SRX1400 Services Gateway Hardware Guide

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Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

SRX1400 Services Gateway Hardware Guide

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

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

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About the Documentation

Documentation and Release Notes

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If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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Supported Platforms

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

- SRX1400

Documentation Conventions

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

Table 1: Notice Icons

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

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

Table 2: Text and Syntax Conventions

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

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

Convention	Description	Examples
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the **[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Encloses optional keywords or variables.	**stub <default-metric *metric*>;**
| (pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	**community name members [*community-ids*]**

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

; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

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- Online feedback rating system—On any page of the Juniper Networks TechLibrary site at http://www.juniper.net/techpubs/index.html, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at http://www.juniper.net/techpubs/feedback/.

- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

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- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.
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- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: http://kb.juniper.net/InfoCenter/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

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

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

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

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

PART 1

Overview

CHAPTER 1

System Overview

SRX1400 Services Gateway Description

Juniper Networks SRX1400 Services Gateway expands the SRX Series family of next-generation security platforms, delivering performance and service integration to environments that require the features without the massive scalability and aggregated throughput provided by Juniper Networks SRX3000 line and SRX5000 line. The SRX1400 Services Gateway provides firewall support with key features such as IP Security (IPsec), virtual private network (VPN), and high-speed deep packet inspection features such as Intrusion Detection and Prevention (IDP). The SRX1400 device is suited for small to medium data centers, enterprises, and service provider network security deployments where consolidation of security functionality, uncompromised performance, and compact environmental footprint are requirements.

The SRX1400 Services Gateway is three rack units (U) tall. Sixteen devices can be stacked in a single floor-to-ceiling rack, for increased port density per unit of floor space. The device provides three common form-factor module (CFM) slots that can be populated with various CFM cards. The device also has one dedicated slot for System I/O card (SYSIOC), one dedicated slot for the Routing Engine, two slots for power supplies, and one slot for the fan tray and air filter.

The SRX1400 Services Gateway runs the Junos operating system (Junos OS). You can use the Junos OS command-line interface (CLI) or J-Web (Web-based graphical interface) to monitor, configure, troubleshoot, and manage the SRX1400 Services Gateway.

Related Documentation

- SRX1400 Services Gateway Models on page 4
- SRX1400 Services Gateway Hardware Features on page 4

- Understanding the SRX1400 Services Gateway in the Enterprise Network on page 5
- Understanding the SRX1400 Services Gateway in the Service Provider Network on page 6
- Understanding the SRX1400 Services Gateway in the Data Center on page 6

SRX1400 Services Gateway Models

The SRX1400 Services Gateway is available in four models, which are listed in Table 3 on page 4.

Table 3: SRX1400 Services Gateway Models

Model Number	Device Type
SRX1400BASE-GE-AC	SRX1400 Services Gateway with 1-Gigabit Ethernet System I/O card (SYSIOC), and AC power supply
SRX1400BASE-GE-DC	SRX1400 Services Gateway with 1-Gigabit Ethernet SYSIOC, and DC power supply
SRX1400BASE-XGE-AC	SRX1400 Services Gateway with 10-Gigabit Ethernet SYSIOC, and AC power supply
SRX1400BASE-XGE-DC	SRX1400 Services Gateway with 10-Gigabit Ethernet SYSIOC, and DC power supply

NOTE: The SRX1400 Services Gateway base models include the Routing Engine, SYSIOC, and power supply. The Network and Services Processing Card (NSPC) and IOCs are not provided with the SRX1400 Services Gateway base models. You must order them separately. Contact your Juniper Networks customer service representative for more information.

Related Documentation

- SRX1400 Services Gateway Description on page 3
- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Physical Specifications on page 58
- SRX1400 Services Gateway Environmental Specifications on page 60

SRX1400 Services Gateway Hardware Features

Table 4 on page 5 lists the hardware features supported on the SRX1400 Services Gateway.

Table 4: SRX1400 Services Gateway Hardware Features

Feature	Description
Input Voltage	• 100 to 240 V AC • -40 to -72 V DC
Power Supplies	2 SRX1400 Services Gateway allows two power supplies for redundancy. Following power supplies are supported: • AC Power Supply (for AC-powered devices) • DC Power Supply (for DC-powered devices)
Ethernet port (10/100/1000 Mbps)	1
Console port	1
Universal Serial Bus (USB) ports	2
Auxiliary port	1
Fans	2
Fan tray	1
Air filter	1

Related Documentation

- SRX1400 Services Gateway Description on page 3
- SRX1400 Services Gateway Physical Specifications on page 58
- SRX1400 Services Gateway Environmental Specifications on page 60

Understanding the SRX1400 Services Gateway in the Enterprise Network

The enterprise gateway provides secure access between the Internet and your network and its resources for medium to regional sites. Playing the role of your enterprise gateway, the services gateway protects key assets, such as internal clients and application servers, and webservers, that provide information to partners, remote access users, and general access to sites.

The SRX1400 Services Gateway accomplishes these tasks using the following features:

- A stateful firewall, including denial of service/distributed denial of service (DoS/DDoS) protection
- Application support through Application Layer Gateways (ALGs)
- Quality of service (QoS) traffic management

- IPsec VPN tunnel termination
- Application Layer security, including high-speed intrusion protection

Related Documentation

- SRX1400 Services Gateway Models on page 4
- SRX1400 Services Gateway Hardware Features on page 4
- Understanding the SRX1400 Services Gateway in the Service Provider Network on page 6
- Understanding the SRX1400 Services Gateway in the Data Center on page 6

Understanding the SRX1400 Services Gateway in the Service Provider Network

The services gateway can be used in the service provider network to provide secure hosting and network services. When placed at the hosting center, it can perform provisioning services to multiple customers. When placed in the services network itself, it protects traffic and performs rate limiting or QoS overlay services.

The SRX1400 Services Gateway accomplishes these tasks using the following features:

- A stateful firewall, including denial of service/distributed denial of service (DoS/DDoS) protection
- Quality of service (QoS) traffic management
- VPN services
- Application Layer security, including high-speed intrusion protection.

Related Documentation

- SRX1400 Services Gateway Models on page 4
- SRX1400 Services Gateway Hardware Features on page 4
- Understanding the SRX1400 Services Gateway in the Enterprise Network on page 5
- Understanding the SRX1400 Services Gateway in the Data Center on page 6

Understanding the SRX1400 Services Gateway in the Data Center

The enterprise data center provides secure access between internal clients and small to medium server farms, demilitarized zones (DMZs), and hosting sites. In the enterprise data center, the services gateway is placed in front of your servers, providing secure partner, extranet, and Web content.

The SRX1400 Services Gateway accomplishes these tasks using the following features:

- A stateful firewall, including denial of service/distributed denial of service (DoS/DDoS) protection
- Application Layer security, including high-speed intrusion protection

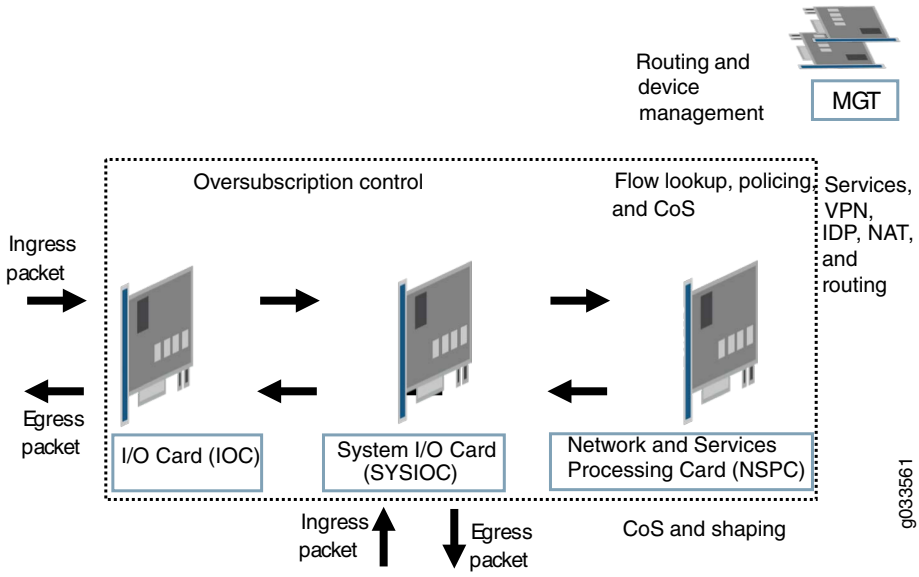
Related Documentation

- SRX1400 Services Gateway Models on page 4
- SRX1400 Services Gateway Hardware Features on page 4
- Understanding the SRX1400 Services Gateway in the Enterprise Network on page 5
- Understanding the SRX1400 Services Gateway in the Service Provider Network on page 6

Understanding the SRX1400 Services Gateway Data Flow

The services gateway receives data from the various physical interfaces on the I/O card (IOC) or System I/O card (SYSIOC). Incoming data is passed through the SYSIOC to a Network and Services Processing Card (NSPC), and back to the outgoing port through the SYSIOC as shown in Figure 1 on page 7.

Figure 1: SRX1400 Services Gateway Data Flow



Related Documentation

- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Hardware Components on page 9
- Overview of the SRX1400 Services Gateway CFMs on page 10

CHAPTER 2

Hardware Component Overview

SRX1400 Services Gateway Hardware Components

Table 5 on page 9 lists the various components, and the maximum number of each, that can be installed in the SRX1400 Services Gateway.

Table 5: SRX1400 Services Gateway Hardware Components

Hardware Component	Minimum Required	Maximum Allowed	Slot
Routing Engine	1	1	**RE0**
Network and Services Processing Card (NSPC)	1	1	CFM slots **1** and **3**
I/O card (IOC) (Optional)	0	1	CFM slot **2**
Network Processing I/O card (NP-IOC) (Optional)	0	1	CFM slot **2**
Services processing card (SPC) (Optional)	0	1	CFM slot **2**
System I/O card (SYSIOC)	1	1	Slot **0**
Power supply	1	2	Slots **P0** and **P1**

Table 5: SRX1400 Services Gateway Hardware Components *(continued)*

Hardware Component	Minimum Required	Maximum Allowed	Slot
Fans	1	2	Rear panel slot

NOTE: You can use a single-wide NPC and a single-wide SPC as an alternative to the NSPC.

Table 6 on page 10 provides minimal configuration details for the SRX1400 Services Gateway models in order to have an operational system.

Table 6: SRX1400 Services Gateway Minimal Configuration

Model Number	Minimal Configuration
SRX1400BASE-GE-AC	1-Gigabit Ethernet SYSIOC + 1 Routing Engine + 1 AC power supply + 1 NSPC
SRX1400BASE-GE-DC	1-Gigabit Ethernet SYSIOC + 1 Routing Engine + 1 DC power supply + 1 NSPC
SRX1400BASE-XGE-AC	10-Gigabit Ethernet SYSIOC + 1 Routing Engine + 1 AC power supply + 1 NSPC
SRX1400BASE-XGE-DC	10-Gigabit Ethernet SYSIOC + 1 Routing Engine + 1 DC power supply + 1 NSPC

NOTE: You can use a single-wide Network Processing Card (NPC) and a single-wide Services Processing Card (SPC) as an alternative to the NSPC.

Related Documentation

- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Physical Specifications on page 58
- SRX1400 Services Gateway Models on page 4
- Overview of the SRX1400 Services Gateway CFMs on page 10

Overview of the SRX1400 Services Gateway CFMs

The SRX1400 Services Gateway provides common form-factor module (CFM) slots that can be populated with the following cards:

- Double-wide Network and Services Processing Card (NSPC) occupying two adjacent CFM slots (**1** and **3**)

- Single-wide CFM slot **2** for an I/O card (IOC) or a services processing card (SPC)

The device also has one dedicated slot for the SYSIOC (marked **0**), one dedicated slot for the Routing Engine, two slots for power supplies, and one slot on the back panel for the fan tray and air filter.

NOTE: You can use a single-wide NPC and a single-wide SPC as an alternative to the NSPC.

Related Documentation

- SRX1400 Services Gateway Chassis Slots on page 26
- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Hardware Components on page 9
- Understanding the SRX1400 Services Gateway Data Flow on page 7

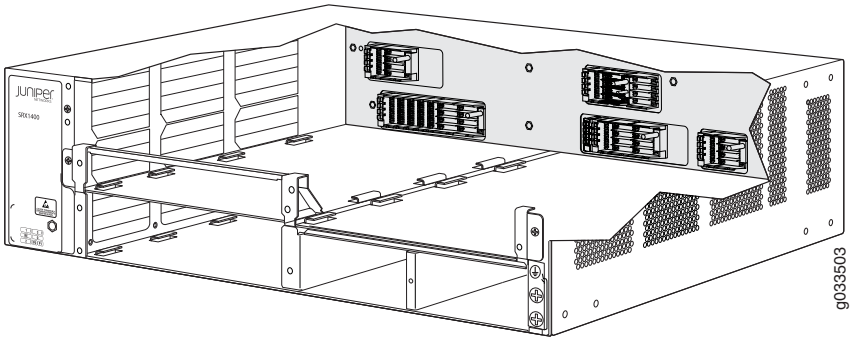
SRX1400 Services Gateway Backplane

The backplane in the SRX1400 Services Gateway is in the rear of the chassis and provides connections for all cards and power supplies through the front of the chassis.

See "SRX1400 Services Gateway Front Panel" on page 25 for details about where the individual modules can be installed.

Figure 2 on page 11 shows the SRX1400 Services Gateway Backplane.

Figure 2: SRX1400 Services Gateway Backplane



The backplane provides the following major functions:

- Data path—Data packets are transferred across the backplane between the I/O card (IOC) and Network and Services Processing Card (NSPC) through the System I/O card (SYSIOC).
- Power distribution—The device power supplies are connected to the backplane, which distributes power to all of the device components.
- Signal path—The backplane provides the signal path to the IOC, NSPC, Routing Engine, SYSIOC, and other device components for monitoring and control of the system.

Related Documentation

- SRX1400 Services Gateway Hardware Components on page 9
- SRX1400 Services Gateway Back Panel on page 26
- SRX1400 Services Gateway Front Panel on page 25
- Overview of the SRX1400 Services Gateway CFMs on page 10

SRX1400 Services Gateway SYSIOCs

The System I/O card (SYSIOC)s supported on the SRX1400 Services Gateway provide fixed I/O ports for the base system and are an important element of the data plane.

NOTE: A SYSIOC is included as a part of base chassis.

The SRX1400 Services Gateway supports the two types of SYSIOC listed in Table 7 on page 12.

Table 7: SRX1400 Services Gateway System I/O Card Models

System I/O Card Model Numbers	Cards Type
SRX1K-SYSIO-GE	1-Gigabit Ethernet SYSIOC
SRX1K-SYSIO-XGE	10-Gigabit Ethernet SYSIOC

Figure 3 on page 12 shows SRX1400 Services Gateway 1-Gigabit Ethernet SYSIOC and Figure 4 on page 13 shows SRX1400 Services Gateway 10-Gigabit Ethernet SYSIOC.

Figure 3: SRX1400 Services Gateway 1-Gigabit Ethernet SYSIOC

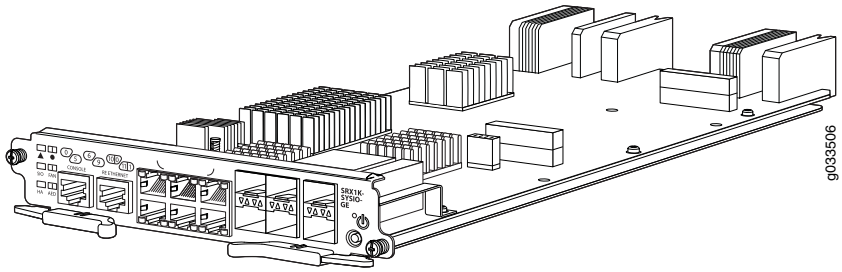
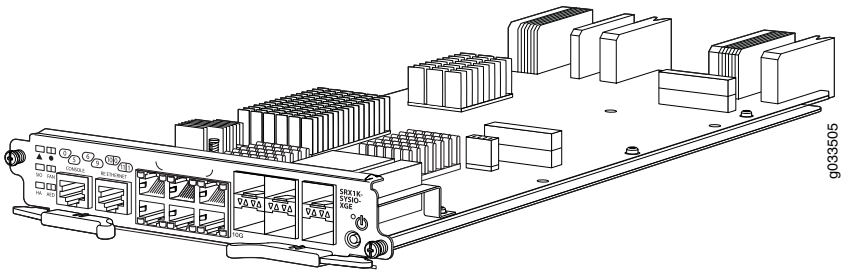


Figure 4: SRX1400 Services Gateway 10-Gigabit Ethernet SYSIOC



This topic provides the following information about SRX1400 Services Gateway System I/O Cards:

Features and Functions

The SYSIOC performs the following functions:

- Supports the Power button.
- Provides 2 optional chassis cluster control ports.
- Provides management and console ports, system LEDs, and Power buttons on the front panel.
- Provides data path connectivity between the NSPC and the IOC.
- Provides 6 x 10/100/1000 Mbps built-in copper ports along with 6 x 1 Gigabit Ethernet SFP ports (for 1-Gigabit Ethernet SYSIOC only) or provides 6 x 10/100/1000 Mbps built-in copper ports along with 3 X 1 Gigabit Ethernet SFP ports and 3 X 10 Gigabit Ethernet SFP+ ports (for 10-Gigabit Ethernet SYSIOC only).

POWER Button Functionality on the System I/O Card

Table 8 on page 13 describes the behavior of the Power button near the right end of the SYSIOC front panel.

Table 8: Power Button Behavior

Condition	Action	Result
Device powered off	Short push (3 to 5 seconds)	Powers the device on. The **PWR** LED blinks to show you that the Routing Engine is initializing.

Table 8: Power Button Behavior *(continued)*

Condition	Action	Result
Device powered on	Short push (3 to 5 seconds)	Initiates a graceful shutdown that preserves the device state information. The **PWR** LED blinks to show you that the device is shutting down.
	Long push (15 seconds or more)	Initiates a forced shutdown. The device state information will be lost. Avoid using immediate shutdown unless necessary.

NOTE: Use the graceful shutdown method to power off or reboot the services gateway. Use the forced shutdown method as a last resort to recover the services gateway if the services gateway operating system is not responding to the graceful shutdown method.

NOTE: After you use the forced shutdown method, you can power-on the device only by pressing the power button again.

LED Indicators on the System I/O Card

Figure 5 on page 14 shows the SRX1400 Services Gateway SYSIOC LEDs.

Figure 5: SRX1400 Services Gateway SYSIOC LEDs

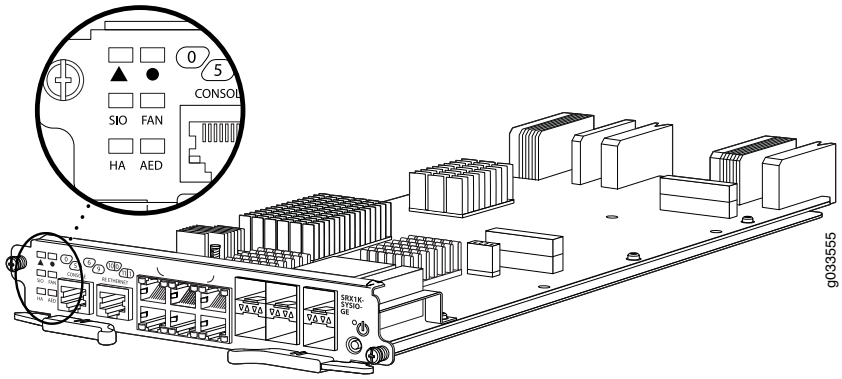


Table 9 on page 14 describes the system behavior indicated by the various LEDs on the front panel of the SYSIOC.

Table 9: System I/O Card LED Indicators

Label	Color	Status	Indicated Behavior
Alarm			

Table 9: System I/O Card LED Indicators *(continued)*

Label	Color	Status	Indicated Behavior
Critical	Red	On steadily	A critical alarm is present in the system. A hardware component or software module has failed, or the network management interface is down.
	Unlit	Off	No critical alarms are present in the system.
Non-Critical	Yellow	On steadily	A noncritical alarm is present in the system. Examples of noncritical alarms include: • Memory usage is high on the SPU; less than 10% available. • The maximum number of sessions has been reached. • The maximum number of tunnels has been reached. • Chassis cluster status has changed. • Device temperature is too warm.
	Unlit	Off	No alarms are present in the system.
System I/O Card			
SIO	Green	On steadily	The SYSIOC is operating normally.
	Green	Blinking	The SYSIOC is initializing.
	Amber	On steadily	The SYSIOC is operating normally, but the Ethernet interfaces are not operating normally.
	Red	On steadily	The SYSIOC has failed and is not operating normally.
Chassis Clustering			

Table 9: System I/O Card LED Indicators *(continued)*

Label	Color	Status	Indicated Behavior
HA	Green	On steadily	Chassis clustering is operating normally. All cluster members and all chassis cluster links are available.
	Amber	On steadily	An alarm is present on the chassis cluster link. All cluster members are present, but some chassis cluster links are down. There are still enough links for full functionality, but performance could be impaired (reduced bandwidth could cause packets to get dropped, or reduced resiliency as a single point of failure might now exist).
	Red	On steadily	A critical alarm is present in the chassis clustering. One or more cluster members are missing or unreachable; or active when a secondary-path is engaged.
	Unlit	Off	Chassis clustering is disabled—The device is not configured for clustering or chassis clustering is disabled by a secondary path.
Fan			
FAN	Green	On steadily	The cooling system is operating normally.
	Red	On steadily	The cooling system has failed (one or more fans in the fan tray are not operating normally).
Power			
PWR (top)	Green	Blinking	The device is in one of two states: • Receiving power and is in the process of booting up but has not yet initialized the Routing Engine • Shutting down gracefully
		On steadily	The device is receiving power. The Power Good signal for at least one power supply has been received after Routing Engine initialization.
	Amber	On steadily	One of the power supplies has failed, but the power available from the remaining power supplies is sufficient to power all the installed components.
	Red	On steadily	One or more of the power supplies have failed, and the power available from the remaining power supplies is not sufficient to power all the installed components.
	Unlit	Off	The device is shut down.

NOTE: All SYSIOC status LEDs remain unlit till Routing Engine initialization is complete. The PWR LED blinks green until Routing Engine initialization is complete, at which point the LED becomes solid green.

NOTE: The LED labeled AED is currently not supported in this release.

Table 10 on page 17 describes the Ethernet port LEDs.

Table 10: SRX1400 Services Gateway Ethernet Port LEDs

LED	Color	State	Description
Link	Green	On steadily	Link is active.
		Off	Link is inactive.
ACT	Green	Blinking	Port is receiving or sending data.
		Off	Port might be on but is not receiving or sending data.

Front Panel Ports and Connectors on the System I/O Card

Figure 6 on page 17 and Figure 7 on page 17 show the port numbering for the 1-Gigabit Ethernet SYSIOC and 10-Gigabit Ethernet SYSIOC, respectively.

Figure 6: Ports on the 1-Gigabit Ethernet SYSIOC

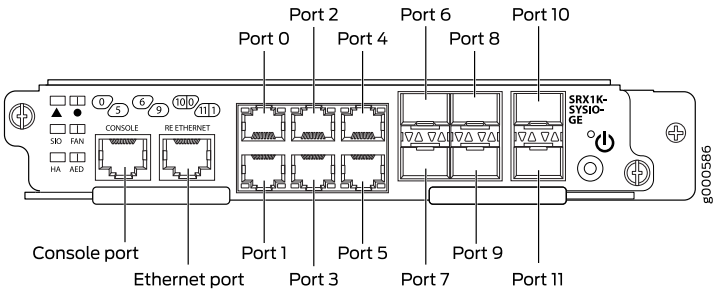


Figure 7: Ports on the 10-Gigabit Ethernet SYSIOC

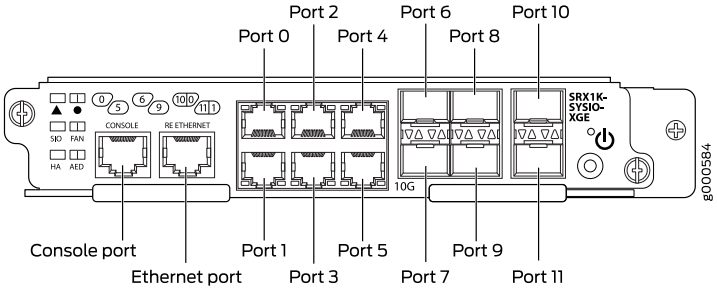


Table 11 on page 18 describes the ports/connections available on the front panel of the SYSIOC.

Table 11: System I/O Card Front Panel Ports and Connectors

Panel Label	Description
RE ETHERNET	RJ-45 port used as management port and supports speed of up to 10/100/1000 Mbps.
CONSOLE	RJ-45 console port used to connect to the Routing Engine.
Onboard copper Ethernet ports)	Six 10/100/1000 Ethernet over copper media ports. The ports use RJ-45 connectors and are numbered from 0-5, top to bottom, left to right.
Onboard SFP and SFP+ ports	Six Ethernet SFP ports (ports 6-11). • On the 1-Gigabit Ethernet SYSIOC, all six ports support SFP transceivers. • On the 10-Gigabit Ethernet SYSIOC, three ports numbered 7-9 can be configured to support SFP+ transceivers. The remaining three ports numbered 6, 10, and 11 support SFP transceivers. • **CHASSIS CLUSTER CONTROL 0** and **CHASSIS CLUSTER CONTROL 1** ports (numbered 10 and 11) can be used for Chassis Clustering (high availability ports). These two revenue SFP ports connects to the control functions on the Routing Engine (multiplexed with Chassis Cluster ports coming from Routing Engine).

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

Related Documentation

- Overview of the SRX1400 Services Gateway CFMs on page 10
- SRX1400 Services Gateway Hardware Components on page 9
- Troubleshooting the System I/O Card on the SRX1400 Services Gateway on page 162
- Replacing the SYSIOC on the SRX1400 Services Gateway on page 185

IOCs and NP-IOCs Supported on the SRX1400 Services Gateway

I/O cards (IOCs) are common form-factor module (CFM) cards that provide additional physical network connections to the services gateway. Their primary function is to deliver data packets arriving on the physical ports to the Network and Services Processing Card (NSPC) and to forward data packets out the physical ports after services processing.

Network Processing I/O cards are IOCs that have their own Network Processing Units (NPUs) so that traffic traversing the NP-IOC does not have to traverse the services gateway bus to a remote NPC. They are well suited to low-latency applications.

You can install one IOC or NP-IOC in the **CFM 2** of the SRX1400 Services Gateway. If no CFM card is installed in slot 2, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

For detailed information about the IOCs and NP-IOCs supported by the services gateway, see the *SRX1400, SRX3400, and SRX3600 Services Gateway Module Guide* at www.juniper.net/techpubs/.

NOTE: **IOCs are not provided with the SRX1400 Services Gateway. You must order them separately. Contact your Juniper Networks customer service representative for more information.**

Related Documentation

- Installing an IOC or NP-IOC in an SRX1400 Services Gateway on page 117

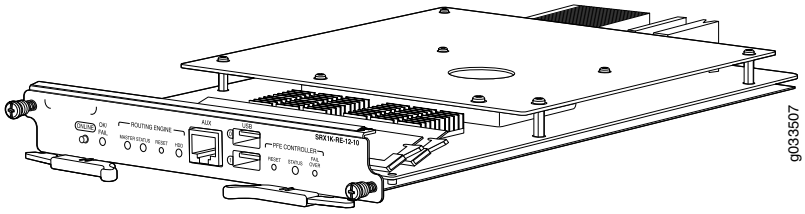
SRX1400 Services Gateway Routing Engine

The Routing Engine is a PowerPC platform that runs Junos operating system (Junos OS). Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the device, control the device interfaces, control some chassis components, and provide the interface for system management and user access to the device.

A pair of USB ports on the Routing Engine accept USB memory cards that allow you to load Junos OS and perform file transfers.

Figure 8 on page 19 shows the SRX1400 Services Gateway Routing Engine.

Figure 8: SRX1400 Services Gateway Routing Engine



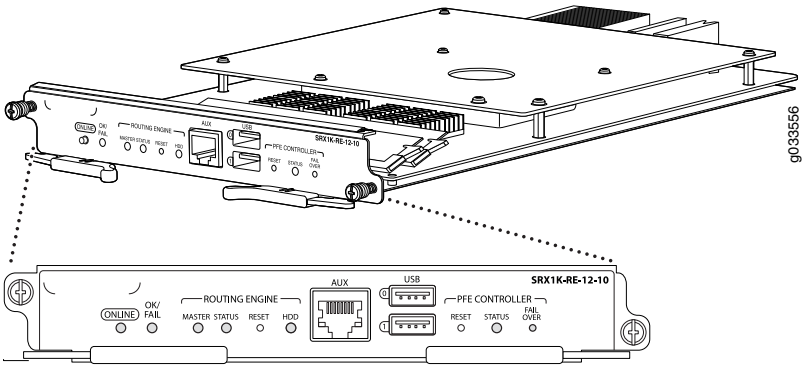
The Routing Engine also provides the following integrated services:

- Central Packet Forwarding Engine Processing (CPP)—This service manages all common form-factor modules (CFM) cards.
- System Control—This service provides system management functions such as monitoring of fan tray, and power systems.

NOTE: The SRX1400 Services Gateway must have a Routing Engine installed in slot RE. The SYSIOC port labeled RE ETHERNET connects directly to the RE Routing Engine slot.

Figure 9 on page 20 shows the SRX1400 Services Gateway Routing Engine.

Figure 9: SRX1400 Services Gateway Routing Engine



For detailed information about the Routing Engines supported by the services gateway, see the *SRX1400, SRX3400, and SRX3600 Services Gateway Module Guide* at www.juniper.net/techpubs/.

Related Documentation

- Overview of the SRX1400 Services Gateway CFMs on page 10
- SRX1400 Services Gateway Hardware Components on page 9
- Maintaining the Routing Engine on the SRX1400 Services Gateway on page 152
- Replacing a Routing Engine on the SRX1400 Services Gateway on page 177

SRX1400 Services Gateway NSPC

The Network and Services Processing Card (NSPC) is a double-wide common form-factor module (CFM) card that provides the processing power to run integrated services such as firewall, IP Security (IPsec), and intrusion detection and prevention (IDP). The NSPC contains a Services Processing Unit (SPU) and a Network Processing Unit (NPU). All traffic traversing the services gateway is passed to the NSPC to have services processing applied to it. Traffic is intelligently distributed for services processing, including session setup based on policies, fast packet processing for packets that match a session, encryption and decryption, and Internet Key Exchange (IKE) negotiation.

NOTE:

- If the NSPC is not present, you must install a filler cover to shield the empty slots 1 and 3 and to keep contaminants out of the chassis and allow cooling air to circulate properly through the device. The services gateway is delivered with a filler cover already installed over these slots.
- The services gateway requires at least one SPU and one NPU in the slots labeled 1 and 3 in order to operate. You can install an NSPC, which contains an NPU and an SPU, or you can install a combination of SRX3000 Series Services Gateway NPC and SPC, on the SRX1400 Services Gateway. You must use a double-wide tray with the combination of NPC and SPC.
- The **ONLINE** button on the NSPC does not perform any function and is currently not supported.
- You can use a single-wide Network Processing Card (NPC) and a single-wide Services Processing Card (SPC) as an alternative to the NSPC.

Figure 10 on page 21 shows the SRX1400 Services Gateway NSPC.

Figure 10: SRX1400 Services Gateway Network and Services Processing Card

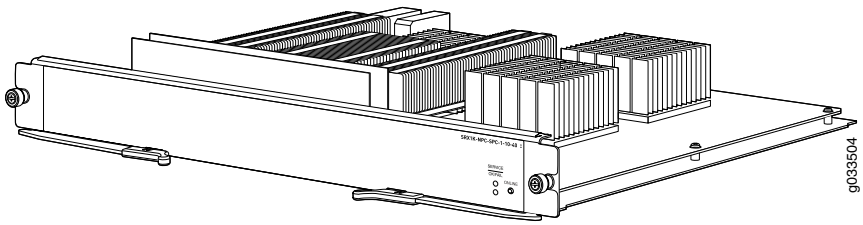


Table 12 on page 21 describes the NSPC behavior indicated by the LEDs on its front panel.

Table 12: SRX1400 Services Gateway Network and Services Processing Card LED Indicators

Label	Color	Status	Description
SERVICE	Green	On steadily	The NSPC is running under acceptable load.
	Amber	On steadily	The NSPC is overloaded.
	Red	On steadily	No service is being provided by the NSPC.
	Unlit	Off	The NSPC is not enabled.

Table 12: SRX1400 Services Gateway Network and Services Processing Card LED Indicators *(continued)*

Label	Color	Status	Description
OK/FAIL	Green	On steadily	The NSPC is operating normally.
	Green	Blinking	The NSPC is preparing for a hot-swappable event.
	Red	On steadily	The NSPC has failed and is not operating normally.
	Unlit	Off	The NSPC is powered down.

Related Documentation

- Overview of the SRX1400 Services Gateway CFMs on page 10
- SRX1400 Services Gateway Hardware Components on page 9
- Troubleshooting the Network and Services Processing Card on the SRX1400 Services Gateway on page 163
- Replacing a Network and Services Processing Card on the SRX1400 Services Gateway on page 183

SPCs for the SRX1400 Services Gateway

Services Processing Cards (SPCs) are common form-factor module (CFM) cards that provide processing power to run integrated services such as firewall, IPsec, and IDP. All traffic traversing the services gateway is passed to an SPC to have services processing applied to it. Traffic is intelligently distributed by Network Processing Cards (NPCs) to SPCs for services processing, including session setup based on policies, fast packet processing for packets that match a session, encryption and decryption, and IKE negotiation.

There are two places where you can install an SPC in your SRX1400 Services Gateway:

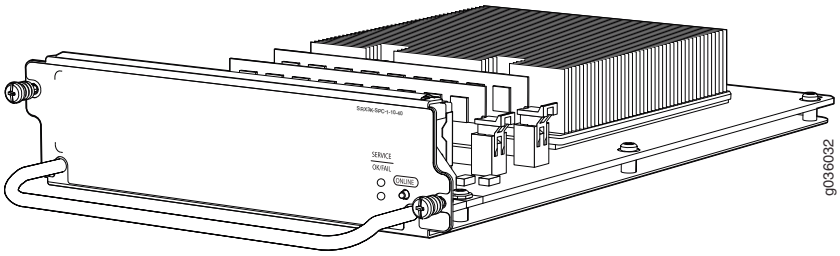
- You can install an SPC in the front-panel slot labeled **1** if you also install an NPC in the slot labeled **3**. This combination of SPC and NPC replaces the full-width Network and Services Processing (NSPC) card that is normally installed in the SRX1400 Services Gateway to perform both services processing and network processing functions.
- If your SRX1400 Services Gateway is running Junos OS Release 12.1X44-D10 or later, you can install an SPC in the slot labeled **2**. Doing so increases the services processing performance of the services gateway and increases its session capacity.

NOTE:

- If a CFM 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 11 on page 23 shows an SPC that can be used on an SRX1400 Services Gateway.

Figure 11: Services Processing Card



For detailed information about the SPCs supported by the services gateway, see the *SRX1400, SRX3400, and SRX3600 Services Gateway Module Guide* at www.juniper.net/techpubs/.

Related Documentation

- Installing an SPC in an SRX1400 Services Gateway on page 113
- Troubleshooting Services Processing Cards on the SRX1400 Services Gateway on page 165
- Replacing an SPC on the SRX1400 Services Gateway on page 188

NPCs for the SRX1400 Services Gateway

NOTE: The SRX1400 Services Gateway is not normally equipped with a Network Processing Card (NPC). In most configurations, network processing functions are performed by the Network and Services Processing Card (NSPC). However, you can install an NPC in the front-panel slot labeled 3 if you also install a Services Processing Card (SPC) in the slot labeled 1. This combination of SPC and NPC replaces the full-width NSPC that is normally installed in the SRX1400 Services Gateway to perform both services processing and network processing functions.

NPCs are common form-factor module (CFM) cards that receive inbound traffic from the I/O cards (IOCs) and direct it to the appropriate SPC for services processing. Once services processing is complete, the NPC receives outbound traffic from the SPC(s) and directs it back to the appropriate IOC or SYSIOC. Additionally, the NPC performs the following functions:

- Buffers incoming traffic and queues outgoing traffic.

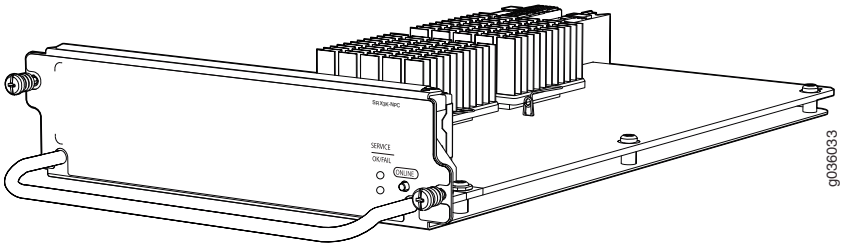
- Performs advanced traffic management, including denial of service/distributed denial of service (DoS/DDoS) protective measures. For example, it can drop traffic to or from a particular IP address, protecting the device from Internet Control Message Protocol (ICMP), UDP, and TCP SYN flooding, and buffering bursty traffic to protect the SPC.

NOTE:

- If a CFM 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.
- The **ONLINE** button on the NPC does not perform any function and is currently not supported.

Figure 12 on page 24 shows the NPC that can be used on SRX1400 Services Gateway.

Figure 12: Network Processing Card



For detailed information about the NPCs supported by the services gateway, see the *SRX1400, SRX3400, and SRX3600 Services Gateway Module Guide* at www.juniper.net/techpubs/.

Related Documentation

- Installing an NPC in an SRX1400 Services Gateway on page 115
- Replacing a Network Processing Card on the SRX1400 Services Gateway on page 187
- Troubleshooting an NPC on the SRX1400 Services Gateway on page 164

CHAPTER 3

Chassis Description

SRX1400 Services Gateway Front Panel

Figure 13 on page 25 shows the front panel of the SRX1400 Services Gateway.

Figure 13: SRX1400 Services Gateway Front Panel

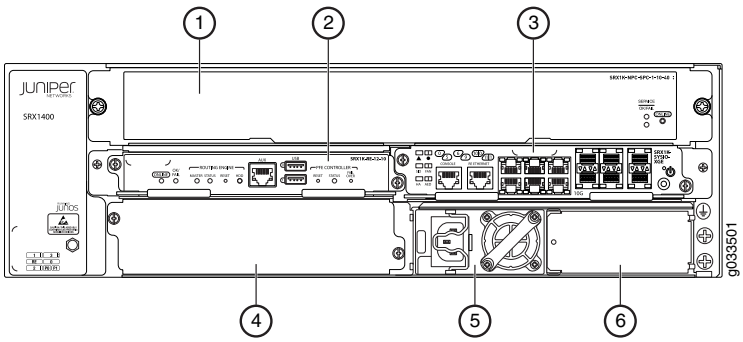


Table 13 on page 25 lists the components on the front panel of the services gateway.

Table 13: SRX1400 Services Gateway Components on the Front Panel

Number	Component
1	NSPC in CFM slots **1** and **3** NOTE: You can use a single-wide NPC and a single-wide SPC as an alternative to the NSPC.
2	Routing Engine in slot **RE**
3	SYSIOC in slot **0**
4	CFM Slot **2** for an IOC, NP-IOC, or SPC
5	Power supply in slot **P0**

Table 13: SRX1400 Services Gateway Components on the Front Panel *(continued)*

Number	Component
6	Slot **P1** for a redundant power supply

Related Documentation

- SRX1400 Services Gateway Hardware Components on page 9
- SRX1400 Services Gateway Back Panel on page 26
- SRX1400 Services Gateway Backplane on page 11
- Overview of the SRX1400 Services Gateway CFMs on page 10

SRX1400 Services Gateway Back Panel

Figure 14 on page 26 shows the back panel of the SRX1400 Services Gateway.

Figure 14: SRX1400 Services Gateway Back Panel

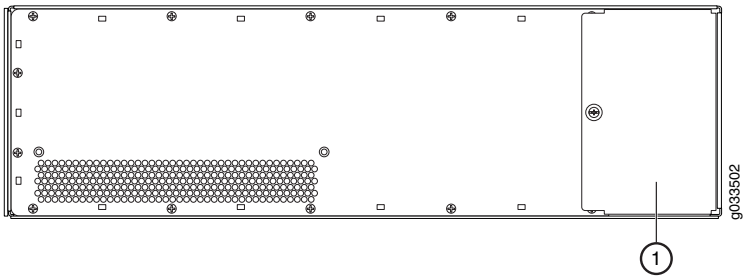


Table 14 on page 26 lists the components on the back panel of the SRX1400 Services Gateway.

Table 14: SRX1400 Services Gateway Components on the Back Panel

Number	Component
1	Fan tray assembly

Related Documentation

- SRX1400 Services Gateway Hardware Components on page 9
- SRX1400 Services Gateway Front Panel on page 25
- SRX1400 Services Gateway Backplane on page 11
- Overview of the SRX1400 Services Gateway CFMs on page 10

SRX1400 Services Gateway Chassis Slots

The SRX1400 Services Gateway chassis has seven front panel slots for various modules.

Figure 15 on page 27 shows the slot label guide printed in the lower left corner of the front panel. This guide shows the names for all of the front panel slots.

Figure 15: SRX1400 Services Gateway Front Panel Slot Label Guide

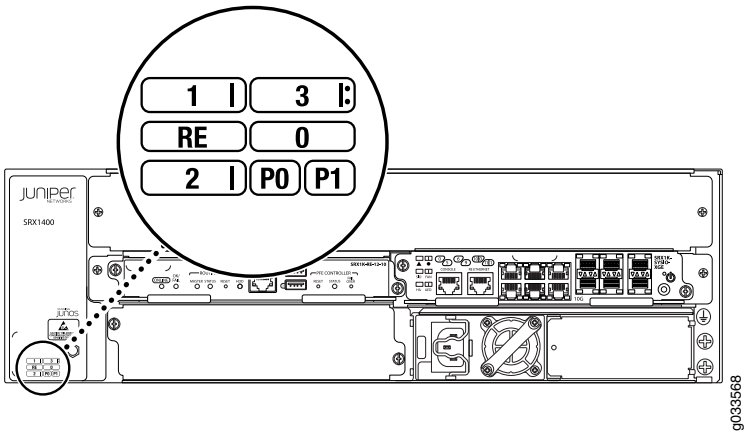


Table 15 on page 27 describes the different slots and their functions.

Table 15: SRX1400 Services Gateway Chassis Slots

Slot	Description
CFM slots **1** and **3**	The CFM slots **1** and **3** are normally combined to accommodate the double-wide NSPC. However, you can also use these slots separately, and install an NPC in CFM slot **1** and an SPC in CFM slot **3**.
CFM slot **2**	CFM slot **2** can be left empty, or can be used to install an IOC or NP-IOC for additional interface ports, or an SPC to add services processing capacity.
RE	Slot **RE** is the dedicated slot for the Routing Engine of the services gateway.
0	Slot **0** is the dedicated slot for the SYSIOC of the services gateway. This module provides fixed I/O ports for the base system and is an important element of the data plane.
P0	Slot **P0** is the slot for the primary power supply of the services gateway. You must install either an AC power supply or a DC power supply in the slot.
P1	Slot **P1** is the slot for a redundant power supply that provides power to the services gateway if the primary power supply fails. You can leave this slot empty, or you can use it to install either an AC power supply or a DC power supply. The power supply must be of the same type (AC or DC) as the power supply installed in slot P0.

Related Documentation

- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Hardware Components on page 9
- Understanding the SRX1400 Services Gateway Data Flow on page 7

CHAPTER 4

Line Card and Module Description

SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview

The modules described in this guide let you upgrade and customize your SRX1400, SRX3400, or SRX3600 Services Gateway to suit the needs of your network. The following types of modules are available for the SRX1400, SRX3400, and SRX3600 Services Gateways:

- I/O cards (IOCs) are common form-factor module (CFM) cards that provide additional physical network connections to the services gateway to supplement the Ethernet ports on the Switch Fabric Board (SFB). Their primary function is to deliver data packets arriving on the physical ports to the Network Processing Card (NPC) and to forward data packets out the physical ports after services processing.
- Network Processing I/O Cards (NP-IOCs) are IOCs that have their own network processing units (NPUs), so that traffic traversing the IOC does not have to traverse the services gateway bus to a remote NPC. This feature makes them well-suited to low-latency applications.
- Services Processing Cards (SPCs) are CFM cards that provide the processing power to run integrated services such as firewall, IPsec, and IDP. All traffic traversing the services gateway is passed to an SPC to have service processing applied to it. Traffic is intelligently distributed by NPCs to SPCs for service processing, including session

setup based on policies, fast packet processing for packets that match a session, encryption and decryption, and IKE negotiation.

