SRX5800 Services Gateway Hardware Guide

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SRX5800 Services Gateway Hardware Guide

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

YEAR 2000 NOTICE

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About the Documentation

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Supported Platforms

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

- SRX5800

Documentation Conventions

Table 1 on page xxiv 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 xxiv 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`
Italic text like this	• Introduces or emphasizes important new terms. • Identifies guide names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS CLI User Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	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** *domain-name*

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 *metric*>;**
| (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** **(*string1* | *string2* | *string3*)**
# (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 [*community-ids*]**

Indention and braces ({ })	Identifies a level in the configuration hierarchy.	[edit]
		routing-options {
		  static {
		  route default {
		  nexthop *address*;
		  retain;
		  }
		  }
		}

; (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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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/.
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- 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/
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To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://entitlementsearch.juniper.net/entitlementsearch/

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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

CHAPTER 1

System Overview

SRX5800 Services Gateway Description

The SRX5800 Services Gateway is a high-performance, highly scalable, carrier-class security device with multi-processor architecture.

The services gateway provides 12 slots that you can populate with 2 or 3 Switch Control Boards (SCBs) and up to 12 additional cards of the following types:

- Services Processing Cards (SPCs) provide the processing capacity to run integrated services such as firewall, IPsec, and IDP.
- Modular PIC Concentrators (MPCs) provide Ethernet interfaces that connect the services gateway to your network.
- I/O cards (IOCs) provide Ethernet interfaces that connect the services gateway to your network.
- Flex IOCs are similar to IOCs, but have slots for port modules that allow you greater flexibility in adding different types of Ethernet ports to your services gateway.

For detailed information about the cards supported by the services gateway, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Reference* at www.juniper.net/documentation/.

Related Documentation

- SRX5800 Services Gateway Physical Specifications on page 106
- SRX5800 Services Gateway Chassis on page 19
- SRX5800 Services Gateway Card Cage and Slots on page 6
- SRX5800 Services Gateway Component Redundancy on page 17

CHAPTER 2

Hardware Component Overview

SRX5800 Services Gateway Rack-Mounting Hardware

The rack-mounting hardware for the SRX5800 Services Gateway includes:

- The large mounting shelf for mounting in four-post racks, cabinets, and open-frame racks
- The small mounting shelf for front-mounting in a four-post rack or cabinet
- Front-mounting flanges on the front of the chassis for front-mounting in a four-post rack or cabinet
- Two center-mounting brackets attached to the center of the chassis for center-mounting in an open-frame rack. For an open-frame rack, center-mounting is preferable because of the more even distribution of weight.

Related Documentation

- Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 163
- Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 165
- SRX5800 Services Gateway Chassis on page 19

- *Chassis Lifting Guidelines*

SRX5800 Services Gateway Card Cage and Slots

The card cage is the set of 14 vertical slots in the front of the chassis where you install cards. The slots are numbered from left to right. Table 3 on page 6 describes the types of cards that you can install into each slot.

Table 3: SRX5800 Services Gateway Card Cage Slots

Card Cage Slot	Eligible Cards			
	SPC	IOC, Flex IOC, or MPC	SCB	IOC3
0 (leftmost)	X	X		
1	X	X		X
2	X	X		X
3	X	X		X
4	X	X		X
5	X	X		X
0			X	X
1			X	X
2/6	X	X	X	X
7	X	X		X
8	X	X		X
9	X	X		X
10	X	X		X
11 (rightmost)	X	X		

NOTE: For operational and cooling efficiency in SRX5800 Services Gateways, we recommend that slot 0 and 11 be filled last.

Related Documentation

- SRX5800 Services Gateway Midplane Description on page 22

SRX5800 Services Gateway Interface Card Description

Interface cards are cards that support physical interfaces that you use to connect the services gateway to your data network. Three different types of interface cards are available:

- I/O Cards (IOCs) have fixed interface ports on the front panel of the card.
- Flex I/O Cards (Flex IOCs) have slots on the front panel that accept smaller cards called port modules. Each port module has two or more physical interfaces on it. A Flex IOC with installed port modules functions in the same way as a regular IOC, but allows greater flexibility in adding different types of Ethernet ports to your services gateway.
- Modular Port Concentrators (MPCs) have slots on the front panel that accept smaller cards called Modular Interface Cards (MICs). Each MIC has one or more physical interface on it. An MPC with MICs installed functions in the same way as a regular I/O card (IOC), but allows greater flexibility in adding different types of Ethernet ports to your services gateway. MPCs and MICs are similar in form and function to Flex IOCs and port modules. However, the two use different form-factors, so you cannot install port modules in an MPC, nor can you install MICs in a Flex IOC.

For all interface card types, the card assembly combines packet forwarding and Ethernet interfaces on a single board. The interface cards interface with the power supplies and Switch Control Boards (SCBs).

You can install interface cards in any of the slots that are not reserved for SCBs. If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

Figure 1 on page 8 shows typical IOCs supported on the services gateway.

Figure 1: Typical IOCs

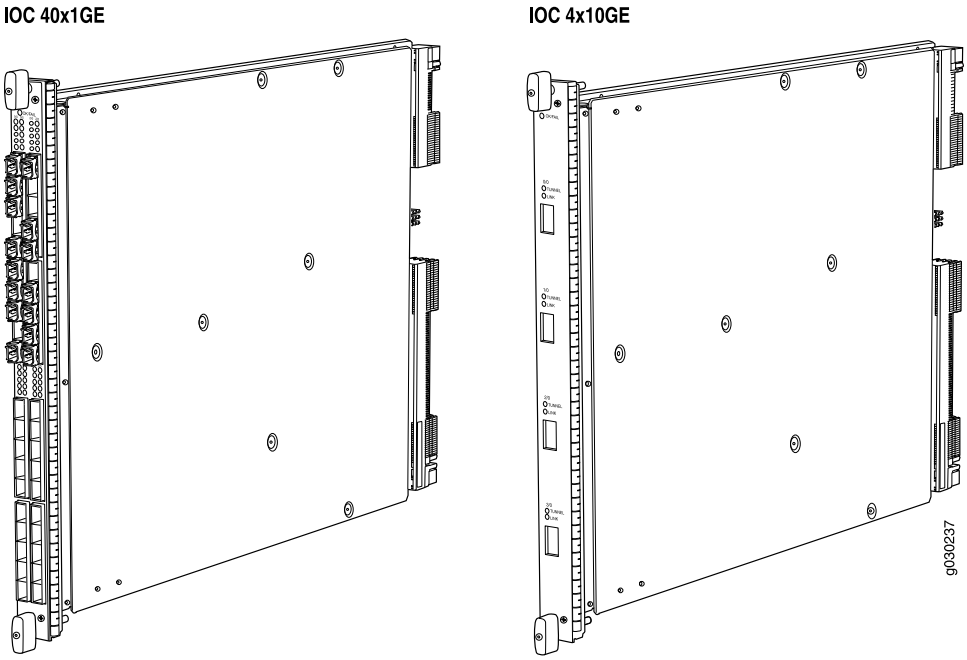


Figure 2 on page 8 shows a Flex IOC with two typical port modules installed.

Figure 2: Flex IOC with Port Modules

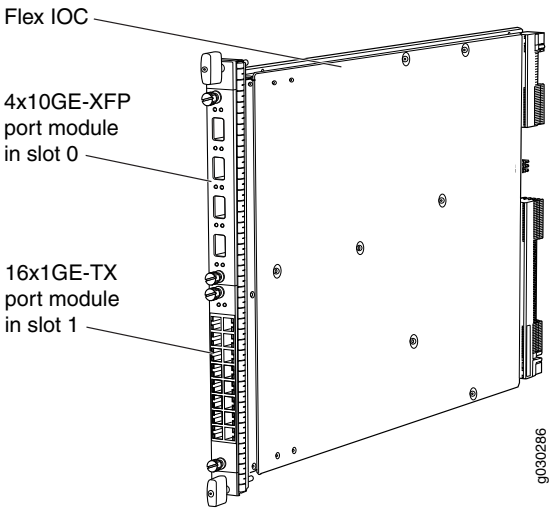
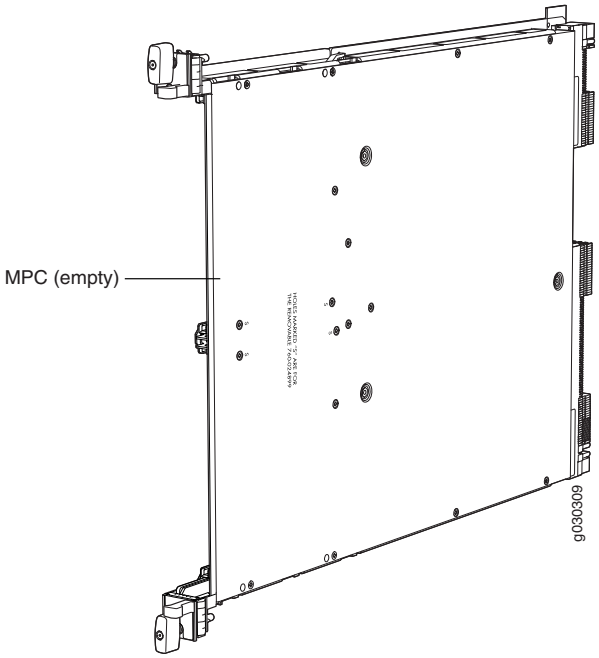


Figure 3 on page 9 shows an MPC.

Figure 3: SRX5K-MPC



For detailed information about the interface cards, port modules, and MICs supported by the services gateway, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Reference* at www.juniper.net/documentation/.

Related Documentation

- Replacing SRX5800 Services Gateway IOCs on page 323
- Replacing SRX5800 Services Gateway Flex IOCs on page 329
- Replacing SRX5800 Services Gateway MPCs on page 352
- SRX5800 Services Gateway Card Cage and Slots on page 6
- SRX5800 Services Gateway Field-Replaceable Units on page 303

SRX5800 Services Gateway SPC Description

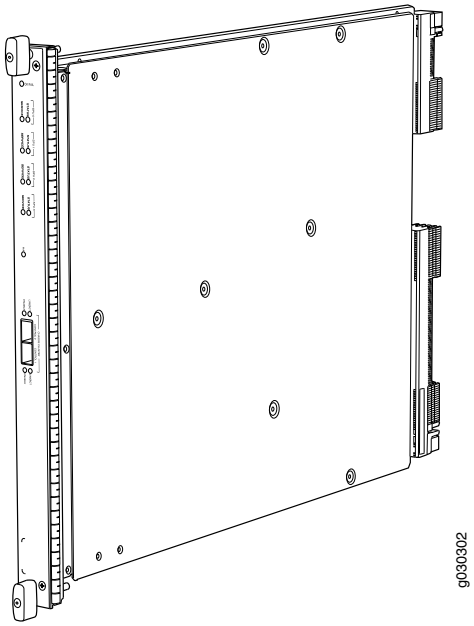
Each Services Processing Card (SPC) contains four Services Processing Units (SPUs), which provide the processing power to run integrated services such as firewall, IPsec, and IDP (see Figure 4 on page 10). All traffic traversing the services gateway is passed to an SPU to have services processing applied to it. Traffic is intelligently distributed by interface cards to SPUs for services processing.

The services gateway must have one SPC installed.

You can install an SPC in any of the slots that are not reserved for Switch Control Board (SCB). If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the device.

Figure 4 on page 10 shows a typical SPC supported on the services gateway.

Figure 4: Typical SPC



For detailed information about SPCs supported by the services gateway, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Reference* at www.juniper.net/documentation/.

Related Documentation

- SRX5800 Services Gateway Card Cage and Slots on page 6
- SRX5800 Services Gateway Field-Replaceable Units on page 303
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Troubleshooting SRX5800 Services Gateway SPCs on page 291
- Replacing SRX5800 Services Gateway SPCs on page 339

SRX5800 Services Gateway Host Subsystem Description

The host subsystem is composed of a Routing Engine installed in a Switch Control Board (SCB). The host subsystem provides the routing and system management functions of the services gateway. You must install one host subsystem on the device. The host subsystem components are as follows:

- Switch Control Board
  - SRX5K-SCB—from Junos OS Release 9.2 to 12.3X48
  - SRX5K-SCBE—from Junos OS Release 12.1X47-D15 and later
  - SRX5K-SCB3—from Junos OS Release 15.1X49-D10 and later
- Routing Engine
  - SRX5K-RE-13-20—from Junos OS Release 9.2 to 12.3X48

- SRX5K-RE-1800X4—from Junos OS Release 12.1X47-D15 and later

NOTE: You can only configure the following combination of Routing Engine and SCB within a host subsystem:

- SRX5K-RE-13-20 and SRX5K-SCB
- SRX5K-RE-1800X4 and SRX5K-SCBE
- SRX5K-RE-1800X4 and SRX5K-SCB3

The host subsystem has three LEDs that display its status. The host subsystem LEDs are located in the middle of the craft interface.

Related Documentation

- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 26
- Switch Control Board SRX5K-SCB Overview on page 11
- Switch Control Board SRX5K-SCBE Overview on page 13
- Switch Control Board SRX5K-SCB3 Overview on page 14
- Routing Engine SRX5K-RE-13-20 Overview on page 15
- Routing Engine SRX5K-RE-1800X4 Overview on page 16
- SRX5800 Services Gateway Card Cage and Slots on page 6

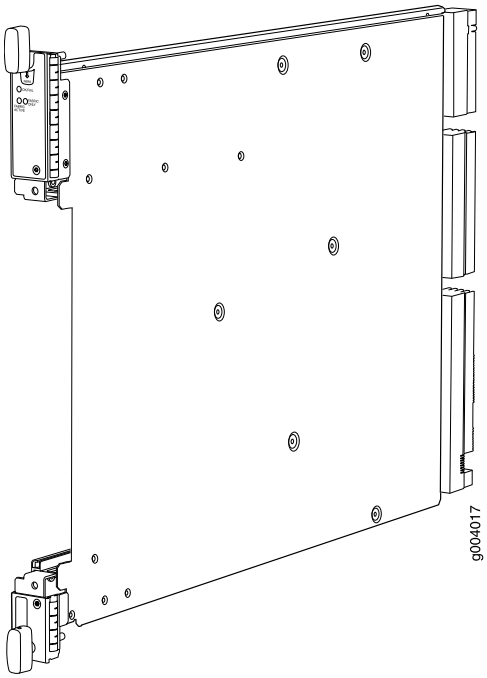
Switch Control Board SRX5K-SCB Overview

The Switch Control Board (SCB) provides the following functions:

- Powers on and powers off IOCs and SPCs
- Controls clocking, system resets, and booting
- Monitors and controls system functions, including fan speed, board power status, PDM status and control, and the system front panel
- Provides interconnections to all the IOCs within the chassis through the switch fabrics integrated into the SCB

When the SCB is part of a host subsystem, the Routing Engine installs directly into a slot on the SCB (see Figure 5 on page 12).

Figure 5: SRX5K-SCB



The SRX5800 Services Gateway has two SCBs installed and you can install a third SCB for switch fabric redundancy.

NOTE: The SRX5800 Services Gateway supports a redundant SCB, provided the SCB is a SRX5K-SCBE (SCB2) running Junos OS Release 12.1X47-D15 and later, or a SRX5K-SCB3 (SCB3) running Junos OS Release 15.1X49-D10 and later.
The SRX5800 Services Gateway does not support a redundant SCB (third SCB) card if SRX5K-SPC-4-15-320 (SPC2) is installed with SCB1 (SRX5K-SCB). If you have installed a SPC2 on a SRX5800 Services Gateway with a redundant SCB1 card, make sure to remove the redundant SCB1 card.

SCBs install vertically into the front of the chassis. The SCB slots are located at the middle of the card cage and are labeled **0**, **1**, and **2/6**. If any slots are empty, you must install a blank panel.

SCBs installed in slots **0** and **1** provide nonredundant fabric connections. A SCB installed in slot **2/6**, in conjunction with SCBs in slots **0** and **1**, provides redundant fabrics. If no SCB is installed in slot **2/6**, you must install a blank panel in the slot (see Table 4 on page 13).

Table 4: SCB Slot Mapping and Functionality

Functionality	Slot 0	Slot 1	Slot 2/6
Full fabric	SCB Routing Engine	SCB	–
Redundant fabric	SCB Routing Engine	SCB	SCB

For detailed information about SCBs supported by the SR5800 Services Gateway, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Guide* at www.juniper.net/documentation/.

Related Documentation

- SRX5800 Services Gateway Card Cage and Slots on page 6
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269
- Replacing an SRX5800 Services Gateway SCB on page 364

Switch Control Board SRX5K-SCBE Overview

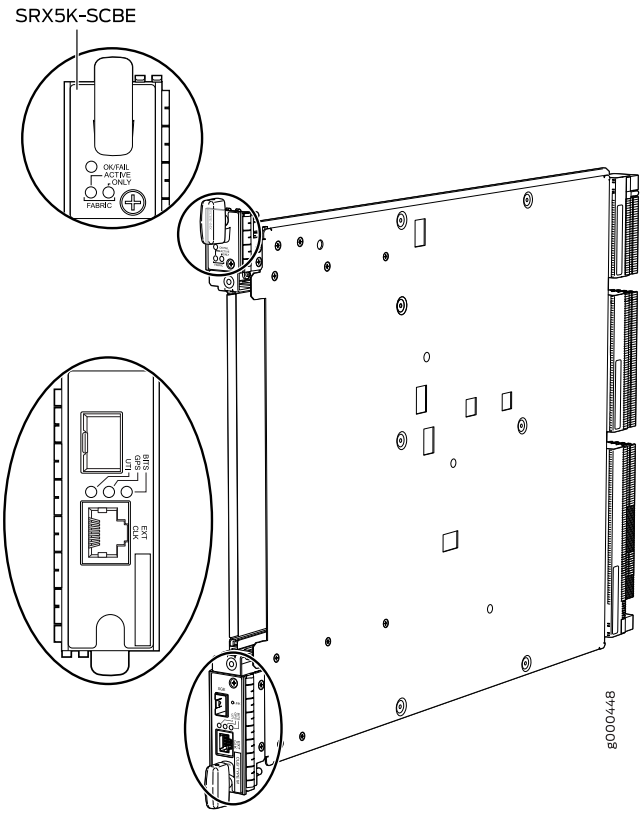
The SRX5000 line enhanced Switch Control Board (SRX5K-SCBE) caters to high-end security markets requiring support for higher capacity traffic. The SRX5K-SCBE provides greater interface density (slot and capacity scale) and improved services.

Some key attributes of the SRX5K-SCBE are:

- A bandwidth of 120 Gbps per slot with redundant fabric support and improved fabric performance by using the next-generation fabric (XF) chip.
- A centralized clocking architecture that supports clock cleanup and distribution. The Stratum 3 clock module performs clock monitoring, filtering, and holdover in a centralized chassis location.
- Full performance with fabric redundancy for higher capacity line cards such as the SRX5K-MPC.

The Routing Engine installs directly into a slot on the SRX5K-SCBE as shown in Figure 6 on page 14.

Figure 6: SRX5K-SCBE



Related Documentation

- Routing Engine SRX5K-RE-1800X4 Overview on page 16

Switch Control Board SRX5K-SCB3 Overview

The SRX5K-SCB3 (SCB3) caters to high-end security markets requiring support for higher capacity traffic, greater interface density (slot and capacity scale), and improved services. The SCB3 is supported on SRX5400, SRX5600, and SRX5800 Services Gateways.

The SCB3 supports the standard midplane and the enhanced midplane.

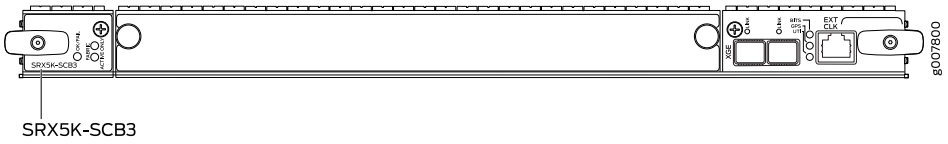
Some key attributes of the SCB3 are:

- With the existing midplane and fabric link speed of 8.36 Gbps, supports a bandwidth of 205 Gbps per slot with redundant fabric support and 308 Gbps per slot without redundancy.
- With the enhanced midplane and fabric link speed of 10.2 Gbps, supports a bandwidth of 249 Gbps per slot with redundant fabric support and 374 Gbps per slot without redundancy with the enhanced midplane
- Improved fabric performance with the next-generation fabric (XF2) chip.
- Full performance with fabric redundancy for higher-capacity line cards.

- Support for MPC line cards such as SRX5K-MPC (IOC2) and IOC3 (SRX5K-MPC3-40G10G or SRX5K-MPC3-100G10G) only.
- Two 10-Gigabit Ethernet SFP+ ports (These ports are disabled and reserved for future use).

The Routing Engine installs directly into a slot on the SCB3, as shown in Figure 7 on page 15.

Figure 7: SRX5K-SCB3



Related Documentation

- Routing Engine SRX5K-RE-1800X4 Overview on page 16

Routing Engine SRX5K-RE-13-20 Overview

The Routing Engine is an Intel-based PC platform that runs Junos OS. Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the device, control the device interfaces, control some chassis components, and provide the interface for system management and user access to the device.

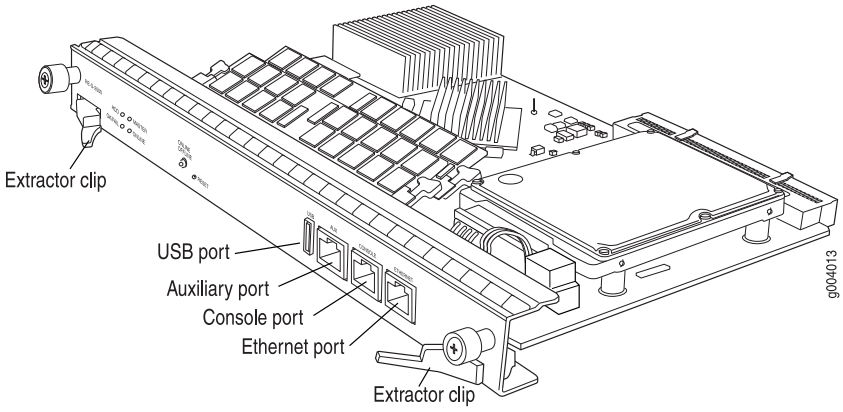
You must install at least one Routing Engine in the services gateway. You can install a second Routing Engine if both Routing Engines are running Junos OS Release 10.0 or later.

A second Routing Engine is required if you are using the dual chassis cluster control link feature available in Junos OS Release 10.0 and later. The second Routing Engine does not perform all the functions of a Routing Engine and does not improve resiliency or redundancy. The second Routing Engine and the Switch Control Board (SCB) in which it is installed do not constitute a host subsystem. The only function of the second Routing Engine is to enable the hardware infrastructure that enables the **Chassis Cluster Control 1** port on the Services Processing Card (SPC) used for chassis cluster control links.

If you install only one Routing Engine in the services gateway, you must install it in the slot in the front panel of SCB0. If you install a second Routing Engine to use the dual chassis cluster control link feature, you install it in the slot in the front panel of SCB1 (see Figure 8 on page 16).

A USB port on the Routing Engine accepts a USB memory card that allows you to load Junos OS.

Figure 8: SRX5K-RE-13-20 Routing Engine



For detailed information about the Routing Engines supported by the services gateway, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Reference* at www.juniper.net/documentation/.

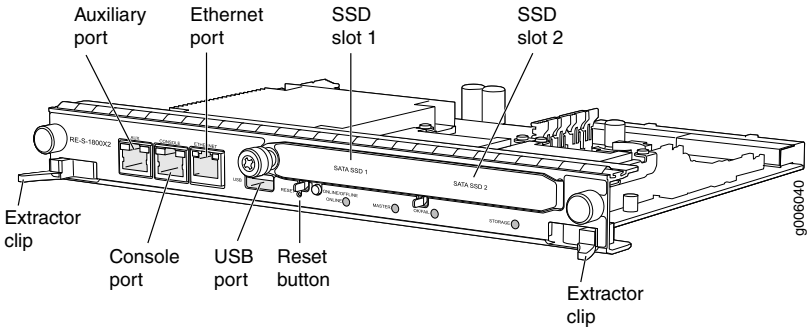
Related Documentation

- Replacing the SRX5800 Services Gateway Routing Engine on page 369

Routing Engine SRX5K-RE-1800X4 Overview

The enhanced Routing Engine is an Intel-based PC platform that runs Junos OS. Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the device, control the device interfaces, control some chassis components, and provide the interface for system management and user access to the device.The Routing Engine must be installed directly into the SRX5K-SCBE. A USB port on the Routing Engine accepts a USB memory device that allows you to load Junos OS. Figure 9 on page 16 shows the Routing Engine.

Figure 9: SRX5K-RE-1800X4 Routing Engine



Three ports located on the Routing Engine connect to one or more external devices on which system administrators can issue Junos OS CLI commands to manage the services gateway.

The ports function as follows:

- **AUX**—Connects the Routing Engine to a laptop, modem, or other auxiliary device through a serial cable with an RJ-45 connector.
- **CONSOLE**—Connects the Routing Engine to a system console through a serial cable with an RJ-45 connector.
- **ETHERNET**—Connects the Routing Engine through an Ethernet connection to a management LAN (or any other device that plugs into an Ethernet connection) for out-of-band management. The port uses an autosensing RJ-45 connector to support 10/100/1000 Mbps connections. Two small LEDs on the bottom of the port indicate the connection in use: the LED flashes yellow or green for a 10/100/1000 Mbps connection, and the LED is light green when traffic is passing through the port.

The solid-state drive (SSD) slots located on the Routing Engine provide secondary storage for log files, for generating core files, and for rebooting the system if the CompactFlash card fails. Currently, SRX5K-RE-1800X4 only supports one 128-GB SSD.

SRX5K-RE-1800X4 Routing Engine Boot Sequence

The services gateway is shipped with three copies of the Junos OS preinstalled on the Routing Engine in the following locations:

- On the CompactFlash card in the Routing Engine
- On the SSD in the Routing Engine
- On a USB flash drive that can be inserted into the slot on the Routing Engine faceplate

The Routing Engine boots from the storage media in this order: the USB device (if present), the CompactFlash card, the solid-state drive (SSD), and then the LAN. Normally, the services gateway boots from the copy of the software on the CompactFlash card.

Related Documentation

- Switch Control Board SRX5K-SCBE Overview on page 13
- *Replacing a CompactFlash Card in an SRX5K-RE-1800X4 Routing Engine*
- *Replacing a Solid-State Drive in an SRX5K-RE-1800X4 Routing Engine*

SRX5800 Services Gateway Component Redundancy

The following major hardware components are redundant:

- Switch Control Boards (SCBs)—The SRX5800 Services Gateway has two SCBs installed and you can install a third SCB for switch fabric redundancy. The SCB of the host subsystem functions as the master and the others function as backup. If the SCB of the host subsystem fails, one of the other SCBs takes over as the master.

NOTE: The SRX5800 Services Gateway supports a redundant SCB, provided the SCB is a SRX5K-SCBE (SCB2) running Junos OS Release 12.1X47-D15 and later, or a SRX5K-SCB3 (SCB3) running Junos OS Release 15.1X49-D10 and later.
The SRX5800 Services Gateway does not support a redundant SCB (third SCB) card if SRX5K-SPC-4-15-320 (SPC2) is installed with SCB1 (SRX5K-SCB). If you have installed a SPC2 on a SRX5800 Services Gateway with a redundant SCB1 card, make sure to remove the redundant SCB1 card.

- Power supplies—When powered by standard-capacity AC power supplies, a minimum of three power supplies are required to supply power to a fully configured services gateway. All AC power supplies share the load evenly. The addition of a fourth power supply provides full power redundancy. If one power supply fails in a redundant configuration, the three remaining power supplies provide full power.

  When powered by DC power supplies or high-capacity AC power supplies, two power supplies are required to supply power to a fully configured services gateway. One power supply supports approximately half of the components in the services gateway, and the other power supply supports the remaining components. The installation of two additional power supplies provides full power redundancy. If one or two power supplies fail, the remaining power supplies can provide full power to the services gateway.

- Cooling system—The cooling system has redundant components, which are controlled by the host subsystem. If one of the fans fails, the host subsystem increases the speed of the remaining fans to provide sufficient cooling for the services gateway indefinitely.

Related Documentation

- SRX5800 Services Gateway Chassis on page 19
- Switch Control Board SRX5K-SCB Overview on page 11
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Cooling System Description on page 85

CHAPTER 3

Chassis Description

SRX5800 Services Gateway Chassis

The services gateway chassis is a rigid sheet metal structure that houses all the other services gateway components (see Figure 10 on page 20, Figure 11 on page 21, and Figure 12 on page 22). The chassis measures 27.75 in. (70.49 cm) high, 17.37 in. (44.11 cm) wide, and 23.0 in. (58.42 cm) deep (from the front-mounting flanges to the rear of the chassis). The chassis installs in 19-in. equipment racks or telco open-frame racks.

The chassis can be installed in standard 800-mm (or deeper) enclosed cabinets when powered by standard-capacity power supplies, or in 1000-mm (or deeper) enclosed cabinets when powered by high-capacity power supplies.

Up to three services gateways can be installed in one standard (48 U) rack if the rack can handle their combined weight, which can be greater than 1,134 lb (515 kg). See "SRX5800 Services Gateway Physical Specifications" on page 106 for physical specifications for the SRX5800 Services Gateway.

Mounting hardware includes front-mounting flanges on the front of the chassis, and two center-mounting brackets attached to the center of the chassis.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

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

Figure 10: Front View of a Fully Configured Services Gateway Chassis

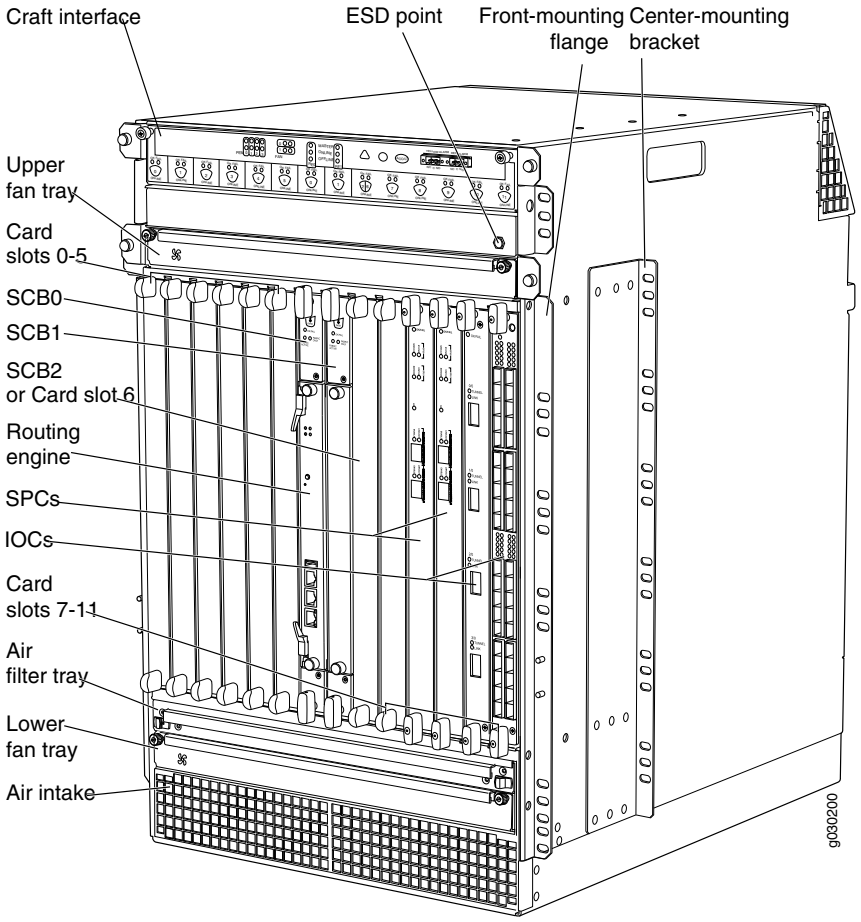


Figure 11: Rear View of a Fully Configured AC-Powered Services Gateway Chassis

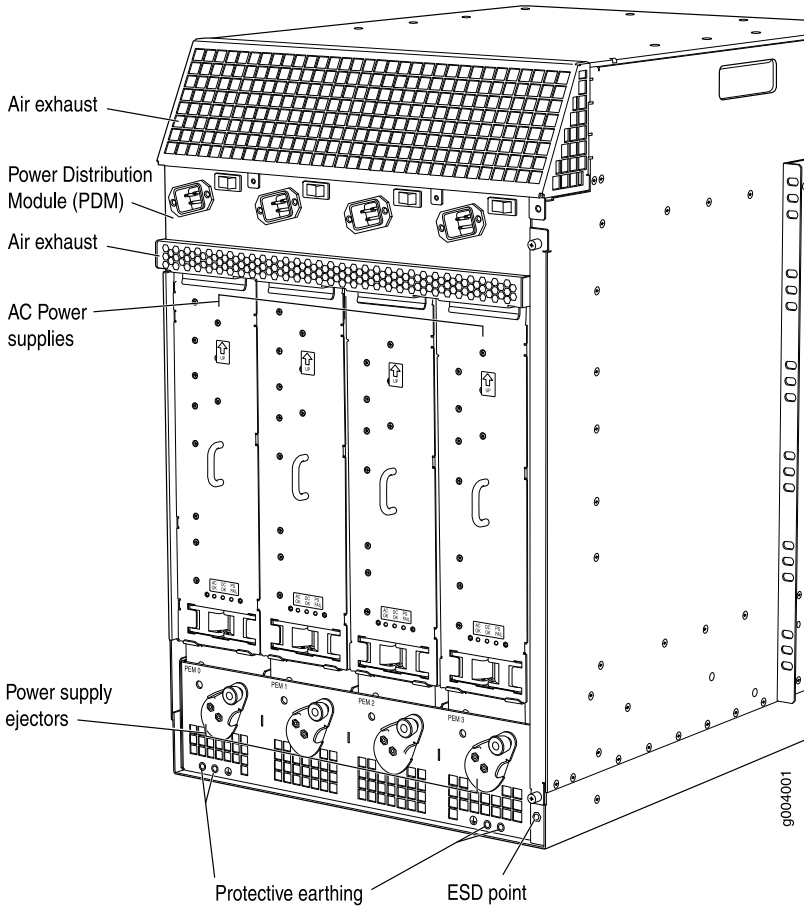
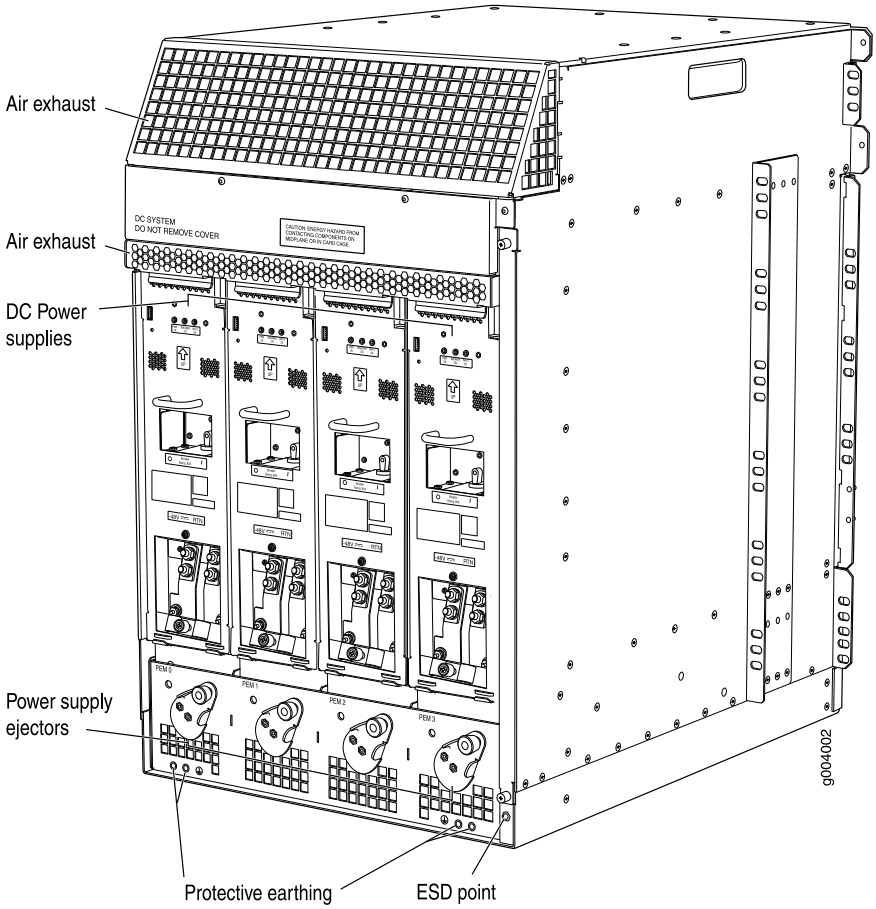


Figure 12: Rear View of a Fully Configured DC-Powered Services Gateway Chassis



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- SRX5800 Services Gateway Physical Specifications on page 106
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Card Cage and Slots on page 6
- SRX5800 Services Gateway Cooling System Description on page 85
- *General Electrical Safety Guidelines and Warnings*

SRX5800 Services Gateway Midplane Description

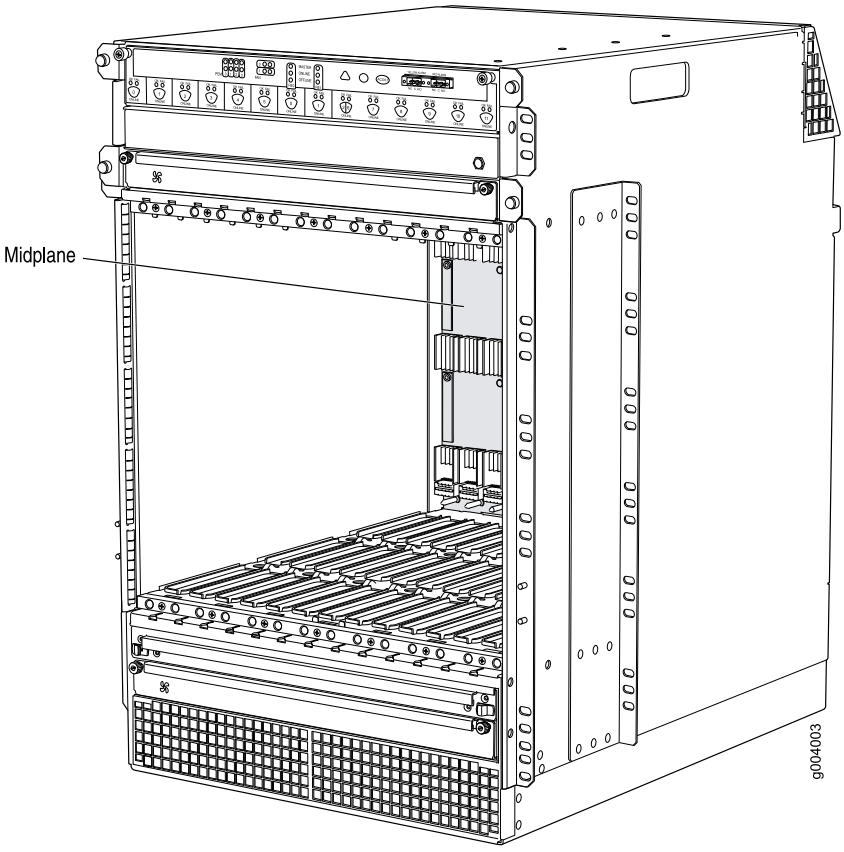
The midplane is located toward the rear of the chassis and forms the rear of the card cage (see Figure 13 on page 23). IOCs, SPCs, and SCBs install into the midplane from the front of the chassis, and the power supplies install into the midplane from the rear of the chassis. The cooling system components also connect to the midplane.

The midplane performs the following major functions:

- Data path—Data packets are transferred across the midplane between the IOCs and SPCs through the fabric ASICs on the SCBs.
- Power distribution—The power supplies are connected to the midplane, which distributes power to all the services gateway components.
- Signal path—The midplane provides the signal path to the IOCs, SCBs, SPCs, Routing Engine, and other system components for monitoring and control of the system.

The enhanced midplane supports Junos OS Release15.1X49-D10. It provides greater per-slot fabric performance and signal integrity, along with error-free high speed data transfer, and it reduces cross-talk. The midplane supports link speeds up to 10 Gbps and is not field replaceable.

Figure 13: Midplane



Related Documentation

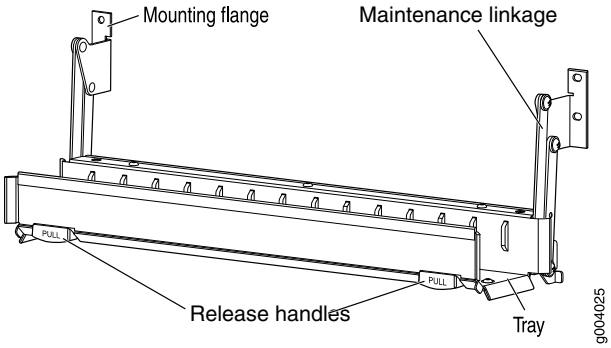
- SRX5800 Services Gateway Chassis on page 19
- SRX5800 Services Gateway Card Cage and Slots on page 6
- SRX5800 Services Gateway Interface Card Description on page 7
- Switch Control Board SRX5K-SCB Overview on page 11
- SRX5800 Services Gateway Power System Overview on page 89

SRX5800 Services Gateway Cable Manager Description

The cable management system (see Figure 14 on page 24) is a tray located below the card cage that has a row of fourteen dividers for securing the cables for each card. Features in the cable management tray allow you to gently secure the cables with cable strips or other ties. To secure the cables in place, loop the tie through the cable anchor and secure the tie.

You can pull the cable management system up and outward to lock it into the maintenance position. This allows you to access the lower fan tray and the air filter.

Figure 14: Cable Management System



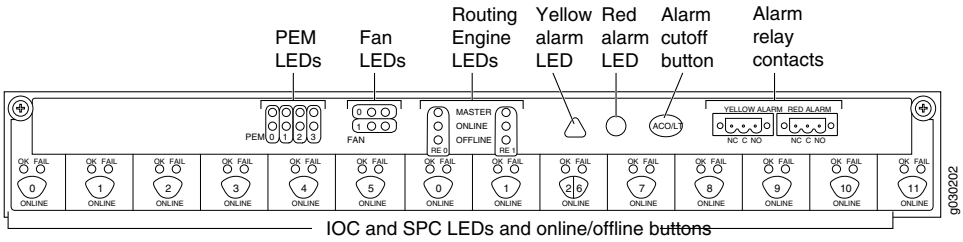
Related Documentation

- Replacing the SRX5800 Services Gateway Cable Manager on page 319

SRX5800 Services Gateway Craft Interface Overview

The craft interface shows you status and troubleshooting information at a glance and lets you perform many system control functions (see Figure 15 on page 24). It is hot-insertable and hot-removable. The craft interface is located on the front of the services gateway above the upper fan tray.

Figure 15: Front Panel of the Craft Interface



NOTE: The craft interface draws its power from the SCBs installed in the SCB slots 0, 1, and 2 at the center of the card cage. At least one SCB must be installed in the services gateway for the craft interface to obtain power.

Related Documentation

- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 26
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Craft Interface Card OK/Fail LEDs on page 27
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 28
- SRX5800 Services Gateway Craft Interface Online Buttons on page 28
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 30
- Replacing the SRX5800 Services Gateway Craft Interface on page 307

SRX5800 Services Gateway Craft Interface Alarm LEDs and Alarm Cutoff/Lamp Test Button

Two large alarm LEDs are located at the upper right of the craft interface. The circular red LED lights to indicate a critical condition that can result in a system shutdown. The triangular yellow LED lights to indicate a less severe condition that requires monitoring or maintenance. Both LEDs can be lit simultaneously. A condition that causes an LED to light also activates the corresponding alarm relay contact on the craft interface.

To deactivate the red and yellow alarms, press the button labeled **ACO/LT** (for “alarm cutoff/lamp test”), which is located to the right of the alarm LEDs. Deactivating an alarm turns off both LEDs and deactivates the device attached to the corresponding alarm relay contact on the craft interface.

Table 5 on page 26 describes the alarm LEDs and alarm cutoff button in more detail.

Table 5: Alarm LEDs and Alarm Cutoff/Lamp Test Button

Shape	Color	State	Description
	Red	On steadily	Critical alarm LED—Indicates a critical condition that can cause the device to stop functioning. Possible causes include component removal, failure, or overheating.
	Yellow	On steadily	Warning alarm LED—Indicates a serious but nonfatal error condition, such as a maintenance alert or a significant increase in component temperature.
	–	–	Alarm cutoff/lamp test button—Deactivates red and yellow alarms. Causes all LEDs on the craft interface to light (for testing) when pressed and held.

Related Documentation

- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 30
- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 26

SRX5800 Services Gateway Craft Interface Host Subsystem LEDs

The host subsystem has three LEDs, located in the middle of the craft interface, that indicate its status. The LEDs labeled **RE0** show the status of the Routing Engine and SCB in slot **0** .

The LEDs labeled **RE1** show the status of the Routing Engine and SCB in slot **1**.
Table 6 on page 26 describes the functions of the host subsystem LEDs.

Table 6: Host Subsystem LEDs

Label	Color	State	Description
MASTER	Green	On steadily	Host is functioning as the master.
ONLINE	Green	On steadily	Host is online and is functioning normally.
OFFLINE	Red	On steadily	Host is installed but the Routing Engine is offline.
		Off	Host is not installed.

Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Craft Interface Alarm LEDs and Alarm Cutoff/Lamp Test Button on page 25
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27

SRX5800 Services Gateway Craft Interface Power Supply LEDs

Each power supply has two LEDs on the craft interface that indicate its status. The LEDs, labeled **0** through **3**, are located near the middle of the craft interface next to the **PEM** label. Table 7 on page 27 describes the functions of the power supply LEDs on the craft interface.

Table 7: Power Supply LEDs on the Craft Interface

Label	Color	State	Description
PEM	Green	On steadily	Power supply is functioning normally.
	Red	On steadily	Power supply has failed or power input has failed.

Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 26
- SRX5800 Services Gateway Craft Interface Card OK/Fail LEDs on page 27

SRX5800 Services Gateway Craft Interface Card OK/Fail LEDs

Each slot in the card cage has a pair of LEDs on the craft interface that indicates the status of the card installed in it. The card LEDs are located along the bottom edge of the craft interface and are labeled as follows:

- **0** through **5** on the left
- **0** and **1** for the two center slots reserved for SCBs
- **2/6** and **7** through **11** on the right

Table 8 on page 27 describes the functions of the **OK** and **Fail** LEDs.

Table 8: Card OK/Fail LEDs

Label	Color	State	Description
OK	Green	On steadily	The card is functioning normally.
		Blinking	The card is transitioning online or offline.
		Off	The card is not online.
FAIL	Red	On steadily	The card has failed.

Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 24

- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 28

SRX5800 Services Gateway Craft Interface Fan LEDs

Each fan LED is located on the top left of the craft interface. Table 9 on page 28 describes the functions of the fan LEDs.

Table 9: Fan LEDs

Label	Color	State	Description
OK	Green	On steadily	Fan tray is functioning normally.
FAIL	Red	On steadily	Fan tray has failed.

Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Craft Interface Card OK/Fail LEDs on page 27
- SRX5800 Services Gateway Craft Interface Online Buttons on page 28

SRX5800 Services Gateway Craft Interface Online Buttons

The craft interface has a row of Online/Offline buttons along its lower edge. Each button corresponds to one slot in the card cage. The Online/Offline buttons are only supported for slots containing MPC interface cards. You can install MPCs into slots **0/1**, **1**, and **2** only.

NOTE: **The Online/Offline buttons are not supported for removal and replacement of SPCs or SCB.**

CAUTION: **While traffic is passing through the SRX5400 Services Gateway, particularly if the device is configured as part of a high availability (HA) cluster, we strongly recommend that you do not push any of the Online/Offline buttons.**

To take an MPC offline using the Online/Offline buttons:

1. Press and hold the corresponding card's Online/Offline button on slot **1** on the craft interface. The green **OK/FAIL** LED next to the button begins to blink. Hold until both the button's LED and the MPC's LED are off.

2. Issue the CLI **show chassis fpc** command to check the status of installed MPCs. As shown in the sample output, the value *Offline* in the column labeled *State* indicates that the MPC in slot **1** is now offline:

```
user@host> show chassis fpc
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online            35      4          0       1024       13         25
  1  Online            47      3          0       1024       13         25
  2  Online            37      8          0       2048       18         14
```

An MPC can also be taken offline via CLI command:

```
user@host> request chassis fpc slot 2 offline
node0:
--------------------------------------------------------------------------
Offline initiated, use "show chassis fpc" to verify

{primary:node0}

user@host> show chassis fpc
node0:
--------------------------------------------------------------------------
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online            35      7          0       1024       13         25
  1  Online            46      4          0       1024       13         25
  2  Offline         ---Offlined by cli command---

After pushing MPC online button:

user@host> show chassis fpc
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online            34      5          0       1024       13         25
  1  Online            46      3          0       1024       13         25
  2  Offline         ---Offlined by button press---
```

To bring an MPC back online using the Online/Offline buttons:

1. Press and hold the corresponding card's Online/Offline button on slot **1** on the craft interface. The green **OK/FAIL** LED next to the button and the MPC's LED begins to blink. Hold until both the button's LED and the MPC's LED are green and steady.

2. Issue the CLI **show chassis fpc** command to check the status of installed MPCs. As shown in the sample output, the value *Online* in the column labeled *State* indicates that the MPC in slot **1** is functioning normally:

Verify if the MPC is offline:

```
user@host> show chassis fpc
node0:
--------------------------------------------------------------------------
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online            37     23          0       2048       19         14
```

```
  1  Offline         ---Offlined by cli command---
  2  Online            49     37          0       1024       14         25
```

The command output indicates the MPC is offline.

Bring the MPC online for the first time by using the following CLI command:

```
user@host> request chassis fpc slot 1 online
node0:
--------------------------------------------------------------------------
Online initiated, use "show chassis fpc" to verify
```

Verify that the MPC is online:

```
user@host> request chassis fpc slot 1 online node 0
node0:
--------------------------------------------------------------------------
FPC 1 already online
```

The command output indicates the MPC is online.

Confirm that the MPC in the chassis is online:

```
user@host> show chassis fpc
node0:
--------------------------------------------------------------------------
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online           37       6          0        2048       19         14
  1  Online           44      11          0        1024       23         29
  2  Online           49      22          0        1024       14         25
```

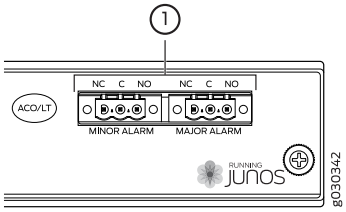
Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 28
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 30

SRX5800 Services Gateway Craft Interface Alarm Relay Contacts

The craft interface has two alarm relay contacts for connecting the device to external alarm devices (see Figure 16 on page 30). Whenever a system condition triggers either the major or minor alarm on the craft interface, the alarm relay contacts are also activated. The alarm relay contacts are located on the upper right of the craft interface.

Figure 16: Alarm Relay Contacts



The alarm relay contacts consist of two sets of connectors, one set for each of the two alarms (major and minor). For each alarm color there are three connectors. Table 10 on page 31 describes the functions of the connectors.

Table 10: Alarm Relay Contact Functions

Contact Label	Contact Name	Function
NC	Normally Closed	Connects the alarm relay to an external alarm-reporting device that activates when the circuit between C and NC is closed.
C	Current In	Connects the alarm relay to the current source for the external alarm-reporting device.
NO	Normally Open	Connects the alarm relay to an external alarm-reporting device that activates when the circuit between C and NC is open.

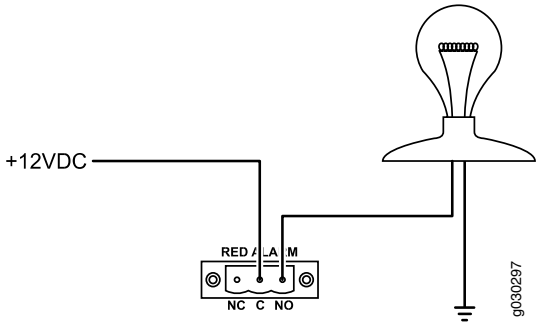
Table 11 on page 32 shows the electrical specifications for the alarm relay contacts.

Table 11: Alarm Relay Contact Electrical Specifications

	Current Type	
	AC	DC
Maximum Voltage	250	30
Maximum Current	8 A	

Figure 17 on page 32 shows an example wiring diagram for a simple alarm reporting device. In this case the device is a 12-volt light bulb that illuminates when the device encounters a condition that activates the major alarm LED and relay contacts. The alarm relay contacts can also be used to activate other devices such as bells or buzzers.

Figure 17: Example Alarm Reporting Device



Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Craft Interface Online Buttons on page 28
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 238
- Alarm Relay Contact Wire Specifications for the SRX5800 Services Gateway on page 146

CHAPTER 4

Line Card and Module Description

SRX5400, SRX5600, and SRX5800 Services Gateway Card Overview

The cards described in this guide let you upgrade and customize your SRX5400, SRX5600, or SRX5800 Services Gateway to suit the needs of your network. The following types of cards are available for the SRX5400, SRX5600, and SRX5800 Services Gateways:

- I/O cards (IOCs) provide additional physical network connections to the services gateway. Their primary function is to deliver data packets arriving on the physical ports to the Services Processing Cards (SPCs) and to forward data packets out the physical ports after services processing.
- Flex IOCs have two slots for port modules that add additional physical network connections to the services gateway. Like IOCs, their primary function is to deliver data packets arriving on the physical ports to the SPCs and to forward data packets out the physical ports after services processing.
- Modular Port Concentrators (MPCs) have slots on the front panel that accept smaller cards called Modular Interface Cards (MICs). Each MIC has one or more physical interfaces on it. An MPC with MICs installed functions in the same way as a regular I/O card (IOC), but allows greater flexibility in adding different types of Ethernet ports to your services gateway. MPCs and MICs are similar in form and function to Flex IOCs and port modules. However, the two use different form-factors, so you cannot install port modules in an MPC, nor can you install MICs in a Flex IOC.
- Services Processing Cards (SPCs) provide the processing power to run integrated services such as firewall, IPsec and IDP. All traffic traversing the services gateway is passed to an SPC to have services processing applied to it.
- Switch Control Boards (SCBs) power on and power off IOCs and SPCs; control clocking and system resets; and control booting, monitor, and system functions. Each SCB has a slot in the front panel for a Routing Engine.

Although the following modules are not cards in the sense of having a form-factor that fits the card cage of the SRX5400, SRX5600, and SRX5800 Services Gateway, this guide also addresses the following modules that fit into certain SRX5400, SRX5600, and SRX5800 Services Gateway cards:

- Routing Engines fit into slots in SCBs and maintain the routing tables, manage the routing protocols used on the device, control the device interfaces and some chassis components, and provide the interface for system management and user access to the device.
- Port modules fit into slots in Flex IOCs and add additional physical network interface ports to the services gateway.
- Modular Interface Cards (MICs) fit into slots in MPCs and add additional physical network interface ports to the services gateway. MPCs and MICs are similar in form and function to Flex IOCs and port modules. However, the two use different form-factors, so you cannot install port modules in an MPC, nor can you install MICs in a Flex IOC.

Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways

Table 12 on page 35 describes the cards and other modules supported on the SRX5400, SRX5600, and SRX5800 Services Gateways.

Table 12: Supported Cards for SRX5400, SRX5600, and SRX5800 Services Gateways

Card Name and Model Number	Earliest Supported Junos OS Release	
	SRX5400	SRX5600 and SRX5800
SPCs		
"Services Processing Card SRX5K-SPC-2-10-40 Specifications" on page 37	Not supported	9.2
"Services Processing Card SRX5K-SPC-4-15-320 Specifications" on page 41	12.1X46-D10	12.1X44-D10
Interface Cards		
"I/O Card SRX5K-40GE-SFP Specifications" on page 45	Not supported	9.2
"I/O Card SRX5K-4XGE-XFP Specifications" on page 47	Not supported	9.2
"Flex I/O Card (SRX5K-FPC-IOC) Specifications" on page 65	Not supported	10.2
"Modular Port Concentrator (SRX5K-MPC) Specifications" on page 49	12.1X46-D10	12.1X46-D10
"SRX5K-MPC3-40G10G Specifications" on page 59	15.1X49-D10	15.1X49-D10
"SRX5K-MPC3-100G10G Specifications" on page 62	15.1X49-D10	15.1X49-D10
SCBs		
"Switch Control Board SRX5K-SCB Specifications" on page 72	12.1X46-D10	9.2
"Switch Control Board SRX5K-SCBE Specifications" on page 75	12.1X47-D15	12.1X47-D15
"Switch Control Board SRX5K-SCB3 Specifications" on page 77	15.1X49-D10	15.1X49-D10
Other modules		
"Flex I/O Card Port Module SRX-IOC-16GE-SFP Specifications" on page 67	Not supported	10.2
"Flex I/O Card Port Module SRX-IOC-16GE-TX Specifications" on page 69	Not supported	10.2

Table 12: Supported Cards for SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Card Name and Model Number	Earliest Supported Junos OS Release	
	SRX5400	SRX5600 and SRX5800
"Flex I/O Card Port Module SRX-IOC-4XGE-XFP Specifications" on page 70	Not supported	10.2
"MIC with 1x100GE CFP Interface (SRX-MIC-1X100G-CFP)" on page 56	12.1X46-D10	12.1X46-D10
"MIC with 2x40GE QSFP+ Interfaces (SRX-MIC-2X40G-QSFP)" on page 58	12.1X46-D10	12.1X46-D10
"MIC with 10x10GE SFP+ Interfaces (SRX-MIC-10XG-SFPP)" on page 54	12.1X46-D10	12.1X46-D10
"MIC with 20x1GE SFP Interfaces (SRX-MIC-20GE-SFP)" on page 52	12.1X47-D10	12.1X47-D10
"Routing Engine SRX5K-RE-13-20 Specifications" on page 78	12.1X46-D10	9.2
"Routing Engine SRX5K-RE-1800X4 Specifications" on page 81	12.1X47-D15	12.1X47-D15

Figure 18 on page 37 is an interoperability matrix that describes the compatibility between various interface cards for the SRX5400, SRX5600, and SRX5800 Services Gateways.

Model Numbers	SRX5400 SRX5K-SCB SRX5K-RE-13-20	SRX5600/SRX5800 SRX5K-SCB SRX5K-RE-13-20	SRX5K-SCBE SRX5K-RE-1800X4	SRX5K-SCB3 SRX5K-RE-1800X4	SRX5K-SPC-2-10-40	SRX5K-SPC-4-15-320	SRX5K-4XGE-XFP SRX5K-40GE-SFP SRX5K-FPC-IOC	SRX5K-MPC (SRX-MIC-20GE-SFP) (SRX-MIC-10XG-SFPP) (SRX-MIC-1X100G-CFP) (SRX-MIC-2X40G-QSFP)	SRX5K-MPC3-40G10G SRX5K-MPC3-100G10G
SRX5400 SRX5K-SCB SRX5K-RE-13-20	✓	×	×	×	×	✓	×	✓	×
SRX5600/SRX5800 SRX5K-SCB SRX5K-RE-13-20	×	✓	×	×	✓	✓	✓	✓	×
SRX5K-SCBE SRX5K-RE-1800X4	×	×	✓	×	×	✓	×	✓	✓
SRX5K-SCB3 SRX5K-RE-1800X4	×	×	×	✓	×	✓	×	✓	✓
SRX5K-SPC-2-10-40	×	✓	×	×	✓	✓	✓	✓	×
SRX5K-SPC-4-15-320	✓	✓	✓	✓	✓	✓	✓	✓	✓
SRX5K-4XGE-XFP	×	✓	×	×	✓	✓	✓	✓	×
SRX5K-40GE-SFP	×	✓	×	×	✓	✓	✓	✓	×
SRX5K-FPC-IOC	×	✓	×	×	✓	✓	✓	✓	×
SRX5K-MPC (SRX-MIC-20GE-SFP) (SRX-MIC-10XG-SFPP) (SRX-MIC-1X100G-CFP) (SRX-MIC-2X40G-QSFP)	✓	✓	✓	✓	✓	✓	✓	✓	✓
SRX5K-MPC3-40G10G SRX5K-MPC3-100G10G	×	×	✓	✓	×	✓	×	✓	✓

g004198

Related Documentation

- SRX5400, SRX5600, and SRX5800 Services Gateway Card Overview on page 34

Services Processing Card SRX5K-SPC-2-10-40 Specifications

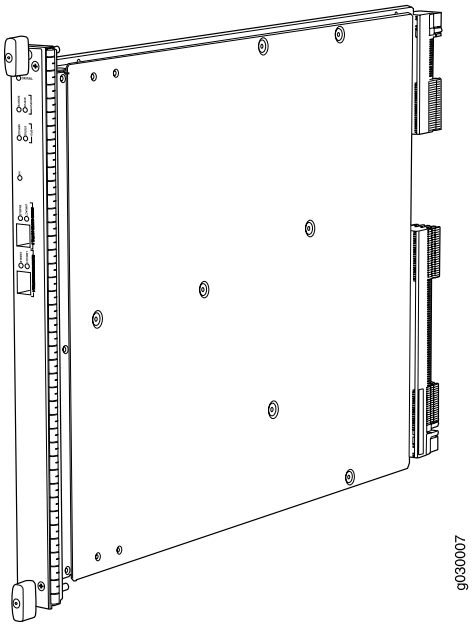
The SRX5K-SPC-2-10-40 Services Processing Card (SPC) contains two Services Processing Units (SPUs), which provide the processing power to run integrated services such as firewall, IPsec, and IDP (see Figure 19 on page 38). All traffic traversing the services gateway is passed to an SPU to have services processing applied to it. Traffic is intelligently distributed by I/O cards (IOCs) to SPUs for services processing.

The services gateway must have at least one SPC installed. You can install additional SPCs to increase services processing capacity.

You can install SPCs in any of the slots that are not reserved for Switch Control Boards (SCBs). If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the device.

Figure 19 on page 38 shows a typical SPC supported on the services gateway.

Figure 19: Services Processing Card SRX5K-SPC-2-10-40



Each SPC consists of the following components:

- SPC cover, which functions as a ground plane and a stiffener.
- Two small form-factor pluggable (SFP) chassis cluster control ports for connecting multiple devices into a redundant chassis cluster. See *Junos OS Security Configuration Guide* for more information about connecting and configuring redundant chassis clusters.

  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.

- Fabric interfaces.
- Two Gigabit Ethernet interfaces that allow control information, route information, and statistics to be sent between the Routing Engine and the CPU on the SPCs.

- Two interfaces from the SCBs that enable the boards to be powered on and controlled.
- Physical SPC connectors.
- Midplane connectors and power circuitry.
- Processor subsystem, which includes a 1.2-GHz CPU, system controller, and 1 GB of SDRAM.
- LEDs on the faceplate that indicate the SPC and SPU status.

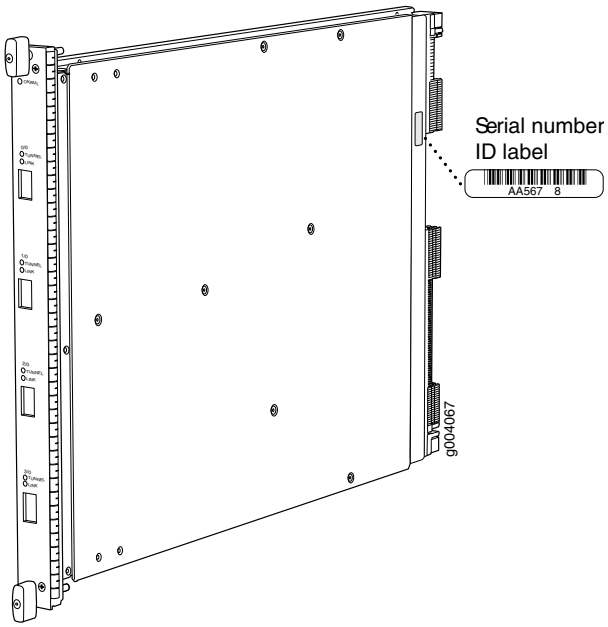
Description	SPC with two SPUs
Software release	• Junos OS Release 9.2 and later
Cables and connectors	**CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1**–SFP ports for control links in chassis cluster configurations. Supported SFP transceivers: 1000BASE-LH (model numbers SRX-SFP-1GE-LH, SRX-SFP-1GE-LH-ET) 1000BASE-LX (model numbers SRX-SFP-1GE-LX, SRX-SFP-1GE-LX-ET) 1000BASE-SX (model numbers SRX-SFP-1GE-SX, SRX-SFP-1GE-SX-ET)
Controls	None
Supported Slots	• SRX5400–Any slot, except the bottom slot **0** which is reserved for SCB/RE. • SRX5600–Any slot, except the bottom slots **0** or **1** which are reserved for SCB/RE. • SRX5800–Any slot, except the slots **0** or **1** which are reserved for SCB/RE.
Power Requirement	Maximum 351 W
Weight	Approximately 13 lb (5.9 kg)

LEDs	**OK/FAIL** LED, one bicolor:
	• Steady green–The SPC is operating normally.
	• Red–The SPC has failed and is not operating normally.
	• Off–The SPC is powered down.
	STATUS LED, one tricolor for each of the two SPUs **SPU 0** and **SPU 1**:
	• Green–The SPU is operating normally.
	• Amber–The SPU is initializing.
	• Red–The SPU has encountered an error or a failure.
	• Off–The SPU is offline. If all four SPUs are offline, it is safe to remove the SPC from the chassis.
	SERVICE LED, one bicolor for each of the two SPUs, **SPU 0** and **SPU 1**:
	• Green–Service is running on the SPU under acceptable load.
	• Amber–Service on the SPU is overloaded.
	• Off–Service is not running on the SPU.
	HA LED, one tricolor:
	• Green–Clustering is operating normally. All cluster members and monitored links are available, and no error conditions are detected.
	• Red–A critical alarm is present on clustering. A cluster member is missing or unreachable, or the other node is no longer part of a cluster because it has been disabled by the dual membership and detection recovery process in reaction to a control link or fabric link failure.
	• Amber–All cluster members are present, but an error condition has compromised the performance and resiliency of the cluster. The reduced bandwidth could cause packets to be dropped or could result in reduced resiliency because a single point of failure might exist. The error condition might be caused by:
	  ◦ The loss of chassis cluster links which causes an interface monitoring failure.
	  ◦ An error in an SPU or NPU.
	  ◦ Failure of the spu-monitoring or cold-sync-monitoring processes.
	  ◦ A chassis cluster IP monitoring failure.
	LINK/ACT LED, one for each of the two ports **CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1**:
	• Green–Chassis cluster control port link is active.
	• Off–No link.
	ENABLE LED, one for each of the two ports **CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1**:
	• Green–The chassis cluster control port is enabled.
	• Off–The chassis cluster control port is disabled.

Serial Number Location

The serial number label is located as shown in Figure 20 on page 41.

Figure 20: Serial Number Label (IOC Shown, Other Cards Similar)



Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

Services Processing Card SRX5K-SPC-4-15-320 Specifications

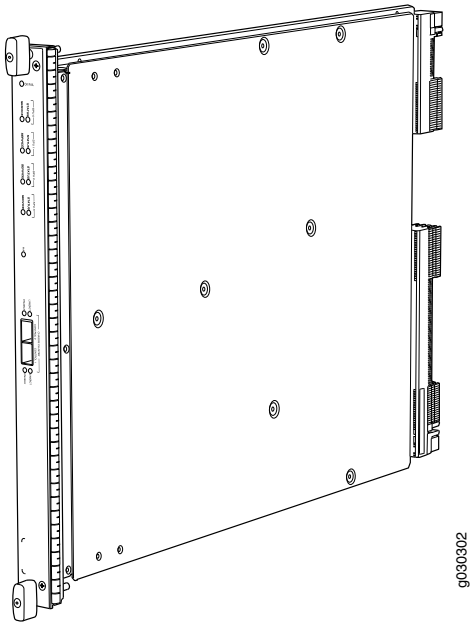
The SRX5K-SPC-4-15-320 Services Processing Card (SPC) contains four Services Processing Units (SPUs), which provide the processing power to run integrated services such as firewall, IPsec, and IDP (see Figure 21 on page 42). All traffic traversing the services gateway is passed to an SPU to have services processing applied to it. Traffic is intelligently distributed by I/O cards (IOCs) to SPUs for services processing.

The services gateway must have at least one SPC installed. You can install additional SPCs to increase services processing capacity.

You can install SPCs in any of the slots that are not reserved for Switch Control Boards (SCBs). If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the device.

If your services gateway contains a mix of SRX5K-SPC-4-15-320 SPCs and earlier SRX5K-SPC-2-10-40 SPCs, an SRX5K-SPC-4-15-320 SPC must occupy the lowest-numbered slot of any SPC in the chassis. This configuration ensures that the center point (CP) function is performed by the faster and higher-performance SPC type.

Figure 21: Services Processing Card SRX5K-SPC-4-15-320



Each SPC consists of the following components:

- SPC cover, which functions as a ground plane and a stiffener.
- Two small form-factor pluggable (SFP) chassis cluster control ports for connecting multiple devices into a redundant chassis cluster. See *Junos OS Security Configuration Guide* for more information about connecting and configuring redundant chassis clusters.

  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.

- Fabric interfaces.
- Two Gigabit Ethernet interfaces that allow control information, route information, and statistics to be sent between the Routing Engine and the CPU on the SPCs.
- Two interfaces from the SCBs that enable the boards to be powered on and controlled.
- Physical SPC connectors.
- Midplane connectors and power circuitry.

- Processor subsystem, which includes a 1.2-GHz CPU, system controller, and 1 GB of SDRAM.
- LEDs on the faceplate that indicate the SPC and SPU status.

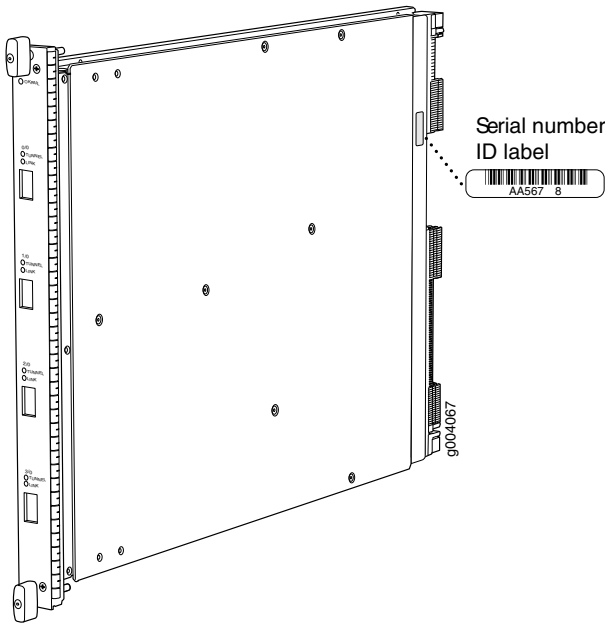
Description	SPC with four SPUs
Software release	• Junos OS Release 12.1X44-D10 and later
Cables and connectors	**CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1**–SFP ports for control links in chassis cluster configurations. Supported SFP transceivers: 1000BASE-LH (model numbers SRX-SFP-1GE-LH, SRX-SFP-1GE-LH-ET) 1000BASE-LX (model numbers SRX-SFP-1GE-LX, SRX-SFP-1GE-LX-ET) 1000BASE-SX (model numbers SRX-SFP-1GE-SX, SRX-SFP-1GE-SX-ET)
Controls	None
Supported Slots	• SRX5400–Any slot, except the bottom slot **0** which is reserved for SCB/RE. • SRX5600–Any slot, except the bottom slots **0** or **1** which are reserved for SCB/RE. • SRX5800–Any slot, except the slots **0** or **1** which are reserved for SCB/RE.
Power Requirement	450 W typical, 585 W maximum NOTE: • In the SRX5600 and SRX5800 Services Gateways, you must have high-capacity power supplies (either AC or DC) and high-capacity fan trays installed in the services gateway in order to install and use SRX5K-SPC-4-15-320 SPCs. If you do not have high-capacity power supplies and fan trays installed, the services gateway will log an alarm condition when it recognizes the SRX5K-SPC-4-15-320 SPCs. • On SRX5600 Services Gateways with AC power supplies, we recommend that you use high-line (220v) input power to ensure the device has adequate power to support SRX5K-SPC-4-15-320 SPCs.
Weight	Approximately 18 lb (8.3 kg)

LEDs	**OK/FAIL** LED, one bicolor:
	• Steady green–The SPC is operating normally.
	• Red–The SPC has failed and is not operating normally.
	• Off–The SPC is powered down.
	STATUS LED, one tricolor for each of the four SPUs **SPU 0** through **SPU 3**:
	• Green–The SPU is operating normally.
	• Amber–The SPU is initializing.
	• Red–The SPU has encountered an error or a failure.
	• Off–The SPU is offline. If all four SPUs are offline, it is safe to remove the SPC from the chassis.
	SERVICE LED, one bicolor for each of the four SPUs **SPU 0** through **SPU 3**:
	• Green–Service is running on the SPU under acceptable load.
	• Amber–Service on the SPU is overloaded.
	• Off–Service is not running on the SPU.
	HA LED, one tricolor:
	• Green–Clustering is operating normally. All cluster members and monitored links are available, and no error conditions are detected.
	• Red–A critical alarm is present on clustering. A cluster member is missing or unreachable, or the other node is no longer part of a cluster because it has been disabled by the dual membership and detection recovery process in reaction to a control-link or fabric-link failure.
	• Amber–All cluster members are present, but an error condition has compromised the performance and resiliency of the cluster. The reduced bandwidth could cause packets to be dropped or could result in reduced resiliency because a single point of failure might exist. The error condition might be caused by:
	  • The loss of chassis cluster links which causes an interface monitoring failure.
	  • An error in an SPU or NPU.
	  • Failure of the spu-monitoring or cold-sync-monitoring processes.
	  • A chassis cluster IP monitoring failure.
	• Off–The node is not configured for clustering or it has been disabled by the dual membership and detection recovery process in reaction to a control link or fabric link failure.
	LINK/ACT LED, one for each of the two ports **CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1**:
	• Green–Chassis cluster control port link is active.
	• Off–No link.
	ENABLE LED, one for each of the two ports **CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1**:
	• Green–The chassis cluster control port is enabled.
	• Off–The chassis cluster control port is disabled.

Serial Number Location

The serial number label is located as shown in Figure 22 on page 45.

Figure 22: Serial Number Label (IOC Shown, Other Cards Similar)



Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

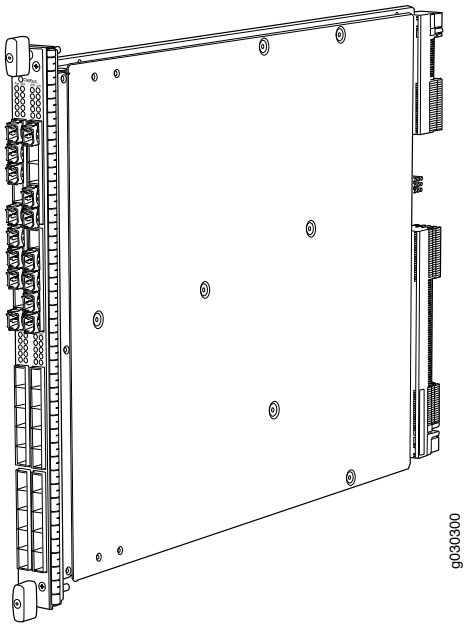
I/O Card SRX5K-40GE-SFP Specifications

The SRX5K-40GE-SFP I/O card (IOC) is optimized for Ethernet density and supports 40 Gigabit Ethernet ports (see Figure 23 on page 46). The IOC assembly combines packet forwarding and Ethernet interfaces on a single board, with four 10-Gbps Packet Forwarding Engines. Each Packet Forwarding Engine consists of one I-chip for Layer 3 processing and one Layer 2 network processor. The IOCs interface with the power supplies and Switch Control Boards (SCBs).

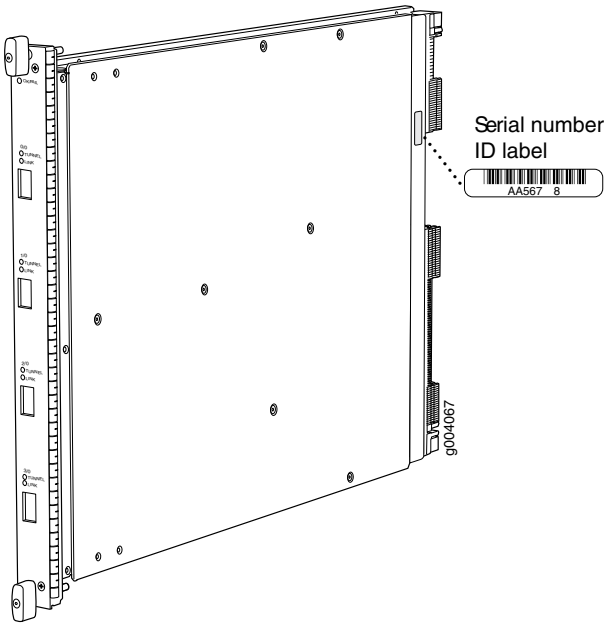
You must install at least one IOC in the services gateway. The IOC can be of any of the available IOC or Flex IOC types.

You can install IOCs in any of the slots that are not reserved for Switch Control Boards (SCBs). If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

Figure 23: IOC SRX5K-40GE-SFP



Description	• I/O card with 40 Gigabit Ethernet SFP ports • Maximum configurable MTU: 9192 bytes • Maximum throughput: 40 Gbps
Software release	• Junos OS Release 9.2 and later
Cables and connectors	40 Gigabit Ethernet SFP ports Supported SFP transceivers: 1000BASE-LH (model numbers SRX-SFP-1GE-LH, SRX-SFP-1GE-LH-ET) 1000BASE-LX (model numbers SRX-SFP-1GE-LX, SRX-SFP-1GE-LX-ET) 1000BASE-SX (model numbers SRX-SFP-1GE-SX, SRX-SFP-1GE-SX-ET) 1000BASE-T (model numbers SRX-SFP-1GE-T, SRX-SFP-1GE-T-ET)
Controls	None
Supported Slots	• SRX5600–Any slot except bottom slots **0** or **1** • SRX5800–Any slot except center slots **0**, **1**, or **2/6**
Power Requirement	312 W typical, 365 W maximum
Weight	Approximately 13 lb (5.9 kg)

LEDs	**OK/FAIL** LED, one bicolor: • Steady green–The IOC is operating normally. • Red–The IOC has failed and is not operating normally. • Off–The IOC is powered down.
Serial Number Location	The serial number label is located as shown in Figure 24 on page 47. **Figure 24: Serial Number Label (IOC Shown, Other Cards Similar)** 

Related Documentation
- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

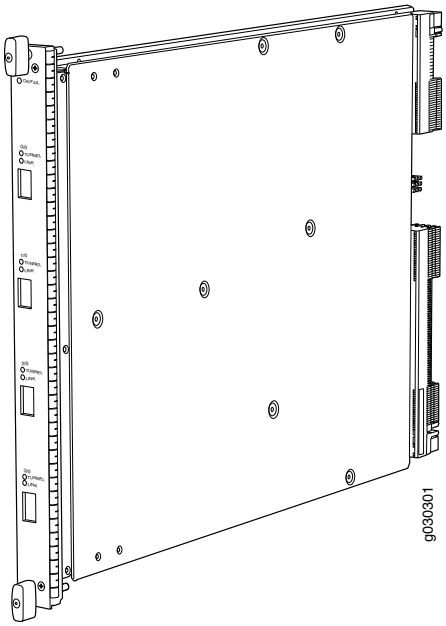
I/O Card SRX5K-4XGE-XFP Specifications

The SRX5K-4XGE-XFP I/O card (IOC) supports four 10-Gigabit Ethernet ports (see Figure 25 on page 48). The IOC assembly combines packet forwarding and Ethernet interfaces on a single board, with four 10-Gbps Packet Forwarding Engines. Each Packet Forwarding Engine consists of one I-chip for Layer 3 processing and one Layer 2 network processor. The IOCs interface with the power supplies and Switch Control Boards (SCBs).

You must install at least one IOC in the services gateway. The IOC can be of any of the available IOC or Flex IOC types.

