JUNIPER
NETWORKS

SRX5800 Services Gateway

Hardware Guide

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Objectives

This guide describes hardware components and installation, basic configuration, and basic troubleshooting procedures for the Juniper Networks SRX5800 Services Gateway. It explains how to prepare your site for services gateway installation, unpack and install the hardware, power on the services gateway, perform initial software configuration, and perform routine maintenance. After completing the installation and basic configuration procedures covered in this guide, see the Junos OS configuration guides for information about further Junos OS configuration.

Audience

This guide is designed for network administrators who are installing and maintaining a Juniper Networks SRX5800 Services Gateway or preparing a site for services gateway installation. To use this guide, you need a broad understanding of networks in general and the Internet in particular, networking principles, and network configuration. Any detailed discussion of these concepts is beyond the scope of this guide.

Documentation Conventions

Table 1 on page xviii defines the 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.

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

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the **configure** command: user@host> **configure**
`Fixed-width text like this`	Represents output that appears on the terminal screen.	user@host> **show chassis alarms** `No alarms currently active`
Italic text like this	• Introduces important new terms. • Identifies book names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS System Basics Configuration 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*
Text like this	Represents names of configuration statements, commands, files, and directories; IP addresses; 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)	Enclose optional keywords or variables.	**stub** <**default-metric** *metric* >;

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

Convention	Description	Examples
| (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)	Enclose a variable for which you can substitute one or more values.	**community name members [** *community-ids* **]**

Indention and braces ({ })	Identify 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.	
J-Web GUI Conventions		
Bold text like this	Represents J-Web 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 J-Web selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

SRX Series Documentation and Release Notes

For a list of related SRX Series documentation, see http://www.juniper.net/techpubs/hardware/srx-series-main.html. If the information in the latest SRX Series Release Notes differs from the information in the documentation, follow the SRX Series Release Notes.

Obtaining Documentation

To obtain the most current version of all Juniper Networks technical documentation, see the products documentation page on the Juniper Networks Web site at http://www.juniper.net/.

To order printed copies of this guide and other Juniper Networks technical documents, or to order a documentation CD, which contains this guide, contact your sales representative.

Copies of the Management Information Bases (MIBs) available in a software release are included on the documentation CDs and at http://www.juniper.net/techpubs.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@junper.net, or fill out the documentation feedback form at http://www.juniper.net/techpubs/docbug/docbugreport.html. If you are using e-mail, be sure to include the following information with your comments:

- Document Name

- Document part number

- Page number

- Software release version (not required for *Network Operations Guides [NOGs]*)

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need postsales 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/customers/support/downloads/710059.pdf.

- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.

- JTAC Hours of Operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

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- Find CSC offerings: http://www.juniper.net/customers/support/

- Search for known bugs: http://www2.juniper.net/kb/

- Find product documentation: http://www.juniper.net/techpubs/

- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/

- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/

- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/

- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/

- Open a case online in the CSC Case Manager: http://www.juniper.net/cm/

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

Opening a Case with JTAC

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

- Use the Case Manager 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, visit us at http://www.juniper.net/support/requesting-support.html.

SRX5800 Services Gateway Overview

Introduction to the SRX5800 Services Gateway

This section includes the following topics:

- SRX5800 Services Gateway Description on page 3
- SRX5800 Services Gateway Physical Specifications on page 3
- SRX5800 Services Gateway Component Redundancy on page 5

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 youn can populate with two or three Switch Control Boards (SCBs) and up to 12 additional cards of the following types:

- Services Processing Cards (SPCs) provide the procesing capacity to run integrated services such as firewall, IPsec, and IDP.
- I/O Cards (IOCs) provide Ethernet interfaces that connect the services gateway to your network.
- Flex I/O Cards (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.

Related Documentation
- SRX5800 Services Gateway Physical Specifications on page 3
- SRX5800 Services Gateway Chassis on page 7
- SRX5800 Services Gateway Card Cage and Slots on page 11
- SRX5800 Services Gateway Component Redundancy on page 5

SRX5800 Services Gateway Physical Specifications

Table 3 on page 4 summarizes the physical specifications for the services gateway chassis.

Table 3: Physical Specifications

Description	Value
Chassis dimensions	27.75 in. (70.49 cm) high
	17.37 in. (44.11 cm) wide
	23.0 in. (58.42 cm) deep (from front-mounting bracket to chassis rear)
	Total depth (including cable management system) 27.75 in. (70.49 cm)
Services Gateway weight	Chassis with midplane, fan tray, air filter, and cable management system: 150 lb (60.4 kg)
	Maximum configuration: 350 lb (158.76 kg)
Routing Engine weight	2.4 lb (1.1 kg)
SCB weight	9.6 lb (4.4 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 managment weight	0.3 lb (0.14 kg)
DC power supply weight	3.8 lb (1.7 kg)
AC power supply weight	5.0 lb (2.3 kg)
High-capacity AC power supply weight	12.0 lb (5.5 kg)

Related Documentation

SRX5800 Services Gateway Component Redundancy

The following major hardware components are redundant:

- Switch Control Boards (SCBs)—The host subsystem consists of a Routing Engine installed in an SCB. The device must have one host subsystem installed. You can install a second SCB for increased throughput, and a third SCB for redundancy. If a second or third SCB is installed, the host subsystem SCB functions as the master and the others function as the backup. If the SCB of the host subsystem fails, one of the other SCBs takes over as the master.

- Power supplies—In the AC configuration, 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.

  In the DC configuration, 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 addition of two 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 Hardware Components

Nearly all components of the SRX5800 Services Gateway are field-replaceable units (FRUs), including the Switch Control Board (SCB), Routing Engine, Service Processing Cards (SPC), and I/O Cards (IOC), the power supply, fan tray, and filter.

This section includes the following topics:

- SRX5800 Services Gateway Chassis on page 7
- SRX5800 Services Gateway Rack-Mounting Hardware on page 10
- SRX5800 Services Gateway Card Cage and Slots on page 11
- SRX5800 Services Gateway Midplane Description on page 12
- SRX5800 Services Gateway I/O Cards on page 13
- SRX5800 Services Gateway Flex I/O Cards and Port Modules on page 16
- SRX5800 Services Gateway Services Processing Cards on page 21
- SRX5800 Services Gateway Host Subsystem Description on page 24
- SRX5800 Services Gateway Switch Control Board on page 24
- SRX5800 Services Gateway Routing Engine on page 27
- SRX5800 Services Gateway Craft Interface on page 31
- SRX5800 Services Gateway Power System Description on page 35
- SRX5800 Services Gateway Cooling System Description on page 46
- SRX5800 Services Gateway Cable Manager Description on page 48

SRX5800 Services Gateway Chassis

The services gateway chassis is a rigid sheet metal structure that houses all the other services gateway components (see Figure 1 on page 8, Figure 2 on page 9, and Figure 3 on page 10). 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 standard 800-mm (or larger) enclosed cabinets, 19-in. equipment racks, or telco open-frame racks. 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 3 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.

> **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.

> **WARNING:** The services gateway must be connected to earth ground during normal operation.

Figure 1: Front View of a Fully Configured Services Gateway Chassis
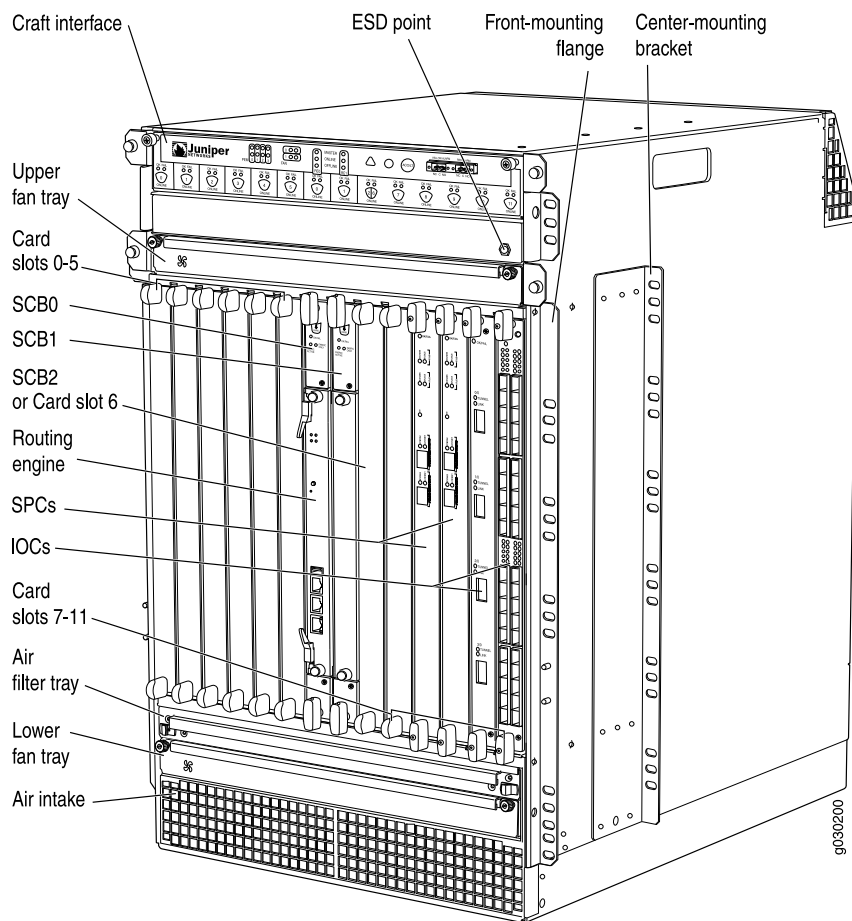
Figure 2: Rear View of a Fully Configured AC-Powered Services Gateway Chassis

Air exhaust

Power Distribution Module (PDM)

Air exhaust

AC Power supplies

Power supply ejectors

Protective earthing

ESD point
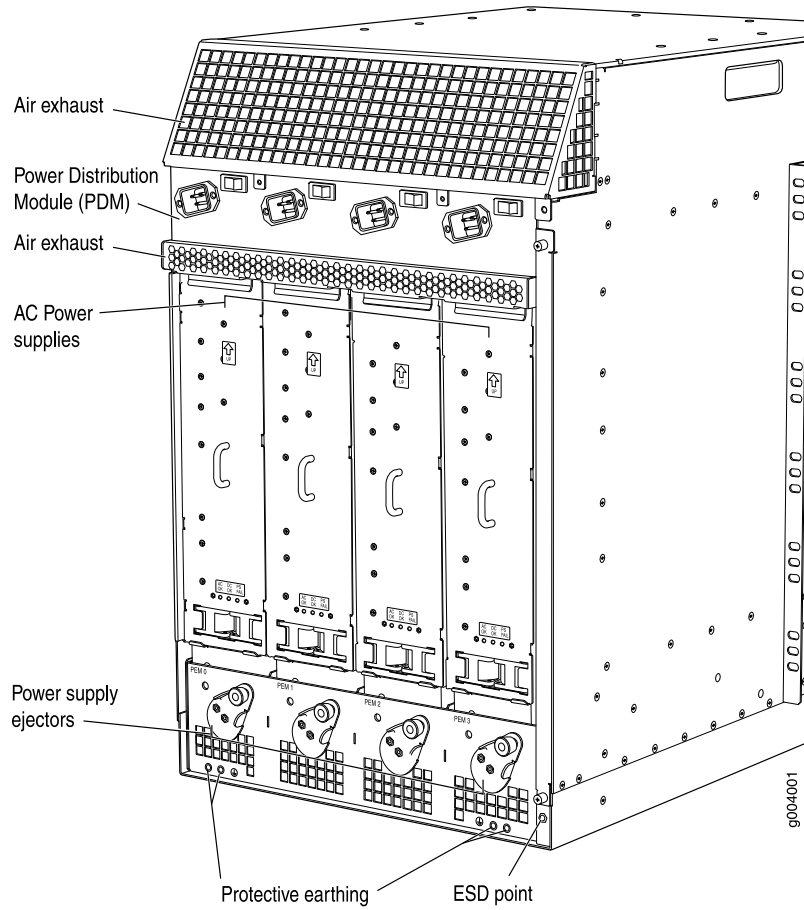
Figure 3: Rear View of a Fully Configured DC-Powered Services Gateway
Chassis
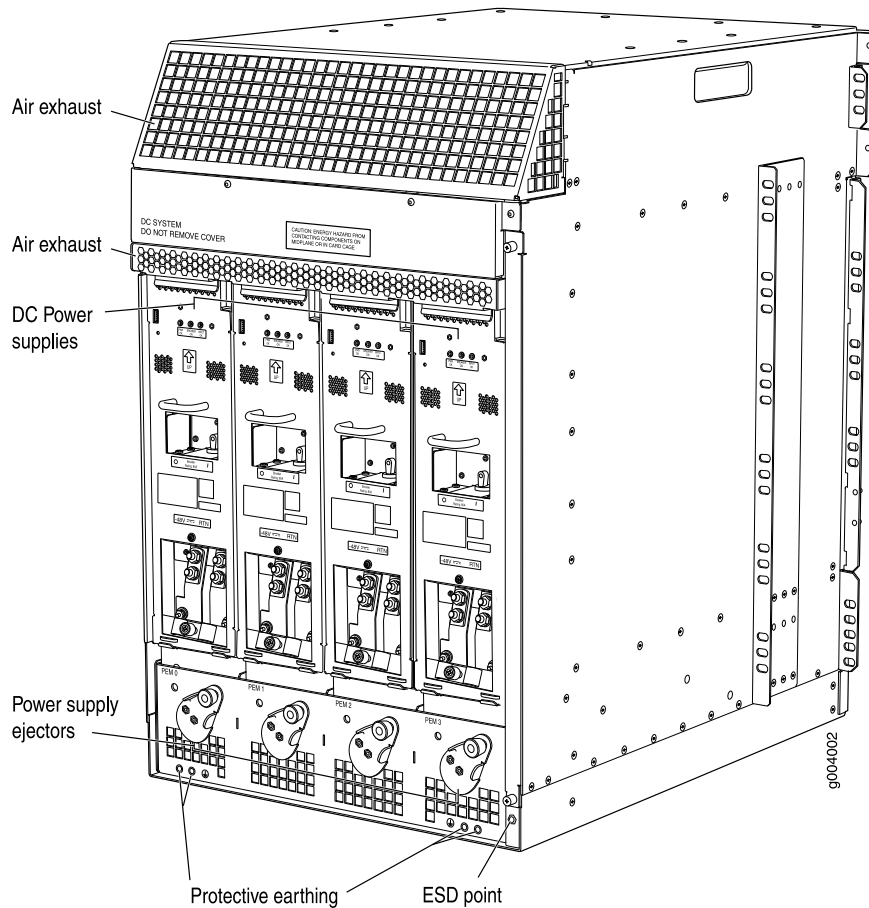
Air exhaust

Air exhaust

DC Power
supplies

Power supply
ejectors

Protective earthing   ESD point

**Related
Documentation**

- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

- SRX5800 Services Gateway Physical Specifications on page 3

- SRX5800 Services Gateway Power System Overview on page 35

- SRX5800 Services Gateway Card Cage and Slots on page 11

- SRX5800 Services Gateway Cooling System Description on page 46

- General Electrical Safety Guidelines and Warnings on page 220

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 69

- Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 71

- SRX5800 Services Gateway Chassis on page 7

- Chassis Lifting Guidelines on page 204

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 4 on page 11 describes the types of cards that you can install into each slot.

Table 4: SRX5800 Services Gateway Card Cage Slots

Card Cage Slot	Eligible Cards			
	SPC	IOC	Flex IOC	SCB
0 (leftmost)	X	X	X	
1	X	X	X	
2	X	X	X	
3	X	X	X	
4	X	X	X	
5	X	X	X	
0				X
1				X
2/6	X	X	X	X
7	X	X	X	
8	X	X	X	

Table 4: SRX5800 Services Gateway Card Cage Slots *(continued)*

Card Cage Slot	Eligible Cards			
	SPC	IOC	Flex IOC	SCB
9	X	X	X	
10	X	X	X	
11 (rightmost)	X	X	X	

Related Documentation

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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 4 on page 13). 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.

Figure 4: Midplane

SRX5800 Services Gateway I/O Cards

This section includes the following topics:

SRX5800 Services Gateway I/O Card Description

The I/O Cards (IOCs) are optimized for Ethernet density and are capable of supporting up to 40 Gigabit Ethernet or four 10-Gigabit Ethernet ports (see Figure 5 on page 14).

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 can install IOCs in any of the slots 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 5 on page 14 shows the IOCs supported on the services gateway.

Figure 5: IOCs Supported on the Services Gateway
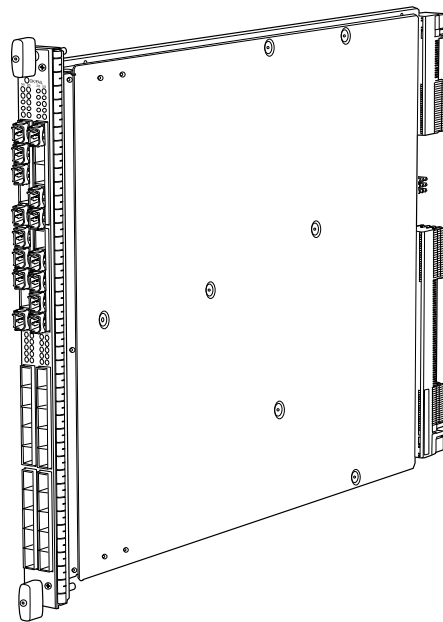
IOC 40x1GE   IOC 4x10GE
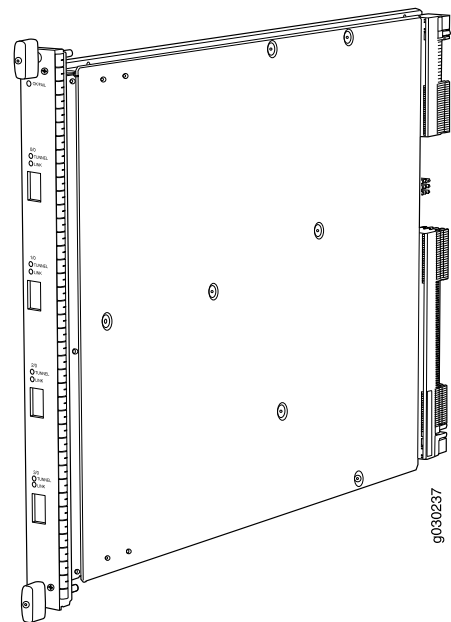
<table>
<tr><td>Related Documentation</td><td>• Installing an SRX5800 Services Gateway IOC on page 154</td></tr>
<tr><td></td><td>• Removing an SRX5800 Services Gateway IOC on page 152</td></tr>
<tr><td></td><td>• SRX5800 Services Gateway Card Cage and Slots on page 11</td></tr>
<tr><td></td><td>• SRX5800 Services Gateway Field-Replaceable Units on page 132</td></tr>
<tr><td></td><td>• SRX5800 Services Gateway I/O Card Components on page 14</td></tr>
<tr><td></td><td>• SRX5800 Services Gateway I/O Card LEDs on page 15</td></tr>
</table>

SRX5800 Services Gateway I/O Card Components

Each IOC consists of the following components:

• IOC cover, which functions as a ground plane and a stiffener

• 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 IOCs

- Two interfaces from the SCBs that enable the boards to be powered on and controlled

- Physical IOC connectors

- Packet Forwarding Engines

- Midplane connectors and power circuitry

- Processor subsystem, which includes a 1.2-GHz CPU, system controller, and 1 GB of SDRAM

Related Documentation
- SRX5800 Services Gateway I/O Card Description on page 13
- Installing an SRX5800 Services Gateway IOC on page 154
- Removing an SRX5800 Services Gateway IOC on page 152
- SRX5800 Services Gateway Field-Replaceable Units on page 132
- SRX5800 Services Gateway I/O Card LEDs on page 15

SRX5800 Services Gateway I/O Card LEDs

LEDs on the 4-port 10-Gigabit Ethernet faceplate indicate the port status. LEDs are labeled top to bottom **0/0** through **0/3** (see Table 5 on page 15).

Table 5: 4-Port 10-Gigabit Ethernet IOC LEDs

Label	Color	State	Description
OK/FAIL	Green	On steadily	IOC is functioning normally.
	Red	On steadily	IOC has failed.
TUNNEL	Green	Off	Normal operating mode.
		On steadily	Port configured in tunnel mode.
LINK	Green	On steadily	Link is active.
		Off	No link.

LEDs on the 40–port Gigabit Ethernet faceplate indicate the port status. LEDs are labeled horizontally and top to bottom **0/0** through **0/5**, **1/0** through **1/5**, **2/0** through **2/5**, and **3/0** through **3/5** (see Table 6 on page 16).

Table 6: 40-Port Gigabit Ethernet IOC LEDs

Label	Color	State	Description
OK/FAIL	Green	On steadily	IOC is functioning normally.
	Red	On steadily	IOC has failed.
LINK	Green	On steadily	Link is active.
		Off	No link.

Related
Documentation

- SRX5800 Services Gateway I/O Card Description on page 13
- Installing an SRX5800 Services Gateway IOC on page 154
- Removing an SRX5800 Services Gateway IOC on page 152
- SRX5800 Services Gateway Field-Replaceable Units on page 132
- SRX5800 Services Gateway I/O Card Components on page 14

SRX5800 Services Gateway Flex I/O Cards and Port Modules

This section includes the following topics:

- SRX5800 Services Gateway Flex IOC and Port Module Description on page 16
- SRX5800 Services Gateway Flex IOC Components on page 18
- SRX5800 Services Gateway Port Module Components on page 19
- SRX5800 Services Gateway Port Module LEDs on page 19

SRX5800 Services Gateway Flex IOC and Port Module Description

Flex I/O Cards (Flex IOCs) are IOCs with two slots, which 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. Figure 6 on page 17 shows a Flex IOC with two typical port modules installed.

Figure 6: Flex IOC with Port Modules

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 (PFEs) with a maximum throughput of 10 Gbps each.

Table 7 on page 17 describes the different port modules available.
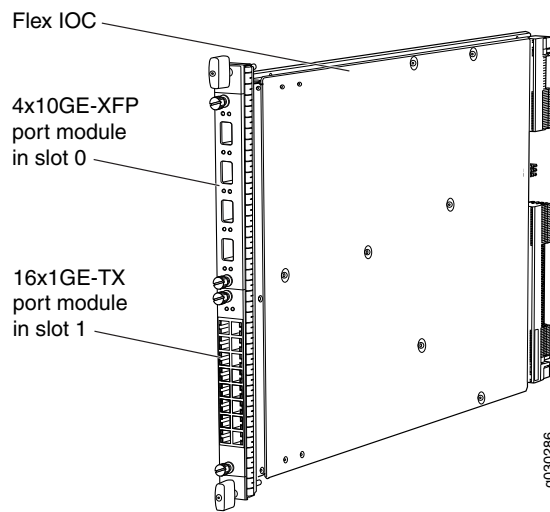
> **NOTE:** Your services gateway must be running Junos OS Release 9.5R1 or later in order to recognize Flex IOCs and port modules.

Table 7: Port Module Types

Port Module Name	Number of Ports	Port Type	Maximum Throughput	Oversubscription Ratio
4x10GE-XFP	4	XFP 10 Gbps	10 Gbps	4:1
16x1GE-TX	16	RJ-45 1 Gbps	10 Gbps	1.6:1
16x1GE-SFP	16	SFP 1 Gbps	10 Gbps	1.6:1

You use port modules and Flex IOCs to add different combinations of SFP, XFP, and TX ports to your services gateway to suit the specific needs of your network. The available port modules are shown in Figure 7 on page 18.

Figure 7: Port Modules Supported on the Flex IOC

SRX-IOC-4XGE-XFP 4-Port XFP
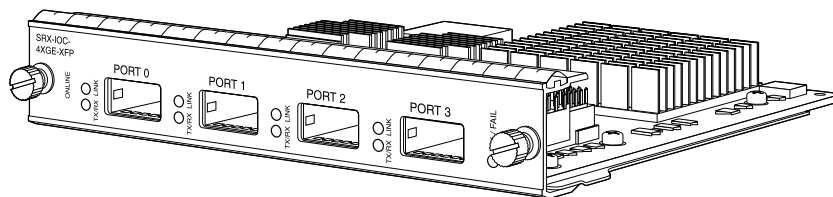
SRX-IOC-16GE-TX 16-Port RJ-45
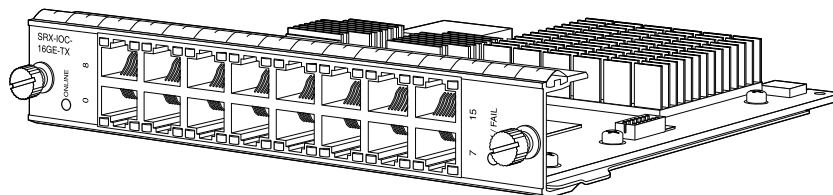
SRX-IOC-16GE-SFP 16-Port SFP
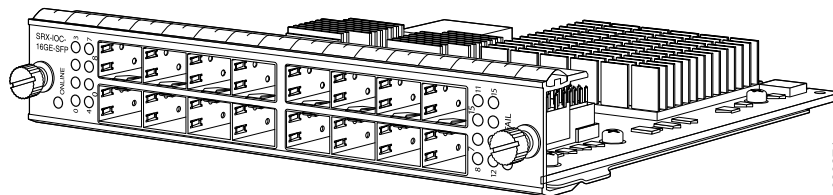
NOTE: Juniper strongly recommends the use of Juniper SFP and SFP transceivers. Juniper cannot guarantee correct operation if non-Juniper transceivers are used. The transceiver type can be different in each port, as long as a supported part number is used.

Related Documentation

- Installing an SRX5800 Services Gateway Flex IOC on page 159

- Installing an SRX5800 Services Gateway Port Module on page 163

- Removing an SRX5800 Services Gateway Flex IOC on page 157

- Removing an SRX5800 Services Gateway Port Module on page 161

- SRX5800 Services Gateway Card Cage and Slots on page 11

- SRX5800 Services Gateway Port Module LEDs on page 19

SRX5800 Services Gateway Flex IOC Components

Each Flex IOC consists of the following components:

- Flex IOC cover, which functions as a ground plane and a stiffener

- Two slots for port modules

- 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 Flex IOC

- Two interfaces from the SCBs that enable the Flex IOC to be powered on and controlled

- Two 10 Gbps PFEs

- Midplane connectors and power circuitry

- Processor subsystem, including a 1.2-GHz CPU, a system controller, and 1 GB of SDRAM

Related Documentation
- Installing an SRX5800 Services Gateway Flex IOC on page 159

- Removing an SRX5800 Services Gateway Flex IOC on page 157

- Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway on page 111

- Troubleshooting SRX5800 Services Gateway IOCs and Flex IOCs on page 125

- SRX5800 Services Gateway Field-Replaceable Units on page 132

SRX5800 Services Gateway Port Module Components

Each services gateway port module consists of the following components:

- Port module cover, which functions as a ground plane and a stiffener

- Physical I/O port connectors

- Ethernet switch

- **Online** button (behind pinhole) for bringing the port module online and offline

- Port module slot connectors and power circuitry

Related Documentation
- Installing an SRX5800 Services Gateway Port Module on page 163

- Removing an SRX5800 Services Gateway Port Module on page 161

- Maintaining Port Modules on the SRX5800 Services Gateway on page 113

- Troubleshooting SRX5800 Services Gateway Port Modules on page 127

- SRX5800 Services Gateway Field-Replaceable Units on page 132

- SRX5800 Services Gateway Port Module LEDs on page 19

SRX5800 Services Gateway Port Module LEDs

LEDs on the faceplate of each port module indicate the status of the module and of each port. Table 8 on page 20, Table 9 on page 20, and Table 10 on page 20 describe the LEDs on each port module type.

Table 8: 4-Port 10-Gigabit XFP Ethernet Port Module LEDs

Label	Color	State	Description
OK/FAIL	Green	On steadily	Port module is functioning normally.
	Red	On steadily	Port module has failed.
LINK	Green	On steadily	Link is active.
		Off	No link.
TX/RX	Green	Blinking	Port is receiving or transmitting data.
		Off	No activity.

Table 9: 16-Port SFP Ethernet Port Module LEDs

Label	Color	State	Description
OK/FAIL	Green	On steadily	Port module is functioning normally.
	Red	On steadily	Port module has failed.
Link **0** through **15**	Green	On steadily	Link is active.
		Off	No link.

Table 10: 16-Port TX Ethernet Port Module LEDs

Label	Color	State	Description
OK/FAIL	Green	On steadily	Port module is functioning normally.
	Red	On steadily	Port module has failed.
Link (top or left of each port)	Green	On steadily	Link is active.
		Off	No link.
TX/RX (bottom or right of each port)	Green	Blinking	Port is receiving or transmitting data.
		Off	No activity.

Related Documentation

- Installing an SRX5800 Services Gateway Port Module on page 163
- Removing an SRX5800 Services Gateway Port Module on page 161
- Maintaining Port Modules on the SRX5800 Services Gateway on page 113
- Troubleshooting SRX5800 Services Gateway Port Modules on page 127

- SRX5800 Services Gateway Port Module Components on page 19

SRX5800 Services Gateway Services Processing Cards

This section includes the following topics:

SRX5800 Services Gateway Services Processing Card Description

Each 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 8 on page 21). All traffic traversing the services gateway is passed to an SPU to have services processing applied to it. Traffic is intelligently distributed by IOCs to SPUs for service processing.

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

You can install SPCs in any of the slots 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 device.

Figure 8 on page 21 shows a typical SPC supported on the services gateway.

Figure 8: Typical SPC
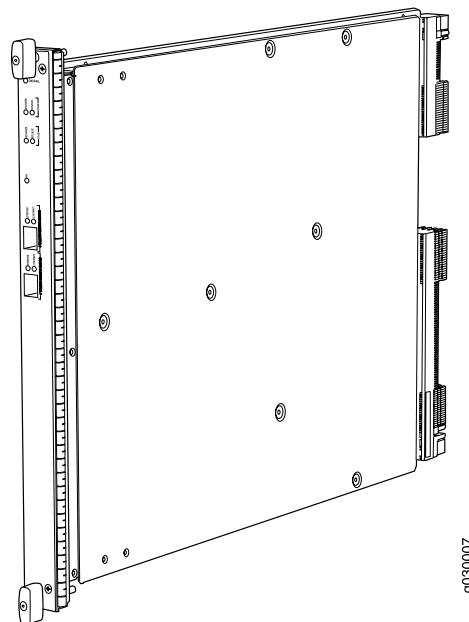
SRX5800 Services Gateway Services Processing Card Components

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. Refer to the *Junos OS Security Configuration Guide* for more information about connecting and configuring redundant chassis clusters.

  > **NOTE:** Juniper strongly recommends the use of Juniper SFP transceivers. Juniper cannot guarantee correct operation if non-Juniper transceivers are used. The transceiver type can be different in each port, as long as a supported part number is used.

- 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 status.

SRX5800 Services Gateway Services Processing Card LEDs

LEDs on the faceplate indicate the SPC status (see Table 11 on page 23).

Table 11: SPC LEDs

Label	Color	State	Description
OK/FAIL	Green	On steadily	SPC is functioning normally.
	Red	On steadily	SPC has failed.
STATUS	Off	Off	SPU is offline. If both SPUs are offline it is safe to remove the SPC from the chassis.
	Green	On steadily	SPU is operating normally.
	Amber	On steadily	SPU is initializing.
	Red	On steadily	SPU has an error or failure.
SERVICE	Off	Off	Service is not running on the SPU.
	Green	On steadily	Service is running on the SPU under acceptable load.
	Amber	On steadily	Service on the SPU is overloaded.
HA	Green	On steadily	All cluster members and monitored links are available.
	Red	On steadily	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	On steadily	All cluster members are present, but one or more monitored links are down.
	Unlit	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	Green	On steadily	Chassis Cluster Control port link is active.
		Off	No link.
ENABLE	Green	On steadily	The Chassis Cluster Control port is enabled.
		Off	The Chassis Cluster Control port is disabled.

Two LEDs, located on the craft interface above the SPC, display the status of the SPC and are labeled **OK** and **FAIL**.

Related Documentation
- SRX5800 Services Gateway Craft Interface IOC and SPC LEDs on page 33
- SRX5800 Services Gateway Services Processing Card Description on page 21
- SRX5800 Services Gateway Services Processing Card Components on page 22

SRX5800 Services Gateway Host Subsystem Description

The host subsystem consists 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 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 32
- SRX5800 Services Gateway Switch Control Board Description on page 24
- SRX5800 Services Gateway Routing Engine Description on page 27
- SRX5800 Services Gateway Card Cage and Slots on page 11

SRX5800 Services Gateway Switch Control Board

This section includes the following topics:

- SRX5800 Services Gateway Switch Control Board Description on page 24
- SRX5800 Services Gateway Switch Control Board Slots on page 25
- SRX5800 Services Gateway Switch Control Board Redundancy on page 26
- SRX5800 Services Gateway Switch Control Board Components on page 26
- SRX5800 Services Gateway Switch Control Board LEDs on page 27

SRX5800 Services Gateway Switch Control Board Description

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 9 on page 25).

Figure 9: SCB
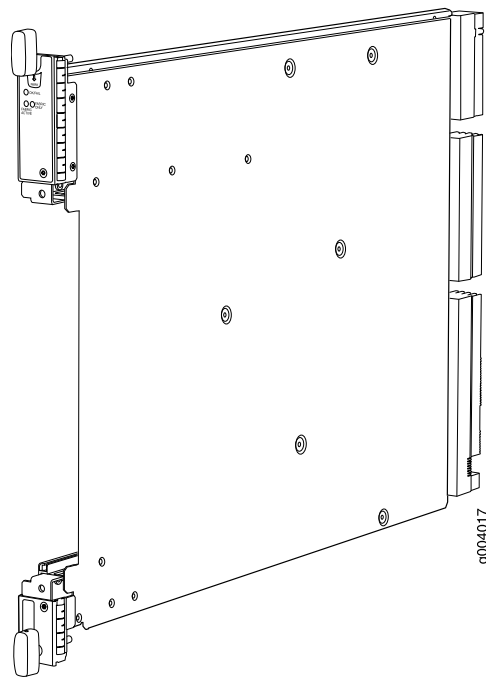
SRX5800 Services Gateway Switch Control Board Slots

You must install at least one SCB in the services gateway as part of a host subsystem. You can install a second SCB for increased throughput, and a third SCB for redundancy.

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.

SRX5800 Services Gateway Switch Control Board Redundancy

SCBs installed in slots **0** and **1** provide nonredundant fabric connections. An 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 12 on page 26).

Table 12: 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

Related Documentation

- SRX5800 Services Gateway Switch Control Board Description on page 24
- Installing an SRX5800 Services Gateway SCB on page 145
- SRX5800 Services Gateway Switch Control Board Slots on page 25

SRX5800 Services Gateway Switch Control Board Components

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.
- Control Board/Routing Engine mastership mechanism.
- Gigabit Ethernet switch that is connected to the embedded CPU complex on all components.
- Switch fabric—Provides the switching functions for the I/O Cards (IOC)s.
- 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.
- LEDs—Provide status.

Related Documentation
- SRX5800 Services Gateway Switch Control Board Redundancy on page 26
- SRX5800 Services Gateway Switch Control Board LEDs on page 27
- SRX5800 Services Gateway Switch Control Board Description on page 24

SRX5800 Services Gateway Switch Control Board LEDs

Three LEDs on the SCB indicate the status of the SCB. The LEDs, labeled **FABRIC ACTIVE**, **FABRIC ONLY**, and **OK/FAIL**, are located directly on the SCB. Table 13 on page 27 describes the functions of the SCB LEDs.