- NPCs are CFM cards that receive inbound traffic from the IOCs and direct it to the appropriate SPC for processing. Once services processing is complete, the NPC receives outbound traffic from the SPC(s) and directs it back to the appropriate IOC. Additionally, the NPC buffers incoming traffic and queues outgoing traffic, and also performs advanced traffic management, including DoS/DDoS protective measures. For example, it can drop traffic to or from a particular IP address, protecting from ICMP, UDP, and TCP SYN flooding, and buffering bursty traffic to protect the SPC.
- The Routing Engine is a PowerPC platform that runs the Junos operating system (Junos OS). Unlike other modules, the Routing Engine is not in the CFM form factor, and so has an assigned slot within the chassis (RE0). Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the services gateway, control the services gateway interfaces, control some chassis components, and provide the interface for system management and user access to the services gateway.
- The SRX Clustering Module (SCM) is a card that you can install in the services gateway to enable the dual control link feature for chassis cluster supported in Junos OS Release 10.2 and later. Unlike other modules, the SCM is not in the CFM form factor, and so has an assigned slot within the chassis (RE1).

Related Documentation

- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways

Table 16 on page 30 describes the modules supported on the SRX1400, SRX3400, and SRX3600 Services Gateways.

Table 16: Supported Modules for SRX1400, SRX3400, and SRX3600 Services Gateways

Module Name and Number	Earliest Supported Junos OS Release		
	SRX1400	SRX3400	SRX3600
Services Processing Cards (SPCs)			
"Services Processing Card SRX3K-SPC-1-10-40" on page 33	10.4	9.3	9.3
Network Processing Cards (NPCs)			
"Network Processing Card SRX3K-NPC" on page 34	10.4	9.3	9.3
I/O Cards (IOCs)			

Table 16: Supported Modules for SRX1400, SRX3400, and SRX3600 Services Gateways *(continued)*

Module Name and Number	Earliest Supported Junos OS Release		
	SRX1400	SRX3400	SRX3600
"I/O Card SRX3K-16GE-TX" on page 36	10.4	9.3	9.3
"I/O Card SRX3K-16GE-SFP" on page 38	10.4	9.3	9.3
"I/O Card SRX3K-2XGE-XFP" on page 40	10.4	9.3	9.3
Network Processing I/O Cards (NP-IOCs)			
"Network Processing I/O Card SRX1K3K-NP-2XGE-SFPP" on page 41	12.1X44-D10	12.1X44-D10	12.1X44-D10
Other Modules			
"Routing Engines SRX3K-RE-12-10 and SRX1K-RE-12-10" on page 43	10.2 (SRX1K-RE-12-10)	9.3 (SRX3K-RE-12-10)	9.3 (SRX3K-RE-12-10)
SRX Clustering Module SRX3K-CRM	Not Applicable	10.2	10.2

Related Documentation

- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules

Table 17 on page 31 summarizes the slots in which you can install each module type for SRX1400, SRX3400, and SRX3600 Services Gateways.

Table 17: Supported Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules

Module Name and Number	Supported Slots		
	SRX1400	SRX3400	SRX3600
"Services Processing Card SRX3K-SPC-1-10-40" on page 33	Front slot labeled **1** (When installed as primary SPC in conjunction with an SRX3K-NPC in slot 3) Front slot labeled **2** (When installed as second SPC)	Front slots labeled **1-4** and rear slots labeled **5-7**. We recommend that you install SPCs in rear panel slots to leave room for IOCs in the front panel slots. See note below for additional restrictions.	Front slots labeled **1-6** and rear slots labeled **7-12**. We recommend that you install SPCs in rear panel slots to leave room for IOCs in the front panel slots. See note below for additional restrictions.

Table 17: Supported Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules *(continued)*

Module Name and Number	Supported Slots		
	SRX1400	SRX3400	SRX3600
"Network Processing Card SRX3K-NPC" on page 34	Slot **3** (When installed as the primary NPC in conjunction with an SRX3K-SPC in slot **1**)	Rear slots labeled **5-7**.	Rear slots labeled **10-12**
"I/O Card SRX3K-16GE-TX" on page 36	Slot **2**	Front slots labeled **1-4**, except as noted below.	Front slots labeled **1-6**, except as noted below.
"I/O Card SRX3K-16GE-SFP" on page 38			
"I/O Card SRX3K-2XGE-XFP" on page 40			
"Network Processing I/O Card SRX1K3K-NP-2XGE-SFPP" on page 41	Slot **2**	Front slots labeled **1-4** and rear slots labeled **5-7**. We recommend that you install IOCs in front panel slots to simplify cable management.	Front slots labeled **1-6** and rear slots labeled **7-12**. We recommend that you install IOCs in front panel slots to simplify cable management.
"Routing Engines SRX3K-RE-12-10 and SRX1K-RE-12-10" on page 43	Front slot labeled **RE** (SRX1K-RE-12-10 only)	Rear slot labeled **RE0**. (SRX3K-RE-12-10 only)	
SRX Clustering Module SRX3K-CRM	Not Applicable	Rear slot labeled **RE1**.	

NOTE:

- For the SRX3400 and SRX3600 Services Gateways to meet NEBS and ETSI standards, they must not have any two SPCs installed side by side in the CFM slots in the front of the chassis (CFM slots 1 through 4 in the SRX3400, CFM Slots 1 through 6 in the SRX3600). You can install SPCs side by side in the CFM slots in the rear of the chassis (CFM slots 5 through 7 in the SRX3400, CFM slots 7 through 12 in the SRX3600).
- When an SRX3400 or SRX3600 Services Gateway is in the Express Path (formerly known as Services Offload) mode supported in Junos OS release 12.1X44-D10 and later, IOCs are only supported in front panel slots 1 through 3. See the Junos OS documentation for more information about Express Path mode.

Related Documentation

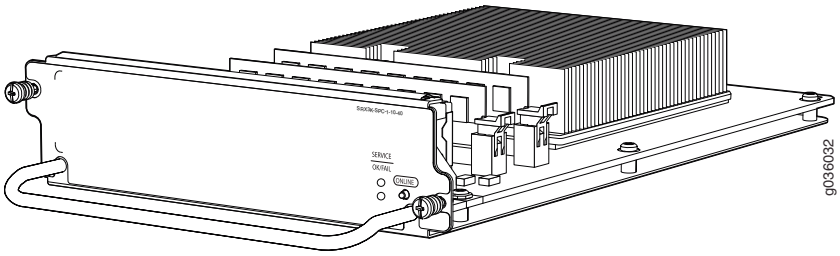
- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29

- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

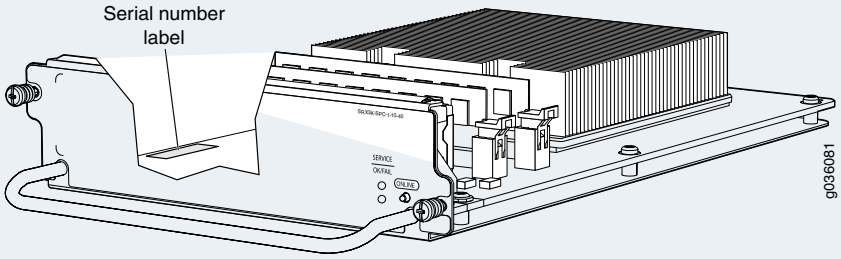
Services Processing Card SRX3K-SPC-1-10-40

The SRX3K-SPC-1-10-40 Services Processing Card (SPC) (Figure 16 on page 33) contains one Services Processing Unit, which provide the processing power to run integrated services such as firewall, IPsec, and IDP. 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.

Figure 16: SRX3K-SPC-1-10-40 SPC



Description	• SPC for SRX3400, SRX3600, and SRX1400 Services Gateways with one SPU • Power requirement: 118 W max • Weight: 3.7 lb (1.7 kg)
Software release	• SRX3400 and SRX3600: Junos OS Release 9.3 and later • SRX1400: Junos OS Release 10.2 and later
Cables and connectors	None
Controls	**ONLINE** Button–The **ONLINE** button on the SPC front panel does not perform any function.
Supported Slots	• SRX1400: Slot **2**. Also supported in slot **1** when installed in conjunction with a Network Processing Card (NPC) in slot **3**. • SRX3400: Front slots labeled **1** through **4** and rear slots labeled **5** through **7**. NOTE: For the SRX3400 Services Gateway to meet NEBS and ETSI standards, it must not have any two SPCs installed side by side in the CFM slots in the front of the chassis (CFM slots **1** through **4**). You can install SPCs side by side in the CFM slots in the rear of the chassis (CFM slots **5** through **7**). • SRX3600: Front slots labeled **1** through **6** and rear slots labeled **7** through **12**. We recommend that you install SPCs in rear panel slots to leave room for IOCs in the front panel slots. NOTE: For the SRX3600 Services Gateway to meet NEBS and ETSI standards, it must not have any two SPCs installed side by side in the CFM slots in the front of the chassis (CFM slots **1** through **6**). You can install SPCs side by side in the CFM slots in the rear of the chassis (CFM slots **7** through **12**).

Swapping	SPCs are cold-swap-only modules. You must power-off the services gateway before removing, replacing, or adding SPCs.
LEDs	**SERVICE** LED, one tricolor • Green–The SPC is running under acceptable load. • Amber–The SPC is overloaded. • Red–No service is being provided by the SPC. • Off–The SPC is not enabled. **OK/FAIL** LED, one bicolor: • Steady Green–The SPC is operating normally. • Blinking Green–The SPC is preparing for hot-swap event. • Red–The SPC has failed and is not operating normally. • Off–The SPC is powered down.
Serial Number Location	The SPC serial number label is located as shown in Figure 17 on page 34). **Figure 17: SPC Serial Number Label** 

Related Documentation

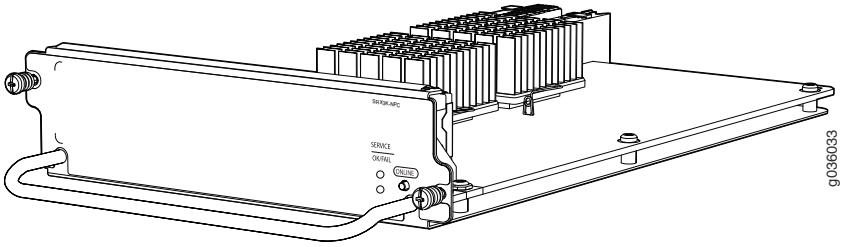
- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

Network Processing Card SRX3K-NPC

Network Processing Cards (NPCs) are CFMs that receive inbound traffic from the IOCs and direct it to the appropriate SPC for services processing. Once services processing is complete, the NPC receives outbound traffic from the SPC(s) and directs it back to the appropriate IOC. Additionally, the NPC performs the following functions:

- Buffers incoming traffic and queues outgoing traffic.
- Performs advanced traffic management, including DoS/DDoS protective measures. For example, it can drop traffic to or from a particular IP address, protecting from ICMP, UDP, and TCP SYN flooding, and buffering bursty traffic to protect the SPC.

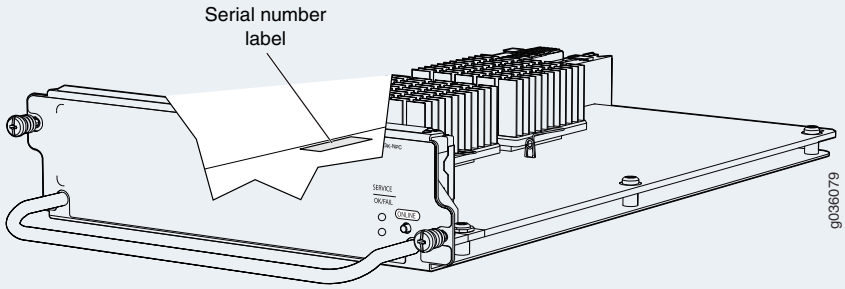
Figure 18: Network Processing Card SRX3K-NPC



Description	• NPC for SRX3400, SRX3600, and SRX1400 • Power requirement: 64 W maximum • Weight: 2.2 lb (1.0 kg)
Software release	• Junos OS Release 9.3 and later
Cables and connectors	None
Controls	**ONLINE** Button–The **ONLINE** button on the NPC front panel does not perform any function.
Supported Slots	• SRX1400: Front slot labeled **3** when installed in conjunction with an SPC installed in slot **1**. • SRX3400: Rear slots labeled **5** through **7**. • SRX3600: Rear slots labeled **10** through **12**.
Swapping	NPCs are cold-swap-only modules. You must power-off the services gateway before removing, replacing, or adding NPCs.
LEDs	**SERVICE** LED, one bicolor • Green–The NPC is mapped to an IOC and is actively carrying traffic. • Amber–The NPC is mapped to a IOC, but there is no SPC present or reachable in the system so all traffic is dropped. • Off–The NPC is not carrying traffic. **OK/FAIL** LED, one bicolor • Steady Green–The NPC is operating normally. • Blinking Green–The NPC is preparing for hot-swap event. • Red–The NPC has failed and is not operating normally. • Off–The NPC is powered down.

Serial Number Location	The serial number label for the NPC is located as shown in Figure 19 on page 36).

Figure 19: NPC Serial Number Label



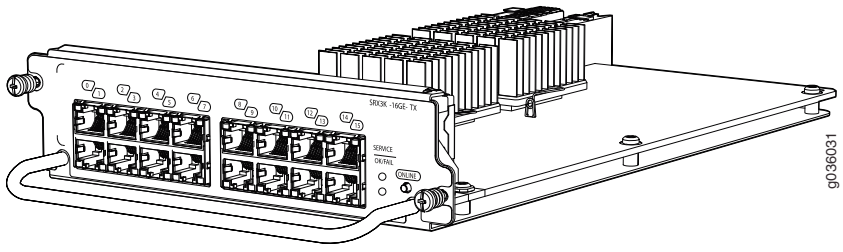
Related Documentation

- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

I/O Card SRX3K-16GE-TX

The SRX3K-16GE-TX (Figure 20 on page 36) IOC adds 16 ports for standard Ethernet, Fast Ethernet, or Gigabit Ethernet traffic from copper media. It is inserted horizontally into the services gateway to communicate with the Switch Fabric Board (SFB) and to receive power. The ports utilize RJ-45 connectors. LEDs on the faceplate of the IOC indicate port status and connectivity.

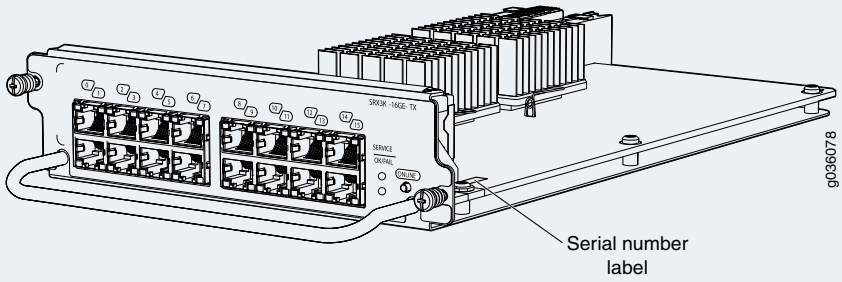
Figure 20: 16-Port Copper 10/100/1000 IOC



Description	• 16-port Ethernet TX IOC with 16 Gigabit Ethernet RJ45 ports • Power requirement: 52 W maximum • Weight: 2.4 lb (1.1 kg) • Maximum configurable MTU: 9192 bytes
Software release	• SRX3400 and SRX3600: Junos OS Release 9.3 and later • SRX1400: Junos OS Release 10.2 and later

Cables and connectors	Sixteen RJ-45 connectors for 10/100/1000 Mbps Ethernet
Controls	**ONLINE** Button–The **ONLINE** button on the IOC front panel does not perform any function.
Supported Slots	• SRX1400: Front slot labeled **2** • SRX3400: Front slots labeled **1** through **4** (except as noted below) • SRX3600: Front slots labeled **1** through **6** (except as noted below) NOTE: When an SRX3400 or SRX3600 Services Gateway is in the Express Path (formerly known as Services Offload) mode supported in Junos OS release 12.1X44-D10 and later, IOCs are only supported in front panel slots **1** through **3**. See the Junos OS documentation for more information about Express Path mode.
Swapping	IOCs are cold-swap-only modules. You must power-off the services gateway before removing, replacing, or adding IOCs.

LEDs	**SERVICE** LED, one bicolor
	
	• Off–The IOC is administratively disabled, butmapped to the NPC.
	• Green–The IOC is mapped to the NPC and is available to carry Ethernet traffic.
	• Amber–The IOC is not mapped to the NPC and is not available to carry Ethernet traffic.
	
	OK/FAIL LED, one bicolor
	
	• Off–One or more of the following conditions apply:
	  ◦ The services gateway is not powered on.
	  ◦ The services gateway is still in the process of either booting or shutting down.
	  ◦ The services gateway is not configured for chassis clustering.
	• Steady Green–The services gateway is configured for chassis clustering, and the SCM is operating normally.
	• Blinking Green–The SCM is initializing (preparing to come online) or is preparing to go offline.
	• Red–The SCM has failed and is not operating normally.

Serial Number Location	The serial number label for all IOC types is located as shown in Figure 21 on page 37). **Figure 21: IOC Serial Number Label (SRX3K-16GE-TX Shown, Other IOCs Similar)** 

Related Documentation

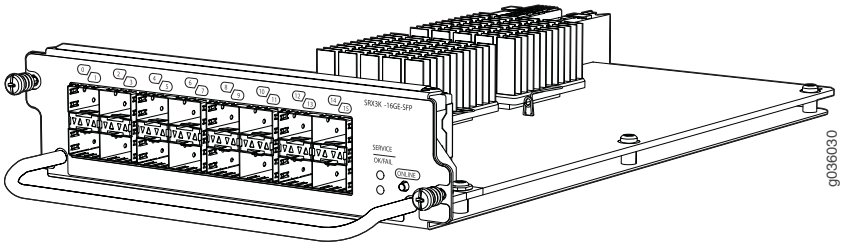
- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30

- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

I/O Card SRX3K-16GE-SFP

The SRX3K-16GE-SFP IOC (Figure 22 on page 38) adds 16 ports for Gigabit Ethernet traffic from either copper or fiber interface media. It is inserted horizontally into the midplane of the services gateway to communicate with the SFB and to receive power. To use fiber interface media, install small form-factor pluggable (SFP) transceivers on the desired ports. LEDs on the faceplate of the IOC indicate port status and connectivity. Ports are numbered from top to bottom and left to right, 0-15.

Figure 22: 16-Port SFP Gigabit Ethernet IOC

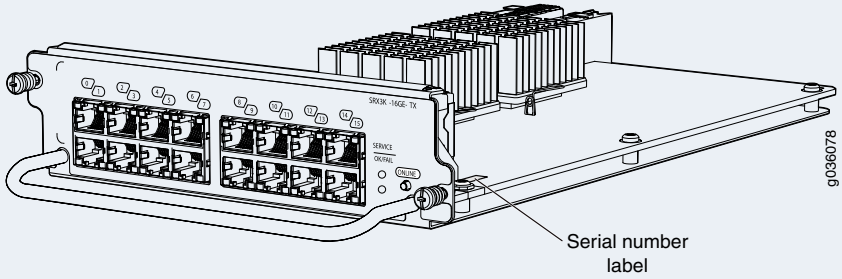


For detailed information about supported transceivers, see the *SRX Series Services Gateway Transceiver Guide* at www.juniper.net/techpubs/.

Description	• 16-port Ethernet SFP IOC for SRX3400, SRX3600, and SRX1400 • Power requirement: 52 W maximum • Weight: 2.4 lb (1.1 kg)
Software release	• Junos OS Release 9.3 and later
Cables and connectors	Sixteen SFP sockets for Ethernet transceivers Supported SFP transceivers: 1000BASE-LH (model numbers SRX-SFP-1GE-LH, SRX-SFP-1GE-LH-ET) 1000BASE-LX (model numbers SRX-SFP-1GE-LX, SRX-SFP-1GE-LX-ET) 1000BASE-SX (model numbers SRX-SFP-1GE-SX, SRX-SFP-1GE-SX-ET) 1000BASE-T (model numbers SRX-SFP-1GE-T, SRX-SFP-1GE-T-ET)
Controls	**ONLINE** Button–The **ONLINE** button on the IOC front panel does not perform any function.

Supported Slots	• SRX1400: Front slot labeled **2** • SRX3400: Front slots labeled **1** through **4** (except as noted below) • SRX3600: Front slots labeled **1** through **6** (except as noted below) NOTE: When an SRX3400 or SRX3600 Services Gateway is in the Express Path (formerly known as Services Offload) mode supported in Junos OS release 12.1X44-D10 and later, IOCs are only supported in front panel slots **1** through **3**. See the Junos OS documentation for more information about Express Path mode.
Swapping	IOCs are cold-swap-only modules. You must power-off the services gateway before removing, replacing, or adding IOCs.

LEDs	**SERVICE** LED, one bicolor
	
	• Off–The IOC is administratively disabled, but mapped to the NPC.
	• Green–The IOC is mapped to the NPC and is available to carry Ethernet traffic.
	• Amber–The IOC is not mapped to the NPC and is not available to carry Ethernet traffic.
	
	OK/FAIL LED, one bicolor
	
	• Steady Green–The IOC is operating normally.
	• Off–One or more of the following conditions apply:
	  ◦ The services gateway is not powered on.
	  ◦ The services gateway is still in the process of either booting or shutting down.
	  ◦ The services gateway is not configured for chassis clustering.
	• Blinking Green–The IOC is preparing for hot-plug event:
	  ◦ Card is being inserted: power up, booting, initialization.
	  ◦ Card is being removed: shut down by chassis management software.
	• Red–The IOC has failed and is not operating normally.

Serial Number Location	The serial number label for all IOC types is located as shown in Figure 23 on page 39). **Figure 23: IOC Serial Number Label (SRX3K-16GE-TX Shown, Other IOCs Similar)** 

Related Documentation

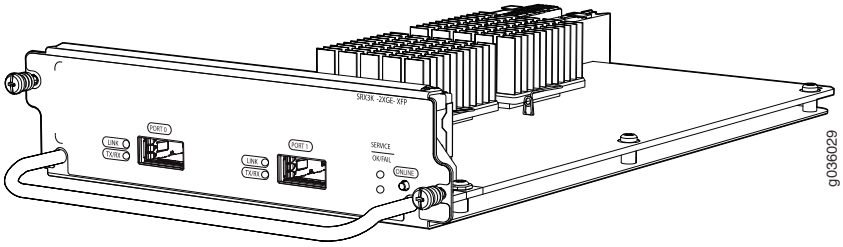
- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31

- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

I/O Card SRX3K-2XGE-XFP

The SRX3K-2XGE-XFP (Figure 24 on page 40) IOC adds two ports for 10-Gigabit Ethernet traffic from fiber interface media. It is inserted horizontally into the midplane of the services gateway to communicate with the Switch Fabric Board (SFB) and to receive power. To use fiber interface media, install 10-Gigabit small form-factor pluggable (XFP) transceivers on the desired ports. LEDs on the faceplate of the IOC indicate port status and connectivity (see Table 15 on page 27). Ports are numbered from left to right, 0-1.

Figure 24: 2-Port XFP 10-Gigabit Ethernet IOC

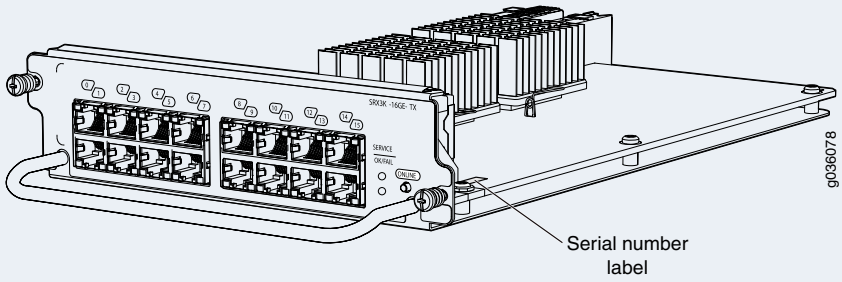


For detailed information about supported transceivers, see the *SRX Series Services Gateway Transceiver Guide* at www.juniper.net/techpubs/.

Description	• 2-port Ethernet XFP IOC for SRX3400, SRX3600, and SRX1400 • Power requirement: 52 W maximum • Weight: 2.4 lb (1.1 kg) • Maximum configurable MTU: 9192 bytes
Software release	• Junos OS Release 9.3 and later
Cables and connectors	Two XFP sockets for Ethernet transceivers Supported XFP transceivers: 10GBASE-ER (model numbers SRX-XFP-10GE-ER and SRX-XFP-10GE-ER-ET) 10GBASE-LR (model numbers SRX-XFP-10GE-LR and SRX-XFP-10GE-LR-ET 10GBASE-SR (model numbers SRX-XFP-10GE-SR and SRX-XFP-10GE-SR-ET)
Controls	**ONLINE** Button–The **ONLINE** button on the IOC front panel does not perform any function.
Supported Slots	• SRX1400: Front slot labeled **2** • SRX3400: Front slots labeled **1** through **4** (except as noted below) • SRX3600: Front slots labeled **1** through **6** (except as noted below) NOTE: When an SRX3400 or SRX3600 Services Gateway is in the Express Path (formerly known as Services Offload) mode supported in Junos OS release 12.1X44-D10 and later, IOCs are only supported in front panel slots **1** through **3**. See the Junos OS documentation for more information about Express Path mode.

Swapping	IOCs are cold-swap-only modules. You must power-off the services gateway before removing, replacing, or adding IOCs.

LEDs	**SERVICE** LED, one bicolor
	• Off–The IOC is administratively disabled, butmapped to the NPC.
	• Green–The IOC is mapped to the NPC and is available to carry Ethernet traffic.
	• Amber–The IOC is not mapped to the NPC and is not available to carry Ethernet traffic.
	OK/FAIL LED, one bicolor
	• Off–One or more of the following conditions apply:
	  ◦ The services gateway is not powered on.
	  ◦ The services gateway is still in the process of either booting or shutting down.
	  ◦ The services gateway is not configured for chassis clustering.
	• Steady Green–The services gateway is configured for chassis clustering, and the SCM is operating normally.
	• Blinking Green–The SCM is initializing (preparing to come online) or is preparing to go offline.
	• Red–The SCM has failed and is not operating normally.

Serial Number Location	The serial number label for all IOC types is located as shown in Figure 25 on page 41). **Figure 25: IOC Serial Number Label (SRX3K-16GE-TX Shown, Other IOCs Similar)** 

Related Documentation

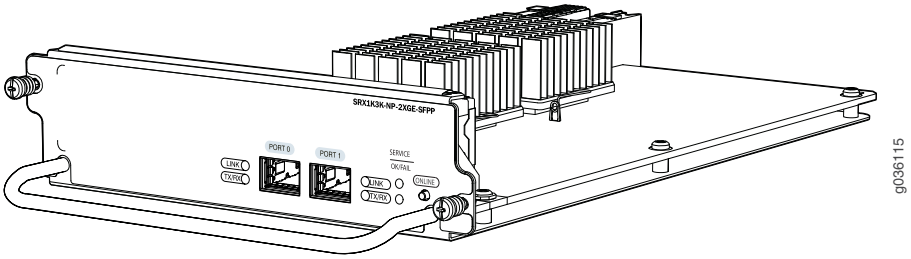
- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

Network Processing I/O Card SRX1K3K-NP-2XGE-SFPP

The Network Processing I/O card (NP-IOC) SRX1K3K-NP-2XGE-SFPP (Figure 26 on page 42) is an IOC that includes its own Network Processing Unit (NPU), so that traffic traversing the NP-IOC does not have to also traverse the services gateway bus to a remote NPC. This feature makes the NP-IOC well-suited to low-latency

applications . It is inserted horizontally into the midplane of the services gateway to communicate with the SFB and to receive power. To use fiber interface media, install enhanced small form-factor pluggable (SFP+) transceivers on the desired ports. LEDs on the faceplate of the NP-IOC indicate port status and connectivity. The SFP+ ports are numbered from left to right, 0-1.

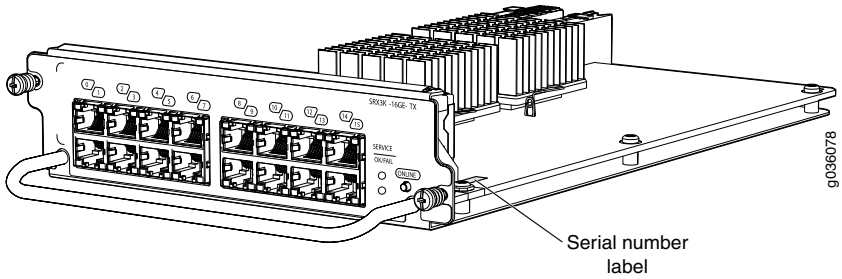
Figure 26: NP-IOC SRX1K3K-NP-2XGE-SFPP



For detailed information about supported transceivers, see the *SRX Series Services Gateway Transceiver Guide* at www.juniper.net/techpubs/.

Description	• 2-port Ethernet SFP+ NP-IOC for SRX3400, SRX3600, and SRX1400 Services Gateways • Power requirement: 52 W maximum • Weight: 2.4 lb (1.1 kg) • Maximum configurable MTU: 9192 bytes
Software release	• Junos OS Release 12.1X44-D10 and later
Cables and connectors	Two SFP+ sockets for Gigabit Ethernet transceivers Supported SFP+ transceivers: 10GBASE-ER (model number SRX-SFP-10GE-ER) 10GBASE-LR (model number SRX-SFP-10GE-LR) 10GBASE-SR (model number SRX-SFP-10GE-SR) 10GBASE-LRM (model number SFPP-10GE-LRM) Supported SFP+ direct attach cables: SRX-SFP-10GE-DAC-1M SRX-SFP-10GE-DAC-3M
Supported Slots	• SRX1400: Front slot labeled **2** • SRX3400: Front slots labeled **1-4** and rear slots labeled **5-7**. • SRX3600: Front slots labeled **1-6** and rear slots labeled **7-12**.
Swapping	NP-IOCs are cold-swap-only. You must power-off the services gateway before removing, replacing, or adding NP-IOCs.

LEDs	**SERVICE** LED, one bicolor
	• Off–The NP-IOC is administratively disabled.
	• Green–The NP-IOC is available to carry Ethernet traffic.
	• Amber–The NP-IOC is not available to carry Ethernet traffic.
	OK/FAIL LED, one bicolor
	• Off–One or more of the following conditions apply:
	  ◦ The services gateway is not powered on.
	  ◦ The services gateway is still in the process of either booting or shutting down.
	  ◦ The services gateway is not configured for chassis clustering.
	• Steady Green–The services gateway is configured for chassis clustering, and the SCM is operating normally.
	• Blinking Green–The NP-IOC is offline. To bring the NP-IOC online, press the **ONLINE** button.
	• Red–The NP-IOC has failed and is not operating normally.

Serial Number Location	The serial number label for all IOC types is located as shown in Figure 27 on page 43. **Figure 27: IOC Serial Number Label (SRX3K-16GE-TX Shown, Other IOCs Similar)** 

Related Documentation

- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

Routing Engines SRX3K-RE-12-10 and SRX1K-RE-12-10

Routing Engines are PowerPC platforms that run the Junos operating system (Junos OS). Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the services gateway, control the services gateway interfaces, control some chassis components, and provide the interface for system management and user access to the services gateway.

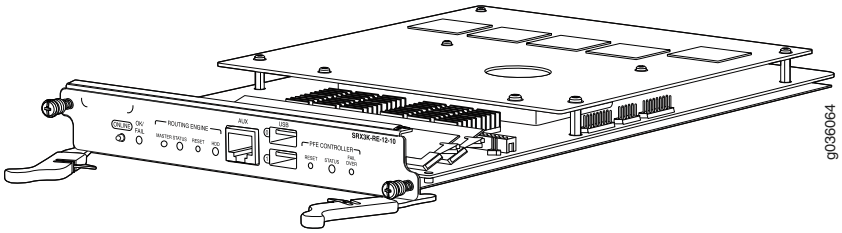
Two USB ports on the Routing Engine accept USB memory cards that allow you to load Junos OS and perform file transfers.

The Routing Engine also provides the following integrated services:

- Central Packet Forwarding Engine Processing (CPP)—This service manages all CFM cards.
- System Control—This service handles Routing Engine arbitration and switching between multiple control planes when installed and acts as the host for the Switch Fabric Board (SFB) and midplane components.

The services gateway must have one Routing Engine installed in slot RE0. A Gigabit Ethernet port on the front panel of the Switch Fabric Board (SFB) is connected directly to the processors on the REs for management purposes. The SFB port labeled **RE ETHERNET 0** connects to the Routing Engine in slot RE0.

Figure 28: Routing Engine (SRX3K-RE-12-10 Shown, SRX1K-RE-12-10 Similar)



Description	• Routing Engine for SRX1400 Services Gateway (SRX1K-RE-12-10) • Routing Engine for SRX3400 or SRX3600 Services Gateway (SRX3K-RE-12-10) • Power requirement: 53 W maximum • Weight: 2.9 lb (1.3 kg)
Software release	• SRX3K-RE-12-10: Junos OS Release 9.3 and later • SRX1K-RE-12-10: Junos OS Release 10.2 and later
Cables and connectors	• **AUX**—RJ-45 serial console port that can be used to manage the Routing Engine. • **USB 0** (top), **USB 1** (bottom)—Connectors for Universal Serial Bus (USB) flash drives.
Supported Slots	Slot **RE0** only
Swapping	The Routing Engine is a cold-swap-only module. You must power-off the services gateway before removing or installing the Routing Engine.
Controls	**ONLINE** Button—The **ONLINE** button on the Routing Engine front panel does not perform any function.

LEDs

OK/FAIL LED, one bicolor

- Off–One or more of the following conditions apply:
  - The services gateway is not powered on.
  - The services gateway is still in the process of either booting or shutting down.
- Steady Green–The Routing Engine is operating normally.
- Blinking Green–The Routing Engine is rebooting or is shutting down..
- Red–The Routing Engine has failed and is not operating normally..

Routing Engine Function **MASTER** LED

- Blue–The Routing Engine is the master. This LED should always be lit.

Routing Engine Function **STATUS** LED

- Steady Green–The Routing Engine is operating normally.
- Blinking Green–The Routing Engine is booting.
- Steady Red–The Routing Engine has failed and is not operating normally.

Routing Engine Function **HDD** LED

- Blinking Green–The Routing Engine hard disk drive is being accessed.
- Off–There is no hard disk drive activity.

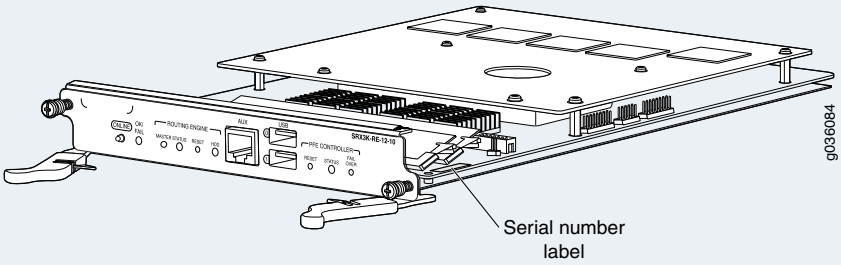
PFE Controller **STATUS** LED

- Steady Green–The PFE Controller is operating normally.
- Blinking Green–The PFE Controller is booting.
- Steady Red–The PFE Controller has failed and is not operating normally.

Serial Number Location

The serial number label is located as shown in Figure 29 on page 45).

Figure 29: Routing Engine Serial Number Label



Related Documentation

- SRX1400, SRX3400, and SRX3600 Services Gateway Module Overview on page 29
- Modules Supported on SRX1400, SRX3400, and SRX3600 Services Gateways on page 30
- Eligible Slots for SRX1400, SRX3400, and SRX3600 Services Gateway Modules on page 31
- *Installing Common Form Factor Modules In SRX1400, SRX3400, and SRX3600 Services Gateways*

CHAPTER 5

Cooling System Description

SRX1400 Services Gateway Cooling System

The cooling system consists of a fan tray containing two fans. These fans keep all services gateway components within the acceptable temperature range.

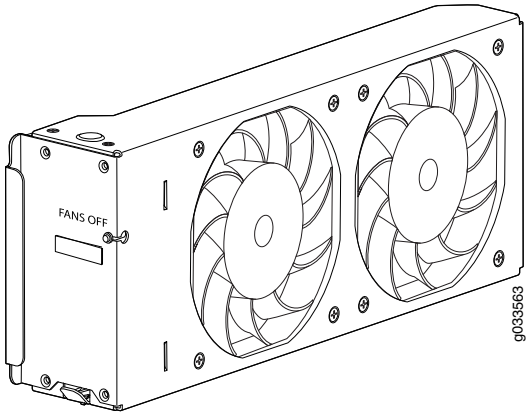
The SRX1400 Services Gateway also includes an air filter that protects the device from dust entering into the system.

The SRX1400 Services Gateway has one fan tray located in the side of the chassis and can be plugged in from the rear of the chassis.

From the front of the chassis, there is a single air intake on the left side of the services gateway. Air is pushed from the fan tray through the air filter and then to the card cage. The air is exhausted out the right of the system.

Figure 30 on page 47 SRX1400 Services Gateway fan tray.

Figure 30: SRX1400 Services Gateway Fan Tray



The Routing Engine monitors the temperature of the device components. Above an ambient temperature of 30° C to 35° C, the fans operate at full speed. Below 30° C, the fans operate at a reduced speed. If a fan fails or the ambient temperature rises above a threshold, the speed of the other fan 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 power supply.

The fan tray includes a single LED, which can be used to monitor the fan speed. The fan tray LED indications can be used to detect the condition when the fan-speed has reduced to a safer value, so that fan tray can be removed from the device safely. This LED is controlled by the Routing Engine. The fan tray LED is located on the fan tray, which is visible only when the fan tray door is opened.

The fan-tray faceplate has a single LED to indicate the status of the fans and fan tray (see Table 18 on page 48).

Table 18: Fan Tray LED

Color	LED Status	Indicated Condition
Amber	Off	Fans are running and fan tray is functioning normally. Do not remove the fan tray in this condition.
	On Steadily	Fans are not running, and fan tray can be removed safely. NOTE: This Fan tray LED lights only when fans are shutdown manually using the CLI **FAN** . The message **FAN** confirms that fans are stopped completely. The Fan Tray LED does not indicate fan failure. The **FAN** LED available on the System I/O card indicates the fan failure status.

NOTE: The fan tray LED provides additional safety measures. Even though you can remove the fan tray while the fans are still running, we strongly recommend that you wait until the fan tray LED lights steadily amber (indicating that the fans are not running) before you remove the fan tray.

NOTE: The fan tray supports hot-swappable functionality. We recommend you to reinstall the fan tray within three minutes; otherwise, the services gateway temperature might exceed the maximum recommended room temperature and the device shuts down automatically in four minutes.

Related Documentation

- Troubleshooting the Cooling System on the SRX1400 Services Gateway on page 161
- Routine Maintenance Procedures for the SRX1400 Services Gateway on page 149
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151
- Maintaining the Air Filter on the SRX1400 Services Gateway on page 150

CHAPTER 6

Power System Description

SRX1400 Services Gateway Power Supplies Overview

The SRX1400 Services Gateway uses following power supplies:

- AC Power Supply (for SRX1400BASE-GE-AC and SRX1400BASE-XGE-AC models)

  For details, see "SRX1400 Services Gateway AC Power Supply" on page 50.

- DC Power Supply (for SRX1400BASE-GE-DC and SRX1400BASE-XGE-DC models)

  For details, see "SRX1400 Services Gateway DC Power Supply" on page 51.

The power supplies are located at the front of the chassis. Each AC power supply weighs approximately 3.1 lb (1.4 kg). Each DC power supply weighs approximately 2.9 lb (1.3 kg).

NOTE: **Only redundant power supplies (AC or DC) support hot-swappable functionality.**

The SRX1400 Services Gateway uses either one AC or one DC power supply unit. A second AC or DC power supply can be used with its matching type of power supply to offer redundancy. The power supplies connect to the backplane, which distributes 10 V main power and 3.3 V standby power to the services gateway components. Each power supply is cooled by its own internal cooling system.

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

Related Documentation

- SRX1400 Services Gateway AC Power Supply on page 50
- SRX1400 Services Gateway DC Power Supply on page 51

SRX1400 Services Gateway AC Power Supply

This topic includes the following sections:

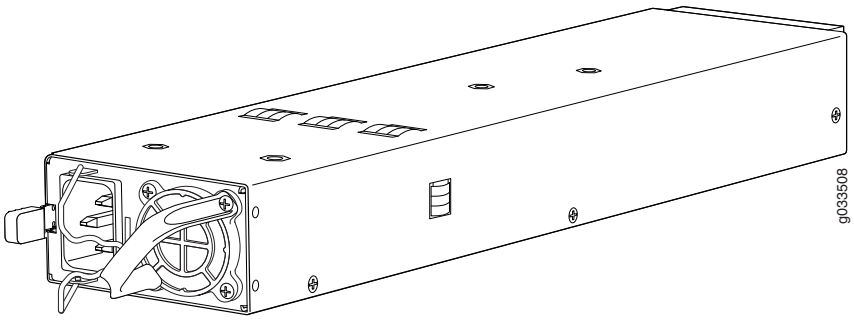
AC Power Supply Overview

In an AC power configuration, the SRX1400 Services Gateway contains one or two AC power supplies, located at the front panel of the chassis in slots **PEM0** and **PEM1**. Each power supply provides power to all components in the services gateway. When two power supplies are present, they share power almost equally within a fully populated system. The two AC power supplies provide full power redundancy. If one power supply fails or is removed, the remaining power supply redistributes the electrical load without interruption.

Figure 31 on page 50 shows the SRX1400 Services Gateway AC power supply.

NOTE: Only a redundant power supply supports hot-swappable functionality.

Figure 31: SRX1400 Services Gateway AC Power Supply



AC Power Supply Electrical Specifications

Table 19 on page 50 lists the AC power supply electrical specifications.

Table 19: AC Power Supply Electrical Specifications

Parameter	Specification
Maximum output power	1000 W
AC input voltage	100-127 V / 200-240 V
AC input line frequency	50 / 60 Hz

Table 19: AC Power Supply Electrical Specifications *(continued)*

Parameter	Specification
AC input current rating	13.0 A (Max.) at 100 VAC

AC Power Supply LEDs

Each AC power supply faceplate displays a single LED to indicate the status of the power supply (see Table 20 on page 51).

Table 20: AC Power Supply LEDs

Color	Status	Condition Indicated
Green	On steadily	AC input voltage is present, and both main 12 V output and standby 3.3 V output are enabled and healthy.
	Blinking	AC input voltage is present, standby 3.3 V output is on, but the main 12 V output is disabled. This condition usually indicates that the device has been powered off at the POWER button on the SYSIOC front panel. This condition can also indicate that either the SYSIOC or Routing Engine has been removed from the services gateway.
Amber	On steadily	The power supply has detected one or more of the following faults: • Power supply fan failure • Power supply over-temperature condition • Over-current or under-voltage condition on the standby 3.3 V output
	Blinking	The power supply has detected one or more of the following faults: • Under-voltage condition on the 12 V output • Over-voltage condition on the 12 V output • Over-current condition on the 12 V output

Related Documentation

- SRX1400 Services Gateway Power Supplies Overview on page 49
- Installing an AC Power Supply in the SRX1400 Services Gateway on page 120
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159

SRX1400 Services Gateway DC Power Supply

This topic includes the following sections:

DC Power Supply Overview

In a DC power configuration, the SRX1400 Services Gateway contains one or two DC power supplies, located at the front of the chassis in slots **P0** and **P1**. Each power supply provides power to all components in the services gateway. When two power supplies are present, they share power almost equally within a fully populated system. The two DC power supplies provide power redundancy. If one power supply fails or is removed, the remaining power supply redistributes the electrical load without interruption.