You can install IOCs in any of the slots that are not reserved for Switch Control Boards (SCBs). If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

Figure 25: IOC SRX5K-4XGE-XFP

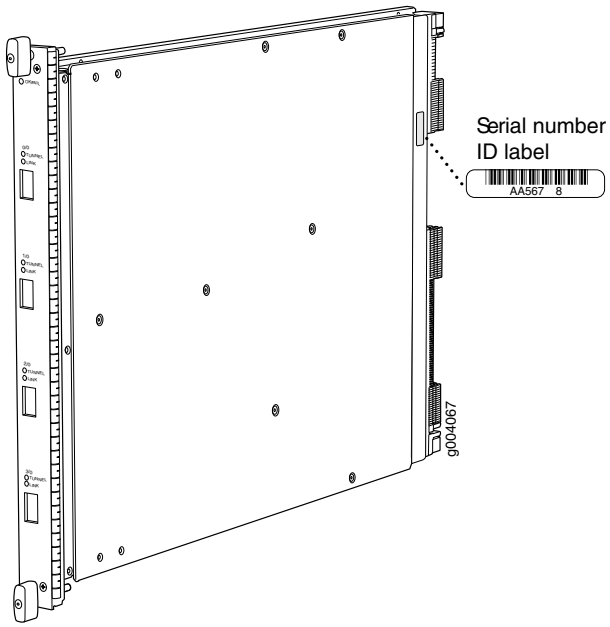


Description	• I/O card with four 10-Gigabit Ethernet XFP ports • Maximum configurable MTU: 9192 bytes • Maximum throughput: 40 Gbps
Software release	• Junos OS Release 9.2 and later
Cables and connectors	Four 10-Gbps XFP ports Supported XFP transceivers: 10GBASE-ER (model numbers SRX-XFP-10GE-ER and SRX-XFP-10GE-ER-ET) 10GBASE-LR (model numbers SRX-XFP-10GE-LR and SRX-XFP-10GE-LR-ET 10GBASE-SR (model numbers SRX-XFP-10GE-SR and SRX-XFP-10GE-SR-ET)
Controls	None
Supported Slots	• SRX5600–Any slot except bottom slots **0** or **1** • SRX5800–Any slot except center slots **0**, **1**, or **2**
Power Requirement	312 W typical, 365 W maximum
Weight	Approximately 13 lb (5.9 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Steady green–The IOC is operating normally. • Red–The IOC has failed and is not operating normally. • Off–The IOC is powered down.

Serial Number Location

The serial number label is located as shown in Figure 26 on page 49.

Figure 26: SRX5K-4XGE-XFP Serial Number Label



Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

Modular Port Concentrator (SRX5K-MPC) Specifications

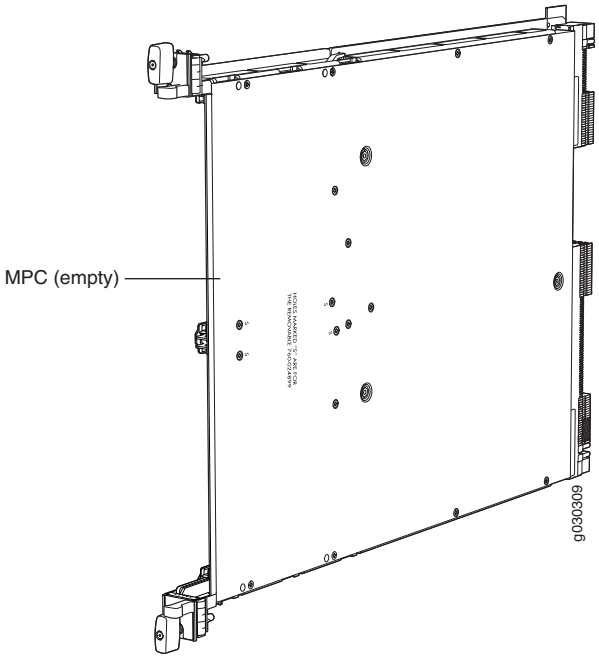
The SRX5K-MPC (see Figure 3 on page 9) is an interface card with two slots that accept MICs. These MICs add Ethernet ports to your services gateway. An MPC with MICs installed functions in the same way as a regular IOC but allows you to add different types of Ethernet ports to your services gateway. MPCs and MICs are similar in form and function to Flex IOCs and port modules. However, the two use different form-factors, so you cannot install port modules in an MPC, nor can you install MICs in a Flex IOC.

You must install at least one interface card in the services gateway. The interface card can be of any of the available IOC, Flex IOC, or MPC types. You can add just one MIC; or you can add two MICs of the same or different types.

You can install MPCs in any of the slots that are not reserved for Switch Control Boards (SCBs).

If a slot in the SRX5400, SRX5600, or SRX5800 Services Gateway card cage is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway. If a slot in an MPC is not occupied by a MIC, you must install a blank panel in the empty MIC slot to shield it and to allow cooling air to circulate properly through the MPC.

Figure 27: SRX5K-MPC



NOTE: When installing an SRX5K-MPC in an SRX5600 or SRX5800 Services Gateway:

- If the **session-distribution-mode** has not been explicitly configured using the CLI command:

  user@host set security forwarding-process application-services session-distribution-mode

  The SRX5K-MPC defaults to hash-based mode automatically even if existing SRX5K-MPC or non-MPCs are installed. You cannot set the **session-distribution-mode** to **normal**.

- If the **session-distribution-mode** has been explicitly configured to **normal**, and the MIC is installed in the device, then the SRX5K-MPC will remain offline, and the services gateway generates a major alarm and logs the event for troubleshooting. You must explicitly configure the **session-distribution-mode** using the CLI command:

  user@host set security forwarding-process application-services session-distribution-mode hash-based

When installing an SRX5K-MPC in an SRX5400 Services Gateway, the **session-distribution-mode** will only function when **hash-based** mode is configured or set as the default. The normal mode is not supported.

A 9% drop is observed for PPS (throughput) when moving from session mode to hash mode (for SRX5K-MPC or non-MPCs), whereas no drop in performance is observed on CPS (connection per second) and session capacity numbers.

For more information about the CLI command, see the Junos OS documentation at www.juniper.net/documentation/.

Description	• MPC with slots for two MICs • Maximum throughput: 75 Gbps per slot from Junos OS Release 12.1X46-D10 and later 120 Gbps per slot from Junos OS Release 12.1x47-D15 and later
Software release	Junos OS Release 12.1x46-D10
Cables and connectors	Slots for two MICs
Controls	One ejector knob each for MIC slots **0** and **1**. Pull the ejector knob to unseat and partially eject the adjacent MIC.
Supported slots	• SRX5400–Any slot except bottom slot **0** • SRX5600–Any slot except bottom slots **0** or **1** • SRX5800–Any slot except center slots **0** or **1**

Power requirement	Maximum of 570 W for the MPC with two MICs, including applicable transceivers. NOTE: • To install and use SRX5K-MPCs in the SRX5600 and SRX5800 Services Gateways, you must have high-capacity power supplies (either AC or DC) and high-capacity fan trays installed in the services gateways. All models of SRX5400 Services Gateways already include high-capacity supplies. If you do not have high-capacity power supplies and fan trays installed, the services gateway will log an alarm condition when it recognizes the SRX5K-MPCs. • On SRX5400 and SRX5600 Services Gateways with AC power supplies, we recommend that you use high-line (220 V) input power to ensure that the devices have adequate power to support SRX5K-MPCs.
Weight	Approximately 10 lb (4.5 kg) without MICs
LEDs	**OK/FAIL** LED, one bicolor: • Green–The MPC is operating normally. • Blinking green–The MPC is transitioning to online or offline. • Red–The MPC has failed and is not operating normally. • Off–The MPC is powered down.
Serial number location	The serial number label is yellow and is located on the opposite side of the card.

Related Documentation

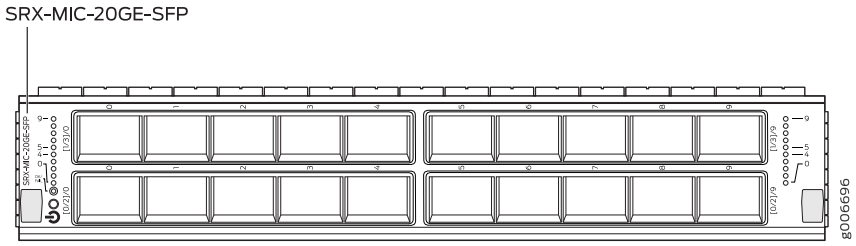
- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- MIC with 1x100GE CFP Interface (SRX-MIC-1X100G-CFP) on page 56
- MIC with 2x40GE QSFP+ Interfaces (SRX-MIC-2X40G-QSFP) on page 58
- MIC with 10x10GE SFP+ Interfaces (SRX-MIC-10XG-SFPP) on page 54
- MIC with 20x1GE SFP Interfaces (SRX-MIC-20GE-SFP) on page 52

MIC with 20x1GE SFP Interfaces (SRX-MIC-20GE-SFP)

You use Modular Interface Cards (MICs) and Modular Port Concentrators (MPCs) to add different combinations of Ethernet interfaces to your services gateway to suit the specific needs of your network.

The SRX-MIC-20GE-SFP MIC can be installed in the SRX-5K MPC (see Figure 28 on page 53) to add twenty 1-Gigabit Ethernet small form-factor pluggable (SFP) Ethernet ports.

Figure 28: SRX-MIC-20GE-SFP

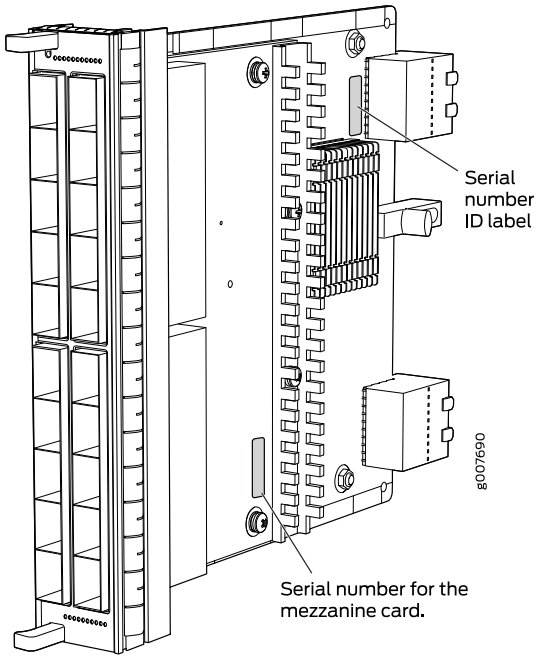


Description	• MIC with twenty 1-Gigabit Ethernet SFP Ethernet ports • Fits into the MPC • Supports up to 20 Gbps of full-duplex traffic • Maximum configurable MTU: 9192 bytes • Maximum throughput: 20 Gbps
Software release	Junos OS Release 12.1X47-D10
Cables and connectors	Sockets for 20 SFP Gigabit Ethernet transceivers. Supported SFP transceivers: 1000BASE-LX (model numbers SRX-SFP-1GE-LX, SRX-SFP-1GE-LX-ET) 1000BASE-SX (model numbers SRX-SFP-1GE-SX, SRX-SFP-1GE-SX-ET) 1000BASE-T (model numbers SRX-SFP-1GE-T, SRX-SFP-1GE-T-ET)
Supported slots	Either slot in SRX5K-MPC
Weight	Approximately 1.2 lb (0.54 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Green–MIC is operating normally. • Red–MIC has failed. • Off–MIC is powered down. **LINK** LED, single color, one per SFP port: • Green–Link is active. • Off–Link is inactive.

Serial number location

The serial number label is yellow and is located as shown in Figure 29 on page 54.

Figure 29: SRX-MIC-20GE-SFP Serial Number Label



NOTE: The serial number for the mezzanine card is shown only for reference and is never used for any purpose.

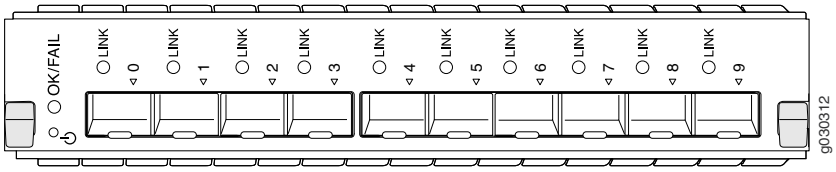
Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Modular Port Concentrator (SRX5K-MPC) Specifications on page 49

MIC with 10x10GE SFP+ Interfaces (SRX-MIC-10XG-SFPP)

You use MICs and MPCs to add different combinations of Ethernet interfaces to your services gateway to suit the specific needs of your network. The SRX-MIC-10XG-SFPP (see Figure 30 on page 55) can be installed in an MPC to add ten 10-Gigabit Ethernet SFP+ ports.

Figure 30: SRX-MIC-10XG SFPP

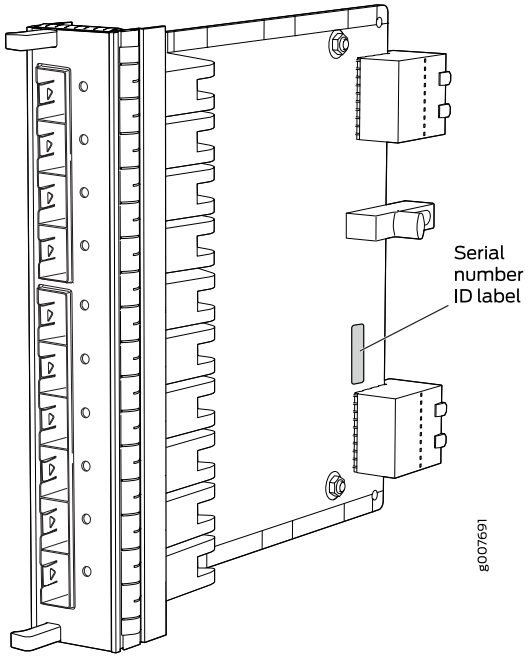


Description	• MIC with ten SFP+ 10-Gigabit Ethernet ports • Fits into MPC • Supports up to 100 Gbps of full-duplex traffic • Maximum configurable MTU: 9192 bytes • Maximum throughput: 100 Gbps
Software release	Junos OS Release 12.1X46-D10
Cables and connectors	Sockets for ten 10-Gbps SFP+ transceivers Fiber-optic 10-Gigabit DAC transceivers: • SRX-SFP-10GE-DAC-1M • SRX-SFP-10GE-DAC-3M • EX-SFP-10GE-DAC-5M • EX-SFP-10GE-DAC-7M Fiber-optic 10-Gigabit SFP+ transceivers: • SRX-SFP-10GE-SR • SFPP-10GE-ER-XT • SFPP-10GE-ER • SRX-SFPP-10G-SR-ET • SRX-SFPP-10G-LR • SRX-SFP-10GE-LR
Supported slots	Either slot in SRX5K-MPC
Weight	Approximately 1.6 lb (0.7 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Green–The MIC is operating normally. • Red–The MIC has failed and is not operating normally. • Off–The MIC is powered down. **LINK** LED, single color: • Green–The link is active. • Off–No link.

Serial number location

The serial number label is yellow and located as shown in Figure 31 on page 56.

Figure 31: SRX-MIC-10XG-SFPP Serial Number Label



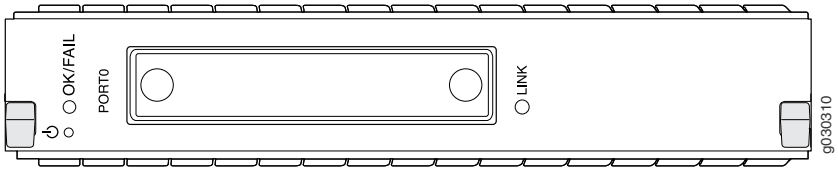
Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Modular Port Concentrator (SRX5K-MPC) Specifications on page 49

MIC with 1x100GE CFP Interface (SRX-MIC-1X100G-CFP)

You use MICs and MPCs to add different combinations of Ethernet interfaces to your services gateway to suit the specific needs of your network. The SRX-MIC-1X100G-CFP (see Figure 32 on page 56) can be installed in an MPC to add one 100-Gigabit Ethernet CFP port.

Figure 32: SRX-MIC-1X100G-CFP

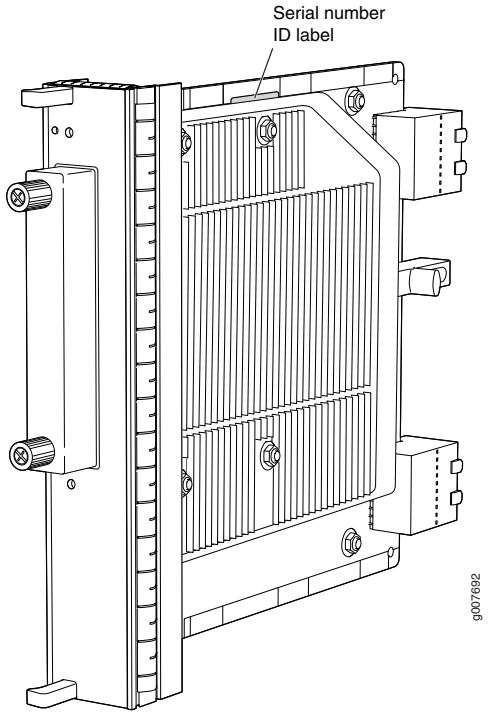


Description

- MIC with one CFP 100-Gigabit Ethernet port
- Fits into MPC
- Supports up to 100 Gbps of full-duplex traffic
- Maximum configurable MTU: 9192 bytes
- Maximum throughput: 100 Gbps

Software release	Junos OS Release 12.1X46-D10
Cables and connectors	One socket for a 100-Gigabit CFP transceiver. Supported CFP transceivers: • 100GBASE-LR4 (model number: SRX-CFP-100G-LR4) • 100GBASE-SR10 (model number: SRX-CFP-100G-SR10)
Supported slots	Either slot in SRX5K-MPC
Weight	Approximately 1.6 lb (0.7 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Green–The MIC is operating normally. • Red–The MIC has failed and is not operating normally. • Off–The MIC is powered down. **LINK** LED, single color: • Green–The link is active. • Off–No link.
Serial number location	The serial number label is yellow and located as shown in Figure 33 on page 57.

Figure 33: SRX-MIC-1X100G-CFP Serial Number Label



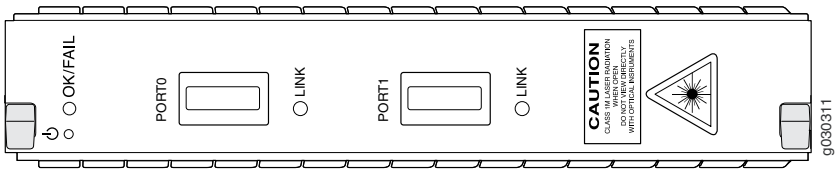
Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Modular Port Concentrator (SRX5K-MPC) Specifications on page 49

MIC with 2x40GE QSFP+ Interfaces (SRX-MIC-2X40G-QSFP)

You use MICs and MPCs to add different combinations of Ethernet interfaces to your services gateway to suit the specific needs of your network. The SRX-MIC-2X40G-QSFP (see Figure 34 on page 58) can be installed in an MPC to add two 40-Gigabit quad small form-factor pluggable (QSFP+) Ethernet ports.

Figure 34: SRX-MIC-2X40G QSFP

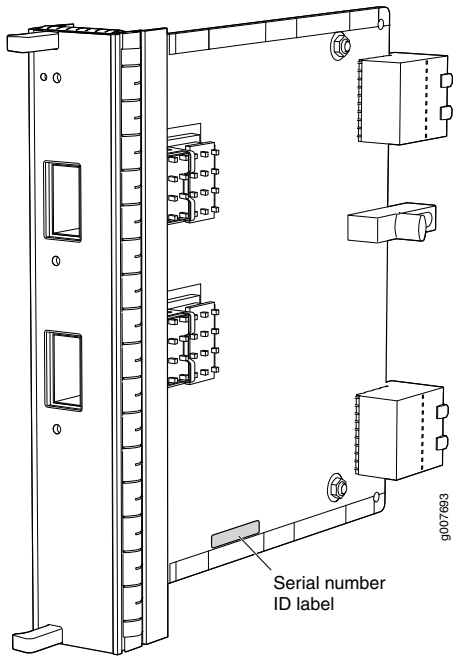


Description	• MIC with two QSFP+ Ethernet ports • Fits into MPC • Supports up to 80 Gbps of full-duplex traffic • Maximum configurable MTU: 9192 bytes • Maximum throughput: 80 Gbps
Software release	Junos OS Release 12.1X46-D10
Cables and connectors	Sockets for two QSFP+ 40-Gigabit Ethernet fiber-optic transceivers. Supported QSFP+ transceiver: 40GBASE-SR4 (model number SRX-QSFP-40G-SR4) 40GBASE-LR4 (model number SRX-QSFP-40G-LR4)
Supported slots	Either slot in SRX5K-MPC
Weight	Approximately 1.6 lb (0.7 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Green–The MIC is operating normally. • Red–The MIC has failed and is not operating normally. • Off–The MIC is powered down. **LINK** LED, single color, one per QSFP+ port: • Green–The link is active. • Off–No link.

Serial number location

The serial number label is yellow and typically located as shown in Figure 35 on page 59.

Figure 35: SRX-MIC-2X40G-QSFP Serial Number Label



Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Modular Port Concentrator (SRX5K-MPC) Specifications on page 49

SRX5K-MPC3-40G10G Specifications

The SRX5K-MPC3-40G10G (IOC3) is an interface card that provides 10 Gigabit Ethernet and 40 Gigabit Ethernet interfaces, with a Packet Forwarding Engine that provides a 240 Gbps line rate. This interface card is supported on SRX5400, SRX5600, and SRX5800 Services Gateways. See Figure 36 on page 60.

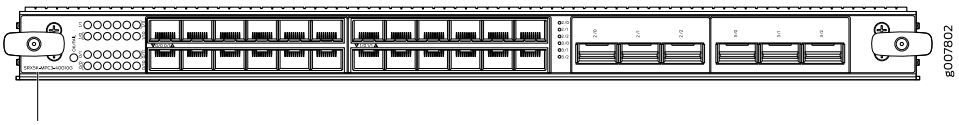
NOTE: **These cards do not support plug-in Modular Interface Cards (MICs).**

All ports on the interface card have dual-color LEDs for reporting link status.

The interface card also supports hot-pluggable optical modules.

You can install the interface card in any of the slots that are not reserved for Switch Control Boards (SCBs).

Figure 36: SRX5K-MPC3-40G10G



NOTE: In SRX5800 Services Gateways, you cannot install the interface card in slots 0 and 11.

If a slot in the SRX5400, SRX5600, or SRX5800 Services Gateway card cage is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

Description	• Fixed-configuration MPC with six 40-Gigabit Ethernet ports and twenty-four 10-Gigabit Ethernet ports • Maximum throughput: 240 Gbps • Maximum configurable MTU: 9192 bytes
Software release	Junos OS Release 15.1X49-D10 and later
Cables and connectors	Fiber-optic 10-Gigabit DAC transceivers: • SRX-SFP-10GE-DAC-1M • SRX-SFP-10GE-DAC-3M • EX-SFP-10GE-DAC-5M • EX-SFP-10GE-DAC-7M Fiber-optic 40-Gigabit transceivers: • JNP-QSFP-40G-LX4 • SRX-QSFP-40G-LR4 • SRX-QSFP-40G-SR4 Fiber-optic 10-Gigabit SFP+ transceivers: • SRX-SFP-10GE-SR • SFPP-10GE-ER-XT • SFPP-10GE-ER • SRX-SFPP-10G-SR-ET • SRX-SFPP-10G-LR • SRX-SFP-10GE-LR
Power requirements	Typical: 9.68 A @ 48 V (460 W) At different temperatures: • 55° C: 607 W • 40° C: 541 W • 25° C: 511 W
Weight	21 lb (9.52 kg)

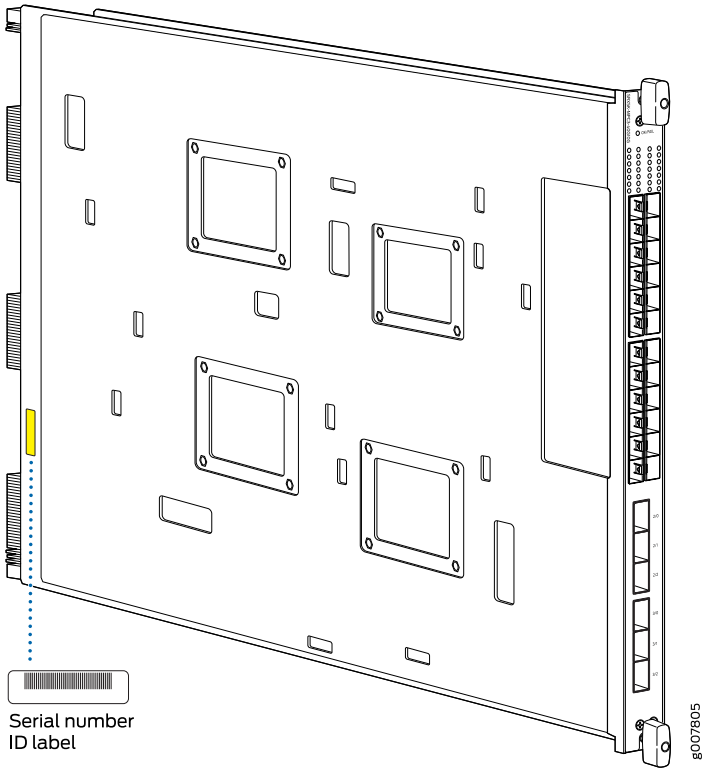
Hardware features	• Line-rate throughput of up to 240 Gbps
	• Supports up to 32,000 queues per-slot
	• LAN-PHY mode at 10.3125 Gbps on a per-port basis
	• The ports are labeled as:
	  ◦ 10-Gigabit Ethernet ports: 0/0 through 0/11 and 1/0 through 1/11
	  ◦ 40-Gigabit Ethernet ports: 2/0 through 2/2 and 3/0 through 3/2

Software features	• Optical diagnostics and related alarms • Two packet-forwarding engines, PFE0 and PFE1. PFE0 hosts PIC0 and PIC2. PFE1 hosts PIC1 and PIC3. • Configurable LAN-PHY mode options per 10-Gigabit Ethernet port • Intelligent oversubscription services NOTE: A maximum of two PICs can be powered on at any one time (PIC0 or PIC2, and PIC1 or PIC3). The other PICs must be powered off.
LEDs	OK/FAIL LED, one bicolor: • Solid green—MPC is functioning normally. • Blinking green—MPC is transitioning online or offline. • Red—MPC has failed. 10-Gigabit Ethernet LINK LED, one green per port: • Green—Link is up. • Off—Link is down or disabled. 40-Gigabit Ethernet LINK LED, one bicolor per port: • Green—Link is up. • Amber—Link is disabled. • Off—Link is down.

Serial Number Location

The serial number label is located as shown in Figure 37 on page 62.

Figure 37: SRX5K-MPC3-40G10G Serial Number Label



Related Documentation

- SRX5K-MPC3-100G10G Specifications on page 62
- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

SRX5K-MPC3-100G10G Specifications

The SRX5K-MPC3-100G10G (IOC3) is an interface card that provides 100 Gigabit Ethernet and 10 Gigabit Ethernet interfaces, with a Packet Forwarding Engine that provides a 240 Gbps line rate. This interface card is supported on SRX5400, SRX5600, and SRX5800 Services Gateways. See Figure 38 on page 63.

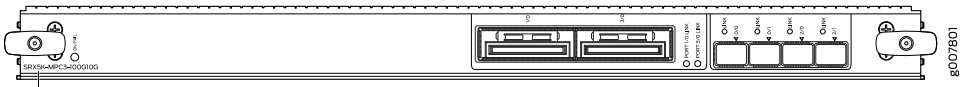
NOTE: **These cards do not support plug-in Modular Interface Cards (MICs).**

All ports on the interface card have dual-color LEDs for reporting link status.

The interface card also supports hot-pluggable optical modules.

You can install the interface card in any of the slots that are not reserved for Switch Control Boards (SCBs).

Figure 38: SRX5K-MPC3-100G10G



NOTE: In SRX5800 Services Gateways, you cannot install the interface card in slots 0 and 11.

If a slot in the SRX5400, SRX5600, or SRX5800 Services Gateway card cage is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

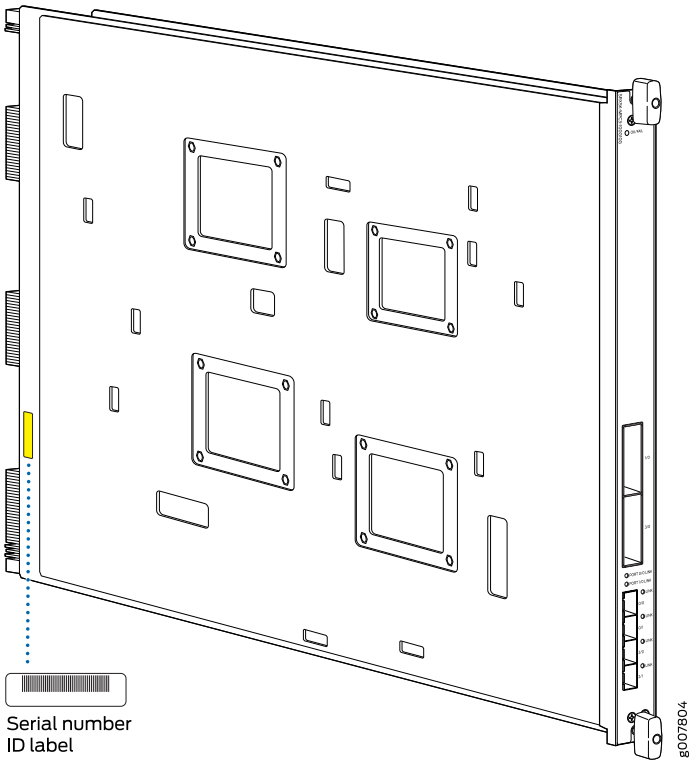
Description	• Fixed-configuration MPC with two 100-Gigabit Ethernet ports and four 10-Gigabit Ethernet ports • Maximum throughput: 240 Gbps • Maximum configurable MTU: 9192 bytes
Software release	Junos OS Release 15.1X49-D10 and later
Cables and connectors	Fiber-optic 10-Gigabit DAC transceivers: • SRX-SFP-10GE-DAC-1M • SRX-SFP-10GE-DAC-3M • EX-SFP-10GE-DAC-5M • EX-SFP-10GE-DAC-7M 1000BASE CFP2 transceivers: • CFP2-100GBASE-SR10 • CFP2-100GBASE-LR4 Fiber-optic 10-Gigabit SFP+ transceivers: • SRX-SFP-10GE-SR • SFPP-10GE-ER-XT • SFPP-10GE-ER • SRX-SFPP-10G-SR-ET • SRX-SFPP-10G-LR • SRX-SFP-10GE-LR
Power requirements	• Typical: 10.52 A @ 48 V (505 W) At different temperatures: • 55° C: 607 W • 40° C: 541 W • 25° C: 511 W
Weight	21 lb (9.52 kg)

Hardware features	• Line-rate throughput of up to 240 Gbps • Supports up to 32,000 queues per-slot • LAN-PHY mode at 10.3125 Gbps on a per-port basis The ports are labeled as: • 10-Gigabit Ethernet ports: 0/0, 0/1, 2/0, and 2/1 • 100-Gigabit Ethernet ports: 1/0 and 3/0
Software features	• Configurable LAN-PHY mode options per 10-Gigabit Ethernet port • Optical diagnostics and related alarms • Intelligent oversubscription services
LEDs	OK/FAIL LED, one bicolor: • Solid green—MPC is functioning normally. • Blinking green—MPC is transitioning online or offline. • Red—MPC has failed. 10-Gigabit Ethernet LINK LED, one bicolor per port: • Green—Link is up. • Amber—Link is disabled. • Off—Link is down or disabled. 100-Gigabit Ethernet LINK LED, one bicolor per port: • Green—Link is up. • Amber—Link is disabled. • Off—Link is down.

Serial Number Location

The serial number label is located as shown in Figure 39 on page 65.

Figure 39: SRX5K-MPC3-100G10G Serial Number Label



Related Documentation

- SRX5K-MPC3-40G10G Specifications on page 59
- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

Flex I/O Card (SRX5K-FPC-IOC) Specifications

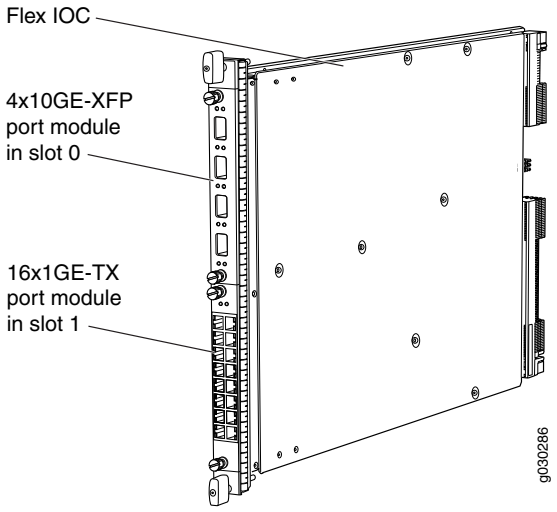
The SRX5K-FPC-IOC Flex I/O card (Flex IOC) (Figure 2 on page 8) is an IOC with two slots that accept port modules that add Ethernet ports to your services gateway. A Flex IOC with installed port modules functions in the same way as a regular IOC, but allows greater flexibility in adding different types of Ethernet ports to your services gateway.

Each Flex IOC has a processor subsystem, which includes a 1.2-GHz CPU, a system controller, 1 GB SDRAM, and two Packet Forwarding Engines with a maximum throughput of 10 Gbps each.

You must install at least one IOC in the services gateway. The IOC can be of any of the available IOC or Flex IOC types.

You can install Flex IOCs in any of the slots that are not reserved for Switch Control Boards (SCBs). If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

Figure 40: Flex IOC with Typical Port Modules

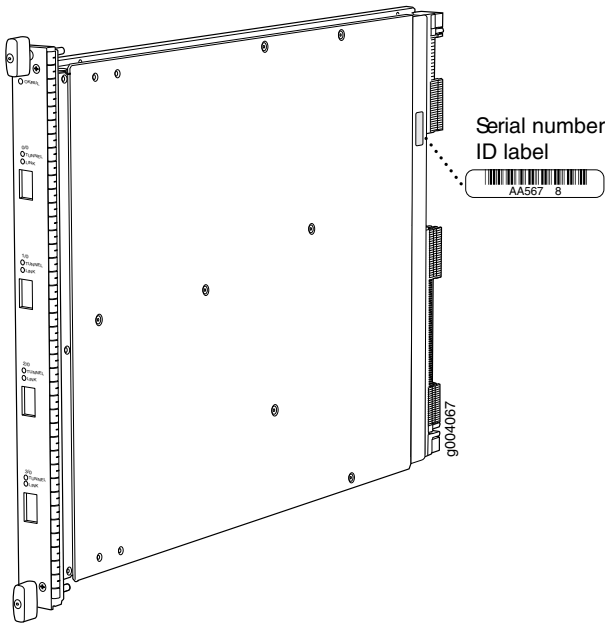


Description	• Flex IOC with slots for two port modules • Maximum throughput: 10 Gbps (per PFE)
Software release	• Junos OS Release 9.5R1 and later
Cables and connectors	Slots for two port modules
Controls	None
Supported Slots	• SRX5600–Any slot except bottom slots **0** or **1** • SRX5800–Any slot except center slots **0**, **1**, or **2/6**
Power Requirement	312 W typical, 365 W maximum (includes port modules)
Weight	Approximately 10 lb (4.5 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Steady green–The Flex IOC is operating normally. • Red–The Flex IOC has failed and is not operating normally. • Off–The Flex IOC is powered down.

Serial Number Location

The serial number label is located as shown in Figure 41 on page 67.

Figure 41: Serial Number Label (IOC Shown, Other Cards Similar)



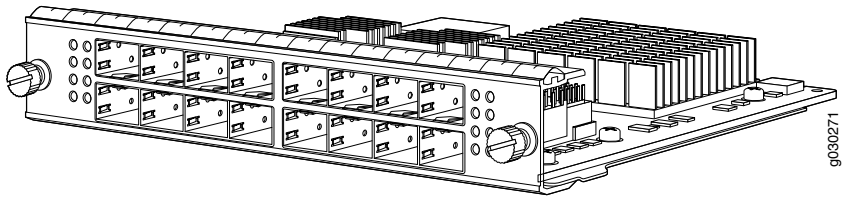
Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Flex I/O Card Port Module SRX-IOC-16GE-TX Specifications on page 69
- Flex I/O Card Port Module SRX-IOC-16GE-SFP Specifications on page 67
- Flex I/O Card Port Module SRX-IOC-4XGE-XFP Specifications on page 70

Flex I/O Card Port Module SRX-IOC-16GE-SFP Specifications

You use port modules and Flex I/O Cards (Flex IOCs) to add different combinations of small form-factor pluggable transceiver (SFP), 10-gigabit SFP transceiver (XFP), and copper ports to your services gateway to suit the specific needs of your network. The SRX-IOC-16GE-SFP port module (Figure 42 on page 68) installs into a Flex IOC to add sixteen 10/100/1000 Ethernet SFP ports.

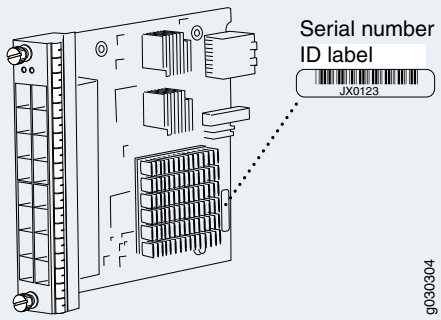
Figure 42: Flex IOC Port Module SRX-IOC-16GE-SFP



Description	• Port module with 16 Gigabit Ethernet SFP ports • Maximum throughput: 10 Gbps • Oversubscription ratio: 1.6:1 • Maximum configurable MTU: 9192 bytes
Software release	• Junos OS Release 9.5R1 and later
Cables and connectors	16 Gigabit Ethernet SFP ports Supported SFP transceivers: 1000BASE-LH (model numbers SRX-SFP-1GE-LH, SRX-SFP-1GE-LH-ET) 1000BASE-LX (model numbers SRX-SFP-1GE-LX, SRX-SFP-1GE-LX-ET) 1000BASE-SX (model numbers SRX-SFP-1GE-SX, SRX-SFP-1GE-SX-ET) 1000BASE-T (model numbers SRX-SFP-1GE-T, SRX-SFP-1GE-T-ET)
Controls	**ONLINE** Button—The **ONLINE** button on the port module front panel toggles the port module online and offline
Supported Slots	Either slot in SRX5K-FPC-IOC Flex IOC
Weight	Approximately 1.6 lb (0.7 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Steady green—The port module is operating normally. • Red—The port module has failed and is not operating normally. • Off—The port module is powered down. **LINK** LED, single color, one per port: • Steady green—The link is active. • Off—No link. **TX/RX** LED, single color, one per port: • Blinking Green—The port is receiving or transmitting data. • Off—No activity.

Serial Number Location	The serial number label is located as shown in Figure 43 on page 69.

Figure 43: Port Module SRX-IOC-16GE-SFP Serial Number Label



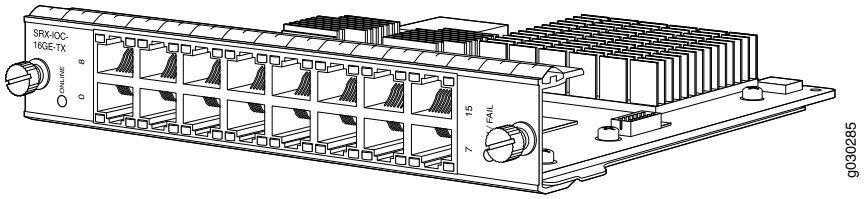
Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Flex I/O Card (SRX5K-FPC-IOC) Specifications on page 65

Flex I/O Card Port Module SRX-IOC-16GE-TX Specifications

You use port modules and Flex I/O Cards (Flex IOCs) to add different combinations of small form-factor pluggable transceiver (SFP), 10-gigabit SFP transceiver (XFP), and copper ports to your services gateway to suit the specific needs of your network. The SRX-IOC-16GE-TX port module (Figure 44 on page 69) installs into a Flex IOC to add sixteen 10/100/1000 Ethernet RJ-45 copper ports.

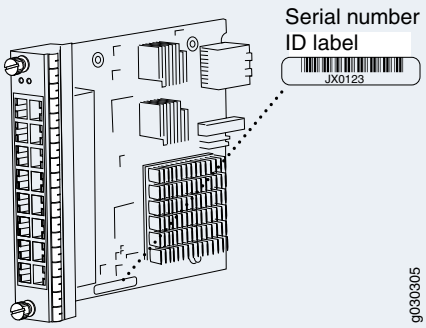
Figure 44: Flex IOC Port Module SRX-IOC-16GE-TX



Description	• Port module with sixteen 10/100/1000 Ethernet RJ45 ports • Maximum throughput: 10 Gbps • Oversubscription ratio: 1.6:1 • Maximum configurable MTU: 9192 bytes
Software release	• Junos OS Release 9.5R1 and later
Cables and connectors	Sixteen RJ-45 1-Gbps ports
Controls	**ONLINE** Button–The **ONLINE** button on the port module front panel toggles the port module online and offline.
Supported Slots	Either slot in SRX5K-FPC-IOC Flex IOC
Weight	Approximately 1.6 lb (0.7 kg)

LEDs	**OK/FAIL** LED, one bicolor: • Steady green–The port module is operating normally. • Red–The port module has failed and is not operating normally. • Off–The port module is powered down. **LINK** LED, single color, one per port: • Steady green–The link is active. • Off–No link. **TX/RX** LED, single color, one per port: • Blinking green–The port is receiving or transmitting data. • Off–No activity.
Serial Number Location	The serial number label is located as shown in Figure 45 on page 70.

Figure 45: Port Module SRX-IOC-16GE-TX Serial Number Label



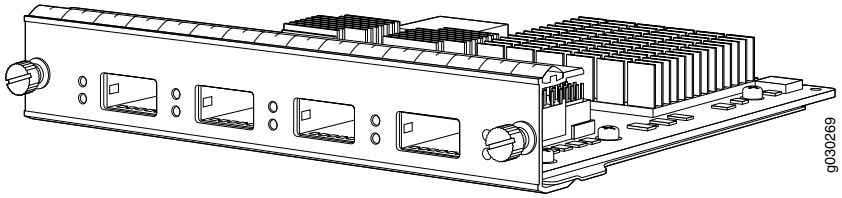
Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Flex I/O Card (SRX5K-FPC-IOC) Specifications on page 65

Flex I/O Card Port Module SRX-IOC-4XGE-XFP Specifications

You use port modules and Flex I/O Cards (Flex IOCs) to add different combinations of small form-factor pluggable transceiver (SFP), 10-gigabit SFP transceiver (XFP), and copper ports to your services gateway to suit the specific needs of your network. The SRX-IOC-4XGE-XFP port module (Figure 46 on page 71) installs into a Flex IOC to add four 10-Gigabit Ethernet XFP ports.

Figure 46: Flex IOC Port Module SRX-IOC-4XGE-XFP

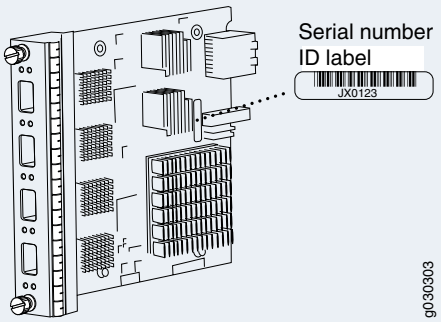


Description	• Port module with four 10-Gigabit Ethernet XFP ports • Maximum throughput: 10 Gbps • Oversubscription ratio: 4:1 • Maximum configurable MTU: 9192 bytes
Software release	• Junos OS Release 9.5R1 and later
Cables and connectors	4 XFP Ethernet ports Supported XFP transceivers: 10GBASE-ER (model numbers SRX-XFP-10GE-ER and SRX-XFP-10GE-ER-ET) 10GBASE-LR (model numbers SRX-XFP-10GE-LR and SRX-XFP-10GE-LR-ET 10GBASE-SR (model numbers SRX-XFP-10GE-SR and SRX-XFP-10GE-SR-ET)
Controls	**ONLINE** Button–The **ONLINE** button on the port module front panel toggles the port module online and offline
Supported Slots	Either slot in SRX5K-FPC-IOC Flex IOC
Weight	Approximately 1.6 lb (0.7 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Steady green–The port module is operating normally. • Red–The port module has failed and is not operating normally. • Off–The port module is powered down. **LINK** LED, single color, one per port: • Steady green–The link is active. • Off–No link.

Serial Number Location

The serial number label is located as shown in Figure 47 on page 72.

Figure 47: Port Module SRX-IOC-4XGE-XFP Serial Number Label



Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Flex I/O Card (SRX5K-FPC-IOC) Specifications on page 65

Switch Control Board SRX5K-SCB Specifications

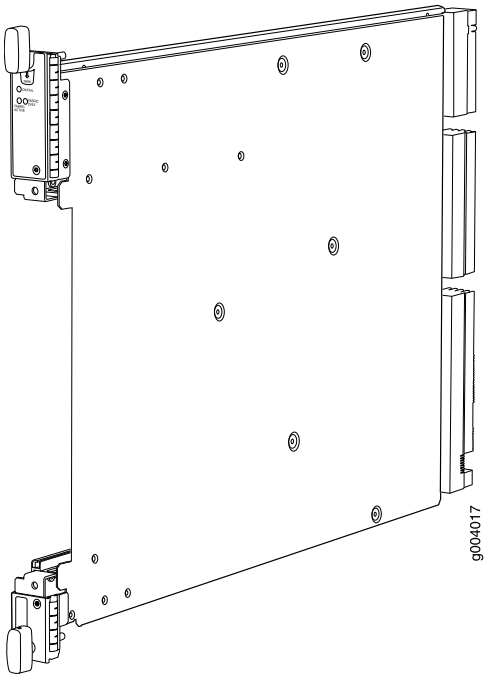
The SRX5K-SCB Switch Control Board (SCB) (Figure 48 on page 73) performs the following functions:

- Powers on and powers off I/O cards (IOCs) and Services Processing Cards (SPCs)
- Controls clocking, system resets, and booting
- Monitors and controls system functions, including fan speed, board power status, PDM status and control, and the system front panel
- Provides interconnections to all the IOCs within the chassis through the switch fabrics integrated into the SCB

The SRX5400 Services Gateway supports only one SCB. The SRX5600 Services Gateway has one SCB installed and you can install a second SCB for redundancy. The SRX5800 Services Gateway has two SCBs installed and you can install a third SCB for switch fabric redundancy.

The host subsystem is composed of a Routing Engine installed directly into a slot on the faceplate of the SCB. When there is no Routing Engine is a SCB, its slot must be covered with a blank panel.

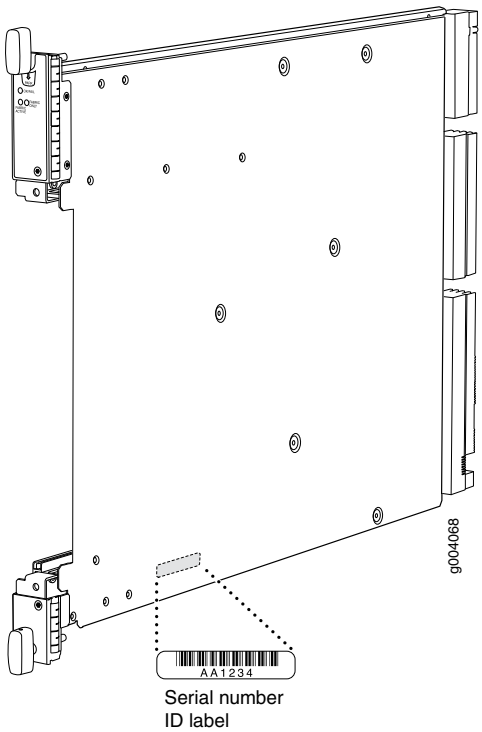
Figure 48: Switch Control Board SRX5K-SCB



Each SCB consists of the following components:

- Chassis management Ethernet switch.
- I2C bus logic, used for low-level communication with each component.
- Component redundancy circuitry.
- Gigabit Ethernet switch that is connected to the embedded CPU complex on all components.
- Switch fabric—Provides the switching functions for the IOCs.
- Control FPGA—Provides the Peripheral Component Interconnect (PCI) interface to the Routing Engine.
- 1000Base-T Ethernet controller—Provides a 1-Gbps Ethernet link between the Routing Engines.
- Ethernet switch—Provides 1-Gbps link speeds between the Routing Engine and the IOCs.
- Circuits for chassis management and control.
- Power circuits for the Routing Engine and SCB.

Description	• SCB with slot for Routing Engine • Maximum throughput: 75 Gbps per slot
Software release	• Junos OS Release 9.2 and later
Cables and connectors	Slot for Routing Engine

Controls	None
Supported Slots	• SRX5400–Only bottom slot **0** • SRX5600–Only bottom slots **0** and **1** • SRX5800–Only center slots **0**, **1**, and **2/6**
Power Requirement	150 W
Weight	Approximately 10 lb (4.5 kg)
LEDs	**OK/FAIL** LED, one bicolor: • Green–The SCB is operating normally. • Red–The SCB has failed and is not operating normally. • Off–The SCB is powered down. **FABRIC ONLY** LED: • Green–The SCB is operating in fabric-only mode. • Off–The SCB is operating in fabric/control board mode. **FABRIC ACTIVE** LED: • Green–The fabric is in active mode.
Serial Number Location	The serial number label is located as shown in Figure 49 on page 74. **Figure 49: SCB Serial Number Label** 

Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Routing Engine SRX5K-RE-13-20 Specifications on page 78

Switch Control Board SRX5K-SCBE Specifications

Each SRX5K-SCBE consists of the following components:

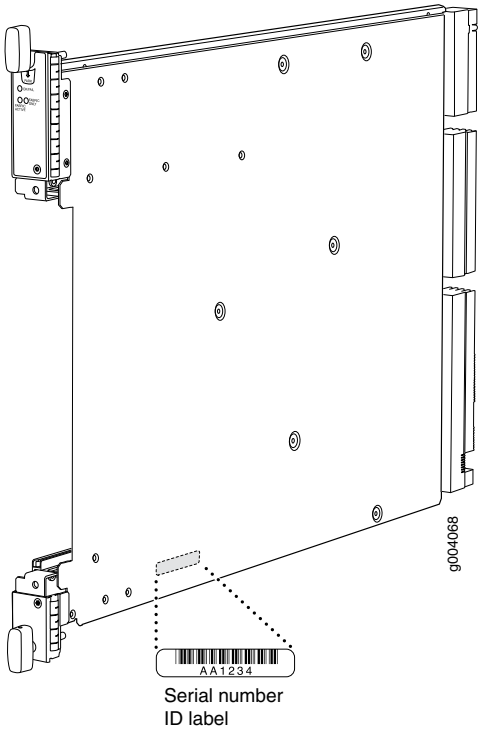
- I2C bus logic for low-level communication with each component
- Component redundancy circuitry
- Control Board/Routing Engine mastership mechanism
- Gigabit Ethernet switch that is connected to the embedded CPU complex on all components
- Switch fabric to provide the switching functions for the MPCs
- 1000BASE-T Ethernet controller to provide a 1-Gbps Ethernet link between the Routing Engines
- Power circuits for the Routing Engine and the SRX5K-SCBE
- LEDs—Provides status of the SRX5K-SCBE and clocking interface

Description	• SRX5K-SCBE with slot for Routing Engine • Maximum throughput: 120 Gbps per slot
Software release	Junos OS Release 12.1X47-D15 and later
Cables and connectors	Slot for Routing Engine
Controls	None
Supported slots	• SRX5400–Only bottom slot 0 • SRX5600–Only bottom slots 0 and 1 • SRX5800–Only center slots 0, 1, and 2/6
Power requirement	• 160 W at 131º F (55º C) • 130 W at 104º F (40º C) • 120 W at 77º F (25º C)
Weight	9.6 lb (4.4 kg) with Routing Engine

Serial number location

The serial number label is located as shown in Figure 50 on page 76.

Figure 50: SRX5K-SCBE Serial Number Label



SRX5K-SCBE LEDs

Table 13 on page 76 describes the SRX5K-SCBE LEDs and their states.

Table 13: SRX5K-SCBE LEDs

Label	Color	State	Description
FABRIC ACTIVE	Green	On steadily	Fabric is in active mode.
FABRIC ONLY	Green	On steadily	SRX5K-SCBE operates in fabric-only mode.
	None	Off	SRX5K-SCBE operates in fabric/control board mode.
OK/FAIL	Green	On steadily	SRX5K-SCBE is online.
	Red	On steadily	SRX5K-SCBE has failed.
	None	Off	SRX5K-SCBE is offline.

Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Routing Engine SRX5K-RE-1800X4 Specifications on page 81

Switch Control Board SRX5K-SCB3 Specifications

Each SRX5K-SCB3 (SCB3) consists of the following components:

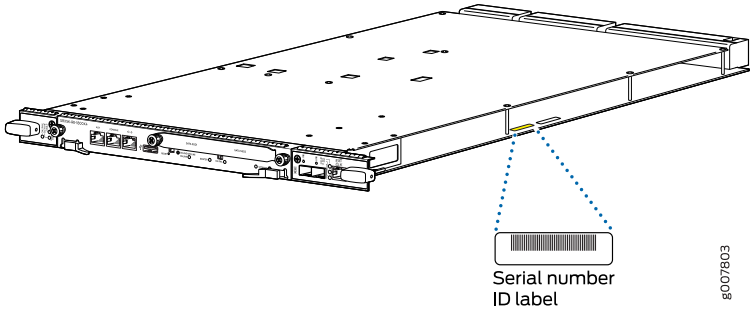
- I2C bus logic for low-level communication with each component
- Component redundancy circuitry
- Control Board/Routing Engine mastership mechanism
- Gigabit Ethernet switch that is connected to the embedded CPU complex on all components
- Switch fabric to provide the switching functions for the MPCs
- Control field-programmable gate array (FPGA) to provide the Peripheral Component Interconnect (PCI) interface to the Routing Engine
- Circuits for chassis management and control
- Power circuits for the Routing Engine and SCB3
- LEDs to provides status of the SCB3

Description	SCB3 with slot for Routing Engine
Software release	Junos OS Release 15.1X49-D10 and later
Cables and connectors	Slot for Routing Engine
Controls	None
Supported slots	• SRX5400–Only bottom slot 0 • SRX5600–Only bottom slots 0 and 1 • SRX5800–Only center slots 0, 1, and 2/6
Power requirement	300 W
Weight	9.6 lb (4.4 kg) with Routing Engine

Serial number location

The serial number label is located as shown in Figure 51 on page 78.

Figure 51: SRX5K-SCB3 Serial Number Label



SRX5K-SCB3 LEDs

Table 14 on page 78 describes the SCB3 LEDs and their states.

Table 14: SRX5K-SCB3 LEDs

Label	Color	State	Description
FABRIC ACTIVE	Green	On steadily	Fabric is in active mode.
OK/FAIL	Green	On steadily	SCB3 is online.
	Red	On steadily	SCB3 has failed.
	–	Off	SCB3 is offline.
LINK	Green	On steadily	Port is enabled and link is established.
	–	Off	Port is disabled or no link is established.

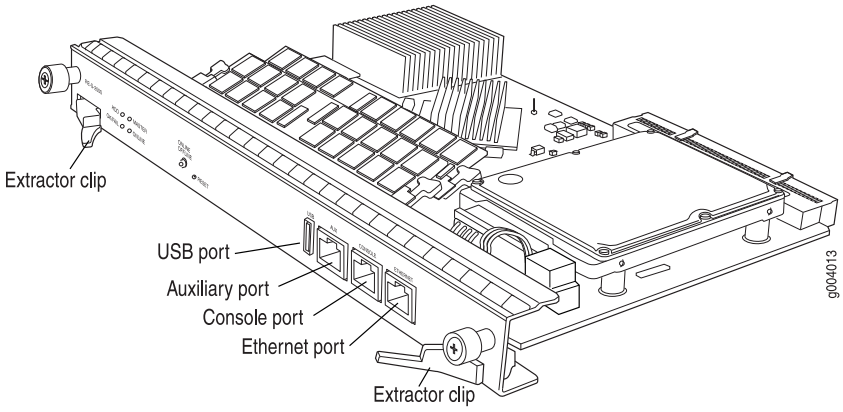
Related Documentation

- SRX5K-MPC3-100G10G Specifications on page 62
- SRX5K-MPC3-40G10G Specifications on page 59
- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35

Routing Engine SRX5K-RE-13-20 Specifications

The SRX5K-RE-13-20 Routing Engine (Figure 52 on page 79) is an Intel-based PC platform that runs the Junos operating system (Junos OS). Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the device, control the device interfaces, control some chassis components, and provide the interface for system management and user access to the device.

Figure 52: Routing Engine



You must install at least one Routing Engine in the services gateway. You can install a second Routing Engine if both Routing Engines are running Junos OS Release 10.0 or later. A second Routing Engine is required if you are using the dual chassis cluster control link feature available in Junos OS Release 10.0 and later. The second Routing Engine does not perform all the functions of a Routing Engine and does not improve resiliency or redundancy. The second Routing Engine and the Switch Control Board (SCB) in which it is installed do not constitute a host subsystem. The only function of the second Routing Engine is to enable the hardware infrastructure that enables the chassis cluster control 1 port on the Services Processing Card (SPC) used for chassis cluster control links. If you install only one Routing Engine in the services gateway, you must install it in the slot in the front panel of SCB0. If you install a second Routing Engine to use the dual chassis cluster control link feature, you install it in the slot in the front panel of SCB1.

The Routing Engine consists of the following components:

- CPU—Runs Junos OS to maintain the services gateway's routing tables and routing protocols. It has a Pentium-class processor.
- DRAM—Provides storage for the routing and forwarding tables and for other Routing Engine processes.
- USB port—Provides a removable media interface through which you can install Junos OS manually. Junos supports USB version 1.0.
- Internal flash disk—Provides primary storage for software images, configuration files, and microcode. The disk is a fixed compact flash and is inaccessible from outside the services gateway.
- Hard disk—Provides secondary storage for log files, memory dumps, and rebooting the system if the internal compact flash disk fails.
- HDD LED—Indicates disk activity for the hard disk drive.
- Management ports—Each Routing Engine has one 10/100-Mbps Ethernet port for connecting to a management network, and two asynchronous serial ports—one for connecting to a console and one for connecting to a modem or other auxiliary device. The interface ports are labeled **AUX**, **CONSOLE**, and **ETHERNET**.
- EEPROM—Stores the serial number of the Routing Engine.

- Extractor clips—Used for inserting and extracting the Routing Engine.
- Captive screws—Secures the Routing Engine in place.

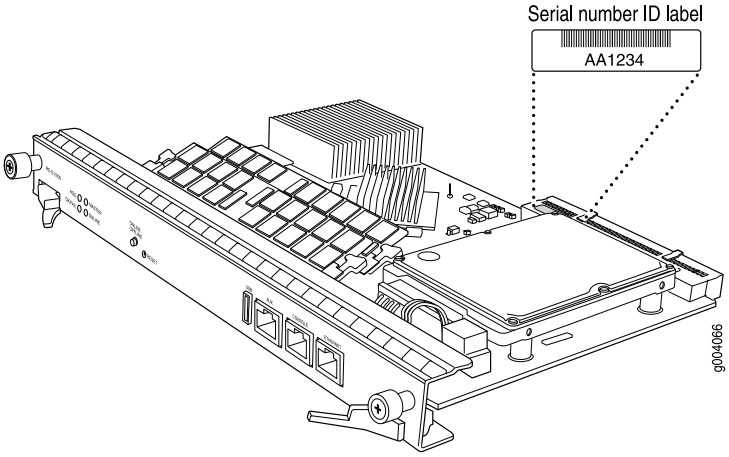
The Routing Engine boots from the storage media in this order: the USB device (if present), then the internal flash disk, then the hard disk, then the LAN.

NOTE: For specific information about Routing Engine components (for example, the amount of DRAM), issue the **show chassis routing-engine** command.

Description	Routing Engine for SRX5400, SRX5600, and SRX5800 Services Gateways
Software release	• Junos OS Release 9.2 and later • Junos OS Release 10.0 and later required to install a second Routing Engine
Cables and connectors	**AUX**—Connects the Routing Engine to a laptop, a modem, or another auxiliary device through a cable with an RJ-45 connector. **CONSOLE**—Connects the Routing Engine to a system console through a cable with an RJ-45 connector. **ETHERNET**—Connects the Routing Engine through an Ethernet connection to a management LAN (or any other device that plugs into an Ethernet connection) for out-of-band management.
Controls	• **RESET** button—Reboots the Routing Engine when pressed • **ONLINE/OFFLINE** Button—Not supported in the current release
Supported Slots	Front panel slot in an SCB installed in: • SRX5400: Bottom slot 0 • SRX5600: Bottom slots 0 or 1 • SRX5800: Center slots 0 or 1 NOTE: The services gateway host subsystem Routing Engine must be installed in the SCB in slot **0**. A Routing Engine installed in an SCB in slot **1** only enables dual control links in chassis cluster configurations.
Power Requirement	90 W
Weight	Approximately 2.4 lb (1.1 kg)

LEDs	**HDD** LED: • Blinking green–The Routing Engine hard disk is functioning normally. **MASTER** LED: • Blue–The Routing Engine is Primary. NOTE: The SRX5400, SRX5600, and SRX5800 Services Gateways do not support a secondary or backup Routing Engine, so the **MASTER** LED should always be lit. **OK/FAIL** LED, one bicolor: • Off–The Routing Engine is operating normally. • Red–The Routing Engine has failed and is not operating normally. **ONLINE** LED: • Blinking green–The Routing Engine is coming online. • Steady green–The Routing Engine is functioning normally.
Serial Number Location	The serial number label is located on the right side of the top of the Routing Engine as shown in Figure 53 on page 81

Figure 53: SRX5K-RE-13-20 Serial Number Label



Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Switch Control Board SRX5K-SCB Specifications on page 72

Routing Engine SRX5K-RE-1800X4 Specifications

Each Routing Engine consists of the following components:

- CPU—Runs Junos OS to maintain the routing tables and routing protocols.
- DRAM—Provides storage for the routing and forwarding tables and for other Routing Engine processes.

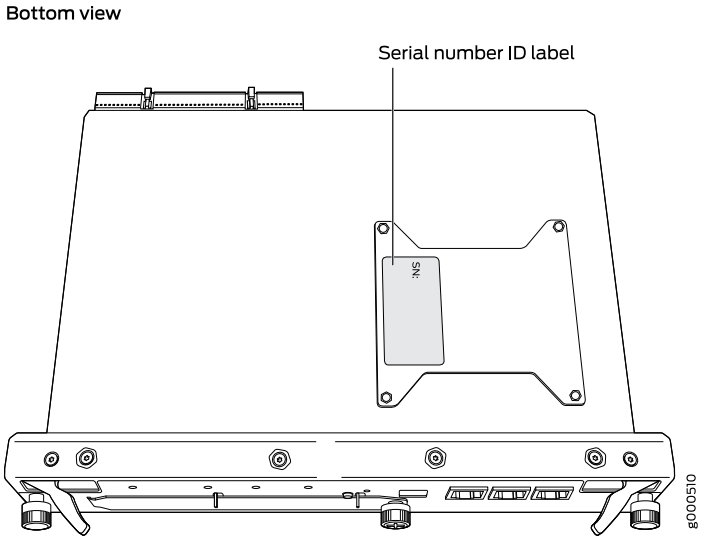
- USB port—Provides a removable media interface through which you can install the Junos OS manually. Junos OS supports USB version 1.0 and 2.0.
- CompactFlash card—Provides primary storage for software images, configuration files, and microcode. The CompactFlash card is fixed and is inaccessible from outside the device.
- Solid-state drive (SSD)—Provides secondary storage for log files, for generating core files, and for rebooting the system if the CompactFlash card fails.
- Interface ports—The **AUX**, **CONSOLE**, and **ETHERNET** ports provide access to management devices. Each Routing Engine has one 10/100/1000-Mbps Ethernet port for connecting to a management network, and two asynchronous serial ports—one for connecting to a console and one for connecting to a modem or other auxiliary device.
- EEPROM—Stores the serial number of the Routing Engine.
- Reset button—Reboots the Routing Engine when pressed.
- Online/Offline button—Takes the Routing Engine online or offline when pressed.
- Extractor clips—Inserts and extracts the Routing Engine.
- Captive screws—Secures the Routing Engine in place.

Description	Routing Engine for SRX5400, SRX5600, and SRX5800 Services Gateways
Software release	Junos OS Release 12.1X47-D15 and later
Cables and connectors	Slot for Routing Engine • **AUX**–Connects the Routing Engine to a laptop, a modem, or another auxiliary device through a cable with an RJ-45 connector. • **CONSOLE**–Connects the Routing Engine to a system console through a cable with an RJ-45 connector. • **ETHERNET**–Connects the Routing Engine through an Ethernet connection to a management LAN (or any other device that plugs into an Ethernet connection) for out-of-band management.
Controls	RESET button–Reboots the Routing Engine when pressed.
Supported slots	Front panel slot in an SCB installed in: • SRX5400: Bottom slot 0 • SRX5600: Bottom slots 0 or 1 • SRX5800: Center slots 0 or 1 NOTE: The services gateway host subsystem Routing Engine must be installed in the SCB in slot 0. A Routing Engine installed in an SCB in slot 1 only enables dual control links in chassis cluster configurations.
Power requirement	90 W
Weight	2.4 lb (1.1 kg)

Serial number location

The serial number label is located as shown in Figure 54 on page 83.

Figure 54: SRX5K-RE-1800X4 Serial Number Label



SRX5K-RE-1800X4 LEDs

Each Routing Engine has four LEDs that indicate its status. The LEDs, labeled **MASTER**, **STORAGE**, **ONLINE**, and **OK/FAIL**, are located directly on the faceplate of the Routing Engine. Table 15 on page 83 describes the Routing Engine LEDs and their states.

Table 15: SRX5K-RE-1800X4 LEDs

Label	Color	State	Description
MASTER	Blue	On steadily	Routing Engine is the master.
STORAGE	Green	Blinking	Indicates activity on the SSD or CompactFlash card.
ONLINE	Green	Blinking	Routing Engine is transitioning online.
	None	On steadily	Routing Engine is functioning normally.
OK/FAIL	Red	On steadily	Routing Engine has failed.

Related Documentation

- Cards Supported on SRX5400, SRX5600, and SRX5800 Services Gateways on page 35
- Switch Control Board SRX5K-SCBE Specifications on page 75

CHAPTER 5

Cooling System Description

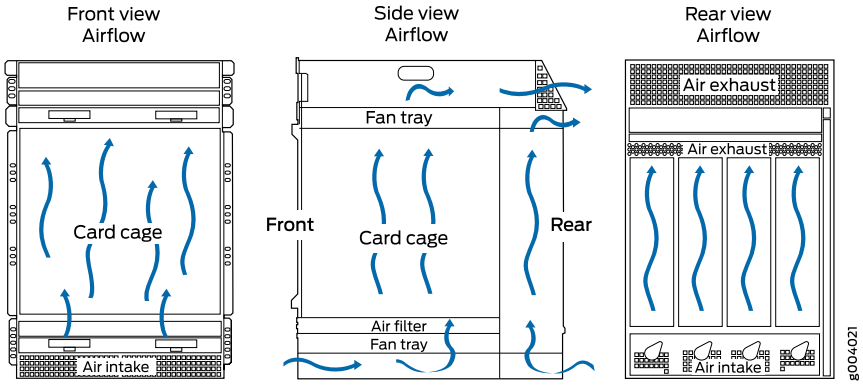
SRX5800 Services Gateway Cooling System Description

The cooling system consists of the following components:

- Upper fan tray
- Lower fan tray
- Air filter tray and air filter

The cooling system components work together to keep all services gateway components within the acceptable temperature range (see Figure 55 on page 85, Figure 56 on page 86, Figure 57 on page 86, Figure 58 on page 86, and Figure 59 on page 86). The services gateway has two fan trays located in the front of the device that install horizontally above and below the card cage. The fan trays are interchangeable and are hot-insertable and hot-removable.

Figure 55: Airflow Through the Chassis



The host subsystem monitors the temperature of the device components. When the device is operating normally, the fans function at lower than full speed. If a fan fails or the ambient temperature rises above a threshold, the speed of the remaining fans is automatically adjusted to keep the temperature within the acceptable range. If the ambient maximum temperature specification is exceeded and the system cannot be

adequately cooled, the Routing Engine shuts down the system by disabling output power from each PEM.

There is a single air intake in the front of the services gateway. Air is pushed up through an air filter, through the card cage, and then through the upper fan tray where it combines in a common exhaust plenum and is exhausted out the upper rear of the system.

Two different types of fan tray are available:

- The standard capacity fan tray has six fans and is adequate for services gateways in which standard-capacity power supplies are installed.
- The high-capacity fan tray has 12 fans and is required when high-capacity power supplies are installed. When high-capacity fan trays are installed, you must also install the high-capacity air filter tray.

Figure 56: Standard-Capacity Fan Tray (Same Upper and Lower)

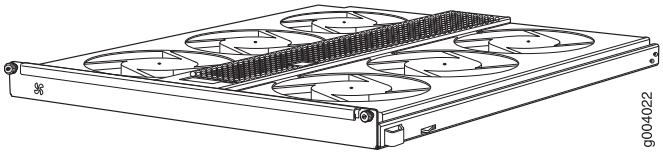


Figure 57: High-Capacity Fan Tray (Same Upper and Lower)

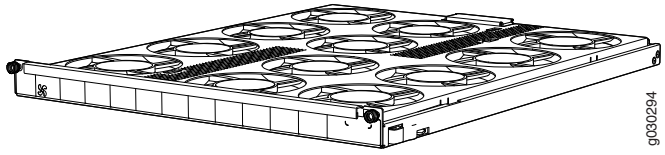


Figure 58: Air Filter

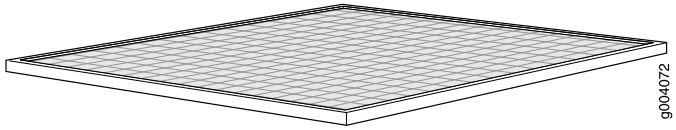


Figure 59: Standard-Capacity Air Filter Tray

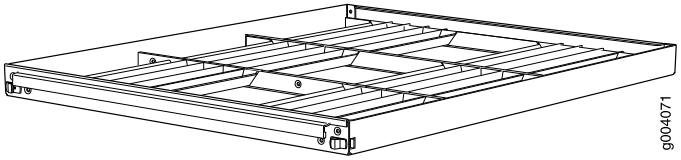
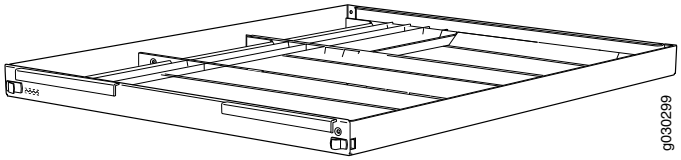


Figure 60: High-Capacity Air Filter Tray



Related Documentation

- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Troubleshooting the SRX5800 Services Gateway Cooling System on page 288
- Replacing an SRX5800 Services Gateway Fan Tray on page 393
- Replacing the SRX5800 Services Gateway Air Filter on page 398

CHAPTER 6

Power System Description

SRX5800 Services Gateway Power System Overview

The SRX5800 Services Gateway uses either AC or DC power supplies. The services gateway is configurable with two to four AC power supplies or two or four DC power supplies. The power supplies connect to the midplane, which distributes the different output voltages produced by the power supplies to the services gateway components, depending on their voltage requirements.

Table 16 on page 89 describes the different types of power supplies available.

Table 16: Power Supply Type Summary

Power Supply Type	Input Condition (If Any)	Maximum Output	Redundancy	Power Distribution
AC standard-capacity		1700 W	3+1	Shared
AC high-capacity	One AC input	1700 W	2+2	Zoned
	Two AC inputs	4100 W		
DC standard-capacity		1700 W		
DC high-capacity	One DC input	1700 W		
	Two DC inputs	4100 W		

NOTE: The services gateway must be running Junos OS Release 10.4 or later in order to use high-capacity AC power supplies. The services gateway must be running Junos OS Release 12.1X44-D10 or later in order to use high-capacity DC power supplies.

All power supplies are hot-removable and hot-insertable. Each power supply is cooled by its own internal cooling system.

NOTE: Devices configured from the factory with DC power supplies are shipped with a blank panel installed over the power distribution modules. Devices configured with AC power supplies have no blank panel.

CAUTION: The services gateway cannot be powered from AC and DC power supplies simultaneously. The first type of power supply detected by the services gateway when initially powered on determines the type of power supply allowed by the services gateway. All installed power supplies of the other type are disabled by the services gateway. If you install a power supply of the other type while the services gateway is operating, the services gateway disables the power supply and generates an alarm.

When the services gateway is powered by standard-capacity AC power supplies, the services gateway contains either three or four AC power supplies, located at the rear of the chassis in slots **PEM0** through **PEM3** (left to right). Each power supply provides power to all components in the services gateway. When three power supplies are present, they share power almost equally within a fully populated system. Four power supplies provide full power redundancy. If one power supply fails or is removed, the remaining power supplies instantly assume the entire electrical load without interruption. Three power supplies provide the maximum configuration with full power for as long as the services gateway is operational.

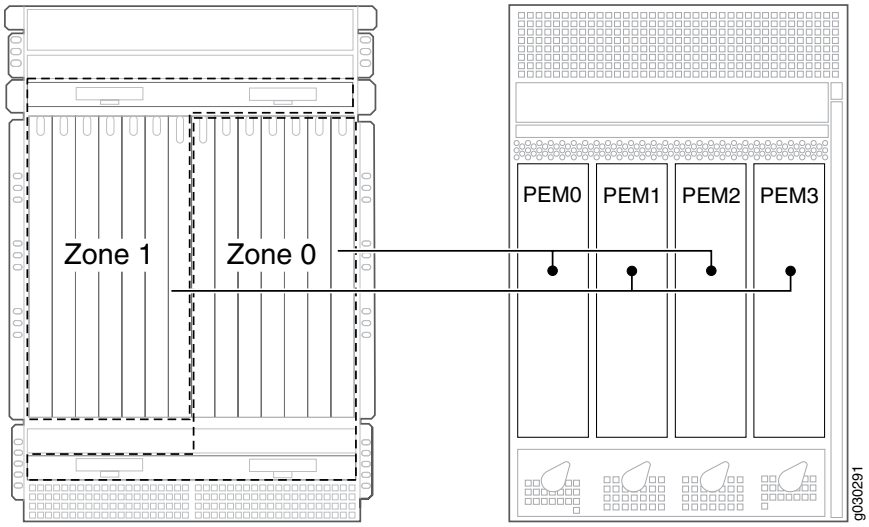
When the services gateway is powered by either standard- or high-capacity DC power supplies, or by high-capacity AC power supplies, power distribution within the chassis is divided into zones, as described in Table 17 on page 90.

Table 17: SRX5800 Services Gateway Power Distribution (DC or High-Capacity AC Power Supplies)

Zone	Power Supplies	Provide Power To:
Zone 0	• PEM0 • PEM2	• Lower fan tray • IOC or SPC slots 6 through 11 • SCB slots 1 and 2
Zone 1	• PEM1 • PEM3	• Upper fan tray • IOC or SPC slots 0 through 5 • SCB slot 0

Figure 61 on page 91 shows the distribution of power from the power supplies to the chassis components in an SRX5800 Services Gateway chassis powered by DC power supplies or high-capacity AC power supplies.

Figure 61: Power Distribution from DC and High-Capacity AC Power Supplies in the SRX5800 Services Gateway Chassis



NOTE: The craft interface draws its power from the SCBs installed in the SCB slots 0, 1, and 2 at the center of the card cage. In the standard configuration, with SCBs in slots 0 and 1, the craft interface is powered on even when one of the two zones loses power. But if the chassis only has one SCB installed, the craft interface draws all of its power from that card, and consequently is powered off if the zone in which that SCB is installed loses power.

You can install either two or four DC power supplies or high-capacity AC power supplies. Two power supplies are required to power the two zones, while four power supplies provide full redundancy for both zones. The power supplies in slots **PEM0** and **PEM2** form a redundant pair, as do the power supplies in slots **PEM1** and **PEM3**. When two power supplies are installed for a zone, they share the load. If a power supply fails, its redundant power supply assumes the full load of that zone without interruption.

If you do install only two power supplies, they must be installed so that one is in an odd-numbered slot and the other is in an even-numbered slot. For example, you can install one high-capacity AC power supply in each of the slots **PEM0** and **PEM1**.

Related Documentation

- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- SRX5800 Services Gateway Standard-Capacity AC Power Supply on page 95
- SRX5800 Services Gateway Standard-Capacity DC Power Supply on page 100
- SRX5800 Services Gateway High-Capacity AC Power Supply on page 92

- SRX5800 Services Gateway High-Capacity DC Power Supply on page 97
- Troubleshooting the SRX5800 Services Gateway Power System on page 292
- Installing an SRX5800 Services Gateway AC Power Supply on page 187
- Installing an SRX5800 Services Gateway DC Power Supply on page 190

SRX5800 Services Gateway High-Capacity AC Power Supply

High-capacity AC power supplies provide a maximum of 4100 W of power each. Two high-capacity power supplies are required, and you can install four high-capacity power supplies for redundancy. Each high-capacity AC power supply has two corresponding AC appliance inlets: one located in the chassis directly above the power supply and one located near the top edge of the power supply itself. For each power supply, you connect one power cord to the inlet on the chassis above the power supply and one power cord to the inlet on the power supply itself. Each inlet you connect requires a dedicated AC power feed and a dedicated 15 A (250 VAC) circuit breaker. See Figure 62 on page 94.

NOTE: The services gateway cannot be powered from standard-capacity and high-capacity AC power supplies simultaneously. The one exception is during the process of replacing standard-capacity AC power supplies with high-capacity AC power supplies, when it is permissible to have both types installed briefly.

NOTE: The high-capacity power supply will operate with only one of its two AC inlets connected to an AC power feed. However, its DC output will be limited to a maximum of 1700 W. We recommend that you connect two AC power feeds to each high-capacity AC power supply.

NOTE: The services gateway must be running Junos OS Release 10.4 or later in order to use high-capacity AC power supplies.

Each high-capacity AC power supply has an input mode switch, covered by a small metal plate. The input mode switch tells the system the number of AC power feeds it should expect. The input mode switch settings are described in Table 18 on page 93. The default setting is 1.

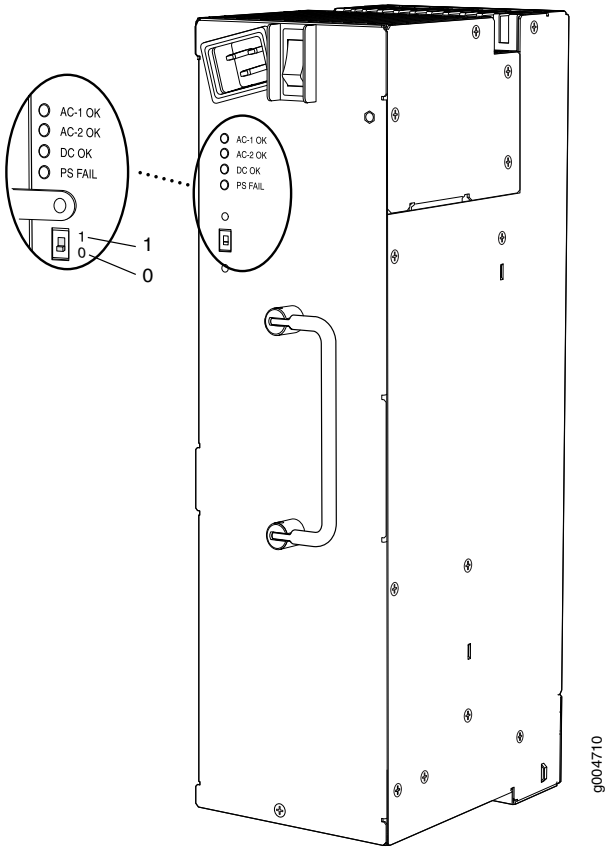
Table 18: High-Capacity AC Power Supply Input Mode Switch Settings

Mode Switch Setting	AC Inputs	Result
1	Both AC inlets powered	DC output of 4100 W **DC OK** LED lights
	Only one AC inlet powered	DC output of 1700 W **DC OK** LED lights
0	Both AC inlets powered	DC output of 4100 W **DC OK** LED lights
	Only one AC inlet powered	DC output disabled **DC OK** LED unlit

NOTE: We recommend that you set the input mode switch to 1 and connect two AC input feeds to each high-capacity AC power supply.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, the services gateway chassis must be adequately grounded before power is connected. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

Figure 62: High-Capacity AC Power Supply



Related Documentation

- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- SRX5800 Services Gateway High-Capacity AC Power Supply LEDs on page 94
- SRX5800 Services Gateway Power System Overview on page 89

SRX5800 Services Gateway High-Capacity AC Power Supply LEDs

Each high-capacity AC power supply faceplate contains four LEDs that indicate the status of the power supply (see Table 19 on page 95). The power supply status is also reflected in two LEDs on the craft interface. In addition, a power supply failure triggers the red alarm LED on the craft interface.

