Simulcast Edge Processor (SEP 48) MPEG-2 Edge Decoder and NTSC Modulator

Installation and Configuration Guide

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SEP 48 Installation and Configuration Guide
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according to FCC Part 15

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Telephone:	(650) 350-0100
Declares that product:	SIMULCAST EDGE PROCESSOR (SEP) Complies with Part 15 of the FCC Rules.

This device complies with Part 15 of the FCC rules. Operations are subject to the following two conditions: (1) This device must not be allowed to cause harmful interference; (2) This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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 own expense.

Table 1. Document History

Part Number	Release Date	Changes
SEP-UM	4/26/2005	Limited initial release.
SEP-UM	6/01/2005	Added redundancy information.
SEP-UM	7/15/2005	Added reduced-depth rack mount instructions.
SEP-UM	8/26/2005	Updated screen information, added SNMP information and minor edits.
SEP-UM	9/1/2005	Added clarification to installation requirements.
SEP-UM	9/30/2005	Modified screen images, added description of new functionality.
SEP-UM	02/12/2006	Added information about DC power supplies.
SEP-UM	04/19/2006	Clarified power supply differences.
SEP-UM	09/16/2006	Updated screens with new information.
SEP-UM	11/01/2006	Updated document for 4.0 version of SEP 48.

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CHAPTER 1

Introduction

RGB Networks' Simulcast Edge Processor (SEP 48) combines high density MPEG-2 decoding, modulation, and upconversion in a single device. Used for digital simulcast applications, the SEP 48 provides a complete solution that simplifies network operations, saves power and space, offers full redundancy options, and greatly simplifies the network architecture.

This guide describes the installation, configuration, and replacement instructions for the SEP 48.

What's New in This Document

This document is specific to v4.0 of the SEP 48. It includes additional features and an update to the Element Manager.

The following features have been introduced since the last update of this document:

v3.0

- VBI functionality now supports Nielsen SID/AMOL I and II, and TV Guide 2.x.
- Manual force switching capability is available through the Element Manager for GbE in-chassis redundancy.
- With new fault detection capabilities, the SEP 48 will shutdown the RF power and enter a sleep mode when the chassis temperature is too high.
- The SEP 48 detects and mutes RF interfaces if PLLs lose lock.
- SEP has passed all Dolby compliance tests and is approved by Dolby as a professional Dolby decoder for AC-3 and stereo Dolby audio signals.
- Added video carrier offset adjustment support for EIA channel (-1.4dB to +1.0dB). In a redundant configuration, manual EIA video carrier offset changes to the primary are mirrored in the redundant SEP.
- Support for EAS canceling operation, support for the ability to update audio duration while EAS is playing, and support for unknown audio duration for audio override were added.

v4.0

- The SEP supports the ability to gate VBI lines to simplify FCC required CTB testing, minimizing headend intervention and customer service interruption. Gating involves “blanking” a line or multiple lines of the VBI, allowing test equipment to test the carrier and measure power levels and interference beats.
- You can configure custom channel frequencies in the 2.5 kHz resolution from 54 to 860 MHz for the first EIA channel of each RF port. The Element Manager automatically rounds up the frequency to the nearest 2.5 kHz multiple and configures the other channels on the same RF port with 6 MHz channel spacing.

- The SEP can synchronize one channel (2-13) through the front panel clock port and with the use of the RGB Off-Air Phase Lock Generator (PLG) device to an Off-Air channel. The loss of the external reference clock from the Phase Lock Generator (PLG) device results in the SEP 48 reverting to the internal clock. The SEP will not revert back to external clock automatically.
- You can now enter a name or description for each EIA channel configured on the SEP 48 through the graphical user interface or through SNMP.
- The SEP 48 suppresses all RF output until the unit is fully booted and ready to process video. If a channel is configured and video is not present, the SEP will display a color bar display for that channel.
- The SEP 48 supports the Dolby AC-3 dialnorm parameters for loudness normalization
- You can now change the SEP 48 SNMP read and write community strings from the default “public” for read and “publicw” for write to new strings.
- The SEP 48 suppresses all spurious alarms on boot or after a reset including phase lock loss and any temperature related alarms until the unit has fully booted and ready to process video.

Document Organization

This guide is organized as follows:

- Chapter 1, "Introduction," (this chapter) describes the contents and conventions used in the SEP 48 Installation and Configuration Guide.
- Chapter 2, "Overview," provides a detailed description of the SEP 48 and its features.
- Chapter 3, "Installation," describes the tools, precautions, and steps necessary to install the system in the network.
- Chapter 4, "System Configuration," describes the initial product setup and product configuration using the Java-based element manager.
- Chapter 5, “Monitoring the SEP 48,” discussed the methods used to monitor the health of your SEP 48 and its status in the network.
- Chapter 6, "Troubleshooting," provides information about system status, alarm messages, software upgrades, and contacting technical support.
- Chapter 7, "Field-replaceable Units," shows you how to replace all field-replaceable units in the SEP 48.
- Chapter 8, "Redundancy and the RDS," describes installing, configuring, and monitoring the chassis in the SEP 48 docking station. The RDS allows redundancy and failover protection by using two SEP 48 units in tandem.
- Chapter 9, "Specifications," includes information about system specifications including physical, environmental, and regulatory and compliance definitions.
- The glossary and index can be used to quickly reference information.

Document Audience

This guide is for system administrators and operators who are responsible for installation and maintenance of the SEP 48.

You should be familiar with general video and networking terminology, and should be familiar with basic installation of hardware.

Most importantly, you must be familiar with your network topology and configuration, and its components.

Document Conventions

The following provide an easy way to recognize important information in the text.

Notes are indicated by the icon shown at left, and point out information that may not be part of the text but provide tips and other helpful advice.

Cautions are indicated by the icon on the left, and let you know that an action may have undesirable consequences if the instructions are not followed correctly. Cautions also indicate that failure to follow guidelines could cause damage to equipment or loss of data.

Warnings are indicated by the icon on the left, and indicate that failure to take the necessary precautions or to follow guidelines could cause harm to equipment and personnel.

If you are reading the document online, clicking any blue link takes you to the item to which the link refers.

Graphics Used

In some cases, the screens shown in this manual may have been slightly modified after the manual was released, or may appear slightly different on different browsers.

All efforts have been made to ensure that the latest images are used. In all cases, the functionality described is current to the time of writing.

CHAPTER 2

Overview

The Simulcast Edge Processor (SEP 48) receives and decodes MPTS and SPTS multiple-input MPEG-2 programs and outputs these programs over multiple NTSC channels at radio frequency (RF), removing the need for external modulators and upconverters. The SEP 48 takes advantage of RGB's flexible video processing platform, based on RGB's Video Intelligence Architecture (VIA™).

This chapter provides an overview of the SEP 48. It includes:

Product Features

Because of its integrated decoding, modulation, and upconversion capabilities, the SEP 48 provides many advantages when constructing a simulcast network, such as simplifying the cabling and installation, and saving a considerable amount of space and power. The SEP 48 is fully programmable and can be upgraded to offer new functionality. The platform also features tremendous network throughput through its GigE interfaces.

In addition to being software upgradeable, scalable, and highly reliable, the SEP 48 has the following features:

- 1 rack unit chassis (1RU), 500W maximum power consumption
- up to 8 GigE interfaces for video input
- 10/100 BaseT Fast Ethernet management interface (Ethernet Control Port)
- Up to 12 physical RF ports with four per STP module and up to three modules in a chassis
- MPTS or SPTS video input over IP (MPEG/UDP/IP)
- IP Multicast with video support for IGMPv2.0 and IGMPv3.0 or Unicast input support
- MPEG-2 decoding of up to 48 program streams (MPEG-2 MP@ML)
- NTSC modulation and upconversion for up to 48 program streams
- Dolby AC-3 audio processing and decoding for two audio channels per program stream: primary stereo audio output and SAP output
- Vertical Blanking Interval (VBI) support for closed captioning, and Nielsen AMOL I and II
- Emergency Alert System (EAS) support, including EAS crawls for non-intrusive text overlay of emergency information
- EAS exception support allows you to configure exceptions channels that do not receive EAS alerts
- Service replication allows the same stream to be sent to multiple RF output ports/EIA channels
- One-to-one redundancy support
- SNMP support

- A Java-based, graphical user interface accessible through a Web browser for configuration and management
- AC or DC power supply available

The SEP 48 supports multiple levels of redundancy that greatly improve the availability of the digital simulcast architecture, including:

- Full one-to-one chassis redundancy (docking station required - see “Redundancy and the RDS” on page 8-1)
- Multiple GigE interfaces supporting redundant feeds
- Ability to join multiple multicast sessions on each GigE interface
- Ability to monitor traffic activity on each port or multicast group
- In-chassis Gigabit Ethernet redundancy (one GigE can be redundant for another GigE in the same chassis)
- Switchover to alternate services on primary service outage.

Note: The RGB SEP 48 decodes MPEG-2 signals which follow the CCIR-601 digital levels, namely, a luma digital level of 16 corresponding to black and a level of 235 corresponding to white. When modulating these decoded signals to NTSC, the SEP 48 follows the North America NTSC broadcast standard which includes a setup of 7.5 IRE, so that the digital levels are translated as 16 to 7.5 IRE (black), 235 to 100 IRE (white), and intermediate values proportionately.

The SEP 48 reproduces digital signal levels ranging from luma digital 0 to digital 255, even though levels 0 to 15 and 236 to 255 will cause the NTSC signal to extend outside of the 7.5 to 100 IRE range. Typically, such levels would only occur as a result of MPEG quantization noise.

The SEP 48 decodes the MPEG stream and modulates the signals to NTSC using the correct scaling from digital to IRE levels. In other words, the SEP reproduces the maximum black level at 7.5 IRE. If the maximum black level corresponds to 0, with the current software release, the SEP 48 will not correctly reproduce MPEG-2 signals. Ensure the sources of content do not contain luma levels below 7.5 IRE, such as sources encoded in some Asian and European countries.

For the most up-to-date information about the SEP 48, always read the release notes.

SEP 48 Architecture

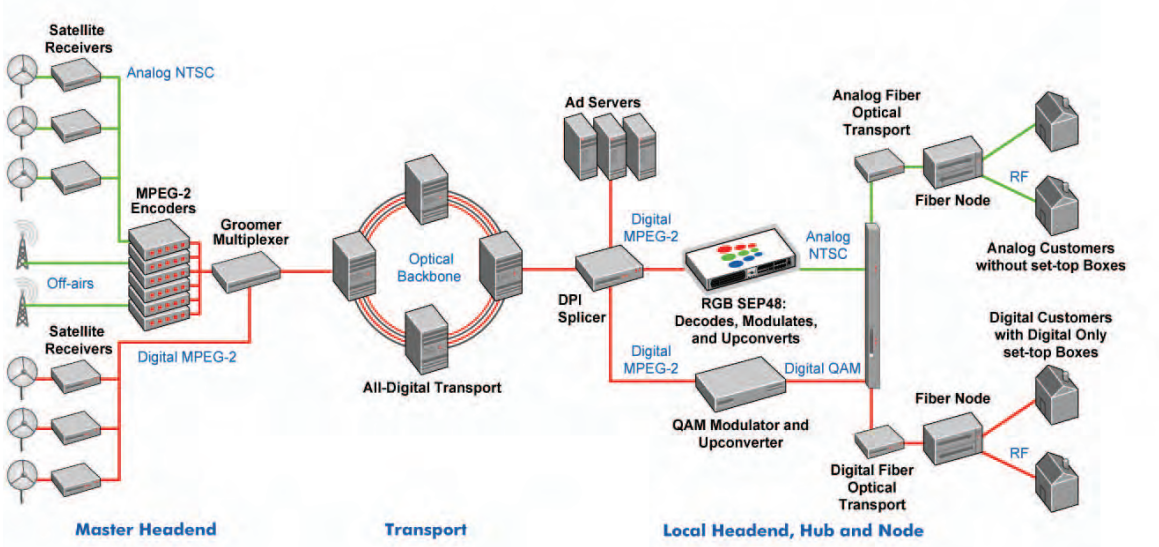


Figure 2-1. SEP 48 in the network

Note: This unit is intended for local (intra-building) connections only and is not designed or evaluated for direct connections to the public telecommunications/cable distributions systems. Cable and Ethernet connections should be made in accordance to the National Electrical Code (NEC). For example, make sure that at least one of the following conditions are met[1]:

- Cable runs are located in the same building as this unit.
- Cable runs through air between buildings are less than 42m (140 ft.)
- Cable runs between buildings are directly buried
- Cable runs between buildings are in underground conduit, where a continuous metallic cable shield or a continuous metallic conduit containing the cable is bonded to each building grounding electrode system.

Figure 2-1 shows a digital simulcast architecture with the use of SEP 48 for edge decoding and modulation.

SEP 48 Components

This section describes the physical characteristics of the SEP 48. Before installing, configuring, or replacing any component of the SEP 48, please be sure that you understand the chassis and its components. With the exception of the midplane, these are described in more detail in the next paragraphs.

The SEP 48 hardware comprises five different modules and components. The settings for these are programmed from a Compact Flash card through the SEP Element Manager.

- GBP - Gigabit Processor, front chassis access, one GBP board per chassis

1. These options are from the US National Electrical Code, Sections 800.10, 800.12, 800.13, 800.31, 800.32, 800.33, and 800.40.

- STP - Strip Processor Module, rear chassis access, up to 3 STP modules per SEP 48 chassis, 4 RF outputs per module
- MID - Midplane, passive assembly, non-removable, one board per chassis
- AC P/S - AC Power Supply, rear chassis access, one AC power supply module per chassis
- DC P/S - DC Power supply, rear chassis access, one DC power supply module per chassis

Additionally, RGB's Redundant Docking Station (RDS) offers 1:1 redundant configuration for SEP 48. RDS is a passive 3 RU assembly that can host two SEP 48 chassis, operating as primary and secondary units and provides full redundancy for these chassis.

Front Panel

Figure 2-2 shows the front view of the SEP 48 with the bezel in place. When the front bezel is removed, the RS-232 serial port is visible, as shown in Figure 2-3.

Any time that any port is not in use, RGB recommends that you keep a dust cover over the port. This ensures that no dust gets into the unit and maintains proper air flow.

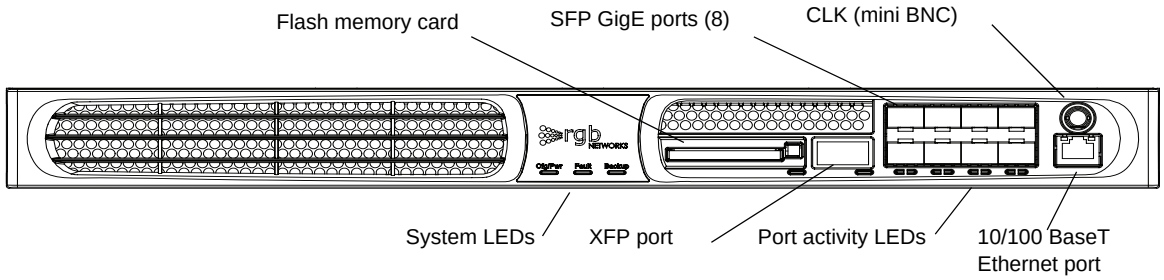


Figure 2-2. Front Panel (with bezel)

The RS-232 serial port, highlighted in Figure 2-3, is used only by field service personnel. Under normal circumstances you will not need to access this port.

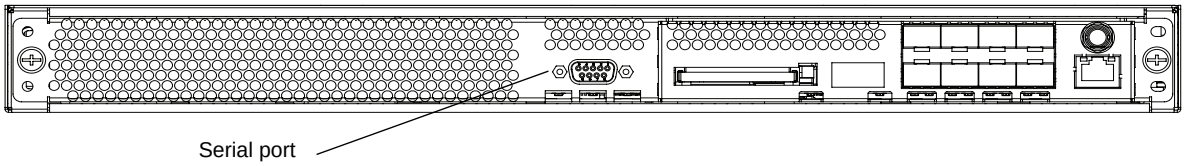


Figure 2-3. Front Panel (without bezel)

The ports, LEDs, and compact flash card are located on the Gigabit Ethernet Processor (GBP) module. For instructions on removing and replacing the GBP module, see “Replacing a Gigabit Ethernet Processor (GBP) Module” on page 7-6.

SFP Port Mapping

Figure 2-4 shows the SFP port mapping scheme. These port numbers correspond with the port LEDs described in “LED Indicators” on page 2-6.

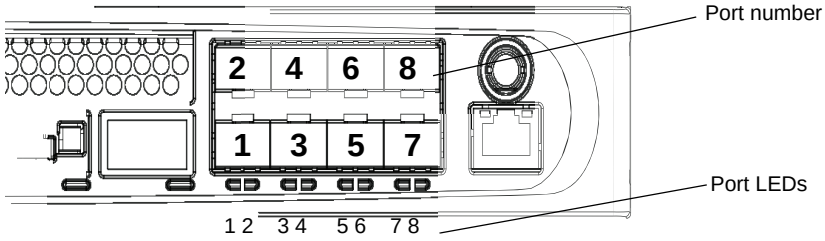


Figure 2-4. Port mapping and LED indicators

LED Indicators

The primary Light Emitting Diodes (LEDs) visible on the front of the SEP 48 chassis are shown in Figure 2-5. These LEDs indicate the general health of the SEP 48.

Note: This section describes the LEDs as they appear in a non-redundant system. In a redundant system, the system LEDs indicate different conditions. See "Redundancy and the RDS" on page 8-1.

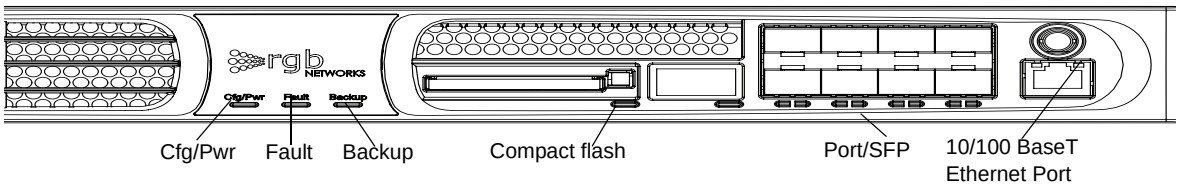


Figure 2-5. LEDs

Use Table 2-1 along with the figure to determine the SEP 48 status.

Table 2-1. LED indicators

LED	Color	Indication
CFG/PWR	Off	No power to chassis
	Solid Green	The host FPGA configuration is loaded
	Solid Red	Chassis is powering up and configuration load is in progress or no compact flash card is present
Fault	Blinking Green	Video stream detected
	Blinking Orange	No video stream detected
	Blinking Red	Fault is present
Backup[a]	N/A	See "LEDs in a Redundant System" on page 8-10
Compact flash[b]	Blinking Green	Reading card
	Solid Green	Compact flash OK
	Blinking Red	Compact flash not installed
	Solid Red	Error is present
SFP (GigE)	Solid Green	(Copper) SFP installed (Fibre) SFP and cable installed, link active
	Solid Red	Error is present
10/100 BaseT (Ethernet control)	Solid Green	Autonegotiated link status
	Blinking Yellow	Activity

a. Used to indicate that the SEP 48 is in a Redundancy Docking Station.

b. Compact flash is necessary for loading code and saving configuration.

Rear Panel

Figure 2-6 shows the rear view of the SEP 48 with three Strip Processor (STP) modules installed and one power supply. The STP module has 4 RF connectors, with a total of 12 RF ports in a fully populated chassis. For each module, the RF ports are numbered left-to-right 1 through 4.

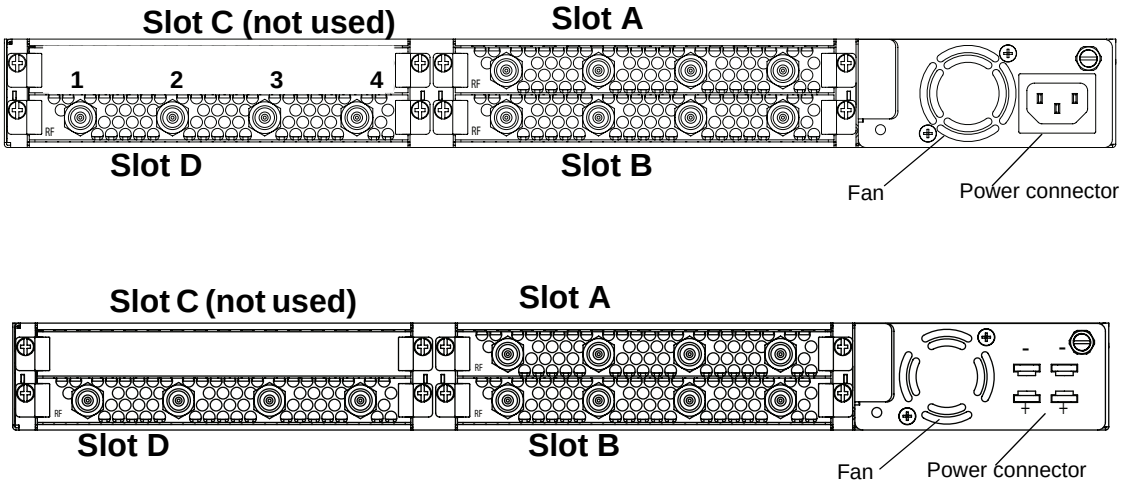


Figure 2-6. Rear panel (AC power supply shown at top, DC power supply shown at bottom)

The SEP 48 can be used with one, two, or three STP modules. *Slot C is not used for STP modules.* Empty slots should always be fitted with blank covers to ensure maximum air flow.

The right side of the chassis holds the power supply, including the power connector and fan. At the top is the AC power supply, and beneath it is the DC power supply. The power supply fan is not replaceable, except as part of the power supply. For details about replacing the STP modules and power supply, see Chapter 7, “Field-replaceable Units.”

SEP 48 Components

The SEP 48 consists of three main sections: a network interface module—called the Gigabit Ethernet Processor (GBP) module, one to three video/audio processing modules—called STP modules, and the power supply assembly.

The number of STP modules installed determines the number of services that can be processed.

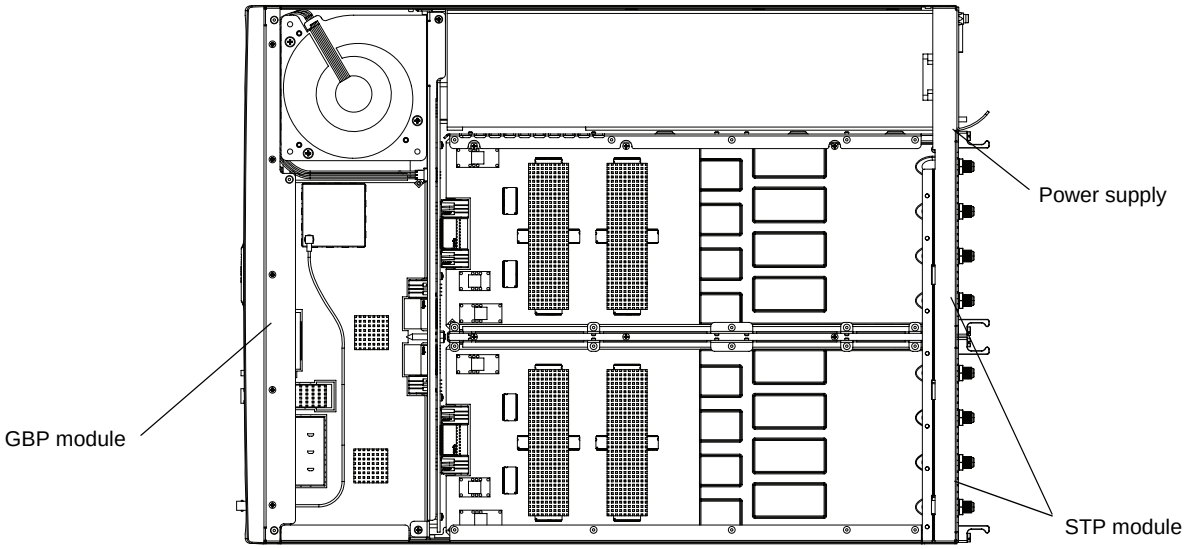


Figure 2-7. SEP 48 chassis, components visible

CHAPTER 3

Installation

This chapter provides the information necessary to install the SEP 48 into a rack. Read this entire chapter before beginning, and perform the installation in the order described. Chapter 4, "System Configuration," describes the configuration procedure.

In this chapter you will learn:

For instructions on installing a Redundancy Docking Station (RDS) and chassis into the RDS, see Chapter 8, "Redundancy and the RDS".

Before You Begin

Required Equipment

Be sure that you have the required items listed below before you begin the installation of the SEP 48. You will need:

- Populated SEP 48 chassis, included
- AC power cord, included if AC power supply is used
- DC connector cables, if DC power supply is used
- Front and rear rack mount brackets, included
- rack mount bracket screws, 22 included
- 1 M4 grounding nut, included
- Mini-BNC-to-standard BNC adapter cable, included
- F-to-G adapters, included only with the docking station in a redundant configuration
- RF port tightening tool, included
- 8 rack mount screws
- Phillips and slotted screwdriver
- 1 ring lug for grounding
- Crossover cable long enough to connect the SEP 48 and the management workstation

Electrostatic Precautions

Warning: Whenever computer components are handled (especially during installation), the equipment can be damaged by the buildup of static electricity. Take precautions before touching any internal components or boards by wearing an ESD wrist strap or working on an antistatic mat. Always hold system modules by the edges and avoid touching any electronic circuitry on the cards.

Rack Mounting the SEP 48

The SEP 48 is mounted into a standard 19-inch rack using rack mount brackets for both the front and rear of the system.

When choosing the location within the rack or choosing to rack the chassis from a selection of multiple racks, make sure that the SEP 48 will be placed within the rack evenly, and that the installation will not cause uneven mechanical loading and weight distribution.

Do not mount the SEP 48 into any rack that obstructs clean air flow either in the front or the rear. Generally, an aisle of at least 15 inches is the minimum distance to ensure proper air flow.

Caution: Be sure that the SEP 48 is mounted in a location that meets the environmental conditions shown in Table 3-1.

Table 3-1. Environmental Requirements

Condition	Limits
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Temperature	0° to 40° C (32° to 104° F)
Humidity	5% to 95% (non-condensing)

For specific details about grounding the chassis, see “Grounding the SEP 48” on page 3-6.