Table 13: Switch Control Board LEDs

Label	Color	State	Description
FABRIC ACTIVE	Green	On steadily	Fabric is in active mode.
FABRIC ONLY	Green	On steadily	SCB operates in fabric-only mode.
		Off	SCB operates in fabric/control board mode.
OK/FAIL	Green	On steadily	SCB is online.
		Off	SCB is offline.
	Red	On steadily	SCB has failed.

Related Documentation
- SRX5800 Services Gateway Switch Control Board Description on page 24
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 32

SRX5800 Services Gateway Routing Engine

This section includes the following topics:

- SRX5800 Services Gateway Routing Engine Description on page 27
- SRX5800 Services Gateway Routing Engine Components on page 28
- SRX5800 Services Gateway Routing Engine LEDs on page 29
- SRX5800 Services Gateway Routing Engine Interface Ports on page 30
- SRX5800 Services Gateway Routing Engine Boot Sequence on page 30

SRX5800 Services Gateway Routing Engine Description

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.

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

Figure 10: Routing Engine
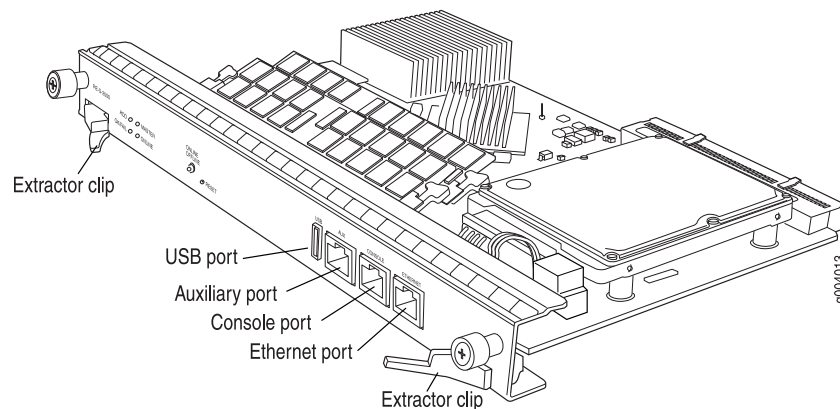
Related Documentation

- SRX5800 Services Gateway Routing Engine Components on page 28
- SRX5800 Services Gateway Routing Engine LEDs on page 29
- SRX5800 Services Gateway Routing Engine Interface Ports on page 30
- SRX5800 Services Gateway Routing Engine Boot Sequence on page 30
- Replacing the SRX5800 Services Gateway Routing Engine on page 147

SRX5800 Services Gateway Routing Engine Components

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 the 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.

- Reset button—Reboots the Routing Engine when pressed.

- Online/Offline button—Not supported in the current release.

- Extractor clips—Used for inserting and extracting the Routing Engine.

- Captive screws—Secure the Routing Engine in place.

Related Documentation

- SRX5800 Services Gateway Routing Engine Description on page 27
- SRX5800 Services Gateway Routing Engine LEDs on page 29

SRX5800 Services Gateway Routing Engine LEDs

The Routing Engine has four LEDs that indicate its status. The LEDs, labeled **MASTER**, **HDD**, **ONLINE**, and **FAIL**, are located directly on the faceplate of the Routing Engine. Table 14 on page 29 describes the functions of the Routing Engine LEDs.

Table 14: Routing Engine LEDs

Label	Color	State	Description
MASTER	Blue	On steadily	Routing Engine is Master.
HDD	Green	Green blinking	Hard disk is functioning normally.
ONLINE	Green	Blinking	Routing Engine is transitioning online.
		On steadily	Routing Engine is functioning normally.
FAIL	Red	On steadily	Routing Engine has failed.

Related Documentation

- SRX5800 Services Gateway Routing Engine Components on page 28
- SRX5800 Services Gateway Routing Engine Interface Ports on page 30

SRX5800 Services Gateway Routing Engine Interface Ports

In the center of the Routing Engine are three ports that connect the Routing Engine to one or more external devices on which system administrators can issue Junos OS command-line interface (CLI) commands to manage the device.

The ports with the indicated labels function as follows:

- **AUX**—Connects the Routing Engine to a laptop, modem, or other 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. The port uses an autosensing RJ-45 connector to support10-Mbps or 100-Mbps connections. Two small LEDs on the bottom of the port indicate the connection in use: the LED lights yellow or green for a 10-Mbps connection, and the LED lights green when traffic is passing through the port.

Related Documentation
- SRX5800 Services Gateway Routing Engine Description on page 27
- SRX5800 Services Gateway Routing Engine LEDs on page 29
- SRX5800 Services Gateway Routing Engine Boot Sequence on page 30
- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports on page 258
- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Ethernet Port on page 257

SRX5800 Services Gateway Routing Engine Boot Sequence

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.

Related Documentation
- SRX5800 Services Gateway Routing Engine Description on page 27
- SRX5800 Services Gateway Routing Engine Interface Ports on page 30

SRX5800 Services Gateway Craft Interface

This section includes the following topics:

- SRX5800 Services Gateway Craft Interface Overview on page 31
- SRX5800 Services Gateway Craft Interface Alarm LEDs and Alarm Cutoff/Lamp Test Button on page 32
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 32
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 33
- SRX5800 Services Gateway Craft Interface IOC and SPC LEDs on page 33
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 34
- SRX5800 Services Gateway Craft Interface Online Buttons on page 34
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 35

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. 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 11: Front Panel of the Craft Interface
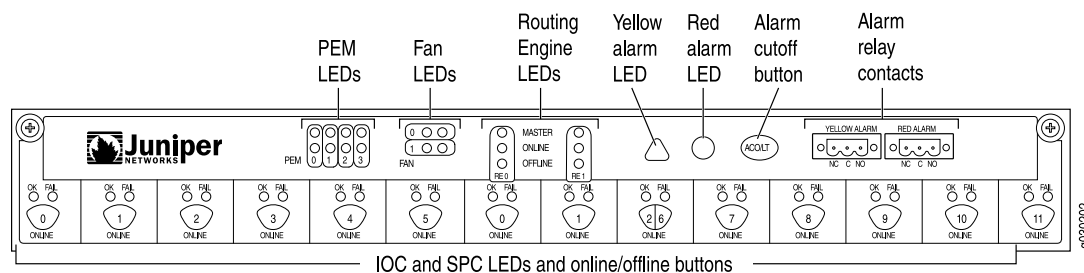
NOTE: At least one SCB must be installed in the services gateway for the craft interface to obtain power.

Related Documentation

- SRX5800 Services Gateway Craft Interface Alarm LEDs and Alarm Cutoff/Lamp Test Button on page 32
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 32
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 33
- SRX5800 Services Gateway Craft Interface IOC and SPC LEDs on page 33
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 34
- SRX5800 Services Gateway Craft Interface Online Buttons on page 34
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 35

- Replacing the SRX5800 Services Gateway Craft Interface on page 134

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 15 on page 32 describes the alarm LEDs and alarm cutoff button in more detail.

Table 15: 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.
(ACO/LT)	–	–	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 35
- SRX5800 Services Gateway Craft Interface Overview on page 31
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 32

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 16 on page 33 describes the functions of the host subsystem LEDs.

Table 16: 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 31
- SRX5800 Services Gateway Craft Interface Alarm LEDs and Alarm Cutoff/Lamp Test Button on page 32
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 33

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 on the upper left of the craft interface next to the **PEM** label. Table 17 on page 33 describes the functions of the power supply LEDs on the craft interface.

Table 17: 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 31
- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 32
- SRX5800 Services Gateway Craft Interface IOC and SPC LEDs on page 33

SRX5800 Services Gateway Craft Interface IOC and SPC LEDs

Each IOC and SPC has LEDs on the craft interface that indicate its status. The IOC and SPC LEDs—labeled **0** through **5**, **2/6**, and **7** through **11**—are located along the bottom of the craft interface. Table 18 on page 34 describes the functions of the IOC and SPC LEDs.

Table 18: IOC and SPC LEDs

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

Related Documentation
- SRX5800 Services Gateway Craft Interface Overview on page 31
- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 33
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 34

SRX5800 Services Gateway Craft Interface Fan LEDs

Each fan LED is located on the top left of the craft interface. Table 19 on page 34 describes the functions of the fan LEDs.

Table 19: Fan LEDs

Label	Color	State	Description
FAN	Green	On steadily	Fan is functioning normally.
	Red	On steadily	Fan has failed.

Related Documentation
- SRX5800 Services Gateway Craft Interface Overview on page 31
- SRX5800 Services Gateway Craft Interface IOC and SPC LEDs on page 33
- SRX5800 Services Gateway Craft Interface Online Buttons on page 34

SRX5800 Services Gateway Craft Interface Online Buttons

The craft interface has a row of Online buttons along its lower edge. Each button corresponds to one slot in the card cage.

In the current release, the Online buttons are only supported for slots containing I/O Cards (IOCs) and Flex I/O Cards (Flex IOCs).

Related Documentation
- SRX5800 Services Gateway Craft Interface Overview on page 31
- SRX5800 Services Gateway Craft Interface Fan LEDs on page 34
- SRX5800 Services Gateway Craft Interface Alarm Relay Contacts on page 35

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 12 on page 35). Whenever a system condition triggers either the red or yellow 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 12: Alarm Relay Contacts
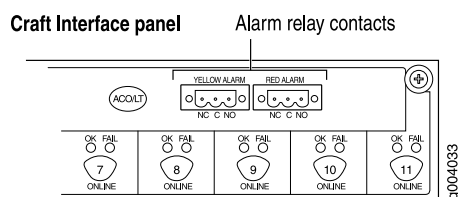
Related Documentation

- SRX5800 Services Gateway Craft Interface Overview on page 31

- SRX5800 Services Gateway Craft Interface Online Buttons on page 34

- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82

- Alarm Relay Contact Wire Specifications for the SRX5800 Services Gateway on page 256

SRX5800 Services Gateway Power System Description

This section includes the following topics:

- SRX5800 Services Gateway Power System Overview on page 35

- SRX5800 Services Gateway Power Distribution on page 36

- SRX5800 Services Gateway High-Capacity AC Power Supply on page 39

- SRX5800 Services Gateway High-Capacity AC Power Supply LEDs on page 41

- SRX5800 Services Gateway Standard-capacity AC Power Supply on page 42

- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 43

- SRX5800 Services Gateway DC Power Supply on page 44

- SRX5800 Services Gateway DC Power Supply LEDs on page 45

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.

Two different types of AC power supply are available:

- Standard-capacity power supplies provide 1700 W of power each. Three standard-capacity power supplies are required, and you can install a fourth for redundancy.

- High-capacity power supplies provide 4100 W of power each. Two high-capacity power supplies are required, and you can install four for redundancy.

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

Related Documentation

- SRX5800 Services Gateway Standard-capacity AC Power Supply on page 42

- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 43

- SRX5800 Services Gateway DC Power Supply on page 44

- SRX5800 Services Gateway DC Power Supply LEDs on page 45

- Troubleshooting the SRX5800 Services Gateway Power System on page 129

- Installing an SRX5800 Services Gateway AC Power Supply on page 177

- Installing an SRX5800 Services Gateway DC Power Supply on page 183

SRX5800 Services Gateway Power Distribution

This topic contains the following sections:

- Power Distribution for Standard-Capacity AC Power Supplies on page 37

- Power Distribution for DC and High-Capacity AC Power Supplies on page 37

Power Distribution for Standard-Capacity AC Power Supplies

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.

Power Distribution for DC and High-Capacity AC Power Supplies

When the services gateway is powered by DC power supplies or by high-capacity AC power supplies, power distribution within the chassis is divided into zones, as described in Table 20 on page 37.

Table 20: SRX5800 Services Gateway Power Distribution (DC or High-Capacity AC Power Supplies)

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

Figure 13 on page 38 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 13: Power Distribution from DC and High-Capacity AC Power Supplies in the SRX5800 Services Gateway Chassis
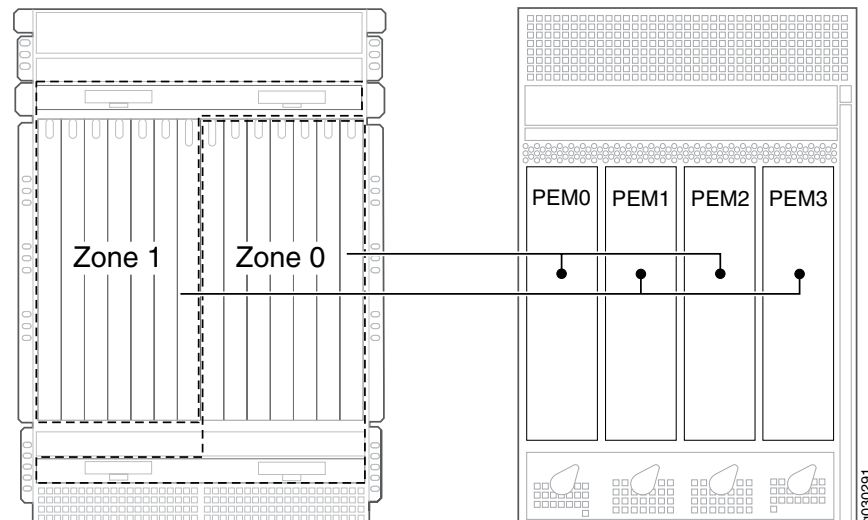
You can install either two or four DC power supplies or high-capacity AC power supplies. Two power supplies are required to power the two zones, while four power supplies provide full redundancy for both zones. The power supplies in slots PEM0 and PEM2 form a redundant pair, as do the power supplies in slots PEM1 and PEM3. When two power supplies are installed for a zone, they share the load equally. 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.

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.

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.

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.

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 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 21 on page 39. The default setting is 1.

Table 21: 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

Table 21: High-Capacity AC Power Supply Input Mode Switch Settings *(continued)*

Mode Switch Setting	AC Inputs	Result
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: The services gateway is pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal (the left pair is sized for M6 bolts, and the right pair is sized for UNC 1/4-20 ground lugs) provided on the chassis in addition to the grounding pin of the power supply cord. This separate protective earth terminal must be permanently connected to earth.

Figure 14: High-Capacity AC Power Supply
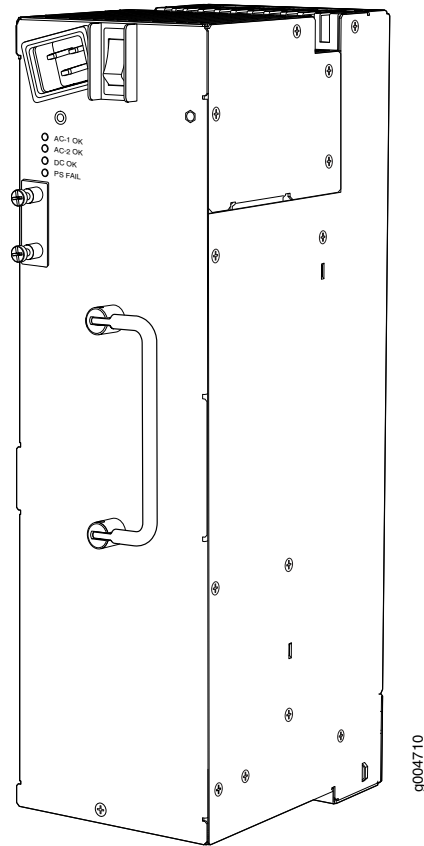
Related Documentation
- SRX5800 Services Gateway High-Capacity AC Power Supply LEDs on page 41
- SRX5800 Services Gateway Power Distribution on page 36

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 22 on page 42). 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 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 33
- SRX5800 Services Gateway High-Capacity AC Power Supply on page 39
- SRX5800 Services Gateway Power System Overview on page 35

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.

WARNING: The services gateway is pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal (the left pair is sized for M6 bolts, and the right pair is sized for UNC 1/4-20 ground lugs) provided on the chassis in addition to the grounding pin of the power supply cord. This separate protective earth terminal must be permanently connected to earth.

Figure 15: Standard-Capacity AC Power Supply
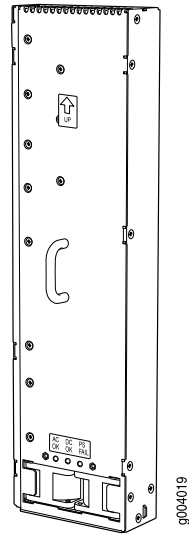
Related Documentation

- SRX5800 Services Gateway Craft Interface Power Supply LEDs on page 33
- SRX5800 Services Gateway Power System Overview on page 35
- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 43
- Troubleshooting the SRX5800 Services Gateway Power System on page 129
- Replacing an SRX5800 Services Gateway AC Power Supply on page 174
- SRX5800 Services Gateway AC Power Supply Specifications on page 239

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 23 on page 44). 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: 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 33
- SRX5800 Services Gateway Power System Overview on page 35
- SRX5800 Services Gateway Standard-capacity AC Power Supply on page 42
- SRX5800 Services Gateway DC Power Supply on page 44

SRX5800 Services Gateway DC Power Supply

In the DC power configuration, the services gateway contains either two or four DC power supplies (see Figure 16 on page 45), 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 16: DC Power Supply
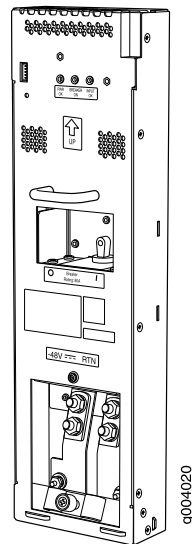
Related
Documentation

- SRX5800 Services Gateway Power Distribution on page 36

- SRX5800 Services Gateway Power System Overview on page 35

- SRX5800 Services Gateway DC Power Supply LEDs on page 45

- Maintaining SRX5800 Services Gateway Power Supplies on page 119

- Troubleshooting the SRX5800 Services Gateway Power System on page 129

- Replacing an SRX5800 Services Gateway DC Power Supply on page 180

- SRX5800 Services Gateway DC Power Supply Specifications on page 244

SRX5800 Services Gateway DC Power Supply LEDs

Each DC power supply faceplate contains three LEDs that indicate the status of the power supply (see Table 24 on page 46). 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 24: 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 33
- SRX5800 Services Gateway Power System Overview on page 35
- SRX5800 Services Gateway DC Power Supply on page 44

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 17 on page 47, Figure 18 on page 47, Figure 20 on page 48, and Figure 21 on page 48). 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 17: Airflow Through the Chassis
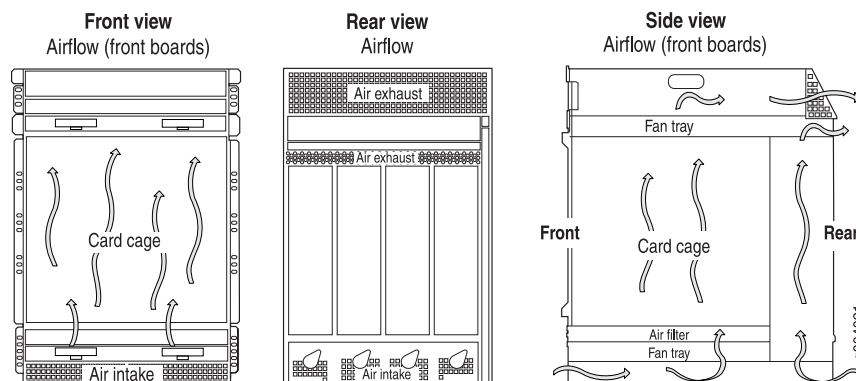
The host subsystem monitors the temperature of the device components. When the device is operating normally, the fans function at lower than full speed. If a fan fails or the ambient temperature rises above a threshold, the speed of the remaining fans is automatically adjusted to keep the temperature 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 18: Standard-Capacity Fan Tray (Same Upper and Lower)
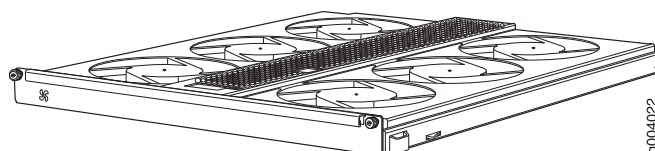
Figure 19: High-Capacity Fan Tray (Same Upper and Lower)
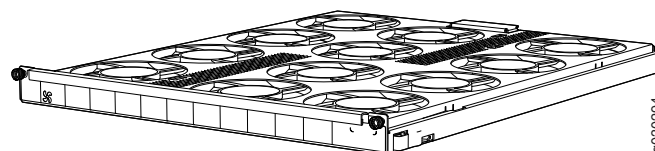
Figure 20: Air Filter
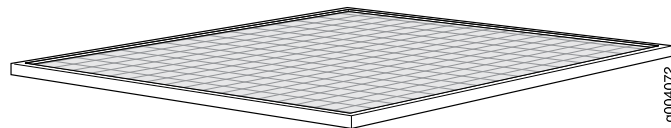
Figure 21: Standard-Capacity Air Filter Tray
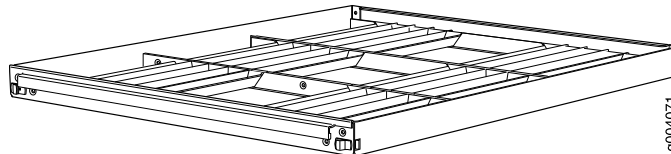
Figure 22: High-Capacity Air Filter Tray
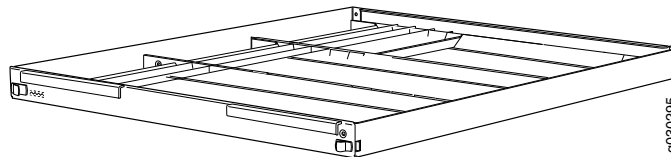
Related Documentation

- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 107

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 106

- Troubleshooting the SRX5800 Services Gateway Cooling System on page 124

- Replacing an SRX5800 Services Gateway Fan Tray on page 136

- Replacing the SRX5800 Services Gateway Air Filter on page 140

SRX5800 Services Gateway Cable Manager Description

The cable management system (see Figure 23 on page 49) 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 23: Cable Management System
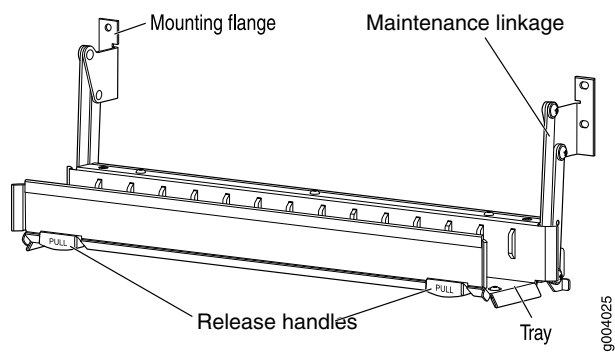
Related
Documentation

- Replacing the SRX5800 Services Gateway Cable Manager on page 190

Setting Up the SRX5800 Services Gateway

SRX5800 Services Gateway Installation

This section includes the following topic:

- Overview of Installing the SRX5800 Services Gateway on page 53

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 55.

2. Review the safety guidelines explained in "SRX5800 Services Gateway General Safety Guidelines and Warnings" on page 197.

3. Unpack the services gateway and verify the parts.

   a. "Unpacking the SRX5800 Services Gateway" on page 63

   b. "Verifying the SRX5800 Services Gateway Parts Received" on page 65

4. Install the mounting hardware.

   - Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 69

   - Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 71

5. Lift the services gateway on to the rack. Because of the weight of the services gateway, we recommend that you use a mechanical lift.

   - Installing the SRX5800 Services Gateway Using a Mechanical Lift on page 75

   - Installing the SRX5800 Services Gateway Chassis in the Rack Manually on page 269

6. Connect cables to the network and external devices.

   - Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81

   - Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80

- Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 136

7. Connect the grounding cable as described in "Grounding the SRX5800 Services Gateway" on page 86.

8. Connect the AC power cord or DC power cables:

    - Connecting Power to an AC-Powered SRX5800 Services Gateway on page 86

    - Connecting Power to a DC-Powered SRX5800 Services Gateway on page 91

9. Power on the services gateway:

    - Powering On an AC-Powered SRX5800 Services Gateway on page 90

    - Powering On a DC-Powered SRX5800 Services Gateway on page 93

10. Perform the initial system configuration as described in "Initially Configuring the SRX5800 Services Gateway" on page 98.

Related Documentation

- SRX5800 Services Gateway Chassis on page 7

- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 105

Preparing the Site for the SRX5800 Services Gateway Installation

This section includes the following topics:

- Site Preparation Checklist for the SRX5800 Services Gateway on page 55
- SRX5800 Services Gateway Rack Requirements on page 56
- SRX5800 Services Gateway Cabinet Requirements on page 61

Site Preparation Checklist for the SRX5800 Services Gateway

The checklist in Table 25 on page 55 summarizes the tasks you need to perform when preparing a site for services gateway installation.

Table 25: 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 233		
Select the type of rack or cabinet.	"SRX5800 Services Gateway Cabinet Size and Clearance Requirements" on page 61, "SRX5800 Services Gateway Rack Size and Strength Requirements" on page 57		
Plan rack or cabinet location, including required space clearances.	"Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance" on page 59		
If a rack is used, secure rack to floor and building structure.	"Connection to Building Structure for the SRX5800 Services Gateway Rack" on page 59		
Acquire cables and connectors.			

Table 25: 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" on page 224		
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 253,"Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway" on page 253		

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53

- Unpacking the SRX5800 Services Gateway on page 63

SRX5800 Services Gateway Rack Requirements

The services gateway can be installed in a rack. Many types of racks are acceptable, including four-post (telco) racks and open-frame racks. An example of an open-frame rack is shown in Figure 24 on page 57.

Figure 24: Typical Open-Frame Rack
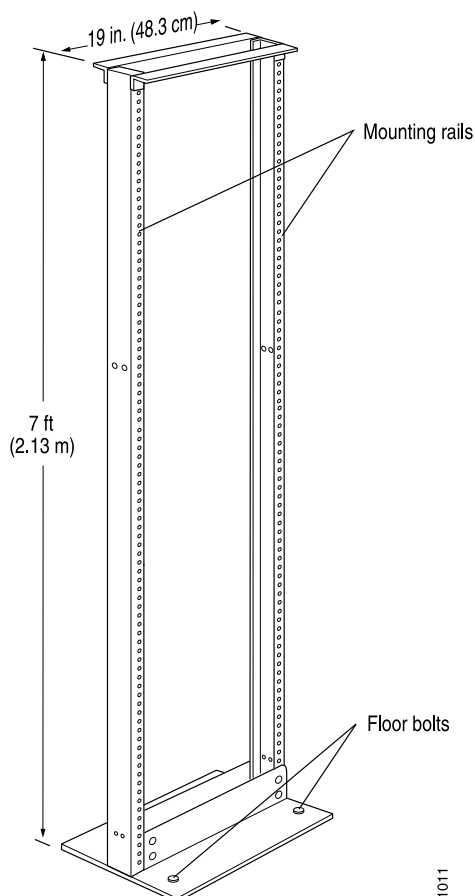
The rack requirements are described in the following topics:

- SRX5800 Services Gateway Rack Size and Strength Requirements on page 57
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 58
- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 59
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 59

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 59.

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 inner edge of 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 accomodate 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 accomodate the depth of the services gateway. The chassis is 23.0 in. (58.42 cm) deep.

- The rack must be strong enough to support the weight of the fully configured services gateway, up to 378 lb (172 kg). If you stack three fully configured services gateways, it must be capable of supporting up to 1,050 lb (515 kg).

Related Documentation
- Overview of Installing the SRX5800 Services Gateway on page 53
- Site Preparation Checklist for the SRX5800 Services Gateway on page 55
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 58
- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 59
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 59

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 to fasten to holes spaced at those distances.

Related Documentation
- Overview of Installing the SRX5800 Services Gateway on page 53
- SRX5800 Services Gateway Rack Size and Strength Requirements on page 57
- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 59
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 59

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 53
- SRX5800 Services Gateway Rack Size and Strength Requirements on page 57
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 58
- Clearance Requirements for SRX5800 Services Gateway Airflow and Hardware Maintenance on page 59

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 25 on page 60):

- For the cooling system to function properly, the airflow around the chassis must be unrestricted.

- 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 no leakage of air in situations where recirculation may result.

- Additional clearance is also required to accommodate the depth of the high-capacity AC power supplies; they extend beyond the chassis 2.85 in. (7.2 cm).

Figure 25: Chassis Dimensions and Clearance Requirements for the Services Gateway (Standard-Capacity Power Supplies)
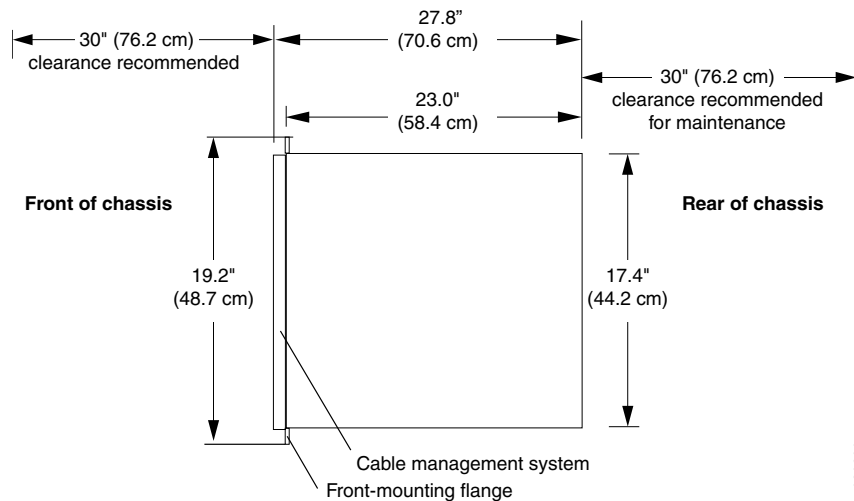
Figure 26: Chassis Dimensions and Clearance Requirements for the Services Gateway (High-Capacity AC Power Supplies)
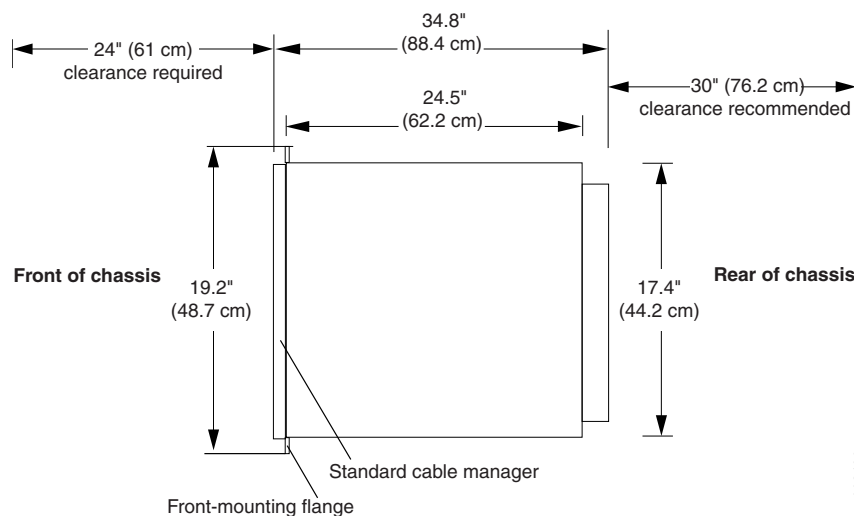
Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53

- SRX5800 Services Gateway Rack Size and Strength Requirements on page 57

- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 58

- Connection to Building Structure for the SRX5800 Services Gateway Rack on page 59

SRX5800 Services Gateway Cabinet Requirements

The services gateway can be installed in an enclosed cabinet. The cabinet requirements are described in the following topics:

- SRX5800 Services Gateway Cabinet Size and Clearance Requirements on page 61
- SRX5800 Services Gateway Cabinet Airflow Requirements on page 61

SRX5800 Services Gateway Cabinet Size and Clearance Requirements

The minimum size cabinet that can accommodate the device is 600 mm wide and 800 mm deep. 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.

The minimum front and rear clearance requirements depend on the mounting configuration you choose. The minimum total clearance inside the cabinet is 30.7 in. between the inside of the front door and the inside of the rear door.

Related Documentation
- Overview of Installing the SRX5800 Services Gateway on page 53
- Site Preparation Checklist for the SRX5800 Services Gateway on page 55
- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 58
- SRX5800 Services Gateway Cabinet Airflow Requirements on page 61

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 46

- Overview of Installing the SRX5800 Services Gateway on page 53

- Site Preparation Checklist for the SRX5800 Services Gateway on page 55

- Spacing of Rack-Mounting Bracket Holes for the SRX5800 Services Gateway on page 58

- SRX5800 Services Gateway Cabinet Size and Clearance Requirements on page 61

Unpacking the SRX5800 Services Gateway

This section includes the following topics:

- Tools and Parts Required to Unpack the SRX5800 Services Gateway on page 63
- Unpacking the SRX5800 Services Gateway on page 63
- Verifying the SRX5800 Services Gateway Parts Received on page 65

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 53
- Site Preparation Checklist for the SRX5800 Services Gateway on page 55
- Unpacking the SRX5800 Services Gateway on page 63
- Verifying the SRX5800 Services Gateway Parts Received on page 65

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).

> ℹ️ 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 27 on page 64):

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 65.

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 27: Contents of the Shipping Crate
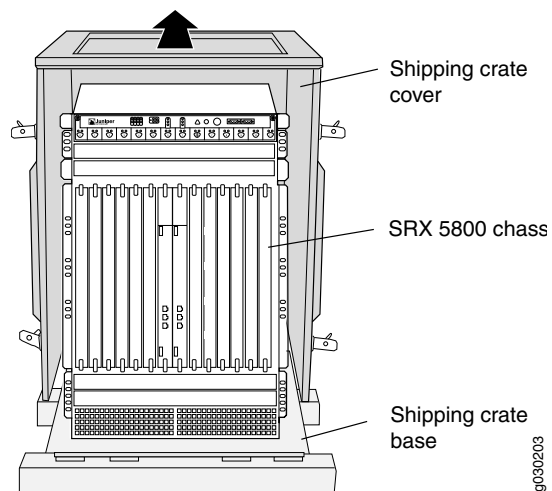
Verifying the SRX5800 Services Gateway Parts Received

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 26 on page 65, and an accessory box, which contains the parts listed in Table 27 on page 66. The parts shipped with your services gateway can vary depending on the configuration you ordered.