Table 19: High-Capacity AC Power Supply LEDs

Label	Color	State	Description
AC-1 OK	Green	Off	AC power applied to power supply at the upper appliance inlet is not within the normal operating range.
		On	AC power applied to power supply at the upper appliance inlet is within the normal operating range.
AC-2 OK	Green	Off	AC power applied to power supply at the lower appliance inlet is not within the normal operating range.
		On	AC power applied to power supply at the lower appliance inlet is within the normal operating range.
DC OK	Green	Off	DC power outputs generated by the power supply are not within the normal operating ranges.
		On	DC power outputs generated by the power supply are within the normal operating ranges.
PS FAIL	Red	Off	Power supply is functioning normally.
		On	Power supply is not functioning normally. Check the **AC-1 OK**, **AC-2 OK**, and **DC OK** LEDs for more information.

Related Documentation

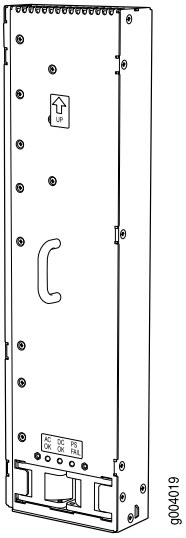
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway High-Capacity AC Power Supply on page 92
- SRX5800 Services Gateway Power System Overview on page 89

SRX5800 Services Gateway Standard-Capacity AC Power Supply

Each standard-capacity AC power supply has a corresponding AC appliance inlet located in the chassis directly above the power supply. Each inlet requires a dedicated AC power feed and a dedicated 15 A (250 VAC) circuit breaker. See Figure 63 on page 96.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, the services gateway chassis must be adequately grounded before power is connected. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

Figure 63: Standard-Capacity AC Power Supply



Related Documentation

- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 96
- Troubleshooting the SRX5800 Services Gateway Power System on page 292
- Replacing an SRX5800 Services Gateway AC Power Supply on page 405
- SRX5800 Services Gateway AC Power Supply Specifications on page 133

SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs

Each standard-capacity AC power supply faceplate contains three LEDs that indicate the status of the power supply (see Table 20 on page 97). The power supply status is also reflected in two LEDs on the craft interface. In addition, a power supply failure triggers the red alarm LED on the craft interface.

Table 20: Standard Capacity AC Power Supply LEDs

Label	Color	State	Description
AC OK	Green	Off	AC power applied to power supply is not within the normal operating range.
		On	AC power applied to power supply is within the normal operating range.
DC OK	Green	Off	DC power outputs generated by the power supply are not within the normal operating ranges.
		On	DC power outputs generated by the power supply are within the normal operating ranges.
PS FAIL	Red	Off	Power supply is functioning normally.
		On	Power supply is not functioning normally. Check **AC OK** and **DC OK** LEDs for more information.

Related Documentation

- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Standard-Capacity AC Power Supply on page 95
- SRX5800 Services Gateway Standard-Capacity DC Power Supply on page 100

SRX5800 Services Gateway High-Capacity DC Power Supply

High-capacity DC power supplies provide a maximum of 4100 W of power each. Two high-capacity DC power supplies are required, and you can install four high-capacity DC power supplies for redundancy. Each high-capacity DC power supply has inlets for two DC power feeds. The four power connectors (-48V and RTN for each of the two inlets) are located behind a clear plastic cover near the bottom of the power supply. Each DC power inlet you use requires a dedicated DC power feed and a dedicated 80 A circuit breaker. See Figure 64 on page 99.

NOTE: The services gateway cannot be powered from standard-capacity and high-capacity DC power supplies simultaneously. The one exception is during the process of replacing standard-capacity DC power supplies with high-capacity DC power supplies, when it is permissible to have both types installed briefly.

NOTE: The high-capacity power supply will operate with only one of its two DC inlets connected to a DC power feed. However, its DC output will be limited to a maximum of 1700 W. We recommend that you connect two DC power feeds to each high-capacity DC power supply.

NOTE: The services gateway must be running Junos OS Release 12.1X44-D10 or later in order to use high-capacity DC power supplies.

Each high-capacity DC power supply has an input mode switch, covered by a small metal plate. The input mode switch tells the system the number of DC power feeds it should expect. The input mode switch settings are described in Table 21 on page 98. The default setting is 1.

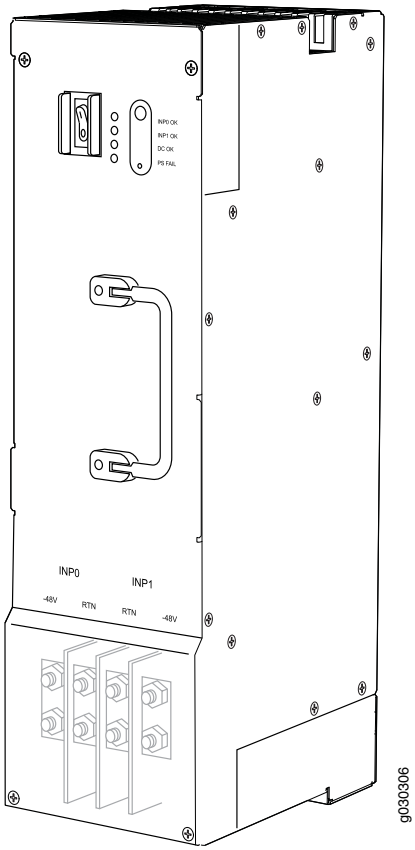
Table 21: High-Capacity DC Power Supply Input Mode Switch Settings

Mode Switch Setting	AC Inputs	Result
1	Both DC inlets powered	DC output of 4100 W **DC OK** LED lights
	Only one DC inlet powered	DC output of 1700 W **DC OK** LED lights
0	Both DC inlets powered	DC output of 4100 W **DC OK** LED lights
	Only one DC inlet powered	DC output disabled **DC OK** LED unlit

NOTE: We recommend that you set the input mode switch to 1 and connect two DC input feeds to each high-capacity DC power supply.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, the services gateway chassis must be adequately grounded before power is connected. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

Figure 64: High-Capacity DC Power Supply



Related Documentation

- SRX5800 Services Gateway Power System Overview on page 89
- Installing an SRX5800 Services Gateway DC Power Supply on page 190
- SRX5800 Services Gateway Standard-Capacity DC Power Supply LEDs on page 101
- Maintaining SRX5800 Services Gateway Power Supplies on page 275
- Troubleshooting the SRX5800 Services Gateway Power System on page 292
- Replacing an SRX5800 Services Gateway DC Power Supply on page 413
- SRX5800 Services Gateway DC Power Supply Specifications on page 137

SRX5800 Services Gateway High-Capacity DC Power Supply LEDs

Each high-capacity DC power supply faceplate contains four LEDs that indicate the status of the power supply (see Table 22 on page 100). The power supply status is also reflected in two LEDs on the craft interface. In addition, a power supply failure triggers the red alarm LED on the craft interface.

Table 22: High-Capacity DC Power Supply LEDs

Label	Color	State	Description
INP0 OK	Green	Off	DC power applied to the power supply at input INP0 is not within the normal operating range.
		On	DC power applied to the power supply at input INP0 is within the normal operating range.
INP1 OK	Green	Off	DC power applied to the power supply at input INP1 is not within the normal operating range.
		On	DC power applied to the power supply at input INP1 is within the normal operating range.
DC OK	Green	Off	DC power outputs generated by the power supply are not within the normal operating ranges.
		On	DC power outputs generated by the power supply are within the normal operating ranges.
PS FAIL	Red	Off	Power supply is functioning normally.
		On	Power supply is not functioning normally. Check the **INP0 OK**, **INP1 OK**, and **DC OK** LEDs for more information.

Related Documentation

- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Standard-Capacity DC Power Supply on page 100

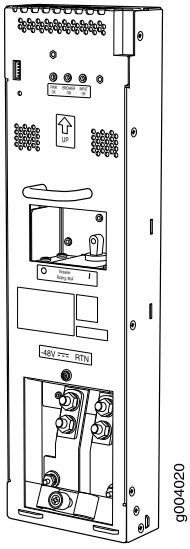
SRX5800 Services Gateway Standard-Capacity DC Power Supply

In the DC power configuration, the services gateway contains either two or four DC power supplies (see Figure 65 on page 101), located at the lower rear of the chassis in slots **PEM0** through **PEM3** (left to right). You can upgrade your DC power system from two to four power supplies.

Four power supplies provide full redundancy. If a DC power supply fails, its redundant power supply takes over without interruption.

Each DC power supply has a single DC input (–48 VDC and return) that requires a dedicated 80 A (–48 VDC) circuit breaker for the maximum hardware configuration.

Figure 65: Standard-Capacity DC Power Supply



Related Documentation

- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Standard-Capacity DC Power Supply LEDs on page 101
- Maintaining SRX5800 Services Gateway Power Supplies on page 275
- Troubleshooting the SRX5800 Services Gateway Power System on page 292
- Replacing an SRX5800 Services Gateway DC Power Supply on page 413
- SRX5800 Services Gateway DC Power Supply Specifications on page 137

SRX5800 Services Gateway Standard-Capacity DC Power Supply LEDs

Each standard-capacity DC power supply faceplate contains three LEDs that indicate the status of the power supply (see Table 23 on page 102). The power supply status is also reflected in two LEDs on the craft interface. In addition, a power supply failure triggers the red alarm LED on the craft interface.

Table 23: DC Power Supply LEDs

Label	Color	State	Description
PWR OK	Green	Off	Power supply is not functioning normally. Check the **INPUT OK** LED for more information.
		On	Power supply is functioning normally.
BREAKER ON	Green	Off	DC power supply circuit breaker is turned off.
		On	DC power supply circuit breaker is turned on.
INPUT OK	Green	Off	DC input to the PEM is not present.
		On	DC input is present, and is connected in correct polarity.
	Amber	On	DC input is present, but connected in reverse polarity.

Related Documentation

- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Standard-Capacity DC Power Supply on page 100

PART 2

Site Planning and Specifications

CHAPTER 7

Planning and Preparing the Site

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 466

Site Electrical Wiring Guidelines

Table 24 on page 106 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 24: Site Electrical Wiring Guidelines

Site Wiring Factor	Guidelines
Signaling limitations	If your site experiences any of the following problems, consult experts in electrical surge suppression and shielding: • Improperly installed wires cause radio frequency interference (RFI). • Damage from lightning strikes occurs when wires exceed recommended distances or pass between buildings. • Electromagnetic pulses (EMPs) caused by lightning damage unshielded conductors and electronic devices.
Radio frequency interference	To reduce or eliminate RFI from your site wiring, do the following: • Use a twisted-pair cable with a good distribution of grounding conductors. • If you must exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal when applicable.
Electromagnetic compatibility	If your site is susceptible to problems with electromagnetic compatibility (EMC), particularly from lightning or radio transmitters, seek expert advice. 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 439
- General Electrical Safety Guidelines and Warnings on page 465
- Prevention of Electrostatic Discharge Damage on page 466

SRX5800 Services Gateway Physical Specifications

Table 25 on page 107 summarizes the physical specifications for the services gateway chassis.

Table 25: Physical Specifications

Description		Value
Chassis dimensions	Height	27.75 in. (70.5 cm) high
	Width	17.37 in. (44.1 cm) wide
	Depth, with standard-capacity power supplies	23.0 in. (58.4 cm) deep from front-mounting bracket to chassis rear 27.8 in. (70.6 cm) total depth including cable management system
	Depth, with high-capacity AC power supplies	25.5 in. (64.8 cm) deep from front-mounting bracket to chassis rear 30.3 in. (77.0 cm) total depth including cable management system
	Depth, with high-capacity DC power supplies	27.8 in. (70.6 cm) deep from front-mounting bracket to chassis rear 32.6 in. (82.8 cm) total depth including cable management system
Services gateway weight		Chassis with midplane, fan tray, air filter, and cable manager: 150 lb (60.4 kg) Maximum configuration: 400 lb (182 kg)
Routing Engine weight		SRX5K-RE-13-20: 2.4 lb (1.1 kg) SRX5K-RE-1800X4: 2.4 lb (1.1 kg)
SCB weight		SRX5K-SCB: 9.6 lb (4.4 kg) SRX5K-SCBE: 9.6 lb (4.4 kg) SRK5K-SCB3: 10.14 lb (4.6 kg)
MPC weight (with two MICs)		13.1 lb (5.9 kg)
IOC weight		13.1 lb (5.9 kg)
Craft interface weight		1.1 lb (0.5 kg)
Fan tray weight		4.2 lb (1.9 kg)
Air filter weight		1.0 lb (0.5 kg)
Cable management weight		0.3 lb (0.14 kg)
Standard-capacity DC power supply weight (only supported on devices with SRX5K-SCB and SRX5K-RE-13-20)		3.8 lb (1.7 kg)

Table 25: Physical Specifications *(continued)*

Description	Value
High-capacity DC power supply weight	12.0 lb (5.5 kg)
Standard-capacity AC power supply weight (only supported on devices with SRX5K-SCB and SRX5K-RE-13-20)	5.0 lb (2.3 kg)
High-capacity AC power supply weight	12.0 lb (5.5 kg)

NOTE: For the weights of specific cards, Routing Engines, or port modules, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Guide* at www.juniper.net/documentation/.

Related Documentation

- SRX5800 Services Gateway Component Redundancy on page 17
- SRX5800 Services Gateway Chassis on page 19
- SRX5800 Services Gateway Host Subsystem Description on page 10
- SRX5800 Services Gateway Craft Interface Overview on page 24
- SRX5800 Services Gateway Power System Overview on page 89
- SRX5800 Services Gateway Cooling System Description on page 85

SRX5800 Services Gateway Environmental Specifications

Table 26 on page 108 specifies the environmental specifications required for normal services gateway operation. In addition, the site should be as dust-free as possible.

Table 26: Services Gateway Environmental Specifications

Description	Value
Altitude	No performance degradation to 10,000 ft (3048 m)
Relative humidity	Normal operation ensured in relative humidity range of 5% to 90%, noncondensing
Temperature	Normal operation ensured in temperature range of 32°F (0°C) to 104°F (40°C) Nonoperating storage temperature in shipping crate: –40°F (–40°C) to 158°F (70°C)
Seismic	Tested to meet Telcordia Technologies Zone 4 earthquake requirements

Table 26: Services Gateway Environmental Specifications *(continued)*

Description	Value
Maximum thermal output	AC power: 20,160, BTU/hour (5912 W) DC power: 17,057 BTU/hour (5002 W) NOTE: These specifications are estimates and subject to change.

NOTE: Install the services gateway 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

- SRX5800 Services Gateway Agency Approvals on page 485
- *SRX5800 Services Gateway General Safety Guidelines and Warnings*
- *SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment*
- *SRX5800 Services Gateway Definition of Safety Warning Levels*
- *General Electrical Safety Guidelines and Warnings*

Site Preparation Checklist for the SRX5800 Services Gateway

The checklist in Table 27 on page 109 summarizes the tasks you need to perform when preparing a site for services gateway installation.

Table 27: Site Preparation Checklist

Item or Task	For More Information ...	Performed By	Date
Verify that environmental factors such as temperature and humidity do not exceed services gateway tolerances.	"SRX5800 Services Gateway Environmental Specifications" on page 108		
Plan rack or cabinet location, including required space clearances.	"Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance" on page 125		
Select the type of rack or cabinet.	"SRX5800 Services Gateway Cabinet Size and Clearance Requirements" on page 127, "SRX5800 Services Gateway Rack Size and Strength Requirements" on page 123		
If a rack is used, secure rack to floor and building structure.	"Connection to Building Structure for the SRX5800 Services Gateway Rack" on page 124		
Acquire cables and connectors.			

Table 27: Site Preparation Checklist *(continued)*

Item or Task	For More Information ...	Performed By	Date
Locate sites for connection of system grounding.	*DC Power Electrical Safety Guidelines and Warnings*		
Measure distance between external power sources and services gateway installation site.			
Calculate the optical power budget and optical power margin.	"Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway" on page 149,"Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway" on page 149		

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Unpacking the SRX5800 Services Gateway on page 157

Calculating Power Requirements for the SRX5800 Services Gateway

The information in this topic helps you determine which power supplies are suitable for various configurations, as well as which power supplies are not suitable because output power is exceeded. You determine suitability by subtracting the total power draw from the maximum output of the power supplies. Afterward, the required input current is calculated. Finally, you calculate the thermal output.

We recommend that you provision power according to the maximum input current listed in the power supply electrical specifications (see "SRX5800 Services Gateway AC Power Supply Specifications" on page 133 and "SRX5800 Services Gateway DC Power Supply Specifications" on page 137).

Use the following procedures to calculate the power requirement:

1. Calculate the power requirement.
2. Evaluate the power budget.
3. Calculate input power.
4. Calculate thermal output (BTUs) for cooling requirements.

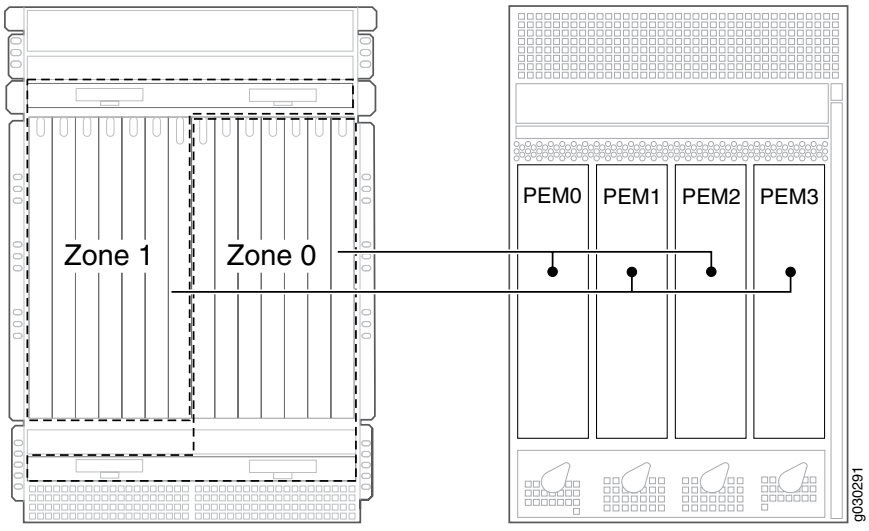
The SRX5800 Services Gateway chassis with normal-capacity AC power supplies has one overall zone. The SRX5800 Services Gateway Chassis with high-capacity AC power supplies or either standard- or high-capacity DC power supplies is zoned. Zoning means that certain components are powered by specific power supplies (see Table 28 on page 111 and Figure 66 on page 111 for information on zoning). When calculating power requirements, be sure that there is adequate power for each zone.

Three AC power supplies are mandatory for a SRX5800 Services Gateway chassis with normal-capacity AC power supplies.

Table 28: SRX5800 Services Gateway Zoning

Zone	Power Supply (PEM)	Components Receiving Power
Zone 0	PEM 0 or 2	• Lower fan tray • IOC/SPC slots 6 through 11 • SCB slots 1 through 2
Zone 1	PEM 1 or 3	• Upper fan tray • IOC/SPC slots 0 through 5 • SCB slot 0

Figure 66: Power Distribution from DC and High-Capacity AC Power Supplies in the SRX5800 Services Gateway Chassis



Sample configuration for SRX5800 Services Gateway chassis with SRX5K-SCB (SCB1) and SRX5K-RE-13-20 (RE1):

- Four high-capacity AC power supplies (using two feeds for each power supply); two supplies are active, two are redundant.
- Two Switch Control Boards (SCBs) with one Routing Engine installed in SCB 0
- One SRX5K-MPC (IOC2) Modular Port Concentrator, with two Modular Interface Cards (MICs)

- One SRX5K-40GE-SFP I/O card (IOC)
- SRX5K-SPC-4-15-320 (SPC2) Services Processing Card

NOTE: You must have high-capacity power supplies (either AC or DC) and high-capacity fan trays installed in the services gateway in order to install and use SPC2. If you do not have high-capacity power supplies and fan trays installed, the services gateway will log an alarm condition when it recognizes the SPC.

- High-capacity cooling system (upper and lower fan trays)

NOTE: The high-capacity cooling system satisfies cooling requirements of SPC2 and must be used for proper cooling.

1. Calculate the power requirements (usage) as shown in Table 29 on page 112 and Table 33 on page 116.

Table 29: Sample Power Requirements for an SRX5800 Services Gateway with SCB1 and RE1

Chassis Component	Part Number	Power Requirement	Zone 0 Power	Zone 1 Power
Base system	SRX5800BASE-HC-AC	50 W	25 W	25 W
High-capacity cooling system	SRX5800-HC-FAN	320 W * 2 = 640 W	320 W	320 W
SPC - slots 0 through 4	SPC2 See note below.	585W * 5 = 2925 W		2925 W
MPC - slot 5	IOC2 with two MICs	570 W		570 W
SCB 0 - slot 6	SCB1 with RE1	150 W 90 W		240 W
SCB 1- slot 7	SCB1	150 W	150 W	
MPC - slot 8	IOC2 with two MICs	570 W	570 W	
SPC - slots 9 through 13	SPC2 See note below.	585W * 5 = 2925 W	2925 W	
Total power requirement		SRX5800 standard-capacity AC (not zoned) 8070 W	Zone 0 total: 3990 W	Zone 1 total: 4080 W

For the power consumption specifications of specific SRX5800 services gateway cards, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Guide* at www.juniper.net/documentation/.

2. Evaluate the power budget, including the budget for each zone, if applicable. In this step, we check the required power against the maximum output power of available power supply options.

   Table 30 on page 113 lists the power supplies, their maximum output power, and unused power (or a power deficit).

Table 30: Calculating Power Budget for SRX5800 Services Gateway with SCB1 and RE1

Power Supply	Maximum Output Power of Power Supply	Maximum Output Power for System	Nonzoned Unused Power	Zone 0 Unused Power[1]	Zone 1 Unused Power[2]
SRX5800 AC standard-capacity	1700 W	5100 W	Power exceeded (non-zoned; 5100 W - 8070 W = -2970 W power exceeded)	–	–
SRX5800 AC high-capacity	1700 W (one feed) 4100 W (two feeds)	3400 W (one feed) 8200 W (two feeds)	–	Power exceeded 4100-3990=110 W	Power exceeded 4100-4080=20 W
SRX5800 DC normal-capacity	2800 W	5600 W	–	Power exceeded	Power exceeded
SRX5800 DC high-capacity	1700 W (one feed) 4100 W (two feeds)	3400 W (one feed) 8200 W (two feeds)	–	Power exceeded 4100-3990=110 W	Power exceeded 4100-4080=20 W

[1] For this configuration, output power is 3990 W.

[2] For this configuration, output power is 4080 W.

3. Calculate input power. In this step, the input power requirements for the example configuration are calculated. To do this, divide the total output requirement by the efficiency of the power supply as shown in Table 31 on page 114 .

NOTE: Normal-capacity AC and DC power supplies are not included in the following table, because their power budget was exceeded in the sample configuration.

Table 31: Calculating Input Power for SRX5800 Services Gateway with SCB1 and RE1

Power Supply	Power Supply Efficiency[1]	Input Power Requirement
SRX5800 AC high-capacity	~88 %	Zone 0: 3990/0.88= 4534 W
		Zone 1: 4080/0.88= 4636 W
SRX5800 DC high-capacity	86 %	Zone 0: 3990/0.86= 4639 W
		Zone 1: 4080/0.86= 4744 W

[1] These values are at full load and nominal voltage.

4. Calculate thermal output (BTUs) for the system. To calculate this value, add the total input power requirement (in watts) for the two zones together and multiply the sum by 3.41 as shown in Table 32 on page 114.

Table 32: Calculating Thermal Output for SRX5800 Services Gateway with SCB1 and RE1

Power Supply	Thermal Output (BTUs per hour)
SRX5800 AC high-capacity	(4534 + 4636) * 3.41 = 31,269 BTU/hr
SRX5800 DC high-capacity	(4639 + 4744) * 3.41 = 31,996 BTU/hr

Sample configuration for SRX5800 Services Gateway chassis with SRX5K-SCBE (SCB2) and SRX5K-RE-1800X4 (RE2):

- Four high-capacity AC power supplies (using two feeds for each power supply); two supplies are active, two are redundant.
- Two Switch Control Boards (SCBs) with one Routing Engine installed in SCB 0
- IOC2 Modular Port Concentrator
- SPC2 Services Processing Card

NOTE: You must have high-capacity power supplies (either AC or DC) and high-capacity fan trays installed in the services gateway in order to install and use SPC2. If you do not have high-capacity power supplies and fan trays installed, the services gateway will log an alarm condition when it recognizes the SPC.

- High-capacity cooling system (upper and lower fan trays)

NOTE: The high-capacity cooling system satisfies cooling requirements of SPC2 and must be used for proper cooling.

1. Calculate the power requirements (usage) as shown in Table 33 on page 116.

Table 33: Sample Power Requirements for an SRX5800 Services Gateway SCB2 and RE2

Chassis Component	Part Number	Power Requirement	Zone 0 Power	Zone 1 Power
Base system	SRX5800BASE-HC-AC	50 W	25 W	25 W
High-capacity cooling system	SRX5800-HC-FAN	320 W * 2 = 640 W	320 W	320 W
SPC - slots 0 through 4	SPC2 See note below.	585 W * 5= 2925 W		2925 W
MPC - slot 5	IOC2 with two MICs	570 W		570 W
SCB 0 (slot 6 for Zone 1)	SCB2 with RE2	200 W 90 W		290 W
SCB 1 (slot 7 for Zone 0)	SCB2	200 W	200 W	
MPC - slot 8	IOC2 with two MICs	570 W	570 W	
SPC - slots 9 through 13	SPC2 See note below.	585 W * 5 = 2925 W	2925 W	
Total power requirement		SRX5800 standard-capacity AC (not zoned) 8170 W	Zone 0 total: 4040 W	Zone 1 total: 4130 W

For the power consumption specifications of specific SRX5800 services gateway cards, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Guide* at www.juniper.net/documentation/.

2. Evaluate the power budget, including the budget for each zone, if applicable. In this step, we check the required power against the maximum output power of available power supply options.

   Table 34 on page 117 lists the power supplies, their maximum output power, and unused power (or a power deficit).

Table 34: Calculating Power Budget for SRX5800 Services Gateway with SCB2 and RE2

Power Supply	Maximum Output Power of Power Supply	Maximum Output Power for System	Nonzoned Unused Power	Zone 0 Unused Power[1]	Zone 1 Unused Power[2]
SRX5800 AC standard-capacity	1700 W	5100 W	Power exceeded (non-zoned; 5100 W - 8170 W = -3070 W power exceeded)	–	–
SRX5800 AC high-capacity	1700 W (one feed) 4100 W (two feeds)	3400 W (one feed) 8200 W (two feeds)	–	Power exceeded 4100-4040=60 W	Power exceeded 4100-4130=-30 W NOTE: Power is exceeded. Therefore, there is not enough power to cover redundancy with this configuration.
SRX5800 DC normal-capacity	2800 W	5600 W	–	Power exceeded	Power exceeded
SRX5800 DC high-capacity	1700 W (one feed) 4100 W (two feeds)	3400 W (one feed) 8200 W (two feeds)	–	Power exceeded 4100-4040=60 W	Power exceeded 4100-4130=-30 W NOTE: Power is exceeded. Therefore, there is not enough power to cover redundancy with this configuration.

[1] For this configuration, output power is 4040 W.

[2] For this configuration, output power is 4130 W.

3. Calculate input power. In this step, the input power requirements for the example configuration are calculated. To do this, divide the total output requirement by the efficiency of the power supply as shown in Table 35 on page 118.

NOTE: Normal-capacity AC and DC power supplies are not included in the following table, because their power budget was exceeded in the sample configuration.

Table 35: Calculating Input Power for SRX5800 Services Gateway with SCB2 and RE2

Power Supply	Power Supply Efficiency[1]	Input Power Requirement
SRX5800 AC high-capacity	~88 %	Zone 0: 4040/0.88= 4590 W
		Zone 1: 4130/0.88= 4693 W
SRX5800 DC high-capacity	86 %	Zone 0: 4040/0.86= 4697 W
		Zone 1: 4130/0.86= 4802 W

[1] These values are at full load and nominal voltage.

4. Calculate thermal output (BTUs) for the system. To calculate this value, add the total input power requirement (in watts) for the two zones together and multiply the sum by 3.41 as shown in Table 36 on page 118 .

Table 36: Calculating Thermal Output for SRX5800 Services Gateway with SCB2 and RE2

Power Supply	Thermal Output (BTUs per hour)
SRX5800 AC high-capacity	(4590 + 4693) * 3.41 = 31,655 BTU/hr
SRX5800 DC high-capacity	(4697 + 4802) * 3.41 = 32,452 BTU/hr

Sample configuration for SRX5800 Services Gateway chassis with SRX5K-SCB3 (SCB3) and SRX5K-RE-1800X4 (RE2):

- Four high-capacity AC power supplies (using two feeds for each power supply); two supplies are active, two are redundant.
- Two Switch Control Boards (SCBs) with one Routing Engine installed in SCB 0
- IOC3 (SRX5K-MPC3-40G10G or SRX5K-MPC3-100G10G) Modular Port Concentrator
- SPC2 Services Processing Card

NOTE: You must have high-capacity power supplies (either AC or DC) and high-capacity fan trays installed in the services gateway in order to install and use SPC2. If you do not have high-capacity power supplies and fan trays installed, the services gateway will log an alarm condition when it recognizes the SPC.

- High-capacity cooling system (upper and lower fan trays)

NOTE: The high-capacity cooling system satisfies cooling requirements of SPC2 and must be used for proper cooling.

1. Calculate the power requirements (usage) as shown in Table 37 on page 120.

Table 37: Sample Power Requirements for an SRX5800 Services Gateway SCB3, IOC3, and RE2

Chassis Component	Part Number	Power Requirement	Zone 0 Power	Zone 1 Power
Base system	SRX5800BASE-HC-AC	50 W	25 W	25 W
High-capacity cooling system	SRX5800-HC-FAN	320 W * 2 = 640 W	320 W	320 W
SPC - slots 0 through 4	SPC2 See note below.	585 W * 5= 2925 W		2925 W
MPC - slot 5	IOC3	607 W		607 W
SCB 0 (slot 6 for Zone 1)	SCB3 with RE2	300 W 90 W		390 W
SCB 1 (slot 7 for Zone 0)	SCB3	300 W	300 W	
MPC - slot 8	IOC3	607 W	607 W	
SPC - slots 9 through 13	SPC2 See note below.	585 W * 5 = 2925 W	2925 W	
Total power requirement		SRX5800 standard-capacity AC (not zoned) 8444 W	Zone 0 total: 4177 W	Zone 1 total: 4267 W

For the power consumption specifications of specific SRX5800 services gateway cards, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Guide* at www.juniper.net/documentation/.

2. Evaluate the power budget, including the budget for each zone, if applicable. In this step, we check the required power against the maximum output power of available power supply options.

   Table 38 on page 121 lists the power supplies, their maximum output power, and unused power (or a power deficit).

Table 38: Calculating Power Budget for SRX5800 Services Gateway with SCB3, IOC3,and RE2

Power Supply	Maximum Output Power of Power Supply	Maximum Output Power for System	Nonzoned Unused Power	Zone 0 Unused Power[1]	Zone 1 Unused Power[2]
SRX5800 AC standard-capacity	1700 W	5100 W	Power exceeded (non-zoned; 5100 W - 8444 W = -3344 W power exceeded)	–	–
SRX5800 AC high-capacity	1700 W (one feed) 4100 W (two feeds)	3400 W (one feed) 8200 W (two feeds)	–	Power exceeded 4100-4177=-77 W	Power exceeded 4100-4267=-167 W NOTE: Power is exceeded. Therefore, there is not enough power to cover redundancy with this configuration.
SRX5800 DC normal-capacity	2800 W	5600 W	–	Power exceeded	Power exceeded
SRX5800 DC high-capacity	1700 W (one feed) 4100 W (two feeds)	3400 W (one feed) 8200 W (two feeds)	–	Power exceeded 4100-4177=-77 W	Power exceeded 4100-4267=-167 W NOTE: Power is exceeded. Therefore, there is not enough power to cover redundancy with this configuration.

[1] For this configuration, output power is 4177 W.

[2] For this configuration, output power is 4267 W.

3. Calculate input power. In this step, the input power requirements for the example configuration are calculated. To do this, divide the total output requirement by the efficiency of the power supply as shown in Table 39 on page 122.

NOTE: Normal-capacity AC and DC power supplies are not included in the following table, because their power budget was exceeded in the sample configuration.

Table 39: Calculating Input Power for SRX5800 Services Gateway with SCB3, IOC3, and RE2

Power Supply	Power Supply Efficiency[1]	Input Power Requirement
SRX5800 AC high-capacity	~88 %	Zone 0: 4177/0.88= 4764 W
		Zone 1: 4267/0.88= 4849 W
SRX5800 DC high-capacity	86 %	Zone 0: 4177/0.86= 4857 W
		Zone 1: 4267/0.86= 4962 W

[1] These values are at full load and nominal voltage.

4. Calculate thermal output (BTUs) for the system. To calculate this value, add the total input power requirement (in watts) for the two zones together and multiply the sum by 3.41 as shown in Table 40 on page 122 .

Table 40: Calculating Thermal Output for SRX5800 Services Gateway with SCB3, IOC3, and RE2

Power Supply	Thermal Output (BTUs per hour)
SRX5800 AC high-capacity	(4764 + 4849) * 3.41 = 32,780 BTU/hr
SRX5800 DC high-capacity	(4857 + 4962) * 3.41 = 33,482 BTU/hr

Related Documentation

- SRX5800 Services Gateway AC Power Supply Specifications on page 133
- SRX5800 Services Gateway DC Power Supply Specifications on page 137

CHAPTER 8

Rack Requirements

SRX5800 Services Gateway Rack Size and Strength Requirements

The size, strength, and location of the rack must accommodate the services gateway's weight and external dimensions. The location of the rack must allow for the clearance requirements specified in "Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance" on page 125.

The chassis is 17.37 in. (44.11 cm) wide. The services gateway is designed for installation in a standard 19-in. rack, as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310-D) published by the Electronics Industry Association (http://www.eia.org). The spacing of the holes between the left and right front-mounting flanges and center-mounting brackets is 18.31 in (465 mm) apart. However, the inside spacing between the rack rails must allow sufficient space for the width of the chassis.

With the use of adapters or approved wing devices to narrow the opening between the rails, the services gateway can fit into a 600-mm-wide rack, as defined in the four-part *Equipment Engineering (EE); European telecommunications standard for equipment practice* (document numbers ETS 300 119-1 through 119-4) published by the European Telecommunications Standards Institute (http://www.etsi.org).

Observe these guidelines:

- The rack must have sufficient vertical usable space to accommodate the height of the services gateway: 27.75 in. (70.49 cm) high (approximately 16 U). You can stack three services gateways in a rack that is at least 48 U (89.3 in. or 2.24 m) in height.

NOTE: A *U* is the standard rack unit defined in *Cabinets, Racks, Panels, and Associated Equipment*.

- The location of the rack must provide sufficient space to accommodate the depth of the services gateway. The chassis depth from the front mounting flange to the rear of the power supply ranges from 23.0 in. (58.4 cm) to 27.8 in. (70.6 cm) depending on the type of power supply installed.
- The rack must be strong enough to support the weight of the fully configured services gateway, up to 400 lb (182 kg). If you stack three fully configured services gateways, it must be capable of supporting up to 1,200 lb (545 kg).

Related Documentation

- SRX5800 Services Gateway Physical Specifications on page 106
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 125
- Overview of Installing the SRX5800 Services Gateway on page 155
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 124
- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 124

Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway

The services gateway can be mounted in any rack that provides holes or hole patterns spaced at 1 U (1.75 in.) increments. The mounting brackets used to attach the chassis to a rack are designed (as per EIA-310-D specifications) to fasten to holes spaced at those distances.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- SRX5800 Services Gateway Rack Size and Strength Requirements on page 123
- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 124
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 125

Connection to Building Structure for the SRX5800 Services Gateway Rack

Always secure the rack to the structure of the building. If your geographical area is subject to earthquakes, bolt the rack to the floor. For maximum stability, also secure the rack to ceiling brackets.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- SRX5800 Services Gateway Rack Size and Strength Requirements on page 123
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 124

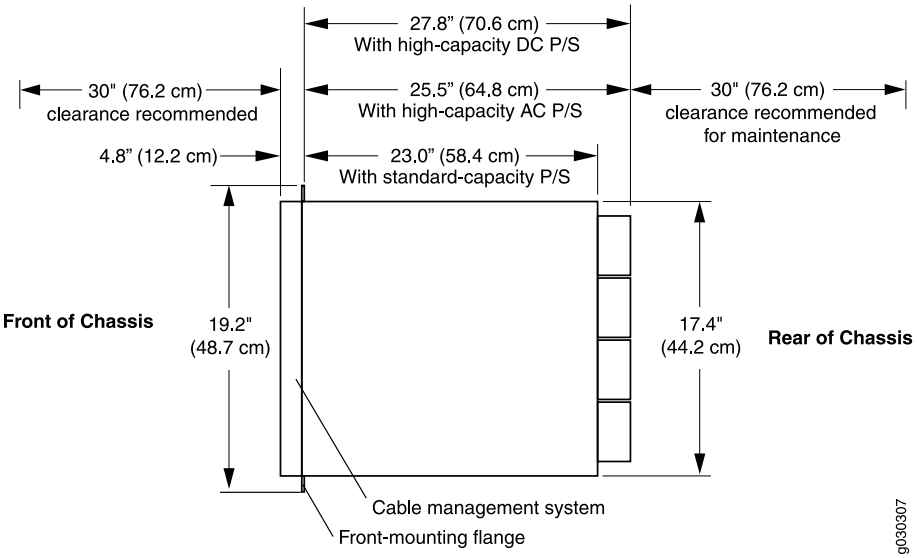
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 125

Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance

When planning the installation site, you need to allow sufficient clearance around the rack (see Figure 67 on page 125):

- For the cooling system to function properly, the airflow around the chassis must be unrestricted.
- A minimum of 3 in. (7.62 cm) clearance must be provided behind the power supplies for airflow.
- For service personnel to remove and install hardware components, there must be adequate space at the front and back of the services gateway. At least 24 in. (61 cm) is required both in front of and behind the services gateway. NEBS GR-63 recommends that you allow at least 30 in. (76.2 cm) behind the services gateway.
- Airflow must always be from front to back with respect to the rack. If the device has side to rear airflow, then provisions must be made to ensure that fresh air from the front of the rack is supplied to the inlets, and exhaust exits the rear of the rack. The device must not interfere with the cooling of other systems in the rack. Fillers must be used as appropriate in the rack to ensure there is no recirculation of heated exhaust air back to the front of the rack. Care must also be taken around cables to ensure that there is no leakage of air in situations where recirculation might result.

Figure 67: Chassis Dimensions and Clearance Requirements for the Services Gateway



Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- SRX5800 Services Gateway Rack Size and Strength Requirements on page 123
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 124
- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 124

CHAPTER 9

Cabinet Requirements

SRX5800 Services Gateway Cabinet Size and Clearance Requirements

The minimum size cabinet that can accommodate the device depends on the type of power supplies installed:

- If only standard-capacity power supplies are installed, the services gateway will fit inside a standard 600 mm wide by 800 mm deep cabinet.
- If high-capacity AC or DC power supplies are installed, the services gateway must be installed in a cabinet that is at least 600 mm wide by 1000 mm deep.

See "Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance" on page 125 for chassis width and depth dimensions. A cabinet larger than the minimum requirement provides better airflow and reduces the chance of overheating. To accommodate a single device, the cabinet must be at least 16 U high. If you provide adequate cooling air and airflow clearance, you can stack three devices in a cabinet that has at least 48 U (84 in. or 2.13 m) of usable vertical space.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 125
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 124
- SRX5800 Services Gateway Cabinet Airflow Requirements on page 128

SRX5800 Services Gateway Cabinet Airflow Requirements

When you mount the services gateway in a cabinet, you must ensure that ventilation through the cabinet is sufficient to prevent overheating. Following is a list of requirements to consider when planning for chassis cooling:

- Ensure that the cool air supply you provide through the cabinet can adequately dissipate the thermal output of the device.
- Ensure that the cabinet allows the chassis hot exhaust air to exit from the cabinet without recirculating into the device. An open cabinet (without a top or doors) that employs hot air exhaust extraction from the top allows the best airflow through the chassis. If the cabinet contains a top or doors, perforations in these elements assist with removing the hot air exhaust.
- Install the device as close as possible to the front of the cabinet so that the cable management system just clears the inside of the front door. This maximizes the clearance in the rear of the cabinet for critical airflow.
- Route and dress all cables to minimize the blockage of airflow to and from the chassis.

Related Documentation

- SRX5800 Services Gateway Cooling System Description on page 85
- Overview of Installing the SRX5800 Services Gateway on page 155
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 125
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 124
- SRX5800 Services Gateway Cabinet Size and Clearance Requirements on page 127

CHAPTER 10

Grounding Specifications

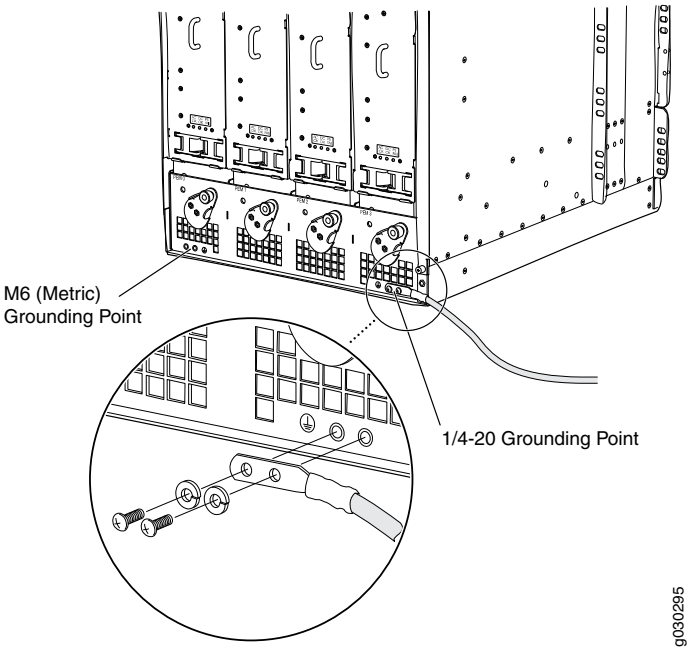
SRX5800 Services Gateway Chassis Grounding Point Specifications

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

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

The services gateway chassis has two grounding points along the lower edge of the back panel. Each grounding point consists of two threaded holes spaced 0.625-in. (15.86-mm) apart (see Figure 68 on page 130). The left grounding point fits M6 screws (European), and the right grounding point fits UNC 1/4–20 screws (American). The accessory box shipped with the services gateway includes the cable lug that attaches to the grounding cable and two UNC 1/4–20 screws used to secure the grounding cable to the right-side grounding point on the services gateway.

Figure 68: SRX5800 Services Gateway Chassis Grounding Points



To ground the services gateway, you must connect a grounding cable to earth ground and then attach it to the chassis grounding point using the two screws provided.

NOTE: Additional grounding is provided to an AC-powered services gateway when you plug its power supplies into grounded AC power receptacles.

Related Documentation

- Grounding the SRX5800 Services Gateway on page 232
- SRX5800 Services Gateway Grounding-Cable Lug Specification on page 131
- SRX5800 Services Gateway Grounding Cable Specifications on page 130

SRX5800 Services Gateway Grounding Cable Specifications

The grounding cable that you provide must meet the specifications in Table 41 on page 130.

Table 41: Grounding Cable Specifications

Cable Type	Quantity and Specification
Grounding	One 6-AWG (13.3 mm^2), minimum 60°C wire, or as required by the local code

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the

services gateway chassis before connecting power. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

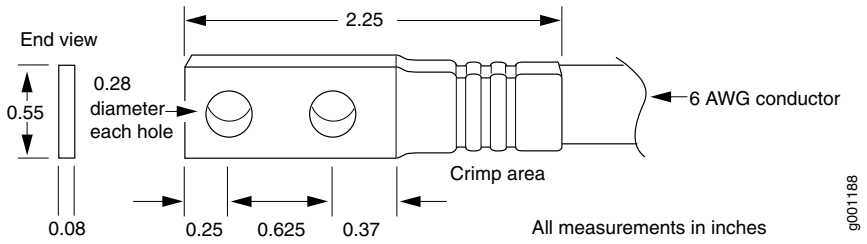
Related Documentation

- Grounding the SRX5800 Services Gateway on page 232
- SRX5800 Services Gateway Chassis Grounding Point Specifications on page 129
- SRX5800 Services Gateway Grounding-Cable Lug Specification on page 131

SRX5800 Services Gateway Grounding-Cable Lug Specification

The accessory box shipped with the services gateway includes the cable lug that attaches to the grounding cable (see Figure 69 on page 131) and two UNC 1/4–20 screws used to secure the grounding cable to the grounding points.

Figure 69: Grounding Cable Lug



CAUTION: Before services gateway installation begins, 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 services gateway.

NOTE: The same cable lug is used for the DC power cables.

Related Documentation

- Grounding the SRX5800 Services Gateway on page 232
- SRX5800 Services Gateway Chassis Grounding Point Specifications on page 129
- SRX5800 Services Gateway Grounding Cable Specifications on page 130

CHAPTER 11

AC Power Requirements and Specifications

SRX5800 Services Gateway AC Power Supply Specifications

Table 42 on page 133 lists the AC power supply electrical specifications for both the standard-capacity and high-capacity AC power supply. Table 43 on page 134 lists the AC power system electrical specifications.

Table 42: AC Power Supply Electrical Specifications

Item	Specification	
	Standard-Capacity	High-Capacity
Maximum output power	1700 W	4100 W (two AC inputs) 1700 W (one AC input)
AC input current rating	11 A @ 240 VAC maximum	13 A @ 240 VAC maximum per AC input (26 A per power supply when two AC inputs are used)
AC input voltage	Operating range: 200 to 240 VAC	
AC input line frequency	50 to 60 Hz	
Efficiency	~88% NOTE: This value is at full load and nominal voltage.	

Table 43: AC Power System Specifications

Item	Normal-Capacity	High-Capacity	
		Two AC inputs for each power supply	One AC input for each power supply
Redundancy	3+1	2+2	2+2
Output power (maximum) per supply	1700 W	4100 W	1700 W
Output power (maximum) per system	5100 W	8200 W	3400 W

Related Documentation

- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 136
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 134

AC Power Cord Specifications for the SRX5800 Services Gateway

Each AC power supply has a single AC appliance inlet located in the chassis directly above the power supply that requires a dedicated AC power feed. Most sites distribute power through a main conduit that leads to frame-mounted power distribution panels, one of which can be located at the top of the rack that houses the services gateway. An AC power cord connects each power supply to the power distribution panel.

The services gateway is not shipped with AC power cords. You must order power cords separately using the model number shown in Table 44 on page 134. The C19 appliance coupler at the female end of the cord inserts into the AC appliance inlet coupler, type C20 (right angle) as described by International Electrotechnical Commission (IEC) standard 60320. The plug at the male end of the power cord fits into the power source receptacle that is standard for your geographical location.

Table 44 on page 134 provides specifications and Figure 70 on page 135 depicts the plug on the AC power cord provided for each country or region.

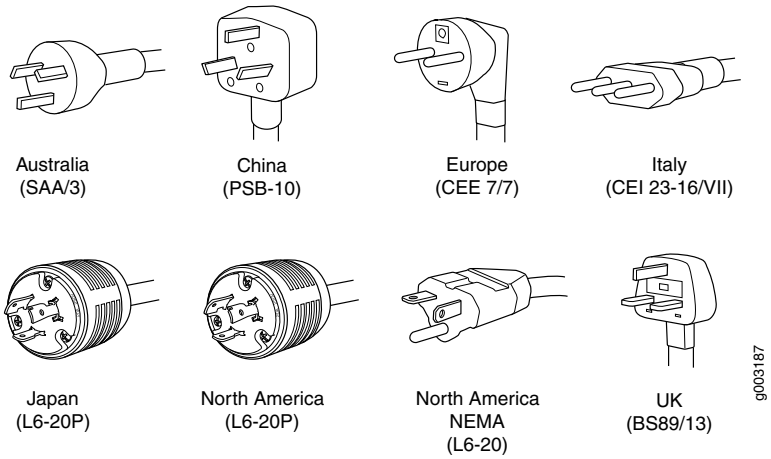
Table 44: AC Power Cord Specifications

Country	Model Number	Electrical Specification	Plug Type
Australia	CBL-M-PWR-RA-AU	240 VAC, 50 Hz AC	SAA/3
China	CBL-M-PWR-RA-CH	220 VAC, 50 Hz AC	PSB-10
Europe (except Denmark, Italy, Switzerland, and United Kingdom)	CBL-M-PWR-RA-EU	220 or 230 VAC, 50 Hz AC	CEE 7/7

Table 44: AC Power Cord Specifications *(continued)*

Country	Model Number	Electrical Specification	Plug Type
Italy	CBL-M-PWR-RA-IT	230 VAC, 50 Hz AC	CEI 23-16/VII
Japan	CBL-M-PWR-RA-JP	220 VAC, 50 or 60 Hz AC	NEMA L6-20P
North America	CBL-M-PWR-RA-TWLK-US	250 VAC, 60 Hz AC	NEMA L6-20P
United Kingdom	CBL-M-PWR-RA-UK	240 VAC, 50 Hz AC	BS89/13

Figure 70: AC Plug Types



WARNING: The AC power cord for the services gateway is intended for use with the services gateway only and not for any other use.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

CAUTION: Power cords and cables must not block access to services gateway components or drape where people could trip on them.

NOTE: In North America, AC power cords must not exceed 4.5 m (approximately 14.75 ft) 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 listed in Table 44 on page 134 are in compliance.

Related Documentation

- SRX5800 Services Gateway AC Power Supply Specifications on page 133
- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 136

AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway

Each AC power supply has a single AC appliance inlet located in the chassis directly above the power supply that requires a dedicated AC power feed. We recommend that you use a dedicated customer site circuit breaker rated for 15 A (250 VAC) minimum for each AC power supply, or as required by local code.

Related Documentation

- SRX5800 Services Gateway AC Power Supply Specifications on page 133
- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 134

CHAPTER 12

DC Power Requirements and Specifications

SRX5800 Services Gateway DC Power Supply Specifications

Table 45 on page 137 lists the DC power supply electrical specifications.

Table 45: DC Power Supply Electrical Specifications

Item	Standard-Capacity	High-Capacity	
		Two-Feed Mode	One-Feed Mode
Maximum output power	2800 W	4100 W	1700 W
DC input voltage	Nominal: –48 VDC Operating range: –40 to –72 VDC	Nominal: –48 VDC Operating range: –40 to –72 VDC	Nominal: –48 VDC Operating range: –40 to –72 VDC
Maximum input current rating @ 40 VDC	70 A	128 A for both feeds (66 A and 62 A per feed)	52 A
DC nominal input current rating @48 VDC	58 A maximum@–48 VDC (nominal)	104 A for both feeds (54 A and 50 A per feed)	42 A
Efficiency	99%	86%	
	NOTE: This value is at full load and nominal voltage.		
Internal Circuit Breaker	80 A	–	–

Table 46 on page 138 lists the power system electrical specifications.

Table 46: Power System Electrical Specifications

Item	Normal-Capacity	High-Capacity	
Redundancy	2+2	2+2	
Output power (maximum) per supply	2800 W	Two-feed mode	One-feed mode
		4100 W	1700 W
Output power (maximum) per system	5600 W	8200 W	3400 W

Related Documentation

- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 139
- DC Power Source Cabling for the SRX5800 Services Gateway on page 140
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 138
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 139

DC Power Cable Specifications for the SRX5800 Services Gateway

Table 47 on page 138 summarizes the specifications for the power cables, which you must supply.

Table 47: DC Power Cable Specifications

Cable Type	Quantity	Specification
Power	Four 6-AWG (13.3 mm^2) cables for each power supply	Minimum 60°C wire, or as required by the local code

CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

Related Documentation

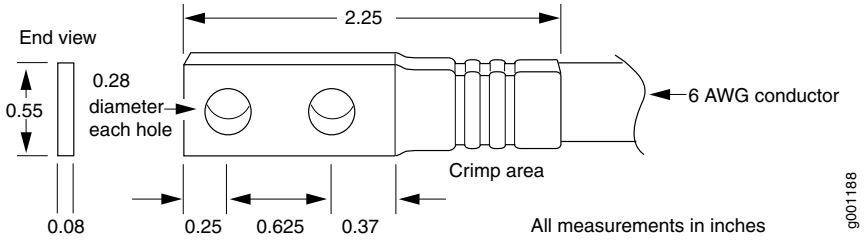
- SRX5800 Services Gateway DC Power Supply Specifications on page 137
- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 139
- DC Power Source Cabling for the SRX5800 Services Gateway on page 140

- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 139

DC Power Cable Lug Specifications for the SRX5800 Services Gateway

The accessory box shipped with the services gateway includes the cable lugs that attach to the terminal studs of each power supply (see Figure 71 on page 139).

Figure 71: DC Power Cable Lug



CAUTION: Before services gateway installation begins, 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 services gateway.

WARNING: The services gateway is a pluggable type A equipment installed in restricted access location. It has a separate protective earthing terminal [Metric -M6 and English - ¼-20 screw) ground lugs] provided on the chassis. This separate protective earth terminal must be permanently connected to earth.

Related Documentation

- SRX5800 Services Gateway DC Power Supply Specifications on page 137
- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 139
- DC Power Source Cabling for the SRX5800 Services Gateway on page 140
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 138

DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway

If you plan to operate a maximally configured DC-powered services gateway with standard-capacity power supplies, we recommend that you provision at least 116 A (58 A per feed) @ –48 VDC (nominal) for the system. Use a customer site circuit breaker rated according to respective National Electrical Code and customer site internal standards to maintain proper level of protection for the current specified above.

If you plan to operate a maximally configured DC-powered services gateway with high-capacity power supplies, we recommend that you provision at least 208 A (104 A per supply) @ –48 VDC (nominal) for the system. This is maximum current draw at –48 VDC when two power supplies are providing the power to the system and the redundant power supplies are not supplying power or not present. Use a customer site circuit breaker rated according to respective National Electrical Code and customer site internal standards to maintain proper level of protection for the current specified above.

If you plan to operate a DC-powered services gateway at less than the maximum configuration, we recommend that you provision a circuit breaker according to respective National Electrical Code and customer site internal standards to maintain proper level of protection for the current specified above or each DC power supply rated for at least 125% of the continuous current that the system draws at –48 VDC.

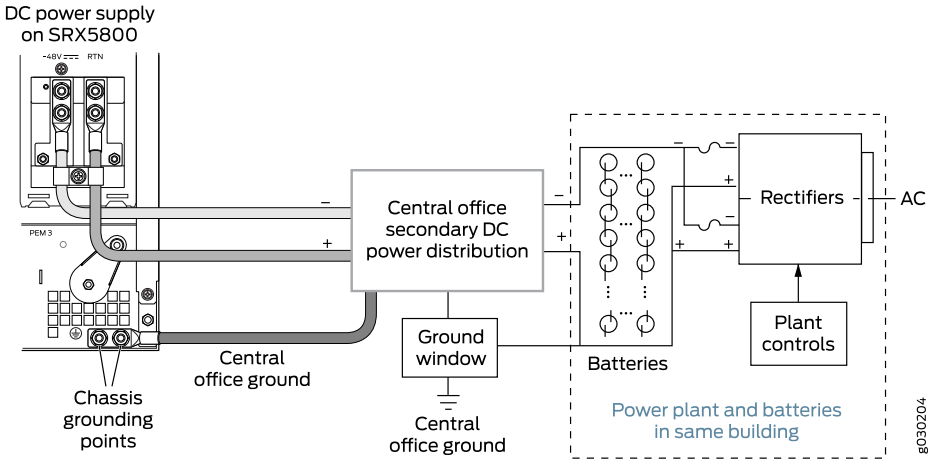
Related Documentation

- SRX5800 Services Gateway DC Power Supply Specifications on page 137
- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- DC Power Source Cabling for the SRX5800 Services Gateway on page 140
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 138
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 139

DC Power Source Cabling for the SRX5800 Services Gateway

Figure 72 on page 140 shows a typical DC source cabling arrangement.

Figure 72: Typical DC Source Cabling to the Services Gateway



The DC power supplies in slots **PEM0** and **PEM1** must be powered by dedicated power feeds derived from feed A, and the DC power supplies in slots **PEM2** and **PEM3** must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

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

CAUTION: Power cords and cables must not block access to device components or drape where people could trip on them.

Related Documentation

- SRX5800 Services Gateway DC Power Supply Specifications on page 137
- Calculating Power Requirements for the SRX5800 Services Gateway on page 110
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 139
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 138
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 139

CHAPTER 13

Cable Specifications and Pinouts

Routing Engine Interface Cable and Wire Specifications for the SRX5800 Services Gateway

Table 48 on page 144 lists the specifications for the cables that connect to management ports and the wires that connect to the alarm relay contacts.

Table 48: Cable and Wire Specifications for Routing Engine Management and Alarm Interfaces

Port	Cable Specification	Cable/Wire Supplied	Maximum Length	Routing Engine Receptacle
Routing Engine console or auxiliary interface	RS-232 (EIA-232) serial cable	One 6-ft (1.83-m) length with RJ-45/DB-9 connectors	6 ft (1.83 m)	RJ-45 female
Routing Engine Ethernet interface	Category 5 cable or equivalent suitable for 100Base-T operation	One 15-ft (4.57-m) length with RJ-45/RJ-45 connectors	328 ft (100 m)	RJ-45 autosensing

Related Documentation

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237

RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Ethernet Port

The port on the Routing Engine labeled **ETHERNET** is an autosensing 10/100-Mbps Ethernet RJ-45 receptacle that accepts an Ethernet cable for connecting the Routing Engine to a management LAN (or other device that supports out-of-band management). Table 49 on page 144 describes the RJ-45 connector pinout.

Table 49: RJ-45 Connector Pinout for the Routing Engine ETHERNET Port

Pin	Signal
1	TX+
2	TX-
3	RX+
4	Termination network
5	Termination network
6	RX-
7	Termination network
8	Termination network

Related Documentation

- Routing Engine Interface Cable and Wire Specifications for the SRX5800 Services Gateway on page 143
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237

RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports

The ports on the Routing Engine labeled **AUX** and **CONSOLE** are asynchronous serial interfaces that accept an RJ-45 connector. The ports connect the Routing Engine to an auxiliary or console management device. Table 50 on page 145 describes the RJ-45 connector pinout.

Table 50: RJ-45 Connector Pinout for the AUX and CONSOLE Ports

Pin	Signal	Description
1	RTS	Request to Send
2	DTR	Data Terminal Ready
3	TXD	Transmit Data
4	Ground	Signal Ground
5	Ground	Signal Ground
6	RXD	Receive Data
7	DSR/DCD	Data Set Ready
8	CTS	Clear to Send

Related Documentation

- Console Port Cable and Wire Specifications for the SRX5800 Services Gateway on page 145
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236

Console Port Cable and Wire Specifications for the SRX5800 Services Gateway

Table 51 on page 146 lists the specifications for the cable that connects a **CONSOLE** port on the Routing Engine to a management console.

Table 51: Cable and Wire Specifications for Routing Engine Management and Alarm Interfaces

Port	Cable Specification	Cable/Wire Supplied	Maximum Length	Receptacle
Routing Engine console or auxiliary interface	RS-232 (EIA-232) serial cable	One 6-ft (1.83-m) length with RJ-45/DB-9 connectors	6 ft (1.83 m)	RJ-45/DB-9 male

Related Documentation

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports on page 145

Alarm Relay Contact Wire Specifications for the SRX5800 Services Gateway

Table 52 on page 146 lists the specifications for the wires that connect to the alarm relay contacts.

Table 52: Cable and Wire Specifications for Alarm Interfaces

Port	Cable Specification	Cable/Wire Supplied
Alarm relay contacts	Wire with gauge between 28-AWG and 14-AWG (0.08 and 2.08 mm^2)	No

Related Documentation

- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 238

Routing Engine Interface Cable and Wire Specifications for the SRX5800 Services Gateway

Table 48 on page 144 lists the specifications for the cables that connect to management ports and the wires that connect to the alarm relay contacts.

Table 53: Cable and Wire Specifications for Routing Engine Management and Alarm Interfaces

Port	Cable Specification	Cable/Wire Supplied	Maximum Length	Routing Engine Receptacle
Routing Engine console or auxiliary interface	RS-232 (EIA-232) serial cable	One 6-ft (1.83-m) length with RJ-45/DB-9 connectors	6 ft (1.83 m)	RJ-45 female

Table 53: Cable and Wire Specifications for Routing Engine Management and Alarm Interfaces *(continued)*

Port	Cable Specification	Cable/Wire Supplied	Maximum Length	Routing Engine Receptacle
Routing Engine Ethernet interface	Category 5 cable or equivalent suitable for 100Base-T operation	One 15-ft (4.57-m) length with RJ-45/RJ-45 connectors	328 ft (100 m)	RJ-45 autosensing

Related Documentation

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237

Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX5800 Services Gateway

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. LEDs are not coherent sources, however. 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, higher-order mode loss (HOL) results. Together these factors limit the transmission distance of multimode fiber compared to single-mode fiber.

Single-mode fiber is so small in diameter that rays of light can 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 with multimode fiber, single-mode fiber has higher bandwidth and can carry signals for longer distances. It is consequently more expensive.

Related Documentation

- Attenuation and Dispersion in Fiber-Optic Cable for the SRX5800 Services Gateway on page 148
- Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway on page 149
- Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway on page 149
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

Attenuation and Dispersion in Fiber-Optic Cable for the SRX5800 Services Gateway

Correct functioning of an optical data link depends on modulated light reaching the receiver with enough power to be demodulated correctly. *Attenuation* is the reduction in power of the light signal as it is transmitted. Attenuation is caused by passive media components, such as cables, cable splices, and connectors. While 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 have enough light available to overcome attenuation.

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

- Chromatic dispersion—The spreading of the signal in time resulting from the different speeds of light rays.
- Modal dispersion—The spreading of the signal in time resulting from 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 rather than modal dispersion limits 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 less than 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

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX5800 Services Gateway on page 147
- Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway on page 149
- Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway on page 149
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway

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

$$P_B = P_T - P_R$$

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

$$P_B = P_T - P_R$$

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

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

Related Documentation

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX5800 Services Gateway on page 147
- Attenuation and Dispersion in Fiber-Optic Cable for the SRX5800 Services Gateway on page 148
- Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway on page 149
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway

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

$$P_M = P_B - LL$$

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

Factors that can cause link loss include higher-order mode losses, modal and chromatic dispersion, connectors, splices, and fiber attenuation. Table 54 on page 150 lists an estimated amount of loss for the factors used in the following sample calculations. For information about the actual amount of signal loss caused by equipment and other factors, see your vendor documentation.

Table 54: Estimated Values for Factors That Cause Link Loss

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

The following example uses the estimated values in Table 54 on page 150 to calculate link loss (*LL*) for a 2 km-long multimode link with a power budget (P_B) of 13 dB:

- Fiber attenuation for 2 km @ 1.0 dB/km= 2 dB
- Loss for five connectors @ 0.5 dB per connector = 5(0.5 dB) = 2.5 dB
- Loss for two splices @ 0.5 dB per splice =2(0.5 dB) = 1 dB
- Higher-order loss = 0.5 dB
- Clock recovery module = 1 dB

The power margin (P_M) is calculated as follows:

$P_M = P_B - LL$

P_M = 13 dB – 2 km (1.0 dB/km) – 5 (0.5 dB) – 2 (0.5 dB) – 0.5 dB [HOL] – 1 dB [CRM]

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

P_M = 6 dB

The following sample calculation for an 8 km-long single-mode link with a power budget (P_B) of 13 dB uses the estimated values from Table 54 on page 150 to calculate link loss (*LL*) as the sum of fiber attenuation (8 km @ 0.5 dB/km, or 4 dB) and loss for seven connectors (0.5 dB per connector, or 3.5 dB). The power margin (P_M) is calculated as follows:

$P_M = P_B - LL$

P_M = 13 dB – 8 km (0.5 dB/km) – 7 (0.5 dB)

P_M = 13 dB – 4 dB – 3.5 dB

P_M = 5.5 dB

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

Related Documentation

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX5800 Services Gateway on page 147
- Attenuation and Dispersion in Fiber-Optic Cable for the SRX5800 Services Gateway on page 148
- Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway on page 149
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

PART 3

Initial Installation and Configuration

CHAPTER 14

Installation Overview

Overview of Installing the SRX5800 Services Gateway

To install the SRX5800 Services Gateway:

1. Prepare your installation site as described in "Site Preparation Checklist for the SRX5800 Services Gateway" on page 109.

2. Review the safety guidelines explained in *SRX5800 Services Gateway General Safety Guidelines and Warnings*.

3. Unpack the services gateway and verify the parts.

   a. Unpacking the SRX5800 Services Gateway on page 157

   b. Verifying the SRX5800 Services Gateway Parts Received on page 159

4. Install the mounting hardware.

   - Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 163
   - Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 165

5. Remove components from the services gateway chassis as described in "Removing Components from the SRX5800 Chassis Before Installing It in the Rack" on page 169.

6. Lift the services gateway on to the rack as described in "Installing the SRX5800 Services Gateway Chassis in the Rack" on page 177.

7. Reinstall components into the services gateway chassis as described in "Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It in the Rack" on page 179.

8. Connect cables to the network and external devices.
   - Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
   - Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237
   - Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 310
9. Connect the grounding cable as described in "Grounding the SRX5800 Services Gateway" on page 232.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power.

10. Connect the AC power cord or DC power cables:
    - Connecting Power to an AC-Powered SRX5800 Services Gateway on page 243
    - Connecting Power to a DC-Powered SRX5800 Services Gateway on page 248
11. Power on the services gateway:
    - Powering On an AC-Powered SRX5800 Services Gateway on page 247
    - Powering On a DC-Powered SRX5800 Services Gateway on page 251
12. Perform the initial system configuration as described in "Initially Configuring the SRX5800 Services Gateway" on page 256.

Related Documentation

- SRX5800 Services Gateway Chassis on page 19
- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 267

Tools Required to Install the SRX5800 Services Gateway

To install the services gateway, you need the following tools:

- Mechanical lift
- Phillips (+) screwdrivers, number 2
- Electrostatic discharge (ESD) grounding wrist strap

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 235
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177

CHAPTER 15

Unpacking the SRX5800 Services Gateway

Tools and Parts Required to Unpack the SRX5800 Services Gateway

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

- Phillips (+) screwdriver, number 2
- 1/2-in. or 13-mm open-end or socket wrench to remove bracket bolts from the shipping pallet
- Blank panels to cover any slots not occupied by a component

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Unpacking the SRX5800 Services Gateway on page 157
- Verifying the SRX5800 Services Gateway Parts Received on page 159

Unpacking the SRX5800 Services Gateway

The services gateway is shipped in a wooden crate. A wooden pallet forms the base of the crate. The services gateway chassis is bolted to this pallet. A cardboard accessory box and a *Getting Started Guide* are also included in the shipping crate.

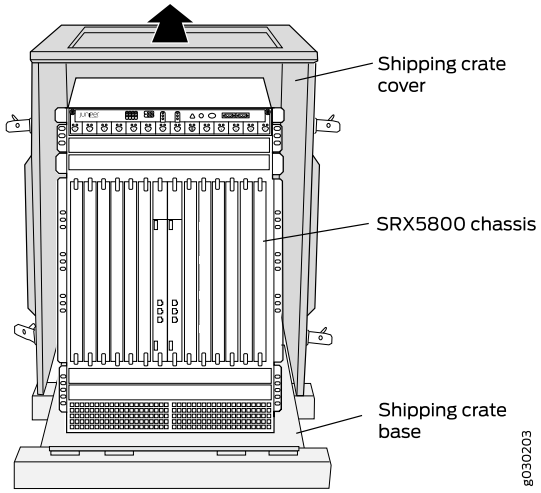
The shipping container measures 33 in. (83.8 cm) high, 30.25 in. (76.8 cm) wide, and 43.25 in. (109.9 cm) deep. The total weight of the container containing the services gateway and accessories can range from 270 lb (122.5 kg) to 475 lb (215.5 kg).

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

To unpack the services gateway, follow these steps (see Figure 73 on page 159):

1. Move the shipping crate to a staging area as close to the installation site as possible, where you have enough room to remove the components from the chassis. While the chassis is bolted to the pallet, you can use a forklift or pallet jack to move it.
2. Position the shipping crate with the arrows pointing up.
3. Open all the latches on the shipping crate.
4. Remove the front door of the shipping crate cover and set it aside.
5. Slide the remainder of the shipping crate cover off the pallet.
6. Remove the foam covering the top of the services gateway.
7. Remove the accessory box and the *SRX5800 Services Gateway Getting Started Guide*.
8. Verify the parts received as described in "Verifying the SRX5800 Services Gateway Parts Received" on page 159.
9. Remove the vapor corrosion inhibitor (VCI) packs attached to the pallet, being careful not to break the VCI packs open.
10. To remove the brackets holding the chassis on the pallet, use a 1/2-in. socket wrench and a number 2 Phillips screwdriver to remove the bolts and screws from the brackets.
11. Store the brackets and bolts inside the accessory box.
12. Save the shipping crate cover, pallet, and packing materials in case you need to move or ship the services gateway at a later time.

Figure 73: Contents of the Shipping Crate



Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Tools and Parts Required to Unpack the SRX5800 Services Gateway on page 157
- Verifying the SRX5800 Services Gateway Parts Received on page 159

Verifying the SRX5800 Services Gateway Parts Received

A packing list is included in each shipment. Check the parts in the shipment against the items on the packing list. The packing list specifies the part numbers and descriptions of each part in your order.

If any part is missing, contact a customer service representative.

A fully configured services gateway contains the services gateway chassis with installed components, listed in Table 55 on page 159, and an accessory box, which contains the parts listed in Table 56 on page 160. The parts shipped with your services gateway can vary depending on the configuration you ordered.

Table 55: Parts List for a Fully Configured Services Gateway

Component	Quantity
Chassis, including midplane, craft interface, and rack-mounting brackets	1
IOCs, Flex IOCs, and MPCs	Up to 11
SPCs	Up to 11

Table 55: Parts List for a Fully Configured Services Gateway *(continued)*

Component	Quantity
Routing Engines	1 or 2
SCBs	Up to 3
Power supplies	Up to 4
Fan trays	2
Air filter	1
Air filter tray	1
Getting Started Guide	1
Large mounting shelf	1
Small mounting shelf	1
Blank panels for slots without components installed	One blank panel for each slot not occupied by a component

Table 56: Accessory Box Parts List

Part	Quantity
Screws to mount chassis	14
Screws to connect grounding cable (1/4-20 thread, 1/2 in. length)	2
Split washers for connecting grounding cable	2
DC power terminal Lugs, 6-AWG	8
RJ-45 cable, with RJ-45 Jack to Female DB-9, to connect the device through the serial port	1
Terminal block plug, 3 pole, 5.08 mm spacing, 12A, to connect the device alarms	2
720-029106 Assy, Cbl, Fiber Optic, Duplex, LC/LC, Multimode, 3 m, UL94V-0	2
740-011613 SFP, GbE, 850 nm, 550 m Reach, SX, DDM, -10ºC to 85ºC Temp	2
Label, accessories contents, SRX5800	1
USB flash drive with Junos OS	1
Read me first document	1

Table 56: Accessory Box Parts List *(continued)*

Part	Quantity
Affidavit for T1 connection	1
Juniper Networks Product Warranty	1
End User License Agreement	1
Document sleeve	1
3" x 5" pink bag	2
9" x 12" pink bag, ESD	2
Accessory Box, 19 x 12 x 3"	1
Ethernet cable, RJ-45/RJ-45, 4-pair stranded UTP, Category 5E, 15'	1
ESD wrist strap with cable	1

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Tools and Parts Required to Unpack the SRX5800 Services Gateway on page 157
- Unpacking the SRX5800 Services Gateway on page 157

CHAPTER 16

Installing the Mounting Hardware

Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet

If you are installing the services gateway in a front-mount four-post rack or cabinet, you must first install the large mounting shelf, followed by the small mounting shelf.

Table 57 on page 163 specifies the holes in which you insert cage nuts and screws to install the mounting hardware required in a four-post or cabinet rack (an *X* indicates a mounting hole location). The hole distances are relative to one of the standard "U" divisions on the rack. The bottom of all mounting shelves is at 0.04 in. (0.02 U) above a "U" division.

Table 57: Four-Post Rack or Cabinet Mounting Hole Locations

Hole	Distance Above "U" Division		Large Shelf	Small Shelf
3	1.51 in. (3.8 cm)	0.86 U		X
2	0.88 in. (2.2 cm)	0.50 U	X	X
1	0.25 in. (0.6 cm)	0.14 U		X

To install the mounting shelves (see Figure 74 on page 165):

1. On the front rack rails, install cage nuts in the holes specified in Table 57 on page 163 for the large shelf.

2. On the front of each front rack rail, partially insert a mounting screw into the hole containing the lowest cage nut.

3. Install the large shelf on the front rack rails. Rest the bottom slot of each ear on a mounting screw.

4. Partially insert a mounting screw into the top hole in each ear of the large shelf.

5. Tighten all the screws completely.

6. On the rear rack rails, install cage nuts in the holes specified in Table 57 on page 163 for the small shelf.

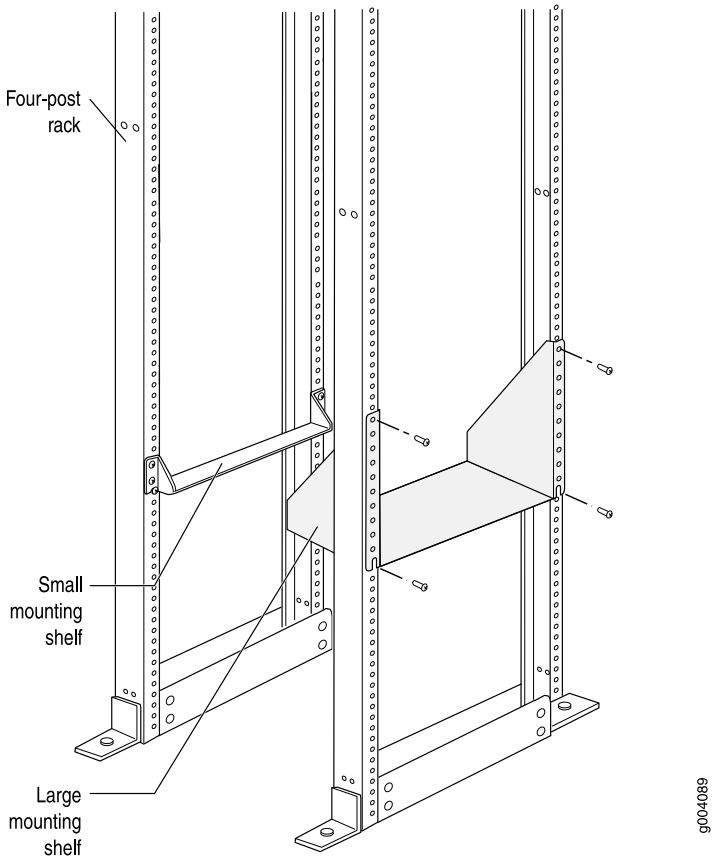
7. On the back of each rear rack rail, partially insert a mounting screw into the hole containing the lowest cage nut.

8. Install the small shelf on the back rack rails. Rest the bottom slot of each ear on a mounting screw. The small shelf installs on the back of the rear rails, extending toward the center of the rack. The bottom of the small shelf should align with the bottom of the large shelf.

9. Partially insert screws into the open holes in the ears of the small shelf.

10. Tighten all the screws completely.

Figure 74: Installing the Mounting Hardware for a Four-Post Rack or Cabinet



Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 165
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177

Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack

Before installing the services gateway in an open-frame rack, install the large mounting shelf on the rack. The small mounting shelf is not needed.

If you are front-mounting the services gateway, also remove the center-mounting brackets located on each side of the chassis.

Table 58 on page 166 specifies the holes in which you insert screws to install the mounting hardware in an open-frame rack (an *X* indicates a mounting hole location). The hole

distances are relative to one of the standard “U” divisions on the rack. For reference, the bottom of all mounting shelves is at 0.04 in. (0.02 U) above a “U” division.

Table 58: Open-Frame Rack Mounting Hole Locations

Hole	Distance Above “U” Division		Large Shelf
30	17.26 in. (43.8 cm)	9.86 U	X
27	15.51 in. (39.4 cm)	8.86 U	X
24	13.76 in. (34.9 cm)	7.86 U	X
21	12.01 in. (30.5 cm)	6.86 U	X
18	10.26 in. (26.0 cm)	5.86 U	X
15	8.51 in. (21.6 cm)	4.86 U	X
12	6.76 in. (17.1 cm)	3.86 U	X
9	5.01 in. (12.7 cm)	2.86 U	X
6	3.26 in. (8.3 cm)	1.86 U	X
3	1.51 in. (3.8 cm)	0.86 U	X
2	0.88 in. (2.2 cm)	0.50 U	X
1	0.25 in. (0.6 cm)	0.14 U	

To install the large mounting shelf (see Figure 75 on page 167):

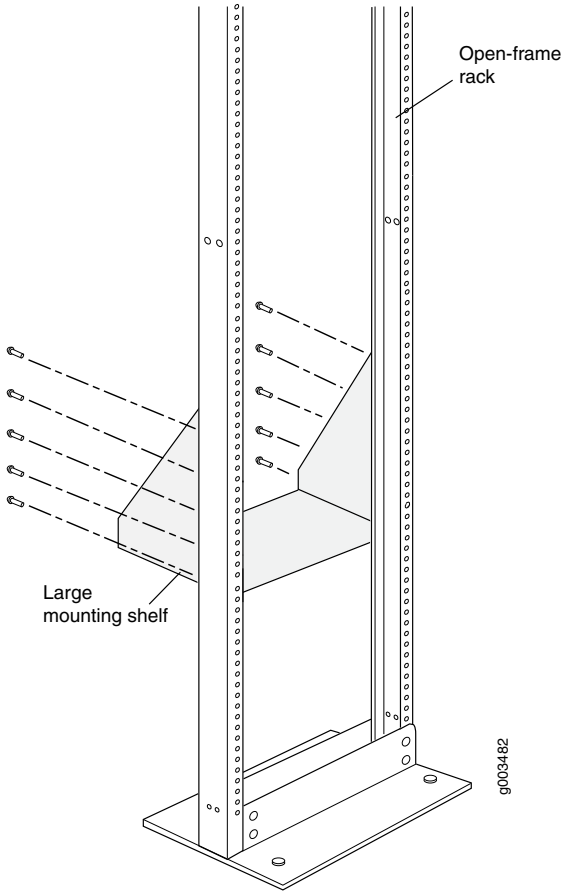
1. On the rear of each rack rail, partially insert a mounting screw into the highest hole specified in Table 58 on page 166 for the large shelf.

2. Install the large shelf on the rack. Hang the shelf over the mounting screws using the keyhole slots located near the top of the large shelf flanges.

3. Partially insert screws into the open holes in the ears of the large shelf.

4. Tighten all the screws completely.

Figure 75: Installing the Mounting Hardware for an Open-Frame Rack



After the mounting hardware is installed, proceed to "Installing the SRX5800 Services Gateway Chassis in the Rack" on page 177.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 163
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109

CHAPTER 17

Installing the SRX5800 Services Gateway

Removing Components from the SRX5800 Chassis Before Installing It in the Rack

Before installing the services gateway in the rack, you must first remove components from the chassis to make it light enough to safely maneuver into the rack. With components removed, the chassis weighs approximately 150 lb (68 kg). You reinstall the components into the chassis after it is installed in the rack.

1. Removing the Power Supplies Before Installing the SRX5800 Services Gateway Chassis on page 169
2. Removing the Cable Manager Before Installing the SRX5800 Services Gateway Chassis on page 171
3. Removing Fan Trays Before Installing the SRX5800 Services Gateway Chassis on page 172
4. Removing Cards Before Installing the SRX5800 Services Gateway Chassis on page 174

Removing the Power Supplies Before Installing the SRX5800 Services Gateway Chassis

Remove the leftmost power supply first and then work your way to the right. To remove each AC or DC power supply (see Figure 76 on page 171):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Switch off the services gateway power supplies:

   - For an AC-powered services gateway, move the AC input switch on the chassis above each AC power supply to the off (**O**) position. If the services gateway is equipped with high-capacity AC power supplies, you must also move the AC input switch on each power supply to the off (**O**) position.

- For DC-powered services gateway, move the DC circuit breaker on each power supply faceplate to the off (**O**) position.

We recommend switching off the power supplies even though they are not connected to power sources.

