevent ESD damage (see [“Prevention of Electrostatic Discharge Damage” on page 273](#)).
- If there are any transceivers installed in the uplink module, remove them before you remove the uplink module. For instructions on removing transceivers, see [“Removing a Transceiver” on page 195](#).

Ensure that you have the following parts and tools available:

- Electrostatic discharge (ESD) grounding strap (If a grounding strap is not available, follow the alternative grounding method described in Step 1 of the following procedure.)
- Cross-head screwdriver (provided in the uplink module kit)
- An antistatic bag or antistatic mat

To remove an uplink module from the switch:

1. Attach the electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.

If a grounding strap is not available, touch the exposed, bare metal of the switch with the other hand to ground yourself and the component.

2. Loosen the screws that secure the flip-up door covering the uplink module slot on the front panel of the switch by using the cross-head screwdriver provided with the uplink module kit and flip the door upward.
3. Insert the ball end of the screwdriver in the keyhole on the front panel of the uplink module and slide the screwdriver to the narrow part of the keyhole (see [Figure 59 on page 191](#)).



CAUTION: Ensure the screwdriver does not slip out of the keyhole when you pull the uplink module out of the switch chassis.

4. Using both hands, gently pull the screwdriver to slide the uplink module halfway out of the chassis (see [Figure 60 on page 191](#)).
5. Place one hand under the uplink module to support it and slide it completely out of the chassis.
6. Slide the screwdriver out of the keyhole.
7. Place the uplink module in an antistatic bag or on an antistatic mat placed on a flat, stable surface.

Figure 59: Sliding the Screwdriver to the Narrow Part of the Keyhole

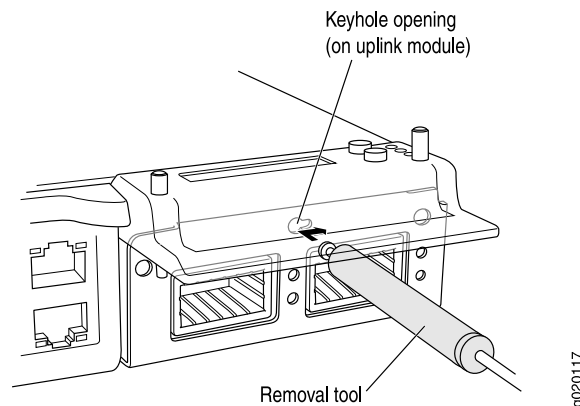
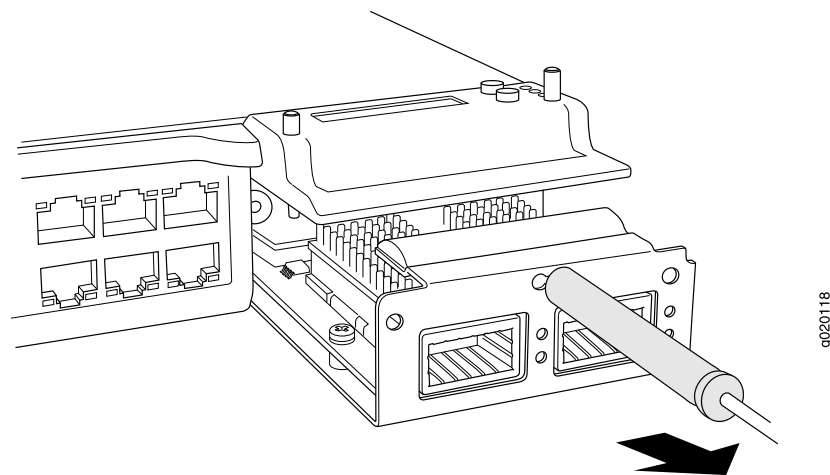


Figure 60: Removing an Uplink Module from an EX4200 Switch



**Related
Documentation**

- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Installing and Removing EX4200 Switch Hardware Components on page 140](#)
- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Front Panel of an EX4200 Switch on page 11](#)

Replacing Transceiver

- [Installing a Transceiver on page 193](#)
- [Removing a Transceiver on page 195](#)

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



NOTE: On an EX3200 switch, if you install a transceiver in a 1-Gigabit Ethernet uplink module port, a corresponding network port from the last four built-in ports is disabled. For example, if you install a transceiver in the uplink module port 3 (ge-0/1/2), then the built-in port 23 (ge-0/0/22) is disabled. The disabled port is not listed in the output of show interface commands.

Before you begin installing 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”](#) on page 261).

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

[Figure 61 on page 195](#) shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the CFP transceivers.

To install a transceiver:



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

1. Remove the transceiver from its bag.
2. 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.



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

3. If the port in which you want to install the transceiver is covered with a dust cover, remove the dust cover and save it in case you need to cover the port later. 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.
4. Using both hands, carefully place the transceiver in the empty port. The connectors must face the chassis.



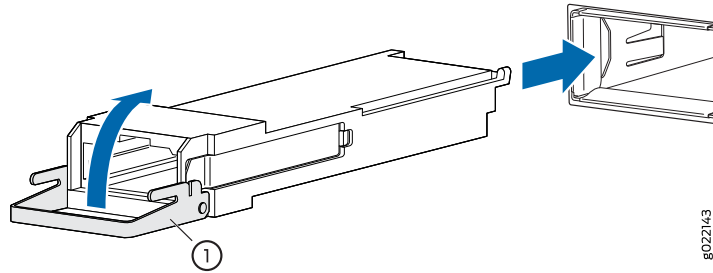
CAUTION: Before you slide the transceiver into the port, ensure that the transceiver is aligned correctly. Misalignment might cause the pins to bend, making the transceiver unusable.

5. Slide the transceiver in gently until it is fully seated. If you are installing a CFP transceiver, tighten the captive screws on the transceiver by using your fingers.
6. Remove the rubber safety cap when you are ready to connect the cable to the transceiver.



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.

Figure 61: Installing a Transceiver



1— Ejector lever

Related Documentation

- [Removing a Transceiver on page 195](#)
- [Connecting a Fiber-Optic Cable on page 159](#)

Removing a 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.

Before you begin removing 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” on page 261](#)).

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

[Figure 62 on page 197](#) shows how to remove a QSFP+ transceiver. The procedure is the same for all types of transceivers except the CFP transceivers.

To remove a transceiver from a device:

1. Place the antistatic bag or antistatic mat on a flat, stable surface.
2. Label the cable connected to the transceiver so that you can reconnect it correctly.



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.



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



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

3. Remove the cable connected to the transceiver (see [“Disconnecting a Fiber-Optic Cable from a Device” on page 200](#)). Cover the transceiver and the end of each fiber-optic cable connector with a rubber safety cap immediately after disconnecting the fiber-optic cables.

4. To remove an SFP, SFP+, XFP, or a QSFP+ transceiver:

- a. By 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 electrostatic discharge (ESD) damage to the transceiver, do not touch the connector pins at the end of the transceiver.

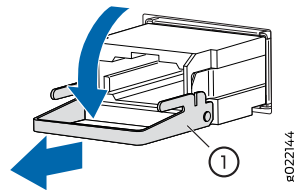
To remove a CFP transceiver:

- a. Loosen the screws on the transceiver by using your fingers.
- 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 electrostatic discharge (ESD) damage to the transceiver, do not touch the connector pins at the end of the transceiver.

Figure 62: Removing an SFP, SFP+, XFP, or a QSFP+ Transceiver



1—Ejector lever

5. By using your fingers, grasp the body of the transceiver and pull it straight out of the port.

6. Place the transceiver in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
7. Place the dust cover over the empty port.

Related Documentation

- [Installing a Transceiver on page 193](#)

Maintaining and Replacing Fiber-Optic Cable

- [Connecting a Fiber-Optic Cable on page 199](#)
- [Disconnecting a Fiber-Optic Cable from a Device on page 200](#)
- [Maintaining Fiber-Optic Cables on page 201](#)

Connecting a Fiber-Optic Cable

Before you begin connecting 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” on page 261](#)).

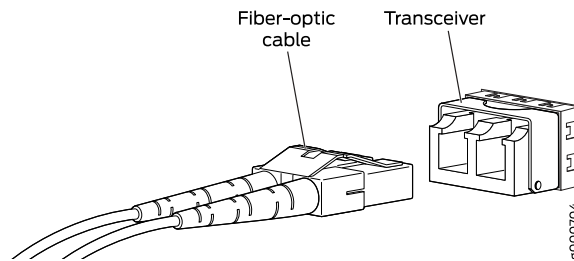
To connect a fiber-optic cable to an optical transceiver installed in a device:



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 51 on page 160](#)).

Figure 63: Connecting 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.

Related Documentation

- [Disconnecting a Fiber-Optic Cable from a Device on page 200](#)
- [Installing a Transceiver on page 193](#)
- [Maintaining Fiber-Optic Cables on page 201](#)

Disconnecting a Fiber-Optic Cable from a Device

Juniper Networks devices have field-replaceable unit (FRU) optical transceivers to which you can connect fiber-optic cables.

Before you begin disconnecting 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” on page 261](#).