Table 26: Parts List for a Fully Configured Services Gateway

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

Table 26: Parts List for a Fully Configured Services Gateway *(continued)*

Component	Quantity
Blank panels for slots without components installed	One blank panel for each slot not occupied by a component

Table 27: Accessory Box Parts List

Part	Quantity
Screws to mount chassis	14
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
Label, accessories contents, SRX5800	1
USB flash drive with Junos OS	1
Read me first document	1
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 53

- Site Preparation Checklist for the SRX5800 Services Gateway on page 55

- Tools and Parts Required to Unpack the SRX5800 Services Gateway on page 63

- Unpacking the SRX5800 Services Gateway on page 63

CHAPTER 6

Installing the SRX5800 Services Gateway Mounting Hardware

This section includes the following topics:

- Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 69
- Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 71

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 28 on page 69 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 28: 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 28 on page 70):

1. On the front rack rails, install cage nuts in the holes specified in Table 28 on page 69 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 28 on page 69 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 28: Installing the Mounting Hardware for a Four-Post Rack or Cabinet
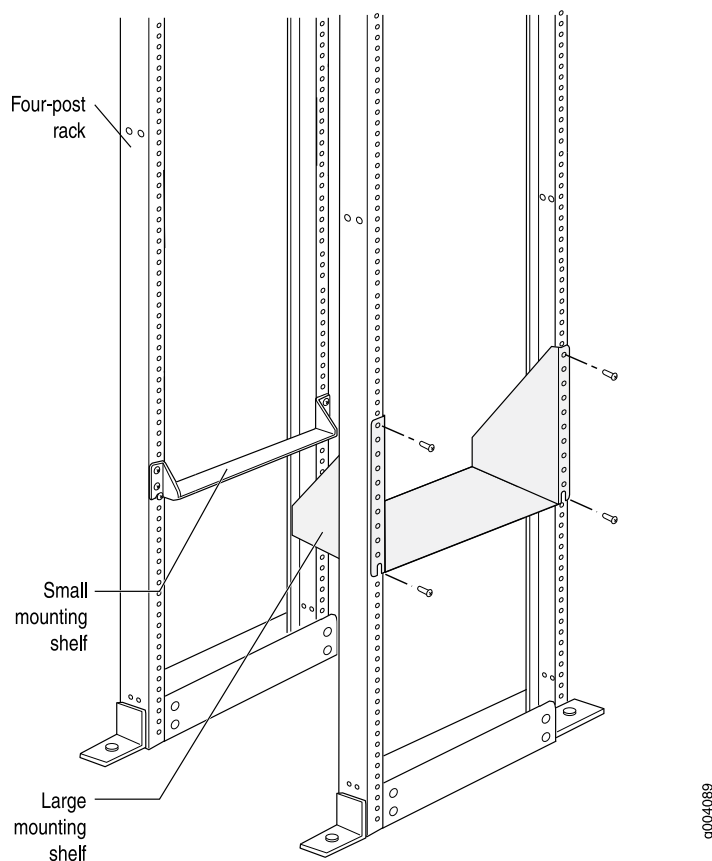
Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53

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 29 on page 71 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 29: 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 29 on page 72):

1. On the rear of each rack rail, partially insert a mounting screw into the highest hole specified in Table 29 on page 71 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 29: Installing the Mounting Hardware for an Open-Frame Rack
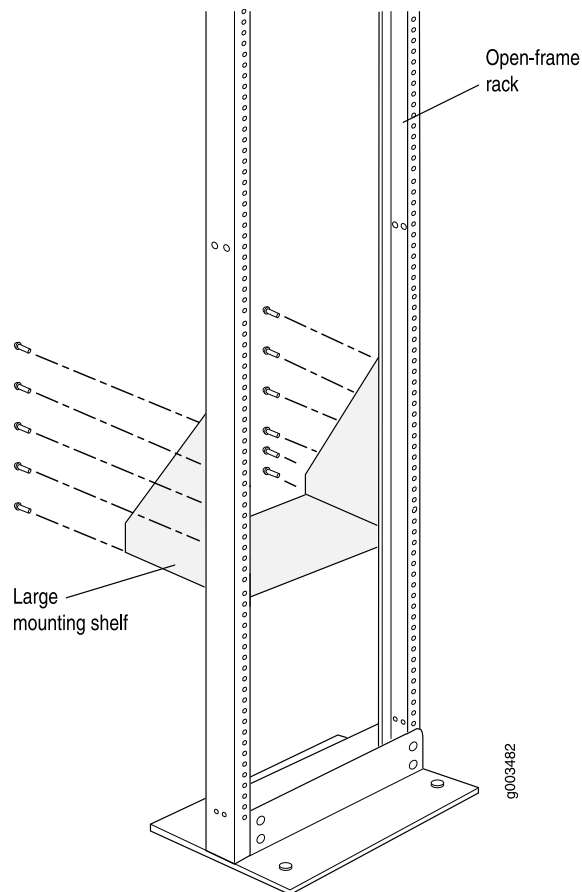
After the mounting hardware is installed, proceed to "Installing the SRX5800 Services Gateway Using a Mechanical Lift" on page 75.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53

- Site Preparation Checklist for the SRX5800 Services Gateway on page 55

- Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 69

- Tools Required to Install the SRX5800 Services Gateway with a Mechanical Lift on page 75

Installing the SRX5800 Services Gateway

This section includes the following topics:

- Tools Required to Install the SRX5800 Services Gateway with a Mechanical Lift on page 75
- Installing the SRX5800 Services Gateway Using a Mechanical Lift on page 75

Tools Required to Install the SRX5800 Services Gateway with a Mechanical Lift

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

- Mechanical lift
- Phillips (+) screwdrivers, number 2

Related Documentation
- Overview of Installing the SRX5800 Services Gateway on page 53
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 79
- Installing the SRX5800 Services Gateway Using a Mechanical Lift on page 75

Installing the SRX5800 Services Gateway Using a Mechanical Lift

Because of the services gateway's size and weight—up to 378 lb (172 kg) depending on the configuration—we strongly recommend that you install the services gateway using a mechanical lift. If you do not use a lift to install the services gateway, see "Installing the SRX5800 Services Gateway Chassis in the Rack Manually" on page 269 for complete instructions to install the services gateway safely.

> ⚠️ 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 30 on page 77):

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 30: Installing the Services Gateway in the Rack
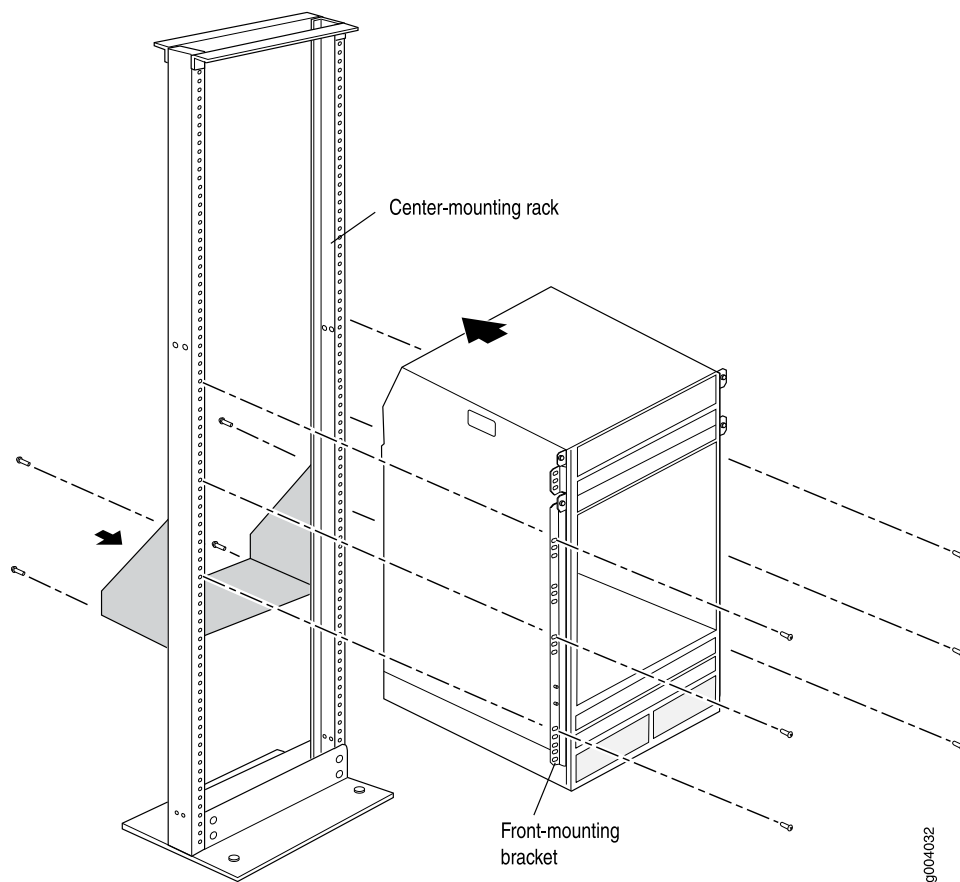
> **NOTE:** This illustration depicts the services gateway being installed in an open-frame rack.

Related Documentation

- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- Site Preparation Checklist for the SRX5800 Services Gateway on page 55
- Unpacking the SRX5800 Services Gateway on page 63
- Tools Required to Install the SRX5800 Services Gateway with a Mechanical Lift on page 75
- Overview of Installing the SRX5800 Services Gateway on page 53

Connecting the SRX5800 Services Gateway

This section includes the following topics:

- Tools and Parts Required for SRX5800 Services Gateway Connections on page 79
- Connecting the SRX5800 Services Gateway to Management and Alarm Devices on page 80
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

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 53
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

Connecting the SRX5800 Services Gateway to Management and Alarm Devices

This section includes the following topics:

- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82

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. Turn off the power to the management device.

2. Plug one end of the Ethernet cable (Figure 32 on page 80 shows the connector) into the **ETHERNET** port on the Routing Engine. Figure 31 on page 80 shows the port.

3. Plug the other end of the cable into the network device.

Figure 31: Ethernet Port
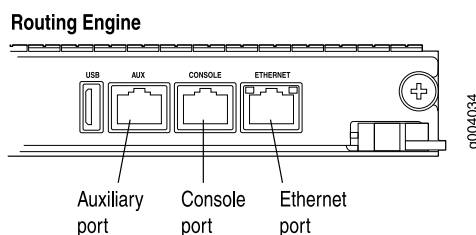
Figure 32: Routing Engine Ethernet Cable Connector
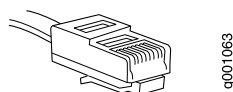
Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 79
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82
- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

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. Turn off the power to the console or auxiliary device.

2. Plug the RJ-45 end of the serial cable (Figure 34 on page 81 shows the connector) into the **AUX** port or **CONSOLE** port on the Routing Engine. Figure 33 on page 81 shows the ports.

3. Plug the female DB-9 end into the device's serial port.

Figure 33: Auxiliary and Console Ports
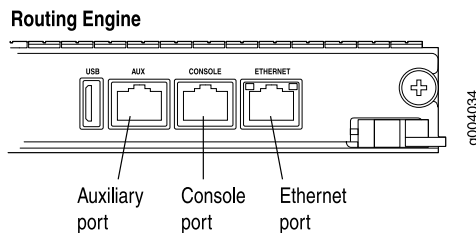
Figure 34: Routing Engine Console and Auxiliary Cable Connector
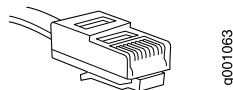
Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53

- Tools and Parts Required for SRX5800 Services Gateway Connections on page 79

- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80

- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

- Console Port Cable and Wire Specifications for the SRX5800 Services Gateway on page 256

- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports on page 258

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 35 on page 82.) A system condition that triggers the red or yellow alarm LED on the craft interface also activates the corresponding alarm relay contact.

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 35 on page 82):

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 side. With the small screws on its side facing left, insert wires into the slots in the front of the block based on the wiring for the external device. Tighten the screws to secure the 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.

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.

Figure 35: Alarm Relay Contacts
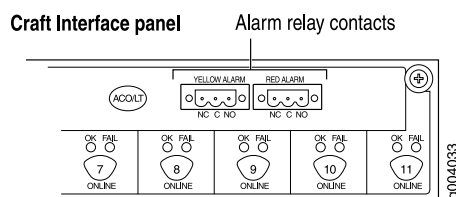
Related Documentation
- Overview of Installing the SRX5800 Services Gateway on page 53

- Tools and Parts Required for SRX5800 Services Gateway Connections on page 79

- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

- Alarm Relay Contact Wire Specifications for the SRX5800 Services Gateway on page 256

Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules

To connect the IOCs or port modules to the network (see Figure 36 on page 84):

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 36: Attaching a Cable to an IOC
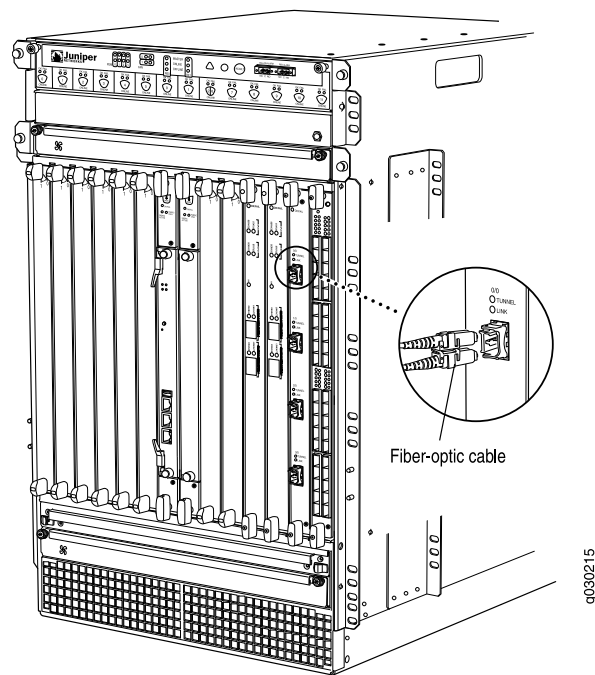
Fiber-optic cable

Related Documentation

- Overview of Installing the SRX5800 Services Gateway on page 53
- Tools and Parts Required for SRX5800 Services Gateway Connections on page 79
- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80
- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81
- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82

Grounding and Providing Power to the SRX5800 Services Gateway

This section includes the following topics:

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

Grounding the SRX5800 Services Gateway

You ground the services gateway by connecting a grounding cable to earth ground and then attaching it to the chassis grounding points using two screws. You must provide the grounding cables (the cable lugs are 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 the grounding points on the rear of the chassis. The left pair is sized for M6 screws, and the right pair is sized for UNC 1/4-20 screws.

8. Secure the grounding cable lug to the grounding points, first with the washers, then with the screws.

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 on page 201

- Overview of Installing the SRX5800 Services Gateway on page 53

- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 85

- Connecting Power to an AC-Powered SRX5800 Services Gateway on page 86

- Connecting Power to a DC-Powered SRX5800 Services Gateway on page 91

Connecting Power to an AC-Powered SRX5800 Services Gateway

⚠ 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 37 on page 88 and Figure 38 on page 89):

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 37: Connecting AC Power to the Services Gateway
(Standard-Capacity Power Supplies)

Protective earthing
(on chassis)
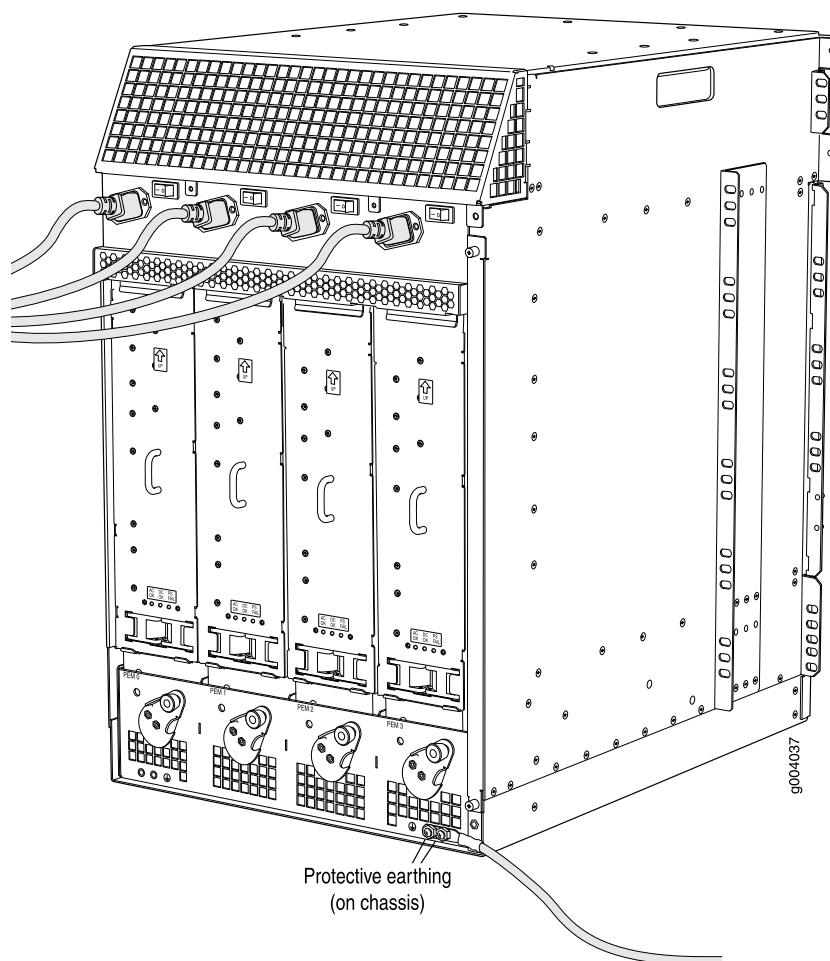
Figure 38: Connecting AC Power to the Services Gateway (High-Capacity Power Supplies)
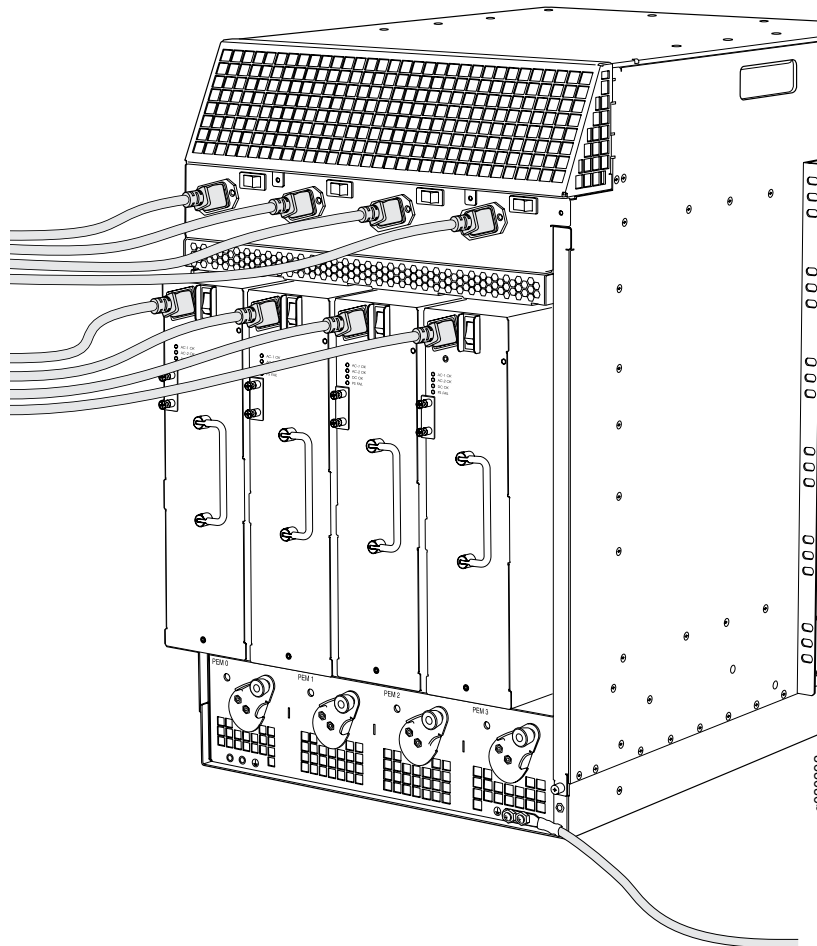
Related Documentation

- AC Power Cord Specifications for the SRX5800 Services Gateway on page 241

- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

- Overview of Installing the SRX5800 Services Gateway on page 53

- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 85

- Grounding the SRX5800 Services Gateway on page 86

- Powering On an AC-Powered SRX5800 Services Gateway on page 90

- Powering Off the SRX5800 Services Gateway on page 95

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.

   > **(i) 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 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 on page 201
- Overview of Installing the SRX5800 Services Gateway on page 53
- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 85
- Grounding the SRX5800 Services Gateway on page 86
- Connecting Power to an AC-Powered SRX5800 Services Gateway on page 86
- Powering Off the SRX5800 Services Gateway on page 95

Connecting Power to a DC-Powered SRX5800 Services Gateway

CAUTION: Do not mix AC and DC power supplies within the same services gateway. Damage to the services gateway might occur.

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.

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 39 on page 93). 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. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

9. Route the positive and negative DC power cables through the left and right sides of the cable restraint.

10. Tighten the cable restraint captive screw to hold the power cables in place.

11. Replace the clear plastic cover over the terminal studs on the faceplate.

12. 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.

13. Repeat Steps 3 through 12 for the remaining power supplies.

Figure 39: Connecting DC Power to the Services Gateway
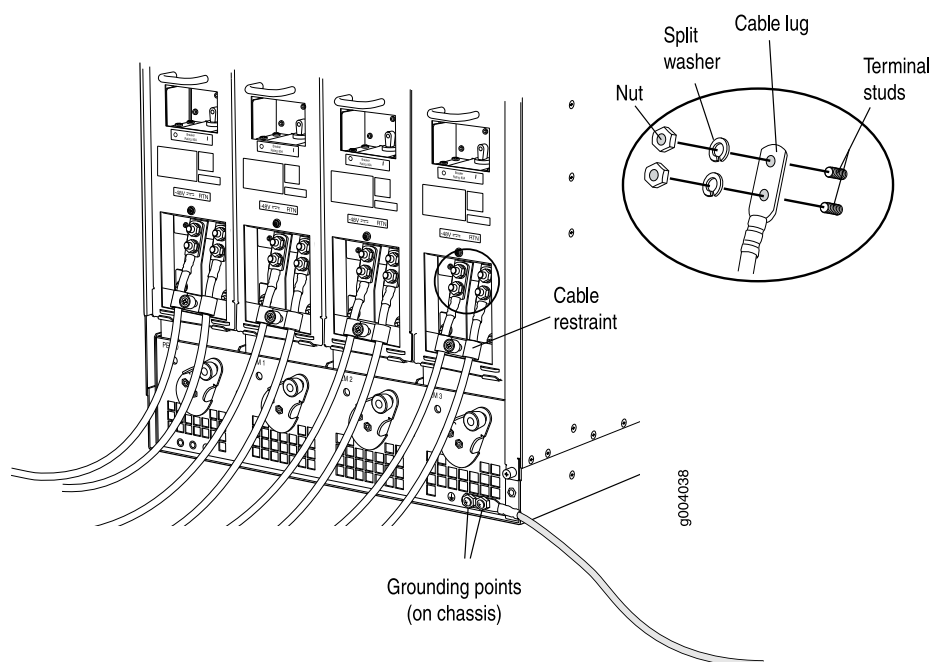
- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

- Overview of Installing the SRX5800 Services Gateway on page 53

- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 85

- Grounding the SRX5800 Services Gateway on page 86

- Powering On a DC-Powered SRX5800 Services Gateway on page 93

- Powering Off the SRX5800 Services Gateway on page 95

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 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 on page 201

- Overview of Installing the SRX5800 Services Gateway on page 53

- Tools and Parts Required for SRX5800 Services Gateway Grounding and Power Connections on page 85

- Grounding the SRX5800 Services Gateway on page 86

- Connecting Power to a DC-Powered SRX5800 Services Gateway on page 91

- Powering Off the SRX5800 Services Gateway on page 95

Powering Off the SRX5800 Services Gateway

> *i* 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 the *Junos OS System Basics and Services Command Reference*.

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 on page 201

- Overview of Installing the SRX5800 Services Gateway on page 53

- Powering On an AC-Powered SRX5800 Services Gateway on page 90

- Powering On a DC-Powered SRX5800 Services Gateway on page 93

Configuring Junos OS for the SRX5800 Services Gateway

This section includes the following topics:

- SRX5800 Services Gateway Software Configuration Overview on page 97
- Initially Configuring the SRX5800 Services Gateway on page 98

SRX5800 Services Gateway Software Configuration Overview

The services gateway is shipped with the 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 98

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 device's Ethernet interface.

    [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 97
- Powering On an AC-Powered SRX5800 Services Gateway on page 90
- Powering On a DC-Powered SRX5800 Services Gateway on page 93

SRX5800 Services Gateway Hardware Maintenance, Replacement, and Troubleshooting Procedures

Maintaining the SRX5800 Services Gateway Hardware Components

This section includes the following topics:

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 105

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.

Maintaining the SRX5800 Cooling System Components

This section includes the following topics:

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.

- Use spare filters within one year of manufacture. Check the date of manufacture printed on the filter. Store spare air filters in a dark, cool, and dry place. Storing air filters at higher temperatures, or where they can be exposed to ultraviolet (UV) radiation, hydrocarbon emissions, or vapors from solvents, can significantly reduce their life.

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 red alarm is triggered when a fan fails, and a yellow alarm and red alarm is triggered when a fan tray is removed.

• To display the status of the cooling system, issue the **show chassis environment** command. The output is similar to the following:

```
user@host> show chassis environment

 Class Item                          Status     Measurement
Temp  PEM 0                          OK         35 degrees C / 95 degrees F
      PEM 1                          OK         35 degrees C / 95 degrees F
      PEM 2                          Absent
      PEM 3                          Absent
      Routing Engine 0               OK         37 degrees C / 98 degrees F
      Routing Engine 1               Absent
      CB 0 Intake                    OK         30 degrees C / 86 degrees F
      CB 0 Exhaust A                 OK         32 degrees C / 89 degrees F
      CB 0 Exhaust B                 OK         33 degrees C / 91 degrees F
      CB 0 ACBC                      OK         30 degrees C / 86 degrees F
      CB 0 SF A                      OK         42 degrees C / 107 degrees
      CB 0 SF B                      OK         34 degrees C / 93 degrees F
      CB 1 Intake                    Absent
      CB 1 Exhaust A                 Absent
      CB 1 Exhaust B                 Absent
      CB 1 ACBC                      Absent
      CB 1 SF A                      Absent
      CB 1 SF B                      Absent
      FPC 0 Intake                   OK         36 degrees C / 96 degrees F
      FPC 0 Exhaust A                OK         32 degrees C / 89 degrees F
      FPC 0 Exhaust B                OK         39 degrees C / 102 degrees
      FPC 0 pfe0/I3 TSensor          OK         35 degrees C / 95 degrees F
      FPC 0 pfe0/I3 Chip             OK         41 degrees C / 105 degrees
      FPC 0 pfe1/I3 TSensor          OK         35 degrees C / 95 degrees F
      FPC 0 pfe1/I3 Chip             OK         39 degrees C / 102 degrees
      FPC 0 pfe0/XLR TSensor         OK         38 degrees C / 100 degrees
      FPC 0 pfe0/XLR Chip            OK         52 degrees C / 125 degrees
      FPC 0 pfe1/XLR TSensor         OK         30 degrees C / 86 degrees F
      FPC 0 pfe1/XLR Chip            OK         51 degrees C / 123 degrees
```

```
          FPC 0 IA TSensor             OK        39 degrees C / 102 degrees
          FPC 0 IA Chip                OK        43 degrees C / 109 degrees
          FPC 0 Forbes 0 TSensor       OK        29 degrees C / 84 degrees F
          FPC 0 Forbes 0 Chip          OK        48 degrees C / 118 degrees
          FPC 0 Forbes 1 TSensor       OK        32 degrees C / 89 degrees F
          FPC 0 Forbes 1 Chip          OK        45 degrees C / 113 degrees
          FPC 2 Intake                 OK        29 degrees C / 84 degrees F
          FPC 2 Exhaust A              OK        37 degrees C / 98 degrees F
          FPC 2 Exhaust B              OK        44 degrees C / 111 degrees
          FPC 2 I3 0 TSensor           OK        45 degrees C / 113 degrees
          FPC 2 I3 0 Chip              OK        50 degrees C / 122 degrees
          FPC 2 I3 1 TSensor           OK        43 degrees C / 109 degrees
          FPC 2 I3 1 Chip              OK        46 degrees C / 114 degrees
          FPC 2 I3 2 TSensor           OK        40 degrees C / 104 degrees
          FPC 2 I3 2 Chip              OK        46 degrees C / 114 degrees
          FPC 2 I3 3 TSensor           OK        35 degrees C / 95 degrees F
          FPC 2 I3 3 Chip              OK        39 degrees C / 102 degrees
          FPC 2 IA 0 TSensor           OK        48 degrees C / 118 degrees
          FPC 2 IA 0 Chip              OK        46 degrees C / 114 degrees
          FPC 2 IA 1 TSensor           OK        41 degrees C / 105 degrees
          FPC 2 IA 1 Chip              OK        45 degrees C / 113 degrees
Fans   Top Rear Fan                    OK        Spinning at normal speed
       Bottom Rear Fan                 OK        Spinning at normal speed
       Top Middle Fan                  OK        Spinning at normal speed
       Bottom Middle Fan               OK        Spinning at normal speed
       Top Front Fan                   OK        Spinning at normal speed
       Bottom Front Fan                OK        Spinning at normal speed
```

NOTE: The fan numbers are stamped into the fan tray sheet metal next to each fan.

Related Documentation

- Tools and Parts Required to Maintain the SRX5800 Services Gateway on page 105
- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 105
- Maintaining the Air Filter on the SRX5800 Services Gateway on page 106
- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 108
- Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway on page 111
- Maintaining Port Modules on the SRX5800 Services Gateway on page 113
- Maintaining SRX5800 Services Gateway Network Cables on page 114
- Maintaining SRX5800 Services Gateway Power Supplies on page 119

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 SCBs, 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
                  CB 1 status:
                      State                        Online Standby
                      Temperature                  40 degrees C / 104 degrees F
                      Power 1
                        1.2 V                       1202 mV
                        1.5 V                       1514 mV
                        1.8 V                       1807 mV
                        2.5 V                       2500 mV
                        3.3 V                       3293 mV
                        5.0 V                       5053 mV
                        12.0 V                     12200 mV
                        1.25 V                      1260 mV
                        3.3 V SM3                   3319 mV
                        5 V RE                      5059 mV
                        12 V RE                    12007 mV
                      Power 2
                        11.3 V bias PEM            11311 mV
                        4.6 V bias MidPlane         4827 mV
                        11.3 V bias FPD            11330 mV
                        11.3 V bias POE 0          11292 mV
                        11.3 V bias POE 1          11311 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 Junos OS manuals.

Related Documentation

- Tools and Parts Required to Maintain the SRX5800 Services Gateway on page 105

- SRX5800 Services Gateway Craft Interface Host Subsystem LEDs on page 32

- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 105

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 106

- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 107

- Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway on page 111

- Maintaining Port Modules on the SRX5800 Services Gateway on page 113

- Maintaining SRX5800 Services Gateway Network Cables on page 114

- Maintaining SRX5800 Services Gateway Power Supplies on page 119

Maintaining the SRX5800 Packet Forwarding Engine Components

This section includes the following topics:

- Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway on page 111
- Maintaining Port Modules on the SRX5800 Services Gateway on page 113
- Maintaining SRX5800 Services Gateway Network Cables on page 114

Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway

Purpose For optimum services gateway performance, verify the condition of the Services Processing Cards (SPCs), I/O Cards (IOCs), and Flex I/O Cards (Flex IOCs). The services gateway can have up to 12 SPCs, IOCs, and Flex IOCs mounted vertically in the card cage at the front of the chassis. To maintain SPCs, IOCs, and Flex IOCs, perform the following procedures regularly:

Action On a regular basis:

- Check the LEDs on the craft interface corresponding to each IOC and SPC slot. The green LED labeled **OK** lights steadily when an IOC or SPC is functioning normally.

- Check the **OK/FAIL** LED on the faceplate of each IOC and SPC. For more information, see "SRX5800 Services Gateway I/O Card LEDs" on page 15 and "SRX5800 Services Gateway Services Processing Card LEDs" on page 22. If the IOC or SPC 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 IOC and SPCs. As shown in the sample output, the value **Online** in the column labeled **State** indicates that the IOC or SPC 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
   6 Empty
   7 Offline        ---Offlined by cli command---
   8 Empty
   9 Empty
  10 Empty
  11 Empty
```

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**, left to right:

    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 the *Junos System Basics and Services Command Reference*.

Maintaining Port Modules on the SRX5800 Services Gateway

Purpose   For optimum services gateway performance, verify the condition of the port modules installed in Flex IOCs.

Action   On a regular basis:

- Check the LEDs on 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 modules slots in an FPC are numbered from **0** through **1**, top to bottom:

```
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 the *Junos OS System Basics and Services Command Reference*.

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 106

- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 107

- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 108

- Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway on page 111

- Maintaining SRX5800 Services Gateway Network Cables on page 114

- Maintaining SRX5800 Services Gateway Power Supplies on page 119

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.

Figure 40: Cable Manager
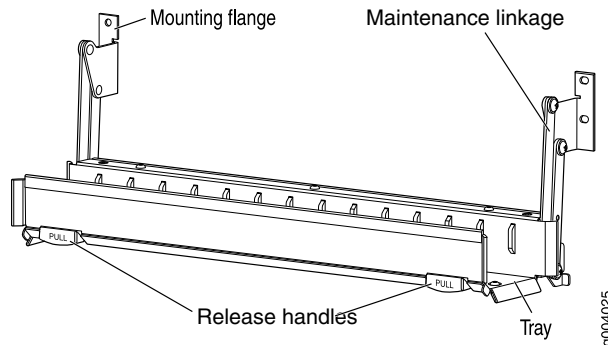
- Place excess cable out of the way in the cable manager. Do not allow fastened loops of cable to dangle from the connector or cable manager, because this stresses the cable at the fastening point. Putting fasteners on the loops helps to maintain their shape.

- 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 105

- Maintaining the Air Filter on the SRX5800 Services Gateway on page 106

- Maintaining the Fan Trays on the SRX5800 Services Gateway on page 107

- Maintaining the SRX5800 Services Gateway Host Subsystem and SCBs on page 108

- Maintaining SPCs, IOCs, and Flex IOCs on the SRX5800 Services Gateway on page 111

- Maintaining Port Modules on the SRX5800 Services Gateway on page 113

- Maintaining SRX5800 Services Gateway Power Supplies on page 119

Handling and Storing SRX5800 Services Gateway Cards

This section includes the following topics:

- SRX5800 Services Gateway Card Terminology on page 115
- Holding an SRX5800 Services Gateway Card on page 116
- Storing an SRX5800 Services Gateway Card on page 118

SRX5800 Services Gateway Card Terminology

Regardless of orientation, this information uses the same terms for all four edges of the card (see Figure 41 on page 116):

- Faceplate—Edge of the card that has connectors to which you connect cables or sockets for SFP or XFP transceivers

- Connector edge—Edge opposite the faceplate; this edge has the connectors that attach to the midplane

- Top edge—Edge at the top of the card when it is vertical

- Bottom edge—Edge at the bottom of the card when it is vertical

> ℹ️ NOTE: This terminology applies to SPCs, IOCs, and SCBs in addition to Routing Engines and port modules

Figure 41: Card Edges
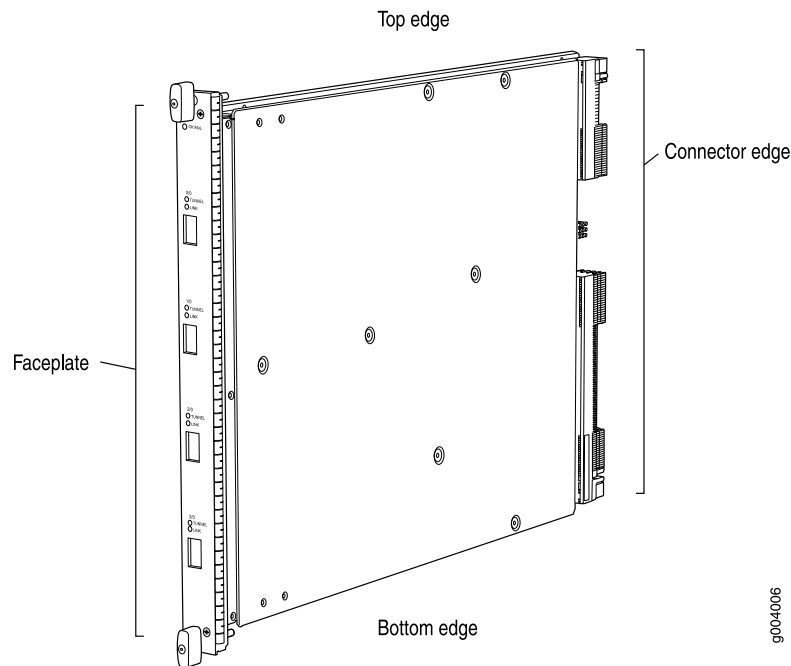
Related Documentation

- Holding an SRX5800 Services Gateway Card on page 116
- Storing an SRX5800 Services Gateway Card on page 118

Holding an SRX5800 Services Gateway Card

When carrying a card, you can hold it either vertically or horizontally.