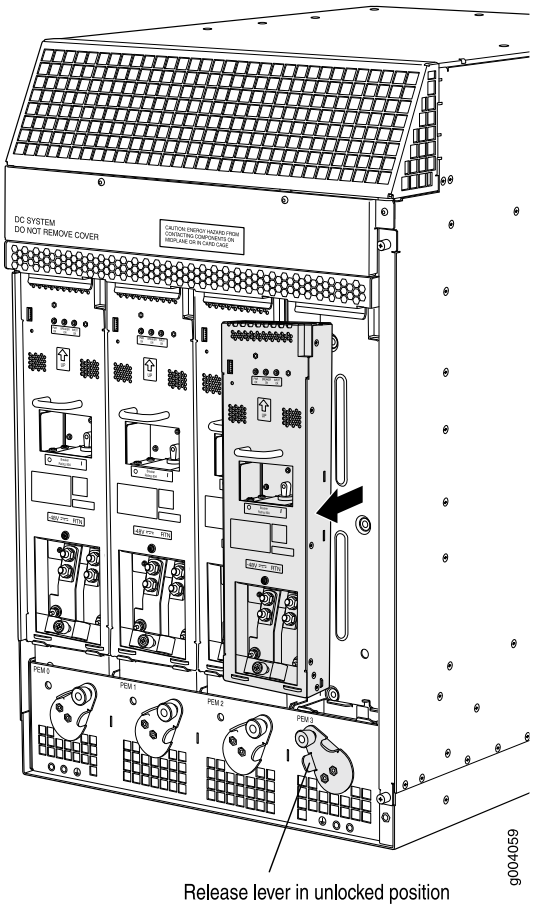
3. While grasping the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops.

4. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

5. Pull the power supply straight out of the chassis.

WARNING: **Do not touch the power connector on the top of the power supply. It can contain dangerous voltages.**

Figure 76: Removing a Power Supply Before Installing the Services Gateway (Standard-Capacity Power Supply Shown, High-Capacity Similar)



Removing the Cable Manager Before Installing the SRX5800 Services Gateway Chassis

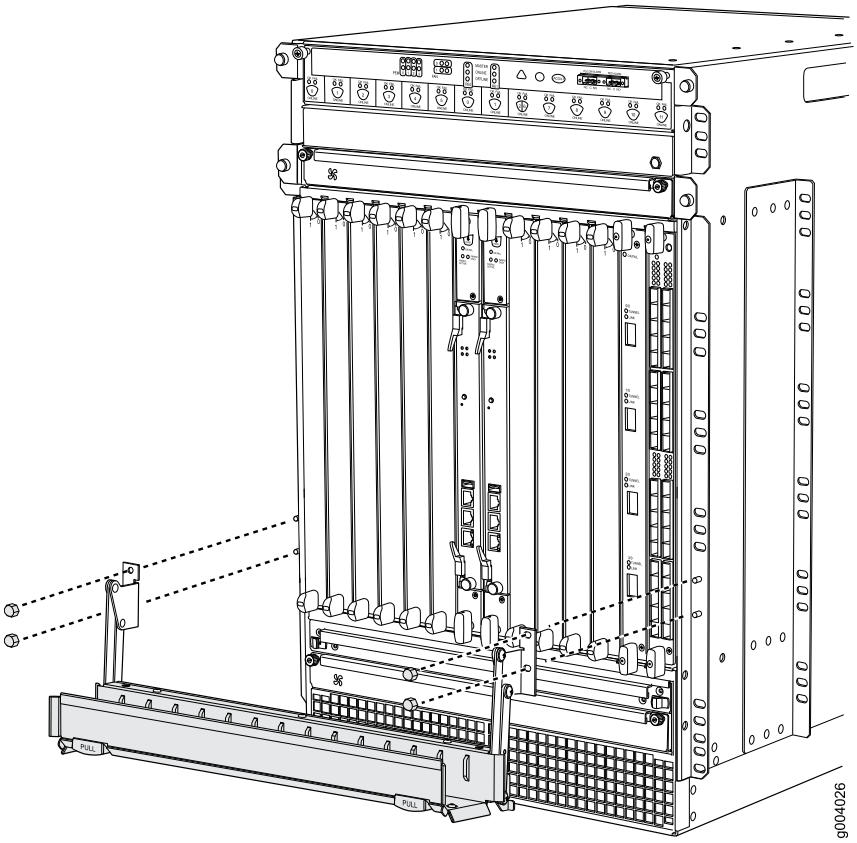
To remove the cable manager (see Figure 77 on page 172):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Using a 7/16-in. nut driver, unscrew the nuts on the corners of the cable manager.

3. Grasp the bottom of the cable manager and pull it straight out from the studs on the front of the chassis.

Figure 77: Removing the Cable Manager



Removing Fan Trays Before Installing the SRX5800 Services Gateway Chassis

To remove the upper or lower fan tray (see Figure 78 on page 173 and Figure 79 on page 174, which illustrate the upper and lower fan trays):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Loosen the captive screw on each side of the fan tray faceplate.

3. Grasp both sides of the fan tray and pull it out approximately 1 to 3 inches.

4. Press on the two latches located on the inside of the fan tray to release the fan tray from the chassis.

5. Place one hand under the fan tray to support it and pull the fan tray completely out of the chassis.

Figure 78: Removing an Upper Fan Tray

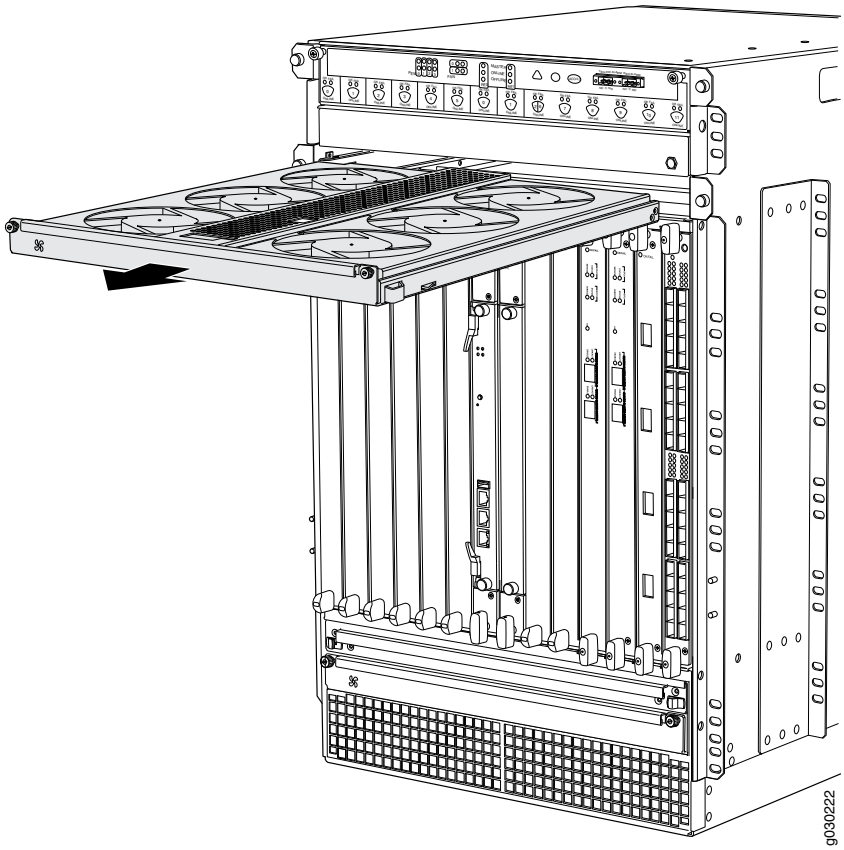
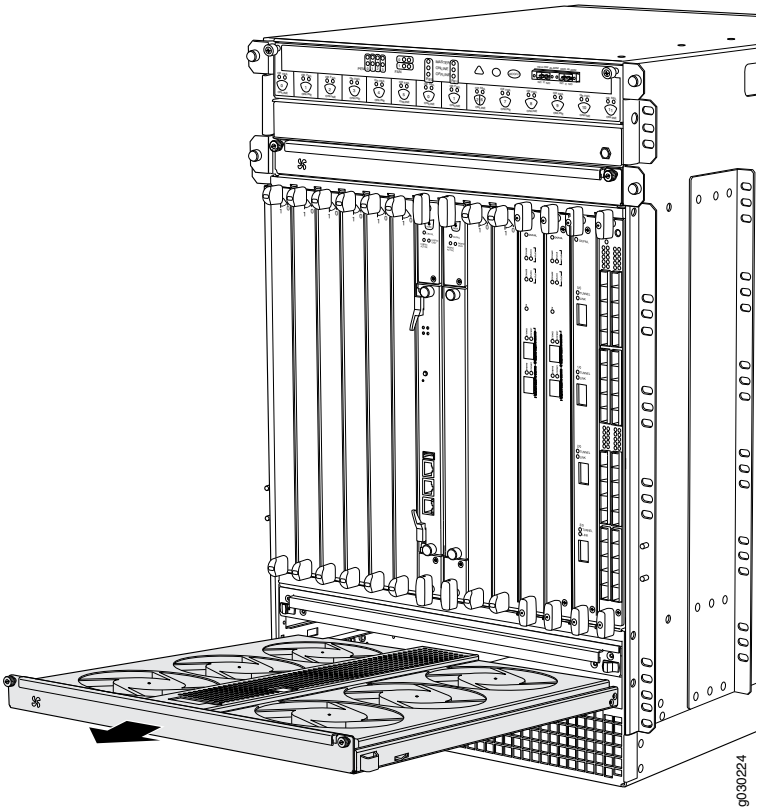


Figure 79: Removing a Lower Fan Tray



Removing Cards Before Installing the SRX5800 Services Gateway Chassis

The services gateway holds up to twelve cards (IOCs, Flex IOCs, MPCs, SCBs, and SPCs), which are installed horizontally in the front of the device. Each card weighs up to 18.3 lb (8.3 kg), be prepared to accept its full weight.

To remove a card (see Figure 80 on page 176):

1. Have ready an antistatic mat for the card. Also have ready rubber safety caps for each port using an optical interface on the card that you are removing.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Label the cables connected to each port on the card so that you can later reconnect the cables to the correct ports.

4. If a card uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap. Arrange the disconnected cables in the cable management system, to prevent the cables from developing stress points.

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

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

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

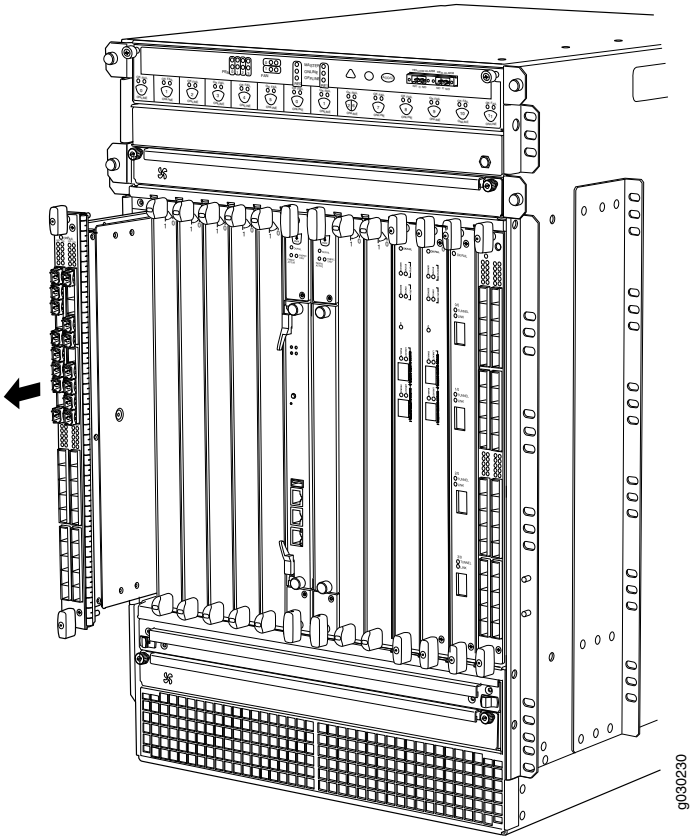
5. For SCBs, observe these points regarding the ejector handles:
   - When removing or inserting an SCB, ensure that the SCBs or blank panels in adjacent slots are fully inserted to avoid hitting them with the ejector handles. The ejector handles require that all adjacent components be completely inserted so the ejector handles do not hit them, which could result in damage.
   - The ejector handles have a center of rotation and need to be stored toward the center of the board. Ensure the long ends of the ejectors located at both the top and the bottom of the board are vertical and pressed as far as possible toward the center of the board. Once you have installed an SCB, place the ejector handles in their proper position, vertically and toward the center of the board. To avoid blocking the visibility of the LEDs, position the ejectors over the PARK icon.
   - To insert or remove the SCB card, slide the ejector across the SCB horizontally, rotate it, and slide it again another quarter of a turn. Turn the ejector again and repeat as necessary. Use the indexing feature to maximize leverage and to avoid hitting any adjacent components.
6. Simultaneously turn both the ejector handles counterclockwise to unseat the card.
7. Grasp the handles and slide the card straight out of the card cage halfway.
8. Place one hand around the front of the card and the other hand under it to support it. Slide the IOC completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

CAUTION: The weight of the card is concentrated in the back end. Be prepared to accept the full weight—up to 13.1 lb (5.9 kg)—as you slide the card out of the chassis.

When the card is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

Do not stack cards on top of one another after removal. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

Figure 80: Removing a Card (IOC Shown, Other Card Types Similar)



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177
- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It in the Rack on page 179

Related Documentation

- SRX5800 Services Gateway Chassis on page 19
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177
- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It in the Rack on page 179
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278
- *Chassis Lifting Guidelines*
- SRX5800 Services Gateway Chassis Grounding Point Specifications on page 129

Installing the SRX5800 Services Gateway Chassis in the Rack

Because of the services gateway's size and weight—up to 400 lb (182 kg) depending on the configuration—you must install the services gateway using a mechanical lift.

CAUTION: **Before front mounting the services gateway in a rack, have a qualified technician verify that the rack is strong enough to support the services gateway's weight and is adequately supported at the installation site.**

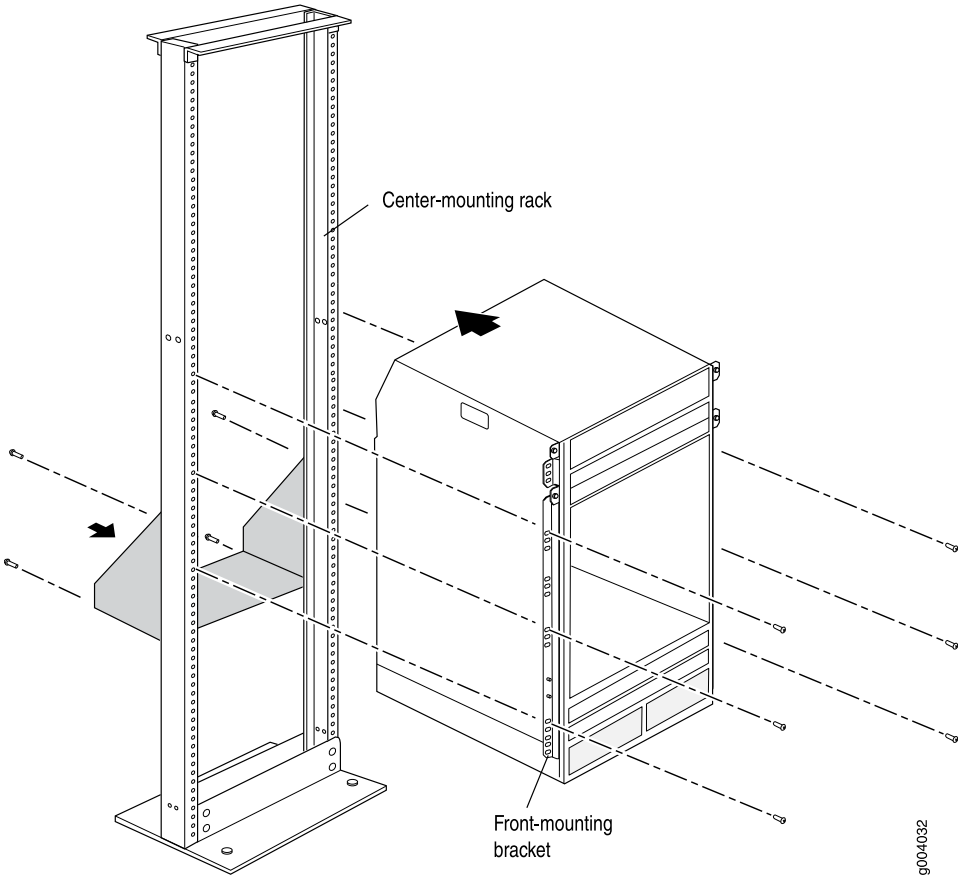
To install the services gateway using a lift (see Figure 81 on page 178):

1. Ensure the rack is in its permanent location and is secured to the building. Ensure that the installation site allows adequate clearance for both airflow and maintenance.
2. Load the services gateway onto the lift, making sure it rests securely on the lift platform.
3. Using the lift, position the services gateway in front of the rack or cabinet, centering it in front of the mounting shelves.
4. Lift the chassis approximately 0.75 in. above the surface of the mounting shelves and position it as close as possible to the shelves.
5. Carefully slide the services gateway onto the mounting shelves so that the bottom of the chassis and the mounting shelves overlap by approximately two inches.
6. Slide the services gateway onto the mounting shelves until the center-mounting brackets or front-mounting flanges contact the rack rails. The shelves ensure that the holes in the center-mounting brackets and the front-mounting flanges of the chassis align with the holes in the rack rails.
7. Move the lift away from the rack.

8. To install the services gateway in an open-frame rack, install a mounting screw into each of the open mounting holes aligned with the rack, starting from the bottom.

9. Visually inspect the alignment of the services gateway. If the services gateway is installed properly in the rack, all the mounting screws on one side of the rack should be aligned with the mounting screws on the opposite side and the services gateway should be level.

Figure 81: Installing the Services Gateway in the Rack



NOTE: This illustration depicts the services gateway being installed in an open-frame rack.

Related Documentation

- *SRX5800 Services Gateway General Safety Guidelines and Warnings*
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Removing Components from the SRX5800 Chassis Before Installing It in the Rack on page 169

- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It in the Rack on page 179
- Unpacking the SRX5800 Services Gateway on page 157

Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It in the Rack

After the services gateway is installed in the rack, reinstall the removed components before booting and configuring the services gateway. You reinstall components first in the rear of the chassis, and then in the front:

1. Reinstalling Power Supplies After Installing the SRX5800 Services Gateway Chassis on page 179
2. Reinstalling Fan Trays After Installing the SRX5800 Services Gateway Chassis on page 181
3. Reinstalling Cards After Installing the SRX5800 Services Gateway Chassis on page 182
4. Reinstalling the Cable Manager After Installing the SRX5800 Services Gateway Chassis on page 184

Reinstalling Power Supplies After Installing the SRX5800 Services Gateway Chassis

Reinstall the rightmost power supply first and then work your way to the left. To reinstall the AC or DC power supplies, follow this procedure for each power supply (see Figure 82 on page 180, which shows the installation of the DC power supplies):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

   Verify that the power supplies are switched off:

   - For an AC-powered services gateway, verify that the AC input switch on the chassis above each AC power supply is in the off (**O**) position. If the services gateway is equipped with high-capacity AC power supplies, also verify that the AC input switch on each power supply is in the off (**O**) position.
   - For DC-powered services gateway, verify that the DC circuit breaker on each power supply faceplate is in the off (**O**) position.

   We recommend verifying that the power supplies are switched off even though they are not connected to power sources.

2. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 82 on page 180).

   If necessary, pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

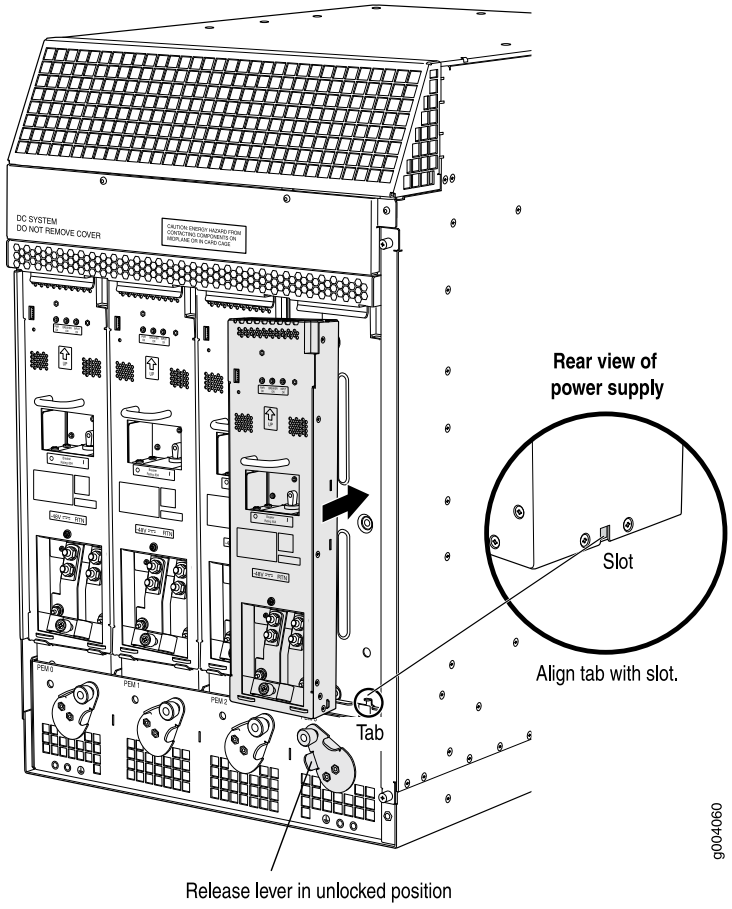
3. Using both hands, slide the power supply straight into the chassis until the power supply is fully seated in the chassis slot. The power supply faceplate should be flush with any adjacent power supply faceplates.

   The small tab on the metal housing that is controlled by the release lever must be inside of the corresponding slot at the bottom of the power supply. This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

4. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

5. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

Figure 82: Reinstalling a Power Supply (Standard-Capacity Shown, High-Capacity Similar)



Reinstalling Fan Trays After Installing the SRX5800 Services Gateway Chassis

To reinstall the fan trays (see Figure 83 on page 181 and Figure 84 on page 182):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Grasp the fan tray on each side and insert it straight into the chassis. Note the correct orientation by the "this side up" label on the top surface of the fan tray.

3. Tighten the captive screws on each side of the fan tray faceplate to secure it in the chassis.

4. Lower the standard cable manager back into position, if necessary.

Figure 83: Installing an Upper Fan Tray

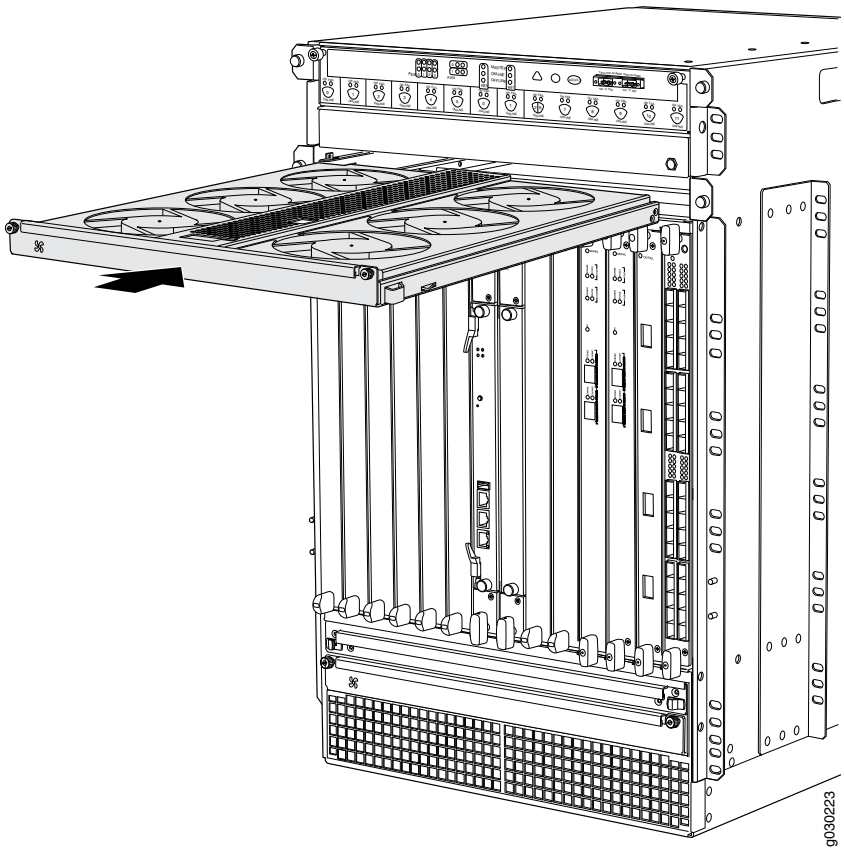
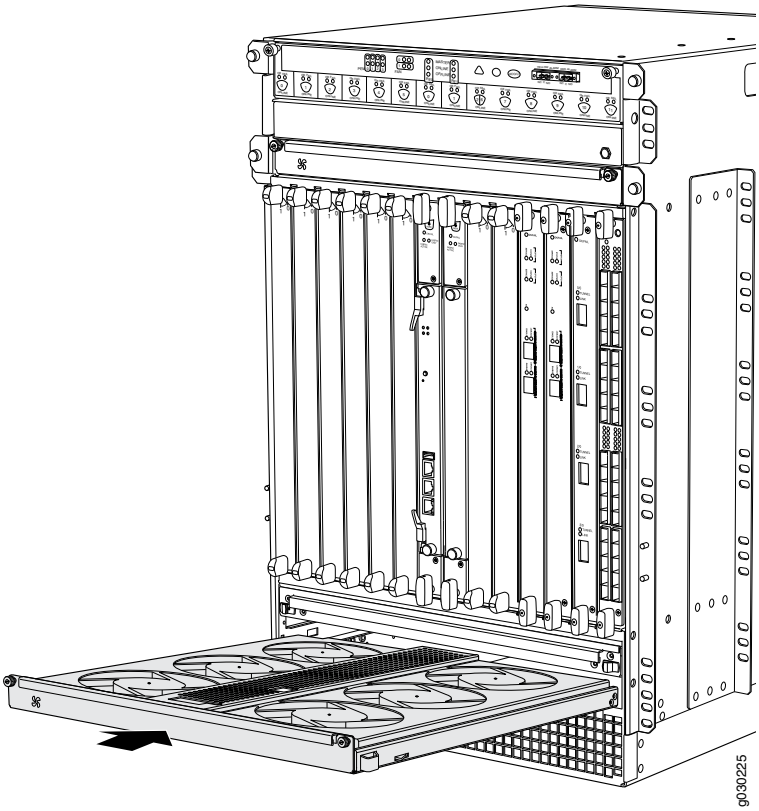


Figure 84: Installing a Lower Rear Fan Tray



Reinstalling Cards After Installing the SRX5800 Services Gateway Chassis

To reinstall cards (IOCs, Flex IOCs, MPCs, SPCs, and SCBs (see Figure 85 on page 184):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Take each card to be installed out of its electrostatic bag and identify the slot on the card cage where it will be connected.
3. Verify that each fiber-optic port has a rubber safety cap covering the transceiver. If it does not, cover the transceiver with a safety cap.
4. Locate the slot in the card cage in which you plan to install the card.
5. Ensure the card is right-side up, with the text on the faceplate of the card facing upward.
6. Lift the card into place and carefully align first the bottom, then the top of the card with the guides inside the card cage.

7. Slide the card all the way into the card cage until you feel resistance.

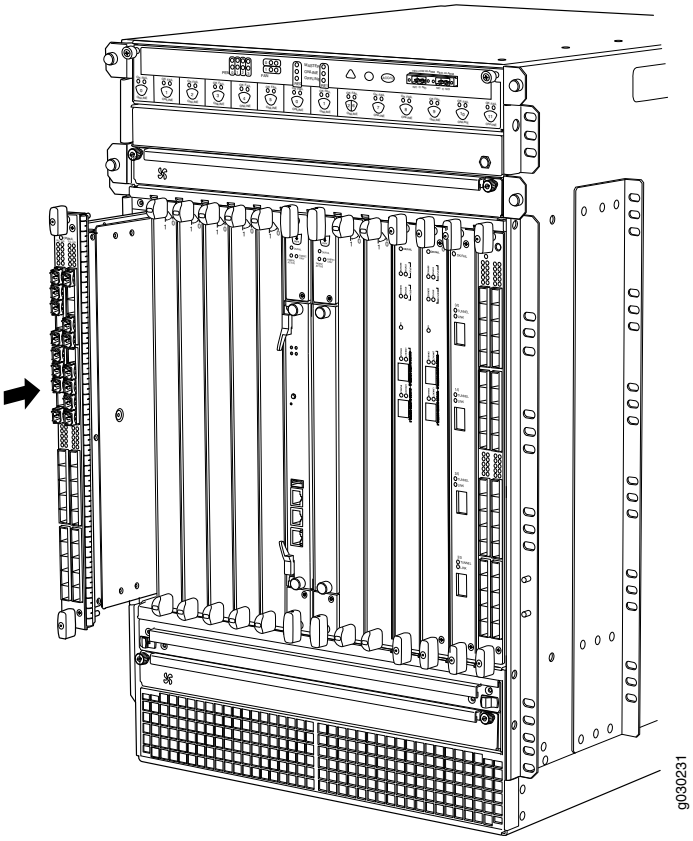
8. For SCBs, observe these points regarding the ejector handles:
   - When removing or inserting an SCB, ensure that the SCBs or blank panels in adjacent slots are fully inserted to avoid hitting them with the ejector handles. The ejector handles require that all adjacent components be completely inserted so the ejector handles do not hit them, which could result in damage.
   - The ejector handles have a center of rotation and need to be stored toward the center of the board. Ensure the long ends of the ejectors located at both the top and the bottom of the board are vertical and pressed as far as possible toward the center of the board. Once you have installed an SCB, place the ejector handles in their proper position, vertically and toward the center of the board. To avoid blocking the visibility of the LEDs,position the ejectors over the PARK icon.
   - To insert or remove the SCB card, slide the ejector across the SCB horizontally, rotate it, and slide it again another quarter of a turn. Turn the ejector again and repeat as necessary. Use the indexing feature to maximize leverage and to avoid hitting any adjacent components.
9. Grasp both ejector handles and rotate them simultaneously clockwise until the card is fully seated.

10. Insert the appropriate cable into the cable connector ports on each card. Secure each cable so that it is not supporting its own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

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

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

Figure 85: Installing an IOC

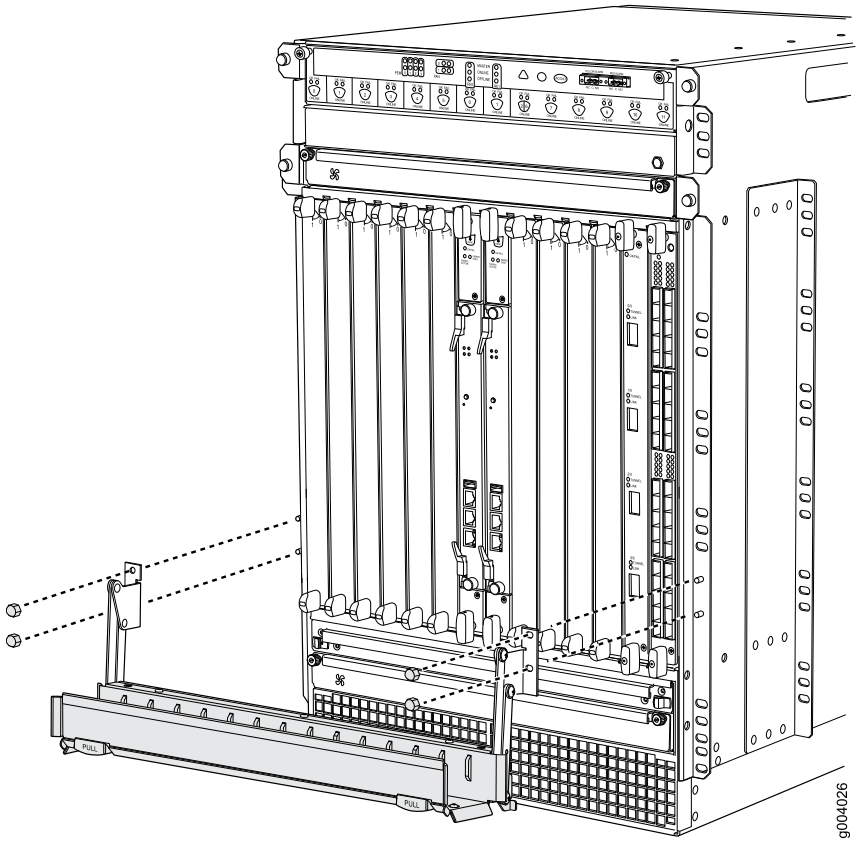


Reinstalling the Cable Manager After Installing the SRX5800 Services Gateway Chassis

To reinstall the cable manager (see Figure 86 on page 185):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Position the cable manager on the studs on the lower front of the chassis.
3. Insert the nuts on the corners in the cable manager onto the studs on the chassis.
4. Using a 7/16-in. nut driver, tighten the nuts securely.

Figure 86: Reinstalling the Cable Manager



See Also

- *SRX5800 Services Gateway General Safety Guidelines and Warnings*
- Site Preparation Checklist for the SRX5800 Services Gateway on page 109
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Removing Components from the SRX5800 Chassis Before Installing It in the Rack on page 169
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177

Related Documentation

- SRX5800 Services Gateway Chassis on page 19
- Tools Required to Install the SRX5800 Services Gateway on page 156
- Removing Components from the SRX5800 Chassis Before Installing It in the Rack on page 169
- Installing the SRX5800 Services Gateway Chassis in the Rack on page 177
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278

- *Chassis Lifting Guidelines*
- SRX5800 Services Gateway Chassis Grounding Point Specifications on page 129

CHAPTER 18

Installing Additional Components

Installing an SRX5800 Services Gateway AC Power Supply

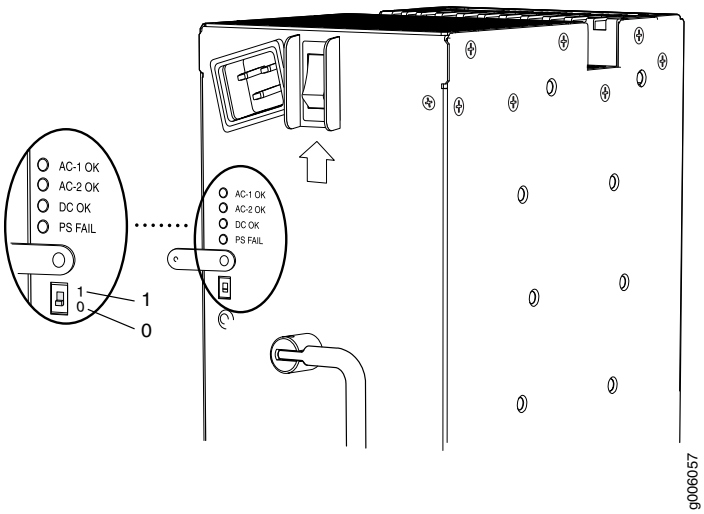
To install an AC power supply:

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. If you have not already done so, move the AC input switch in the chassis above the empty power supply slot to the off (**O**) position.

3. For each high-capacity AC power supply, move the input mode switch to position **0** for one feed or position **1** for two feeds (see Figure 87 on page 188). We recommend that you use two AC power feeds and set the mode input switch to **1**.

Figure 87: High-Capacity AC Power Supply Input Mode Switch



NOTE: **Do not use a pencil to set the mode switch, because fragments can break off and cause damage to the power supply.**

4. If you are installing a high-capacity power supply, move the AC input switch on the faceplate of the power supply itself to the off (**O**) position.

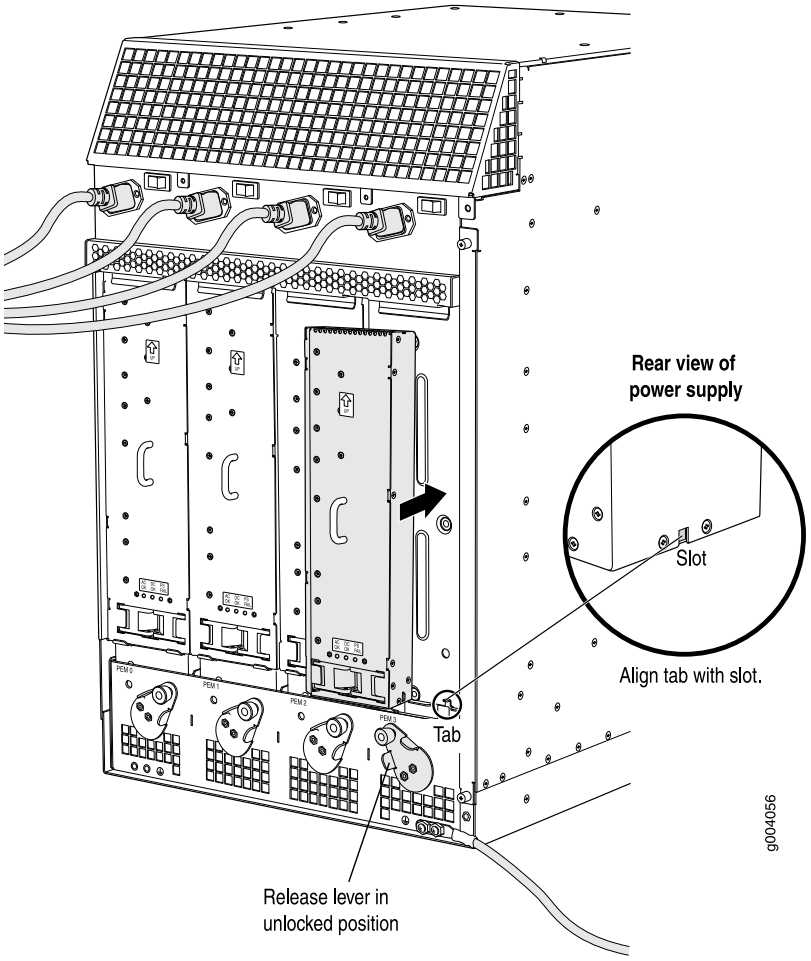
5. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 88 on page 189).

   If necessary, pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

6. Using both hands, slide the power supply straight into the chassis until the power supply is fully seated in the chassis slot. The power supply faceplate should be flush with any adjacent power supply faceplates.

   The small tab on the metal housing that is controlled by the release lever must be inside of the corresponding slot at the bottom of the power supply (see Figure 88 on page 189). This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

Figure 88: Installing an AC Power Supply (Standard-Capacity Shown, High-Capacity Similar)



7. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

8. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

9. If you are installing a high-capacity power supply, connect a power cord to the appliance inlet at the top edge of the power supply. For more information, see "Connecting an SRX5800 Services Gateway AC Power Supply Cord" on page 412.

10. Move the AC input switch in the chassis above the power supply to the on (—) position.

11. If you are installing a high-capacity power supply, move the AC input switch on the faceplate of the power supply itself to the on (**1**) position.

12. Verify the following LED indications for each installed power supply:

    - For standard-capacity AC power supplies, verify that the **AC OK** and **DC OK** LEDs light steadily and the **PS FAIL** LED is not lit.
    - For high-capacity AC power supplies, verify that the **DC OK** LED lights steadily and the **PS FAIL** LED is not lit. In addition, the **AC-1 OK** LED should light green steadily if the upper AC feed (on the chassis above the power supply) is connected and receiving power, and the **AC-2 OK** LED should light green steadily if the lower AC feed (on the power supply itself) is connected and receiving power.

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

    If any of the status LEDs indicates that the power supply is not functioning normally, repeat the installation and cabling procedures.

Related Documentation

- Connecting an SRX5800 Services Gateway AC Power Supply Cord on page 412
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing an SRX5800 Services Gateway AC Power Supply on page 405
- Replacing an SRX5800 Services Gateway AC Power Supply Cord on page 411

Installing an SRX5800 Services Gateway DC Power Supply

WARNING: **Before performing 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 switch handle of the circuit breaker in the off position.**

To install a DC power supply (see Figure 89 on page 192):

1. Verify that the power switch on the power supply is in the off (**O**) position.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Move the switch or circuit breaker on the power supply faceplate to the off (**O**) position.

4. For a high-capacity DC power supply, configure the power supply for the number of DC feeds:

   a. Rotate the metal cover away from the input mode switch to expose the switch.

   b. Move the input mode switch to position **0** for one feed or position **1** for two feeds.

NOTE: **The high-capacity DC power supply will operate with only one of its two DC inputs connected to a power feed. However, its DC output will be limited to a maximum of 1700 W. We recommend that you connect two DC power feeds to each high-capacity DC power supply.**

5. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.

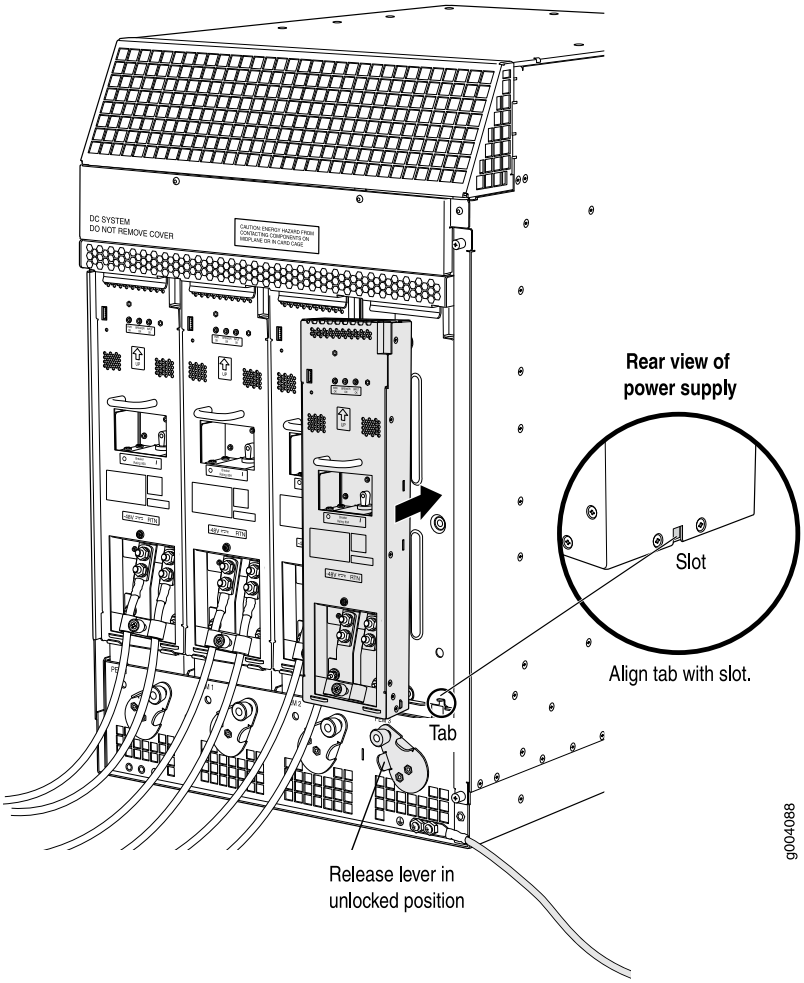
6. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 89 on page 192).

   If necessary, pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

7. Using both hands, slide the power supply straight into the chassis until the power supply is fully seated in the chassis slot.

   The small tab on the metal housing that is controlled by the release lever must be inside of the corresponding slot at the bottom of the power supply (see Figure 89 on page 192). This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

Figure 89: Installing a DC Power Supply (Standard Capacity Shown, High-Capacity Similar)



8. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

9. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

10. Remove the clear plastic cover protecting the terminal studs on the faceplate.

11. Remove the nuts and washers from the terminal studs.

12. Secure each power cable lug to the terminal studs, first with the split washer, then with the nut.

CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

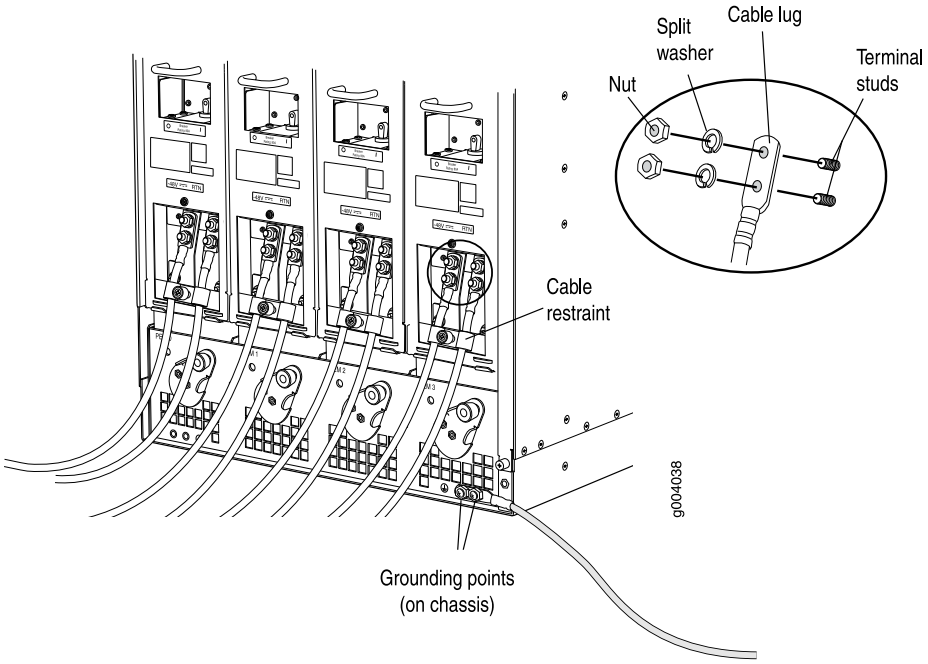
For a standard-capacity power supply:

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

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

c. Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each nut (see Figure 90 on page 193).

Figure 90: Connecting DC Power to a Standard-Capacity DC Power Supply



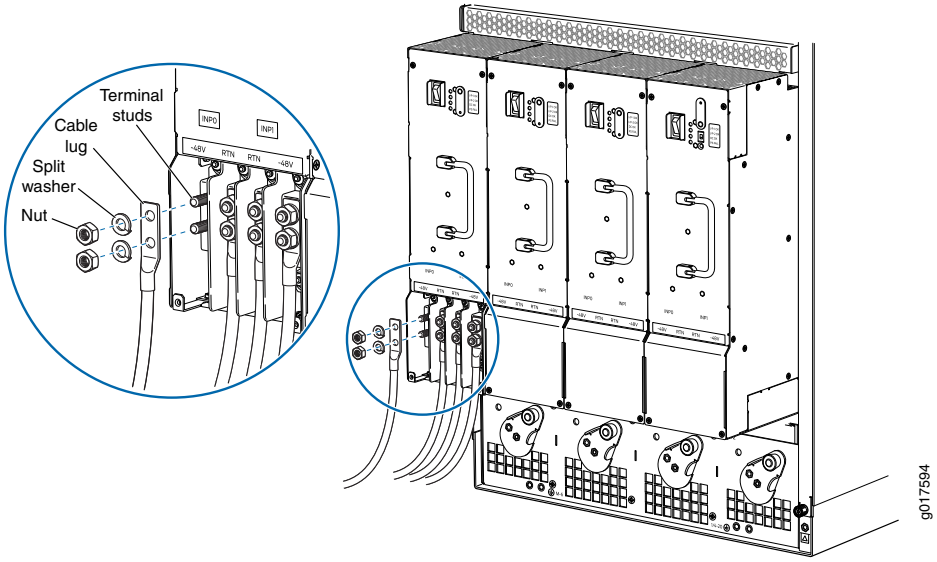
For a high-capacity power supply:

a. On **INP0**, attach the positive (+) DC source power cable lug to the **RTN** (return) terminal. Repeat this step for **INP1** if using two feeds.

b. On **INP0** attach the negative (–) DC source power cable lug to the –48V (input) terminal. Repeat this step for **INP1** if using two feeds.

c. Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each nut (see Figure 91 on page 194).

Figure 91: Connecting DC Power to a High-Capacity DC Power Supply



CAUTION: Ensure that each power cable lug seats flush against the surface of the terminal block as you are tightening the nuts. Ensure that each nut is properly threaded onto the terminal stud. The nut should be able to spin freely with your fingers when it is first placed onto the terminal stud. Applying installation torque to the nut when improperly threaded may result in damage to the terminal stud.

CAUTION: The maximum torque rating of the terminal studs on the DC power supply is 36 in-lb. (4.0 Nm). The terminal studs may be damaged if excessive torque is applied. Use only a torque-controlled driver or socket wrench to tighten nuts on the DC power supply terminal studs.

NOTE: The DC power supplies in slots PEM0 and PEM1 must be powered by dedicated power feeds derived from feed A, and the DC power supplies in PEM2 and PEM3 must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

13. For standard-capacity DC power supplies, secure each DC power cable to its strain relief bracket as follows:

    a. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

    b. Route the positive and negative DC power cables through the left and right sides of the cable restraint.

    c. Tighten the cable restraint captive screw to hold the power cables in place.

14. Replace the clear plastic cover over the terminal studs on the faceplate.

15. Verify that the power cabling is correct, that the cables are not touching, and that they do not block access to services gateway components or drape where people could trip on them.

16. Switch on the dedicated customer site circuit breaker.

17. Verify that the input LEDs on the power supply indicate that the DC power is connected properly:

    - For a standard-capacity power supply, verify that the **INPUT OK** LED on the power supply is lit steadily.
    - For a high-capacity power supply, verify that the **INP0 OK** or **INP1 OK** LEDs on the power supply are lit green steadily. If using two feeds, verify that both **INP0 OK** and **INP1 OK** LEDs on the power supply are lit steadily

NOTE: An input LED will be lit amber if that input's voltage is in reverse polarity. Check the polarity of the power cables to fix the condition

18. Move the switch or circuit breaker on the DC power supply to the on (**|**) position .

19. Verify that the output LEDs on the power supply indicate that it is operating properly:

- For a standard-capacity power supply, verify that the **BREAKER ON** and **PWR OK** LEDs are lit steadily.
- For a high-capacity power supply, verify that the **DC OK** LED is lit, and that the **PS FAIL** LED is not lit.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing an SRX5800 Services Gateway DC Power Supply on page 413
- Disconnecting an SRX5800 Services Gateway DC Power Supply Cable on page 422
- Connecting an SRX5800 Services Gateway DC Power Supply Cable on page 423

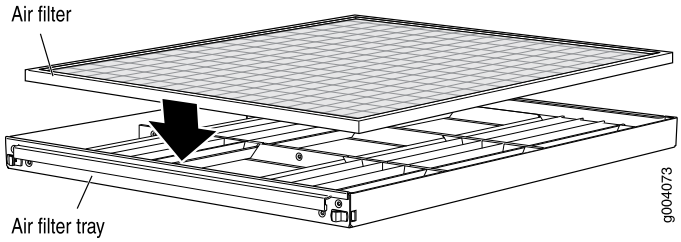
Installing the SRX5800 Services Gateway Air Filter

You should change the air filter every six months.

To install the air filter (see Figure 92 on page 196):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Ensure the air filter is right side up.
3. Place the air filter into the air filter tray.
4. Insert the air filter tray into the chassis by sliding it straight into the chassis until it stops.
5. Lower the cable manager back into position.
6. Rearrange the cables in the cable manager.

Figure 92: Installing the Air Filter Standard-Capacity Filter Tray Shown, High-Capacity Similar)



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304

- Removing the SRX5800 Services Gateway Air Filter on page 398

Installing an SRX5800 Services Gateway Fan Tray

NOTE: To prevent overheating, install the replacement fan tray immediately after removing the existing fan tray. Do not operate the services gateway for more than two minutes without both fan trays installed.

To install a fan tray (see Figure 93 on page 198 and Figure 94 on page 199):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Grasp the fan tray on each side and insert it straight into the chassis. Note the correct orientation by the "this side up" label on the top surface of the fan tray.
3. Tighten the captive screws on each side of the fan tray faceplate to secure it in the chassis.
4. Lower the cable manager back into position, if necessary.

Figure 93: Installing an Upper Fan Tray (Standard-Capacity Shown, High-Capacity Similar)

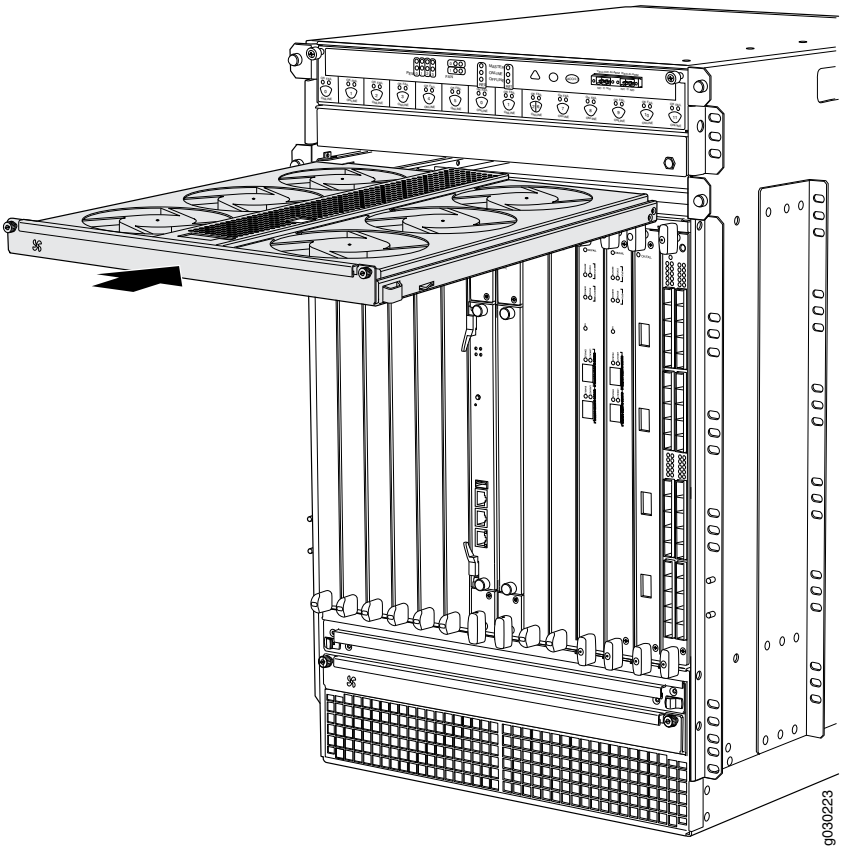
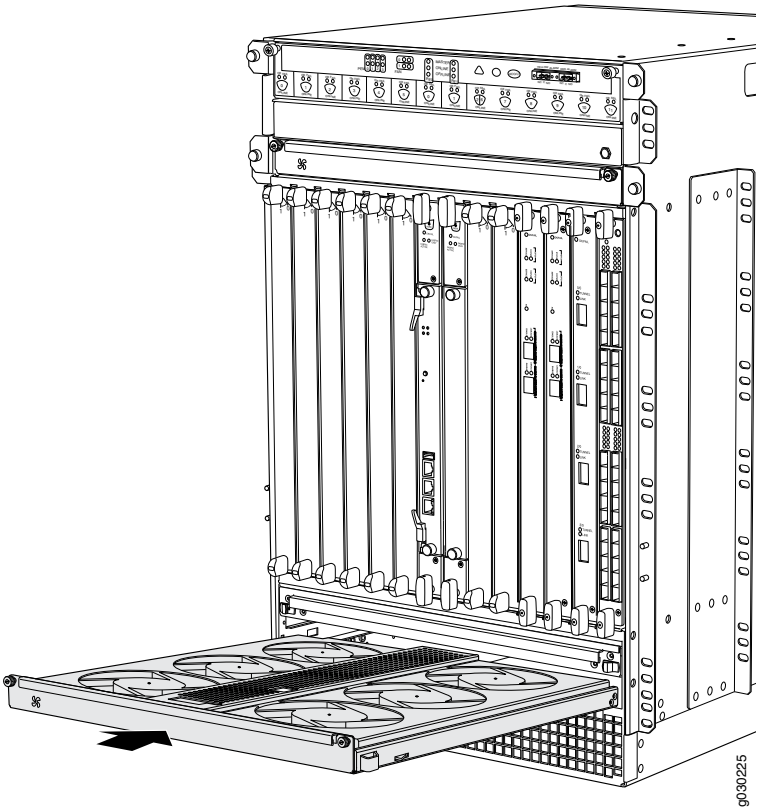


Figure 94: Installing a Lower Fan Tray (Standard-Capacity Shown, High-Capacity Similar)



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Removing an SRX5800 Services Gateway Fan Tray on page 393

Holding an SRX5800 Services Gateway Card

When carrying a card, you can hold it either vertically or horizontally.

NOTE: **A card weighs up to 18.3 lb (8.3 kg). Be prepared to accept the full weight of the card as you lift it.**

To hold a card vertically:

1. Orient the card so that the faceplate faces you. To verify orientation, confirm that the text on the card is right-side up and the EMI strip is on the right-hand side.

2. Place one hand around the card faceplate about a quarter of the way down from the top edge. To avoid deforming the EMI shielding strip, do not press hard on it.

3. Place your other hand at the bottom edge of the card.

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

To hold a card horizontally:

1. Orient the card so that the faceplate faces you.

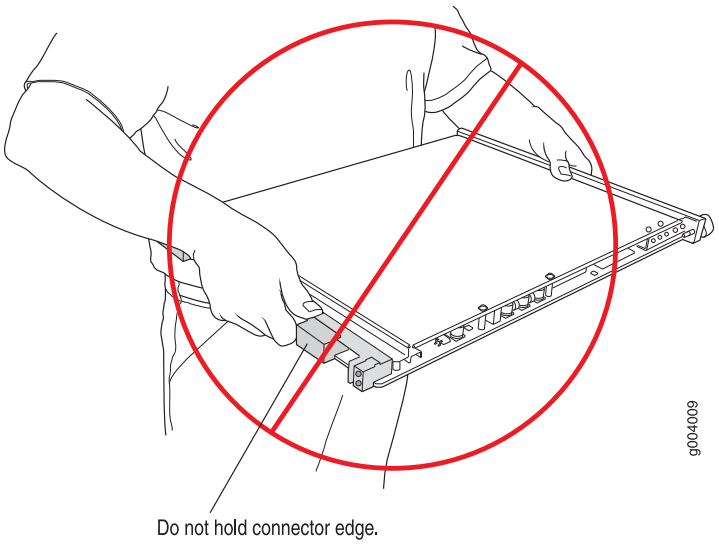
2. Grasp the top edge with your left hand and the bottom edge with your right hand.

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

As you carry the card, do not bump it against anything. Card components are fragile.

Never hold or grasp the card anywhere except those places that this topic indicates are appropriate. In particular, never grasp the connector edge, especially at the power connector in the corner where the connector and bottom edges meet (see Figure 95 on page 200).

Figure 95: Do Not Grasp the Connector Edge

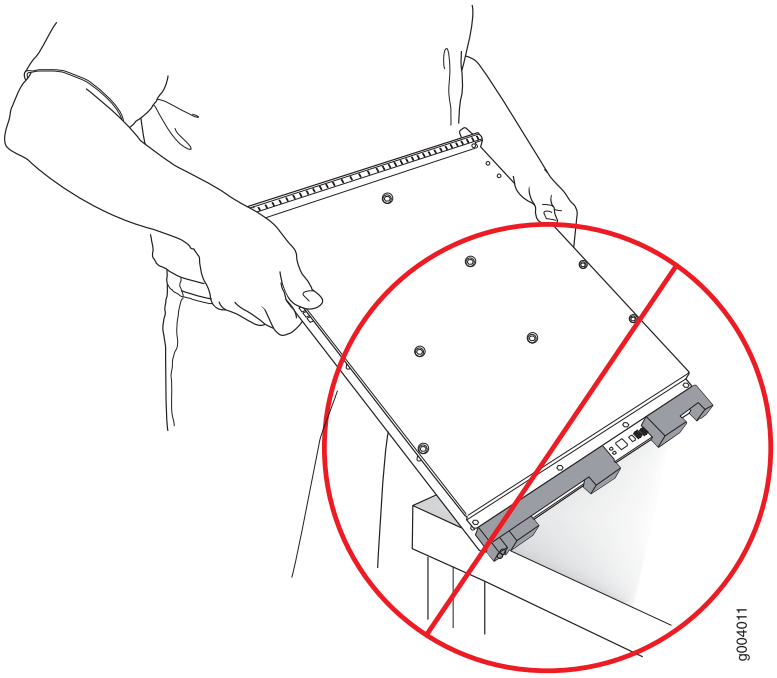


Never carry the card by the faceplate with only one hand.

Do not rest any edge of a card directly against a hard surface (see Figure 96 on page 201).

Do not stack cards.

Figure 96: Do Not Rest the Card on an Edge



Do not rest connectors on any surface.

If you must rest the card temporarily on an edge while changing its orientation between vertical and horizontal, use your hand as a cushion between the edge and the surface.

Related Documentation

- *SRX5800 Services Gateway Card Terminology*
- Storing an SRX5800 Services Gateway Card on page 201

Storing an SRX5800 Services Gateway Card

You must store a card as follows:

- In the services gateway chassis
- In the container in which a spare card is shipped
- Horizontally and sheet metal side down

When you store a card on a horizontal surface or in the shipping container, always place it inside an antistatic bag. Because the card is heavy, and because antistatic bags are fragile, inserting the card into the bag is easier with two people. To do this, one person holds the card in the horizontal position with the faceplate facing the body, and the other person slides the opening of the bag over the card connector edge.

If you must insert the card into a bag by yourself, first lay the card horizontally on a flat, stable surface, sheet metal side down. Orient the card with the faceplate facing you. Carefully insert the card connector edge into the opening of the bag, and pull the bag toward you to cover the card.

Never stack a card under or on top of any other component.

Related Documentation

- *SRX5800 Services Gateway Card Terminology*
- Holding an SRX5800 Services Gateway Card on page 199

Operating and Positioning the SRX5800 Services Gateway SCB Ejectors

- When removing or inserting an SCB, ensure that the SCBs or blank panels in adjacent slots are fully inserted to avoid hitting them with the ejector handles. The ejector handles require that all adjacent components be completely inserted so the ejector handles do not hit them, which could result in damage.
- The ejector handles have a center of rotation and need to be stored toward the center of the board. Ensure the long ends of the ejectors located at both the top and the bottom of the board are vertical and pressed as far as possible toward the center of the board. Once you have installed an SCB, place the ejector handles in their proper position, vertically and toward the center of the board. To avoid blocking the visibility of the LEDs,position the ejectors over the PARK icon.
- To insert or remove the SCB card, slide the ejector across the SCB horizontally, rotate it, and slide it again another quarter of a turn. Turn the ejector again and repeat as necessary. Use the indexing feature to maximize leverage and to avoid hitting any adjacent components.
- Operate both ejector handles simultaneously. The insertion force on an SCB is too great for one ejector.

Related Documentation

- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Replacing an SRX5800 Services Gateway SCB on page 364
- Replacing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Installing an SRX5800 Services Gateway SCB

To install an SCB (see Figure 97 on page 204):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Carefully align the sides of the SCB with the guides inside the chassis.

4. Slide the SCB into the chassis until you feel resistance, carefully ensuring that it is correctly aligned.

5. Grasp both ejector handles and rotate them simultaneously clockwise until the SCB is fully seated.

6. Place the ejector handles in the proper position, vertically and toward the center of the board.

7. Power on the services gateway.

8. To verify that the SCB is functioning normally, check the LEDs on its faceplate. The green **OK/FAIL** LED should light steadily a few minutes after the SCB is installed. If the **OK/FAIL** LED is red, remove and install the SCB again. If the **OK/FAIL** LED still lights steadily, the SCB is not functioning properly. Contact your customer support representative.

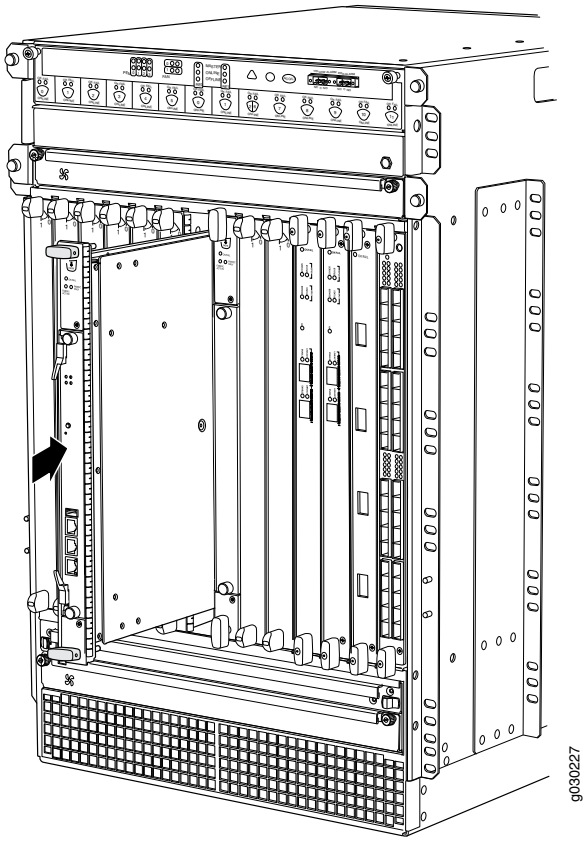
   To check the status of the SCB:

```
user@host> show chassis environment cb
CB 0 status:
  State                       Online Master
  Temperature                 30 degrees C / 86 degrees F
  Power 1
    1.2 V                      1202 mV
    1.5 V                      1511 mV
    1.8 V                      1798 mV
    2.5 V                      2481 mV
    3.3 V                      3306 mV
    5.0 V                      4956 mV
    12.0 V                    12084 mV
    1.25 V                     1250 mV
    3.3 V SM3                  3287 mV
    5.0 V RE                   5046 mV
    12.0 V RE                 11910 mV
  Power 2
    11.3 V bias PEM           11292 mV
    4.6 V bias MidPlane        4833 mV
    11.3 V bias FPD           11156 mV
    11.3 V bias POE 0         11253 mV
    11.3 V bias POE 1         11272 mV
  Bus Revision                42
  FPGA Revision               1
CB 1 status:
  State                       Online
  Temperature                 31 degrees C / 87 degrees F
  Power 1
    1.2 V                      1205 mV
    1.5 V                      1508 mV
    1.8 V                      1817 mV
    2.5 V                      2507 mV
    3.3 V                      3306 mV
    5.0 V                      5053 mV
    12.0 V                    12200 mV
    1.25 V                     1256 mV
```



```
  3.3 V SM3                  3306 mV
  5.0 V RE                   5091 mV
  12.0 V RE                     0 mV
Power 2
  11.3 V bias PEM           11214 mV
  4.6 V bias MidPlane        4821 mV
  11.3 V bias FPD           11350 mV
  11.3 V bias POE 0         11350 mV
  11.3 V bias POE 1         11330 mV
Bus Revision                42
FPGA Revision               0
```

Figure 97: Installing an SCB



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Powering Off the SRX5800 Services Gateway on page 253
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Operating and Positioning the SRX5800 Services Gateway SCB Ejectors on page 202
- Removing an SRX5800 Services Gateway SCB on page 365
- Replacing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Installing the SRX5800 Services Gateway Routing Engine

To install a Routing Engine into an SCB (see Figure 98 on page 206):

NOTE: If you install only one Routing Engine in the service gateway, you must install it in SCB slot 0 of service gateway chassis.

1. If you have not already done so, take the host subsystem offline. See "Taking the SRX5800 Services Gateway Host Subsystem Offline" on page 363.
2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
3. Ensure that the ejector handles are not in the locked position. If necessary, flip the ejector handles outward.
4. Place one hand underneath the Routing Engine to support it.
5. Carefully align the sides of the Routing Engine with the guides inside the opening on the SCB.
6. Slide the Routing Engine into the SCB until you feel resistance, and then press the Routing Engine's faceplate until it engages the connectors.
7. Press both of the ejector handles inward to seat the Routing Engine.
8. Tighten the captive screws on the top and bottom of the Routing Engine faceplate.
9. Power on the services gateway.

   The Routing Engine might require several minutes to boot.

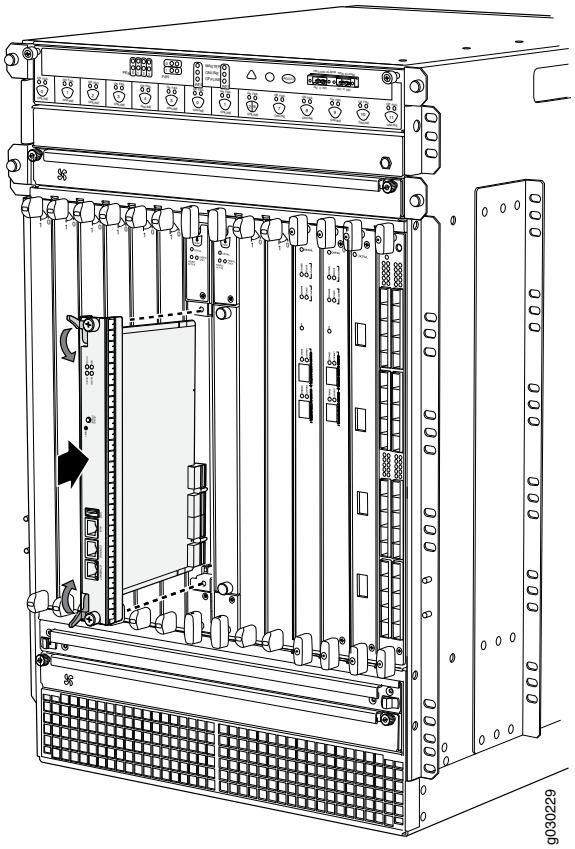
   After the Routing Engine boots, verify that it is installed correctly by checking the **RE0** and **RE1** LEDs on the craft interface. If the services gateway is operational and the Routing Engine is functioning properly, the green **ONLINE** LED lights steadily. If the red **FAIL** LED lights steadily instead, remove and install the Routing Engine again. If the red **FAIL** LED still lights steadily, the Routing Engine is not functioning properly. Contact your customer support representative.

   To check the status of the Routing Engine, use the CLI command:

```
user@host> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state                  Master ...
```

For more information about using the CLI, see the CLI Explorer.

Figure 98: Installing the Routing Engine



10. If the Routing Engine was replaced on one of the nodes in a chassis cluster, then you need to copy certificates and key pairs from the other node in the cluster:

    a. Start the shell interface as a root user on both nodes of the cluster.

    b. Verify files in the **/var/db/certs/common/key-pair** folder of the source node (other node in the cluster) and destination node (node on which the Routing Engine was replaced) by using the following command:

       ls -la /var/db/certs/common/key-pair/

    c. If the same files exist on both nodes, back up the files on the destination node to a different location. For example:

       root@SRX-B% pwd
       /var/db/certs/common/key-pair
       root@SRX-B% ls -la
       total 8
       drwx------ 2 root wheel 512 Jan 22 15:09
       drwx------ 7 root wheel 512 Mar 26 2009
       -rw-r--r-- 1 root wheel 0 Jan 22 15:09 test
       root@SRX-B% mv test test.old
       root@SRX-B% ls -la
       total 8
       drwx------ 2 root wheel 512 Jan 22 15:10
       drwx------ 7 root wheel 512 Mar 26 2009
       -rw-r--r-- 1 root wheel 0 Jan 22 15:09 test.old
       root@SRX-B%

    d. Copy the files from the **/var/db/certs/common/key-pair** folder of the source node to the same folder on the destination node.

       NOTE: **Ensure that you use the correct node number for the destination node.**

    e. In the destination node, use the **ls –la** command to verify that all files from the **/var/db/certs/common/key-pair** folder of the source node are copied.

    f. Repeat Step b through Step e for the **/var/db/certs/common/local** and **/var/db/certs/common/certification-authority** folders.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Removing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311
- Replacing the SRX5800 Services Gateway Console or Auxiliary Cable on page 312

- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251

Installing an SRX5800 Services Gateway IOC

An IOC weighs up to 13.1 lb (5.9 kg). Be prepared to accept its full weight.

To install an IOC (see Figure 99 on page 210):

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Place the IOC on an antistatic mat or remove it from its electrostatic bag.
4. Identify the slot on the services gateway where it will be installed.
5. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it does not, cover the transceiver with a safety cap.
6. Orient the IOC so that the faceplate faces you.
7. Lift the IOC into place and carefully align the top and bottom edges of the IOC with the guides inside the card cage.
8. Slide the IOC all the way into the card cage until you feel resistance.
9. Grasp both ejector handles and rotate them clockwise simultaneously until the IOC is fully seated.
10. Remove the rubber safety cap from each fiber-optic transceiver and cable.

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

11. Insert the cables into the cable connector ports on each IOC (see Figure 100 on page 211).
12. Arrange the cable in the cable manager to prevent it from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs

to the floor. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on the loop helps to maintain its shape.

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

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

13. Power on the services gateway.

14. Use one of the following methods to bring the IOC online:

    - Press and hold the corresponding IOC online button on the craft interface until the green **OK** LED next to the button lights steadily, in about 5 seconds.
    - Issue the following CLI command:

      `user@host>` **request chassis fpc slot *slot-number* online**

      For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

      CAUTION: After the OK LED turns green, wait at least 30 seconds before removing the IOC again, removing an IOC from a different slot, or inserting an IOC in a different slot.

      You can also verify that the IOC is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Figure 99: Installing an IOC

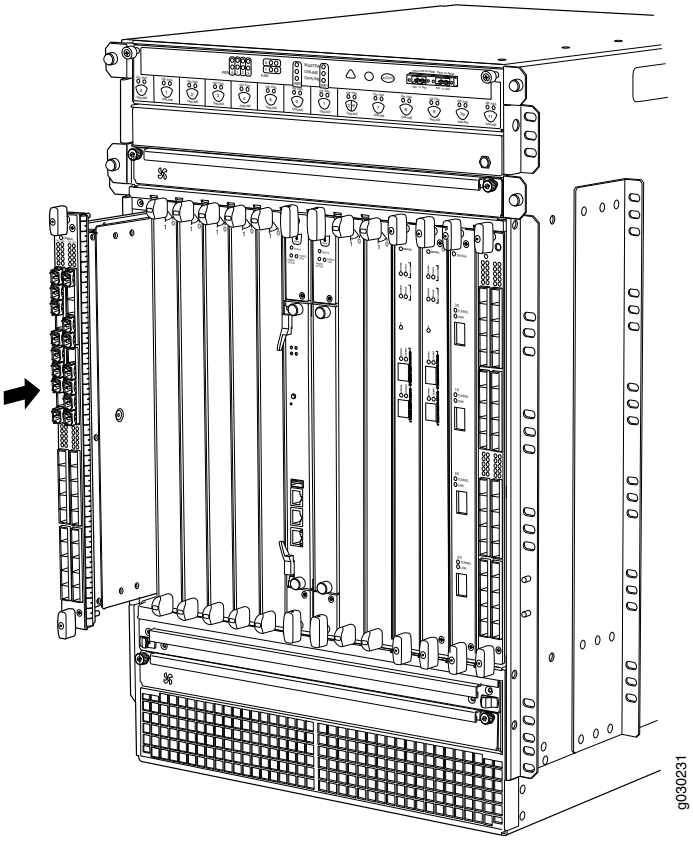
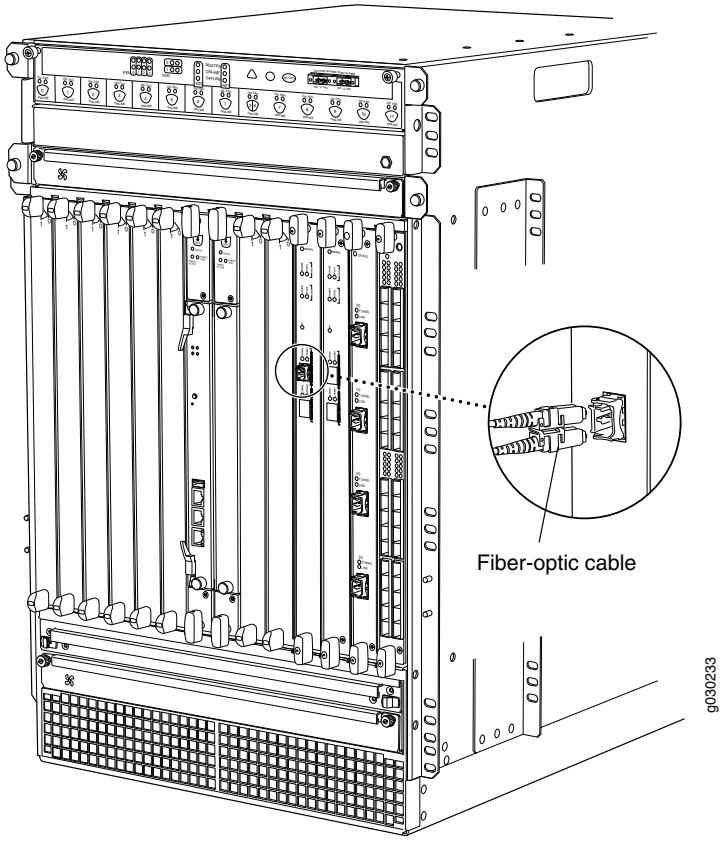


Figure 100: Attaching a Cable to an IOC



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway IOC on page 323
- Installing IOCs or Flex IOCs in an Operating SRX5800 Services Gateway Chassis Cluster on page 214

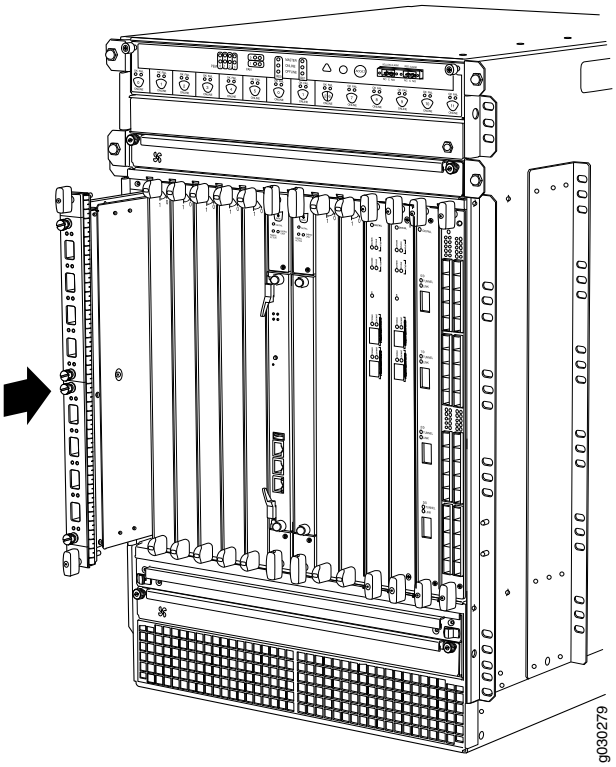
Installing an SRX5800 Services Gateway Flex IOC

NOTE: Your services gateway must be running Junos version 9.5R1 or later in order to recognize Flex IOCs and port modules.

To install a Flex IOC (see Figure 101 on page 213):

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Place the Flex IOC on an antistatic mat or remove it from its electrostatic bag.
4. Identify the slot on the services gateway where you will install the Flex IOC.
5. If you have not already done so, remove the blank panel from the slot where you are installing the Flex IOC.
6. Orient the Flex IOC so that the faceplate faces you, the text on the card is right-side up, and the EMI strip is on the right-hand side.
7. Lift the Flex IOC into place and carefully align first the bottom and then the top of the card with the guides inside the card cage.
8. Slide the Flex IOC all the way into the card cage until you feel resistance.

Figure 101: Installing a Flex IOC



9. Grasp both ejector handles and rotate them clockwise simultaneously until the Flex IOC is fully seated.

10. Power on the services gateway.

11. Use one of the following methods to bring the Flex IOC online:

    - Press and hold the corresponding online button on the craft interface until the green **OK** LED next to the button lights steadily, in about 5 seconds.
    - Issue the following CLI command:

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

      For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

CAUTION: After the OK LED turns green, wait at least 30 seconds before removing the card again, removing a card from a different slot, or inserting a card in a different slot.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway Flex IOC on page 330
- Replacing SRX5800 Services Gateway Port Modules on page 334
- Installing IOCs or Flex IOCs in an Operating SRX5800 Services Gateway Chassis Cluster on page 214

Installing IOCs or Flex IOCs in an Operating SRX5800 Services Gateway Chassis Cluster

If your services gateway is part of a chassis cluster, you can install IOCs or Flex IOCs in the services gateways in the cluster without incurring downtime on your network.

Such an installation meet the following conditions:

- If the chassis cluster is operating in active-active mode, you must transition it to active-passive mode before using this procedure. You transition the cluster to active-passive mode by making one node primary for all redundancy groups.
- Both of the services gateways in the cluster must be running Junos OS Release 12.1X45-D11 or later.

If your installation does not meet these criteria, use the procedure in "Installing an SRX5800 Services Gateway IOC" on page 208 or "Installing an SRX5800 Services Gateway Flex IOC" on page 212 to install IOCs or Flex IOCs in your services gateway.

NOTE: During this installation procedure, you must shut down both devices, one at a time. During the period when one device is shut down, the remaining device operates without a backup. If that remaining device fails for any reason, you incur network downtime until you restart at least one of the devices.