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

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
```



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.



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

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

Related Documentation

- [Connecting a Fiber-Optic Cable on page 159](#)
- [Removing a Transceiver on page 195](#)
- [Maintaining Fiber-Optic Cables on page 201](#)

Maintaining Fiber-Optic Cables

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

To maintain 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. Attach a short fiber extension to the optical equipment. Any wear and tear due to frequent plugging and unplugging is then absorbed by the short fiber extension, which is easier and less expensive to replace than the instruments.
- Keep fiber-optic cable connections clean. Microdeposits of oil and dust in the canal of the transceiver or cable connector can cause loss of light, reduction in signal power, and possibly intermittent problems with the optical connection.
 - To clean the transceiver canal, use an appropriate fiber-cleaning device such as RIFOCS Fiber Optic Adaptor Cleaning Wands (part number 946). Follow the directions in the cleaning kit you use.
 - After 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 directions in the cleaning kit you use.

**Related
Documentation**

- [Connecting a Fiber-Optic Cable on page 159](#)
- [Laser and LED Safety Guidelines and Warnings on page 261](#)

CHAPTER 21

Replacing a Member Switch to Virtual Chassis

- [Adding a New EX4200 Switch to an Existing EX4200 Virtual Chassis \(CLI Procedure\) on page 203](#)
- [Replacing a Member Switch of a Virtual Chassis Configuration \(CLI Procedure\) on page 209](#)

Adding a New EX4200 Switch to an Existing EX4200 Virtual Chassis (CLI Procedure)

This topic explains how to add an EX4200 switch to an existing EX4200 Virtual Chassis. For information about adding an EX4200 switch to an EX4500 Virtual Chassis or a mixed Virtual Chassis, see *Adding an EX4200 Switch to a Preprovisioned EX4500 Virtual Chassis or a Preprovisioned Mixed EX4200 and EX4500 Virtual Chassis (CLI Procedure)*.

To add an EX4200 switch to an existing EX4200 Virtual Chassis, use the procedure that matches what you need to accomplish:

- [Adding a New Switch to an Existing Virtual Chassis Within the Same Wiring Closet on page 203](#)
- [Adding a New Switch from a Different Wiring Closet to an Existing Virtual Chassis on page 205](#)
- [Adding a New Switch to an Existing Preprovisioned Virtual Chassis Using Autoprovisioning on page 207](#)

Adding a New Switch to an Existing Virtual Chassis Within the Same Wiring Closet

This procedure can be used to add an EX4200 switch to an EX4200 Virtual Chassis.

Before you begin, be sure you have:

- Mounted the new switch in a rack.
- Confirmed that the new switch is powered off.
- If you are expanding a preprovisioned configuration, made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.

- If you are expanding a preprovisioned configuration, edited the existing Virtual Chassis configuration to include the serial number of the new member switch. The parameters specified in the master Virtual Chassis configuration file are applied to the new switch after it has been interconnected to an existing member switch.



NOTE: After you have created a preprovisioned Virtual Chassis configuration, you can use the autoprovisioning feature to add member switches to that configuration.

- (Optional) Configured Ethernet interfaces on different member switches into the same LAG.. See *Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*

An active member switch might temporarily go down before coming back up as part of this procedure. Having traffic load-balanced across member switches using a LAG helps alleviate traffic loss during this procedure.

To add a new member switch to an existing Virtual Chassis configuration within the same wiring closet:

1. If the new member switch has been previously configured, revert that switch's configuration to the factory defaults. See *Reverting to the Default Factory Configuration for the EX Series Switch*.
2. Interconnect the unpowered new switch to one member of the existing Virtual Chassis configuration using the dedicated Virtual Chassis ports (VCPs). Connect only one VCP on the unpowered new switch to a VCP on a member switch in the existing Virtual Chassis at this point of the procedure.
3. Power on the new switch.
4. Confirm that the new member switch is now included within the Virtual Chassis configuration by checking the front-panel LCD for the member ID. It should display a member ID that is greater than 0 (1 through 9), because there is already at least one member of the Virtual Chassis configuration.



NOTE: If you are using a preprovisioned configuration, the member ID is automatically assigned to the member's serial number in the configuration file.

5. Cable the other dedicated VCP on the new member switch to the Virtual Chassis.



CAUTION: If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual Chassis might become nonoperational for

several seconds. Network traffic to this switch is dropped during the downtime.

The member switch will return to the normal operational state with no user intervention, and normal operation of the Virtual Chassis will resume after this downtime.

Adding a New Switch from a Different Wiring Closet to an Existing Virtual Chassis

This procedure can be used to add an EX4200 switch to an EX4200 Virtual Chassis from a different wiring closet to an existing Virtual Chassis.

To add a new switch from a different wiring closet to an existing Virtual Chassis configuration, you must use a long cable to connect the members switches across wiring closets. You can use any SFP, SFP+, or XFP port and a fiber-optic cable for this purpose.

Before you begin, be sure you have:

- Installed the uplink modules needed for the Virtual Chassis configuration. See [“Installing an Uplink Module in an EX4200 Switch” on page 187](#).
 - Mounted the new switch in a rack.
 - If the new member switch has been previously configured, reverted its configuration to the factory defaults. See *Reverting to the Default Factory Configuration for the EX Series Switch*.
 - If you are expanding a preprovisioned configuration, made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.
 - If you are expanding a preprovisioned configuration, edited the existing Virtual Chassis configuration to include the serial number of the new member switch. You can specify the role of the new member switch when you add its serial number in the Virtual Chassis configuration file. The parameters specified in the master Virtual Chassis configuration file are applied to the new switch after it has been interconnected with its uplink VCP to an existing member switch.
-



NOTE: After you have created a preprovisioned Virtual Chassis configuration, you can use the autoprovisioning feature to add member switches to that configuration.

To add a new member switch that is going to be interconnected with the existing Virtual Chassis configuration across wiring closets:

1. Power on the new switch.
2. Connect a laptop or terminal to the console port of the switch, or use EZSetup on the LCD Panel of the standalone switch to specify temporary identification parameters.

(When you interconnect the new member switch with the existing Virtual Chassis configuration, the master will overwrite and disable any specified parameters that conflict with the Virtual Chassis parameters or assigned member configuration.)

3. Use the CLI or the J-Web interface to set one uplink module port as a VCP:

```
user@switch> request virtual-chassis vc-port set pic-slot 1 port 0
```



NOTE: If you are using a nonprovisioned configuration, you might configure the new member switch with a mastership priority value that is less than that of the existing member switches. Doing so ensures that the new member switch will function in a linecard role when it is included within the Virtual Chassis configuration.

4. Power off the new switch.
5. Interconnect the new member switch to one existing member switch in the Virtual Chassis configuration using one of the uplink module ports that you have configured as a VCP. Connect only one VCP on the unpowered new switch to a VCP on a member switch in the existing Virtual Chassis at this point of the procedure.
6. Power on the new member switch.
7. Confirm that the new member switch is now included within the Virtual Chassis configuration by checking the front-panel LCD for the member ID. It should display a member ID that is greater than 0 (1 through 9), because there is already at least one member of the Virtual Chassis configuration.



NOTE: If you are using a preprovisioned configuration, the member ID is automatically assigned to the member's serial number in the configuration file.

8. Cable another user-configured VCP on the new member switch to the Virtual Chassis, if desired.



CAUTION: If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual Chassis might become nonoperational for several seconds. Network traffic to this switch is dropped during the downtime.

The member switch will return to the normal operational state with no user intervention, and normal operation of the Virtual Chassis will resume after this downtime.

.....

Adding a New Switch to an Existing Preprovisioned Virtual Chassis Using Autoprovisioning

This procedure can be used to add an EX4200 switch to an existing EX4200 Virtual Chassis using autoprovisioning.

Before you begin, be sure you have:

- Installed the uplink modules needed for the Virtual Chassis configuration.
- Mounted the new switch in a rack.
- Ensured that the preprovisioned Virtual Chassis configuration has an active master. For more information, see *Example: Configuring an EX4200 Virtual Chassis Using a Preprovisioned Configuration File*.
- On the master, configured the Link Level Discovery Protocol (LLDP) on the uplink module ports that will be used as VCPs. LLDP is configured by default but might have been disabled. To configure LLDP, see *Configuring LLDP (CLI Procedure)*.
- Ensured that the new member switch has the factory-default configuration. If the new member switch has been previously configured, revert its configuration to the factory defaults. See *Reverting to the Default Factory Configuration for the EX Series Switch*.
- Made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.
- Edited the existing Virtual Chassis preprovisioned configuration to include the serial number of the new member switch. The parameters specified in the master Virtual Chassis configuration file are applied to the new member switch after it has been interconnected through its uplink VCP to an existing member switch.
- Prepared an existing member switch to interconnect with the new switch through an uplink module port by configuring an uplink module port as a VCP on the existing member switch.
- Ensured that the operational modes of the uplink modules on the existing member switch and the new member switch match.
- Confirmed that the new member switch is powered off.

If the preceding conditions are not met, autoprovisioning will not work and you will need to manually configure uplink module ports on the switch to be added to the configuration to be VCPs. For more information, see *Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port (CLI Procedure)*.

To add a switch to an existing preprovisioned Virtual Chassis configuration using the autoprovisioning feature:

1. Interconnect the unpowered new switch to one member of the existing Virtual Chassis configuration. Only connect one VCP on the unpowered new switch to a VCP on a member switch in the existing Virtual Chassis at this point of the procedure.
2. Power on the new member switch.
3. Confirm that the new member switch is now included in the Virtual Chassis configuration by checking the front-panel LCD for the member ID. It should display a member ID in the range from 0 through 9. The member ID is automatically assigned to the new member switch's serial number in the configuration file.
4. Cable the other VCP on the new member switch to the Virtual Chassis.



CAUTION: If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual Chassis might become nonoperational for several seconds. Network traffic to this switch is dropped during the downtime.

The member switch will return to the normal operational state with no user intervention, and normal operation of the Virtual Chassis will resume after this downtime.

**Related
Documentation**

- *Example: Expanding an EX4200 Virtual Chassis in a Single Wiring Closet*
- *Example: Setting Up a Multimember EX4200 Virtual Chassis Access Switch with a Default Configuration*
- *Example: Configuring an EX4200 Virtual Chassis Interconnected Across Multiple Wiring Closets*
- *Example: Configuring an EX4200 Virtual Chassis Using a Preprovisioned Configuration File*
- *Example: Configuring Automatic Software Update on EX4200 Virtual Chassis Member Switches*
- *Monitoring the Virtual Chassis Status and Statistics on EX Series Virtual Chassis*
- [Replacing a Member Switch of a Virtual Chassis Configuration \(CLI Procedure\) on page 209](#)

Replacing a Member Switch of a Virtual Chassis Configuration (CLI Procedure)



NOTE: This topic does not apply to Virtual Chassis Fabric (VCF). See *Removing a Device From a Virtual Chassis Fabric* for VCF information. This topic also does not apply to EX8200 Virtual Chassis.

You can replace a member switch in a Virtual Chassis without disrupting network service on the other members. You can retain the existing configuration of the member switch and apply it to a new member switch, or you can free up the member ID and make it available for assignment to a new member switch.

If you want to replace a member switch of a *mixed* Virtual Chassis that contains EX4200, EX4500, or EX4550 switches, see *Removing an EX4200, EX4500, or EX4550 Switch From a Mixed Virtual Chassis (CLI Procedure)*.

To replace a member switch, use the procedure that matches what you need to accomplish:

- [Remove, Repair, and Reinstall the Same Switch on page 209](#)
- [Remove a Member Switch, Replace It with a Different Switch, and Reapply the Old Configuration on page 210](#)
- [Remove a Member Switch and Make Its Member ID Available for Reassignment to a Different Switch on page 212](#)

Remove, Repair, and Reinstall the Same Switch

If you need to repair a member switch, you can remove it from the Virtual Chassis configuration without disrupting network service for the other members. The master stores the configuration for the member ID so that it can be reapplied when the member switch (with the same base MAC address) is reconnected.

To remove, repair, and reinstall the member switch:

1. Power off and disconnect the member switch to be repaired.
2. Repair, as necessary.
3. Reconnect the switch and power it on.

Remove a Member Switch, Replace It with a Different Switch, and Reapply the Old Configuration

If you are unable to repair a member switch, you can replace it with a different member switch while retaining the previous configuration. The master stores the configuration of the member that was removed. When you connect a different member switch, the master assigns a new member ID, but the old configuration is still stored under the previous member ID of the previous member switch.

To remove and replace a switch and reapply the old configuration:

1. Power off and disconnect the member switch to be replaced.
2. If the replacement member switch has been previously configured, revert that switch's configuration to the factory defaults. See *Reverting to the Default Factory Configuration for the EX Series Switch* for information about reverting to the factory default configuration on an EX Series switch or *Reverting to the Default Factory Configuration* for information about reverting to the factory default configuration on a QFX Series switch.

The replacement member switch should be powered on and running with the factory default configuration at the end of this step.

3. (Required when automatic software update is not enabled on the Virtual Chassis and the new member switch is running a version of Junos OS that is different than the version of Junos OS running on the Virtual Chassis) Ensure that the correct version of Junos OS is or will be installed on the new member switch by performing *either* of the following tasks:
 - Enable automatic software update on the Virtual Chassis. See *Configuring Automatic Software Update on Virtual Chassis Member Switches (CLI Procedure)*. The Virtual Chassis will automatically update the software on the replacement switch in a later step when it is interconnected and recognized as part of the Virtual Chassis. The replacement switch does not require any action in this case for this step.
 - Install the version of Junos OS running on the Virtual Chassis onto the new member switch before interconnecting it into the Virtual Chassis. See *Installing Software on an EX Series Switch with a Single Routing Engine (CLI Procedure)*. The replacement switch will be running with the new version of the software and the factory default configuration in this case at the end of this step.
4. Connect one link from the replacement member switch to the Virtual Chassis as follows, depending on which type of ports you are using:
 - If you are interconnecting a switch using dedicated Virtual Chassis Ports (VCPs), connect one dedicated VCP on the replacement member switch to a dedicated VCP on another member switch in the Virtual Chassis.
 - If you are interconnecting a switch using optical ports configured as VCPs:

On the replacement switch, configure the optical ports that you are using to connect to the Virtual Chassis as VCPs. (The optical ports on the existing members in the Virtual Chassis where the replacement member will be connected should be

configured as VCPs as well, if they are not already configured.) To configure an optical port as a VCP:

```
user@switch> request virtual-chassis vc-port set pic-slot 1 port port-number
```

Connect one configured optical port VCP on the replacement switch to a configured optical port VCP on another member switch in the Virtual Chassis.



NOTE: You can set optical port VCPs on a standalone switch before interconnecting one link into an existing Virtual Chassis, or set optical port VCPs for the switch after interconnecting a link into the existing Virtual Chassis. In either case, you must set the ports as VCPs that are used to interconnect the switch into the Virtual Chassis for the master to detect and complete the process of adding the switch as a member. See *Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port (CLI Procedure)* for more information.

5. Confirm that the new member switch is now included in the Virtual Chassis configuration by checking the front-panel LCD or the for the member ID. It should display a member ID in the range from 0 through 9.

If you are using a switch that does not have an LCD interface, confirm the switch is part of the Virtual Chassis configuration by entering the **show virtual-chassis** command and reviewing the output.

6. Cable the other VCP on the replacement member switch into the Virtual Chassis based on how you planned to interconnect the switch in Step 4.



CAUTION: If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual Chassis might become nonoperational for several seconds. Network traffic to this switch is dropped during the downtime.

The member switch will return to the normal operational state with no user intervention, and normal operation of the Virtual Chassis will resume after this downtime.

7. To update the new member switch's current member ID to the member ID of the member switch that was removed from the Virtual Chassis configuration:
 - In a nonprovisioned Virtual Chassis, issue the **request virtual-chassis renumber** command on the master member switch.
 - In a preprovisioned Virtual Chassis, on the master member switch, reconfigure the member information for the new member switch using the **[edit virtual-chassis] member** configuration statement.

To use the same member ID as the member that was replaced, associate the new member's serial number (on the back of the switch) with the replaced member ID, as follows:

```
[edit virtual-chassis]
user@switch# set member replaced-member-ID serial-number new-member-serial-number
```



NOTE: You can alternatively use the `replace` configuration editing command to substitute the serial number of the replacement member switch for the replaced member's serial number in the existing configuration item for the replaced member.

To configure the new member with a different member ID, associate the new member's serial number with the desired member ID and then delete the configuration item for the replaced member, as follows:

```
[edit virtual-chassis]
user@switch# set member new-member-ID serial-number new-member-serial-number
user@switch# delete member replaced-member-ID
```

Remove a Member Switch and Make Its Member ID Available for Reassignment to a Different Switch

When you remove a member switch from the Virtual Chassis configuration, the master keeps that member switch's member ID in reserve. To make that member switch's member ID available for reassignment, issue the **request virtual-chassis recycle** command from the Virtual Chassis master.



NOTE: When you add or delete members in a Virtual Chassis configuration, internal routing changes might cause temporary traffic loss for a few seconds.

Related Documentation

- [Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port \(CLI Procedure\)](#)
- [Adding or Replacing a Member Switch or an External Routing Engine in an EX8200 Virtual Chassis \(CLI Procedure\)](#)
- [Adding a New Switch to an Existing QFX Series Virtual Chassis \(CLI Procedure\)](#)
- [Monitoring the Virtual Chassis Status and Statistics on EX Series Virtual Chassis](#)
- [Adding a New EX4200 Switch to an Existing EX4200 Virtual Chassis \(CLI Procedure\) on page 203](#)
- [Adding an EX4200 Switch to a Preprovisioned EX4500 Virtual Chassis or a Preprovisioned Mixed EX4200 and EX4500 Virtual Chassis \(CLI Procedure\)](#)
- [Adding an EX4500 Switch to a Preprovisioned EX4200 Virtual Chassis \(CLI Procedure\)](#)
- [Adding an EX4500 Switch to a Nonprovisioned EX4200 Virtual Chassis \(CLI Procedure\)](#)

Maintaining and Replacing Virtual Chassis Cable

- [Connecting a Virtual Chassis Cable to an EX4200 Switch on page 213](#)
- [Disconnecting a Virtual Chassis Cable from an EX4200 Switch on page 214](#)

Connecting a Virtual Chassis Cable to an EX4200 Switch

EX4200 switches have two Virtual Chassis ports on the rear panel. You can use the Virtual Chassis ports to interconnect up to 10 EX4200 switches, enabling them to operate as a unified single high bandwidth switch. To see illustrations of a few Virtual Chassis cabling configuration examples, see [“Virtual Chassis Cabling Configuration Examples for EX4200 Switches” on page 116](#).

Ensure that you have the following parts and tools available:

- A cross-head screwdriver (provided in the uplink module kit)

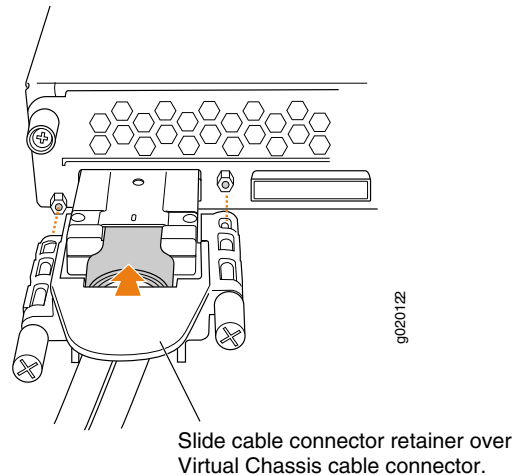


NOTE: If you order Virtual Chassis cables separately, you must reuse the cable connector retainers provided with the original cable or order Virtual Chassis cable connector retainers also separately.

To connect a Virtual Chassis cable to an EX4200 switch (see [Figure 64 on page 214](#)):

1. Taking care not to touch module components, pins, leads, or solder connections, remove the Virtual Chassis cable from its bag.
2. Using both hands, place the Virtual Chassis cable connector in the empty Virtual Chassis port and slide it in gently until it is fully seated.
3. Slide the cable connector retainer over the Virtual Chassis cable connector.
4. Tighten the screws on the cable connector retainer by using the cross-head screwdriver.

Figure 64: Connecting a Virtual Chassis Cable to an EX4200 Switch



Related Documentation

- [Disconnecting a Virtual Chassis Cable from an EX4200 Switch on page 214](#)
- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)
- [Understanding EX Series Virtual Chassis Components](#)
- [Planning EX4200, EX4500, and EX4550 Virtual Chassis on page 114](#)
- [Virtual Chassis Ports Connector Pinout Information for EX4200 Switches on page 107](#)

Disconnecting a Virtual Chassis Cable from an EX4200 Switch

If you need to disconnect an EX4200 switch from a Virtual Chassis configuration, you need to disconnect the Virtual Chassis cable from the Virtual Chassis ports (VCPs).

Ensure that you have the following parts and tools available:

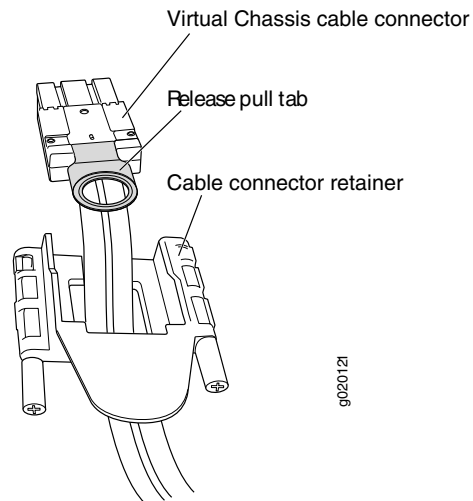
- A cross-head screwdriver (provided in the uplink module kit)

To disconnect a Virtual Chassis cable from an EX4200 switch (see [Figure 65 on page 215](#)):

1. Loosen the screws on the cable connector retainer by using the cross-head screwdriver.
2. Slide the cable connector retainer back.

3. Gently pull the release pull tab on the Virtual Chassis cable connector to release the lock holding the Virtual Chassis cable connector in the Virtual Chassis port.
4. Gently pull the Virtual Chassis cable connector out of the Virtual Chassis port.

Figure 65: Virtual Chassis Cable Connector in an EX4200 Switch



NOTE: If you order Virtual Chassis cables separately, you must reuse the cable connector retainers provided with the original cable or order Virtual Chassis cable connector retainers also separately.

Related Documentation

- [Connecting a Virtual Chassis Cable to an EX4200 Switch on page 213](#)
- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)
- [Understanding EX Series Virtual Chassis Components](#)
- [Planning EX4200, EX4500, and EX4550 Virtual Chassis on page 114](#)
- [Virtual Chassis Ports Connector Pinout Information for EX4200 Switches on page 107](#)

Contacting Customer Support and Returning the Chassis or Components

- [Returning an EX4200 Switch or Component for Repair or Replacement on page 217](#)
- [Locating the Serial Number on an EX4200 Switch or Component on page 218](#)
- [Contacting Customer Support to Obtain Return Material Authorization on page 219](#)
- [Packing an EX4200 Switch or Component for Shipping on page 220](#)

Returning an EX4200 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 component. For instructions, see [“Locating the Serial Number on an EX4200 Switch or Component” on page 218](#).
2. Obtain an RMA number from JTAC as described in [“Contacting Customer Support to Obtain Return Material Authorization” on page 219](#).



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 EX4200 Switch or Component for Shipping” on page 220](#).

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

**Related
Documentation**

- [EX4200 Switches Hardware Overview on page 3](#)

Locating the Serial Number on an EX4200 Switch or Component

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).

If the switch is operational and you can access the CLI, you can list serial numbers for the switch and for some components with a CLI command. If you do not have access to the CLI or if the serial number for the component does not appear in the command output, you can locate the serial number ID label on the physical switch or component (see [Figure 66 on page 219](#)).



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.

- [Listing the Switch and Components Details with the CLI on page 218](#)
- [Locating the Chassis Serial Number ID Label on an EX4200 Switch on page 218](#)
- [Locating the Serial Number ID Labels on FRUs in an EX4200 Switch on page 219](#)

Listing the Switch and Components Details with the CLI

To list the switch and switch components and their serial numbers, enter the following CLI command:

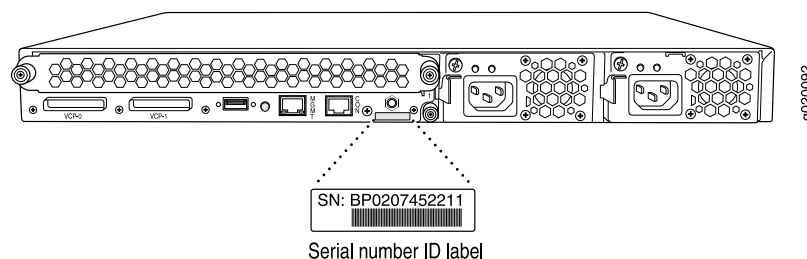
```
user@switch> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               BM0208327733  EX4200-24T
Routing Engine 0 REV 11    750-021256  BM0208327733  EX4200-24T, 8 POE
FPC 0         REV 11    750-021256  BM0208327733  EX4200-24T, 8 POE
  CPU                               BUILTIN       BUILTIN       FPC CPU
  PIC 0                               BUILTIN       BUILTIN       24x 10/100/1000 Base-T
  PIC 1         REV 03B  711-021270  AR0208162285  4x GE SFP
Power Supply 0  REV 03    740-020957  AT0508346354  PS 320W AC
Fan Tray
```

For information about the **show chassis hardware** command, see *show chassis hardware*.

Locating the Chassis Serial Number ID Label on an EX4200 Switch

EX4200 switches have serial number ID labels located on the rear panel of the chassis (see [Figure 66 on page 219](#)).

Figure 66: Location of the Serial Number ID Label on an EX4200 Switch



Locating the Serial Number ID Labels on FRUs in an EX4200 Switch

The power supplies, fan trays, and uplink modules installed in EX Series switches are field-replaceable units (FRUs).

For each of these FRUs, you must remove the FRU from the switch chassis to see the FRU's serial number ID label.

- **Power Supply**—The serial number ID label is on the top of the power supply. See [“Removing a Power Supply from an EX4200 Switch” on page 185](#).
- **Fan tray**—The serial number ID label is on the back of the fan tray. See [“Installing a Fan Tray in an EX4200 Switch” on page 179](#).
- **Uplink module**—The serial number ID label is on the circuit board. See [“Removing an Uplink Module from an EX4200 Switch” on page 189](#).

Related Documentation

- [Contacting Customer Support to Obtain Return Material Authorization on page 219](#)
- [Returning an EX4200 Switch or Component for Repair or Replacement on page 217](#)

Contacting Customer Support to Obtain Return Material Authorization

If you are returning 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).

After locating the serial number of the device or hardware component you want to return, open a Case with 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 case 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:

- Case Manager at CSC: <http://www.juniper.net/cm/>
- Telephone: +1-888-314-JTAC1-888-314-5822, toll free in U.S., Canada, and Mexico



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

If you are contacting JTAC by telephone, enter your 11-digit case 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.

**Related
Documentation**

- [Prevention of Electrostatic Discharge Damage on page 273](#)

Packing an EX4200 Switch or Component for Shipping

If you are returning an EX4200 switch or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you begin packing the switch or component:

- Ensure that you have 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 "[Contacting Customer Support to Obtain Return Material Authorization](#)" on page 219.

Ensure that you have the following parts and tools available:

- Antistatic bag, one for each switch or component
- Phillips (+) screwdriver, number 2

This topic describes:

- [Packing an EX4200 Switch for Shipping on page 220](#)
- [Packing EX4200 Switch Components for Shipping on page 221](#)

Packing an EX4200 Switch for Shipping

To pack a switch for shipping:

1. On the console or other management device connected to the switch (to the master switch in a Virtual Chassis configuration), enter the 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.

2. Disconnect power from the switch by performing one of the following:
 - If the power source outlet has a power switch, set it to the OFF (O) position.
 - If the power source outlet does not have a power switch, gently pull out the male end of the power cord connected to the power source outlet.
3. Remove the cables that connect the switch to all external devices. See [“Disconnecting a Fiber-Optic Cable from a Device” on page 200](#).
4. Remove all field-replaceable units (FRUs) from the switch.
5. If the switch is installed on a wall, rack, or cabinet, have one person support the weight of the switch while another person unscrews and removes the mounting screws.
6. Remove the switch from the wall, rack, cabinet, or desk and place the switch in an antistatic bag.
7. Place the switch in the shipping carton.
8. Place the packing foam on top of and around the switch.
9. If you are returning accessories or FRUs with the switch, pack them as instructed in the following section.
10. Replace the accessory box on top of the packing foam.
11. Close the top of the cardboard shipping box and seal it with packing tape.
12. Write the RMA number on the exterior of the box to ensure proper tracking.

Packing EX4200 Switch Components for Shipping



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

To pack and ship switch components:

- Place individual boards in antistatic bags.
- Ensure that the components are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
- Close the top of the cardboard shipping box and seal it with packing tape.
- Write the RMA number on the exterior of the box to ensure proper tracking.

**Related
Documentation**

- [Returning an EX4200 Switch or Component for Repair or Replacement on page 217](#)
- [Installing a Fan Tray in an EX4200 Switch on page 179](#)
- [Removing a Power Supply from an EX4200 Switch on page 185](#)
- [Removing an Uplink Module from an EX4200 Switch on page 189](#)
- [Removing a Transceiver on page 195](#)

PART 5

Troubleshooting

- [Alarms and Syslog Messages on page 225](#)
- [Troubleshooting Switch Components on page 237](#)

Alarms and Syslog Messages

- [Understanding Alarm Types and Severity Levels on EX Series Switches on page 225](#)
- [Chassis Component Alarm Conditions on EX4200 Switches on page 226](#)
- [Checking Active Alarms with the J-Web Interface on page 231](#)
- [Monitoring System Log Messages on page 232](#)

Understanding 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 61 on page 225](#).

Table 61: 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.
alarm severity	Seriousness of the alarm. If the Alarm (ALM) LED is red, this indicates a major alarm. If the Alarm LED is yellow, 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 alarm condition requires monitoring or maintenance.

A missing rescue configuration generates a yellow system alarm.

Related Documentation

- [Checking Active Alarms with the J-Web Interface on page 231](#)
- [Dashboard for EX Series Switches on page 39](#)

Chassis Component Alarm Conditions on EX4200 Switches

This topic describes the chassis component alarm conditions on EX4200 switches.

[Table 62 on page 227](#) lists the alarms that the chassis components can generate on EX4200 switches, their severity levels, and the actions you can take to respond to them.

Table 62: Chassis Component Alarm Conditions on EX4200 Switches

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Power supplies	A power supply has been removed from the chassis.	Minor (yellow)	Install a power supply in the empty slot.
	The power supply is offline or the power supply output has failed.	Major (red)	Open a support case using the Case Manager link at http://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).
	An unknown power supply is installed.	Minor (yellow)	Install a Juniper networks recommended power supply.
Fan tray	Fan tray is not installed.	Minor (yellow)	Install the fan tray.
	One fan in the chassis is not spinning or is spinning at below the required speed.	Major (red)	• Check the fan. • Replace the faulty fan tray. • If the above two checks show no problems, open a support case using the Case Manager link at http://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).
	Fan failure—i2c read failure.	Major (red)	• Check the fan. • Replace the faulty fan tray. • If the above two checks show no problems, open a support case using the Case Manager link at http://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).

Table 62: Chassis Component Alarm Conditions on EX4200 Switches (*continued*)

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Temperature	The temperature inside the chassis has exceeded 203° F (95° C).	Major (red)	- Check the room temperature. - Check the fan. - If the above two checks show no problems, open a support case using the Case Manager link at http://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).
	The temperature inside the chassis has exceeded 185° F (85° C) and a fan has failed.	Major (red)	- Replace the fan tray. - Open a support case using the Case Manager link at http://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).
	The temperature inside the chassis has exceeded 176° F (80° C).	Minor (yellow)	- Check the room temperature. - Check the fan. - If the above two checks show no problems, open a support case using the Case Manager link at http://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).
	The temperature inside the chassis has exceeded 158° F (70° C) and a fan has failed.	Minor (yellow)	- Replace the fan tray. - Open a support case using the Case Manager link at http://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).
	The temperature sensor has failed.	Major (red)	Open a support case using the Case Manager link at http://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).

Table 62: Chassis Component Alarm Conditions on EX4200 Switches (continued)

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Media	Device booted from backup root.	Minor (yellow)	Open a support case using the Case Manager link at http://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).
	/var or /config full (only 10% free).	Major (red)	Open a support case using the Case Manager link at http://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).
	/var or /config full (only 25% free).	Minor (yellow)	Open a support case using the Case Manager link at http://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).
	Upgrade bank is empty or corrupted.	Major (red)	Open a support case using the Case Manager link at http://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).
	Firmware version is not the latest.	Minor (yellow)	Open a support case using the Case Manager link at http://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).
	Single-bit ECC error detected.	Major (red)	Open a support case using the Case Manager link at http://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).

Table 62: Chassis Component Alarm Conditions on EX4200 Switches (*continued*)

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Redundant power system (RPS)	RPS is disconnected.	Major (red)	Check the RPS connection.
	RPS fan has failed.	Major (red)	Open a support case using the Case Manager link at http://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).
	RPS power supply has failed.	Major (red)	Open a support case using the Case Manager link at http://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).
	RPS is backing up the switch for the first time.	Minor (yellow)	Check the reason for power supply failure.
Management Ethernet interface	Management Ethernet link is down	Major (red)	• Check whether a cable is connected to the management Ethernet interface, or whether the cable is defective. Replace the cable if required. • If you are unable to resolve the problem, open a support case using the Case Manager link at http://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).

Table 62: Chassis Component Alarm Conditions on EX4200 Switches *(continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
Routing Engine	<code>/var</code> partition usage is high.	Minor (yellow)	Clean up the system file storage space on the switch. For more information, see <i>Cleaning Up the System File Storage Space</i> .
	<code>/var</code> partition is full.	Major (red)	Clean up the system file storage space on the switch. For more information, see <i>Cleaning Up the System File Storage Space</i> .
	Rescue configuration is not set.	Minor (yellow)	Use the request system configuration rescue save command to set the rescue configuration. For more information, see <i>Setting or Deleting the Rescue Configuration (CLI Procedure)</i> .
	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 <i>Understanding Software Licenses for EX Series Switches</i> .

Related Documentation

- [Field-Replaceable Units in EX4200 Switches on page 10](#)
- [Chassis Status LEDs in EX4200 Switches on page 21](#)
- [Understanding Alarm Types and Severity Levels on EX Series Switches on page 225](#)

Checking Active Alarms with the J-Web Interface

Purpose



NOTE: This topic applies only to the J-Web Application package.

Use the monitoring functionality to view alarm information for the EX Series switches including alarm type, alarm severity, and a brief description for each active alarm on the switching platform.

Action

To view the active alarms:

1. Select **Monitor > Events and Alarms > View Alarms** in the J-Web interface.
2. Select an alarm filter based on alarm type, severity, description, and date range.
3. Click **Go**.

All the alarms matching the filter are displayed.



NOTE: When the switch is reset, the active alarms are displayed.

Meaning [Table 63 on page 232](#) lists the alarm output fields.

Table 63: Summary of Key Alarm Output Fields

Field	Values
Type	Category of the alarm: - Chassis—Indicates an alarm condition on the chassis (typically an environmental alarm such as one related to temperature). - System—Indicates an alarm condition in the system.
Severity	Alarm severity—either major (red) or minor (yellow).
Description	Brief synopsis of the alarm.
Time	Date and time when the failure was detected.

Related Documentation

- [Monitoring System Log Messages on page 232](#)
- [Dashboard for EX Series Switches on page 39](#)
- [Understanding Alarm Types and Severity Levels on EX Series Switches on page 225](#)

Monitoring System Log Messages

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 64 on page 233](#) describes the different filters, their functions, and the associated actions.

To view events in the CLI, enter the following command:

```
show log
```

Table 64: 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.
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 <i>Initial</i>.
Search	Applies the specified filter and displays the matching messages.	To apply the filter and display messages, click Search.

Table 64: Filtering System Log Messages (*continued*)

Field	Function	Your Action
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 .
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: - Click Generate Raw Report. The <i>Opening filteredEvents.html</i> window appears. - Select Open with to open the HTML file or select Save File to save the file. - Click OK.
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: - Click Generate Report. The <i>Opening Report.html</i> window appears. - Select Open with to open the HTML file or select Save File to save the file. - Click OK.

Meaning Table 65 on page 235 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 65: 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—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.
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.	

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.

**Related
Documentation**

- [Checking Active Alarms with the J-Web Interface on page 231](#)
- [Understanding Alarm Types and Severity Levels on EX Series Switches on page 225](#)

Troubleshooting Switch Components

- [Troubleshooting Network Interfaces on EX4200 Switches on page 237](#)
- [Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch on page 238](#)
- [Troubleshooting Power Supply Installation Alarms on EX4200 Switches on page 238](#)

Troubleshooting Network Interfaces on EX4200 Switches

This topic provides troubleshooting information for specific problems related to interfaces on EX4200 switches.

- [The interface on the port in which an SFP or SFP+ transceiver is installed is down on page 237](#)

The interface on the port in which an SFP or SFP+ transceiver is installed is down

Problem **Description:** The interface on the port in which an SFP or SFP+ transceiver is installed in an uplink module installed in an EX4200 switch is down.

Symptoms: When you check the status with the CLI command **show interfaces ge-** or with the J-Web user interface, the disabled port is not listed.

Cause By default, the SFP+ and SFP+ MACsec uplink modules operate in the 10-gigabit mode and support only SFP+ transceivers. The operating mode for the module is incorrectly set.

Solution Either SFP+ or SFP transceivers can be installed in the uplink modules. You must configure the operating mode of the SFP+ or SFP+ MACsec uplink module to match the type of transceiver you want to use. For SFP+ transceivers, configure the 10-gigabit operating mode and for SFP transceivers, configure the 1-gigabit operating mode. See *Setting the Mode on an SFP+ or SFP+ MACSec Uplink Module (CLI Procedure)*.

Related Documentation

- [Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch on page 238](#)
- *Monitoring Interface Status and Traffic*
- *Configuring Gigabit Ethernet Interfaces (CLI Procedure)*

- [Configuring Gigabit Ethernet Interfaces \(J-Web Procedure\)](#)
- [Removing a Transceiver on page 195](#)
- [Uplink Modules in EX4200 Switches on page 18](#)
- [EX Series Switches Interfaces Overview](#)

Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch

This topic provides troubleshooting information for specific problems related to uplink module ports on EX4200 switches.

1. [Virtual Chassis port \(VCP\) connection does not work on page 238](#)

Virtual Chassis port (VCP) connection does not work

Problem **Description:** The Virtual Chassis port (VCP) connection configured in an EX4200 switch does not work.

Environment: A port of the uplink module is set as a VCP.

Cause The uplink module installed in the switch was replaced.

Solution Set a port in the uplink module as a VCP. See *Setting an Uplink Port on an EX Series Switch as a Virtual Chassis Port (CLI Procedure)*.

Related Documentation

- [Monitoring Interface Status and Traffic](#)
- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)
- [Configuring Gigabit Ethernet Interfaces \(J-Web Procedure\)](#)
- [Installing an Uplink Module in an EX4200 Switch on page 187](#)
- [Removing a Transceiver on page 195](#)
- [Uplink Modules in EX4200 Switches on page 18](#)
- [Understanding EX4200, EX4500, and EX4550 Virtual Chassis Hardware Configurations on page 111](#)

Troubleshooting Power Supply Installation Alarms on EX4200 Switches

This topic provides troubleshooting information for problems related to power supply installation on EX4200 switches.

- [The Switch Displays the “Unsupported PSU” Alarm on page 239](#)

The Switch Displays the “Unsupported PSU” Alarm

Problem **Description:** The “Unsupported PSU” alarm appears on the EX4200-24PX or the EX4200-48PX switch.

Symptoms:

- A 930 W AC power supply is installed in the switch, but no power is detected on PoE+ ports.
- The Alarm (ALM) LED lights red and when you check the alarm status using the **show chassis alarms** command, the “Unsupported PSU” alarm is displayed as shown below:

```
user@switch> show chassis alarms
1 alarm currently active
Alarm time           Class  Description
2011-02-14 08:34:39 UTC  Unsupported PSU
```

Cause The power supply you have installed is not compatible with the switch.

EX4200-24PX and EX4200-48PX switches do not support the 930 W (**EX-PWR-930-AC**) or the 600 W (**EX-PWR-600-AC**) AC power supplies that are used in the EX4200-48P and the EX4200-24P switch models. EX4200-24PX and EX4200-48PX switches work only with the power supplies labeled **EX-PWR2-930-AC** or **EX-PWR3-930-AC**. All EX4200 switches support **EX-PWR2-930-AC** and **EX-PWR3-930-AC** power supplies.

Solution Check the label of the power supply you have installed in the switch. You can find the label on the top of the power supply (see [“Removing a Power Supply from an EX4200 Switch” on page 185](#)). If it is an incompatible power supply, remove it and install the correct power supply.

Related Documentation

- [Installing a Power Supply in an EX4200 Switch on page 183](#)
- [Power Supply in EX4200 Switches on page 33](#)

PART 6

Safety and Compliance Information

- [General Safety Guidelines and Warnings on page 243](#)
- [Fire Safety Requirements on page 249](#)
- [Installation Safety Guidelines and Warnings on page 251](#)
- [Radiation and Laser Safety Guidelines and Warnings on page 261](#)
- [Maintenance and Operational Safety Warnings on page 265](#)
- [Electrical Safety Guidelines and Warnings on page 271](#)
- [Agency Approvals and Compliance Statements on page 287](#)

CHAPTER 26

General Safety Guidelines and Warnings

- [General Safety Guidelines and Warnings on page 243](#)
- [Definitions of Safety Warning Levels on page 244](#)
- [Qualified Personnel Warning on page 246](#)
- [Warning Statement for Norway and Sweden on page 247](#)

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.
- Ensure that the separate protective earthing terminal provided on this device is permanently connected 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.
- Always ensure that all modules, power supplies, and cover panels are fully inserted and that the installation screws are fully tightened.

Related Documentation

- [AC Power Electrical Safety Guidelines on page 274](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [Maintenance and Operational Safety Guidelines and Warnings on page 265](#)
- [Installation Instructions Warning on page 251](#)
- [Grounded Equipment Warning on page 258](#)

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.
.....



.....
WARNING: This symbol alerts you to the risk of personal injury from a 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 be familiar 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.

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

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

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

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

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

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

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.

Related Documentation • [General Safety Guidelines and Warnings on page 243](#)

- [Installation Instructions Warning on page 251](#)
- [Maintenance and Operational Safety Guidelines and Warnings on page 265](#)
- [Grounded Equipment Warning on page 258](#)
- [Laser and LED Safety Guidelines and Warnings on page 261](#)
- [Laser and LED Safety Guidelines and Warnings for the QFX Series](#)
- [Laser and LED Safety Guidelines and Warnings for the PTX Series](#)
- [Warning Statement for Norway and Sweden on page 247](#)

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.

Attention 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.

Related Documentation

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [AC Power Electrical Safety Guidelines on page 274](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)

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.

Related Documentation

- [General Safety Guidelines and Warnings on page 243](#)

Fire Safety Requirements

- [Fire Safety Requirements on page 249](#)

Fire Safety Requirements

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.



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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.

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

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [Action to Take After an Electrical Accident on page 272](#)

CHAPTER 28

Installation Safety Guidelines and Warnings

- [Installation Instructions Warning on page 251](#)
- [Chassis Lifting Guidelines on page 252](#)
- [Restricted Access Warning on page 252](#)
- [Ramp Warning on page 254](#)
- [Rack-Mounting and Cabinet-Mounting Warnings on page 254](#)
- [Wall-Mounting Warning for EX4200 Switches on page 258](#)
- [Grounded Equipment Warning on page 258](#)

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 virtälähteeseen.

Attention 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.

- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [Laser and LED Safety Guidelines and Warnings on page 261](#)
 - [Grounded Equipment Warning on page 258](#)

Chassis 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 most of the weight is borne by your legs 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 routing devices and components:
 - Up to 39.7 lb (18 kg): One person.
 - 39.7 lb (18 kg) to 70.5 lb (32 kg): Two or more people.
 - 70.5 lb (32 kg) to 121.2 lb (55 kg): Three or more people.
 - Above 121.2 lbs (55 kg): Material handling systems (such as levers, slings, lifts and so on) must be used. When this is not practical, specially trained persons or systems must be used (riggers or movers).

- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [Installation Instructions Warning on page 251](#)

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.

Attention 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.

- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [General Electrical Safety Guidelines and Warnings on page 271](#)
 - [Installation Instructions Warning on page 251](#)
 - [Grounded Equipment Warning on page 258](#)

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.

Attention 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.

- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [Installation Instructions Warning on page 251](#)
 - [Grounded Equipment Warning on page 258](#)

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:

- The device must be installed in a rack that is secured to the building structure.
- The device should be mounted 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 bouwswel 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 vältetään 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 alaosaan kaikkein raskaimmalla esineellä ja siirry sitten sen yläosaan.
- Jos telinettä varten on vakaimet, asenna ne ennen laitteen asettamista telineeseen tai sen huoltamista siinä.

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

¡Atención! Para evitar lesiones durante el montaje de este equipo sobre un bastidor, o posteriormente 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.
-

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [Installation Instructions Warning on page 251](#)
- [Grounded Equipment Warning on page 258](#)

Wall-Mounting Warning for EX4200 Switches



WARNING: When mounted in a vertical position, an EX3200 or EX4200 chassis must be oriented with the front panel of the chassis pointing down to ensure proper airflow and meet safety requirements in the event of a fire.



WARNING: Avertissement: lorsqu'installé en position verticale, un châssis de commutation EX3200 ou EX4200 doit être orienté avec le panneau avant dirigé vers le bas.



WARNING: Warnhinweis: Bei der Befestigung in vertikaler Position muss ein EX3200- oder EX4200-Switch-Gehäuse so ausgerichtet werden, dass das vordere Bedienfeld des Switch-Gehäuses nach unten zeigt.

**Related
Documentation**

- [Mounting an EX4200 Switch on a Wall on page 138](#)

Grounded Equipment Warning



WARNING: The device is intended to be grounded. During normal use, ensure that you have connected earth ground to the chassis.

Waarschuwing Deze apparatuur hoort geaard te worden. Zorg dat de host-computer tijdens normaal gebruik met aarde is verbonden.

Varoitus Tämä laitteisto on tarkoitettu maadoitettavaksi. Varmista, että isäntälaitte on yhdistetty maahan normaalikäytön aikana.

Attention Cet équipement doit être relié à la terre. S'assurer que l'appareil hôte est relié à la terre lors de l'utilisation normale.

Warnung Dieses Gerät muß geerdet werden. Stellen Sie sicher, daß das Host-Gerät während des normalen Betriebs an Erde gelegt ist.

Avvertenza Questa apparecchiatura deve essere collegata a massa. Accertarsi che il dispositivo host sia collegato alla massa di terra durante il normale utilizzo.

Advarsel Dette utstyret skal jordes. Forviss deg om vertsterminalen er jordet ved normalt bruk.

Aviso Este equipamento deverá estar ligado à terra. Certifique-se que o host se encontra ligado à terra durante a sua utilização normal.

¡Atención! Este equipo debe conectarse a tierra. Asegurarse de que el equipo principal esté conectado a tierra durante el uso normal.

Varning! Denna utrustning är avsedd att jordas. Se till att värdenheten är jordad vid normal användning.

-
- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [AC Power Electrical Safety Guidelines on page 274](#)
 - [DC Power Electrical Safety Guidelines for Switches on page 276](#)

CHAPTER 29

Radiation and Laser Safety Guidelines and Warnings

- [Laser and LED Safety Guidelines and Warnings on page 261](#)
- [Radiation from Open Port Apertures Warning on page 263](#)

Laser and LED Safety Guidelines and Warnings

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 EN 60825-1 requirements.

Observe the following guidelines and warnings:

- [General Laser Safety Guidelines on page 261](#)
- [Class 1 Laser Product Warning on page 262](#)
- [Class 1 LED Product Warning on page 262](#)
- [Laser Beam Warning on page 262](#)

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.



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.

Class 1 Laser Product Warning



WARNING: Class 1 laser product.

Waarschuwing Klasse-1 laser produkt.

Varoitus Luokan 1 lasertuote.

Attention 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



WARNING: Class 1 LED product.

Waarschuwing Klasse 1 LED-product.

Varoitus Luokan 1 valodiodituote.

Attention 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



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.

Attention 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [Radiation from Open Port Apertures Warning on page 263](#)
- [Installation Instructions Warning on page 251](#)
- [Grounded Equipment Warning on page 258](#)

Radiation from Open Port Apertures Warning



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.

Attention 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 emitteres 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 a 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [Laser and LED Safety Guidelines and Warnings on page 261](#)
- [Installation Instructions Warning on page 251](#)
- [Grounded Equipment Warning on page 258](#)

Maintenance and Operational Safety Warnings

- [Maintenance and Operational Safety Guidelines and Warnings on page 265](#)

Maintenance and Operational Safety Guidelines and Warnings

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

- [Battery Handling Warning on page 265](#)
- [Jewelry Removal Warning on page 266](#)
- [Lightning Activity Warning on page 267](#)
- [Operating Temperature Warning on page 268](#)
- [Product Disposal Warning on page 269](#)

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.

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

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

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

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

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

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

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

Jewelry Removal Warning



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

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

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

Attention 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.

Attention 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.

Varoituis 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.

Attention 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 aberturas 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.

Attention 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [AC Power Electrical Safety Guidelines on page 274](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)
- [Laser and LED Safety Guidelines and Warnings on page 261](#)
- [Installation Instructions Warning on page 251](#)
- [Grounded Equipment Warning on page 258](#)

CHAPTER 31

