ExtremeSwitching™

E4G Routers Hardware Installation Guide

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Preface

Audience

This guide is intended for network administrators and equipment installers who are responsible for installing and setting up network equipment.

This guide assumes a basic working knowledge of:

- Standard equipment installation procedures, including remote location and electrical safety practices
- Local area networks (LANs)
- Ethernet concepts
- Ethernet switching and bridging concepts
- Routing concepts
- Time division multiplexing (TDM)
- Simple Network Management Protocol (SNMP)

See the *ExtremeXOS 21.1 User Guide* and the *ExtremeXOS 21.1 Command Reference Guide* for information about configuring Extreme Networks E4G series routers.

Note
If the information in an installation note or release note shipped with your Extreme Networks equipment differs from the information in this guide, follow the installation or release note.

Conventions

This section discusses the conventions used in this guide.

Text Conventions

The following tables list text conventions that are used throughout this guide.

Table 1: Notice Icons

Icon	Notice Type	Alerts you to...
	General Notice	Helpful tips and notices for using the product.
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.

Table 1: Notice Icons (continued)

Icon	Notice Type	Alerts you to...
	Warning	Risk of severe personal injury.
	New	This command or section is new for this release.

Table 2: Text Conventions

Convention	Description
`Screen displays`	This typeface indicates command syntax, or represents information as it appears on the screen.
The words **enter** and **type**	When you see the word "enter" in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
[Key] names	Key names are written with brackets, such as **[Return]** or **[Esc]**. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press **[Ctrl]**+**[Alt]**+**[Del]**
Words in italicized type	Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles.

Platform-Dependent Conventions

Unless otherwise noted, all information applies to all platforms supported by ExtremeXOS® software, which are the following:

- ExtremeSwitching® switches
- Summit® switches
- SummitStack™

When a feature or feature implementation applies to specific platforms, the specific platform is noted in the heading for the section describing that implementation in the ExtremeXOS command documentation (see the Extreme Documentation page at http://documentation.extremenetworks.com). In many cases, although the command is available on all platforms, each platform uses specific keywords. These keywords specific to each platform are shown in the Syntax Description and discussed in the Usage Guidelines sections.

Terminology

When features, functionality, or operation is specific to a switch family, such as ExtremeSwitching™ or Summit®, the family name is used. Explanations about features and operations that are the same across all product families simply refer to the product as the *switch*.

Getting Help

If you require assistance, contact Extreme Networks using one of the following methods:

- Global Technical Assistance Center (GTAC) for Immediate Support
  - Phone: 1-800-998-2408 (toll-free in U.S. and Canada) or +1 408-579-2826. For the support phone number in your country, visit: www.extremenetworks.com/support/contact
  - Email: support@extremenetworks.com. To expedite your message, enter the product name or model number in the subject line.
- GTAC Knowledge — Get on-demand and tested resolutions from the GTAC Knowledgebase, or create a help case if you need more guidance.
- The Hub — A forum for Extreme customers to connect with one another, get questions answered, share ideas and feedback, and get problems solved. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.
- Support Portal — Manage cases, downloads, service contracts, product licensing, and training and certifications.

Before contacting Extreme Networks for technical support, have the following information ready:

- Your Extreme Networks service contract number and/or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any action(s) already taken to resolve the problem
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this is a recurring problem)
- Any related Return Material Authorization (RMA) numbers

Providing Feedback to Us

We are always striving to improve our documentation and help you work better, so we want to hear from you! We welcome all feedback but especially want to know about:

- Content errors or confusing or conflicting information.
- Ideas for improvements to our documentation so you can find the information you need faster.
- Broken links or usability issues.

If you would like to provide feedback to the Extreme Networks Information Development team about this document, please contact us using our short online feedback form. You can also email us directly at internalinfodev@extremenetworks.com.

Related Publications

Hardware Documentation

- *E4G Series Routers Hardware Installation Guide*
- *Extreme Hardware/Software Compatibility and Recommendation Matrices*

- *Extreme Networks Pluggable Transceivers Installation Guide*
- *ExtremeSwitching X8 Series Switches Hardware Installation Guide*
- *ExtremeXOS 21.1 User Guide*
- *ExtremeXOS 21.1 Command Reference Guide*
- *ExtremeXOS 16.2 User Guide*
- *ExtremeXOS 16.2 Command Reference Guide*
- *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 21.1 or Later*
- *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier*
- *Environmental Guidelines for ExtremeSwitching Products*

1 Extreme Networks E4G Series Routers

The Extreme Networks E4G router family consists of the E4G-200 cell site routers (models E4G-200 and E4G-200-12x) and the E4G-400 cell site aggregation router.

These routers provide high-bandwidth capacity, highly accurate and flexible timing, and Operations Administration and Maintenance (OAM) capabilities that support service level agreement (SLA) metrics. They support time-division multiplexing pseudowire end-to-end emulation (TDM PWE3). PWE allows the simultaneous support of multiple generations of services (2G, 3G, and 4G) over the same Ethernet backhaul network without having to remove legacy T1/E1 equipment and incur associated costs.

Note
Unless otherwise noted, the term E4G-200 refers in this document to both models in the E4G-200 series: the E4G-200 and the E4G-200-12x.

The E4G-200 cell site router collects traffic from cell site towers for handoff to the mobile backhaul network. The E4G-200 router connects to the E4G-400 cell site aggregation router, which aggregates T1, E1, and Ethernet traffic for handoff to the mobile core.

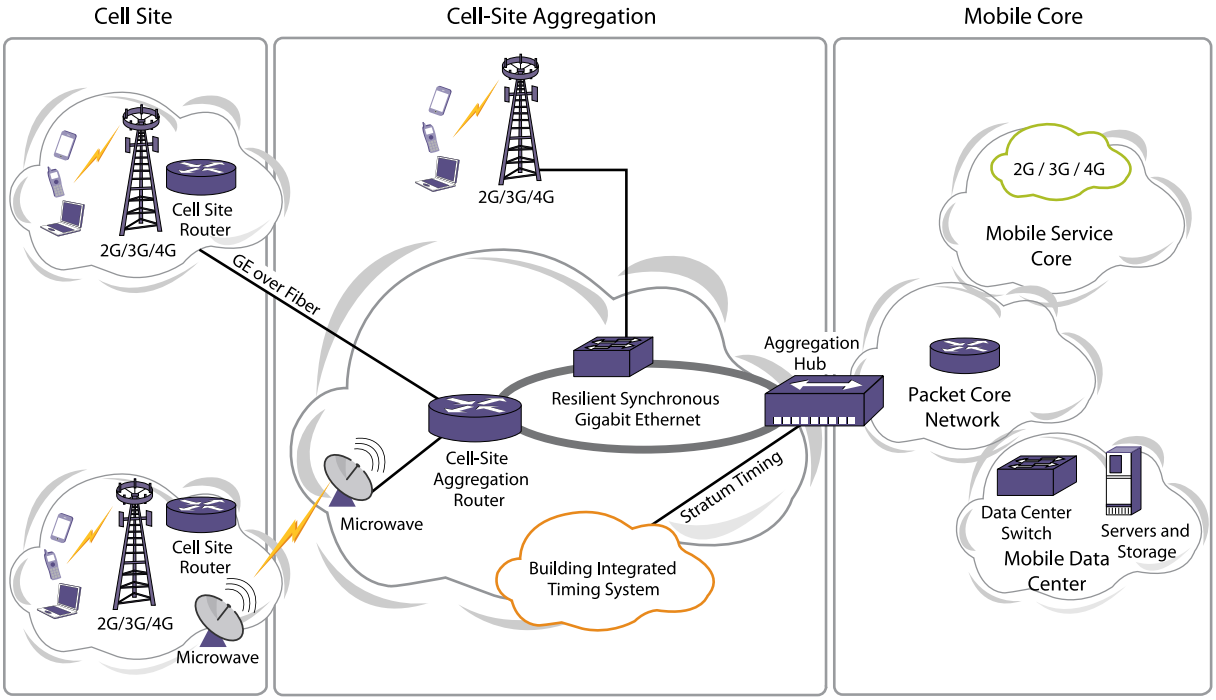

Figure 1: Mobile Backhaul Architecture

E4G-200 Cell Site Routers

The Extreme Networks E4G-200 routers provide 12 resilient synchronous Gigabit Ethernet ports and 16 T1/E1 ports in a compact (1RU or 1.75 inches high) unit.

Note

Unless otherwise noted, the term **E4G-200** refers in this document to both models in the E4G-200 series: the E4G-200 and the E4G-200-12x.

The Ethernet ports support both IEEE 1588v2 and Synchronous Ethernet (SyncE) timing, and the T1/E1 ports support time division multiplexing (TDM) timing. The router provides high-performance pseudowire capability, supporting both CESoPSN (channelized) and SAToP (unframed and unchannelized) TDM services. Deployed at the cell site, the E4G-200 cell site router collects traffic from 2G, 3G, and 4G radio towers for handoff to the mobile backhaul over fiber or microwave.

The E4G-200 extended temperature range of -40°C to +65°C allows service providers to deploy the E4G-200 router at sites without climate control.

Features:

- Management and console ports
- Eight 10/100/1000BASE-T (RJ-45) dedicated ports
- Four 100/1000BASE-X (SFP) ports

  These ports require Extreme Networks optical modules that are designed for use within the temperature range of the router.
- Slot for clock module

- Slot for T1/E1 module with 16 ports
- Grounding lug
- Redundant DC input power connectors

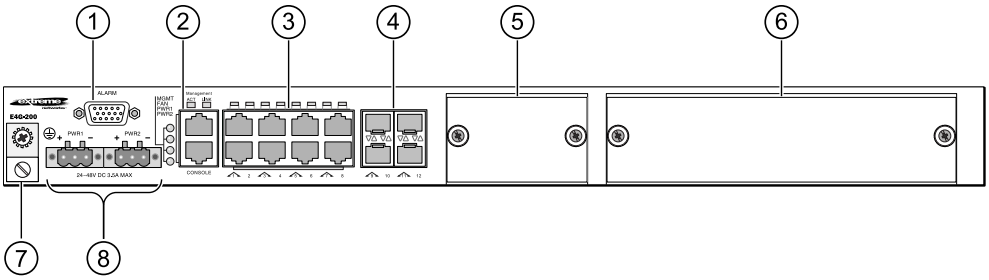

Figure 2: E4G-200 Cell Site Router Front Panel

1 = Alarms connection (inactive)	5 = Slot for E4G-200 CLK module
2 = Management and console ports	6 = Slot for F16T1E1 module
3 = RJ-45 dedicated ports	7 = Grounding lug
4 = SFP ports	8 = DC input power connectors

The E4G-200 router has an integrated DC power supply with dual feeds on the front panel. Power feed A can be connected to one power source and power feed B can be connected to a different power source to provide protection should either source of power fail. The power supply is not field-replaceable.

The back panel of the E4G-200 router provides an alternate attachment point for the grounding lug.

Status LEDs on the E4G-200 router are described in Table 3 on page 13.

E4G-200 Power Supply

The E4G-200 router has an integrated DC power supply with dual feeds on the front panel. Power feed A can be connected to one power source and power feed B can be connected to a different power source to provide protection should either source of power fail. The power supply is not field-replaceable.

The back panel of the E4G-200 router provides an alternate attachment point for the grounding lug.

E4G-200 Clock (CLK) Module

An optional clock module for the E4G-200 router provides timing. Timing is based on either:

- ITU-T Synchronous Ethernet (SyncE) protocol
- Precision Time Protocol based on the IEEE specification 1588v2

The clock module has four mini-BNC connectors providing Sync In/Sync Out timing interfaces and an RJ-45 connector that provides an RS-422 BITS-IN interface. Clock modules can be installed or removed without powering down the router, although a system reboot is required to initialize the module.

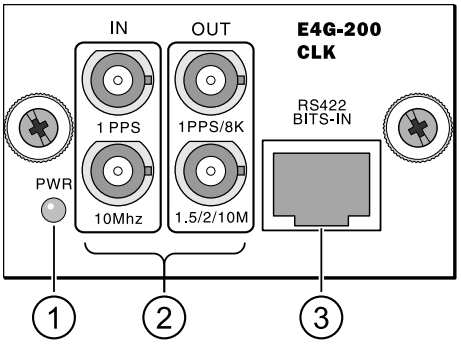

Figure 3: E4G-200 Clock Module

1 = LED	3 = BITS IN interface
2 = Sync In/Sync Out interfaces	

E4G-200 F16T1E1 Module

The F16T1E1 module for the E4G-200 router provides 16 T1/E1 ports implemented as RJ-45 connectors.

These ports support circuit emulations over industry-standard pseudowires, allowing the transformation of TDM cell sites to Ethernet/IP/MPLS cell sites. T1/E1 modules can be installed or removed without powering down the router, although a system reboot is required to initialize the module.

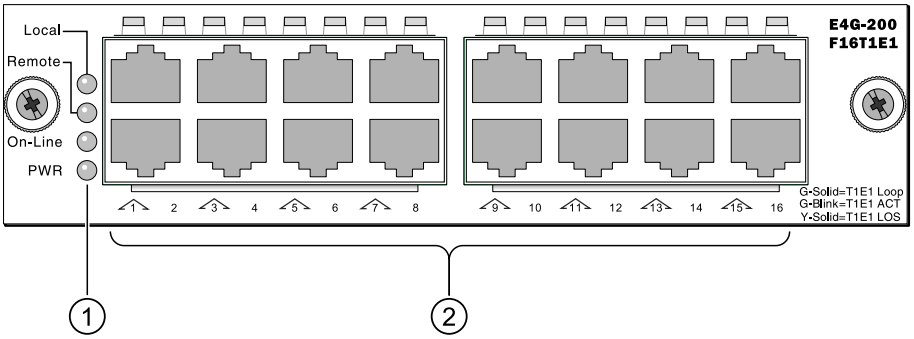

Figure 4: E4G-200 F16T1E1 Module

1 = LEDs	2 = T1/E1 ports

E4G-200 LEDs

The following tables describe the LEDs on the E4G-200 cell site router (models E4G-200 and E4G-200-12x).

Table 3: System LEDs

Label/type	Color/State	Meaning
MGMT	Steady green	Power-on self- test (POST) passed, normal operation
	Blinking green	POST in progress
	Amber	POST failed or system has overheated
	Off	No power
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-1, PSU-2	Steady green	Normal operation
	Blinking amber	Power failure
	Off	No power attached to this connector

Table 4: MGMT Port LEDs

Label/type	Color/State	Meaning
ACT	Blinking green	Packet transmitting or receiving
	Off	No packet transmitting or receiving
LINK	Blinking green	Link up
	Off	No link or port disabled

Table 5: Port LEDs

Label/type	Color/State	Meaning
Ports 1 – 8 (see note)	Steady green	Link exists
	Blinking green	Activity occurring
	Off	No link or port is disabled
Ports 9 – 12 (see note)	Steady green	Link exists
	Blinking green	Activity occurring
	Off	No link or port is disabled

Note

On model E4G-200 routers, LEDs for ports 1 – 8 are located above the ports and LEDs for ports 9 – 12 are located on SFP cages.

On model E4G-200-12x routers, LEDs for ports 1 – 12 are located on SFP cages.

Table 6: Clock Module LED

Label/type	Color/State	Meaning
PWR	Steady green	3.3 V power OK
	Off	No power

Table 7: F16T1E1 Module LEDs

Label/type	Color/State	Meaning
Local (Alarm LED)	Steady green	Local alarm active
	Blinking green	Local alarm active but silenced
	Off	No local alarm active
Remote (Alarm LED)	Steady green	Remote alarm active
	Blinking green	Remote alarm active but silenced
	Off	No remote alarm active
On-Line	Steady green	On line
	Off	Off line
PWR	Steady green	Normal operation
	Off	No power
Port LEDs (1 – 16)	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled

E4G-400 Cell Site Aggregation Router

The E4G-400 cell site aggregation router is a compact unit (1RU or 1.75 inches high) that enables networks to aggregate multiple Ethernet links from various cell sites and route the traffic to the mobile core.

The E4G-400 router provides 28 Gigabit Ethernet ports and port options for up to six 10-Gigabit Ethernet ports, as well as a 16-port T1/E1 module with pseudowire capability. The T1/E1 module is used where 2G and 3G radios are co-located at the aggregation site, and eliminates the need for separate cell site routers.