NOTE: **Only redundant power supply supports hot-swappable functionality.**

DC Power Supply Electrical Specifications

Each DC power supply has a single DC input (-48 VDC and return) that requires a dedicated 40 A (-48 VDC) circuit breaker. Table 21 on page 52 lists the DC power supply electrical specifications.

Table 21: DC Power Supply Electrical Specifications

Parameter	Specification
Maximum output power	1200 W
DC input voltage	–40 to –72 VDC
DC input current rating	30 A @ -48 VDC

DC Power Supply LEDs

Each DC power supply faceplate displays a single LED to indicate the status of the power supply (see Table 22 on page 52).

Table 22: DC Power Supply LED

Color	LED Status	Indicated Condition
Green	On steadily	DC input voltage is present, and both main 12 V output and standby 3.3 V output are enabled and healthy.
	Blinking	DC input voltage is present, standby 3.3 V output is on, but the main 12 V output is disabled. This condition usually indicates that the device has been powered off at the POWER button on the SYSIOC front panel. This condition can also indicate that either the SYSIOC or Routing Engine has been removed from the services gateway.

Table 22: DC Power Supply LED *(continued)*

Color	LED Status	Indicated Condition
Red	On steadily	The power supply has detected one or more of the following faults: • Power supply fan failure • Power supply over-temperature condition • Over-current or under-voltage condition on the standby 3.3V output
	Blinking	The power supply has detected one or more of the following faults: • Under-voltage condition on the 12 V output • Over-voltage condition on the 12 V output • Over-current condition on the 12 V output

Related Documentation

- SRX1400 Services Gateway Power Supplies Overview on page 49
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159

PART 2

Site Planning and Specifications

CHAPTER 7

Planning and Preparing the Site

General Site Guidelines

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

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

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

Related Documentation

- Prevention of Electrostatic Discharge Damage on page 250

Site Electrical Wiring Guidelines

Table 23 on page 58 describes the factors you must consider while planning the electrical wiring at your site.

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

Table 23: Site Electrical Wiring Guidelines

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

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- Prevention of Electrostatic Discharge Damage on page 250

SRX1400 Services Gateway Physical Specifications

The SRX1400 Services Gateway chassis is a rigid sheet metal structure that houses all of the other device components. The chassis measures 5.25 in. (13.3 cm) high, 17.5 in. (44.5 cm) wide, and 13.8 in. (35.05 cm) deep (from the front to the rear of the chassis). The chassis installs in standard 800-mm (or larger) enclosed cabinets, 19-in. equipment racks, or telecommunications open-frame racks. Up to 16 services gateways can be installed in one standard (48-U) rack if the rack can handle their combined weight, which can be greater than 677 lb (308 kg) (fully-loaded device).

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX1400 Services Gateway" on page 125 for instructions.

Figure 32 on page 59 shows the SRX1400 Services Gateway chassis.

Figure 32: SRX1400 Services Gateway Chassis

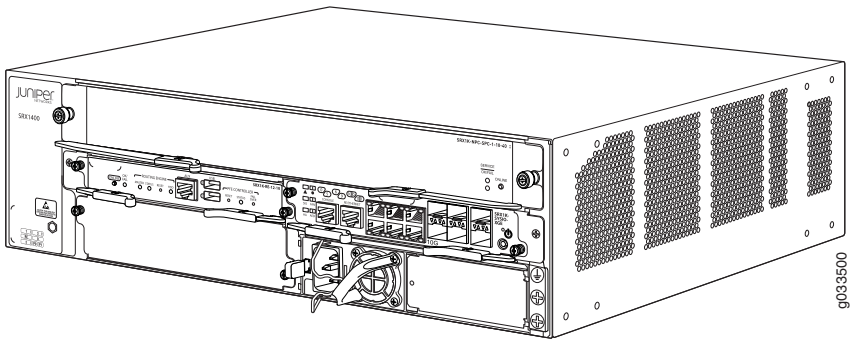


Table 24 on page 59 summarizes the physical specifications for the SRX1400 Services Gateway chassis.

Table 24: SRX1400 Services Gateway Physical Specifications

Specification	Value
Chassis height	5.25 in. (13.3 cm), 3 rack units (U)
Chassis width	17.5 in. (44.5 cm)
Chassis depth	13.8 in. (35.05 cm)
Chassis weight	• Base chassis: 29.3 lb (13.3 kg) • Fully configured chassis: 42.5 lb (19.3 kg)

Table 25 on page 59 summarizes the weight of the SRX1400 Services Gateway chassis with different configurations.

Table 25: Weight of the SRX1400 Services Gateway with Different Configurations

SRX1400 Chassis with Different Configurations	Weight
Base chassis (Routing Engine + SYSIOC + 1 power supply + fan tray assembly + filler cover for CFM slots 1 and 3)	29.3 lb (13.3 kg)

Table 25: Weight of the SRX1400 Services Gateway with Different Configurations *(continued)*

SRX1400 Chassis with Different Configurations	Weight
Fully configured chassis (Base chassis + NSPC + IOC + power supply)	42.5 lb (19.3 kg)
Chassis without fan tray and power supply (Base chassis - fan tray - power supply)	23.3 lb (10.6 kg)

Related Documentation

- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Environmental Specifications on page 60
- SRX1400 Services Gateway Hardware Components on page 9
- Overview of the SRX1400 Services Gateway CFMs on page 10

SRX1400 Services Gateway Environmental Specifications

Table 26 on page 60 specifies the environmental specifications required for normal SRX1400 Services Gateway operation.

Table 26: SRX1400 Services Gateway Environmental Specifications

Specification	Value
Altitude	No performance degradation to 10,000 ft (3048 m)
Relative humidity	Normal operation ensured in relative humidity range of 5% to 90%, noncondensing
Temperature	Normal operation ensured in temperature range of 32°F (0°C) to 104°F (40°C) Nonoperating storage temperature in shipping container: –40°F (–40°C) to 158°F (70°C)
Seismic	Tested to meet Telcordia Technologies Zone 4 earthquake requirements
Maximum thermal output	• AC power: 1653 BTU/hour (W) • DC power: 1653 BTU/hour (W)

Related Documentation

- SRX1400 Services Gateway Hardware Features on page 4
- SRX1400 Services Gateway Hardware Components on page 9
- Overview of the SRX1400 Services Gateway CFMs on page 10

Site Preparation Checklist for the SRX1400 Services Gateway

The checklist in Table 27 on page 61 summarizes the tasks you need to perform when preparing a site for SRX1400 Services Gateway installation.

Table 27: Site Preparation Checklist

Item or Task	For More Information ...	Performed By	Date
Verify that environmental factors such as temperature and humidity do not exceed services gateway tolerances.	"SRX1400 Services Gateway Environmental Specifications" on page 60		
Select the type of rack or cabinet.	"SRX1400 Services Gateway Rack Requirements" on page 63		
Plan rack or cabinet location, including required space clearances.	"Clearance Requirements for Airflow and Hardware Maintenance of the SRX1400 Services Gateway" on page 65		
If a rack is used, secure rack to floor and building structure.	"SRX1400 Services Gateway Rack Requirements" on page 63		
Acquire cables and connectors.	"Console Port Cable and Wire Specifications for the SRX1400 Services Gateway" on page 83 "SRX1400 Services Gateway AC Power Cord Specifications" on page 72 "SRX1400 Services Gateway DC Power Cable Specifications" on page 78		
Locate sites for connection of system grounding.	"SRX1400 Services Gateway Grounding Cable Specification" on page 69"Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX1400 Services Gateway" on page 84		
Measure distance between external power sources and services gateway installation site.	*SRX1400 Services Gateway Electrical Wiring Guidelines*		
Calculate the optical power budget and optical power margin.	"Calculating the Power Budget for Fiber-Optic Cable for the SRX1400 Services Gateway" on page 84 "Calculating the Power Margin for Fiber-Optic Cable for the SRX1400 Services Gateway" on page 86		

Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Clearance Requirements for Airflow and Hardware Maintenance of the SRX1400 Services Gateway on page 65
- SRX1400 Services Gateway Cabinet Requirements on page 67
- SRX1400 Services Gateway Rack Requirements on page 63

CHAPTER 8

Rack Requirements

SRX1400 Services Gateway Rack Requirements

This topic includes the following sections:

SRX1400 Services Gateway Rack Size and Strength Requirements

The SRX1400 Services Gateway can be installed in a rack. Many types of racks are acceptable, including four-post (telco) racks and open-frame racks.

You can front-mount or rear-mount the services gateway in a two-post rack, a four-post rack, or a cabinet.

NOTE: **Though two-post front mounting is most common method of installation for the SRX1400 device, you can also front-mount or rear-mount the chassis in a four-post rack. However, there is no support shelf provided for the rear edge of the chassis to rest.**

The device is designed for installation into a 19-in. (48.26 cm) 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).

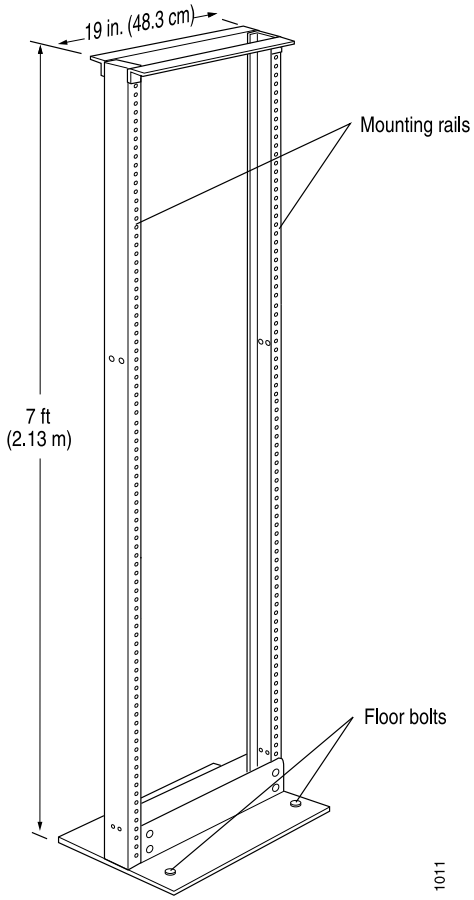
With the use of adapters, the device is designed to fit into a 600-mm-wide (23.62-mm) rack or cabinet, as defined in the four-part Equipment Engineering (EE); European telecommunications standard for equipment practice (document numbers ETS 300 119-1 through 119-4) published by the European Telecommunications Standards Institute (http://www.etsi.org). Use approved wing devices to narrow the opening between the rails.

The rack rails must be spaced widely enough to accommodate the device chassis's external dimensions: 5.25 in. (13.3 cm) high, 13.8 in. (35.05 cm) deep, and 17.5 in. (44.5 cm) wide. The spacing of rails and adjacent racks must also allow for the clearances around the device and rack.

The chassis height of 5.25 in. (13.3 cm) is approximately 3 U. A U is the standard rack unit defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310-D) published by the Electronics Industry Association. You can stack eight SRX1400 Services Gateways in a rack that has at least 40 U (70 in. or 1.78 m) of usable vertical space.

The rack must be strong enough to support the weight of the fully configured device, up to 42.3 lb (19.3 kg). If you stack 8 fully configured devices in one rack, it must be capable of supporting up to 341 lb (155 kg)

Figure 33: Typical Open-Frame Rack



SRX1400 Services Gateway Spacing of Mounting Bracket Holes

The device can be mounted in any rack that provides holes or hole patterns spaced at 1 U (1.75 in. or 4.4 cm) increments. The mounting brackets used to attach the chassis to a rack are designed to fasten to holes spaced at those distances.

Connecting the SRX1400 Services Gateway to the Building Structure

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. For more information, see *Rack-Mounting Requirements and Warnings*.

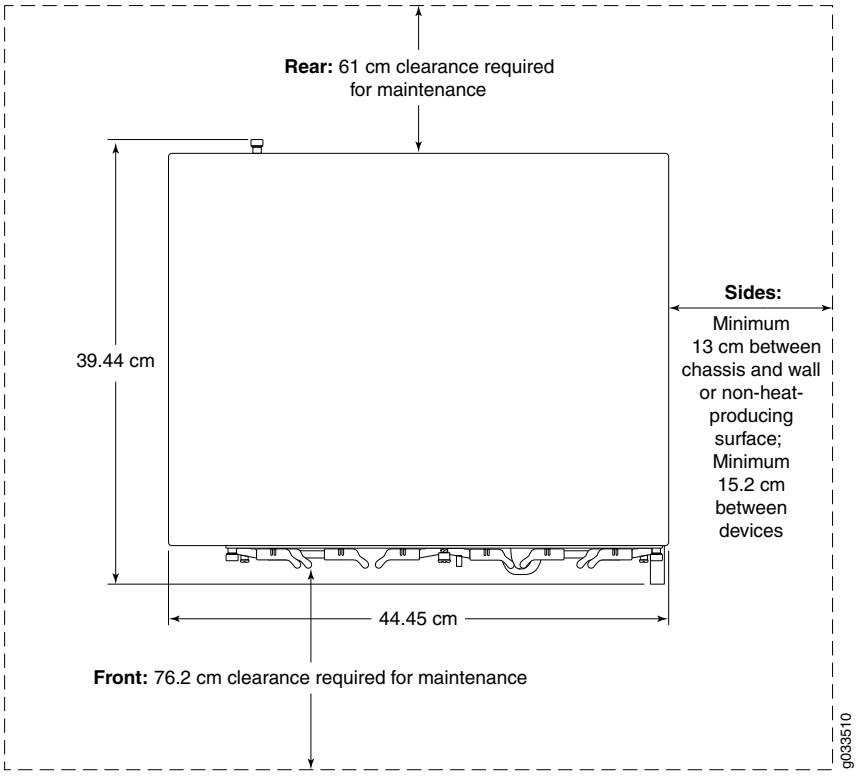
Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Site Preparation Checklist for the SRX1400 Services Gateway on page 61
- SRX1400 Services Gateway Cabinet Requirements on page 67
- Clearance Requirements for Airflow and Hardware Maintenance of the SRX1400 Services Gateway on page 65

Clearance Requirements for Airflow and Hardware Maintenance of the SRX1400 Services Gateway

When planning the installation site, you need to allow sufficient clearance around the rack (see Figure 34 on page 65):

Figure 34: SRX1400 Services Gateway Clearance Requirements



- For the cooling system to function properly, the airflow around the chassis must be unrestricted. Allow at least 6 in. (15.2 cm) of clearance between devices. Allow 5 in.

(13 cm) between the side of the chassis and any non-heat-producing surface such as a wall.

- 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 device. NEBS GR-63 recommends that you allow at least 30 in. (72.6 cm) in front of the rack and 24 in. (61.0 cm) behind the rack.

Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Site Preparation Checklist for the SRX1400 Services Gateway on page 61
- SRX1400 Services Gateway Cabinet Requirements on page 67
- SRX1400 Services Gateway Rack Requirements on page 63

CHAPTER 9

Cabinet Requirements

SRX1400 Services Gateway Cabinet Requirements

This topic includes the following sections:

Cabinet Size and Clearance Requirements

The minimum size cabinet that can accommodate the services gateway is 27.5 in. (69.8 cm) wide and 31.5 in. (80.0 cm) deep. The cabinet must allow at least 5 in. (13 cm) of clearance on each side of the chassis to allow for cooling air to flow through the vents on each side of the device. A cabinet larger than the minimum requirement provides better airflow and reduces the chance of overheating.

Allow at least 3 in. (7.6 cm) of vertical clearance between the top and bottom of the services gateway and other devices in the cabinet.

If you provide adequate cooling air and airflow clearance, you can stack eight devices in a cabinet that has at least 40 U (70 in. or 1.78 m) of usable vertical space.

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. Consider the following requirements when planning for chassis cooling:

- Ensure that the cool air supply you provide through the cabinet can adequately dissipate the thermal output of the services gateway.
- Allow at least 3 in. (7.6 cm) of vertical clearance between the top and bottom of the services gateway and other devices in the cabinet.
- Ensure that the cabinet allows the chassis hot exhaust air to exit from the cabinet without recirculating into the services gateway. An open cabinet (without a top or doors) that employs hot air exhaust extraction from the top allows the best airflow through the chassis.

- Ensure that the cabinet provides at least 13 cm (5 in) of clearance on each side of the chassis for cooling airflow.
- If the cabinet contains a top or doors, you must provide perforations in these elements to allow adequate airflow through the cabinet to dissipate the heat generated by all of the devices in the cabinet.
- Route and dress all cables to minimize the blockage of airflow to and from the chassis.

Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Site Preparation Checklist for the SRX1400 Services Gateway on page 61
- SRX1400 Services Gateway Rack Requirements on page 63
- Clearance Requirements for Airflow and Hardware Maintenance of the SRX1400 Services Gateway on page 65

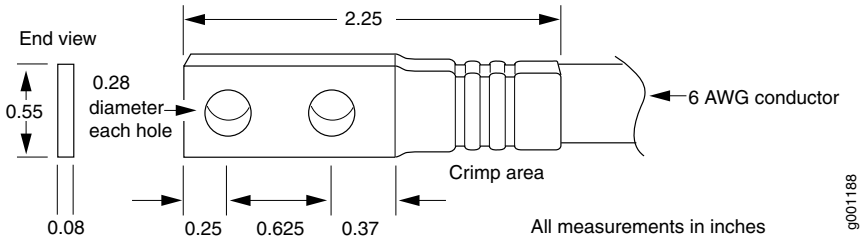
CHAPTER 10

Grounding Specifications

SRX1400 Services Gateway Grounding-Cable Lug Specification

The cable attaches to the grounding cable (see Figure 35 on page 69) and two M5 screws are used to secure the grounding cable to the grounding point.

Figure 35: Grounding Cable Lug



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

Related Documentation

- SRX1400 Services Gateway Chassis Grounding Point on page 123
- SRX1400 Services Gateway Grounding Cable Specification on page 69
- Grounding the SRX1400 Services Gateway on page 125
- SRX1400 Services Gateway Front Panel on page 25

SRX1400 Services Gateway Grounding Cable Specification

The grounding cable that you provide must meet the specifications in Table 28 on page 70.

Table 28: Grounding Cable Specifications

Cable Type	Quantity and Specification
Grounding	One 14-AWG (2.1 mm^2), minimum 60°C wire, or as required by the local code

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX1400 Services Gateway" on page 125 for instructions.

Related Documentation

- SRX1400 Services Gateway Chassis Grounding Point on page 123
- SRX1400 Services Gateway Grounding-Cable Lug Specification on page 69
- Grounding the SRX1400 Services Gateway on page 125
- SRX1400 Services Gateway Front Panel on page 25

CHAPTER 11

AC Power Requirements and Specifications

SRX1400 Services Gateway AC Power System Electrical Specifications

Table 29 on page 71 lists the AC power system electrical specifications.

Table 29: AC Power System Specifications

Item	Specification
AC input voltage	Operating range: 100-127 V / 200-240 V
AC input line frequency	47 – 63 Hz
AC system current rating	5 A at 100 VAC 2.5 A at 100 VAC
Maximum AC input power	485 W at 100 VAC

Related Documentation

- SRX1400 Services Gateway AC Power Supply Electrical Specifications on page 72
- SRX1400 Services Gateway AC Power Cord Specifications on page 72
- Power Requirements for AC-Powered SRX1400 Services Gateways on page 74
- SRX1400 Services Gateway AC Power Supply on page 50
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129

SRX1400 Services Gateway AC Power Supply Electrical Specifications

Table 30 on page 72 lists the electrical specifications for the services gateway AC power supply.

Table 30: AC Power Supply Electrical Specifications

Item	Specification
Maximum output power	1000 W
AC input voltage	Operating range: 100-127 VAC / 200-240 VAC
AC input line frequency	47 – 63 Hz
AC input current rating	13.0 A (maximum) at 100 VAC 6.5 A (maximum) at 200 VAC

Related Documentation

- SRX1400 Services Gateway AC Power System Electrical Specifications on page 71
- SRX1400 Services Gateway AC Power Cord Specifications on page 72
- Power Requirements for AC-Powered SRX1400 Services Gateways on page 74
- SRX1400 Services Gateway AC Power Supply on page 50
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129

SRX1400 Services Gateway AC Power Cord Specifications

Each AC power supply has a single AC appliance inlet located on the power supply that requires a dedicated AC power feed and a dedicated 15 A (250 VAC) circuit breaker. 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 device. An AC power cord connects each power supply to the power distribution panel.

Locate the power cord or cords with the type of plug appropriate for your geographical location to connect the device to AC power using the model number.

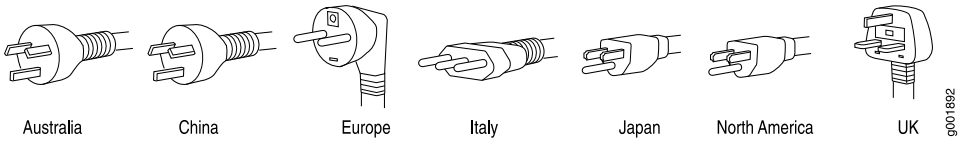
The services gateway uses detachable AC power cords with C13 appliance couplers at the female end as described by International Electrotechnical Commission (IEC) standard 60320. The plug at the male end of the power cord fits into the power source receptacle that is standard for your geographical location.

Table 31 on page 73 provides specifications and Figure 36 on page 73 depicts the plug on the AC power cord provided for each country or region.

Table 31: AC Power Cord Specifications

Country	Model Number	Electrical Specification	Plug Type
Australia	CBL-JX-PWR-AU	250 VAC, 10 A, 50 Hz	AS/NZ 3112–1993
China	CBL-JX-PWR-CH	250 VAC, 10 A, 50 Hz	GB2099.1 1996 and GB1002 1996 (CH1-10P)
Europe (except Italy and United Kingdom)	CBL-JX-PWR-EU	250 VAC, 10 A, 50 Hz	CEE (7) VII
Italy	CBL-JX-PWR-IT	250 VAC, 10 A, 50 Hz	CEI 23–16/VII
Japan	CBL-JX-PWR-JP	125 VAC, 12 A, 50 Hz or 60 Hz	JIS 8303
North America	CBL-JX-PWR-US	125 VAC, 10 A, 60 Hz	NEMA 5-15
United Kingdom	CBL-JX-PWR-UK	250 VAC, 10 A, 50 Hz	BS 1363A

Figure 36: AC Plug Types



WARNING: The AC power cord for the services gateway is intended for use with the SRX1400 Services Gateway only and not for any other devices.

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

NOTE: In North America, AC power cords must not exceed approximately 14.75 ft (4.5 m) 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). You can order AC power cords that are in compliance.

For information about the AC power supply, including a description of components, see "SRX1400 Services Gateway AC Power Supply" on page 50. For instructions on connecting the power cord during initial installation, see "Connecting the SRX1400 Services Gateway to an AC Power Supply" on page 129. For instructions on replacing the AC power cables, see "Replacing an AC Power Supply on the SRX1400 Services Gateway" on page 198.

Related Documentation

- SRX1400 Services Gateway AC Power Supply Electrical Specifications on page 72
- SRX1400 Services Gateway AC Power System Electrical Specifications on page 71
- Power Requirements for AC-Powered SRX1400 Services Gateways on page 74
- SRX1400 Services Gateway AC Power Supply on page 50
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129

Power Requirements for AC-Powered SRX1400 Services Gateways

NOTE: If you plan to operate a maximally configured AC-powered services gateway, we recommend that you provision 6 A at 240 VAC for the system.

If you do not plan to provision 6 A at 240 VAC for the system, you can use the information in Table 32 on page 74 and Table 33 on page 75 to calculate power consumption for various hardware configurations, and thermal output.

Table 32 on page 74 lists the power requirements for base AC-powered devices operating under typical voltage conditions. It includes the efficiency for the AC power supplies.

Table 32: Base System AC Power Requirements

Component	Power Requirement (Watts)
Nonredundant configuration includes AC power supply, backplane, SYSIOC, Routing Engine, and the fan tray.	210 W (approximate)
Redundant configuration includes two AC power supplies, backplane, SYSIOC, Routing Engine, and the fan tray.	222 W (approximate)

NOTE: The power requirement values shown in Table 32 on page 74 are for a lightly loaded system. For a heavily loaded system, the contribution of the base system to the overall system power requirement is lower, because the power supply efficiency improves as the load increases. For a heavily loaded system, both the redundant and nonredundant base systems contribute approximately 210 W to the overall system power requirement.

NOTE: In SRX1400 Services Gateways with 1-Gigabit Ethernet System I/O card, the base system power requirement is less by 5 to 6 watts than the base system power requirement for the SRX1400 devices with 10-Gigabit Ethernet System I/O card.

Table 33 on page 75 lists the power requirements for various hardware components when the services gateway is operating under typical voltage conditions.

Table 33: Component AC Power Requirements

Component	Power Requirement (Watts)
NSPC	214 W
IOC	61 W (max.)

Use the information in Table 32 on page 74 and Table 33 on page 75 to calculate power consumption for various hardware configurations, input current from a different source voltage, and thermal output, as shown in the following examples. These examples use maximum values per IOC.

Typical power consumption for AC-powered devices:

- Minimum AC-powered configuration:

  Base device + 1 NSPC =
  210 W + 214 W = 424 W

- Maximum AC-powered configuration:

  Base device + 1NSPC + 1 IOC =
  210 W + 214 W + 61 W = 485 W

- Typical system thermal output (based on maximally configured AC-powered services gateway at 110 V input):

  Watts * 3.41 = BTU/hr
  485 W * 3.41 = 1653.85 BTU/hr

Related Documentation

- SRX1400 Services Gateway AC Power Supply Electrical Specifications on page 72
- SRX1400 Services Gateway AC Power System Electrical Specifications on page 71
- SRX1400 Services Gateway AC Power Cord Specifications on page 72
- SRX1400 Services Gateway AC Power Supply on page 50
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129

CHAPTER 12

DC Power Requirements and Specifications

SRX1400 Services Gateway DC Power System Electrical Specifications

Table 34 on page 77 lists the DC power system electrical specifications.

Table 34: DC Power System Electrical Specifications

Item	Specification
DC input voltage	Operating range: – 40 to – 72 VDC
DC system current rating	10.1 A @ - 48 VDC
Maximum DC input power	485 W

Related Documentation

- SRX1400 Services Gateway DC Power Supply Electrical Specifications on page 77
- Power Requirements for DC-Powered SRX1400 Services Gateways on page 80
- SRX1400 Services Gateway DC Power Cable Specifications on page 78
- SRX1400 Services Gateway DC Power Supply on page 51
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121

SRX1400 Services Gateway DC Power Supply Electrical Specifications

Each DC power supply has a single DC input (-48 VDC and return) that requires a dedicated 16 A (-48 VDC) circuit breaker. Table 35 on page 78 lists the DC power supply electrical specifications.

Table 35: DC Power Supply Electrical Specifications

Parameter	Specification
Maximum output power	1200 W
DC input voltage	–40 to –72 VDC
DC input current rating	30 A @ –48 VDC

Each DC power supply faceplate displays a single LED to indicate the status of the power supply (see Table 36 on page 78).

Table 36: DC Power Supply LED

Color	LED Status	Indicated Condition
Green	On steadily	DC input voltage is present, and both main 12 V output and standby 3.3 V output are enabled and healthy.
	Blinking	DC input voltage is present, standby 3.3 V output is on, but the main 12 V output is disabled. This condition usually indicates that the device has been powered off at the Power button on the SYSIOC front panel. It might also indicate that either the SYSIOC or the Routing Engine has been removed from the services gateway.
Red	On steadily	The power supply has detected one or more of the following faults: • Power supply fan failure • Power supply over-temperature condition • Over-current or under-voltage condition on the standby 3.3V output
	Blinking	The power supply has detected one or more of the following faults: • Under-voltage condition on the 12 V output • Over-voltage condition on the 12 V output • Over-current condition on the 12 V output

Related Documentation

- SRX1400 Services Gateway DC Power System Electrical Specifications on page 77
- Power Requirements for DC-Powered SRX1400 Services Gateways on page 80
- SRX1400 Services Gateway DC Power Cable Specifications on page 78
- SRX1400 Services Gateway DC Power Supply on page 51
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121

SRX1400 Services Gateway DC Power Cable Specifications

The DC power supply in slot **P0** must be powered by dedicated power feeds derived from feed A, and the DC power supply in slot **P1** 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.

For other electrical safety information, see *General Electrical Safety Guidelines and Warnings*

CAUTION: Power cords and cables must not block access to services gateway components or cause a tripping hazard.

For a description of the DC power supply, see "SRX1400 Services Gateway DC Power Supply" on page 51. For instructions on connecting the DC power and grounding cables during initial installation, see "Connecting the SRX1400 Services Gateway to a DC Power Supply" on page 132. For instructions on replacing a DC power cable, see "Replacing a DC Power Supply on the SRX1400 Services Gateway" on page 201.

Table 37 on page 79 summarizes the specifications for the power cables, which you must supply.

Table 37: DC Power Cable Specifications

Cable Type	Quantity and Specification
Power	Eight 6-AWG (13.3 mm^2), minimum 60ºC wire, or as permitted by the local code

Related Documentation

- SRX1400 Services Gateway DC Power System Electrical Specifications on page 77
- SRX1400 Services Gateway DC Power Supply Electrical Specifications on page 77
- Power Requirements for DC-Powered SRX1400 Services Gateways on page 80
- SRX1400 Services Gateway DC Power Supply on page 51
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121

Power Requirements for DC-Powered SRX1400 Services Gateways

NOTE: If you plan to operate a maximally configured DC-powered services gateway, we recommend that you provision 16 A @ -48 VDC for the system.

If you do not plan to provision 16 A @ -48 VDC for the system, you can use the information in Table 38 on page 80 and Table 39 on page 80 to calculate the power consumption @ -48 VDC, and thermal output for various hardware configurations.

Table 38 on page 80 lists the power requirements for base DC-powered devices operating under typical voltage conditions.

Table 38: DC-Powered Base System Requirements

DC Power Supply Configuration	Power Requirement (Watts)
Nonredundant configuration includes DC power supply, backplane, SYSIOC, Routing Engine, and fan tray.	210 W (approximate)
Redundant configuration includes two DC power supplies, backplane, SYSIOC, Routing Engine, and fan tray.	222 W (approximate)

NOTE: The power requirement values shown in Table 38 on page 80 are for a lightly loaded system. For a heavily loaded system, the contribution of the base system to the overall system power requirement is lower, because the power supply efficiency improves as the load increases. For a heavily loaded system, both the redundant and nonredundant base systems contribute approximately 210 W to the overall system power requirement.

NOTE: In the SRX1400 Services Gateways with 1-Gigabit Ethernet System I/O card, the base system power requirement is less by 5-6 watts than the SRX1400 devices with 10-Gigabit Ethernet System I/O card.

Table 39 on page 80 lists the power requirements for various hardware components when the services gateway is operating under typical voltage conditions.

Table 39: Component DC Power Requirements

Component	Power Requirement (Watts)
NSPC	214 W
IOC	61 W (max.)

Use the information in Table 38 on page 80 and Table 39 on page 80 to calculate power consumption for various hardware configurations, input current from a different source voltage, and thermal output, as shown in the following examples. These examples use maximum values per IOC.

- Minimum DC-powered configuration:

  Base device + 1 NSPC =
  210 W +214 W = 424 W, 8.83 A @ -48 VDC

- Maximum DC-powered configuration:

  Base device + 1 NSPC + 1 IOC =
  210 W + 214 W + 61 W = 485 W, 10.1A @ -48 VDC

- 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 = 48V * 10.1 A
  X = (48 * 10.1)/54 = 8.98 A

- Thermal output for maximally configured DC-powered services gateway:

  Watts DC * 3.41 = BTU/hr
  485 * 3.41 = 1653.85 BTU/hr

Related Documentation

- SRX1400 Services Gateway DC Power System Electrical Specifications on page 77
- SRX1400 Services Gateway DC Power Supply Electrical Specifications on page 77
- SRX1400 Services Gateway DC Power Cable Specifications on page 78
- SRX1400 Services Gateway DC Power Supply on page 51
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121

CHAPTER 13

Cable Specifications and Pinouts

Console Port Cable and Wire Specifications for the SRX1400 Services Gateway

Table 40 on page 83 lists the specifications for the cable that connects a **CONSOLE** port on the SYSIOC to a management console.

Table 40: Cable and Wire Specifications for Routing Engine Management and Alarm Interfaces

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

Related Documentation

- *SRX1400 Services Gateway Electrical Wiring Guidelines*
- Connecting the SRX1400 Services Gateway to a Management Console or an Auxiliary Device on page 127
- Connecting the SRX1400 Services Gateway to a Network for Out-of-Band Management on page 128

Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX1400 Services Gateway

Multimode fiber is large enough in diameter to allow rays of light to reflect internally (bounce off the walls of the fiber). Interfaces with multimode optics typically use LEDs as light sources. LEDs are not coherent sources, however. They spray varying wavelengths of light into the multimode fiber, which reflects the light at different angles. Light rays travel in jagged lines through a multimode fiber, causing signal dispersion. When light traveling in the fiber core radiates into the fiber cladding, higher-order mode loss (HOL) results. Together these factors limit the transmission distance of multimode fiber compared to single-mode fiber.

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

Related Documentation

- *SRX1400 Services Gateway Electrical Wiring Guidelines*
- Attenuation and Dispersion in Fiber-Optic Cable for the SRX1400 Services Gateway on page 85
- Calculating the Power Budget for Fiber-Optic Cable for the SRX1400 Services Gateway on page 84
- Calculating the Power Margin for Fiber-Optic Cable for the SRX1400 Services Gateway on page 86

Calculating the Power Budget for Fiber-Optic Cable for the SRX1400 Services Gateway

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

$$P_B = P_T - P_R$$

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

$$P_B = P_T - P_R$$

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

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

Related Documentation

- *SRX1400 Services Gateway Electrical Wiring Guidelines*
- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX1400 Services Gateway on page 84
- Attenuation and Dispersion in Fiber-Optic Cable for the SRX1400 Services Gateway on page 85
- Calculating the Power Margin for Fiber-Optic Cable for the SRX1400 Services Gateway on page 86

Attenuation and Dispersion in Fiber-Optic Cable for the SRX1400 Services Gateway

Correct functioning of an optical data link depends on modulated light reaching the receiver with enough power to be demodulated correctly. *Attenuation* is the reduction in power of the light signal as it is transmitted. Attenuation is caused by passive media components, such as cables, cable splices, and connectors. While attenuation is significantly lower for optical fiber than for other media, it still occurs in both multimode and single-mode transmission. An efficient optical data link must have enough light available to overcome attenuation.

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

- Chromatic dispersion—The spreading of the signal in time resulting from the different speeds of light rays.
- Modal dispersion—The spreading of the signal in time resulting from the different propagation modes in the fiber.

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

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

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

Related Documentation

- *SRX1400 Services Gateway Electrical Wiring Guidelines*
- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX1400 Services Gateway on page 84

- Calculating the Power Budget for Fiber-Optic Cable for the SRX1400 Services Gateway on page 84
- Calculating the Power Margin for Fiber-Optic Cable for the SRX1400 Services Gateway on page 86

Calculating the Power Margin for Fiber-Optic Cable for the SRX1400 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 41 on page 86 lists an estimated amount of loss for the factors used in the following sample calculations. For information about the actual amount of signal loss caused by equipment and other factors, see your vendor documentation.

Table 41: Estimated Values for Factors That Cause Link Loss

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

The following example uses the estimated values in Table 41 on page 86 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 41 on page 86 to calculate link loss (LL) as the sum of fiber attenuation (8 km @ 0.5 dB/km, or 4 dB) and loss for seven connectors (0.5 dB per connector, or 3.5 dB). The power margin (P_M) is calculated as follows:

$P_M = P_B - LL$

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

P_M = 13 dB – 4 dB – 3.5 dB

P_M = 5.5 dB

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

Related Documentation

- *SRX1400 Services Gateway Electrical Wiring Guidelines*
- Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for the SRX1400 Services Gateway on page 84
- Attenuation and Dispersion in Fiber-Optic Cable for the SRX1400 Services Gateway on page 85
- Calculating the Power Budget for Fiber-Optic Cable for the SRX1400 Services Gateway on page 84

PART 3

Initial Installation and Configuration

CHAPTER 14

Installation Overview

Installation Overview for the SRX1400 Services Gateway

This section provides instructions for installing the SRX1400 Services Gateway in a rack or cabinet. Because of the size and weight of the device—up to 42.5 lb (19.3 kg) (fully loaded chassis) depending on the configuration—we recommend that you install it using a mechanical lift. The SRX1400 Services Gateway is rack-mountable with support for both front-mounting and rear-mounting.

After you have prepared your installation site, you are ready to unpack and install the services gateway. It is important to proceed through the installation process as shown in Table 42 on page 91.

Table 42: SRX1400 Services Gateway Installation Process

Procedures	For More Information, See:
Review the safety guidelines	"Site Preparation Checklist for the SRX1400 Services Gateway" on page 61
Install the services gateway	"Installing the SRX1400 Services Gateway in a Rack or Cabinet Manually" on page 108 or "Installing the SRX1400 Services Gateway in a Rack or Cabinet Using a Mechanical Lift" on page 101
Connect cables to external devices	"Connecting the SRX1400 Services Gateway to a Network for Out-of-Band Management" on page 128 or "Connecting the SRX1400 Services Gateway to a Management Console or an Auxiliary Device" on page 127
Connect the grounding cable	"Grounding the SRX1400 Services Gateway" on page 125

Table 42: SRX1400 Services Gateway Installation Process *(continued)*

Procedures	For More Information, See:
Connect the power cables	"Connecting the SRX1400 Services Gateway to a DC Power Supply" on page 132 or "Connecting the SRX1400 Services Gateway to an AC Power Supply" on page 129
Power on the services gateway	"Powering On the SRX1400 Services Gateway" on page 133
Perform the initial system startup	"SRX1400 Services Gateway Software Configuration Overview" on page 137

Related Documentation

- *SRX1400 Services Gateway Safety Requirements, Warnings, and Guidelines*
- Installing the Mounting Hardware for the SRX1400 Services Gateway on page 99
- Installing the SRX1400 Services Gateway in a Rack or Cabinet Using a Mechanical Lift on page 101
- Installing the SRX1400 Services Gateway in a Rack or Cabinet Manually on page 108

Preparing the SRX1400 Services Gateway for Rack-Mount or Cabinet Installation

Before you begin the installation, verify the following:

- Your site has been properly prepared for the device. See "Site Preparation Checklist for the SRX1400 Services Gateway" on page 61 for a summary of the tasks you need to perform.
- The device has been removed from the shipping container. See "Unpacking the SRX1400 Services Gateway" on page 95.
- You have read the safety information in *Chassis Lifting Guidelines*.
- 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. For details, see "Clearance Requirements for Airflow and Hardware Maintenance of the SRX1400 Services Gateway" on page 65.

Related Documentation

- Required Tools for Installing the SRX1400 Services Gateway on page 101
- Installing the Mounting Hardware for the SRX1400 Services Gateway on page 99
- Installing the SRX1400 Services Gateway in a Rack or Cabinet Using a Mechanical Lift on page 101
- Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway on page 106
- Lifting the SRX1400 Services Gateway Chassis into a Rack on page 106

- Reinstalling Components into the SRX1400 Services Gateway Chassis on page 109

CHAPTER 15

Unpacking the Services Gateway

Required Tools and Parts for Unpacking the SRX1400 Services Gateway

To unpack the SRX1400 Services Gateway and prepare for installation, you need a Phillips (+) screwdriver, number 2.

Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Site Preparation Checklist for the SRX1400 Services Gateway on page 61
- Unpacking the SRX1400 Services Gateway on page 95
- Verifying Parts Received with the SRX1400 Services Gateway on page 97

Unpacking the SRX1400 Services Gateway

The SRX1400 Services Gateway is shipped in a cardboard carton. Getting Started installation instructions and an accessory box are also included in the shipping carton.

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

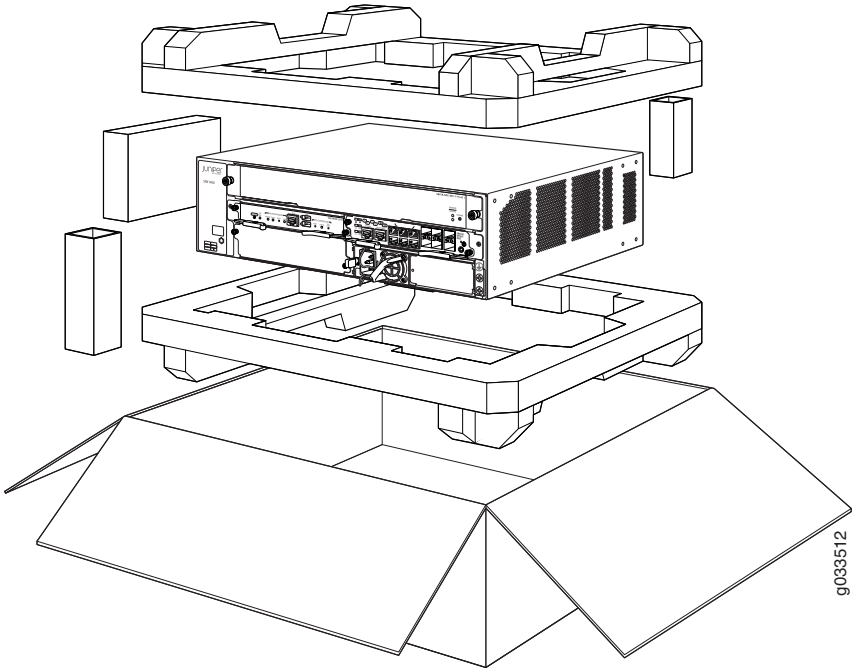
Figure 37 on page 96 shows the SRX1400 Services Gateway in a shipping carton.

To unpack the services gateway:

1. Move the shipping carton to a staging area as close to the installation site as possible, where you have enough room to remove the components from the chassis.
2. Position the shipping carton with the arrows pointing up.
3. Remove the plastic handle inserts and lift the cardboard cover off the device.
4. Remove the foam covering the top of the services gateway.

5. Remove the accessory box and the *SRX1400 Services Gateway Getting Started Guide*.

Figure 37: Unpack the SRX1400 Services Gateway



6. With a person on each side of the carton, carefully lift the services gateway from the carton and place it on a flat, level surface. Remove the bag covering the services gateway.
7. Verify the parts received against the list provided in the "Verifying Parts Received with the SRX1400 Services Gateway" on page 97.
8. Save the carton and the packing materials in case you need to move or ship the services gateway at a later time.

NOTE: At the time of shipment, the adjacent CFM slots 1 and 3 are covered with a filler cover and slot 2 is covered with a blank panel. Save the filler cover and the blank panel after removing them from the slots, in case you need them when you pack or move the chassis at a later time. The filler cover is bare metal, without a colored overlay.

9. Proceed to install the services gateway.

Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Site Preparation Checklist for the SRX1400 Services Gateway on page 61
- Required Tools and Parts for Unpacking the SRX1400 Services Gateway on page 95
- Verifying Parts Received with the SRX1400 Services Gateway on page 97

Verifying Parts Received with the SRX1400 Services Gateway

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. Note that feature and service cards are shipped in separate boxes from the chassis.

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

A fully configured services gateway contains the chassis with installed components, listed in Table 43 on page 97, and an accessory box, which contains the parts listed in Table 44 on page 98. The parts shipped with your services gateway can vary depending on the configuration you ordered.

Table 43: Parts List for a Fully Configured SRX1400 Services Gateway

Component	Quantity
Chassis, including backplane, and rack-mounting brackets	1
NSPC	1
Routing Engine	1
System I/O card	1
Power supplies	At least 1 and up to 2
Fan tray	1
Air filter	1
SRX1400 Services Gateway Getting Started Guide	1
Blank panels for slots without components installed	• 1 single-wide blank panel for CFM slot 2. • 1 double-wide blank panel for adjacent CFM slots 1 and 3.
AC Power Cord	1

NOTE: The NSPC is not a part of the base chassis configuration. You must order it separately. Contact your Juniper Networks customer service representative for more information.

NOTE: If you are planning to use an Network Processing Card (NPC) and a Services Processing Card (SPC) (supported on SRX3000 Series Services Gateway) on the SRX1400 device, then you must order them separately.