To install IOCs or Flex IOCs in an operating SRX5800 Services Gateway cluster without incurring downtime:

1. Use the console port on the Routing Engine to establish a CLI session with one of the devices in the cluster.

2. Issue the **show chassis cluster status** command to determine which services gateway is currently primary, and which services gateway is secondary, within the cluster.

   In the example below, all redundancy groups are primary on node 0, and secondary on node 1:

```
admin@cluster> show chassis cluster status
Cluster ID: 1
Node                 Priority         Status    Preempt  Manual failover
```

```
Redundancy group: 0 , Failover count: 5
    node0                   1           primary        no       no
    node1                   100         secondary      no       no

Redundancy group: 1 , Failover count: 1
    node0                   200         primary        no       no
    node1                   100         secondary      no       no

Redundancy group: 2 , Failover count: 1
    node0                   200         primary        no       no
    node1                   100         secondary      no       no

Redundancy group: 3 , Failover count: 1
    node0                   100         primary        no       no
    node1                   200         secondary      no       no

Redundancy group: 4 , Failover count: 1
    node0                   200         primary        no       no
    node1                   100         secondary      no       no
```

3. If the device with which you established the CLI session in Step 2 is not the secondary node in the cluster, use the console port on the device that is the secondary node to establish a CLI session.

4. In the CLI session for the secondary services gateway, issue the **request system power off** command to shut down the services gateway.

5. Wait for the secondary services gateway to completely shut down.

6. Install the new IOCs or Flex IOCs in the powered-off services gateway using the procedure in "Installing an SRX5800 Services Gateway IOC" on page 208 or "Installing an SRX5800 Services Gateway Flex IOC" on page 212.

7. Power on the secondary services gateway and wait for it to finish starting.

8. Reestablish the CLI session with the secondary node device.

9. Issue the **show chassis fpc pic-status** command to make sure that all of the cards in the secondary node chassis are back online.

   In the example below, the second column shows that all of the cards are online.

```
user@mland00> show chassis fpc pic-status
node0:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k IOC II
  PIC 0  Online       2x 40GE QSFP+
  PIC 2  Online       10x 10GE SFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
```



```
Slot 5   Online       SRX5k DPC 4X 10GE
  PIC 0  Online       1x 10GE(LAN/WAN) RichQ
  PIC 1  Online       1x 10GE(LAN/WAN) RichQ
  PIC 2  Online       1x 10GE(LAN/WAN) RichQ
  PIC 3  Online       1x 10GE(LAN/WAN) RichQ

node1:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k IOC II
  PIC 0  Online       2x 40GE QSFP+
  PIC 2  Online       10x 10GE SFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k DPC 4X 10GE
  PIC 0  Online       1x 10GE(LAN/WAN) RichQ
  PIC 1  Online       1x 10GE(LAN/WAN) RichQ
  PIC 2  Online       1x 10GE(LAN/WAN) RichQ
  PIC 3  Online       1x 10GE(LAN/WAN) RichQ
```

10. Issue the **show chassis cluster status** command to make sure that the priority for all redundancy groups is greater than zero.

11. Use the console port on the device that is the primary node to establish a CLI session.

12. In the CLI session for the primary node device, issue the **request chassis cluster failover** command to fail over each redundancy group that has an ID number greater than zero.

    For example:

    ```
    admin@cluster> request chassis cluster failover redundancy-group 1 node 1
    ```

13. In the CLI session for the primary node device, issue the **request system power off** command to shut down the services gateway. This action causes redundancy group 0 to fail over onto the other services gateway, making it the active node in the cluster.

14. Repeat Step 6 to install IOCs or Flex IOCs in the powered-off services gateway.

15. Power on the services gateway and wait for it to finish starting.

16. Issue the **show chassis fpc pic-status** command on each node to confirm that all cards are online and both services gateways are operating correctly.

17. Issue the **show chassis cluster status** command to make sure that the priority for all redundancy groups is greater than zero.

Related Documentation

- Installing an SRX5800 Services Gateway IOC on page 208
- Installing an SRX5800 Services Gateway Flex IOC on page 212

Installing MPCs and MICs in an Operating SRX5800 Services Gateway Chassis Cluster

If your services gateway is part of a chassis cluster, you can install MPCs in the services gateways in the cluster without incurring downtime on your network.

Such an installation meet the following conditions:

- If the chassis cluster is operating in active-active mode, you must transition it to active-passive mode before using this procedure. You transition the cluster to active-passive mode by making one node primary for all redundancy groups.
- Both of the services gateways in the cluster must be running Junos OS Release 12.1X45-D11 or later.

If your installation does not meet these criteria, use the procedure in "Installing an SRX5800 Services Gateway MPC" on page 354 to install MPCs in your services gateway.

NOTE: During this installation procedure, you must shut down both devices, one at a time. During the period when one device is shut down, the remaining device operates without a backup. If that remaining device fails for any reason, you incur network downtime until you restart at least one of the devices.

To install MPCs in an operating SRX5800 Services Gateway cluster without incurring downtime:

1. Use the console port on the Routing Engine to establish a CLI session with one of the devices in the cluster.

2. Issue the **show chassis cluster status** command to determine which services gateway is currently primary, and which services gateway is secondary, within the cluster.

   In the example below, all redundancy groups are primary on node 0, and secondary on node 1:

```
admin@cluster> show chassis cluster status
Cluster ID: 1
Node                 Priority          Status    Preempt  Manual failover

Redundancy group: 0 , Failover count: 5
    node0                   1           primary        no       no
    node1                   100         secondary      no       no

Redundancy group: 1 , Failover count: 1
    node0                   200         primary        no       no
    node1                   100         secondary      no       no

Redundancy group: 2 , Failover count: 1
    node0                   200         primary        no       no
```

```
    node1                   100         secondary       no       no

Redundancy group: 3 , Failover count: 1
    node0                   100         primary         no       no
    node1                   200         secondary       no       no

Redundancy group: 4 , Failover count: 1
    node0                   200         primary         no       no
    node1                   100         secondary       no       no
```

3. If the device with which you established the CLI session in Step 2 is not the secondary node in the cluster, use the console port on the device that is the secondary node to establish a CLI session.

4. In the CLI session for the secondary services gateway, issue the **request system power off** command to shut down the services gateway.

5. Wait for the secondary services gateway to completely shut down.

6. Install the new MPCs in the powered-off services gateway using the procedure in "Installing an SRX5800 Services Gateway MPC" on page 354.

7. Install MICs in the MPCs in the powered-off services gateway using the procedure in "Installing an SRX5800 Services Gateway MIC" on page 349.

8. Power on the secondary services gateway and wait for it to finish starting.

9. Reestablish the CLI session with the secondary node device.

10. Issue the **show chassis fpc pic-status** command to make sure that all of the cards in the secondary node chassis are back online.

    In the example below, the second column shows that all of the cards are online.

```
user@mland00> show chassis fpc pic-status
node0:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k IOC II
  PIC 0  Online       2x 40GE QSFP+
  PIC 2  Online       10x 10GE SFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k DPC 4X 10GE
  PIC 0  Online       1x 10GE(LAN/WAN) RichQ
  PIC 1  Online       1x 10GE(LAN/WAN) RichQ
  PIC 2  Online       1x 10GE(LAN/WAN) RichQ
  PIC 3  Online       1x 10GE(LAN/WAN) RichQ

node1:
--------------------------------------------------------------------------
```

```
Slot 2   Online       SRX5k IOC II
  PIC 0  Online       2x 40GE QSFP+
  PIC 2  Online       10x 10GE SFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k DPC 4X 10GE
  PIC 0  Online       1x 10GE(LAN/WAN) RichQ
  PIC 1  Online       1x 10GE(LAN/WAN) RichQ
  PIC 2  Online       1x 10GE(LAN/WAN) RichQ
  PIC 3  Online       1x 10GE(LAN/WAN) RichQ
```

11. Issue the **show chassis cluster status** command to make sure that the priority for all redundancy groups is greater than zero.

12. Use the console port on the device that is the primary node to establish a CLI session.

13. In the CLI session for the primary node device, issue the **request chassis cluster failover** command to fail over each redundancy group that has an ID number greater than zero.

    For example:

    ```
    admin@cluster> request chassis cluster failover redundancy-group 1 node 1
    ```

14. In the CLI session for the primary node device, issue the **request system power off** command to shut down the services gateway. This action causes redundancy group 0 to fail over onto the other services gateway, making it the active node in the cluster.

15. Repeat Step 6 to install MPCs in the powered-off services gateway.

16. Repeat Step 7 to install MICs in the MPCs in the powered-off services gateway.

17. Power on the services gateway and wait for it to finish starting.

18. Issue the **show chassis fpc pic-status** command on each node to confirm that all cards are online and both services gateways are operating correctly.

19. Issue the **show chassis cluster status** command to make sure that the priority for all redundancy groups is greater than zero.

Related Documentation

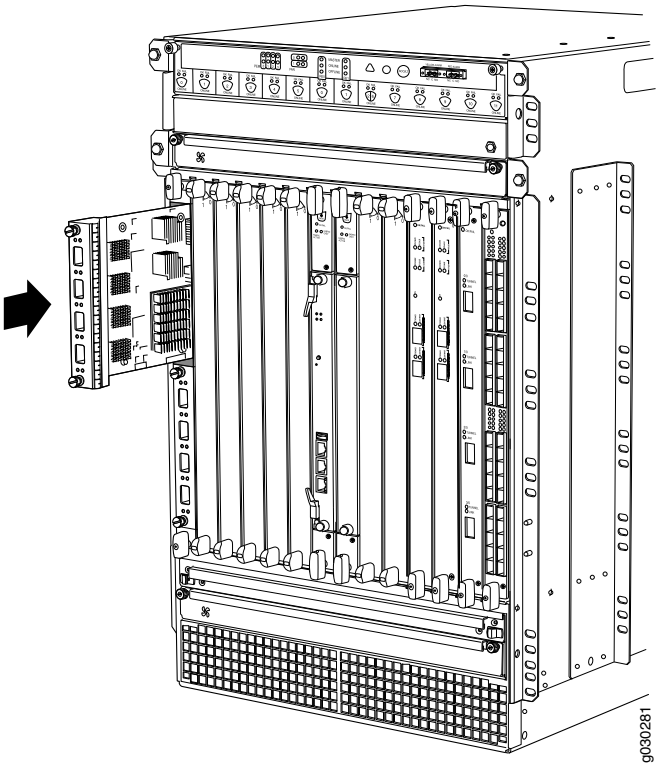
- Installing an SRX5800 Services Gateway MPC on page 354
- Installing an SRX5800 Services Gateway MIC on page 349

Installing an SRX5800 Services Gateway Port Module

To install a port module into a Flex IOC (see Figure 102 on page 221):

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Place the port module on an antistatic mat or remove it from its electrostatic bag.
4. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it is not, cover the transceiver with a safety cap.
5. If necessary, remove the blank panel covering the slot in the Flex IOC where you are installing the port module.
6. Orient the port module so that the faceplate faces you.
7. Lift the port module into place and carefully align the top and bottom edges of the port module with the guides inside the Flex IOC.
8. Slide the port module all the way into the Flex IOC until it is fully seated.
9. Tighten both captive screws to secure the port module in the Flex IOC.

Figure 102: Installing a Port Module



10. If the port module uses fiber-optic interfaces, remove the rubber safety cap from each transceiver and cable.

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

11. Insert the appropriate cables into the cable connector ports on each port module. Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

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

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

12. Power on the services gateway.

13. Use one of the following methods to take the port module online:

    - Insert a pointed tool into the **ONLINE** pinhole on the front panel of the port module to press the button behind it. Hold the button down until the **OK/FAIL** LED at the opposite end of the front panel lights green steadily, in about 5 seconds.
    - Issue the following CLI command:

      ```
      user@host>request chassis fpc-slot slot-number pic-slot slot-number online
      ```

      For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

CAUTION: **After the OK/FAIL LED turns green, wait at least 30 seconds before removing the port module again, removing a port module from a different slot, or inserting a port module in a different slot.**

You can also verify that the port module is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway Port Module on page 334
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273

Installing an SRX5800 Services Gateway SPC

To install an SPC (see Figure 103 on page 224):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. If you have not already done so, power off the services gateway.

3. Place the SPC on an antistatic mat or remove it from its electrostatic bag.

4. Identify the slot on the services gateway where it will be installed.

5. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it does not, cover the transceiver with a safety cap.

6. Orient the SPC so that the faceplate faces you, the text on the card is right-side up, and the EMI strip is on the right-hand side.

7. Lift the SPC into place and carefully align first the bottom and then the top of the card with the guides inside the card cage.

8. Slide the SPC all the way into the card cage until you feel resistance.

9. Grasp both ejector handles and rotate them clockwise simultaneously until the SPC is fully seated.

10. If the SPC uses fiber-optic cable, remove the rubber safety cap from each transceiver and cable.

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

11. Insert the appropriate cables into the cable connector ports on each SPC (see Figure 104 on page 225). Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

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

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

12. Power on the services gateway.

13. Verify that the SPC is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Figure 103: Installing an SPC

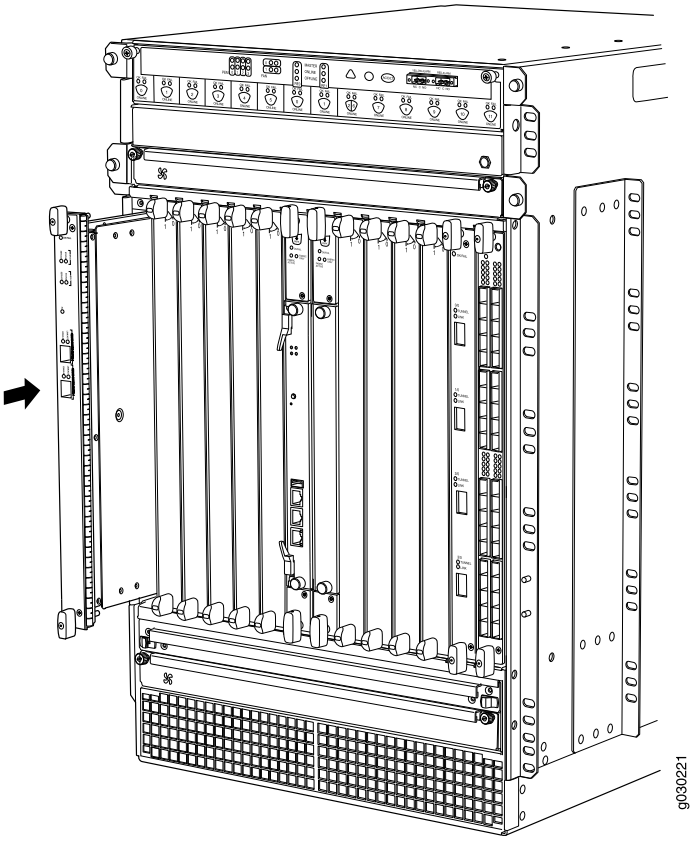
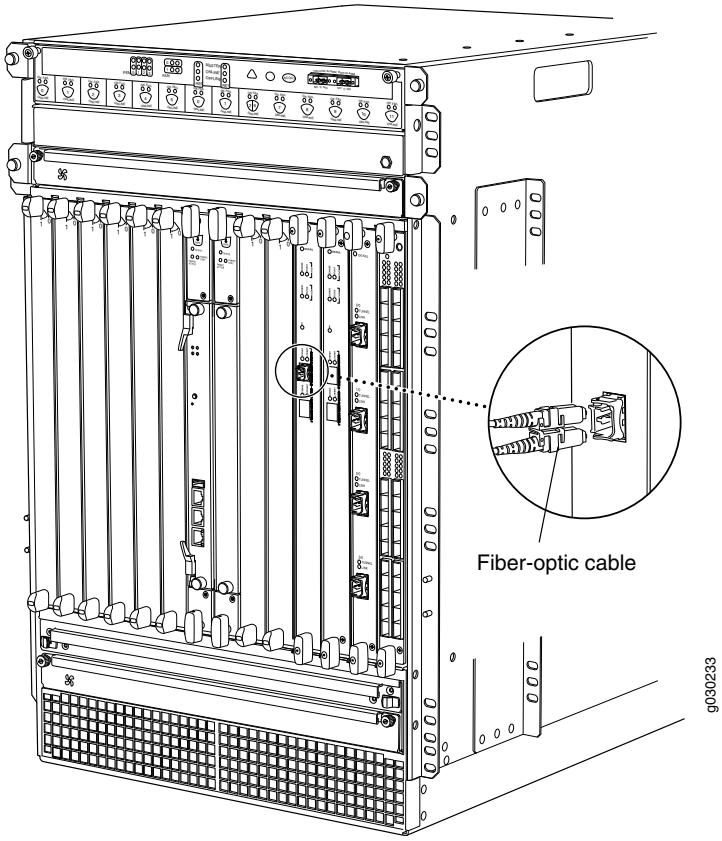


Figure 104: Attaching a Cable to an SPC



NOTE: To install additional SPCs in a services gateway that is part of a chassis cluster, it must meet the following conditions.

- Each services gateway must already have at least two SPCs installed in it.
- To add first-generation SRX5K-SPC-2-10-40 SPCs, both of the services gateways in the cluster must be running Junos OS Release 11.4R2S1, 12.1R2, or later.
- To add next-generation SRX5K-SPC-4-15-320 SPCs, both of the services gateways in the cluster must be running Junos OS Release 12.1X44-D10, or later.
- You must install SPCs of the same type and in the same slots in both of the services gateways in the cluster. Both services gateways in the cluster must end up with the same physical configuration of SPCs.
- If you are only adding first-generation SRX5K-SPC-2-10-40 SPCs to the chassis, you must install them so that the new SPCs are not the SPCs with the lowest-numbered slots in the chassis. For example, if the chassis already has two SPCs with one SPC each in slots 2 and 3, you cannot install additional SPCs in slots 0 or 1 using this procedure.
- If you are adding next-generation SRX5K-SPC-4-15-320 SPCs to the chassis, you must install the new SPCs so that a next-generation SRX5K-SPC-4-15-320 SPC is the SPC in the original lowest-numbered slot. For example, if the chassis already has two first-generation SPCs installed in slots 2 and 3, you cannot install SRX5K-SPC-4-15-320 SPCs in slots 0 or 1. You will need to make sure that an SRX5K-SPC-4-15-320 SPC is installed in the slot providing center point (CP) functionality (in this case, slot 2). This ensures that the CP functionality is performed by an SRX5K-SPC-4-15-320 SPC.
- If you are adding next-generation SRX5K-SPC-4-15-320 SPCs to the services gateways, both services gateways must already be equipped with high-capacity power supplies and fan trays, and the high-capacity air filter. See "Upgrading an SRX5800 Services Gateway from Standard-Capacity to High-Capacity Power Supplies" on page 401 for more information.

During this installation procedure, you must shut down both devices, one at a time.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- *Replacing SPCs in an Operating SRX5600 Services Gateway Chassis Cluster*
- Powering Off the SRX5800 Services Gateway on page 253
- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251
- Holding an SRX5800 Services Gateway Card on page 199

- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway SPC on page 340
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271

Installing an SRX5800 Services Gateway SFP or XFP Transceiver

Transceivers that are installed in an MIC or SPC. Transceivers are hot-insertable and hot-removable. Removing a transceiver does not interrupt the functioning of the card, but the removed transceiver no longer receives or transmits data.

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.

To install a transceiver:

1. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Take each transceiver to be installed out of its electrostatic bag and identify the slot on the component where it will be installed.
3. Verify that each transceiver is covered by a rubber safety cap. If it is not, cover the transceiver with a safety cap.
4. Carefully align the transceiver with the slots in the component. The connectors should face the component.
5. Slide the transceiver until the connector is seated in the component slot. If you are unable to fully insert the transceiver, make sure the connector is facing the right way.
6. Close the ejector handle of the transceiver.
7. Remove the rubber safety cap from the transceiver and the end of the cable. Insert the cable into the transceiver.
8. Verify that the status LEDs on the component faceplate indicate that the transceiver is functioning correctly.

Related Documentation

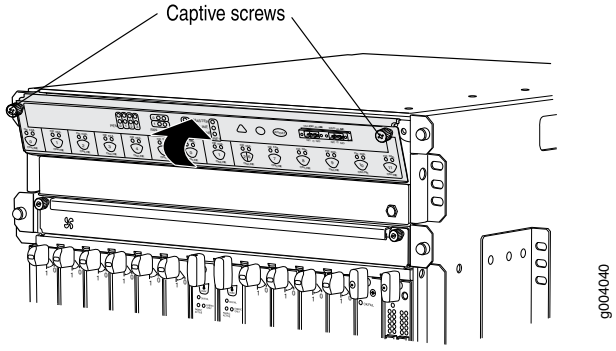
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing an SRX5800 Services Gateway SFP or XFP Transceiver on page 316

Installing the SRX5800 Services Gateway Craft Interface

To install the craft interface (see Figure 105 on page 228):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Grasp the craft interface with one hand and hold the bottom edge of the craft interface with the other hand to support its weight.
3. Orient the ribbon cable so that it plugs into the connector socket. The connector is keyed and can be inserted only one way.
4. Align the bottom of the craft interface with the sheet metal above the card cage and press it into place.
5. Tighten the screws on the left and right corners of the craft interface faceplate.
6. Reattach any external devices connected to the craft interface.

Figure 105: Installing the Craft Interface



Rest lower edge of the craft interface in the chassis bay, then tilt it toward the chassis, and secure the screws.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Disconnecting the Alarm Relay Wires from the SRX5800 Services Gateway Craft Interface on page 307
- Removing the SRX5800 Services Gateway Craft Interface on page 308

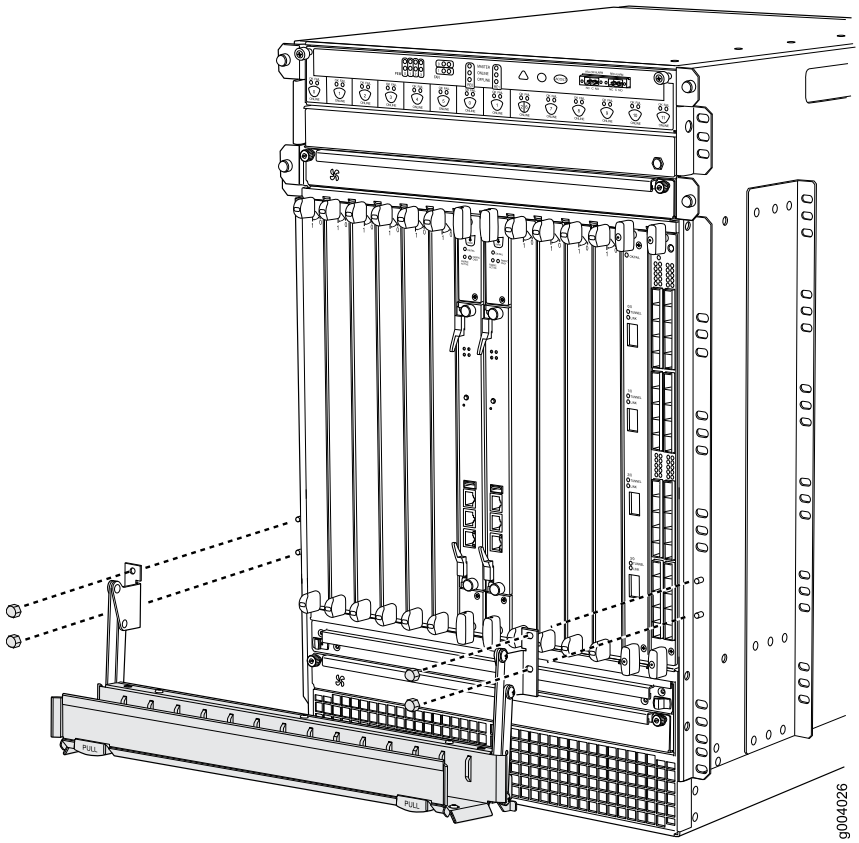
- Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 310

Installing the SRX5800 Services Gateway Cable Manager

To install the cable manager (see Figure 106 on page 229):

1. Position the standard cable manager on the studs on the lower front of the chassis.
2. Insert the nuts on the corners in the standard cable manager onto the studs on the chassis.
3. Using a 7/16-in. nut driver, tighten the nuts securely.

Figure 106: Installing the Cable Manager



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing the SRX5800 Services Gateway Cable Manager on page 319
- SRX5800 Services Gateway Cable Manager Description on page 24

CHAPTER 19

Grounding the SRX5800 Services Gateway

Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections

To ground and provide power to the services gateway, you need the following tools and parts:

- Phillips (+) screwdrivers, numbers 1 and 2
- 2.5-mm flat-blade (–) screwdriver
- 7/16-in. hexagonal-head external drive socket wrench, or nut driver, with a torque range between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) tightening torque, for tightening nuts to terminal studs on each power supply on a DC-powered services gateway.
- Wire cutters
- Electrostatic discharge (ESD) grounding wrist strap

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Grounding the SRX5800 Services Gateway on page 232
- Connecting Power to an AC-Powered SRX5800 Services Gateway on page 243
- Connecting Power to a DC-Powered SRX5800 Services Gateway on page 248

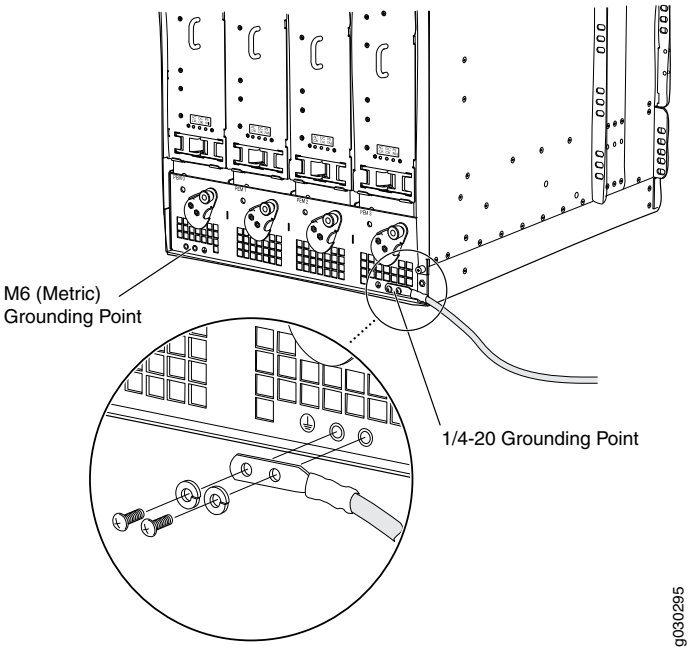
Grounding the SRX5800 Services Gateway

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power.

You ground the services gateway by connecting a grounding cable to earth ground and then attaching it to one of the chassis grounding points using two screws. You must provide the grounding cable (the cable lug is supplied with the services gateway).

1. Verify that a licensed electrician has attached the cable lug provided with the services gateway to the grounding cable.
2. Attach an ESD grounding strap to your bare wrist and connect the strap to an approved site ESD grounding point. See the instructions for your site.
3. Ensure that all grounding surfaces are clean and brought to a bright finish before grounding connections are made.
4. Connect the grounding cable to a proper earth ground.
5. Detach the ESD grounding strap from the site ESD grounding point.
6. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
7. Place the grounding cable lug over one of the two grounding points. The right pair is sized for UNC 1/4-20 screws and 1/4 in. split washers, which are provided in the accessory box. The left pair is sized for M6 metric screws. If you wish to use the metric-sized grounding point, you must provide appropriate screws and split washers.
8. Secure the grounding cable lug to the grounding point, first with the washers, and then with the screws as shown in Figure 107 on page 233.

Figure 107: Connecting the Grounding Cable



9. Dress the grounding cable and verify that it does not touch or block access to services gateway components, and that it does not drape where people could trip on it.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 231
- SRX5800 Services Gateway Chassis Grounding Point Specifications on page 129
- SRX5800 Services Gateway Grounding-Cable Lug Specification on page 131
- SRX5800 Services Gateway Grounding Cable Specifications on page 130

CHAPTER 20

Connecting the SRX5800 Services Gateway to External Devices

Tools and Parts Required for SRX5800 Services Gateway Connections

To connect the device to management devices and IOCs, you need the following tools and parts:

- Phillips (+) screwdrivers, numbers 1 and 2
- 2.5-mm flat-blade (-) screwdriver
- 2.5 mm Phillips (+) screwdriver
- Electrostatic discharge (ESD) grounding wrist strap

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 238
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device

To use a system console to configure and manage the Routing Engine, connect it to the appropriate **CONSOLE** port on the Routing Engine. To use a laptop, modem, or other auxiliary device, connect it to the **AUX** port on the Routing Engine. Both ports accept a cable with an RJ-45 connector. One serial cable with an RJ-45 connector and a DB-9 connector is provided with the services gateway. To connect a device to the **CONSOLE** port and another device to the **AUX** port, you must supply an additional cable.

To connect a management console or auxiliary device:

1. Plug the RJ-45 end of the serial cable (Figure 108 on page 236 shows the connector) into the **AUX** port or **CONSOLE** port on the Routing Engine. Figure 109 on page 236 shows the ports.

Figure 108: Routing Engine Console and Auxiliary Cable Connector

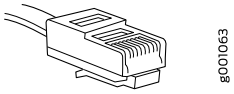
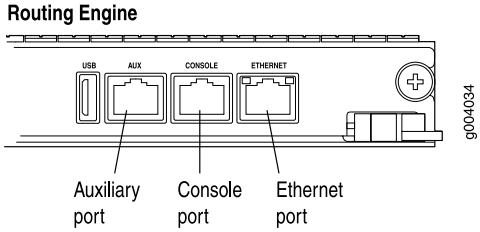


Figure 109: Auxiliary and Console Ports



2. Plug the female DB-9 end into the device's serial port.

NOTE:

For console devices, configure the serial port to the following values:

- Baud rate—9600
- Parity—N
- Data bits—8
- Stop bits—1
- Flow control—none

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 235

- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 238
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239
- Console Port Cable and Wire Specifications for the SRX5800 Services Gateway on page 145
- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports on page 145

Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management

To connect the Services Gateway Routing Engine to a network for out-of-band management, connect an Ethernet cable with RJ-45 connectors to the **ETHERNET** port on the Routing Engine. One Ethernet cable is provided with the services gateway. To connect to the **ETHERNET** port on the Routing Engine:

1. Plug one end of the Ethernet cable (Figure 110 on page 237 shows the connector) into the **ETHERNET** port on the Routing Engine. Figure 111 on page 237 shows the port.

2. Plug the other end of the cable into the network device.

Figure 110: Routing Engine Ethernet Cable Connector

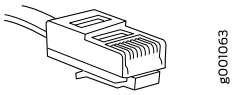
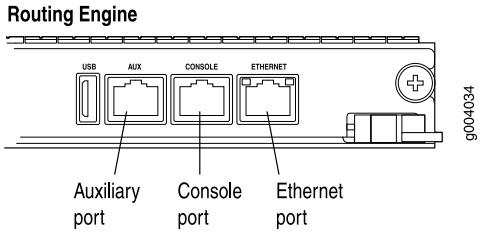


Figure 111: Ethernet Port



Related Documentation

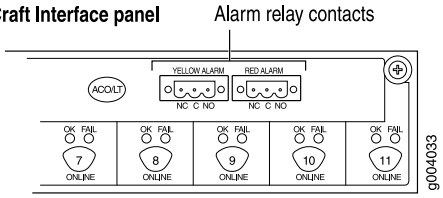
- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 235
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 238

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device

To connect the services gateway to external alarm-reporting devices, attach wires to the **RED** and **YELLOW** relay contacts on the craft interface. (See Figure 112 on page 238.) A system condition that triggers the red or yellow alarm LED on the craft interface also activates the corresponding alarm relay contact.

Figure 112: Alarm Relay Contacts



The terminal blocks that plug into the alarm relay contacts are supplied with the services gateway. They accept wire of any gauge between 28-AWG and 14-AWG (0.08 and 2.08 mm^2), which is not provided. Use the gauge of wire appropriate for the external device you are connecting.

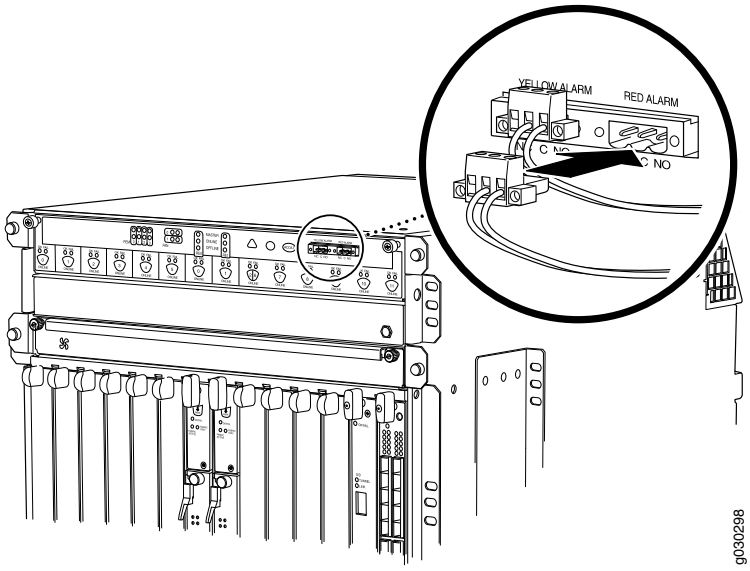
To connect an external device to an alarm relay contact (see Figure 112 on page 238):

1. Prepare the required length of wire with gauge between 28-AWG and 14-AWG (0.08 and 2.08 mm^2).

2. While the terminal block is not plugged into the relay contact, use a 2.5-mm flat-blade screwdriver to loosen the small screws on its top. With the small screws on its top facing upward, insert wires into the slots in the front of the block based on the wiring for the external device. Tighten each screw to secure the corresponding wire.

3. Plug the terminal block into the relay contact, and use a 2.5-mm flat-blade screwdriver to tighten the screws on the face of the block. See Figure 113 on page 239.

Figure 113: Connecting an External Alarm-Reporting Device



4. Attach the other end of the wires to the external device.

To attach a reporting device for the other kind of alarm, repeat the procedure.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 30
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 235
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239
- Alarm Relay Contact Wire Specifications for the SRX5800 Services Gateway on page 146

Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules

To connect the IOCs, MPCs, and port modules to the network (see Figure 114 on page 241):

1. Have ready a length of the type of cable used by the component.

2. Remove the rubber safety plug from the cable connector port.

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

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

3. Insert the cable connector into the cable connector port on the faceplate.

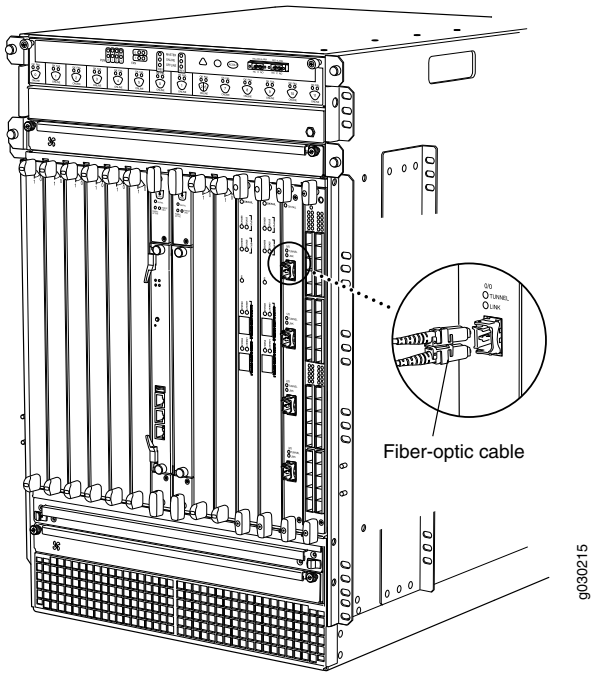
NOTE: The XFP cages and optics on the components are industry standard parts that have limited tactile feedback for insertion of optics and fiber. You need to insert the optics and fiber firmly until the latch is securely in place.

4. Arrange the cable in the standard or extended cable manager to prevent it from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on the loop helps to maintain its shape.

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

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

Figure 114: Attaching a Cable to an IOC



Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 235
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 237
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 236
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 238

CHAPTER 21

Providing Power to the SRX5800 Services Gateway

Connecting Power to an AC-Powered SRX5800 Services Gateway

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

CAUTION: Do not mix AC and DC power supplies within the same services gateway. Damage to the services gateway might occur.

You connect AC power to the device by attaching power cords from the AC power sources to the AC appliance inlets located on the chassis above the power supplies. If the services gateway is powered by high-capacity power supplies, you also connect AC feeds to AC appliance inlets located on the power supplies themselves. The power cords are not provided with the services gateway; you must order them separately.

To connect the AC power cords to the services gateway (see Figure 115 on page 245 and Figure 116 on page 246):

1. Locate or obtain the power cords you will use with the services gateway. The power cords must have a plug appropriate for your geographical location.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Move the AC input switch on the chassis above each power supply to the off (**O**) position. If the services gateway is equipped with high-capacity AC power supplies, you must also move the AC input switch on each power supply to the off (**O**) position.

4. For each installed AC power supply, connect a power cord to the appliance inlet on the chassis directly above the power supply.

5. If your services gateway is equipped with high-capacity AC power supplies, you must also connect a power cord to the appliance inlet located on each power supply.

6. Insert the power cord plugs into an external AC power source receptacle.

   NOTE: **Each power supply must be connected to a dedicated AC power feed and a dedicated customer site circuit breaker. We recommend that you use a 15 A (250 VAC) minimum, or as required by local code.**

7. Dress the power cords appropriately. Verify that the power cords do not block the air exhaust and access to services gateway components, or drape where people could trip on them.

8. Repeat Step 3 through Step 7 for the remaining power supplies.

Figure 115: Connecting AC Power to the Services Gateway (Standard-Capacity Power Supplies)

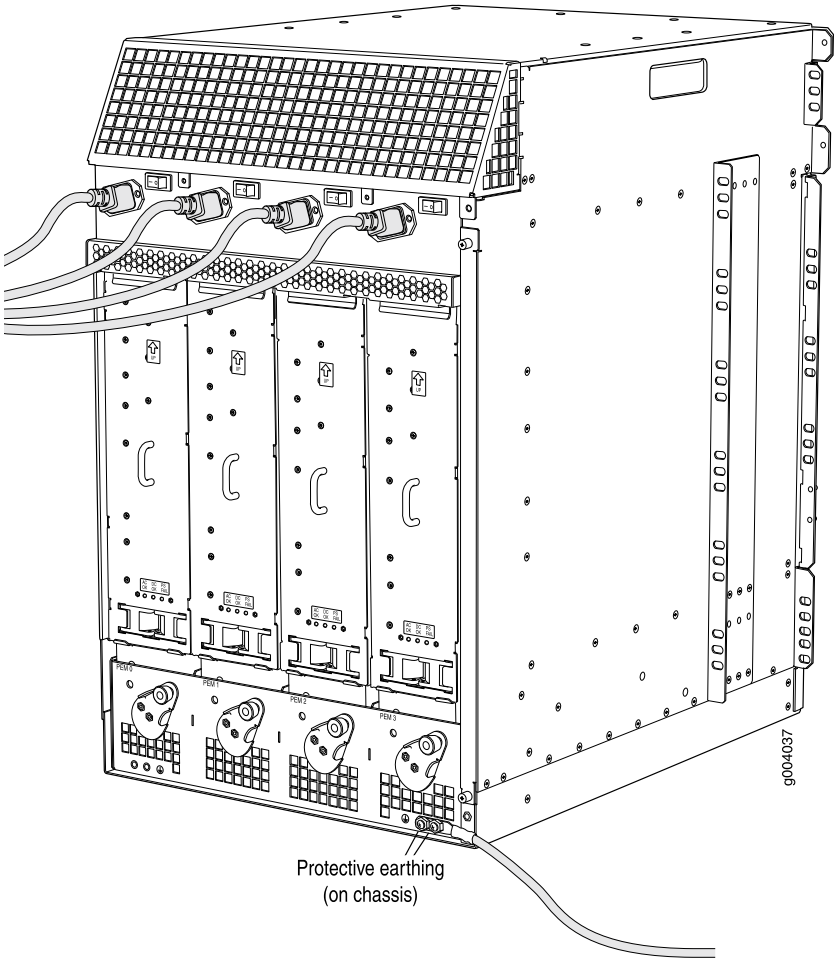
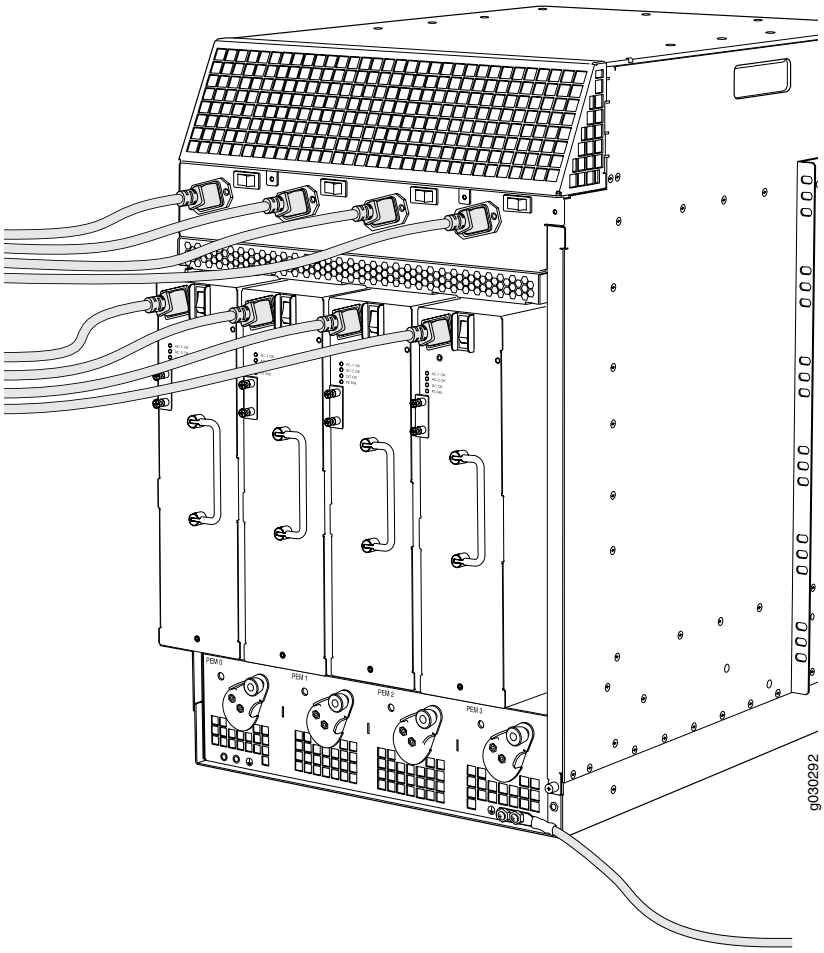


Figure 116: Connecting AC Power to the Services Gateway (High-Capacity Power Supplies)



Related Documentation

- AC Power Cord Specifications for the SRX5800 Services Gateway on page 134
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 231
- Grounding the SRX5800 Services Gateway on page 232
- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering Off the SRX5800 Services Gateway on page 253

Powering On an AC-Powered SRX5800 Services Gateway

To power on an AC-powered services gateway:

1. Verify that the power supplies are fully inserted in the chassis.
2. Verify that each AC power cord is securely inserted into its appliance inlet.
3. Verify that an external management device is connected to one of the Routing Engine ports (**AUX**, **CONSOLE**, or **ETHERNET**).
4. Turn on the power to the external management device.
5. Switch on the dedicated customer site circuit breakers. Follow the ESD and safety instructions for your site.
6. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
7. Switch the AC switch in the chassis above each power supply to the on (**—**) position.
8. If the services gateway has high-capacity power supplies installed, you must also move the AC switch at the top of each power supply to the on (**|**) position.
9. Verify the following LED indications for each installed power supply:
   - For standard-capacity AC power supplies, verify that the **AC OK** and **DC OK** LEDs light steadily and the **PS FAIL** LED is not lit.
   - For high-capacity AC power supplies, verify that the **DC OK** LED lights steadily, and the **PS FAIL** LED is not lit. In addition, the **AC-1 OK** LED should light green steadily if the upper AC feed (on the chassis above the power supply) is connected and receiving power, and the **AC-2 OK** LED should light green steadily if the lower AC feed (on the power supply itself) is connected and receiving power.

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

If any of the status LEDs indicates that the power supply is not functioning normally, repeat the installation and cabling procedures.

10. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.

NOTE: If the system is completely powered off when you power on the power supply, the Routing Engine boots as the power supply completes its startup sequence. Normally, the services gateway boots from the Junos OS imageon the CompactFlash card.

After you have powered on a power supply, wait at least 60 seconds before you power it off.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 231
- Grounding the SRX5800 Services Gateway on page 232
- Connecting Power to an AC-Powered SRX5800 Services Gateway on page 243
- Powering Off the SRX5800 Services Gateway on page 253

Connecting Power to a DC-Powered SRX5800 Services Gateway

WARNING: Before performing 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 switch handle of the circuit breaker in the off position.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX5800 Services Gateway" on page 232 for instructions.

CAUTION: Do not mix AC and DC power supplies within the same services gateway. Damage to the services gateway might occur.

You connect DC power to the services gateway by attaching power cables from the external DC power sources to the terminal studs on the power supply faceplates. You must provide the power cables (the cable lugs are supplied with the services gateway).

To connect the DC source power cables to the services gateway:

1. Switch off the dedicated customer site circuit breakers. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Move the DC circuit breaker on the power supply faceplate to the off (**O**) position.

4. Remove the clear plastic cover protecting the terminal studs on the faceplate.

5. Verify that the DC power cables are correctly labeled before making connections to the power supply. In a typical power distribution scheme where the return is connected to chassis ground at the battery plant, you can use a multimeter to verify the resistance of the **–48V** and **RTN** DC cables to chassis ground:

   - The cable with very large resistance (indicating an open circuit) to chassis ground is **–48V**.
   - The cable with very low resistance (indicating a closed circuit) to chassis ground is **RTN**.

   CAUTION: **You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.**

6. Remove the nuts and washers from the terminal studs. (Use a 7/16-in. nut driver or socket wrench.)

7. Secure each power cable lug to the terminal studs, first with the split washer, then with the nut (see Figure 117 on page 250). Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each nut. (Use a 7/16-in. nut driver or socket wrench.)

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

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

   The DC power supplies in slots **PEM0** and **PEM1** must be powered by dedicated power feeds derived from feed A, and the DC power supplies in slots **PEM2** and **PEM3** must

be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

8. For standard-capacity DC power supplies, secure each DC power cable to its strain relief bracket as follows:

   a. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

   b. Route the positive and negative DC power cables through the left and right sides of the cable restraint.

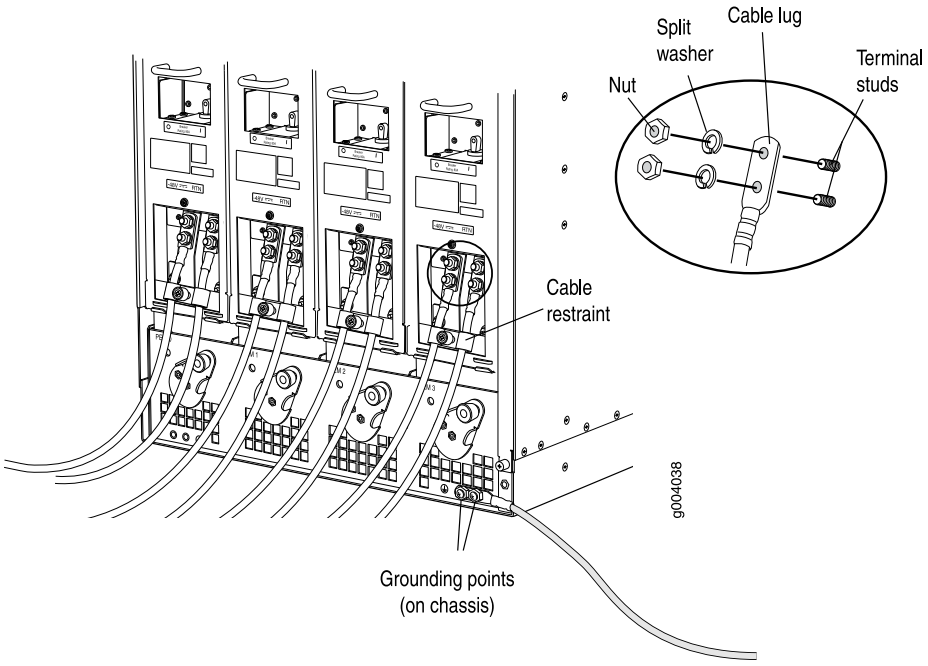
   c. Tighten the cable restraint captive screw to hold the power cables in place.

9. Replace the clear plastic cover over the terminal studs on the faceplate.

10. Verify that the power cables are connected correctly, that they are not touching or blocking access to services gateway components, and that they do not drape where people could trip on them.

11. Repeat Steps 3 through 10 for the remaining power supplies.

Figure 117: Connecting DC Power to the Services Gateway (Standard-Capacity SHown, High-Capacity Similar)



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 231
- Grounding the SRX5800 Services Gateway on page 232
- Powering On a DC-Powered SRX5800 Services Gateway on page 251
- Powering Off the SRX5800 Services Gateway on page 253

Powering On a DC-Powered SRX5800 Services Gateway

To power on a DC-powered services gateway:

1. Verify that an external management device is connected to one of the Routing Engine ports (**AUX**, **CONSOLE**, or **ETHERNET**).
2. Turn on the power to the external management device.
3. Verify that the power supplies are fully inserted in the chassis.
4. Verify that the source power cables are connected to the appropriate terminal: the positive (+) source cable to the return terminal (labeled **RTN**) and the negative (–) source cable to the input terminal (labeled **–48V**).
5. Switch on the dedicated customer site circuit breakers to provide power to the DC power cables. Follow your site's procedures.
6. Check the **INPUT OK** LED is lit steadily green to verify that power is present.
7. If power is not present:
   - Verify that the fuse is installed correctly and turn on the breaker at the battery distribution fuse board or fuse bay.
   - Check the voltage with a meter at the terminals of the power supply for correct voltage level and polarity.
8. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
9. Move the DC circuit breaker on the DC power supplies to the on (**|**) position.
10. Verify that the **BREAKER ON** LED is lit green steadily.

11. Verify that the **PWR OK** LED is lit green steadily, indicating the power supply is correctly installed and functioning normally.

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

    If any of the status LEDs indicates that the power supply is not functioning normally, repeat the installation and cabling procedures .

12. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.

    NOTE: If the system is completely powered off when you power on the power supply, the Routing Engine boots as the power supply completes its startup sequence. Normally, the services gateway boots from the Junos OS image on the CompactFlash card.

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

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Overview of Installing the SRX5800 Services Gateway on page 155
- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 231
- Grounding the SRX5800 Services Gateway on page 232
- Connecting Power to a DC-Powered SRX5800 Services Gateway on page 248
- Powering Off the SRX5800 Services Gateway on page 253

Powering Off the SRX5800 Services Gateway

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

To power off the services gateway:

1. On the external management device connected to the Routing Engine, issue the **request system halt** operational mode command. The command shuts down the Routing Engine cleanly, so its state information is preserved.

   ```
   user@host> request system halt
   ```

2. Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

3. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

4. Switch off the power supplies:

   - For an AC-powered services gateway, move the AC input switch on the chassis above each AC power supply to the off (**O**) position. If the services gateway is equipped with high-capacity AC power supplies, you must also move the AC input switch on each power supply to the off (**O**) position.
   - For a DC-powered services gateway, move the DC circuit breaker on each DC power supply faceplate to the off (**O**) position.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Overview of Installing the SRX5800 Services Gateway on page 155
- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251

CHAPTER 22

Performing the Initial Configuration

SRX5800 Services Gateway Software Configuration Overview

The services gateway is shipped with the Junos operating system (Junos OS) preinstalled and ready to be configured when the device is powered on. There are three copies of the software: one on a CompactFlash card (if installed) in the Routing Engine, one on the hard disk in the Routing Engine, and one on a USB flash drive that can be inserted into the slot in the Routing Engine faceplate.

When the device boots, it first attempts to start the image on the USB flash drive. If a USB flash drive is not inserted into the Routing Engine or the attempt otherwise fails, the device next tries the CompactFlash card (if installed), and finally the hard disk.

You configure the services gateway by issuing Junos OS command-line interface (CLI) commands, either on a console device attached to the **CONSOLE** port on the Routing Engine, or over a telnet connection to a network connected to the **ETHERNET** port on the Routing Engine.

Gather the following information before configuring the device:

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

Related Documentation

- Initially Configuring the SRX5800 Services Gateway on page 256

Initially Configuring the SRX5800 Services Gateway

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

To configure the software:

1. Verify that the device is powered on.

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

3. Start the CLI.

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

4. Enter configuration mode.

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

5. Set the root authentication password by entering either a cleartext password, an encrypted password, or an SSH public key string (DSA or RSA).

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

6. Configure an administrator account on the device. When prompted, enter the password for the administrator account.

```
[edit]
root@# set system login user admin class super-user authentication
  plain-text-password
New password: password
Retype new password: password
```

7. Commit the configuration to activate it on the device.

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

8. Log in as the administrative user you configured in Step 6.

9. Configure the name of the device. If the name includes spaces, enclose the name in quotation marks (“ ”).

```
configure
```

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

10. Configure the IP address and prefix length for the Ethernet management interface on the services gateway's Routing Engine.

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

11. Configure the traffic interface.

```
[edit]
admin@# set interfaces ge-6/2/0 unit 0 family inet address address/prefix-length
admin@# set interfaces ge-6/3/5 unit 0 family inet address address/prefix-length
```

12. Configure the default route.

```
[edit]
admin@# set routing-options static route 0.0.0.0/0 next-hop gateway
```

13. Configure basic security zones and bind them to traffic interfaces.

```
[edit]
admin@# set security zones security-zone trust interfaces ge-6/3/5
admin@# set security zones security-zone untrust interfaces ge-6/2/0
```

14. Configure basic security policies.

```
[edit]
admin@# set security policies from-zone trust to-zone untrust policy policy-name
  match source-address any destination-address any application any
root@# set security policies from-zone trust to-zone untrust policy policy-name then
  permit
```

15. Check the configuration for validity.

```
[edit]
admin@# commit check
configuration check succeeds
```

16. Commit the configuration to activate it on the device.

```
[edit]
admin@# commit
commit complete
```

17. Optionally, display the configuration to verify that it is correct.

```
admin@# show
## Last changed: 2008-05-07 22:43:25 UTC
version "9.2I0 [builder]";
system {
    autoinstallation;
    host-name henbert;
```

```
    root-authentication {
       encrypted-password "$1$oTVn2KY3$uQe4xzQCxpR2j7sKuV.Pa0"; ## SECRET-DATA

    }
    login {
        user admin {
            uid 928;
            class super-user;
            authentication {
                encrypted-password "$1$cdOPmACd$QvreBsJkNR1EF0uurTBkE."; ##
SECRET-DATA
            }
        }
    }
    services {
        ssh;
       web-management {
            http {
                interface ge-0/0/0.0;
            }
        }
    }
    syslog {
        user * {
            any emergency;
        }
        file messages {
            any any;
            authorization info;
        }
        file interactive-commands {
            interactive-commands any;
        }
    }
    license {
        autoupdate {
            url https://ae1.juniper.net/junos/key_retrieval;
        }
    }
}
interfaces {
    ge-0/0/0 {
        unit 0;
    }
    ge-6/2/0 {
        unit 0 {
            family inet {
                address 5.1.1.1/24;
            }
        }
    }
    ge-6/3/5 {
        unit 0 {
            family inet {
                address 192.1.1.1/24;
            }
        }
    }
    fxp0 {
        unit 0 {
            family inet {
```

```
                address 192.168.10.2/24;
            }
        }
    }
}
routing-options {
    static {
        route 0.0.0.0/0 next-hop 5.1.1.2;
    }
}
security {
    zones {
        security-zone trust {
            interfaces {
                ge-6/3/5.0;
            }
        }
        security-zone untrust {
            interfaces {
                ge-6/2/0.0;
            }
        }
    }
    policies {
        from-zone trust to-zone untrust {
            policy bob {
                match {
                    source-address any;
                    destination-address any;
                    application any;
                }
                then {
                    permit;
                }
            }
        }
    }
}
```

18. Commit the configuration to activate it on the device.

    ```
    [edit]
    admin@# commit
    ```

19. Optionally, configure additional properties by adding the necessary configuration statements. Then commit the changes to activate them on the device.

    ```
    [edit]
    admin@# commit
    ```

20. When you have finished configuring the device, exit configuration mode.

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

Related Documentation

- SRX5800 Services Gateway Software Configuration Overview on page 255

- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251

Performing Initial Software Configuration Using J-Web

- Configuring Root Authentication and the Management Interface from the CLI on page 260
- Configuring Interfaces, Zones, and Policies with J-Web on page 261

Configuring Root Authentication and the Management Interface from the CLI

Before you can use J-Web to configure your device, you must access the CLI to perform the initial configuration.

To configure root authentication and the management interface:

1. Log in as root. There is no password.

2. Start the CLI and enter configuration mode.

   ```
   root@% cli
   root@>configure
   root@#
   ```

3. Set the root authentication password by entering a cleartext password, an encrypted password, or an SSH public key string (DSA or RSA).

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

4. Commit the configuration to activate it on the device.

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

5. Configure the IP address and prefix length for the Ethernet management interface on the device.

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

6. Configure the default route.

   ```
   [edit]
   root@# set routing-options static route 0.0.0.0/0 next-hop gateway
   ```

7. Enable Web access to launch J-Web.

   ```
   [edit]
   root@# set system services web-management http
   ```

8. Commit the configuration changes.

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

Configuring Interfaces, Zones, and Policies with J-Web

You can configure hostnames, interfaces, zones, and security policies using J-Web.

NOTE: You cannot use J-Web to configure SRX5400, SRX5600, and SRX5800 Services Gateways in Junos OS Release 15.1X49-D10.

Before you begin:

- Ensure you have configured the IP address, root authentication, and default route. See "Configuring Root Authentication and the Management Interface from the CLI" on page 260
- Enable HTTP on the device to access J-Web. See "Configuring Root Authentication and the Management Interface from the CLI" on page 260

Configure the device with J-Web using the following procedures.

Configuring the Hostname

To configure the hostname:

1. Launch a Web browser from the management device.
2. Enter the IP address of the device in the URL address field.
3. Specify the default username as root and enter the password. See "Configuring Root Authentication and the Management Interface from the CLI" on page 260.
4. Click **Log In**. The J-Web Dashboard page appears.
5. Select **Configure>System Properties>System Identity**, and then select **Edit**. The Edit System Identity dialog box appears.
6. Enter the hostname and click **OK**.
7. Select **Commit Options>Commit** to apply the configuration changes.

You have successfully configured the hostname for the system.

Configuring Interfaces

To configure two physical interfaces:

1. From the J-Web Dashboard page, select **Configure>Interfaces** and select a physical interface you want to configure.
2. Select **Add>Logical Interface**. The Add interface dialog box appears.
3. Set **Unit** = **0**.
4. Select the check box for **IPv4 Address** to enable IPv4 addressing.
5. Click **Add** and enter the IPv4 address.
6. Click **OK**.

   A message appears after your configuration changes are validated successfully.
7. Click **OK**.
8. Select **Commit Options>Commit** to apply the configuration changes.

   A message appears after your configuration changes are applied successfully.
9. Click **OK**.

You have successfully configured the physical interface. Repeat these steps to configure the second physical interface for the device.

Configuring Zones and Assigning Interfaces

To assign interfaces within a trust zone and an untrust zone:

1. From the J-Web Dashboard page, select **Configure>Security>Zones/Screens** and click **Add**. The Add Zone dialog box appears.
2. In the Main tab, enter **trust** for zone name and enter the description.
3. Set the zone type to **Security**.
4. Select the interfaces listed under Available and move them under Selected.
5. Click **OK**.

   A message appears after your configuration changes are validated successfully.

6. Click **OK**.

7. Select **Commit Options>Commit** to apply the configuration changes.

   A message appears after your configuration changes are applied successfully.

8. Click **OK**.

9. Repeat Step 1 through Step 8 and assign another interface to an untrust zone.

You have successfully configured interfaces in a trust zone and in an untrust zone.

Configuring Security Policies

To configure security policies:

1. From the J-Web Dashboard page, select **Configure>Security>Security Policy** and click **Add**. The Add Policy dialog box appears.

2. In the Policy tab, enter the policy name and set the policy action to **permit**. Then select **Zone** and set the From Zone to **trust** and the To Zone to **untrust**.

3. Configure the source IP address by selecting **any** listed under Available and moving it under Selected.

4. Configure the destination IP address by selecting **any** listed under Available and moving it under Selected.

5. Configure the application by selecting **any** listed under Available and moving it under Selected.

6. Click **OK**.

   A message appears after your configuration changes are validated successfully.

7. Click **OK**.

8. Select **Commit Options>Commit** to apply the configuration changes.

   A message appears after your configuration changes are applied successfully.

9. Click **OK**.

You have successfully configured the security policy.

Related Documentation

- *Performing Initial Software Configuration on the SRX1400 Services Gateway (CLI Procedure)*
- *Performing Initial Software Configuration on the SRX3400 Services Gateway*
- *Performing Initial Software Configuration on the SRX3600 Services Gateway*
- *Initially Configuring the SRX5400 Services Gateway*
- *Initially Configuring the SRX5600 Services Gateway*
- Initially Configuring the SRX5800 Services Gateway on page 256

PART 4

Maintaining and Troubleshooting Components

CHAPTER 23

Maintaining Components

Tools and Parts Required to Maintain the SRX5800 Services Gateway

To maintain hardware components, you need the following tools and parts:

- ESD grounding wrist strap
- Flat-blade (–) screwdriver
- Phillips (+) screwdriver, number 1
- Phillips (+) screwdriver, number 2

Related Documentation

- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 267

Routine Maintenance Procedures for the SRX5800 Services Gateway

Purpose For optimum services gateway performance, perform preventive maintenance procedures regularly.

Action

- Inspect the installation site for moisture, loose wires or cables, and excessive dust. Make sure that airflow is unobstructed around the device and into the air intake vents.
- Check the status-reporting devices on the craft interface—System alarms and LEDs.

- Inspect the air filter at the bottom front of the services gateway, replacing it every six months for optimum cooling system performance. Do not run the device for more than a few minutes without the air filter in place.

Related Documentation

- Tools and Parts Required to Maintain the SRX5800 Services Gateway on page 267
- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273
- Maintaining SRX5800 Services Gateway Network Cables on page 274
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

Maintaining the Air Filter on the SRX5800 Services Gateway

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

Action

- Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, impeding the ventilation of the chassis. The filter degrades over time. Periodically replace the filter in use, as well as spares. We recommend that you replace the filter every six months. Discard used filters, do not attempt to clean and reuse them.

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

- The shelf life of polyurethane filter varies from two years to five years depending on the storage conditions. Store in a cool, dry, and dark environment. Wrap the media in plastic and store in an environment with relative humidity between 40%- 80% and temperature between 40°F (4° C) to 90°F (32° C). Note that if the material flakes, or becomes brittle when rubbed or deformed, it is no longer usable.

Related Documentation

- Tools and Parts Required to Maintain the SRX5800 Services Gateway on page 267
- Replacing the SRX5800 Services Gateway Air Filter on page 398
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273

- Maintaining SRX5800 Services Gateway Network Cables on page 274
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

Maintaining the Fan Trays on the SRX5800 Services Gateway

Purpose For optimum cooling, verify the condition of the fans.

Action

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

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

NOTE: The fan numbers are stamped into the fan tray sheet metal next to each fan.

Related Documentation

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273
- Maintaining SRX5800 Services Gateway Network Cables on page 274
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs

Purpose For optimum services gateway performance, verify the condition of the host subsystem and any additional SCBs. The host subsystem comprises an SCB and a Routing Engine installed into a slot in the SCB.

Action On a regular basis:

- Check the LEDs on the craft interface to view information about the status of the Routing Engines.
- Check the LEDs on the SCB faceplate.
- Check the LEDs on the Routing Engine faceplate.

- To check the status of the Routing Engine, issue the **show chassis routing-engine** command. The output is similar to the following:

```
user@host> show chassis routing-engine

Routing Engine status:
  Slot 0:
    Current state                  Master
    Election priority              Master (default)
    Temperature                 36 degrees C / 96 degrees F
    CPU temperature             33 degrees C / 91 degrees F
    DRAM                      2048 MB
    Memory utilization          12 percent
    CPU utilization:
      User                       1 percent
      Background                 0 percent
      Kernel                     4 percent
      Interrupt                  0 percent
      Idle                      94 percent
    Model                          RE-S-1300
    Serial ID                      1000697084
    Start time                     2008-07-11 08:31:44 PDT
    Uptime                         3 hours, 27 minutes, 27 seconds
    Load averages:                 1 minute   5 minute  15 minute
                                       0.44       0.16       0.06
```

- To check the status of the SCB, issue the **show chassis environment cb** command. The output is similar to the following:

```
user@host> show chassis environment cb

CB 0 status:
  State                      Online Master
  Temperature                40 degrees C / 104 degrees F
  Power 1
    1.2 V                     1208 mV
    1.5 V                     1521 mV
    1.8 V                     1807 mV
    2.5 V                     2507 mV
    3.3 V                     3319 mV
    5.0 V                     5033 mV
    12.0 V                   12142 mV
    1.25 V                    1243 mV
    3.3 V SM3                 3312 mV
    5 V RE                    5059 mV
    12 V RE                  11968 mV
  Power 2
    11.3 V bias PEM          11253 mV
    4.6 V bias MidPlane       4814 mV
    11.3 V bias FPD          11234 mV
    11.3 V bias POE 0        11176 mV
    11.3 V bias POE 1        11292 mV
  Bus Revision               42
  FPGA Revision              1
```

To check the status of a specific SCB, issue the **show chassis environment cb node *slot*** command, for example, **show chassis environment cb node 0**.

For more information about using the CLI, see the CLI Explorer.

Related Documentation

- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 267
- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273
- Maintaining SRX5800 Services Gateway Network Cables on page 274
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway

Purpose For optimum services gateway performance, verify the condition of the Services Processing Cards (SPCs) and interface cards (IOCs, Flex IOCs and MPCs). The services gateway can have up to 11 SPCs and interface cards. To maintain SPCs and interface cards, perform the following procedures regularly.

Action On a regular basis:

- Check the LEDs on the craft interface corresponding to the slot for each SPC and interface card. The green LED labeled **OK** lights steadily when a card is functioning normally.
- Check the **OK/FAIL** LED on the faceplate of each SPC and interface card. If the card detects a failure, it sends an alarm message to the Routing Engine.
- Issue the CLI **show chassis fpc** command to check the status of installed cards. As shown in the sample output, the value *Online* in the column labeled *State* indicates that the card is functioning normally:

```
user@host> show chassis fpc
                    Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State          (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online         41       9          0        1024       15         57
  1  Online         43       5          0        1024       16         57
  2  Online         43      11          0        1024       16         57
  3  Empty
  4  Empty
  5  Online         42       6          0        1024       16         57
```

For more detailed output, add the **detail** option. The following example does not specify a slot number, which is optional:

```
user@host> show chassis fpc detail
Slot 0 information:
  State                                   Online
  Temperature                          41 degrees C / 105 degrees F
  Total CPU DRAM                     1024 MB
  Total RLDRAM                        256 MB
  Total DDR DRAM                     4096 MB
  Start time:                             2007-07-10 12:28:33 PDT
```

```
  Uptime:                                1 hour, 33 minutes, 52 seconds
Slot 1 information:
  State                                  Online
  Temperature                           43 degrees C / 109 degrees F
  Total CPU DRAM                      1024 MB
  Total RLDRAM                         256 MB
  Total DDR DRAM                      4096 MB
  Start time:                            2007-07-10 12:28:38 PDT
  Uptime:                                1 hour, 33 minutes, 47 seconds
Slot 2 information:
  State                                  Online
  Temperature                           43 degrees C / 109 degrees F
  Total CPU DRAM                      1024 MB
  Total RLDRAM                         256 MB
  Total DDR DRAM                      4096 MB
  Start time:                            2007-07-10 12:28:40 PDT
  Uptime:                                1 hour, 33 minutes, 45 seconds
Slot 5 information:
  State                                  Online
  Temperature                           42 degrees C / 107 degrees F
  Total CPU DRAM                      1024 MB
  Total RLDRAM                         256 MB
  Total DDR DRAM                      4096 MB
  Start time:                            2007-07-10 12:28:42 PDT
  Uptime:                                1 hour, 33 minutes, 43 seconds
```

- Issue the CLI **show chassis fpc pic-status** command. The slots are numbered **0** through **5**, bottom to top:

```
user@host> show chassis fpc pic-status

Slot 0   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ
Slot 1   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ
Slot 2   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ
Slot 3   Online       SRX5k SPC
  PIC 0  Offline
  PIC 1  Offline
Slot 4   Online       SRX5k SPC
  PIC 0  Offline
  PIC 1  Offline
```

  For further description of the output from the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

Related Documentation

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273
- Maintaining SRX5800 Services Gateway Network Cables on page 274
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

Maintaining MICs and Port Modules on the SRX5800 Services Gateway

Purpose For optimum services gateway performance, verify the condition of the MICs installed in MPCs, and port modules installed in Flex IOCs.

Action On a regular basis:

- Check the LEDs on MIC and port modules faceplates. The meaning of the LED states differs for various port modules. If the Flex IOC that houses the port modules detects a port modules failure, the Flex IOC generates an alarm message to be sent to the Routing Engine.
- Issue the CLI **show chassis fpc pic-status** command. The port module and MIC slots in an FPC are numbered from **0** through **1**, bottom to top:

```
user@host> show chassis fpc pic-status
Slot 0   Online       SRX5k SPC
  PIC 0  Online       SPU Cp-Flow
  PIC 1  Online       SPU Flow
Slot 3   Online       SRX5k DPC 4X 10GE
  PIC 0  Online       1x 10GE(LAN/WAN) RichQ
  PIC 1  Online       1x 10GE(LAN/WAN) RichQ
  PIC 2  Online       1x 10GE(LAN/WAN) RichQ
  PIC 3  Online       1x 10GE(LAN/WAN) RichQ
Slot 5   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
  PIC 1  Online       4x 10GE XFP
```

For further description of the output from the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

Related Documentation

- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 267
- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining SRX5800 Services Gateway Network Cables on page 274
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

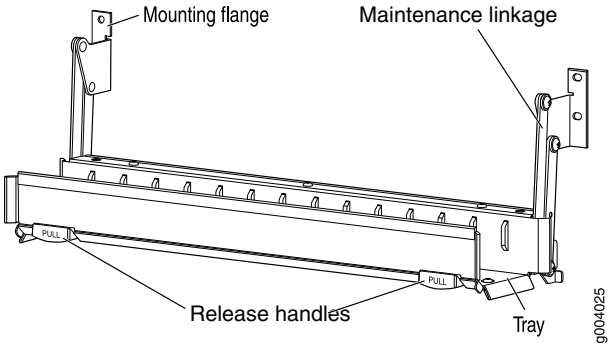
Maintaining SRX5800 Services Gateway Network Cables

Purpose For optimum services gateway performance, verify the condition of the network cables.

Action On a regular basis:

- Use the cable manager to support cables and prevent cables from dislodging or developing stress points (see Figure 118 on page 274).

Figure 118: Cable Manager



- Place excess cable out of the way in the cable manager. Do not allow fastened loops of cable to dangle from the connector or cable manager, because this stresses the cable at the fastening point. Putting fasteners on the loops helps to maintain their shape.
- Keep the cable connections clean and free of dust and other particles, which can cause drops in the received power level. Always inspect cables and clean them if necessary before connecting an interface.
- Label both ends of the cables to identify them.

The following guidelines apply specifically to fiber-optic cables:

- When you unplug a fiber-optic cable, always place a rubber safety plug over the transceiver on the IOC or port module faceplate and on the end of the cable.
- Anchor fiber-optic cables to avoid stress on the connectors. Be sure to secure fiber-optic cables so that they do not support their own weight as they hang to the floor. Never let fiber-optic cable hang free from the connector.
- Avoid bending fiber-optic cable beyond its bend radius. An arc smaller than a few inches can damage the cable and cause problems that are difficult to diagnose.
- Frequent plugging and unplugging of fiber-optic cable into and out of optical instruments can cause damage to the instruments that is expensive to repair. Instead, 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 easy and inexpensive to replace.

- Keep fiber-optic cable connections clean. Small microdeposits of oil and dust in the canal of the transceiver or cable connector could cause loss of light, reducing signal power and possibly causing intermittent problems with the optical connection.

  To clean the transceivers, use an appropriate fiber-cleaning device, such as RIFOCS Fiber Optic Adaptor Cleaning Wands (part number 946). Follow the directions for the cleaning kit you use.

  After you clean an optical 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 for the cleaning kit you use.

Related Documentation

- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 267
- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273
- Maintaining SRX5800 Services Gateway Power Supplies on page 275

Maintaining SRX5800 Services Gateway Power Supplies

Purpose For optimum services gateway performance, verify the condition of the power supplies.

Action On a regular basis:

- To check the status of the power supplies, issue the **show chassis environment pem** command. The output is similar to the following:

```
user@host> show chassis environment pem
PEM 0 status:
  State                       Online
  Temperature                 OK
  AC Input:                   OK
  DC Output             Voltage   Current       Power    Load
                          50        6             300      17
PEM 1 status:
  State                       Online
  Temperature                 OK
  AC Input:                   OK
  DC Output             Voltage   Current       Power    Load
                          50        3             150      8
```

- Make sure that the power and grounding cables are arranged so that they do not obstruct access to other services gateway components.
- Routinely check the status LEDs on the power supply faceplates and the craft interface to determine if the power supplies are functioning normally.
- Check the red and yellow alarm LEDs on the craft interface. Power supply failure or removal triggers an alarm that causes one or both of the LEDs to light. You can display the associated error messages by issuing the following command:

  ```
  user@host> show chassis alarms
  ```

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

Related Documentation

- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 96
- SRX5800 Services Gateway Standard-Capacity DC Power Supply LEDs on page 101
- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 267
- Maintaining SRX5800 Services Gateway Network Cables on page 274

CHAPTER 24

Troubleshooting Components

Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI

The Junos OS command-line interface (CLI) is the primary tool for controlling and troubleshooting services gateway hardware, Junos OS, routing protocols, and network connectivity. CLI commands display information from routing tables, information specific to routing protocols, and information about network connectivity derived from the ping and traceroute utilities.

You enter CLI commands on one or more external management devices connected to ports on the Routing Engine.

For information about using the CLI to troubleshoot Junos OS, see the appropriate Junos OS configuration guide.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 286
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages

When the Routing Engine detects an alarm condition, it lights the major or minor alarm LED on the craft interface as appropriate. To view a more detailed description of the alarm cause, issue the **show chassis alarms** CLI command:

```
user@host> show chassis alarms
```

There are two classes of alarm messages:

- Chassis alarms—Indicate a problem with a chassis component such as the cooling system or power supplies.
- Interface alarms—Indicate a problem with a specific network interface.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 286
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways

Table 59 on page 278 lists the alarms that the chassis components can generate on SRX5400, SRX5600, and SRX5800 Services Gateways.

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Air filters	Change air filter.	Change air filter.	Yellow

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Alternative media	The Services Gateway boots from an alternate boot device, the hard disk. The CompactFlash card is typically the primary boot device. The Routing Engine boots from the hard disk when the primary boot device fails.	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Yellow
Craft interface	The craft interface has failed.	Replace failed craft interface.	Red
Interface Cards (MPC/IOC/Flex IOC)	An interface card is offline.	Check the card. Remove and reinsert the card. If this fails, replace failed card.	Yellow
	An interface card has failed.	Replace failed card.	Red
	An interface card has been removed.	Insert card into empty slot.	Red
	Volt Sensor Fail	Reboot the specified card.	Red
	Abnormal exit in the current flow sessions of an SPU (Services Processing Unit)	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Red

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Fan trays	A fan tray has been removed from the chassis.	Install missing fan tray.	Red
	Fan tray not working or failed.	Replace fan tray.	Red
	One fan in the chassis is not spinning or is spinning below required speed.	Replace fan tray.	Red
	A higher-cooling capacity fan tray is required when an MPC or high-density SPCs are installed on the chassis.	Upgrade to a high-capacity fan tray.	Yellow
	Fan tray under voltage.	Reseat the Fan Tray. If problem still continues open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Red
	Wrong fan tray installed.	Check and insert the appropriate fan tray.	Red
	In SRX5800 Services Gateway, mix of fan trays.	Insert the appropriate fan trays.	Red
	In SRX5800 Services Gateway, wrong fan tray installed on the top.	Check and insert the appropriate fan tray.	Red
Host subsystem	A host subsystem has been removed.	Insert host subsystem into empty slot.	Yellow
	A host subsystem has failed.	Replace failed host subsystem.	Red

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Power supplies	A power supply has been removed from the chassis.	Insert power supply into empty slot.	Yellow
	A power supply has a high temperature.	Replace failed power supply or power entry module.	Red
	A power supply input has failed.	Check power supply input connection.	Red
	A power supply output has failed.	Check power supply output connection.	Red
	A power supply has failed.	Replace failed power supply.	Red
	Invalid AC power supply configuration.	When two AC power supplies are installed, insert one power supply into an odd-numbered slot and the other power supply into an even-numbered slot.	Red
	Invalid DC power supply configuration.	When two DC power supplies are installed, insert one power supply into an odd-numbered slot and the other power supply into an even-numbered slot.	Red
	Mix of AC and DC power supplies.	Do not mix AC and DC power supplies. For DC power, remove the AC power supply. For AC power, remove the DC power supply.	Red
	Not enough power supplies.	Install an additional power supply.	Red

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Routing Engine	Excessive framing errors on console port. An excessive framing error alarm is triggered when the default framing error threshold of 20 errors per second on a serial port is exceeded. This might be caused by a faulty serial console port cable connected to the device.	Replace the serial cable connected to the device. If the cable is replaced and no excessive framing errors are detected within 5 minutes from the last detected framing error, the alarm is cleared automatically.	Yellow
	Error in reading or writing hard disk.	Reformat hard disk and install bootable image. If this fails, replace failed Routing Engine.	Yellow
	Error in reading or writing CompactFlash card.	Reformat CompactFlash card and install bootable image. If this fails, replace failed Routing Engine.	Yellow
	System booted from default backup Routing Engine. If you manually switched mastership, ignore this alarm condition.	Install bootable image on default master Routing Engine. If this fails, replace failed Routing Engine.	Yellow
	System booted from hard disk.	Install bootable image on CompactFlash card. If this fails, replace failed Routing Engine.	Yellow
	CompactFlash card missing in boot list.	Replace failed Routing Engine.	Red
	Hard disk missing in boot list.	Replace failed Routing Engine.	Red
	Routing Engine failed to boot.	Replace failed Routing Engine.	Red
	The Ethernet management interface (**fxp0** or **em0**) on the Routing Engine is down.		Red

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
		• Check the interface cable connection. • Reboot the system. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States)	
System Control Board (SCB)	An SCB has been removed.	Insert SCB into empty slot.	Yellow
	An SCB temperature sensor alarm has failed.	Replace failed SCB.	Yellow
	An SCB has failed.	Replace failed SCB.	Red
	An SCB throughput decreased.	• Check fabric plane summary if all 4 fabric planes are online. • This alarm could be raised before all fabric planes are brought up. It will be cleared after at least 4 planes are up. • If all planes are up and still seeing alarms, raise a case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States)	Yellow

Table 59: Chassis Component Alarm Conditions on SRX5400, SRX5600, and SRX5800 Services Gateways *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Temperature	The chassis temperature has exceeded 55 degrees C (131 degrees F), the fans have been turned on to full speed, and one or more fans have failed.	• Check room temperature. • Check air filter and replace it. • Check airflow. • Check fan.	Yellow
	The chassis temperature has exceeded 65 degrees C (149 degrees F), and the fans have been turned on to full speed.	• Check room temperature. • Check air filter and replace it. • Check airflow. • Check fan.	Yellow
	The chassis temperature has exceeded 65 degrees C (149 degrees F), and a fan has failed. If this condition persists for more than 4 minutes, the Services Gateway shuts down.	• Check room temperature. • Check air filter and replace it. • Check airflow. • Check fan.	Red
	Chassis temperature has exceeded 75 degrees C (167 degrees F). If this condition persists for more than 4 minutes, the Services Gateway shuts down.	• Check room temperature. • Check air filter and replace it. • Check airflow. • Check fan.	Red
	The temperature sensor has failed.	• Check environmental conditions and alarms on other devices. • Ensure that environmental factors (such as hot air blowing around the equipment) are not affecting the temperature sensor. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Red

Backup Routing Engine Alarms

For Services Gateways with master and backup Routing Engines, a master Routing Engine can generate alarms for events that occur on a backup Routing Engine. Table 60 on page 285 lists chassis alarms generated for a backup Routing Engine.

NOTE: Because the failure occurs on the backup Routing Engine, alarm severity for some events (such as Ethernet interface failures) is yellow instead of red.