The Gigabit and 10-Gigabit Ethernet ports on the E4G-400 router support Synchronous Ethernet (SyncE) and IEEE 1588v2 timing. Integrated timing connectors on the front panel provide timing based on either the ITU-T Synchronous Ethernet (SyncE) protocol or the Precision Time Protocol based on IEEE specification 1588v2. Four mini-BNC connectors providing Sync In/Sync Out timing interfaces and an RJ-422 connector provides a BITS-IN interface.

The E4G-400 router has 4 shared ports. For each pair of shared ports, either the 10/100/1000BASE-T port (RJ45) or 100/1000BASE-X (SFP) port can be used as needed.

The E4G-400 router supports stacking using ports on installed port option cards at the back of the unit. Up to eight units can be connected into a single management entity that has up to 192 Gigabit Ethernet ports and up to 32 10-Gigabit Ethernet ports.

At the back of the unit are two bays for either AC or DC power supplies. One 300 W AC or DC power supply is included with the base unit. A redundant power supply must be ordered separately. You can mix any combination of 300 W AC and DC power supplies based on the need at the particular site. For example, you can have a DC main power feed and an AC input backup from an uninterruptible power supply (UPS).

The front panel of the E4G-400 router has the following features:

- Twenty 10/100/1000BASE-T (RJ-45) dedicated ports
- Four 100/1000BASE-X (SFP) or 10/100/1000BASE-T (RJ-45) shared ports
- Four 100/1000BASE-X (SFP) dedicated ports
- Timing interfaces
- BITS-IN interface
- Console port
- Stack number indicator
- Management and USB ports

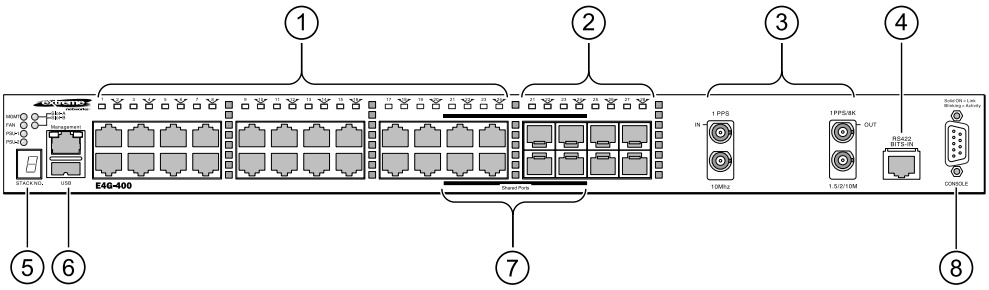

Figure 5: E4G-400 Front Panel

1 = RJ-45 ports	5 = Stack number indicator
2 = SFP ports	6 = Management and USB ports
3 = Timing connections (Mini-BNC connectors)	7 = Shared ports
4 = BITS IN connector (RJ-45 connector)	8 = Console port

The rear panel of the E4G-400 router (Figure 6 on page 16) has the following features:

- Slot A for one of the following optional cards:
  - XGM3S-2xf option card (2 XFP with Sync-E for stacking or data links)
  - XGM3S-2sf option card (2 SFP+ with Sync-E for stacking or data links)
- Slot B for one of the following optional cards:
  - XGM3SB-4sf option card (4 SFP+ with Sync-E for data links)
  - E4G-B16T1E1 module (2 MRJ21 with 8 TDM ports per MRJ21 connector)

  Cards in Slot A and Slot B are hot-pluggable.
- Hot-swappable fan tray
- Two bays for AC or DC power supplies

To provide redundant power to the router, you can install two AC power supplies, two DC power supplies, or a combination of an AC and DC power supply.

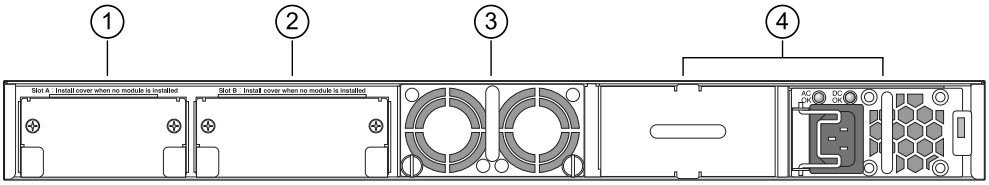

Figure 6: E4G-400 Back Panel

1 = Slot A	3 = Fan tray
2 = Slot B	4 = Power supply bays

E4G-400 Combination Ports

The E4G-400 cell site aggregation router provides four uplink ports implemented as combination ports that pair a copper port using RJ-45 connectors with an optical port using LC connectors.

The copper port operates as an autonegotiating 10/100/1000BASE-T port. The optical port allows Gigabit Ethernet uplink connections through Extreme Networks small form factor pluggable (SFP) interface modules.

The E4G-400 router supports automatic failover from an active fiber port to a copper backup or from an active copper port to a fiber port. If one of the uplink connections fails, the uplink connection automatically fails over to the second connection. To set up a redundant link on a combination port, connect the active 1000BASE-T and fiber links to both the RJ-45 and SFP interfaces of that port.

Gigabit Ethernet uplink redundancy on the E4G-400 router follows these rules:

- With both the SFP and 1000BASE-T interfaces connected on a combination port, only one interface can be activated. The other is inactive.
- If only one interface is connected, the router activates the connected interface.
- The router determines whether the port uses the fiber or copper connection based on the order in which the connectors are inserted into the router. When the router senses that an SFP and a copper connector are inserted, the router enables the uplink redundancy feature. For example, if you first connect copper ports 21 and 22, and then insert SFPs into optical ports 21 and 22, the router assigns the copper ports as active ports and the fiber ports as redundant ports.

Hardware identifies when a link is lost and responds by swapping the primary and redundant ports to maintain stability. After a failover occurs, the router keeps the current port assignment until another failure occurs or a user changes the assignment using the CLI. For more information about configuring automatic failover on combination ports, see the *ExtremeXOS 21.1 User Guide*.

E4G-400 LEDs

The following tables describe the LEDs on the E4G-400 cell site aggregation router.

Table 8: Front Panel LEDs

Type/Label	Color/State	Meaning
MGMT	Steady green	Power-on self test (POST) completed successfully; normal operation
	Blinking green	POST is in progress
	Amber	POST failed, or the system has overheated
	Off	No external power attached
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-1, PSU-2	Steady green	Normal operation
	Steady amber	Power is attached, but no power is on
	Blinking amber	Failure
	Off	No power is attached
Slot-A, Slot-B	Steady green	Port option card is installed in the indicated slot at the back of the router
	Off	No port option card is installed in the indicated slot at the back of the router

Table 9: 2-digit Stack Number Indicator

Type/Label	Color/State	Meaning
Left digit (1)	NA	Reserved for future use
Right digit (1 – 8) Indicates the position of this router in a stacked configuration.	Upper half blinking	This router is the stack master node
	Lower half blinking	This router is the stack backup node
	Lit steadily	This router is a standby node in the stack
Ethernet Ports 1 – 28	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled
Management Port	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled

Table 10: Back Panel

Type/Label	Color/State	Meaning
Port LED on installed XGM3S-2sf option card	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled

Table 10: Back Panel (continued)

Port LED on installed XGM3S-2xf option card	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled
Port LED on installed XGM3SB-4xf option card (S1 – S4)	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled
Port LED on installed E4G-B16T1E1 module (1 – 16)	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled

E4G-400 Power Supplies

The E4G-400 router is compatible with the following power supplies:

- 300 W AC power supply (model number 10930A)
- 300 W DC power supply (model number 10934A)
- 300 W DC power supply (model number 10933)

An E4G-400 router accommodates one or two 300 W power supplies. You can combine AC and DC power supplies in the same E4G-400 router. In a redundant power configuration, both power supplies are fully fault-tolerant and load-sharing. You can remove one power supply without interrupting router operation.

Note

An AC power input cord is not provided with a 300 W AC power supply. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Supplies for the E4G-400 Router on page 103.

Table 11: 300 W AC Power Supply LEDs

LED Label and Color		Meaning
AC IN OK Green	DC Out OK Green/red bicolor	
Off	Off	No AC input power
Off	Steady red	No AC input power; receiving standby output from system
On	Off	AC input good; 12 V output is disabled Standby output is ON
On	Steady red	AC input good; fault in 12 V output

Table 11: 300 W AC Power Supply LEDs (continued)

LED Label and Color		Meaning
AC IN OK Green	DC Out OK Green/red bicolor	
On	Flashing green and red	AC input good, 12 V output good Power supply alert: power supply is likely to fail because of a developing fault, such as abnormal thermal conditions or poor fan performance
On	Steady green	AC input good; DC outputs good

Note
The model 10933 is the recommended DC power supply.

Table 12: 300 W DC Power Supply (models 10934A and 10933) LEDs

LED Label and Color		Meaning
AC IN OK Green	DC Out OK Green/red bicolor	
Off	Off	No DC input power
Off	Steady red	No DC input power; receiving standby output from system
On	Off	DC input is good; 12 V output is disabled Standby output is ON
On	Steady red	DC input is good; fault in 12 V output
On	Flashing green and red	DC input is good, 12 V output is good Power supply alert: power supply is likely to fail because of a developing fault, such as abnormal thermal conditions or poor fan performance
On	Steady green	DC input is good; DC outputs are good

Optional Port Cards for the E4G-400 Router

The rear panel of the E4G-400 router has two slots for installing optional port cards.

Slot A accommodates either of the following option cards:

- XGM3S-2sf Option Card on page 19
- XGM3S-2xf Option Card on page 20

Slot B accommodates either of the following option cards:

- XGM3SB-4sf Option Card on page 20
- E4G-B16T1E1 Module on page 21

XGM3S-2sf Option Card

The XGM3S-2sf option card allows you to add one or two 10-Gigabit SFP+ optical ports to slot A on the rear panel of an E4G-400 router.

These ports support synchronous Ethernet and can be used for stacking connections or data links. The XGM3S-2sf option card supports either SFP+ optical modules or an SFP+ direct-attach passive copper cable.

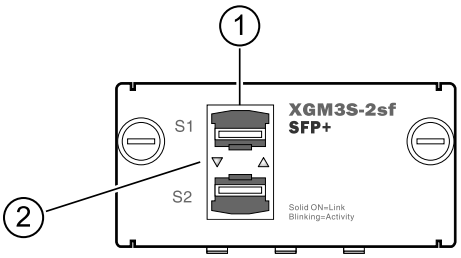

Figure 7: XGM3S-2sf Option Card

1 = SFP+ ports	2 = LEDs

XGM3S-2xf Option Card

The XGM3S-2xf option card allows you to add one or two 10-Gigabit XFP optical ports to Slot A on the rear panel of the E4G-400 router.

These ports support synchronous Ethernet and can be used for stacking connections or data links.

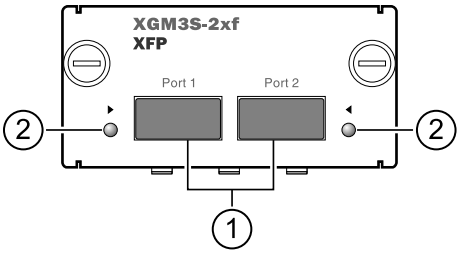

Figure 8: XGM3S-2xf Option Card

1 = XFP ports	2 = LEDs

XGM3SB-4sf Option Card

The XGM3SB-4sf option card allows you to add up to four 10-Gigabit SFP+ optical ports to Slot B on the rear panel of the E4G-400 router.

These ports support synchronous Ethernet and can be used for data links. The XGM3SB-4sf option card supports either SFP+ optical modules or the SFP+ direct-attach passive copper cable.

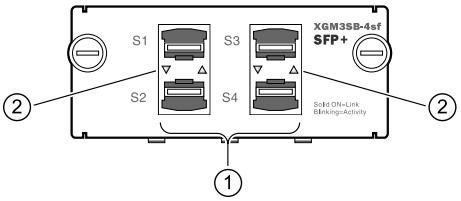

Figure 9: XGM3SB-4sf Option Card

1 = SFP+ ports	2 = LEDs

E4G-B16T1E1 Module

The E4G-B16T1E1 module allows you to add 16 T1/E1 ports with pseudowire emulation to slot B on the rear panel of the E4G-400 router.

This module has two MRJ21 connectors, each one providing eight ports. Connections to these connectors are made in either of the following ways:

- A special fan-out cable that connects to the module and provides eight separate RJ-45 connectors at the other end. (See E4G-400 Connector Pinouts on page 109 for more information about this cable.)
- A straight MRJ21-to-MRJ21 cable that connects to a breakout panel

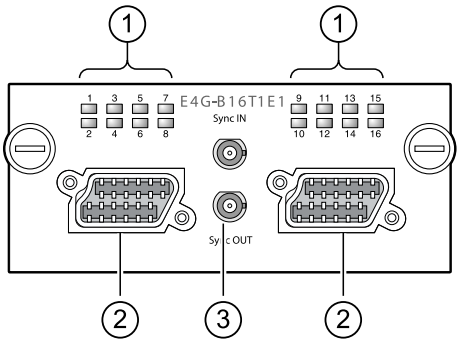

Figure 10: E4G-B16T1E1 Module

1 = T1/E1 ports	3 = Sync In/Sync Out interfaces
2 = MRJ21 connectors	

Pluggable Interfaces for E4G Series Routers

Ports on E4G series routers are compatible with a variety of optical modules, including SFP, SFP+, and XFP modules.

Extreme Networks optical modules are tested to work in all supported Extreme Networks devices. We recommend that all customers use Extreme Networks optical modules in their Extreme Networks devices. Extreme Networks assumes no liability for third-party optical modules. Although Extreme Networks does not block third-party optical modules, we cannot ensure that all third-party optical modules operate properly in all Extreme Networks devices. The customer assumes all risks associated with using third-party optical modules in Extreme Networks devices.

For details about which optical modules are supported for use with E4G series routers, see the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

Stacking Options for E4G Series Routers

The E4G-400 can be stacked with Summit family switches and other E4G-400 units that are running the same version of ExtremeXOS. SummitStack-V and SummitStack-V80 connections are made using 10-Gbps Ethernet data ports on either of the following port option cards:

- XGM3S-2sf (SFP+ port)
- XGM3S-2xf (XFP port)

2 Site Preparation

By carefully planning your site, you can maximize the performance of your existing network and ensure that it is ready to migrate to future networking technologies.

The information in this chapter is intended for the system administrator, network equipment technician, network manager, or facilities manager responsible for installing and managing the network hardware. The chapter assumes a working knowledge of local area network (LAN) operations, and a familiarity with communications protocols that are used on interconnected LANs.

Only qualified service personnel should install, maintain, or remove Extreme Networks equipment. Qualified service personnel have had appropriate technical training and experience that is necessary to be aware of the hazards to which they are exposed when performing a task and of measures to minimize the danger to themselves or other people.

Note
Before installing or removing any components of the system, or before carrying out any maintenance procedures, read Safety Information on page 78.

Planning Your Site

For successful installation and operation of your equipment, plan the site carefully.

The site planning process has three major parts:

1 Meet site requirements.
   - Building and electrical code requirements
   - Environmental, safety, and thermal requirements for the equipment you plan to install
   - Equipment rack requirements

2 Evaluate and meet cable requirements.

   Compare existing cabling with the requirements of the Extreme Networks equipment to determine if you need to install new cables.

3 Meet power requirements.

To run your equipment safely, you must meet the specific power requirements for each router and external power supply unit installed in the system. For power specifications of the router and power supplies, see the specific router models listed in Technical Specifications on page 91.

Meeting Site Requirements

By carefully planning your site, you can maximize the performance of your existing network and ensure that it is ready to migrate to future networking technologies.

The information in this chapter is intended for the system administrator, network equipment technician, network manager, or facilities manager responsible for installing and managing the network hardware.

Operating Environment Requirements

Virtually all areas of the United States are regulated by building codes and standards. During the early planning stages of installing or modifying your network, it is important that you develop a thorough understanding of the regulations that pertain to your location and industry.

Verify that your site meets all environmental and safety requirements.

Building and Electrical Codes

Building and electrical codes vary depending on your location. Comply with all code specifications when planning your site and installing cable. This section lists resources for obtaining additional information.

For information about major building codes, consult the following organization:

International Code Council (ICC)
5203 Leesburg Pike
Falls Church, VA 22041 USA
www.iccsafe.org
www.sbcci.org

The organizations listed in the following table are authorities on electrical codes.