Note: Except where noted, illustrations are of installation using an AC power supply. The procedure for installation of an SEP 48 with a DC power supply is the same. The only exception is that the attached power connector for the DC power supply extends beyond the rear of the chassis in the rack.

To install the SEP 48 into a rack:

1. Using the provided screws, attach the front rack mount bracket to one side of the chassis as shown in Figure 3-1.
2. Using the provided screws, attach the rear rack mount bracket to the chassis.

3. Repeat steps 1 and 2 on the other side of the chassis.

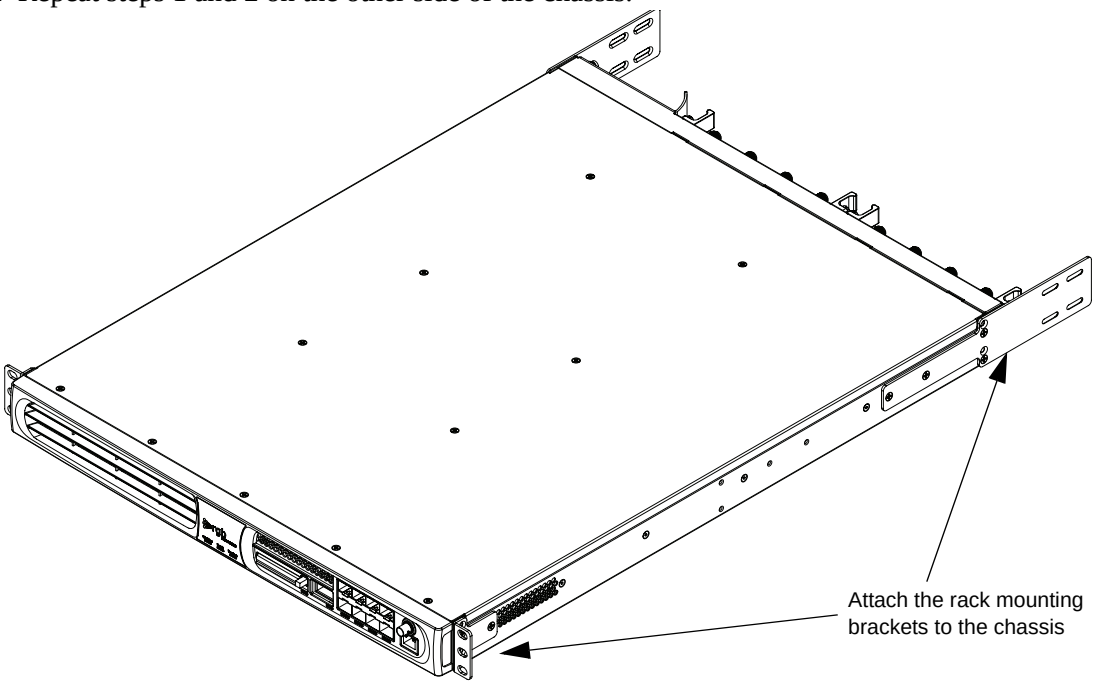


Figure 3-1. Attaching the rack mount brackets

4. Secure the front of the chassis to the rack using two screws on each side, as shown in Figure 3-2.

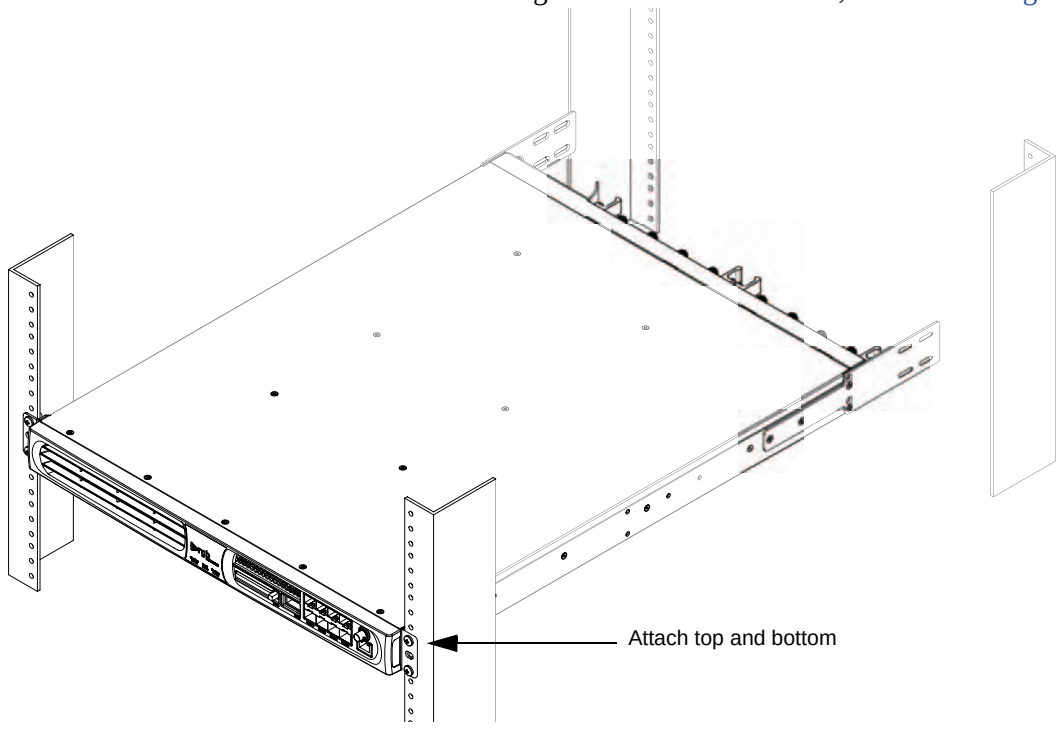


Figure 3-2. Securing the chassis to the rack

5. Connect the rear rack mount extensions between the rear rack mount brackets and the rack, as shown in Figure 3-3.

   Slide the mounting brackets to the correct distance and secure them. The rack mount bracket requires four screws, and the rack requires two screws per side.

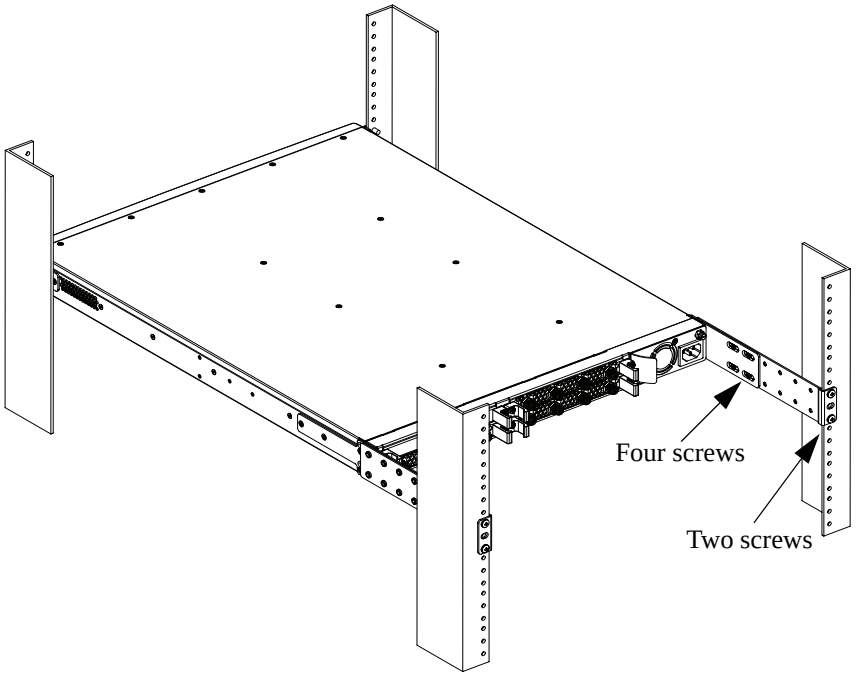


Figure 3-3. Connecting the rear rack mount brackets

Alternate Rack Mount Procedure

This method works best for reduced-depth racks.

1. Using the provided screws, attach the front rack mount bracket to one side of the chassis as shown in Figure 3-4.

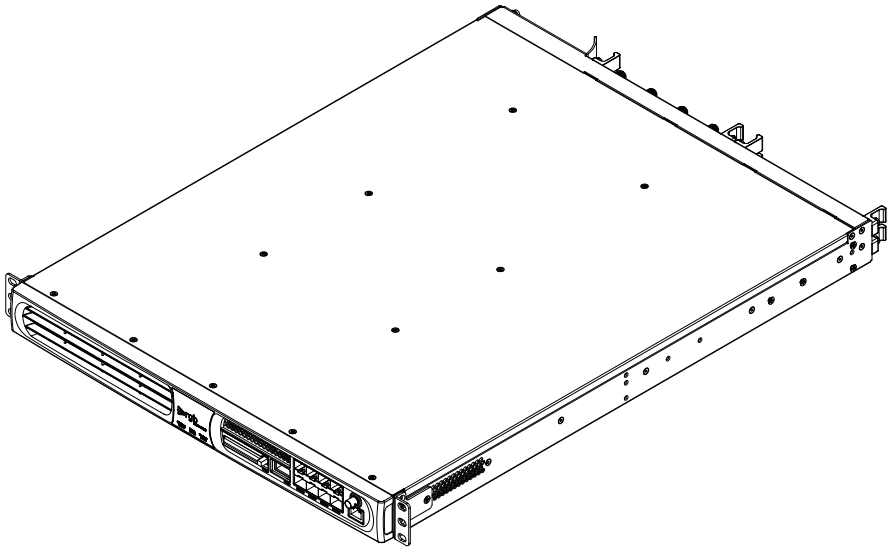


Figure 3-4. Front brackets attached

2. Repeat step 1 on the other side of the chassis.
3. Install the SEP 48 rear rack shelf to the rear mounting rails of the rack using two screws on each side as shown in Figure 3-5.

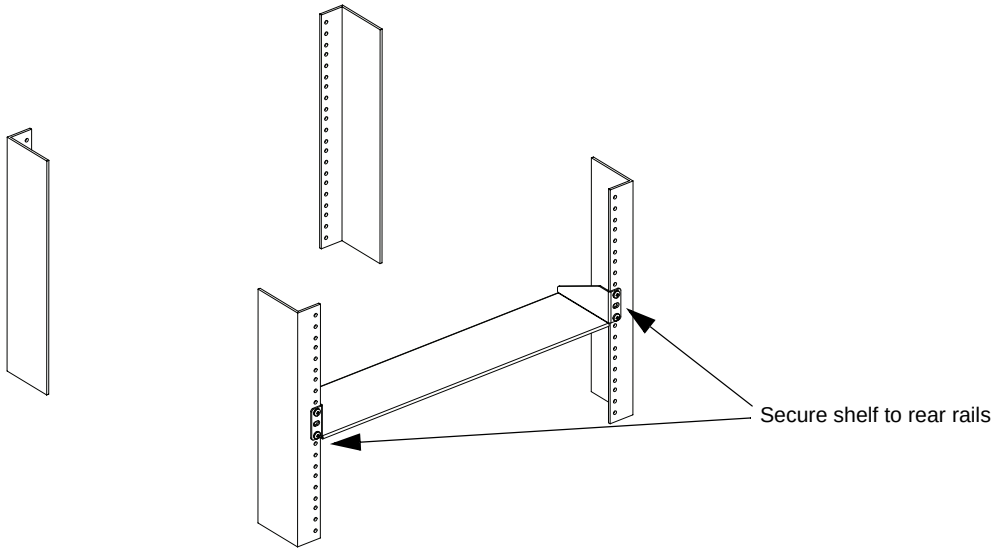


Figure 3-5. Rack shelf

4. Install the SEP 48 chassis in the rack.

   The rear edge of the chassis will rest on the rear rack shelf. Secure the front of the chassis to the rack using two screws on each side, as shown in Figure 3-6.

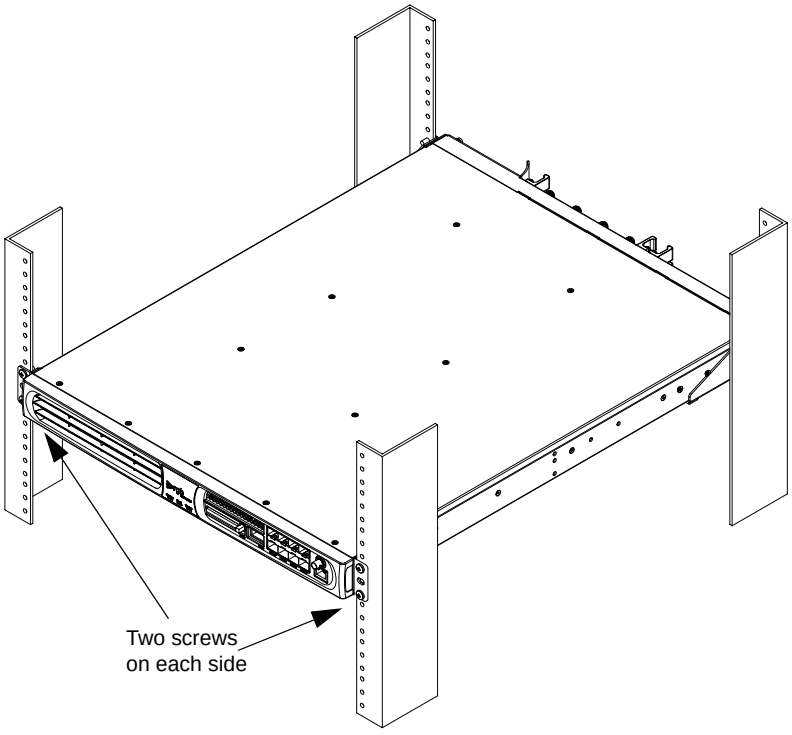


Figure 3-6. Mounted SEP 48

Grounding the SEP 48

Warning: The SEP 48 must be properly grounded to ensure safe operation. Before you connect power or turn on the SEP 48, ground the chassis. This section provides one method of grounding. There may be others: check your network configuration for details.

To connect the chassis ground:

1. Using a length of wire, terminate one end with a ring lug.

   For use with a DC power supply, the grounding wire must be a minimum of 12 AWG.
2. Using the provided M4 nut, install the ring lug on the grounding terminal.

   The grounding terminal is at the rear of the SEP 48 chassis, located at the lower left of the power supply, just beneath the power supply handle.

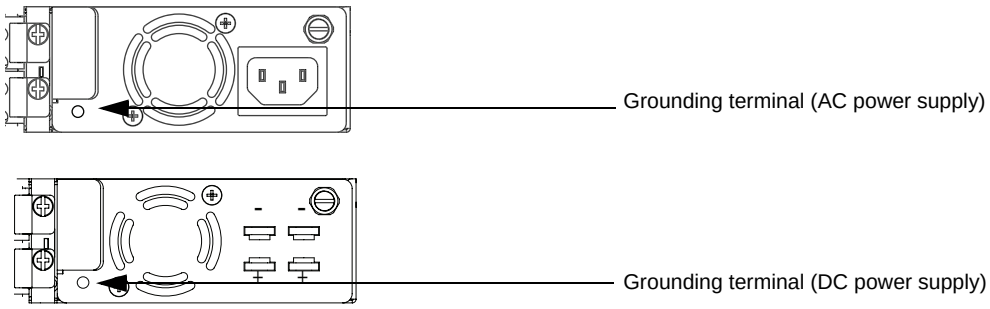


Figure 3-7. Grounding terminal, AC power supply top, DC power supply bottom

3. Using wire strippers, strip off 3/8 inch of insulation from the other end of the wire.
4. Attach the stripped wire into a grounding hole on the equipment rack.

Installing SFP modules

For optical output, a Small Form Factor Pluggable (SFP) optical or electrical interface module is required. The SFP modules come in a variety of ITU Grid 100GHz spacing wavelengths for connection to short haul (1000Base SX) or long haul (1000Base LX) optical networks.

- GigE interfaces that meet 1000Base SX specifications support 850nm wavelengths for distances up to 550 meters.
- GigE interfaces that meet 1000Base LX specifications support 1310nm and 1550nm wavelengths for distances up to 70 kilometers.

SFPs approved for use with the SEP 48 are based on the Multi-Source Agreement (MSA) and listed in Table 3-2:

Table 3-2. Supported SFPs

Manufacturer	Model
Tyco	1382392-3: Single mode 850nm, 1GigE, LC Optical transceiver
	1511094-3: Single mode 1310nm, 1GigE, LC Optical transceiver
Finisar	FCMJ-8521-3: Active copper SFP
	FTRJ1319P1BTL: Single mode 1310nm, 1GigE, LC optical transceiver

To install an SFP, follow the manufacturer's instructions. A general guideline to SFP installation includes:

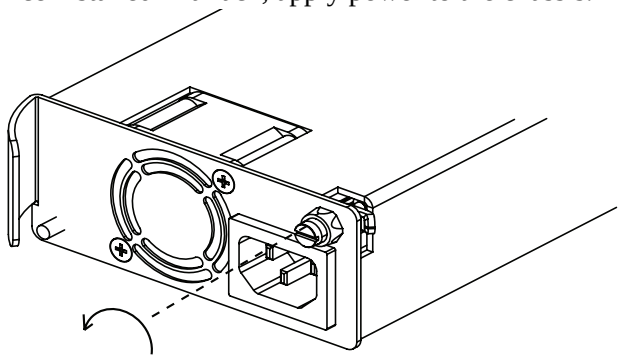
1. Consider your network and cabling requirements and verify that the SFP you are installing is an approved model as described in Table 3-2.
2. Insert the SFP into the port.

   SFPs are keyed so they can only be installed one way.
3. Slide the SFP into the port until it clicks into place and the LED is activated.

Applying Power to the SEP 48 (AC Power Supply)

Caution! Make sure that the safety screw is in the locked position (turned counterclockwise) before applying power. Note that the locked position may be different than that of similar units. This ensures that the power supply cannot be accidentally disconnected, causing possible damage.

Once installed in a rack, apply power to the chassis.



Before you apply power to chassis, make sure that the circuit, wiring, and connections that you are using to supply the power will not become overloaded by the SEP 48(s). See “Specifications” on page 9-1 for power consumption details.

Caution! The power cord is the disconnect device for the SEP 48. There is no power switch: once connected to the power outlet, the unit powers up immediately.

Connect all ports before applying power.

To connect AC power to a SEP 48:

1. Locate the AC power cable included with the SEP 48 chassis.
2. Plug one end of the power cable into the SEP 48 power connector.
3. The AC power connector is located on the power supply.

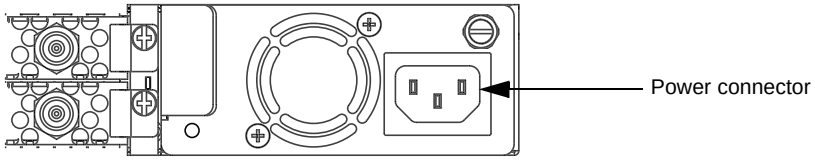


Figure 3-8. Connect power

4. Plug the other end of the power cable into the input power source.

   The unit should now have power. Check the LEDs to verify that power has been applied. See “LED Indicators” on page 2-6 for details.

When the SEP 48 is installed and powered on, verify that the **Cfg/Pwr** LED is solid green. See “LED Indicators” on page 2-6.

Disconnecting Power from the SEP 48 (AC Power Supply)

Caution! Make sure that the safety screw is in the locked position (turned counterclockwise) before applying power. Note that the locked position may be different than that of similar units. This ensures that the power supply cannot be accidentally disconnected, causing possible damage.

To remove power from the SEP 48, disconnect the power cable from the power source, that is, pull the plug from the power connector. This is the only way to ensure that the unit is not receiving power.

Applying Power to the SEP 48 (DC Power Supply)

Before Applying Power

Caution! Only trained personnel should install or replace this equipment.

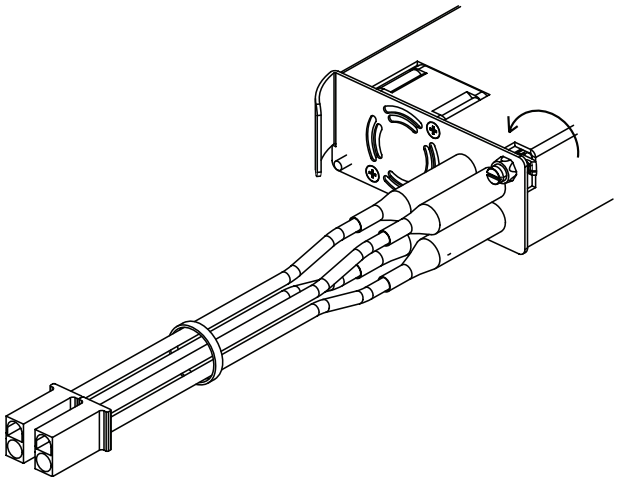
- Remove all jewelry, including rings, necklaces, and watches. Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.
- The protective earth connection should be connected before proceeding with the power connection.

- Confirm that the DC power source is powered off during installation.
- For a centralized DC power connection, the unit must be installed in a restricted access location in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.
- Damage may occur if the power is connected improperly.

Applying Power

Once installed in a rack, apply power to the chassis.

Caution! Make sure that the safety screw is in the locked position (turned counterclockwise) after the power supply is installed, but before applying power. Note that the locked position may be different than that of similar units. This ensures that the power supply cannot be accidentally disconnected, causing possible damage.



Before you apply power to chassis, make sure that the circuit, wiring, and connections that you are using to supply the power will not become overloaded by the SEP 48(s). See “Specifications” on page 9-1 for power consumption details.

Connect all ports before applying power.

To connect DC power to a SEP 48:

1. Cut the provided DC connector cables to the correct length to reach the SEP 48 from the power source.

2. The DC power connectors are permanently attached to the power supply. Attach the connector cables from the power source to the SEP 48 power connectors.

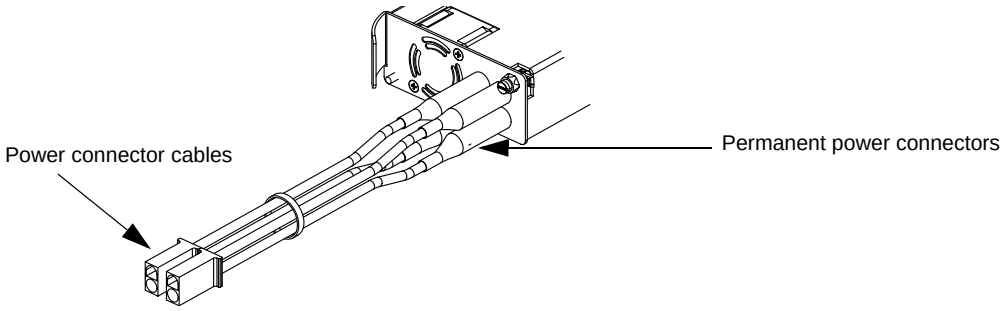


Figure 3-9. Connect power

3. Attach the other end of the power connector cables into the input power source.

   The power cables should be attached to a UL Listed 20 amp circuit breaker.

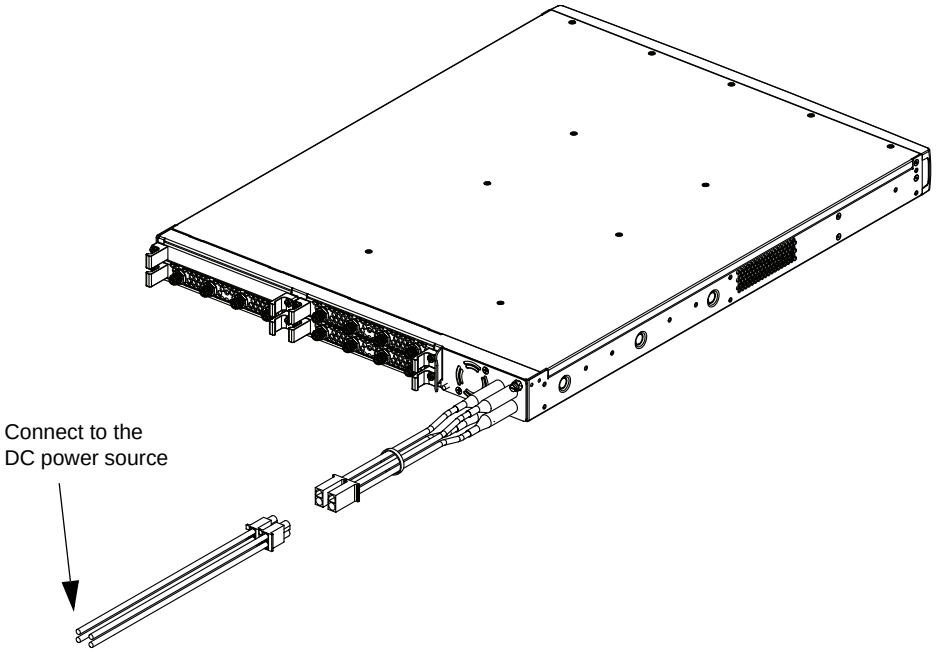


Figure 3-10. Connect the power cables

4. To power the unit on, toggle the circuit breaker to the ON position.

   The unit should now have power. Check the LEDs to verify that power has been applied. See “LED Indicators” on page 2-6 for details.

   When the SEP 48 is installed and powered on, verify that the **Cfg/Pwr** LED is solid green. See “LED Indicators” on page 2-6.

Disconnecting Power from the SEP 48 (DC Power Supply)

To remove power from the SEP 48, toggle the circuit breaker to the OFF position. This is the only way to ensure that the unit is not receiving power.

Connecting External Ports

The SEP 48 chassis has four discrete types of ports. When connecting ports, be sure to use the correct cabling. This section describes the port types and basic cabling, but the actual cabling requirements will depend on your specific network configuration and needs.

10/100 Fast Ethernet Management Port

The 10/100BaseT Ethernet port is used to communicate with an external console for SNMP configuration control, maintenance diagnostics, status monitoring, fault notification, and redundancy switching. The external console can be a workstation on the IP network.

RF Ports

RF ports are located on the rear of the chassis. To allow for the maximum number of ports, the connectors are close together. Use the included tightening tool to tighten and loosen the cables.

1 GigE Ports

The Ethernet ports must be fitted with small-form-factor pluggables (SFPs). See Table 3-2 for a list of tested and approved SFPs that can be used with the SEP 48.

CLK Port (HRC/IRC Port and Adapter Cable)

The clock port, or HRC/IRC port is located on the front of the chassis. It can be used for time synchronization with your network. See“LED Indicators” on page 2-6 for the location of this port.