NOTE: For information about configuring redundant Routing Engines, see the *Junos OS High Availability Library for Routing Devices*.

Table 60: Backup Routing Engine Alarms

Chassis Component	Alarm Condition	Remedy	Alarm Severity
Alternative media	The backup Routing Engine boots from an alternate boot device, the hard disk. The CompactFlash card is typically the primary boot device. The Routing Engine boots from the hard disk when the primary boot device fails.	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Yellow
Boot Device	The boot device (CompactFlash or hard disk) is missing in boot list on the backup Routing Engine.	Replace failed backup Routing Engine.	Red
Ethernet	The Ethernet management interface (**fxp0** or **em0**) on the backup Routing Engine is down.	• Check the interface cable connection. • Reboot the system. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Yellow

Table 60: Backup Routing Engine Alarms *(continued)*

Chassis Component	Alarm Condition	Remedy	Alarm Severity
FRU Offline	The backup Routing Engine has stopped communicating with the master Routing Engine.	Open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Yellow
Hard Disk	Error in reading or writing hard disk on the backup Routing Engine.	Reformat hard disk and install bootable image. If this fails, replace failed backup Routing Engine.	Yellow
Multibit Memory ECC	The backup Routing Engine reports a multibit ECC error.	• Reboot the system with the board reset button on the backup Routing Engine. • If the alarm recurs, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll free, US & Canada) or 1-408-745-9500 (from outside the United States).	Yellow

Related Documentation

- *SRX5600 Services Gateway Craft Interface Overview*
- SRX5800 Services Gateway Craft Interface Overview on page 24

Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts

The craft interface has two alarm relay contacts for connecting the services gateway to external alarm devices. Whenever a system condition triggers either the major or minor alarm on the craft interface, the alarm relay contacts are also activated. The alarm relay contacts are located on the upper right of the craft interface.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs

The craft interface is the panel on the front of the services gateway located above the card cage that contains LEDs and buttons that allow you to troubleshoot the device.

LEDs on the craft interface include the following:

- Alarm LEDs—One large red circular LED and one large yellow triangular LED, located on the upper right of the craft interface, indicate two levels of alarm conditions. The circular red LED lights to indicate a critical condition that can result in a system shutdown. The triangular yellow LED lights to indicate a less severe condition that requires monitoring or maintenance. Both LEDs can be lit simultaneously. A condition that causes an alarm LED to light also activates the corresponding alarm relay contact on the craft interface.
- Host subsystem LEDs—Three LEDs, **MASTER**, **ONLINE**, and **OFFLINE**, indicate the status of the host subsystem. A green **MASTER** LED indicates that the host is functioning as master. The **ONLINE** LED indicates the host is online. The **OFFLINE** LED indicates the host is offline. The host subsystem LEDs are located on the left of the craft interface and are labeled **RE0** and **RE1**.
- Power supply LEDs—Two LEDs (**PEM**) indicate the status of each power supply. Green indicates that the power supply is functioning normally. Red indicates that the power supply is not functioning normally. The power supply LEDs are located in the center of the craft interface, and are labeled **0** through **3**.
- Card OK/Fail LEDs—Two LEDs, **OK** and **FAIL**, indicate the status of the card in each slot in the card cage. Green indicates OK and red indicates a failure. The card OK/Fail LEDs are located along the bottom of the craft interface, and are labeled **0** through **5**, **2/6**, and **7** through **11**.
- SCB LEDs—Two LEDs, **OK** and **FAIL**, indicate the status of each SCB. Green indicates OK and red indicates a failure. The SCB LEDs are located in the center of the craft interface along the bottom, and are labeled **0** and **1**.
- Fan LEDs—Two LEDs indicate the status of each fan tray. Green indicates OK and red indicates a fan failure. The fan LEDs are located on the upper left of the craft interface.

Related Documentation

- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 26
- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 286
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Troubleshooting the SRX5800 Services Gateway with the Component LEDs

The following LEDs are located on various services gateway components and display the status of those components:

- Card LED—One LED labeled **OK/FAIL** on each card in the card cage indicates the card's status.
- MIC and port module LED—One LED labeled **OK/FAIL** on each MIC installed in an MPC, and each port module installed in a Flex IOC indicates the MIC or port module's status.
- SCB LEDs—Three LEDs, labeled **FABRIC ACTIVE**, **FABRIC ONLY**, and **OK/FAIL** , on each SCB faceplate indicate the status of the SCB. If no LEDs are lit, the master Routing Engine might still be booting, or the SCB is not receiving power.
- Routing Engine LEDs—Four LEDs, labeled **MASTER**, **HDD**, **ONLINE**, and **FAIL** on the Routing Engine faceplate indicate the status of the Routing Engine and hard disk drive.
- Power supply LEDs—Three or four LEDs on each power supply faceplate indicate the status of that power supply.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 286
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287

Troubleshooting the SRX5800 Services Gateway Cooling System

Problem **Description:** The fans in a fan tray are not functioning normally.

Solution Follow these guidelines to troubleshoot the fans:

- Check the fan LEDs and alarm LEDs on the craft interface.
- If the major alarm LED on the craft interface lights, use the CLI to get information about the source of an alarm condition: **user@host> show chassis alarms**.

  If the CLI output lists only one fan failure, and the other fans are functioning normally, the fan is most likely faulty and you must replace the fan tray.
- Place your hand near the exhaust vents at the side of the chassis to determine whether the fans are pushing air out of the chassis.

- If the fan tray is removed, a minor alarm and a major alarm occur.
- The following conditions automatically cause the fans to run at full speed and also trigger the indicated alarm:
  - A fan fails (major alarm).
  - The services gateway temperature exceeds the “temperature warm” threshold (minor alarm).
  - The temperature of the services gateway exceeds the maximum (“temperature hot”) threshold (major alarm and automatic shutdown of the power supplies).

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 286

Troubleshooting SRX5800 Services Gateway Interface Cards

Problem **Description:** The interface cards (IOCs, Flex IOCs, or MPCs) are not functioning normally.

Solution

- Monitor the green LED labeled **OK** on the craft interface corresponding to the slot as soon as an interface card is seated in an operating services gateway.

  The Routing Engine downloads the interface card’s software to it under two conditions: the interface card is present when the Routing Engine boots Junos OS, and the interface card is installed and requested online through the CLI or push button on the front panel. The interface card then runs diagnostics, during which the **OK** LED blinks. When the interface card is online and functioning normally, the **OK** LED lights green steadily.
- Make sure the interface card is properly seated in the midplane. Check that each ejector handle has been turned clockwise and is tight.
- Check the **OK/FAIL** LED on the interface card and **OK** and **FAIL** LEDs for the slot on the craft interface. When the interface card is online and functioning normally, the **OK** LED lights green steadily.
- Issue the CLI **show chassis fpc** command to check the status of installed interface cards. As shown in the sample output, the value *Online* in the column labeled *State* indicates that the interface card is functioning normally:

```
user@host> show chassis fpc
                    Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State           (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online           41      9          0       1024       15         57
  1  Online           43      5          0       1024       16         57
  2  Online           43     11          0       1024       16         57
  3  Empty
  4  Empty
```

```
  5  Online            42       6          0       1024       16          57
```

For more detailed output, add the **detail** option. The following example does not specify a slot number, which is optional:

```
user@host> show chassis fpc detail
Slot 0 information:
  State                               Online
  Temperature                      41 degrees C / 105 degrees F
  Total CPU DRAM                 1024 MB
  Total RLDRAM                    256 MB
  Total DDR DRAM                 4096 MB
  Start time:                         2007-07-10 12:28:33 PDT
  Uptime:                             1 hour, 33 minutes, 52 seconds
Slot 1 information:
  State                               Online
  Temperature                      43 degrees C / 109 degrees F
  Total CPU DRAM                 1024 MB
  Total RLDRAM                    256 MB
  Total DDR DRAM                 4096 MB
  Start time:                         2007-07-10 12:28:38 PDT
  Uptime:                             1 hour, 33 minutes, 47 seconds
Slot 2 information:
  State                               Online
  Temperature                      43 degrees C / 109 degrees F
  Total CPU DRAM                 1024 MB
  Total RLDRAM                    256 MB
  Total DDR DRAM                 4096 MB
  Start time:                         2007-07-10 12:28:40 PDT
  Uptime:                             1 hour, 33 minutes, 45 seconds
Slot 5 information:
  State                               Online
  Temperature                      42 degrees C / 107 degrees F
  Total CPU DRAM                 1024 MB
  Total RLDRAM                    256 MB
  Total DDR DRAM                 4096 MB
  Start time:                         2007-07-10 12:28:42 PDT
  Uptime:                             1 hour, 33 minutes, 43 seconds
```

For further description of the output from the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Troubleshooting SRX5800 Services Gateway MICs and Port Modules

Problem **Description:** The MICs or port modules are not functioning normally.

Solution

- Check the status of each port on a port module by looking at the LED located on the port module faceplate.
- Check the status of a port module by issuing the **show chassis fpc pic-status** CLI command. The port module slots in the Flex IOC are numbered from **0** through **1**:

```
user@host> show chassis fpc pic-status
Slot 0   Online       SRX5k SPC
  PIC 0  Online       SPU Cp-Flow
  PIC 1  Online       SPU Flow
Slot 3   Online       SRX5k DPC 4X 10GE
  PIC 0  Online       1x 10GE(LAN/WAN) RichQ
  PIC 1  Online       1x 10GE(LAN/WAN) RichQ
  PIC 2  Online       1x 10GE(LAN/WAN) RichQ
  PIC 3  Online       1x 10GE(LAN/WAN) RichQ
Slot 5   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
  PIC 1  Online       4x 10GE XFP
```

For further description of the output from the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Troubleshooting SRX5800 Services Gateway SPCs

Problem **Description:** A Services Processing Card (SPC) is not functioning normally.

Solution

- Make sure the SPC is properly seated in the midplane. Check that each ejector handle has been turned clockwise and is tight.
- Issue the CLI **show chassis fpc** command to check the status of installed SPCs. As shown in the sample output, the value *Online* in the column labeled *State* indicates that the SPC is functioning normally:

```
user@host> show chassis fpc
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online            35      4          0          1024       13         25
  1  Online            47      3          0          1024       13         25
  2  Online            37      8          0          2048       18         14
```

For more detailed output, add the **detail** option. The following example does not specify a slot number, which is optional:

```
user@host> show chassis fpc detail
Slot 0 information:
  State                                Online
```

```
  Temperature                      35
  Total CPU DRAM                 1024 MB
  Total RLDRAM                    259 MB
  Total DDR DRAM                 4864 MB
  Start time:                         2013-12-10 02:58:16 PST
  Uptime:                          1 day, 11 hours, 59 minutes, 15 seconds

  Max Power Consumption           585 Watts
Slot 1 information:
  State                               Online
  Temperature                      47
  Total CPU DRAM                 1024 MB
  Total RLDRAM                    259 MB
  Total DDR DRAM                 4864 MB
  Start time:                         2013-12-10 02:55:30 PST
  Uptime:                             1 day, 12 hours, 2 minutes, 1 second
  Max Power Consumption           585 Watts
Slot 2 information:
  State                               Online
  Temperature                      37
  Total CPU DRAM                 2048 MB
  Total RLDRAM                   1036 MB
  Total DDR DRAM                 6656 MB
  Start time:                         2013-12-10 02:58:07 PST
  Uptime:                          1 day, 11 hours, 59 minutes, 24 seconds

  Max Power Consumption           570 Watts
```

For further description of the output from the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Troubleshooting the SRX5800 Services Gateway Power System

Problem **Description:** The power system is not functioning normally.

Solution

- Check the LEDs on each power supply faceplate.
  - If an AC power supply is correctly installed and functioning normally, the **AC OK** and **DC OK** LEDs light steadily, and the **PS FAIL** LED is not lit.
  - If a DC power supply is correctly installed and functioning normally, the **PWR OK**, **BREAKER ON**, and **INPUT OK** LEDs light steadily.
- Issue the CLI **show chassis environment pem** command to check the status of installed power supplies. As shown in the sample output, the value *Online* in the rows labeled *State* indicates that each of the power supplies is functioning normally:

```
user@host> show chassis environment pem
State                       Online
  Temperature                 OK
  DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                          57        14            798      19
PEM 1 status:
  State                       Online
  Temperature                 OK
  DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                          57        13            741      18
```

If a power supply is not functioning normally, perform the following steps to diagnose and correct the problem:

- If a major alarm condition occurs, issue the **show chassis alarms** command to determine the source of the problem.
- Check that the AC input switch (—) or DC circuit breaker (|) is in the on position and that the power supply is receiving power.
- Verify that the source circuit breaker has the proper current rating. Each power supply must be connected to a separate source circuit breaker.
- Verify that the AC power cord or DC power cables from the power source to the services gateway are not damaged. If the insulation is cracked or broken, immediately replace the cord or cable.
- Connect the power supply to a different power source with a new power cord or power cables. If the power supply status LEDs indicate that the power supply is not operating normally, the power supply is the source of the problem. Replace the power supply with a spare.
- If all power supplies have failed, the system temperature might have exceeded the threshold, causing the system to shut down.

NOTE: If the system temperature exceeds the threshold, Junos OS shuts down all power supplies so that no status is displayed.

Junos OS also can shut down one of the power supplies for other reasons. In this case, the remaining power supplies provide power to the services gateway, and you can still view the system status through the CLI or display.

To restart a high-capacity AC power supply after a shut down due to an over-temperature situation:

1. Move the power switch on the power supply to the off (o) position.
2. Turn off power to where the AC line goes into the power distribution module (PDM) area.
3. Wait for the power supply LEDs to fade out and for the fans inside the power supply to shutdown. This can take up to 10 seconds.

CAUTION: Do not attempt to power-on the power supply if the LED is still lit and the fan is still running. If you do, the services gateway will not reboot.

4. Turn on power to where the AC line goes into the power distribution module (PDM) area.
5. Move the power switch on the power supply to the on (**|**) position.
6. Verify that the LEDs on the power supply faceplate are properly lit.
7. Issue the CLI **show chassis environment pem** command and verify the State is **ONLINE** and the Temperature is **OK**.

To restart a high-capacity DC power supply after a shut down due to an over-temperature situation:

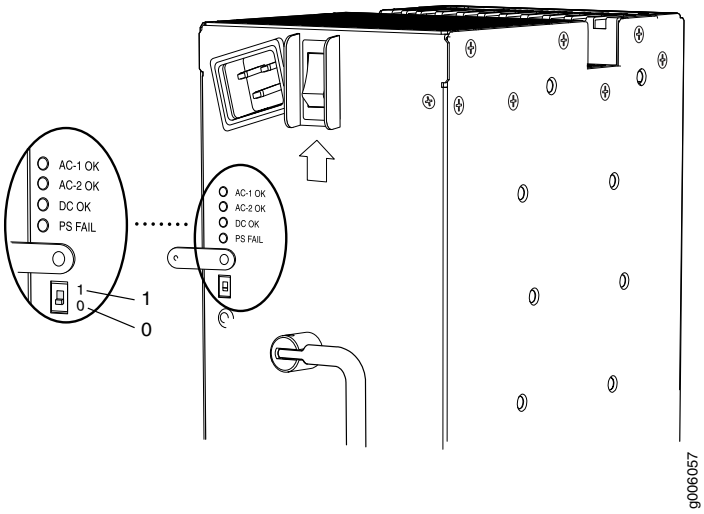
1. Switch off the circuit breaker(s) on the DC distribution panel to remove power to the chassis and power supplies.
2. Switch on the circuit breaker(s) on the distribution panel to power up the chassis and power supplies.

NOTE: The power switch on the power supplies is not part of the outer or inner DC circuits and therefore does not need to be switched off when restarting the chassis.

NOTE: If output power is not load-balancing correctly in the same zone on a services gateway with a high-capacity AC or DC power supply module, connect two feeds and change the DIP switch to 1 to boost the voltage on the power supply module.

Each High Capacity AC or DC power supply accepts two AC or DC feeds in two unique AC or DC receptacles. It is possible to operate with one feed, but there is a reduction in the power supply output. The DIP switch must be set according to the number of AC or DC feeds that are present for the power supply.

Figure 119: AC Power Input Mode Switch



- Position – **0** indicates that only one AC or DC feed is provided.
- Position – **1** indicates that two AC or DC feeds are provided.

The following example shows what should be the DIP switch position based on the number of AC or DC input feeds expected and connected to the PEM:

1. Issue the CLI **show chassis power** command and check how many feeds are connected.

```
# run show chassis power
PEM 0:
  State:     Online
  AC input:  OK (2 feed expected, 2 feed connected)
  Capacity:  4100 W (maximum 4100 W)
  DC output: 798 W (zone 0, 14 A at 57 V, 19% of capacity)

PEM 1:
  State:     Online
  AC input:  OK (1 feed expected, 2 feed connected)
  Capacity:  1700 W (maximum 4100 W)
  DC output: 741 W (zone 1, 13 A at 57 V, 43% of capacity)

PEM 2:
  State:     Empty
  Input:     Absent

PEM 3:
  State:     Empty
  Input:     Absent

System:
  Zone 0:
      Capacity:          4100 W (maximum 4100 W)
      Allocated power:   1255 W (2845 W remaining)
      Actual usage:      798 W
  Zone 1:
      Capacity:          1700 W (maximum 4100 W)
      Allocated power:   1090 W (610 W remaining)
      Actual usage:      741 W
```

```
  Total system capacity: 5800 W (maximum 8200 W)
  Total remaining power: 3455 W
```

The output of the **show chassis power** command shows that; on PEM 0 two AC input feeds are expected and two AC input feeds are connected and on PEM 1 one AC input feed is expected and two AC input feeds are connected.

2. Issue the **show chassis alarms** command to see if there are any active alarms and the position of the PEM DIP switch.

```
> show chassis alarms
1 alarms currently active
Alarm time               Class  Description
2017-01-23 05:05:17 PST  Minor  PEM 1 Dipswitch 0 Feed Connection 2
```

The output of the **show chassis alarms** command shows one active alarm on PEM 1 and the position of the DIP switch as 0.

In this example output, there is an alarm on PEM 1 because there is a need of only one AC feed but the PEM 1 is connected with two AC feeds and the DIP switch position is 0.

3. Change the PEM 1 DIP switch position to **1**. This should clear the alarm.

NOTE: Changing the DIP switch position does not impact traffic. However, it is always recommended to do so in a maintenance window.

4. Issue the CLI **show chassis power** command and check the output to see if the number of feeds expected on PEM 1 is the same as the feeds connected.

```
# run show chassis power
PEM 0:
  State:     Online
  AC input:  OK (2 feed expected, 2 feed connected)
  Capacity:  4100 W (maximum 4100 W)
  DC output: 741 W (zone 0, 13 A at 57 V, 18% of capacity)

PEM 1:
  State:     Online
  AC input:  OK (2 feed expected, 2 feed connected)
  Capacity:  4100 W (maximum 4100 W)
  DC output: 741 W (zone 1, 13 A at 57 V, 18% of capacity)

PEM 2:
  State:     Empty
  Input:     Absent

PEM 3:
  State:     Empty
  Input:     Absent

System:
  Zone 0:
      Capacity:          4100 W (maximum 4100 W)
      Allocated power:   1255 W (2845 W remaining)
```

```
    Actual usage:      741 W
Zone 1:
    Capacity:          4100 W (maximum 4100 W)
    Allocated power:   1090 W (3010 W remaining)
    Actual usage:      741 W
Total system capacity: 8200 W (maximum 8200 W)
Total remaining power: 5855 W
```

The output of the **show chassis power** command shows that the number of feeds on PEM 1 expected is the same as the feeds connected.

5. Issue the CLI **show chassis alarms** command to check if the alarm is removed.

```
> show chassis alarms
No alarms currently active
```

The output of the **show chassis alarms** command shows no active alarms.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

Behavior of the SRX5400, SRX5600, and SRX5800 Services Gateways When the SRX5K-SCBE and SRX5K-RE-1800X4 in a Chassis Cluster Fail

It is important to understand the behavior of the SRX5400, SRX5600, and SRX5800 Services Gateways when the Switch Control Board (SRX5K-SCBE) and Routing Engine (SRX5K-RE-1800X4) in the chassis cluster fail.

NOTE: This procedure is also applicable for SCB3 except that SCB3 redundancy is supported.

NOTE: We strongly recommend that you perform the ISHU during a maintenance window, or during the lowest possible traffic as the secondary node is not available at this time.

NOTE: The SRX5K-SCBE and SRX5K-RE-1800X4 are not hot-swappable.

NOTE: Four fabric planes must be active at any time in a chassis cluster. If fewer than four fabric planes are active, then the Redundancy Group (RG1+) will fail over to the secondary node.

Table 61 on page 298 shows the minimum fabric plane requirements for the SCB.

Table 61: Expected Device Behavior and Minimum SRX5K-SCBE and Fabric Plane Requirements

Platform	Number of SRX5K-SCBs	Active Planes	Redundant Planes	Expected Behavior After the SCB and Routing Engine are Removed
SRX5400	1	4 (virtual)	0 (virtual)	If the SCB in the primary node fails, the device will fail over to the secondary node as the primary node powers off.
SRX5600	2	4 (virtual)	4 (virtual)	If the active SCB in the primary node fails, the behavior of the device does not change as the redundant SCB becomes active provided all four fabric planes are in good condition. If the second SCB in the primary node fails, the device will fail over to the secondary node as the primary node powers off.
SRX5800	3	4	2	This device supports one SCB for two fabric planes, providing a redundancy of three SCBs. If the active SCB fails, the device behavior does not change as the remaining two SCBs fulfill the requirement to have four fabric planes. If the second SCB also fails, no spare planes are available in the chassis triggering inter-chassis redundancy. Therefore, RG1+ will fail over to the secondary node.

NOTE: In SRX5600 and SRX5800 Services Gateways, failover does not happen when the secondary Routing Engine in slot 1 fails, while the SCB in slot 1 is inactive.

For detailed information about chassis cluster, see the *Chassis Cluster Feature Guide for Security Devices* at www.juniper.net/documentation/.

Related Documentation

- SRX5800 Services Gateway Description on page 3
- *SRX5600 Services Gateway Description*

- *SRX5400 Services Gateway Description*

Juniper Networks Technical Assistance Center

If you need assistance while troubleshooting a services gateway, open a support case using the Case Manager link at: https://www.juniper.net/support/, or call 1-888-314-JTAC (within the United States) or 1-408-745-9500.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Junos OS CLI on page 277
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 278
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 286
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 288

PART 5

Replacing Components

CHAPTER 25

Overview of Replacing Components

SRX5800 Services Gateway Field-Replaceable Units

Field-replaceable units (FRUs) are services gateway components that can be replaced at the customer site. The services gateway uses the following types of FRUs:

Table 62 on page 303 lists the FRUs of the services gateway and the action to perform to install, remove, or replace an FRU.

Table 62: Field-Replaceable Units

Field-Replaceable Units (FRUs)	Action
Air filter	You need not power off the services gateway to install, remove, or replace any of these FRUs.
Fan tray	
Craft interface	
AC and DC power supplies (if redundant)	
SFP and XFP transceivers	

Table 62: Field-Replaceable Units *(continued)*

Field-Replaceable Units (FRUs)	Action
IOCs	Power off the services gateway to install, remove, or replace any of these FRUs.
Flex IOCs	
Port modules	
Routing Engine	
SCBs	
SPCs	
MPCs	
MICs	

Related Documentation

- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304

Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components

To replace hardware components, you must have the tools listed in Table 63 on page 304.

Table 63: Tools and Parts Required

Tool or part	Components
7/16-in. nut driver or pliers	DC power supply. To remove or tighten the cables to a DC power supply.
Blank panels (if component is not reinstalled)	SCB IOC SPC Power supply Routing Engine

Table 63: Tools and Parts Required *(continued)*

Tool or part	Components
Electrostatic bag or antistatic mat	Craft Interface SCB IOC SPC Routing Engine SFP and XFP Transceivers
Electrostatic discharge (ESD) grounding wrist strap	All
Phillips (+) screwdrivers, numbers 0 and 1	Air filter Routing Engine Craft interface SCB Fan tray
Rubber safety cap	IOC SPC SFP and XFP Transceivers
Wire cutters	Cables and connectors DC power supply

Related Documentation

- SRX5800 Services Gateway Field-Replaceable Units on page 303

CHAPTER 26

Replacing Cables and Connectors

Replacing the SRX5800 Services Gateway Craft Interface

To replace the craft interface, perform the following procedures in sequence:

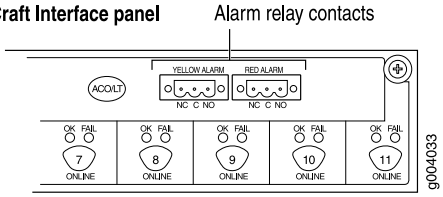
1. Disconnecting the Alarm Relay Wires from the SRX5800 Services Gateway Craft Interface on page 307
2. Removing the SRX5800 Services Gateway Craft Interface on page 308
3. Installing the SRX5800 Services Gateway Craft Interface on page 309
4. Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 310

Disconnecting the Alarm Relay Wires from the SRX5800 Services Gateway Craft Interface

To disconnect the alarm relay wires from the services gateway and an alarm-reporting device (see Figure 120 on page 308):

1. Disconnect the existing wire at the external device.
2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
3. Using a 2.5-mm flat-blade screwdriver, loosen the small screws on the face of the terminal block and remove the block from the relay contact.
4. Using the 2.5-mm flat-blade screwdriver, loosen the small screws on the side of the terminal block. Remove existing wires from the slots in the front of the block.

Figure 120: Alarm Relay Contacts



See Also

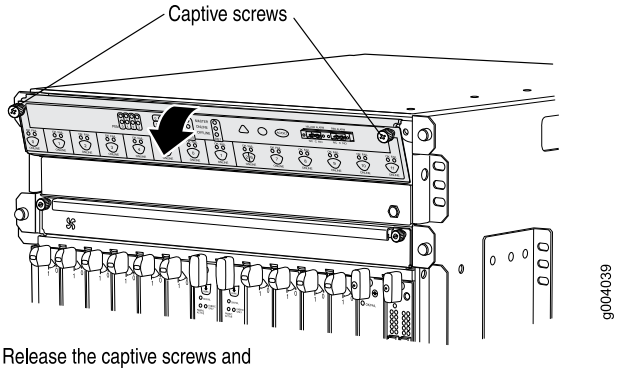
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Removing the SRX5800 Services Gateway Craft Interface on page 308
- Installing the SRX5800 Services Gateway Craft Interface on page 228
- Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 310

Removing the SRX5800 Services Gateway Craft Interface

To remove the craft interface (see Figure 121 on page 309):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Detach any external devices connected to the craft interface.
3. Loosen the captive screws at the left and right corners of the craft interface faceplate.
4. Grasp the craft interface faceplate and carefully tilt it toward you until it is horizontal.
5. Disconnect the ribbon cable from the back of the faceplate by gently pressing on both sides of the latch with your thumb and forefinger. Remove the craft interface from the chassis.

Figure 121: Removing the Craft Interface



Release the captive screws and tilt the craft interface toward you.

See Also

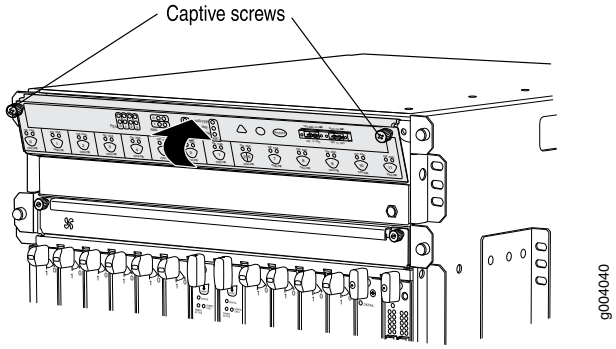
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Disconnecting the Alarm Relay Wires from the SRX5800 Services Gateway Craft Interface on page 307
- Installing the SRX5800 Services Gateway Craft Interface on page 228
- Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 310

Installing the SRX5800 Services Gateway Craft Interface

To install the craft interface (see Figure 105 on page 228):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Grasp the craft interface with one hand and hold the bottom edge of the craft interface with the other hand to support its weight.
3. Orient the ribbon cable so that it plugs into the connector socket. The connector is keyed and can be inserted only one way.
4. Align the bottom of the craft interface with the sheet metal above the card cage and press it into place.
5. Tighten the screws on the left and right corners of the craft interface faceplate.
6. Reattach any external devices connected to the craft interface.

Figure 122: Installing the Craft Interface



Rest lower edge of the craft interface in the chassis bay, then tilt it toward the chassis, and secure the screws.

See Also

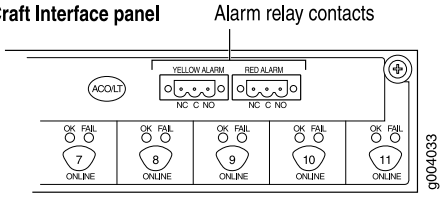
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Disconnecting the Alarm Relay Wires from the SRX5800 Services Gateway Craft Interface on page 307
- Removing the SRX5800 Services Gateway Craft Interface on page 308
- Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 310

Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface

To connect the alarm relay wires between a services gateway and an alarm-reporting device (see Figure 123 on page 311):

1. Prepare the required length of replacement wire with gauge between 28-AWG and 14-AWG (0.08 and 2.08 mm^2).
2. Insert the replacement wires into the slots in the front of the block. Use a 2.5-mm flat-blade screwdriver to tighten the screws and secure the wire.
3. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
4. Plug the terminal block into the relay contact, and use a 2.5-mm flat-blade screwdriver to tighten the screws on the face of the block.
5. Attach the other end of the wires to the external device.

Figure 123: Alarm Relay Contacts



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Disconnecting the Alarm Relay Wires from the SRX5800 Services Gateway Craft Interface on page 307
- Removing the SRX5800 Services Gateway Craft Interface on page 308
- Installing the SRX5800 Services Gateway Craft Interface on page 228

Related Documentation

- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 26
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 27
- SRX5800 Services Gateway Craft Interface Card OK/Fail LEDs on page 27
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 28
- SRX5800 Services Gateway Craft Interface Online Buttons on page 28
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 30
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 287

Replacing the Management Ethernet Cable on an SRX5800 Services Gateway

One Ethernet cable with RJ-45 connectors is provided with the services gateway. To replace the cable connected to the **ETHERNET** port:

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Press the tab on the connector and pull the connector straight out of the port. Figure 124 on page 312 shows the connector.
3. Disconnect the cable from the network device.

4. Plug one end of the replacement cable into the **ETHERNET** port. Figure 125 on page 312 shows the port.

5. Plug the other end of the cable into the network device.

Figure 124: Cable Connector

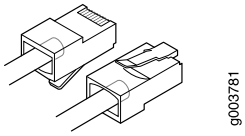
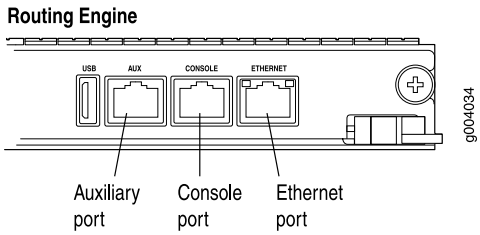


Figure 125: Ethernet Port



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Replacing the SRX5800 Services Gateway Console or Auxiliary Cable on page 312
- Replacing the SRX5800 Services Gateway Routing Engine on page 369

Replacing the SRX5800 Services Gateway Console or Auxiliary Cable

To use a system console to configure and manage the Routing Engine, connect it to the **CONSOLE** port on the Routing Engine. To use a laptop, modem, or other auxiliary device, connect it to the **AUX** port on the Routing Engine. Both ports accept a cable with an RJ-45 connector. One RJ-45/DB-9 cable is provided with the services gateway. If you want to connect a device to both ports, you must supply another cable.

To replace a cable connected to a management console or auxiliary device:

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

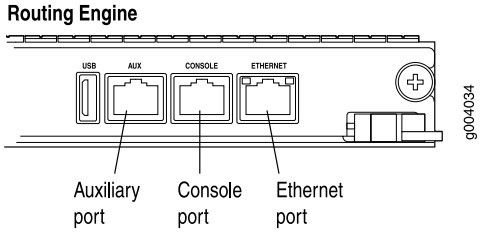
2. Press the tab on the connector and pull the connector straight out of the port.

3. Disconnect the cable from the console or auxiliary device.

4. Plug the RJ-45 end of the replacement serial cable into the **CONSOLE** or **AUX** port. Figure 126 on page 313 shows the external device ports on the Routing Engine.

5. Plug the female DB-9 end into the console or auxiliary device's serial port.

Figure 126: Auxiliary and Console Ports



Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Replacing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Replacing an SRX5800 Services Gateway Network Interface Cable

To replace a network interface cable connected to an IOC, port module, or MIC, perform the following procedures:

1. Removing an SRX5800 Services Gateway Network Interface Cable on page 313
2. Installing an SRX5800 Services Gateway Network Interface Cable on page 314

Removing an SRX5800 Services Gateway Network Interface Cable

Removing and installing network interface cables does not affect services gateway function, except that the component does not receive or transmit data while its cable is disconnected.

To remove a fiber-optic cable from a network interface on an IOC, port module, or MIC:

1. If the component connects to fiber-optic cable, have ready a rubber safety cap for each cable and transceiver.

2. If removing all cables connected to the component, use one of the following methods to take the component offline:

   - To take a port module offline :

     - Press the online/offline button on the port module. Use a narrow-ended tool that fits inside the opening that leads to the button. Press and hold the button until the port module LED goes out (about 5 seconds).

     - Issue the following CLI command:

       ```
       user@host> request chassis pic fpc-slot fpc-slot pic-slot port-module-slot offline
       ```

       For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

   - To take an interface card offline :

- Press and hold the corresponding online button on the craft interface. The green **OK** LED next to the button begins to blink. Hold the button down until the LED goes off.
- Issue the following CLI command:

  `user@host>` **request chassis fpc slot *slot-number* offline**

  For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

3. Unplug the cable from the cable connector port. If the network interface uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap.

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

CAUTION: **Do not leave a fiber-optic transceiver uncovered except when you are inserting or removing cable. The safety cap keeps the port clean and prevents accidental exposure to laser light.**

4. Remove the cable from the cable manager and detach it from the destination port.

See Also
- Installing an SRX5800 Services Gateway Network Interface Cable on page 314

Installing an SRX5800 Services Gateway Network Interface Cable

To install a fiber-optic cable on a network interface on an IOC, port module, or MIC:

1. Have ready a length of the type of cable used by the component.

2. If the cable connector port is covered by a rubber safety plug, remove the plug.

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

CAUTION: **Do not leave a fiber-optic transceiver uncovered except when you are inserting or removing cable. The safety cap keeps the port clean and prevents accidental exposure to laser light.**

3. Insert the cable connector into the cable connector port on the component faceplate.

4. Arrange the cable in the cable manager to prevent it from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on the loop helps to maintain its shape.

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

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

5. Insert the other end of the cable into the destination port.

6. Repeat the previous steps for any additional cables.

7. If the component is offline (its failure indicator LED is lit), use one of the following methods to bring it online.

   - To bring an IOC or MPC online:
     - Press and hold the corresponding IOC or MPC online button on the craft interface until the green **OK** LED next to the button lights steadily, in about 5 seconds.
     - Issue the following CLI command:

       `user@host>` **request chassis fpc slot** ***slot-number*** **online**

       For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

   - To bring a port module online:
     - Press the port module online button until the PIC LED lights green. Use a narrow-ended tool that fits inside the opening that leads to the button.
     - Issue the following CLI command:

       `user@host>` **request chassis pic fpc-slot** *`fpc-slot`* **pic-slot** *`pic-slot`* **online**

       For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

The normal functioning indicator LED confirms that the component is online. You can also verify correct IOC functioning by issuing the **show chassis fpc** command or correct PIC functioning by issuing the **show chassis fpc pic-status** command.

See Also
- Removing an SRX5800 Services Gateway Network Interface Cable on page 313

Related Documentation
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239

Replacing SRX5800 Services Gateway XFP and SFP Transceivers

To replace an XFP or SFP transceiver, perform the following procedures:

1. Removing an SRX5800 Services Gateway SFP or XFP Transceiver on page 316
2. Installing an SRX5800 Services Gateway SFP or XFP Transceiver on page 318

Removing an SRX5800 Services Gateway SFP or XFP Transceiver

Transceivers are installed in a MIC or SPC. Transceivers are hot-insertable and hot-removable. Removing a transceiver does not interrupt the functioning of the card, but the removed transceiver no longer receives or transmits data.

To remove a transceiver (see Figure 127 on page 317):

1. Have ready a replacement transceiver or a transceiver slot plug, an antistatic mat, and a rubber safety cap for the transceiver.
2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
3. Label the cables connected to the transceiver so that you can reconnect them correctly later.

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

4. Remove the cable connector from the transceiver.
5. Carefully arrange the disconnected cable in the cable manager to prevent the cable from developing stress points.

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

6. Pull the ejector handle out from the transceiver to unlock the transceiver.

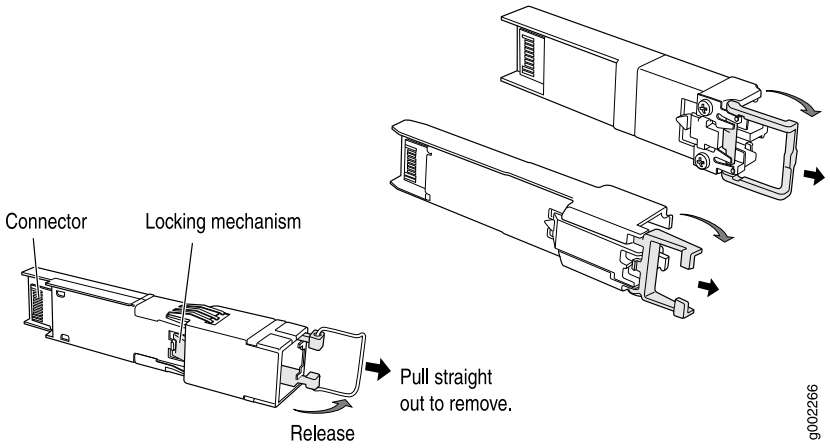
   CAUTION: Make sure that you open the ejector handle completely until you hear it click. This prevents damage to the transceiver.

   Use needlenose pliers to pull the ejector handle out from the transceiver.

7. Grasp the transceiver ejector handle and pull the transceiver approximately 0.5 in. (1.3 cm) out of the card.

8. Using your fingers, grasp the body of the transceiver and pull it the rest of the way out of the card.

Figure 127: Removing a Transceiver



9. Place a rubber safety cap over the transceiver.

10. Place the removed transceiver on an antistatic mat or in an electrostatic bag.

CAUTION: After removing a transceiver from the card, wait at least 30 seconds before reinserting it or inserting a transceiver into a different socket.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Installing an SRX5800 Services Gateway SFP or XFP Transceiver on page 227

Installing an SRX5800 Services Gateway SFP or XFP Transceiver

Transceivers that are installed in an MIC or SPC. Transceivers are hot-insertable and hot-removable. Removing a transceiver does not interrupt the functioning of the card, but the removed transceiver no longer receives or transmits data.

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.

To install a transceiver:

1. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Take each transceiver to be installed out of its electrostatic bag and identify the slot on the component where it will be installed.
3. Verify that each transceiver is covered by a rubber safety cap. If it is not, cover the transceiver with a safety cap.
4. Carefully align the transceiver with the slots in the component. The connectors should face the component.
5. Slide the transceiver until the connector is seated in the component slot. If you are unable to fully insert the transceiver, make sure the connector is facing the right way.
6. Close the ejector handle of the transceiver.
7. Remove the rubber safety cap from the transceiver and the end of the cable. Insert the cable into the transceiver.
8. Verify that the status LEDs on the component faceplate indicate that the transceiver is functioning correctly.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing an SRX5800 Services Gateway SFP or XFP Transceiver on page 316

Related Documentation

- Replacing SRX5800 Services Gateway MPCs on page 352

- Replacing SRX5800 Services Gateway MICs on page 346
- Replacing SRX5800 Services Gateway SPCs on page 339

Replacing the SRX5800 Services Gateway Cable Manager

To replace the cable manager, perform the following procedures:

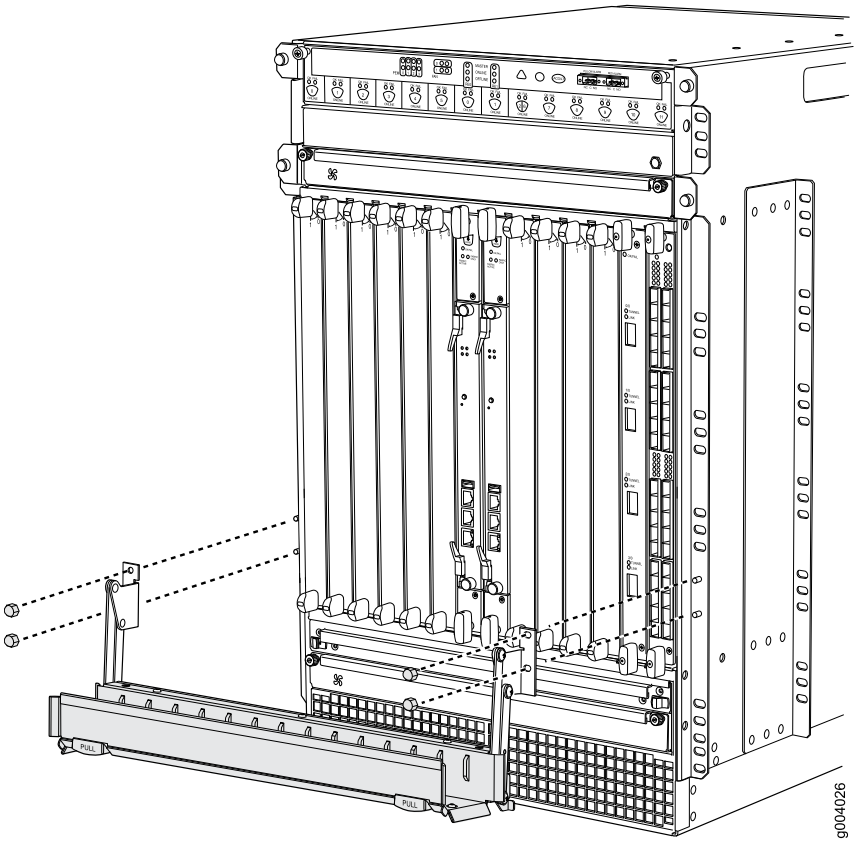
1. Removing the SRX5800 Services Gateway Cable Manager on page 319
2. Installing the SRX5800 Services Gateway Cable Manager on page 320

Removing the SRX5800 Services Gateway Cable Manager

To remove the cable manager (see Figure 128 on page 320):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Using a 7/16-in. nut driver, unscrew the nuts on the corners of the cable manager.
3. Grasp the bottom of the cable manager and pull it straight out from the studs on the front of the chassis.

Figure 128: Removing the Cable Manager



See Also

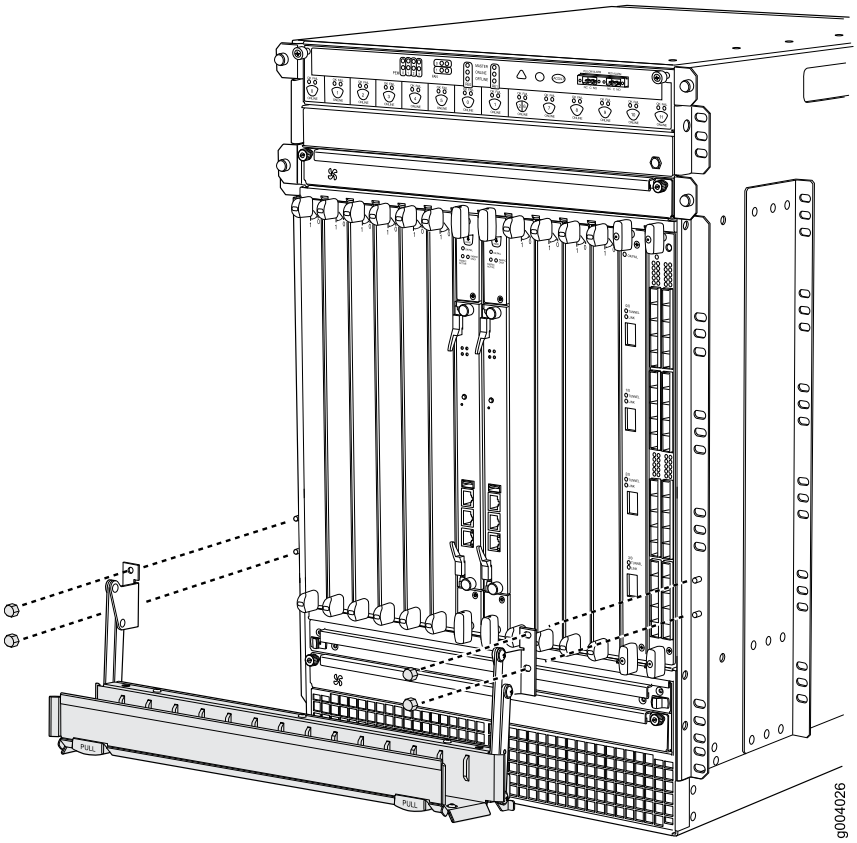
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Installing the SRX5800 Services Gateway Cable Manager on page 229
- SRX5800 Services Gateway Cable Manager Description on page 24

Installing the SRX5800 Services Gateway Cable Manager

To install the cable manager (see Figure 106 on page 229):

1. Position the standard cable manager on the studs on the lower front of the chassis.
2. Insert the nuts on the corners in the standard cable manager onto the studs on the chassis.
3. Using a 7/16-in. nut driver, tighten the nuts securely.

Figure 129: Installing the Cable Manager



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing the SRX5800 Services Gateway Cable Manager on page 319
- SRX5800 Services Gateway Cable Manager Description on page 24

Related Documentation

- SRX5800 Services Gateway Cable Manager Description on page 24
- Removing the Cable Manager Before Installing the SRX5800 Services Gateway Chassis on page 171
- Reinstalling the Cable Manager After Installing the SRX5800 Services Gateway Chassis on page 184

CHAPTER 27

Replacing Line Cards and Module Components

Replacing SRX5800 Services Gateway IOCs

To replace an IOC, perform the following procedures:

1. Removing an SRX5800 Services Gateway IOC on page 323
2. Installing an SRX5800 Services Gateway IOC on page 326

Removing an SRX5800 Services Gateway IOC

An IOC weighs up to 13.1 lb (5.9 kg). Be prepared to accept its full weight.

To remove an IOC (see Figure 130 on page 325):

1. Have ready a replacement IOC or IOC blank panel and an antistatic mat for the IOC. Also have ready rubber safety caps for each optical interface on the IOC you are removing.

2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

3. Label the cables connected to each port on the IOC so that you can later reconnect the cables to the correct ports.

4. Use one of the following methods to take the IOC offline:

- Press and hold the corresponding IOC online button on the craft interface. The green **OK** LED next to the button begins to blink. Hold the button down until the LED goes off.
- Issue the following CLI command:

  `user@host>` **request chassis fpc slot *slot-number* offline**

  For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

5. Power off the services gateway.
6. Disconnect the cables from the IOC.

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

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

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

7. Immediately cover each optical transceivers and the end of each fiber-optic cable with a rubber safety cap.
8. Arrange the disconnected cables in the cable manager to prevent the cables from developing stress points.
9. Simultaneously turn both of the ejector handles counterclockwise to unseat the IOC.
10. Grasp the handles and slide the IOC straight out of the card cage halfway.
11. Place one hand around the front of the IOC and the other hand under it to support it. Slide the IOC completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

CAUTION: The weight of the IOC is concentrated in the back end. Be prepared to accept the full weight—up to 13.1 lb (5.9 kg)—as you slide the IOC out of the chassis.

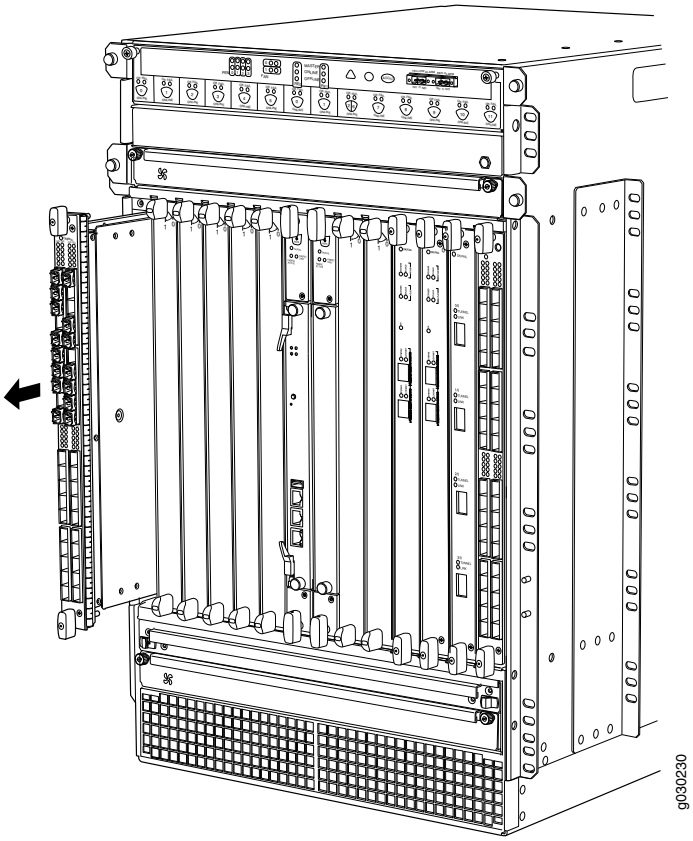
When the IOC is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

Do not stack IOC on top of one another after removal. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

12. If you are not reinstalling an IOC into the empy slot within a short time, install a blank IOC panel over the slot to maintain proper airflow in the card cage.

CAUTION: After removing an IOC from the chassis, wait at least 30 seconds before reinserting it, removing an IOC from a different slot, or inserting an IOC into a different slot.

Figure 130: Removing an IOC



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Installing an SRX5800 Services Gateway IOC on page 208

Installing an SRX5800 Services Gateway IOC

An IOC weighs up to 13.1 lb (5.9 kg). Be prepared to accept its full weight.

To install an IOC (see Figure 99 on page 210):

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Place the IOC on an antistatic mat or remove it from its electrostatic bag.
4. Identify the slot on the services gateway where it will be installed.
5. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it does not, cover the transceiver with a safety cap.
6. Orient the IOC so that the faceplate faces you.
7. Lift the IOC into place and carefully align the top and bottom edges of the IOC with the guides inside the card cage.
8. Slide the IOC all the way into the card cage until you feel resistance.
9. Grasp both ejector handles and rotate them clockwise simultaneously until the IOC is fully seated.
10. Remove the rubber safety cap from each fiber-optic transceiver and cable.

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

11. Insert the cables into the cable connector ports on each IOC (see Figure 100 on page 211).

12. Arrange the cable in the cable manager to prevent it from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on the loop helps to maintain its shape.

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

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

13. Power on the services gateway.

14. Use one of the following methods to bring the IOC online:

- Press and hold the corresponding IOC online button on the craft interface until the green **OK** LED next to the button lights steadily, in about 5 seconds.
- Issue the following CLI command:

  `user@host>` **request chassis fpc slot *slot-number* online**

  For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

CAUTION: After the **OK** LED turns green, wait at least 30 seconds before removing the IOC again, removing an IOC from a different slot, or inserting an IOC in a different slot.

  You can also verify that the IOC is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Figure 131: Installing an IOC

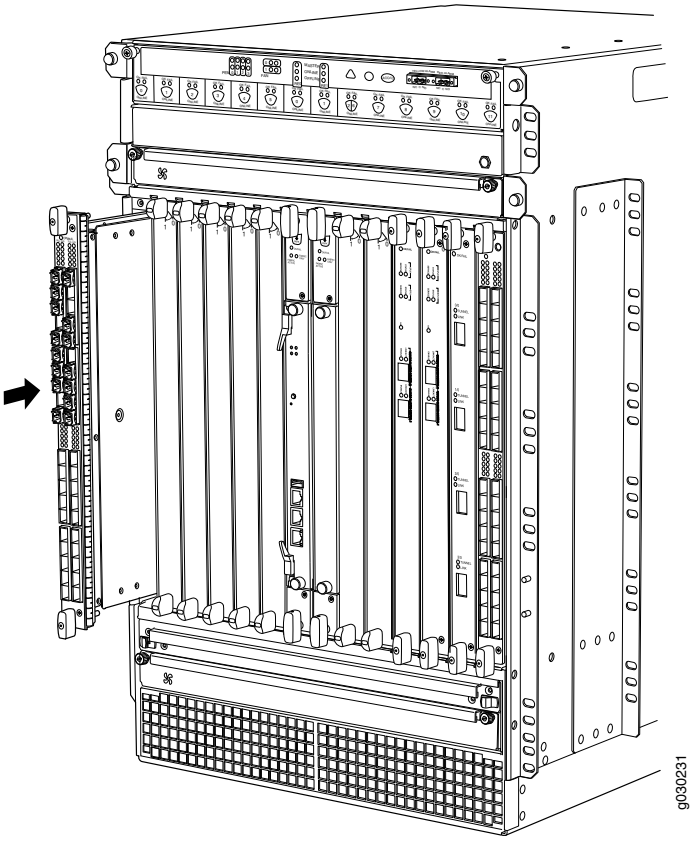
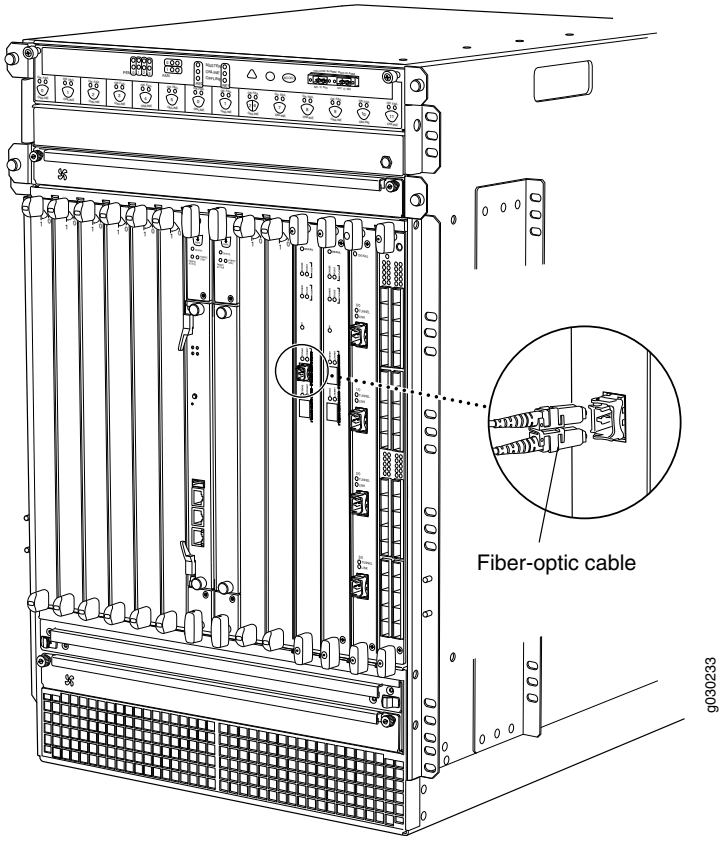


Figure 132: Attaching a Cable to an IOC



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway IOC on page 323
- Installing IOCs or Flex IOCs in an Operating SRX5800 Services Gateway Chassis Cluster on page 214

Related Documentation

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239
- Replacing SRX5800 Services Gateway Flex IOCs on page 329

Replacing SRX5800 Services Gateway Flex IOCs

To replace a Flex IOC, perform the following procedures:

1. Removing an SRX5800 Services Gateway Flex IOC on page 330
2. Installing an SRX5800 Services Gateway Flex IOC on page 332

Removing an SRX5800 Services Gateway Flex IOC

A Flex IOC weighs up to 13.1 lb (5.9 kg). Be prepared to accept the full weight of the card as you remove it.

To remove a Flex IOC (see Figure 133 on page 331):

1. Have ready a replacement card or blank panel and an antistatic mat for the Flex IOC.

2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

3. Use one of the following methods to take the Flex IOC offline:

   - Press and hold the corresponding online button on the craft interface. The green **OK** LED next to the button begins to blink. Hold the button down until the LED goes off.
   - Issue the following CLI command:

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

     For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

4. Power off the services gateway.

5. If you have not already done so, remove the port modules installed in the Flex IOC.

6. Simultaneously turn both of the ejector handles counterclockwise to unseat the Flex IOC.

7. Grasp the handles and slide the Flex IOC straight out of the card cage halfway.

8. Place one hand around the front of the Flex IOC and the other hand under it to support it. Slide the Flex IOC completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

CAUTION: The weight of the Flex IOC is concentrated in the back end. Be prepared to accept the full weight—up to 13 lb (5.9 kg)—as you slide the Flex IOC out of the chassis.

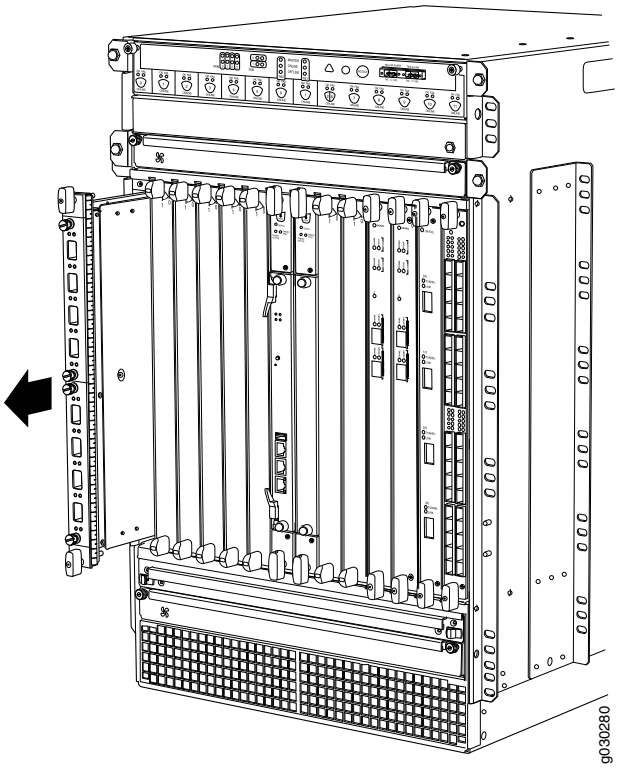
When the Flex IOC is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

Do not stack Flex IOCs on top of one another after removal. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

9. If you are not reinstalling a replacement card into the empty slot within a short time, install a blank panel over the slot to maintain proper airflow in the card cage.

CAUTION: After removing an IOC from the chassis, wait at least 30 seconds before reinserting it, removing an IOC from a different slot, or inserting an IOC into a different slot.

Figure 133: Removing a Flex IOC



See Also • *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*

- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Installing an SRX5800 Services Gateway Flex IOC on page 212
- Replacing SRX5800 Services Gateway Port Modules on page 334

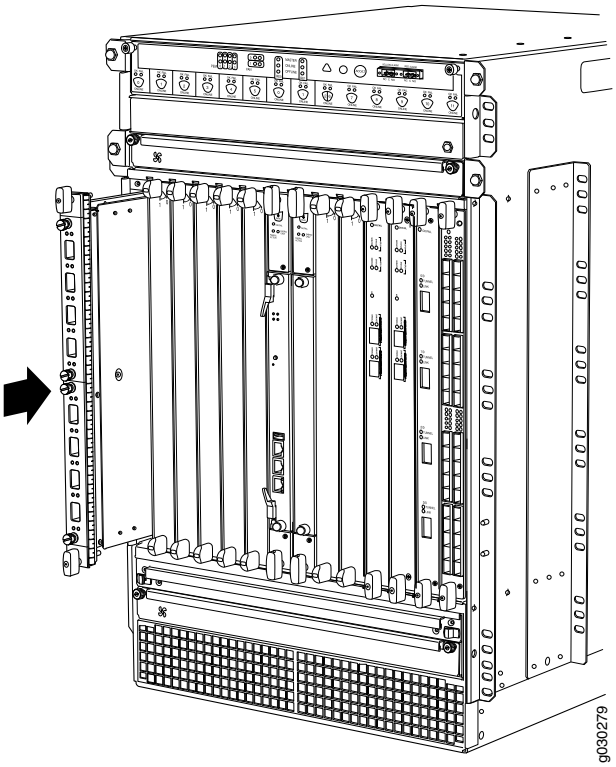
Installing an SRX5800 Services Gateway Flex IOC

NOTE: **Your services gateway must be running Junos version 9.5R1 or later in order to recognize Flex IOCs and port modules.**

To install a Flex IOC (see Figure 101 on page 213):

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Place the Flex IOC on an antistatic mat or remove it from its electrostatic bag.
4. Identify the slot on the services gateway where you will install the Flex IOC.
5. If you have not already done so, remove the blank panel from the slot where you are installing the Flex IOC.
6. Orient the Flex IOC so that the faceplate faces you, the text on the card is right-side up, and the EMI strip is on the right-hand side.
7. Lift the Flex IOC into place and carefully align first the bottom and then the top of the card with the guides inside the card cage.
8. Slide the Flex IOC all the way into the card cage until you feel resistance.

Figure 134: Installing a Flex IOC



9. Grasp both ejector handles and rotate them clockwise simultaneously until the Flex IOC is fully seated.

10. Power on the services gateway.

11. Use one of the following methods to bring the Flex IOC online:

    - Press and hold the corresponding online button on the craft interface until the green **OK** LED next to the button lights steadily, in about 5 seconds.
    - Issue the following CLI command:

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

      For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

CAUTION: After the OK LED turns green, wait at least 30 seconds before removing the card again, removing a card from a different slot, or inserting a card in a different slot.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway Flex IOC on page 330
- Replacing SRX5800 Services Gateway Port Modules on page 334
- Installing IOCs or Flex IOCs in an Operating SRX5800 Services Gateway Chassis Cluster on page 214

Related Documentation

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239
- Replacing SRX5800 Services Gateway IOCs on page 323

Replacing SRX5800 Services Gateway Port Modules

To replace a port module, perform the following procedures:

1. Removing an SRX5800 Services Gateway Port Module on page 334
2. Installing an SRX5800 Services Gateway Port Module on page 337

Removing an SRX5800 Services Gateway Port Module

Port modules are installed in Flex IOCs in the services gateway card cage. A port module weighs up to 1.6 lb (0.7 kg). Be prepared to accept its full weight when you remove or install a port module.

To remove a port module (see Figure 135 on page 336):

1. Have ready a replacement port module or blank panel and an antistatic mat for the port module. Also have ready rubber safety caps for each port on the port module you are removing that uses an optical interface.

2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

3. Label the cables connected to each port on the port module so that you can later reconnect the cables to the correct ports.

4. Use one of the following methods to take the port module offline:

   - Insert a pointed tool into the **ONLINE** pinhole on the front panel of the port module to press the button behind it. Hold the button down until the **OK/FAIL** LED goes off.
   - Issue the following CLI command:

     ```
     user@host>request chassis fpc-slot slot-number pic-slot slot-number offline
     ```

For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

5. Power off the services gateway.

6. Disconnect the cables from the port module. If the port module uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap. Arrange the disconnected cables in the cable management system to prevent the cables from developing stress points.

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

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

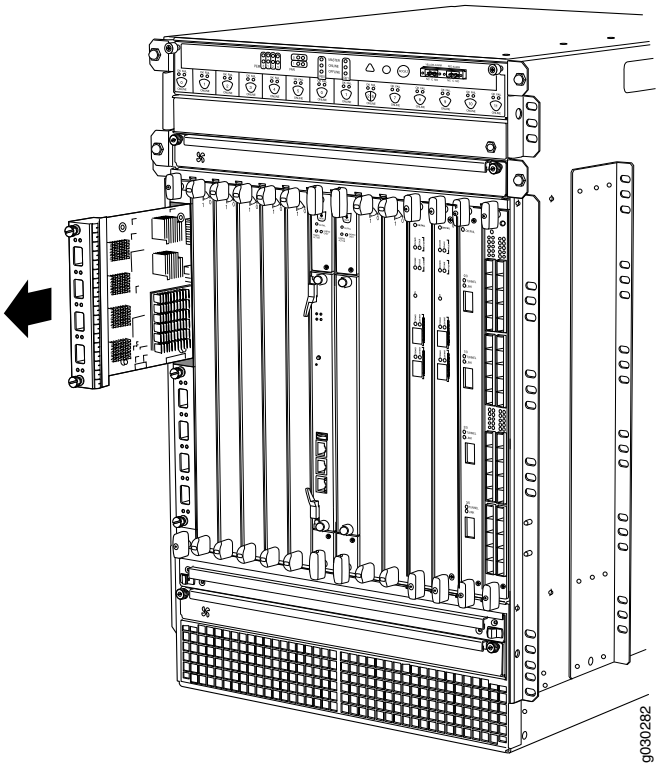
CAUTION: Avoid bending fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

7. Loosen the captive screws that retain the port module in its slot in the Flex IOC.

8. Grasp the captive screws and slide the port module straight out of the Flex IOC halfway.

9. Place one hand around the front of the port module and the other hand under it to support it. Slide the port module completely out of the Flex IOC, and place it on the antistatic mat or in the electrostatic bag.

Figure 135: Removing a Port Module



10. If you are not reinstalling a port module into the empty slot within a short time, install a blank panel over the slot to maintain proper airflow in the card cage.

CAUTION: After removing a port module from the chassis, wait at least 30 seconds before reinserting it, removing a port module from a different slot, or inserting a port module into a different slot.

See Also

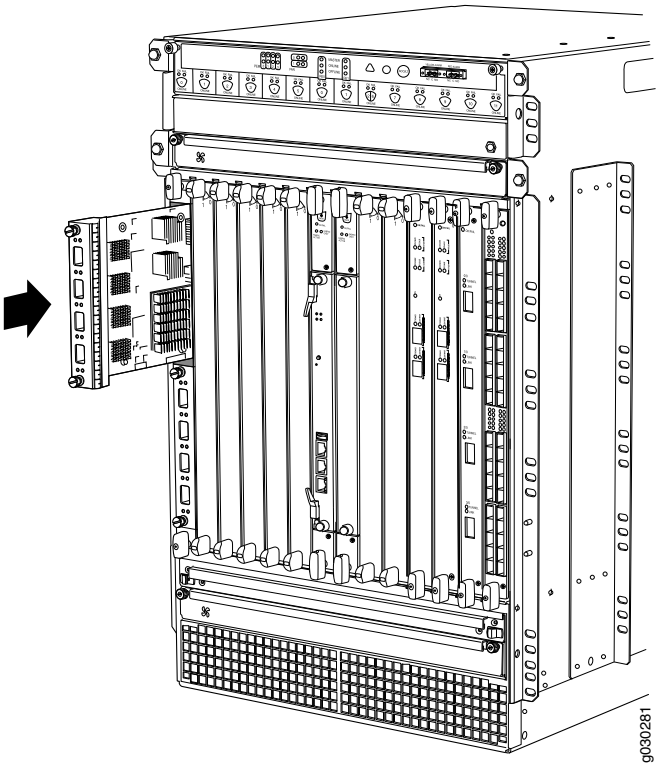
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Installing an SRX5800 Services Gateway Port Module on page 220

Installing an SRX5800 Services Gateway Port Module

To install a port module into a Flex IOC (see Figure 102 on page 221):

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. Power off the services gateway.
3. Place the port module on an antistatic mat or remove it from its electrostatic bag.
4. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it is not, cover the transceiver with a safety cap.
5. If necessary, remove the blank panel covering the slot in the Flex IOC where you are installing the port module.
6. Orient the port module so that the faceplate faces you.
7. Lift the port module into place and carefully align the top and bottom edges of the port module with the guides inside the Flex IOC.
8. Slide the port module all the way into the Flex IOC until it is fully seated.
9. Tighten both captive screws to secure the port module in the Flex IOC.

Figure 136: Installing a Port Module



10. If the port module uses fiber-optic interfaces, remove the rubber safety cap from each transceiver and cable.

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

11. Insert the appropriate cables into the cable connector ports on each port module. Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

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

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

12. Power on the services gateway.

13. Use one of the following methods to take the port module online:

    - Insert a pointed tool into the **ONLINE** pinhole on the front panel of the port module to press the button behind it. Hold the button down until the **OK/FAIL** LED at the opposite end of the front panel lights green steadily, in about 5 seconds.
    - Issue the following CLI command:

      ```
      user@host>request chassis fpc-slot slot-number pic-slot slot-number online
      ```

      For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

CAUTION: **After the OK/FAIL LED turns green, wait at least 30 seconds before removing the port module again, removing a port module from a different slot, or inserting a port module in a different slot.**

You can also verify that the port module is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway Port Module on page 334
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273

Related Documentation

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 239
- Maintaining MICs and Port Modules on the SRX5800 Services Gateway on page 273
- Troubleshooting SRX5800 Services Gateway MICs and Port Modules on page 290

Replacing SRX5800 Services Gateway SPCs

To replace an SPC, perform the following procedures:

1. Removing an SRX5800 Services Gateway SPC on page 340
2. Installing an SRX5800 Services Gateway SPC on page 342

Removing an SRX5800 Services Gateway SPC

An SPC weighs up to 18.3 lb (8.3 kg). Be prepared to accept its full weight.

To remove an SPC (see Figure 137 on page 341):

1. Have ready a replacement SPC or blank panel and an antistatic mat for the SPC. Also have ready rubber safety caps for each SPC you are removing that uses an optical interface.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Power off the services gateway.

4. Label the cables connected to each port on the SPC so that you can later reconnect the cables to the correct ports.

5. Disconnect the cables from the SPC. If the SPC uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap. Arrange the disconnected cables in the cable management system to prevent the cables from developing stress points.

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

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

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

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

6. Simultaneously turn both of the ejector handles counterclockwise to unseat the SPC.

7. Grasp the handles and slide the SPC straight out of the card cage halfway.

8. Place one hand around the front of the SPC and the other hand under it to support it. Slide the SPC completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

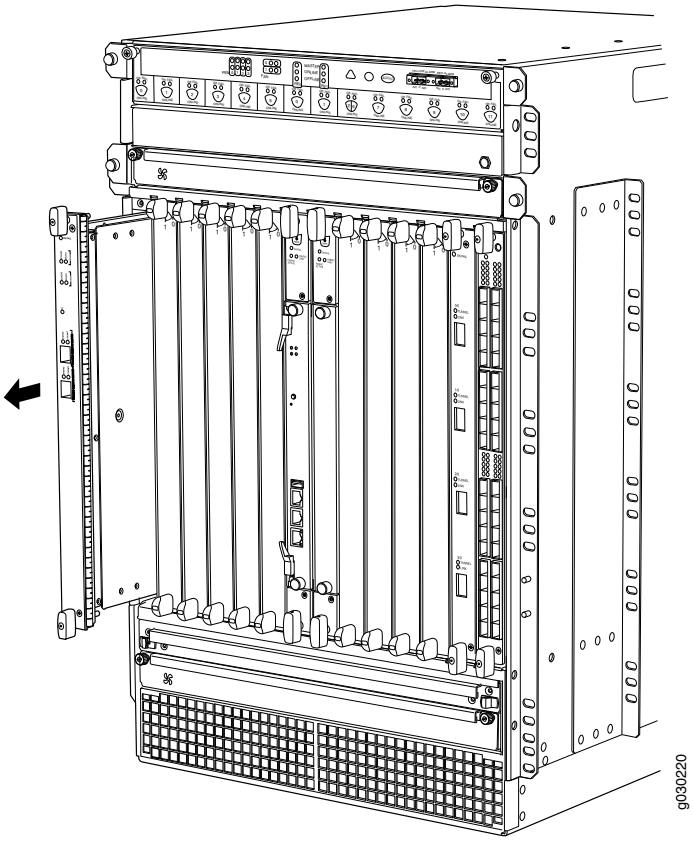
CAUTION: The weight of the SPC is concentrated in the back end. Be prepared to accept the full weight—up to 18.3 lb (8.3 kg)—as you slide the SPC out of the chassis.

When the SPC is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

Do not stack SPCs on top of one another after removal. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

9. If you are not reinstalling an SPC into the empty slot within a short time, install a blank panel over the slot to maintain proper airflow in the card cage.

Figure 137: Removing an SPC



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Powering Off the SRX5800 Services Gateway on page 253
- Holding an SRX5800 Services Gateway Card on page 199
- Storing an SRX5800 Services Gateway Card on page 201
- Installing an SRX5800 Services Gateway SPC on page 222
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271

Installing an SRX5800 Services Gateway SPC

To install an SPC (see Figure 103 on page 224):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. If you have not already done so, power off the services gateway.
3. Place the SPC on an antistatic mat or remove it from its electrostatic bag.
4. Identify the slot on the services gateway where it will be installed.
5. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it does not, cover the transceiver with a safety cap.
6. Orient the SPC so that the faceplate faces you, the text on the card is right-side up, and the EMI strip is on the right-hand side.
7. Lift the SPC into place and carefully align first the bottom and then the top of the card with the guides inside the card cage.
8. Slide the SPC all the way into the card cage until you feel resistance.
9. Grasp both ejector handles and rotate them clockwise simultaneously until the SPC is fully seated.
10. If the SPC uses fiber-optic cable, remove the rubber safety cap from each transceiver and cable.

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

11. Insert the appropriate cables into the cable connector ports on each SPC (see Figure 104 on page 225). Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

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

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

12. Power on the services gateway.

13. Verify that the SPC is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Figure 138: Installing an SPC

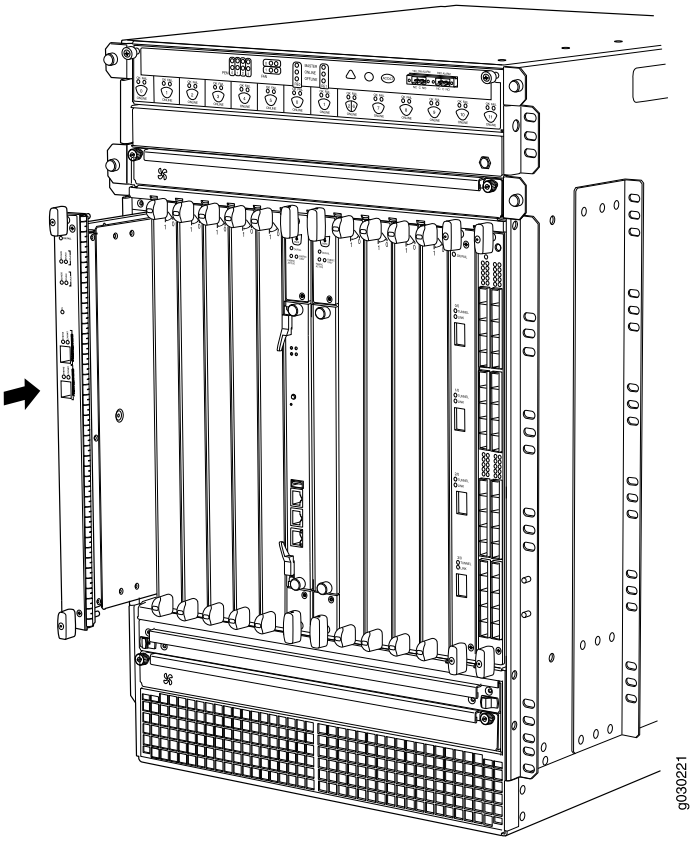
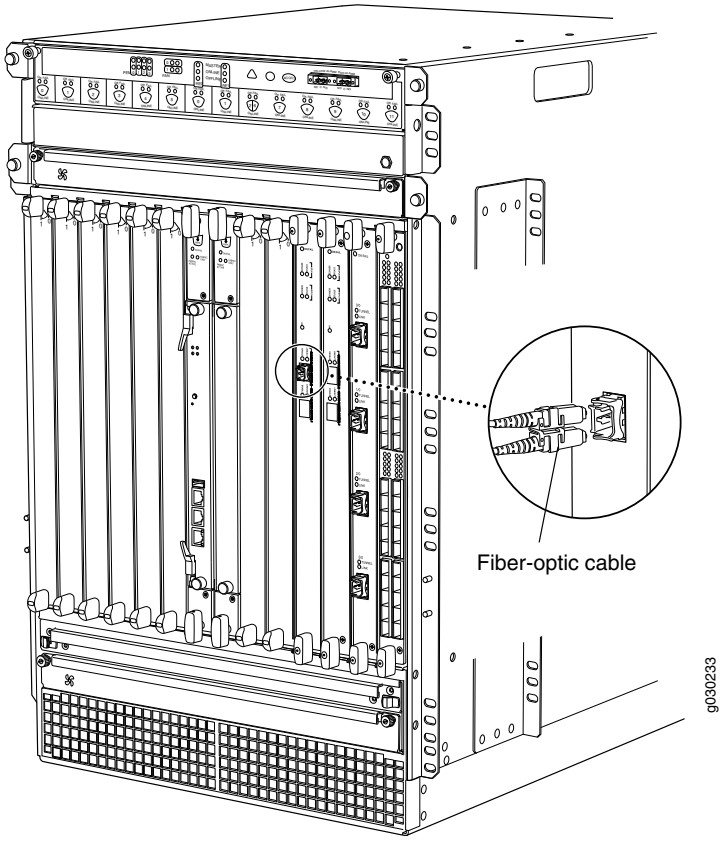


Figure 139: Attaching a Cable to an SPC



NOTE: To install additional SPCs in a services gateway that is part of a chassis cluster, it must meet the following conditions.

- Each services gateway must already have at least two SPCs installed in it.
- To add first-generation SRX5K-SPC-2-10-40 SPCs, both of the services gateways in the cluster must be running Junos OS Release 11.4R2S1, 12.1R2, or later.
- To add next-generation SRX5K-SPC-4-15-320 SPCs, both of the services gateways in the cluster must be running Junos OS Release 12.1X44-D10, or later.
- You must install SPCs of the same type and in the same slots in both of the services gateways in the cluster. Both services gateways in the cluster must end up with the same physical configuration of SPCs.
- If you are only adding first-generation SRX5K-SPC-2-10-40 SPCs to the chassis, you must install them so that the new SPCs are not the SPCs with the lowest-numbered slots in the chassis. For example, if the chassis already has two SPCs with one SPC each in slots 2 and 3, you cannot install additional SPCs in slots 0 or 1 using this procedure.
- If you are adding next-generation SRX5K-SPC-4-15-320 SPCs to the chassis, you must install the new SPCs so that a next-generation SRX5K-SPC-4-15-320 SPC is the SPC in the original lowest-numbered slot. For example, if the chassis already has two first-generation SPCs installed in slots 2 and 3, you cannot install SRX5K-SPC-4-15-320 SPCs in slots 0 or 1. You will need to make sure that an SRX5K-SPC-4-15-320 SPC is installed in the slot providing center point (CP) functionality (in this case, slot 2). This ensures that the CP functionality is performed by an SRX5K-SPC-4-15-320 SPC.
- If you are adding next-generation SRX5K-SPC-4-15-320 SPCs to the services gateways, both services gateways must already be equipped with high-capacity power supplies and fan trays, and the high-capacity air filter. See "Upgrading an SRX5800 Services Gateway from Standard-Capacity to High-Capacity Power Supplies" on page 401 for more information.

During this installation procedure, you must shut down both devices, one at a time.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- *Replacing SPCs in an Operating SRX5600 Services Gateway Chassis Cluster*
- Powering Off the SRX5800 Services Gateway on page 253
- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251
- Holding an SRX5800 Services Gateway Card on page 199

- Storing an SRX5800 Services Gateway Card on page 201
- Removing an SRX5800 Services Gateway SPC on page 340
- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271

Related Documentation

- Maintaining Interface Cards and SPCs on the SRX5800 Services Gateway on page 271
- Troubleshooting SRX5800 Services Gateway SPCs on page 291
- Replacing SPCs in an Operating SRX5800 Services Gateway Chassis Cluster on page 356

Replacing SRX5800 Services Gateway MICs

To replace an MIC, perform the following procedures:

1. Removing an SRX5800 Services Gateway MIC on page 346
2. Installing an SRX5800 Services Gateway MIC on page 349

Removing an SRX5800 Services Gateway MIC

The MICs are located in the MPCs installed in the front of the services gateway. A MIC weighs less than 2 lb (0.9 kg).

To remove a MIC:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface to receive the MIC. If the MIC connects to fiber-optic cable, have ready a rubber safety cap for each transceiver and cable.
2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
3. Power off the services gateway.
4. Label the cables connected to the MIC so that you can later reconnect each cable to the correct MIC.
5. Disconnect the cables from the MIC. If the MIC uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap.