Table 13: Authorities on Electrical Codes

Organization	Address	Web Site URL
National Electrical Code (NEC) Classification (USA only) Recognized authority on safe electrical wiring. Federal, state, and local governments use NEC standards to establish their own laws, ordinances, and codes on wiring specifications. The NEC classification is published by the National Fire Protection Association (NFPA).	NFPA 1 Batterymarch Park Quincy, Massachusetts 02169 USA	www.nfpa.org
Underwriters' Laboratory (UL) (USA only) Independent research and testing laboratory. UL evaluates the performance and capability of electrical wiring and equipment to determine whether they meet certain safety standards when properly used. Acceptance is usually indicated by the words "UL Approved" or "UL Listed."	UL 333 Pfingsten Road Northbrook, Illinois 60062-2096 USA	www.ul.com
National Electrical Manufacturing Association (NEMA) (USA only) Organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components.	NEMA 1300 N. 17th Street Rosslyn, Virginia 22209 USA	www.nema.org

Table 13: Authorities on Electrical Codes (continued)

Organization	Address	Web Site URL
Electronics Industries Alliance (EIA) Trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry.	EIA 2500 Wilson Boulevard Arlington, Virginia 22201 USA	www.eia.org
Federal Communications Commission (FCC) (USA only) Commission that regulates all interstate and foreign electrical communication systems that originate in the United States according to the Communications Act of1934. The FCC regulates all U.S. telephone and cable systems.	FCC 445 12th Street S.W. Washington, D.C. 20554 USA	www.fcc.gov

Equipment Location

Observe the following recommendations when locating your equipment.

Note
Extreme Networks recommends that you consult an electrical contractor for commercial building and wiring specifications.

- Be sure that your system is readily accessible for installation and service.

  See Rack and Cabinet Specifications and Recommendations on page 27 for information.
- Use appropriate AC or DC power, power distribution, and grounding for your specific installation.
- Use a vinyl floor covering in wiring closets or other indoor equipment locations.

  Concrete floors accumulate dust, and carpets can cause static electricity.
- Prevent unauthorized access to equipment locations by providing door locks.

  Install the equipment in a secured, enclosed, and restricted access location, ensuring that only qualified service personnel have access to the equipment.
- Provide adequate overhead lighting for easy maintenance.
- Be sure that each equipment location has a suitable ground.

  All equipment racks and equipment installed in the closet should be grounded.
- Be sure that all system environmental requirements are met, such as ambient temperature and humidity.

  Refer to the following topics for details.

Temperature

It is important to keep installed equipment within the thermal operating specifications for optimum performance and safety.

Install the E4G-400 cell site aggregation router only in a temperature-controlled and humidity-controlled indoor area that is free of airborne materials that can conduct electricity. Too much humidity can cause a fire. Too little humidity can produce electrical shock and fire.

Note

As with all electrical equipment, Extreme Networks product lifetimes degrade with increased temperature. If possible, temperatures should be kept at approximately 25°C (78°F) or lower.

- Be sure that the ventilation in the installation site is adequate to maintain a temperature below 50°C (113°F) for the E4G-400 router or below 65°C (149°F) for the E4G-200 router.
- Install a reliable air conditioning and ventilation system for indoor locations.
- Keep the ventilation in wiring closets running during non-business hours to prevent overheating of the equipment.
- Maintain an ambient operating temperature range of -10° to 50°C (14° to 122°F) for the E4G-400 router or a range of -40° to 65°C (-49° to 149°F) for the E4G-200 router.
- Maintain a storage temperature of -40° to 70°C (-40° to 158°F).

Humidity

Keep operating humidity between 50% and 70% relative humidity (non-condensing) during typical operation.

The equipment can operate at between 10% and 95% relative humidity (non-condensing) for short intervals.

Spacing Requirements and Airflow

Be sure that cables and other equipment do not block the air intake or outflow on an Extreme Networks router.

Depending on other conditions in the equipment room, it may be possible to install the routers closer to each other; consult your Extreme Networks Customer Support representative for guidance.

Leave at least 3 inches (8 cm) of clear space in front of the air intake and outflow vents on the sides of the router.

Airflow moves from side to side. For proper airflow through an E4G series router, leave clear space on the left and right sides of the router.

Electrostatic Discharge (ESD)

Your system must be protected from static electricity or electrostatic discharge (ESD). Take the following measures to ensure optimum system performance:

- Remove materials that can cause electrostatic generation (such as synthetic resins) from the wiring closet.

  Check the appropriateness of floor mats and flooring.
- Connect metal chassis, conduit, and other metals to ground using dedicated grounding lines.
- Use electrostatically safe equipment.

  If you are working with pluggable interface modules, wear an ESD-preventive wrist strap and connect the metal end to a grounded equipment rack or other source of ground.

Rack and Cabinet Specifications and Recommendations

Racks and cabinets should conform to conventional standards.

In the United States, use EIA Standard RS-310C: Racks, Panels, and Associated Equipment.

In countries other than the United States, use IEC Standard 297. In addition, verify that your rack meets the basic mechanical, space, and earthquake requirements that are described in this section.

Mechanical Recommendations for the Rack

Use equipment racks that meet the following mechanical recommendations:

- Use an open style, 19-inch rack to facilitate easy maintenance and to provide proper ventilation.
- Use a rack made of steel or aluminum.
- The rack should use the universal mounting rail hole pattern that is identified in IEC Standard 297.
- The rack should have designated earth grounding connections (typically on the base).
- The rack must meet earthquake safety requirements equal to that of the installed chassis.
- The mounting holes should be flush with the rails to accommodate the chassis.

Protective Grounding for the Rack

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground.

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground.

Before you install an E4G series router in an equipment rack, clean the rack and mounting bracket surfaces and apply an antioxidant. When you secure an E4G series router to the rack, use thread-forming mounting screws that remove any paint or non-conductive coatings and establish metal-to-metal contact.

Extreme Networks equipment is designed with mounting brackets that provide solid metal-to-metal connection to the rack.

Note
Because building codes vary worldwide, Extreme Networks strongly recommends that you consult an electrical contractor to ensure proper equipment grounding for your specific installation.

At a minimum, follow these guidelines to ground equipment racks to the earth ground:

- CAD weld appropriate wire terminals to building I-beams or earth ground rods.
- Use a minimum 14 AWG stranded copper wire for grounding an E4G-200 router or a DC-powered E4G-400 router.

  An AC-powered E4G-400 router does not need separate chassis grounding.

- Position the earth ground as close to the equipment rack as possible to maintain the shortest wiring distance possible.
- Use a ground impedance tester or micro-ohm meter to test the quality of earth ground connection at the chassis. This will ensure good grounding between the chassis, rack, and earth ground.

Note

Because building codes vary worldwide, Extreme Networks strongly recommends that you consult an electrical contractor to ensure proper equipment grounding for your specific installation.

Space Requirements for the Rack

Provide enough space in front of and behind the switch so that you can service it easily.

Allow a minimum of 48 inches (122 cm) in front of the rack and 30 inches (76 cm) behind the rack. When using a relay (two-post) rack, provide a minimum of 24 inches (61 cm) of space behind the mounted equipment. Extra room on each side is optional.

Securing the Rack

The rack should be attached to the wiring closet floor with 3/8-inch (9.5 mm) lag screws or equivalent hardware.

The floor under the rack should be level within 3/16-inch (5 mm). Use a floor-leveling cement compound if necessary or bolt the racks to the floor as shown.

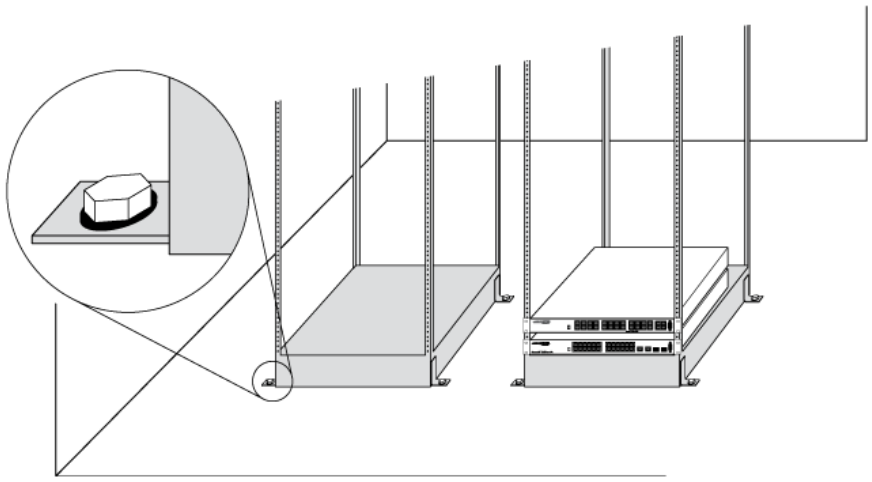

Figure 11: Properly Secured Rack

Brace open equipment racks if the channel thickness is less than 1/4 inch (6.4 mm).

Outdoor Installation

The E4G-200 router can be installed in locations outside of buildings.

- Prevent unauthorized access to equipment locations and make sure that only qualified service personnel have access to the equipment.
- Take reasonable precautions to prevent animals from gaining access to the equipment.
- Be sure that the ventilation in the installation site is adequate to maintain a temperature below 65°C (149°F) for the E4G-200 router.
- For proper airflow through the router, leave clear space on the left and right sides of the router.

Evaluating and Meeting Cable Requirements

Use professional consultants for site planning and cabling.

Extreme Networks recommends using the Building Industry Consulting Service International (BICSI) Registered Communications Distribution Designer (RCDD), which is globally recognized as a standard in site planning and cabling.

For information, visit www.bicsi.org.

Cable Labeling and Record Keeping

A reliable cable labeling system is essential when planning and installing a network.

Maintaining accurate records helps you to:

- Relocate devices easily.
- Make changes quickly.
- Isolate faults in the distribution system.
- Locate the opposite end of any cable.
- Know the types of network devices that your cabling infrastructure can support.

Follow these guidelines when setting up a cable labeling system suitable for your installation:

- Identify cables by securely attaching labels to all cable ends.
- Assign a unique block of sequential numbers to the group of cables that run between each pair of wiring closets.
- Assign a unique identification number to each equipment rack.
- Identify all wiring closets by labeling the front panel of your Extreme Networks equipment and other hardware.
- Keep accurate and current cable identification records.
- Post records near each equipment rack. For each cable drop, include information about the cable source, destination, and jumper location.

Installing Cable

When you connect cable to your network equipment, keep the following things in mind.

- Examine cable for cuts, bends, and nicks.
- Support cable using a cable manager that is mounted above connectors to avoid unnecessary weight on the cable bundles.

- Use cable managers to route cable bundles to the left and right of the network equipment to maximize accessibility to the connectors, as shown in the following figure.

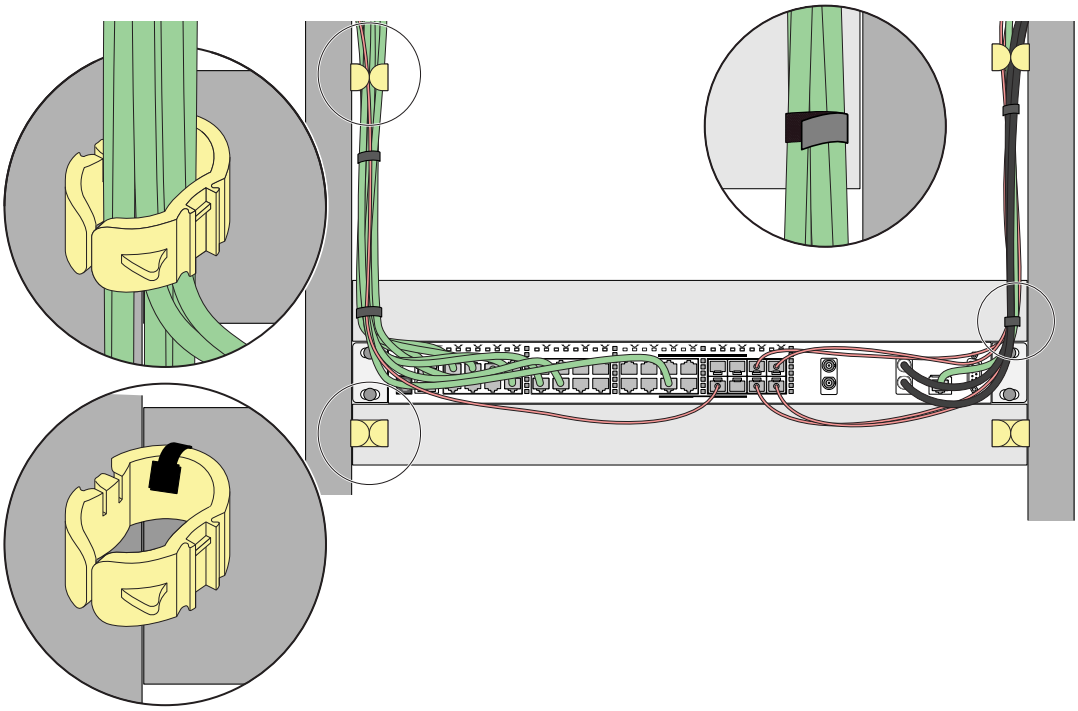

Figure 12: Properly Installed and Bundled Cable for an E4G-400 Router

- Provide enough slack, approximately 2 to 3 inches (5 to 8 cm), to provide proper strain relief as shown in the following figure.

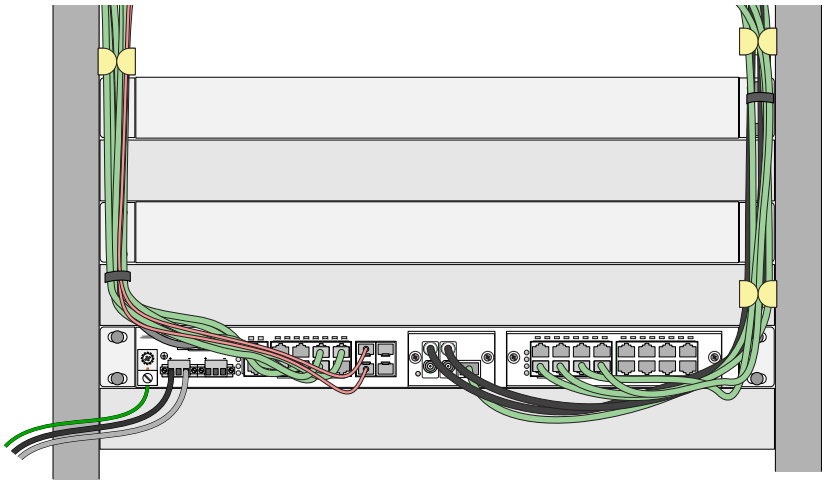

Figure 13: Properly Installed Cables, Showing Slack for Proper Strain Relief

- Bundle cable using hook-and-loop straps to avoid injuring cables.
- If you build your own cable, be sure that connectors are properly crimped.
- When installing a patch panel using twisted pair wiring, untwist no more than 1 inch (2.54 cm) of the cable to avoid radio frequency (RF) interference.

- Discharge the RJ-45 Ethernet cable before plugging it into a port on the switch.

Caution

Unshielded twisted pair (UTP) cable can build up ESD charges when being pulled into a new installation. Before connecting any category 5 UTP cable to the switch, discharge ESD from the cable by plugging the RJ-45 connector into a LAN static discharge device or use an equivalent method.

- Use plenum-rated cable when it is necessary for safety and fire rating requirements. Consult your local building codes to determine when it is appropriate to use plenum-rated cable, or refer to IEC standard 850.
- Keep all ports and connectors free of dust.

Handling fiber Optic Cable

Fiber optic cable must be handled carefully during installation.

Every cable has a minimum bend radius, example, and fibers will be damaged if the cables are bent too sharply. It is also important not to stretch the cable during installation. Extreme Networks recommends that the bend radius for fiber optic cable equal at least 2 inches (5 cm) for each 90-degree turn as shown in Figure 14.

Note

Kinks and sharp bends can destroy or impair the cable's ability to convey light pulses accurately from one end of the cable to the other. Use care in dressing the optical fiber cables: provide satisfactory strain relief to support the cable and maintain an adequate bend radius at all cable turns, particularly where the cable connects to the I/O module.