You can use an NPC and an SPC on the SRX1400 device in place of the NSPC.

To install the NPC and SPC on the SRX1400 Services Gateway, you must order the double-wide tray (SRX1K3K-2CFM-TRAY) to hold two single-wide CFMs (NPC and SPC) separately. Contact your Juniper Networks customer service representative for more information.

Table 44: Accessory Box Parts List

Part	Quantity
Rack mount kit	1
RJ-45-to-DB-9 cable to connect the services gateway through the serial port	1
Juniper Networks Product Warranty	1
End User License Agreement	1
SRX1400 Services Gateway Getting Started Guide	1
Documentation Information Card	1
Product Registration	1
Juniper Compliance Form Letter; Reduction of Hazardous Substances (RoHS)	1
Document sleeve	1
ESD wrist strap with cable	1

Related Documentation

- Installation Overview for the SRX1400 Services Gateway on page 91
- Site Preparation Checklist for the SRX1400 Services Gateway on page 61
- Required Tools and Parts for Unpacking the SRX1400 Services Gateway on page 95
- Unpacking the SRX1400 Services Gateway on page 95

CHAPTER 16

Installing the Mounting Hardware

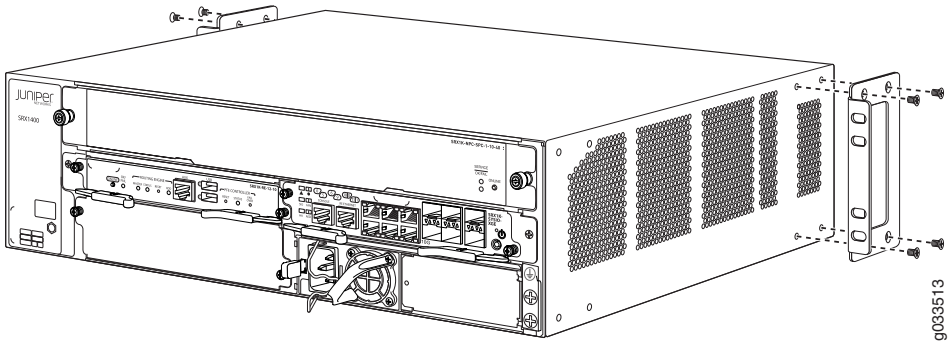
Installing the Mounting Hardware for the SRX1400 Services Gateway

The specific mounting hardware used depends on the type of rack you are using. Follow the appropriate steps for your rack to install the mounting hardware.

To install the mounting hardware:

1. Locate the rack-mounting brackets in the accessory kit.
2. Position a mounting bracket on each side of the chassis. You can position the brackets in front-mount or rear-mount position.
3. Use the screws provided to secure the rack-mounting brackets to the sides of the chassis as shown in Figure 38 on page 99.

Figure 38: Attaching Mounting Brackets to the SRX1400 Services Gateway



Related Documentation

- Required Tools for Installing the SRX1400 Services Gateway on page 101
- Preparing the SRX1400 Services Gateway for Rack-Mount or Cabinet Installation on page 92
- Installing the SRX1400 Services Gateway in a Rack or Cabinet Using a Mechanical Lift on page 101
- Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway on page 106

- Lifting the SRX1400 Services Gateway Chassis into a Rack on page 106
- Reinstalling Components into the SRX1400 Services Gateway Chassis on page 109

CHAPTER 17

Installing the SRX1400 Services Gateway Using a Mechanical Lift

Required Tools for Installing the SRX1400 Services Gateway

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

- Mechanical lift (if you are installing the device using a mechanical lift)
- Phillips (+) screwdriver, number 2

Related Documentation

- Preparing the SRX1400 Services Gateway for Rack-Mount or Cabinet Installation on page 92
- Installing the Mounting Hardware for the SRX1400 Services Gateway on page 99
- Installing the SRX1400 Services Gateway in a Rack or Cabinet Using a Mechanical Lift on page 101
- Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway on page 106
- Lifting the SRX1400 Services Gateway Chassis into a Rack on page 106
- Reinstalling Components into the SRX1400 Services Gateway Chassis on page 109

Installing the SRX1400 Services Gateway in a Rack or Cabinet Using a Mechanical Lift

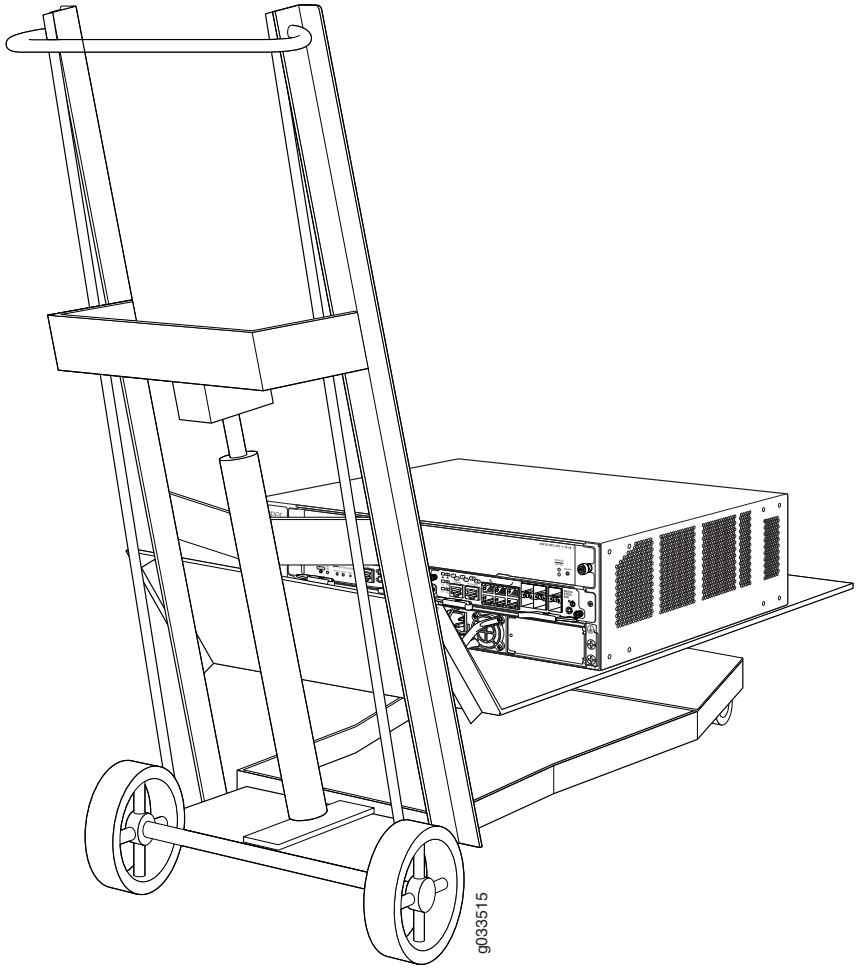
CAUTION: If a slot is not occupied by a card, you must install a blank panel to shield the empty slot to prevent foreign objects from damaging the exposed electronics.

You can front-mount or rear-mount the services gateway in a two-post rack, a four-post rack, or a cabinet. This topic provides the installation instructions on front-mounting of the device in a two-post rack.

To install an SRX1400 Services Gateway in a rack or cabinet:

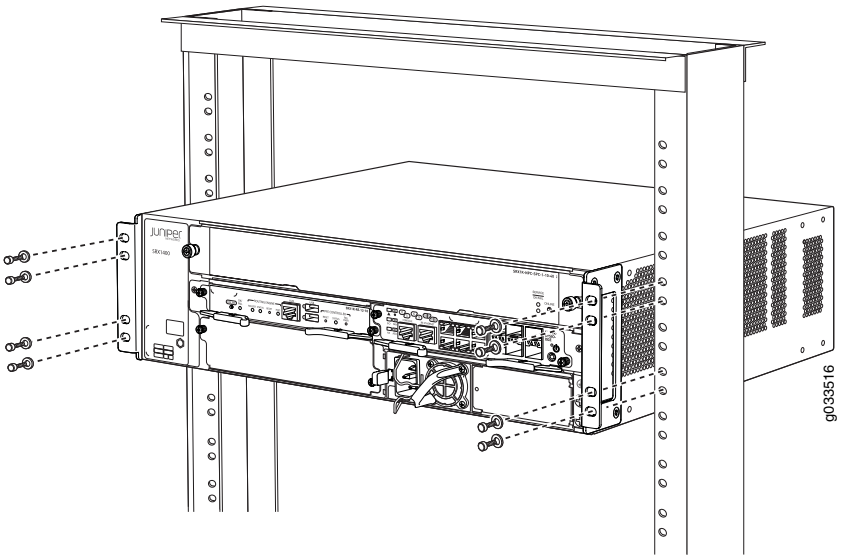
1. Ensure the rack is in its permanent location and is secured to the building.
2. Ensure that the installation site allows adequate clearance for both airflow and maintenance. For details, see "Site Preparation Checklist for the SRX1400 Services Gateway" on page 61.
3. Load the device onto the lift, making sure it rests securely on the lift platform (see Figure 39 on page 102).

Figure 39: Load SRX1400 Services Gateway Into a Mechanical Lift



4. Using the lift, position the device in the rack and align the bottom hole in each mounting bracket with a hole in each rack rail as shown in Figure 40 on page 103.

Figure 40: Attach Mounting Hardware for Two-Post Rack



- For front-mounting the chassis in a two-post rack, align the bottom hole in each mounting bracket at the front edge of the chassis.
- For rear-mounting the chassis in a two-post rack, align the bottom hole in each mounting bracket at the rear edge of the chassis.

NOTE: Similarly, you can front-mount or rear-mount the chassis in a four-post rack. However, there is no support shelf provided for the unsupported edge of the chassis to rest on.

5. Install the remaining screws in each mounting bracket. Use a number-2 Phillips screwdriver to tighten the screws.
6. Move the lift away from the rack.
7. 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.

NOTE: Similarly, you can front-mount or rear-mount the chassis in a four-post rack. However, there is no support shelf provided for the rear edge of the chassis to rest on.

Related Documentation

- Required Tools for Installing the SRX1400 Services Gateway on page 101
- Preparing the SRX1400 Services Gateway for Rack-Mount or Cabinet Installation on page 92

- Installing the Mounting Hardware for the SRX1400 Services Gateway on page 99

CHAPTER 18

Installing the SRX1400 Services Gateway Manually (Without a Mechanical Lift)

Required Tools for Installing the SRX1400 Services Gateway Manually

To install the device, you need the following tools and parts:

- Phillips (+) screwdrivers, numbers 1 and 2
- ESD grounding wrist strap

Related Documentation

- Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway on page 106
- Lifting the SRX1400 Services Gateway Chassis into a Rack on page 106
- Reinstalling Components into the SRX1400 Services Gateway Chassis on page 109

Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway

To make the services gateway light enough to install manually, you must remove the following components from the chassis:

- Power supplies
- Fan tray

The procedure in this topic is for removing components from the base model of the chassis for initial installation only. To use this procedure, you must have not yet connected power cables to the services gateway.

To remove the components from the services gateway:

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see the SRX1400 Services Gateway hardware documentation at www.juniper.net/techpubs.
2. Release each component by loosening its retaining screws and unlatching its ejector handles, as appropriate.
3. Slide each component out of the chassis evenly so that it does not become stuck or damaged.
4. Label each component as you remove it so you can reinstall it in the correct location.
5. Immediately store each removed component in an electrostatic bag.
6. Do not stack removed components. Set each one on a flat surface.

Related Documentation

- Required Tools for Installing the SRX1400 Services Gateway Manually on page 105
- Lifting the SRX1400 Services Gateway Chassis into a Rack on page 106
- Reinstalling Components into the SRX1400 Services Gateway Chassis on page 109

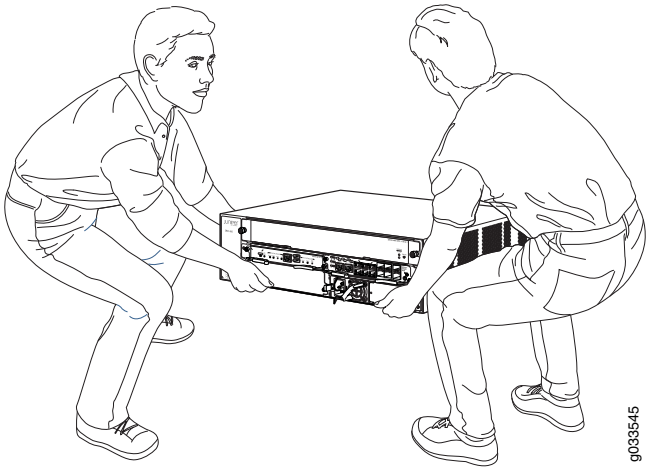
Lifting the SRX1400 Services Gateway Chassis into a Rack

Lifting the chassis and mounting it in a rack requires two people (see Figure 41 on page 107). Without the power supply and fan tray, the chassis weighs approximately 23 lb (10.6 kg).

1. Ensure that the rack is in its permanent location and is secured to the building.
2. Position the chassis in front of the rack.
3. With one person on each side, lift the chassis into position in the rack.

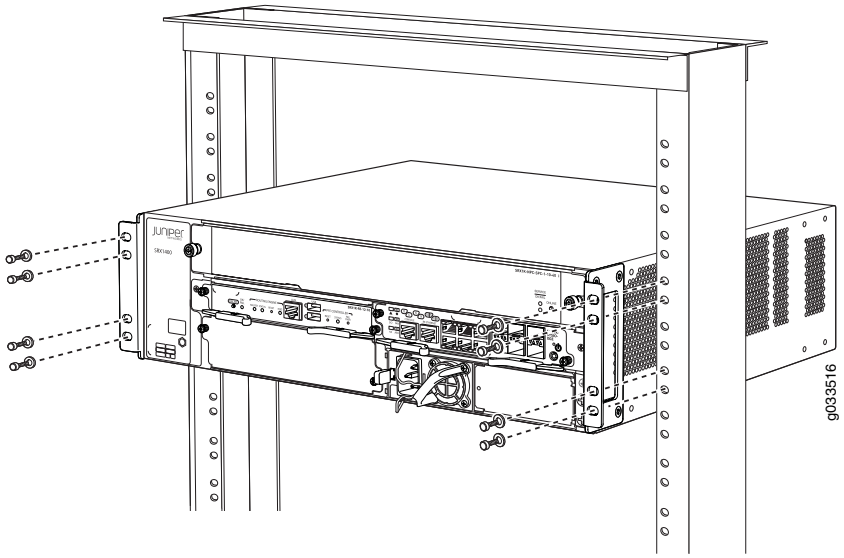
WARNING: **Do not attempt to lift the chassis by the handles on the power supplies or on the CFMs. The handles might break off and cause the chassis to fall and inflict injury.**

Figure 41: Lift the Chassis Into the Rack



4. Align the bottom hole in each mounting bracket with a hole in each rack rail as shown in Figure 42 on page 107.

Figure 42: Attach Mounting Hardware for Two-Post Rack



- For front-mounting the chassis in a two-post rack, align the bottom hole in each mounting bracket at the front edge of the chassis.
- For rear-mounting the chassis in a two-post rack, align the bottom hole in each mounting bracket at the rear edge of the chassis.

NOTE: Similarly, you can front-mount or rear-mount the chassis in a four-post rack. However, there is no support shelf provided for the unsupported edge on which the chassis can rest.

5. Use the screws to attach the left and right brackets to the rack.
6. Visually inspect the alignment of the chassis. If the chassis is installed properly in the rack, all the mounting screws on one side of the rack should be aligned with the mounting screws on the opposite side, and the chassis should be level.

Related Documentation

- Required Tools for Installing the SRX1400 Services Gateway Manually on page 105
- Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway on page 106
- Reinstalling Components into the SRX1400 Services Gateway Chassis on page 109

Installing the SRX1400 Services Gateway in a Rack or Cabinet Manually

If you cannot use a mechanical lift to install the SRX1400 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.

NOTE: **We recommend removing the components from the chassis before installing to prevent damage to the components.**

At least two people are needed to safely lift the chassis into the rack or cabinet. With components removed, the chassis weighs approximately 23.30 lb (10.57 kg).

CAUTION: **If a slot is not occupied by a card, you must install a blank panel to shield the empty slot to prevent foreign objects from damaging the exposed electronics.**

Before installing the services gateway in the rack:

- Read the safety information in *Chassis Lifting Guidelines*.
- Remove the services gateway from the shipping container as described in "Unpacking the SRX1400 Services Gateway" on page 95.
- Install the mounting hardware as described in "Installing the Mounting Hardware for the SRX1400 Services Gateway" on page 99.

Installing the SRX1400 Services Gateway in a rack or cabinet Manually involves the following steps:

1. Remove the components from chassis to reduce the weight. For more information, see "Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway" on page 106.
2. Lift the chassis into a rack. For more information, see "Lifting the SRX1400 Services Gateway Chassis into a Rack" on page 106.

3. Reinstall the components into the SRX1400 Services Gateway chassis. For more information, see "Reinstalling Components into the SRX1400 Services Gateway Chassis" on page 109.

Related Documentation

- *SRX1400 Services Gateway Safety Requirements, Warnings, and Guidelines*
- Required Tools for Installing the SRX1400 Services Gateway Manually on page 105
- Installing the Mounting Hardware for the SRX1400 Services Gateway on page 99

Reinstalling Components into the SRX1400 Services Gateway Chassis

To reinstall the components into the SRX1400 Services Gateway chassis:

1. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis. For more information about ESD, see the SRX1400 Services Gateway hardware documentation at www.juniper.net/techpubs.
2. Identify the locations in the chassis where you will reinstall the removed components. Use the label you have marked on each removed component to identify the component and its correct location in the chassis.
3. Slide each component into the chassis evenly so that it does not become stuck or damaged.
4. Tighten the latching levers or captive screws for each component as appropriate.

NOTE: **Do not expose the empty CFM slots during storage or transportation. Use appropriate covers (blank panel for CFM slot 2 and filler cover for the adjacent CFM slots 1 and 3) to prevent any dust or foreign objects from damaging the electronics.**

Related Documentation

- Required Tools for Installing the SRX1400 Services Gateway Manually on page 105
- Removing Components from the Chassis for Manual Lifting of the SRX1400 Services Gateway on page 106
- Lifting the SRX1400 Services Gateway Chassis into a Rack on page 106

CHAPTER 19

Installing Additional Hardware Components

Installing a Network and Services Processing Card in an SRX1400 Services Gateway

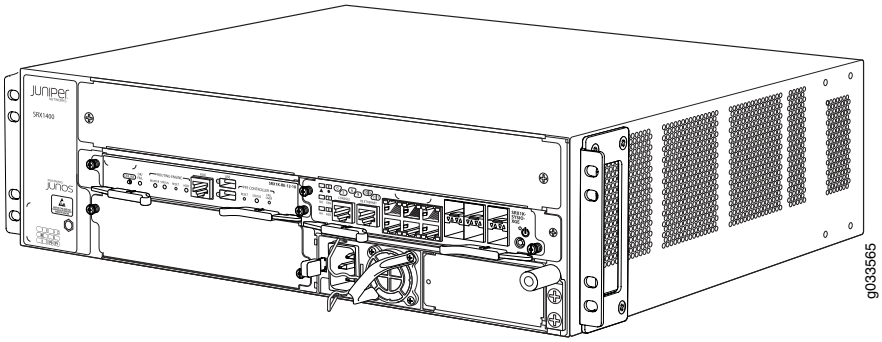
You install the NSPC in the CFM slots labeled **1** and **3** in the front panel of the SRX1400 Services Gateway. These two slots combine into a double-wide slot that accommodates the NSPC.

Before installing your card, see "SRX1400 Services Gateway Front Panel" on page 25 to identify the CFM1 and CFM3 slots.

NOTE: You can install either an NSPC, or a combination of SRX3000 Series Services Gateway Network Processing Card (NPC) and Services Processing Card (SPC), on the SRX1400 Services Gateway. You must use a double-wide tray with the combination of NPC and SPC.

NOTE: If an NSPC is not present, you must install a filler cover to shield the empty slots 1 and 3 and to (shown in Figure 43 on page 112) to shield the empty slots and to allow cooling air to circulate properly through the device.

Figure 43: SRX1400 Services Gateway with CFM Slots 1 and 3 Covered by Double-Wide Filler Cover



To install an NSPC:

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

   For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.

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

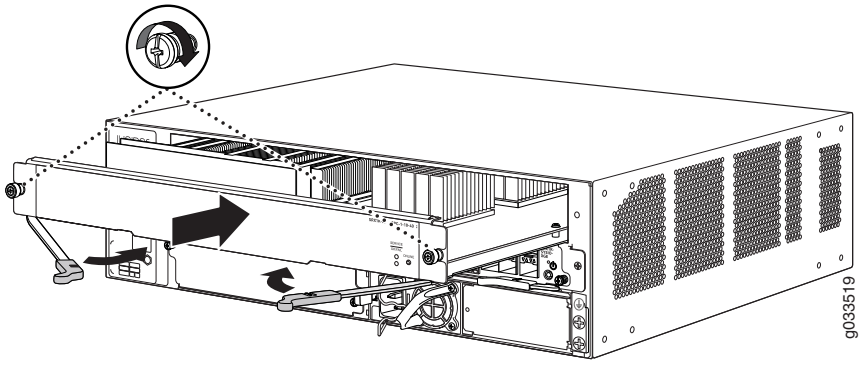
3. Identify the double-wide CFM **1** and **3** slot on the services gateway where you will install the NSPC.

   See "SRX1400 Services Gateway Front Panel" on page 25 for details about where the individual modules can be installed.

4. Remove the double-wide filler cover from the slot by loosening its screws and sliding it out of the slot. Save the filler cover after removing it from the slot, in case you need it when you pack or move the chassis at a later time.

5. Orient the NSPC so that the faceplate faces you. Slide the NSPC all the way into the card cage until you feel resistance. See Figure 44 on page 113.

Figure 44: Installing a Network and Services Processing Card in an SRX1400 Services Gateway



6. Press both of the ejector handles inward to seat the NSPC.
7. Tighten the screws on either side of the card.

   You can proceed with installing other hardware components, or power supplies, or connecting to a management device. See "Powering On the SRX1400 Services Gateway" on page 133 to power on the SRX1400 Services Gateway.

Related Documentation

- Installing an NPC in an SRX1400 Services Gateway on page 115
- Installing an SPC in an SRX1400 Services Gateway on page 113
- SRX1400 Services Gateway Hardware Components on page 9

Installing an SPC in an SRX1400 Services Gateway

There are two places where you can install an SPC in your SRX1400 Services Gateway:

- You can install an SPC in the front-panel slot labeled **1** if you also install an NPC in the slot labeled **3**. This combination of SPC and NPC replaces the full-width NSPC that is normally installed in the SRX1400 Services Gateway to perform both services processing and network processing functions.
- If your SRX1400 Services Gateway is running Junos OS Release 12.1X44-D10 or later, you can install an SPC in slot **2**. Doing so increases the services processing performance of the services gateway and increases its session capacity.

Before installing your card, see "SRX1400 Services Gateway Front Panel" on page 25 to verify that you have selected an appropriate slot location.

NOTE: 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.

To install an SPC:

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

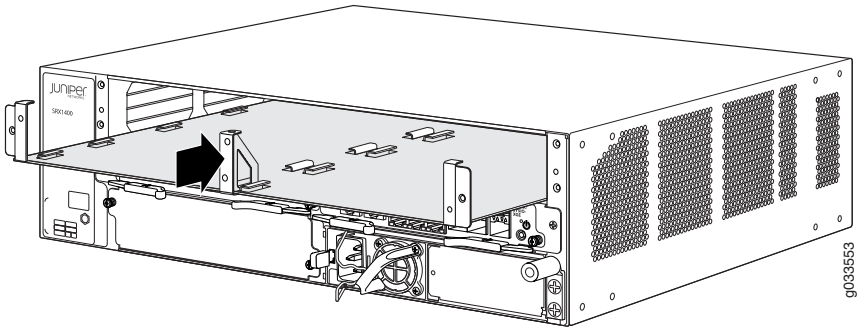
   For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.

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

3. If necessary, remove the blank panel covering the slot where you are installing the SPC. If you are installing the SPC in slot 1 in conjunction with an NPC in slot 3, remove the double-wide filler cover from the slot by loosening its screws and sliding it out of the slot.

4. If you are installing the SPC in slot 1 in conjunction with an NPC in slot 3, insert the double-wide tray and insert it straight into the slot until you hear a click, indicating the latch has closed as shown in Figure 45 on page 114.

Figure 45: Installing Double-Wide Tray on SRX1400 Services Gateway



5. Orient the SPC so that the faceplate faces you. Slide the SPC all the way into the card cage until you feel resistance. See Figure 46 on page 114 and Figure 47 on page 115.

Figure 46: Installing an SPC in Slot 1 of the SRX1400 Services Gateway

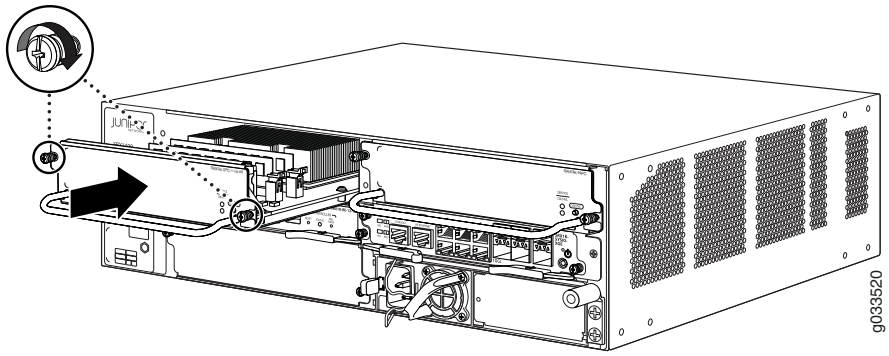
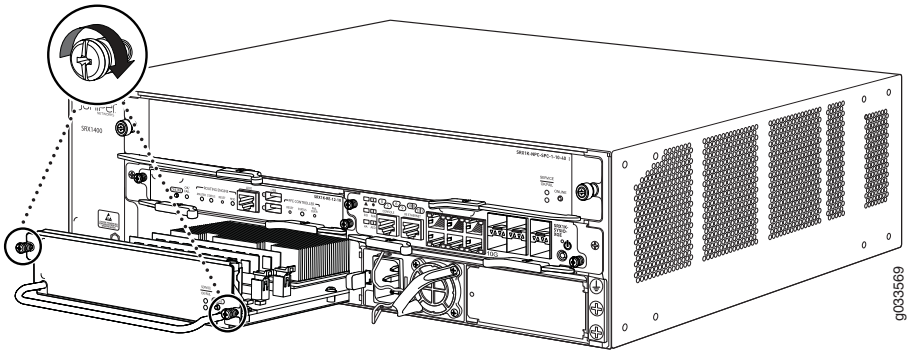


Figure 47: Installing an SPC in Slot 2 of the SRX1400 Services Gateway



6. Tighten the screws on either side of the card.

You can proceed with installing other hardware components or power supplies, or connecting to a management device. See "Powering On the SRX1400 Services Gateway" on page 133 to power on the SRX1400 Services Gateway.

WARNING: Never lift the services gateway using the handles on the front panels of the SPC or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

Related Documentation

- SPCs for the SRX1400 Services Gateway on page 22
- Troubleshooting Services Processing Cards on the SRX1400 Services Gateway on page 165
- Replacing an SPC on the SRX1400 Services Gateway on page 188

Installing an NPC in an SRX1400 Services Gateway

NOTE: The SRX1400 Services Gateway is not normally equipped with an NPC. In most configurations, network processing functions are performed by the NSPC.

You can install an NPC in the front-panel slot labeled **3** if you also install an SPC in the slot labeled **1**. This combination of SPC and NPC replaces the full-width NSPC that is normally installed in the SRX1400 Services Gateway to perform both services processing and network processing functions.

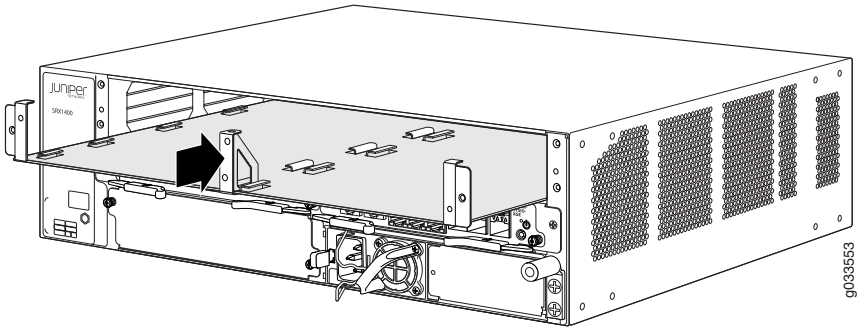
NOTE: If a slot is not occupied by a card, you must install a blank panel to shield the empty slot and to allow cooling air to circulate properly through the services gateway.

NOTE: To install the NPC and SPC on the SRX1400 Services Gateway, you must order the double-wide tray (SRX1K3K-2CFM-TRAY) to hold the two single-wide CFMs (NPC and SPC) separately. Contact your Juniper Networks customer service representative for more information.

To install an NPC:

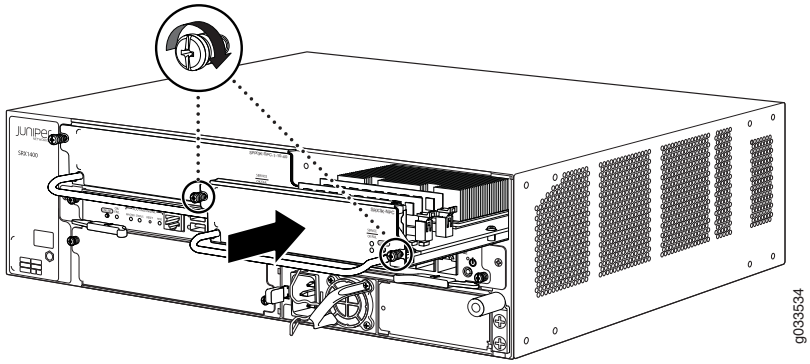
1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
2. Place the card on an antistatic mat or remove it from its electrostatic bag.
3. If necessary, remove the filler cover from the slot by loosening its screws and sliding it out of the slot.
4. Insert the double-wide tray and insert it straight into the slot until you hear a click, indicating the latch has closed as shown in Figure 48 on page 116.

Figure 48: Installing a Double-Wide Tray on the SRX1400 Services Gateway



5. Orient the NPC so that the faceplate faces you. Slide the NPC all the way into the card cage until you feel resistance. See Figure 49 on page 116

Figure 49: Installing an NPC on the SRX1400 Services Gateway



6. Tighten the screws on either side of the card.

You can proceed with installing other hardware components, or power supplies, or connecting to a management device. See "Powering On the SRX1400 Services Gateway" on page 133 to power on the SRX1400 Services Gateway.

WARNING: **Never lift the services gateway using the handles on the front panels of the NPC or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.**

Related Documentation

- NPCs for the SRX1400 Services Gateway on page 23
- Replacing a Network Processing Card on the SRX1400 Services Gateway on page 187
- Troubleshooting an NPC on the SRX1400 Services Gateway on page 164

Installing an IOC or NP-IOC in an SRX1400 Services Gateway

You can install an IOC or NP-IOC in slot 2 on the SRX1400 Services Gateway front panel. See "SRX1400 Services Gateway Front Panel" on page 25 for front panel slot locations.

To install an IOC or NP-IOC:

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

   For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.

2. Power off the services gateway if it is powered on.

   To power off the services gateway, press the Power button on the front panel of the System I/O Card (SYSIOC) for three to five seconds.

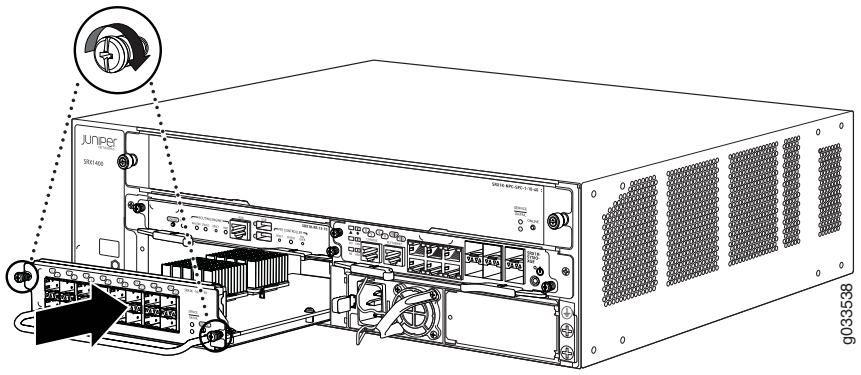
   The **PWR** LED blinks to show you that the services gateway is shutting down.

3. Place the IOC or NP-IOC on an antistatic mat or remove it from its electrostatic bag.

4. Identify the slot on the services gateway where you will install the IOC or NP-IOC.

   See "SRX1400 Services Gateway Front Panel" on page 25 for details about where the individual modules can be installed.

5. Orient the IOC or NP-IOC so that the faceplate faces you. Slide the IOC or NP-IOC all the way into the card cage until you feel resistance.



6. Tighten the screws on either side of the card.
7. For an NP-IOC or an IOC that uses fiber interfaces, install SFP, SFP+, or XFP transceivers as appropriate into the sockets on the IOC or NP-IOC:

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

   a. Take each new transceiver to be installed out of its electrostatic bag and identify the port on the IOC or NP-IOC where it will be installed.
   b. Verify that each transceiver is covered with a rubber safety cap. Cover any transceivers without a safety cap.
   c. Remove the rubber dust covers from each SFP, SFP+, or XFP socket in which you will install a transceiver.
   d. Carefully align the transceiver with the sockets in the IOC or NP-IOC. The connectors should face the IOC or NP-IOC.
   e. Slide the transceiver until the connector is seated in the IOC or NP-IOC slot. If you are unable to fully insert the transceiver, make sure the connector is facing the right way.
   f. Close the ejector handle of the transceiver.

8. For fiber 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.

9. Insert the appropriate cables into the cable connector ports on each IOC or NP-IOC. Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on a loop helps 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.

WARNING: Never lift the services gateway using the handles on the front panels of the IOC, NP-IOC, or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

Related Documentation

- SRX1400 Services Gateway Hardware Components on page 9

Installing a System I/O Card into the SRX1400 Services Gateway

Before installing your card, see "SRX1400 Services Gateway Front Panel" on page 25 to verify that you have selected an appropriate slot location.

To install a SYSIOC on an SRX1400 Services Gateway:

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

   For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.

2. Place the SYSIOC on an antistatic mat or remove it from its electrostatic bag.
3. Identify the slot on the services gateway where you will install the SYSIOC.

   See "SRX1400 Services Gateway Front Panel" on page 25 for details about where the individual modules can be installed.

4. Orient the SYSIOC so that the faceplate faces you. Slide the SYSIOC all the way into the card cage until you feel resistance.
5. Press both of the ejector handles inward to seat the SYSIOC.
6. Tighten the screws on either side of the card.
7. Insert the appropriate cables into the cable connector ports (ports 0-5) and small form-factor pluggable (SFP) transceivers (ports 6-11) on SYSIOC as required. Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on a loop helps to maintain its shape.

You can proceed with installing other hardware components, or power supplies, or connecting to a management device. See "Powering On the SRX1400 Services Gateway" on page 133 to power on the SRX1400 Services Gateway.

Related Documentation

- SRX1400 Services Gateway SYSIOCs on page 12
- SRX1400 Services Gateway Hardware Components on page 9
- Installing an AC Power Supply in the SRX1400 Services Gateway on page 120
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121

Installing an AC Power Supply in the SRX1400 Services Gateway

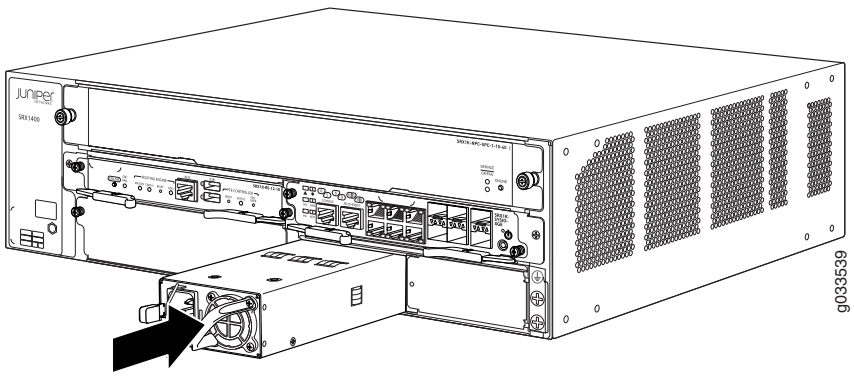
To install an AC power supply:

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

   For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.

2. Orient the power supply so that the locking lever is on the left, as shown in Figure 50 on page 120.

Figure 50: Installing an AC Power Supply in the SRX1400 Services Gateway



3. Using both hands, slide the power supply straight into the chassis until the power supply is fully seated in the chassis slot. The power supply faceplate should be flush with any adjacent power supply faceplate or blank installed in the power supply slot.
4. Proceed with connecting the power supply to AC power. See "Connecting the SRX1400 Services Gateway to an AC Power Supply" on page 129 for information on connecting the power supply to AC power.

Related Documentation

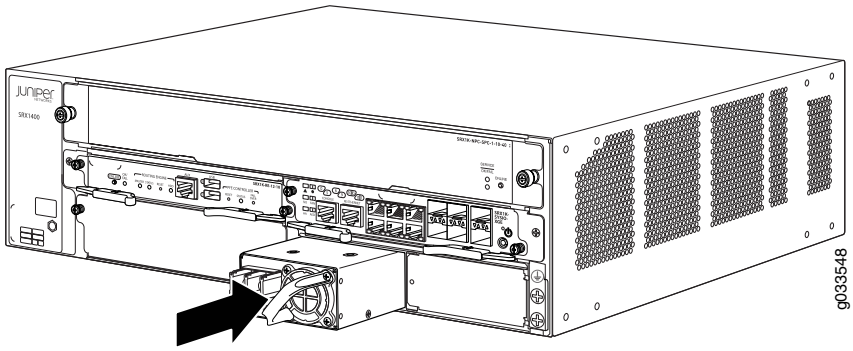
- SRX1400 Services Gateway Power Supplies Overview on page 49
- SRX1400 Services Gateway AC Power Supply on page 50
- Installing a DC Power Supply in the SRX1400 Services Gateway on page 121
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129

Installing a DC Power Supply in the SRX1400 Services Gateway

To install a DC power supply:

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. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Orient the power supply so that the locking lever is on the left, as shown in Figure 51 on page 121.

Figure 51: Installing a DC Power Supply in the SRX1400 Services Gateway



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 faceplate.
5. Proceed with connecting the power supply to DC power. See "Connecting the SRX1400 Services Gateway to a DC Power Supply" on page 132.

Related Documentation

- SRX1400 Services Gateway Power Supplies Overview on page 49
- SRX1400 Services Gateway DC Power Supply on page 51

- Installing an AC Power Supply in the SRX1400 Services Gateway on page 120
- Connecting the SRX1400 Services Gateway to a DC Power Supply on page 132

CHAPTER 20

Grounding the SRX1400 Services Gateway

Required Tools and Parts for Grounding and Providing Power to the SRX1400 Services Gateway

To ground and provide power to the device, you need the following tools and parts:

- Phillips (+) screwdrivers, numbers 1 and 2
- 2.5-mm flat-blade (–) screwdriver
- Wire cutters
- Electrostatic discharge (ESD) grounding wrist strap

Related Documentation

- Grounding the SRX1400 Services Gateway on page 125
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129
- Connecting the SRX1400 Services Gateway to a DC Power Supply on page 132
- Powering On the SRX1400 Services Gateway on page 133
- Powering Off the SRX1400 Services Gateway on page 134

SRX1400 Services Gateway Chassis Grounding Point

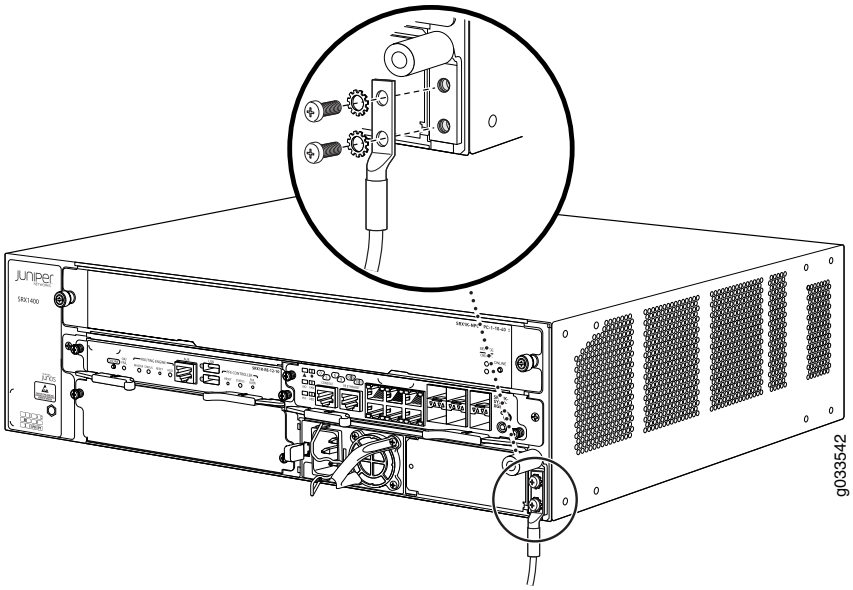
WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power.

CAUTION: Before services gateway installation begins, a licensed electrician must attach appropriate cable lugs to the grounding and power cables that

you supply. A cable with an incorrectly attached lug can damage the services gateway.

The services gateway chassis has one grounding point at the lower right corner of the front panel. The grounding point consists of two threaded holes spaced 0.625-in. (15.86-mm) apart (Figure 52 on page 124). The grounding point holes fit M5 screws. The accessory box shipped with the services gateway includes the cable lug that attaches to the grounding cable and two M5 screws used to secure the grounding cable to the services gateway grounding point.

Figure 52: Grounding Point on the SRX1400 Services Gateway



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

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

Related Documentation

- SRX1400 Services Gateway Grounding-Cable Lug Specification on page 69
- SRX1400 Services Gateway Grounding Cable Specification on page 69
- Grounding the SRX1400 Services Gateway on page 125
- SRX1400 Services Gateway Front Panel on page 25

Grounding the SRX1400 Services Gateway

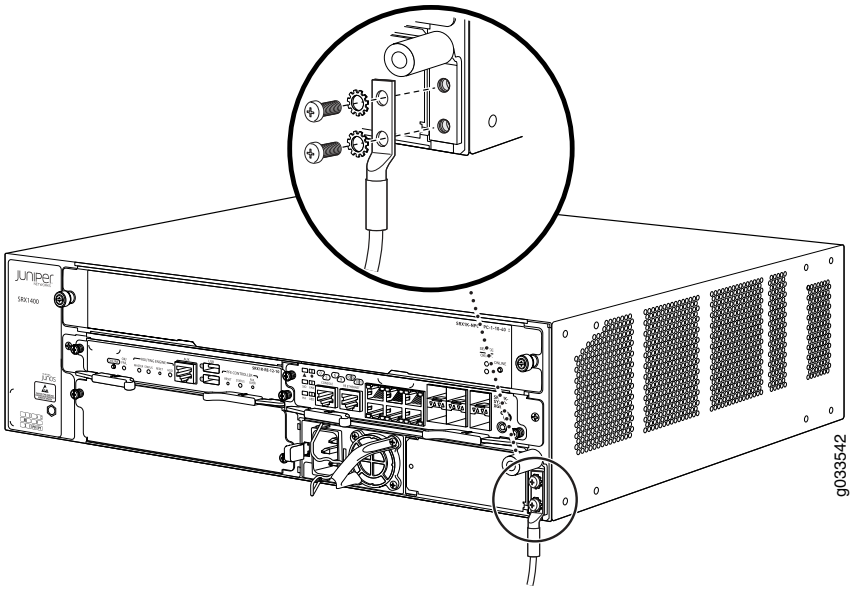
WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power.