> ℹ️ NOTE: A card weighs up to 14.5 lb (6.6 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 electromagnetic interference (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 places that this document indicates. In particular, never grasp the connector edge, especially at the power connector in the corner where the connector and bottom edges meet.

Figure 42: Do Not Grasp the Connector Edge

Do not hold connector edge.
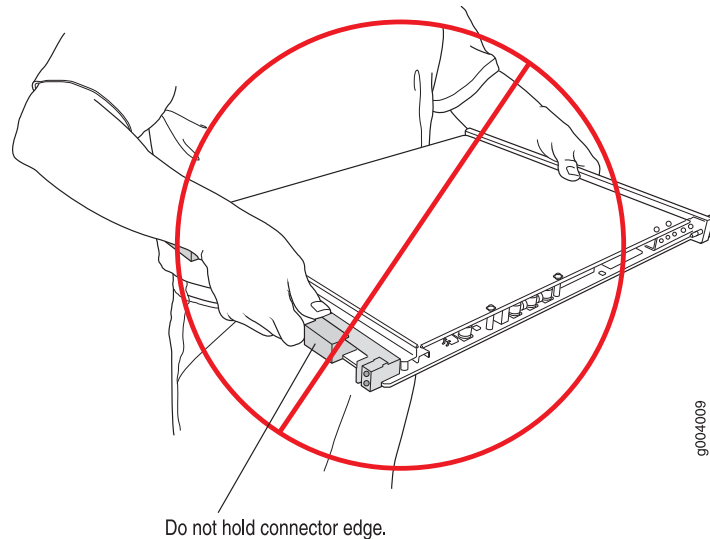
Never carry the card by the faceplate with only one hand.

Do not rest any edge of a card directly against a hard surface (see Figure 43 on page 118).

Do not stack cards.

Figure 43: Do Not Rest the IOC on an Edge
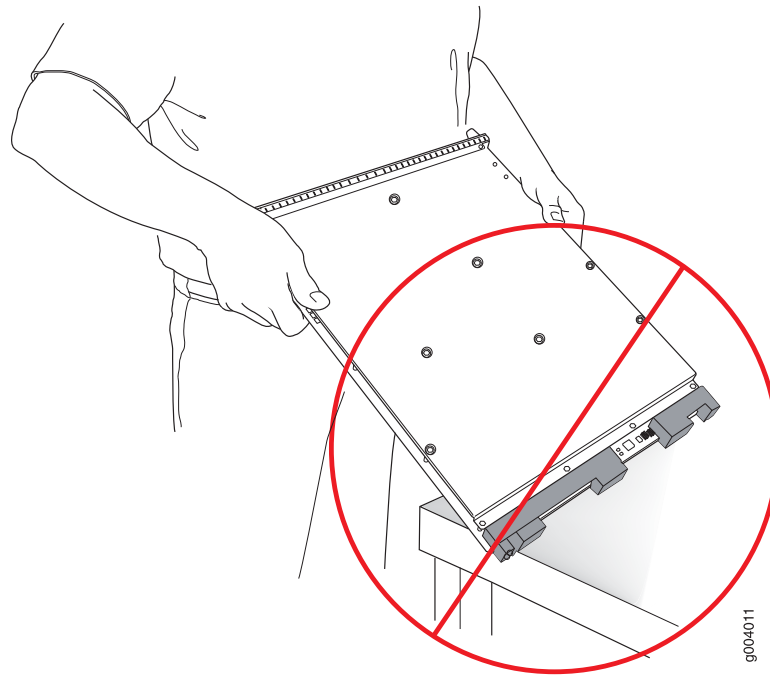
Do not rest connectors on any surface.

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 on page 115
- Storing an SRX5800 Services Gateway Card on page 118

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 on page 115
- Holding an SRX5800 Services Gateway Card on page 116

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 33
- SRX5800 Services Gateway Standard-Capacity AC Power Supply LEDs on page 43
- SRX5800 Services Gateway DC Power Supply LEDs on page 45
- Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface on page 121
- Routine Maintenance Procedures for the SRX5800 Services Gateway on page 105

- Maintaining SRX5800 Services Gateway Network Cables on page 114

Troubleshooting the SRX5800 Services Gateway Hardware Components

This section includes the following topics:

- Troubleshooting Resources for the SRX5800 Services Gateway on page 121
- Troubleshooting the SRX5800 Services Gateway Cooling System on page 124
- Troubleshooting SRX5800 Services Gateway IOCs and Flex IOCs on page 125
- Troubleshooting SRX5800 Services Gateway Port Modules on page 127
- Troubleshooting SRX5800 Services Gateway SPCs on page 127
- Troubleshooting the SRX5800 Services Gateway Power System on page 129

Troubleshooting Resources for the SRX5800 Services Gateway

This section includes the following topics:

- Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface on page 121
- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 122
- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 122
- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 123
- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 124
- Juniper Networks Technical Assistance Center on page 124

Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface

The Junos OS command-line interface (CLI) is the primary tool for controlling and troubleshooting services gateway hardware, the 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 the Junos OS, see the appropriate Junos OS configuration guide.

Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages

When the Routing Engine detects an alarm condition, it lights the red or yellow 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.

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 red or yellow 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.

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**.

- IOC and SPC LEDs—Two LEDs, **OK** and **FAIL**, indicate the status of each IOC or SPC. Green indicates OK and red indicates a failure. The IOC and SPC 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 **FAIL**. 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 32

- Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface on page 121

- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 122

- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 122

- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 124

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:

- IOC LED—One LED labeled **OK/FAIL** on each IOC faceplate indicates the IOC's status.

- SPC LED—One LED labeled **OK/FAIL** on each SPC faceplate indicates the SPC's status.

- Port module LED—One LED labeled **OK/FAIL** on each port module faceplate indicates the 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 may 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 Command-Line Interface on page 121

- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 122

- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 122

- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 123

Juniper Networks Technical Assistance Center

If you need assistance while troubleshooting a services gateway, open a support case using the Case Manager link at: http://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 Command-Line Interface on page 121

- Troubleshooting the SRX5800 Services Gateway with Chassis and Interface Alarm Messages on page 122

- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 122

- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 123

- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 124

Troubleshooting the SRX5800 Services Gateway Cooling System

Problem 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 red 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 a fan tray is removed, a yellow alarm and a red alarm occur.

- The following conditions automatically cause the fans to run at full speed and also trigger the indicated alarm:

  - A fan fails (red alarm).

  - The services gateway temperature exceeds the "temperature warm" threshold (yellow alarm).

  - The temperature of the services gateway exceeds the maximum ("temperature hot") threshold (red alarm and automatic shutdown of the power supplies).

Related
Documentation
- Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface on page 121

- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 123

- Troubleshooting the SRX5800 Services Gateway with Alarm Relay Contacts on page 122

Troubleshooting SRX5800 Services Gateway IOCs and Flex IOCs

Problem   The IOCs or Flex IOCs are not functioning normally.

Solution
- Monitor the green LED labeled **OK** on the craft interface corresponding to the slot as soon as an IOC is seated in an operating services gateway.

  The Routing Engine downloads the IOC software to it under two conditions: the IOC is present when the Routing Engine boots Junos, and the IOC is installed and requested online through the CLI or push button on the front panel. The IOC then runs diagnostics, during which the **OK** LED blinks. When the IOC is online and functioning normally, the **OK** LED lights green steadily.

- Make sure the IOC 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 IOC and **OK** and **FAIL** LEDs for the slot on the craft interface. When the IOC is online and functioning normally, the **OK** LED lights green steadily.

- Issue the CLI **show chassis fpc** command to check the status of installed IOCs. As shown in the sample output, the value **Online** in the column labeled **State** indicates that the IOC 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 commands, see the *Junos System Basics and Services Command Reference*.

Troubleshooting SRX5800 Services Gateway Port Modules

Problem   The 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 the *Junos OS System Basics and Services Command Reference*.

Troubleshooting SRX5800 Services Gateway SPCs

Problem   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

                 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 commands, see the *Junos System Basics and Services Command Reference*.

Related Documentation
- Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface on page 121

- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 123

- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 124

Troubleshooting the SRX5800 Services Gateway Power System

Problem   The power system is not functioning normally.

Solution
- Check the LEDs on each power supply faceplate.

  - If a standard-capacity 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 high-capacity AC power supply is correctly installed and functioning normally, the **DC OK** LED lights steadily and the **PS FAIL** LED is not lit. In addition, the **AC-1 OK** LED lights 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 lights green steadily if the lower AC feed (on the power supply itself) is connected and receiving power.