Use the provided adapter cable (shown in Figure 3-11) to convert the mini-BNC to a standard BNC (shown in Figure 3-12), then attach your BNC cable to the adapter.

Figure 3-11. Mini BNC to standard BNC adapter

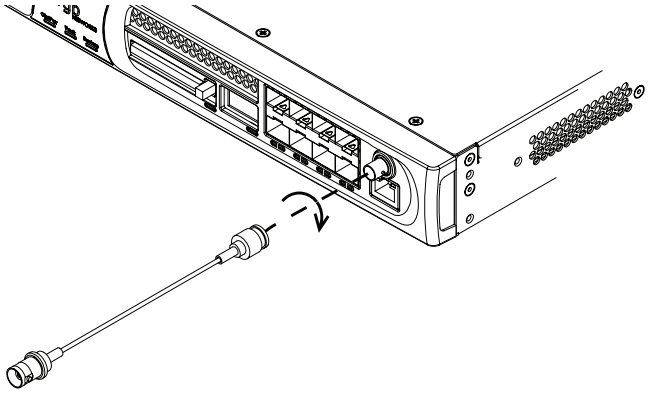


Figure 3-12. Installing the BNC adapter cable

Installing the Compact Flash Card

Your SEP 48 comes with a compact flash card preinstalled. You do not need to do anything during initial setup.

The SEP 48 uses the compact flash card to load software and save configuration information. You cannot use your SEP 48 without it.

If your compact flash card fails, contact technical support for details about replacement. See page 6-2 for details on contacting technical support.

CHAPTER 4

System Configuration

This chapter describes how to configure the SEP 48 using the RGB VIA Element Manager. The Element Manager is a Java application that provides a graphical user interface used to configure and monitor the SEP 48 system.

This chapter describes:

Obtaining the Java Runtime Environment

The Element Manager requires that the management workstation on which it is running has Java™ Runtime Environment (JRE) v1.5 or higher. If your management workstation does not have the correct JRE installed, it is available free from Sun Microsystems' web site, and from the RGB CustomerCare Support web site at http://support.rgbnetworks.com.

To receive a user name and other information for use with the RGB CustomerCare Support site, ask your RGB salesperson or call 877-RGB-NETW. Additional technical notes and useful software are available from the CustomerCare site, as well.

To download the JRE from Sun:

1. Open a browser with an internet connection and point to

   http://java.sun.com

The screens shown in this section are from the java.sun.com site at the time the manual was written and may be updated without notice. The instructions provided here are for general information only.

2. Select **Java SE** from the Popular Downloads page.

3. Select **J2SE 5.0.x** from the platform selection page.

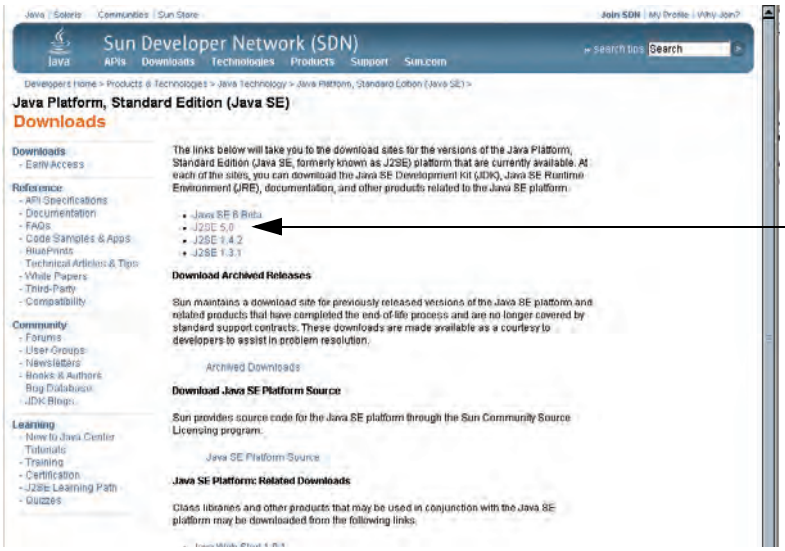


Figure 4-1. Select the 1.5.x version

4. On the download page, choose **JDK 5.0**.

Figure 4-2. Click Download JDK 5.0

5. Accept the licensing agreement and click **Continue**.
6. Choose the appropriate platform for your system.

   For Windows installations, do ***not*** choose the Offline option.
7. Click **Open**.
8. Follow the installation instructions provided by Sun Microsystems.

Launching Element Manager

To launch the VIA Element Manager:

1. Open a browser session on the management workstation.
2. Enter the IP address of the SEP 48 into the browser's address field. The default IP address is 10.1.1.1.

   The IP address of the computer being used must be changed to an address on the same subnet as the SEP 48.

   For easier access, bookmark the URL or set it as the home page.

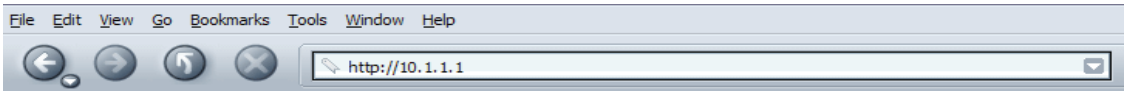


Figure 4-3. Enter the IP address

3. Click the **Launch Simulcast Edge Processor** link.

   The system detects whether or not the latest version of the Element Manager software is installed, and performs an update if needed.

   Once launched, EM displays the Login Window. Log in as described in "Logging In" on page 4-5.

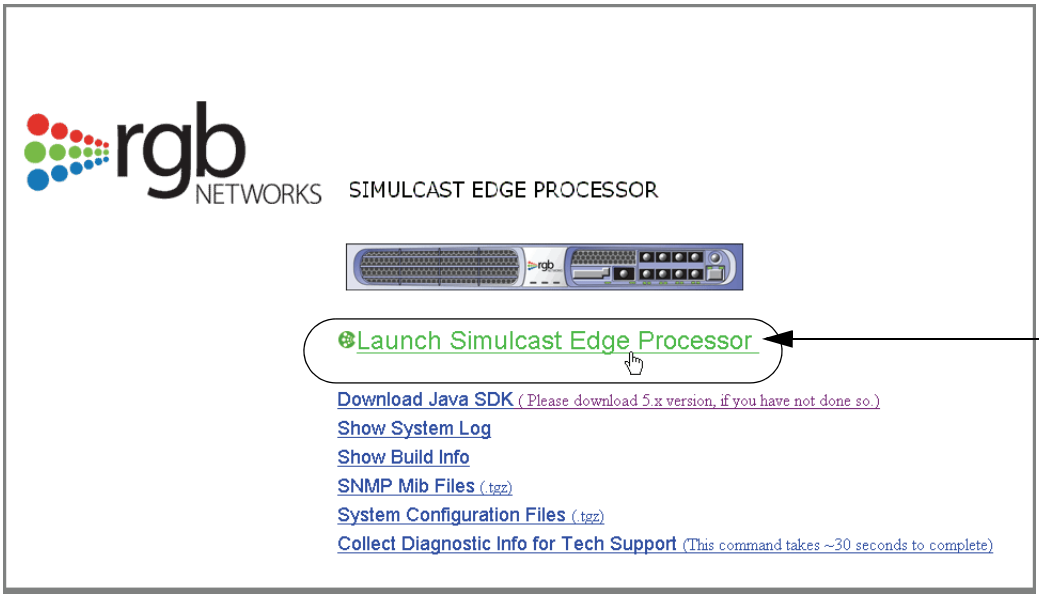


Figure 4-4. Initial launch page

From the initial launch page, you can also view the system log, download SNMP MIB and System configuration files, get build information, and, if requested, collect data to send to Technical support.

Using the Element Manager

Use the Element Manager to configure your system, monitor system status, and upgrade software as needed. To view the Redundancy Docking Station secondary unit information, follow the procedures described in "Using Element Manager to Monitor the RDS Units" on page 8-13.

Logging In

1. Once you have launched the Element Manager and clicked the login link at the top of the page, the login screen appears, as shown in Figure 4-5.

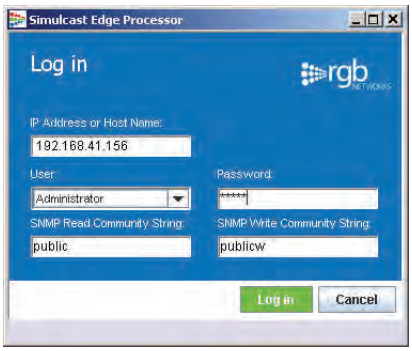


Figure 4-5. Element Manager login

2. Enter the IP Address of the SEP 48.

   By default, the IP address for the SEP 48 is 10.1.1.1.

3. Select your user account and enter the corresponding password in the Password field. Passwords are case sensitive.

   Three levels of user, each with specific access to the system, have permission to use the Element Manager:

Table 4-1. User levels

User name	Default Password	Permission
User	**User**	Logging in as User provides read-only access. You cannot make any changes to the configuration, and do not have access to the Configuration and Maintenance menus.
Operator	**Operator**	Logging in as Operator provides both read and write access. Operators can make changes to the configuration. This is the normal login level.
Administrator	**Admin**	The Administrator user is typically only used by Field Application Engineers and Technical Support personnel, however access can be granted to key headend personnel.

   RGB recommends that to limit access to the Element Manager by unauthorized persons, you change the default passwords as soon as possible. Changing your password is described in "The About box" on page 4-22.

4. Verify that the SNMP information is correct. If not, enter the correct information.

5. Click **Login**.

   By default, the Element Manager now opens to display the RF Configuration view.

Element Manager Overview

Once installed, the Element Manager provides an easy way to configure your SEP 48 system.

Element Manager Menus

The Element Manager contains the following menus, which are used to access specific screens:

Table 4-2. Element Manager Menus

Menu	Use
File	Exit Element Manager
View	Refresh the information on the current screen
Maintenance	Upgrade software, manage licenses, reboot system, or change the SNMP community strings
Status	View system information
Help	Display application information

Access each menu item using the menu list.

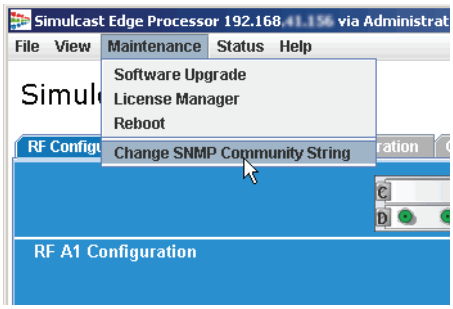


Figure 4-6. Pull down menu options

Element Manager Screens

There are four main configuration tabs in the Element Manager: each provides access to a specific configuration or monitoring element. The tabs used to configure the SEP 48 are described in the sections that follow.

RF Port Configuration Tab

By default, the RF Configuration window appears when the Element Manager is launched. This window has two parts. The upper portion lets you configure the RF ports, while the lower portion lets you define and run diagnostic tests.

RF Port Configuration

To view and modify RF port configuration:

1. Log in to the Element Manager. If necessary, select the **RF Configuration** tab.

   The RF Configuration screen appears. On this screen, the port indicators that are shown in yellow indicate that the EIA channel is receiving the data package from the Redundancy GigE port, not from the primary GigE port. If you are unsure which redundancy GigE port is configured as the redundant or primary port, open the **Configuration > GigE Port Configuration** tab.

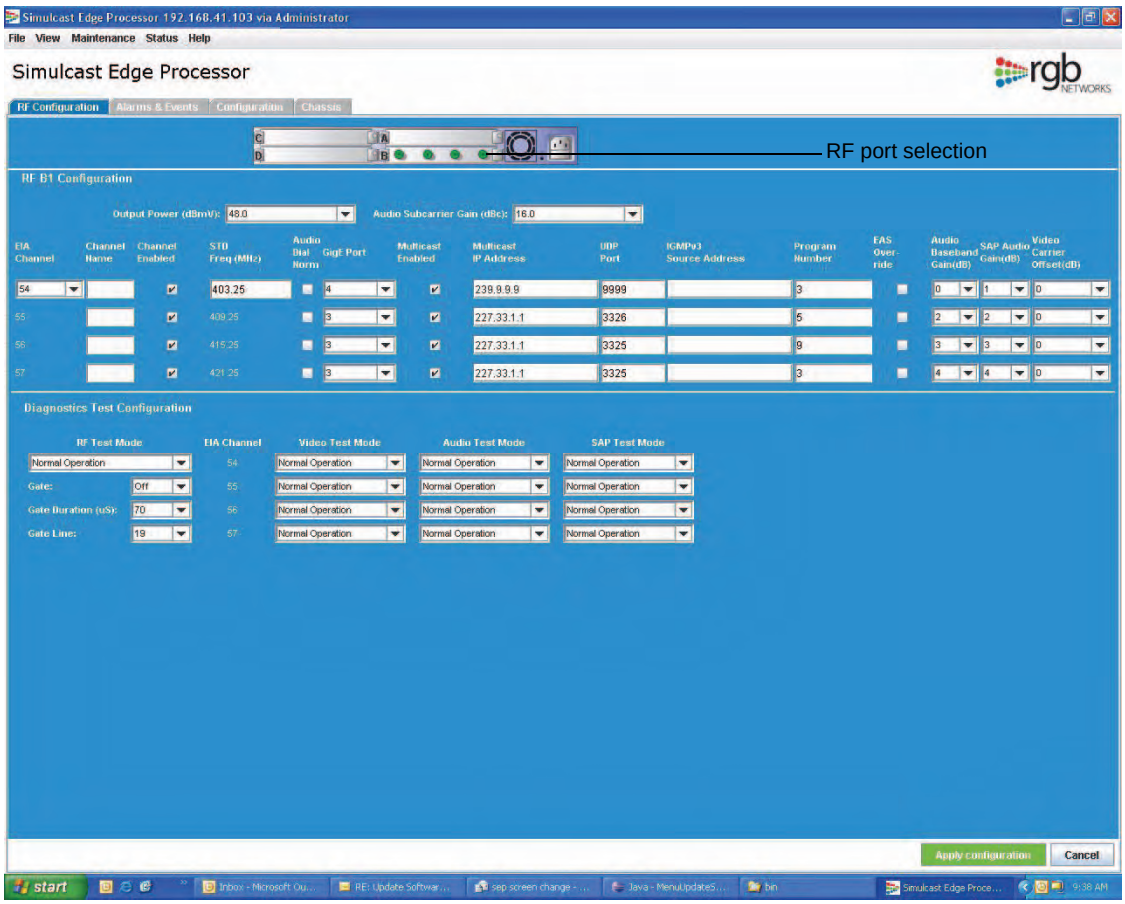


Figure 4-7. RF configuration and diagnostics screen

2. Select the port.

   Select the port to configure from the graphic representation of that port, located at the top of the screen. RF ports are shown in the appropriate slot.

3. Use the selectors and fields to modify any setting required.

Table 4-3 describes the variables that can be changed in the RF Port Configuration view.

Table 4-3. RF Port Configuration Fields

Field	Description
Port	Port identifier
Output power	Select the correct output power, expressed as dBmV. Maximum output differs when the SEP 48 is in an RDS. In this case, the output should be 1 dB less than in the primary mode. Valid selections are from 41— 55 dBmV, in .5 dBmV increments. If you are unsure whether or not this SEP 48 is in an RDS, use the main menu to select **Configuration > Global Configuration**. The information is shown there.
Audio Subcarrier Gain	Select the desired value from a pull-down list of gain values. Valid selections are *Off*, and from 12—18 dBc, in .1 increments.
EIA Channel	Select the channel that EIA is using
Channel Name	Type the channel name in the text field for easy identification
Channel Enabled	Enable or disable the channels
STD Freq	The standard frequency for the RF port, in MHz, if STD Frequency was selected
Audio Dial Norm	Dolby AC-3 dial norm parameters for loudness normalization; enable this to normalize perceived loudness when dialog is present
GigE Port	Select the GigE port to which this RF port is mapped
Multicast Enabled	Click to enable multicast streaming on this port. When enabled, a check mark appears.
Multicast IP address	The IP address which a multicast-enabled RF port should monitor
UDP Port	The User Datagram Protocol port used by this RF port
IGMPv3 Source Address	The IP address of an IGMPv3 source, if one is used
Program Number	The program number
EAS Override	If checked, EAS override is enabled. To disable the EAS override, uncheck the appropriate box.
Audio Base Band Gain	Choose the gain value from a pull-down list; values are from -16 to 16 dB Default: 0
SAP Audio Gain	If Secondary Audio Programming is available, choose the gain value from a pull-down list; values are from -16 to 16 dB Default: 0
Video Carrier Offset	Choose the video carrier offset, from -1.4 to 7.0, in .2 dB increments

4. Click **Apply configuration** after making changes to each port. This allows the Element Manager to save and initiate any changes.

Note: The maximum power level of RF ports is automatically calculated based on the number of channels configured per RF port. The minimum level for four channels is 41 dB and the maximum level is 55 dB. In the case of a single channel per RF port configuration, the maximum power level is 61 dB and minimum level is 47 dB.

Diagnostic Testing

The RF configuration window is also used to send diagnostic test commands. The lower portion of the window (shown in Figure 4-4-7 on page 4-7) lets you define the diagnostic test configuration and then send the command to the SEP 48.

You have the option to select from various RF test modes, video test modes, audio test modes and SAP test modes. Table 4-4 shows the options available under each test mode.

Table 4-4. Diagnostic tests

Field	Description
RF Test Mode	Choose to test normal operation, CW Carrier, 2-tone signal, 8-tone signal, flat noise, and white noise
Gate	Toggle the gate on or off
Gate Duration	Select the gate duration; valid choices are 53, 70, and 83 microseconds
Gate Line	The SEP 48 supports the ability to gate VBI lines, minimizing headend intervention and customer service interruption. Select the gate (blanking) line to use
EIA Channel	This is a read-only view of the EIA channel assigned to the RF port
Video Test Mode	Choose video test mode; valid choices are normal operation, color bars, composite, multiburst, black, unmodulated, Sin(x)/x, and FCC multiburst
Audio Test Mode	Choose the audio test mode; valid choices are: normal operation silent Left and silent Right 1 kHz Left and silent Right silent Left and 1 kHz Right silent Left and 10 kHz Right 10 kHz Left and silent Right 10 kHz Left and 10 kHz Right
SAP Test Mode	To test SAP mode, choose normal operation, silent SAP, 1 kHz SAP, or 5 kHz SAP

Alarms & Events

The Alarms & Events tab is used to monitor and troubleshoot the SEP 48. You can filter which alarms and events the SEP 48 displays.

For details about configuring and understanding this tab, see Chapter 5, “Monitoring the SEP 48”.

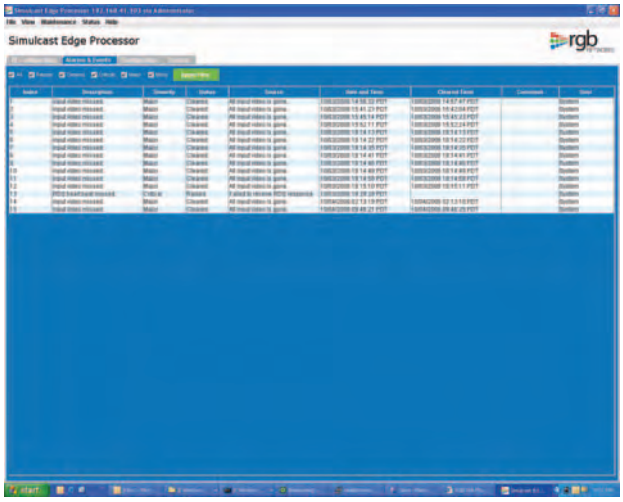


Figure 4-8. Alarms & Events tab

Configuration

The Configuration tab has several subtabs, which are described in detail in the following section. You use these to configure your SEP 48. These subtabs include:

- “Global Chassis Configuration” on page 4-11
- “Ethernet Control Port Configuration” on page 4-13
- “GigE Port Configuration” on page 4-14
- “SNMP Trap Configuration” on page 4-15
- “Changing Your Password” on page 4-16

Global Chassis Configuration

To view and configure information that is global to the SEP 48 chassis:

1. Log in to the Element Manager and select **Configuration** > **Global Chassis Configuration**.

   The global chassis configuration window appears.

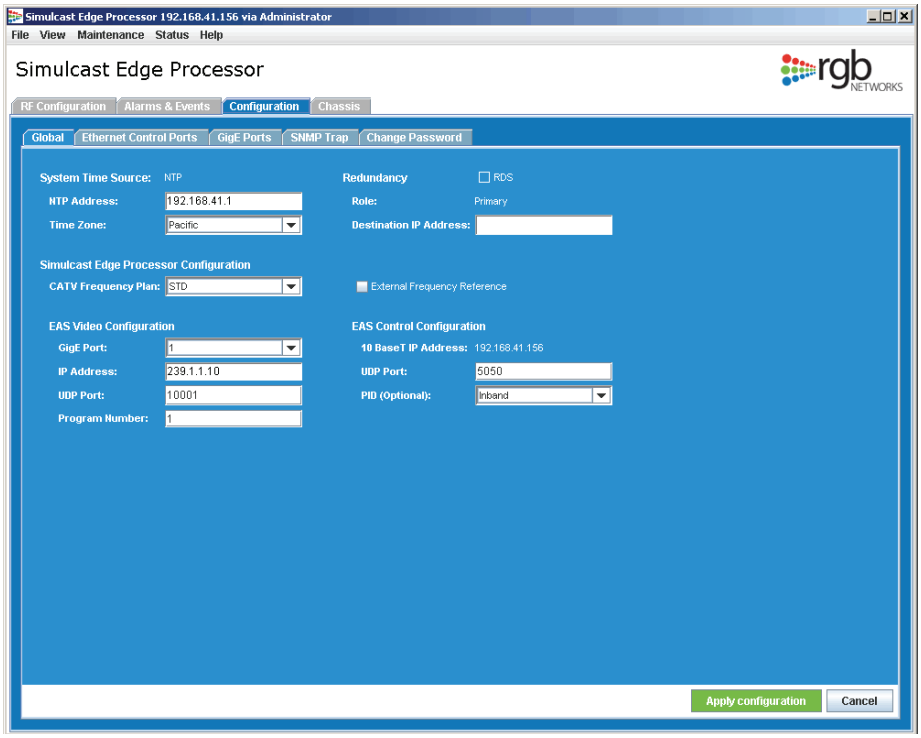


Figure 4-9. Single and primary chassis configuration

2. Use the fields and selection options to change the global configuration variables.

   Table 4-5 describes the configuration variables that can be changed in the Global Chassis Configuration view.

Table 4-5. Global Chassis Configuration Fields

Category	Field	Description/Values
System Time	NTP Address	If External is selected, the IP address of the NTP server; if set to 0.0.0.0, there are no NTP server available on the existing network
	Time Zone	Choose the time zone from the pull-down list

Table 4-5. Global Chassis Configuration Fields (Continued)

Category	Field	Description/Values
Redundancy	RDS	Select this option if this is a redundant chassis.
	Role	Primary or secondary
	Destination IP Address	Default: 0.0.0.0. For a redundant system, if you configured any redundancy GigE ports in the **Configuration > GigE Port Configuration** window, the “Redundancy” option and destination IP fields let you set values. If the GigE Port configuration was set, this section is grayed out and unavailable. The destination IP address can only be set when the SEP 48 is in an RDS. By selecting the “RDS” check box, you can set the IP text field.
CATV	CATV Frequency Plan	Choose the CATV frequency plan; options are STD, HRC, and IRC Default: STD
	External Frequency Reference	If selected, provide the reference for an external frequency for HRC/IRC
EAS Video	GbE Port	Select the Gigabit Ethernet port that provides EAS video
	IP Address	Enter the IP address that provides the EAS video
	UDP Port	Enter the EAS destination port
	Program Number	Enter the EAS program number
EAS Control	10BaseT IP Address	The 10/100 BaseT IP address for EAS control messages
	UDP Port	Enter the UDP port for EAS control messages (SCTE 18)
	PID	Choose from inband or outband

3. Click **Apply**.

   Any time changes are made to a configuration, you must click **Apply Configuration** to save and implement the changes.

Ethernet Control Port Configuration

To view and configure the Ethernet Control port:

1. Log in to the Element Manager and select **Configuration** > **Ethernet Control Port**.

   The Ethernet Control Port Configuration window appears.

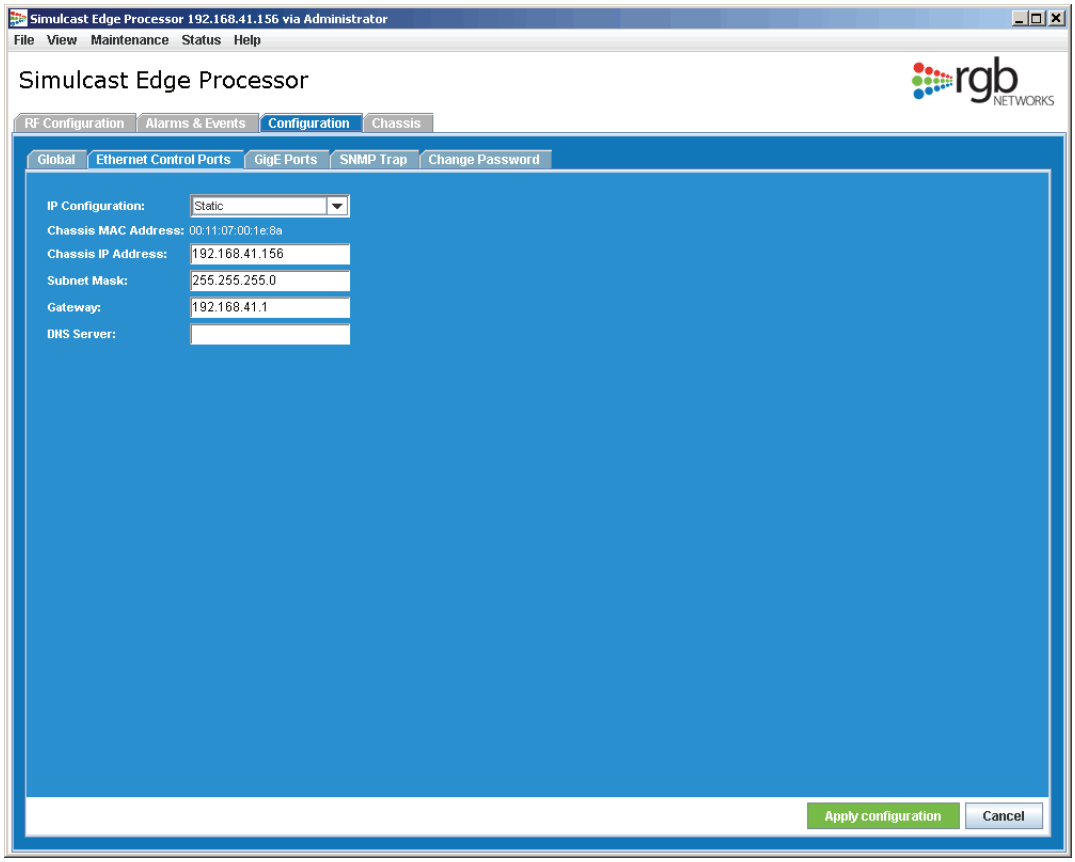


Figure 4-10. Ethernet Control Port configuration

2. Make any necessary configuration changes.

   Table 4-6 describes the variables that can be changed in the Ethernet Control Port Configuration view. Depending on whether you choose a static configuration or a DHCP configuration, the variables may be different. By default, a static IP address is used.