Electrical Safety Guidelines and Warnings

- General Electrical Safety Guidelines and Warnings on page 271
- Action to Take After an Electrical Accident on page 272
- Prevention of Electrostatic Discharge Damage on page 273
- AC Power Electrical Safety Guidelines on page 274
- AC Power Disconnection Warning on page 275
- DC Power Electrical Safety Guidelines for Switches on page 276
- DC Power Disconnection Warning on page 279
- DC Power Grounding Requirements and Warning on page 280
- DC Power Wiring Sequence Warning on page 281
- DC Power Wiring Terminations Warning on page 283
- Multiple Power Supplies Disconnection Warning on page 284
- TN Power Warning on page 284

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 requirements and protect against lightning surges and commercial power disturbances, the intrabuilding ports *must not* be metalically 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 metalically to OSP wiring.



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

- 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.
- 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 grounding surfaces are cleaned and brought to a bright finish before grounding connections are made.
- 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [AC Power Electrical Safety Guidelines on page 274](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)

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, then call for help.

Related Documentation

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [AC Power Electrical Safety Guidelines on page 274](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)

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 grounding 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 67 on page 274](#)) in one hand and touch the exposed, bare metal of the device with the other hand immediately before inserting the component into the device.



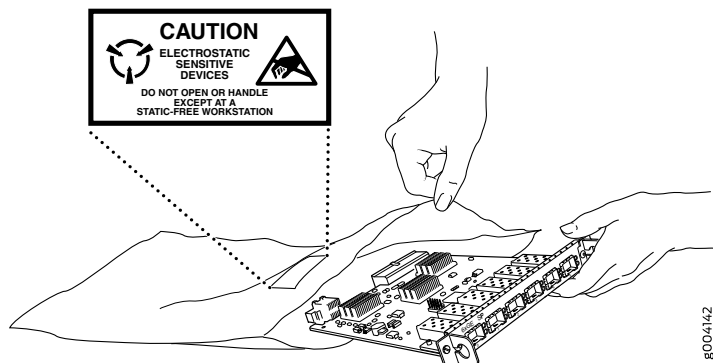
WARNING: For safety, periodically check the resistance value of the ESD grounding strap. The measurement must be in the range 1 through 10 Mohms.

- 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 grounding 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 67 on page 274](#)). If you are returning a component, place it in an antistatic bag before packing it.

Figure 67: 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.

Related Documentation

- [General Safety Guidelines and Warnings on page 243](#)

AC Power Electrical Safety Guidelines



CAUTION: For devices with AC power supplies, an external surge protective device (SPD) must be used at the AC power source.

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 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。

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- Related Documentation**
- [General Safety Guidelines and Warnings on page 243](#)
 - [General Electrical Safety Guidelines and Warnings on page 271](#)
 - [Multiple Power Supplies Disconnection Warning on page 284](#)

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.

Attention 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [AC Power Electrical Safety Guidelines on page 274](#)

DC Power Electrical Safety Guidelines for Switches

This topic applies to hardware devices in the EX Series product family, which includes EX Series switches and the XRE200 External Routing Engine.

This topic also applies to hardware devices in the QFX Series and to OCX1100 switches.

- A DC-powered device is equipped with a DC terminal block that is rated for the power requirements of a maximally configured device.



NOTE: To supply sufficient power, terminate the DC input wiring on a facility DC source that is capable of supplying:

- Minimum of 7.5 A at –48 VDC for EX2200, EX2300, EX3300, and EX3400 switches
- Minimum of 8 A at –48 VDC for EX3200 and EX4200 switches
- Minimum of 20 A at –48 VDC for EX4300, EX4500, EX4550, and QFX10002 switches
- Minimum of 50 A at –48 VDC for EX6210 switches
- Minimum of 60 A at –48 VDC for EX8208, QFX10008 and QFX10016 switches
- Minimum of 100 A at –48 VDC for EX8216 switches
- Minimum of 7 A at –48 VDC for QFX3500, EX4600, QFX5100, QFX5110, and QFX5200 devices
- Minimum of 8 A at –48 VDC for QFX3600 devices
- Minimum of 7 A at –48 VDC for OCX1100 switches

Incorporate an easily accessible disconnect device into the facility wiring. Be sure to connect the ground wire or conduit to a solid 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.
- For personal safety, connect the green and yellow wire to safety (earth) ground at both the device and the supply side of the DC wiring.

- 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [DC Power Disconnection Warning on page 279](#)
- [DC Power Grounding Requirements and Warning on page 280](#)
- [DC Power Wiring Sequence Warning on page 281](#)
- [DC Power Wiring Terminations Warning on page 283](#)
- *Connecting DC Power to an EX2200 Switch*
- *Connecting DC Power to an EX2300 Switch*
- *Connecting DC Power to an EX3200 Switch*
- *Connecting DC Power to an EX3400 Switch*
- [Connecting DC Power to an EX4200 Switch on page 152](#)
- *Connecting DC Power to an EX4300 Switch*
- *Connecting DC Power to an EX4500 Switch*
- *Connecting DC Power to an EX4550 Switch*
- *Connecting DC Power to an EX4600 Switch*
- *Connecting DC Power to an EX6200 Switch*
- *Connecting DC Power to an EX8200 Switch*
- *Connecting DC Power to an EX9204 Switch*
- *Connecting DC Power to an EX9208 Switch*
- *Connecting DC Power to an EX9214 Switch*
- *Connecting DC Power to an OCX1100 Switch*
- *Connecting DC Power to an XRE200 External Routing Engine*
- *Connecting DC Power to a QFX3500, QFX3600, or QFX3600-I Device*
- *Connecting DC Power to a QFX5100 Device*
- *Connecting DC Power to a QFX5200*
- *Connecting DC Power to a QFX10002*
- *Connecting DC Power to a QFX10000*

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.

Attention 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)
- [DC Power Grounding Requirements and Warning on page 280](#)
- [DC Power Wiring Sequence Warning on page 281](#)
- [DC Power Wiring Terminations Warning on page 283](#)

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.

Varoit Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

Attention 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.

Related Documentation

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)
- [DC Power Disconnection Warning on page 279](#)
- [DC Power Wiring Sequence Warning on page 281](#)
- [DC Power Wiring Terminations Warning on page 283](#)

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 yhdistettävä kytkentäjäjestys on maaajohto maaajohtoon, +RTN varten +RTN, –48 V varten –48 V. Oikea irrotettävä kytkentäjäjestys on –48 V varten –48 V, +RTN varten +RTN, maaajohto maaajohtoon.

Attention Câblez l'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.

Atenção! Wire a fonte de alimentação de DC Usando os talões apropriados na extremidade da fiação. Ao conectar a potência, a sequência apropriada da fiação é moída para moer, +RTN a +RTN, então –48 V a –48 V. Ao desconectar a potência, a sequência 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)

- [DC Power Disconnection Warning on page 279](#)
- [DC Power Grounding Requirements and Warning on page 280](#)
- [DC Power Wiring Terminations Warning on page 283](#)

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 johdinliitintä, esimerkiksi suljettua silmukkaa tai kourumaista liitintä, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

Attention 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 forcilla 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)
- [DC Power Disconnection Warning on page 279](#)
- [DC Power Grounding Requirements and Warning on page 280](#)
- [DC Power Wiring Sequence Warning on page 281](#)

Multiple Power Supplies Disconnection Warning



WARNING: For a device that has 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [AC Power Electrical Safety Guidelines on page 274](#)
- [DC Power Electrical Safety Guidelines for Switches on page 276](#)

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.

Attention 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.

**Related
Documentation**

- [General Safety Guidelines and Warnings on page 243](#)
- [General Electrical Safety Guidelines and Warnings on page 271](#)
- [Grounded Equipment Warning on page 258](#)
- [Multiple Power Supplies Disconnection Warning on page 284](#)

Agency Approvals and Compliance Statements

- [Agency Approvals for EX Series Switches on page 287](#)
- [Compliance Statements for EMC Requirements for EX Series Switches on page 288](#)
- [Compliance Statements for Acoustic Noise for EX Series Switches on page 292](#)

Agency Approvals 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.

These hardware devices comply with the following standards:

- Safety
 - CAN/CSA-C22.2 No. 60950-1 Information Technology Equipment
 - UL 60950-1 Information Technology Equipment
 - EN 60950-1 Information Technology Equipment
 - IEC 60950-1 Information Technology Equipment
 - EN 60825-1 Safety of Laser Products - Part 1: Equipment classification and requirements
- EMC
 - FCC 47CFR Part 15 Class A (USA)
 - EN 55022 Class A Emissions (Europe)
 - ICES-003 Class A
 - VCCI Class A (Japan)
 - AS/NZS CISPR 22 Class A (Australia/New Zealand)
 - CISPR 22 Class A
 - EN 55024
 - EN 300386

- [EN 61000-3-2 Power Line Harmonics](#)
- [EN 61000-3-3 Voltage Fluctuations and Flicker](#)
- [EN 61000-4-2 ESD](#)
- [EN 61000-4-3 Radiated Immunity](#)
- [EN 61000-4-4 EFT](#)
- [EN 61000-4-5 Surge](#)
- [EN 61000-4-6 Low Frequency Common Immunity](#)
- [EN 61000-4-11 Voltage Dips and Sags](#)

**Related
Documentation**

- [Compliance Statements for EMC Requirements for EX Series Switches on page 288](#)
- [Compliance Statements for Acoustic Noise for EX Series Switches on page 292](#)

Compliance Statements for EMC Requirements 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.

This topic describes the EMC requirements for these hardware devices for:

- [Canada on page 288](#)
- [European Community on page 289](#)
- [Israel on page 289](#)
- [Japan on page 289](#)
- [Korea on page 290](#)
- [United States on page 290](#)
- [FCC Part 15 Statement on page 290](#)
- [Nonregulatory Environmental Standards on page 291](#)

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.



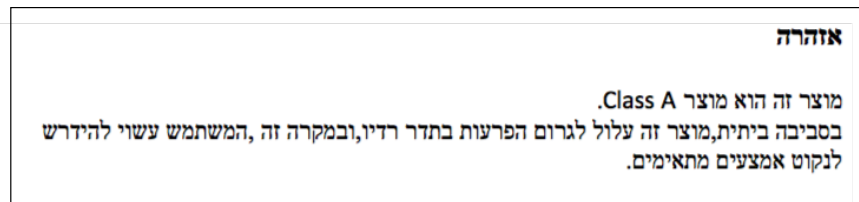
CAUTION: Users should not attempt to make electrical ground connections by themselves, but should contact the appropriate inspection authority or an electrician, as appropriate.

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.

European Community

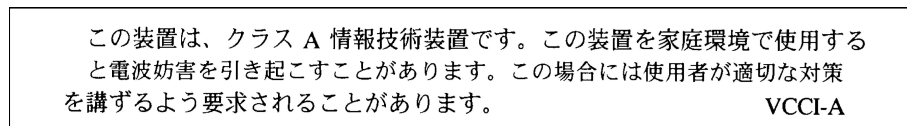
This is a Class A device. In a domestic environment this device might cause radio interference, in which case the user needs to take adequate measures.

Israel



Translation from Hebrew—Warning: This product is Class A. In residential environments, the product may cause radio interference, and in such a situation, the user may be required to take adequate measures.

Japan



The preceding translates as follows:

This is a Class A 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 9040913

The preceding translates as follows:

This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home

United States

The 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.

Nonregulatory Environmental Standards

NEBS compliance—These EX Series switches are Network Equipment Building System (NEBS) compliant:

- EX2200-24T and EX2200-48T
- EX3200-24T, EX3200-48T
- EX3300-24T, EX3300-48T
- EX4200-24T, EX4200-24F, EX4200-24F-S, EX4200-48T and EX4200-48T-S
- EX4300-24T, EX4300-24T-S, EX4300-24P, EX4300-24P-S, EX4300-32F, EX4300-32F-S, EX4300-48T, EX4300-48T-AFI, EX4300-48T-S, EX4300-48P, and EX4300-48P-S
- All EX4500 switches with AC power supplies
- EX4550-32T-AFO, EX4550-32T-AFI, EX4550-32F-AFO, EX4550-32F-AFI, and EX4550-32F-S
- EX4600-40F and EX4600-40F-S
- All EX6200 switches



NOTE: For the EX6200-48P line cards, the intrabuilding ports must use shielded intrabuilding cabling or wiring that is grounded at both ends.

- All EX8200 switches

These switches meet the following NEBS compliance standards:

- SR-3580 NEBS Criteria Levels (Level 4 Compliance)
- GR-1089-CORE: EMC and Electrical Safety for Network Telecommunications Equipment
- GR-63-CORE: NEBS, Physical Protection
 - The equipment is suitable for installation as part of the Common Bonding Network (CBN).
 - The equipment is suitable for installation in locations where the National Electrical Code (NEC) applies.
 - The battery return connection is to be treated as an Isolated DC return (DC-I), as defined in GR-1089-CORE.

Related Documentation

- [Agency Approvals for EX Series Switches on page 287](#)
- [Compliance Statements for Acoustic Noise for EX Series Switches on page 292](#)

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.

- Related Documentation**
- [Agency Approvals for EX Series Switches on page 287](#)
 - [Compliance Statements for EMC Requirements for EX Series Switches on page 288](#)