  - 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

  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
  ```

If a power supply is not functioning normally, perform the following steps to diagnose and correct the problem:

- If a red alarm condition occurs, issue the **show chassis alarms** command to determine the source of the problem.

- If all power supplies have failed, the system temperature might have exceeded the threshold, causing the system to shut down.

  > NOTE: If the system temperature exceeds the threshold, the Junos OS shuts down all power supplies so that no status is displayed.
  >
  > The 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.

- Check that the power supplies are switched on:

  - If the services gateway is equipped with standard-capacity AC power supplies, verify that the AC switch on the chassis above each power supply is in the on (—) position.

  - If the services gateway is equipped with high-capacity AC power supplies, verify that the AC switch on the chassis above each power supply is in the on (—) position and that the AC switch at the top of each power supply is in the on (|) position.

  - If the services gateway is equipped with DC power supplies, verify that the DC circuit breaker on the power supply (|) is in the on position.

- 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 cords or DC power cables from the power sources 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.

Related Documentation

- Troubleshooting the SRX5800 Services Gateway with the Command-Line Interface on page 121

- Troubleshooting the SRX5800 Services Gateway with the Craft Interface LEDs on page 123

- Troubleshooting the SRX5800 Services Gateway with the Component LEDs on page 124

Replacing SRX5800 Services Gateway Hardware Components

This section includes the following topics:

SRX5800 Services Gateway Field-Replaceable Units

Field-replaceable units (FRUs) are services gateway components that can be replaced at the customer site. The device uses the following types of FRUs:

- Hot-removable and hot-insertable FRUs—You can remove and replace these components without powering off the device or disrupting the routing functions.

- Hot-pluggable FRUs—You can remove and replace these components without powering off the device, but the routing functions of the system are interrupted when the component is removed.

- Cold-swap-only FRUs—You must power off the device in order to remove, replace, or add these components.

Table 30 on page 132 lists the FRUs for the services gateway.

Table 30: Field-Replaceable Units

Hot-removable and hot-insertable FRUs	Hot-pluggable FRUs	Cold-swap-only FRUs
Air filter	I/O Cards(IOCs)	Routing Engine
Fan tray	Flex I/O Cards (Flex IOCs)	Switch Control Boards (SCBs)
Craft interface	Port modules	Services Processing Cards (SPCs)
AC and DC power supplies (if redundant)		
SFP and XFP Transcievers		

Related Documentation
- Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components on page 132

Tools and Parts Required to Replace SRX5800 Services Gateway Hardware Components

To replace hardware components, you must have the tools listed in Table 31 on page 132.

Table 31: Tools and Parts Required

Tool or part	Components
7/16-in. nut driver or pliers	Cables and connectors
	DC power supply

Table 31: Tools and Parts Required *(continued)*

Tool or part	Components
Blank panels (if component is not reinstalled)	SCB
	IOC
	SPC
	Power supply
	Routing Engine
Electrostatic bag or antistatic mat	Craft Interface
	SCB
	IOC
	SPC
	Routing Engine
	SFP and XFP Transcievers
Electrostatic discharge (ESD) grounding wrist strap	All
Flat-blade (−) screwdriver	Cables and connectors
	IOC
Phillips (+) screwdrivers, numbers 1 and 2	Air filter
	Routing Engine
	Craft interface
	SCB
	Cables and connectors
	Fan tray
Rubber safety cap	IOC
	SPC
	SFP and XFP Transcievers
Wire cutters	Cables and connectors
	DC power supply

Related Documentation
- SRX5800 Services Gateway Field–Replaceable Units on page 132

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 134

2. Removing the SRX5800 Services Gateway Craft Interface on page 134

3. Installing the SRX5800 Services Gateway Craft Interface on page 135

4. Connecting the Alarm Relay Wires to the SRX5800 Services Gateway Craft Interface on page 136

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 44 on page 134):

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 44: Alarm Relay Contacts
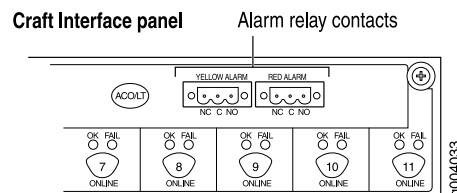
Removing the SRX5800 Services Gateway Craft Interface

To remove the craft interface (see Figure 45 on page 135):

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 45: Removing the Craft Interface
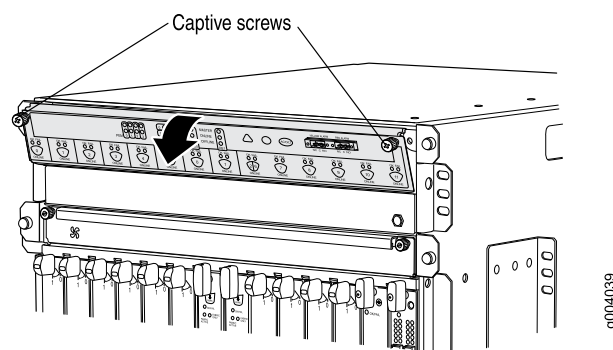
Release the captive screws and
tilt the craft interface toward you.

Installing the SRX5800 Services Gateway Craft Interface

To install the craft interface (see Figure 46 on page 135):

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 46: Installing the Craft Interface
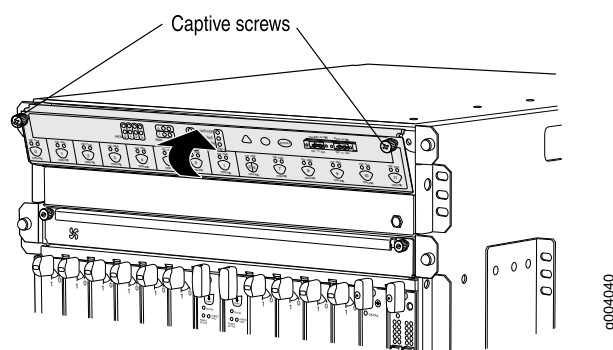
Rest lower edge of the craft interface in the chassis
bay, then tilt it toward the chassis, and secure the screws.

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 47 on page 136):

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 47: Alarm Relay Contacts
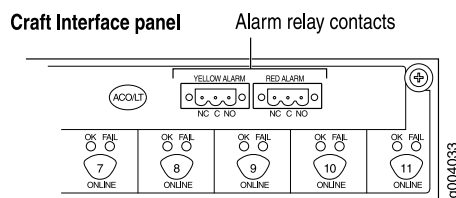
Replacing an SRX5800 Services Gateway Fan Tray

To replace a fan tray, perform the following procedures in sequence:

1. Removing an SRX5800 Services Gateway Fan Tray on page 136
2. Installing an SRX5800 Services Gateway Fan Tray on page 138

Removing an SRX5800 Services Gateway Fan Tray

NOTE: To prevent overheating, install the replacement fan tray immediately after removing the existing fan tray.

To remove the upper or lower fan tray (see Figure 48 on page 137 and Figure 49 on page 138):

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 tray 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.

Figure 48: Removing an Upper Fan Tray (Standard-Capacity Shown, High-Capacity Similar)
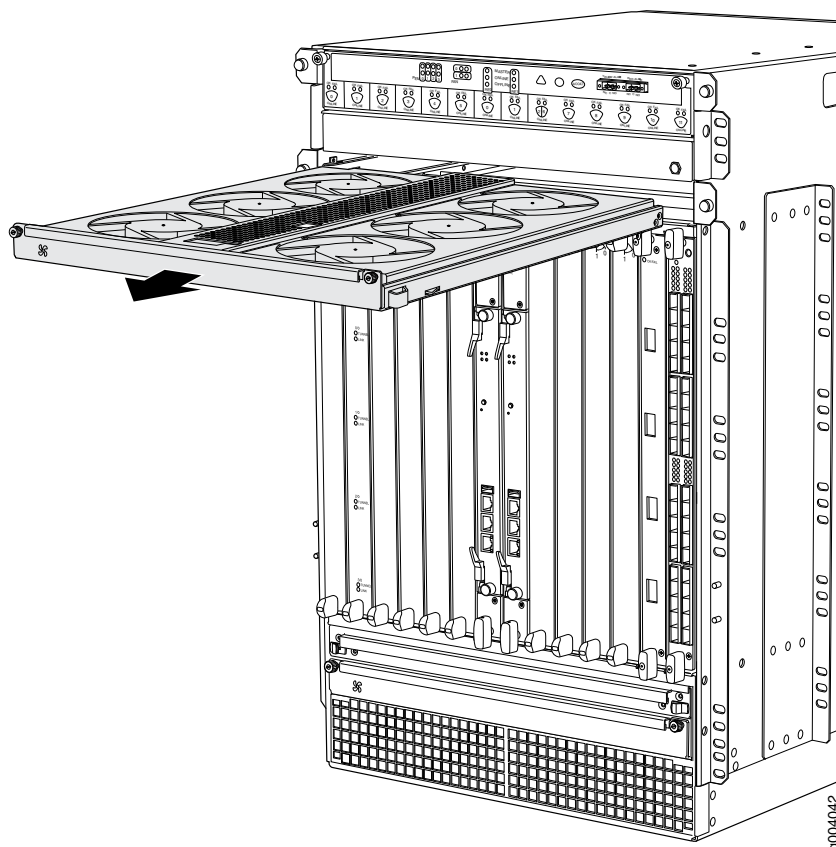
Figure 49: Removing a Lower Fan Tray (Standard-Capacity Shown, High-Capacity Similar)
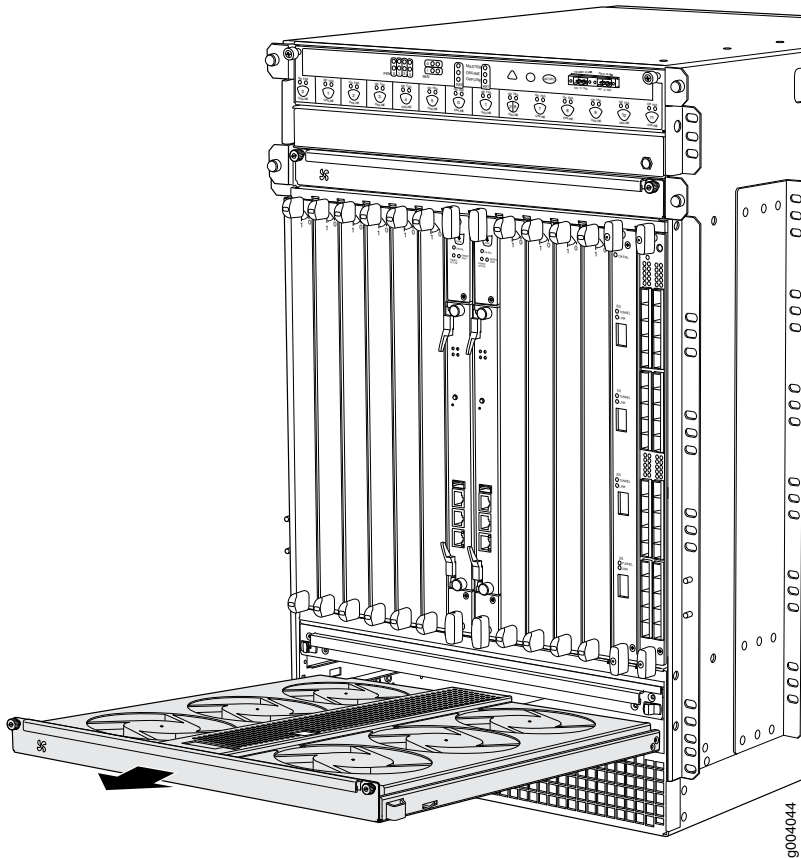
Installing an SRX5800 Services Gateway Fan Tray

To install a fan tray (see Figure 50 on page 139 and Figure 51 on page 140):

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 50: Installing an Upper Fan Tray (Standard-Capacity Shown, High-Capacity Similar)
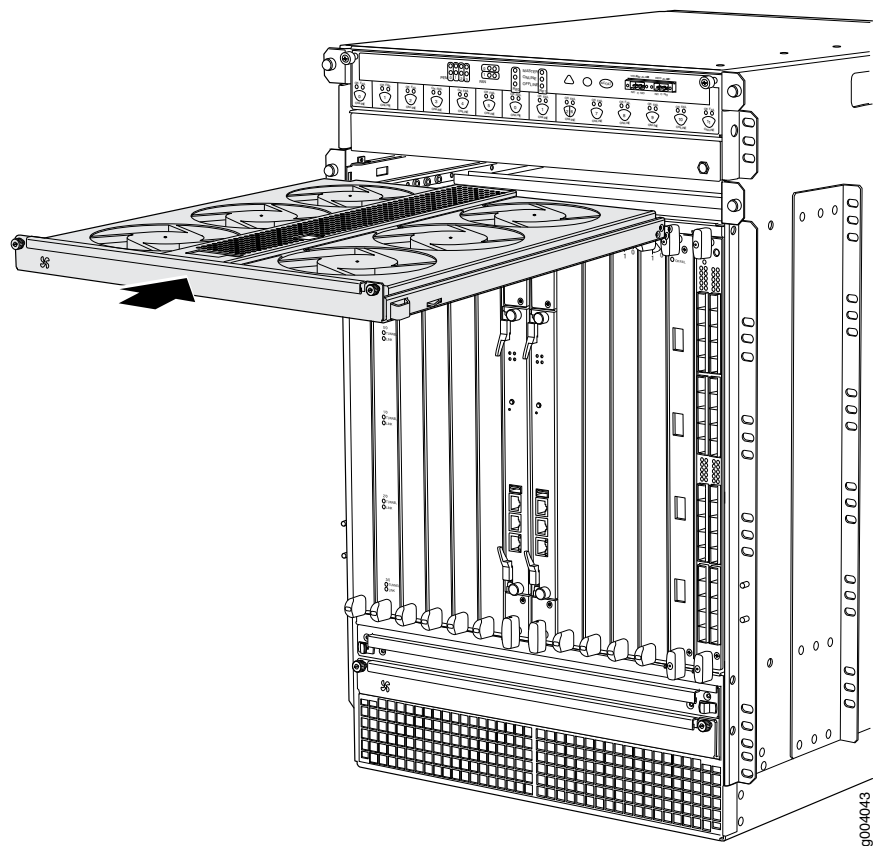
Figure 51: Installing a Lower Fan Tray (Standard-Capacity Shown, High-Capacity Similar)
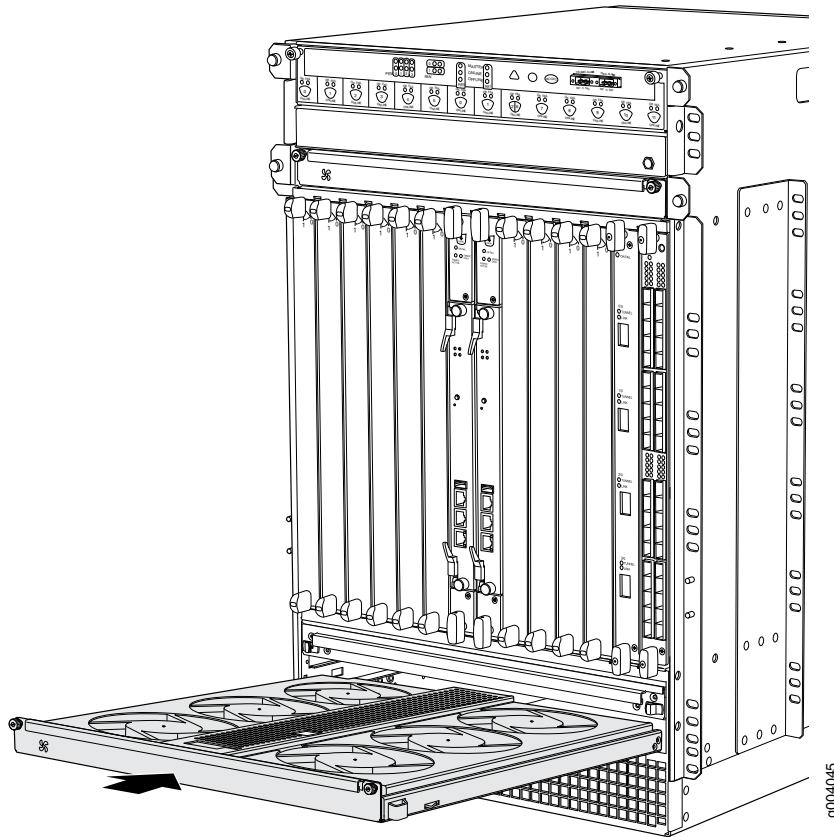
Replacing the SRX5800 Services Gateway Air Filter

To replace the air filter, perform the following procedures in sequence:

1. Removing the SRX5800 Services Gateway Air Filter on page 140
2. Installing the SRX5800 Services Gateway Air Filter on page 141

Removing the SRX5800 Services Gateway Air Filter

⚠ CAUTION: Do not run the services gateway for more than a few 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 52 on page 141):

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 52: Removing the Air Filter (Standard-Capacity Filter Tray Shown, High-Capacity Similar)

Installing the SRX5800 Services Gateway Air Filter

To install the air filter (see Figure 53 on page 142):

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.
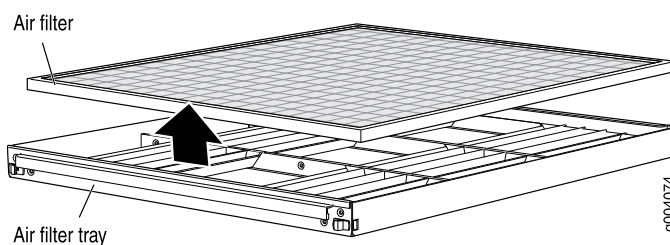
6. Rearrange the cables in the cable manager.

Figure 53: Installing the Air Filter Standard-Capacity Filter Tray Shown, High-Capacity Similar)
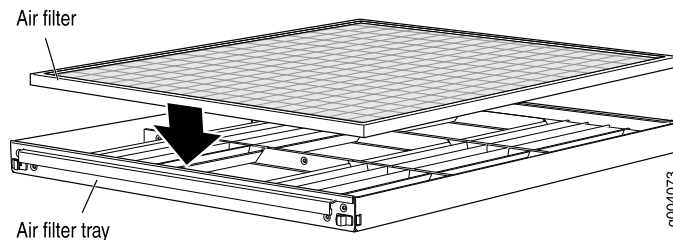
Replacing SRX5800 Services Gateway Host Subsystem Components

This section includes the following topics:

- Taking the SRX5800 Services Gateway Host Subsystem Offline on page 142
- Operating and Positioning the SRX5800 Services Gateway SCB Ejectors on page 143
- Replacing an SRX5800 Services Gateway SCB on page 143
- Replacing the SRX5800 Services Gateway Routing Engine on page 147

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**

   Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see the *Junos OS System Basics and Services Command Reference*.

   > **NOTE:** The SCB might continue forwarding traffic for approximately 5 minutes after the request system halt command has been issued.

2. Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see the *Junos OS System Basics and Services Command Reference*.

> *i* 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 143
- Removing an SRX5800 Services Gateway SCB on page 144
- Installing an SRX5800 Services Gateway SCB on page 145
- Replacing the SRX5800 Services Gateway Routing Engine on page 147
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 150

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 towards the center of the board.
- 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 142
- Replacing an SRX5800 Services Gateway SCB on page 143
- Replacing the SRX5800 Services Gateway Routing Engine on page 147
- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 150

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 143. To replace an SCB, perform the following procedures:

1. Removing an SRX5800 Services Gateway SCB on page 144
2. Installing an SRX5800 Services Gateway SCB on page 145

Removing an SRX5800 Services Gateway SCB

To remove an SCB (see Figure 54 on page 145):

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 device.

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 54: Removing an SCB
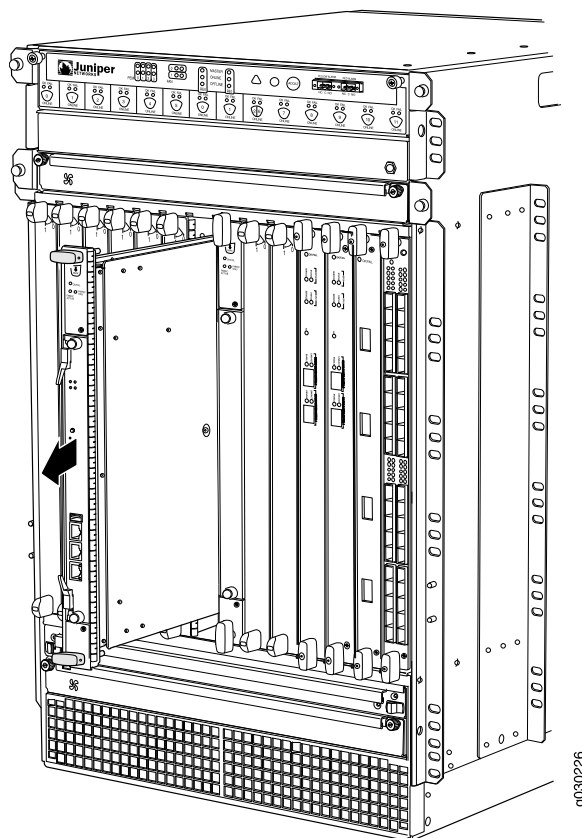
Installing an SRX5800 Services Gateway SCB

To install an SCB (see Figure 55 on page 147):

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 55: Installing an SCB
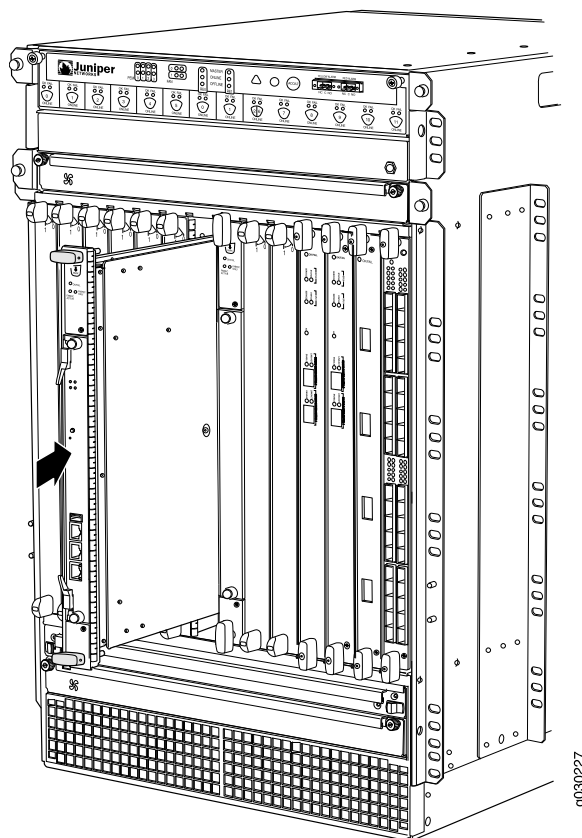
Replacing the SRX5800 Services Gateway Routing Engine

To replace the routing engine, perform the following procedures:

1. Removing the SRX5800 Services Gateway Routing Engine on page 147

2. Installing the SRX5800 Services Gateway Routing Engine on page 148

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 56 on page 148):

1. Take the host subsystem offline as described in "Taking the SRX5800 Services Gateway Host Subsystem Offline" on page 142.

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 56: Removing the Routing Engine
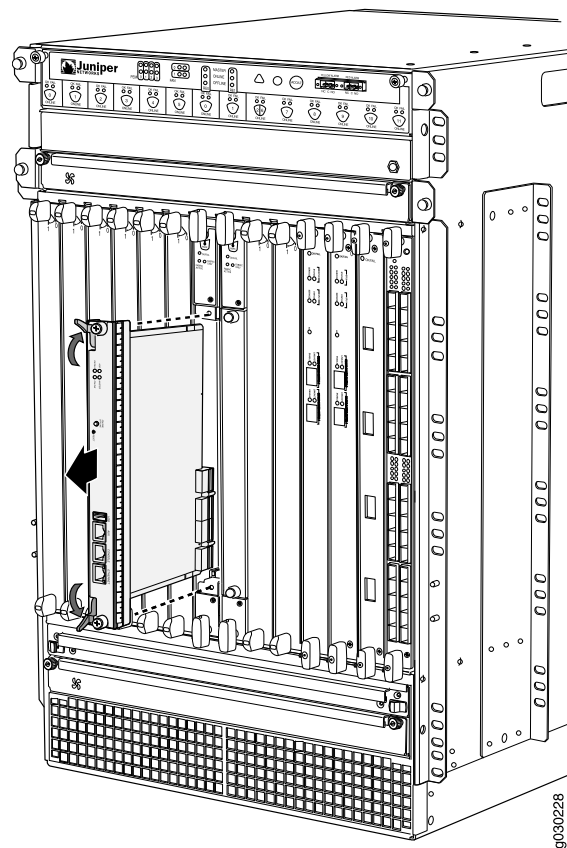
Installing the SRX5800 Services Gateway Routing Engine

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.

To install a Routing Engine into an SCB (see Figure 57 on page 150):

1. If you have not already done so, take the host subsystem offline. See "Taking the SRX5800 Services Gateway Host Subsystem Offline" on page 142.

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 Junos OS manuals.

Figure 57: Installing the Routing Engine
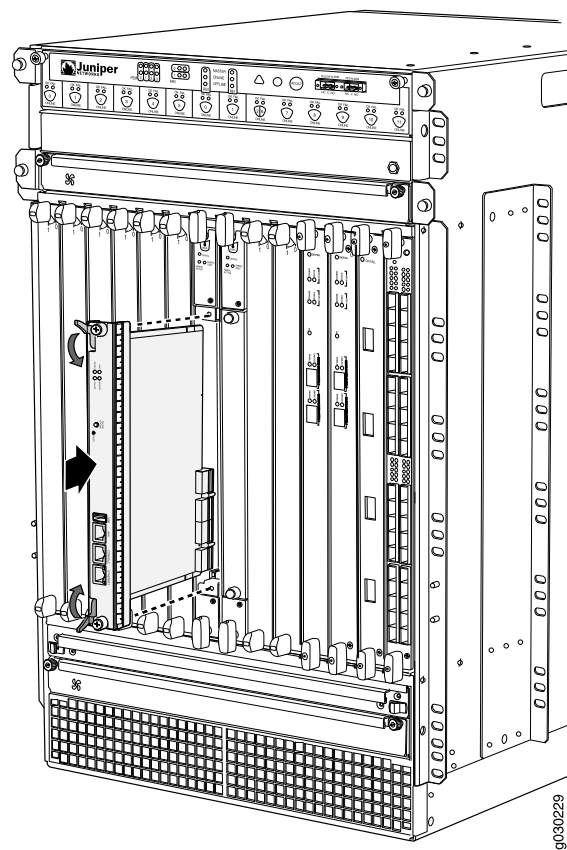
Replacing Connections to SRX5800 Services Gateway Routing Engine Interface Ports

This section includes the following topics:

- Replacing the Management Ethernet Cable on an SRX5800 Services Gateway on page 150
- Replacing the SRX5800 Services Gateway Console or Auxiliary Cable on page 151

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 58 on page 151 shows the connector.

3. Disconnect the cable from the network device.

4. Plug one end of the replacement cable into the **ETHERNET** port. Figure 59 on page 151 shows the port.

5. Plug the other end of the cable into the network device.

Figure 58: Cable Connector
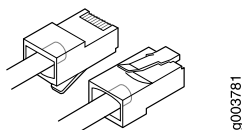
Figure 59: Ethernet Port
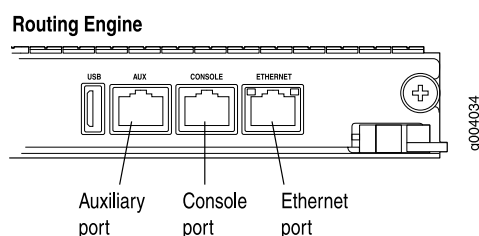
<table>
<tr><td>Related
Documentation</td><td>• Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

• Replacing the SRX5800 Services Gateway Console or Auxiliary Cable on page 151

• Replacing the SRX5800 Services Gateway Routing Engine on page 147</td></tr>
</table>

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 60 on page 152 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 60: Auxiliary and Console Ports

Routing Engine

Auxiliary port   Console port   Ethernet port

Replacing SRX5800 Services Gateway IOCs

To replace an IOC, perform the following procedures:

1. Removing an SRX5800 Services Gateway IOC on page 152
2. Installing an SRX5800 Services Gateway IOC on page 154

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 61 on page 154):

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 the *Junos OS System Basics and Services Command Reference*.

5. 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 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. Immediately cover each optical transceivers and the end of each fiber-optic cable with a rubber safety cap.

7. Arrange the disconnected cables in the cable manager to prevent the cables from developing stress points.

8. Simultaneously turn both of the ejector handles counterclockwise to unseat the IOC.

9. Grasp the handles and slide the IOC straight out of the card cage halfway.

10. 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.

11. 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 61: Removing an IOC
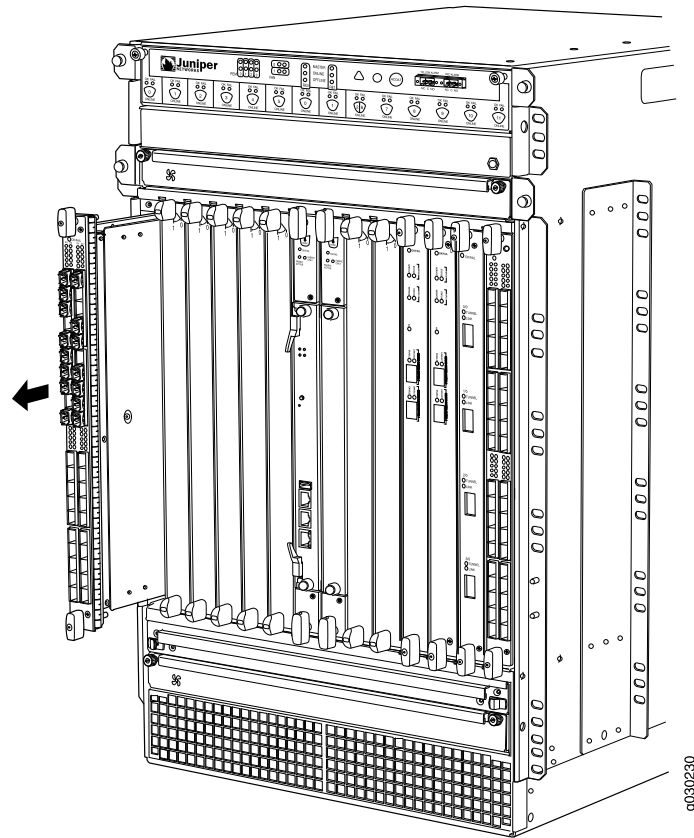
Installing an SRX5800 Services Gateway IOC

An IOC weighs up to 14.5 lb (6.6 kg). Be prepared to accept its full weight.

To install an IOC (see Figure 62 on page 156):

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

2. Place the IOC on an antistatic mat or remove it from its electrostatic bag.

3. Identify the slot on the services gateway where it will be installed.

4. Verify that each fiber-optic transceiver is covered with a rubber safety cap. If it does not, cover the transceiver with a safety cap.

5. Orient the IOC so that the faceplate faces you.

6. Lift the IOC into place and carefully align the top and bottom edges of the IOC with the guides inside the card cage.

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

8. Grasp both ejector handles and rotate them clockwise simultaneously until the IOC is fully seated.

9. 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.

10. Insert the cables into the cable connector ports on each IOC (see Figure 63 on page 157).

11. 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.

12. 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 the *Junos OS System Basics and Services Command Reference*.

> **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 62: Installing an IOC
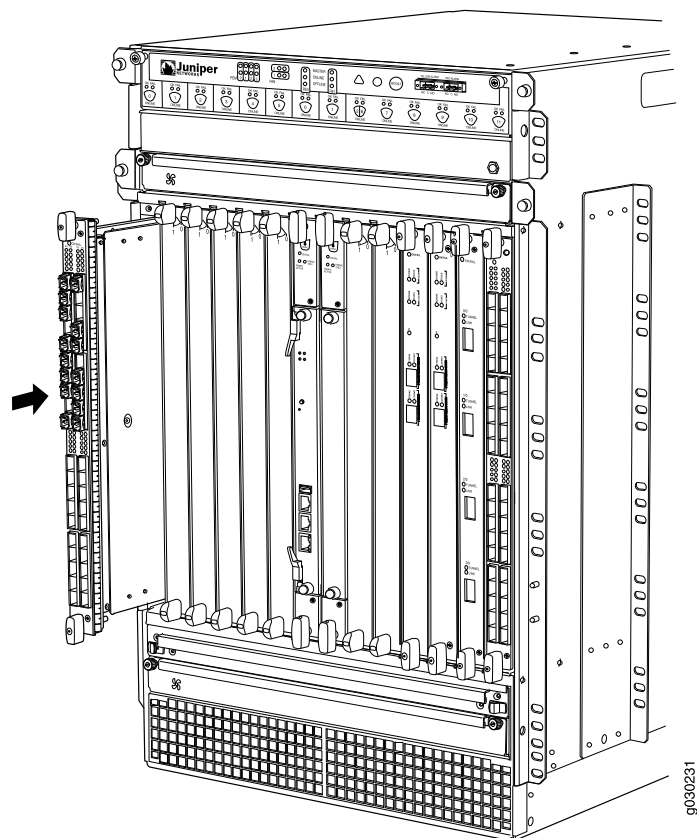
Figure 63: Attaching a Cable to an IOC

Fiber-optic cable

g030233
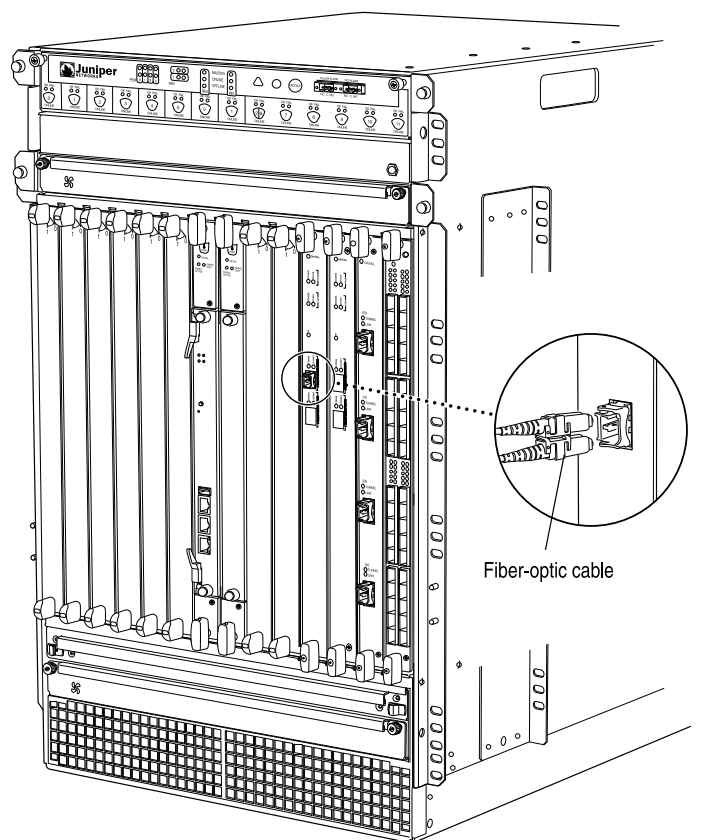
Replacing SRX5800 Services Gateway Flex IOCs

To replace a Flex IOC, perform the following procedures:

1. Removing an SRX5800 Services Gateway Flex IOC on page 157

2. Installing an SRX5800 Services Gateway Flex IOC on page 159

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 64 on page 159):

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 the *Junos System Basics and Services Command Reference*.

4. If you have not already done so, remove the port modules installed in the Flex IOC.

5. Simultaneously turn both of the ejector handles counterclockwise to unseat the Flex IOC.

6. Grasp the handles and slide the Flex IOC straight out of the card cage halfway.

7. 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 13.1 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.

8. 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 64: Removing a Flex IOC
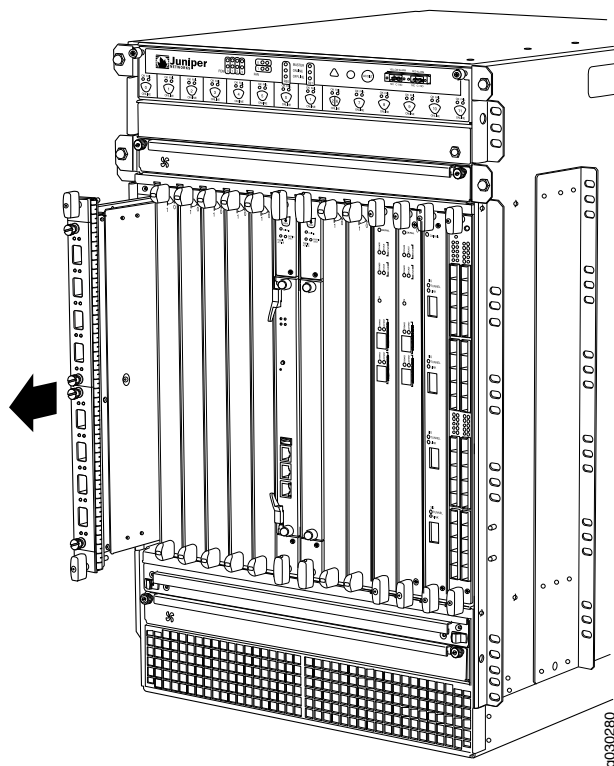
Installing an SRX5800 Services Gateway Flex IOC

> **i** 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 65 on page 160):

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

2. Place the Flex IOC on an antistatic mat or remove it from its electrostatic bag.

3. Identify the slot on the services gateway where you will install the Flex IOC.

4. If you have not already done so, remove the blank panel from the slot where you are installing the Flex IOC.

5. 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.

6. 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.

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

Figure 65: Installing a Flex IOC
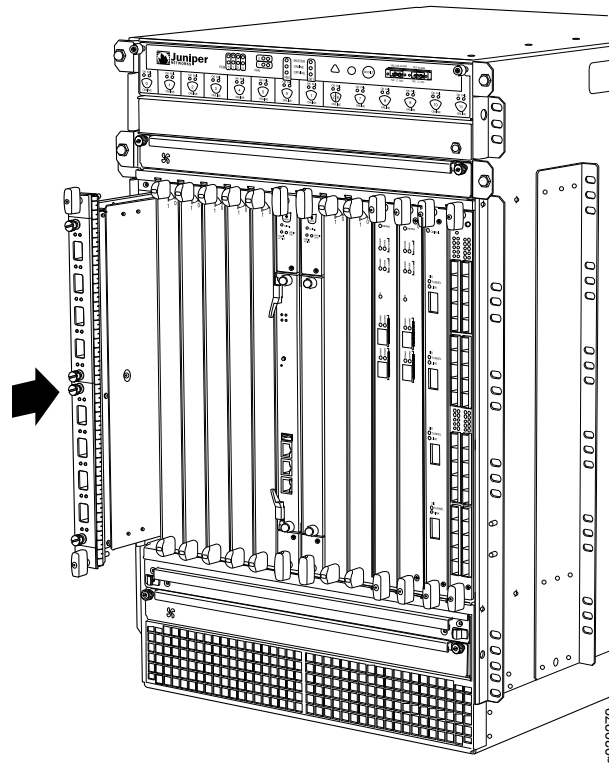
8. Grasp both ejector handles and rotate them clockwise simultaneously until the Flex IOC is fully seated.

9. 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 the *Junos System Basics and Services Command Reference*.

   > ⚠ 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.

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 161
2. Installing an SRX5800 Services Gateway Port Module on page 163

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 3 lb (1.4 kg). Be prepared to accept its full weight when you remove or install a port module.

To remove a port module (see Figure 66 on page 162):

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 the *Junos System Basics and Services Command Reference*.

5. 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 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. Loosen the captive screws that retain the port module in its slot in the Flex IOC.

7. Grasp the captive screws and slide the port module straight out of the Flex IOC halfway.

8. 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 66: Removing a Port Module
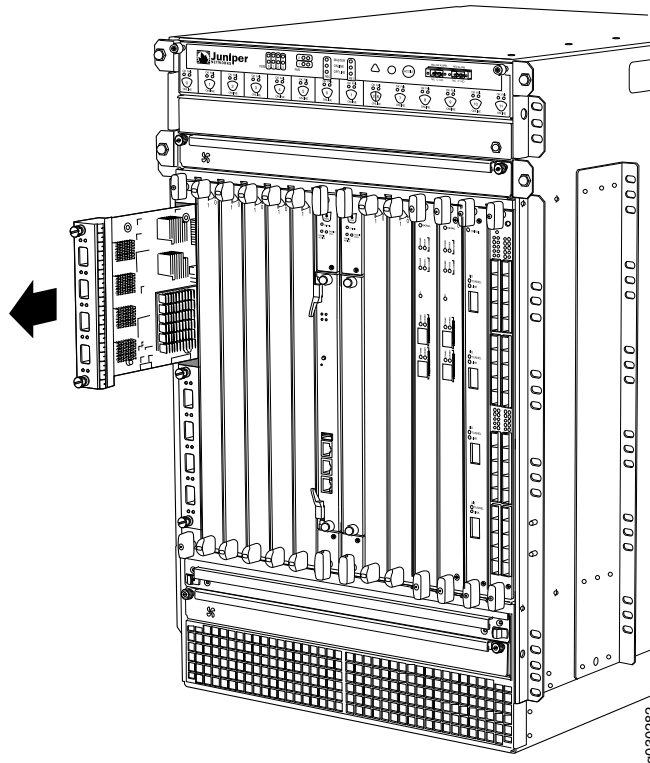
9. If you are not reinstalling a port module into the empty slot within a short time, install a blank panel over the slot to maintain proper airflow in the card cage.

> ⚠️ **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.

Installing an SRX5800 Services Gateway Port Module

To install a port module into a Flex IOC (see Figure 67 on page 163):

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, install the Flex IOC in which you are installing the port module.

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 67: Installing a Port Module
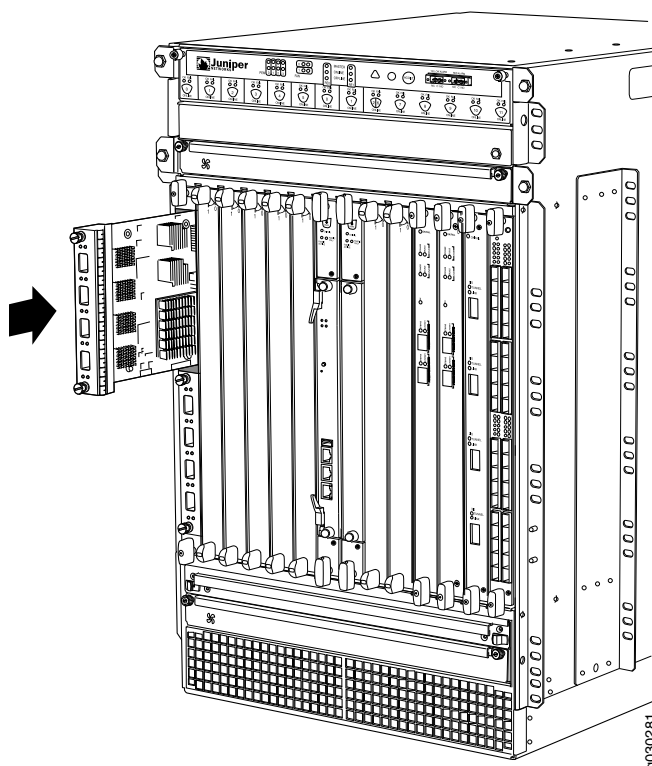
10. If the port module uses fiber-optic interfaces, remove the rubber safety cap from each transceiver and cable.

> ⚠️ **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. 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 the *Junos System Basics and Services Command Reference*.

> ⚠️ **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.

Replacing an SRX5800 IOC or Port Module Cable

To replace an IOC or port module cable, perform the following procedures:

1. Removing an SRX5800 IOC or Port Module Cable on page 165
2. Installing an SRX5800 IOC or Port Module Cable on page 166

Removing an SRX5800 IOC or Port Module Cable

Removing and installing IOC or port module 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 an IOC or a port module:

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 offline a port module:

     - 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 the *Junos OS System Basics and Services Command Reference*.

   - To offline an IOC:

     - 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 the *Junos OS System Basics and Services Command Reference*.

3. Unplug the cable from the cable connector port. If the port module 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 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.

Installing an SRX5800 IOC or Port Module Cable

To install a cable in an IOC or a port module::

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 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 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.

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 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 the *Junos OS System Basics and Services Command Reference*.

- 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 the *Junos OS System Basics and Services Command Reference*.

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.

Replacing SRX5800 Services Gateway SPCs

To replace an SPC, perform the following procedures:

1. Removing an SRX5800 Services Gateway SPC on page 167
2. Installing an SRX5800 Services Gateway SPC on page 169

Removing an SRX5800 Services Gateway SPC

An SPC weighs up to 13.1 lb (5.9 kg). Be prepared to accept its full weight.

To remove an SPC (see Figure 68 on page 169):

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 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 13.1 lb (5.9 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 68: Removing an SPC
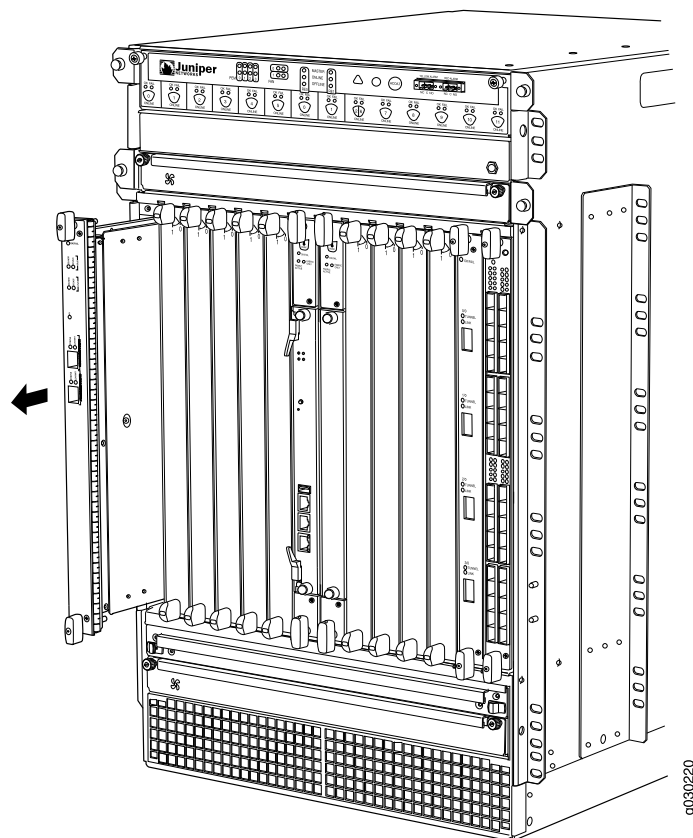
Installing an SRX5800 Services Gateway SPC

To install an SPC (see Figure 69 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. If you have not already done so, power off the device.

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 70 on page 172). 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.
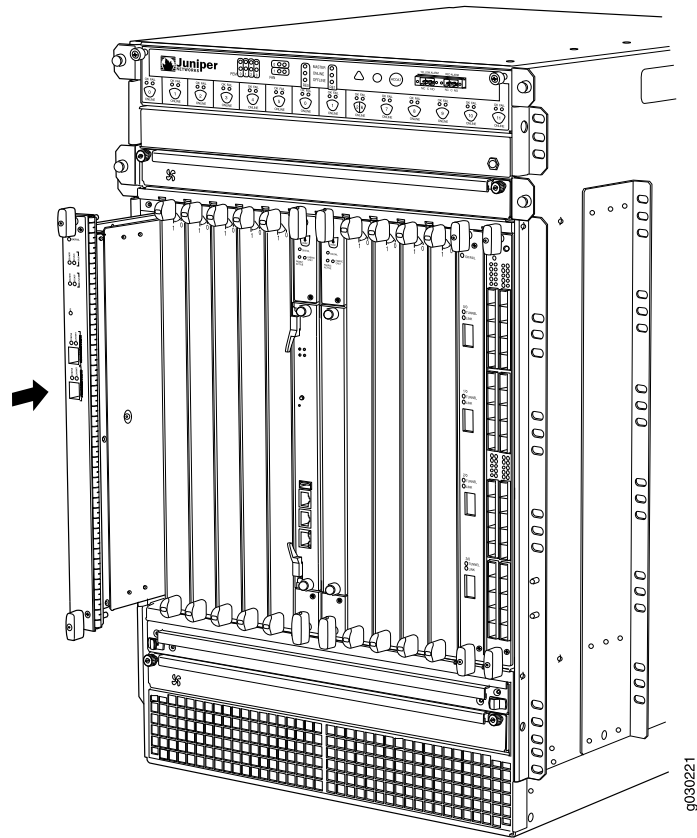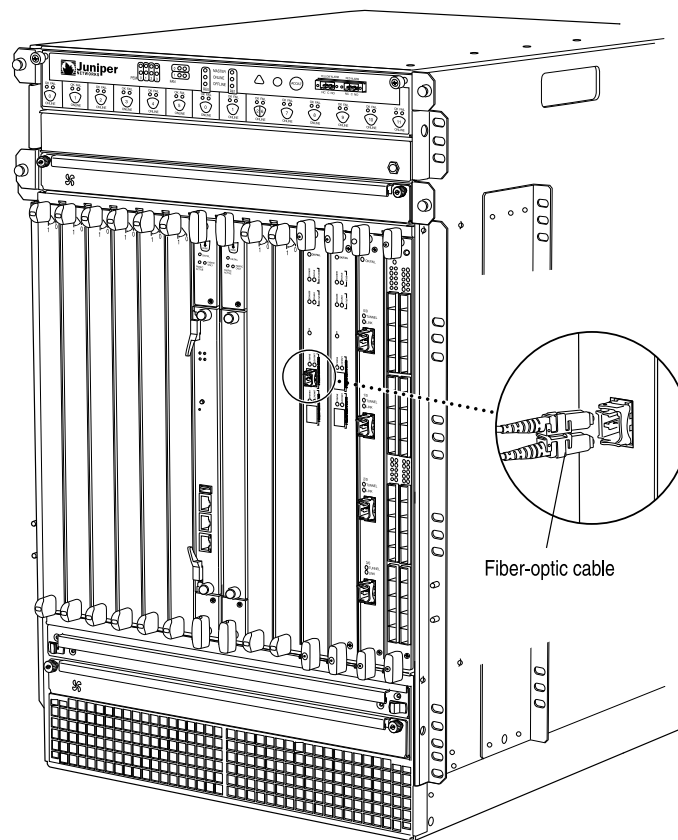
Figure 69: Installing an SPC

g030221

Figure 70: Attaching a Cable to an SPC

Fiber-optic cable

Replacing SRX5800 Services Gateway XFP and SFP Transceivers

To replace an XFP or SFP transciever, perform the following procedures:

1. Removing an SRX5800 Services Gateway SFP or XFP Transceiver on page 172
2. Installing an SRX5800 Services Gateway SFP or XFP Transceiver on page 174

Removing an SRX5800 Services Gateway SFP or XFP Transceiver

Small form-factor pluggable (SFPs) and XFPs are optical transceivers that are installed in an IOC. SPC, or port module. SFPs and XFPs are hot-insertable and hot-removable. Removing an SFP or XFP does not interrupt the functioning of the card, but the removed SFP or XFP no longer receives or transmits data.

To remove an SFP or XFP transceiver (see Figure 71 on page 173):

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 71: Removing SFPs or XFPs
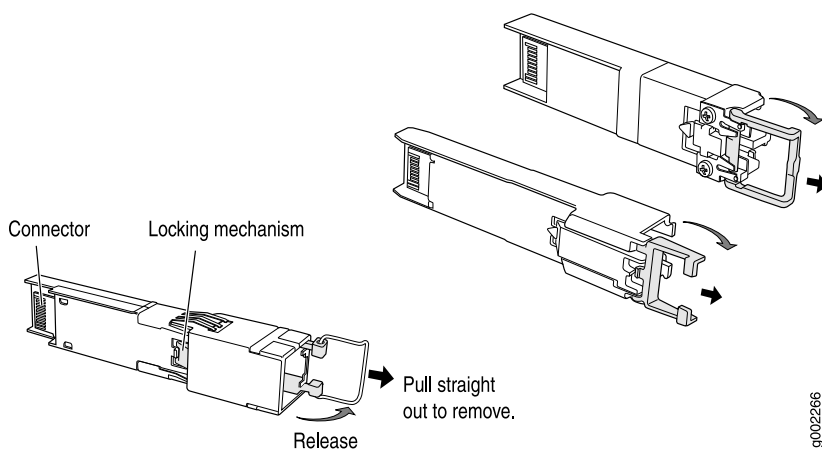
9. Place a rubber safety cap over the transceiver.

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.

Installing an SRX5800 Services Gateway SFP or XFP Transceiver

Small form-factor pluggable (SFPs) and XFPs are optical transceivers that are installed in an IOC, SPC, or port module. SFPs and XFPs are hot-insertable and hot-removable. Removing an SFP or XFP does not interrupt the functioning of the card, but the removed SFP or XFP no longer receives or transmits data.

NOTE: Juniper strongly recommends the use of Juniper transceivers. Juniper cannot guarantee correct operation if non-Juniper transceivers are used. The transceiver type can be different in each port, as long as a supported part number is used.

To install an SFP or XFP:

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 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 SFP or XFP is functioning correctly.

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 174
2. Installing an SRX5800 Services Gateway AC Power Supply on page 177

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 72 on page 176):

1. Switch off the dedicated customer site circuit breaker for the power supply, and remove the power cord from the AC power source. Follow the 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 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.

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 72: Removing an AC Power Supply (Standard-Capacity Shown, High-Capacity Similar)

Release lever in
unlocked position
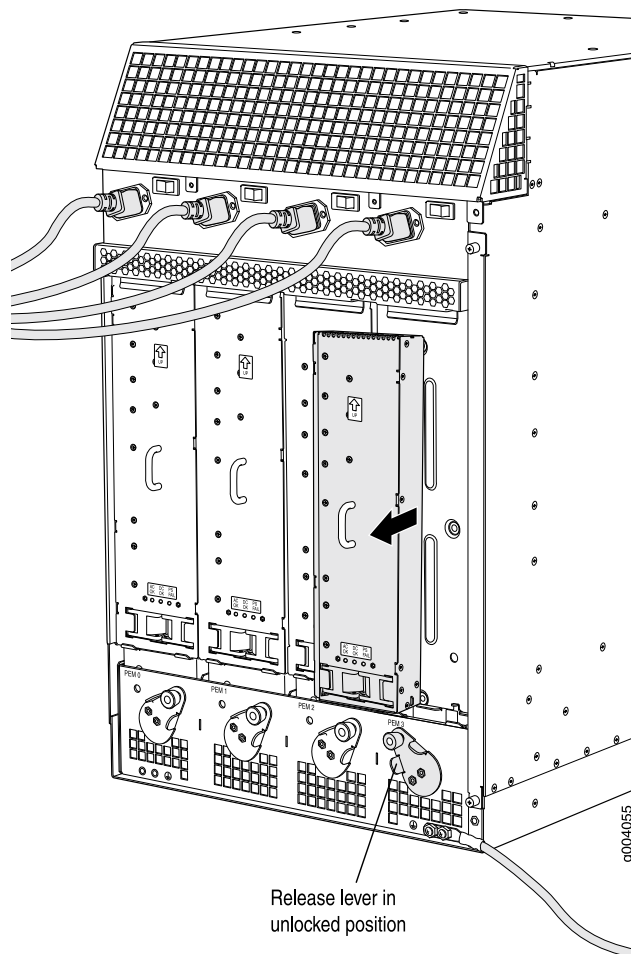
WARNING: Do not touch the power connector on the top of the power supply (see Figure 73 on page 176). It can contain dangerous voltages.

Figure 73: Top of the Power Supply Showing Midplane Connector
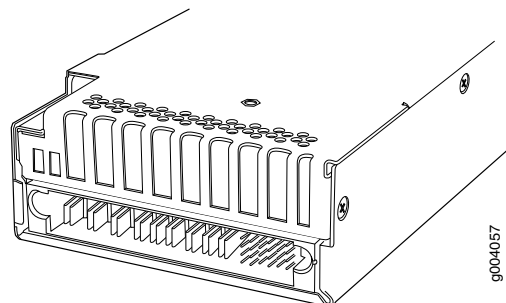
Connector end of AC or DC power supply

Installing an SRX5800 Services Gateway AC Power Supply

To install an AC power supply (see Figure 74 on page 178):

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 in the chassis above the empty power supply slot to the off (**O**) position.

3. 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.

4. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 74 on page 178).

   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.

5. 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 74 on page 178). This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

Figure 74: Installing an AC Power Supply (Standard-Capacity Shown, High-Capacity Similar)
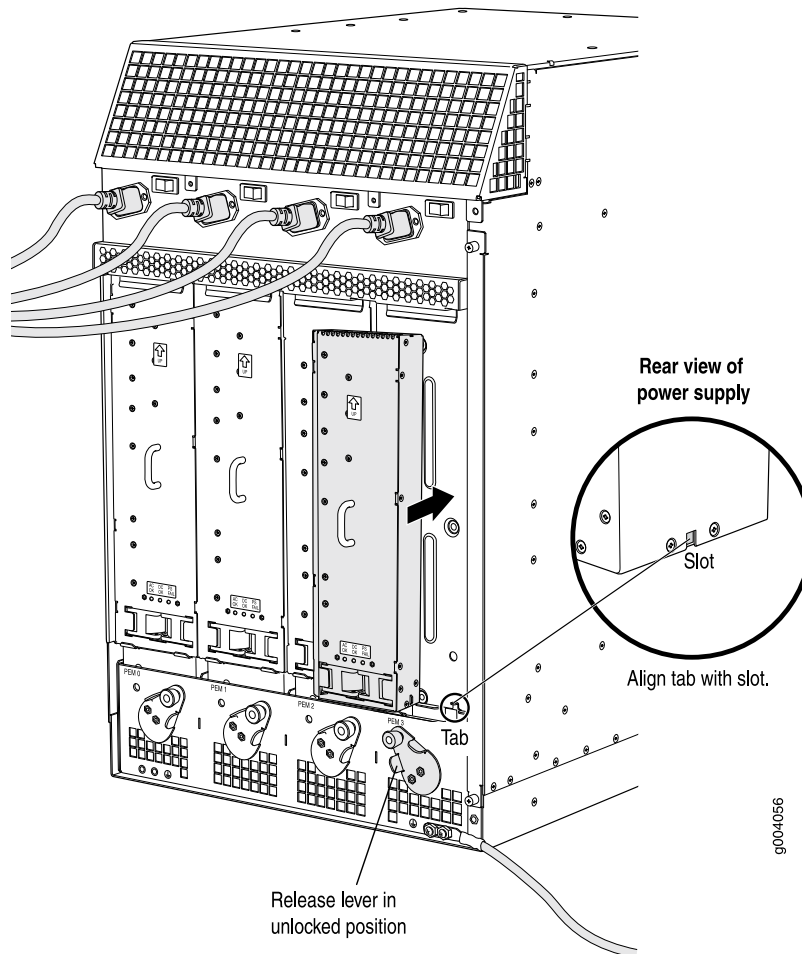
6. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

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

8. 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 186.