Table 4-6. Ethernet Control Port Configuration Fields

Field	Description
IP Configuration	Select the source of the SEP 48 boot configuration file from the pull-down menu: choices include Static, Compact flash, BOOTP, and DHCP Default: Static
Chassis MAC Address	A read-only field that displays the MAC address of the SEP 48
Chassis IP Address	Enter the IP address of the SEP 48
Subnet Mask	Enter the subnet mask of the SEP 48. You cannot leave this field blank.

Table 4-6. Ethernet Control Port Configuration Fields (Continued)

Field	Description
Gateway	Enter the IP address where packets are routed out of the local network
DNS Server	If one is used, the IP address of the DNS server; if no DNS server is being used, leave this blank

3. Click **Apply Configuration** to save and load the changes.

GigE Port Configuration

The GigE ports can be configured from the Element Manager. The GigE ports support full duplex processing of transport streams.

If the SEP 48 that you are configuring is in an RDS and you have specified the destination IP address for this SEP 48 in the global configuration section, no Redundancy GigE information can be specified. The Redundancy selection is out and unavailable.

The GigE Port configuration screen is shown in Figure 4-11.

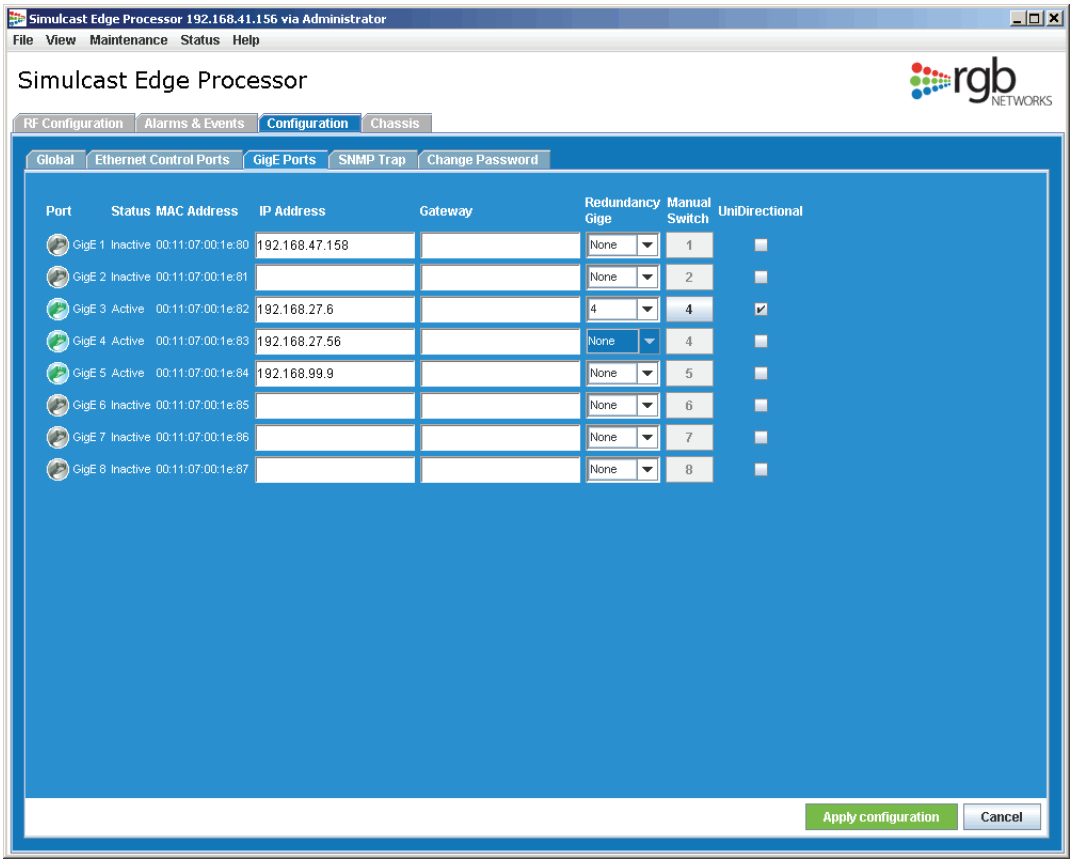


Figure 4-11. GigE Port configuration screen (no redundancy)

To modify the GigE ports:

1. Log in to the Element Manager and select **Configuration** >**GigE Ports Port Configuration**.
2. Make any necessary changes to the GigE port configuration.

   Table 4-7 describes the variables that can be changed.

Table 4-7. GigE Port Configuration Fields

Field	Description
Port	Port number; green indicates an active port
Status	Read-only; active or inactive status of the port
MAC Address	Read-only; the MAC address of the port
IP Address	The IP address for the interface You cannot input the IP address 0.0.0.0
Gateway	If a gateway is used with this port, enter the IP address of the gateway
Redundancy GigE	In a non-redundant system, one GigE port can provide redundancy for another in the same chassis. When a substitution is needed, the switchover decisions are based on link status and data detection. To define the GigE ports as redundant, select the number of redundant ports to use for the port. When you enable redundancy, use MCast video and make sure that both ports have a valid IP address for IGMP to work. When the redundancy is allowed, the window is active and selections are possible.
Manual Switch	If this port requires a manual switch, that is, the port is unidirectional, the switch number is enabled
Unidirectional	If you are using a single strand of fiber for a GigE connection, this feature can be enabled to activate the port as unidirectional. If this feature is selected, do not use the IGMP router to select the traffic.

3. Click **Apply Configuration** to apply the changes to your configuration.

SNMP Trap Configuration

You can set SNMP traps to up to eight IP addresses. In each case, this ensures that you are notified when the conditions defined by the specific severity level are encountered. Trap severity levels are described in Table 4-8.

Table 4-8. SNMP Trap Levels

Severity level	Severity type	Description
0	Emergency	The system is unstable
1	Alert	The specified action must be taken immediately
2	Critical	Critical conditions exist
3	Error	Error conditions exist
4	Warning	Warning conditions exist

Table 4-8. SNMP Trap Levels

Severity level	Severity type	Description
5	Notice	Normal but significant condition exists
6	Info	Information only

You can change the SNMP information at any time.

1. Log in to the Element Manager and select **Configuration** > **SNMP**.

   The SNMP Configuration window appears.

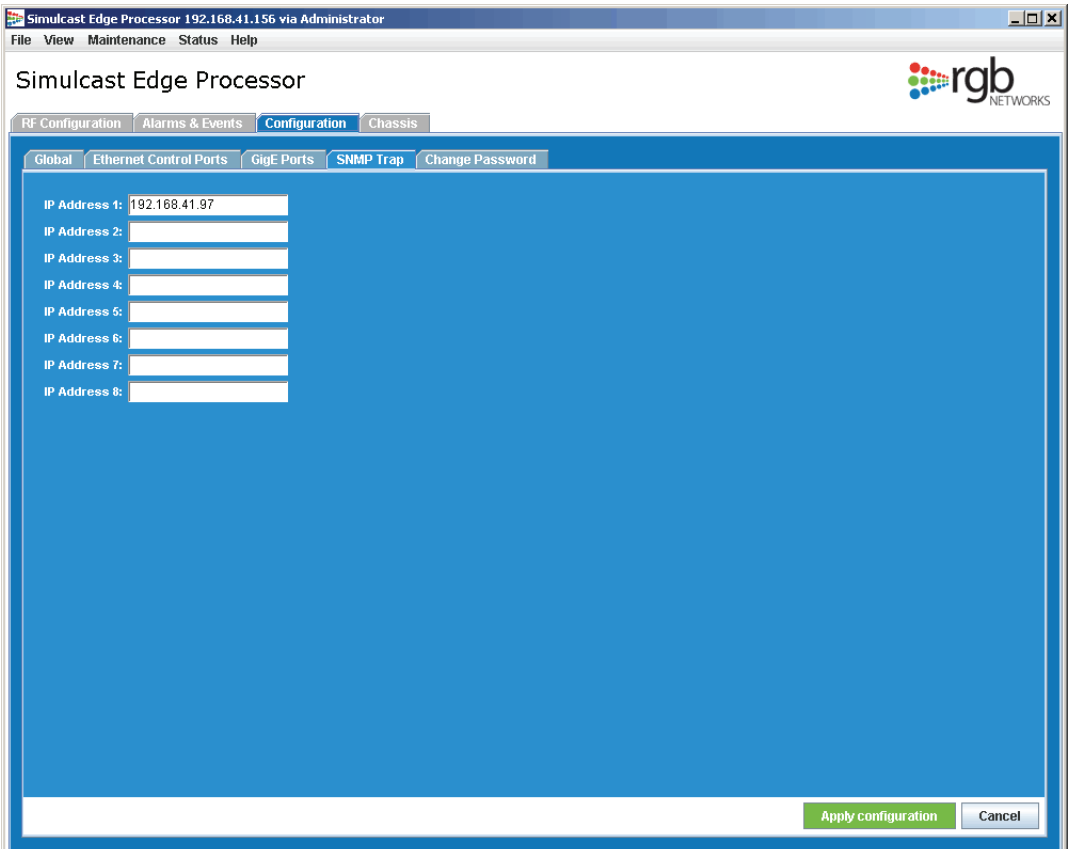


Figure 4-12. SNMP configuration window

2. Enter the IP address for each SNMP trap desired: up to eight addresses can be specified.
3. Click **Apply Configuration** to save your configuration.

Changing Your Password

By logging in with administrator privileges, you can change the password for each of the default users.

Note: You cannot change the password when you are logged in to a secondary SEP 48 chassis. See Chapter 8, "Redundancy and the RDS," for details about redundancy chassis.

1. Log in to the Element Manager with at Administrator-level access.

2. From the main menu, select **Configuration > Change Password**.

   The Element Manager displays the Change Password window.

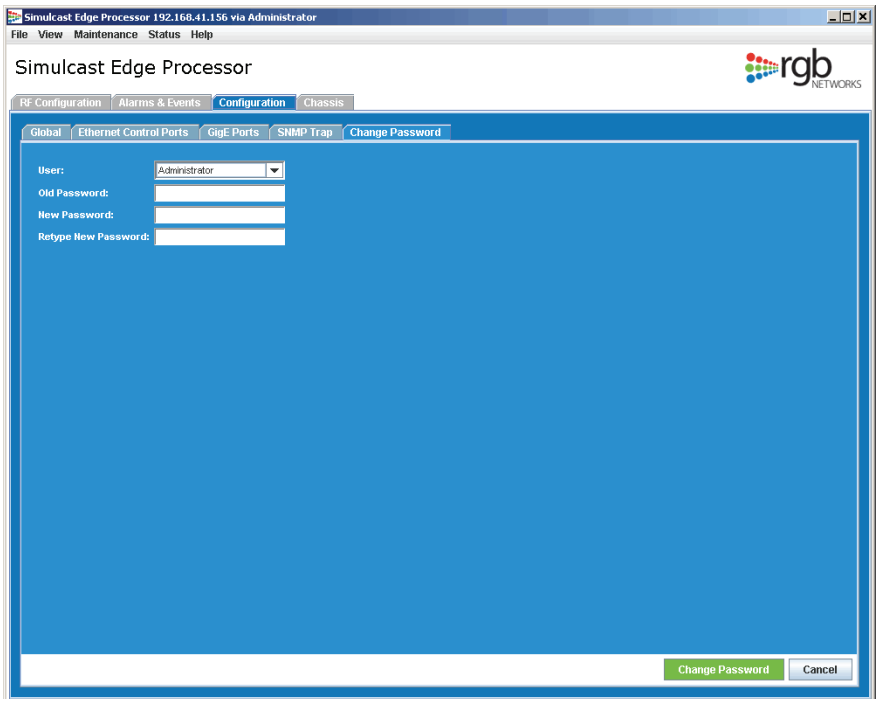


Figure 4-13. Change Password window

3. Select the user role whose password you want to change.
4. In the **Old Password** field, type in the default password if it has not been changed, or the current password if you have previously changed it.
5. In the New Password field, type the new password for the role.

   Passwords should not be easily guessed. It is good practice to include letters and numbers in your password, and not use common items such as birth dates, pet names, or children's names.
6. In the **Confirm New Password**, type the password again, exactly as you typed it the first time.

Upgrading Software

If your software is out of date and you would like to upgrade it to the latest SEP 48 software, download the software from an FTP server and use the Element Manager upgrade feature to perform the upgrade:

1. Log in to the Element Manager. From the main menu, select **Maintenance** > **Upgrade**.

   The Element Manager displays the Upgrade screen.

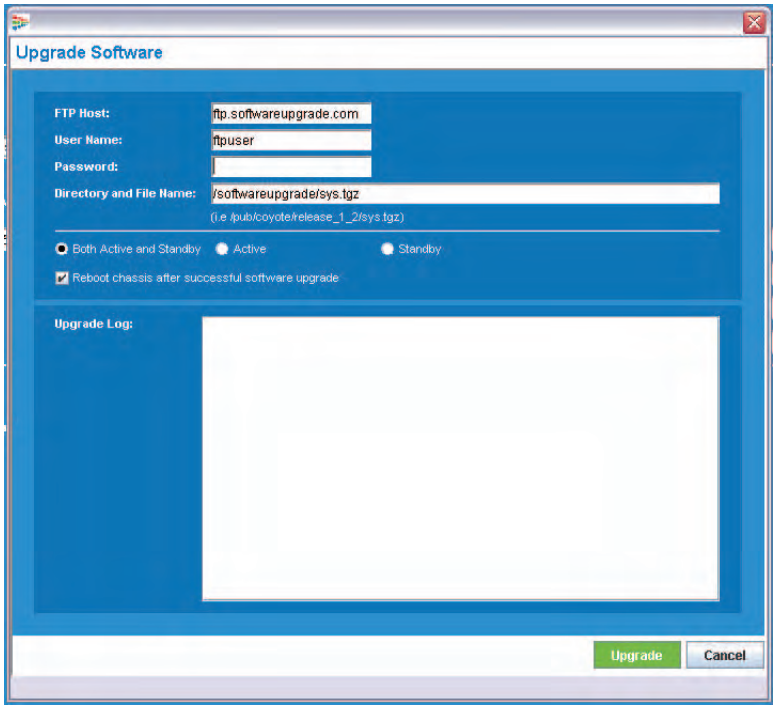


Figure 4-14. Enter the URL for the FTP server

2. In the **FTP Host** field, enter the URL or IP address.
3. In the **User Name** field, enter the user name with access to the FTP server.
4. In the **Password** field, enter the password associated with the above user name account.
5. In the **Directory and File Name** field, enter the location and file name of the software upgrade.

   Be sure to use the correct format.
6. In a redundant configuration, choose which chassis to upgrade, or choose to upgrade both the active and standby chassis.
7. To allow the system to autmatically reboot after the upgrade, enable this feature.

   If you choose not to reboot automatically, you will need to reboot manually, as described in "Rebooting the SEP 48" on page 4-21.
8. Click **Upgrade** to begin the upgrade procedure.
9. After the upgrade is complete and the status shows 100%, the upgrade is installed.
10. If this was a downrev of the installed software, clear the Java Web Start cache, as described in "Clearing the Web Start Cache" on page 4-20.

Adding EAS Crawl Licenses

The SEP 48 version 2.0 supports Emergency Alert System (EAS) crawls or text overlay insertion capability for providing emergency text information to viewers. The textual description of the emergency alert and information for switching to the “details” channel is based on the SCTE 18 EAS message priority system.

Only the highest priority alert will switch the channel to the designated details channel for unconditional EAS information. In all but these highest priority alert situations, the alert is sent as a text crawl over the original video.

In order to use the EAS crawl feature, you must submit your request to the appropriate RGB URL and receive a license. Please contact RGB at support@rgbnetworks.com to receive the URL.

To install the EAS crawl license:

1. Log in to the Element Manager and from the main menu select **Maintenance > License Manager**.

   the Element Manager displays the License Manager screen.
2. For each new license, enter the URL from which to receive the license.

   In the **New License** field, enter the *exact license text* provided by RGB. The existing licenses are displayed in the **Current License** section of this window.
3. Click **Apply** to add the new license.

   After the license information is applied, it appears in the Current License section.

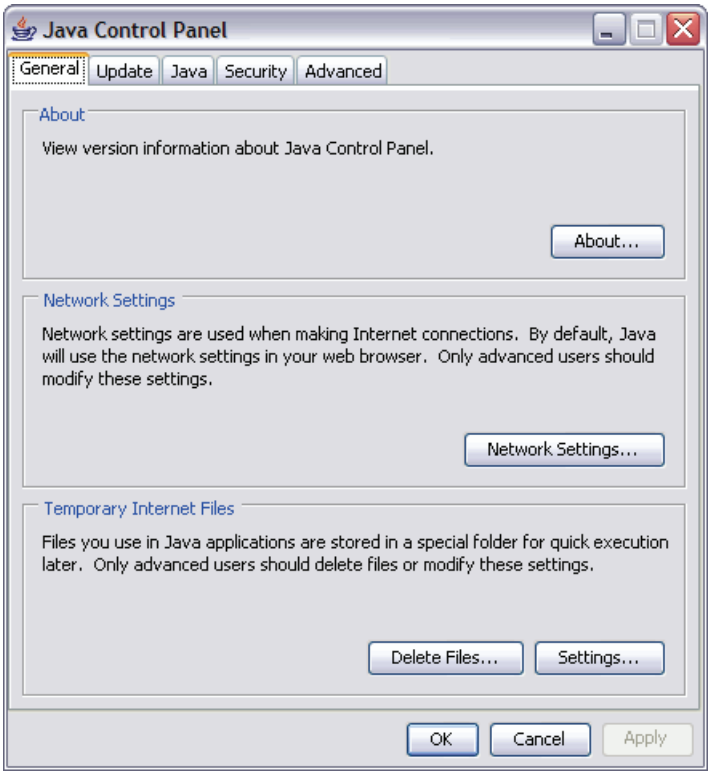
Clearing the Web Start Cache

Any time that you *downgrade* software, you must clear the cache from the Java Web Start. Older versions of the Element Manager use Web Start when the Element Manager is started. This is only needed when you change to a software version lower than the current one.

To clear the Java Web Start cache (on a Windows system):

1. From the Start Menu, select **Settings** > **Control Panel** > **Java**.

   The Java Control Panel is launched.



2. From the File menu, select **Preferences**.

   The Java Start Preferences screen appears.

3. In the Temporary Internet Files section, click **Clear Folder**.

4. Click **OK** to clear the cache and close the screen.

Rebooting the System

Any time you load a new software image, you must reboot the system. When a power cycle or reboot is performed, the SEP 48 will retain previously saved configuration settings. Only the parameters of newly introduced features need to be set when the system is upgraded and rebooted.

The SEP 48 is rebooted either by using a power cycle or by using the Element Manager interface.

Power Cycling the SEP 48

The SEP 48 does not have a power switch. To power cycle the SEP 48, use the following procedure:

- AC power supply units - Shut down the unit by removing the power cable from the power supply connector. After the unit has completely shut down, apply power by plugging the power cable back into the power supply connector.
- DC power supply units - Shut down the unit by toggling the circuit breaker to the OFF position. After the unit has completely shut down, apply power by toggling the circuit breaker back to the ON position.

Rebooting the SEP 48

The same method is used to reboot the unit using the Element Manager regardless of whether the SEP 48 uses the AC or DC power supply.

To reboot the unit from the Element Manager:

1. Log in to the Element Manager, and select **Maintenance** > **Reboot**.
2. The Reboot Element Manager screen appears, as shown in Figure 4-16.

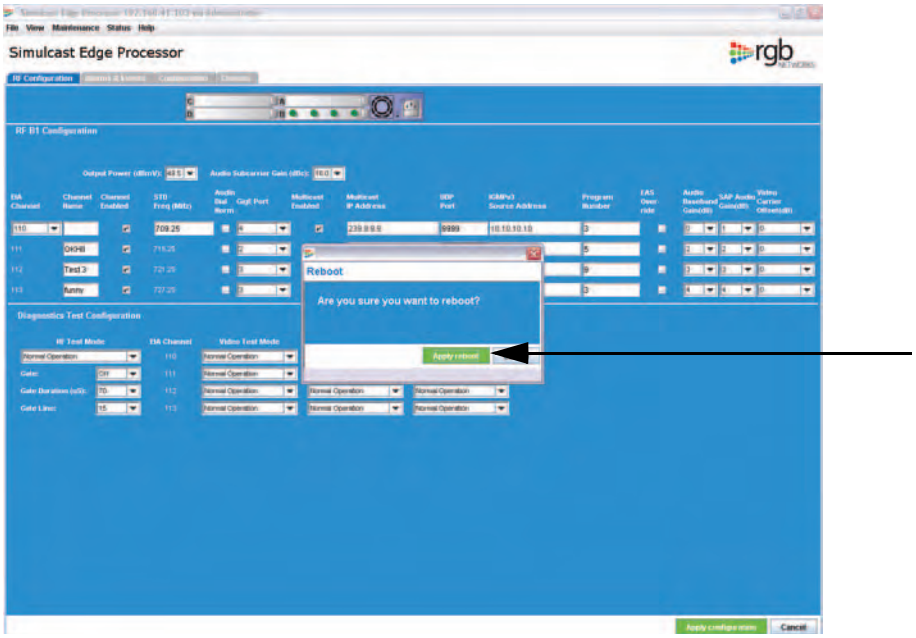


Figure 4-15. Reboot dialog

3. Select Apply **Reboot**, then click **OK**.

4. After the confirmation message appears, click **Yes** to initiate the system reboot.

Checking for the Element Manager Version

To determine the currently installed version of the Element Manager, from the main menu select **Help > About Simulcast Edge Processor**. The Element Manager displays the About SEP screen.

Figure 4-16. The About box

Chassis

The Element Manager automatically detects the chassis hardware and provides a graphical display of the product components and their state, as shown in Figure 4-18.

By default, the first RF port appears green onscreen. For easy identification, whenever another port is selected, that RF or GigE port's icon is shown for easy identification. The information that appears depends on the type of port selected.

Figure 4-17. Chassis view

The information on this screen cannot be changed and is displayed for informational purposes only. When you move the cursor over a port on the screen, the cursor changes to a hand, indicating a link, as shown in Figure 4-19.

Figure 4-18. Cursor changes to a hand

The information displayed in the main Chassis Information screen is shown in Table 4-9

Table 4-9. Chassis information window

Field	Description
SEP version	Version of the SEP software currently installed
Chassis up time	Amount of time that the chassis has been continuously accessible
Chassis serial number	Serial number for the chassis; useful when troubleshooting or contacting technical support. The serial number is the same as the 10/100 BaseT port MAC address.
Inside Chassis Temperature	For each slot, the internal temperature is displayed
Graphical view of physical configuration	A graphical representation of the front and rear of the chassis configuration: move the cursor over the port and click to modify configuration
Ethernet control port	Port configuration, IP address, subnet masks, gateway, and DNS server
GigE port information	Status and addresses of the GigE ports; select the port to view the information
RF port information	Output power, band plan, EIA channels, and frequency

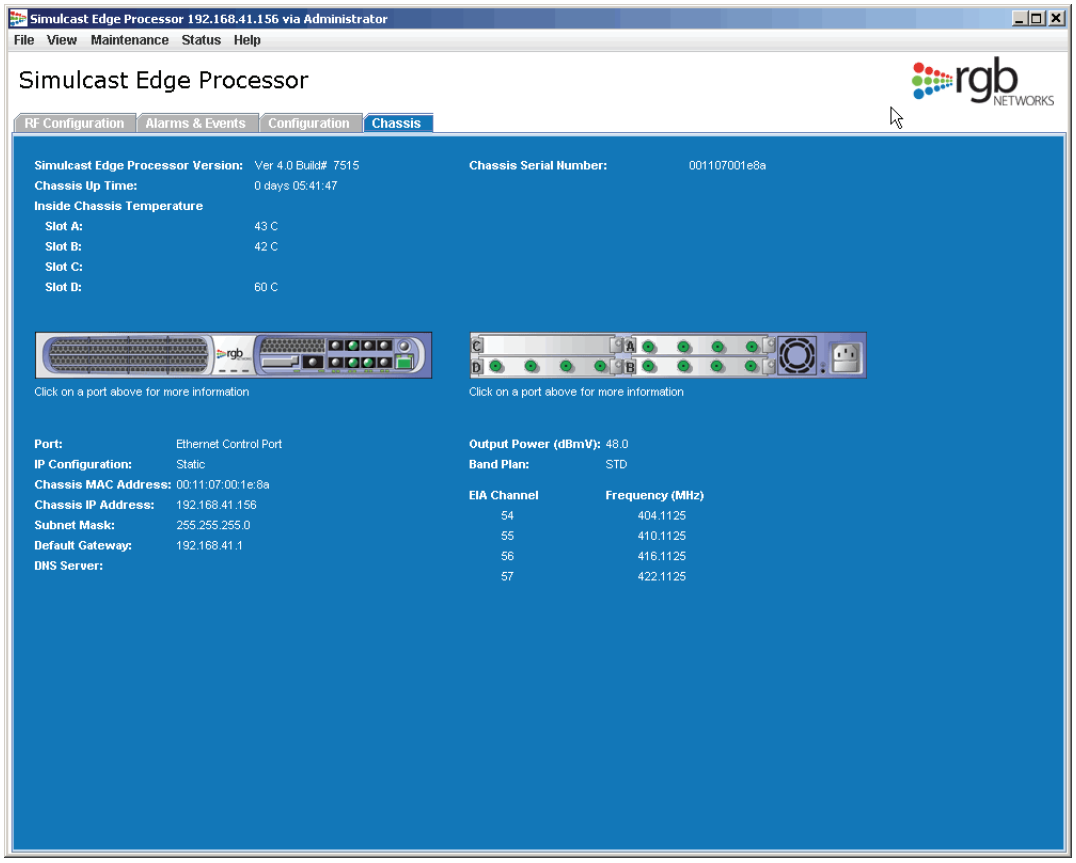


Figure 4-19. Example chassis view

CHAPTER 5

Monitoring the SEP 48

This chapter describes information about the system that you can monitor to ensure that the system is always healthy.