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

To connect the services gateway to earth ground:

1. Verify that a licensed electrician has attached the cable lug provided with the services gateway to the grounding cable. The cable must be 14-AWG (2.1 mm^2), minimum 60°C wire.
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 you make the grounding connections.
4. Connect the grounding cable to a proper earth ground.
5. Detach the ESD grounding strap from the site ESD grounding point.
6. With the ESD grounding strap attached to your bare wrist, connect the strap to one of the ESD points on the chassis.
7. Place the grounding cable lug over the grounding point—a pair of M5 holes to the left of the power supply slots. See Figure 53 on page 126.

Figure 53: Connect the Grounding Cable to the SRX1400 Services Gateway



8. Secure the grounding cable lug to the chassis using washers and screws.
9. Dress the grounding cable, and verify that it does not touch or block access to device components and it does not cause a tripping hazard.

Related Documentation

- Required Tools and Parts for Grounding and Providing Power to the SRX1400 Services Gateway on page 123
- Powering On the SRX1400 Services Gateway on page 133
- Powering Off the SRX1400 Services Gateway on page 134

CHAPTER 21

Connecting the SRX1400 Services Gateway to External Devices

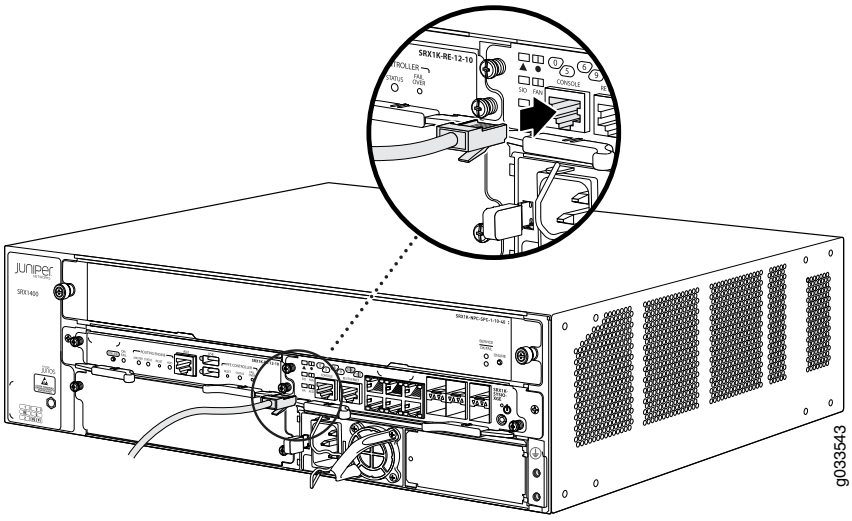
Connecting the SRX1400 Services Gateway to a Management Console or an Auxiliary Device

To use a system console to configure and manage the Routing Engine, use an RJ-45 cable to connect it to one of the **CONSOLE** ports on the SYSIOC.

To connect a management console or an auxiliary device:

1. Plug the RJ-45 end of the cable (see Figure 54 on page 127) into one of the **CONSOLE** ports on the SYSIOC.

Figure 54: Console Cable Connector



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

3. Proceed with grounding and powering on the device.

   You can start performing initial software configuration on the SRX1400 Services Gateway after the device is up.

Related Documentation

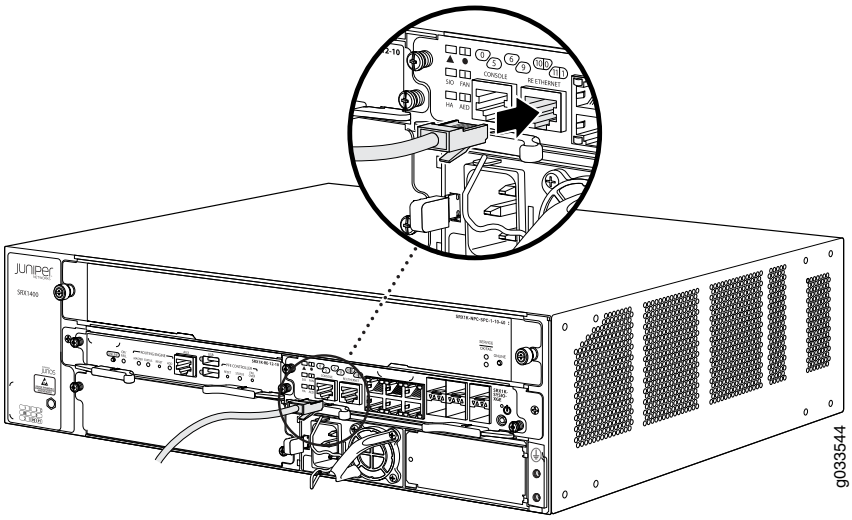
- Connecting the SRX1400 Services Gateway to a Network for Out-of-Band Management on page 128
- SRX1400 Services Gateway Software Configuration Overview on page 137
- Performing Initial Software Configuration on the SRX1400 Services Gateway (CLI Procedure) on page 138

Connecting the SRX1400 Services Gateway to a Network for Out-of-Band Management

To connect the Routing Engine to a network for out-of-band management:

1. Plug one end of an Ethernet cable with RJ-45 connectors (see Figure 55 on page 128) into the **RE ETHERNET** port on the front of the SYSIOC.

Figure 55: Ethernet Cable Connector



2. Plug the other end of the cable into the management device.
3. Proceed with grounding and powering on the device.

Related Documentation

- Connecting the SRX1400 Services Gateway to a Management Console or an Auxiliary Device on page 127
- SRX1400 Services Gateway Software Configuration Overview on page 137
- Performing Initial Software Configuration on the SRX1400 Services Gateway (CLI Procedure) on page 138

CHAPTER 22

Providing Power to the SRX1400 Services Gateway

Connecting the SRX1400 Services Gateway to an AC Power Supply

You connect AC power to the services gateway by attaching power cords from the AC power sources to the AC appliance inlets located on the power supplies.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX1400 Services Gateway" on page 125 for instructions.

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

To connect the AC power cords to the services gateway for each power supply:

1. Locate the power cord or cords with the type of plug appropriate for your geographical location to connect the device to AC power.

   For more information about model numbers, see the SRX1400 Services Gateway hardware documentation at www.juniper.net/techpubs.

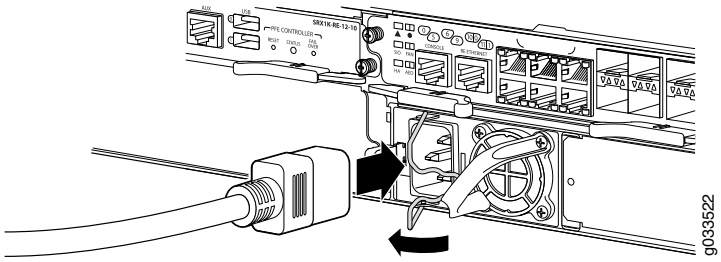
   NOTE: The SRX1400 Services Gateways now ship with a retainer clip for the power cord.

2. If your services gateway is equipped with a wire bail:

a. Insert the appliance coupler end of the power cord into the appliance inlet on the power supply.

b. Snap the wire bail on the power supply over the power cord to prevent the power cord from accidentally disengaging.

Figure 56: Connect the Chassis to AC Power (Using a Wire Bail)



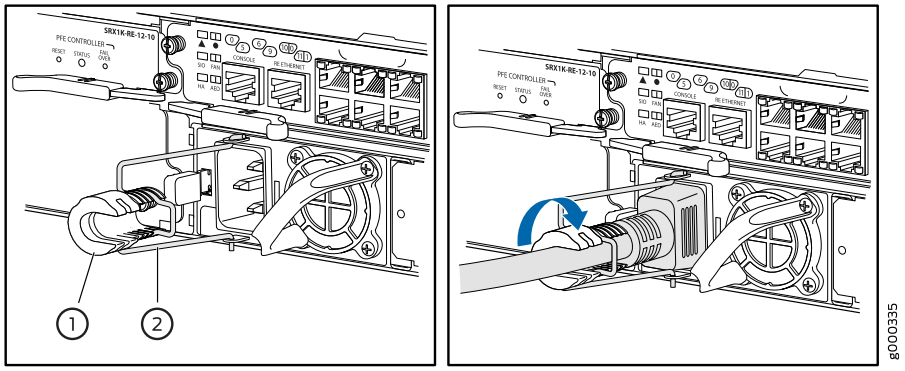
3. If your services gateway is equipped with a retainer clip for the power cord:

a. Squeeze the two sides of the power cord retainer clip and insert the L-shaped ends of the retainer clip into the holes in the bracket on each side of the AC appliance inlet.

b. Insert the appliance coupler end of the power cord into the appliance inlet on the power supply.

c. Push the power cord into the slot in the adjustment nut of the power cord retainer clip. Turn the nut until it is snug against the base of the coupler.

Figure 57: Connect the Chassis to AC Power (Using a Retainer Clip)



1. Adjustment nut
2. Retainer clip

4. Insert the power cord plug into an external AC power source receptacle.

NOTE: Each power supply must be connected to a dedicated AC power feed and a dedicated external circuit breaker. We recommend that you use a 15 A (250 VAC) minimum circuit breaker, or as permitted by local code.

5. Dress the power cord appropriately. Verify that the power cord does not block the air exhaust or access to device components and does not cause a tripping hazard.
6. Repeat Steps 1 through 5 for the second power supply.

If the **PWR** LED indicates that the power supply is not functioning normally, repeat the installation and cabling procedures.

NOTE: If power is lost to the services gateway, the Power-On/Power-Off state is retained. For example, if the services gateway loses power while the device is on, when power returns, the device will still be in the On state.

Related Documentation

- Required Tools and Parts for Grounding and Providing Power to the SRX1400 Services Gateway on page 123
- SRX1400 Services Gateway AC Power Supply on page 50
- Grounding the SRX1400 Services Gateway on page 125
- Connecting the SRX1400 Services Gateway to a DC Power Supply on page 132
- Powering On the SRX1400 Services Gateway on page 133
- SRX1400 Services Gateway AC Power System Electrical Specifications on page 71
- SRX1400 Services Gateway AC Power Supply Electrical Specifications on page 72

Connecting the SRX1400 Services Gateway to a DC Power Supply

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.

WARNING: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must properly ground the services gateway chassis before connecting power. See "Grounding the SRX1400 Services Gateway" on page 125 for instructions.

WARNING: Before performing the following procedure, 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: Do not mix AC and DC power supplies within the same services gateway. Damage to the services gateway might occur.

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

To connect the DC source power cables to the services gateway for each power supply:

1. Switch off the dedicated facility 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. Remove the clear plastic cover that protects the terminal studs on the faceplate.
3. 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 that the ohm output of the -48V and RTN DC cables to chassis ground. The cable with very large resistance (indicating an open circuit) to chassis ground will be -48V, and the cable with very low resistance (indicating a closed circuit) to chassis ground will be 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.

4. Remove the screws and square washers from the terminals, using a Phillips (+) screwdriver, number 2.
5. Secure each power cable lug to the terminals with the square washers and the screws. Apply between 23 in.-lb (2.6 Nm) and 25 in.-lb (2.8 Nm) of torque to each screw.
   - Secure each positive **(+)** DC source power cable lug to a **RTN** (return) terminal.
   - Secure each negative **(–)** DC source power cable lug to a **-48V** (input) terminal.
6. Replace the clear plastic cover over the terminal studs on the faceplate.
7. Verify that the power cables are connected correctly, that they are not touching or blocking access to services gateway components, and they do not cause a tripping hazard.
8. Repeat Steps 1 through 7 for the second power supply, if you are installing one.

NOTE: If power is lost to the services gateway, the Power-On/Power-Off state is retained. For example, if the services gateway loses power while the device is on, when power returns, the device will still be in the On state.

Related Documentation

- Required Tools and Parts for Grounding and Providing Power to the SRX1400 Services Gateway on page 123
- Grounding the SRX1400 Services Gateway on page 125
- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129
- Powering On the SRX1400 Services Gateway on page 133
- SRX1400 Services Gateway DC Power System Electrical Specifications on page 77
- SRX1400 Services Gateway DC Power Supply Electrical Specifications on page 77

Powering On the SRX1400 Services Gateway

To power on the services gateway:

1. Ensure that you have connected the AC power cord or DC power cables to the device.
2. Insert the plug into an AC power source receptacle (for AC-powered devices).

   Or

   Attach the power cable to the DC power source (for DC-powered devices).

The device starts automatically as the power supply completes its startup sequence. The Power LED blinks during startup and remains on steadily when the device is operating normally.

NOTE:

- If the device does not power on after connecting to the power supply, press the POWER button on the front of the SYSIOC for 3 to 5 seconds to power on the device.
- The Routing Engine, the SYSIOC, and at least one power supply must be installed on the SRX1400 Services Gateway for the device to power on.
- If power is lost to the services gateway, the Power-On/Power-Off state is retained. For example, if the services gateway loses power while the device is on, when power returns, the device will still be in the On state.

Related Documentation

- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129
- Connecting the SRX1400 Services Gateway to a DC Power Supply on page 132
- Powering Off the SRX1400 Services Gateway on page 134

Powering Off the SRX1400 Services Gateway

You can power off the services gateway in one of the following ways:

- Graceful shutdown—Press and the POWER button on the front of the SYSIOC for 3 to 5 seconds to initiate graceful shutdown. The device begins gracefully shutting down the operating system and then powers itself off.
- Forced shutdown—Press the POWER button and hold it for 15 seconds to power down the device immediately.

  You need to press the POWER button again to power on the device.

CAUTION:

Use the graceful shutdown method to power off or reboot the services gateway. Use the forced shutdown method as a last resort to recover the services gateway if the services gateway operating system is not responding to the graceful shutdown method.

By default, even if you press the POWER button and hold it for 15 seconds (that is, more than 5 seconds), the device will still do a graceful shutdown if it is responsive and operating normally. The device will resort to forced shutdown only if the operating system does not initiate the graceful shutdown process first.

To remove power completely from the device, unplug the AC power cord (for AC-powered devices) or switch off the DC power source (for DC-powered devices). After powering off the device, wait for at least 10 seconds before powering on the device again. After powering on the device, wait for at least 10 seconds before powering it off.

CAUTION: **Forced shutdown can result in data loss and corruption of the file system.**

Related Documentation

- Connecting the SRX1400 Services Gateway to an AC Power Supply on page 129
- Connecting the SRX1400 Services Gateway to a DC Power Supply on page 132
- Powering On the SRX1400 Services Gateway on page 133

CHAPTER 23

Performing the Initial Configuration

SRX1400 Services Gateway Software Configuration Overview

The services gateway is shipped with Junos OS preinstalled and ready to be configured when the services gateway is powered on. You can configure the services gateway using the CLI, the J-Web interface, SSH, or Telnet. However, you can perform initial configuration using the CLI only.

The SRX1400 Services Gateway includes Junos OS images in:

- The CompactFlash card in the Routing Engine
- The hard disk in the Routing Engine

NOTE: You can also use a Junos OS image stored on a USB flash drive that you insert into the Routing Engine faceplate.

When the services gateway boots, the following sequence of events occurs:

1. The device attempts to start the image on the USB flash drive (if available).
2. The device attempts to start the image from the CompactFlash card if the USB flash drive is not inserted into the Routing Engine or if the first attempt fails.
3. The device attempts to start the image from the hard disk if the first two methods fail.

You configure the services gateway by using CLI commands, either on a console device attached to the **CONSOLE** port on the SYSIOC or over a Telnet connection to a network connected to the **RE ETHERNET** port on the SYSIOC.

Gather the following information before configuring the services gateway:

- Name the services gateway will use on the network
- Domain name the services gateway 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

- Connecting the SRX1400 Services Gateway to a Network for Out-of-Band Management on page 128
- Connecting the SRX1400 Services Gateway to a Management Console or an Auxiliary Device on page 127
- Performing Initial Software Configuration on the SRX1400 Services Gateway (CLI Procedure) on page 138

Performing Initial Software Configuration on the SRX1400 Services Gateway (CLI Procedure)

This sample procedure explains how you can create an initial configuration using CLI commands to connect the services gateway to the network. For complete information about enabling the services gateway to forward traffic, including examples, see the appropriate Junos OS configuration guides at www.juniper.net/techpubs/.

To configure Junos OS:

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 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 you are 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 services gateway.

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

8. Log in as the administrative user you configured in Step 6.

9. Configure the name of the services gateway. 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 services gateway 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-0/0/0 unit 0 family inet address address/prefix-length
admin@# set interfaces ge-0/0/1 unit 0 family inet address address/prefix-length
```

NOTE: The ge-0/0/0 interface is for the LAN, and the ge-0/0/1 interface is for the ISP.

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-0/0/0
admin@# set security zones security-zone untrust interfaces ge-0/0/1
```

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
admin@# set security policies from-zone trust to-zone untrust policy policy-name then permit
admin@# set security policies from-zone untrust to-zone trust policy policy-name match
source-address any destination-address any application any
admin@# set security policies from-zone untrust to-zone trust policy policy-name then permit
```

NOTE: The actual configuration of the policies depends on your requirements.

15. Check the configuration for validity.

```
[edit]
admin@# commit check
configuration check succeeds
```

16. Commit the configuration to activate it on the services gateway.

```
[edit]
admin@# commit
commit complete
```

17. Optionally, display the configuration to verify that it is correct.

NOTE: This is a sample output. The actual output might vary depending on your configuration requirements.

```
admin@# show
## Last changed: 2010-08-18 05:50:46 UTC
version "10.4I0 [sharibkh]";
system {
    host-name doc;
    root-authentication {
        encrypted-password "$ABC123"; ## SECRET-DATA
    }
    login {
        user admin {
            uid 2000;
            class super-user;
            authentication {
                encrypted-password "$ABC123"; ## SECRET-DATA
            }
        }
        user@host {
            uid 928;
            class super-user;
            authentication {
                encrypted-password "$ABC123"; ## SECRET-DATA
            }
        }
    }
    services {
        ssh;
        telnet;
        web-management {
            http;
        }
    }
}
interfaces {
    ge-0/0/0 {
        unit 0 {
            family inet {
                address 192.1.1.1/24;
            }
        }
    }
    ge-0/0/1 {
        unit 0 {
            family inet {
                address 5.1.1.1/24;
            }
        }
    }
    fxp0 {
        unit 0 {
            family inet {
                address 10.204.210.23/23;
                address 192.168.10.2/24;
            }
        }
```

```
    }
}
routing-options {
    static {
        route 0.0.0.0/0 next-hop [ 10.204.211.254 5.1.1.2 ];
    }
}
security {
    zones {
        security-zone trust {
            interfaces {
                ge-0/0/0.0;
            }
        }
        security-zone untrust {
            interfaces {
                ge-0/0/1.0;
            }
        }
    }
    policies {
        from-zone trust to-zone untrust {
            policy bob {
                match {
                    source-address any;
                    destination-address any;
                    application any;
                }
                then {
                    permit;
                }
            }
        }
    }
  policies {
        from-zone untrust to-zone trust {
            policy bob {
                match {
                    source-address any;
                    destination-address any;
                    application any;
                }
                then {
                    permit;
                }
            }
        }
    }
}

[edit]
user@host#

[edit]
```

18. Commit the configuration to activate it on the services gateway.

```
[edit]
admin@# commit
```

19. Optionally, configure additional properties by adding the necessary configuration statements. Then commit the changes to activate them on the services gateway.

```
[edit]
admin@# commit
```

20. When you have finished configuring the services gateway, exit configuration mode.

```
[edit]
admin@# exit
admin@>
```

NOTE: To access the device using J-Web for the first time, enter the configuration mode in the CLI, and set the management option using the command **set system services web-management http**.

If you are using an interface other than fxp0, then you must also use the command **set security zones security-zone trust interface** ***interface-name*** **host-inbound-traffic system-services http/https** to set up J-Web.

Related Documentation

- Connecting the SRX1400 Services Gateway to a Network for Out-of-Band Management on page 128
- Connecting the SRX1400 Services Gateway to a Management Console or an Auxiliary Device on page 127
- SRX1400 Services Gateway Software Configuration Overview on page 137

Performing Initial Software Configuration Using J-Web

- Configuring Root Authentication and the Management Interface from the CLI on page 142
- Configuring Interfaces, Zones, and Policies with J-Web on page 143

Configuring Root Authentication and the Management Interface from the CLI

Before you can use J-Web to configure your device, you must access the CLI to perform the initial configuration.

To configure root authentication and the management interface:

1. Log in as root. There is no password.
2. Start the CLI and enter configuration mode.

```
root@% cli
root@>configure
root@#
```

3. Set the root authentication password by entering a cleartext password, an encrypted password, or an SSH public key string (DSA or RSA).

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

New password: *password*
Retype new password: *password*

4. Commit the configuration to activate it on the device.

   [edit]
   root@# **commit**

5. Configure the IP address and prefix length for the Ethernet management interface on the device.

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

6. Configure the default route.

   [edit]
   root@# **set routing-options static route 0.0.0.0/0 next-hop *gateway***

7. Enable Web access to launch J-Web.

   [edit]
   root@# **set system services web-management http**

8. Commit the configuration changes.

   [edit]
   root@# **commit**

Configuring Interfaces, Zones, and Policies with J-Web

You can configure hostnames, interfaces, zones, and security policies using J-Web.

NOTE: **You cannot use J-Web to configure SRX5400, SRX5600, and SRX5800 Services Gateways in Junos OS Release 15.1X49-D10.**

Before you begin:

- Ensure you have configured the IP address, root authentication, and default route. See "Configuring Root Authentication and the Management Interface from the CLI" on page 142
- Enable HTTP on the device to access J-Web. See "Configuring Root Authentication and the Management Interface from the CLI" on page 142

Configure the device with J-Web using the following procedures.

- Configuring the Hostname on page 144
- Configuring Interfaces on page 144
- Configuring Zones and Assigning Interfaces on page 144
- Configuring Security Policies on page 145

Configuring the Hostname

To configure the hostname:

1. Launch a Web browser from the management device.
2. Enter the IP address of the device in the URL address field.
3. Specify the default username as root and enter the password. See "Configuring Root Authentication and the Management Interface from the CLI" on page 142.
4. Click **Log In**. The J-Web Dashboard page appears.
5. Select **Configure>System Properties>System Identity**, and then select **Edit**. The Edit System Identity dialog box appears.
6. Enter the hostname and click **OK**.
7. Select **Commit Options>Commit** to apply the configuration changes.

You have successfully configured the hostname for the system.

Configuring Interfaces

To configure two physical interfaces:

1. From the J-Web Dashboard page, select **Configure>Interfaces** and select a physical interface you want to configure.
2. Select **Add>Logical Interface**. The Add interface dialog box appears.
3. Set **Unit** = **0**.
4. Select the check box for **IPv4 Address** to enable IPv4 addressing.
5. Click **Add** and enter the IPv4 address.
6. Click **OK**.

   A message appears after your configuration changes are validated successfully.
7. Click **OK**.
8. Select **Commit Options>Commit** to apply the configuration changes.

   A message appears after your configuration changes are applied successfully.
9. Click **OK**.

You have successfully configured the physical interface. Repeat these steps to configure the second physical interface for the device.

Configuring Zones and Assigning Interfaces

To assign interfaces within a trust zone and an untrust zone:

1. From the J-Web Dashboard page, select **Configure>Security>Zones/Screens** and click **Add**. The Add Zone dialog box appears.
2. In the Main tab, enter **trust** for zone name and enter the description.

3. Set the zone type to **Security**.
4. Select the interfaces listed under Available and move them under Selected.
5. Click **OK**.

   A message appears after your configuration changes are validated successfully.
6. Click **OK**.
7. Select **Commit Options>Commit** to apply the configuration changes.

   A message appears after your configuration changes are applied successfully.
8. Click **OK**.
9. Repeat Step 1 through Step 8 and assign another interface to an untrust zone.

You have successfully configured interfaces in a trust zone and in an untrust zone.

Configuring Security Policies

To configure security policies:

1. From the J-Web Dashboard page, select **Configure>Security>Security Policy** and click **Add**. The Add Policy dialog box appears.
2. In the Policy tab, enter the policy name and set the policy action to **permit**. Then select **Zone** and set the From Zone to **trust** and the To Zone to **untrust**.
3. Configure the source IP address by selecting **any** listed under Available and moving it under Selected.
4. Configure the destination IP address by selecting **any** listed under Available and moving it under Selected.
5. Configure the application by selecting **any** listed under Available and moving it under Selected.
6. Click **OK**.

   A message appears after your configuration changes are validated successfully.
7. Click **OK**.
8. Select **Commit Options>Commit** to apply the configuration changes.

   A message appears after your configuration changes are applied successfully.
9. Click **OK**.

You have successfully configured the security policy.

Related Documentation

- Performing Initial Software Configuration on the SRX1400 Services Gateway (CLI Procedure) on page 138
- *Performing Initial Software Configuration on the SRX3400 Services Gateway*
- *Performing Initial Software Configuration on the SRX3600 Services Gateway*
- *Initially Configuring the SRX5400 Services Gateway*

- *Initially Configuring the SRX5600 Services Gateway*
- *Initially Configuring the SRX5800 Services Gateway*

PART 4

Maintaining and Troubleshooting Components

CHAPTER 24

Maintaining Components

Required Tools and Parts for Maintaining the SRX1400 Services Gateway Hardware Components

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 SRX1400 Services Gateway on page 149
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151
- Maintaining the Air Filter on the SRX1400 Services Gateway on page 150

Routine Maintenance Procedures for the SRX1400 Services Gateway

For optimum services gateway performance, perform the following preventive maintenance procedures regularly:

- 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.

- Inspect the air filter, cleaning or replacing it as needed for optimum cooling system performance. Do not run the device for more than a few minutes without the air filter in place. For maintenance instructions, see "Maintaining the Air Filter on the SRX1400 Services Gateway" on page 150.

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 device through the unfiltered air intake. This could damage the device components.

Related Documentation

- Required Tools and Parts for Maintaining the SRX1400 Services Gateway Hardware Components on page 149
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151
- Maintaining the Air Filter on the SRX1400 Services Gateway on page 150

Maintaining the Air Filter on the SRX1400 Services Gateway

Regularly inspect the air filter. A dirty air filter restricts airflow in the unit, impeding the ventilation of the chassis. The filter degrades over time. Periodically replace the filter in use, as well as spares. We recommend that you replace the filter every six months. Discard used filters, do not attempt to clean and reuse them.

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

The shelf life of polyurethane filter varies from two years to five years depending on the storage conditions. Store in a cool, dry, and dark environment. Wrap the media in plastic and store in an environment with relative humidity between 40%- 80% and temperature between 40°F (4° C) to 90°F (32° C). Note that if the material flakes, or becomes brittle when rubbed or deformed, it is no longer usable.

Related Documentation

- Required Tools and Parts for Maintaining the SRX1400 Services Gateway Hardware Components on page 149
- Routine Maintenance Procedures for the SRX1400 Services Gateway on page 149
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151

Maintaining the Fan Tray on the SRX1400 Services Gateway

The fan tray contains two fans that work in unison to cool the services gateway components. If one fan fails, the host subsystem adjusts the speed of the remaining fan 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.

NOTE: The fan tray supports hot-swappable functionality. We recommend that you reinstall the fan tray within three minutes; otherwise, the services gateway temperature exceeds the maximum recommended room temperature and the device shuts down automatically in 4 minutes.

If one fan fails, you must replace the failed fan immediately. If the remaining fan also fails, then all the components in the device go offline automatically (when both fans fail).

To display the status of the cooling system, use 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
      PEM 1                         Absent
      Routing Engine 0              OK
      Routing Engine 1              Absent
      CB 0 Intake                   OK         34 degrees C / 93 degrees F
      CB 0 Exhaust A                OK         41 degrees C / 105 degrees F
      CB 0 Mezz                     OK         34 degrees C / 93 degrees F
      FPC 0 Intake                  OK         42 degrees C / 107 degrees F
      FPC 0 Exhaust A               OK         44 degrees C / 111 degrees F
      FPC 1 Intake                  OK         34 degrees C / 93 degrees F
      FPC 1 Exhaust A               OK         43 degrees C / 109 degrees F
      FPC 1 XLR                     OK         52 degrees C / 125 degrees F
      FPC 2 Intake                  OK         32 degrees C / 89 degrees F
      FPC 2 Exhaust A               OK         41 degrees C / 105 degrees F
      FPC 3 Intake                  OK         51 degrees C / 123 degrees F
      FPC 3 Exhaust A               OK         55 degrees C / 131 degrees F
Fans  Fan 1                         OK         Spinning at normal speed
      Fan 2                         OK         Spinning at normal speed
```

Related Documentation

- Required Tools and Parts for Maintaining the SRX1400 Services Gateway Hardware Components on page 149
- Routine Maintenance Procedures for the SRX1400 Services Gateway on page 149
- Maintaining the Air Filter on the SRX1400 Services Gateway on page 150
- Replacing the Fan Tray on the SRX1400 Services Gateway on page 191

Maintaining the Routing Engine on the SRX1400 Services Gateway

To monitor the Routing Engine, follow these guidelines:

- Check the LEDs on the Routing Engine faceplate
- Check the status of the Routing Engine using 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)
    DRAM                        1023 MB
    Memory utilization            35 percent
    CPU utilization:
      User                         0 percent
      Background                   0 percent
      Kernel                       2 percent
      Interrupt                    0 percent
      Idle                        97 percent
    Model                          RE-SRX1400
    Start time                     2010-07-08 13:54:21 UTC
    Uptime                         5 days, 1 hour, 38 minutes, 53 seconds
    Last reboot reason             0x1:power cycle/failure
    Load averages:                 1 minute   5 minute  15 minute
                                       0.01       0.04       0.03
```

- Check the status of the chassis using the **show chassis environment** command. The output is similar to the following

```
user@host> show chassis environment
user@host-pubs> show chassis environment
Class Item                           Status     Measurement
Temp  PEM 0                          OK
      PEM 1                          Absent
      Routing Engine 0               OK
      Routing Engine 1               Absent
      CB 0 Intake                    OK         33 degrees C / 91 degrees F
      CB 0 Exhaust A                 OK         40 degrees C / 104 degrees F
      CB 0 Mezz                      OK         34 degrees C / 93 degrees F
      FPC 0 Intake                   OK         41 degrees C / 105 degrees F
      FPC 0 Exhaust A                OK         43 degrees C / 109 degrees F
      FPC 1 Intake                   OK         34 degrees C / 93 degrees F
      FPC 1 Exhaust A                OK         43 degrees C / 109 degrees F
      FPC 1 XLR                      OK         52 degrees C / 125 degrees F
      FPC 2 Intake                   OK         32 degrees C / 89 degrees F
      FPC 2 Exhaust A                OK         40 degrees C / 104 degrees F
      FPC 3 Intake                   OK         50 degrees C / 122 degrees F
      FPC 3 Exhaust A                OK         54 degrees C / 129 degrees F
Fans  Fan 1                          OK         Spinning at normal speed
      Fan 2                          OK         Spinning at normal speed
```

For more information about using the CLI, see the CLI Explorer.

Related Documentation

- Required Tools and Parts for Maintaining the SRX1400 Services Gateway Hardware Components on page 149

- Routine Maintenance Procedures for the SRX1400 Services Gateway on page 149
- SRX1400 Services Gateway Routing Engine on page 19

Maintaining Power Supplies on the SRX1400 Services Gateway

To maintain the power supplies, follow these guidelines:

- To check the status of the power supplies, use 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   34 degrees C / 93 degrees F
  AC Input:                 OK   118 Volts
  DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                          12        11            132      11
PEM 1 status:
  State                     Online
  Temperature               OK   29 degrees C / 84 degrees F
  AC Input:                 OK   119 Volts
  DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                          12        10            120      10
```

- 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 PWR status LED on the SYSIOC faceplate. If this LED is solid green, the power supplies are functioning normally.
- Routinely check the LED on the power supply faceplate. Each power supply faceplate displays a single LED to indicate the status of the power supply. For more information, see "SRX1400 Services Gateway AC Power Supply" on page 50 or "SRX1400 Services Gateway DC Power Supply" on page 51.
- 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

- Required Tools and Parts for Maintaining the SRX1400 Services Gateway Hardware Components on page 149
- Routine Maintenance Procedures for the SRX1400 Services Gateway on page 149
- SRX1400 Services Gateway Power Supplies Overview on page 49

CHAPTER 25

Troubleshooting Components

Troubleshooting with the CLI on the SRX1400 Services Gateway

The Junos OS command-line interface (CLI) is the primary tool for controlling and troubleshooting services gateway hardware, Junos OS, routing protocols, and network connectivity. CLI commands display information from routing tables, information specific to routing protocols, and information about network connectivity derived from the ping and traceroute utilities. CLI commands are entered on one or more external management devices. These devices are connected to the services gateway through the CONSOLE port on the SYSIOC.

You can use the CLI to display details about alarms generated by interfaces and hardware components as shown in examples below:

- Use the CLI **show chassis fpc** command to check the status of the installed cards. As shown in the sample output, the value **Online** in the column labeled **State** indicates that the card is functioning normally:

```
user@host> show chassis fpc
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online           42     40          0       1024        3         27
```

```
  1  Online            34     40          0       1024        3          27
  2  Online            32     40          0       1024        3          27
  3  Online            55     40          0       1024        3          27
```

- Using a question mark (?) gives you a listing of the various options for the command as shown below:

```
user@host> show chassis fpc ?
Possible completions:
  <[Enter]>            Execute this command
  <fpc-slot>           FPC slot number (0..3)
  detail               Display detailed output
  pic-status           Show Physical Interface Cards installed in FPC
  |                    Pipe through a command
```

- To view information about a particular card in the chassis, use the **fpc *slot*** option:

```
user@host> show chassis fpc 3

                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  3  Online            54     39          0       1024        3          27
```

- 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
user@host-pubs> show chassis fpc detail
Slot 0 information:
  State                                 Online
  Temperature                        42 degrees C / 107 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:19 UTC
  Uptime:                               2 hours, 23 minutes
  Max Power Consumption               0 Watts
Slot 1 information:
  State                                 Online
  Temperature                        34 degrees C / 93 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:24 UTC
  Uptime:                               2 hours, 22 minutes, 55 seconds
  Max Power Consumption               0 Watts
Slot 2 information:
  State                                 Online
  Temperature                        32 degrees C / 89 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:19 UTC
  Uptime:                               2 hours, 23 minutes
  Max Power Consumption               0 Watts
Slot 3 information:
  State                                 Online
  Temperature                        54 degrees C / 129 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:19 UTC
```

```
Uptime:                                  2 hours, 23 minutes
Max Power Consumption                 0 Watts
```

NOTE: For further descriptions of the output from the commands, see the *Junos System Basics and Services Command Reference*.

NOTE: The **set chassis ioc-npc-connectivity** command is not supported on the SRX1400 Services Gateway.

You can also view the chassis properties in the J-Web interface by selecting **Monitor>Chassis**. For more information on troubleshooting the individual hardware components, see the following topics:

- Troubleshooting the Cooling System on the SRX1400 Services Gateway on page 161
- Troubleshooting the System I/O Card on the SRX1400 Services Gateway on page 162
- Troubleshooting the Network and Services Processing Card on the SRX1400 Services Gateway on page 163
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159
- Troubleshooting I/O Cards on the SRX1400 Services Gateway on page 164

Related Documentation

- Troubleshooting with LEDs on the SRX1400 Services Gateway on page 157
- Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway on page 159
- *Juniper Networks Technical Assistance Center*

Troubleshooting with LEDs on the SRX1400 Services Gateway

The SRX1400 Services Gateway LEDs, listed in Table 45 on page 157 display the status of various components.

Table 45: LEDs on SRX1400 Services Gateway

LEDs	Labels	For More Information
Common form-factor module (CFM) LED	One LED labeled **OK/FAIL** and **SERVICE** on the faceplate of following cards indicates the CFM's status: • NSPC • IOC	• SRX1400 Services Gateway NSPC on page 20 • Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway on page 159

Table 45: LEDs on SRX1400 Services Gateway *(continued)*

LEDs	Labels	For More Information
SYSIOC LEDs	The following LEDs on the SYSIOC faceplate indicate the status of the card. If no LEDs are lit, the Routing Engine might still be booting or the SYSIOC is not receiving power. • **ALARM** (2 LEDs) • **SIO** • **HA** • **PWR** • **FAN** NOTE: The LED labeled as **AED** is currently not supported in this release and this LED always remains off.	• SRX1400 Services Gateway SYSIOCs on page 12 • Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway on page 159
Routing Engine LEDs	The following LEDs on the Routing Engine faceplate indicate the status of the Routing Engine and hard disk drive: • **MASTER** • **HDD** • **STATUS** (for the Routing Engine) • **STATUS** (for the Packet Forwarding Engine controller) • **OK/FAIL**	• SRX1400 Services Gateway Routing Engine on page 19 • Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway on page 159
Power supply LEDs	One LED on each power supply faceplate indicates the status of that power supply.	• SRX1400 Services Gateway AC Power Supply on page 50 • SRX1400 Services Gateway DC Power Supply on page 51 • Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway on page 159

Related Documentation

- Troubleshooting with the CLI on the SRX1400 Services Gateway on page 155
- Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway on page 159
- *Juniper Networks Technical Assistance Center*

Troubleshooting with Chassis and Interface Alarm Messages on the SRX1400 Services Gateway

When the Routing Engine detects an alarm condition, it lights the red or yellow alarm LED on the SYSIOC as appropriate. To view a more detailed description of the alarm cause, use the **show chassis alarms** CLI command:

```
user@host> show chassis alarms
No alarms currently active
```

There are two classes of alarm messages:

- Chassis alarms—Indicate a problem with a chassis component such as the cooling system or power supplies.
- Interface alarms—Indicate a problem with a specific network interface.

Related Documentation

- Troubleshooting with the CLI on the SRX1400 Services Gateway on page 155
- Troubleshooting with LEDs on the SRX1400 Services Gateway on page 157
- *Juniper Networks Technical Assistance Center*

Troubleshooting the Power System on the SRX1400 Services Gateway

To verify that a power supply is functioning normally:

- Check the LEDs on each power supply faceplate. If an AC or DC power supply is correctly installed and functioning normally, the **OUTPUT OK** status LED on the power supply faceplate blinks, then lights steadily approximately five seconds after you switch the power supply circuit breaker on.

  For more information on power supply LEDs, see "SRX1400 Services Gateway DC Power Supply" on page 51 or "SRX1400 Services Gateway AC Power Supply" on page 50.

- Use 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 the power supplies in slots **P0** and **P1** are functioning normally:

  ```
  user@host>show chassis environment pem

  PEM 0 status:
    State                       Online
    Temperature                 OK   34 degrees C / 93 degrees F
    AC Input:                   OK   118 Volts
    DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                            12        11            132      11
  PEM 1 status:
    State                       Online
    Temperature                 OK   29 degrees C / 84 degrees F
    AC Input:                   OK   119 Volts
    DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                            12        10            120      10
  ```

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

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

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

  Junos OS also can shut down one of the power supplies for other reasons. In this case, the remaining power supplies provide power to the services gateway, and you can still view the system status through the CLI or J-Web interface.

  NOTE: The services gateway shuts down automatically if the device temperature exceeds the red-alarm threshold. In this case, the Routing Engine will also be in the off state, and you must press the POWER button to power on the device again.

- Verify that the Routing Engine, SYSIOC, and at least one power supply is installed on the SRX1400 Services Gateway and are functioning properly; otherwise the device can not be powered on.
- Verify that the source circuit breaker has the proper current rating. Each power supply must be connected to a separate source circuit breaker.
- Verify that the AC power cord or DC power cables from the power source to the services gateway are not damaged. If the insulation is cracked or broken, immediately replace the cord or cable.
- Connect the power supply to a different power source with a new power cord or power cables. If the power supply status LEDs indicate that the power supply is not functioning normally, the power supply is the source of the problem. Replace the power supply with a spare, as described in "Replacing a DC Power Supply on the SRX1400 Services Gateway" on page 201 or "Replacing AC Power Supply Cables on the SRX1400 Services Gateway" on page 197.
- Verify that power supply is functioning properly by checking the status of power supply LED. For more information, see "SRX1400 Services Gateway AC Power Supply" on page 50 or "SRX1400 Services Gateway DC Power Supply" on page 51.

  NOTE: If the SRX1400 Services Gateway is not powering on and the power supply LED is blinking, press the Power button to power on the device.

- If you cannot determine the cause of the problem or need additional 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

- SRX1400 Services Gateway AC Power Supply on page 50
- SRX1400 Services Gateway DC Power Supply on page 51
- Replacing an AC Power Supply on the SRX1400 Services Gateway on page 198
- Replacing AC Power Supply Cables on the SRX1400 Services Gateway on page 197
- Replacing a DC Power Supply on the SRX1400 Services Gateway on page 201
- Replacing DC Power Supply Cables on the SRX1400 Services Gateway on page 204

Troubleshooting the Cooling System on the SRX1400 Services Gateway

The services gateway cooling system consists of a fan tray and an air filter, both of which are located in the side of the chassis and plugged in from the rear of the chassis. The fan tray contains two fans. The fan tray provides cooling to the components installed in the device.

An air filter installed in the rear of the chassis helps keep dust and other particles from entering the cooling system. To function properly, the entire cooling system requires an unobstructed airflow and proper clearance around the site, as described in "Site Preparation Checklist for the SRX1400 Services Gateway" on page 61.

During normal operation, the fans in the fan tray function at less than full speed. The Routing Engine constantly monitors the temperatures detected by sensors and services gateway components, adjusting the speed of the fans as necessary. If the services gateway temperature exceeds the acceptable maximum, the Routing Engine turns off the power supplies.

Table 46 on page 161 describes the alarm conditions and corrective actions for SRX1400 Services Gateway cooling system.

Table 46: SRX1400 Services Gateway Cooling System Alarm Conditions and Corrective Actions

Alarm Conditions	Alarm Indications on SYSIO Card	Possible Cause and Corrective Action
The services gateway fan has failed.	Red (critical alarm LED)	1. Use the CLI to get information about the source of an alarm condition: **user@host> show chassis alarms** 2. If the CLI output lists only one fan failure and the other fan is functioning normally, the fan is most likely faulty and you need to replace the fan tray, as described in "Replacing the Fan Tray on the SRX1400 Services Gateway" on page 191.
The services gateway fan tray is removed	Red (critical alarm LED) and Yellow (non-critical alarm LED)	Reinstall the fan tray.

Table 46: SRX1400 Services Gateway Cooling System Alarm Conditions and Corrective Actions *(continued)*

Alarm Conditions	Alarm Indications on SYSIO Card	Possible Cause and Corrective Action
The device temperature is too warm.	Yellow (non-critical alarm LED)	The Routing Engine constantly monitors the temperatures detected by sensors and device components, and adjusts the speed of the fans as necessary. TIP: 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.
The services gateway temperature is too high, either because of an internal overheating condition or because the maximum recommended room temperature has been exceeded.	Red (critical alarm LED)	The services gateway shuts down automatically in four minutes.

NOTE: The services gateway shuts down automatically if the device temperature exceeds the threshold value. In this case, the Routing Engine will also be in the off state, and you must press the POWER button to power on the device again.

Related Documentation

- SRX1400 Services Gateway Cooling System on page 47
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151
- Maintaining the Air Filter on the SRX1400 Services Gateway on page 150

Troubleshooting the System I/O Card on the SRX1400 Services Gateway

To troubleshoot a SYSIOC , follow these guidelines:

- Make sure the SYSIOC is properly seated in the slot and its screws are tightened.
- Use the CLI **show chassis fpc** command to check the status of the installed SYSIOC. As shown in the sample output, the value **Online** in the column labeled **State** indicates that the SYSIOC is functioning normally:

```
user@host> show chassis fpc 0

                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online           41     40          0        1024        3         27
```

- Use the CLI **show chassis fpc 0 detail** command for more detailed output.

```
user@host> show chassis fpc 0 detail

Slot 0 information:
  State                                 Online
  Temperature                        41 degrees C / 105 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                       0 MB
  Total DDR DRAM                     0 MB
  Start time:                          2010-07-08 13:56:19 UTC
  Uptime:                             5 days, 20 hours, 7 minutes, 49 seconds

  Max Power Consumption              0 Watts
```

For further descriptions of the output from the commands, see the *Junos System Basics and Services Command Reference*.

Related Documentation

- SRX1400 Services Gateway SYSIOCs on page 12
- Replacing the SYSIOC on the SRX1400 Services Gateway on page 185
- *Juniper Networks Technical Assistance Center*

Troubleshooting the Network and Services Processing Card on the SRX1400 Services Gateway

To troubleshoot the Network and Services Processing Card (NSPC), follow these guidelines:

- Make sure the NSPC is properly seated in the slot and its screws are tightened.
- Use the CLI **show chassis fpc 1** command to check the status of installed NSPC. As shown in the sample output for **show chassis fpc 1**, the value **Online** in the column labeled **State** indicates that the NSPC is functioning normally:

```
user@host> show chassis fpc 1
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  1  Online            34     40          0       1024        3          27
```

NOTE: Because the NSPC occupies slot 1 and slot 3 of the SRX1400 Services Gateway chassis, you can use the **show chassis fpc 1** and **show chassis fpc 3** commands to check the status of NSPC.

- Use the CLI **show chassis fpc 1 detail** command for more detailed output.