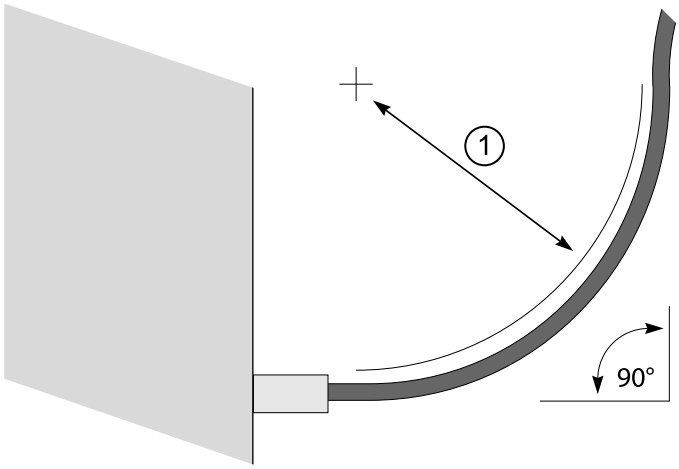

Figure 14: Bend Radius for Fiber Optic Cable

1 = Minimum 2-inch (5.08 cm) radius in 90° bend

Cable Distances

The following table shows cable media types and maximum distances that support reliable transmission in accordance with international standards (except where noted).

Table 14: Media Types and Maximum Distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
1000BASE-SX (850nm optical window)	50/125 µm multimode fiber	400	500
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	160	220
	62.5/125 µm multimode fiber	200	275
1000BASE-LX (1300nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	–	5,000
	10/125 µm single-mode fiber *	–	10,000
1000BASE-LX70 (1550nm optical window)	10/125 µm single-mode fiber	–	70,000
1000BASE-ZX (1550nm optical window)	10/125 µm single-mode fiber	–	80,000
100BASE-LX100 (1550nm optical window)	10/125 µm single-mode fiber	–	100,000
1000BASE-BX10 (1490nm optical window) (1310nm optical window)	10/125 µm single-mode fiber	–	10,000
1000BASE-LX70 (1550nm optical window)	10/125 µm single-mode fiber	–	70,000
10/100/1000BASE-T SFP	(1-Gbps link) Category 5 and higher UTP cable	–	100
	(100-Mbps link) Category 5 and higher UTP cable	–	150
	(10-Mbps link) Category 5 and higher UTP cable	–	250
1000BASE-T	Category 5 and higher UTP cable	–	100
100BASE-TX	Category 5 and higher UTP cable	–	100
10BASE-T	Category 3 and higher UTP cable	–	100

The following table lists the direct-attach cables available from Extreme Networks.

* Proprietary to Extreme Networks. Connections between two Extreme Networks 1000BASE-LX interfaces that use 10/125 µm single-mode fiber can use a maximum distance of 10,000 meters.

Table 15: Extreme Networks SFP+ Direct-Attach Cables

Cable Type	Model Number	Length
SFP+ passive copper cable	10304	1 meter
	10305	3 meters
	10306	5 meters
	10307	10 meters

RJ45 Connector Jackets

Use RJ45 cable with connector jackets that are flush with the connector or that have connectors with a no-snag feature.

Using cable with jackets that are wider than the connectors can cause:

- Connectors that are not properly aligned with the port.
- Crowded cable installation, which can cause connectors to pop out of the port.

Figure 15 shows examples of recommended and non-recommended connector jacket types.

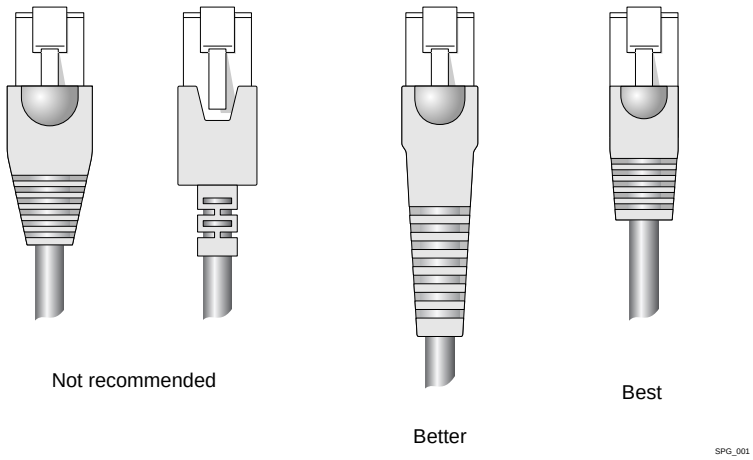

Figure 15: RJ45 Connector Jacket Types

Preventing Radio Frequency Interference (RFI)

If you use UTP cabling in an installation, take precautions to avoid radio frequency (RF) interference.

RF interference can cause degradation of signal quality, and, in an Ethernet network environment, can cause excessive collisions, loss of link status, or other physical layer problems that can lead to poor performance or loss of communication.

To prevent RF interference, avoid the following situations:

- Attaching UTP cable to AC power cables
- Routing UTP cable near antennas, such as a ham radio antenna
- Routing UTP cable near equipment that could exhibit RF interference, such as ARC welding equipment
- Routing UTP cable near electrical motors that contain coils
- Routing UTP cable near air conditioner units
- Routing UTP cable near electrical transformers

In areas or applications where these situations cannot be avoided, use fiber optic cabling or shielded twisted pair cabling (STP).

Meeting Power Requirements

Observe the following requirements and precautions for powering your hardware.

Power Supply Requirements

Follow these recommendations when you plan power supply connections for the E4G series routers:

- Place the equipment in an area that accommodates the power consumption and component heat dissipation specifications.
- Be sure that your power supply meets the site DC power or AC power requirements of the network equipment.
- When you connect power to installed equipment, do not make this connection through an extension cord or power strip.
- If your router includes more than one power supply, connect each power supply to a different, independent power source.

  If a power source fails, it will affect only the router power supply to which it is connected. If all router power supplies are connected to a single power source, the entire router is vulnerable to a power source failure.
- In regions that are susceptible to electrical storms, we recommend that you plug your system into a surge suppressor.

For power specifications for E4G series routers, see Technical Specifications on page 91.

Turning your unit on and off

Extreme Networks routers do not have a switch for turning power to the unit on and off.

Warning
Disconnecting the DC power cable from the DC power source must be done by a qualified, licensed electrician.

- For systems using an AC power supply, remove the wall plug from the electrical outlet to disconnect the power to the router.

- For systems connected to DC power, turn off power to the chassis by de-energizing the circuit that feeds the power supply.

  This is usually accomplished by turning off a circuit breaker.

Selecting and Purchasing Power Cords

Extreme Networks equipment does not ship with power cords. Visit www.extremenetworks.com/product/powercords/ for information on selecting and purchasing the correct power cords for use with specific Extreme Networks equipment. Specifications for power cords in each country are provided so that you can purchase cords locally.

The power cord must meet the requirements listed in Power Cord Requirements for AC Power Supplies on page 106.

Uninterruptible Power Supply (UPS) Requirements

An uninterruptible power supply (UPS) is a device that sits between a power supply (such as a wall outlet) and a device (such as a switch) to prevent outages, sags, surges, and bad harmonics from adversely affecting the performance of the device.

A UPS traditionally can perform the following functions:

- Absorb relatively small power surges.
- Smooth out noisy power sources.
- Continue to provide power to equipment during line sags.
- Provide power for a period of time after a blackout has occurred.

In addition, some UPS devices or UPS-plus-software combinations provide the following functions:

- Automatically shut down equipment during long power outages.
- Monitor and log power supply status.
- Display the voltage (current draw) of the equipment.
- Restart equipment after a long power outage.
- Display the voltage currently on the line.
- Provide alarms on certain error conditions.
- Provide short-circuit protection.

Selecting a UPS

To determine UPS requirements for your switch, answer these questions:

- What are the amperage requirements?
- What is the longest potential time period that the UPS would be required to supply backup power?

- Where will the UPS be installed?
- What is the maximum transition time that the installation will allow? (See UPS Transition Time on page 36.)

Note
We recommend that you use a UPS that provides online protection.

Calculating Volt-Amperage Requirements

To determine the size of UPS that you need:

1. Locate the voltage and amperage requirements for each piece of equipment.
   These numbers are usually found on a sticker on the back or bottom of your equipment.
2. Multiply the numbers together to get Volt-Amperes (VA):
   VA = Volts x Amperes
3. Add the VA from all the pieces of equipment together to find the total VA requirement.
   To determine the minimum volt-amperage requirements for your UPS, we recommend that you add 30% to the total.

UPS Transition Time

UPS transition time is the time required for the UPS to switch from providing AC power derived from the utility (or mains) supply to providing AC power derived from the battery backup. (It is sometimes called *UPS transfer time*.)

UPS transition times vary between UPS models and implementations, but shorter transition times are preferred. For Extreme Networks stacking products, we recommend a UPS transition time of 20 milliseconds or less to ensure optimum performance and minimize service interruptions.

For high-availability and fault-tolerant installations in which the switches use redundant power supply units (PSUs), we recommend that each PSU in a switch be connected to a different UPS and that each UPS be powered by an independent AC supply. This will prevent service interruptions when a power source is lost, or when a UPS unit fails. (Note that a single, appropriately sized UPS can power PSUs in multiple switches. The recommendation is simply that for any given switch, the two PSUs should be connected to different UPS units.)

DC Power Requirements

A DC-powered system should be installed in a DC-I battery return configuration.

Using a DC-I configuration, connect the battery return conductor directly to the central office power return bus, and not to the equipment frame or the grounding means of the equipment.

The E4G-200 can accept -48 or +24 volts for DC input.

Following Applicable Industry Standards

Always follow applicable industry standards.

For more information, see the following ANSI/TIA/EIA standards:

- ANSI/TIA/EIA-568-A—the six subsystems of a structured cabling system
- ANSI/TIA/EIA-569-A—design considerations
- ANSI/TIA/EIA-606—cabling system administration
- ANSI/TIA/EIA-607—commercial building grounding and bonding requirements

You can access these standards at: www.ansi.org or www.tiaonline.org.

3 Installing an E4G Series Router

Extreme Networks E4G series routers fit into standard 19-inch equipment racks.

This chapter provides installation instructions for E4G-200 cell site routers and E4G-400 cell site aggregation routers.

Pre-installation Requirements

When installing an E4G series router in an equipment rack, ensure that you have the following tools and equipment on hand:

- Four rack mounting screws to match your equipment rack
- Screwdriver to fit the rack mounting screws
- ESD-preventive wrist strap for installing optional ports
- For DC-powered routers, #14 AWG stranded copper cable for grounding the router and connecting it to the DC power source

Note
Rack mounting brackets and screws for attaching the brackets to the router are shipped with the router.

Installing an E4G-200 Cell Site Router

Installing the E4G-200 router involves the following steps.

- Install the router in a rack.
- Ground the router and connect it to a power source.
- (Optional) Install a T1/E1 module.
- (Optional) Install the clock module.
- Connect optional cables and perform initial configuration.

The steps are covered in the following sections.

What's Included

Included in the packaging with the E4G-200 cell site router are the following items:

- Two rack-mounting brackets with eight screws
- Ethernet console cable

- DB-9-to-RJ-45 adapter
- Two pluggable DC terminal block connectors (Dinkle part number 2ESDVM-03P)

Recommended insulation colors are:

- Green, or green with yellow stripe, for the ground connection
- Red and black for the power and return connections

Have the additional items on hand before you begin the installation:

- Connection hardware appropriate to the installation site:
  - Hardware for connecting the ground wire to the site grounding point
  - Hardware for connecting the power wires to the DC source
- Stripping tool
- Torque screwdriver and wrench or torque driver with attachments for tightening screws
  - The ground lug requires a 1/4-inch screwdriver tip.
  - The screws on the DC power connector require a 1/8-inch straight screwdriver tip.

Installing the E4G-200 Router in a Rack

The E4G-200 router is installed in a standard equipment rack.

Two rack-mounting brackets, and eight screws, are provided in the product packaging.

To rack-mount the E4G-200 router, follow these steps:

1 Decide which position (front-mount or mid-mount) is most suitable for the installation.

Position the mounting brackets as shown in the following figure.

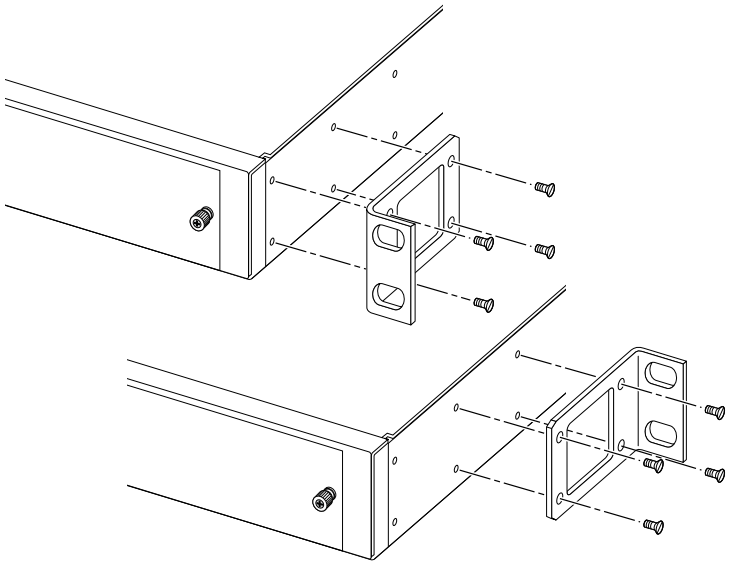

Figure 16: Positions for the Mounting Brackets

2 On each side of the router, use the screws provided to attach a mounting bracket in the selected mounting position.

3 Slide the router into the equipment rack as shown in the following figure.

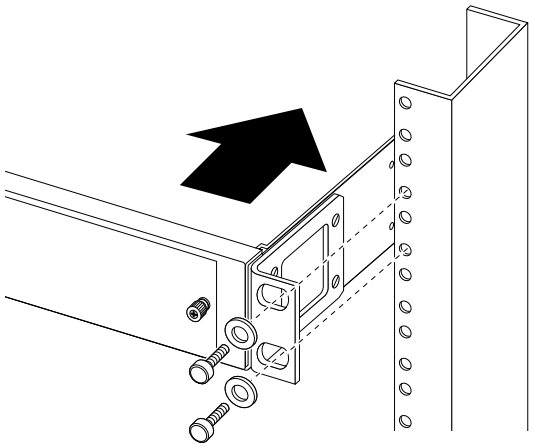

Figure 17: Installing the Router in the Rack

4 While firmly holding the router in position, insert and tighten rack-mounting screws to secure the router to the rack.

Grounding the Router

Before you connect the power input cable to an E4G-200 router, you must ground the router.

Warning
Connect the ground wire before you connect any power cables.

1 If necessary, move the grounding lug to the back panel of the router.

A grounding lug is located on the front of the router. You can move the lug to the back panel if this location is more suitable for your installation site.

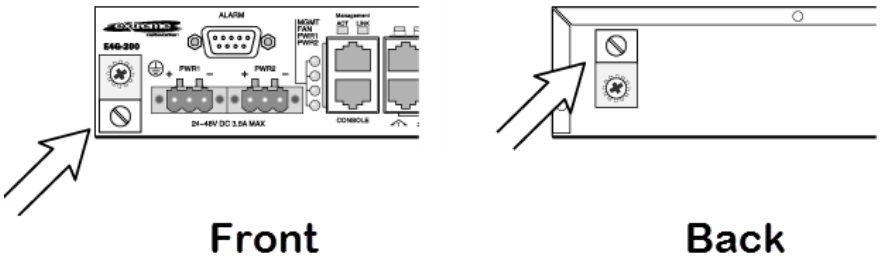

Figure 18: Possible Grounding Lug Locations on the E4G-200 Router

2 At one end of the ground wire, strip the insulation to expose 1/2 inch (12 mm) of bare wire.

3 Loosen the screw, and insert the stripped wire into the grounding lug.

4 Using a 1/4-inch straight-tip torque screwdriver, tighten the retaining screw to 20 pound-inches (2.25 Newton-meters).

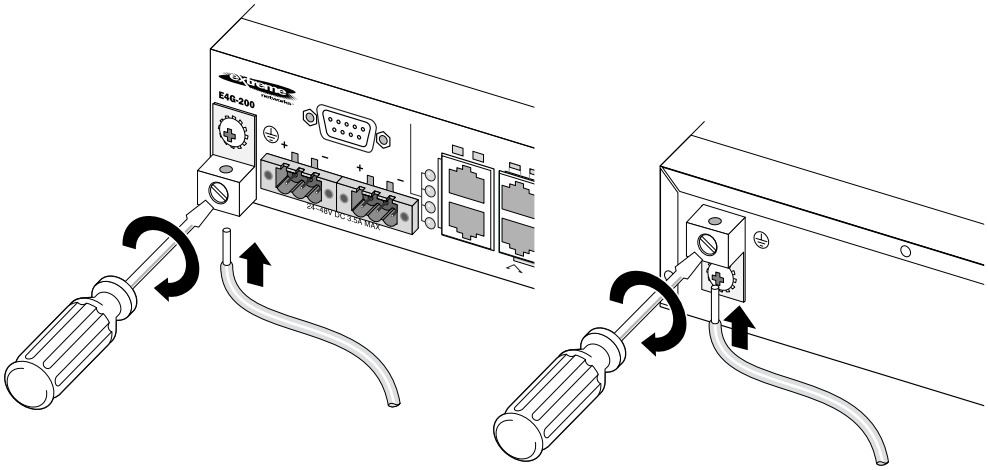

Figure 19: Grounding the E4G-200 Router

5 Connect the other end of the wire to a known reliable earth ground point at your site.

Preparing the DC Power Input Cable

Before connecting the E4G-200 router to DC power, prepare the DC power input cable.