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

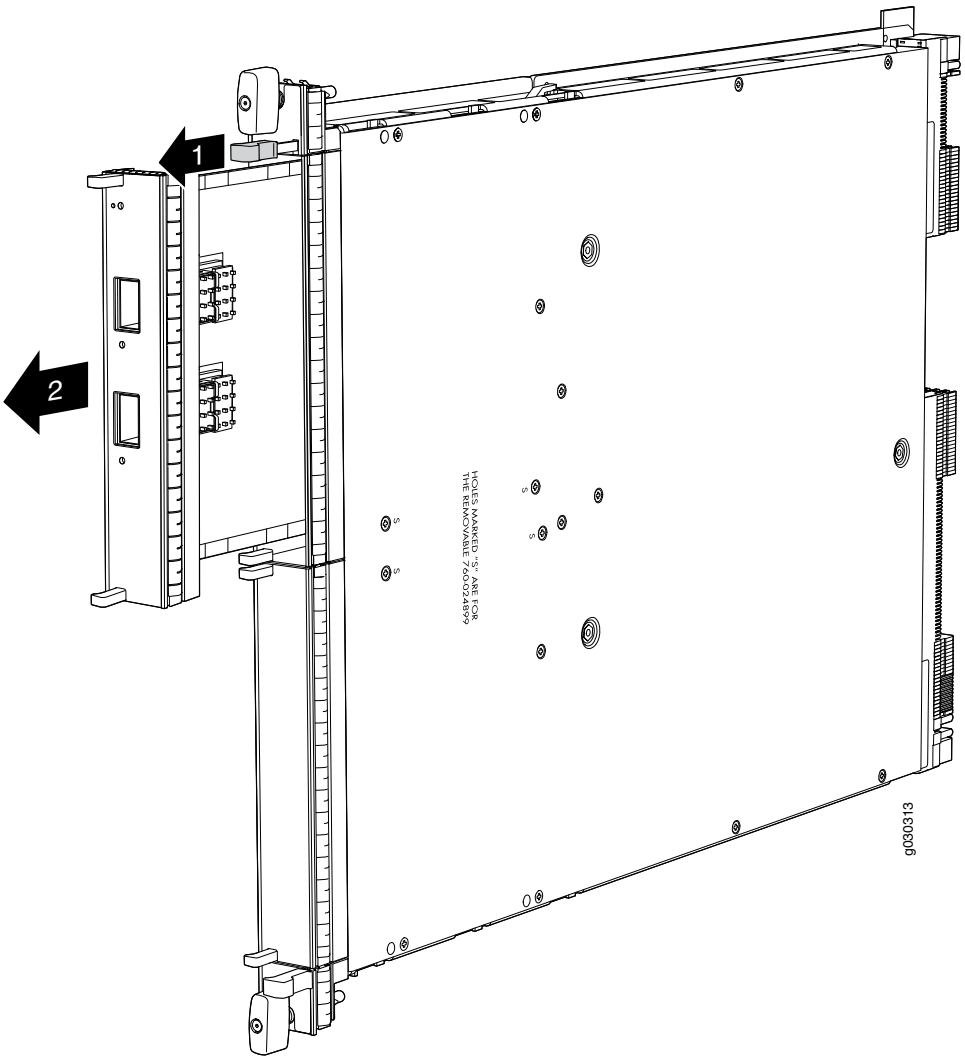
CAUTION: Do not leave a fiber-optic transceiver uncovered except when you are inserting or removing cable. The safety cap keeps the port clean and prevents accidental exposure to laser light.

6. Arrange the cable to prevent it from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop.

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

7. On the MPC, pull the ejector knob that is adjacent to the MIC you are removing away from the MPC faceplate. The ejector knob is located between the MIC and the rotational knob that retains the MPC in the services gateway card cage. Pulling the ejector knob unseats the MIC from the MPC and partially ejects it. See Figure 140 on page 348.

Figure 140: Removing a MIC



8. Grasp the handles on the MIC faceplate, and slide the MIC out of the MPC card carrier. Place it in the electrostatic bag or on the antistatic mat.

9. If you are not reinstalling a MIC into the emptied MIC slot within a short time, install a blank MIC panel over the slot to maintain proper airflow in the MPC card cage.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Replacing SRX5800 Services Gateway MPCs on page 352
- Installing an SRX5800 Services Gateway MIC on page 349
- Troubleshooting SRX5800 Services Gateway Interface Cards on page 289

Installing an SRX5800 Services Gateway MIC

NOTE: If your services gateway is part of a chassis cluster, you may be able to install MICs in the services gateways in the cluster without incurring downtime on your network. See "Installing MPCs and MICs in an Operating SRX5800 Services Gateway Chassis Cluster" on page 217 for more information.

To install a MIC:

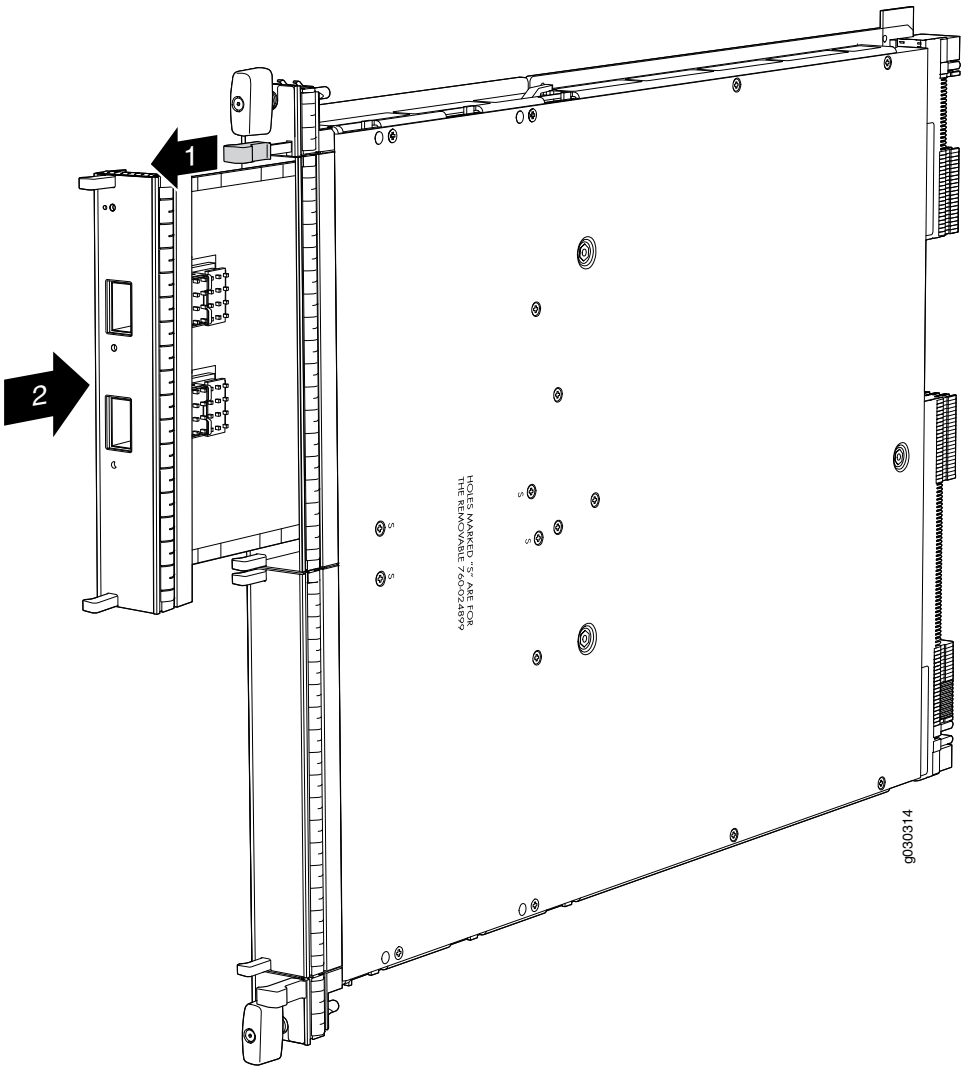
1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

2. If you have not already done so, power off the services gateway.

3. If the MIC uses fiber-optic cable, verify that a rubber safety cap is over each transceiver on the faceplate. Install a cap if necessary.

4. On the MPC, pull the ejector knob that is adjacent to the MIC you are installing away from the MPC faceplate. The ejector knob is located between the MIC and the rotational knob that retains the MPC in the services gateway card cage. See Figure 141 on page 350.

Figure 141: Installing a MIC



5. Align the rear of the MIC with the guides located at the corners of the MIC slot.

6. Slide the MIC into the MPC until it is firmly seated in the MPC. The ejector knob will automatically move in towards the faceplate to lock the MIC in position as it seats.

   If the MIC does not seat properly in the slot, pull the ejector knob all the way out and try again to seat the MIC. The MIC will not seat properly unless the ejector knob is all the way when you start to insert the MIC.

   CAUTION: Slide the MIC straight into the slot to avoid damaging the components on the MIC.

7. After the MIC is seated in its slot, verify that the ejector knob is engaged by pushing it all the way in toward the MPC faceplate.

8. If the MIC uses fiber-optic cable, remove the rubber safety cap from each transceiver and the end of each cable.

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

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

9. Insert the appropriate cables into the cable connectors on the MIC.

10. Arrange each cable to prevent the cable from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop.

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

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

11. Power on the services gateway. The OK LED on the power supply faceplate should blink, then light steadily.

12. Verify that the MPC and MICs are functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Related Documentation

- Replacing SRX5800 Services Gateway MPCs on page 352
- Installing MPCs and MICs in an Operating SRX5800 Services Gateway Chassis Cluster on page 217
- Troubleshooting SRX5800 Services Gateway Interface Cards on page 289

Replacing SRX5800 Services Gateway MPCs

To replace an MPC, perform the following procedures:

1. Removing an SRX5800 Services Gateway MPC on page 352
2. Installing an SRX5800 Services Gateway MPC on page 354

Removing an SRX5800 Services Gateway MPC

An MPC installs vertically in the front of the services gateway. A fully configured MPC can weigh up to 18.35 lb (8.3 kg). Be prepared to accept its full weight.

To remove an MPC:

1. Have ready a replacement MPC or DPC blank panel and an antistatic mat for the MPC. Also have ready rubber safety caps for each MIC using an optical interface on the MPC that you are removing.

2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

3. Power off the services gateway.

4. Label the cables connected to each MIC on the MPC so that you can later reconnect the cables to the correct MICs.

5. Disconnect the cables from the MICs installed in the MPC.

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

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

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

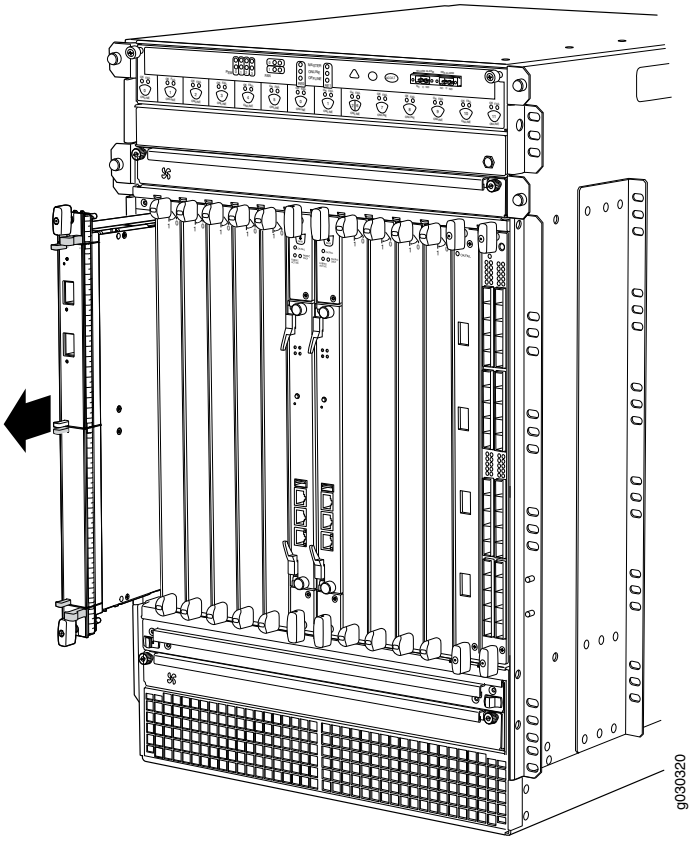
6. If a MIC uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap.

7. Arrange the disconnected cables in the cable management brackets to prevent the cables from developing stress points.

8. Simultaneously turn both the ejector handles counterclockwise to unseat the MPC.

9. Grasp the handles, and slide the MPC straight out of the card cage halfway. See Figure 142 on page 353.

Figure 142: Removing an MPC



10. Place one hand around the front of the MPC (the MIC housing) and the other hand under it to support it. Slide the MPC completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

CAUTION: The weight of the MPC is concentrated in the back end. Be prepared to accept the full weight—up to 18.35 lb (8.3 kg)—as you slide the MPC out of the chassis.

When the MPC is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

Do not stack MPCs on top of one another after removal. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

11. If necessary, remove each installed MIC from the MPC.
12. After you remove each MIC, immediately place it on an antistatic mat or in an electrostatic bag.
13. If you are not reinstalling an MPC into the emptied line card slots within a short time, install a blank DPC panel over each slot to maintain proper airflow in the card cage.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Installing an SRX5800 Services Gateway MPC on page 354
- Replacing SRX5800 Services Gateway MICs on page 346
- Troubleshooting SRX5800 Services Gateway Interface Cards on page 289

Installing an SRX5800 Services Gateway MPC

An MPC installs vertically in the front of the services gateway. A fully configured MPC can weigh up to 18.35 lb (8.3 kg). Be prepared to accept its full weight.

NOTE: If your services gateway is part of a chassis cluster, you may be able to install MPCs in the services gateways in the cluster without incurring downtime on your network. See "Installing MPCs and MICs in an Operating SRX5800 Services Gateway Chassis Cluster" on page 217 for more information.

To install an MPC:

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
2. If you have not already done so, power off the services gateway.
3. Place the MPC on an antistatic mat.
4. Take each MIC to be installed in the replacement MPC out of its electrostatic bag, and identify the slot on the MPC where it will be connected.
5. Verify that each fiber-optic MIC has a rubber safety cap covering the MIC transceiver. If it does not, cover the transceiver with a safety cap.

6. Install each MIC into the appropriate slot on the MPC.

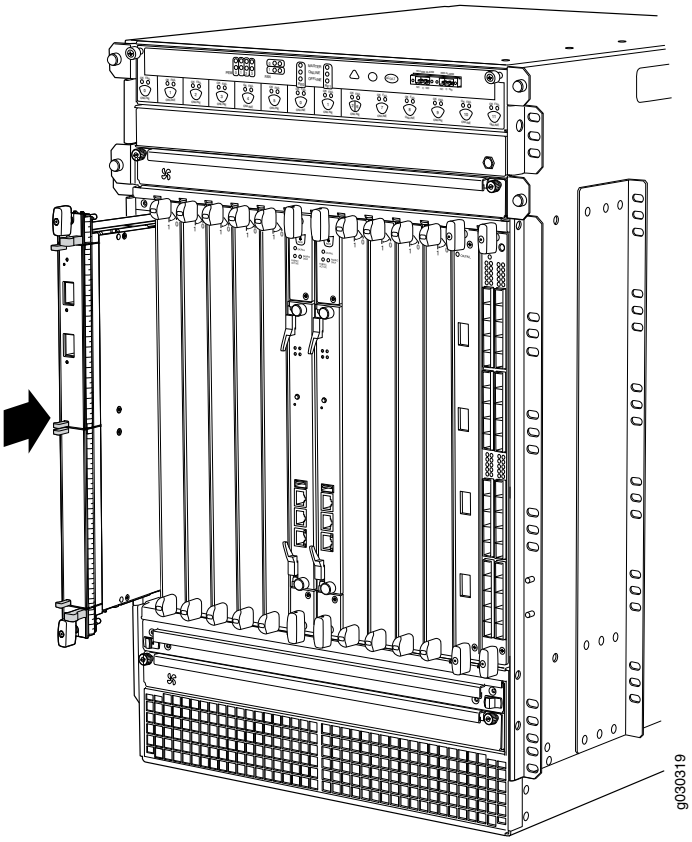
7. Locate the slot in the card cage in which you plan to install the MPC.

8. Orient the MPC so that the faceplate faces you.

9. Lift the MPC into place, and carefully align the sides of the MPC with the guides inside the card cage. See Figure 143 on page 355.

CAUTION: When the MPC is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

Figure 143: Installing an MPC



10. Slide the MPC all the way into the card cage until you feel resistance.

11. Grasp both ejector handles, and rotate them clockwise simultaneously until the MPC is fully seated.

12. If any of the MICs on the MPC connect to fiber-optic cable, remove the rubber safety cap from each transceiver and cable.

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

13. Insert the appropriate cable into the cable connector ports on each MIC on the MPC. Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

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

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

14. Power on the services gateway. The OK LED on the power supply faceplate should blink, then light steadily.

15. Verify that the MPC is functioning correctly by issuing the **show chassis fpc** and **show chassis fpc pic-status** commands.

Related Documentation

- Replacing SRX5800 Services Gateway MICs on page 346
- Installing MPCs and MICs in an Operating SRX5800 Services Gateway Chassis Cluster on page 217
- Troubleshooting SRX5800 Services Gateway Interface Cards on page 289

Replacing SPCs in an Operating SRX5800 Services Gateway Chassis Cluster

If your SRX5800 Services Gateway is part of an operating chassis cluster, you can replace SPCs by incurring a minimum downtime on your network. You can also replace first-generation SPCs with next-generation SRX5K-SPC-4-15-320 SPCs.

To replace SPCs in a services gateway that is part of a chassis cluster, it must meet the following conditions:

- Each services gateway must have at least one SPC installed. The installation may warrant additional SPCs if the number of sessions encountered is greater than the session limit of one SPC.
- If the chassis cluster is operating in active-active mode, you must transition it to active-passive mode before using this procedure. You transition the cluster to active-passive mode by making one node primary for all redundancy groups.
- To replace first-generation SRX5K-SPC-2-10-40 SPCs, both of the services gateways in the cluster must be running Junos OS Release 11.4R2S1, 12.1R2, or later.
- To repalce next-generation SRX5K-SPC-4-15-320 SPCs, both of the services gateways in the cluster must be running Junos OS Release 12.1X44-D10, or later.
- You must install SPCs of the same type and in the same slots in both of the services gateways in the cluster. Both services gateways in the cluster must end up with the same physical configuration of SPCs.
- If you are replacing an existing first-generation SRX5K-SPC-2-10-40 SPC with a next-generation SRX5K-SPC-4-15-320 SPC, you must install the new SPC so that the next-generation SRX5K-SPC-4-15-320 SPC is the SPC with the lowest-numbered slot. For example, if the chassis has SPCs installed in slots 2 and 3, then you must replace the SPC in slot 2 first. This ensures that the center point (CP) functionality is performed by an SRX5K-SPC-4-15-320 SPC.
- If you are replacing next-generation SRX5K-SPC-4-15-320 SPCs to the chassis, you must install the new SPCs so that a next-generation SRX5K-SPC-4-15-320 SPC is the SPC in the original lowest-numbered slot. For example, if the chassis already has two first-generation SPCs installed in slots 2 and 3, you cannot install SRX5K-SPC-4-15-320 SPCs in slots 0 or 1. You will need to make sure that an SRX5K-SPC-4-15-320 SPC is installed in the slot providing center point (CP) functionality (in this case, slot 2). This ensures that the CP functionality is performed by an SRX5K-SPC-4-15-320 SPC.
- If you are replacing next-generation SRX5K-SPC-4-15-320 SPCs in the services gateways, both services gateways must already be equipped with high-capacity power supplies and fan trays. See "Upgrading an SRX5800 Services Gateway from Standard-Capacity to High-Capacity Power Supplies" on page 401 for more information.

If your installation does not meet these criteria, use the procedure in "Installing an SRX5800 Services Gateway SPC" on page 222 to install SPCs in your services gatewa

NOTE: During this installation procedure, you must shut down both devices, one at a time. During the period when one device is shut down, the remaining device operates without a backup. If that remaining device fails for any reason, you incur network downtime until you restart at least one of the devices.

To replace SPCs in an SRX5800 Services Gateway cluster without incurring downtime:

1. Use the console port on the Routing Engine to establish a CLI session with one of the devices in the cluster.

2. Use the **show chassis cluster status** command to determine which services gateway is currently primary, and which services gateway is secondary, within the cluster.

   In the example below, all redundancy groups are primary on node 0, and secondary on node 1:

```
{primary:node0}
admin@admin> show chassis cluster status
Monitor Failure codes:
    CS  Cold Sync monitoring FL Fabric Connection monitoring
    GR  GRES monitoring  HW Hardware monitoring
    IF  Interface monitoring PIP monitoring
    LB  Loopback monitoring MB  Mbuf monitoring
    NH  Nexthop monitoring NP  NPC monitoring
    SP  SPU monitoring  SM Schedule monitoring
    CF  Config Sync monitoring

Cluster ID: 1
Node   Priority Status  Preempt Manual Monitor-failures

Redundancy group: 0 , Failover count: 1
node0  250      primary  no no None
node1  100      secondary no no None

Redundancy group: 1 , Failover count: 1
node0  254      primary  no no None
node1  150      secondary no no None
```

3. Use the **show chassis fpc pic-status** command to check the status of all the cards on both the nodes.

   The example below shows the status of all the cards.

```
{secondary:node1}
admin@admin> show chassis fpc pic-status
node0:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
Slot 3   Online       SRX5k SPC
  PIC 0  Online       SPU Cp-Flow
  PIC 1  Online       SPU Flow
Slot 5   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ

node1:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
Slot 3   Online       SRX5k SPC
  PIC 0  Online       SPU Cp-Flow
```

```
  PIC 1  Online       SPU Flow
Slot 5   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ
```

4. If the device with which you established the CLI session in Step 2 is not the secondary node in the cluster, use the console port on the device that is the secondary node to establish a CLI session.

5. In the CLI session for the secondary services gateway, use the **request system power off** command to shut down the services gateway.

6. Wait for the secondary services gateway to completely shut down.

7. If you are replacing first-generation SPCs with SRX5K-SPC-4-15-320 SPCs, use the procedure in "Removing an SRX5800 Services Gateway SPC" on page 340 to remove the SPCs you are replacing from the powered-off services gateway.

8. Install the new SPC or SPCs in the powered-off services gateway using the procedure in "Installing an SRX5800 Services Gateway SPC" on page 222.

9. Power on the secondary services gateway and wait for it to finish starting.

10. Reestablish the CLI session with the secondary node device.

11. Use the **show chassis fpc pic-status** command to make sure that all of the cards in the secondary node chassis are back online.

    The example below shows the status of all the cards.

```
{secondary:node1}
admin@admin> show chassis fpc pic-status
node0:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
Slot 3   Online       SRX5k SPC
  PIC 0  Online       SPU Cp-Flow
  PIC 1  Online       SPU Flow
Slot 5   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ

node1:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
Slot 3   Online       SRX5k SPC II
```

```
    PIC 0  Online       SPU Cp
    PIC 1  Online       SPU Flow
    PIC 2  Online       SPU Flow
    PIC 3  Online       SPU Flow
  Slot 5   Online       SRX5k DPC 40x 1GE
    PIC 0  Online       10x 1GE RichQ
    PIC 1  Online       10x 1GE RichQ
    PIC 2  Online       10x 1GE RichQ
    PIC 3  Online       10x 1GE RichQ
```

12. Use the **show chassis cluster status** command to make sure that the priority for all redundancy groups is greater than zero.

13. Use the console port on the device that is the primary node to establish a CLI session.

14. In the CLI session for the primary node device, use the **request chassis cluster failover** command to fail over each redundancy group that has an ID number greater than zero.

    For example:

    ```
    admin@cluster> request chassis cluster failover redundancy-group 1 node 1

    admin@cluster> request chassis cluster failover redundancy-group 2 node 1

    admin@cluster> request chassis cluster failover redundancy-group 3 node 1

    admin@cluster> request chassis cluster failover redundancy-group 4 node 1
    ```

15. In the CLI session for the primary node device, use the **request system power off** command to shut down the services gateway. This action causes redundancy group 0 to fail over onto the other services gateway, making it the active node in the cluster.

16. Repeat Step 7 and Step 8 to replace or install SPCs in the powered-off services gateway.

17. Power on the services gateway and wait for it to finish starting.

18. Use the **show chassis fpc pic-status** command on the primary node to confirm that all cards are online and both services gateways are operating correctly.

    The example below shows the status of all the cards.

    ```
    {primary:node0}
    admin@admin> show chassis fpc pic-status
    node0:
    --------------------------------------------------------------------------
    Slot 2   Online       SRX5k FIOC
      PIC 0  Online       16x 1GE TX
    Slot 3   Online       SRX5k SPC II
    ```

```
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ

node1:
--------------------------------------------------------------------------
Slot 2   Online       SRX5k FIOC
  PIC 0  Online       16x 1GE TX
Slot 3   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k DPC 40x 1GE
  PIC 0  Online       10x 1GE RichQ
  PIC 1  Online       10x 1GE RichQ
  PIC 2  Online       10x 1GE RichQ
  PIC 3  Online       10x 1GE RichQ
```

19. Use the **show chassis cluster status** command to make sure that the priority for all redundancy groups is greater than zero.

Related Documentation

- Installing an SRX5800 Services Gateway SPC on page 222
- Removing an SRX5800 Services Gateway SPC on page 340

CHAPTER 28

Replacing Host Subsystem Components

Taking the SRX5800 Services Gateway Host Subsystem Offline

The host subsystem is composed of an SCB with a Routing Engine installed in it. You take the host subsystem offline and bring it online as a unit. Before you replace an SCB or a Routing Engine, you must take the host subsystem offline. Taking the host subsystem offline causes the device to shut down.

To take the host subsystem offline:

1. On the console or other management device connected to the Routing Engine that is paired with the SCB you are removing, enter CLI operational mode and issue the following command. The command shuts down the Routing Engine cleanly, so its state information is preserved:

   ```
   user@host> request system halt
   ```

2. Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

   NOTE: The SCB might continue forwarding traffic for approximately 5 minutes after the **request system halt** command has been issued.

Related Documentation

- Operating and Positioning the SRX5800 Services Gateway SCB Ejectors on page 202
- Removing an SRX5800 Services Gateway SCB on page 365
- Installing an SRX5800 Services Gateway SCB on page 202
- Replacing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Operating and Positioning the SRX5800 Services Gateway SCB Ejectors

- When removing or inserting an SCB, ensure that the SCBs or blank panels in adjacent slots are fully inserted to avoid hitting them with the ejector handles. The ejector handles require that all adjacent components be completely inserted so the ejector handles do not hit them, which could result in damage.
- The ejector handles have a center of rotation and need to be stored toward the center of the board. Ensure the long ends of the ejectors located at both the top and the bottom of the board are vertical and pressed as far as possible toward the center of the board. Once you have installed an SCB, place the ejector handles in their proper position, vertically and toward the center of the board. To avoid blocking the visibility of the LEDs,position the ejectors over the PARK icon.
- To insert or remove the SCB card, slide the ejector across the SCB horizontally, rotate it, and slide it again another quarter of a turn. Turn the ejector again and repeat as necessary. Use the indexing feature to maximize leverage and to avoid hitting any adjacent components.
- Operate both ejector handles simultaneously. The insertion force on an SCB is too great for one ejector.

Related Documentation

- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Replacing an SRX5800 Services Gateway SCB on page 364
- Replacing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Replacing an SRX5800 Services Gateway SCB

Before replacing an SCB, read the guidelines in "Operating and Positioning the SRX5800 Services Gateway SCB Ejectors" on page 202. To replace an SCB, perform the following procedures:

NOTE: The procedure to replace an SCB applies to the SRX5K-SCB, SRX5K-SCBE, and SRX5K-SCB3.

1. Removing an SRX5800 Services Gateway SCB on page 365
2. Installing an SRX5800 Services Gateway SCB on page 366

Removing an SRX5800 Services Gateway SCB

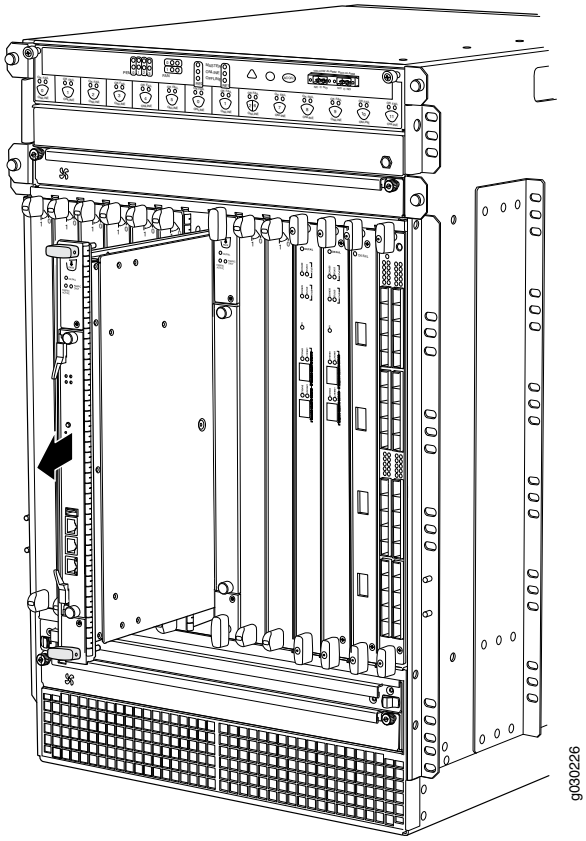
To remove an SCB (see Figure 144 on page 366):

NOTE: The SCB and Routing Engine are removed as a unit. You can also remove the Routing Engine separately.

CAUTION: Before removing an SCB, ensure that you know how to operate the ejector handles properly to avoid damage to the equipment.

1. Power off the services gateway.
2. Place an electrostatic bag or antistatic mat on a flat, stable surface.
3. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
4. Rotate the ejector handles simultaneously counterclockwise to unseat the SCB.
5. Grasp the ejector handles and slide the SCB about halfway out of the chassis.
6. Place one hand underneath the SCB to support it and slide it completely out of the chassis.
7. Place the SCB on the antistatic mat.
8. If you are not replacing the SCB now, install a blank panel over the empty slot.

Figure 144: Removing an SCB



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Powering Off the SRX5800 Services Gateway on page 253
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Operating and Positioning the SRX5800 Services Gateway SCB Ejectors on page 202
- Installing an SRX5800 Services Gateway SCB on page 202
- Replacing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Installing an SRX5800 Services Gateway SCB

To install an SCB (see Figure 97 on page 204):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Power off the services gateway.

3. Carefully align the sides of the SCB with the guides inside the chassis.

4. Slide the SCB into the chassis until you feel resistance, carefully ensuring that it is correctly aligned.

5. Grasp both ejector handles and rotate them simultaneously clockwise until the SCB is fully seated.

6. Place the ejector handles in the proper position, vertically and toward the center of the board.

7. Power on the services gateway.

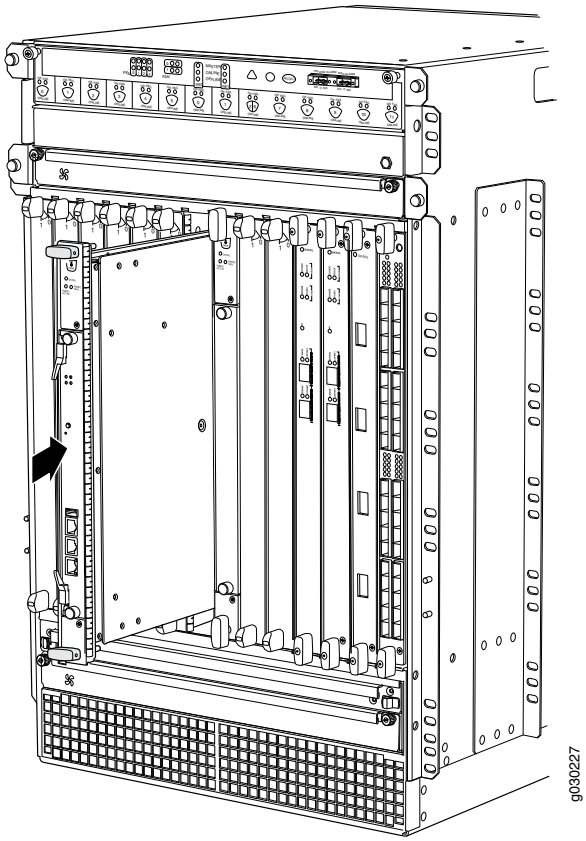
8. To verify that the SCB is functioning normally, check the LEDs on its faceplate. The green **OK/FAIL** LED should light steadily a few minutes after the SCB is installed. If the **OK/FAIL** LED is red, remove and install the SCB again. If the **OK/FAIL** LED still lights steadily, the SCB is not functioning properly. Contact your customer support representative.

   To check the status of the SCB:

```
user@host> show chassis environment cb
CB 0 status:
  State                      Online Master
  Temperature                30 degrees C / 86 degrees F
  Power 1
    1.2 V                     1202 mV
    1.5 V                     1511 mV
    1.8 V                     1798 mV
    2.5 V                     2481 mV
    3.3 V                     3306 mV
    5.0 V                     4956 mV
    12.0 V                   12084 mV
    1.25 V                    1250 mV
    3.3 V SM3                 3287 mV
    5.0 V RE                  5046 mV
    12.0 V RE                11910 mV
  Power 2
    11.3 V bias PEM          11292 mV
    4.6 V bias MidPlane       4833 mV
    11.3 V bias FPD          11156 mV
    11.3 V bias POE 0        11253 mV
    11.3 V bias POE 1        11272 mV
  Bus Revision               42
  FPGA Revision              1
CB 1 status:
  State                      Online
  Temperature                31 degrees C / 87 degrees F
  Power 1
    1.2 V                     1205 mV
    1.5 V                     1508 mV
    1.8 V                     1817 mV
    2.5 V                     2507 mV
    3.3 V                     3306 mV
```

```
  5.0 V                    5053 mV
  12.0 V                  12200 mV
  1.25 V                   1256 mV
  3.3 V SM3                3306 mV
  5.0 V RE                 5091 mV
  12.0 V RE                   0 mV
Power 2
  11.3 V bias PEM         11214 mV
  4.6 V bias MidPlane      4821 mV
  11.3 V bias FPD         11350 mV
  11.3 V bias POE 0       11350 mV
  11.3 V bias POE 1       11330 mV
Bus Revision              42
FPGA Revision             0
```

Figure 145: Installing an SCB



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Powering Off the SRX5800 Services Gateway on page 253
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Operating and Positioning the SRX5800 Services Gateway SCB Ejectors on page 202
- Removing an SRX5800 Services Gateway SCB on page 365
- Replacing the SRX5800 Services Gateway Routing Engine on page 369

- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311

Related Documentation

- Switch Control Board SRX5K-SCB Overview on page 11
- Operating and Positioning the SRX5800 Services Gateway SCB Ejectors on page 202
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 269

Replacing the SRX5800 Services Gateway Routing Engine

To replace the Routing Engine, perform the following procedures:

NOTE: **The procedure to replace a Routing Engine applies to both SRX5K-RE-13-20 and SRX5K-RE-1800X4.**

1. Removing the SRX5800 Services Gateway Routing Engine on page 369
2. Installing the SRX5800 Services Gateway Routing Engine on page 371

Removing the SRX5800 Services Gateway Routing Engine

CAUTION: **Before you replace a Routing Engine, you must take the host subsystem offline.**

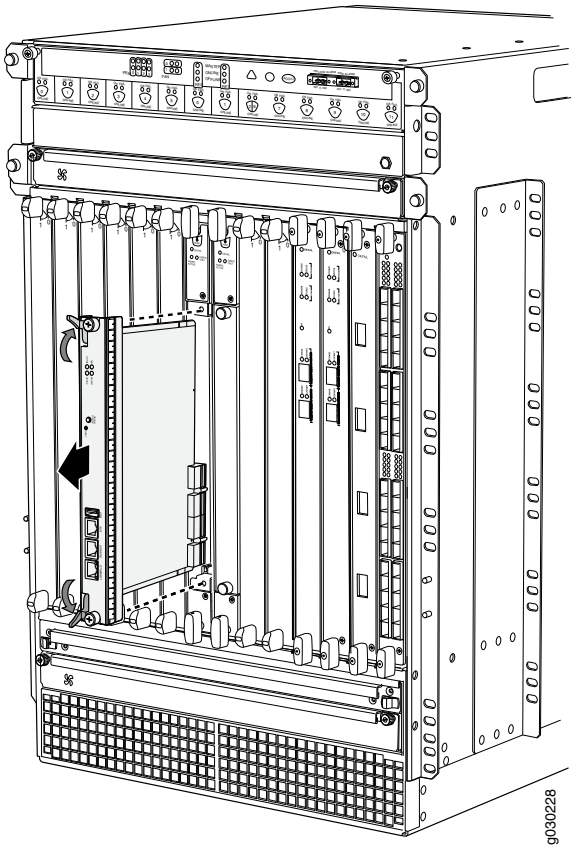
To remove the Routing Engine (see Figure 146 on page 370):

1. Take the host subsystem offline as described in "Taking the SRX5800 Services Gateway Host Subsystem Offline" on page 363.
2. Place an electrostatic bag or antistatic mat on a flat, stable surface.
3. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
4. Loosen the captive screws at each end of the Routing Engine faceplate.
5. Flip the ejector handles outward to unseat the Routing Engine.
6. Grasp the Routing Engine by the ejector handles and slide it about halfway out of the chassis.

7. Place one hand underneath the Routing Engine to support it and slide it completely out of the chassis.

8. Place the Routing Engine on the antistatic mat.

Figure 146: Removing the Routing Engine



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Replacing an SRX5800 Services Gateway SCB on page 364
- Installing the SRX5800 Services Gateway Routing Engine on page 205

Installing the SRX5800 Services Gateway Routing Engine

To install a Routing Engine into an SCB (see Figure 98 on page 206):

NOTE: If you install only one Routing Engine in the service gateway, you must install it in SCB slot 0 of service gateway chassis.

1. If you have not already done so, take the host subsystem offline. See "Taking the SRX5800 Services Gateway Host Subsystem Offline" on page 363.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Ensure that the ejector handles are not in the locked position. If necessary, flip the ejector handles outward.

4. Place one hand underneath the Routing Engine to support it.

5. Carefully align the sides of the Routing Engine with the guides inside the opening on the SCB.

6. Slide the Routing Engine into the SCB until you feel resistance, and then press the Routing Engine's faceplate until it engages the connectors.

7. Press both of the ejector handles inward to seat the Routing Engine.

8. Tighten the captive screws on the top and bottom of the Routing Engine faceplate.

9. Power on the services gateway.

   The Routing Engine might require several minutes to boot.

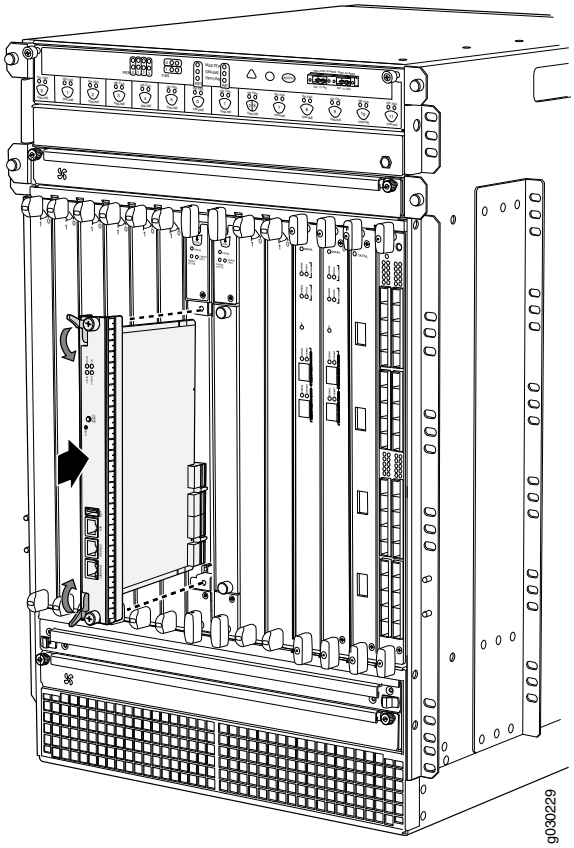
   After the Routing Engine boots, verify that it is installed correctly by checking the **RE0** and **RE1** LEDs on the craft interface. If the services gateway is operational and the Routing Engine is functioning properly, the green **ONLINE** LED lights steadily. If the red **FAIL** LED lights steadily instead, remove and install the Routing Engine again. If the red **FAIL** LED still lights steadily, the Routing Engine is not functioning properly. Contact your customer support representative.

   To check the status of the Routing Engine, use the CLI command:

```
user@host> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state                  Master ...
```

   For more information about using the CLI, see the CLI Explorer.

Figure 147: Installing the Routing Engine



10. If the Routing Engine was replaced on one of the nodes in a chassis cluster, then you need to copy certificates and key pairs from the other node in the cluster:

    a. Start the shell interface as a root user on both nodes of the cluster.

    b. Verify files in the **/var/db/certs/common/key-pair** folder of the source node (other node in the cluster) and destination node (node on which the Routing Engine was replaced) by using the following command:

       ls -la /var/db/certs/common/key-pair/

    c. If the same files exist on both nodes, back up the files on the destination node to a different location. For example:

       ```
       root@SRX-B% pwd
       /var/db/certs/common/key-pair
       root@SRX-B% ls -la
       total 8
       drwx------ 2 root wheel 512 Jan 22 15:09
       drwx------ 7 root wheel 512 Mar 26 2009
       -rw-r--r-- 1 root wheel 0 Jan 22 15:09 test
       root@SRX-B% mv test test.old
       root@SRX-B% ls -la
       total 8
       drwx------ 2 root wheel 512 Jan 22 15:10
       drwx------ 7 root wheel 512 Mar 26 2009
       -rw-r--r-- 1 root wheel 0 Jan 22 15:09 test.old
       root@SRX-B%
       ```

    d. Copy the files from the **/var/db/certs/common/key-pair** folder of the source node to the same folder on the destination node.

       NOTE: Ensure that you use the correct node number for the destination node.

    e. In the destination node, use the **ls –la** command to verify that all files from the **/var/db/certs/common/key-pair** folder of the source node are copied.

    f. Repeat Step b through Step e for the **/var/db/certs/common/local** and **/var/db/certs/common/certification-authority** folders.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Removing the SRX5800 Services Gateway Routing Engine on page 369
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 311
- Replacing the SRX5800 Services Gateway Console or Auxiliary Cable on page 312

- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251

Related Documentation

- Routing Engine SRX5K-RE-13-20 Overview on page 15
- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 363
- Replacing the SRX5800 Services Gateway Console or Auxiliary Cable on page 312
- Replacing an SRX5800 Services Gateway SCB on page 364

Low Impact Hardware Upgrade for SCB3 and IOC3

If your device is part of a chassis cluster, you can upgrade SRX5K-SCBE (SCB2) to SRX5K-SCB3 (SCB3) and SRX5K-MPC (IOC2) to IOC3 (SRX5K-MPC3-100G10G or SRX5K-MPC3-40G10G) using the low-impact hardware upgrade (LICU) procedure, with minimum downtime. You can also follow this procedure to upgrade SCB1 to SCB2, and RE1 to RE2.

Before you begin the LICU procedure, verify that both services gateways in the cluster are running the same Junos OS release.

NOTE: You can perform the hardware upgrade using the LICU process only.

You must perform the hardware upgrade at the same time as the software upgrade from Junos OS Release 12.3X48-D10 to 15.1X49-D10.

In the chassis cluster, the primary device is depicted as node 0 and the secondary device as node 1.

Follow these steps to perform the LICU.

1. Ensure that the secondary node does not have an impact on network traffic by isolating it from the network when LICU is in progress. For this, disable the physical interfaces (RETH child interfaces) on the secondary node.

```
      For SRX5400 Services Gateways
admin@cluster#set interfaces xe-5/0/0 disable
admin@cluster#set interfaces xe-5/1/0 disable

      For SRX5600 Services Gateways
admin@cluster#set interfaces xe-9/0/0 disable
admin@cluster#set interfaces xe-9/0/4 disable

      For SRX5800 Services Gateways
admin@cluster#set interfaces xe-13/0/0 disable
admin@cluster#set interfaces xe-13/1/0 disable
```

2. Disable SYN bit and TCP sequence number checking for the secondary node to take over.

   ```
   admin@cluster#set security flow tcp-session no-syn-check
   admin@cluster#set security flow tcp-session no-sequence-check
   ```

3. Commit the configuration.

   ```
   root@#commit
   ```

4. Disconnect control and fabric links between the devices in the chassis cluster so that nodes running different Junos OS releases are disconnected. For this, change the control port and fabric port to erroneous values. Fabric ports must be set to any FPC number and control ports to any non-IOC port. Issue the following commands:

   ```
   admin@cluster#delete chassis cluster control-ports
   admin@cluster#set chassis cluster control-ports fpc 10 port 0 <<<<<<< non-SPC
     port
   admin@cluster#set chassis cluster control-ports fpc 22 port 0 <<<<<<< non-SPC
     port
   admin@cluster#delete interfaces fab0
   admin@cluster#delete interfaces fab1
   admin@cluster#set interfaces fab0 fabric-options member-interfaces xe-4/0/5
     <<<<<<< non-IOC port
   admin@cluster#set interfaces fab1 fabric-options member-interfaces
     xe-10/0/5<<<<<<< non-IOC port
   ```

5. Commit the configuration.

   ```
   root@#commit
   ```

   NOTE: After you commit the configuration, the following error message appears: *Connection to node1 has been broken error:remote unlock-configuration failed on node1 due to control plane communication break*.

   Ignore the error message.

6. Upgrade the Junos OS release on the secondary node from 12.3X48-D10 to 15.1X49-D10.

   ```
   admin@cluster#request system software add <location of package/junos filename>
     no-validate no-copy
   ```

7. Power on the secondary node.

   ```
   admin@cluster#request system reboot
   ```

   See:

   - *Powering On an AC-Powered SRX5400 Services Gateway*
   - *Powering On a DC-Powered SRX5400 Services Gateway*

- *Powering On an AC-Powered SRX5600 Services Gateway*
- *Powering On a DC-Powered SRX5600 Services Gateway*
- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251

8. Perform the hardware upgrade on the secondary node by replacing SCB2 with SCB3, IOC2 with IOC3, and the existing midplane with the enhanced midplane.

   Following these steps while upgrading the SCB:

   To upgrade the Routing Engine on the secondary node:

   a. Before powering off the secondary node, copy the configuration information to a USB device.

   b. Replace RE1 with RE2 and upgrade the Junos OS on RE2.

   c. Upload the configuration to RE2 from the USB device.

For more information about mounting the USB drive on the device, refer to KB articles *KB12880* and *KB12022* from the *Knowledge Base*.

Perform this step when you upgrade the MPC.

a. Configure the control port, fabric port, and RETH child ports on the secondary node.

```
[edit]

root@clustert# show | display set | grep delete

delete groups global interfaces fab1

delete groups global interfaces fab0

delete interfaces reth0

delete interfaces reth1

delete interfaces xe-3/0/5 gigether-options redundant-parent reth0

delete interfaces xe-9/0/5 gigether-options redundant-parent reth0

delete interfaces xe-3/0/9 gigether-options redundant-parent reth

delete interfaces xe-9/0/9 gigether-options redundant-parent reth0

[edit]
root@clustert# show | display set | grep fab
set groups global interfaces fab1 fabric-options member-interfaces xe-9/0/2
set groups global interfaces fab0 fabric-options member-interfaces xe-3/0/2


[edit]
root@clustert# show | display set | grep reth0
set chassis cluster redundancy-group 1 ip-monitoring family inet 44.44.44.2
interface reth0.0 secondary-ip-address 44.44.44.3
set interfaces xe-3/0/0 gigether-options redundant-parent reth0
set interfaces xe-9/0/0 gigether-options redundant-parent reth0
set interfaces reth0 vlan-tagging
set interfaces reth0 redundant-ether-options redundancy-group 1
set interfaces reth0 unit 0 vlan-id 20
set interfaces reth0 unit 0 family inet address 44.44.44.1/8


[edit]
root@clustert# show | display set | grep reth1
set interfaces xe-3/0/4 gigether-options redundant-parent reth1
set interfaces xe-9/0/4 gigether-options redundant-parent reth1
set interfaces reth1 vlan-tagging
set interfaces reth1 redundant-ether-options redundancy-group 1
set interfaces reth1 unit 0 vlan-id 30
set interfaces reth1 unit 0 family inet address 55.55.55.1/8
```

9. Verify that the secondary node is running the upgraded Junos OS release.

```
root@cluster> show version node1
```

```
Hostname: <displays the hostname>
Model: <displays the model number>
Junos: 15.1X49-D10
JUNOS Software Release [15.1X49-D10]

root@cluster> show chassis cluster status
Monitor Failure codes:
    CS  Cold Sync monitoring        FL  Fabric Connection monitoring
    GR  GRES monitoring             HW  Hardware monitoring
    IF  Interface monitoring        IP  IP monitoring
    LB  Loopback monitoring         MB  Mbuf monitoring
    NH  Nexthop monitoring          NP  NPC monitoring
    SP  SPU monitoring              SM  Schedule monitoring
    CF  Config Sync monitoring


Cluster ID: 1
Node   Priority Status         Preempt Manual   Monitor-failures

Redundancy group: 0 , Failover count: 1
node0  0        lost           n/a     n/a      n/a
node1  100      primary        no      no       None

Redundancy group: 1 , Failover count: 3
node0  0        lost           n/a     n/a      n/a
node1  150      primary        no      no       None

root@cluster>show chassis fpc pic-status node1
Slot 1   Online       SRX5k IOC II
  PIC 0  Online       1x 100GE CFP
  PIC 2  Online       2x 40GE QSFP+
Slot 2   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 3   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
  PIC 2  Online       2x 40GE QSFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Flow
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
  PIC 2  Online       2x 40GE QSFP+
```

10. Verify configuration changes by disabling interfaces on the primary node and enabling interfaces on the secondary.

```
      For SRX5400 Services Gateways
admin@cluster#set interfaces xe-2/0/0 disable
admin@cluster#set interfaces xe-2/1/0 disable
admin@cluster#delete interfaces xe-5/0/0 disable
admin@cluster#delete interfaces xe-5/1/0 disable

      For SRX5600 Services Gateways
```

```
admin@cluster#set interfaces xe-2/0/0 disable
admin@cluster#set interfaces xe-2/0/4 disable
admin@cluster#delete interfaces xe-9/0/0 disable
admin@cluster#delete interfaces xe-9/0/4 disable

      For SRX5800 Services Gateways
admin@cluster#set interfaces xe-1/0/0 disable
admin@cluster#set interfaces xe-1/1/0 disable
admin@cluster#delete interfaces xe-13/0/0 disable
admin@cluster#delete interfaces xe-13/1/0 disable
```

11. Check the configuration changes.

    root@#commit check

12. After verifying, commit the configuration.

    root@#commit

    Network traffic fails over to the secondary node.

13. Verify that the failover was successful by checking the session tables and network traffic on the secondary node.

    admin@cluster#show security flow session summary
    admin@cluster#monitor interface traffic

14. Upgrade the Junos OS release on the primary node from 12.3X48-D10 to 15.1X49-D10.

    admin@cluster#request system software add *<location of package/junos filename>* no-validate no-copy

    Ignore error messages pertaining to the disconnected cluster.

15. Power on the primary node.

    admin@cluster#request system reboot

    See:

    - *Powering On an AC-Powered SRX5400 Services Gateway*
    - *Powering On a DC-Powered SRX5400 Services Gateway*
    - *Powering On an AC-Powered SRX5600 Services Gateway*
    - *Powering On a DC-Powered SRX5600 Services Gateway*
    - Powering On an AC-Powered SRX5800 Services Gateway on page 247
    - Powering On a DC-Powered SRX5800 Services Gateway on page 251

16. Perform the hardware upgrade on the primary node by replacing SCB2 with SCB3, IOC2 with IOC3, and the existing midplane with the enhanced midplane.

    Perform the following steps while upgrading the SCB.

    To upgrade the Routing Engine on the primary node:

    a. Before powering off the secondary node, copy the configuration information to a USB device.

    b. Replace RE1 with RE2 and upgrade the Junos OS on RE2.

    c. Upload the configuration to RE2 from the USB device.

For more information about mounting the USB drive on the device, refer to KB articles *KB12880* and *KB12022* from the *Knowledge Base*.

Perform this step when you upgrade the MPC.

a. Configure the control port, fabric port, and RETH child ports on the primary node.

```
[edit]
root@clustert# show | display set | grep delete
delete groups global interfaces fab1
delete groups global interfaces fab0
delete interfaces reth0
delete interfaces reth1
delete interfaces xe-3/0/5 gigether-options redundant-parent reth0
delete interfaces xe-9/0/5 gigether-options redundant-parent reth0
delete interfaces xe-3/0/9 gigether-options redundant-parent reth0
delete interfaces xe-9/0/9 gigether-options redundant-parent reth0


[edit]
root@clustert# show | display set | grep fab
set groups global interfaces fab1 fabric-options member-interfaces xe-9/0/2
set groups global interfaces fab0 fabric-options member-interfaces xe-3/0/2


[edit]
root@clustert# show | display set | grep reth0
set chassis cluster redundancy-group 1 ip-monitoring family inet 44.44.44.2
interface reth0.0 secondary-ip-address 44.44.44.3
set interfaces xe-3/0/0 gigether-options redundant-parent reth0
set interfaces xe-9/0/0 gigether-options redundant-parent reth0
set interfaces reth0 vlan-tagging
set interfaces reth0 redundant-ether-options redundant-group 1
set interfaces reth0 unit 0 vlan-id 20
set interfaces reth0 unit 0 family inet address 44.44.44.1/8


[edit]
root@clustert# show | display set | grep reth1
set interfaces xe-3/0/4 gigether-options redundant-parent reth1
set interfaces xe-9/0/4 gigether-options redundant-parent reth1
set interfaces reth1 vlan-tagging
set interfaces reth1 redundant-ether-options redundant-group 1
set interfaces reth1 unit 0 vlan-id 30
set interfaces reth1 unit 0 family inet address 55.55.55.1/8
```

17. Verify that the primary node is running the upgraded Junos OS release, and that the primary node is available to take over network traffic.

```
root@cluster> show version node1
Hostname: <displays the hostname>
Model: <displays the model number>
Junos: 15.1X49-D10
JUNOS Software Release [15.1X49-D10]


root@cluster> show chassis cluster status
```

```
Monitor Failure codes:
    CS  Cold Sync monitoring        FL  Fabric Connection monitoring
    GR  GRES monitoring             HW  Hardware monitoring
    IF  Interface monitoring        IP  IP monitoring
    LB  Loopback monitoring         MB  Mbuf monitoring
    NH  Nexthop monitoring          NP  NPC monitoring
    SP  SPU monitoring              SM  Schedule monitoring
    CF  Config Sync monitoring


Cluster ID: 1
Node   Priority Status         Preempt Manual   Monitor-failures

Redundancy group: 0 , Failover count: 1
node0  0        lost           n/a     n/a      n/a
node1  100      primary        no      no       None

Redundancy group: 1 , Failover count: 3
node0  0        lost           n/a     n/a      n/a
node1  150      primary        no      no       None

root@cluster>show chassis fpc pic-status node1
Slot 1   Online       SRX5k IOC II
  PIC 0  Online       1x 100GE CFP
  PIC 2  Online       2x 40GE QSFP+
Slot 2   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 3   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
  PIC 2  Online       2x 40GE QSFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Flow
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
  PIC 2  Online       2x 40GE QSFP+
```

18. Check the configuration changes.

    root@#commit check

19. After verifying, commit the configuration.

    root@#commit

20. Verify configuration changes by disabling interfaces on the secondary node and enabling interfaces on the primary.

    ```
          For SRX5400 Services Gateways
    admin@cluster#set interfaces xe-5/0/0 disable
    admin@cluster#set interfaces xe-5/1/0 disable
    admin@cluster#delete interfaces xe-2/0/0 disable
    ```

```
admin@cluster#delete interfaces xe-2/1/0 disable

      For SRX5600 Services Gateways
admin@cluster#set interfaces xe-9/0/0 disable
admin@cluster#set interfaces xe-9/0/4 disable
admin@cluster#delete interfaces xe-2/0/0 disable
admin@cluster#delete interfaces xe-2/0/4 disable

      For SRX5800 Services Gateways
admin@cluster#set interfaces xe-13/0/0 disable
admin@cluster#set interfaces xe-13/1/0 disable
admin@cluster#delete interfaces xe-1/0/0 disable
admin@cluster#delete interfaces xe-1/1/0 disable
```

Network traffic fails over to the primary node.

21. To synchronize the devices within the cluster, reconfigure the control ports and fabric ports with the correct port values on the secondary node.

```
admin@cluster#delete chassis cluster control-ports
admin@cluster#set chassis cluster control-ports fpc 1 port 0
admin@cluster#set chassis cluster control-ports fpc 13 port 0
admin@cluster#delete interfaces fab0
admin@cluster#delete interfaces fab1
admin@cluster#set interfaces fab0 fabric-options member-interfaces xe-3/0/2
admin@cluster#set interfaces fab1 fabric-options member-interfaces xe-9/0/2
```

22. Commit the configuration.

```
root@#commit
```

23. Power on the secondary node.

```
admin@cluster#request system reboot
```

See:

- *Powering On an AC-Powered SRX5400 Services Gateway*
- *Powering On a DC-Powered SRX5400 Services Gateway*
- *Powering On an AC-Powered SRX5600 Services Gateway*
- *Powering On a DC-Powered SRX5600 Services Gateway*
- Powering On an AC-Powered SRX5800 Services Gateway on page 247
- Powering On a DC-Powered SRX5800 Services Gateway on page 251

a. When you power on the secondary node, enable the control ports and fabric ports on the primary node, and reconfigure them with the correct port values.

```
admin@cluster#delete chassis cluster control-ports
admin@cluster#set chassis cluster control-ports fpc 1 port 0
admin@cluster#set chassis cluster control-ports fpc 13 port 0
admin@cluster#delete interfaces fab0
admin@cluster#delete interfaces fab1
```

```
admin@cluster#set interfaces fab0 fabric-options member-interfaces xe-3/0/2
admin@cluster#set interfaces fab1 fabric-options member-interfaces xe-9/0/2
```

24. Commit the configuration.

```
root@#commit
```

25. After the secondary node is up, verify that it synchronizes with the primary node.

```
admin@cluster#delete interfaces xe-4/0/5 disable
admin@cluster#delete interfaces xe-10/0/5 disable
```

26. Enable SYN bit and TCP sequence number checking for the secondary node.

```
admin@cluster#delete security flow tcp-session no-syn-check
admin@cluster#delete security flow tcp-session no-sequence-check
```

27. Commit the configuration.

```
root@#commit
```

28. Verify the Redundancy Group (RG) states and their priority.

```
root@cluster>show version
node0:
--------------------------------------------------------------------------
Hostname: <displays the hostname>
Model: <displays the model number>
Junos: 15.1X49-D10
JUNOS Software Release [15.1X49-D10]

node1:
--------------------------------------------------------------------------
Hostname: <displays the hostname>
Model: <displays the model>
Junos: 15.1X49-D10
JUNOS Software Release [15.1X49-D10]
```

After the secondary node is powered on, issue the following command:

```
root@cluster>show chassis fpc pic-status
node0:
--------------------------------------------------------------------------
Slot 1   Online       SRX5k IOC II
  PIC 0  Online       1x 100GE CFP
  PIC 2  Online       2x 40GE QSFP+
Slot 2   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 3   Online       SRX5k IOC3 24XGE+6XLG
  PIC 0  Online       12x 10GE SFP+
  PIC 1  Online       12x 10GE SFP+
  PIC 2  Offline      3x 40GE QSFP+
  PIC 3  Offline      3x 40GE QSFP+
Slot 4   Online       SRX5k SPC II
```

```
  PIC 0  Online       SPU Flow
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
  PIC 2  Online       10x 10GE SFP+

node1:
--------------------------------------------------------------------------
Slot 1   Online       SRX5k IOC II
  PIC 0  Online       1x 100GE CFP
  PIC 2  Online       2x 40GE QSFP+
Slot 2   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 3   Online       SRX5k IOC3 24XGE+6XLG
  PIC 0  Online       12x 10GE SFP+
  PIC 1  Online       12x 10GE SFP+
  PIC 2  Offline      3x 40GE QSFP+
  PIC 3  Offline      3x 40GE QSFP+
Slot 4   Online       SRX5k SPC II
  PIC 0  Online       SPU Flow
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 5   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
  PIC 2  Online       2x 40GE QSFP+
```

```
root@cluster> show chassis cluster status
    CS  Cold Sync monitoring        FL  Fabric Connection monitoring
    GR  GRES monitoring             HW  Hardware monitoring
    IF  Interface monitoring        IP  IP monitoring
    LB  Loopback monitoring         MB  Mbuf monitoring
    NH  Nexthop monitoring          NP  NPC monitoring
    SP  SPU monitoring              SM  Schedule monitoring
    CF  Config Sync monitoring

Cluster ID: 1
Node   Priority Status         Preempt Manual   Monitor-failures

Redundancy group: 0 , Failover count: 0
node0  250      primary        no      no       None
node1  100      secondary      no      no       None

Redundancy group: 1 , Failover count: 0
node0  254      primary        no      no       None
node1  150      secondary      no      no       None
```

```
root@cluster>show security monitoring
node0:
--------------------------------------------------------------------------
                  Flow session   Flow session     CP session     CP session
FPC PIC CPU Mem         current        maximum        current        maximum
--------------------------------------------------------------------------
  2   0   0  11               0              0        1999999      104857600
```

```
  2   1   2   5          289065        4194304              0              0
  2   2   2   5          289062        4194304              0              0
  2   3   2   5          289060        4194304              0              0
  4   0   2   5          289061        4194304              0              0
  4   1   2   5          281249        4194304              0              0
  4   2   2   5          281251        4194304              0              0
  4   3   2   5          281251        4194304              0              0

node1:
--------------------------------------------------------------------------
                     Flow session   Flow session     CP session     CP session
FPC PIC CPU Mem           current        maximum        current        maximum
--------------------------------------------------------------------------
  2   0   0  11               0              0        1999999      104857600
  2   1   0   5          289065        4194304              0              0
  2   2   0   5          289062        4194304              0              0
  2   3   0   5          289060        4194304              0              0
  4   0   0   5          289061        4194304              0              0
  4   1   0   5          281249        4194304              0              0
  4   2   0   5          281251        4194304              0              0
  4   3   0   5          281251        4194304              0              0
```

Enable the traffic interfaces on the secondary node.

```
root@cluster> show interfaces terse | grep reth0
xe-3/0/0.0 up up aenet --> reth0.0
xe-3/0/0.32767 up up aenet --> reth0.32767
xe-9/0/0.0 up up aenet --> reth0.0
xe-9/0/0.32767 up up aenet --> reth0.32767
reth0 up up
reth0.0 up up inet 44.44.44.1/8
reth0.32767 up up multiservice

root@cluster> show interfaces terse | grep reth1
xe-3/0/4.0 up up aenet --> reth1.0
xe-3/0/4.32767 up up aenet --> reth1.32767
xe-9/0/4.0 up up aenet --> reth1.0
xe-9/0/4.32767 up up aenet --> reth1.32767
reth1 up up
reth1.0 up up inet 55.55.55.1/8
reth1.32767 up up multiservice
```

For more information about LICU, refer to KB article *KB17947* from the *Knowledge Base*.

Related Documentation

- In-Service Hardware Upgrade for SRX5K-RE-1800X4 and SRX5K-SCBE in a Chassis Cluster on page 386

In-Service Hardware Upgrade for SRX5K-RE-1800X4 and SRX5K-SCBE in a Chassis Cluster

If your device is part of a chassis cluster, you can upgrade SRX5K-SCB and SRX5K-RE-13-20 to SRX5K-SCBE and SRX5K-RE-1800X4, respectively, using the in-service hardware upgrade (ISHU) procedure.

NOTE: We strongly recommend that you perform the ISHU during a maintenance window, or during the lowest possible traffic as the secondary node is not available at this time.

Ensure to upgrade the SCB and Routing Engine at the same time as the following configurations are only supported:

- SRX5K-RE-13-20 and SRX5K-SCB
- SRX5K-RE-1800X4 and SRX5K-SCBE

NOTE: While performing the ISHU, in the SRX5800 service gateway, the second SCB can contain a Routing Engine but the third SCB must not contain a Routing Engine. In the SRX5600 services gateway, the second SCB can contain a Routing Engine.

Ensure that the following prerequisites are completed before you begin the ISHU procedure:

- Replace all interface cards such as IOCs and Flex IOCs as specified in Table 64 on page 387.

Table 64: List of Interface Cards for Upgrade

Cards to Replace	Replacement Cards for Upgrade
SRX5K-40GE-SFP	SRX5K-MPC and MICs
SRX5K-4XGE-XFP	SRX5K-MPC and MICs
SRX5K-FPC-IOC	SRX5K-MPC and MICs
SRX5K-RE-13-20	SRX5K-RE-1800X4
SRX5K-SCB	SRX5K-SCBE
SRX5K-SPC-2-10-40	SRX5K-SPC-4-15-320

- Verify that both services gateways in the cluster are running the same Junos OS versions, and release 12.1X47-D15 and later.

  For more information about unified in-service software upgrade (unified ISSU), see Upgrading Both Devices in a Chassis Cluster Using an ISSU.

To perform an ISHU:

1. Export the configuration information from the secondary node to a USB or an external storage device.

   For more information about mounting the USB on the device, refer to KB articles *KB12880* and *KB12022* from the *Knowledge Base*.

2. Power off the secondary node.

   See, *Powering Off the SRX5400 Services Gateway*, *Powering Off the SRX5600 Services Gateway*, or "Powering Off the SRX5800 Services Gateway" on page 253.

3. Disconnect all the interface cards from the chassis backplane by pulling them out of the backplane by 6" to 8" (leaving cables in place).

4. Replace the SRX5K-SCBs with SRX5K-SCBEs, and SRX5K-RE-13-20s with SRX5K-RE-1800X4s based on the chassis specifications.

5. Power on the secondary node.

   See:

   - *Powering On an AC-Powered SRX5400 Services Gateway*
   - *Powering On a DC-Powered SRX5400 Services Gateway*
   - *Powering On an AC-Powered SRX5600 Services Gateway*
   - *Powering On a DC-Powered SRX5600 Services Gateway*
   - Powering On an AC-Powered SRX5800 Services Gateway on page 247
   - Powering On a DC-Powered SRX5800 Services Gateway on page 251

6. After the secondary node reboots as a standalone node, configure the same cluster ID as in the primary node.

   ```
   root@>set chassis cluster cluster-id 1 node 1
   ```

7. Install the same Junos OS software image on the secondary node as on the primary node and reboot.

   NOTE: **Ensure that the Junos OS version installed is release 12.1X47-D15 or later.**

8. After the secondary node reboots, import all the configuration settings from the USB to the node.

   For more information about mounting the USB on the device, refer to KB articles *KB12880* and *KB12022* from the *Knowledge Base*.

9. Power off the secondary node.

   See *Powering Off the SRX5400 Services Gateway*, *Powering Off the SRX5600 Services Gateway*, or "Powering Off the SRX5800 Services Gateway" on page 253.

10. Re-insert all the interface cards into the chassis backplane.

    NOTE: Ensure the cards are inserted in the same order as in the primary node, and maintain connectivity between the control link and fabric link.

11. Power on the node and issue this command to ensure all the cards are online:

```
user@host> show chassis fpc pic-status
Slot 0   Online       SRX5k SPC II
  PIC 0  Online       SPU Cp
  PIC 1  Online       SPU Flow
  PIC 2  Online       SPU Flow
  PIC 3  Online       SPU Flow
Slot 1   Online       SRX5k IOC II
  PIC 0  Online       10x 10GE SFP+
```

    After the node boots, it must join the cluster as a secondary node. To verify, issue the following command

```
admin@cluster> show chassis cluster status

Cluster ID: 1
Node   Priority Status         Preempt Manual   Monitor-failures

Redundancy group: 0 , Failover count: 6
node0  254      secondary      no      no       None
node1  1        primary        no      no       None

Redundancy group: 1 , Failover count: 6
node0  254      secondary      no      no       None
node1  1        primary        no      no       None
```

    NOTE: The command output must indicate that the node priority is set to a non-zero value, and that the cluster contains a primary node and a secondary node.

12. Initiate Redundancy Group (RG) failover to the upgraded node, manually, so that it is assigned to all RGs as a primary node.

    For RG0, issue the following command:

```
admin@cluster> request chassis cluster failover redundancy-group 0 node 1
```

    For RG1, issue the following command:

```
admin@cluster> request chassis cluster failover redundancy-group 1 node 1
```

Verify that all RGs are failed over by issuing the following command:

```
admin@cluster> show chassis cluster status
```

13. Verify the operations of the upgraded secondary node by performing the following:

    - To ensure all FPC's are online, issue the following command:

      ```
      admin@cluster> show chassis fpc pic-status
      ```

    - To ensure all RG's are upgraded and the node priority is set to a non-zero value, issue the following command:

      ```
      admin@cluster> show chassis cluster status
      ```

    - To ensure that the upgraded primary node receives and transmits data, issue the following command:

      ```
      admin@cluster> monitor interface traffic
      ```

    - To ensure sessions are created and deleted on the upgraded node, issue the following command:

      ```
      admin@cluster> show security monitoring
      ```

14. Repeat Step 1 through 12 for the primary node.

15. To ensure that the ISHU process is completed successfully, check the status of the cluster by issuing the following command:

```
admin@cluster> show chassis cluster status
Monitor Failure codes:
    CS  Cold Sync monitoring        FL  Fabric Connection monitoring
    GR  GRES monitoring             HW  Hardware monitoring
    IF  Interface monitoring        IP  IP monitoring
    LB  Loopback monitoring         MB  Mbuf monitoring
    NH  Nexthop monitoring          NP  NPC monitoring
    SP  SPU monitoring              SM  Schedule monitoring
    CF  Config Sync monitoring

Cluster ID: 1
Node   Priority Status         Preempt Manual   Monitor-failures

Redundancy group: 0 , Failover count: 1
node0  200      primary        no      no       None
node1  100      secondary      no      no       None

Redundancy group: 1 , Failover count: 1
node0  200      primary        no      no       None
node1  100      secondary      no      no       None

Redundancy group: 2 , Failover count: 1
node0  200      primary        no      no       None
node1  100      secondary      no      no       None
```

```
Redundancy group: 3 , Failover count: 2
node0  200      secondary      no      yes      None
node1  255      primary        no      yes      None
```

For detailed information about chassis cluster, see the *Chassis Cluster Feature Guide for Security Devices* at www.juniper.net/documentation/.

Related Documentation

- Replacing SRX5800 Services Gateway MPCs on page 352
- Replacing SRX5800 Services Gateway SPCs on page 339
- *Replacing SRX5600 Services Gateway MPCs*
- *Replacing SRX5600 Services Gateway SPCs*
- *Replacing SRX5400 Services Gateway MPCs*
- *Replacing SRX5400 Services Gateway SPCs*

CHAPTER 29

Replacing Cooling System Components

Replacing an SRX5800 Services Gateway Fan Tray

To replace a fan tray, perform the following procedures in sequence:

Removing an SRX5800 Services Gateway Fan Tray

NOTE: **To prevent overheating, install the replacement fan tray immediately after removing the existing fan tray. Do not operate the services gateway for more than two minutes without both fan trays installed.**

To remove the upper or lower fan tray (see Figure 148 on page 394 and Figure 149 on page 395):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Reposition the cable manager before removing the lower front fan tray:

   a. Unwrap any cables on the cable manager and remove the cables from the tray. Arrange the cables so that they do not block the front of the cable manager and tray, and secure them with temporary fasteners so that they are not supporting their own weight as they hang from the connector.

   b. Simultaneously pull the two releases labeled PULL on the cable manager. Lift it up and outward to lock it in place.

3. Loosen the captive screw on each side of the fan tray faceplate.

4. Grasp both sides of the fan tray and pull it out approximately 1 to 3 inches.

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

5. Pause for approximately 15 seconds to allow the fans to stop spinning.

6. When the fans stop spinning, press on the two latches located on the inside of the fan tray.

7. Place one hand under the fan tray to support it and pull the fan tray completely out of the chassis.

8. Proceed to "Installing an SRX5800 Services Gateway Fan Tray" on page 197 to install the replacement fan tray.

Figure 148: Removing an Upper Fan Tray (Standard-Capacity Shown, High-Capacity Similar)

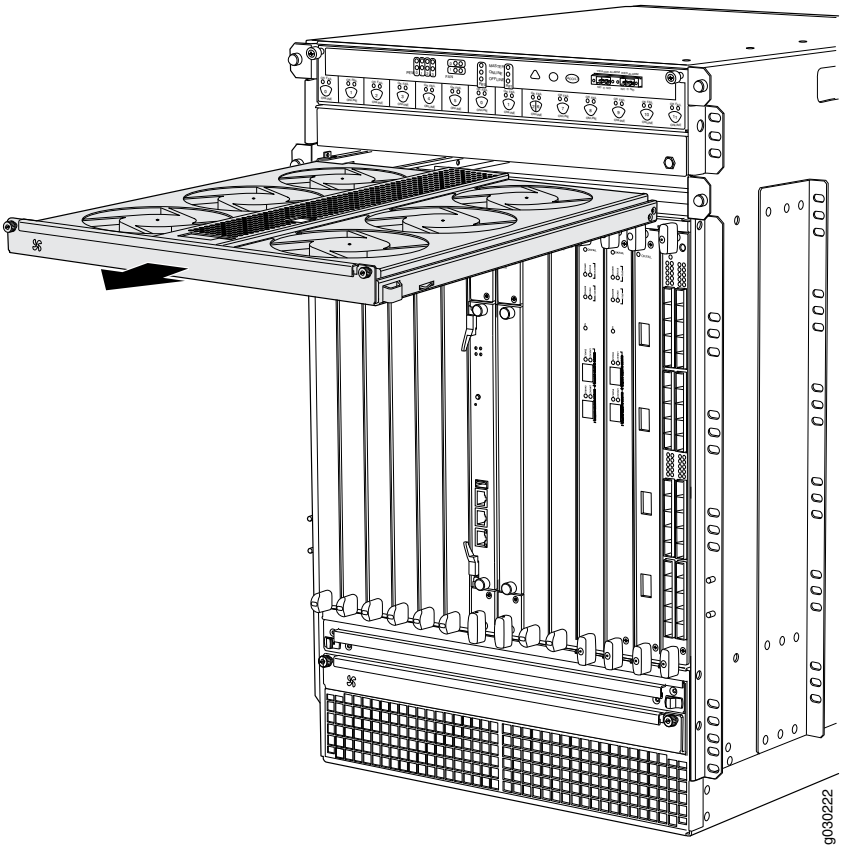
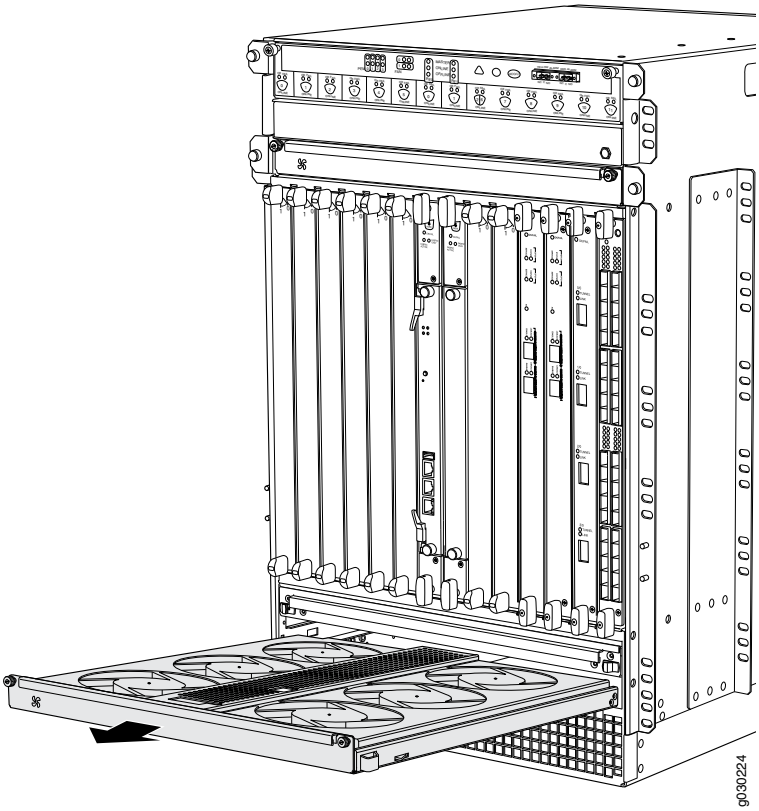


Figure 149: Removing a Lower Fan Tray (Standard-Capacity Shown, High-Capacity Similar)



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Installing an SRX5800 Services Gateway Fan Tray on page 197

Installing an SRX5800 Services Gateway Fan Tray

NOTE: To prevent overheating, install the replacement fan tray immediately after removing the existing fan tray. Do not operate the services gateway for more than two minutes without both fan trays installed.

To install a fan tray (see Figure 93 on page 198 and Figure 94 on page 199):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. Grasp the fan tray on each side and insert it straight into the chassis. Note the correct orientation by the "this side up" label on the top surface of the fan tray.

3. Tighten the captive screws on each side of the fan tray faceplate to secure it in the chassis.

4. Lower the cable manager back into position, if necessary.

Figure 150: Installing an Upper Fan Tray (Standard-Capacity Shown, High-Capacity Similar)

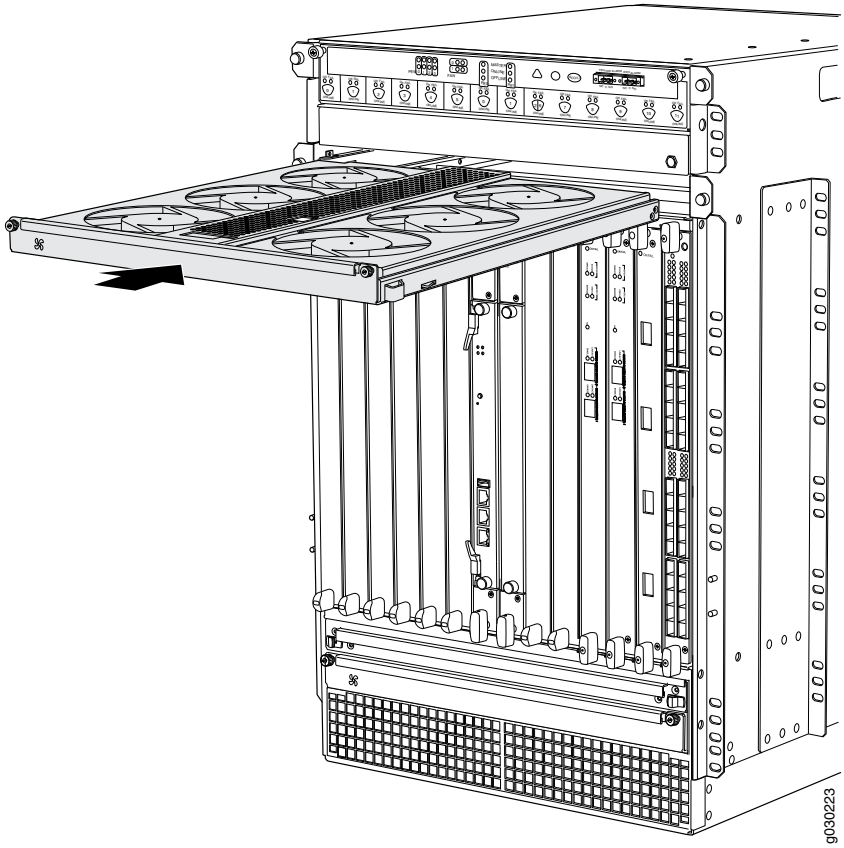
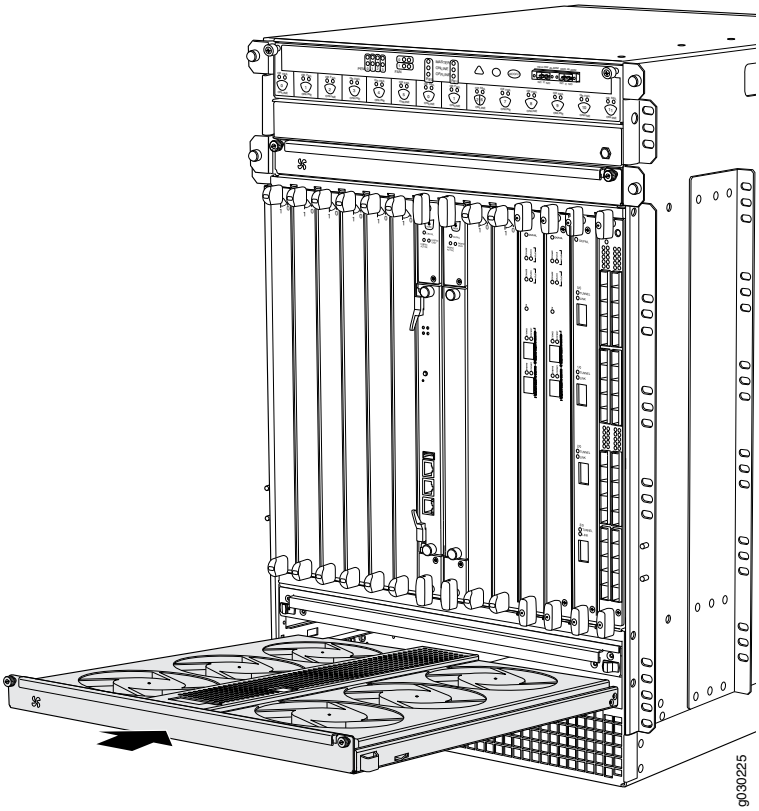


Figure 151: Installing a Lower Fan Tray (Standard-Capacity Shown, High-Capacity Similar)



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Removing an SRX5800 Services Gateway Fan Tray on page 393

Related Documentation

- Removing Fan Trays Before Installing the SRX5800 Services Gateway Chassis on page 172
- Reinstalling Fan Trays After Installing the SRX5800 Services Gateway Chassis on page 181
- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 269

Replacing the SRX5800 Services Gateway Air Filter

You should change the air filter every six months.To replace the air filter, perform the following procedures in sequence:

1. Removing the SRX5800 Services Gateway Air Filter on page 398
2. Installing the SRX5800 Services Gateway Air Filter on page 399

Removing the SRX5800 Services Gateway Air Filter

CAUTION: Do not run the services gateway for more than two minutes without the air filter in place.