```
user@host> show chassis fpc 1 detail
Slot 1 information:
  State                                 Online
  Temperature                        34 degrees C / 93 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                       0 MB
  Total DDR DRAM                     0 MB
  Start time:                          2010-07-08 13:56:24 UTC
  Uptime:                             5 days, 20 hours, 22 minutes, 7 seconds

  Max Power Consumption              0 Watts
```

For further descriptions of the output from the commands, see the *Junos System Basics and Services Command Reference*.

Related Documentation

- SRX1400 Services Gateway NSPC on page 20
- Installing an NPC in an SRX1400 Services Gateway on page 115
- Installing an SPC in an SRX1400 Services Gateway on page 113

Troubleshooting I/O Cards on the SRX1400 Services Gateway

To troubleshoot an IOC, follow these guidelines:

- Make sure the IOC is properly seated in the slot and its screws are tightened.
- Issue the CLI **show chassis fpc 2** 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 2

                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  2  Online           32     39          0       1024        3          27
```

- Issue the CLI **show chassis fpc 2 detail** command for more detailed output.

```
user@host> show chassis fpc 2 detail

Slot 2 information:
  State                                 Online
  Temperature                        32 degrees C / 89 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:19 UTC
  Uptime:                              5 days, 19 hours, 59 minutes, 31 seconds

  Max Power Consumption                0 Watts
```

For further descriptions of the output from the commands, see the *Junos System Basics and Services Command Reference*.

Related Documentation

- Replacing an IOC or NP-IOC on the SRX1400 Services Gateway on page 180
- *Juniper Networks Technical Assistance Center*

Troubleshooting an NPC on the SRX1400 Services Gateway

NOTE: The SRX1400 Services Gateway is not normally equipped with a Network Processing Card (NPC). In most configurations, network processing functions are performed by the NSPC. However, replacing the NSPC with an SRX3000-series SPC and an NPC in slots 1 and 3 is a supported configuration for the SRX1400 Services Gateway.

To troubleshoot an NPC, follow these guidelines:

- Make sure the NPC is properly seated in the slot and its screws are tightened.
- Make sure that the double-wide tray is properly installed in the slot.
- Use the CLI **show chassis fpc 3** command with the slot number to check the status of installed NPC.

  As shown in the sample output, the value **Online** in the column labeled **State** indicates that the NPC is functioning normally:

```
user@host> show chassis fpc 3

                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  3  Online           54     40          0       1024        3          27
```

- Use the CLI **show chassis fpc 3 detail** command for more detailed output.

```
user@host> show chassis fpc 3 detail
Slot 3 information:
  State                                 Online
  Temperature                        54 degrees C / 129 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:19 UTC
  Uptime:                             5 days, 20 hours, 34 minutes, 56 seconds

  Max Power Consumption               0 Watts
```

For further descriptions of the output from the commands, see the *Junos System Basics and Services Command Reference*.

Related Documentation

- NPCs for the SRX1400 Services Gateway on page 23
- Replacing a Network Processing Card on the SRX1400 Services Gateway on page 187

Troubleshooting Services Processing Cards on the SRX1400 Services Gateway

There are two places an SPC can be installed in your SRX1400 Services Gateway:

- You can install an SPC in the front-panel slot labeled 1 if you also install an NPC in the slot labeled 3. This combination of SPC and NPC replaces the full-width NSPC that is normally installed in the SRX1400 Services Gateway to perform both services processing and network processing functions.
- If your SRX1400 Services Gateway is running Junos OS Release 12.1X44-D10 or later, you can install an SPC in CFM slot **2**. Doing so increases the services processing performance of the services gateway and increases its session capacity.

To troubleshoot the SPC, follow these guidelines:

- Make sure the SPC is properly seated in the slot and its screws are tightened.
- For an SPC installed in slot 1, make sure the double-wide tray is installed properly in the slot.
- Issue the CLI **show chassis fpc *slot*** command to check the status of installed SPC.

  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 1

                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  1  Online            34     40          0       1024        3         27
```

- Issue the CLI **show chassis fpc 1 detail** command for more detailed output.

```
user@host> show chassis fpc 1 detail
Slot 1 information:
  State                                 Online
  Temperature                        34 degrees C / 93 degrees F
  Total CPU DRAM                   1024 MB
  Total RLDRAM                        0 MB
  Total DDR DRAM                      0 MB
  Start time:                           2010-07-08 13:56:24 UTC
  Uptime:                             5 days, 20 hours, 30 minutes, 55 seconds

  Max Power Consumption               0 Watts
```

For further descriptions of the output from the commands, see the *Junos System Basics and Services Command Reference*.

Related Documentation

- SPCs for the SRX1400 Services Gateway on page 22
- Replacing an SPC on the SRX1400 Services Gateway on page 188

PART 5

Replacing Components

CHAPTER 26

Overview of Replacing Components

Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway

To replace hardware components, you need the tools and parts listed in Table 47 on page 169.

Table 47: Tools and Parts Required for Replacing Hardware Components on the SRX1400 Services Gateway

Tool or Part	Components
3/8-in. nut driver or pliers	• Cables and connectors • DC power supply
Blank panels (if component is not reinstalled)	• IOC • NSPC • Power supply
Electrostatic bag or antistatic mat	• SYSIOC • IOC • NSPC • SFP and XFP transceivers • Routing Engine
Electrostatic discharge (ESD) grounding wrist strap	All
Flat-blade (–) screwdriver	• Cables and connectors • IOC
Phillips (+) screwdrivers, numbers 1 and 2	• SYSIOC • NSPC • Routing Engine • IOC

Table 47: Tools and Parts Required for Replacing Hardware Components on the SRX1400 Services Gateway *(continued)*

Tool or Part	Components
Rubber safety cap	• IOC • SYSIOC • Small form-factor pluggable (SFP) and SFP+ transceivers
Wire cutters	• Cables and connectors • DC power supply

Related Documentation

- Field-Replaceable Units on the SRX1400 Services Gateway on page 170
- SRX1400 Services Gateway Hardware Components on page 9
- SRX1400 Services Gateway Front Panel on page 25
- Overview of the SRX1400 Services Gateway CFMs on page 10

Field-Replaceable Units on the SRX1400 Services Gateway

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

- Hot-removable and hot-insertable-FRUs —You can remove and replace these components without powering off the device or disrupting the routing functions.
- Cold-Swap-Only FRUs —You must power off the device in order to remove, replace, or add these components.

Table 48 on page 170 lists the FRUs for the services gateway.

Table 48: Field-Replaceable Units

Hot-Swappable FRUs	Cold-Swap-Only FRUs
Air filters (cooling system)	Routing Engine
Air filters (power supply) (if redundant)	SYSIOC
Fan tray	IOC
AC and DC power supplies (if redundant)	NSPC
SFP, SFP+, and XFP transceivers	NP-IOC

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SRX1400 Services Gateway Hardware Components on page 9
- SRX1400 Services Gateway Front Panel on page 25

- Overview of the SRX1400 Services Gateway CFMs on page 10

CHAPTER 27

Replacing Cables and Connectors

Replacing SFP, SFP+, and XFP Transceivers on the SRX1400 Services Gateway

Small form-factor pluggable (SFP), enhanced small form-factor pluggable (SFP+), and 10-Gigabit SFP (XFP) are transceivers that you install in sockets in various cards or modules in the services gateway. These transceivers are hot-insertable and hot-removable. Removing a transceiver does not interrupt the functioning of the card or module, but the removed transceiver no longer receives or transmits data.

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

To replace an SFP, SFP+, or XFP transceiver:

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 electrostatic discharge (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 end of a fiber-optic cable. Fiber-optic transceivers contain laser light sources that can damage your eyes.

4. Remove the cable connector plugged into the transceiver.

5. Carefully drape the disconnected cables 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.

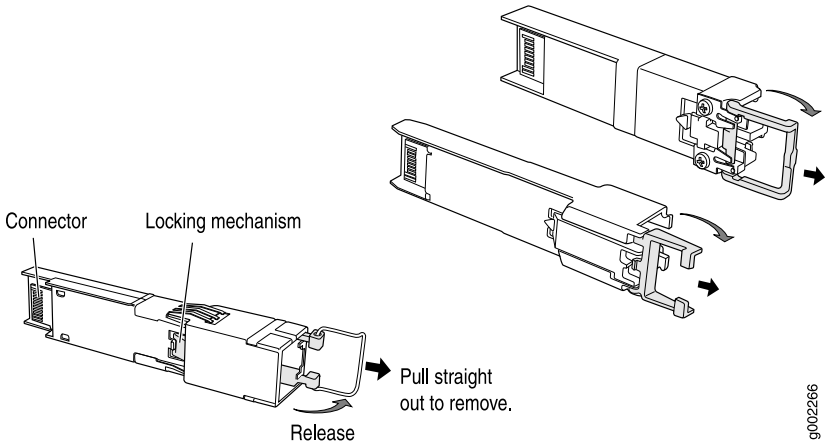
6. Pull the ejector handle out from the transceiver to unlock the transceiver.

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 SFP.

7. Grasp the transceiver ejector handle and pull the transceiver approximately 0.5 in. (1.3 cm) out of the IOC.
8. Using your fingers, grasp the body of the transceiver and pull it the rest of the way out of the IOC.

Figure 58: Removing SFP, SFP+, or XFP Transceivers



9. Place a rubber safety cap over the transceiver.
10. Place the removed transceiver on an antistatic mat or in an electrostatic bag.
11. Repeat steps 3 through 10 for each transceiver you need to replace.
12. Take each new transceiver to be installed out of its electrostatic bag and identify the port on the IOC where it will be installed.
13. Verify that each transceiver is covered by a rubber safety cap. If it is not, cover the transceiver with a safety cap.
14. Carefully align the transceiver with the slot in the IOC. The connectors should face the IOC.

15. Slide the transceiver until the connector is seated in the IOC slot. If you are unable to fully insert the transceiver, make sure the connector is facing the right way.
16. Close the ejector handle of the transceiver.
17. Remove the rubber safety cap from the transceiver and the end of the cable. Reconnect the cables into the transceivers.
18. Verify that the status LEDs on the IOC faceplate indicate that the SFP or XFP is functioning correctly. You can also verify that the IOC is functioning by issuing the **show chassis fpc pic-status** command.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- IOCs and NP-IOCs Supported on the SRX1400 Services Gateway on page 18
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170
- Replacing an IOC or NP-IOC on the SRX1400 Services Gateway on page 180

CHAPTER 28

Replacing Host Subsystem Components

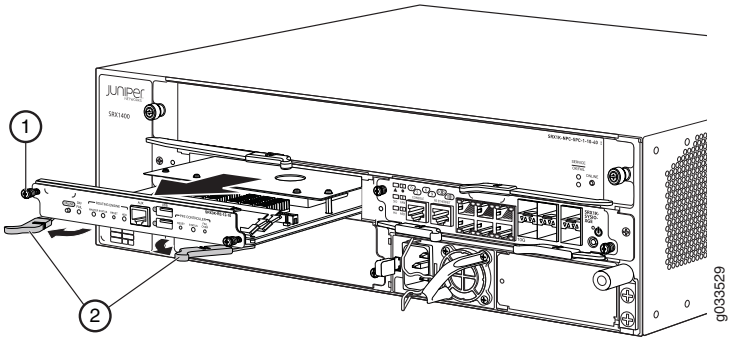
Replacing a Routing Engine on the SRX1400 Services Gateway

The Routing Engine is located in the front slot labeled **RE0** on the services gateway. Before you replace the Routing Engine, you must power off the services gateway.

To replace the Routing Engine:

1. If you have not already done so, power off the services gateway as described in "Powering Off the SRX1400 Services Gateway" on page 134.
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. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
4. Disconnect any cables connected to the **AUX** or **USB** ports.
5. Loosen the captive screws at each end of the Routing Engine faceplate.
6. Pull open the ejector handles to unseat the Routing Engine as shown in Figure 59 on page 178.

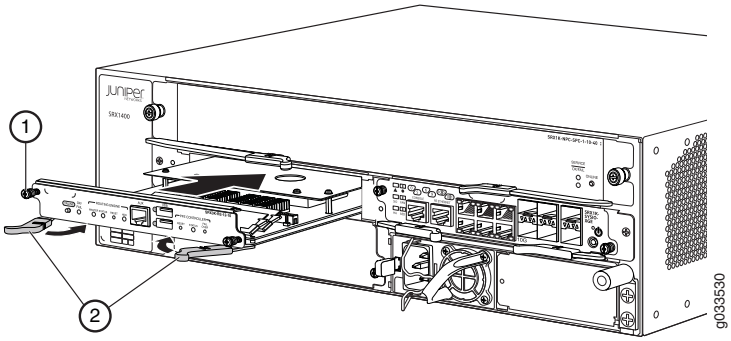
Figure 59: Removing the Routing Engine from the SRX1400 Services Gateway



1. Captive screws
2. Ejector handles

7. Grasp the Routing Engine by the ejector handles and slide it halfway out of the chassis.
8. Place one hand underneath the Routing Engine to support it and slide it completely out of the chassis.
9. Place the Routing Engine on the antistatic mat.
10. Carefully align the sides of the replacement Routing Engine with the guides inside the chassis.
11. Slide the Routing Engine into the slot until you feel resistance, and then press the Routing Engine faceplate until it engages the connectors.
12. Press both of the ejector handles inward to seat the Routing Engine. See Figure 60 on page 178.

Figure 60: Installing the Routing Engine on the SRX1400 Services Gateway



13. Tighten the captive screws on the left and right of the Routing Engine.
14. Reconnect cables previously attached to the AUX or USB ports.
15. Power on the services gateway by pressing the Power button on the front panel of the SYSIOC for three to five seconds if the Routing Engine does not start automatically. Wait for the device to start. The **OK/FAIL** LED on the Routing Engine faceplate should blink green, then light steadily.

NOTE: The Routing Engine might require several minutes to boot. If after this time the OK/FAIL LED is red, remove and reinstall the Routing Engine. If the OK/FAIL LED remains red, the Routing Engine is not functioning properly. Contact your customer support representative.

NOTE: The memory of the POWER button state is maintained in the Routing Engine.

- If the Routing Engine is replaced, the state of the new Routing Engine determines whether the device powers up automatically or needs the power button to be pressed to power up.
- If a device was powered down using the power button, and the Routing Engine was subsequently transferred to another device, the new device will power up only when the power button is pressed.

To check the status of the Routing Engine:

```
user@host> show chassis routing-engine
  Routing Engine status:
  Slot 0:
    Current state                  Master
    Election priority              Master (default)
    DRAM                        1023 MB
    Memory utilization            36 percent
    CPU utilization:
      User                         0 percent
      Background                   0 percent
      Kernel                       2 percent
      Interrupt                    0 percent
      Idle                        98 percent
    Model                          RE-SRX1400
    Start time                     2010-07-20 11:58:49 UTC
    Uptime                         27 minutes, 16 seconds
    Last reboot reason             0x1:power cycle/failure
    Load averages:                 1 minute   5 minute  15 minute
                                       0.00       0.02       0.07
```

For more information about using the CLI, see the CLI Explorer.

16. If the Routing Engine was replaced on one of the nodes in a chassis cluster, then you need to copy certificates and key pairs from the other node in the cluster:

    a. Start the shell interface as a root user on both nodes of the cluster.

    b. Verify files in the **/var/db/certs/common/key-pair** folder of the source node (other node in the cluster) and destination node (node on which the Routing Engine was replaced) by using the following command:

       ls -la /var/db/certs/common/key-pair/

    c. If the same files exist on both nodes, back up the files on the destination node to a different location. For example:

       root@SRX-B% pwd

```
/var/db/certs/common/key-pair
root@SRX-B% ls -la
total 8
drwx------ 2 root wheel 512 Jan 22 15:09
drwx------ 7 root wheel 512 Mar 26 2009
-rw-r--r-- 1 root wheel 0 Jan 22 15:09 test
root@SRX-B% mv test test.old
root@SRX-B% ls -la
total 8
drwx------ 2 root wheel 512 Jan 22 15:10
drwx------ 7 root wheel 512 Mar 26 2009
-rw-r--r-- 1 root wheel 0 Jan 22 15:09 test.old
root@SRX-B%
```

d. Copy the files from the **/var/db/certs/common/key-pair** folder of the source node to the same folder on the destination node.

NOTE: Ensure that you use the correct node number for the destination node.

e. In the destination node, use the **ls –la** command to verify that all files from the **/var/db/certs/common/key-pair** folder of the source node are copied.

f. Repeat Step b through Step e for the **/var/db/certs/common/local** and **/var/db/certs/common/certification-authority** folders.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SRX1400 Services Gateway Routing Engine on page 19
- Maintaining the Routing Engine on the SRX1400 Services Gateway on page 152
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170

Replacing an IOC or NP-IOC on the SRX1400 Services Gateway

IOCs or NP-IOCs are installed in the services gateway in the CFM slot labeled **2**.

To replace an IOC or NP-IOC:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface.
2. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Power off the services gateway.

   To power off the services gateway, press the Power button on the front panel of the System I/O Card (SYSIOC) for three to five seconds.

The **PWR** LED blinks to show you that the services gateway is shutting down.

4. Disconnect any cables connected to the Ethernet ports, marking them so they can be reconnected in the proper location. If the IOC or NP-IOC 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.

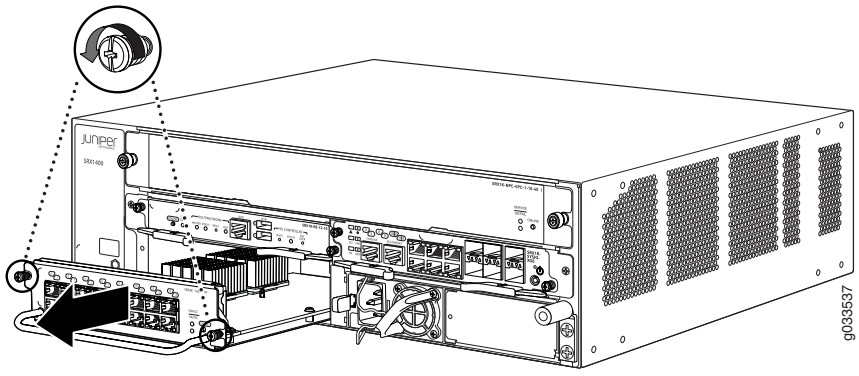
   WARNING: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can damage your eyes.

   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. Loosen the captive screws at each end of the IOC or NP-IOC faceplate.
6. Grasp the IOC or NP-IOC by its handle and slide it halfway out of the chassis. See Figure 61 on page 181.

Figure 61: Removing an IOC or NP-IOC from the SRX1400 Services Gateway

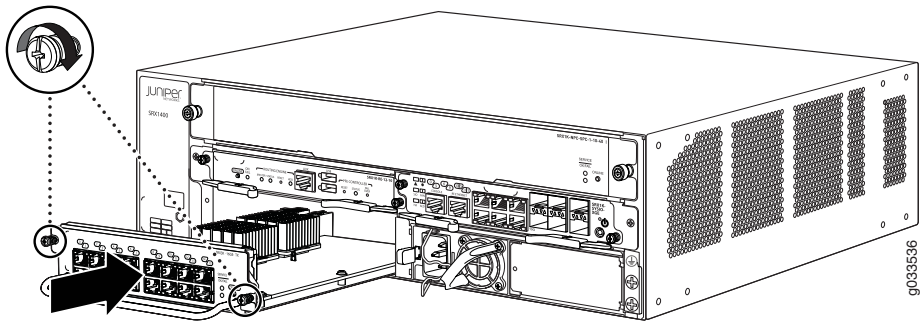


7. Place one hand underneath the IOC or NP-IOC to support it and slide it completely out of the chassis.
8. Place the IOC or NP-IOC on the antistatic mat. If you are not reinstalling an IOC or NP-IOC into the emptied slot within 30 minutes, install a blank panel over the slot to maintain proper airflow in the card cage.

If you need to replace the transceivers, see "Replacing SFP, SFP+, and XFP Transceivers on the SRX1400 Services Gateway" on page 173; otherwise, continue with step 10.

9. Carefully align the sides of the replacement IOC or NP-IOC with the guides inside the chassis.
10. Slide the IOC into the slot until you feel resistance, and then press the IOC or NP-IOC faceplate until it engages the connectors.
11. Tighten the captive screws on the left and right of the IOC or NP-IOC faceplate. See Figure 62 on page 182.

Figure 62: Installing an IOC or NP-IOC on the SRX1400 Services Gateway



12. If the IOC or NP-IOC 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.

13. Insert the appropriate cables into the cable connector ports on each IOC or NP-IOC.

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

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

14. Power on the services gateway, as described in "Powering On the SRX1400 Services Gateway" on page 133.
15. Check the **OK/FAIL** LED on the new IOC or NP-IOC. The **OK/FAIL** LED on the CFM faceplate should blink green, then light steadily. If it is red, remove and reinstall the

IOC or NP-IOC. If the **OK/FAIL** LED remains red, the IOC or NP-IOC is not functioning properly. Contact your customer support representative.

WARNING: Never lift the services gateway using the handles on the front panels of the IOC or NP-IOC. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- Troubleshooting I/O Cards on the SRX1400 Services Gateway on page 164
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170

Replacing a Network and Services Processing Card on the SRX1400 Services Gateway

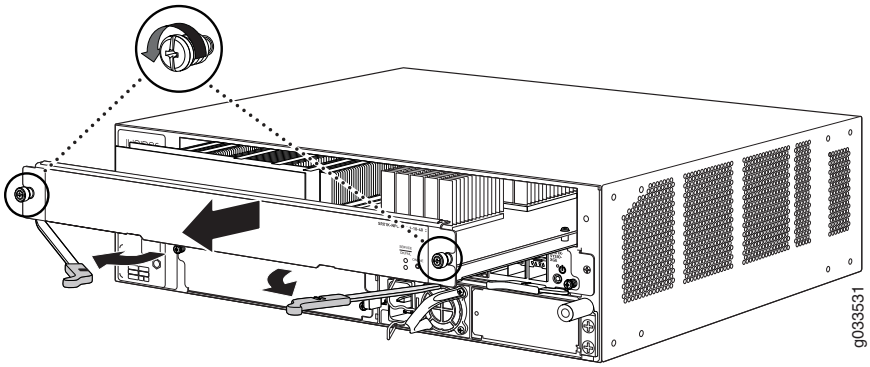
The NSPC is installed on the front panel of the SRX1400 Services Gateway.

NOTE: It is not necessary to power off the device to remove or replace the NSPC. However, its removal disrupts the routing functionality of the device. After the replacement, you must reboot the device for the new card to be initialized.

To replace the NSPC:

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. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Loosen the captive screws at each end of the NSPC faceplate.
4. Pull open the ejector handles to unseat the NSPC. See Figure 63 on page 183.

Figure 63: Removing the NSPC from the SRX1400 Services Gateway

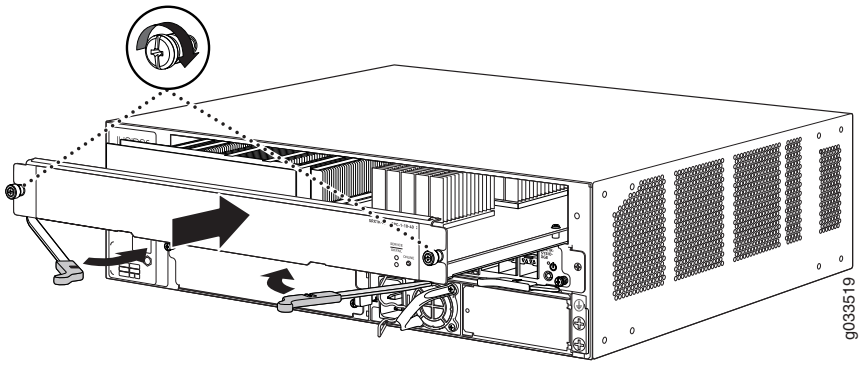


5. Grasp the NSPC by the ejector handles and slide it halfway out of the chassis.
6. Place one hand underneath the NSPC to support it and slide it completely out of the chassis.

CAUTION: The NSPC can become very warm during operation. Avoid contact with the heat sink on top of the card when you remove it to prevent personal injury.

7. Place the NSPC on the antistatic mat.
8. Slide the replacement NSPC into the slot until you feel resistance, and then press the NSPC's faceplate until it engages the connectors.
9. Tighten the captive screws on the left and right of the NSPC. See Figure 64 on page 184.

Figure 64: Installing the NSPC in the SRX1400 Services Gateway



10. Power on the services gateway, as described in "Powering On the SRX1400 Services Gateway" on page 133. The **OK/FAIL** LED on the NSPC faceplate should blink green, then light steadily.

NOTE: If the **OK/FAIL** LED is red, remove and reinstall the NSPC. If the **OK/FAIL** LED remains red, the NSPC is not functioning properly. Contact your customer support representative.

WARNING: Never lift the services gateway using the handles on the front panels of the NSPC or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- Troubleshooting the Network and Services Processing Card on the SRX1400 Services Gateway on page 163

- SRX1400 Services Gateway NSPC on page 20
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170

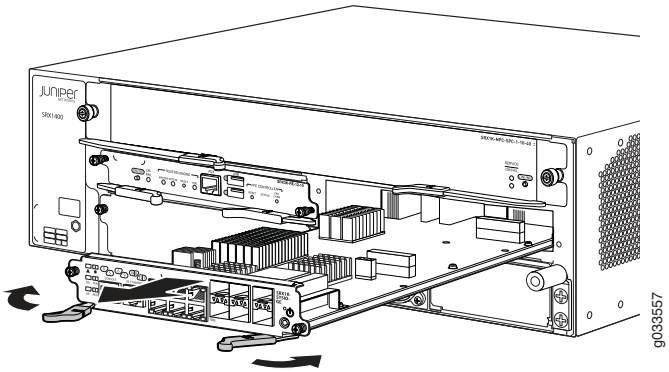
Replacing the SYSIOC on the SRX1400 Services Gateway

The system I/O card (SYSIOC) is installed in the front of the SRX1400 Services Gateway.

To replace the SYSIOC:

1. If you have not already done so, power off the services gateway as described in "Powering Off the SRX1400 Services Gateway" on page 134.
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. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
4. Disconnect any cables attached to the console or management ports.
5. Loosen the captive screws at each end of the SYSIOC faceplate.
6. Pull open the ejector handles to unseat the SYSIOC.
7. Grasp the SYSIOC by the ejector handles and slide it halfway out of the chassis. See figure Figure 65 on page 185.

Figure 65: Removing the SYSIOC from the SRX1400 Services Gateway

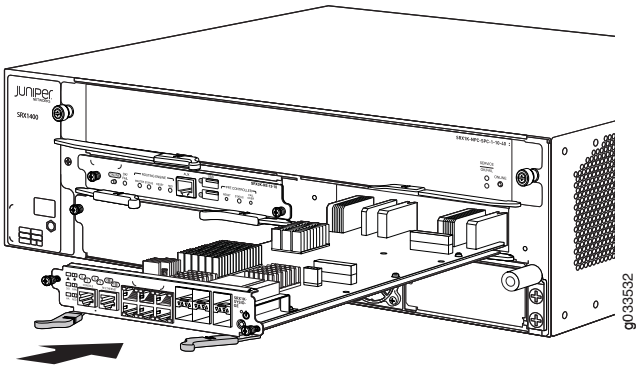


8. Place one hand underneath the SYSIOC to support it and slide it completely out of the chassis.
9. Place the SYSIOC on the antistatic mat.

   We strongly recommend to reinstall the SYSIOC into the emptied slot as soon as the replacement card is ready, in order to protects the device from dust entering into the system through empty slot.
10. Carefully align the sides of the replacement SYSIOC with the guides inside the chassis.
11. Slide the SYSIOC into the chassis until you feel resistance.

12. Press both of the ejector handles inward to seat the SYSIOC as shown in Figure 66 on page 186.

Figure 66: Installing the SYSIOC from the SRX1400 Services Gateway



13. Tighten the captive screws on the left and right of the SYSIOC faceplate.
14. Insert the appropriate cables into the cable connector ports on each SYSIOC.
15. Power on the services gateway, as described in "Powering On the SRX1400 Services Gateway" on page 133.

    The **SYSIO** LED on the SYSIOC faceplate should blink green, then light steadily.

NOTE: If the **SYSIO** LED is red, remove and reinstall the SYSIOC. If the **SYSIO** LED remains red, the SYSIOC is not functioning properly. Contact your customer support representative.

16. Check the status of the SYSIOC by using the **show chassis environment fpc 0** command.

WARNING: Never lift the services gateway using the handles on the front panels of the IOCs or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

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.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SRX1400 Services Gateway SYSIOCs on page 12
- Troubleshooting the System I/O Card on the SRX1400 Services Gateway on page 162
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170

Replacing a Network Processing Card on the SRX1400 Services Gateway

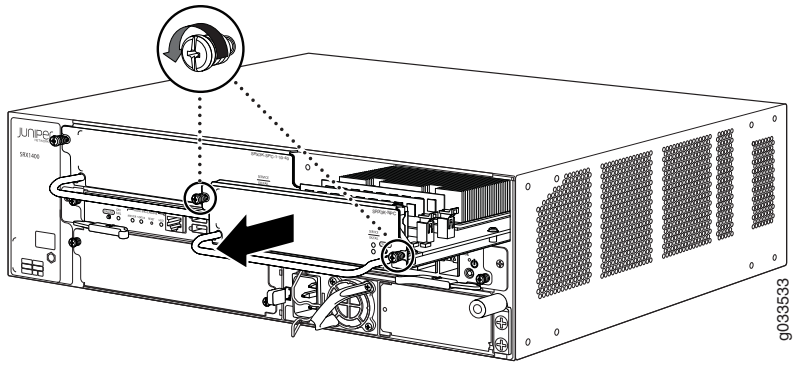
NOTE: The SRX1400 Services Gateway is not normally equipped with a Network Processing Card (NPC). In most configurations, network processing functions are performed by the NSPC. However, replacing the NSPC with an SRX3000-series SPC and an NPC in slots 1 and 3 is a supported configuration for the SRX1400 Services Gateway.

The NPC is installed in the front of the services gateway in CFM slot **3**.

To replace an NPC:

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. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Loosen the captive screws at each end of the NPC faceplate.
4. Grasp the NPC by its handle and slide it halfway out of the chassis. See Figure 67 on page 187.

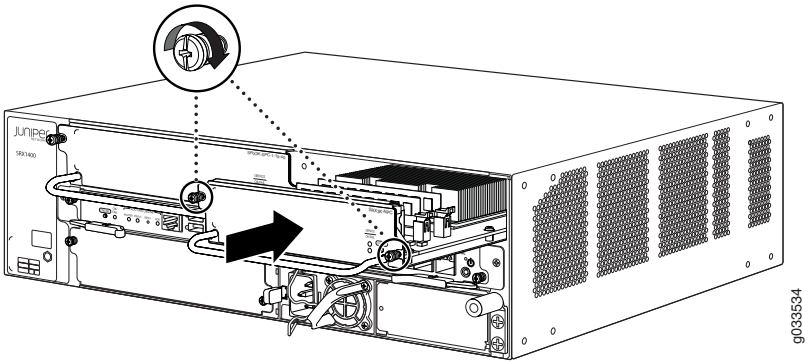
Figure 67: Removing an NPC from the SRX1400 Services Gateway



5. Place one hand underneath the NPC to support it and slide it completely out of the chassis.
6. Place the NPC on the antistatic mat.

7. Slide the replacement NPC into the slot until you feel resistance, and then press the NPC's faceplate until it engages the connectors as shown in Figure 68 on page 188.

Figure 68: Installing an NPC on the SRX1400 Services Gateway



8. Tighten the captive screws on the left and right of the NPC.

WARNING: Never lift the services gateway using the handles on the front panels of the NPCs or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

When you power on the SRX1400 Services Gateway, the **OK/FAIL** LED on the NPC faceplate blinks green, then lights steadily indicating a normal operating condition.

NOTE: If the **OK/FAIL** LED is red, remove and reinstall the NPC. If the **OK/FAIL** LED remains red, the NPC is not functioning properly. Contact your customer support representative.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- NPCs for the SRX1400 Services Gateway on page 23
- Troubleshooting an NPC on the SRX1400 Services Gateway on page 164
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170

Replacing an SPC on the SRX1400 Services Gateway

There are two places an SPC can be installed in your SRX1400 Services Gateway:

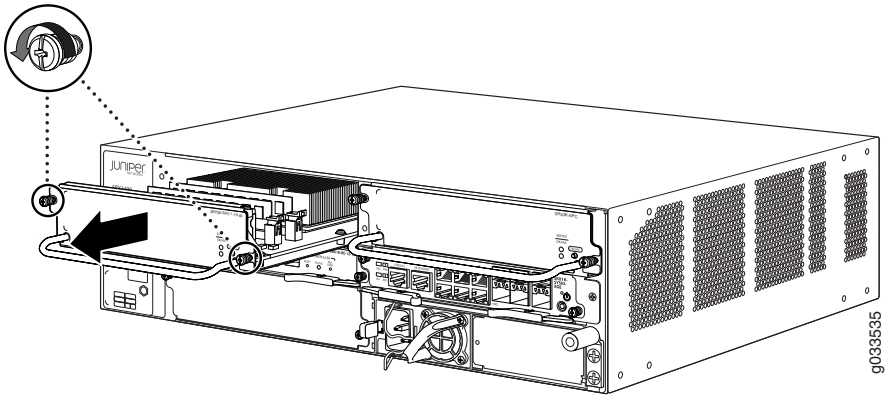
- You can install an SPC in the front-panel slot labeled **1** if you also install an NPC in the slot labeled **3**. This combination of SPC and NPC replaces the full-width NSPC that is normally installed in the SRX1400 Services Gateway to perform both services processing and network processing functions.

- If your SRX1400 Services Gateway is running Junos OS Release 12.1X44-D10 or later, you can install an SPC in slot **2**. Doing so increases the services processing performance of the services gateway and increases its session capacity.

To replace an SPC:

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. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Loosen the captive screws at each end of the SPC faceplate.
4. Grasp the SPC by its handle and slide it halfway out of the chassis.

Figure 69: Removing an SPC from the SRX1400 Services Gateway

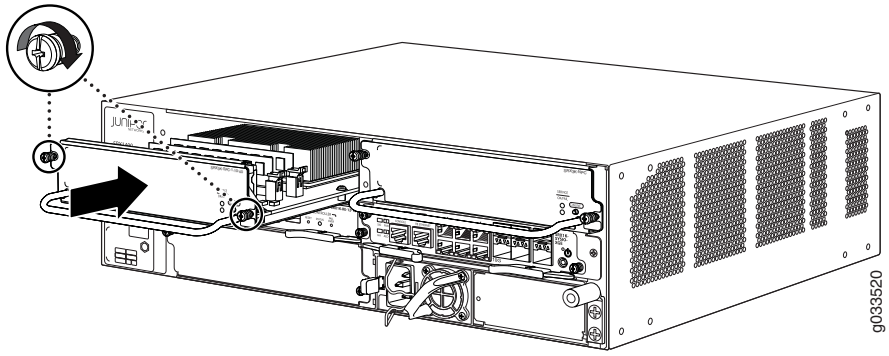


5. Place one hand underneath the SPC to support it and slide it completely out of the chassis. See Figure 69 on page 189.

> CAUTION: SPCs can become very warm during operation. Avoid contact with the heat sink on top of the card when you remove it to prevent personal injury.

6. Place the SPC on the antistatic mat.
7. Slide the replacement SPC into the slot until you feel resistance, and then press the SPC faceplate until it engages the connectors as shown in Figure 70 on page 190.

Figure 70: Installing an SPC on the SRX1400 Services Gateway



8. Tighten the captive screws on the left and right of the SPC.

When you power on the SRX1400 Services Gateway, the **OK/FAIL** LED on the SPC faceplate blinks green, then lights steadily indicating a normal operating condition.

NOTE: If the **OK/FAIL** LED is red, remove and reinstall the SPC. If the **OK/FAIL** LED remains red, the SPC is not functioning properly. Contact your customer support representative.

WARNING: Never lift the services gateway using the handles on the front panels of the SPCs or other CFM cards. The handles might come off, causing the chassis to drop and inflicting possible grave injury.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SPCs for the SRX1400 Services Gateway on page 22
- Troubleshooting Services Processing Cards on the SRX1400 Services Gateway on page 165
- Field-Replaceable Units on the SRX1400 Services Gateway on page 170

CHAPTER 29

Replacing Cooling System Components

Replacing the Fan Tray on the SRX1400 Services Gateway

The SRX1400 Services Gateway has one fan tray located in the side of the chassis and can be plugged in from the rear of the chassis. The fan tray contains two fans. The fan tray supports hot-swappable functionality. It weighs about 4.2 lb (1.9 kg).

NOTE: To prevent overheating, install the replacement fan tray immediately after removing the existing fan tray. We recommend that you reinstall the fan tray within 3 minutes; otherwise, the services gateway temperature exceeds the maximum recommended room temperature, and the device shuts down automatically in 4 minutes.

You can also use the fan tray LED to detect the condition when the fan speed has reduced to a safer value, so that the fan tray can be removed from the device safely.

Table 49 on page 191 provides the LED indications of the fan tray LED.

Table 49: Fan Tray LED

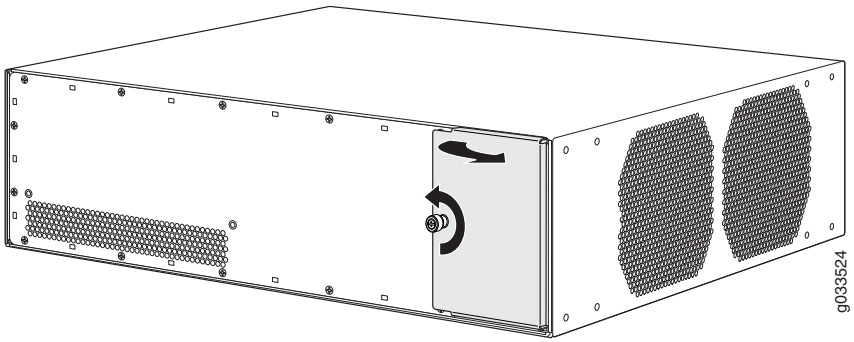
Color	LED Status	Indicated Condition
Amber	Off	Fans are running and fan tray is functioning normally. Do not remove the fan tray in this condition.
	On Steadily	Fans are not running, and fan tray can be removed safely. NOTE: This fan tray LED lights only when fans are shut down manually using the CLI command **request chassis fan-tray offline**. The fan tray LED does not indicate a fan failure. The **FAN** LED on the System I/O Card (SYSIOC) indicates the fan failure status.

NOTE: The fan tray LED provides additional safety measures. Even though you can remove the fan tray while the fans are still running, we strongly recommend that you wait until the fan tray LED lights steadily amber (indicating that the fans are not running) before you remove the fan tray..

To replace the fan tray:

1. Use the **request chassis fan-tray offline** command to shut down the fans. Wait until the system displays **Fan Take Offline Successful** message and the fan tray LED lights amber (indicating that the fans are not running).
2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Turn the screw to the left on the fan tray door as shown in Figure 71 on page 192. Open the fan tray door to the right and remove the fan tray door.

Figure 71: Replacing the Fan Tray—Opening the Fan Tray Door



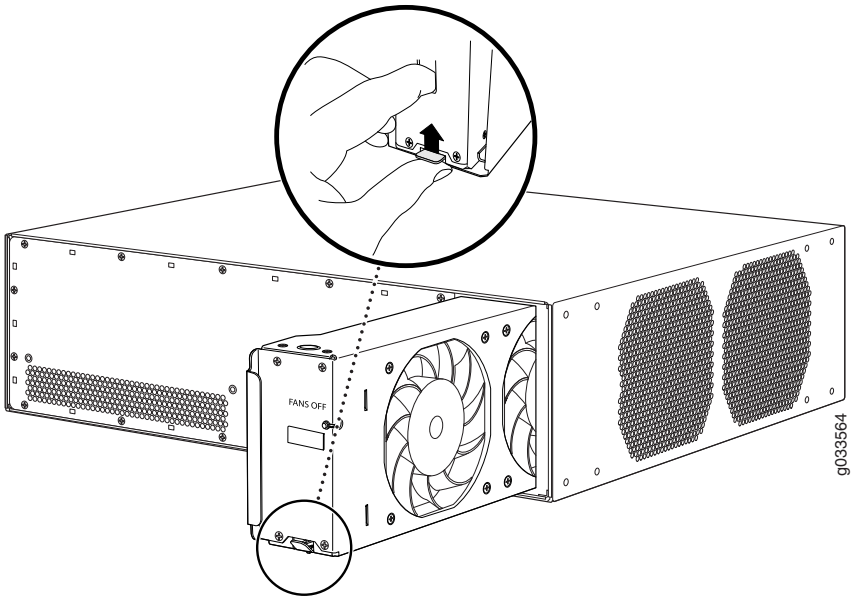
4. Wait for the fans to stop spinning completely.

WARNING: To avoid injury, do not proceed until the fans have stopped spinning.

WARNING: The fan tray LED provides additional safety measures. Even though you can remove the fan tray while fans are still running, we that you wait until the fan tray LED lights steadily amber (indicating that the fans are not running) before you remove the fan tray.

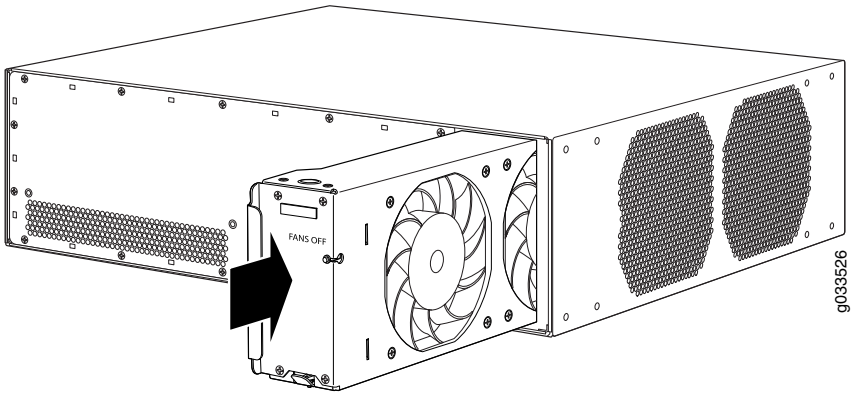
5. After the fans have stopped spinning and the fan tray LED lights steadily, lift upward on the latch at the bottom of the fan tray to release it as shown in Figure 72 on page 193.

Figure 72: Removing the Fan Tray from the SRX1400 Services Gateway



6. Grasp the fan tray and pull it out approximately 6 in. (15 cm).
7. Place one hand under the fan tray to support it and pull the fan tray completely out of the chassis. Set it aside.
8. Grasp the replacement fan tray and insert it straight into the chassis until you hear a click, indicating the latch has closed. See Figure 73 on page 193.

Figure 73: Installing the Fan Tray into the SRX1400 Services Gateway



NOTE: Be sure the fan tray is correctly oriented in the slot, with the latch on the bottom of the vertically aligned fan tray.

9. Press the fan tray into the chassis about 1 in. (2.5 cm) beyond where the latch closes to engage the power connection.
10. Reinsert the fan tray door, and close and tighten the captive screw to secure it in the chassis.

NOTE: The FAN LED on the System I/O card lights steadily green, indicating that cooling system is operating normally.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SRX1400 Services Gateway Cooling System on page 47
- Troubleshooting the Cooling System on the SRX1400 Services Gateway on page 161
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151

Replacing the Cooling System Air Filter on the SRX1400 Services Gateway

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 device through the unfiltered air intake. This could damage the services gateway components.

NOTE: You can order an air filter kit separately. Contact your Juniper Networks customer service representative for more information. The air filter kit includes a cooling system air filter and four power supply air filters.

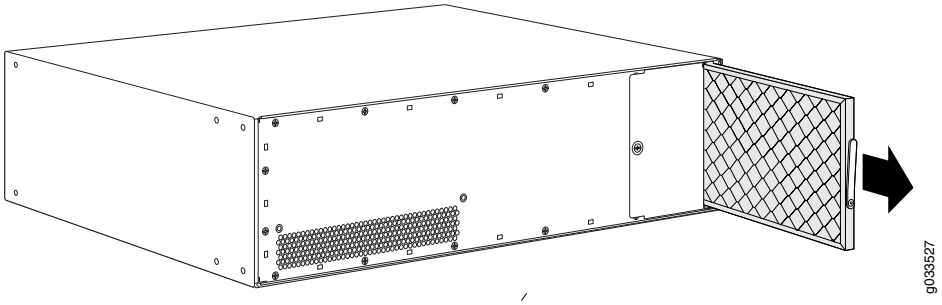
The services gateway cooling system has one air filter that installs in the rear of the chassis. The air filter supports hot-swappable functionality.

The air filter is located in the rear of the chassis on the right side. The air filter weighs approximately 0.2 lb (0.09 kg).

To replace the cooling system air filter:

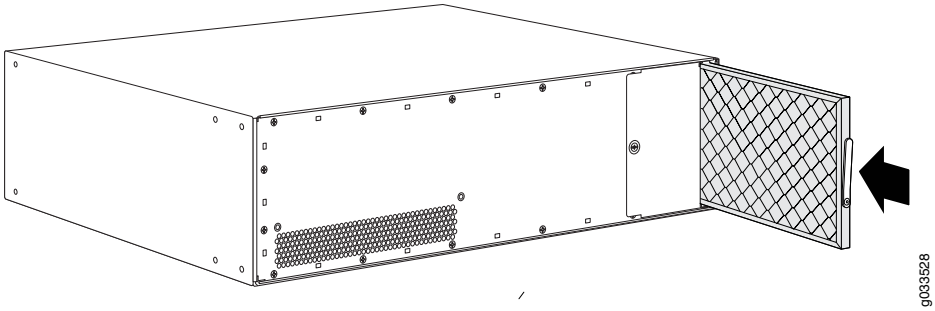
1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
2. Turn the screw to the left on the fan tray door. Open it to the right and remove it. See Figure 74 on page 195

Figure 74: Removing the Cooling System Air Filter from the SRX1400 Services Gateway



3. Slide the air filter out of the chassis and properly dispose of it.
4. Locate the up arrow on the replacement filter to ensure that the air filter is right side up.
5. Slide the air filter straight into the chassis until it stops as shown in Figure 75 on page 195.

Figure 75: Installing Cooling System Air Filter from the SRX1400 Services Gateway



6. Replace the fan tray door and tighten the screw to secure it in the chassis.

NOTE: The SRX1400 Services Gateway power supply has one air filter located in the front. For information about replacing the power supply air filter, see "Replacing the Power Supply Air Filter on the SRX1400 Services Gateway" on page 205.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SRX1400 Services Gateway Cooling System on page 47
- Troubleshooting the Cooling System on the SRX1400 Services Gateway on page 161
- Maintaining the Fan Tray on the SRX1400 Services Gateway on page 151

CHAPTER 30

Replacing Power Supply Components

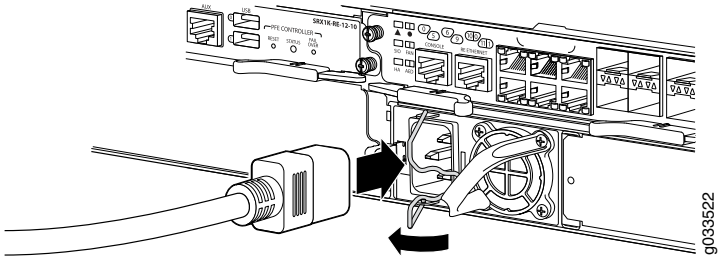
Replacing AC Power Supply Cables on the SRX1400 Services Gateway

WARNING: **Before working on an AC-powered services gateway or near power supplies, unplug the power cord.**

To replace an AC power supply cord:

1. Unplug the power cord from the power source receptacle.
2. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
3. Unplug the power cord from the appliance inlet on the power supply.
4. Locate a replacement C13 power cord with the type of plug appropriate for your geographical location.
5. Insert the power cord plug into an external AC power source receptacle.
6. Connect the power cord to the power supply. See Figure 76 on page 198.

Figure 76: Connecting AC Power Supply Cables on the SRX1400 Services Gateway



7. Verify that the power cord does not block the air exhaust and access to services gateway components, or it does not cause a tripping hazard.
8. If the power supply is correctly installed and functioning normally, the supply automatically powers up.

Related Documentation

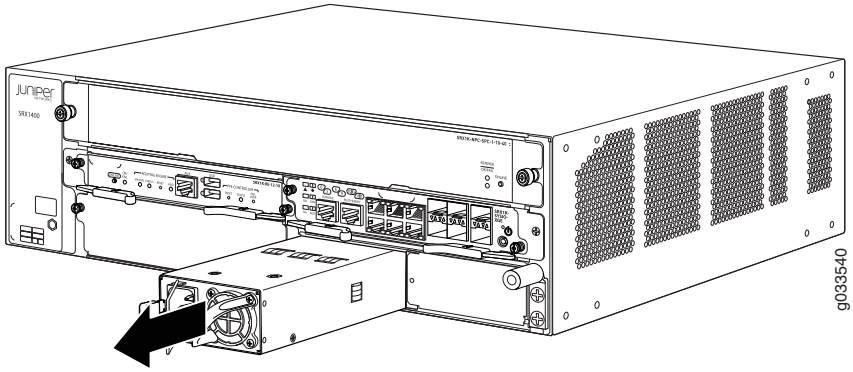
- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- Replacing an AC Power Supply on the SRX1400 Services Gateway on page 198
- SRX1400 Services Gateway AC Power Supply on page 50
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159

Replacing an AC Power Supply on the SRX1400 Services Gateway

To replace an AC power supply:

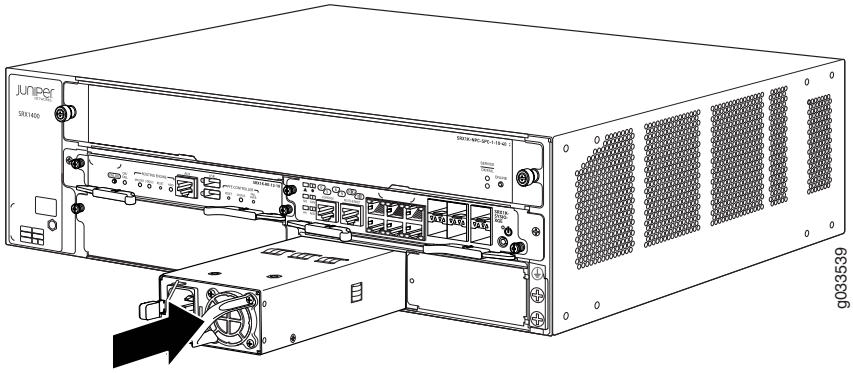
1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
2. Remove the power cord from the power supply.
3. Push the tab on the left edge of the power supply to the right.
4. Pull the power supply straight out of the chassis using the provided handle. Use one hand to support underneath the supply as you remove it. See Figure 77 on page 199.

Figure 77: Removing an AC Power Supply from the SRX1400 Services Gateway



5. Orient the replacement power supply so that the tab is on the left side.
6. Using both hands, slide the replacement power supply straight into the chassis until the power supply is fully seated in the chassis slot. Make sure the tab on the left edge of the power supply clicks into place. The power supply faceplate should be flush with any adjacent power supply faceplate. See Figure 78 on page 199.

Figure 78: Installing an AC Power Supply in the SRX1400 Services Gateway



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

NOTE: Be sure to have the power supply oriented correctly. The tab must be on the left and click into place when fully seated. If the power supply does not insert easily or does not become flush with the chassis, you might have the power supply upside down.

7. Attach the power cord to the power supply. If the power supply is correctly installed and functioning normally, the power supply powers up immediately.

NOTE: Press the Power button if the device does not power on automatically. See "Powering On the SRX1400 Services Gateway" on page 133 for more details.

NOTE: The Power button state is maintained in the Routing Engine. If the Routing Engine is replaced, the state of the new Routing Engine determines whether the device powers up automatically or needs the Power button to be pressed to power up.

If the device was powered down using the Power button, and the Routing Engine was subsequently transferred to another device, the new device will power up only when the power button is pressed.

NOTE: You must have a SYSIOC and a Routing Engine installed in the services gateway for the power supply to turn on automatically.

NOTE: If you are moving this power supply from one slot to another, wait at least 60 seconds before inserting it into the new slot.

NOTE: 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.

Related Documentation

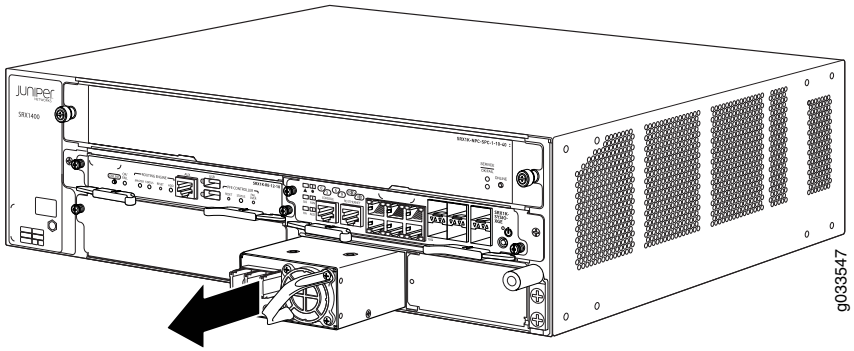
- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- Replacing AC Power Supply Cables on the SRX1400 Services Gateway on page 197
- SRX1400 Services Gateway AC Power Supply on page 50
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159

Replacing a DC Power Supply on the SRX1400 Services Gateway

To replace a DC power supply:

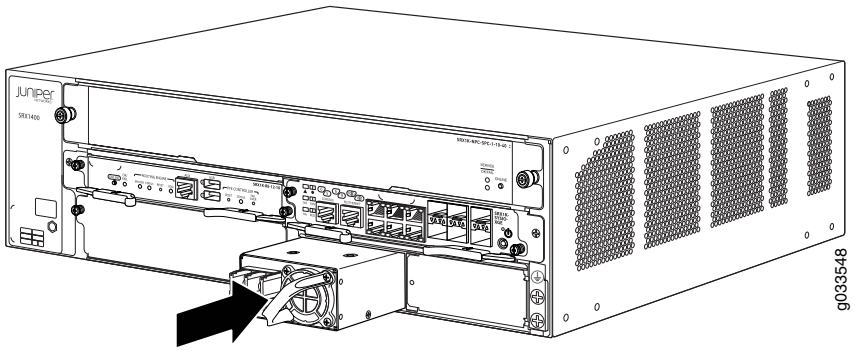
1. Switch off the dedicated facility circuit breaker for the power supply being removed. Follow your site's procedures for ESD.
2. Make sure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cables might become active during the removal process.
3. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
4. Remove the clear plastic cover protecting the terminal studs on the faceplate.
5. Remove the screws and washers from the terminals. Use a number-2 Phillips screwdriver to loosen and remove the screws.
6. Remove the cable lugs from the terminals.
7. Carefully move the power cables out of the way.
8. Push the tab on the left edge of the power supply to the right.
9. Pull the power supply straight out of the chassis. See figure Figure 79 on page 201.

Figure 79: Removing a DC Power Supply from the SRX1400 Services Gateway



10. Orient the replacement power supply so that the tab is on the left side, as shown in Figure 80 on page 202.

Figure 80: Installing a DC Power Supply on the SRX1400 Services Gateway



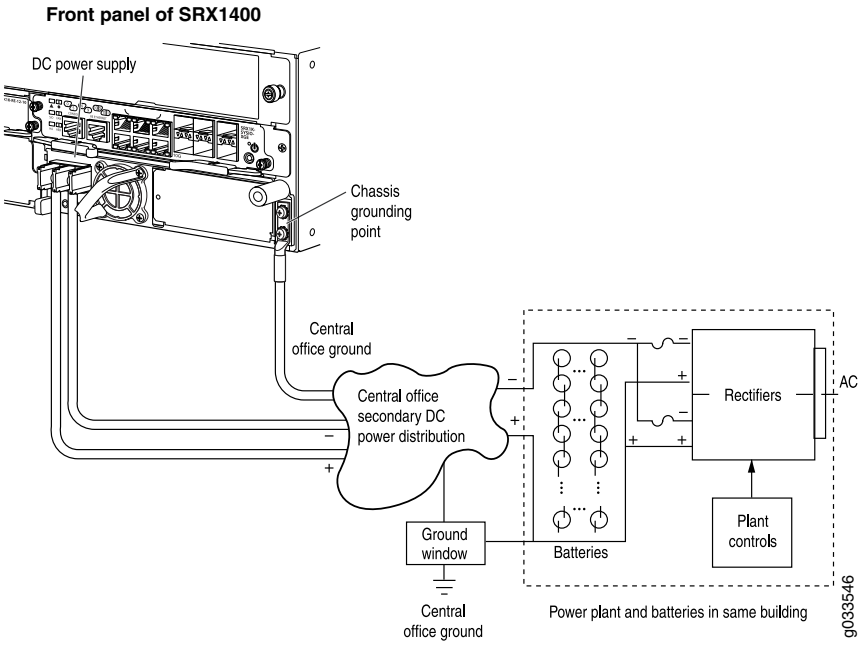
11. Using both hands, slide the replacement power supply straight into the chassis until the power supply is fully seated in the chassis slot. Make sure the tab on the left edge of the power supply clicks into place. The power supply faceplate should be flush with any adjacent power supply faceplate.

    NOTE: Be sure to have the power supply oriented correctly. The tab must be on the left and click into place when fully seated. If the power supply does not insert easily or does not become flush with the chassis, you might have the power supply upside down.

12. Remove the clear plastic cover protecting the terminal studs on the faceplate.
13. Remove the screws and washers from the terminals.
14. Secure each power cable lug to the terminal studs, first with the washer, then with the screw. Apply between 23 lb-in. (2.6 Nm) and 25 lb-in. (2.8 Nm) of torque to each screw.
    a. Secure each positive (+) DC source power cable lug to a **RTN** (return) terminal.
    b. Secure each negative (–) DC source power cable lug to a **-48V** (input) terminal.

    Figure 81 on page 203 shows typical DC source cabling to the SRX1400 Services Gateway.

Figure 81: Typical DC Source Cabling to the SRX1400 Services Gateway



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 supply in slot P0 must be powered by dedicated power feeds derived from feed A, and the DC power supply in slot P1 must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

NOTE: For information about connecting to DC power sources, see "SRX1400 Services Gateway DC Power Supply Electrical Specifications" on page 77.

15. Replace the clear plastic cover over the terminal studs on the faceplate.
16. Verify that the power cabling is correct, that the cables are not touching or blocking access to services gateway components, and it does not cause a tripping hazard. If the power supply is correctly installed and functioning normally, the LED on the power supply lights green steadily.

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

NOTE: You must have a SYSIOC and a Routing Engine installed in the services gateway for the power supply to turn on automatically.

NOTE: 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.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- Replacing DC Power Supply Cables on the SRX1400 Services Gateway on page 204
- SRX1400 Services Gateway DC Power Supply on page 51
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159

Replacing DC Power Supply Cables on the SRX1400 Services Gateway

To replace a power supply cable connected to a DC power supply:

1. 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.
2. Switch off the external circuit breakers for all the cables attached to the power supply. 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. Remove the power cable from the DC power source.
4. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.
5. Make sure the cable is not touching or in the way of any services gateway components, and that it does not cause a tripping hazard.
6. Replace the clear plastic cover over the terminal studs on the faceplate.

7. Attach the power cable to the DC power source.
8. Verify that the DC source power cabling is correct. Observe the status of the LED on the power supply. If the power cable is correctly installed and the power supply is functioning normally, the LED on the power supply lights green steadily.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- Replacing a DC Power Supply on the SRX1400 Services Gateway on page 201
- SRX1400 Services Gateway DC Power Supply on page 51
- Maintaining Power Supplies on the SRX1400 Services Gateway on page 153
- Troubleshooting the Power System on the SRX1400 Services Gateway on page 159

Replacing the Power Supply Air Filter on the SRX1400 Services Gateway

The SRX1400 Services Gateway power supply has one air filter located in the front of the power supply. The SRX1400 power supply air filter supports hot-swappable functionality.

CAUTION: Do not run the services gateway for more than a few minutes without the air filter in place.

NOTE: You can order an air filter kit separately. Contact your Juniper Networks customer service representative for more information. The air filter kit includes a cooling system air filter and four power supply air filters.

To replace the air filter:

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the SRX1400 chassis. For more information about ESD, see *Preventing Electrostatic Discharge Damage to the SRX1400 Services Gateway*.

   Figure 82 on page 206 shows the SRX1400 Services Gateway power supply air filter.

Figure 82: SRX1400 Power Supply Air Filter

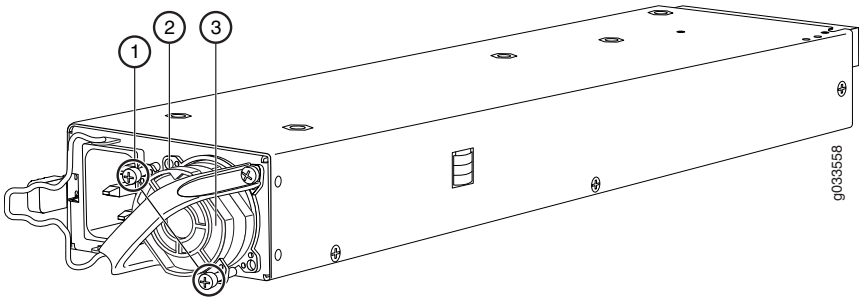


   Table 50 on page 206 lists the SRX1400 services gateway power supply air filter components.

Table 50: Power Supply Air Filter Components

Number	Power Supply Air Filter Components
1	Removable self-tap screws
2	Plastic holder
3	Air Filter

   The numbers in Figure 82 on page 206 on page 10 correspond to the numbers in Table 50 on page 206.

2. Using a number-2 Phillips screwdriver, loosen the screws (removable self-tap screws, no. 3) on the power supply air filter plastic holder.
3. Remove the plastic holder of the power supply air filter.
4. Slide the air filter out of the plastic holder and dispose the air filter.
5. Locate the up arrow on the replacement filter to ensure that the air filter is right side up.
6. Slide the new air filter inside the plastic holder.
7. Tighten the screws on the power supply air filter plastic holder, and secure it in the power supply unit.

Related Documentation

- Required Tools and Parts for Replacing Hardware Components on the SRX1400 Services Gateway on page 169
- SRX1400 Services Gateway Cooling System on page 47

- Troubleshooting the Cooling System on the SRX1400 Services Gateway on page 161
- Maintaining the Air Filter on the SRX1400 Services Gateway on page 150

CHAPTER 31

Contacting Customer Support

Contacting Customer Support

Once you have located the serial numbers of the services gateway or component, you can return the services gateway or component for repair or replacement. For this, you need to contact Juniper Networks Technical Assistance Center (JTAC).

You can contact JTAC 24 hours a day, 7 days a week, using any of the following methods:

- On the Web: Using the Case Manager link at 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

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215

Return Procedure for the SRX1400 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. For the serial number locations of CFMs (SPCs, IOCs, and NPCs), see the *SRX1400, SRX3400, and SRX3600 Services Gateway Module Guide* at www.juniper.net/techpubs/.
2. Obtain a Return Materials Authorization (RMA) number from JTAC.

   NOTE: Do not return the services gateway or any component to Juniper Networks unless you have first obtained an RMA number. Juniper Networks reserves the right to refuse shipments that do not have an RMA. Refused shipments are returned to the customer via collect freight.
3. Pack the services gateway or component for shipping.

For more information about return and repair policies, see the customer support webpage at 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 SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209
- Packing the SRX1400 Services Gateway for Shipment on page 216
- Packing SRX1400 Services Gateway Components for Shipment on page 217

Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI

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 list all of the device 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                                BH0310AA4416      SRX 1400
Midplane         REV 00   711-031012   AABA4416          SRX1k Backplane
PEM 0            rev 06   740-020226   E182C1003Z06P     AC Power Supply
CB 0             REV 16   750-032544   AAAY0804          SRX1K-RE-12-10
  Routing Engine          BUILTIN      BUILTIN           Routing Engine
  CPP                     BUILTIN      BUILTIN           Central PFE Processor
  Mezz           REV 08   710-021035   AAAZ0730          SRX HD Mezzanine Card
FPC 0            REV 00   750-031019                     SRX1k 10GE SYSIO
  PIC 0                   BUILTIN      BUILTIN           6x 1GE RJ45 3x 1GE SFP
3x 10GE SFP+
    Xcvr 6       REV 02   740-013111   9101477           SFP-T
FPC 1            REV 11   750-016077   AAAX7644          SRX3k SPC
  PIC 0                   BUILTIN      BUILTIN           SPU Cp-Flow
FPC 2                    750-020317   TV3333            SRX3k 16xGE TX
  PIC 0                   BUILTIN      BUILTIN           16x 1GE-TX
FPC 3            REV 13   750-017866   AAAN7996          SRX3k NPC
  PIC 0                   BUILTIN      BUILTIN           NPC PIC
Fan Tray         -N/A-    -N/A-        -N/A-             SRX 1400 Fan Tray
```