Viewing System Status

The Element Manager interface provides detailed system information, accessible from the Status menu.

From the **Status** menu, select **System Information**.

If any module appears in the information window in an error state, verify that the appropriate unit is correctly installed and configured, and that the unit has not failed.

When monitoring SEP 48 units within an RDS chassis, the standby SEP 48 displays read-only information about the secondary (standby) unit. These are described in "Using Element Manager to Monitor the RDS Units" on page 8-13.

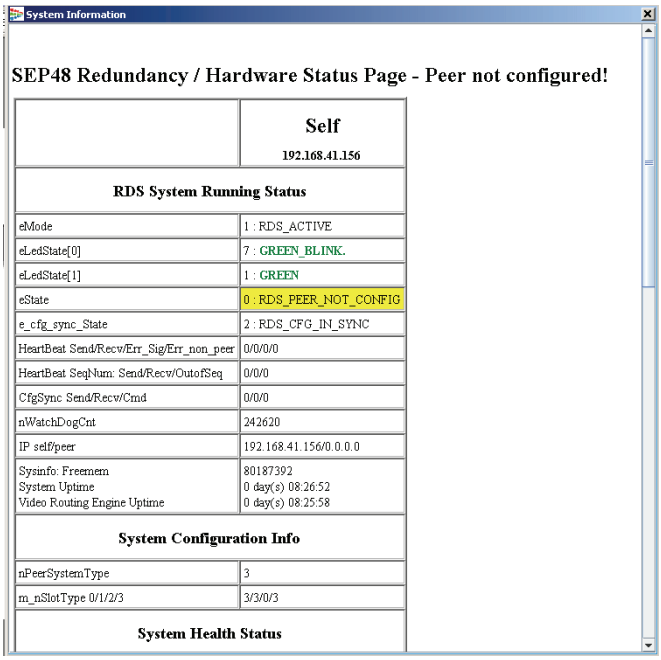


Figure 5-1. System information window

Information visible in the System Status is shown in Table 5-1.

Table 5-1. System information

Field	Description
STP card temperature	The board temperature for each STP card
Fan information	Fan counts and usage
Heartbeat	Heartbeat information
Event log	The event log, including SNMP trap information

Viewing the System Log

You can check the system log at any time. From the initial window, select **Show System Log**. This can be a helpful troubleshooting tool.

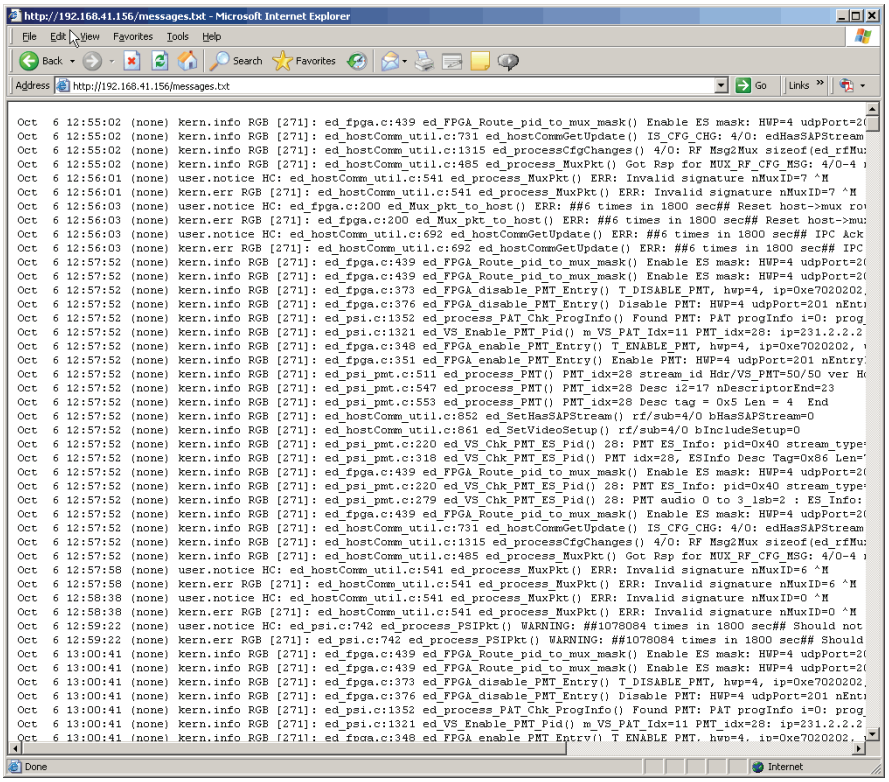


Figure 5-2. System log

Viewing Alarms & Events

Alarms and events can be an excellent source of information if your system is not acting the way you expect it to.

To view alarms and events:

1. Tab to **Alarms & Events**.

2. Select the types of alarms and events you want to filter.

   By filtering alarms and events you can see only the types of activity in which you are interested. Options include:

   - **All** shows all alerts and events, regardless of severity
   - **Raised** shows all alerts that have been raised, but not cleared
   - **Cleared** shows all alerts that have been raised and cleared
   - **Critical** shows only critical severity alerts; these are alerts that must be dealt with immediately
   - **Major** shows major alerts; these are alerts that may not require immediate intervention but cannot be allowed to continue indefinitely
   - **Minor** shows minor alerts that will not disrupt the system

   Cleared events are retained for historical purposes.

3. Click **Apply Filter** to accept your choices and refresh the page.

   You will now see each filtered alert along with its description, severity, status, source, and other information about the alert.

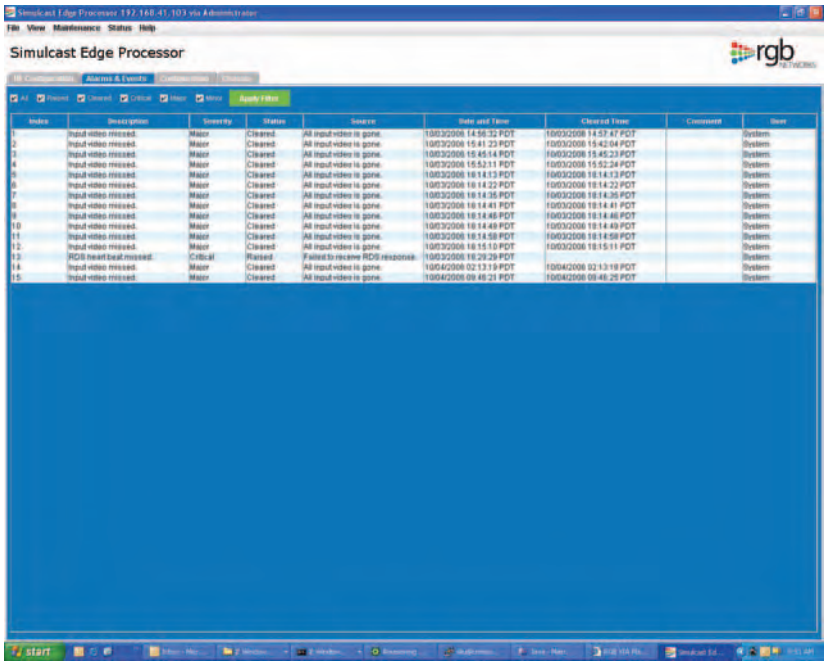


Figure 5-3. Alerts & Events page

CHAPTER 6

Troubleshooting

This chapter describes error detection and correction procedures. The following sections are included:

Alarms & Events

Sometimes, the Alarms and Events window can provide the information you need to determine a problem. To access the Alarms & Events window, log in to the Element Manager and select the **Alarms & Events** tab.

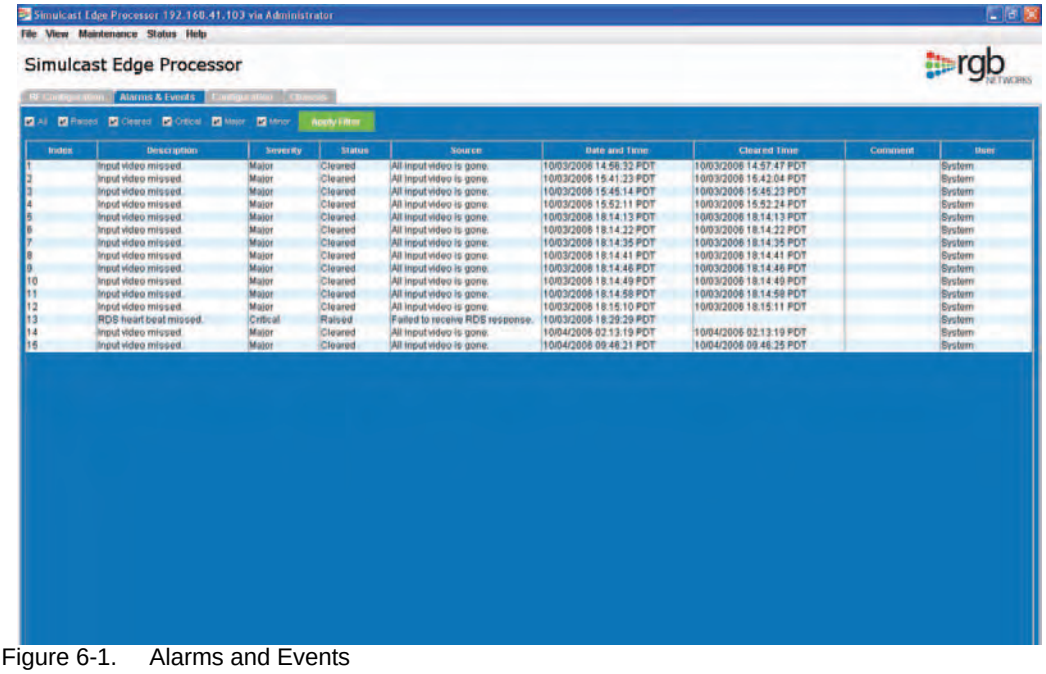


Figure 6-1. Alarms and Events

You can choose to see various levels or alarms and events by selecting and unselecting the filters. When a filter is selected, that item is displayed.

By removing irrelevant alarms and events from the list, you can quickly see any issues that need immediate attention. For a list of filter options, see Chapter 5, "Monitoring the SEP 48".

LED Indicators

The LED indicators are fully described in “LED Indicators” on page 2-6. These should be your first line of inquiry if any SEP 48 component is not performing correctly.

Indicator: An LED indicator for one of the GigE port is red.
Possible solution: Verify that the module is installed correctly and has power.

Indicator: The LED indicator for the 10/100 BaseT port is off or red.
Possible solution: Verify that the module is installed correctly and the 10/100 BaseT port cable is connected correctly.

Indicator: The system power LED indicator is off.
Possible solution: Verify that the power cord is correctly installed and that the power to the SEP is turned on.

Indicator: The LED indicator for the compact flash is blinking red.
Possible solution: Install a compact flash card.

Indicator: The LED indicator for the compact flash is solid red.
Possible solution: A flash error has occurred or the flash module is corrupted and needs to be reformatted or replaced.

Error Log Analysis

If asked to do so by technical support, access the error log. You will be instructed on this procedure by the technical support engineer.

Software Upgrade

Use the Element Manager to upgrade any software image of the SEP 48. See “Upgrading Software” on page 4-18 for details about upgrading software.

Contacting Technical Support

Before you contact technical support, have the following information handy:

- chassis model and serial number
- clear description of the problem
- steps to reproduce the problem, if applicable

Customers who purchased their SEP product through **Motorola** should contact **888-GEN-INST** (888-436-4678).

Customers who purchased their SEP product directly from **RGB Networks** should contact **877-RGB-NETW** (877-742- 6389).

CHAPTER 7

Field-replaceable Units

This chapter provides instructions on replacing the Field-replaceable Units (FRUs). There are three replaceable units on the SEP 48, shown in Figure 7-1. The removal and replacement procedure is provided for each.

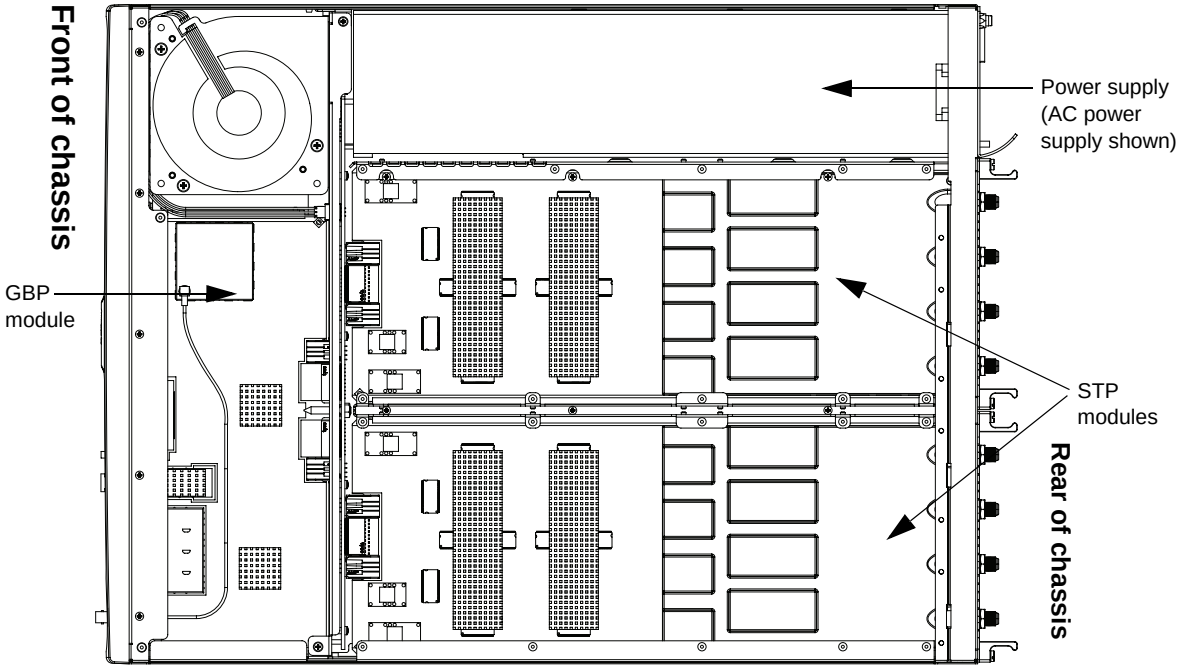


Figure 7-1. Top view of chassis, with FRUs visible

Always wear an ESD wristband or use an electrostatic mat when working with electronic components.

The chassis does not need to be removed from the rack to replace a FRU, but the system **must** be powered down before beginning any replacement process.

Warning: Never replace any FRU while the chassis is still connected to the power source.

If replaced items need to be configured, see Chapter 4, "System Configuration."

- "Replacing a Power Supply," next
- "Replacing a Gigabit Ethernet Processor (GBP) Module" on page 7-6
- "Replacing a Strip Processor (STP) Module" on page 7-8

Warning: Do not replace any component (such as fuses) not specifically described here. For replacement beyond the FRU level, contact your technical support representative for instructions on returning the component. (See "Contacting Technical Support" on page 6-2.)

Replacing a Power Supply

The power supply is located on the rear of the SEP 48 chassis, next to the RF ports. Any time that the chassis is not getting adequate power, as indicated by the system LEDs and performance, verify that power is reaching the chassis.

If power is reaching the power supply but not getting to the system, you might need to replace the power supply.

Removing a Power Supply

The basic procedure for removing a power supply is similar regardless of whether the power supply is for AC or DC power.

To remove a failed power supply:

1. Ensure that you have a replacement power supply ready to reinsert.
2. Ensure that there is no power to the unit:
   - AC power supply units - Shut down the unit by removing the power cable from the power supply connector.
   - DC power supply units - Toggle the circuit breaker to the OFF position. Disconnect the cables from the power connector.

3. Loosen the power supply unit by turning the safety screw *clockwise*. Turning the screw counterclockwise tightens the screw.

Use a slotted screwdriver to tighten or loosen the screw, then use your fingers to further turn the screw, if necessary.

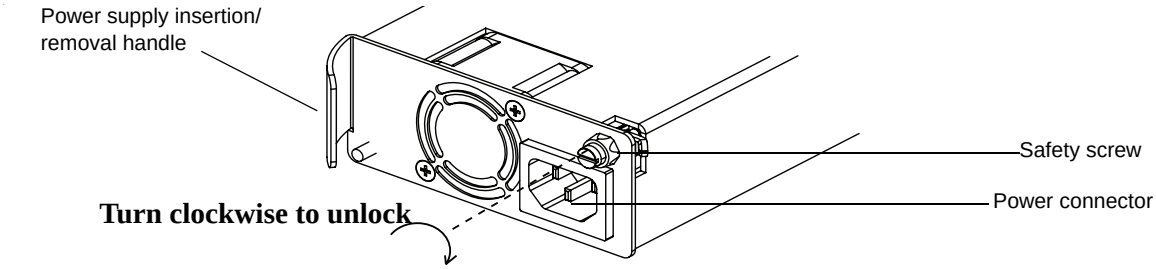


Figure 7-2. Power supply handle (AC power supply)

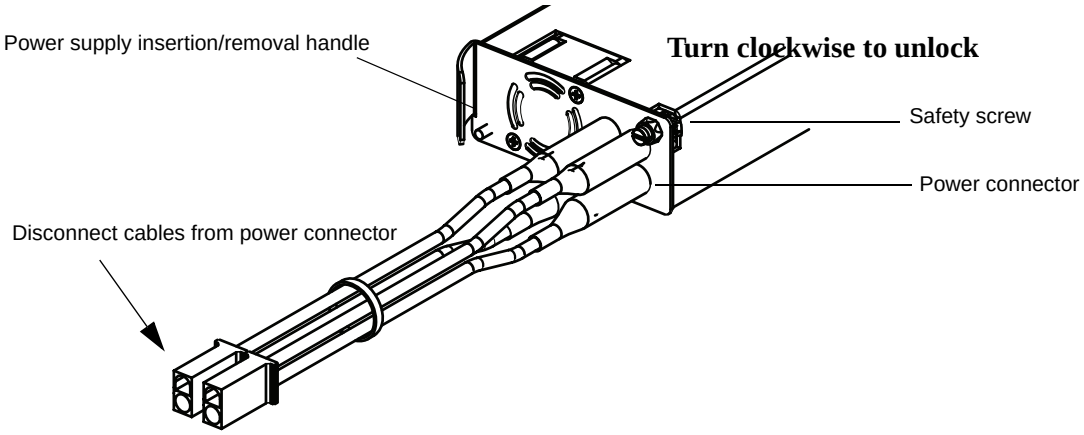


Figure 7-3. Power supply handle (DC power supply)

4. Firmly grasp the power supply by the handle, shown in Figure 7-4

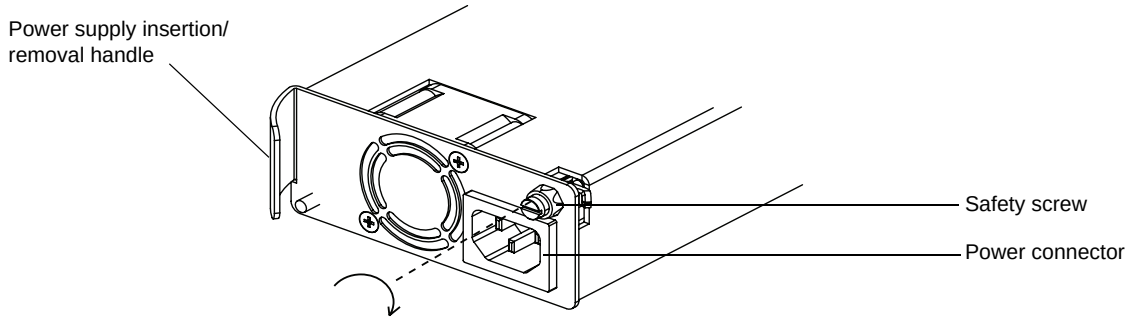


Figure 7-4. Power supply handle (AC power supply)

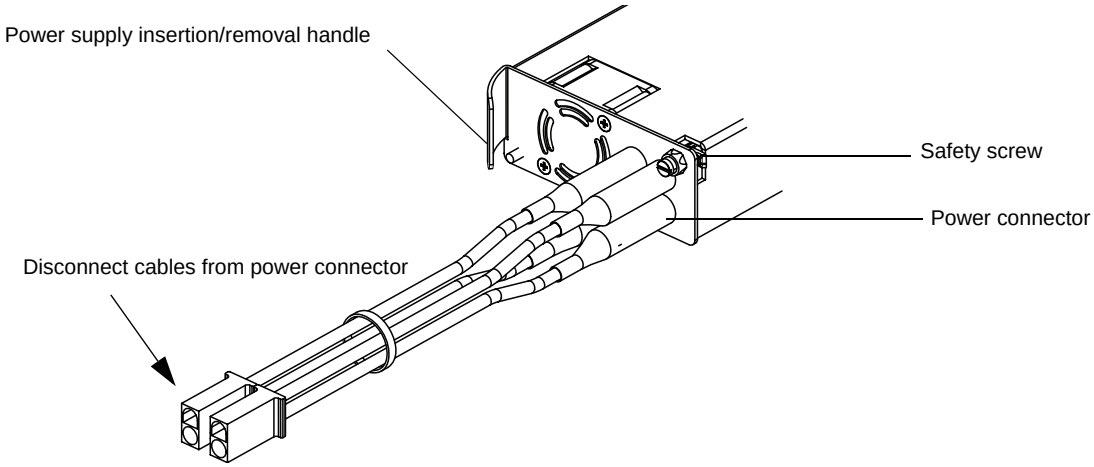


Figure 7-5. Power supply handle (DC power supply)

5. Pull gently but firmly, sliding the power supply out of the bay as shown in Figure 7-6.

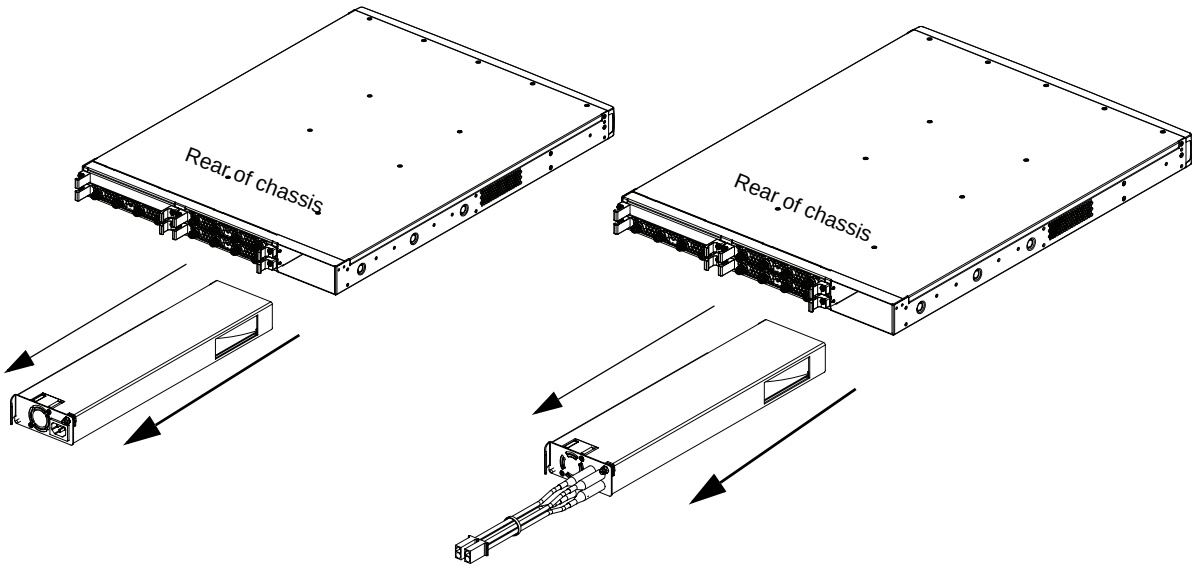


Figure 7-6. Power supply removal (AC power supply shown at left, DC power supply shown at right)

Inserting a Power Supply

Once you have removed the failed power supply, install a replacement:

1. Remove the replacement power supply from its packing and carefully inspect it for damage.

   Do not install a visibly damaged power supply.
2. Slide the replacement power supply into the slot.

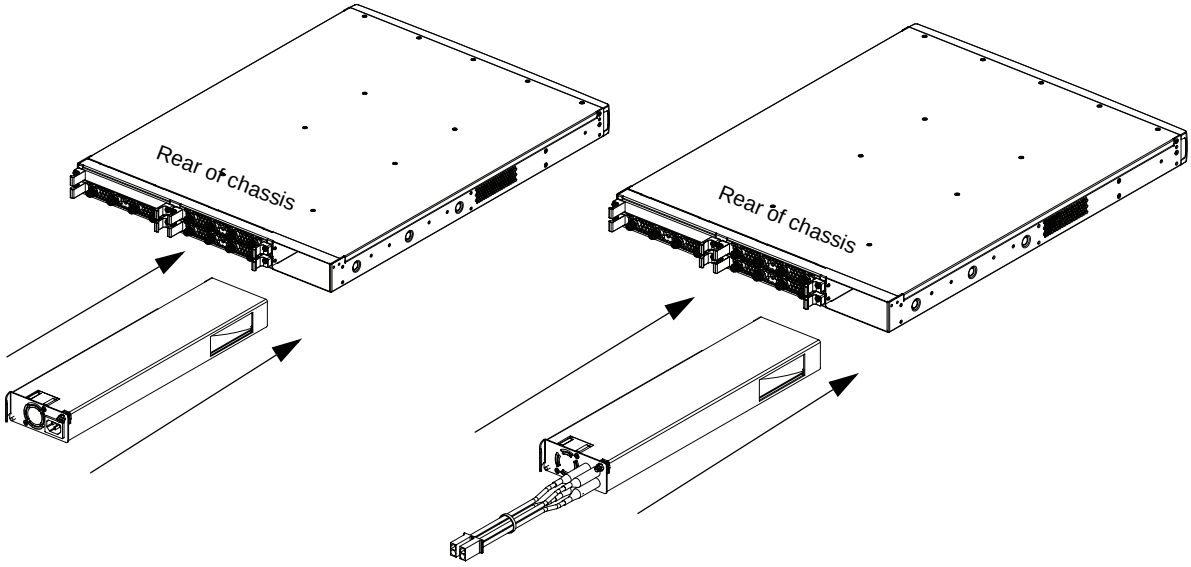


Figure 7-7. Power supply insertion (AC power supply shown at left, DC power supply shown at right)

3. Turn the screw counterclockwise to tighten it, securing the power supply to the SEP 48 chassis

.**Caution!** Note that the locked position may be different than that of similar units. Make sure that the safety screw is in the locked position (turned counterclockwise) before applying power. This

ensures that the power supply cannot be accidentally disconnected, causing possible damage and possibly voiding the warranty.