1 Strip 0.25 inch (6.4 mm) from the ends of two lengths of #14 AWG copper wire.
2 On the provided connector, identify the positions where you will attach the wires.

Table 16: Wire Positions in the DC Connector

DC Power Source	–Connection	+Connection
–48 VDC	48 RTN	–48 V
+24 VDC	+24 V	GND

3 Insert each stripped wire into the connector, as shown in the following figure.

Make sure that no exposed part of the copper wire extends beyond either side of the connector.

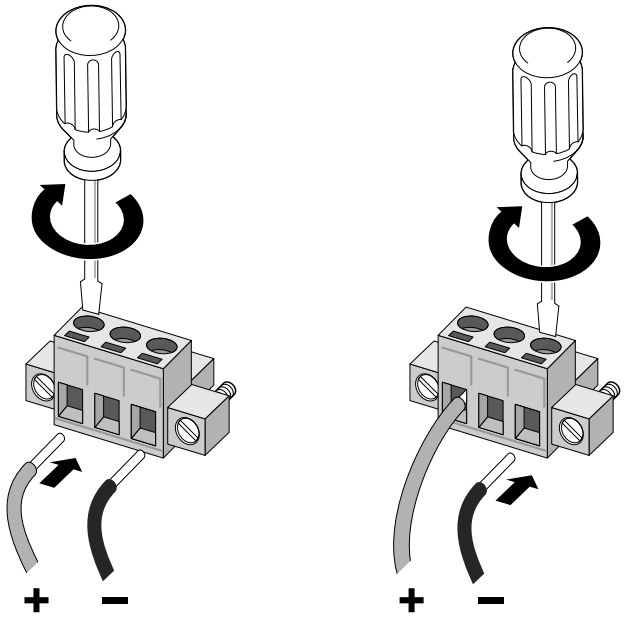

Figure 20: Preparing a DC Power Cable

4 Tighten each retaining screw to 4.5 pound-inches (0.5 Newton-meters) to fasten the wire in place.

After the DC input cable is attached to the connector, it must be properly connected to the DC source voltage at your facility by a qualified electrician.

Connecting the E4G-200 Router to DC Power

Before you connect the DC input cable to the power input socket on the E4G-200 router, the DC input cable must be properly connected to the DC source voltage at your facility by a qualified electrician.

Caution

Connect the DC input cable to a DC main circuit breaker rated no greater than 15A. Provide proper connection and strain relief on the DC input cable in accordance with all local and national electrical codes.

1 Verify that the DC circuit is de-energized.

2 Align the power cable connector with the power input connector on the router and press the connector firmly into place.

3 Align and securely tighten the retaining screws on the connector, as shown in the following figure.

Caution

Make sure the retaining screws are securely tightened to prevent accidental removal of the power connector.

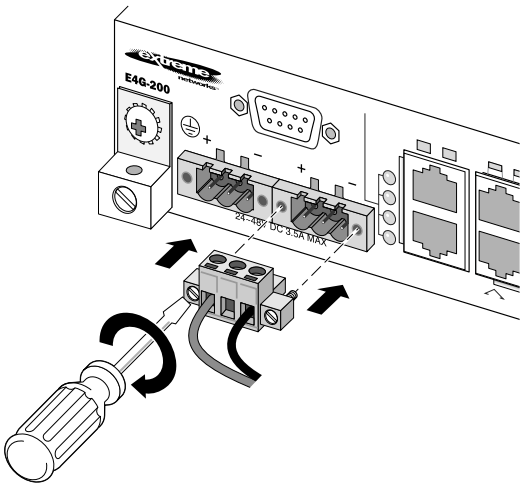

Figure 21: Connecting the DC Input Cable

4 Energize the DC circuit.

Installing a T1/E1 Module

Before you install a T1/E1 module (E4G-F16T1E1) on the E4G-200 router, have the following items on hand:

- ESD-preventive wrist strap
- #1 Phillips screwdriver

You can install a T1/E1 module without powering down the router. However, you will need to reboot the router to initialize the newly installed T1/E1 module.

Note

The router might reboot itself when the installation is complete. Because of this, we recommend that you perform the installation during off-peak hours.

1 Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.

2 On the front panel of the E4G-200 router, loosen the screws that hold the cover on the T1/E1 module slot.

Remove the slot cover as shown in the following figure.

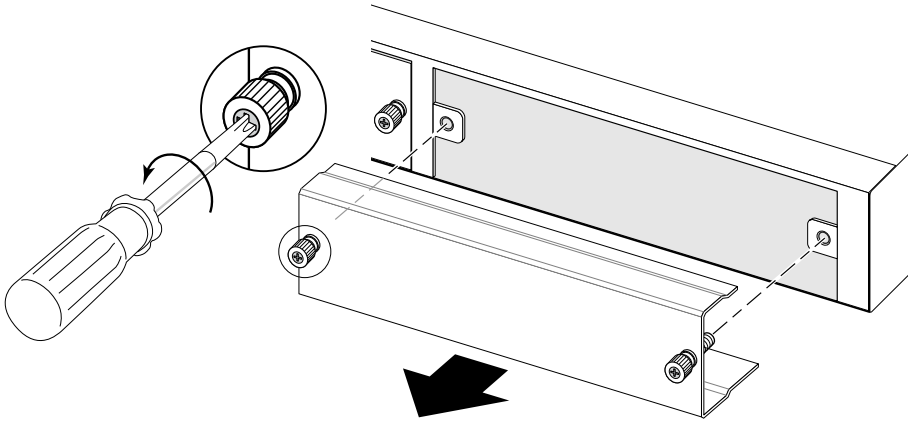

Figure 22: T1/E1 Module Slot Cover

3 Align the T1/E1 module with the card guides and carefully slide the module into the slot.

4 Align and securely tighten the retaining screws, as shown in the following figure.

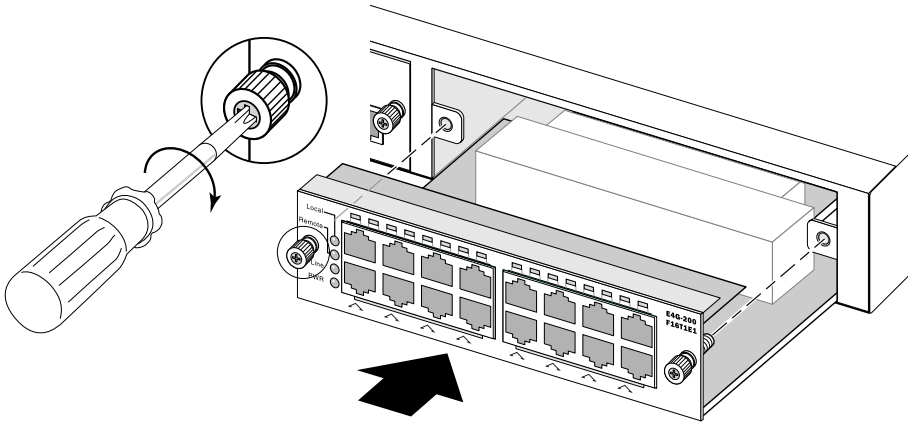

Figure 23: Installing a T1/E1 Module

5 To initialize the T1/E1 module, reboot the router.

To connect the ports on the T1/E1 module, use a standard T1/E1 crossover cable with RJ-48C connectors and the pinouts listed in Table 82 on page 108.

Save the slot cover to re-use in case you remove the T1/E1 module later. An unoccupied module slot must be covered to ensure satisfactory electromagnetic interference (EMI) levels and to maintain adequate airflow through the router.

Installing a Clock Module

Before you install the clock module on the E4G-200 router, have the following items on hand:

- ESD-preventive wrist strap

- #1 Phillips screwdriver

You can install a clock module without powering down the router. However, you will need to reboot the router to initialize the newly installed clock module.

Note
The router might reboot itself when the installation is complete. Because of this, we recommend that you perform the installation during off-peak hours.

1 Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
2 On the front panel of the E4G-200 router, loosen the screws that hold the cover on the clock module slot.

   Remove the slot cover as shown in the following figure.

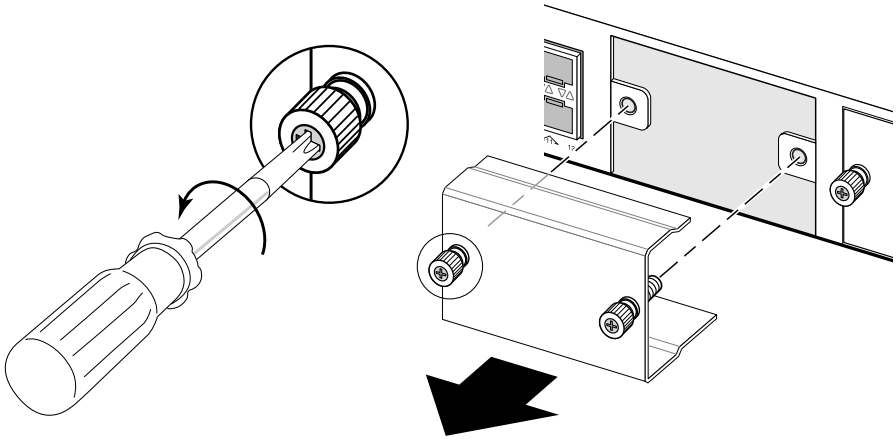

Figure 24: Removing the Clock Module Slot Cover

3 Align the clock module with the card guides and carefully slide the module all the way into the slot.
4 Align and securely tighten the retaining screws as shown in the following figure.

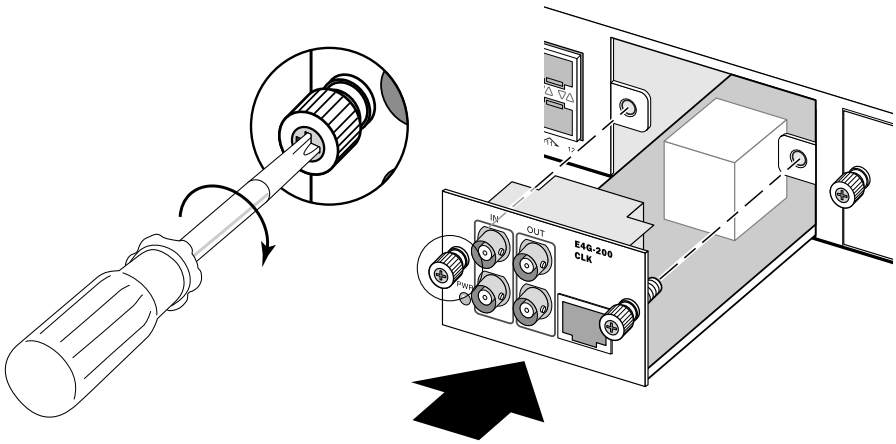

Figure 25: Installing a Clock Module

5 To initialize the clock module, reboot the router.

Save the slot cover to re-use in case you remove the clock module later. An unoccupied module slot must be covered to ensure satisfactory EMI levels and to maintain adequate airflow through the router.

Connecting a Timing Cable to the E4G-200 Router

Use the E4G-200's clock module for connecting a timing cable.

The clock module provides the following types of cable connections for connecting a Building Integrated Timing Supply (BITS) or a GPS timing source:

- Two mini-BNC connectors labeled IN
  - 1 PPS input
  - 10 MHz input
- Two mini-BNC connectors labeled OUT
  - 1 PPS or 8 KHz frame output
  - 10 MHz or 2.048 MHz or 1.544 MHz output

  To connect to the mini-BNC connectors, use a 50-ohm coaxial cable with a mini-BNC connector at one end and a standard BNC connector at the other end.
- One RJ-45 connector for time-of-day (ToD) input/output or for RJ422 BITS input

  To connect to the RJ-45 connector, use a twisted-pair cable with the pinouts listed in Table 77 on page 106.

Installing an E4G-400 Cell Site Aggregation Router

Installing the E4G-400 router involves the following steps.

- Install the router in a rack: mid-mount or front-mount.
- Install an AC or DC power supply and connect it to a power source.
- (Optional) Install port option cards.
- Connect optional cables and perform initial configuration.

The steps are covered in the following sections.

What's Included

Included in the packaging with the E4G-400 cell site aggregation router are the following items:

- Two rack-mounting brackets with eight screws
- Console cable terminated in DB-9 connectors
- Ferrite in-line noise filter with installation instructions
- Power supply (AC or DC)

The E4G-400 router is shipped with one power supply. A second power supply for redundant power can be ordered and shipped separately.

Note

An AC power input cord is not provided with an E4G-400 AC power supply. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Supplies for the E4G-400 Router on page 103.

The E4G-400 cell site aggregation router can be installed in either a mid-mount or front-mount position in a standard 19-inch equipment rack.

Installing the E4G-400 Router in a Rack

The E4G-400 router is installed in a standard equipment rack. It can be installed either in a mid-mount or a front-mount position.

For instructions on installing the router in a rack, refer to the appropriate topic:

- Mid-Mount Installation for the E4G-400 Router on page 47
- Front-Mount Installation for the E4G-400 Router on page 48

Mid-Mount Installation for the E4G-400 Router

To mid-mount an E4G-400 router in a two-post equipment rack, follow these steps:

1 On each side of the router, use six screws to attach a mounting bracket as shown in the following figure.

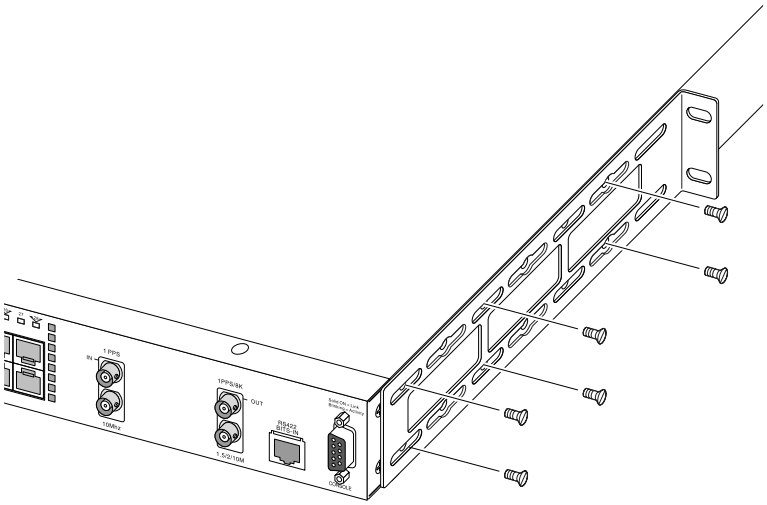

Figure 26: Rack-mounting Bracket for Mid-Mount Installation

2 Slide the router into the equipment rack.

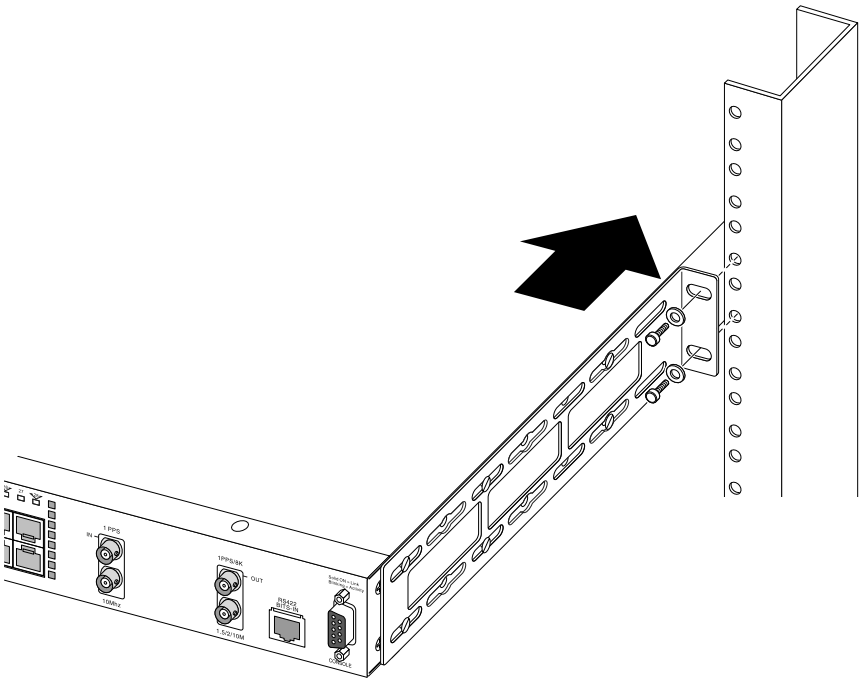

Figure 27: Installing the E4G-400 Router (Mid-mount)

3 While firmly holding the router in position, insert and tighten rack-mounting screws to secure the router to the rack.

To install the power supply, see Installing an AC Power Supply on page 50 or Installing a DC Power Supply on page 51.