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

10. 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.

11. 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.

Upgrading an SRX5800 Services Gateway from Standard-Capacity to High-Capacity AC Power Supplies

You can replace the standard-capacity AC power supplies in the SRX5800 Services Gateway with either two or four high-capacity AC power supplies. Two high-capacity AC power supplies provide adequate power for a fully loaded chassis; installing four high-capacity AC 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 AC power supplies.

> 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.

To upgrade an operational SRX5800 Services Gateway from standard-capacity power supplies to high-capacity power supplies:

1. Remove the power supply, if any, in slot **PEM0**, as described in "Removing an SRX5800 Services Gateway AC Power Supply" on page 174.

2. Install a high-capacity AC power supply in slot **PEM0**, as described in "Installing an SRX5800 Services Gateway AC Power Supply" on page 177.

3. Repeat steps 1 through 2 for slot **PEM1**.

4. Remove the power supply, if any, in slot **PEM2**, as described in "Removing an SRX5800 Services Gateway AC Power Supply" on page 174.

5. If you are installing four high-capacity power supplies, install a high-capacity AC power supply in slot **PEM2**, as described in "Installing an SRX5800 Services Gateway AC

Power Supply" on page 177. If you are installing only two high-capacity power supplies, install a blank slot cover over the **PEM2** slot.

6. Repeat steps 4 through 5 for slot **PEM3**.

Replacing an SRX5800 Services Gateway DC Power Supply

To replace a DC power supply, perform the following procedures:

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 75 on page 182):

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 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 5 lb (2.3 kg). Be prepared to accept its full weight.

Figure 75: Removing a DC Power Supply from the Services Gateway

Release lever in
unlocked position
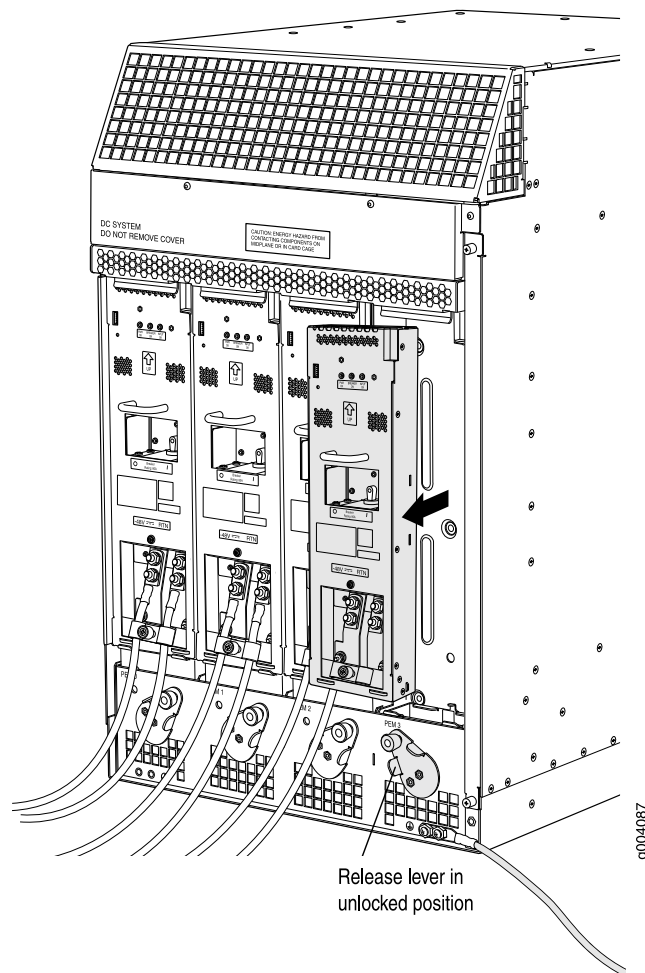
⚡ WARNING: Do not touch the power connector on the top of the power
supply (see Figure 76 on page 182). It can contain dangerous voltages.

Figure 76: Top of the Power Supply Showing Midplane Connector
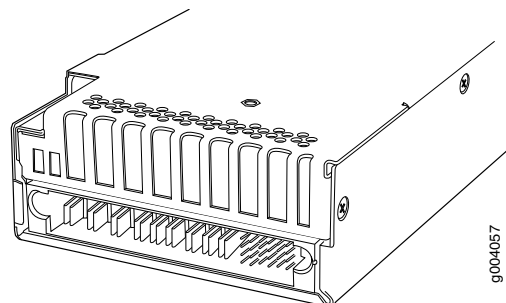
Connector end of AC or DC power supply

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 77 on page 184):

1. 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. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 77 on page 184).

   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.

5. 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 77 on page 184). This tab is used to pull the power supply down in the chassis slot, prior to removing the power supply.

Figure 77: Installing a DC Power Supply
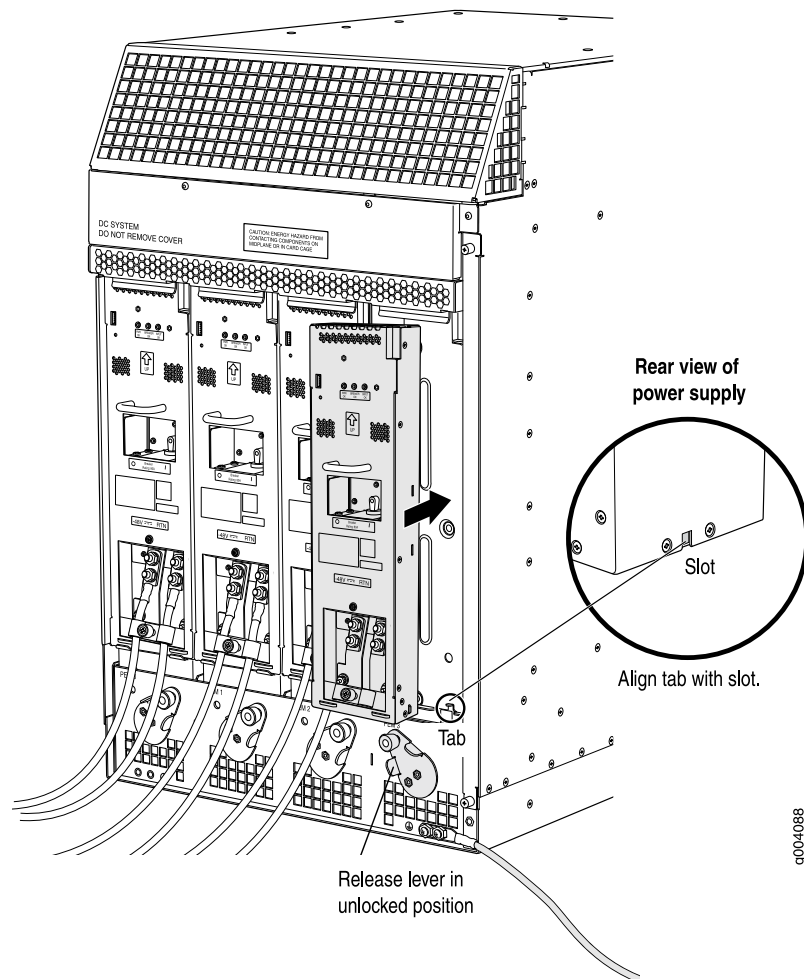
6. While firmly pushing the handle on the power supply faceplate with one hand, use your other hand to pull the spring-loaded locking pin in the release lever away from the chassis and turn the release lever clockwise until it stops.

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

8. Remove the clear plastic cover protecting the terminal studs on the faceplate.

9. Remove the nuts and washers from the terminal studs.

10. Secure each 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 78 on page 185).

    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.

⚠ 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.

ⓘ 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.

Figure 78: Connecting DC Power to the Services Gateway
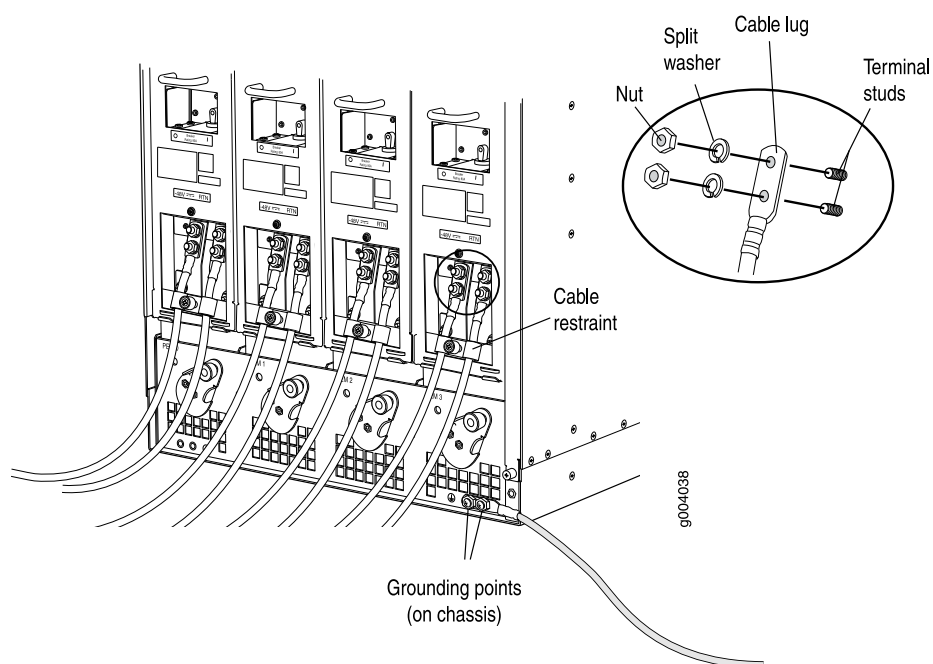
11. Loosen the captive screw on the cable restraint on the lower edge of the power supply faceplate.

12. Route the positive and negative DC power cables through the left and right sides of the cable restraint.

13. 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 OK** LED on the power suppply is lit steadily.

18. Move the DC circuit breaker on the DC power supply to the on (**|**) position .

19. Verify that the **BREAKER ON** LED is lit steadily.

20. Verify that the **PWR OK** LED is lit steadily.

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 186
2. Connecting an SRX5800 Services Gateway AC Power Supply Cord on page 186

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.

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.

   > *i* 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 (**I**) 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.

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 188
2. Connecting an SRX5800 Services Gateway DC Power Supply Cable on page 189

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 OK** LED on the power supply is not lit.

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. 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.

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 248.

2. Verify that a licensed electrician has attached a cable lug to the replacement power cable.

3. Verify that the **INPUT OK** LED is off.

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 79 on page 189).

Figure 79: Connecting Power Cables to the DC Power Supply
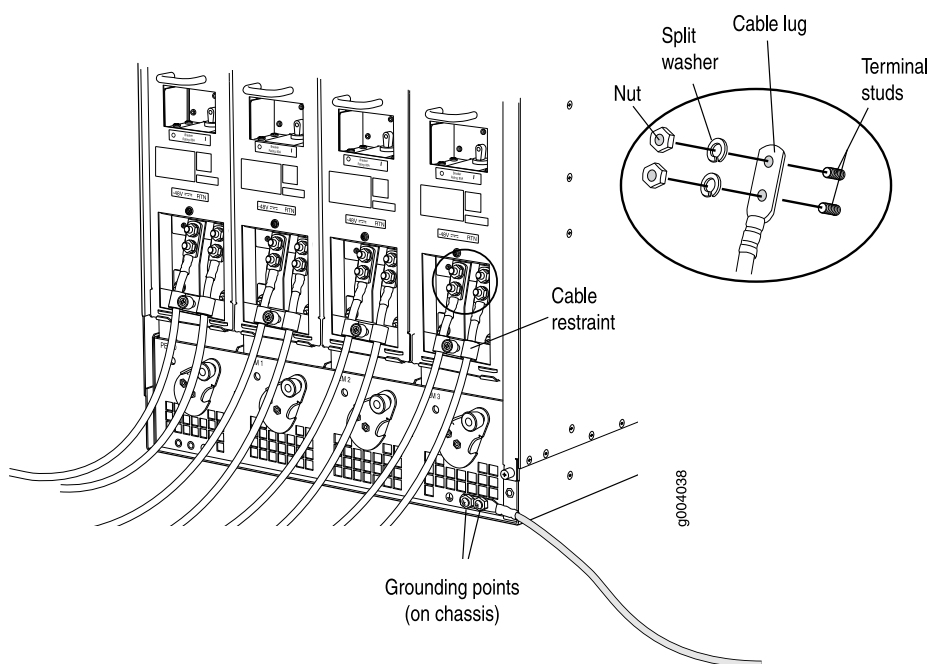
5. Route the power cable through the cable restraint. Make sure that the cable does not touch or obstruct any services gateway components.

6. Tighten the cable restraint captive screw to hold the power cables in place.

7. 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.

8. Replace the clear plastic cover over the terminal studs on the faceplate.

9. Attach the power cable to the DC power source.

10. Turn on the dedicated customer site circuit breaker to the power supply.

11. Verify that the **INPUT OK** LED on the power supply is lit steadily.

12. Move the DC circuit breaker on the power supply to the on (**|**) position and observe the status LEDs on the power supply faceplate. If the power supply is correctly installed and functioning normally, the **PWR OK**, **BRKR ON**, and **INPUT OK** LEDs light green steadily.

Replacing the SRX5800 Services Gateway Cable Manager

To replace the cable manager, perform the following procedures:

Removing the SRX5800 Services Gateway Cable Manager

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 80: Removing the Cable Manager
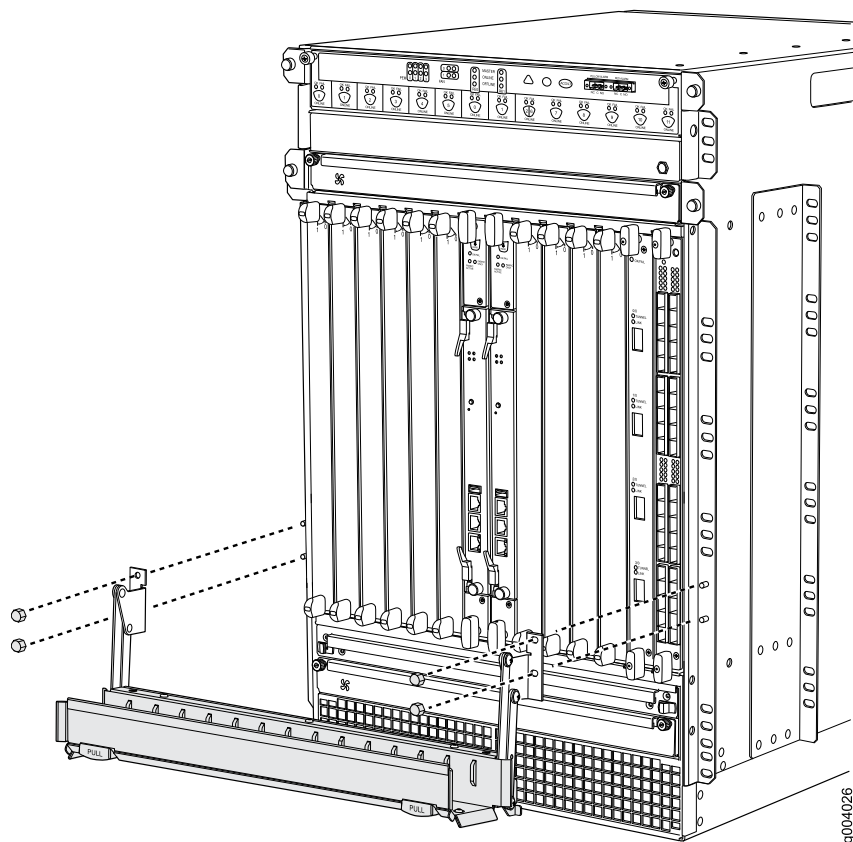
Installing the SRX5800 Services Gateway Cable Manager

To install the cable manager (see Figure 81 on page 192):

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 81: Installing the Cable Manager
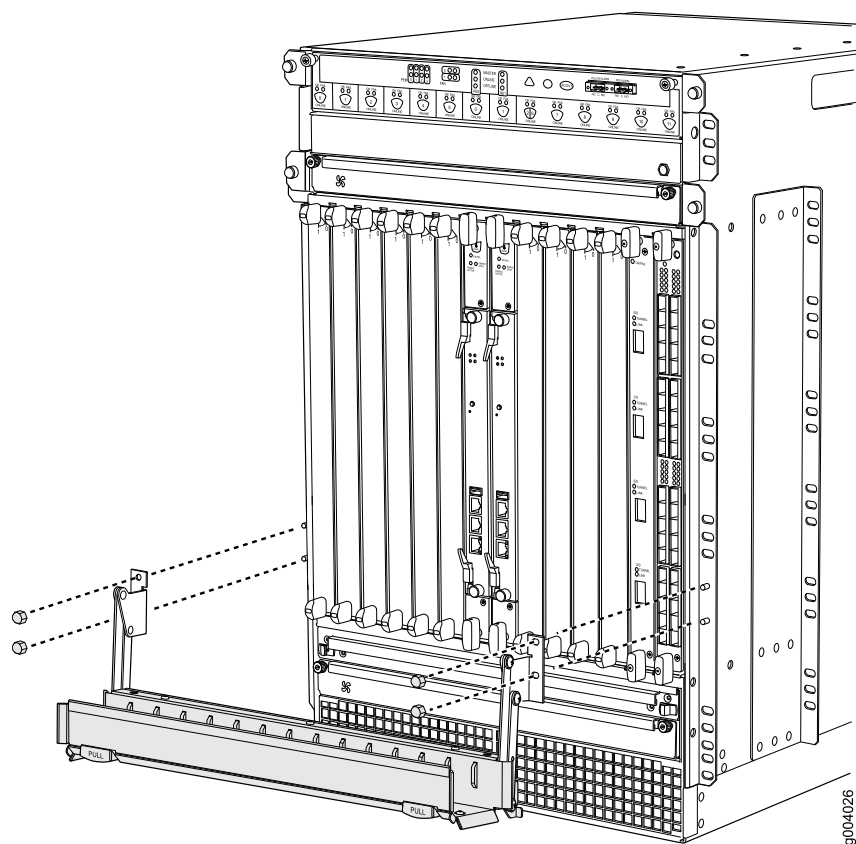
PART 4

Appendixes

Safety and Regulatory Compliance Information

This section includes the following topics:

SRX5800 Services Gateway Definition of Safety Warning Levels

This guide uses the following levels of safety warnings:

NOTE: You might find this information helpful in a particular situation or might otherwise overlook it.

CAUTION: You need to observe the specified guidelines to avoid minor injury or discomfort to you or severe damage to the services gateway.

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
- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201
- SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment on page 203

SRX5800 Services Gateway General Safety Guidelines and Warnings

The following guidelines help ensure your safety and protect the services gateway 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 this guide. Make sure that only authorized service personnel perform other system services.
- Keep the area around the chassis clear and free from dust before, during, and after installation.
- Keep tools away from areas where people could trip on them.
- Do not wear loose clothing or jewelry, such as rings, bracelets, or chains, which could become caught in the chassis.
- 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 that 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 services gateway only when it is properly grounded.
- Do not open or remove chassis covers or sheet metal parts unless instructions are provided in this guide. 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 services gateway chassis or onto any services gateway component. Such an action could cause electrical shock or could damage the services gateway.

- Avoid touching uninsulated electrical wires or terminals that have not been disconnected from their power source. Such an action could cause electrical shock.

Related Documentation
- SRX5800 Services Gateway Definition of Safety Warning Levels on page 195
- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201
- SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment on page 203

Additional SRX5800 Services Gateway Warnings

This section includes the following topics:

- Qualified Personnel Warning on page 198
- Restricted Access Area Warning on page 199

Qualified Personnel Warning

WARNING: Only trained and qualified personnel should install or replace the services gateway.

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

- Restricted Access Area Warning on page 199
- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- SRX5800 Services Gateway Definition of Safety Warning Levels on page 195
- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201
- SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment on page 203

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

- Qualified Personnel Warning on page 198

- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197

- SRX5800 Services Gateway Definition of Safety Warning Levels on page 195

- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

- SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment on page 203

Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway

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

- Always use an ESD wrist strap or ankle strap, and verify that it is in direct contact with your skin.

  ⚠️ CAUTION: For safety, periodically check the resistance value of the ESD strap. The measurement should be in the range of 1 to 10 Megaohms.

- When handling any component that is removed from the chassis, verify that the equipment end of your ESD strap is attached to one of the ESD points on the chassis, which are shown in Figure 82 on page 201 and Figure 83 on page 202.

Figure 82: ESD Point on Front of Services Gateway
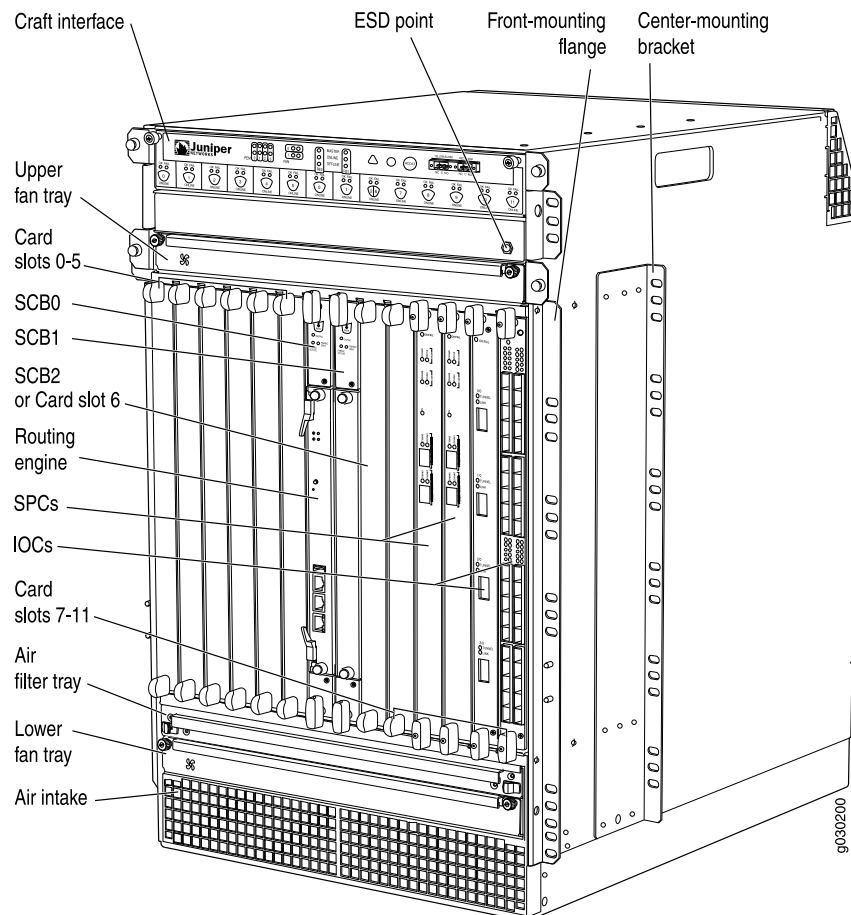
Figure 83: ESD Point on Rear of Services Gateway
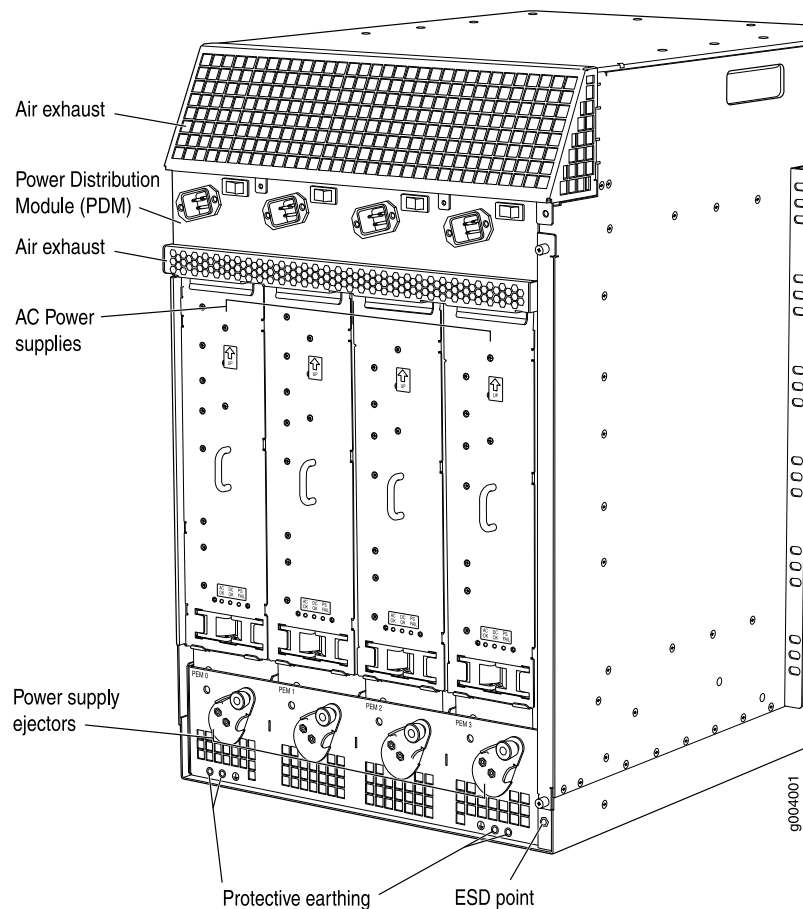
- Avoid contact between the component and your clothing. ESD voltages emitted from clothing can still damage components.

- When removing or installing a component, always place it component-side up on an antistatic surface, in an antistatic card rack, or in an electrostatic bag (see Figure 84 on page 203). If you are returning a component, place it in an electrostatic bag before packing it.

Figure 84: Placing a Component into an Electrostatic Bag
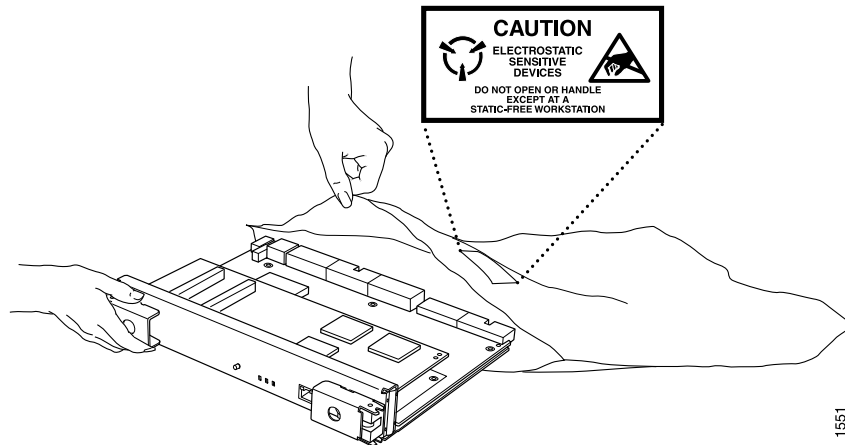
Related
Documentation

- Qualified Personnel Warning on page 198

- Restricted Access Area Warning on page 199

- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197

- SRX5800 Services Gateway Definition of Safety Warning Levels on page 195

- SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment on page 203

SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment

In the event of a fire emergency involving services gateways and other network equipment, the safety of people is the primary concern. 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, 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 installing and operating your equipment.

In the event of an electrical hazard or an electrical fire, first turn power off to the equipment at the source. Then use a Type C fire extinguisher to extinguish the fire. Type C fire extinguishers, which use noncorrosive fire retardants such as carbon dioxide (CO_2) and Halotron, are most effective for suppressing electrical fires. Type C fire extinguishers displace the 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, use this type of inert oxygen displacement extinguisher instead of an extinguisher that leave residues on equipment.

Do not use multipurpose Type ABC chemical fire extinguishers (dry chemical fire extinguishers) near Juniper Networks equipment. The primary ingredient in these fire extinguishers is monoammonium phosphate, which is very sticky and difficult to clean. In addition, in 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 services gateway. 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

- Qualified Personnel Warning on page 198

- Restricted Access Area Warning on page 199

- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197

- SRX5800 Services Gateway Definition of Safety Warning Levels on page 195

- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

SRX5800 Services Gateway Installation Safety Guidelines and Warnings

This section includes the following topics:

- Chassis Lifting Guidelines on page 204
- Installation Instructions Warning on page 205
- Rack-Mounting Requirements and Warnings on page 206
- Ramp Warning on page 209

Chassis Lifting Guidelines

The fully configured chassis with the cable manager weighs up to 350 lb (159 kg), or 150 lb (68 kg) with components removed. Observe the following guidelines for lifting and moving the services gateway:

- Before moving the services gateway, check the Site Preparation Checklist to verify that the intended site meets the specified power, environmental, and clearance requirements.

- Do not attempt to lift a fully configured services gateway by yourself. Using a mechanical lift to maneuver the services gateway into a rack is recommended. If a lift cannot be

used, a minimum of three people are required to lift the services gateway, and you must remove components from the chassis before lifting.

- Before lifting or moving the services gateway, disconnect all external cables.

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

Related Documentation
- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- Installation Instructions Warning on page 205
- Rack-Mounting Requirements and Warnings on page 206
- Ramp Warning on page 209

Installation Instructions Warning

WARNING: Read the installation instructions before you connect the services gateway 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
- Chassis Lifting Guidelines on page 204
- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- Rack-Mounting Requirements and Warnings on page 206

- Ramp Warning on page 209

Rack-Mounting Requirements and Warnings

Ensure that the equipment rack into which the services gateway is installed is evenly and securely supported to avoid the hazardous condition that could result from uneven mechanical loading.

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

- The services gateway must be installed into a rack that is secured to the building structure.

- The services gateway should be mounted at the bottom of the rack if it is the only unit in the rack.

- When mounting the services gateway in 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 devices, install the stabilizers before mounting or servicing the services gateway 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 services gateway 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 services gateway 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 services gateway 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 services gateway 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 services gateway 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 services gateway 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 services gateway 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 services gateway 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 services gateway 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

Ramp Warning

WARNING: When installing the services gateway, 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

- Chassis Lifting Guidelines on page 204
- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- Installation Instructions Warning on page 205
- Rack-Mounting Requirements and Warnings on page 206

SRX5800 Services Gateway Laser and LED Safety Guidelines and Warnings

This section includes the following topics:

- General Laser Safety Guidelines on page 210
- Class 1 Laser Warning on page 211
- Class 1 LED Product Warning on page 211
- Laser Beam Warning on page 212
- Radiation from Open Port Apertures Warning on page 213

General Laser Safety Guidelines

When working around the services gateway, 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.

Related
Documentation

- Class 1 Laser Warning on page 211
- Class 1 LED Product Warning on page 211
- Laser Beam Warning on page 212

- Radiation from Open Port Apertures Warning on page 213

Class 1 Laser 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.

Related Documentation

- General Laser Safety Guidelines on page 210
- Class 1 LED Product Warning on page 211
- Laser Beam Warning on page 212
- Radiation from Open Port Apertures Warning on page 213

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.

Radiation from Open Port Apertures Warning

WARNING: Because invisible radiation may 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 Laser Safety Guidelines on page 210

- Class 1 Laser Warning on page 211

- Class 1 LED Product Warning on page 211

- Laser Beam Warning on page 212

SRX5800 Services Gateway Maintenance and Operational Safety Guidelines and Warnings

This section includes the following topics:

- Battery Handling Warning on page 214
- Jewelry Removal Warning on page 215
- Lightning Activity Warning on page 216
- Operating Temperature Warning on page 217
- Product Disposal Warning on page 219

Battery Handling Warning

WARNING: Replacing the battery incorrectly might result in an explosion. Replace the 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.

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.

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.

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.

Related Documentation
- Jewelry Removal Warning on page 215
- Lightning Activity Warning on page 216
- Operating Temperature Warning on page 217
- Product Disposal Warning on page 219

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 weld the metal object 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.

Related Documentation

- Battery Handling Warning on page 214
- Lightning Activity Warning on page 216
- Operating Temperature Warning on page 217
- Product Disposal Warning on page 219

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.

Related Documentation

- Battery Handling Warning on page 214
- Jewelry Removal Warning on page 215
- Operating Temperature Warning on page 217
- Product Disposal Warning on page 219

Operating Temperature Warning

WARNING: To prevent the services gateway from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 104ºF (40ºC). To prevent airflow restriction, allow at least 6 in. (15.2 cm) of clearance around the ventilation openings.

Waarschuwing Om te voorkomen dat welke services gateway van de Juniper Networks services gateway dan ook oververhit raakt, dient u deze niet te bedienen op een plaats waar de maximale aanbevolen omgevingstemperatuur van 40ºC 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 services gateway-sarjan reititin ylikuumentuisi, sitä ei saa käyttää tilassa, jonka lämpötila ylittää korkeimman suositellun ympäristölämpötilan 40ºC. Ettei ilmanvaihto estyisi, tuuletusaukkojen ympärille on jätettävä ainakin 15,2 cm tilaa.

Attention Pour éviter toute surchauffe des routeurs de la gamme Juniper Networks services gateway, ne l'utilisez pas dans une zone où la température

ambiante est supérieure à 40ºC. Pour permettre un flot d'air constant, dégagez un espace d'au moins 15,2 cm autour des ouvertures de ventilations.

Warnung Um einen services gateway der services gateway vor Überhitzung zu schützen, darf dieser nicht in einer Gegend betrieben werden, in der die Umgebungstemperatur das empfohlene Maximum von 40ºC 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 services gateway, non adoperateli in un locale che ecceda la temperatura ambientale massima di 40ºC. 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 services gateway Disse skal ikke brukes på steder der den anbefalte maksimale omgivelsestemperaturen overstiger 40ºC (104ºF). 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 services gateway, não utilize este equipamento numa área que exceda a temperatura máxima recomendada de 40ºC. 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 services gateway se recaliente, no lo haga funcionar en un área en la que se supere la temperatura ambiente máxima recomendada de 40ºC. 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 services gateway överhettas genom att inte använda den i ett område där den maximalt rekommenderade omgivningstemperaturen på 40ºC överskrids. Förhindra att luftcirkulationen inskränks genom att se till att det finns fritt utrymme på minst 15,2 cm omkring ventilationsöppningarna.

Related Documentation

- Battery Handling Warning on page 214
- Jewelry Removal Warning on page 215
- Lightning Activity Warning on page 216
- Product Disposal Warning on page 219

Product Disposal Warning

![warning icon]

WARNING: Disposal of this product 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

SRX5800 Services Gateway Electrical Safety Guidelines and Warnings

This section includes the following topics:

In Case of 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 services gateway.

3. If possible, send another person to get medical aid. Otherwise, assess the condition of the victim, then call for help.

Related Documentation
- General Electrical Safety Guidelines and Warnings on page 220
- DC Power Electrical Safety Guidelines and Warnings on page 224
- SRX5800 Services Gateway Agency Approvals on page 230

General Electrical Safety Guidelines and Warnings

- Install the services gateway in compliance with the following local, national, or international electrical codes:

  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code

  - Canada—Canadian Electrical Code, Part 1, CSA C22.1

  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7

  - Evaluated to the TN power system

- 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.

- 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 services gateway within marked electrical ratings and product usage instructions.

- For the services gateway and peripheral equipment to function safely and correctly, use the cables and connectors specified for the attached peripheral equipment, and make certain they are in good condition.

Grounded Equipment Warning

WARNING: The services gateway is intended to be grounded. Ensure that the services gateway is connected to earth ground during normal use.

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.

Midplane Energy Hazard Warning

WARNING: High levels of electrical energy are distributed across the services gateway midplane. Be careful not to contact the midplane connectors, or any component connected to the midplane, with any metallic object while servicing components installed in the services gateway.

Multiple Power Supplies Disconnection Warning

WARNING: The services gateway 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.

Power Disconnection Warning

WARNING: Before working on the services gateway or near power supplies, unplug the power cord from an AC-powered services gateway; switch off the power at the circuit breaker on a DC-powered services gateway.

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; voor gelijkstroom toestellen dient u de stroom uit te schakelen bij de stroomverbreker.

Varoitus Kytke irti vaihtovirtalaitteiden virtajohto ja katkaise tasavirtalaitteiden virta suojakytkimellä, 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; couper l'alimentation des unités en courant continu au niveau du disjoncteur.

Warnung Bevor Sie an einem Chassis oder in der Nähe von Netzgeräten arbeiten, ziehen Sie bei Wechselstromeinheiten das Netzkabel ab bzw. schalten Sie bei Gleichstromeinheiten den Strom am Unterbrecher ab.

Avvertenza Prima di lavorare su un telaio o intorno ad alimentatori, scollegare il cavo di alimentazione sulle unità CA; scollegare l'alimentazione all'interruttore automatico sulle unità CC.