Most components also have a small rectangular serial number ID label attached to the component body.

NOTE: To list all of the serial numbers of the NSPC, use the serial number of *FPC 1* or *FPC 3* in the show chassis hardware command output.

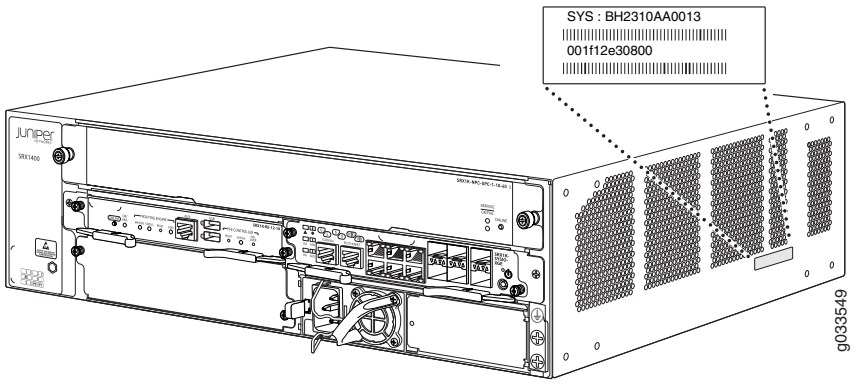
Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

Locating the SRX1400 Services Gateway Chassis Serial Number Label

The chassis serial number is located on the side of the chassis as shown in Figure 83 on page 212.

Figure 83: SRX1400 Services Gateway Chassis Serial Number Label



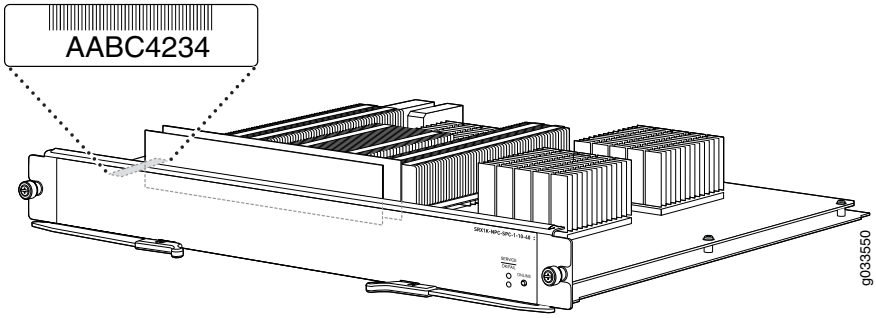
Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

Locating the SRX1400 Services Gateway Network and Services Processing Card Serial Number Label

The serial number label for the Network and Services Processing Card (NSPC) is located behind the faceplate on the right side of the card (see Figure 84 on page 212).

Figure 84: SRX1400 Services Gateway Network and Services Processing Card Serial Number Label



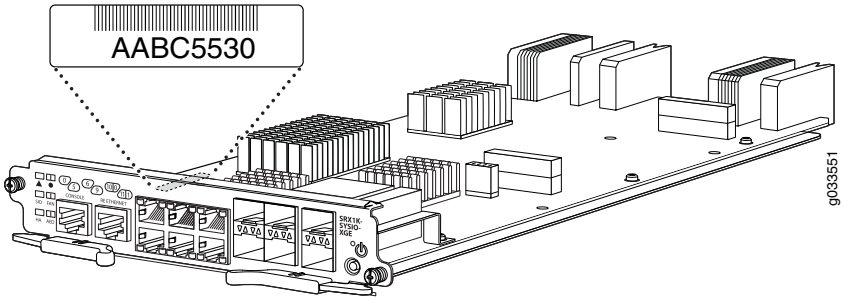
Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

Locating the SRX1400 Services Gateway System I/O Card Serial Number Label

The serial number label for the SYSIOC is located behind the faceplate on the right side of the card (see Figure 85 on page 213).

Figure 85: Locating the SRX1400 Services Gateway System I/O Card Serial Number Label



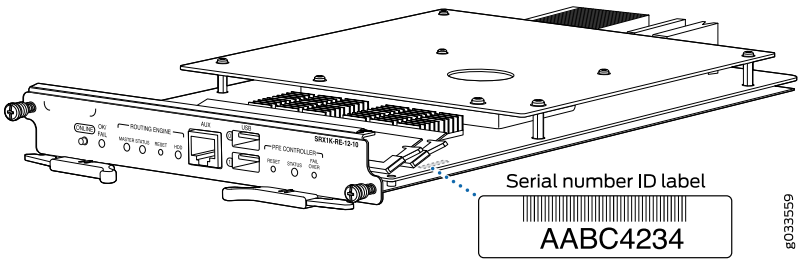
Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

Locating the SRX1400 Services Gateway Routing Engine Serial Number Label

The serial number for the Routing Engine is located behind the faceplate on the right side of the card as shown in Figure 86 on page 213.

Figure 86: SRX1400 Services Gateway Routing Engine



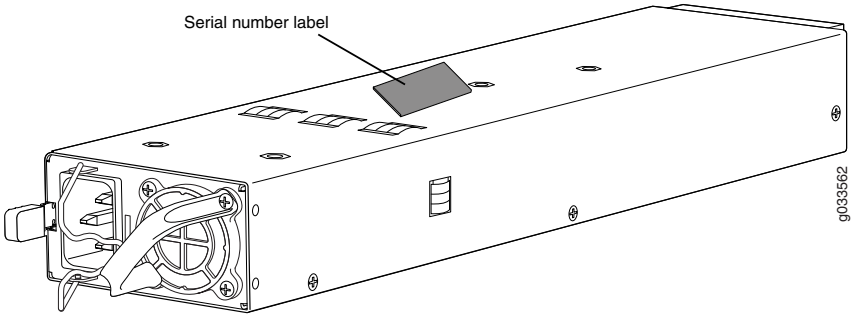
Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

Locating the SRX1400 Services Gateway Power Supply Serial Number Label

The serial number label for the AC and DC power supplies is located on the top of the power supply (see Figure 87 on page 214).

Figure 87: SRX1400 Services Gateway Power Supply Serial Number Label



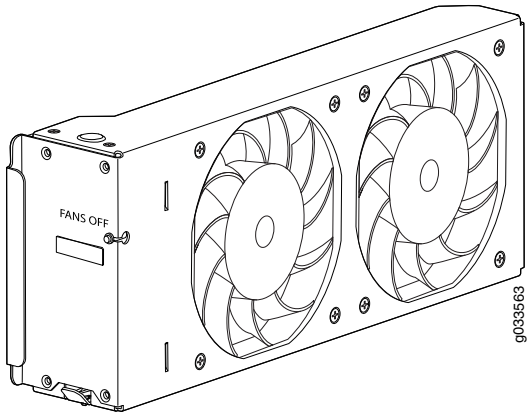
Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

Locating the SRX1400 Services Gateway Fan Tray Number Label

The serial number label for the fan tray is located on the top of the fan tray (see Figure 88 on page 215).

Figure 88: SRX1400 Fan Tray



Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209

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

- Return Procedure for the SRX1400 Services Gateway on page 210
- Listing the SRX1400 Services Gateway Component Serial Numbers with the CLI on page 211
- Contacting Customer Support on page 209

Required Tools and Parts for Packing the SRX1400 Services Gateway

To remove the components from the services gateway or to remove the services gateway from a rack, you need the following tools and parts:

- Blank panels to cover empty slots
- Electrostatic bag or antistatic mat for each component
- Electrostatic discharge (ESD) grounding wrist strap
- Flat-blade screwdriver, approximately 1/4 in. (6 mm)
- Phillips (+) screwdrivers, numbers 1 and 2

Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209
- Packing the SRX1400 Services Gateway for Shipment on page 216
- Packing SRX1400 Services Gateway Components for Shipment on page 217

Packing the SRX1400 Services Gateway for Shipment

To pack the services gateway for shipment:

1. Retrieve the shipping carton 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. Attach an ESD grounding strap to your bare wrist and connect the strap to the ESD point on the chassis or to an outside ESD point if the services gateway is disconnected from earth ground.
3. On the console or other management device connected to the services gateway, 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.
4. Shut down power to the services gateway by pressing the Power button on the front of the services gateway.
5. Disconnect power from the services gateway.
6. Remove the cables that connect to all external devices.
7. If the services gateway is installed in a rack, have one person support the weight of the services gateway while another person unscrews and removes the mounting screws.

8. Place the services gateway in the shipping carton.
9. Cover the services gateway with an ESD bag, and place the packing foam on top of and around the services gateway.
10. Replace the accessory box on top of the packing foam.
11. Securely tape the box closed.
12. Write the Return Materials Authorization (RMA) number on the exterior of the box to ensure proper tracking.

Related Documentation

- Return Procedure for the SRX1400 Services Gateway on page 210
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209
- Required Tools and Parts for Packing the SRX1400 Services Gateway on page 216
- Packing SRX1400 Services Gateway Components for Shipment on page 217

Packing SRX1400 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

- Return Procedure for the SRX1400 Services Gateway on page 210
- Information You Might Need to Supply to JTAC on page 215
- Contacting Customer Support on page 209
- Required Tools and Parts for Packing the SRX1400 Services Gateway on page 216
- Packing the SRX1400 Services Gateway for Shipment on page 216

PART 6

Safety Guidelines

CHAPTER 32

General Safety Information

General Safety Guidelines and Warnings

The following guidelines help ensure your safety and protect the device from damage. The list of guidelines might not address all potentially hazardous situations in your working environment, so be alert and exercise good judgment at all times.

- Perform only the procedures explicitly described in the hardware documentation for this device. Make sure that only authorized service personnel perform other system services.
- Keep the area around the device clear and free from dust before, during, and after installation.
- Keep tools away from areas where people could trip over them while walking.
- Do not wear loose clothing or jewelry, such as rings, bracelets, or chains, which could become caught in the device.
- Wear safety glasses if you are working under any conditions that could be hazardous to your eyes.
- Do not perform any actions that create a potential hazard to people or make the equipment unsafe.
- Never attempt to lift an object that is too heavy for one person to handle.
- Never install or manipulate wiring during electrical storms.
- Never install electrical jacks in wet locations unless the jacks are specifically designed for wet environments.
- Operate the device only when it is properly grounded.

- Ensure that the separate protective earthing terminal provided on this device is permanently connected to earth.
- Replace fuses only with fuses of the same type and rating.
- Do not open or remove chassis covers or sheet-metal parts unless instructions are provided in the hardware documentation for this device. Such an action could cause severe electrical shock.
- Do not push or force any objects through any opening in the chassis frame. Such an action could result in electrical shock or fire.
- Avoid spilling liquid onto the chassis or onto any device component. Such an action could cause electrical shock or damage the device.
- Avoid touching uninsulated electrical wires or terminals that have not been disconnected from their power source. Such an action could cause electrical shock.
- Always ensure that all modules, power supplies, and cover panels are fully inserted and that the installation screws are fully tightened.

Related Documentation

- AC Power Electrical Safety Guidelines on page 252
- *DC Power Electrical Safety Guidelines for Switches*
- General Electrical Safety Guidelines and Warnings on page 249
- Maintenance and Operational Safety Guidelines and Warnings on page 243
- Installation Instructions Warning on page 229
- Grounded Equipment Warning on page 235

Definitions of Safety Warning Levels

The documentation uses the following levels of safety warnings (there are two *Warning* formats):

NOTE: You might find this information helpful in a particular situation, or you might overlook this important information if it was not highlighted in a Note.

CAUTION: You need to observe the specified guidelines to prevent minor injury or discomfort to you or severe damage to the device.

WARNING: This symbol alerts you to the risk of personal injury from a laser.

WARNING: This symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards

involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Waarschuwing Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.

Varoitus Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.

Attention Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.

Warnung Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.

Avvertenza Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti.

Advarsel Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

Aviso Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes.

¡Atención! Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes.

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning

måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- Installation Instructions Warning on page 229
- Maintenance and Operational Safety Guidelines and Warnings on page 243
- Grounded Equipment Warning on page 235
- Laser and LED Safety Guidelines and Warnings for Switches on page 237
- *Laser and LED Safety Guidelines and Warnings for the QFX Series*
- Warning Statement for Norway and Sweden on page 227

Restricted Access Area Warning

WARNING: The services gateway is intended for installation in restricted access areas. A restricted access area is an area to which access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and which is controlled by the authority responsible for the location.

Waarschuwing Dit toestel is bedoeld voor installatie op plaatsen met beperkte toegang. Een plaats met beperkte toegang is een plaats waar toegang slechts door servicepersoneel verkregen kan worden door middel van een speciaal instrument, een slot en sleutel, of een ander veiligheidsmiddel, en welke beheerd wordt door de overheidsinstantie die verantwoordelijk is voor de locatie.

Varoitus Tämä laite on tarkoitettu asennettavaksi paikkaan, johon pääsy on rajoitettua. Paikka, johon pääsy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pääsee jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.

Attention Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contrôle de l'autorité responsable de l'emplacement.

Warnung Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem für die Anlage zuständigen Gremium kontrolliert wird.

Avvertenza Questa unità deve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autorità responsabile della zona.

Advarsel Denne enheten er laget for installasjon i områder med begrenset adgang. Et område med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktøy, lås og nøkkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for området.

Aviso Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta área é controlada pela autoridade responsável pelo local.

¡Atención! Esta unidad ha sido diseñada para instalarse en áreas de acceso restringido. Área de acceso restringido significa un área a la que solamente tiene acceso el personal de servicio mediante la utilización de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.

Varning! Denna enhet är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde får endast tillträdas av servicepersonal med ett speciellt verktyg, lås och nyckel, eller annan säkerhetsanordning, och kontrolleras av den auktoritet som ansvarar för området.

Related Documentation

- Definitions of Safety Warning Levels on page 222
- General Safety Guidelines and Warnings on page 221
- Qualified Personnel Warning on page 226
- Prevention of Electrostatic Discharge Damage on page 250

Fire Safety Requirements

In the event of a fire emergency, the safety of people is the primary concern. You should establish procedures for protecting people in the event of a fire emergency, provide safety training, and properly provision fire-control equipment and fire extinguishers.

In addition, you should establish procedures to protect your equipment in the event of a fire emergency. Juniper Networks products should be installed in an environment suitable for electronic equipment. We recommend that fire suppression equipment be available in the event of a fire in the vicinity of the equipment and that all local fire, safety, and electrical codes and ordinances be observed when you install and operate your equipment.

Fire Suppression

In the event of an electrical hazard or an electrical fire, you should first turn power off to the equipment at the source. Then use a Type C fire extinguisher, which uses noncorrosive fire retardants, to extinguish the fire.

Fire Suppression Equipment

Type C fire extinguishers, which use noncorrosive fire retardants such as carbon dioxide and Halotron™, are most effective for suppressing electrical fires. Type C fire extinguishers displace oxygen from the point of combustion to eliminate the fire. For extinguishing fire on or around equipment that draws air from the environment for cooling, you should use this type of inert oxygen displacement extinguisher instead of an extinguisher that leaves residues on equipment.

Do not use multipurpose Type ABC chemical fire extinguishers (dry chemical fire extinguishers). The primary ingredient in these fire extinguishers is monoammonium phosphate, which is very sticky and difficult to clean. In addition, in the presence of minute amounts of moisture, monoammonium phosphate can become highly corrosive and corrodes most metals.

Any equipment in a room in which a chemical fire extinguisher has been discharged is subject to premature failure and unreliable operation. The equipment is considered to be irreparably damaged.

NOTE: **To keep warranties effective, do not use a dry chemical fire extinguisher to control a fire at or near a Juniper Networks device. If a dry chemical fire extinguisher is used, the unit is no longer eligible for coverage under a service agreement.**

We recommend that you dispose of any irreparably damaged equipment in an environmentally responsible manner.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- Action to Take After an Electrical Accident on page 266

Qualified Personnel Warning

WARNING: **Only trained and qualified personnel should install or replace the device.**

Waarschuwing Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.

Varoitus Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.

Attention Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.

Warnung Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.

Avvertenza Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.

Advarsel Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.

Aviso Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.

¡Atención! Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.

Varning! Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- AC Power Electrical Safety Guidelines on page 252
- *DC Power Electrical Safety Guidelines for Switches*

Warning Statement for Norway and Sweden

WARNING: The equipment must be connected to an earthed mains socket-outlet.

Advarsel Apparatet skal kobles til en jordet stikkontakt.

Varning! Apparaten skall anslutas till jordat nätuttag.

Related Documentation

- General Safety Guidelines and Warnings on page 221

CHAPTER 33

Installation and Maintenance Safety Guidelines and Warnings

Installation Instructions Warning

WARNING: Read the installation instructions before you connect the device to a power source.

Waarschuwing Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.

Varoitus Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.

Attention Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

Warnung Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.

Avvertenza Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.

Advarsel Les installasjonsinstruksjonene før systemet kobles til strømkilden.

Aviso Leia as instruções de instalação antes de ligar o sistema à sua fonte de energia.

¡Atención! Ver las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Varning! Läs installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- Laser and LED Safety Guidelines and Warnings for Switches on page 237
- Grounded Equipment Warning on page 235

Chassis Lifting Guidelines for EX3200 Switches

The weight of a fully loaded EX3200 switch chassis is approximately 22 lb (10 kg). Observe the following guidelines for lifting and moving an EX3200 switch:

- Before installing an EX3200 switch, read the guidelines in *Site Preparation Checklist for EX3200 Switches* to verify that the intended site meets the specified power, environmental, and clearance requirements.
- Before lifting or moving the EX3200 switch, 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

- General Safety Guidelines and Warnings on page 221
- Installation Instructions Warning on page 229
- *Mounting an EX3200 Switch*

Ramp Warning

WARNING: **When installing the device, do not use a ramp inclined at more than 10 degrees.**

Waarschuwing Gebruik een oprijplaat niet onder een hoek van meer dan 10 graden.

Varoitus Älä käytä sellaista kaltevaa pintaa, jonka kaltevuus ylittää 10 astetta.

Attention Ne pas utiliser une rampe dont l'inclinaison est supérieure à 10 degrés.

Warnung Keine Rampen mit einer Neigung von mehr als 10 Grad verwenden.

Avvertenza Non usare una rampa con pendenza superiore a 10 gradi.

Advarsel Bruk aldri en rampe som heller mer enn 10 grader.

Aviso Não utilize uma rampa com uma inclinação superior a 10 graus.

¡Atención! No usar una rampa inclinada más de 10 grados

Varning! Använd inte ramp med en lutning på mer än 10 grader.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- Installation Instructions Warning on page 229
- Grounded Equipment Warning on page 235

Rack-Mounting and Cabinet-Mounting Warnings

Ensure that the rack or cabinet in which the device is installed is evenly and securely supported. Uneven mechanical loading could lead to a hazardous condition.

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

- The device must be installed in a rack that is secured to the building structure.
- The device should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the device on a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing equipment, install the stabilizers before mounting or servicing the device in the rack.

Waarschuwing Om lichamelijk letsel te voorkomen wanneer u dit toestel in een rek monteert of het daar een servicebeurt geeft, moet u speciale voorzorgsmaatregelen nemen om ervoor te zorgen dat het toestel stabiel blijft. De onderstaande richtlijnen worden verstrekt om uw veiligheid te verzekeren:

- De Juniper Networks switch moet in een stellage worden geïnstalleerd die aan een bouwsel is verankerd.
- Dit toestel dient onderaan in het rek gemonteerd te worden als het toestel het enige in het rek is.

- Wanneer u dit toestel in een gedeeltelijk gevuld rek monteert, dient u het rek van onderen naar boven te laden met het zwaarste onderdeel onderaan in het rek.
- Als het rek voorzien is van stabiliseringshulpmiddelen, dient u de stabilisatoren te monteren voordat u het toestel in het rek monteert of het daar een servicebeurt geeft.

Varoitus Kun laite asetetaan telineeseen tai huolletaan sen ollessa telineessä, on noudatettava erityisiä varotoimia järjestelmän vakavuuden säilyttämiseksi, jotta vältytään loukkaantumiselta. Noudata seuraavia turvallisuusohjeita:

- Juniper Networks switch on asennettava telineeseen, joka on kiinnitetty rakennukseen.
- Jos telineessä ei ole muita laitteita, aseta laite telineen alaosaan.
- Jos laite asetetaan osaksi täytettyyn telineeseen, aloita kuormittaminen sen alaosasta kaikkein raskaimmalla esineellä ja siirry sitten sen yläosaan.
- Jos telinettä varten on vakaimet, asenna ne ennen laitteen asettamista telineeseen tai sen huoltamista siinä.

Attention Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel:

- Le rack sur lequel est monté le Juniper Networks switch doit être fixé à la structure du bâtiment.
- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

Warnung Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:

- Der Juniper Networks switch muß in einem Gestell installiert werden, das in der Gebäudestruktur verankert ist.
- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.

- Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.
- Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.

Avvertenza Per evitare infortuni fisici durante il montaggio o la manutenzione di questa unità in un supporto, occorre osservare speciali precauzioni per garantire che il sistema rimanga stabile. Le seguenti direttive vengono fornite per garantire la sicurezza personale:

- Il Juniper Networks switch deve essere installato in un telaio, il quale deve essere fissato alla struttura dell'edificio.
- Questa unità deve venire montata sul fondo del supporto, se si tratta dell'unica unità da montare nel supporto.
- Quando questa unità viene montata in un supporto parzialmente pieno, caricare il supporto dal basso all'alto, con il componente più pesante sistemato sul fondo del supporto.
- Se il supporto è dotato di dispositivi stabilizzanti, installare tali dispositivi prima di montare o di procedere alla manutenzione dell'unità nel supporto.

Advarsel Unngå fysiske skader under montering eller reparasjonsarbeid på denne enheten når den befinner seg i et kabinett. Vær nøye med at systemet er stabilt. Følgende retningslinjer er gitt for å verne om sikkerheten:

- Juniper Networks switch må installeres i et stativ som er forankret til bygningsstrukturen.
- Denne enheten bør monteres nederst i kabinettet hvis dette er den eneste enheten i kabinettet.
- Ved montering av denne enheten i et kabinett som er delvis fylt, skal kabinettet lastes fra bunnen og opp med den tyngste komponenten nederst i kabinettet.
- Hvis kabinettet er utstyrt med stabiliseringsutstyr, skal stabilisatorene installeres før montering eller utføring av reparasjonsarbeid på enheten i kabinettet.

Aviso Para se prevenir contra danos corporais ao montar ou reparar esta unidade numa estante, deverá tomar precauções especiais para se certificar de que o sistema possui um suporte estável. As seguintes directrizes ajudá-lo-ão a efectuar o seu trabalho com segurança:

- O Juniper Networks switch deverá ser instalado numa prateleira fixa à estrutura do edificio.
- Esta unidade deverá ser montada na parte inferior da estante, caso seja esta a única unidade a ser montada.
- Ao montar esta unidade numa estante parcialmente ocupada, coloque os itens mais pesados na parte inferior da estante, arrumando-os de baixo para cima.
- Se a estante possuir um dispositivo de estabilização, instale-o antes de montar ou reparar a unidade.