To install optional ports at the back of the router, see Installing Port Option Cards on page 59.

Front-Mount Installation for the E4G-400 Router

To front-mount an E4G-400 router in a two-post equipment rack, follow these steps:

1 On each side of the router, use six screws to attach a mounting bracket as shown in the following figure.

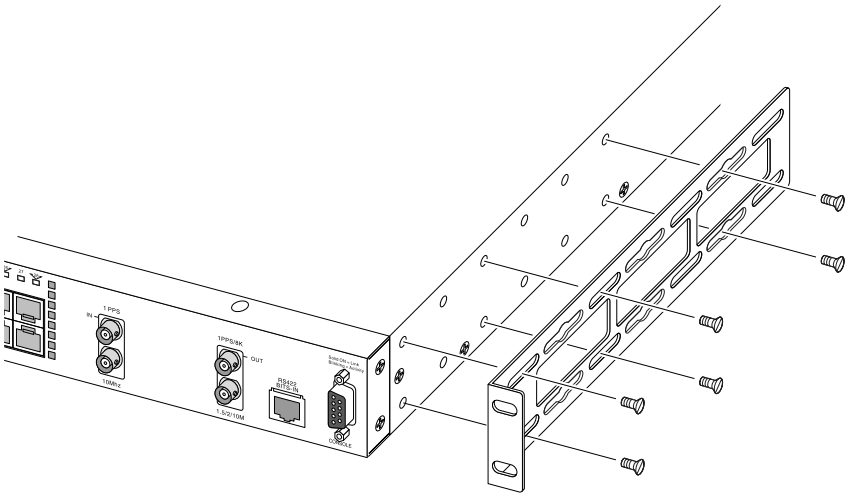

Figure 28: Rack-mounting Bracket for Front-Mount installation

2 Slide the router into the equipment rack.

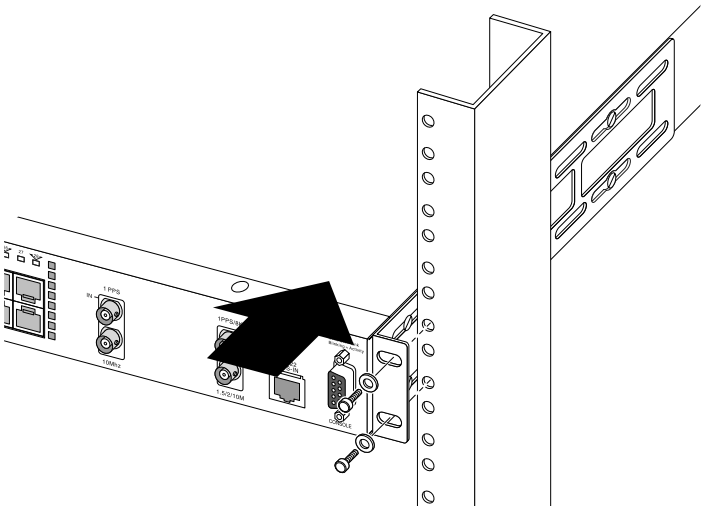

Figure 29: Installing the E4G-400 Router (Front-mount)

3 While firmly holding the router in position, insert and tighten rack-mounting screws to secure the router to the rack.

To install the power supply, see Installing an AC Power Supply on page 50 or Installing a DC Power Supply on page 51.

To install optional ports at the back of the router, see Installing Port Option Cards on page 59.

Installing an AC Power Supply

You can install an AC power supply in an E4G-400 router.

Warning
To prevent an electrical hazard, make sure that the AC power cord is disconnected from the power supply before you install the power supply in the router.

Caution
Make sure the AC power supply circuit is not overloaded. Use proper precautions, such as a circuit breaker, to prevent overcurrent conditions.

1 On the rear panel of the E4G-400 router, remove the blank panel from the power supply tray as shown in the following figure.

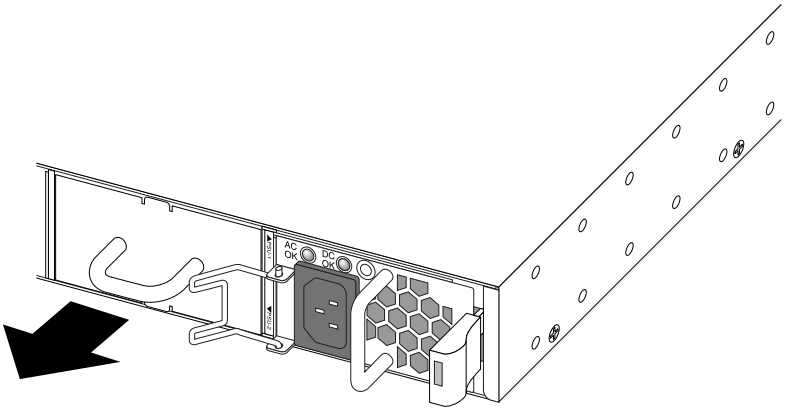

Figure 30: Removing a Blank Panel

2 Slide the power supply into the router as shown in the following figure.

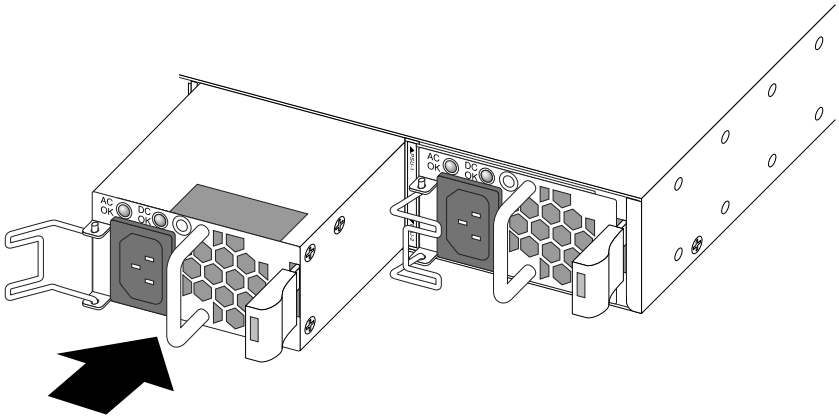

Figure 31: Installing an AC Power Supply

3 Push the power supply in until the latch snaps into place.

Note
If power supplies are not installed in both power supply bays, be sure to install a panel to cover the unoccupied bay. The panel is required for maintaining proper system ventilation and EMI levels.

4 Connect the power cord to the power input connector and rotate the wire cord retainer over the power cord connector to hold the connector in place.

Installing a DC Power Supply

Two 300 W DC power supplies are available for use with the E4G-400:

- Model 10933 can connect to either a –48 V or a +24 V power source.
- Model 10934A can connect only to a –48 V power source.

We recommend using a Model 10933 power supply, connected to a +24 V power source.

Connecting an E4G-400 router to DC power is a four-step process:

1 Preparing the DC Cables on page 51
2 Installing the DC Power Supply on page 52
3 Connecting the Ground Cable on page 53
4 Connecting the Power Supply to the DC Source Voltage on page 55

Warning
To prevent an electrical hazard, make sure the DC power cord is disconnected from the power supply before you install the power supply in the power supply bay.

Caution
Make sure the DC power supply circuit is not overloaded. Use proper precautions, such as a circuit breaker, to prevent overcurrent conditions. Do not use a breaker that is rated for more than 30 A.

Preparing the DC Cables

Before connecting the E4G-400 router to DC power, prepare the DC cables.

The following terminals are provided with the power supply.

- Two spade terminals (Tyco part number 328281 or equivalent) for connecting the input power cables
- One ring terminal (Tyco part number 2-320561-4 or equivalent) and screw with captive lock washer (type 6-32 UNC) for connecting the ground cable

You need a crimping tool to attach the terminals to the power and ground cables.

1 On each wire, strip 0.25 inch (6.4 mm) of insulation from one end.
2 Insert the stripped end of the input power cable end all the way into the barrel of a spade terminal.

Crimp the terminal securely to the cable.

3 Insert the stripped end of the green/yellow ground cable end all the way into the barrel of the ring terminal.

Crimp the terminal securely to the cable.

Refer to the following figure.

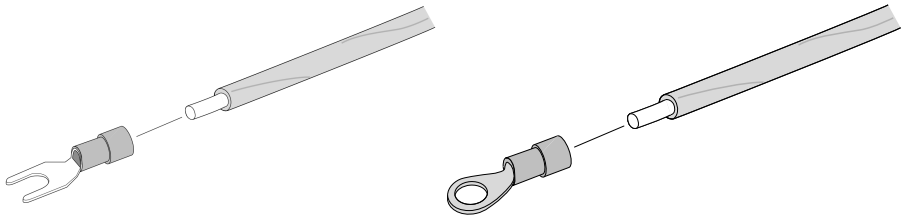

Figure 32: Attaching Terminals to Cables

Power connection wire	Ground wire

Installing the DC Power Supply

After preparing the DC cables, install the DC power supply (Model 10933 or 10934A) in the E4G-400 router.

1 If necessary, remove a blank panel as shown in the following figure.

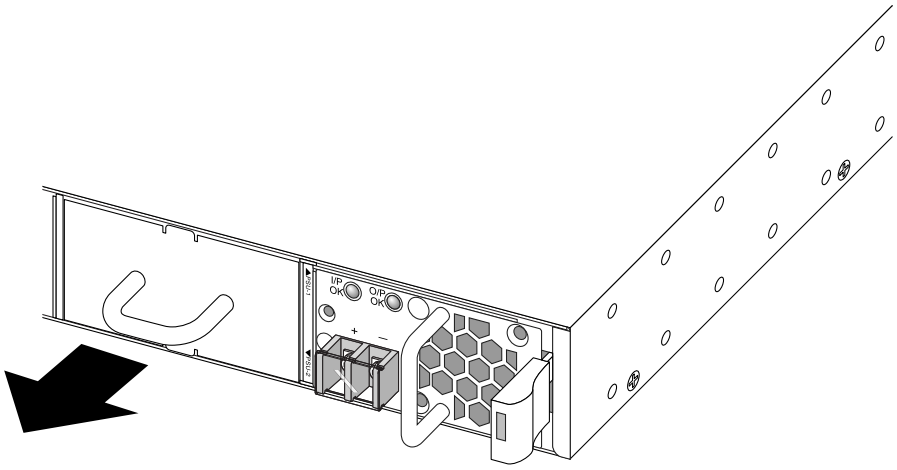

Figure 33: Removing a Blank Panel

2 Verify that the power supply is right side up, and slide it into the router.

3 Carefully slide the power supply all the way into the power supply bay, as shown in the figures below, until the latch snaps into place.

Caution

Do not slam the power supply into the router.

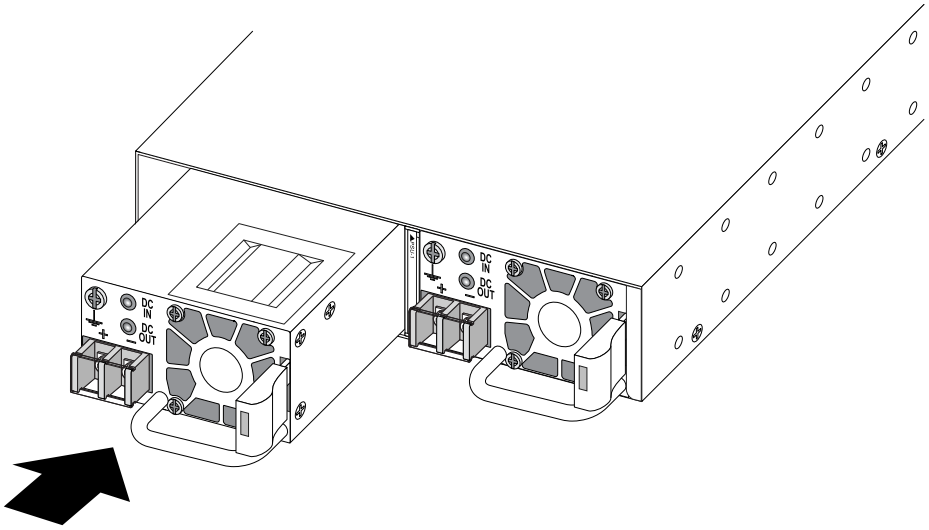

Figure 34: Installing a Summit 300 W DC Power Supply (Model 10933)

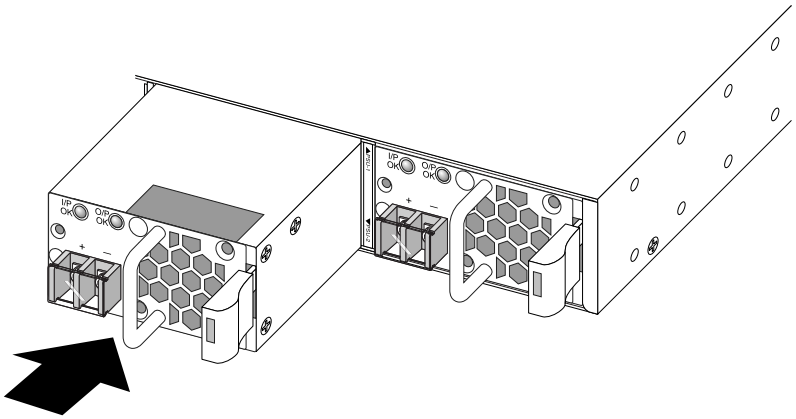

Figure 35: Installing a Summit 300 W DC Power Supply (Model 10934A)

If power supplies are not installed in both power supply bays, install a cover over the unoccupied bay. The cover is required for maintaining proper system ventilation and EMI levels.

Connecting the Ground Cable

After installing the DC power supply (Model 10933 or 10934A), you must ground it before attaching it to a power source.

Warning
Connect the ground cable before you connect any power cables.

Warning
Disconnect the ground cable after you disconnect all power cables.

1 Verify that the DC circuit is de-energized.
2 Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.

3 Identify the grounding point on the power supply (shown in the figures below).

4 Insert a 6-32 UNC screw (provided) through the ring terminal and into the grounding point on the power supply.

See the following figures.