It is important to lock the power supply into the chassis because if you need to disconnect the power cord, the power supply must be locked tightly into position.

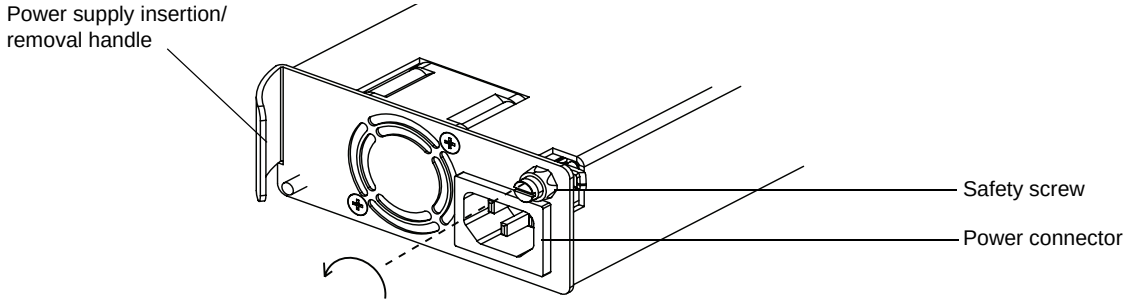


Figure 7-8. Power supply handle (AC power supply)

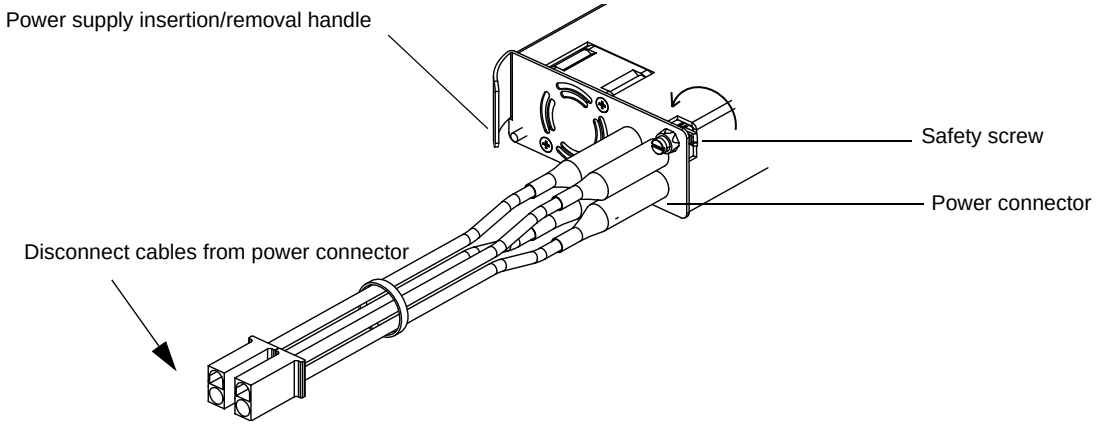


Figure 7-9. Power supply handle (DC power supply)

4. Apply power to the power supply:

- For AC power supplies, refer to "Applying Power to the SEP 48 (AC Power Supply)" on page 3-7.
- For DC power supplies, refer to "Applying Power to the SEP 48 (DC Power Supply)" on page 3-8.

Replacing a Gigabit Ethernet Processor (GBP) Module

When you have determined that a GBP module must be replaced, follow this procedure to remove and replace the module. You do not need to remove the chassis from its rack mount to replace a module.

Removing a GBP Module

1. Ensure that you have a replacement module available, then shut down the unit by removing the power cable from the power supply connector.
2. Remove all cabling from the module.

3. Grasping it firmly with your fingers, gently remove the bezel on the front of the chassis, as shown in Figure 7-10.

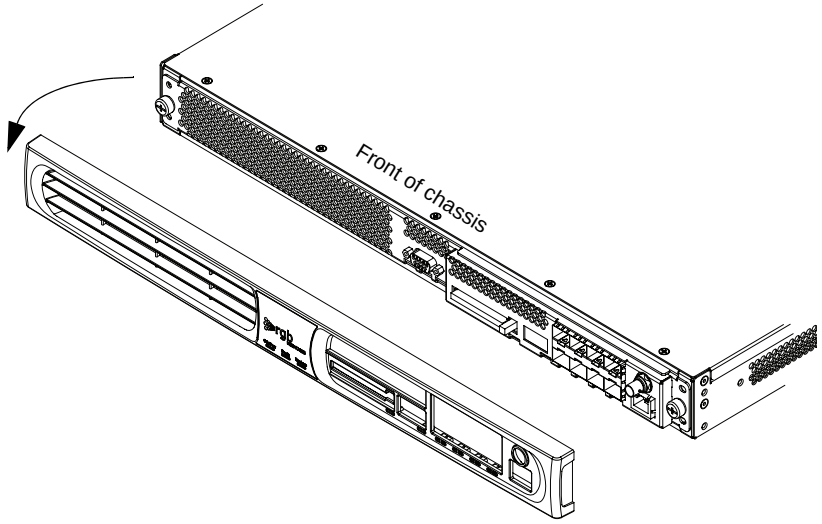


Figure 7-10. Front bezel removal

4. Using a Phillips screwdriver, loosen—but do not remove—the screws that secure both sides of the GBP module to the chassis. They act as handles to assist with the module's removal.

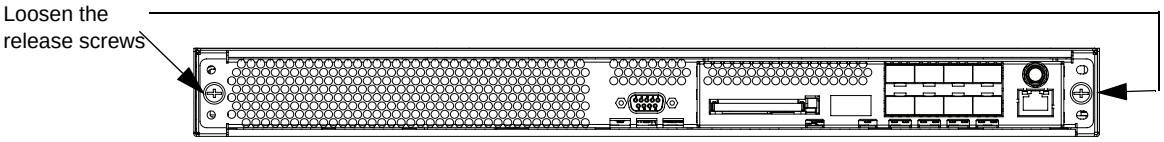


Figure 7-11. Loosen the GBP module release screws

5. Firmly grasping the screws, slide the GBP module out of the bay, as shown in Figure 7-12.

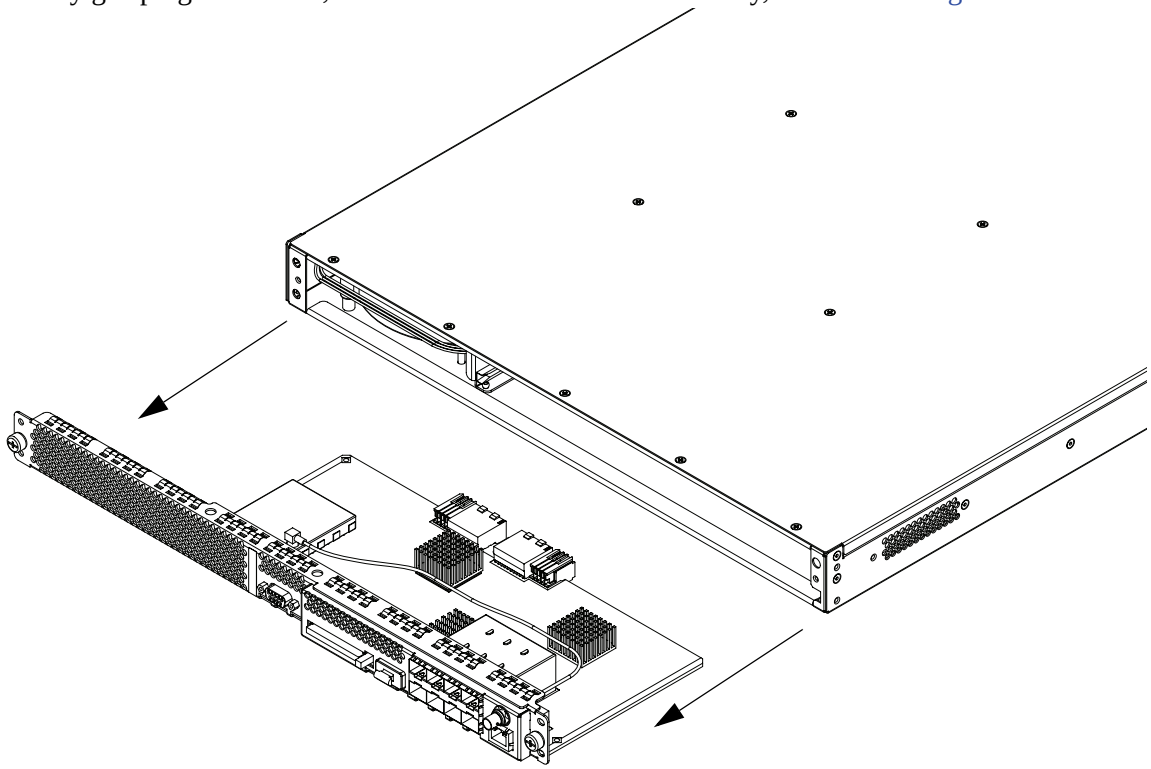


Figure 7-12. GBP module removal

Replacing a GBP Module

After you have removed the failed GBP module, replace it with the new one:

1. Grasp the module firmly by the edges only and slide it into the chassis, using the plastic guide rails to ensure proper seating.
2. Push until the module is firmly seated.
3. Using a Phillips screwdriver, tighten the insertion/removal screws to secure the GBP module to the SEP 48 chassis.
4. Replace the front bezel by snapping it in place.
5. Restore any cabling and power up the unit.

Replacing a Strip Processor (STP) Module

Caution: The order in which STP modules are inserted is important to maintain proper air flow and temperature.

- If you are replacing all existing STP modules, replace them in the order described in “Rear Panel” on page 2-7, beginning with slot A.
- If you are adding a new STP module to an existing but underpopulated chassis, insert the card into the next designated slot (A through D, excluding C).
- If you are replacing a failed unit, simply replace that unit regardless of the slot it occupies.

Removing an STP Module

1. Shut down the unit by removing the power cable from the power supply connector.
2. Remove any cabling from the RF ports on the STP module.
3. Using a Phillips screwdriver, loosen—but do not remove—the insertion/removal screws, shown in Figure 7-13.

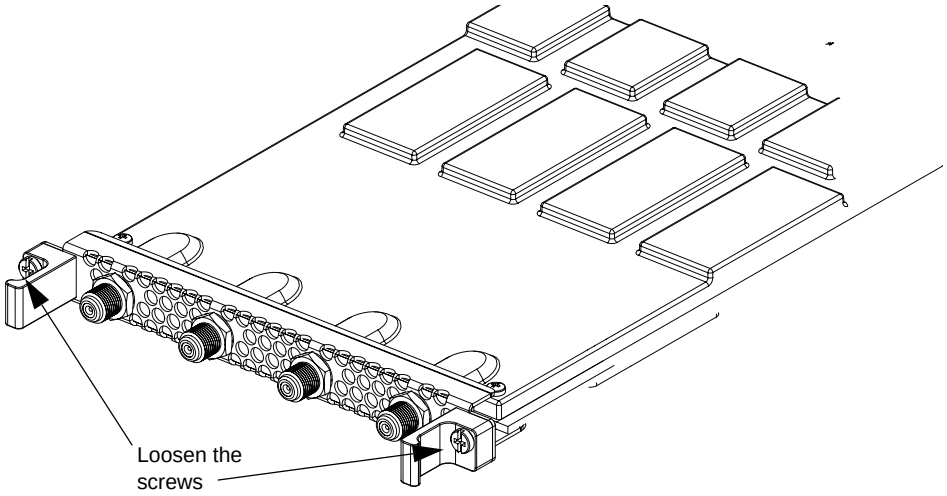


Figure 7-13. Loosen the insertion/removal screws

4. Using the handles on either side of the module as a grip, gently but firmly slide the module out of the chassis, as shown in Figure 7-14.

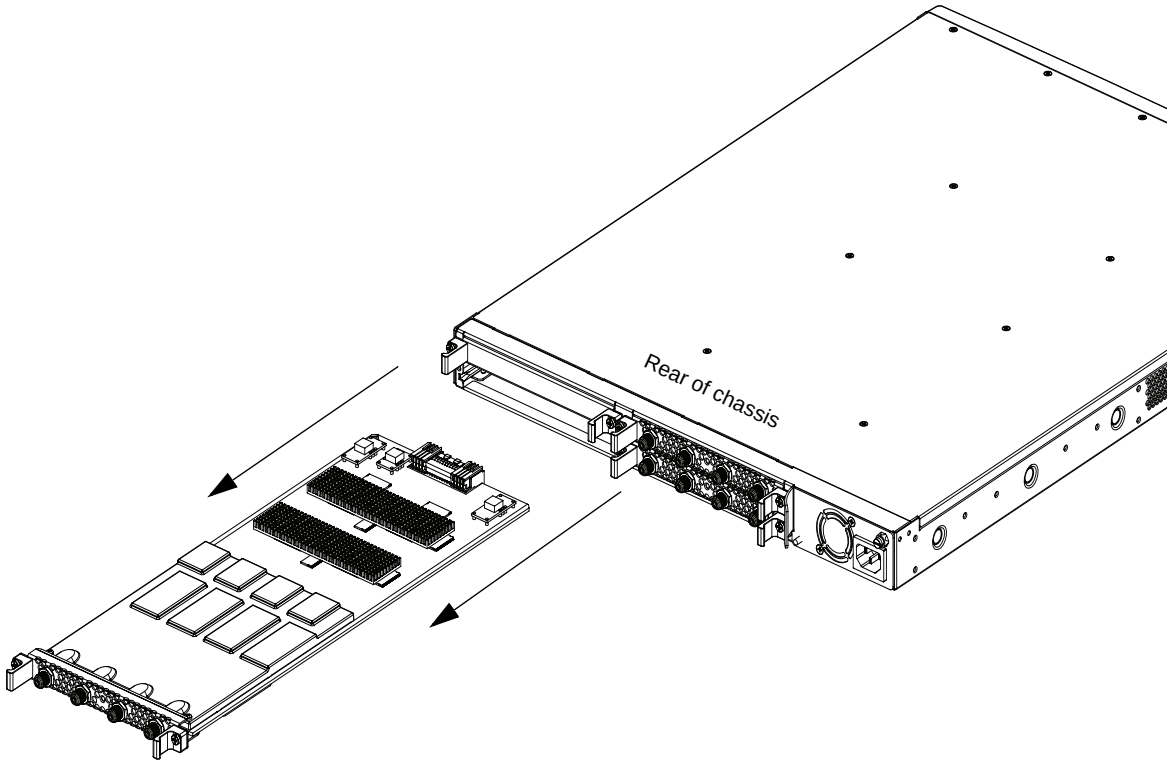


Figure 7-14. Remove the STP module

Replacing an STP Module

After an STP module has been removed, replace it as soon as possible, or install a blank slot cover to ensure proper air flow.

If you are leaving an empty slot, move the remaining STP modules into the proper slot order: A, B, D. Install the blank slot cover in the D slot first, then B, then A. Slot C is not used for STP modules and should be fitted with a blank cover.

To install an STP module:

1. Firmly hold the card by the edges or the handles and slide it into the chassis, using the plastic guide rails to ensure proper seating.
2. Press firmly until the module seats in the chassis.

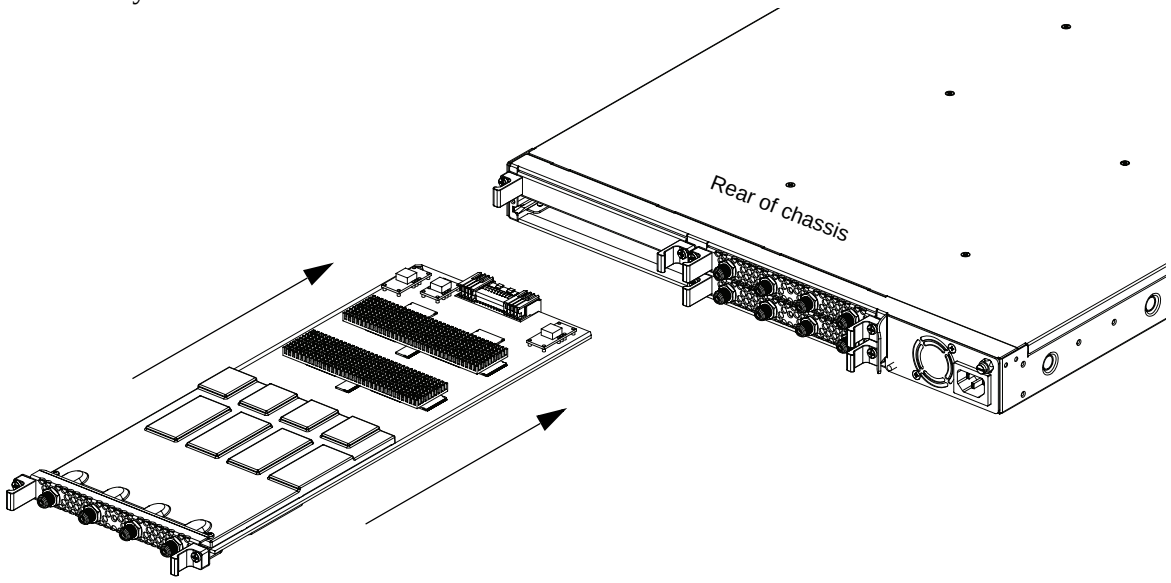


Figure 7-15. Install the STP module

3. Using a Phillips screwdriver, tighten the insertion/removal screws to attach the card to the chassis.
4. Restore any cabling and power up the unit.
5. Reboot the system as described in “Rebooting the System” on page 4-21.

CHAPTER 8

Redundancy and the RDS

The Redundant Docking Station (RDS) greatly simplifies a one-to-one fully-redundant design with no additional wires, connections, or power sources. The units monitor each other with active heartbeats. If a primary unit fails and the heartbeat is not detected, RDS initiates an immediate switchover to the secondary unit.

The design of the docking station allows for removal and replacement of a failed unit without the need for any RF rewiring.

In a redundant configuration and when using the RDS, only the primary unit must be configured. The secondary SEP 48 detects the configuration from the primary unit, via the network interface. This communication between units simplifies the configuration of the redundant pair and ensures that the pair's configuration is synchronized.

RDS is for use only with RGB Networks' SEP 48.

Two SEP 48 chassis are installed in the Redundant Docking Station (RDS) for failover protection. The RDS is fully passive.

In this chapter you will learn about:

Failover

For any mission-critical application, failover—that is, one-to-one chassis redundancy—is highly desirable. The SEP 48 RDS is an easy-to-manage way to ensure that the SEP 48 has no single point of failure.

By installing two SEP 48 chassis into a single docking station, the workload on a failed unit is moved to the redundant unit until a replacement can be made. This ensures that there is no down time in the streaming. At least one unit is always available as long as any failed units are promptly replaced.

Note: The RDS is not used for load balancing.

Installing the RDS in the Rack

Before you begin, make sure that all safety precautions described in “Rack Mounting the SEP 48” on page 3-2, “Grounding the SEP 48” on page 3-6, and “Applying Power to the SEP 48 (AC Power Supply)” on page 3-7 are met.

Caution: A fully populated RDS is heavy. Always install the empty RDS chassis and then install the SEP 48 units into the mounted chassis.

The RDS is mounted in a 3 RU space of a standard 19-inch rack. Use rack mount brackets (included) to attach the RDS to the front and rear of the rack, as shown in Figure 8-1.

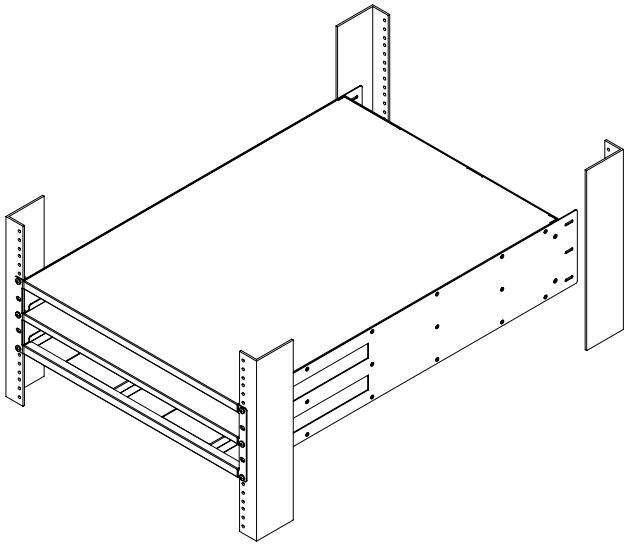


Figure 8-1. Rack mounted docking station

To install an RDS into a rack:

1. Before you begin, inspect the rack to ensure that the environmental conditions are met, and that adequate power is available to the unit. No power is applied until the SEP 48 chassis are installed, however. For a complete description of the operating and environmental requirements, see “Environmental Limitations” on page 9-1.

2. Making sure that the chassis is level in the rack, secure the front of the RDS to the rack, using the screws provided, as shown in Figure 8-2.

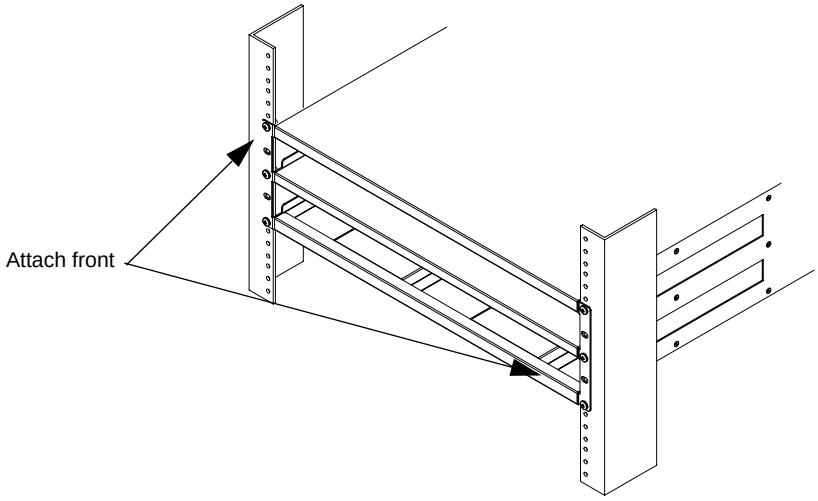


Figure 8-2. Securing the front of RDS to the rack

3. Use the provided screws to attach rear rack mount extensions to the left and right rear of the RDS chassis, as shown in Figure 8-3.

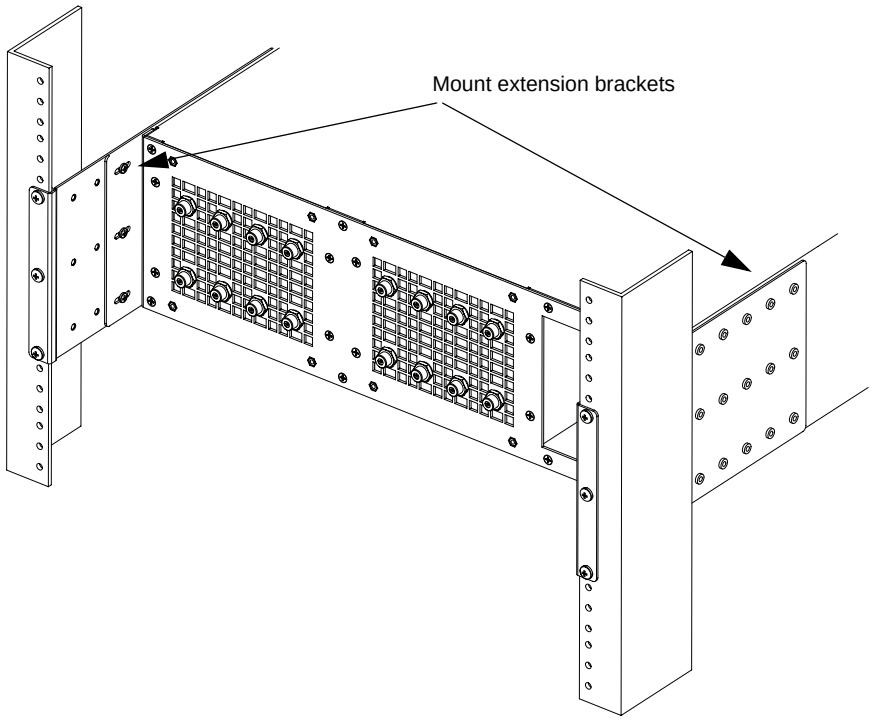


Figure 8-3. Installing rear rack mount brackets

4. Secure the rear of the RDS to the rack using three screws on each side, as shown in Figure 8-4.

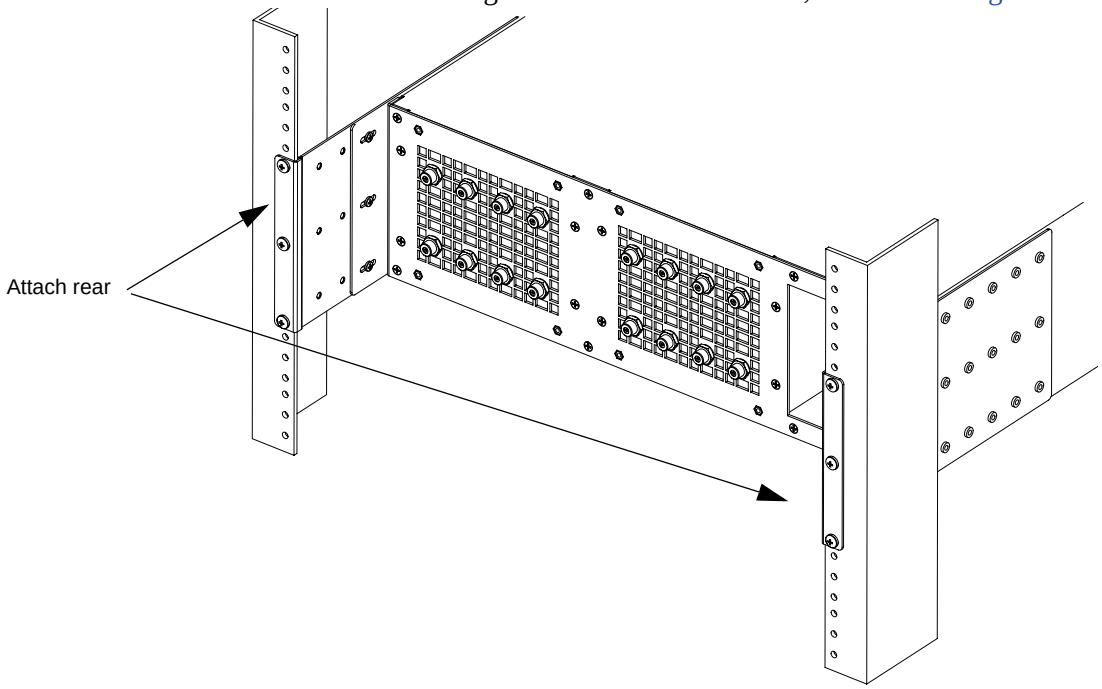


Figure 8-4. Securing the RDS rear to the rack

Caution: Never place heavy objects directly on top of the RDS chassis.