Advarsel Før det utføres arbeid på kabinettet eller det arbeides i nærheten av strømforsyningsenheter, skal strømledningen trekkes ut p vekselstrømsenheter og strømmen kobles fra ved strømbryteren på likestrømsenheter.

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; desligue a corrente no disjuntor nas unidades de corrente contínua.

¡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); cortar la alimentación desde el interruptor automático en los equipos de corriente continua (CC).

Varning! Innan du arbetar med ett chassi eller nära strömförsörjningsenheter skall du för växelströmsenheter dra ur nätsladden och för likströmsenheter bryta strömmen vid överspänningsskyddet.

TN Power Warning

WARNING: The services gateway is designed to work with TN power systems.

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.

Copper Conductors Warning

WARNING: Use copper conductors only.

Waarschuwing Gebruik alleen koperen geleiders.

Varoitus Käytä vain kuparijohtimia.

Attention Utilisez uniquement des conducteurs en cuivre.

Warnung Verwenden Sie ausschließlich Kupferleiter.

Avvertenza Usate unicamente dei conduttori di rame.

Advarsel Bruk bare kobberledninger.

Aviso Utilize apenas fios condutores de cobre.

¡Atención! Emplee sólo conductores de cobre.

Varning! Använd endast ledare av koppar.

Related Documentation

DC Power Electrical Safety Guidelines and Warnings

When working with DC-powered equipment, observe the following guidelines and warnings:

- DC Power Electrical Safety Guidelines
- DC Power Disconnection Warning
- DC Power Grounding Requirements and Warning
- DC Power Wiring Sequence Warning
- DC Power Wiring Terminations Warning

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 116 A @ −48 VDC for the system, or at least 58 A @ −48 VDC for each power supply. We recommend that the 48 VDC facility DC source be equipped with a circuit breaker rated at 80 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 80 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

- In Case of Electrical Accident on page 220
- General Electrical Safety Guidelines and Warnings on page 220
- SRX5800 Services Gateway Agency Approvals on page 230
- SRX5800 Services Gateway DC Power Supply Specifications on page 244
- SRX5800 Services Gateway Chassis Grounding Specifications on page 235

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
- 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 on page 220

- General Electrical Safety Guidelines and Warnings on page 220

- DC Power Electrical Safety Guidelines and Warnings on page 224

SRX5800 Services Gateway Compliance Statements for EMC Requirements

- Canada on page 231
- European Community on page 231
- Japan on page 232
- United States on page 232

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.

Japan

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

The preceding translates as follows:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this product is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

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 230

SRX5800 Services Gateway Environmental Specifications

This section includes the following topics:

- SRX5800 Services Gateway Environmental Specifications on page 233

SRX5800 Services Gateway Environmental Specifications

Table 32 on page 233 specifies the environmental specifications required for normal services gateway operation. In addition, the site should be as dust-free as possible.

Table 32: 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 32ºF (0ºC) to 104ºF (40ºC)
	Nonoperating storage temperature in shipping crate: −40ºF (−40ºC) to 158ºF (70ºC)
Seismic	Tested to meet Telcordia Technologies Zone 4 earthquake requirements
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 230
- SRX5800 Services Gateway General Safety Guidelines and Warnings on page 197
- SRX5800 Services Gateway Fire Safety Requirements and Fire Suppression Equipment on page 203
- SRX5800 Services Gateway Definition of Safety Warning Levels on page 195
- General Electrical Safety Guidelines and Warnings on page 220

SRX5800 Services Gateway Power Guidelines, Requirements, and Specifications

This section includes the following topics:

- SRX5800 Services Gateway Chassis Grounding Specifications on page 235
- SRX5800 Services Gateway Grounding-Cable Lug Specification on page 238
- SRX5800 Services Gateway AC Power Specifications and Requirements on page 238
- SRX5800 Services Gateway DC Power Specifications and Requirements on page 243
- SRX5800 Services Gateway Electrical Wiring Guidelines on page 250

SRX5800 Services Gateway Chassis Grounding Specifications

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, the services gateway must be adequately grounded before power is connected. To ground AC-powered and DC-powered services gateways, you must connect a grounding cable to earth ground and then attach it to the chassis grounding points (see Figure 85 on page 236 or Figure 86 on page 237).

Figure 85: Grounding Point on an AC-powered Services Gateway

Protective earthing
(on chassis)

g004037
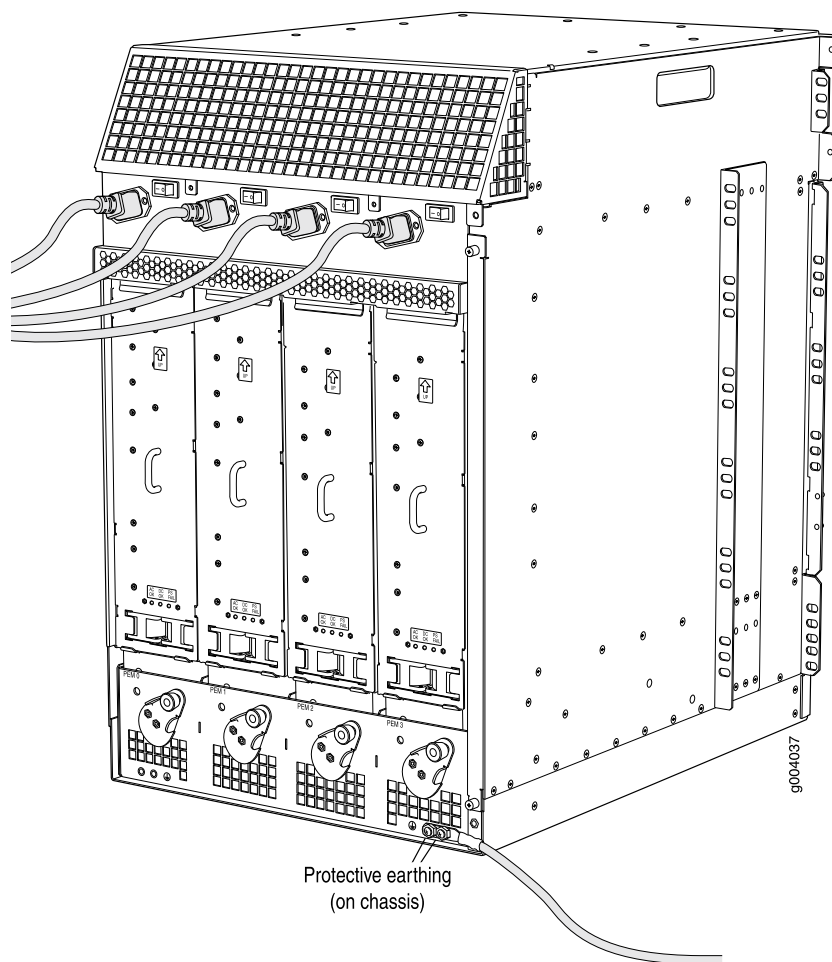
Figure 86: Grounding Point on a DC-powered Services Gateway
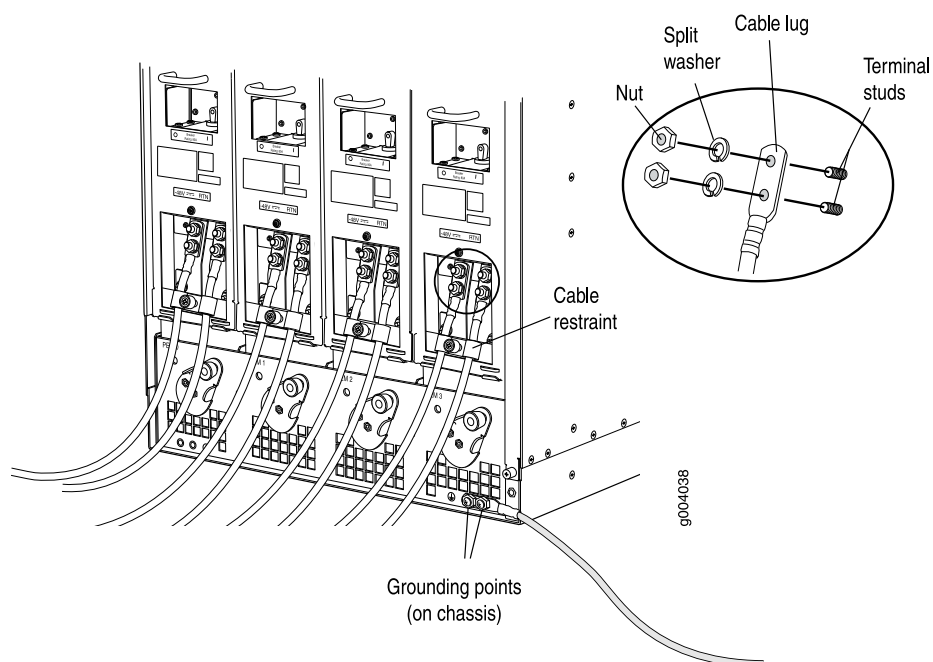
To ground AC-powered and DC-powered services gateways, connect a grounding cable to earth ground and then attach it to the chassis grounding points using two screws. The left pair of grounding points fits M6 screws (European), and the right pair fits UNC 1/4–20 screws (English). The grounding points are spaced at 0.625-in. (15.86-mm) centers. 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 pair of grounding points.

> ⚠️ **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 in addition to the grounding pin of the power supply cord. This separate protective earth terminal must be permanently connected to earth.

The 48 VDC facility shall be equipped with a circuit breaker rated 40 A (−48 VDC), or 60 A (−48 VDC), and the grounding cable must be minimum 10 AWG, or as required by the local code.

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

> ⚠️ **WARNING:** The services gateway is installed in a restricted-access location. It has a separate protective earthing terminal (Metric [M6] and English [¼-20]

screw ground lugs) provided on the chassis in addition to the grounding pin of the power supply cord. This separate protective earth terminal must be permanently connected to earth.

- SRX5800 Services Gateway Grounding-Cable Lug Specification on page 238

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 87 on page 238).

Figure 87: 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.

- SRX5800 Services Gateway Chassis Grounding Specifications on page 235

SRX5800 Services Gateway AC Power Specifications and Requirements

This section includes the following topics:

- SRX5800 Services Gateway AC Power System Specifications on page 238
- SRX5800 Services Gateway AC Power Supply Specifications on page 239
- Power Consumption for an AC-Powered SRX5800 Services Gateway on page 239
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 241
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 241

SRX5800 Services Gateway AC Power System Specifications

Table 33 on page 239 lists the AC power system electrical specifications.

Table 33: AC Power System Electrical Specifications

Item	Specification
AC input voltage	Operating range: 200 to 240 VAC
AC input line frequency	50 to 60 Hz
AC system current rating	33 A @ 240 VAC (11 A per inlet)
AC system input power	6018 W

Related Documentation

- SRX5800 Services Gateway AC Power Supply Specifications on page 239
- Power Consumption for an AC-Powered SRX5800 Services Gateway on page 239
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 241
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 241

SRX5800 Services Gateway AC Power Supply Specifications

Table 34 on page 239 lists the AC power supply electrical specifications for both the standard-capacity and high-capacity AC power supply.

Table 34: AC Power Supply Electrical Specifications

Item	Specification (Standard-Capacity)	Specification (High-Capacity)
Maximum output power	1700 W	4100 W (two AC inputs)
		1700 W (one AC input)
AC input voltage	Operating range: 200 to 240 VAC	Operating range: 200 to 240 VAC
AC input line frequency	50 to 60 Hz	50 to 60 Hz
AC input current rating	11 A @ 240 VAC maximum	13 A @ 240 VAC maximum per AC inp
Maximum input	2640 W per input	4706 W per input

Related Documentation

- SRX5800 Services Gateway AC Power System Specifications on page 238
- Power Consumption for an AC-Powered SRX5800 Services Gateway on page 239
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 241
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 241

Power Consumption for an AC-Powered SRX5800 Services Gateway

We recommend that you provision 11 A @ 240 VAC for each input.

If you do not plan to provision 11 A @ 240 VAC for each input, you can use the information in Table 35 on page 240 and Table 36 on page 240 to calculate the power consumption and thermal output for your hardware configuration.

Table 35 on page 240 lists the power requirements for base AC-powered services gateways operating under typical voltage conditions and includes nonredundant and redundant power supply configurations.

Table 35: Base Device AC Power Requirements

Power Supplies	Services Gateway Configuration	Power Requirement (Watts)
Standard-capacity	Nonredundant AC configuration includes three standard-capacity AC power supplies, the midplane, craft interface, and fan trays (running at normal speed)	471 W (approximate)
	Redundant AC configuration includes four standard-capacity AC power supplies, the midplane, craft interface, and fan trays (running at normal speed)	500 W (approximate)
High-capacity	Nonredundant AC configuration includes two high-capacity AC power supplies, the midplane, craft interface, and fan trays (running at normal speed)	588 W (approximate)
	Redundant AC configuration includes four high-capacity AC power supplies, the midplane, craft interface, and fan trays (running at normal speed)	708 W (approximate)

Table 36 on page 240 lists the power requirements for various hardware components under typical voltage conditions.

Table 36: Component Power Requirements for AC-Powered Devices

Component	Power Requirement (Watts)	Power Requirement (Watts) with 85% Efficiency
Cooling system (full speed − normal speed)	600 W − 400 W = 200 W	235 W
High-capacity fan tray	320 W	376 W
SCB	150 W	176 W
Routing Engine	90 W	106 W
IOC—Generalized typical value	312 W	367 W
IOC—Generalized maximum value	365 W	429 W
SPC—Generalized typical value	213 W	251 W
SPC—Generalized maximum value	351 W	413 W

Typical power consumption for AC-powered devices:

- Power consumption for minimum configuration:

    Base device and three power supplies + 2 SCBs + 1 Routing Engine + 1 IOC—Generalized
      typical value + 1 SPC—Generalized typical value=
    471 W + (2)176 W + 106 W + 367 W + 251 =
    471 W + 352 W + 106 W + 367 W + 251 = 1547 W

- AC Power consumption for maximum configuration:

    Base device and four power supplies + standard-capacity fan tray at full speed + 2 SCBs
      + 1 Routing Engine + 10 IOCs + 1 SPC—Generalized maximum value=
    500 W + 235 W + 2(176 W) + 106 W + 10(429 W) + 413 W =
    500 W + 235 W + 352 W + 106 W + 4290 W+ 413 W = 5896 W

- System thermal output for maximally configured AC-powered services gateway:

    Watts DC* 3.41 = BTU/hr
    5896 W * 3.41 = 20,105 BTU/hr

Related Documentation
- SRX5800 Services Gateway AC Power System Specifications on page 238
- SRX5800 Services Gateway AC Power Supply Specifications on page 239
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 241
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 241

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 System Specifications on page 238
- SRX5800 Services Gateway AC Power Supply Specifications on page 239
- Power Consumption for an AC-Powered SRX5800 Services Gateway on page 239
- AC Power Cord Specifications for the SRX5800 Services Gateway on page 241

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 37 on page 242. 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 37 on page 242 provides specifications and Figure 88 on page 242 depicts the plug on the AC power cord provided for each country or region.

Table 37: 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
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 88: AC Plug Types

Australia
(SAA/3)

China
(PSB-10)

Europe
(CEE 7/7)

Italy
(CEI 23-16/VII)

Japan
(L6-20P)

North America
(L6-20P)

UK
(BS89/13)
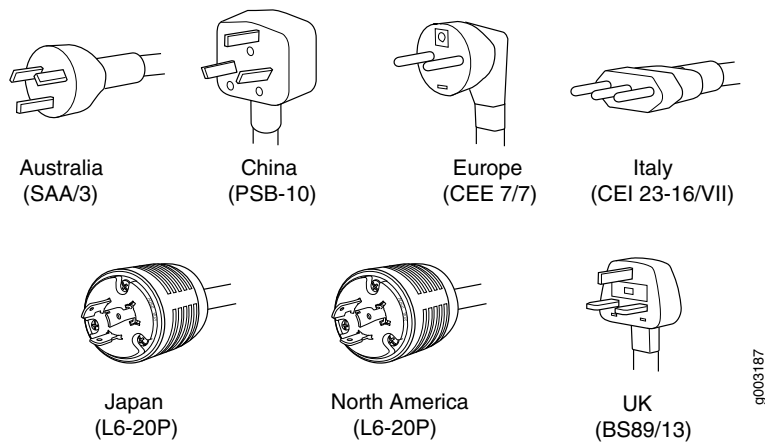
WARNING: The AC power cord for the services gateway is intended for use with the services gateway only and not for any other use.

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 37 on page 242 are in compliance.

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 in addition to the grounding pin of the power supply cord. This separate protective earth terminal must be permanently connected to earth.

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

Related Documentation
- SRX5800 Services Gateway AC Power System Specifications on page 238
- SRX5800 Services Gateway AC Power Supply Specifications on page 239
- Power Consumption for an AC-Powered SRX5800 Services Gateway on page 239
- AC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 241

SRX5800 Services Gateway DC Power Specifications and Requirements

This section includes the following topics:

- SRX5800 Services Gateway DC Power System Specifications on page 243
- SRX5800 Services Gateway DC Power Supply Specifications on page 244
- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 247
- DC Power Source Cabling for the SRX5800 Services Gateway on page 247
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 248
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 249

SRX5800 Services Gateway DC Power System Specifications

Table 38 on page 243 lists the DC power system electrical specifications.

Table 38: DC Power System Electrical Specifications

Item	Specification
DC input voltage	Operating range: −40 to −72 VDC

Table 38: DC Power System Electrical Specifications *(continued)*

Item	Specification
DC system current rating	116 A (58 A per feed) @ −48 VDC (nominal)
DC system input power	4987 W

Related Documentation

- SRX5800 Services Gateway DC Power Supply Specifications on page 244
- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 247
- DC Power Source Cabling for the SRX5800 Services Gateway on page 247
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 248
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 249

SRX5800 Services Gateway DC Power Supply Specifications

Table 39 on page 244 lists the DC power supply electrical specifications.

Table 39: DC Power Supply Electrical Specifications

Item	Specification
Maximum output power	2800 W
DC input voltage	Nominal: −48 VDC Operating range: −40 to −72 VDC
DC input current rating	70 A maximum @ −48 VDC (58 A nominal operating voltage)
Maximum input	3360 W per input
Internal Supplementary Protector	80 A

Related Documentation

- SRX5800 Services Gateway DC Power System Specifications on page 243
- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 247
- DC Power Source Cabling for the SRX5800 Services Gateway on page 247
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 248
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 249

Power Consumption for a DC-Powered SRX5800 Services Gateway

We recommend that you provision at least 116 A (58 A per feed) @ −48 VDC (nominal) for the system.

If you do not plan to provision at least 116 A (58 A per feed) @ −48 VDC (nominal) for the system, you can use the information in Table 40 on page 245 and Table 41 on page 245 to calculate the power consumption @ −48 VDC and thermal output for your hardware configuration.

Table 40 on page 245 lists the power requirements for base DC-powered services gateways operating under typical voltage conditions and includes nonredundant and redundant power supply configurations.

> **NOTE:** The base DC-powered services gateway includes the midplane, craft interface, and fan trays running at normal speed.

Table 40: DC Base Services Gateway Power Requirements

DC Power Supply Configuration	Power Requirement (Watts)	Current Requirement (Amps @ −48 VDC)
Nonredundant DC configuration includes two DC power supplies, the midplane, craft interface, and fan trays running at normal speed.	400 W (approximate)	8.3 A (approximate)
Redundant DC configuration includes four DC power supplies, the midplane, craft interface, and fan trays running at normal speed.	400 W (approximate)	8.3 A (approximate)

Table 41: Component DC Power Requirements

Component	Power Requirement (Watts)	Current Requirement (Amps @ −48 VDC)
SCB	150 W	3.1 A
Routing Engine	90 W	1.9 A
Cooling system (full speed − normal speed)	600 W − 400 W = 200 W	4.2 A
IOC—Generalized typical value	312 W	6.5 A
IOC—Generalized maximum value	365 W	7.6 A
SPC—Generalized typical value	213 W	4.4 A

Table 41: Component DC Power Requirements *(continued)*

Component	Power Requirement (Watts)	Current Requirement (Amps @ −48 VDC)
SPC—Generalized maximum value	351 W	7.3 A

These examples use generalized values for DPCs.

Typical power consumption for DC-powered devices:

- Power consumption for minimum configuration:

  Base device and two power supplies + 2 SCBs + 1 Routing Engine + 1 IOC—Generalized typical value + 1 SPC—Generalized typical value =
  8.3 A + 2(3.1) A + 1.9 A + 6.5 A + 4.4 A =
  8.3 A + 6.2 A + 1.9 A + 6.5 A + 4.4 A = 27.3 A @ −48 VDC = 1310 W

- Power consumption for maximum configuration:

  Base device and four power supplies + fan tray at full speed + 2 SCBs + 1 Routing Engine + 10 IOCs—Generalized typical value + 1 SPC—Generalized maximum value =
  8.3 A + 4.2 A + 2(3.1 A) + 1.9 A + 10(7.6 A) + 7.3 A =
  8.3 A + 4.2 A + 6.2 A + 1.9 A + 76 A + 7.3 A = 103.9 A @ −48 VDC = 4987 W

- Current requirement adjustment for fans running at full speed (high temperature environment or cooling component failure):

  Calculated system current (X) − Cooling (normal) + Cooling (full speed) =
  X A − 8.3 A + 12.5 A =
  X A + 4.2 A

- Input current from a DC source other than −48 VDC (based on maximum configuration; applies to DC power supply only):

  (−54 VDC input) * (input current X) = (−48 VDC input) * (input current Y)
  54 * X = 48 * 103.9 A
  X = 48 * 103.9 A/54 = 92.4 A

- System thermal output for maximally configured DC-powered services gateway:

  Watts DC * 3.41 = BTU/hr
  4987 * 3.41= 17,006 BTU/hr

Related Documentation

DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway

If you plan to operate a maximally configured DC-powered services gateway, 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 for 80 A (−48 VDC) minimum for each DC power supply.

If you plan to operate a DC-powered services gateway at less than the maximum configuration and do not provision a 80 A (−48 VDC) circuit breaker, we recommend that you provision a circuit breaker for 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 System Specifications on page 243

- SRX5800 Services Gateway DC Power Supply Specifications on page 244

- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245

- DC Power Source Cabling for the SRX5800 Services Gateway on page 247

- DC Power Cable Specifications for the SRX5800 Services Gateway on page 248

- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 249

DC Power Source Cabling for the SRX5800 Services Gateway

Figure 89 on page 247 shows a typical DC source cabling arrangement.

Figure 89: Typical DC Source Cabling to the Services Gateway
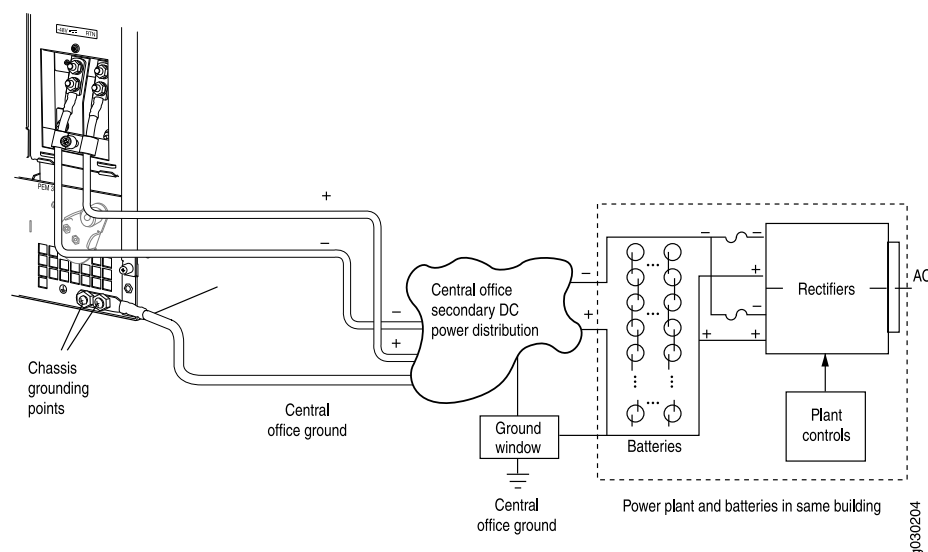
The DC power supplies in slots **PEM0** and **PEM1** must be powered by dedicated power feeds derived from feed **A**, and the DC power supplies in slots **PEM2** and **PEM3** must be powered by dedicated power feeds derived from feed **B**. This configuration provides the commonly deployed **A/B** feed 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 System Specifications on page 243
- SRX5800 Services Gateway DC Power Supply Specifications on page 244
- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245
- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 247
- DC Power Cable Specifications for the SRX5800 Services Gateway on page 248
- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 249

DC Power Cable Specifications for the SRX5800 Services Gateway

Table 42 on page 248 summarizes the specifications for the power cables, which you must supply.

Table 42: DC Power Cable Specifications

Cable Type	Quantity and Specification
Power	Eight 6-AWG (13.3 mm^2), minimum 60ºC 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 System Specifications on page 243

- SRX5800 Services Gateway DC Power Supply Specifications on page 244

- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245

- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 247

- DC Power Source Cabling for the SRX5800 Services Gateway on page 247

- DC Power Cable Lug Specifications for the SRX5800 Services Gateway on page 249

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 90 on page 249).

Figure 90: DC Power Cable Lug
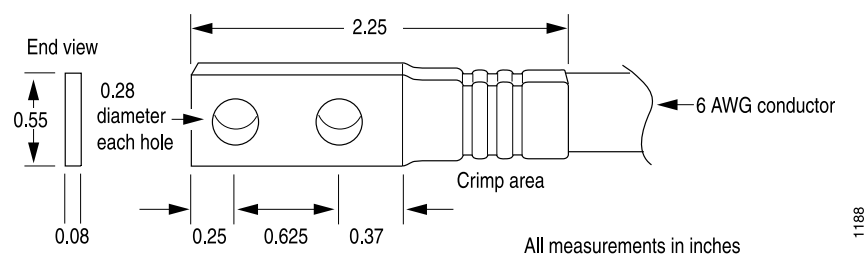
CAUTION: Before services gateway installation begins, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the services gateway.

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 System Specifications on page 243

- SRX5800 Services Gateway DC Power Supply Specifications on page 244

- Power Consumption for a DC-Powered SRX5800 Services Gateway on page 245

- DC Power Circuit Breaker Requirements for the SRX5800 Services Gateway on page 247

- DC Power Source Cabling for the SRX5800 Services Gateway on page 247

- DC Power Cable Specifications for the SRX5800 Services Gateway on page 248

SRX5800 Services Gateway Electrical Wiring Guidelines

- Distance limitations for signaling—Improperly installed wires can emit radio interference. In addition, the potential for damage from lightning strikes increases if wires exceed recommended distances or if wires pass between buildings. The electromagnetic pulse (EMP) caused by lightning can damage unshielded conductors and destroy electronic devices. If your site has previously experienced such problems, you might want to consult experts in electrical surge suppression and shielding.

- Radio frequency interference—You can reduce or eliminate the emission of radio frequency interference (RFI) from your site wiring by using 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, you might want to seek expert advice. Strong sources of electromagnetic interference (EMI) can destroy the signal drivers and receivers in the routing platform and conduct power surges over the lines into the equipment, resulting in an electrical hazard. It is particularly important to provide a properly grounded and shielded environment and to use electrical surge-suppression devices.

> **WARNING:** Certain ports on the services gateway are designed for use as intrabuilding (within-the-building) interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS requirements and protect against lightening 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 services gateway 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.

Related Documentation
- General Electrical Safety Guidelines and Warnings on page 220
- Installation Instructions Warning on page 205

Cable and Wire Guidelines and Specifications for the SRX5800 Services Gateway

This section includes the following topics:

- Network Cable Specifications and Guidelines for the SRX5800 Services Gateway on page 251

Network Cable Specifications and Guidelines for the SRX5800 Services Gateway

This section includes the following topics:

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.

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.

<div style="text-align: right">Related Documentation</div>

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX5800 Services Gateway on page 251

- Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway on page 253

- Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway on page 253

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

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):