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

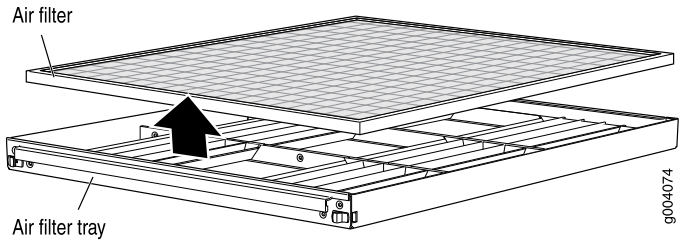
To remove the air filter (see Figure 152 on page 399):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Unwrap any cables on the cable manager and remove the cables from the tray. Arrange the cables so that they do not block the front of the cable manager and tray, and secure them with temporary fasteners so that they are not supporting their own weight as they hang from the connector.

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

3. Simultaneously pull the two releases labeled **PULL** on the cable manager. Lift it up and outward to lock it in place to access the air filter.
4. Slide the air filter tray out of the chassis.
5. Lift the air filter out of the air filter tray.

Figure 152: Removing the Air Filter (Standard-Capacity Filter Tray Shown, High-Capacity Similar)



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Installing the SRX5800 Services Gateway Air Filter on page 196

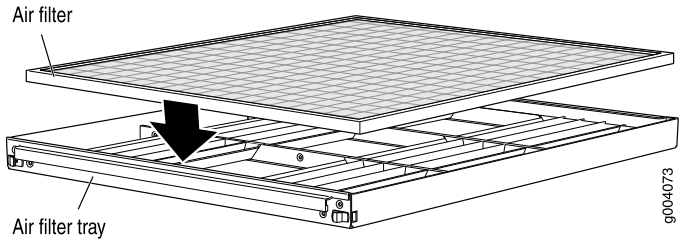
Installing the SRX5800 Services Gateway Air Filter

You should change the air filter every six months.

To install the air filter (see Figure 92 on page 196):

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Ensure the air filter is right side up.
3. Place the air filter into the air filter tray.
4. Insert the air filter tray into the chassis by sliding it straight into the chassis until it stops.
5. Lower the cable manager back into position.
6. Rearrange the cables in the cable manager.

Figure 153: Installing the Air Filter Standard-Capacity Filter Tray Shown, High-Capacity Similar)



See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 304
- Removing the SRX5800 Services Gateway Air Filter on page 398

Related Documentation

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 268

CHAPTER 30

Replacing Power System Components

Upgrading an SRX5800 Services Gateway from Standard-Capacity to High-Capacity Power Supplies

You can replace the standard-capacity power supplies in the SRX5800 Services Gateway with either two or four high-capacity power supplies of the same input type (AC or DC). Two high-capacity power supplies provide adequate power for a fully loaded chassis; installing four high-capacity power supplies provides redundancy in case one power supply in either zone fails. You do not need to power off the device to upgrade to high-capacity power supplies.

NOTE: The services gateway cannot be powered from standard-capacity and high-capacity power supplies simultaneously. The one exception is during the process of replacing standard-capacity power supplies with high-capacity power supplies, when it is permissible to have both types installed briefly.

CAUTION: The services gateway cannot be powered from AC and DC power supplies simultaneously. The first type of power supply detected by the services gateway when initially powered on determines the type of power supply allowed by the services gateway. All installed power supplies of the other type are disabled by the services gateway. If you install a power supply of the other type while the services gateway is operating, the services gateway disables the power supply and generates an alarm.

The following procedures describe how to upgrade from standard-capacity power supplies to high-capacity power supplies of the same input type (AC or DC) without interrupting

power to the services gateway components. Choose the procedure that matches your services gateway configuration:

To upgrade a services gateway that has three or four standard-capacity AC power supplies to two or four high-capacity AC power supplies:

CAUTION: Limit to five minutes or less the time during which standard-capacity AC power supplies and high-capacity AC power supplies are installed in the services gateway at the same time.

1. Ensure that the services gateway is running Junos OS Release 10.4 or later. Earlier Junos OS releases do not support high-capacity AC power supplies.

2. If you have not already done so, replace both standard-capacity fan trays with high-capacity fan trays. Also replace the standard-capacity air filter with a high-capacity air filter. For more information, see "Replacing an SRX5800 Services Gateway Fan Tray" on page 393 and "Replacing the SRX5800 Services Gateway Air Filter" on page 398.

3. Check the LEDs on all of the installed power supply faceplates to ensure that they are operating properly.

4. If there are four standard-capacity AC power supplies installed, remove the standard-capacity AC power supply installed in the **PEM0** slot. See "Removing an SRX5800 Services Gateway AC Power Supply" on page 405 for instructions on removing AC power supplies. If there are only three standard-capacity AC power supplies installed in the services gateway, proceed to the next step.

5. Install a high-capacity AC power supply in the vacant slot in the back of the chassis. See "Installing an SRX5800 Services Gateway AC Power Supply" on page 187 for instructions on installing AC power supplies.

6. Check the LEDs on the high-capacity AC power supply faceplate to ensure that it is operating properly.

7. Identify the slot for the next high-capacity AC power supply:

   - If the slot you installed the power supply into in 5 is **PEM0** or **PEM2**, install the next high-capacity AC power supply in either slot **PEM1** or **PEM3**
   - If the slot you installed the power supply into in 5 is **PEM1** or **PEM3**, install the next high-capacity AC power supply in either slot **PEM0** or **PEM2**

8. Remove the standard-capacity AC power supply from the slot you identified in step7. See "Removing an SRX5800 Services Gateway AC Power Supply" on page 405 for instructions on removing AC power supplies.

9. Install a high-capacity AC power supply in the slot you identified in Step 7. See "Installing an SRX5800 Services Gateway AC Power Supply" on page 187 for instructions on installing AC power supplies.

10. Check the LEDs on both high-capacity AC power supply faceplates to ensure that they are operating properly.

11. Remove the remaining two standard-capacity AC power supply from the services gateway. See "Removing an SRX5800 Services Gateway AC Power Supply" on page 405 for instructions on removing AC power supplies.

12. If you are upgrading to four high-capacity AC power supplies to achieve 2+2 redundancy, install high-capacity AC power supplies in the slots you vacated in Step 11. See "Installing an SRX5800 Services Gateway AC Power Supply" on page 187 for instructions on installing AC power supplies.

13. Check the LEDs on all installed high-capacity AC power supply faceplates to ensure that they are operating properly.

To upgrade a services gateway that has two standard-capacity DC power supplies to two or four high-capacity DC power supplies:

1. Ensure that the services gateway is running Junos OS Release 12.1X44-D10 or later. Earlier Junos OS releases do not support high-capacity DC power supplies.

2. If you have not already done so, replace both standard-capacity fan trays with high-capacity fan trays. Also replace the standard-capacity air filter with a high-capacity air filter. For more information, see "Replacing an SRX5800 Services Gateway Fan Tray" on page 393 and "Replacing the SRX5800 Services Gateway Air Filter" on page 398.

3. Install high-capacity DC power supplies in the two empty PEM slots in the back of the chassis. See "Installing an SRX5800 Services Gateway DC Power Supply" on page 190 for instructions on installing DC power supplies.

4. Check the LEDs on the faceplate of each of the new power supplies to confirm that they are operating properly.

5. Remove both of the standard-capacity power supplies from the services gateway. See "Removing an SRX5800 Services Gateway DC Power Supply" on page 413 for instructions on removing DC power supplies.

6. If you are installing four high-capacity DC power supply to achieve 2+2 redundancy, install high-capacity DC power supplies in the slots vacated in Step 5.

7. Check the LEDs on the faceplate of each of the new power supplies to confirm that they are operating properly.

To upgrade a services gateway that has four standard-capacity DC power supplies to two or four high-capacity DC power supplies:

1. Ensure that the services gateway is running Junos OS Release 12.1X44-D10 or later. Earlier Junos OS releases do not support high-capacity DC power supplies.

2. If you have not already done so, replace both standard-capacity fan trays with high-capacity fan trays. Also replace the standard-capacity air filter with a high-capacity air filter. For more information, see "Replacing an SRX5800 Services Gateway Fan Tray" on page 393 and "Replacing the SRX5800 Services Gateway Air Filter" on page 398.

3. Check the LEDs on all four power supply faceplates to ensure that they are operating properly.

4. Remove the standard-capacity power supply from slot **PEM0**. See "Removing an SRX5800 Services Gateway DC Power Supply" on page 413 for instructions on removing DC power supplies.

5. Install a high-capacity DC power supply in the **PEM0** slot in the back of the chassis. See "Installing an SRX5800 Services Gateway DC Power Supply" on page 190 for instructions on installing DC power supplies.

6. Repeat Step 4 and Step 5 to replace the standard-capacity DC power supply in the **PEM1** slot with a high-capacity DC power supply.

7. Check the LEDs on the faceplate of each of the new power supplies to confirm that they are operating properly.

8. Remove the two standard-capacity power supplies from the **PEM2** and **PEM3** slots. See "Removing an SRX5800 Services Gateway DC Power Supply" on page 413 for instructions on removing DC power supplies.

9. If you are upgrading to four high-capacity DC power supplies to achieve 2+2 redundancy, install high-capacity DC power supplies in the **PEM2** and **PEM3** slots. See

"Installing an SRX5800 Services Gateway DC Power Supply" on page 190 for instructions on installing DC power supplies.

10. Check the LEDs on the faceplate of each of the new power supplies to confirm that they are operating properly.

Related Documentation

- SRX5800 Services Gateway Power System Overview on page 89
- Removing an SRX5800 Services Gateway AC Power Supply on page 405
- Installing an SRX5800 Services Gateway AC Power Supply on page 187
- Removing an SRX5800 Services Gateway DC Power Supply on page 413
- Installing an SRX5800 Services Gateway DC Power Supply on page 190

Replacing an SRX5800 Services Gateway AC Power Supply

To replace an AC power supply, perform the following procedures:

1. Removing an SRX5800 Services Gateway AC Power Supply on page 405
2. Installing an SRX5800 Services Gateway AC Power Supply on page 408

Removing an SRX5800 Services Gateway AC Power Supply

Before you remove a power supply, be aware of the following:

NOTE: The minimum number of power supplies must be present in the services gateway at all times.

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

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

To remove an AC power supply (see Figure 154 on page 407):

1. Switch off the dedicated customer site circuit breaker for the power supply, and remove the power cord from the AC power source. If the services gateway is equipped with high-capacity AC power supplies, remove both of the power cords for the power supply. Follow the ESD and disconnection instructions for your site.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

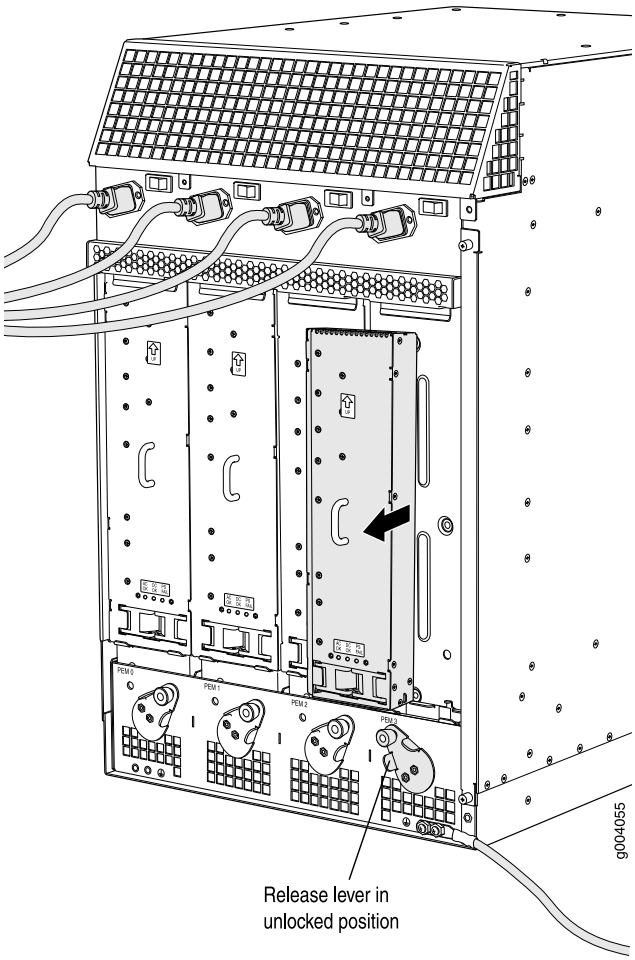
3. Move the AC input switch on the chassis above the AC power supply to the off (**O**) position. If the services gateway is equipped with high-capacity AC power supplies you must also move the AC input switch on the power supply itself to the off (**O**) position.

4. While grasping the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops.

5. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

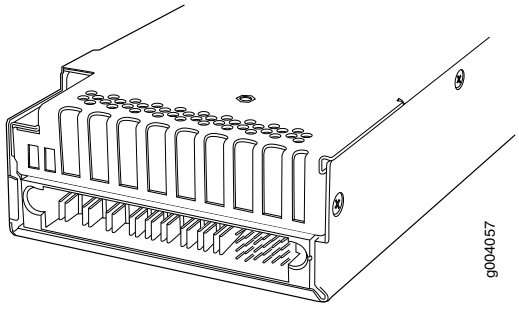
6. Pull the power supply straight out of the chassis. The power supply can weigh up to 12 lb (5.5 kg). Be prepared to accept its full weight.

Figure 154: Removing an AC Power Supply (Standard-Capacity Shown, High-Capacity Similar)



WARNING: Do not touch the power connector on the top of the power supply (see Figure 155 on page 407). It can contain dangerous voltages.

Figure 155: Top of the Power Supply Showing Midplane Connector



Connector end of AC or DC power supply

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Installing an SRX5800 Services Gateway AC Power Supply on page 187
- Replacing an SRX5800 Services Gateway AC Power Supply Cord on page 411

Installing an SRX5800 Services Gateway AC Power Supply

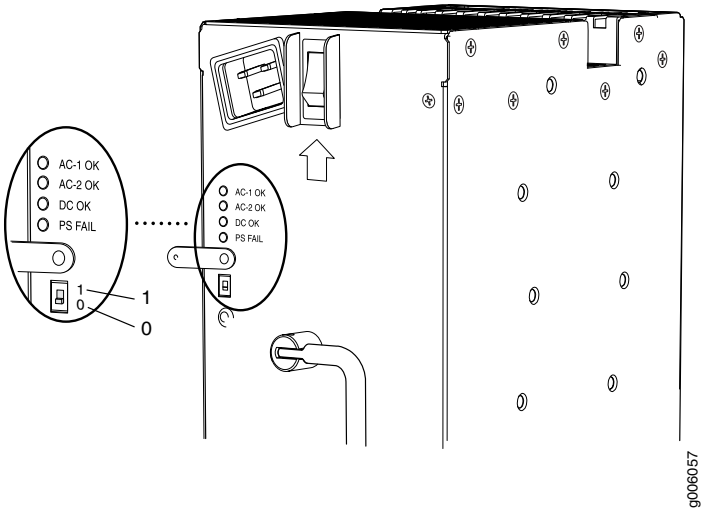
To install an AC power supply:

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

2. If you have not already done so, move the AC input switch in the chassis above the empty power supply slot to the off (**O**) position.

3. For each high-capacity AC power supply, move the input mode switch to position **0** for one feed or position **1** for two feeds (see Figure 87 on page 188). We recommend that you use two AC power feeds and set the mode input switch to **1**.

Figure 156: High-Capacity AC Power Supply Input Mode Switch



NOTE: **Do not use a pencil to set the mode switch, because fragments can break off and cause damage to the power supply.**

4. If you are installing a high-capacity power supply, move the AC input switch on the faceplate of the power supply itself to the off (**O**) position.

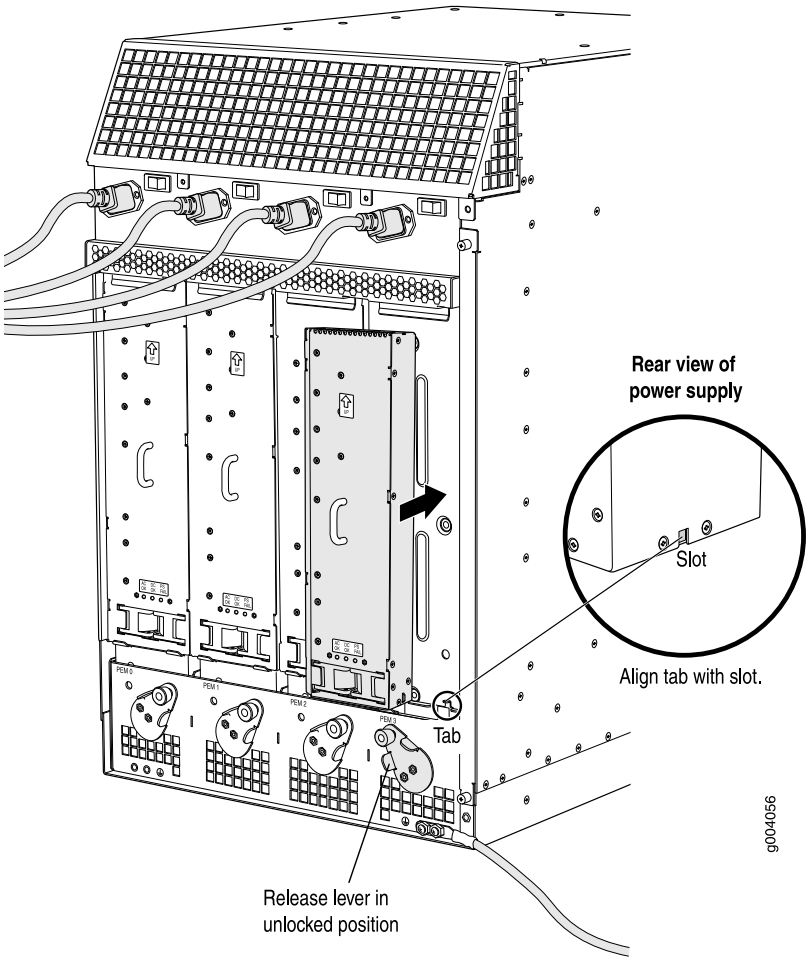
5. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 88 on page 189).

If necessary, pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

6. Using both hands, slide the power supply straight into the chassis until the power supply is fully seated in the chassis slot. The power supply faceplate should be flush with any adjacent power supply faceplates.

   The small tab on the metal housing that is controlled by the release lever must be inside of the corresponding slot at the bottom of the power supply (see Figure 88 on page 189). This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

Figure 157: Installing an AC Power Supply (Standard-Capacity Shown, High-Capacity Similar)



7. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

8. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

9. If you are installing a high-capacity power supply, connect a power cord to the appliance inlet at the top edge of the power supply. For more information, see "Connecting an SRX5800 Services Gateway AC Power Supply Cord" on page 412.

10. Move the AC input switch in the chassis above the power supply to the on (—) position.

11. If you are installing a high-capacity power supply, move the AC input switch on the faceplate of the power supply itself to the on (**1**) position.

12. Verify the following LED indications for each installed power supply:

    - For standard-capacity AC power supplies, verify that the **AC OK** and **DC OK** LEDs light steadily and the **PS FAIL** LED is not lit.
    - For high-capacity AC power supplies, verify that the **DC OK** LED lights steadily and the **PS FAIL** LED is not lit. In addition, the **AC-1 OK** LED should light green steadily if the upper AC feed (on the chassis above the power supply) is connected and receiving power, and the **AC-2 OK** LED should light green steadily if the lower AC feed (on the power supply itself) is connected and receiving power.

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

    If any of the status LEDs indicates that the power supply is not functioning normally, repeat the installation and cabling procedures.

See Also

- Connecting an SRX5800 Services Gateway AC Power Supply Cord on page 412
- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing an SRX5800 Services Gateway AC Power Supply on page 405
- Replacing an SRX5800 Services Gateway AC Power Supply Cord on page 411

Related Documentation

- SRX5800 Services Gateway High-Capacity AC Power Supply on page 92
- SRX5800 Services Gateway High-Capacity AC Power Supply LEDs on page 94
- SRX5800 Services Gateway Standard-Capacity AC Power Supply on page 95
- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 96
- SRX5800 Services Gateway AC Power Supply Specifications on page 133

- Replacing an SRX5800 Services Gateway AC Power Supply Cord on page 411

Replacing an SRX5800 Services Gateway AC Power Supply Cord

To replace an SRX5800 Services Gateway AC power supply cord, perform the following procedures:

1. Disconnecting an SRX5800 Services Gateway AC Power Supply Cord on page 411
2. Connecting an SRX5800 Services Gateway AC Power Supply Cord on page 412

Disconnecting an SRX5800 Services Gateway AC Power Supply Cord

To disconnect an AC power cord:

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. Move the AC input switch nearest to the appliance inlet for the power cord you are replacing to the off (**O**) position:
   - For standard-capacity AC power supplies, there is only one AC input switch for each power supply; it is located next to the appliance inlet on the chassis above the power supply.
   - For high-capacity AC power supplies, there is one AC input switch for each of the two appliance inlets. One is located next to the AC inlet on the chassis above the power supply, and the other is located next to the appliance inlet on the power supply itself.
3. Unplug the power cord from the power source receptacle.
4. Unplug the power cord from the appliance inlet on the chassis or power supply.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Replacing an SRX5800 Services Gateway AC Power Supply on page 405
- Connecting an SRX5800 Services Gateway AC Power Supply Cord on page 412

Connecting an SRX5800 Services Gateway AC Power Supply Cord

NOTE: Power cords are not supplied with the services gateway. You must order the power cords separately.

To connect an AC power cord:

1. Locate a replacement power cord with the type of plug appropriate for your geographical location.

2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

3. Verify that the AC input switch nearest to the appliance inlet for the power cord you are replacing is in the off (**O**) position:

   - For standard-capacity AC power supplies, there is only one AC input switch for each power supply; it is located next to the appliance inlet on the chassis above the power supply.
   - For high-capacity AC power supplies, there is one AC input switch for each of the two appliance inlets. One switch is located next to the AC inlet on the chassis above the power supply, and the other is located next to the appliance inlet on the power supply itself.

4. Plug the replacement power cord into the corresponding appliance inlet located in the chassis directly above the power supply, or, in the case of a high-capacity AC power supply, at the top edge of the power supply itself.

5. Insert the power cord plug into an external AC power source receptacle.

   NOTE: Each power supply must be connected to a dedicated AC power feed and a dedicated customer site circuit breaker. We recommend that you use a 15 A (250 VAC) minimum, or as required by local code.

6. Dress the power cord appropriately. Verify that the power cord does not block the air exhaust and access to services gateway components, or drape where people could trip on it.

7. Move the AC input switch nearest to the appliance inlet for the power cord you are replacing to the on (**|**) position:

   - For standard-capacity AC power supplies, there is only one AC input switch for each power supply; it is located next to the appliance inlet on the chassis above the power supply.

- For high-capacity AC power supplies, there is one AC input switch for each of the two appliance inlets. One is located next to the AC inlet on the chassis above the power supply, and the other is located next to the appliance inlet on the power supply itself.

8. Verify the following LED indications for the power supply for which you replaced the power cord:

   - For standard-capacity AC power supplies, verify that the **AC OK** and **DC OK** LEDs light steadily and the **PS FAIL** LED is not lit.
   - For high-capacity AC power supplies, verify that the **DC OK** LED lights steadily and the **PS FAIL** LED is not lit. In addition, the **AC-1 OK** LED should light green steadily if the upper AC feed (on the chassis above the power supply) is connected and receiving power, and the **AC-2 OK** LED should light green steadily if the lower AC feed (on the power supply itself) is connected and receiving power.

   If any of the status LEDs indicates that the power supply is not functioning normally, repeat the installation and cabling procedures.

See Also

- Replacing an SRX5800 Services Gateway AC Power Supply on page 405
- Disconnecting an SRX5800 Services Gateway AC Power Supply Cord on page 411

Related Documentation

- SRX5800 Services Gateway High-Capacity AC Power Supply on page 92
- SRX5800 Services Gateway High-Capacity AC Power Supply LEDs on page 94
- SRX5800 Services Gateway Standard-Capacity AC Power Supply on page 95
- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 96
- SRX5800 Services Gateway AC Power Supply Specifications on page 133
- Replacing an SRX5800 Services Gateway AC Power Supply on page 405

Replacing an SRX5800 Services Gateway DC Power Supply

To replace a DC power supply, perform the following procedures:

1. Removing an SRX5800 Services Gateway DC Power Supply on page 413
2. Installing an SRX5800 Services Gateway DC Power Supply on page 416

Removing an SRX5800 Services Gateway DC Power Supply

Before you remove a power supply, be aware of the following:

NOTE: The minimum number of power supplies must be present in the services gateway at all times.

WARNING: Before performing 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 switch handle of the circuit breaker in the off position.

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

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

To remove a DC power supply (see Figure 158 on page 415):

1. Switch off the dedicated customer site circuit breaker for the power supply being removed. Follow your site's procedures for ESD.
2. Make sure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cables might become active during the removal process. If the services gateway is equipped with high-capacity DC power supplies, check both pairs of DC leads to make sure that the voltage is 0 V.
3. Verify that the **INPUT OK** LEDs on the power supply to be removed are not lit.
4. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
5. Move the DC circuit breaker on the power supply faceplate to the off (**O**) position.
6. Remove the clear plastic cover protecting the terminal studs on the faceplate.
7. Remove the nuts and washers from the terminal studs. (Use a 7/16-in. nut driver or socket wrench.)
8. Remove the cable lugs from the terminal studs.
9. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

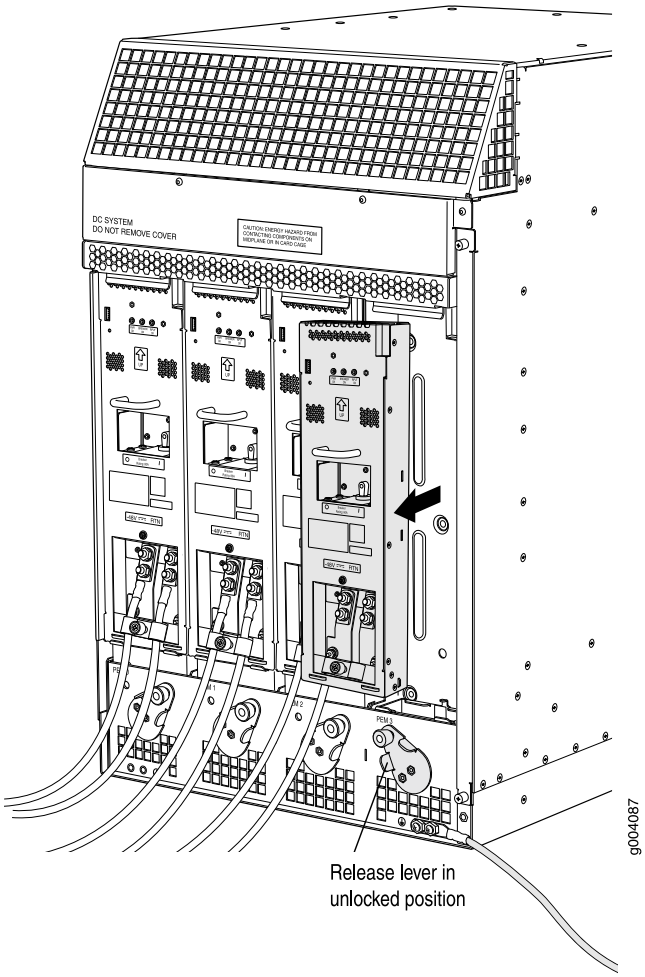
10. Carefully move the power cables out of the way.

11. While grasping the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops.

12. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

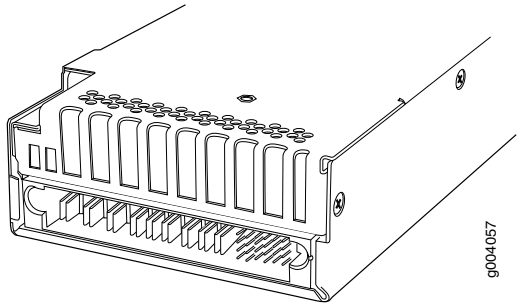
13. Pull the power supply straight out of the chassis. The power supply can weigh up to 12 lb (5.5 kg). Be prepared to accept its full weight.

Figure 158: Removing a DC Power Supply from the Services Gateway (Standard-Capacity Shown, High-Capacity Similar)



WARNING: Do not touch the power connector on the top of the power supply (see Figure 159 on page 416). It can contain dangerous voltages.

Figure 159: Top of the Power Supply Showing Midplane Connector



Connector end of AC or DC power supply

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Installing an SRX5800 Services Gateway DC Power Supply on page 190
- Replacing an SRX5800 Services Gateway DC Power Supply Cable on page 422

Installing an SRX5800 Services Gateway DC Power Supply

WARNING: Before performing 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 switch handle of the circuit breaker in the off position.

To install a DC power supply (see Figure 89 on page 192):

1. Verify that the power switch on the power supply is in the off (**O**) position.
2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
3. Move the switch or circuit breaker on the power supply faceplate to the off (**O**) position.

4. For a high-capacity DC power supply, configure the power supply for the number of DC feeds:

   a. Rotate the metal cover away from the input mode switch to expose the switch.

   b. Move the input mode switch to position **0** for one feed or position **1** for two feeds.

   NOTE: **The high-capacity DC power supply will operate with only one of its two DC inputs connected to a power feed. However, its DC output will be limited to a maximum of 1700 W. We recommend that you connect two DC power feeds to each high-capacity DC power supply.**

5. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.

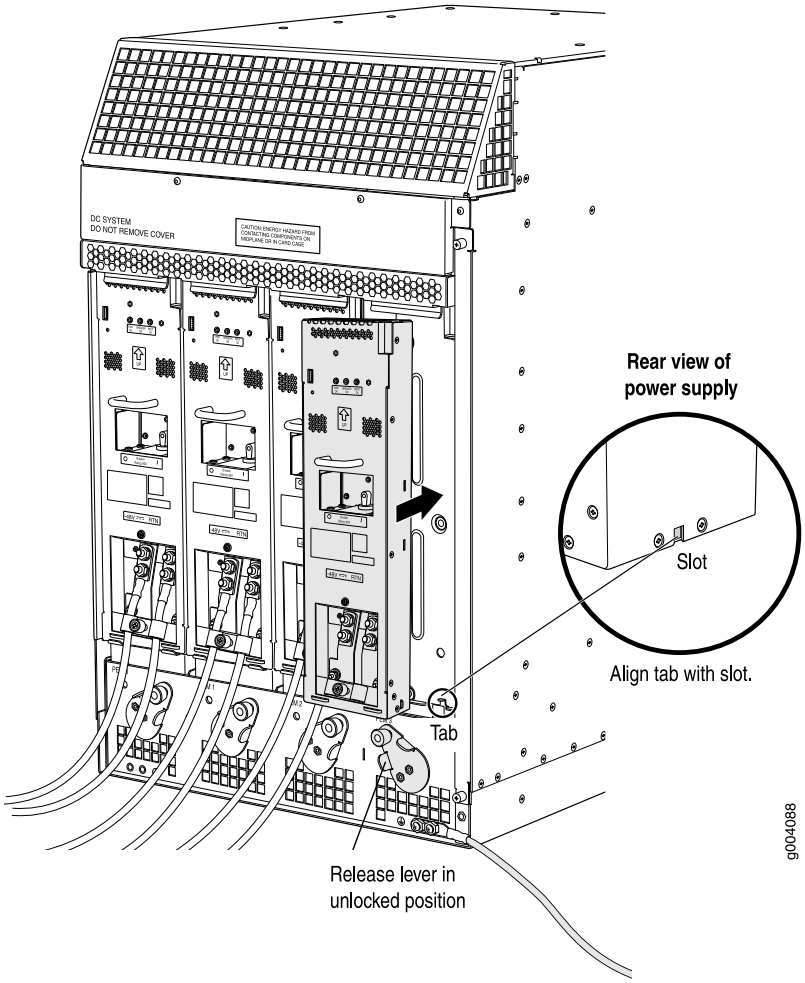
6. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 89 on page 192).

   If necessary, pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever counterclockwise until it stops. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

7. Using both hands, slide the power supply straight into the chassis until the power supply is fully seated in the chassis slot.

   The small tab on the metal housing that is controlled by the release lever must be inside of the corresponding slot at the bottom of the power supply (see Figure 89 on page 192). This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

Figure 160: Installing a DC Power Supply (Standard Capacity Shown, High-Capacity Similar)



8. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

9. Let go of the locking pin in the release lever. Ensure that the pin is seated inside the corresponding hole in the chassis.

10. Remove the clear plastic cover protecting the terminal studs on the faceplate.

11. Remove the nuts and washers from the terminal studs.

12. Secure each power cable lug to the terminal studs, first with the split washer, then with the nut.

CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

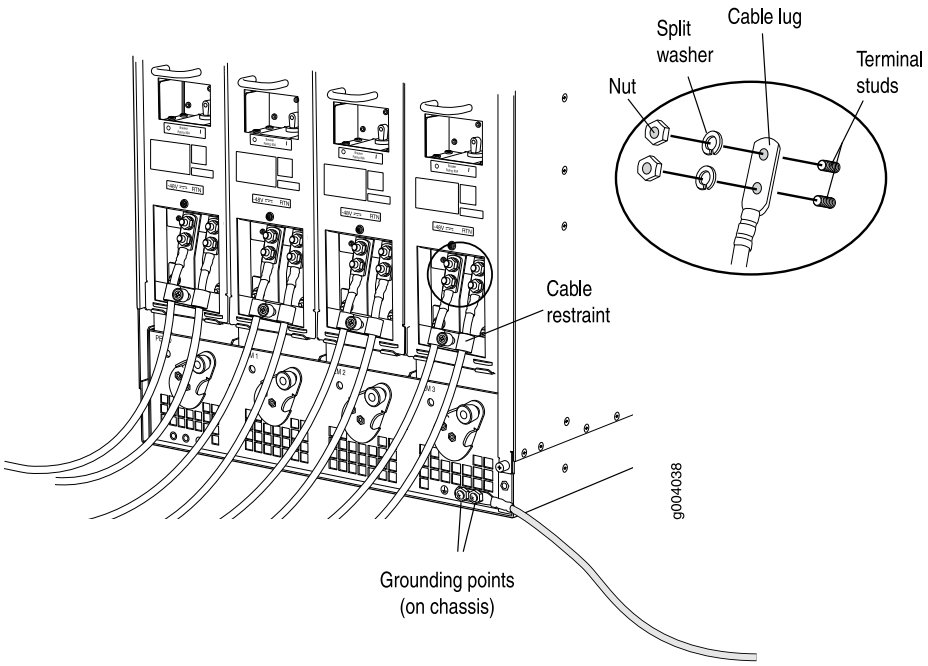
For a standard-capacity power supply:

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

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

c. Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each nut (see Figure 90 on page 193).

Figure 161: Connecting DC Power to a Standard-Capacity DC Power Supply



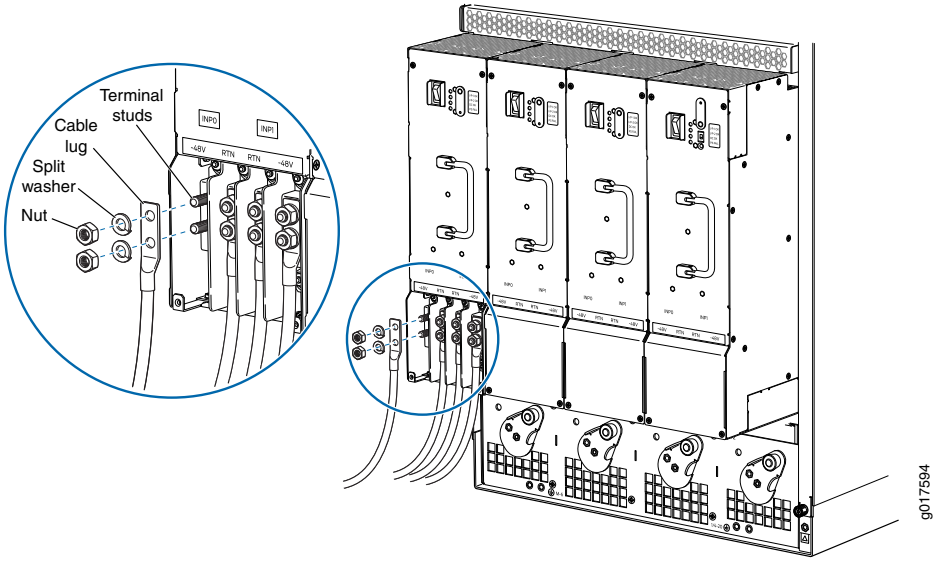
For a high-capacity power supply:

a. On **INP0**, attach the positive (+) DC source power cable lug to the **RTN** (return) terminal. Repeat this step for **INP1** if using two feeds.

b. On **INP0** attach the negative (–) DC source power cable lug to the –48V (input) terminal. Repeat this step for **INP1** if using two feeds.

c. Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each nut (see Figure 91 on page 194).

Figure 162: Connecting DC Power to a High-Capacity DC Power Supply



CAUTION: Ensure that each power cable lug seats flush against the surface of the terminal block as you are tightening the nuts. Ensure that each nut is properly threaded onto the terminal stud. The nut should be able to spin freely with your fingers when it is first placed onto the terminal stud. Applying installation torque to the nut when improperly threaded may result in damage to the terminal stud.

CAUTION: The maximum torque rating of the terminal studs on the DC power supply is 36 in-lb. (4.0 Nm). The terminal studs may be damaged if excessive torque is applied. Use only a torque-controlled driver or socket wrench to tighten nuts on the DC power supply terminal studs.

NOTE: The DC power supplies in slots PEM0 and PEM1 must be powered by dedicated power feeds derived from feed A, and the DC power supplies in PEM2 and PEM3 must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

13. For standard-capacity DC power supplies, secure each DC power cable to its strain relief bracket as follows:

    a. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

    b. Route the positive and negative DC power cables through the left and right sides of the cable restraint.

    c. Tighten the cable restraint captive screw to hold the power cables in place.

14. Replace the clear plastic cover over the terminal studs on the faceplate.

15. Verify that the power cabling is correct, that the cables are not touching, and that they do not block access to services gateway components or drape where people could trip on them.

16. Switch on the dedicated customer site circuit breaker.

17. Verify that the input LEDs on the power supply indicate that the DC power is connected properly:

    - For a standard-capacity power supply, verify that the **INPUT OK** LED on the power supply is lit steadily.
    - For a high-capacity power supply, verify that the **INP0 OK** or **INP1 OK** LEDs on the power supply are lit green steadily. If using two feeds, verify that both **INP0 OK** and **INP1 OK** LEDs on the power supply are lit steadily

NOTE: An input LED will be lit amber if that input's voltage is in reverse polarity. Check the polarity of the power cables to fix the condition

18. Move the switch or circuit breaker on the DC power supply to the on (**|**) position .

19. Verify that the output LEDs on the power supply indicate that it is operating properly:

- For a standard-capacity power supply, verify that the **BREAKER ON** and **PWR OK** LEDs are lit steadily.
- For a high-capacity power supply, verify that the **DC OK** LED is lit, and that the **PS FAIL** LED is not lit.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Removing an SRX5800 Services Gateway DC Power Supply on page 413
- Disconnecting an SRX5800 Services Gateway DC Power Supply Cable on page 422
- Connecting an SRX5800 Services Gateway DC Power Supply Cable on page 423

Related Documentation

- SRX5800 Services Gateway High-Capacity DC Power Supply on page 97
- SRX5800 Services Gateway High-Capacity DC Power Supply LEDs on page 99
- SRX5800 Services Gateway Standard-Capacity DC Power Supply on page 100
- SRX5800 Services Gateway Standard-Capacity DC Power Supply LEDs on page 101
- Replacing an SRX5800 Services Gateway DC Power Supply Cable on page 422
- SRX5800 Services Gateway DC Power Supply Specifications on page 137

Replacing an SRX5800 Services Gateway DC Power Supply Cable

To replace an SRX5800 Services Gateway DC power supply cable, perform the following procedures:

1. Disconnecting an SRX5800 Services Gateway DC Power Supply Cable on page 422
2. Connecting an SRX5800 Services Gateway DC Power Supply Cable on page 423

Disconnecting an SRX5800 Services Gateway DC Power Supply Cable

WARNING: **Before performing 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 switch handle of the circuit breaker in the off position.**

To disconnect a power cable for a DC power supply:

1. Switch off the dedicated customer site circuit breaker for the power supply being removed. Follow your site's procedures for ESD.
2. Make sure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cables might become active during the removal process.

3. Verify that the input LEDs on the power supply are not lit (**INPUT OK** for a standard-capacity power supply, **INP0 OK** and **INP1 OK** for a high-capacity power supply).

4. Remove the power cable from the external DC power source.

5. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

6. Move the DC circuit breaker on the power supply faceplate to the off (**O**) position.

7. Remove the clear plastic cover protecting the terminal studs on the faceplate.

8. Remove the nut and washer from the terminal studs. (Use a 7/16–in. nut driver or socket wrench.)

9. Remove the cable lug from the terminal studs.

10. For a standard-capacity power supply, loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

11. Carefully move the power cable out of the way.

See Also

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Replacing an SRX5800 Services Gateway DC Power Supply on page 413
- Connecting an SRX5800 Services Gateway DC Power Supply Cable on page 423

Connecting an SRX5800 Services Gateway DC Power Supply Cable

WARNING: **Before performing 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 switch handle of the circuit breaker in the off position.**

To connect a power cable for a DC power supply:

1. Locate a replacement power cable that meets the specifications defined in "DC Power Cable Specifications for the SRX5800 Services Gateway" on page 138.

2. Verify that a licensed electrician has attached a cable lug to the replacement power cable.

3. Verify that the input LEDs on the power supply are not lit (**INPUT OK** for a standard-capacity power supply, **INP0 OK** and **INP1 OK** for a high-capacity power supply).

4. Secure the power cable lug to the terminal studs, first with the split washer, then with the nut. Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each nut (see Figure 163 on page 424 and Figure 164 on page 425).

Figure 163: Connecting Power Cables to a Standard Capacity DC Power Supply

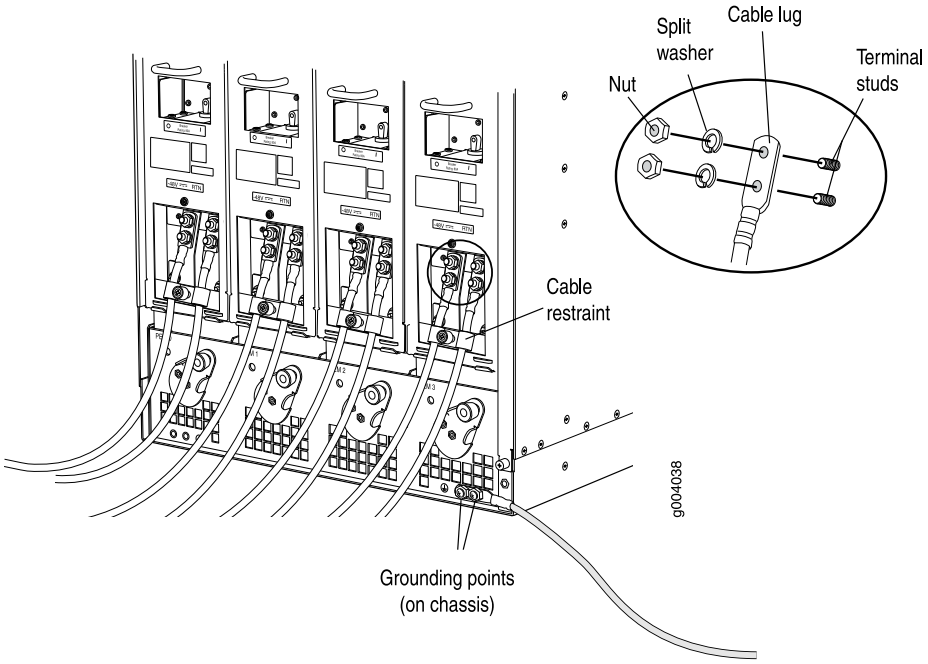
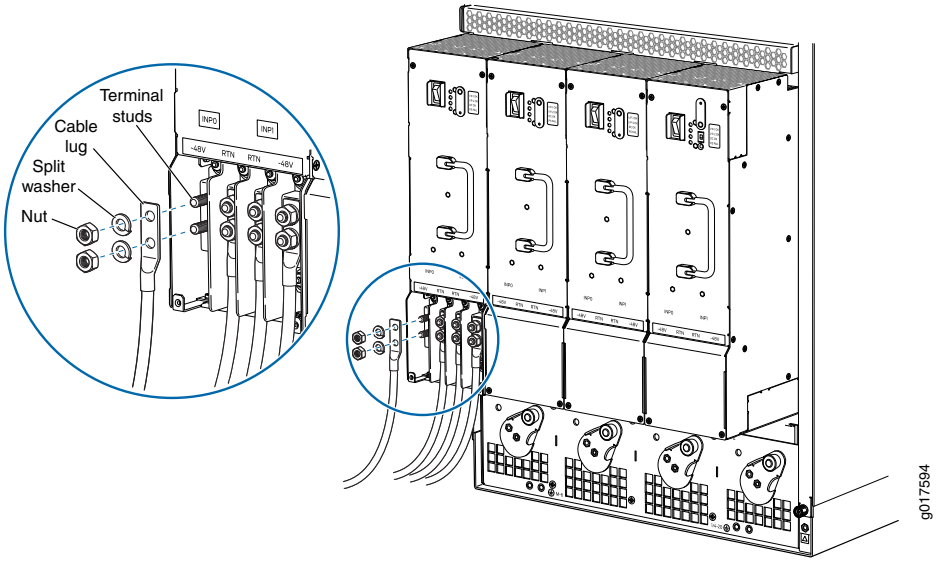


Figure 164: Connecting DC Power Cables to a High-Capacity DC Power Supply



5. For standard-capacity DC power supplies, secure each DC power cable to its strain relief bracket as follows:

   a. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

   b. Route the positive and negative DC power cables through the left and right sides of the cable restraint.

   c. Tighten the cable restraint captive screw to hold the power cables in place.

6. Verify that the DC power cable is connected correctly, that it does not touch or block access to services gateway components, and that it does not drape where people could trip on it.

7. Replace the clear plastic cover over the terminal studs on the faceplate.

8. Attach the power cable to the DC power source.

9. Turn on the dedicated customer site circuit breaker to the power supply.

10. Verify that the input LEDs on the power supply are lit (**INPUT OK** for a standard-capacity power supply, **INP0 OK** and **INP1 OK** for a high-capacity power supply).

11. Move the DC circuit breaker on the power supply to the on (**|**) position and verify that the output LEDs on the power supply indicate that it is operating properly:

    - For a standard-capacity power supply, verify that the **BREAKER ON** and **PWR OK** LEDs are lit steadily.
    - For a high-capacity power supply, verify that the **DC OK** LED is lit, and that the **PS FAIL** LED is not lit.

See Also

- DC Power Cable Specifications for the SRX5800 Services Gateway on page 138
- Replacing an SRX5800 Services Gateway DC Power Supply on page 413
- Disconnecting an SRX5800 Services Gateway DC Power Supply Cable on page 422

Related Documentation

- SRX5800 Services Gateway High-Capacity DC Power Supply on page 97
- SRX5800 Services Gateway High-Capacity DC Power Supply LEDs on page 99
- SRX5800 Services Gateway Standard-Capacity DC Power Supply on page 100
- SRX5800 Services Gateway Standard-Capacity DC Power Supply LEDs on page 101
- Replacing an SRX5800 Services Gateway DC Power Supply on page 413
- SRX5800 Services Gateway DC Power Supply Specifications on page 137

CHAPTER 31

Contacting Customer Support

Contacting Customer Support

Once you have located the serial numbers of the services gateway or component, you can return the services gateway or component for repair or replacement. For this, you need to contact Juniper Networks Technical Assistance Center (JTAC).

You can contact JTAC 24 hours a day, 7 days a week, using any of the following methods:

- On the Web: Using the Case Manager link at https://www.juniper.net/support/
- By telephone:
  - From the US and Canada: 1-888-314-JTAC
  - From all other locations: 1-408-745-9500

NOTE: If contacting JTAC by telephone, enter your 11-digit case number followed by the pound (#) key if this is an existing case, or press the star (*) key to be routed to the next available support engineer.

Related Documentation

- Information You Might Need to Supply to JTAC on page 434

Return Procedure for the SRX5800 Services Gateway

If a problem cannot be resolved by the JTAC technician, a Return Materials Authorization (RMA) is issued. This number is used to track the returned material at the factory and to return repaired or new components to the customer as needed.

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

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

To return a services gateway or component to Juniper Networks for repair or replacement:

1. Determine the part number and serial number of the services gateway or component. For the serial number locations of cards and modules such as MPCs, SPCs, port modules and Routing Engines, see the *SRX5400, SRX5600, and SRX5800 Services Gateway Card Reference* at www.juniper.net/documentation/.
2. Obtain a Return Materials Authorization (RMA) number from JTAC.

   NOTE: Do not return the services gateway or 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 via collect freight.
3. Pack the services gateway or component for shipping.

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

For product problems or technical support issues, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-JTAC (within the United States) or 1-408-745-9500 (outside the United States).

Related Documentation

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 429
- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 430
- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 431

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 433
- Information You Might Need to Supply to JTAC on page 434
- Contacting Customer Support on page 427

Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface

Before contacting Juniper Networks, Inc. to request a Return Materials Authorization (RMA), you must find the serial number on the services gateway or component. To display all of the services gateway components and their serial numbers, enter the following command-line interface (CLI) command:

```
user@host> show chassis hardware

Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                JN10B7ACDAGA      SRX 5800
Midplane         REV 03   710-013698   TR0813            SRX 5800 Backplane
FPM Board        REV 03   710-014974   KC3418            Front Panel Display
PDM              Rev 03   740-013110   QCS1122501L       Power Distribution Modu
le
PEM 1            Rev 03   740-013682   QCS1130409T       PS 1.7kW; 200-240VAC in
PEM 2            Rev 03   740-013682   QCS1130409M       PS 1.7kW; 200-240VAC in
Routing Engine 0 REV 06   740-015113   1000697051        RE-S-1300
CB 0             REV 07   710-013385   KC0433            SRX5k SCB
CB 1             REV 07   710-013385   KC0259            SRX5k SCB
FPC 6            REV 03   750-020235   JS4722            SRX5k DPC 40x 1GE
  CPU            REV 06   710-013713   JZ4019            DPC PMB
  PIC 0                   BUILTIN      BUILTIN           10x 1GE RichQ
    Xcvr 0       REV 01   740-011782   PAQ2K01           SFP-SX
    Xcvr 1       REV 01   740-014132   61531018          SFP-T
    Xcvr 2       REV 01   740-013111   7303709           SFP-T
    Xcvr 4       REV 01   740-011782   PAQ2JZP           SFP-SX
    Xcvr 5       REV 01   740-013111   8043356           SFP-T
    Xcvr 6       REV 01   740-013111   8043257           SFP-T
    Xcvr 7       REV 01   740-013111   8043300           SFP-T
    Xcvr 8       REV 01   740-013111   8043215           SFP-T
    Xcvr 9       REV 01   740-013111   8043184           SFP-T
  PIC 1                   BUILTIN      BUILTIN           10x 1GE RichQ
    Xcvr 0       0        NON-JNPR     AM0619193B        SFP-SX
    Xcvr 9       0        NON-JNPR     AJ054100PH        SFP-SX
  PIC 2                   BUILTIN      BUILTIN           10x 1GE RichQ
    Xcvr 1       REV 01   740-014132   61522010          SFP-T
    Xcvr 2       REV 01   740-013111   7303481           SFP-T
    Xcvr 4       REV 01   740-011782   PAQ2K0H           SFP-SX
    Xcvr 5       REV 01   740-013111   8043179           SFP-T
    Xcvr 6       REV 01   740-013111   7522572           SFP-T
    Xcvr 7       REV 01   740-013111   8043157           SFP-T
    Xcvr 8       REV 01   740-013111   7522678           SFP-T
    Xcvr 9       REV 01   740-013111   7522683           SFP-T
  PIC 3                   BUILTIN      BUILTIN           10x 1GE RichQ
    Xcvr 0       0        NON-JNPR     AJ06080TKC        SFP-SX
    Xcvr 9       0        NON-JNPR     AJ06020HSJ        SFP-SX
FPC 7            BB_P2_28 710-013699   JS4812            SRX5k SPC
  CPU            REV 06   710-013713   KA7426            DPC PMB
```

```
  PIC 0                    BUILTIN      BUILTIN          SPU Cp
  PIC 1                    BUILTIN      BUILTIN          SPU Flow
Fan Tray 0       REV 04   740-014971   TP1433           Fan Tray
Fan Tray 1       REV 04   740-014971   TP1636           Fan Tray
```

Most components also have a small rectangular serial number ID label (see Figure 165 on page 430) attached to the component body.

Figure 165: Serial Number ID Label

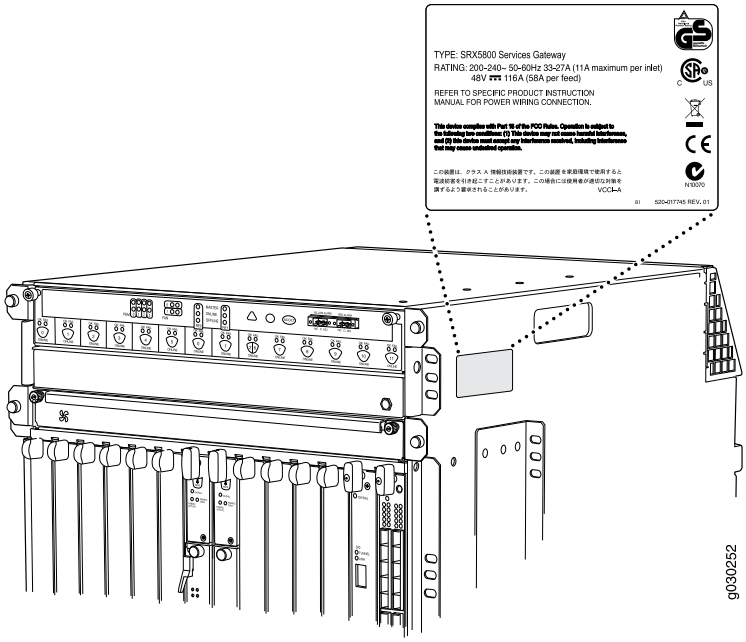
Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 428
- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 430
- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 431
- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 433

Locating the SRX5800 Services Gateway Chassis Serial Number Label

The chassis serial number label is located on the side of the chassis (see Figure 166 on page 430).

Figure 166: SRX5800 Chassis Serial Number Label



Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 428

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 429
- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 431
- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 433

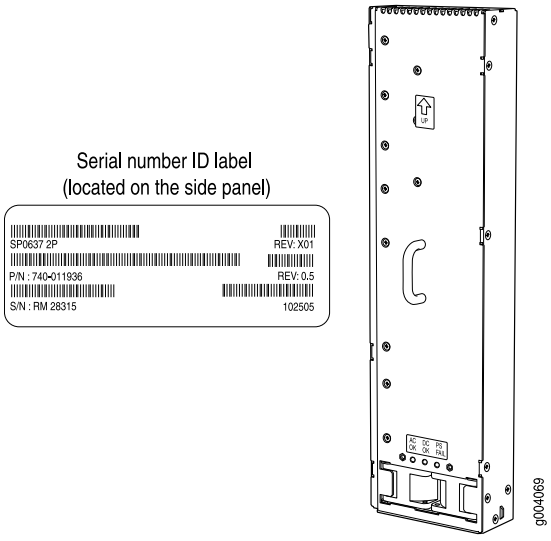
Locating the SRX5800 Services Gateway Power Supply Serial Number Label

If you are returning an AC or a DC power supply to Juniper Networks for repair or replacement, you must locate the serial number of the 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).

The location of the serial number labels on Standard-Capacity and High Capacity AC or DC power supplies is explained below:

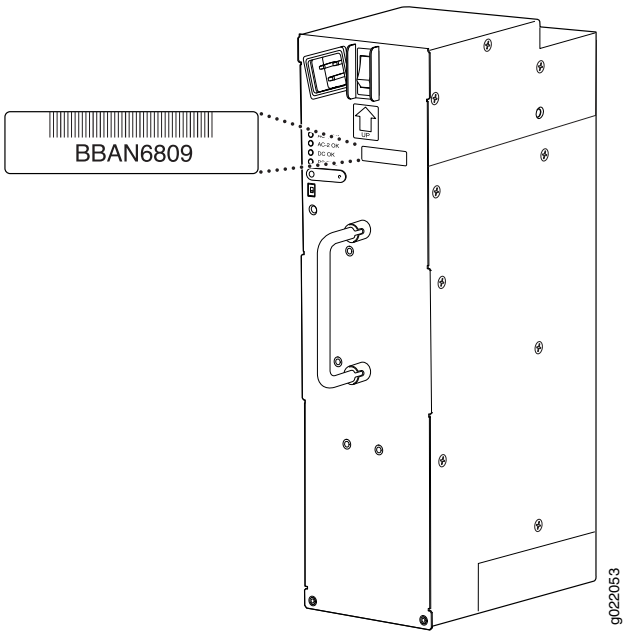
- AC Power Supplies:
  - Standard-Capacity AC Power Supply—The serial number label is on the AC power supply faceplate under the on/off switch. See Figure 167 on page 431.

Figure 167: Standard-Capacity AC Power Supply Serial Number Label



  - High-Capacity AC Power Supply—The serial number label is on the top of the AC power supply. See Figure 168 on page 432.

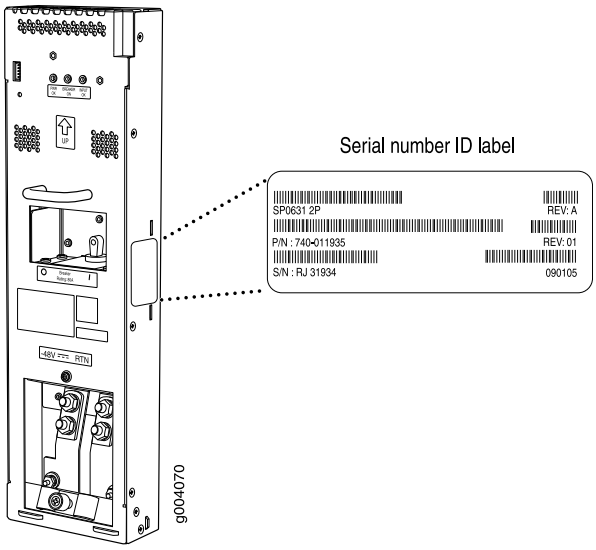
Figure 168: High-Capacity AC Power Supply Serial Number Label



DC power Supplies:

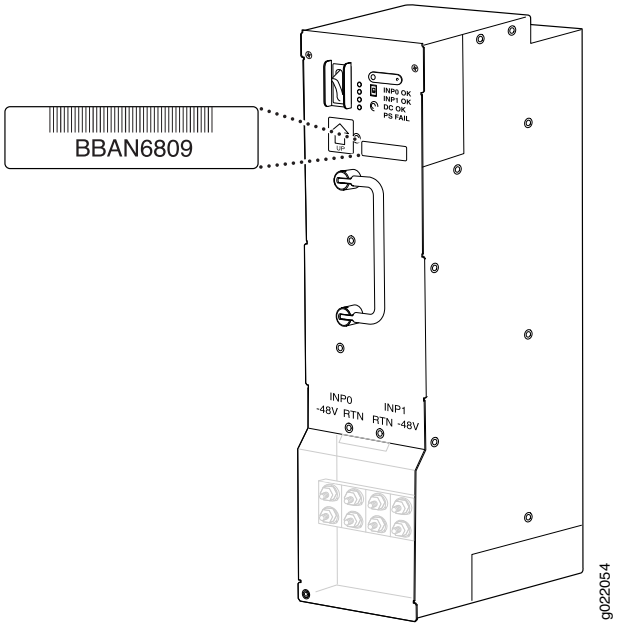
- Standard-Capacity DC Power Supply—The serial number label is on the DC power supply faceplate under the circuit breaker switch. See Figure 169 on page 432.

Figure 169: Standard-Capacity DC Power Supply Serial Number Label



- High-Capacity DC Power Supply—The serial number label is on the top of the DC power supply. See Figure 170 on page 433.

Figure 170: High-Capacity DC Power Supply Serial Number Label



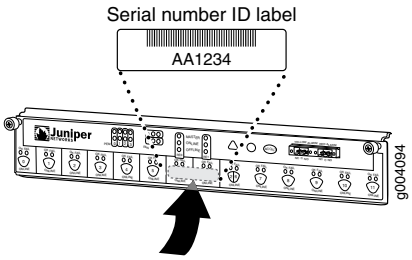
Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 428
- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 429
- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 430
- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 433

Locating the SRX5800 Services Gateway Craft Interface Serial Number Label

The serial number is located on the back of the craft interface panel (see Figure 171 on page 433).

Figure 171: Craft Interface Serial Number Label



Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 428
- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 429
- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 430
- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 431

Information You Might Need to Supply to JTAC

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

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

Related Documentation

- Contacting Customer Support on page 427

Required Tools and Parts for Packing the SRX5800 Services Gateway

To remove components from the services gateway or the services gateway from a rack, you need the following tools and parts:

- 2.5-mm flat-blade (–) screwdriver, for detaching alarm relay terminal block
- 7/16-in. (11 mm) nut driver
- Blank panels to cover empty slots
- Electrostatic bag or antistatic mat, for each component
- Electrostatic discharge (ESD) grounding wrist strap
- Flat-blade (–) screwdriver
- Mechanical lift, if available
- Phillips (+) screwdrivers, numbers 1 and 2
- Rubber safety cap for fiber-optic interfaces or cable
- Wire cutters

Related Documentation

- Packing the SRX5800 Services Gateway for Shipment on page 435
- Packing SRX5800 Services Gateway Components for Shipment on page 436

Packing the SRX5800 Services Gateway for Shipment

To pack the services gateway for shipment:

1. Retrieve the shipping crate and packing materials in which the services gateway was originally shipped. If you do not have these materials, contact your Juniper Networks representative about approved packaging materials.

2. On the console or other management device connected to the master Routing Engine, enter CLI operational mode and issue the following command to shut down the services gateway software.

   ```
   user@host> request system halt
   ```

   Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see *Junos OS System Basics and Services Command Reference* at www.juniper.net/documentation/.

3. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

4. Shut down power to the services gateway by pressing the AC input switch or DC circuit breaker for all power supplies to the off (**O**) position.

5. Disconnect power from the services gateway.

6. Remove the cables that connect to all external devices.

7. Remove all field replaceable units (FRUs) from the services gateway.

8. Remove the services gateway chassis from the rack:

   - If you are using a mechanical lift, place the lift platform under the chassis, unscrew and remove the mounting screws from the rack, and move the chassis to the shipping crate.
   - If you are not using a mechanical lift and the chassis weight is fully supported by a shelf or another device, unscrew and remove the mounting screws from the rack. Three people can then lift the chassis and move it to the shipping crate.
   - If you are not using a mechanical lift and the chassis weight is not fully supported by a shelf or another device, three people should grasp the chassis while a fourth person unscrews and removes the mounting screws from the rack. The three lifters can then move the chassis to the shipping container.

9. Place the services gateway in the shipping crate or onto the pallet. If on a pallet, bolt the services gateway to the pallet.

10. Cover the services gateway with an ESD bag and place the packing foam on top of and around the services gateway.

11. Replace the accessory box on top of the packing foam.

12. Securely tape the box closed or place the crate cover over the services gateway.

13. Write the RMA number on the exterior of the box to ensure proper tracking.

Related Documentation

- *Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway*
- Powering Off the SRX5800 Services Gateway on page 253
- Disconnecting an SRX5800 Services Gateway AC Power Supply Cord on page 411
- Disconnecting an SRX5800 Services Gateway DC Power Supply Cable on page 422
- Return Procedure for the SRX5800 Services Gateway on page 428
- Required Tools and Parts for Packing the SRX5800 Services Gateway on page 434
- Packing SRX5800 Services Gateway Components for Shipment on page 436

Packing SRX5800 Services Gateway Components for Shipment

Follow these guidelines for packing and shipping individual components of the services gateway:

- When you return a component, make sure that it is adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
- Use the original shipping materials if they are available.
- Place the individual component in an electrostatic bag.
- Write the Return Materials Authorization (RMA) number on the exterior of the box to ensure proper tracking.

CAUTION: **Do not stack any of the services gateway components during packing.**

Related Documentation

- Required Tools and Parts for Packing the SRX5800 Services Gateway on page 434
- Packing the SRX5800 Services Gateway for Shipment on page 435

PART 6

Safety Guidelines

CHAPTER 32

General Safety Information

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 468
- General Electrical Safety Guidelines and Warnings on page 465
- Maintenance and Operational Safety Guidelines and Warnings on page 459
- Installation Instructions Warning on page 447
- Grounded Equipment Warning on page 453

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 vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

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

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

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning

måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

Related Documentation

- General Safety Guidelines and Warnings on page 439
- Installation Instructions Warning on page 447
- Maintenance and Operational Safety Guidelines and Warnings on page 459
- Grounded Equipment Warning on page 453
- Laser and LED Safety Guidelines and Warnings on page 455
- *Laser and LED Safety Guidelines and Warnings for the ACX5000 Router*
- Warning Statement for Norway and Sweden on page 445

Restricted Access Area Warning

WARNING: The services gateway 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

- Definitions of Safety Warning Levels on page 440
- General Safety Guidelines and Warnings on page 439
- Qualified Personnel Warning on page 444
- Prevention of Electrostatic Discharge Damage on page 466

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.

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

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

Related Documentation

- General Safety Guidelines and Warnings on page 439
- General Electrical Safety Guidelines and Warnings on page 465
- Action to Take After an Electrical Accident on page 482

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- AC Power Electrical Safety Guidelines on page 468
- *DC Power Electrical Safety Guidelines for Switches*

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 439

CHAPTER 33

Installation and Maintenance Safety Guidelines and Warnings

Installation Instructions Warning

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

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

Varoitus Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.

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 439
- Laser and LED Safety Guidelines and Warnings on page 455
- *Laser and LED Safety Guidelines and Warnings for the ACX5000 Router*
- Grounded Equipment Warning on page 453

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 439
- Installation Instructions Warning on page 447

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 439
- Installation Instructions Warning on page 447
- Grounded Equipment Warning on page 453

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

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

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

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

¡Atención! Para evitar lesiones durante el montaje de este equipo sobre un bastidor, 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 439

- Installation Instructions Warning on page 447
- Grounded Equipment Warning on page 453

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 isäntälaite 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 439
- AC Power Electrical Safety Guidelines on page 468
- *DC Power Electrical Safety Guidelines for Switches*

CHAPTER 34

Radiation and Laser Warnings

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

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 439
- Radiation from Open Port Apertures Warning on page 457
- Installation Instructions Warning on page 447
- Grounded Equipment Warning on page 453

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 emiteres fra portens åpning når det ikke er tilkoblet en fiberkabel.

Aviso Dada a possibilidade de emissão de radiação invisível através do orifício da via de acesso, quando esta não tiver nenhum cabo de fibra conectado, deverá evitar 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 439
- Laser and LED Safety Guidelines and Warnings on page 455
- *Laser and LED Safety Guidelines and Warnings for the ACX5000 Router*
- Installation Instructions Warning on page 447
- Grounded Equipment Warning on page 453

CHAPTER 35

Maintenance and Operational Safety Guidelines and Warnings

Maintenance and Operational Safety Guidelines and Warnings

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

Battery Handling Warning

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

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

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

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.

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

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 aperturas para ventilación.

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

Product Disposal Warning

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

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

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

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- AC Power Electrical Safety Guidelines on page 468
- *DC Power Electrical Safety Guidelines for Switches*
- Laser and LED Safety Guidelines and Warnings on page 455
- *Laser and LED Safety Guidelines and Warnings for the ACX5000 Router*
- Installation Instructions Warning on page 447
- Grounded Equipment Warning on page 453

CHAPTER 36

Electrical Safety Guidelines and Warnings

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 metallically connected to interfaces that connect to the OSP or its wiring. The intrabuilding ports on the device are suitable for connection to intrabuilding or unexposed wiring or cabling only. The addition of primary protectors is not sufficient protection for connecting these interfaces metallically to OSP wiring.

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 439
- AC Power Electrical Safety Guidelines on page 468
- *DC Power Electrical Safety Guidelines for Switches*

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 172 on page 467) 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.

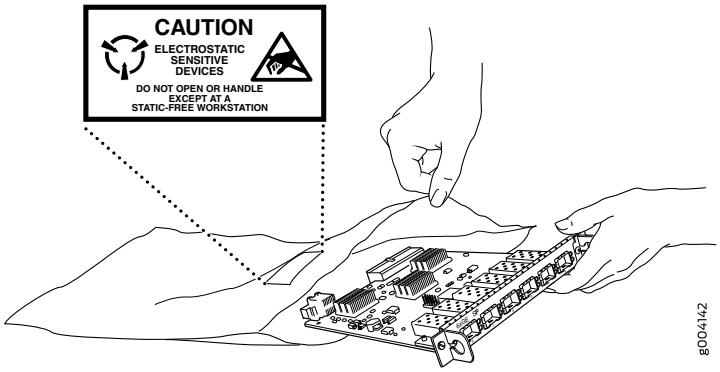
- When handling any component that is subject to ESD damage and that is removed from the device, make sure the equipment end of your ESD grounding strap is attached to the ESD point on the chassis.

  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 172 on page 467). If you are returning a component, place it in an antistatic bag before packing it.

Figure 172: 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 439

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 (for two-pole or four-pole based on your requirement) 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。

Related Documentation

- General Safety Guidelines and Warnings on page 439
- General Electrical Safety Guidelines and Warnings on page 465
- Multiple Power Supplies Disconnection Warning on page 481

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- AC Power Electrical Safety Guidelines on page 468

DC Power Electrical Safety Guidelines

DC Power Electrical Safety Guidelines

The following electrical safety guidelines apply to a DC-powered services gateway:

- A DC-powered services gateway is equipped with a DC terminal block that is rated for the power requirements of a maximally configured services gateway. To supply sufficient power, terminate the DC input wiring on a facility DC source capable of supplying at least 30 A @ -48 VDC for the system. We recommend that the 48 VDC facility DC source be equipped with a circuit breaker rated at 40 A (-48 VDC) minimum, or as required by local code. Incorporate an easily accessible disconnect device into the facility wiring. In the United States and Canada, the -48 VDC facility should be equipped with a circuit breaker rated a minimum of 125% of the power provisioned for the input in accordance with the National Electrical Code in the US and the Canadian Electrical Code in Canada. 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. Use appropriate gauge wire to handle up to 40 A.
- A DC-powered services gateway 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 should protect against excess currents, short circuits, and earth faults in accordance with NEC ANSI/NFPA70.

- 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 services gateway and the supply side of the DC wiring.
- The marked input voltage of -48 VDC for a DC-powered services gateway 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 services gateway is a positive ground system, you must connect the positive lead to the terminal labeled **RETURN**, the negative lead to the terminal labeled **-48V**, and the earth ground to the chassis grounding points.

DC Power Disconnection Warning

WARNING: Before performing any of the following 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 switch 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.

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 unit. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When installing the services gateway, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

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.

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 should 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 V naar – 48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, -48 V varten – 48 V. Oikea irrotettava kytkentajarjestys on -48 V varten – 48 V, +RTN varten +RTN, maajohto maajohtoon.

Attention Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis -48 V à -48 V. En débranchant la puissance, l'ordre approprié de câblage est -48 V à -48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, -48 V til – 48 V. Riktig frakoples tilkoplingssekvens er -48 V til – 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se muele para moler, +RTN a +RTN, entonces -48 V a -48 V. Al desconectar potencia, la secuencia apropiada del cableado es -48 V a -48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados na extremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então -48 V a -48 V. Ao desconectar a potência, a seqüência apropriada da fiação é -48 V a -48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

Varning! Korrekt kopplingssekvens ar jord till jord, +RTN till +RTN, -48 V till – 48 V. Korrekt kopplas kopplingssekvens ar -48 V till -48 V, +RTN till +RTN, jord till jord.

DC Power Wiring Terminations Warning

WARNING: When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

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 Verdrahtungsanschlüsse, z.B. Ringoesen oder gabelförmige Kabelschuhe mit nach oben gerichteten Enden zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

Avvertenza Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori

devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Related Documentation

- Action to Take After an Electrical Accident on page 482
- General Electrical Safety Guidelines and Warnings on page 465
- AC Power Electrical Safety Guidelines on page 468

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Grounding Requirements and Warning on page 477
- DC Power Wiring Sequence Warning on page 478
- DC Power Wiring Terminations Warning on page 479

DC Power Grounding Requirements and Warning

An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors but is identifiable by green and yellow stripes is installed as part of the branch circuit that supplies the device. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When you install the device, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

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 439

- General Electrical Safety Guidelines and Warnings on page 465
- *DC Power Electrical Safety Guidelines for Switches*
- *DC Power Copper Conductors Warning*
- DC Power Disconnection Warning on page 475
- DC Power Wiring Sequence Warning on page 478
- DC Power Wiring Terminations Warning on page 479

DC Power Wiring Sequence Warning

WARNING: Wire the DC power supply using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then –48 V to –48 V. When disconnecting power, the proper wiring sequence is –48 V to –48 V, +RTN to +RTN, then ground to ground. Note that the ground wire must always be connected first and disconnected last.

Waarschuwing De juiste bedradingsvolgorde verbonden is aarde naar aarde, +RTN naar +RTN, en –48 V naar – 48 V. De juiste bedradingsvolgorde losgemaakt is en –48 naar –48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, –48 V varten – 48 V. Oikea irrotettava kytkentajarjestys on –48 V varten – 48 V, +RTN varten +RTN, maajohto maajohtoon.

Attention Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis –48 V à –48 V. En débranchant la puissance, l'ordre approprié de câblage est –48 V à –48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, –48 V til – 48 V. Riktig frakoples tilkoplingssekvens er –48 V til – 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se muele para moler, +RTN a +RTN, entonces –48 V a –48 V. Al desconectar potencia, la secuencia apropiada del cableado es –48 V a –48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados na extremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então –48 V a –48 V. Ao desconectar a potência, a seqüência apropriada da fiação é –48 V a –48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Disconnection Warning on page 475
- DC Power Grounding Requirements and Warning on page 477
- DC Power Wiring Terminations Warning on page 479

DC Power Wiring Terminations Warning

WARNING: When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations must be the appropriate size for the wires and must clamp both the insulation and conductor.

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog

wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

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 forcella con linguette rivolte verso l'alto. I connettori devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Related Documentation

- General Safety Guidelines and Warnings on page 439
- General Electrical Safety Guidelines and Warnings on page 465
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Disconnection Warning on page 475
- DC Power Grounding Requirements and Warning on page 477
- DC Power Wiring Sequence Warning on page 478

Multiple Power Supplies Disconnection Warning

WARNING: The network device has more than one power supply connection. All connections must be removed completely to remove power from the unit completely.

Waarschuwing Deze eenheid heeft meer dan één stroomtoevoerverbinding; alle verbindingen moeten volledig worden verwijderd om de stroom van deze eenheid volledig te verwijderen.

Varoitus Tässä laitteessa on useampia virtalähdekytkentöjä. Kaikki kytkennät on irrotettava kokonaan, jotta virta poistettaisiin täysin laitteesta.

Attention Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.

Warnung Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

Avvertenza Questa unità ha più di una connessione per alimentatore elettrico; tutte le connessioni devono essere completamente rimosse per togliere l'elettricità dall'unità.

Advarsel Denne enheten har mer enn én strømtilkobling. Alle tilkoblinger må kobles helt fra for å eliminere strøm fra enheten.

Aviso Este dispositivo possui mais do que uma conexão de fonte de alimentação de energia; para poder remover a fonte de alimentação de energia, deverão ser desconectadas todas as conexões existentes.

¡Atención! Esta unidad tiene más de una conexión de suministros de alimentación; para eliminar la alimentación por completo, deben desconectarse completamente todas las conexiones.

Varning! Denna enhet har mer än en strömförsörjningsanslutning; alla anslutningar måste vara helt avlägsnade innan strömtillförseln till enheten är fullständigt bruten.

Related Documentation

- General Safety Guidelines and Warnings on page 439
- General Electrical Safety Guidelines and Warnings on page 465
- AC Power Electrical Safety Guidelines on page 468
- *DC Power Electrical Safety Guidelines for Switches*

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- Grounded Equipment Warning on page 453
- Multiple Power Supplies Disconnection Warning on page 481

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 439
- General Electrical Safety Guidelines and Warnings on page 465
- AC Power Electrical Safety Guidelines on page 468
- *DC Power Electrical Safety Guidelines for Switches*

CHAPTER 37

Agency Approvals and Regulatory Compliance Information

SRX5800 Services Gateway Agency Approvals

The services gateway complies with the following standards:

- Safety
  - CSA 60950-1 (2003) Safety of Information Technology Equipment
  - UL 60950-1 (2003) Safety of Information Technology Equipment
  - EN 60950-1 (2001) Safety of Information Technology Equipment
  - IEC 60950-1 (2001) Safety of Information Technology Equipment (with country deviations)
  - EN 60825-1 +A1+A2 (1994) Safety of Laser Products - Part 1: Equipment Classification
- NEBS
  - GR-63-CORE
  - GR-1089-CORE
- EMC
  - EN 300 386 V1.3.3 (2005) Telecom Network Equipment - EMC requirements
- EMI
  - FCC Part 15 Class A (2007) USA Radiated Emissions
  - EN 55022 Class A (2006) European Radiated Emissions
  - VCCI Class A (2007) Japanese Radiated Emissions
- Immunity

- EN 55024 +A1+A2 (1998) Information Technology Equipment Immunity Characteristics
- EN-61000-3-2 (2006) Power Line Harmonics
- EN-61000-3-3 +A1 +A2 +A3 (1995) Power Line Voltage Fluctuations
- EN-61000-4-2 +A1 +A2 (1995) Electrostatic Discharge
- EN-61000-4-3 +A1+A2 (2002) Radiated Immunity
- EN-61000-4-4 (2004) Electrical Fast Transients
- EN-61000-4-5 (2006) Surge
- EN-61000-4-6 (2007) Immunity to Conducted Disturbances
- EN-61000-4-11 (2004) Voltage Dips and Sags

Related Documentation

- *In Case of Electrical Accident*
- *General Electrical Safety Guidelines and Warnings*
- *DC Power Electrical Safety Guidelines and Warnings*

SRX5800 Services Gateway Compliance Statements for EMC Requirements

Canada

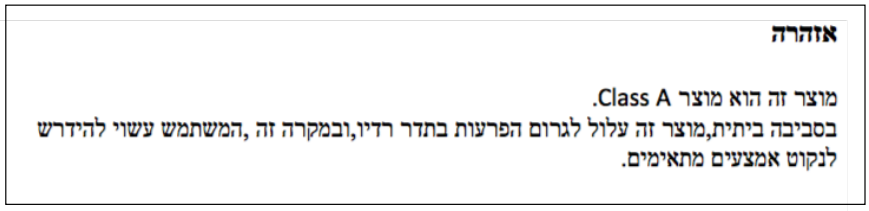
This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Community

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

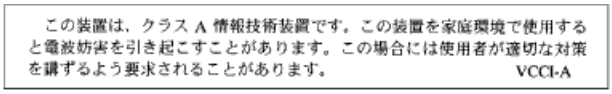
Israel



The preceding translates as follows:

This product is Class A. In residential environments, the product may cause radio interference, and in such a situation, the user may be required to take adequate measures.

Japan



The preceding translates as follows:

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

VCCI-A

United States

The services gateway has been tested and found to comply with the limits for a Class A digital device of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Related Documentation

- SRX5800 Services Gateway Agency Approvals on page 485