Alternate Rack Mount Procedure

Use this method for mounting the RDS into a reduced-depth rack.

1. Install the RDS rear rack shelf to the rear mounting rails of the rack using three screws on each side, as shown in Figure 8-5.

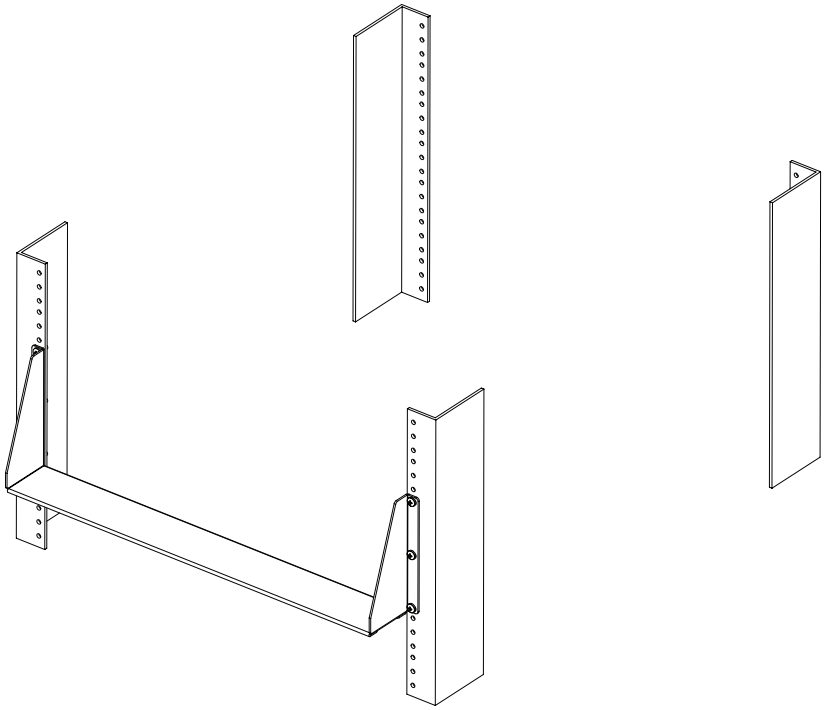


Figure 8-5. Rear rack shelf

2. Install the RDS chassis in the rack.

   The rear edge of the chassis will rest on the rear rack shelf. Secure the front of the chassis to the rack using three screws on each side, as shown in Figure 8-6.

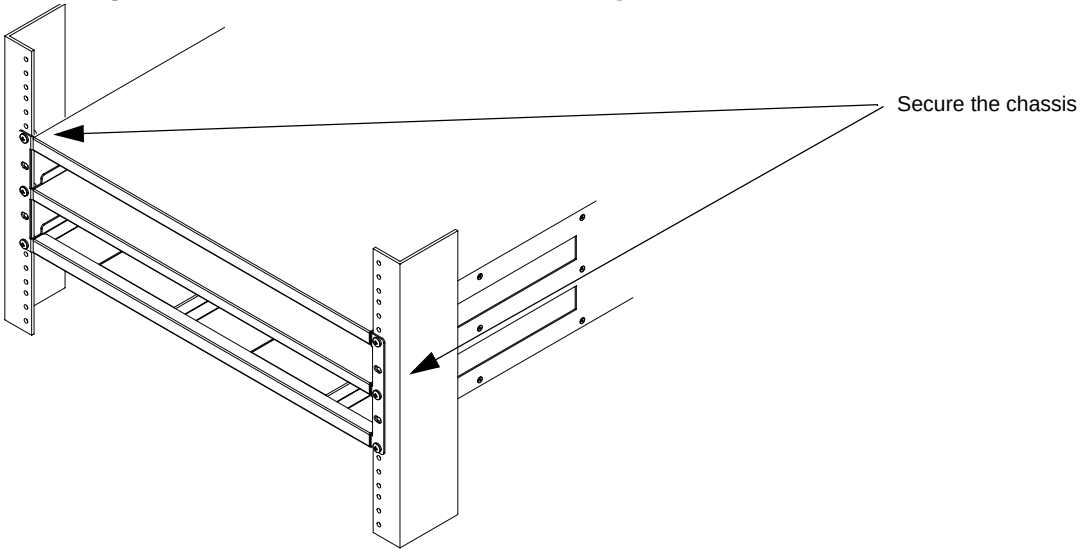


Figure 8-6. Secure front of chassis

Installing Two SEP 48 Chassis into the RDS

Note: If you have installed a rack mount kit on your SEP 48 unit (for example, you are reusing an existing mounted chassis), remove the rack mount brackets *before* installing the chassis into the RDS.

1. Make sure that the RDS is installed firmly into the rack, and that the rack is adequately balanced.
2. Remove the first SEP 48 chassis from its packing and carefully inspect it for damage.

   Never insert a damaged unit into the RDS.
3. Using the provided screws, attach the provided front insertion/removal handle to the SEP 48 chassis, as shown in Figure 8-7.

   Using three provided screws, attach one handle on the left. Repeat this step to attach a handle on the right. The handle is not keyed to a left- and right-only; each handle can be installed on either side.

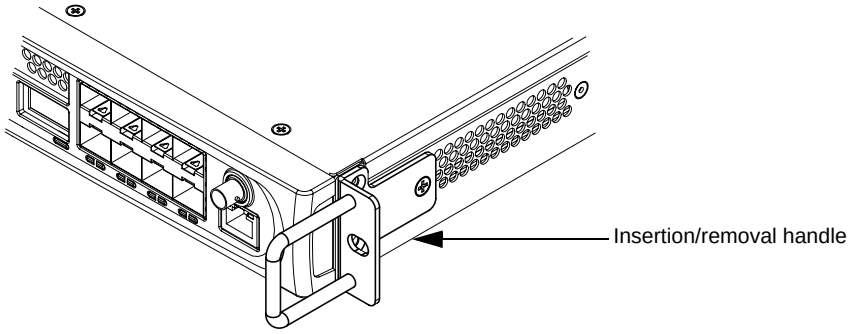


Figure 8-7. Attaching the handle

4. Attach one F-to-G adapter to each RF port in the rear of each SEP 48 chassis.

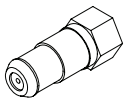


Figure 8-8. F-to-G adapter

5. Tighten the adapters by twisting to the right (clockwise), as shown in Figure 8-9.

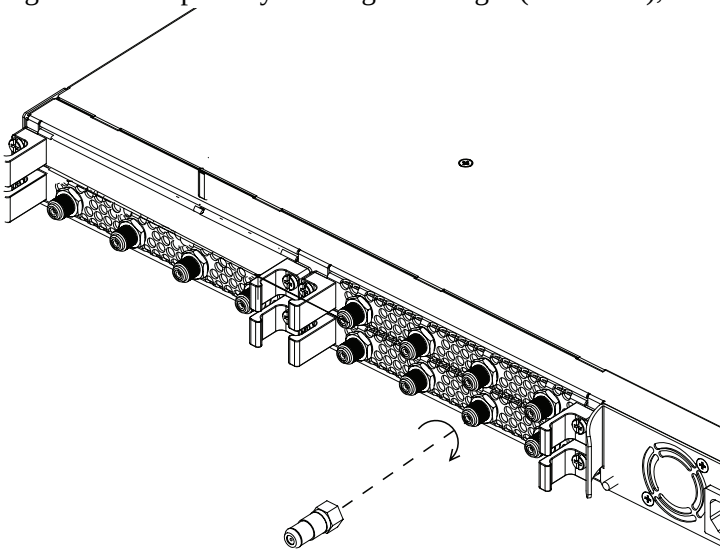


Figure 8-9. Tighten adapters

6. Slide the chassis into the upper bay, as shown in Figure 8-10.

   Make sure that the chassis is seated correctly into the guides on the sides of the docking station.

   Fully seat the chassis by pushing it firmly into place within the docking station. As you can see in the following figure, when installing a SEP 48 with a DC power supply, the power connectors extend beyond the RDS.

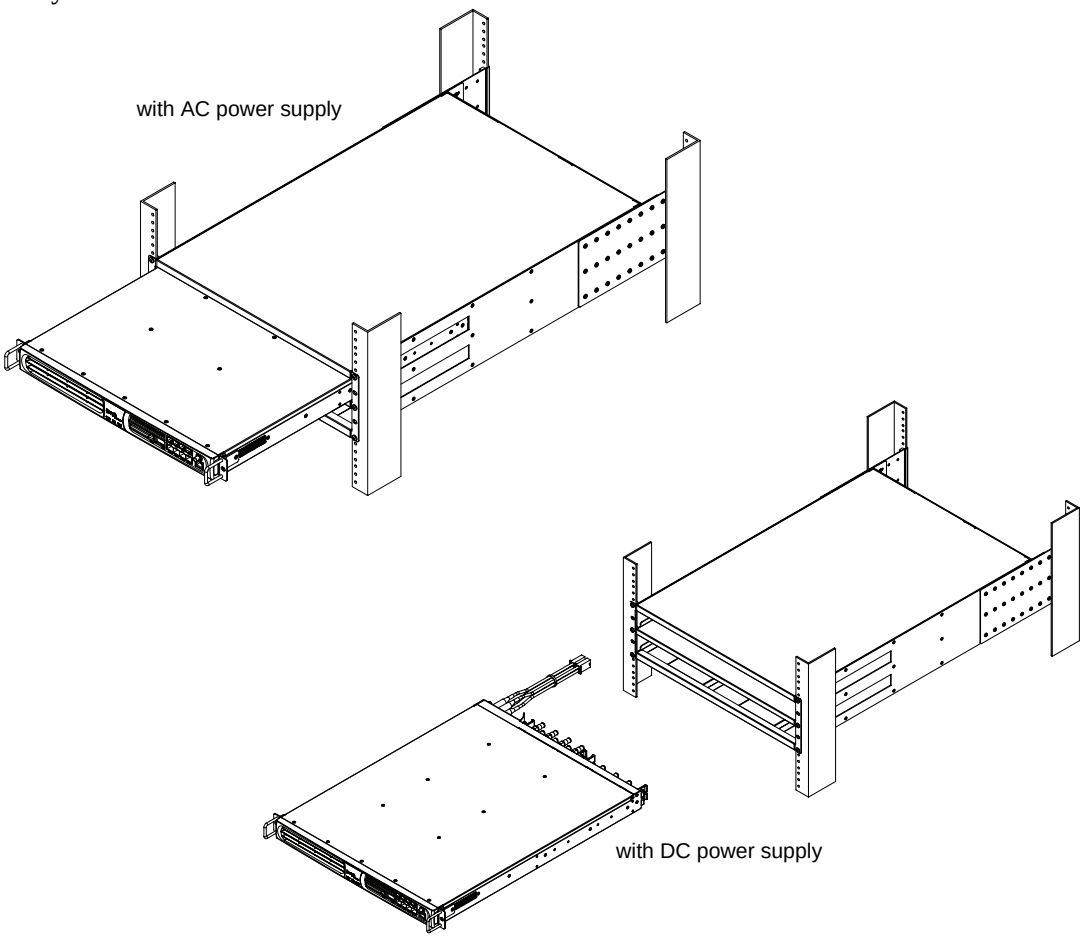


Figure 8-10. Inserting the SEP 48 into the Top RDS Bay
(AC power supply shown at top, DC power supply shown at bottom)

7. Attach the handles onto the second unit, as described in step 3.

8. Slide the second SEP 48 chassis into the lower bay, as shown in Figure 8-11.

Make sure that the chassis is fully seated in the docking station by pushing it firmly into place.

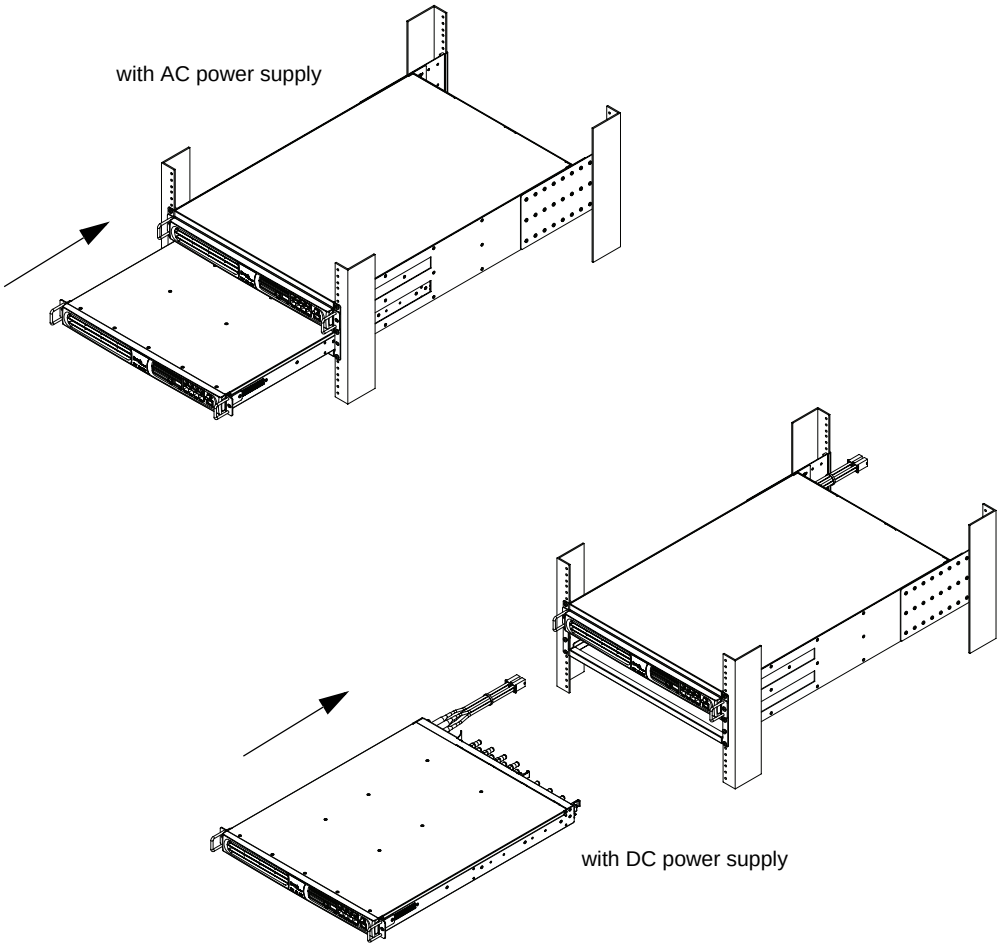


Figure 8-11. Inserting the SEP 48 into the bottom RDS bay

9. Secure both of the SEP 48 chassis into the RDS, using the provided screws, as shown in Figure 8-12.

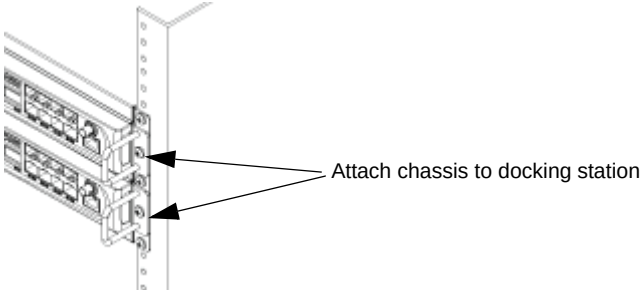


Figure 8-12. Attach the SEP 48 to the RDS

10. Move to the opening at the rear of the docking station and connect the power cords to both SEP 48 chassis.

Connect the power cord of the upper chassis bay to a power source first, then connect the lower unit.

The chassis LEDs should light up as the system receives power.

Figure 8-13 shows a fully populated redundant system.

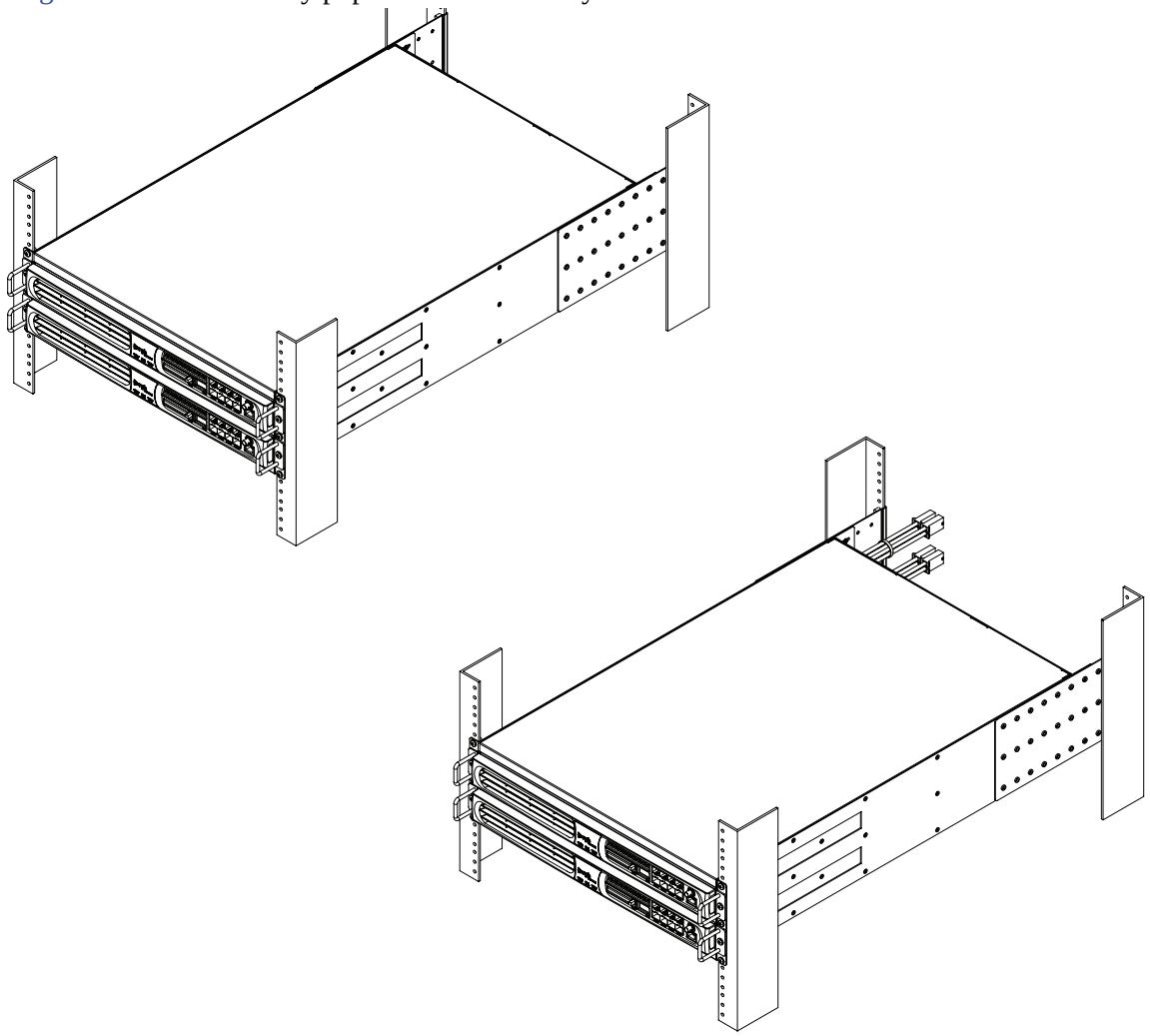
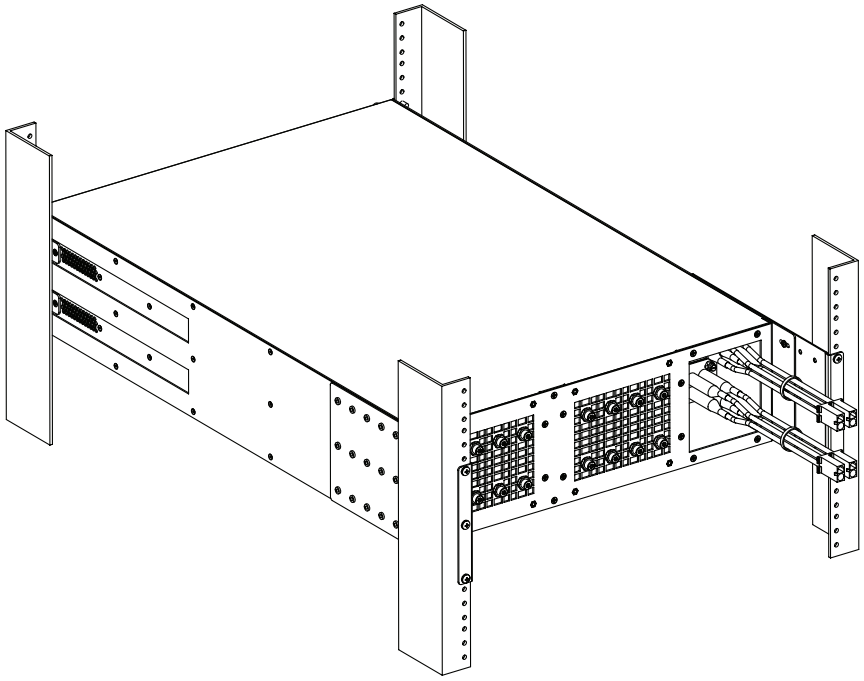


Figure 8-13. Redundant RDS (AC power supply at top, DC power supply at bottom)

11. If you are using SEP 48s with DC power supplies, the cables will extend beyond the end of the rack mount, as shown in the following figure.



12. Cable the primary SEP 48 chassis as you normally would, and configure the SEP 48 units as described in Chapter 4, "System Configuration."

The primary chassis now communicates with the secondary chassis via a heartbeat. If this heartbeat is lost, the secondary SEP 48 initiates the failover protection and takes over streaming until the primary unit is restored.

After you replace the chassis in the primary bay and restore power to the replaced SEP 48, rebooting the secondary chassis returns control to the primary unit. To determine the current role of a SEP 48, check the LEDs as described in "LEDs in a Redundant System".

LEDs in a Redundant System

The primary Light Emitting Diodes (LEDs) visible on the front of the SEP 48 chassis are shown in Figure 8-14. This section describes the LEDs as they appear in a redundant system. The three system

LEDs have a different meaning when the SEP 48 is installed in a single (non-redundant) configuration. Single-system LEDs are described in "LED Indicators" on page 2-6.

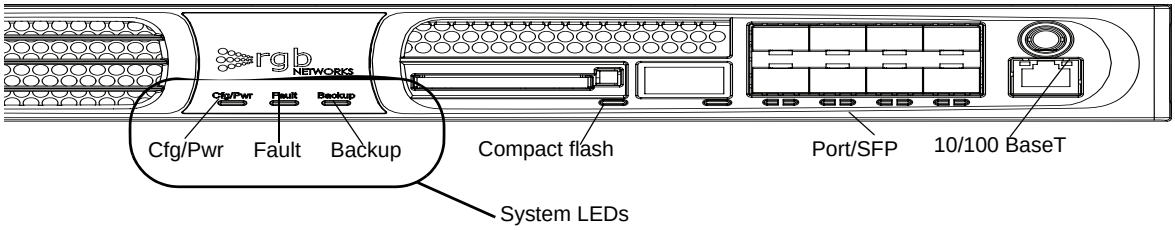


Figure 8-14. LEDs in an RDS system

Use Table 8-1 along with the figure to determine the SEP 48 status.

Table 8-1. LED indicators

LED	Color	Indication
CFG/PWR	Off	No power to chassis
	Solid Green	The host FPGA configuration is loaded
	Solid Red	Chassis is powering up and configuration load is in progress
Fault	Solid	No activity
	Blinking Green	Video stream detected
	Blinking Orange	No video stream detected
	Blinking Red	Hardware faults are present
Backup	Solid Green	Unit has taken the active (primary) role
	Solid Orange	Unit has taken the standby role
	Solid Orange/Black	Initialization is in progress
Compact flash[a]	Blinking Green	Loading FPGA bit stream
	Solid Green	Compact flash OK
	Blinking Red	Compact flash not installed
	Solid Red	Error is present

a. Compact flash is necessary for loading code and saving configuration.

Configuring the Redundant Chassis

Because the redundant SEP 48 chassis takes its configuration settings from the primary SEP 48, you cannot set all configuration options for the non-primary unit. The only configurable setting for this unit is the IP address.

1. Launch the Element Manager and log in to the secondary SEP 48 chassis, as shown in Figure 8-15. By default, the IP address for a SEP 48 is 10.1.1.1.

   Enter the necessary SNMP settings.

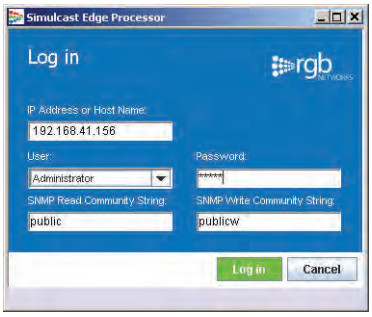


Figure 8-15. Element Manager login

   By default, the Element Manager now opens to display the RF Configuration tab.