$$P_B = P_T - P_R$$

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

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

<div style="text-align: right">Related Documentation</div>

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX5800 Services Gateway on page 251

- Attenuation and Dispersion in Fiber-Optic Cable for the SRX5800 Services Gateway on page 252

- Calculating Power Margin for Fiber-Optic Cable for the SRX5800 Services Gateway on page 253

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

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 43 on page 254 lists an estimated amount of loss for the factors used in the following sample calculations. For information about the actual amount of signal loss caused by equipment and other factors, refer to vendor documentation.

Table 43: Estimated Values for Factors Causing Link Loss

Link-Loss Factor	Estimated Link-Loss Value
Higher-order mode losses	Single-mode—None Multimode—0.5 dB
Modal and chromatic dispersion	Single-mode—None Multimode—None, if product of bandwidth and distance is less than 500 MHz–km
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 43 on page 254 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 43 on page 254 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:

$$P_M = P_B - LL$$

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

$$P_M = 13 \text{ dB} - 4 \text{ dB} - 3.5 \text{ dB}$$

$$P_M = 5.5 \text{ dB}$$

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 251

- Attenuation and Dispersion in Fiber-Optic Cable for the SRX5800 Services Gateway on page 252

- Calculating Power Budget for Fiber-Optic Cable for the SRX5800 Services Gateway on page 253

- Connecting Network Cables to SRX5800 Services Gateway IOCs and Port Modules on page 83

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

Table 44 on page 255 lists the specifications for the cables that connect to management ports and the wires that connect to the alarm relay contacts.

Table 44: 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

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81

- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80

Alarm Relay Contact Wire Specifications for the SRX5800 Services Gateway

Table 45 on page 256 lists the specifications for the wires that connect to the alarm relay contacts.

Table 45: 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

- Connecting an SRX5800 Services Gateway to an External Alarm-Reporting Device on page 82

Console Port Cable and Wire Specifications for the SRX5800 Services Gateway

Table 46 on page 256 lists the specifications for the cable that connects a **CONSOLE** port on the Routing Engine to a management console.

Table 46: 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

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81

- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports on page 258

Cable Connector Pinouts

This section includes the following topics:

- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Ethernet Port on page 257
- RJ-45 Connector Pinouts for the SRX5800 Services Gateway Routing Engine Auxiliary and Console Ports on page 258

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 47 on page 257 describes the RJ-45 connector pinout.

Table 47: 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 255

- Connecting the SRX5800 Services Gateway to a Network for Out-of-Band Management on page 80

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 48 on page 258 describes the RJ-45 connector pinout.

Table 48: 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 256

- Connecting the SRX5800 Services Gateway to a Management Console or an Auxiliary Device on page 81

Installing the SRX5800 Services Gateway Without a Mechanical Lift

This section includes the following topics:

- Overview of Installing the SRX5800 Services Gateway Without a Mechanical Lift on page 259
- Tools Required to Install the SRX5800 Services Gateway Without a Mechanical Lift on page 260
- Removing Components from the SRX5800 Chassis Before Installing It Without a Lift on page 260
- Installing the SRX5800 Services Gateway Chassis in the Rack Manually on page 269
- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It Without a Lift on page 271

Overview of Installing the SRX5800 Services Gateway Without a Mechanical Lift

If you cannot use a mechanical lift to install the services gateway (the preferred method), you can install it manually. Before installing the services gateway manually, you must first remove components from the chassis, and you must reinstall the components once the services gateway is installed in the rack. At least three people are needed to safely lift the chassis into the rack or cabinet. With components removed, the chassis weighs approximately 150 lb (68 kg).

Before installing the services gateway in the rack, read the safety information in "Chassis Lifting Guidelines" on page 204. Remove the services gateway from the shipping container as described in "Unpacking the SRX5800 Services Gateway" on page 63. Install the mounting hardware as described in "Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet" on page 69 or "Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack" on page 71.

Related Documentation
- Tools Required to Install the SRX5800 Services Gateway Without a Mechanical Lift on page 260
- Removing Components from the SRX5800 Chassis Before Installing It Without a Lift on page 260
- Installing the SRX5800 Services Gateway Chassis in the Rack Manually on page 269

- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It Without a Lift on page 271

Tools Required to Install the SRX5800 Services Gateway Without a Mechanical Lift

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

- Phillips (+) screwdrivers, numbers 1 and 2
- 7/16-in. (11 mm) nut driver
- ESD grounding wrist strap

Related Documentation

- Overview of Installing the SRX5800 Services Gateway Without a Mechanical Lift on page 259
- Removing Components from the SRX5800 Chassis Before Installing It Without a Lift on page 260
- Installing the SRX5800 Services Gateway Chassis in the Rack Manually on page 269
- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It Without a Lift on page 271

Removing Components from the SRX5800 Chassis Before Installing It Without a Lift

If you cannot use a mechanical lift to install the services gateway (the preferred method), you can install it manually. Before installing the services gateway manually, you must first remove components from the chassis, and reinstall the components the chassis is installed in the rack. With components removed, the chassis weighs approximately 150 lb (68 kg).

1. Removing the Power Supplies Before Installing the SRX5800 Services Gateway Without a Lift on page 261
2. Removing the Cable Manager Before Installing the SRX5800 Services Gateway Without a Lift on page 262
3. Removing Fan Trays Before Installing the SRX5800 Services Gateway Without a Lift on page 263
4. Removing SCBs Before Installing the SRX5800 Services Gateway Without a Lift on page 265
5. Removing IOCs, Flex IOCs, and SPCs Before Installing the SRX5800 Services Gateway Without a Lift on page 266

Removing the Power Supplies Before Installing the SRX5800 Services Gateway Without a Lift

Remove the leftmost power supply first and then work your way to the right. To remove each AC or DC power supply (see Figure 91 on page 262):

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 91: Removing a Power Supply Before Installing the Services Gateway (Standard-Capacity Filter Tray Shown, High-Capacity Similar)
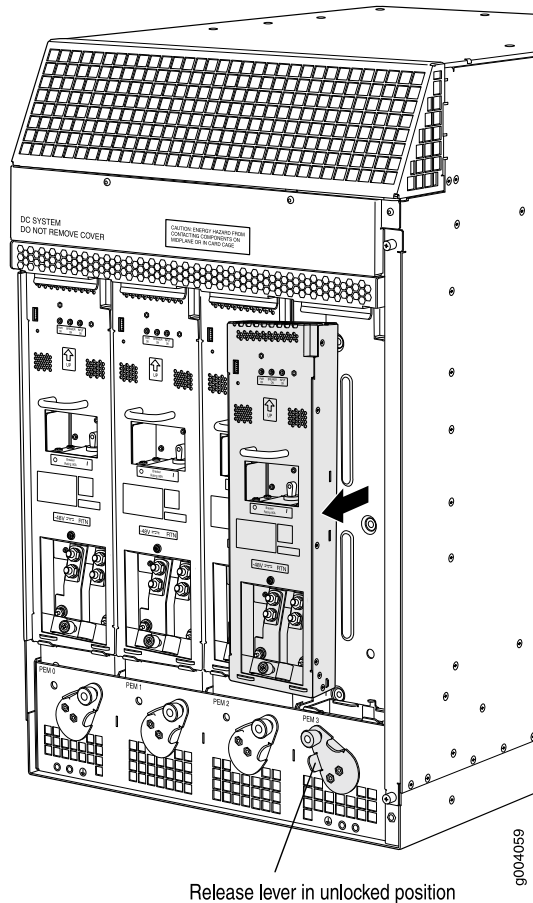
Release lever in unlocked position

Removing the Cable Manager Before Installing the SRX5800 Services Gateway Without a Lift

To remove the cable manager (see Figure 92 on page 263):

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 92: Removing the Cable Manager
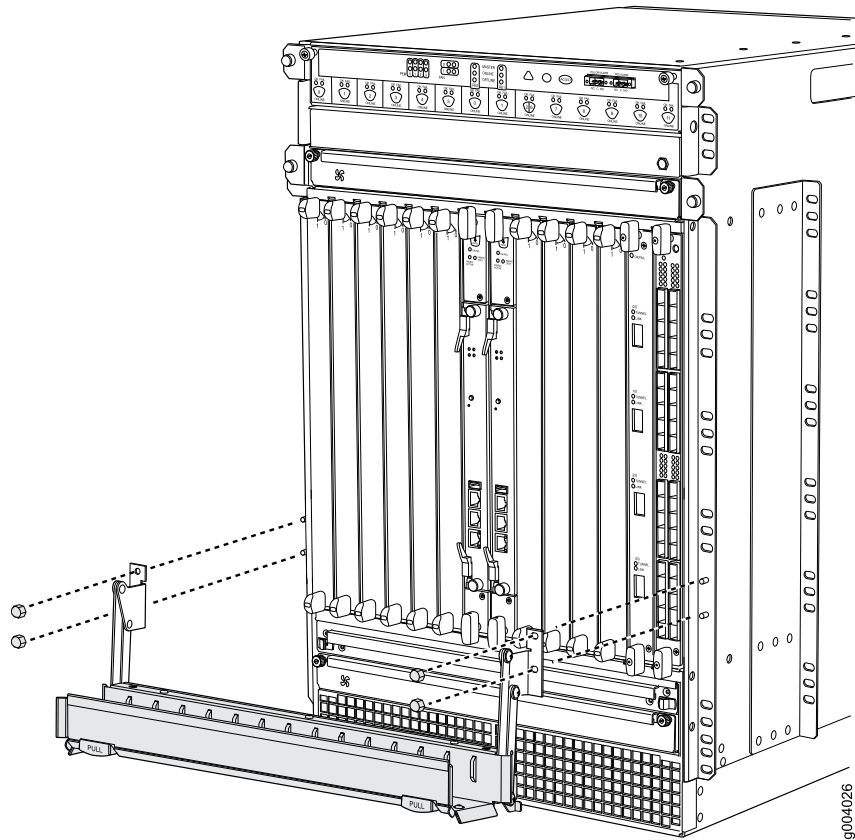
Removing Fan Trays Before Installing the SRX5800 Services Gateway Without a Lift

To remove the upper or lower fan tray (see Figure 93 on page 264 and Figure 94 on page 265, 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 93: Removing an Upper Fan Tray
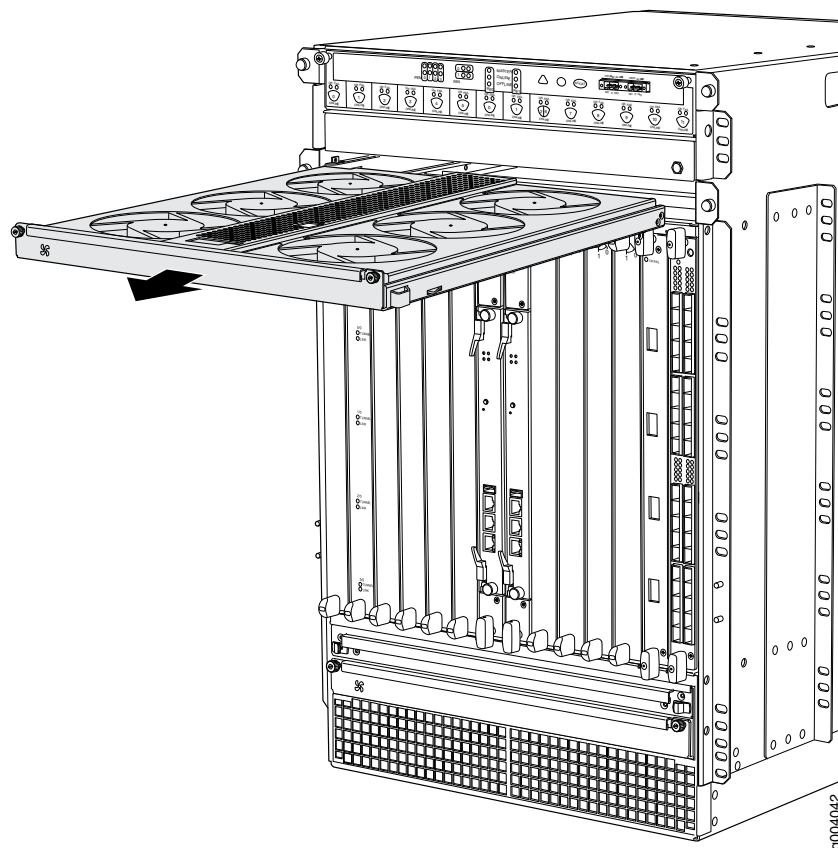
Figure 94: Removing a Lower Fan Tray
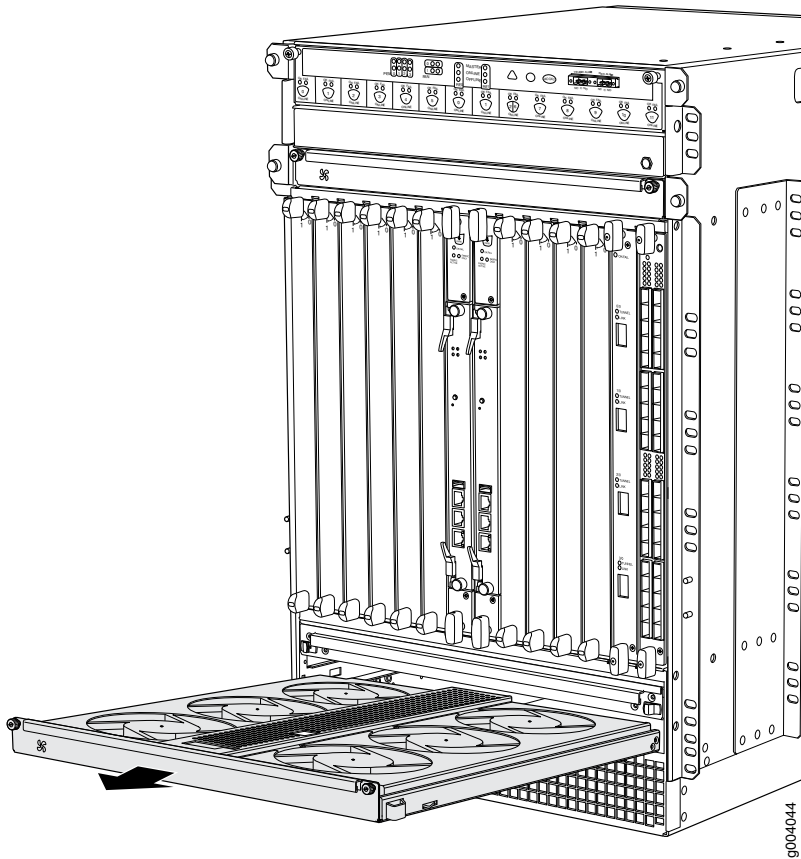
Removing SCBs Before Installing the SRX5800 Services Gateway Without a Lift

To remove the SCBs (see Figure 95 on page 266):

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

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

3. Rotate the ejector handles simultaneously counterclockwise to unseat the SCB.

4. Grasp the ejector handles and slide the SCB about halfway out of the chassis.

5. Place one hand underneath the SCB to support it and slide it completely out of the chassis. Place it on the antistatic mat.

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

6. Repeat the procedure for each SCB.

Figure 95: Removing an SCB
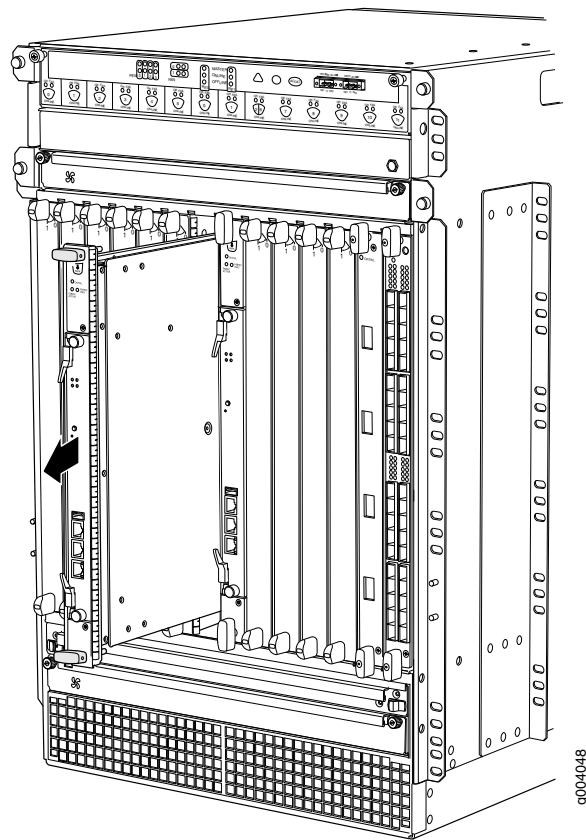
Removing IOCs, Flex IOCs, and SPCs Before Installing the SRX5800 Services Gateway Without a Lift

The services gateway holds up to twelve IOCs, Flex IOCs, and SPCs, which are installed horizontally in the front of the device. Each card weighs up to 13.1 lb (5.9 kg), be prepared to accept its full weight.

To remove an IOC, a Flex IOC, or an SPC (see Figure 96 on page 268):

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 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. Simultaneously turn both the ejector handles counterclockwise to unseat the IOC.

6. Grasp the handles and slide the card straight out of the card cage halfway.

7. 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 96: Removing an IOC, a Flex IOC, or an SPC
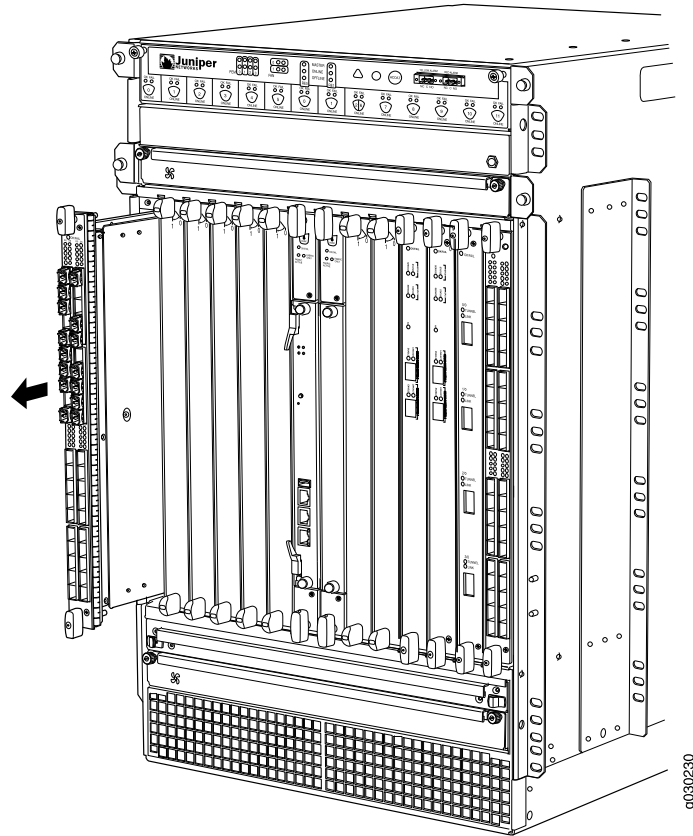
Related Documentation

- Overview of Installing the SRX5800 Services Gateway Without a Mechanical Lift on page 259

- Tools Required to Install the SRX5800 Services Gateway Without a Mechanical Lift on page 260

- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

- Installing the SRX5800 Services Gateway Chassis in the Rack Manually on page 269

- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It Without a Lift on page 271

Installing the SRX5800 Services Gateway Chassis in the Rack Manually

To install the services gateway in the rack (see Figure 97 on page 270):

⚠ CAUTION: If you are installing more than one services gateway in a rack, install the lowest one first. Installing a services gateway in an upper position in a rack or cabinet requires a 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.

⚠ CAUTION: Lifting the chassis and mounting it in a rack requires three people. The empty chassis weighs approximately 150 lb (68 kg).

1. Ensure that 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. Position the services gateway in front of the rack or cabinet, centering it in front of the mounting shelf. Use a pallet jack if one is available.

3. With one person on each side and one person in the front, hold onto the bottom of the chassis and carefully lift it onto the large and small (if installed) mounting shelves.

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

4. 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.

5. 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.

6. 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 97: Installing the Services Gateway in the Rack
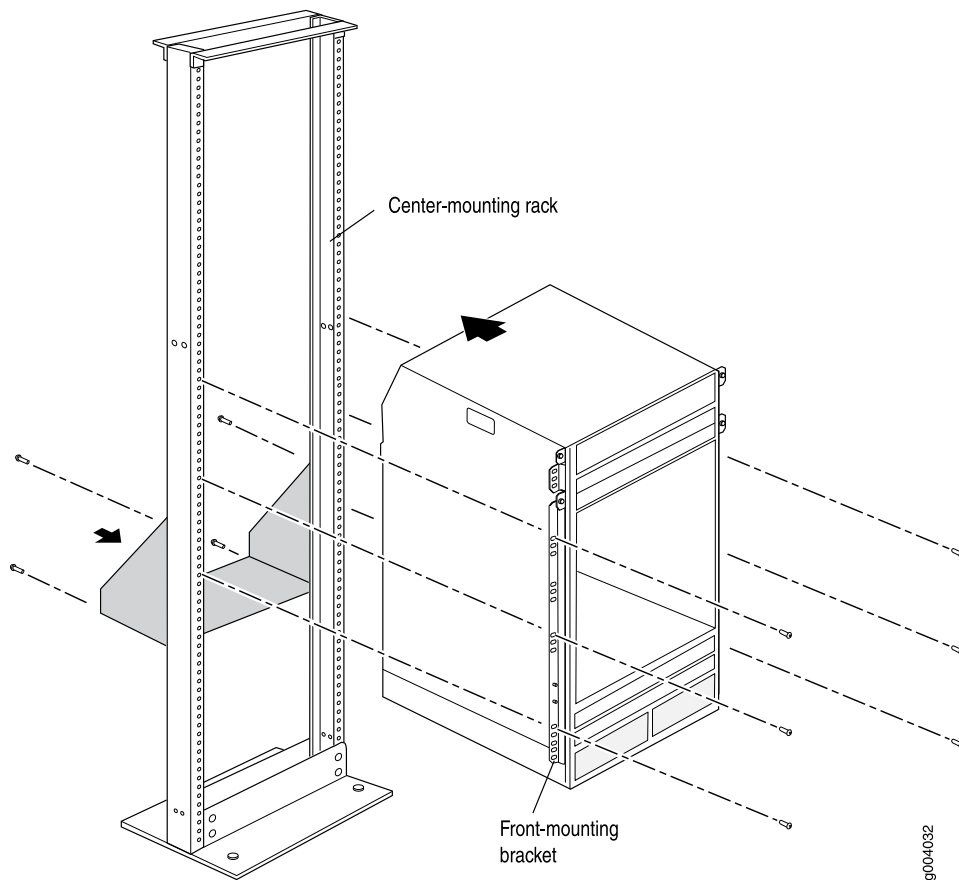
NOTE: This illustration depicts the services gateway being installed in an open-frame rack. For an illustration of the mounting hardware required for a four-post rack or cabinet, see "Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet" on page 69.

Related Documentation

- Overview of Installing the SRX5800 Services Gateway Without a Mechanical Lift on page 259

- Tools Required to Install the SRX5800 Services Gateway Without a Mechanical Lift on page 260

- Removing Components from the SRX5800 Chassis Before Installing It Without a Lift on page 260

- Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It Without a Lift on page 271

- Installing the SRX5800 Services Gateway Mounting Hardware for a Four-Post Rack or Cabinet on page 69

- Installing the SRX5800 Services Gateway Mounting Hardware in an Open-Frame Rack on page 71

Reinstalling Components in the SRX5800 Services Gateway Chassis After Installing It Without a Lift

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 Without a Lift on page 271

2. Reinstalling Fan Trays After Installing the SRX5800 Services Gateway Without a Lift on page 273

3. Reinstalling SCBs After Installing the SRX5800 Services Gateway Without a Lift on page 274

4. Reinstalling IOCs, Flex IOCs, and SPCs After Installing the SRX5800 Services Gateway Without a Lift on page 275

5. Reinstalling the Cable Manager After Installing an SRX5800 Services Gateway Without a Lift on page 277

Reinstalling Power Supplies After Installing the SRX5800 Services Gateway Without a Lift

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 98 on page 272, 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.

2. 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.

3. Ensure that the release lever below the empty power supply slot is locked in the counterclockwise position (see Figure 98 on page 272).

   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.

4. 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.

5. 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.

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

Figure 98: Reinstalling a Power Supply (Standard-Capacity Shown, High-Capacity Similar)
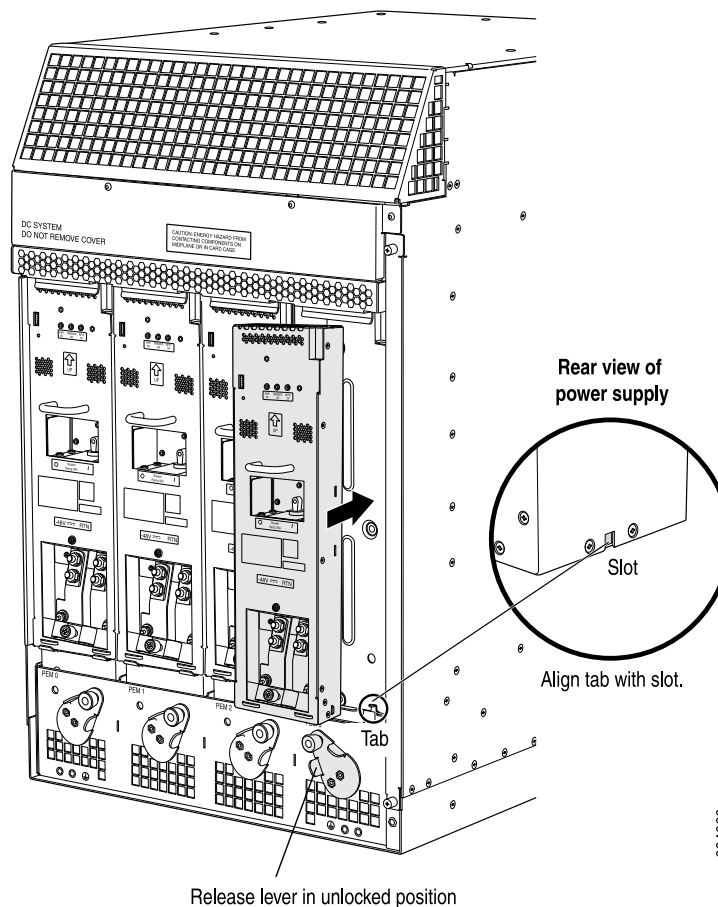
Reinstalling Fan Trays After Installing the SRX5800 Services Gateway Without a Lift

To reinstall the fan trays (see Figure 99 on page 273 and Figure 100 on page 274):

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 99: Installing an Upper Fan Tray
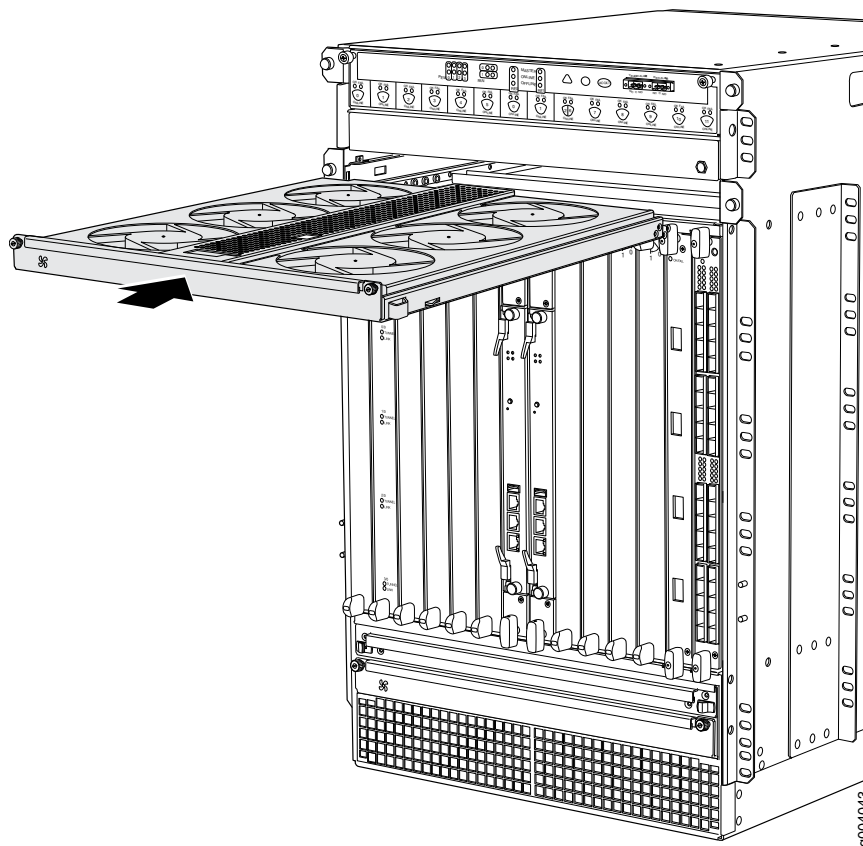
Figure 100: Installing a Lower Rear Fan Tray
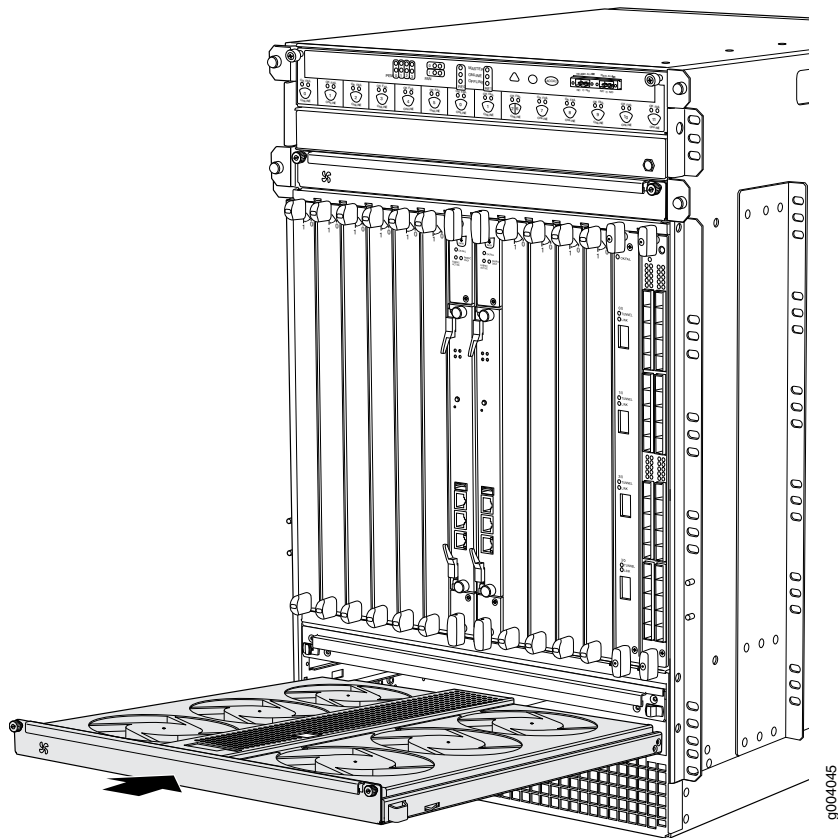
Reinstalling SCBs After Installing the SRX5800 Services Gateway Without a Lift

To reinstall an SCB (see Figure 101 on page 275):

> ⚠ CAUTION: Before removing or replacing an SCB, ensure that the ejector handles are stored vertically and pressed toward the center of the SCB.

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

2. Carefully align the sides of the SCB with the guides inside the chassis.

3. Slide the SCB into the chassis until you feel resistance, carefully ensuring that it is correctly aligned.

4. Grasp both ejector handles and rotate them simultaneously clockwise until the SCB is fully seated.

5. 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.

Figure 101: Reinstalling an SCB
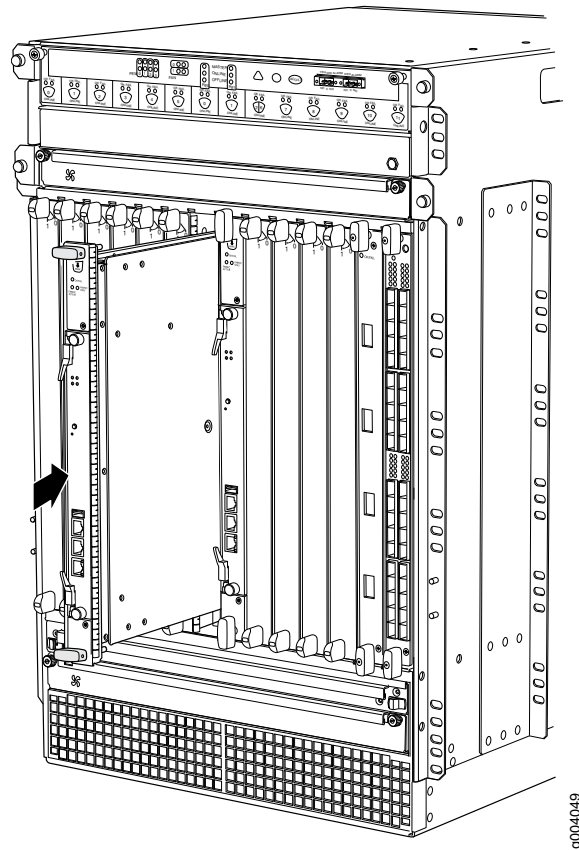
Reinstalling IOCs, Flex IOCs, and SPCs After Installing the SRX5800 Services Gateway Without a Lift

To reinstall IOCs, Flex IOCs, and SPCs (see Figure 102 on page 276):

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. Grasp both ejector handles and rotate them simultaneously clockwise until the card is fully seated.

9. 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 102: Installing an IOC
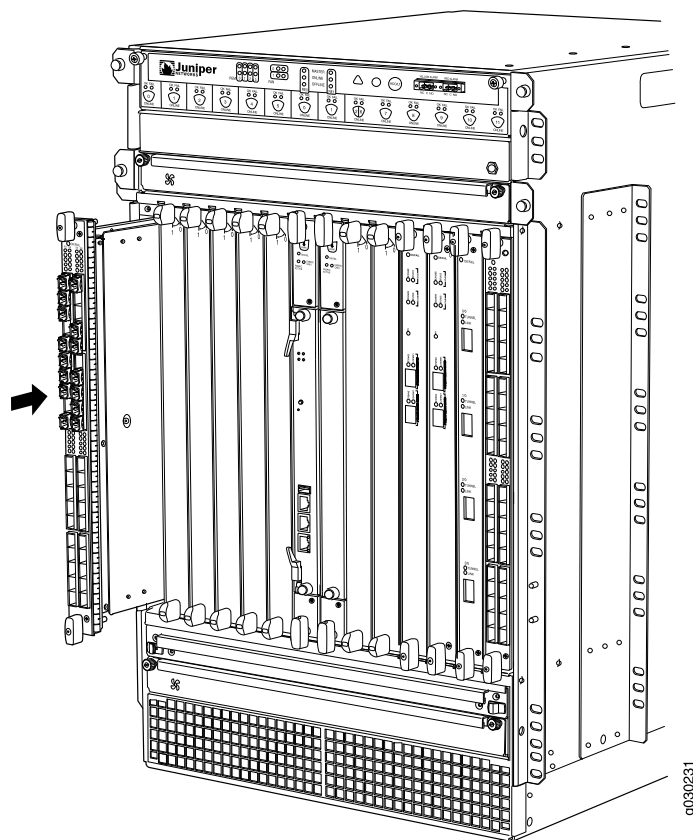
Reinstalling the Cable Manager After Installing an SRX5800 Services Gateway Without a Lift

To reinstall the cable manager (see Figure 103 on page 277):

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 103: Reinstalling the Cable Manager
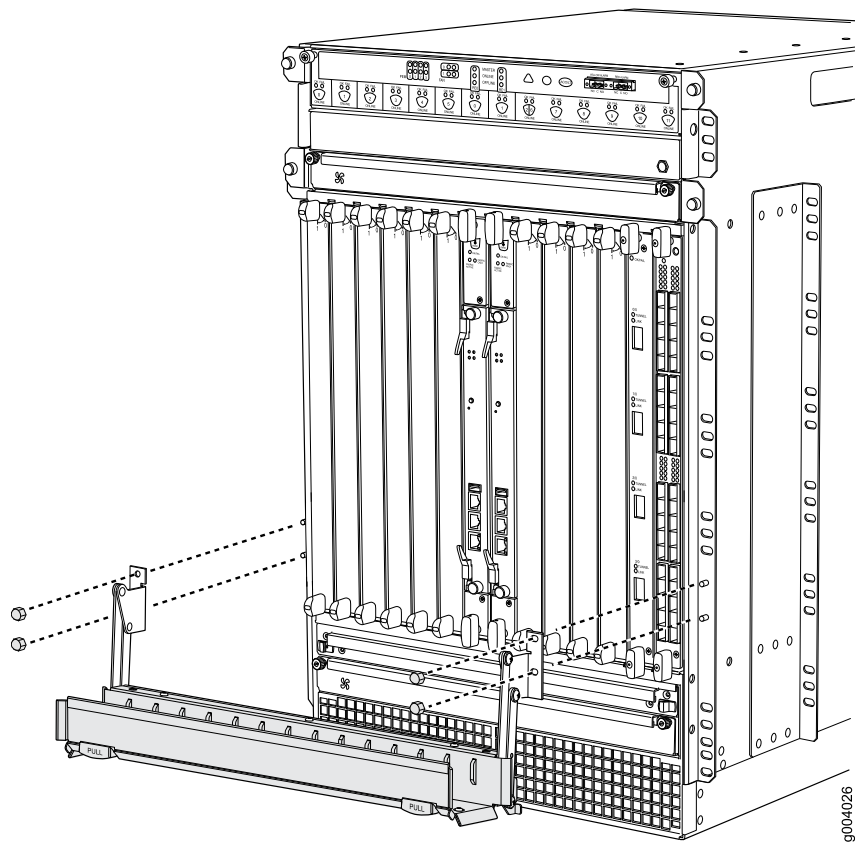
Related Documentation

- Preventing Electrostatic Discharge Damage to the SRX5800 Services Gateway on page 201

- Overview of Installing the SRX5800 Services Gateway Without a Mechanical Lift on page 259

- Tools Required to Install the SRX5800 Services Gateway Without a Mechanical Lift on page 260

- Removing Components from the SRX5800 Chassis Before Installing It Without a Lift on page 260
- Installing the SRX5800 Services Gateway Chassis in the Rack Manually on page 269

Contacting Customer Support and Returning the SRX5800 Services Gateway Hardware

This section includes the following topics:

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 http://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.

2. Obtain a Return Materials Authorization (RMA) number from JTAC.

> (i) 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 http://www.juniper.net/support/guidelines.html .

For product problems or technical support issues, open a support case using the Case Manager link at http://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 281

- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282

- Locating the SRX5800 Services Gateway SCB Serial Number Label on page 283

- Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels on page 284

- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285

- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286

- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

- Information You Might Need to Supply to JTAC on page 289

- Contacting Customer Support on page 290

Locating SRX5800 Services Gateway Component Serial Numbers

This section includes the following topics:

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 281
- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282
- Locating the SRX5800 Services Gateway SCB Serial Number Label on page 283
- Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels on page 284
- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285
- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286

- Locating the SRX5800 Services Gateway Routing Engine Serial Number
  Label on page 288
- Locating the SRX5800 Services Gateway Craft Interface Serial Number
  Label on page 288

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 104 on page 282) attached to the component body.

Figure 104: Serial Number ID Label

AD6003

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Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279

- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282

- Locating the SRX5800 Services Gateway SCB Serial Number Label on page 283

- Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels on page 284

- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285

- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286

- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

Locating the SRX5800 Services Gateway Chassis Serial Number Label

The chassis serial number label is located on the side of the chassis (see Figure 105 on page 283).

Figure 105: SRX5800 Chassis Serial Number Label

Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 281

- Locating the SRX5800 Services Gateway SCB Serial Number Label on page 283

- Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels on page 284

- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285

- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286

- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

Locating the SRX5800 Services Gateway SCB Serial Number Label

The serial number is located on the right side of the top of the SCB (see Figure 106 on page 284).

Figure 106: SCB Serial Number Label

Serial number
ID label

Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279
- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 281
- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282
- Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels on page 284
- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285
- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286
- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288
- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels

The serial number label is located on the center of the right side of the card (see Figure 107 on page 285).

Figure 107: Serial Number Label

Related
Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 281

- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282

- Locating the SRX5800 Services Gateway SCB Serial Number Label on page 283

- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285

- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286

- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

Locating the SRX5800 Services Gateway Port Module Serial Number Labels

Figure 108 on page 286 shows the serial number label location on the three port moddule types.

Figure 108: Serial Number Label

Locating the SRX5800 Services Gateway Power Supply Serial Number Label

The serial number label is located on the AC power supply faceplate under the on/off switch (see Figure 109 on page 287).

The serial number label is located on the DC power supply faceplate under the circuit breaker switch (see Figure 110 on page 287).

Figure 109: AC Power Supply Serial Number Label
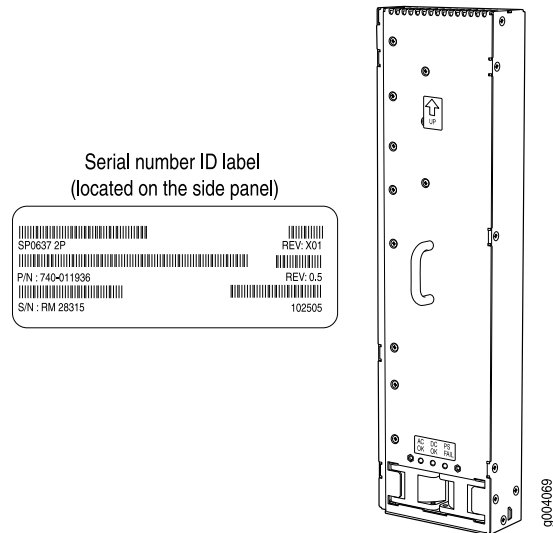
Figure 110: DC Power Supply Serial Number Label

Related Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 281

- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282

- Locating the SRX5800 Services Gateway SCB Serial Number Label on page 283

- Locating the SRX5800 Services Gateway IOC, Flex IOC, and SPC Serial Number Labels on page 284

- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285

- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

Locating the SRX5800 Services Gateway Routing Engine Serial Number Label

The serial number label is located on the right side of the top of the Routing Engine (see Figure 111 on page 288).

Figure 111: Routing Engine Serial Number Label

<table>
<tr><td rowspan="9" align="right">Related
Documentation</td><td>• Return Procedure for the SRX5800 Services Gateway on page 279</td></tr>
</table>

Related
Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279

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- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282

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- Locating the SRX5800 Services Gateway Port Module Serial Number Labels on page 285

- Locating the SRX5800 Services Gateway Power Supply Serial Number Label on page 286

- Locating the SRX5800 Services Gateway Craft Interface Serial Number Label on page 288

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 112 on page 289).

Figure 112: Craft Interface Serial Number Label

Related
Documentation

- Return Procedure for the SRX5800 Services Gateway on page 279

- Listing the SRX5800 Services Gateway Component Serial Numbers with the Command-Line Interface on page 281

- Locating the SRX5800 Services Gateway Chassis Serial Number Label on page 282

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- Locating the SRX5800 Services Gateway Routing Engine Serial Number Label on page 288

Contacting Customer Support to Obtain Return Materials Authorization for the SRX5800 Services Gateway

This section includes the following topics:

- Information You Might Need to Supply to JTAC on page 289
- Contacting Customer Support on page 290

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 290

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 http://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 289

Packing the SRX5800 Services Gateway or a Component for Shipment

This section includes the following topics:

- Required Tools and Parts for Packing the SRX5800 Services Gateway on page 290
- Packing the SRX5800 Services Gateway for Shipment on page 291
- Packing SRX5800 Services Gateway Components for Shipment on page 292

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

- Packing the SRX5800 Services Gateway for Shipment on page 291

- Packing SRX5800 Services Gateway Components for Shipment on page 292

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 the *Junos OS System Basics and Services Command Reference*.

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 on page 201
- Powering Off the SRX5800 Services Gateway on page 95
- Disconnecting an SRX5800 Services Gateway AC Power Supply Cord on page 186
- Disconnecting an SRX5800 Services Gateway DC Power Supply Cable on page 188
- Return Procedure for the SRX5800 Services Gateway on page 279
- Required Tools and Parts for Packing the SRX5800 Services Gateway on page 290
- Packing SRX5800 Services Gateway Components for Shipment on page 292

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 290
- Packing the SRX5800 Services Gateway for Shipment on page 291

PART 5

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