¡Atención! Para evitar lesiones durante el montaje de este equipo sobre un bastidor, o posteriormente durante su mantenimiento, se debe poner mucho cuidado en que el sistema quede bien estable. Para garantizar su seguridad, proceda según las siguientes instrucciones:

- El Juniper Networks switch debe instalarse en un bastidor fijado a la estructura del edificio.
- Colocar el equipo en la parte inferior del bastidor, cuando sea la única unidad en el mismo.
- Cuando este equipo se vaya a instalar en un bastidor parcialmente ocupado, comenzar la instalación desde la parte inferior hacia la superior colocando el equipo más pesado en la parte inferior.
- Si el bastidor dispone de dispositivos estabilizadores, instalar éstos antes de montar o proceder al mantenimiento del equipo instalado en el bastidor.

Varning! För att undvika kroppsskada när du installerar eller utför underhållsarbete på denna enhet på en ställning måste du vidta särskilda försiktighetsåtgärder för att försäkra dig om att systemet står stadigt. Följande riktlinjer ges för att trygga din säkerhet:

- Juniper Networks switch måste installeras i en ställning som är förankrad i byggnadens struktur.
- Om denna enhet är den enda enheten på ställningen skall den installeras längst ned på ställningen.
- Om denna enhet installeras på en delvis fylld ställning skall ställningen fyllas nedifrån och upp, med de tyngsta enheterna längst ned på ställningen.
- Om ställningen är försedd med stabiliseringsdon skall dessa monteras fast innan enheten installeras eller underhålls på ställningen.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- Installation Instructions Warning on page 229
- Grounded Equipment Warning on page 235

Grounded Equipment Warning

This topic applies to hardware devices in the EX Series product family, which includes EX Series switches, the EX Series Redundant Power System (RPS), and the XRE200 External Routing Engine.

This topic also applies to hardware devices in the QFX Series, to OCX1100 switches, and to NFX250 devices.

WARNING: The device is intended to be grounded. During normal use, ensure that you have connected earth ground to the chassis.

Waarschuwing Deze apparatuur hoort geaard te worden Zorg dat de host-computer tijdens normaal gebruik met aarde is verbonden.

Varoitus Tämä laitteisto on tarkoitettu maadoitettavaksi. Varmista, että isäntälaite on yhdistetty maahan normaalikäytön aikana.

Attention Cet équipement doit être relié à la terre. S'assurer que l'appareil hôte est relié à la terre lors de l'utilisation normale.

Warnung Dieses Gerät muß geerdet werden. Stellen Sie sicher, daß das Host-Gerät während des normalen Betriebs an Erde gelegt ist.

Avvertenza Questa apparecchiatura deve essere collegata a massa. Accertarsi che il dispositivo host sia collegato alla massa di terra durante il normale utilizzo.

Advarsel Dette utstyret skal jordes. Forviss deg om vertsterminalen er jordet ved normalt bruk.

Aviso Este equipamento deverá estar ligado à terra. Certifique-se que o host se encontra ligado à terra durante a sua utilização normal.

¡Atención! Este equipo debe conectarse a tierra. Asegurarse de que el equipo principal esté conectado a tierra durante el uso normal.

Varning! Denna utrustning är avsedd att jordas. Se till att värdenheten är jordad vid normal användning.

Related Documentation

- General Safety Guidelines and Warnings on page 221

CHAPTER 34

Radiation and Laser Warnings

Laser and LED Safety Guidelines and Warnings for Switches

EX Series switches, OCX1100 switches, NFX250 devices, and the XRE200 External Routing Engine are equipped with laser transmitters, which are considered a Class 1 Laser Product by the U.S. Food and Drug Administration and are evaluated as a Class 1 Laser Product per EN 60825-1 requirements.

Observe the following guidelines and warnings:

General Laser Safety Guidelines

When working around ports that support optical transceivers, observe the following safety guidelines to prevent eye injury:

- Do not look into unterminated ports or at fibers that connect to unknown sources.
- Do not examine unterminated optical ports with optical instruments.
- Avoid direct exposure to the beam.

WARNING: **Unterminated optical connectors can emit invisible laser radiation. The lens in the human eye focuses all the laser power on the retina, so focusing the eye directly on a laser source—even a low-power laser—could permanently damage the eye.**

Class 1 Laser Product Warning

WARNING: Class 1 laser product.

Waarschuwing Klasse-1 laser produkt.

Varoitus Luokan 1 lasertuote.

Attention Produit laser de classe I.

Warnung Laserprodukt der Klasse 1.

WARNING: **Avvertenza** Prodotto laser di Classe 1.

Advarsel Laserprodukt av klasse 1.

Aviso Produto laser de classe 1.

¡Atención! Producto láser Clase I.

Varning! Laserprodukt av klass 1.

Class 1 LED Product Warning

WARNING: Class 1 LED product.

Waarschuwing Klasse 1 LED-product.

Varoitus Luokan 1 valodiodituote.

Attention Alarme de produit LED Class I.

Warnung Class 1 LED-Produktwarnung.

WARNING: **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.

WARNING: **Waarschuwing** Niet in de straal staren of hem rechtstreeks bekijken met optische instrumenten.

WARNING: **Varoitus** Älä katso säteeseen äläkä tarkastele sitä suoraan optisen laitteen avulla.

WARNING: **Attention** Ne pas fixer le faisceau des yeux, ni l'observer directement à l'aide d'instruments optiques.

WARNING: **Warnung** Nicht direkt in den Strahl blicken und ihn nicht direkt mit optischen Geräten prüfen.

WARNING: **Avvertenza** Non fissare il raggio con gli occhi né usare strumenti ottici per osservarlo direttamente.

WARNING: **Advarsel** Stirr eller se ikke direkte p strlen med optiske instrumenter.

WARNING: **Aviso** Não olhe fixamente para o raio, nem olhe para ele directamente com instrumentos ópticos.

WARNING: **¡Atención!** No mirar fijamente el haz ni observarlo directamente con instrumentos ópticos.

WARNING: **Varning!** Rikta inte blicken in mot strålen och titta inte direkt på den genom optiska instrument.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- Radiation from Open Port Apertures Warning on page 240
- Installation Instructions Warning on page 229
- Grounded Equipment Warning on page 235
- *Pluggable Transceivers Supported on EX Series Switches*
- *Pluggable Transceivers Supported on OCX1100 Switches*

Radiation from Open Port Apertures Warning

WARNING: Because invisible radiation might be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures.

Waarschuwing Aangezien onzichtbare straling vanuit de opening van de poort kan komen als er geen fiberkabel aangesloten is, dient blootstelling aan straling en het kijken in open openingen vermeden te worden.

Varoitus Koska portin aukosta voi emittoitua näkymätöntä säteilyä, kun kuitukaapelia ei ole kytkettynä, vältä säteilylle altistumista äläkä katso avoimiin aukkoihin.

Attention Des radiations invisibles à l'il nu pouvant traverser l'ouverture du port lorsqu'aucun câble en fibre optique n'y est connecté, il est recommandé de ne pas regarder fixement l'intérieur de ces ouvertures.

Warnung Aus der Port-Öffnung können unsichtbare Strahlen emittieren, wenn kein Glasfaserkabel angeschlossen ist. Vermeiden Sie es, sich den Strahlungen auszusetzen, und starren Sie nicht in die Öffnungen!

Avvertenza Quando i cavi in fibra non sono inseriti, radiazioni invisibili possono essere emesse attraverso l'apertura della porta. Evitate di esporvi alle radiazioni e non guardate direttamente nelle aperture.

Advarsel Unngå utsettelse for stråling, og stirr ikke inn i åpninger som er åpne, fordi usynlig stråling kan emiteres fra portens åpning når det ikke er tilkoblet en fiberkabel.

Aviso Dada a possibilidade de emissão de radiação invisível através do orifício da via de acesso, quando esta não tiver nenhum cabo de fibra conectado, deverá evitar a exposição à radiação e não deverá olhar fixamente para orifícios que se encontrarem a descoberto.

¡Atención! Debido a que la apertura del puerto puede emitir radiación invisible cuando no existe un cable de fibra conectado, evite mirar directamente a las aperturas para no exponerse a la radiación.

Varning! Osynlig strålning kan avges från en portöppning utan ansluten fiberkabel och du bör därför undvika att bli utsatt för strålning genom att inte stirra in i oskyddade öppningar.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- Laser and LED Safety Guidelines and Warnings for Switches on page 237
- Installation Instructions Warning on page 229
- Grounded Equipment Warning on page 235

CHAPTER 35

Maintenance and Operational Safety Guidelines and Warnings

Maintenance and Operational Safety Guidelines and Warnings

While performing the maintenance activities for devices, observe the following guidelines and warnings:

Battery Handling Warning

WARNING: Replacing a battery incorrectly might result in an explosion. Replace a battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Waarschuwing Er is ontploffingsgevaar als de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type dat door de fabrikant aanbevolen is. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften weggeworpen te worden.

Varoitus Räjähdyksen vaara, jos akku on vaihdettu väärään akkuun. Käytä vaihtamiseen ainoastaan saman- tai vastaavantyyppistä akkua, joka on valmistajan suosittelema. Hävitä käytetyt akut valmistajan ohjeiden mukaan.

Attention Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

Warnung Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

Advarsel Det kan være fare for eksplosjon hvis batteriet skiftes på feil måte. Skift kun med samme eller tilsvarende type som er anbefalt av produsenten. Kasser brukte batterier i henhold til produsentens instruksjoner.

Avvertenza Pericolo di esplosione se la batteria non è installata correttamente. Sostituire solo con una di tipo uguale o equivalente, consigliata dal produttore. Eliminare le batterie usate secondo le istruzioni del produttore.

Aviso Existe perigo de explosão se a bateria for substituída incorrectamente. Substitua a bateria por uma bateria igual ou de um tipo equivalente recomendado pelo fabricante. Destrua as baterias usadas conforme as instruções do fabricante.

¡Atención! Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

Varning! Explosionsfara vid felaktigt batteribyte. Ersätt endast batteriet med samma batterityp som rekommenderas av tillverkaren eller motsvarande. Följ tillverkarens anvisningar vid kassering av använda batterier.

Jewelry Removal Warning

WARNING: Before working on equipment that is connected to power lines, remove jewelry, including rings, necklaces, and watches. Metal objects heat up when connected to power and ground and can cause serious burns or can be welded to the terminals.

Waarschuwing Alvorens aan apparatuur te werken die met elektrische leidingen is verbonden, sieraden (inclusief ringen, kettingen en horloges) verwijderen. Metalen voorwerpen worden warm wanneer ze met stroom en aarde zijn verbonden, en kunnen ernstige brandwonden veroorzaken of het metalen voorwerp aan de aansluitklemmen lassen.

Varoitus Ennen kuin työskentelet voimavirtajohtoihin kytkettyjen laitteiden parissa, ota pois kaikki korut (sormukset, kaulakorut ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sähkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitäntänapoihin.

Attention Avant d'accéder à cet équipement connecté aux lignes électriques, ôter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés

à l'alimentation et reliés à la terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.

Warnung Vor der Arbeit an Geräten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließlich Ringe, Ketten und Uhren) abnehmen. Metallgegenstände erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschlußklemmen angeschweißt werden.

Avvertenza Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo può saldarsi ai terminali.

Advarsel Fjern alle smykker (inkludert ringer, halskjeder og klokker) før du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forårsake alvorlige brannskader eller smelte fast til polene.

Aviso Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jóias que estiver a usar (incluindo anéis, fios e relógios). Os objectos metálicos aquecerão em contacto com a corrente e em contacto com a ligação à terra, podendo causar queimaduras graves ou ficarem soldados aos terminais.

¡Atención! Antes de operar sobre equipos conectados a líneas de alimentación, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentación y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metálicos queden soldados a los bornes.

Varning! Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som är kopplad till kraftledningar. Metallobjekt hettas upp när de kopplas ihop med ström och jord och kan förorsaka allvarliga brännskador; metallobjekt kan också sammansvetsas med kontakterna.

Lightning Activity Warning

WARNING: Do not work on the system or connect or disconnect cables during periods of lightning activity.

Waarschuwing Tijdens onweer dat gepaard gaat met bliksem, dient u niet aan het systeem te werken of kabels aan te sluiten of te ontkoppelen.

Varoitus Älä työskentele järjestelmän parissa äläkä yhdistä tai irrota kaapeleita ukkosilmalla.

Attention Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.

Warnung Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.

Avvertenza Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.

Advarsel Utfør aldri arbeid på systemet, eller koble kabler til eller fra systemet når det tordner eller lyner.

Aviso Não trabalhe no sistema ou ligue e desligue cabos durante períodos de mau tempo (trovoada).

¡Atención! No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.

Varning! Vid åska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

Operating Temperature Warning

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

Waarschuwing Om te voorkomen dat welke switch van de Juniper Networks router dan ook oververhit raakt, dient u deze niet te bedienen op een plaats waar de maximale aanbevolen omgevingstemperatuur van 40° C wordt overschreden. Om te voorkomen dat de luchtstroom wordt beperkt, dient er minstens 15,2 cm speling rond de ventilatie-openingen te zijn.

Varoitus Ettei Juniper Networks switch-sarjan reititin ylikuumentuisi, sitä ei saa käyttää tilassa, jonka lämpötila ylittää korkeimman suositellun ympäristölämpötilan 40° C. Ettei ilmanvaihto estyisi, tuuletusaukkojen ympärille on jätettävä ainakin 15,2 cm tilaa.

Attention Pour éviter toute surchauffe des routeurs de la gamme Juniper Networks switch, ne l'utilisez pas dans une zone où la température ambiante est supérieure à 40° C. Pour permettre un flot d'air constant, dégagez un espace d'au moins 15,2 cm autour des ouvertures de ventilations.

Warnung Um einen Router der switch vor Überhitzung zu schützen, darf dieser nicht in einer Gegend betrieben werden, in der die Umgebungstemperatur das empfohlene Maximum von 40° C überschreitet. Um Lüftungsverschluß zu verhindern, achten Sie darauf, daß mindestens 15,2 cm lichter Raum um die Lüftungsöffnungen herum frei bleibt.

Avvertenza Per evitare il surriscaldamento dei switch, non adoperateli in un locale che ecceda la temperatura ambientale massima di 40° C. Per evitare che la circolazione dell'aria sia impedita, lasciate uno spazio di almeno 15.2 cm di fronte alle aperture delle ventole.

Advarsel Unngå overoppheting av eventuelle rutere i Juniper Networks switch Disse skal ikke brukes på steder der den anbefalte maksimale omgivelsestemperaturen overstiger 40° C (104° F). Sørg for at klaringen rundt lufteåpningene er minst 15,2 cm (6 tommer) for å forhindre nedsatt luftsirkulasjon.

Aviso Para evitar o sobreaquecimento do encaminhador Juniper Networks switch, não utilize este equipamento numa área que exceda a temperatura máxima recomendada de 40° C. Para evitar a restrição à circulação de ar, deixe pelo menos um espaço de 15,2 cm à volta das aberturas de ventilação.

¡Atención! Para impedir que un encaminador de la serie Juniper Networks switch se recaliente, no lo haga funcionar en un área en la que se supere la temperatura ambiente máxima recomendada de 40° C. Para impedir la restricción de la entrada de aire, deje un espacio mínimo de 15,2 cm alrededor de las aperturas para ventilación.

Varning! Förhindra att en Juniper Networks switch överhettas genom att inte använda den i ett område där den maximalt rekommenderade omgivningstemperaturen på 40° C överskrids. Förhindra att luftcirkulationen inskränks genom att se till att det finns fritt utrymme på minst 15,2 cm omkring ventilationsöppningarna.

Product Disposal Warning

WARNING: Disposal of this device must be handled according to all national laws and regulations.

Waarschuwing Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.

Varoitus Tämän tuotteen lopullisesta hävittämisestä tulee huolehtia kaikkia valtakunnallisia lakeja ja säännöksiä noudattaen.

Attention La mise au rebut définitive de ce produit doit être effectuée conformément à toutes les lois et réglementations en vigueur.

Warnung Dieses Produkt muß den geltenden Gesetzen und Vorschriften entsprechend entsorgt werden.

Avvertenza L'eliminazione finale di questo prodotto deve essere eseguita osservando le normative italiane vigenti in materia

Advarsel Endelig disponering av dette produktet må skje i henhold til nasjonale lover og forskrifter.

Aviso A descartagem final deste produto deverá ser efectuada de acordo com os regulamentos e a legislação nacional.

¡Atención! El desecho final de este producto debe realizarse según todas las leyes y regulaciones nacionales

Varning! Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- AC Power Electrical Safety Guidelines on page 252
- *DC Power Electrical Safety Guidelines for Switches*
- Laser and LED Safety Guidelines and Warnings for Switches on page 237
- Installation Instructions Warning on page 229
- Grounded Equipment Warning on page 235

CHAPTER 36

Electrical Safety Guidelines and Warnings

General Electrical Safety Guidelines and Warnings

WARNING: Certain ports on the device are designed for use as intrabuilding (within-the-building) interfaces only (Type 2 or Type 4 ports as described in *GR-1089-CORE*) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS requirements and protect against lightning surges and commercial power disturbances, the intrabuilding ports *must not* be metallically connected to interfaces that connect to the OSP or its wiring. The intrabuilding ports on the device are suitable for connection to intrabuilding or unexposed wiring or cabling only. The addition of primary protectors is not sufficient protection for connecting these interfaces metallically to OSP wiring.

CAUTION: Before removing or installing components of a device, attach an electrostatic discharge (ESD) grounding strap to an ESD point and place the other end of the strap around your bare wrist. Failure to use an ESD grounding strap could result in damage to the device.

- Install the device in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
- Locate the emergency power-off switch for the room in which you are working so that if an electrical accident occurs, you can quickly turn off the power.
- Make sure that grounding surfaces are cleaned and brought to a bright finish before grounding connections are made.
- Do not work alone if potentially hazardous conditions exist anywhere in your workspace.
- Never assume that power is disconnected from a circuit. Always check the circuit before starting to work.
- Carefully look for possible hazards in your work area, such as moist floors, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the device and peripheral equipment function safely and correctly, use the cables and connectors specified for the attached peripheral equipment, and make certain they are in good condition.

You can remove and replace many device components without powering off or disconnecting power to the device, as detailed elsewhere in the hardware documentation for this device. Never install an equipment that it appears to be damaged.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- AC Power Electrical Safety Guidelines on page 252
- *DC Power Electrical Safety Guidelines for Switches*

Prevention of Electrostatic Discharge Damage

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

- Always use an ESD grounding strap when you are handling components that are subject to ESD damage, and make sure that it is in direct contact with your skin.

  If a grounding strap is not available, hold the component in its antistatic bag (see Figure 89 on page 251) in one hand and touch the exposed, bare metal of the device with the other hand immediately before inserting the component into the device.

  WARNING: For safety, periodically check the resistance value of the ESD grounding strap. The measurement must be in the range 1 through 10 Mohms.

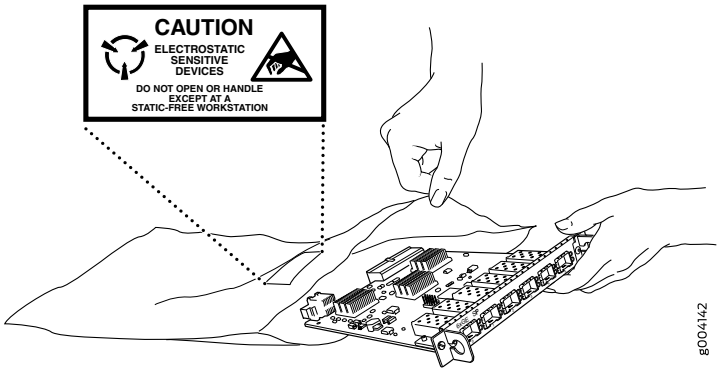
- When handling any component that is subject to ESD damage and that is removed from the device, make sure the equipment end of your ESD grounding strap is attached to the ESD point on the chassis.

  If no grounding strap is available, touch the exposed, bare metal of the device to ground yourself before handling the component.

- Avoid contact between the component that is subject to ESD damage and your clothing. ESD voltages emitted from clothing can damage components.

- When removing or installing a component that is subject to ESD damage, always place it component-side up on an antistatic surface, in an antistatic card rack, or in an antistatic bag (see Figure 89 on page 251). If you are returning a component, place it in an antistatic bag before packing it.

Figure 89: Placing a Component into an Antistatic Bag



CAUTION: ANSI/TIA/EIA-568 cables such as Category 5e and Category 6 can get electrostatically charged. To dissipate this charge, always ground the cables to a suitable and safe earth ground before connecting them to the system.

Related Documentation

- General Safety Guidelines and Warnings on page 221

AC Power Electrical Safety Guidelines

CAUTION: For devices with AC power supplies, an external surge protective device (SPD) must be used at the AC power source.

The following electrical safety guidelines apply to AC-powered devices:

- Note the following warnings printed on the device:

  "**CAUTION:** THIS UNIT HAS MORE THAN ONE POWER SUPPLY CORD. DISCONNECT ALL POWER SUPPLY CORDS BEFORE SERVICING TO AVOID ELECTRIC SHOCK."

  "**ATTENTION:** CET APPAREIL COMPORTE PLUS D'UN CORDON D'ALIMENTATION. AFIN DE PRÉVENIR LES CHOCS ÉLECTRIQUES, DÉBRANCHER TOUT CORDON D'ALIMENTATION AVANT DE FAIRE LE DÉPANNAGE."

- AC-powered devices are shipped with a three-wire electrical cord with a grounding-type plug that fits only a grounding-type power outlet. Do not circumvent this safety feature. Equipment grounding must comply with local and national electrical codes.
- You must provide an external certified circuit breaker rated minimum 20 A in the building installation.
- The power cord serves as the main disconnecting device for the AC-powered device. The socket outlet must be near the AC-powered device and be easily accessible.
- For devices that have more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed to prevent electric shock. To disconnect power, unplug all power cords (one for each power supply).

Power Cable Warning (Japanese)

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

附属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。

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Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- Multiple Power Supplies Disconnection Warning on page 265

AC Power Disconnection Warning

WARNING: Before working on the device or near power supplies, unplug all the power cords from an AC switch.

Waarschuwing Voordat u aan een frame of in de nabijheid van voedingen werkt, dient u bij wisselstroom toestellen de stekker van het netsnoer uit het stopcontact te halen.

Varoitus Kytke irti vaihtovirtalaitteiden virtajohto, ennen kuin teet mitään asennuspohjalle tai työskentelet virtalähteiden läheisyydessä.

Attention Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher le cordon d'alimentation des unités en courant alternatif.

Warnung Bevor Sie an einem Chassis oder in der Nähe von Netzgeräten arbeiten, ziehen Sie bei Wechselstromeinheiten das Netzkabel ab bzw.

Avvertenza Prima di lavorare su un telaio o intorno ad alimentatori, scollegare il cavo di alimentazione sulle unità CA.

Advarsel Før det utføres arbeid på kabinettet eller det arbeides i nærheten av strømforsyningsenheter, skal strømledningen trekkes ut på vekselstrømsenheter.

Aviso Antes de trabalhar num chassis, ou antes de trabalhar perto de unidades de fornecimento de energia, desligue o cabo de alimentação nas unidades de corrente alternada.

¡Atención! Antes de manipular el chasis de un equipo o trabajar cerca de una fuente de alimentación, desenchufar el cable de alimentación en los equipos de corriente alterna (CA).

Varning! Innan du arbetar med ett chassi eller nära strömförsörjningsenheter skall du för växelströmsenheter dra ur nätsladden.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- AC Power Electrical Safety Guidelines on page 252

DC Power Electrical Safety Guidelines

DC Power Electrical Safety Guidelines

The following electrical safety guidelines apply to a DC-powered services gateway:

- A DC-powered services gateway is equipped with a DC terminal block that is rated for the power requirements of a maximally configured services gateway. To supply sufficient power, terminate the DC input wiring on a facility DC source capable of supplying at least 30 A @ -48 VDC for the system. We recommend that the 48 VDC facility DC source be equipped with a circuit breaker rated at 40 A (-48 VDC) minimum, or as required by local code. Incorporate an easily accessible disconnect device into the facility wiring. In the United States and Canada, the -48 VDC facility should be equipped with a circuit breaker rated a minimum of 125% of the power provisioned for the input in accordance with the National Electrical Code in the US and the Canadian Electrical Code in Canada. Be sure to connect the ground wire or conduit to a solid office (earth) ground. A closed loop ring is recommended for terminating the ground conductor at the ground stud.
- Run two wires from the circuit breaker box to a source of 48 VDC. Use appropriate gauge wire to handle up to 40 A.
- A DC-powered services gateway that is equipped with a DC terminal block is intended only for installation in a restricted access location. In the United States, a restricted access area is one in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code ANSI/NFPA 70.

NOTE: Primary overcurrent protection is provided by the building circuit breaker. This breaker should protect against excess currents, short circuits, and earth faults in accordance with NEC ANSI/NFPA70.

- Ensure that the polarity of the DC input wiring is correct. Under certain conditions, connections with reversed polarity might trip the primary circuit breaker or damage the equipment.
- For personal safety, connect the green and yellow wire to safety (earth) ground at both the services gateway and the supply side of the DC wiring.
- The marked input voltage of -48 VDC for a DC-powered services gateway is the nominal voltage associated with the battery circuit, and any higher voltages are only to be associated with float voltages for the charging function.
- Because the services gateway is a positive ground system, you must connect the positive lead to the terminal labeled **RETURN**, the negative lead to the terminal labeled **-48V**, and the earth ground to the chassis grounding points.

DC Power Disconnection Warning

WARNING: Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

Waarschuwing Voordat u een van de onderstaande procedures uitvoert, dient u te controleren of de stroom naar het gelijkstroom circuit uitgeschakeld is. Om u ervan te verzekeren dat alle stroom UIT is geschakeld, kiest u op het schakelbord de stroomverbreker die het gelijkstroom circuit bedient, draait de stroomverbreker naar de UIT positie en plakt de schakelaarhendel van de stroomverbreker met plakband in de UIT positie vast.

Varoitus Varmista, että tasavirtapiirissä ei ole virtaa ennen seuraavien toimenpiteiden suorittamista. Varmistaaksesi, että virta on KATKAISTU täysin, paikanna tasavirrasta huolehtivassa kojetaulussa sijaitseva suojakytkin, käännä suojakytkin KATKAISTU-asentoon ja teippaa suojakytkimen varsi niin, että se pysyy KATKAISTU-asennossa.

Attention Avant de pratiquer l'une quelconque des procédures ci-dessous, vérifier que le circuit en courant continu n'est plus sous tension. Pour en être sûr, localiser le disjoncteur situé sur le panneau de service du circuit en courant continu, placer le disjoncteur en position fermée (OFF) et, à l'aide d'un ruban adhésif, bloquer la poignée du disjoncteur en position OFF.

Warnung Vor Ausführung der folgenden Vorgänge ist sicherzustellen, daß die Gleichstromschaltung keinen Strom erhält. Um sicherzustellen, daß sämtlicher Strom abgestellt ist, machen Sie auf der Schalttafel den Unterbrecher für die Gleichstromschaltung ausfindig, stellen Sie den Unterbrecher auf AUS, und kleben Sie den Schaltergriff des Unterbrechers mit Klebeband in der AUS-Stellung fest.

Avvertenza Prima di svolgere una qualsiasi delle procedure seguenti, verificare che il circuito CC non sia alimentato. Per verificare che tutta l'alimentazione sia scollegata (OFF), individuare l'interruttore automatico sul quadro strumenti che alimenta il circuito CC, mettere l'interruttore in posizione OFF e fissarlo con nastro adesivo in tale posizione.

Advarsel Før noen av disse prosedyrene utføres, kontroller at strømmen er frakoblet likestrømkretsen. Sørg for at all strøm er slått AV. Dette gjøres ved å lokalisere strømbryteren på brytertavlen som betjener likestrømkretsen, slå strømbryteren AV og teipe bryterhåndtaket på strømbryteren i AV-stilling.

Aviso Antes de executar um dos seguintes procedimentos, certifique-se que desligou a fonte de alimentação de energia do circuito de corrente contínua. Para se assegurar que toda a corrente foi DESLIGADA, localize o disjuntor no painel que serve o circuito de corrente contínua e coloque-o na posição OFF (Desligado), segurando nessa posição a manivela do interruptor do disjuntor com fita isoladora.

¡Atención! Antes de proceder con los siguientes pasos, comprobar que la alimentación del circuito de corriente continua (CC) esté cortada (OFF). Para asegurarse de que toda la alimentación esté cortada (OFF), localizar el interruptor automático en el panel que alimenta al circuito de corriente continua, cambiar el interruptor automático a la posición de Apagado (OFF),

y sujetar con cinta la palanca del interruptor automático en posición de Apagado (OFF).

Varning! Innan du utför någon av följande procedurer måste du kontrollera att strömförsörjningen till likströmskretsen är bruten. Kontrollera att all strömförsörjning är BRUTEN genom att slå AV det överspänningsskydd som skyddar likströmskretsen och tejpa fast överspänningsskyddets omkopplare i FRÅN-läget.

DC Power Grounding Requirements and Warning

An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors, but is identifiable by green and yellow stripes, is installed as part of the branch circuit that supplies the unit. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When installing the services gateway, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

Attention Lors de l'installation de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.

Warnung Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.

Avvertenza In fase di installazione dell'unità, eseguire sempre per primo il collegamento a massa e disconnetterlo per ultimo.

Advarsel Når enheten installeres, må jordledningen alltid tilkobles først og frakobles sist.

Aviso Ao instalar a unidade, a ligação à terra deverá ser sempre a primeira a ser ligada, e a última a ser desligada.

¡Atención! Al instalar el equipo, conectar la tierra la primera y desconectarla la última.

Varning! Vid installation av enheten måste jordledningen alltid anslutas först och kopplas bort sist.

DC Power Wiring Sequence Warning

WARNING: Wire the DC power supply using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then -48 V to -48 V. When disconnecting power, the proper wiring sequence is -48 V to -48 V, +RTN to +RTN, then ground to ground. Note that the ground wire should always be connected first and disconnected last.

Waarschuwing De juiste bedradingsvolgorde verbonden is aarde naar aarde, +RTN naar +RTN, en -48 V naar – 48 V. De juiste bedradingsvolgorde losgemaakt is en -48 V naar – 48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, -48 V varten – 48 V. Oikea irrotettava kytkentajarjestys on -48 V varten – 48 V, +RTN varten +RTN, maajohto maajohtoon.

Attention Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis -48 V à -48 V. En débranchant la puissance, l'ordre approprié de câblage est -48 V à -48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, -48 V til – 48 V. Riktig frakoples tilkoplingssekvens er -48 V til – 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se muele para moler, +RTN a +RTN, entonces -48 V a -48 V. Al desconectar potencia, la secuencia apropiada del cableado es -48 V a -48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados na extremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então -48 V a -48 V. Ao desconectar a potência, a seqüência apropriada da fiação é -48 V a -48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

Varning! Korrekt kopplingssekvens ar jord till jord, +RTN till +RTN, -48 V till – 48 V. Korrekt kopplas kopplingssekvens ar -48 V till -48 V, +RTN till +RTN, jord till jord.

DC Power Wiring Terminations Warning

WARNING: When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

Attention Quand des fils torsadés sont nécessaires, utiliser des douilles terminales homologuées telles que celles à circuit fermé ou du type à plage ouverte avec cosses rebroussées. Ces douilles terminales doivent être de la taille qui convient aux fils et doivent être refermées sur la gaine isolante et sur le conducteur.

Warnung Wenn Litzenverdrahtung erforderlich ist, sind zugelassene Verdrahtungsanschlüsse, z.B. Ringoesen oder gabelförmige Kabelschuhe mit nach oben gerichteten Enden zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

Avvertenza Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori

devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Related Documentation

- Action to Take After an Electrical Accident on page 266
- General Electrical Safety Guidelines and Warnings on page 249
- AC Power Electrical Safety Guidelines on page 252

DC Power Disconnection Warning

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

This topic also applies to hardware devices in the QFX Series and to OCX1100 switches.

WARNING: Before performing any of the DC power procedures, ensure that power is removed from the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the device handle of the circuit breaker in the OFF position.

Waarschuwing Voordat u een van de onderstaande procedures uitvoert, dient u te controleren of de stroom naar het gelijkstroom circuit uitgeschakeld is. Om u ervan te verzekeren dat alle stroom UIT is geschakeld, kiest u op het

schakelbord de stroomverbreker die het gelijkstroom circuit bedient, draait de stroomverbreker naar de UIT positie en plakt de schakelaarhendel van de stroomverbreker met plakband in de UIT positie vast.

Varoitus Varmista, että tasavirtapiirissä ei ole virtaa ennen seuraavien toimenpiteiden suorittamista. Varmistaaksesi, että virta on KATKAISTU täysin, paikanna tasavirrasta huolehtivassa kojetaulussa sijaitseva suojakytkin, käännä suojakytkin KATKAISTU-asentoon ja teippaa suojakytkimen varsi niin, että se pysyy KATKAISTU-asennossa.

Attention Avant de pratiquer l'une quelconque des procédures ci-dessous, vérifier que le circuit en courant continu n'est plus sous tension. Pour en être sûr, localiser le disjoncteur situé sur le panneau de service du circuit en courant continu, placer le disjoncteur en position fermée (OFF) et, à l'aide d'un ruban adhésif, bloquer la poignée du disjoncteur en position OFF.

Warnung Vor Ausführung der folgenden Vorgänge ist sicherzustellen, daß die Gleichstromschaltung keinen Strom erhält. Um sicherzustellen, daß sämtlicher Strom abgestellt ist, machen Sie auf der Schalttafel den Unterbrecher für die Gleichstromschaltung ausfindig, stellen Sie den Unterbrecher auf AUS, und kleben Sie den Schaltergriff des Unterbrechers mit Klebeband in der AUS-Stellung fest.

Avvertenza Prima di svolgere una qualsiasi delle procedure seguenti, verificare che il circuito CC non sia alimentato. Per verificare che tutta l'alimentazione sia scollegata (OFF), individuare l'interruttore automatico sul quadro strumenti che alimenta il circuito CC, mettere l'interruttore in posizione OFF e fissarlo con nastro adesivo in tale posizione.

Advarsel Før noen av disse prosedyrene utføres, kontroller at strømmen er frakoblet likestrømkretsen. Sørg for at all strøm er slått AV. Dette gjøres ved å lokalisere strømbryteren på brytertavlen som betjener likestrømkretsen, slå strømbryteren AV og teipe bryterhåndtaket på strømbryteren i AV-stilling.

Aviso Antes de executar um dos seguintes procedimentos, certifique-se que desligou a fonte de alimentação de energia do circuito de corrente contínua. Para se assegurar que toda a corrente foi DESLIGADA, localize o disjuntor no painel que serve o circuito de corrente contínua e coloque-o na posição OFF (Desligado), segurando nessa posição a manivela do interruptor do disjuntor com fita isoladora.

¡Atención! Antes de proceder con los siguientes pasos, comprobar que la alimentación del circuito de corriente continua (CC) esté cortada (OFF). Para asegurarse de que toda la alimentación esté cortada (OFF), localizar el interruptor automático en el panel que alimenta al circuito de corriente continua, cambiar el interruptor automático a la posición de Apagado (OFF), y sujetar con cinta la palanca del interruptor automático en posición de Apagado (OFF).

Varning! Innan du utför någon av följande procedurer måste du kontrollera att strömförsörjningen till likströmskretsen är bruten. Kontrollera att all strömförsörjning är BRUTEN genom att slå AV det överspänningsskydd som skyddar likströmskretsen och tejpa fast överspänningsskyddets omkopplare i FRÅN-läget.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Grounding Requirements and Warning on page 261
- DC Power Wiring Sequence Warning on page 262
- DC Power Wiring Terminations Warning on page 263

DC Power Grounding Requirements and Warning

An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors but is identifiable by green and yellow stripes is installed as part of the branch circuit that supplies the device. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When you install the device, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

Attention Lors de l'installation de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.

Warnung Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.

Avvertenza In fase di installazione dell'unità, eseguire sempre per primo il collegamento a massa e disconnetterlo per ultimo.

Advarsel Når enheten installeres, må jordledningen alltid tilkobles først og frakobles sist.

Aviso Ao instalar a unidade, a ligação à terra deverá ser sempre a primeira a ser ligada, e a última a ser desligada.

¡Atención! Al instalar el equipo, conectar la tierra la primera y desconectarla la última.

Varning! Vid installation av enheten måste jordledningen alltid anslutas först och kopplas bort sist.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Disconnection Warning on page 259
- DC Power Wiring Sequence Warning on page 262
- DC Power Wiring Terminations Warning on page 263

DC Power Wiring Sequence Warning

WARNING: Wire the DC power supply using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then –48 V to –48 V. When disconnecting power, the proper wiring sequence is –48 V to –48 V, +RTN to +RTN, then ground to ground. Note that the ground wire must always be connected first and disconnected last.

Waarschuwing De juiste bedradingsvolgorde verbonden is aarde naar aarde, +RTN naar +RTN, en –48 V naar – 48 V. De juiste bedradingsvolgorde losgemaakt is en –48 naar –48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, –48 V varten – 48 V. Oikea irrotettava kytkentajarjestys on –48 V varten – 48 V, +RTN varten +RTN, maajohto maajohtoon.

Attention Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis –48 V à –48 V. En débranchant la puissance, l'ordre approprié de câblage est –48 V à –48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, –48 V til – 48 V. Riktig frakoples tilkoplingssekvens er –48 V til – 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se muele para moler, +RTN a +RTN, entonces –48 V a –48 V. Al desconectar potencia, la secuencia apropiada del cableado es –48 V a –48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados na extremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então –48 V a –48 V. Ao desconectar a potência, a seqüência apropriada da fiação é –48 V a –48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

Varning! Korrekt kopplingssekvens ar jord till jord, +RTN till +RTN, –48 V till –48 V. Korrekt kopplas kopplingssekvens ar –48 V till –48 V, +RTN till +RTN, jord till jord.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Disconnection Warning on page 259
- DC Power Grounding Requirements and Warning on page 261
- DC Power Wiring Terminations Warning on page 263

DC Power Wiring Terminations Warning

WARNING: When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations must be the appropriate size for the wires and must clamp both the insulation and conductor.

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

Attention Quand des fils torsadés sont nécessaires, utiliser des douilles terminales homologuées telles que celles à circuit fermé ou du type à plage ouverte avec cosses rebroussées. Ces douilles terminales doivent être de la taille qui convient aux fils et doivent être refermées sur la gaine isolante et sur le conducteur.

Warnung Wenn Litzenverdrahtung erforderlich ist, sind zugelassene Verdrahtungsabschlüsse, z.B. für einen geschlossenen Regelkreis oder gabelförmig, mit nach oben gerichteten Kabelschuhen zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

Avvertenza Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- *DC Power Electrical Safety Guidelines for Switches*
- DC Power Disconnection Warning on page 259
- DC Power Grounding Requirements and Warning on page 261
- DC Power Wiring Sequence Warning on page 262

Multiple Power Supplies Disconnection Warning

WARNING: For a device that has more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- AC Power Electrical Safety Guidelines on page 252
- *DC Power Electrical Safety Guidelines for Switches*

TN Power Warning

WARNING: The device is designed to work with a TN power system.

Waarschuwing Het apparaat is ontworpen om te functioneren met TN energiesystemen.

Varoitus Koje on suunniteltu toimimaan TN-sähkövoimajärjestelmien yhteydessä.

Attention Ce dispositif a été conçu pour fonctionner avec des systèmes d'alimentation TN.

Warnung Das Gerät ist für die Verwendung mit TN-Stromsystemen ausgelegt.

Avvertenza Il dispositivo è stato progettato per l'uso con sistemi di alimentazione TN.

Advarsel Utstyret er utfomet til bruk med TN-strømsystemer.

Aviso O dispositivo foi criado para operar com sistemas de corrente TN.

¡Atención! El equipo está diseñado para trabajar con sistemas de alimentación tipo TN.

Varning! Enheten är konstruerad för användning tillsammans med elkraftssystem av TN-typ.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- Grounded Equipment Warning on page 235
- Multiple Power Supplies Disconnection Warning on page 265

Action to Take After an Electrical Accident

If an electrical accident results in an injury, take the following actions in this order:

1. Use caution. Be aware of potentially hazardous conditions that could cause further injury.
2. Disconnect power from the device.
3. If possible, send another person to get medical aid. Otherwise, assess the condition of the victim, then call for help.

Related Documentation

- General Safety Guidelines and Warnings on page 221
- General Electrical Safety Guidelines and Warnings on page 249
- AC Power Electrical Safety Guidelines on page 252
- *DC Power Electrical Safety Guidelines for Switches*

CHAPTER 37

Agency Approvals and Regulatory Compliance Information

SRX1400 Services Gateway Agency Approvals

The services gateway complies with the following standards:

- Safety
  - CSA 60950-1 (2003) Safety of Information Technology Equipment
  - UL 60950-1 (2003) Safety of Information Technology Equipment
  - EN 60950-1 (2001) Safety of Information Technology Equipment
  - IEC 60950-1 (2001) Safety of Information Technology Equipment (with country deviations)
  - EN 60825-1 +A1+A2 (1994) Safety of Laser Products - Part 1: Equipment Classification
- NEBS
  - GR-63-CORE
  - GR-1089-CORE
- EMC
  - EN 300 386 V1.3.3 (2005) Telecom Network Equipment - EMC requirements
- EMI
  - FCC Part 15 Class A (2007) USA Radiated Emissions
  - EN 55022 Class A (2006) European Radiated Emissions
  - VCCI Class A (2007) Japanese Radiated Emissions
- Immunity

- EN 55024 +A1+A2 (1998) Information Technology Equipment Immunity Characteristics
- EN-61000-3-2 (2006) Power Line Harmonics
- EN-61000-3-3 +A1 +A2 +A3 (1995) Power Line Voltage Fluctuations
- EN-61000-4-2 +A1 +A2 (1995) Electrostatic Discharge
- EN-61000-4-3 +A1+A2 (2002) Radiated Immunity
- EN-61000-4-4 (2004) Electrical Fast Transients
- EN-61000-4-5 (2006) Surge
- EN-61000-4-6 (2007) Immunity to Conducted Disturbances
- EN-61000-4-11 (2004) Voltage Dips and Sags

Related Documentation

- SRX1400 Services Gateway Compliance Statements for EMC Requirements on page 268
- SRX1400 Services Gateway Description on page 3
- SRX1400 Services Gateway Models on page 4
- SRX1400 Services Gateway NEBS and ETSI Compliance on page 269

SRX1400 Services Gateway Compliance Statements for EMC Requirements

This topic includes the following sections:

Canada

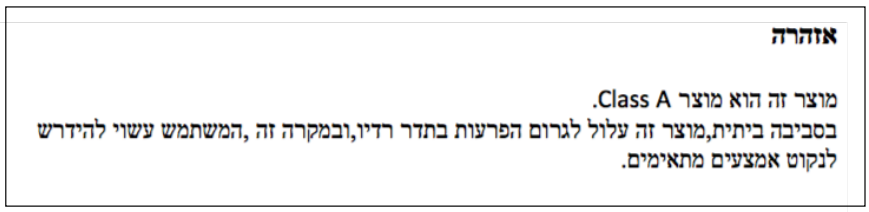
This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Community

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

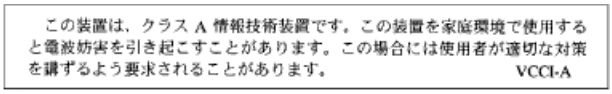
Israel



The preceding translates as follows:

This product is Class A. In residential environments, the product may cause radio interference, and in such a situation, the user may be required to take adequate measures.

Japan



The preceding translates as follows:

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

VCCI-A

United States

The services gateway has been tested and found to comply with the limits for a Class A digital device of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Related Documentation

- SRX1400 Services Gateway Agency Approvals on page 267
- SRX1400 Services Gateway Description on page 3
- SRX1400 Services Gateway Models on page 4
- SRX1400 Services Gateway NEBS and ETSI Compliance on page 269

SRX1400 Services Gateway NEBS and ETSI Compliance

The SRX1400 Services Gateway, when installed and configured as described in this documentation, meets the following NEBS and ETSI standards:

- GR-63-CORE
- ETSI 300019-2-1
- ETSI 300019-2-2
- ETSI 300019-2-3
- GR-1089-CORE

Related Documentation

- SRX1400 Services Gateway Agency Approvals on page 267
- SRX1400 Services Gateway Description on page 3
- SRX1400 Services Gateway Models on page 4