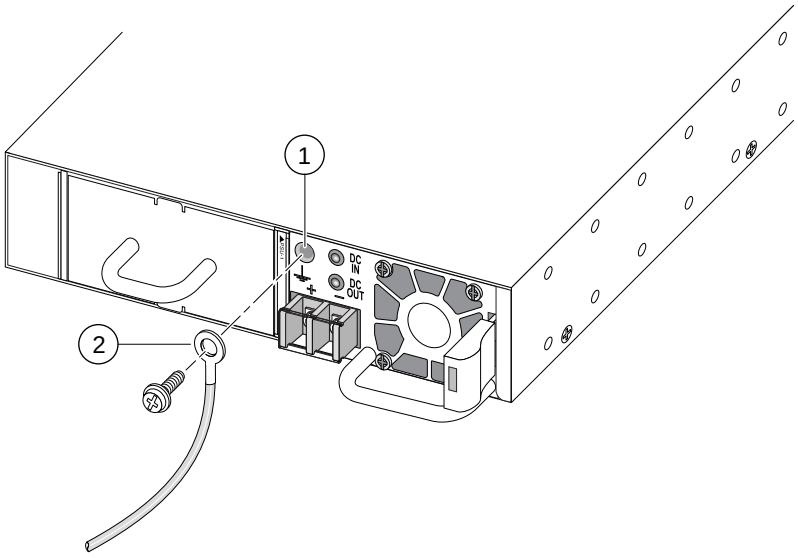

Figure 36: Connecting the Ground Cable (Model 10933)

1 = Grounding point	2 = Ground cable

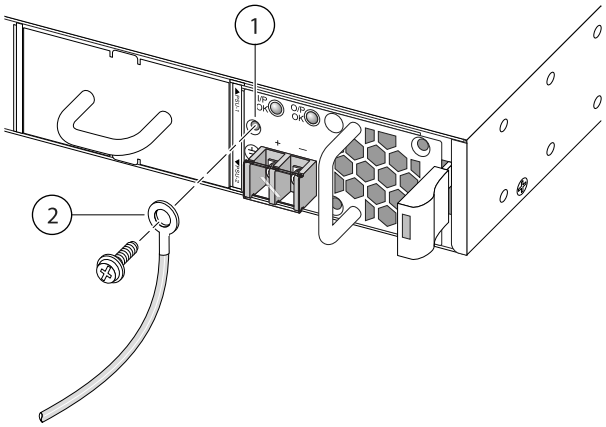

Figure 37: Connecting the Ground Cable (Model 10934A)

1 = Grounding point	2 = Ground cable

5 Tighten the screw to 12.6 pound-inches (1.42 Newton-meters).

6 Connect the other end of the cable to a known reliable earth ground point at your site.

Connecting the Power Supply to the DC Source Voltage

The DC power connection at your facility must be made by a qualified electrician, following the appropriate instructions:

- Connect the Power Supply to the DC Source Voltage (–48 V) on page 55
- Connect the Power Supply to the DC Source Voltage (+24 V) on page 57

Warning
Always make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cables on the 300 W DC power supply.

Caution
Provide proper connection and strain relief on the DC power cables in accordance with all local and national electrical codes.

Connect the Power Supply to the DC Source Voltage (–48 V)

To connect the DC power input cables on the Model 10933 or 10934A power supplies to a –4 source, follow these steps:

1 Verify that the DC circuit is de-energized.
2 Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
3 Slide the cover off the terminal block.

4 Connect the DC power input cables.

a On each terminal, loosen the screw enough to allow the spade terminal to slide underneath the captive square washer.

b Slide the spade terminal of the **negative** wire (–48 V) under the captive square washer on the **negative** terminal (labeled –48V).

c Slide the spade terminal of the **positive** wire (–48 V RTN) under the captive square washer on the **positive** terminal (labeled RTN).

The following figure shows the correct positioning for both wires.

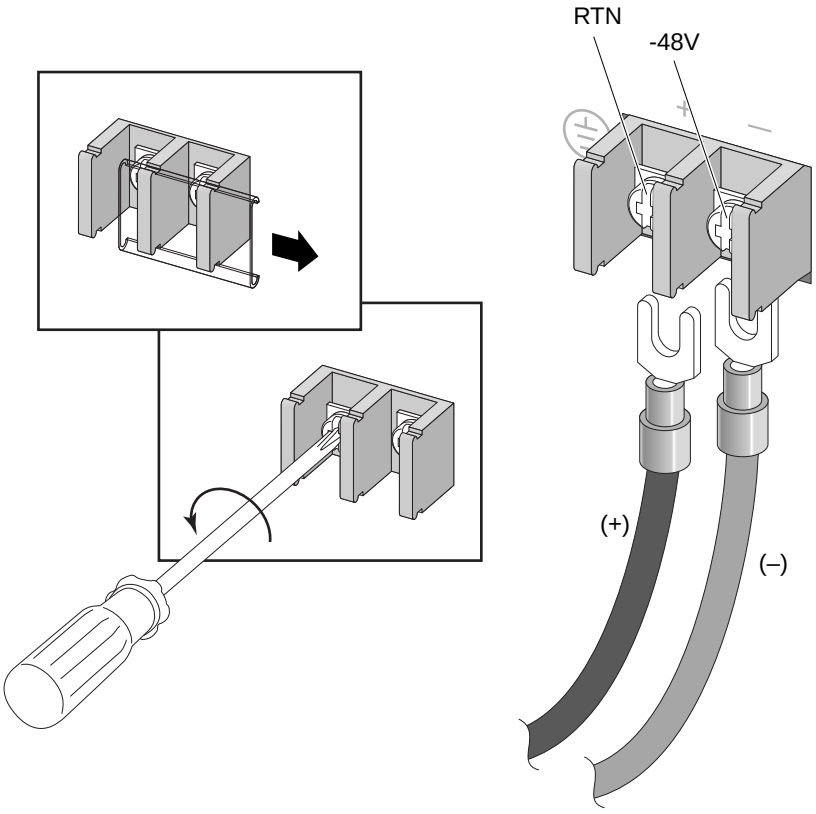

Figure 38: Connecting the DC Power Cables (Part 1)

d Tighten both screws on the terminal block to 11 pound-inches (1.25 Newton-meters).

5 Slide the cover into place over the terminal block, as shown in the following figure.

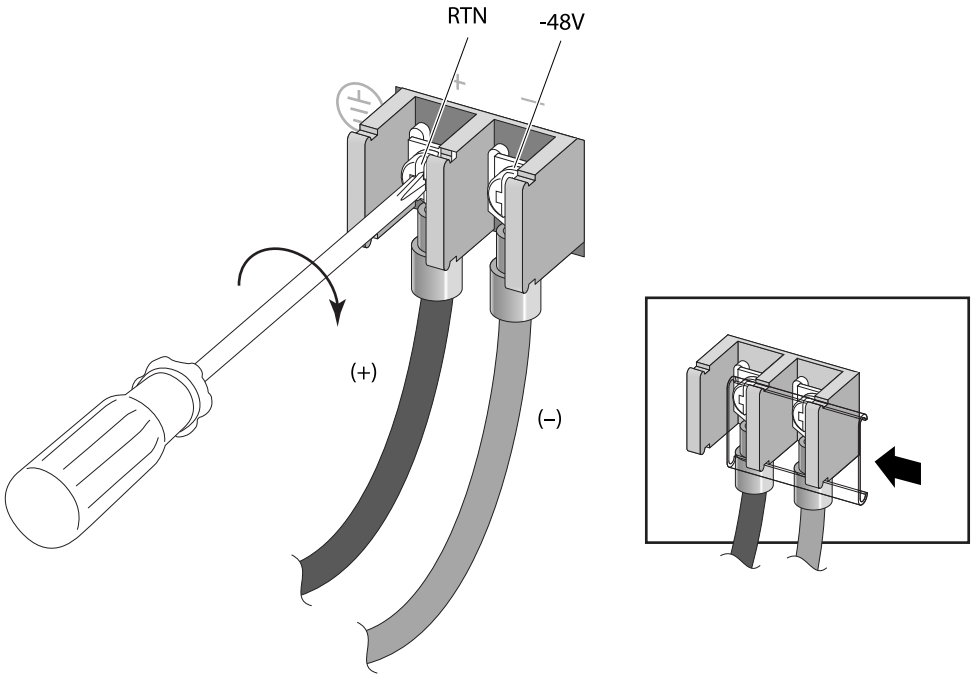

Figure 39: Connecting the DC Power Cables (Part 2)

6 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.

7 Energize the DC circuit.

Leave the ESD strap permanently connected to the rack, so that the strap is always available when you need to handle ESD-sensitive components.

Connect the Power Supply to the DC Source Voltage (+24 V)

To connect the DC power input cables on the Model 10933 power supply to a +24 V source, follow these steps:

Caution
Do not connect a Model 10934A DC power supply to a +24 V source.

1 Verify that the DC circuit is de-energized.

2 Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.

3 Slide the cover off the terminal block.

4 Connect the DC power input cables.

a On each terminal, loosen the screw enough to allow the spade terminal to slide underneath the captive square washer.

b Slide the spade terminal of the **negative** wire (–24 V) under the captive square washer on the **negative** terminal (labeled –24V).

c Slide the spade terminal of the **positive** wire (+24 V) under the captive square washer on the **positive** terminal (labeled +24V).

The following figure shows the correct positioning for both wires.

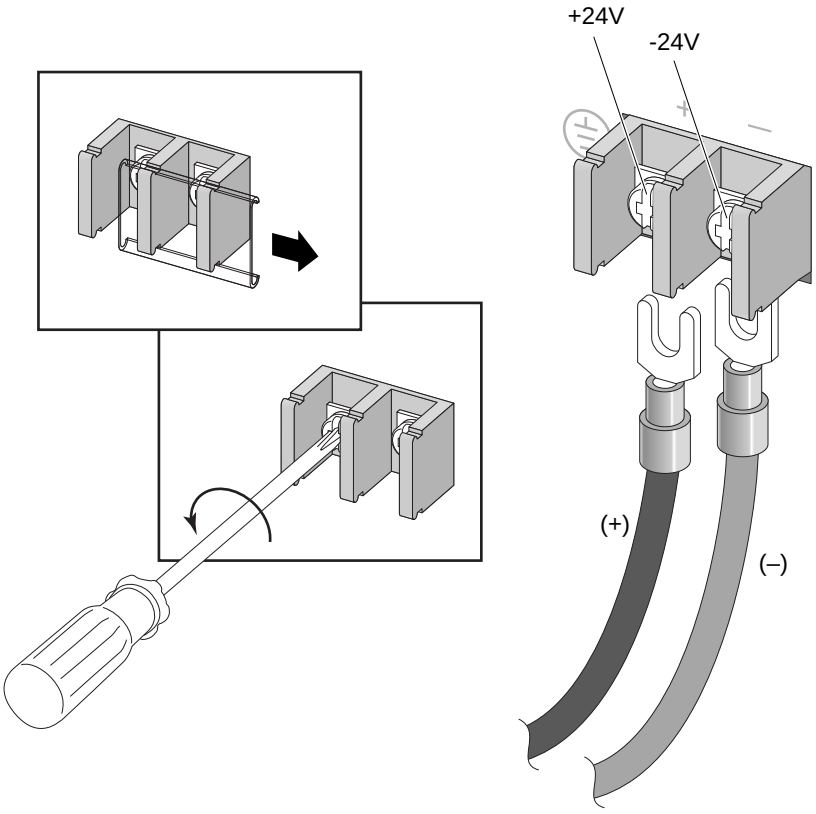

Figure 40: Connecting the DC Power Cables (Part 1)

d Tighten both screws on the terminal block to 11 pound-inches (1.25 Newton-meters).

5 Slide the cover into place over the terminal block, as shown in the following figure.

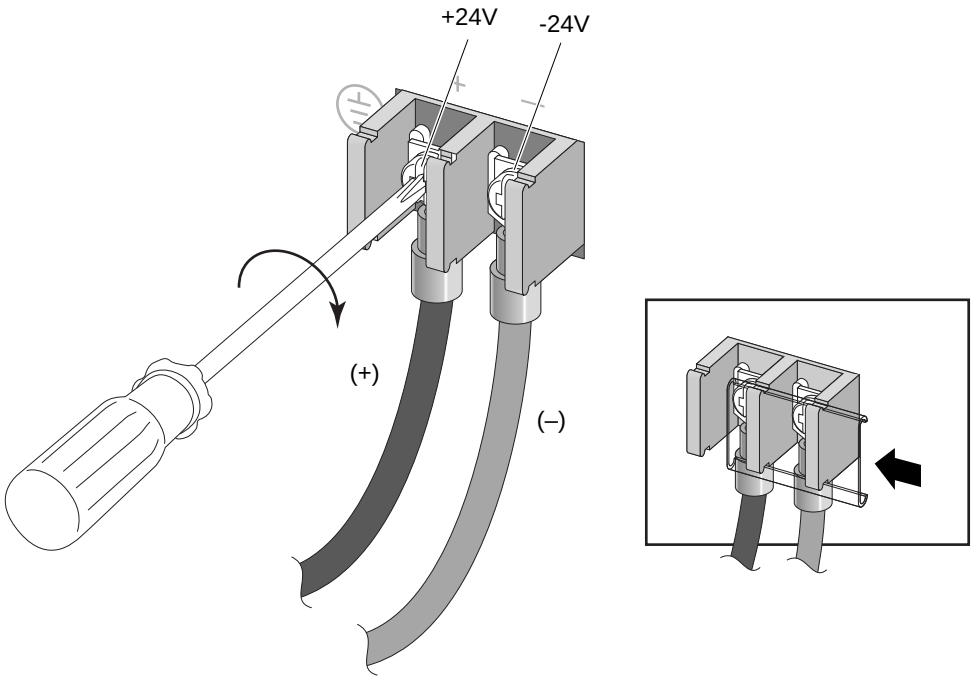

Figure 41: Connecting the DC Power Cables (Part 2)

6 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.

7 Energize the DC circuit.

Leave the ESD strap permanently connected to the rack, so that the strap is always available when you need to handle ESD-sensitive components.

Installing Port Option Cards

Before you install a port option card or module in slot A or slot B on the rear of the E4G-400 router, have the following items on hand:

- ESD-preventive wrist strap
- 1/2-inch flat-blade screwdriver

Slot A accommodates the following cards:

- XGM3S-2sf option card
- XGM3S-2xf option card

Slot B accommodates the following cards:

- XGM3SB-4sf option card
- E4G-B16T1E1 module

You can install or remove a port option card in the E4G-400 router without powering down the router; however, you must reboot the router to initialize a newly installed option card.

1 Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.

2 Remove the blank cover over the slot where the option card will be installed, as shown in the figures below.

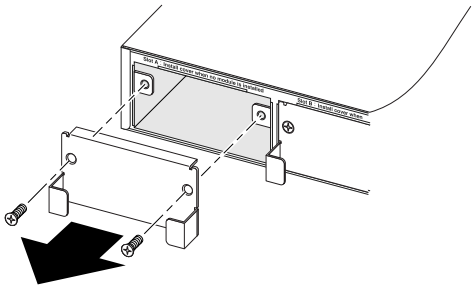

Figure 42: Removing the Option Slot Cover (E4G-400 Slot A)

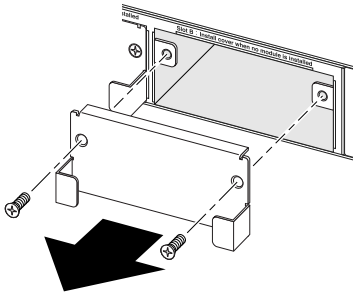

Figure 43: Removing the Option Slot Cover (E4G-400 Slot B)

3 Carefully slide the option card all the way into the slot.

Note
When you install an E4G-B16T1E1 module, the final seating of the card requires firm pressure. Otherwise the retaining screws do not engage, and the internal connector will not mate properly.

4 Align and securely tighten the captive retaining screws as shown in the following figures.

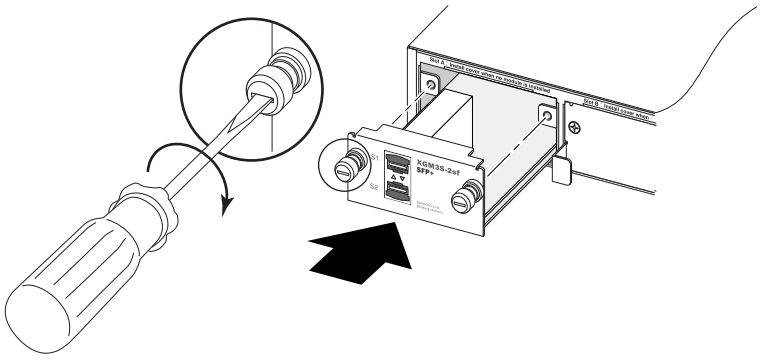

Figure 44: Slot A

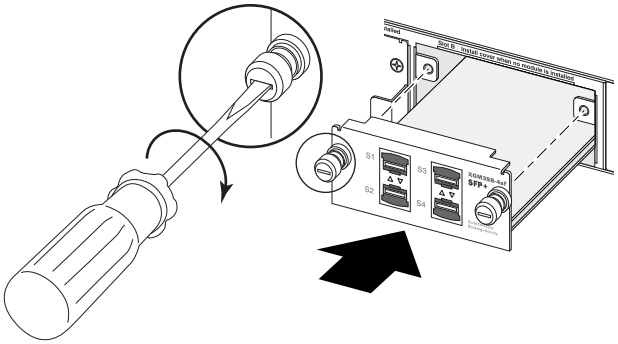

Figure 45: Slot B

5 Reboot the router to initialize the newly installed option card.

If you installed an E4G-B16T1E1 module, follow the instructions in Connecting a Cable for the E4G-B16T1E1 Module on page 61.

Save the slot cover to re-use in case you remove the port option card later. An unoccupied module slot must be covered to ensure satisfactory EMI levels and to maintain adequate airflow through the router.