2. Select the Configuration tab, and then choose **Global**.

   Because the chassis is not yet configured as a redundant unit, the Element Manager displays the Global Configuration window.

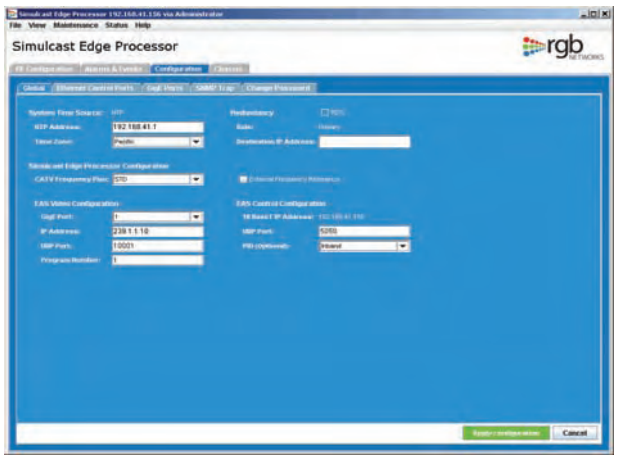


Figure 8-16. Set redundant IP address

3. Type the IP address for the redundant chassis in the Destination IP address field.
4. Click **Apply**.

Using Element Manager to Monitor the RDS Units

When you use the Element Manager to monitor multiple SEPs in an RDS chassis, the Element Manager provides additional screens specific to RDS monitoring. These screens are described here.

When configured in a redundant one-to-one chassis configuration, the Element Manager includes additional screens for monitoring the secondary (nonprimary) unit. All RDS secondary chassis information (except the IP address) is read-only: you cannot change the configuration.

You view the monitoring windows in exactly the same manner as in a non-redundant configuration. Because the redundant SEP 48 units share configuration information, most of the settings are identical between chassis. One exception is the system status. For this window, information about both chassis is visible.

1. To view system information, log in to the Element Manager using the IP address of the secondary (standby) SEP 48 and select **Status** >**System Information**.

   The System Information window appears. This information is read-only by all users, and cannot be changed.

   Use this window to view the results of the Diagnostic Tests feature.

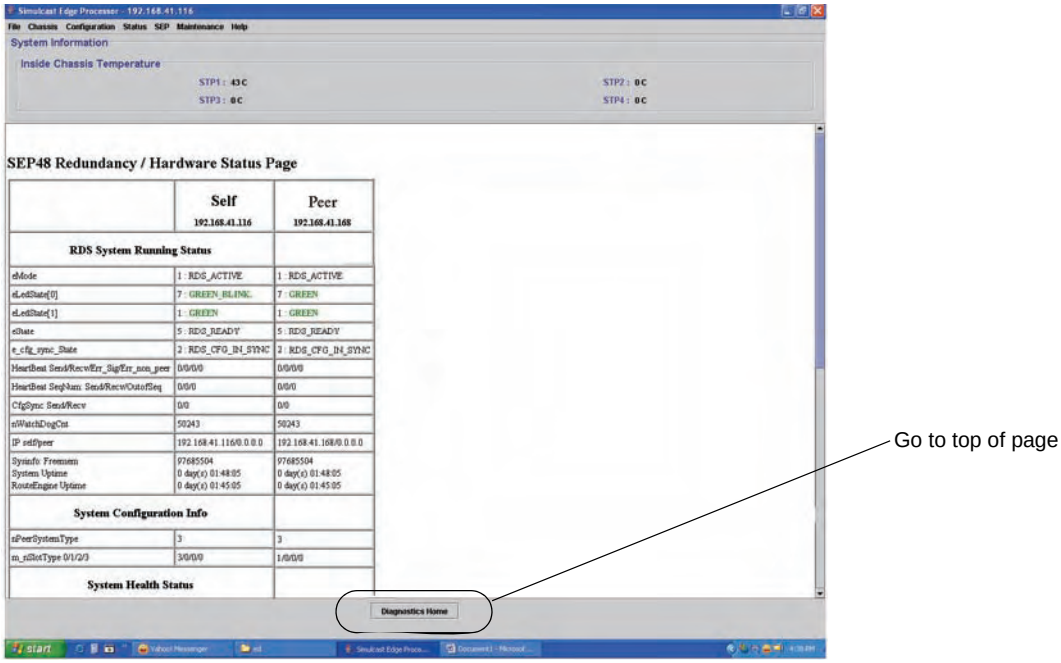


Figure 8-17. System Information

2. To view the redundant chassis Ethernet port information, tab to Configuration and select Ethernet Control Port Configuration.

   The Ethernet Control Port Configuration window appears.

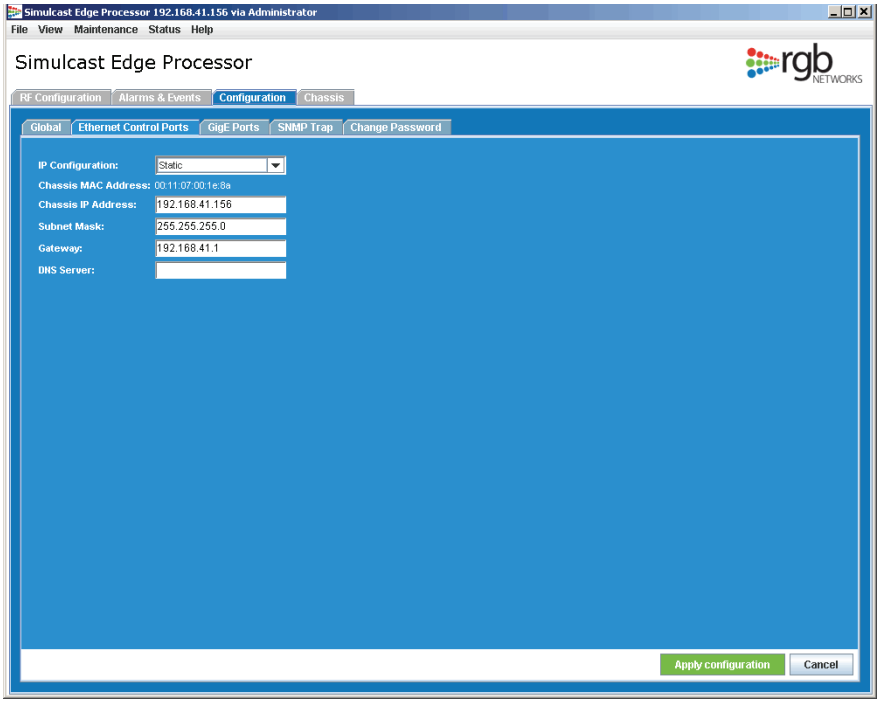


Figure 8-18. Ethernet control port information

3. To set the GigE Port configuration information for a standby SEP 48 chassis, select the Configuration tab, and then the GigE Ports subtab.

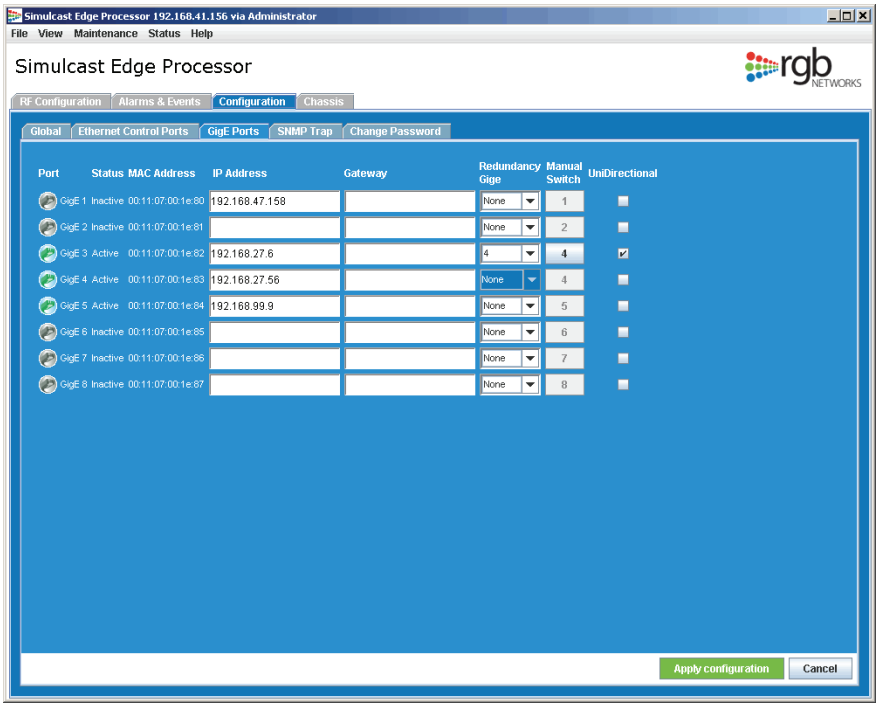
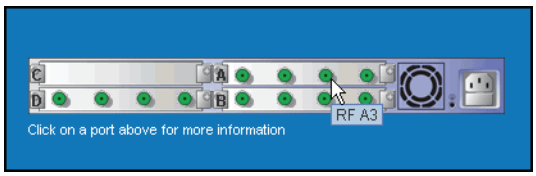


Figure 8-19. GigE port information

4. To view RF port configuration, select the Chassis tab and select an RF port.

   If you are not sure which port you are looking at, hold the cursor over the port for a second - a tool tip appears with the port number.



   The RF port information appears.

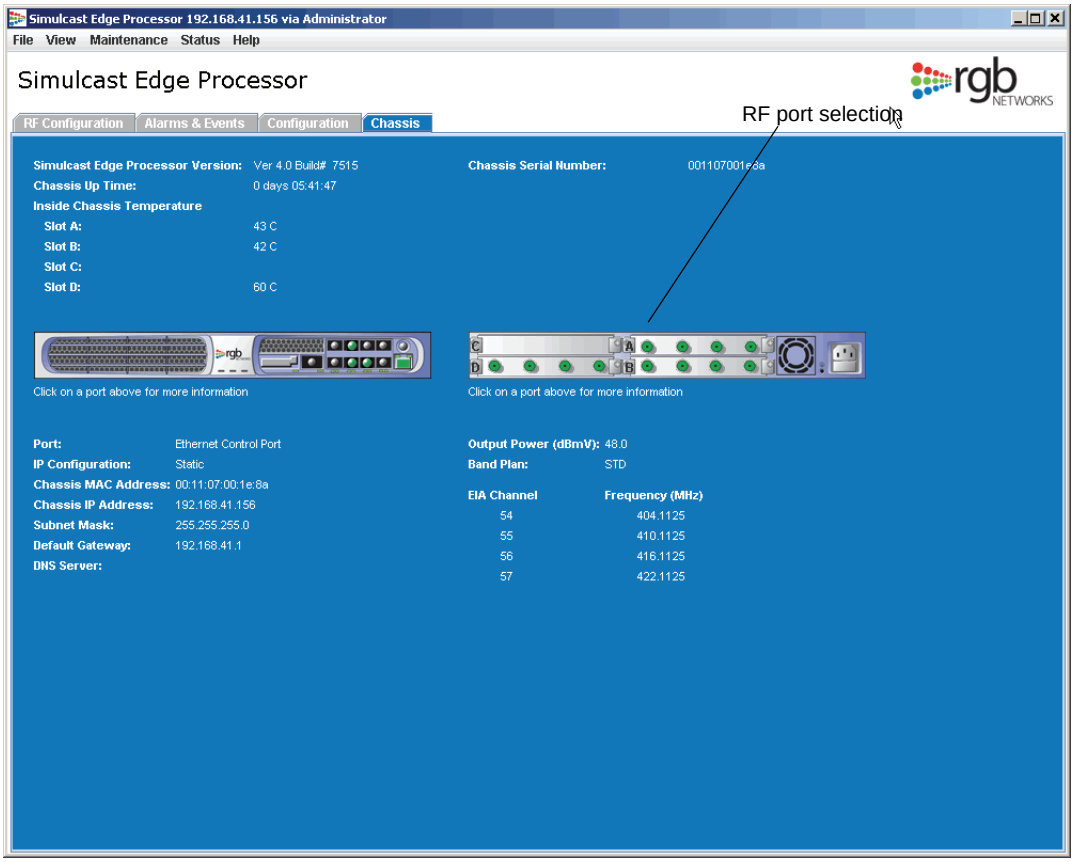


Figure 8-20. RF Configuration Window

5. Use the RF port selector to choose the RF port whose configuration you want to see.

   When an RF port is selected, the Element Manager displays the port configuration for that port. Selecting a different port updates the screen with the newly-selected port configuration.

   You can select any type of port to view the current configuration. To change configuration of a port, use the RF Configuration tab or the Configuration tab, depending on the port you want to reconfigure.

   To change the configuration, tab to RF Configuration.

CHAPTER 9

Specifications

This chapter provides the system specifications.

Electrical and Mechanical

Table 9-1. Electrical and mechanical

Parameter		Specification
Input Power	AC	AC: 100-127 VAC @ 5.0A and 200-240 VAC @2.5A
	DC	DC: 48V @ 14A
Line frequency		50Hz to 60Hz
Power Consumption		500 W maximum, 1000 W for 2 chassis in 1:1 redundancy mode in a Redundancy Docking Station (RDS)
Dimensions		1.75 in. H x 19 in. W x 23 in. L (43.6 mm H, 433 mm W, 583 mm L)
Weight		<30 lbs (11.34 kg)
MTBF		100,000 Hours

Environmental Limitations

Table 9-2. Environmental

Condition	Limits
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Temperature	0° to 40° C (32° to 104° F)
Humidity	5% to 95% (non-condensing)

Input Interfaces

Table 9-3. Input Interfaces

Parameter	Specification
Gigabit Ethernet	8 SFP interfaces with support for copper or optical
Fast Ethernet	1 10/100BaseT control and management interface

Output Interfaces

Table 9-4. Output Interfaces

Parameter	Specification
RF Interface	F-Type 75 Ω connector
Number of RF Interfaces	12 RF interfaces per chassis, 4 per STP module
Modulation	NTSC modulation, up to 4 NTSC channels per RF interface

MPEG Processing

Table 9-5. MPEG Processing

Parameter	Specification
Maximum number of streams	Up to 48 input streams decoded and modulated per chassis
Video processing	VBR and CBR, MPTS or SPTS
PCR correction	± 75 nsec
Jitter tolerance	± 100 msecs

Video Profiles

Table 9-6. Video

Parameter	Specification
MPEG-2 Level and Profile	MPEG-2, MP@ML
Resolution	720 x 480, 704 x 480, 544 x 480, 528 x 480, 352 x 480 at 29.97 fps

Audio Profiles

Table 9-7. Audio

Parameter	Specification
Audio Input Format	Dolby Digital (AC3) Primary AC3 5.1 or 2 channel stereo (downmixed to stereo) Secondary AC3 5.1 or 2 channel stereo (downmixed to mono)
Audio Output Format	Stereo analog audio primary Monaural secondary SAP
Audio Bit Rates	32 kbps to 448 kbps each, primary or secondary audio
Stereo Frequency Response	50 Hz to 14 kHz, ± 1dB
SAP Frequency Response	50 Hz to 10 kHz, ± 1dB
BTSC Stereo Audio Separation	Maintains stereo separation of minimum 30 dB from 100 Hz to 8 kHz and tapers off to 20 dB from 8 kHz to 12.5 kHz

RF Specifications

Table 9-8. RF specifications

Parameter	Specification
Center Frequency	54 to 830 MHz
Frequency Band Plan	STD, HRC, and IRC
Output Level Adjustment Range	44 to 58 dBmV for up to 2 NTSC channels per RF port 41 to 55 dBmV for up to 4 NTSC channels per RF port
Attenuation Step Size	0.5 dB
Output Impedance	75 Ω
Output Return Loss	> 8.5 dB for 5 to 50 MHz and 860 MHz to 1GHz
In-Band Gain Flatness	± 0.25 dB
Reference Input Return Loss	> 16 dB minimum
Reference Input Level	10 to 40 dBmV

Regulatory and Compliance

Table 9-9. Safety and Regulatory

Regulatory	Compliance
FCC	US: FCC Part 15 Sub-part B, Class A Canada: Class A ICES-003
Laser Safety	Class 1 Laser Product Complies with 21 CFR Chapter 1, Subchapter J, Part 1040.10. IEC Compliance – IEC60825-1: 1993, A1: 1997, A2:2001, IEC 60825-2: 2000 For continued compliance with the above laser-safety standards, only approved Class 1 laser transceiver modules from our approved vendor list should be installed in the product. See the RGB Networks web site at www.rgbnetworks.com for a list of approved vendors.
EMI/EMC	International Declaration of Conformity EMC Standards – EN55022, EN55024, EN50083-2, CISPR-22, CISPR-24, CISPR-13 EU EMC Directive 89/336/EEC, 93/68/EEC IEC60950 + A1: 1992 + A2: 1993 + A3: 1994 + A4: 1996, IEC60065 NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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, 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. CANADA: This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme a la norme NMB-003 du Canada.
Safety	UL, TUV

Laser Caution Statement (CDRH-US)

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Glossary

This glossary defines the acronyms common in the video industry, and used in this guide. It is not all-inclusive but serves as a reference.

Numeric

3DES Triple Data Encryption Standard. A mode of DES that encrypts data three times. Three 64-bit keys are used, for an overall key length of 192 bits.

A

AES Advanced Encryption Standard. AES is a privacy transform for IPSec and Internet Key Exchange, and is replacing the Data Encryption Standard (DES). AES offers a larger key size and a variable key length.

ARP Address Resolution Protocol. ARP broadcasts a packet containing the IP address that the sender specifies to all hosts attached to an Ethernet connection. When the target recognizes that the IP address is its own, it returns a response.

ASI Asynchronous Serial Interface. ASI extends the functionality from strictly a video/audio-bounded device to a transport stream-based system that can store data in either a single program stream or a set of multiple program streams.

ATSC Advanced Television Systems Committee. ATSC is working to coordinate television standards among different communications media. ATSC is also developing digital television implementation strategies.

C

CA Conditional Access. Conditional access is an encryption/decryption management method by which a broadcaster controls a subscriber's access to services.

CAS Conditional Access Systems. These are systems that ensure broadcast service is accessible only to those entitled to access, usually by scrambling or encrypting the service.

CBR Constant Bit Rate. Constant bit rate encoding ensures that the rate at which a codec's output is consumed is constant. Because it is the maximum bitrate that matters, CBR is useful for streaming multimedia content on limited capacity channels. See also VBR.

CSA Common Scrambling Algorithm.

D

DCCT Direct Channel Change Table, part of 9 tables in the ATCS PSIP. The DCCT instructs the receiver to change channels based on viewer preferences, demographics or geographical location. This table works with a DCCSDT in the set top box.

DCCSDT DCC Selected Code Change Table, part of 9 tables in the ATCS PSIP.

DES Data Encryption Standard. DES specifies a FIPS approved cryptographic algorithm as required by FIPS 140-1. Encrypting data converts it to an unintelligible form called cipher. The cryptographic security of the data depends on the security provided for the key used to encipher and decipher the data. Data can be recovered from cipher only by using exactly the same key used to encipher it.

DET Data Event Table, part of 9 tables in the ATCS PSIP. The DET announces the data portion of a video/audio/data event when the data event does not match the exact duration of an video/audio event.

DHCP Dynamic Host Configuration Protocol. DHCP servers let individual computers on an IP network extract their configurations. DHCP servers have no specific information about the individual computers until they request the information.

DOCSIS Data Over Cable Service Interface Specifications. Now known as CableLabs Certified Cable Modems. DOCSIS specifies modulation schemes and the protocol for exchanging bidirectional signals over cable.

DPI Digital Program Insertion. The digital splicing of one MPEG program (typically a commercial) into another based on digital cues within the MPEG transport stream.

DVB Digital Video Broadcast. A European set of defined transmission standards for digital broadcasting systems.

DWDM Dense Wavelength Division Multiplexing. A fiber-optic transmission technique using light wavelengths to transmit data parallel-by-bit or serial-by-character.

E

EAS Emergency Alert System. An operational structure for national and local emergency alerts used by broadcast, cable, and wireless cable.

ECM Entitlement Control Messages.

ECMG ECM Generator.

EIT Event Information Table, part of 9 tables in the ATCS PSIP. EITs are associated with a specific virtual channel in the VCT, contain event information, and point to the location of extended text in the ETT.

EM Element Manager. The graphical user interface for the SEP 48.

EMM Entitlement Management Message. A packet containing the information necessary to decrypt the picture.

EMMG Entitlement Management Message Generator. The component of the conditional access headend that delivers entitlements to the multiplexers.

EOD Everything-On-Demand.

ETT Extended Text Table, part of 9 tables in the ATCS PSIP. ETTs carry longer text messages than EITs for describing events and virtual channels.

F

FCC Federal Communications Commission. The agency that regulates communications services, including cable television, at the Federal level.

FPGA Field Programmable Gate Array. An array of logic gates that can be hardware-programmed to fulfill user-specified task.

FVOD Free-Video-On-Demand.

G

GigE Gigabit Ethernet. Ethernet which supports data transfer rates of 1 Gigabit (1,000 megabits) per second.

GBP Gigabit Ethernet Processor module used with the SEP 48.

GUI Graphical User Interface.

H

HD High Definition. High-resolution digital television combined with Dolby Digital surround sound (AC-3).

HFC Hybrid Fiber/Coax. A distribution system combining fiber and coax cable. An HFC system is used to distribute CATV signals into a neighborhood.

I

IGMP Internet Group Management Protocol. IP hosts use IGMP to register dynamic multicast group membership. Connected routers discover the group members using the same protocol.

IP Internet Protocol. The network layer for the TCP/IP Protocol Suite. It is a connectionless, best-effort packet switching protocol.

ITU International Telecommunication Union. An international organization through which governments and the private sector coordinate global telecommunications networks and devices.

J

JRE Java Runtime Environment. JRE is made up of the Java virtual machine, the Java platform core classes, and supporting files.

L

LED Light Emitting Diode. A semiconductor diode that emits light when current passes through it. LEDs are used as indicators.

M

MGT Master Guide Table, part of 9 tables in the ATCS PSIP. MGT provides program-identification (PID) locations so a receiver can find the other tables, and informs the receiver of changes or table updates.

MIB Management Information Base. MIB defines the variables needed by the SNMP protocol to monitor and control elements in a network.

MID SEP 48 chassis passive mid-plane.

MPEG Moving Pictures Experts Group. The standards group and the standard for compression and storage of motion video.

MPTS Multi-Program Transport Stream. A combined multiplex of video streams.

MUX Multiplexer. A device that both combines multiple data sources into a single data stream for transmission, and demultiplexes the single data stream into its composite forms.

N

NTP Network Time Protocol. A TCP protocol that assures accurate local time-keeping with reference to radio and atomic clocks, and can synchronize distributed clocks within milliseconds.

NTSC National Television System Committee. Committee that defined the current standard for analog color television in North America, as well as the name for the standard. The format is 525 lines in 4MHx of video bandwidth.

O

OOB Out-Of-Band.

P

PAT Program Association Table. A table ID that indicates the MPEG-2 SI packet type.

PCR Program Clock Reference.

PMT Program Map Table. A table ID that indicates the MPEG-2 SI packet type.

PSI Program Specific Information, as part of MPEG-2

PSIP Program and System Information Protocol. PSIP is a collection of nine tables that allow the DTV transport stream to provide information about a station's services and programming. These nine tables include:

Master Guide Table (MGT)
System Time Table (STT)
Virtual Channel Table (VCT)
Rating Region Table (RRT)
Event Information Table (EIT)
Extended Text Table (ETT)
Data Event Table (DET)
Directed Channel Change Table (DCCT)
DCC Selected Code Change Table (DCCSDT)

Q

QAM Quadrature Amplitude Modulation. This is the modulation technique used in systems carrying digital video.

QoS Quality of Service. Guarantees network bandwidth and availability for applications.

R

RF Radio Frequency. Television signals are modulated onto RF signals and are then demodulated by the television tuner.

RTP Real Time Protocol. RTP provides services such as payload type identification, sequence numbering, time-stamping, and delivery monitoring to real-time applications.

RU Rack Unit. A common increment of equipment space height. The height of 1 RU is 1.75 inches.

S

SAP Secondary Audio Program. A way to provide a second audio channel within a TV broadcast channel. Commonly used for stereophonic sound or bilingual audio tracks.

SCTE Society of Cable Telecommunications Engineers. An organization that develops training for cable television installers and engineers; SCTE is a standards-developing organization for the cable industry.

SD Standard definition.

SFP Small Form Factor Pluggable. An optical interface that is used in network switches for Fibre Channel, Gigabit Ethernet and InfiniBand.

SNMP Simple Network Management Protocol. A protocol used to monitor and control network devices, and to manage configurations, statistics collection, performance, and security

SPTS Single Program Transport Stream.

STP Strip Processor. The STP module is one of the units that comprise the SEP 48.

STT System Table Time. Allows a broadcaster to present time indicators to the consumer, ensuring that the time is synchronized.

SVOD Subscription-Video-on-Demand. This is a Video-on-Demand service offered by subscription, providing viewers with access to select programs from the libraries of featured cable networks.

T

TFTP Trivial File Transfer Protocol. TFTP uses UDP and is often used by servers to boot diskless workstations, X-terminals, and routers.

U

UDP User Datagram Protocol. A connectionless protocol that runs on top of IP networks. UDP provides a direct way to send over an IP network. It is used primarily for broadcasting messages over a network.

V

VBI Vertical Blanking Interval. A portion of a television signal that carries non-audio/video data, such as closed-caption text.

VBR Variable Bit Rate. VBR streams vary in bandwidth over time.

VCT Virtual Channel Table, part of 9 tables in the ATCS PSIP. The VCT contains a list of all the channels that are or will be online, along with their channel name and number. This table contains the set of data that enables a receiver to tune and locate the service being broadcast.

VOD Video-on-Demand. Video-on-demand systems allow users to watch video content over a network as part of an interactive television system, either by streaming or by download.

X

XFP 10 Gigabit Small Form Factor Pluggable (SFP). The XFP is a pluggable, hot-swappable optical interface for 10 Gigabit SONET/SDH, Fibre Channel, Gigabit Ethernet, and other applications. XFP modules are optical transceivers, typically 1310nm or 1550nm. Optical XFPs include digital diagnostics.

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