Connecting a Timing Cable to the E4G-400 Router

The front panel of the E4G-400 router provides the following types of cable connections for connecting a Building Integrated Timing Supply (BITS) or a GPS timing source:

- Two mini-BNC connectors labeled IN
  - 1 PPS input
  - 10 MHz input
- Two mini-BNC connectors labeled OUT
  - 1 PPS or 8 KHz frame output
  - 10 MHz or 2.048 MHz or 1.544 MHz output

  To connect to the mini-BNC connectors, use a 50-ohm coaxial cable with a mini-BNC connector at one end and a standard BNC connector at the other end.
- One RJ-45 connector for time-of-day (ToD) input/output or for RJ422 BITS input

  To connect to the RJ-45 connector, use a twisted-pair cable with the pinouts listed in Table 77 on page 106.

Connecting a Cable for the E4G-B16T1E1 Module

The ports on the E4G-B16T1E1 module are implemented as MRJ21 connectors.

Each connector represents eight ports. Two cable types are available for these ports:

- MRJ21-to-RJ-45 fan-out cable (Extreme Networks part number 16220; see the figure below)

- MRJ21-to-MRJ21 cable

Caution

When you handle the RJ21 cable for the E4G-B16T1E1 module, be careful not to bend the cable too sharply, especially at the connector. Make sure the cable extends at least 3 inches (8 cm) from the back panel of the module before it starts to bend.

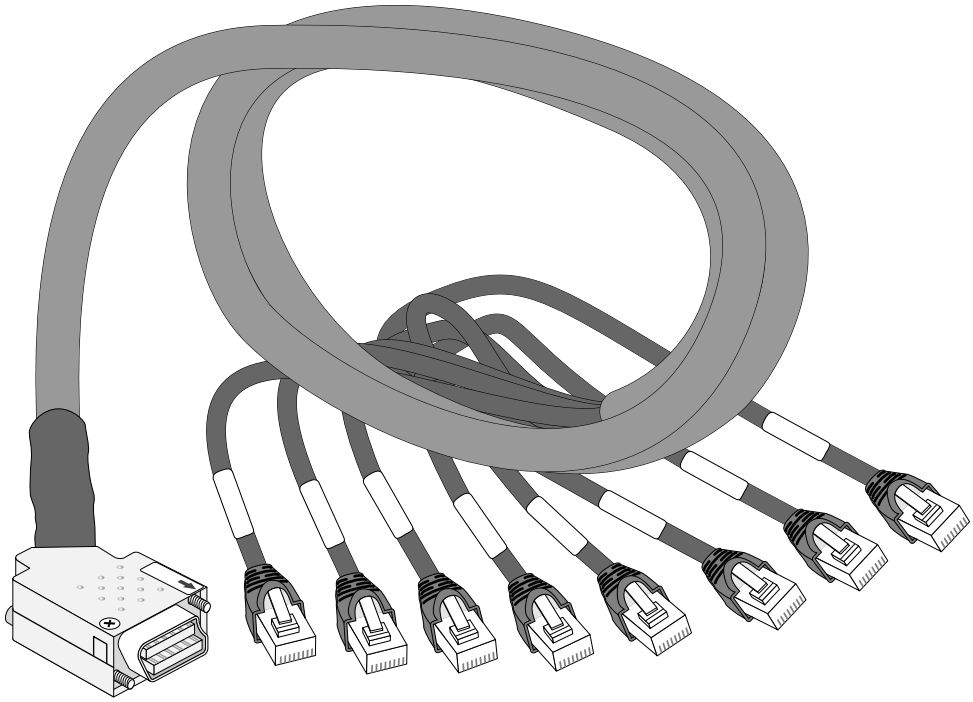

Figure 46: MRJ21-to-RJ-48 Fan-out Cable

To connect the cable, follow these steps:

1 Align the cable connector with the port connector and firmly press the cable connector into place.

2 Use a small straight-tip screwdriver to align and tighten the retaining screw at each end of the cable connector.

See the following figure.

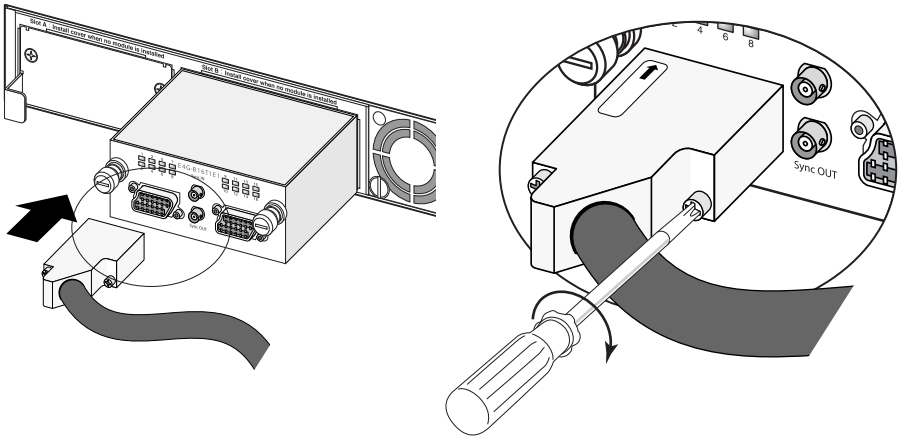

Figure 47: Connecting a Cable to the E4G-B16T1E1 Module

Note

Although shielded cables are used in most central office applications, Extreme Networks E4G routers do not require shielded cables to comply with emissions and immunity requirements.

First-Time Startup

An E4G series router starts when it is connected to a power source.

When a router starts for the first time, it can take up to 40 minutes for the clock function to stabilize and allow the T1 lines to hold synchronization.

Fans in the router might not start immediately when the unit is connected to power. This is normal: the system cycles the fans on and off automatically in response to the unit's cooling requirements.

Refer to the *ExtremeXOS Quick Guide* for information about configuring ExtremeXOS for your E4G router.

4 Maintaining Your Equipment

Use the procedures in this section to complete the following maintenance tasks for an E4G router.

Caution
Wear hearing protection if you plan to work near multiple routers for an extended time. When all fans are operating, the noise level for an E4G-400 router can exceed 7.2 B(A) declared sound power or 69 decibels sound power.

Replacing an AC Power Supply

The E4G-400 routers have two bays for hot-swappable power supplies.

In a router with a redundant power configuration, you can replace one AC power supply without powering down the router.

Before you start, have the following items on hand:

- Thermal protective gloves.
- An AC power cord, if you will not be re-using the cord from the removed power supply.

  An AC power cord is not included with the AC power supply. You must obtain a power supply cord that meets requirements. See Selecting Power Supply Cords on page 82 for more information.

When replacing a power supply unit, be sure to observe all of the safety recommendations in Installing Power Supply Units and Connecting Power on page 81.

To replace the AC power supply in an E4G-400 router, follow these steps:

1 Disconnect the AC power cord from the wall outlet and from the power supply.
2 Note the orientation of the installed power supply and the location of the latching tab at the right of the unit.

3 Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors.

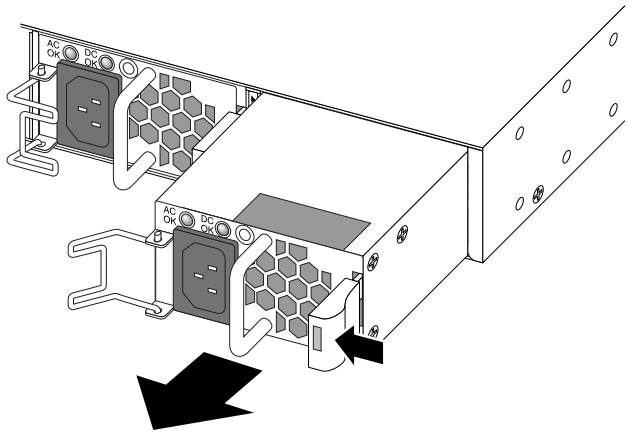

Figure 48: Removing a 300 W AC Power Supply

4 Carefully slide the power supply the rest of the way out of the router.

Caution
Power supplies can become very hot during operation. Wear thermal protective gloves when you remove a power supply from an operating router.

Note
If you are not installing a replacement power supply, install a cover over the unoccupied power supply bay. Unoccupied bays must always be covered to maintain proper system ventilation and electromagnetic interference (EMI) levels.

5 Verify that the replacement power supply is oriented the same way as the unit you removed.

6 Carefully slide the power supply all the way into the power supply bay.

7 Push the power supply in until the latch snaps into place.

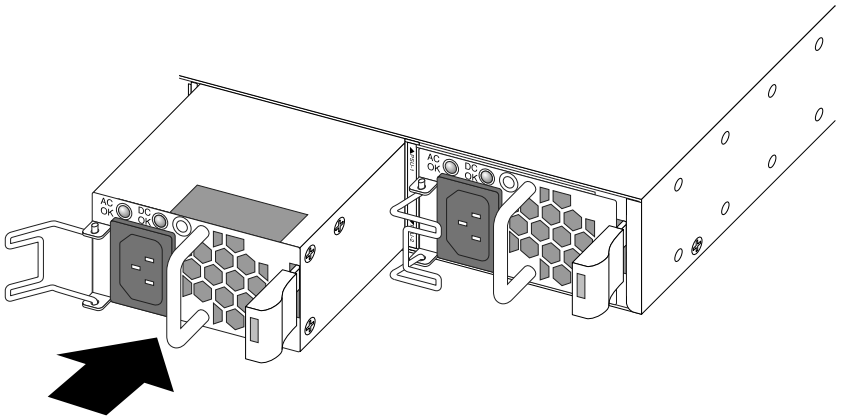

Figure 49: Installing a 300 W AC Power Supply

Caution
Do not slam the power supply into the router.

8 Connect the AC power cord to the input connector on the power supply and rotate the wire clip into place over the power cord connector.
9 Connect the other end of the power cord to an AC power outlet.

Warning
Always be sure that the source outlet is properly grounded before plugging the AC power cord into the AC power supply.

Replacing a DC Power Supply

Two 300 W DC power supplies are available for use with the E4G-400:

- Model 10933 can connect to either a –48 V or a +24 V power source.
- Model 10934A can connect only to a –48 V power source.

We recommend using a Model 10933 power supply, connected to a +24 V power source.

In a redundant power configuration, you can replace one DC power supply without powering down the router.

Before you start, have the following items on hand:

- #1 Phillips screwdriver
- Torque screwdriver and wrench or torque driver with attachments for tightening screws and nuts
- Thermal protective gloves (required for removing a power supply)

Warning
Be sure to disconnect all power cables before you disconnect the chassis ground wire.

When replacing a power supply unit, be sure to observe all of the safety recommendations in Installing Power Supply Units and Connecting Power on page 81.

To replace the DC power supply in an E4G-400 router, perform the following tasks in order:

1 Removing the Power Supply on page 67
2 Installing the Replacement Power Supply on page 68
3 Connecting the Ground Cable on page 70
4 Connecting the Power Supply to the DC Source Voltage on page 55

Removing the Power Supply

To remove the DC power supply from an E4G-400 router, follow these steps:

1 De-energize the DC circuit.
2 Disconnect the DC power cables.
   a Slide the cover off the terminal block.
   b Loosen the screws that secure the cable terminals to the terminal block.
   c Slide the wires out from under the captive washers.
3 Disconnect the ground wire.
   a Remove the screw that secures the ground wire to the power supply.
   b Move the wire away from the power supply.
4 Push the latching tab to the left as you pull outward on the handle to disengage the power supply internal connectors
5 Carefully slide the power supply the rest of the way out of the router, as shown in the figures below.

Caution
Power supplies can become very hot during operation. Wear thermal protective gloves when you remove a power supply from an operating router.

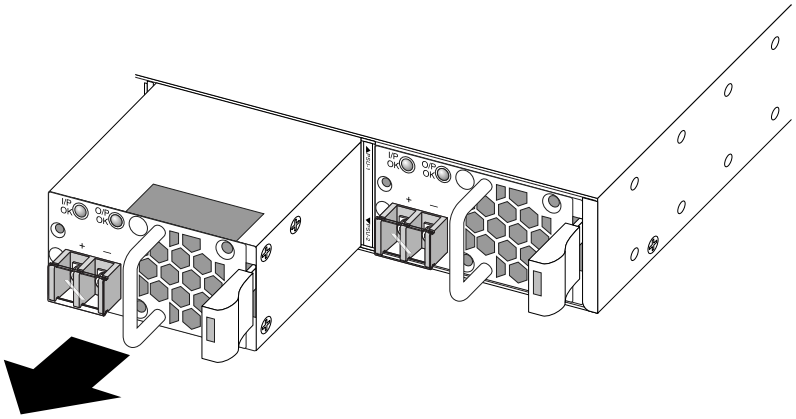

Figure 50: Removing a Summit 300 W DC Power Supply (Model 10934A)

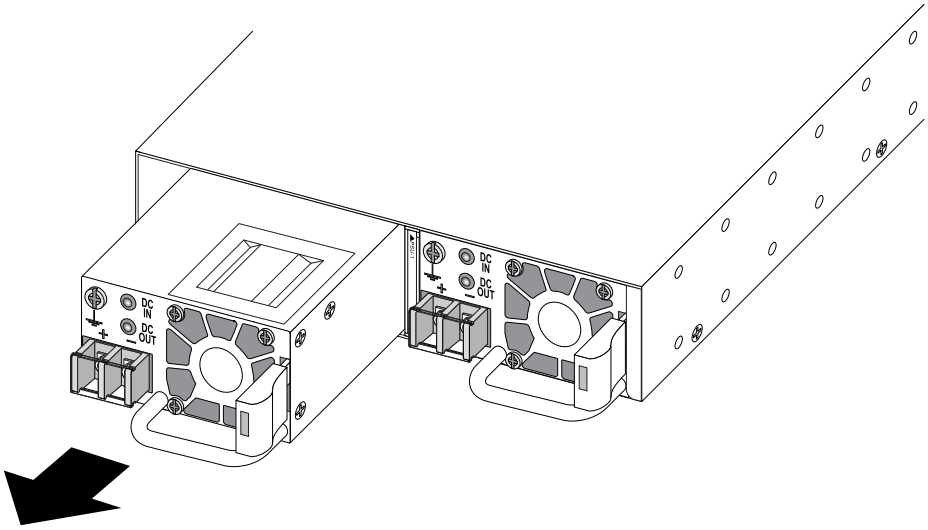

Figure 51: Removing a Summit 300 W DC Power Supply (Model 10933)

Follow the steps in Installing the Replacement Power Supply on page 68.

If you do not plan to replace the power supply immediately, install a cover over the unoccupied bay. The cover is required for maintaining proper system ventilation and EMI levels.

Installing the Replacement Power Supply

To replace a DC power supply (Model 10933 or 10934A) in an E4G-400 router, follow these steps:

1 If necessary, remove the blank panel cover as shown in the following figure.

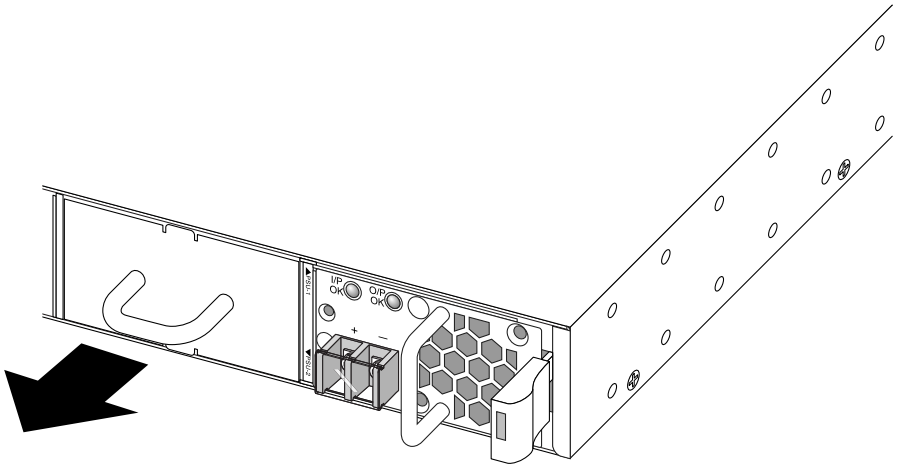

Figure 52: Removing a Blank Panel

2 Verify that the power supply is right side up, and slide it into the router.

3 Carefully slide the power supply all the way into the power supply bay, as shown in the figures below, until the latch snaps into place.

Caution
Do not slam the power supply into the router.

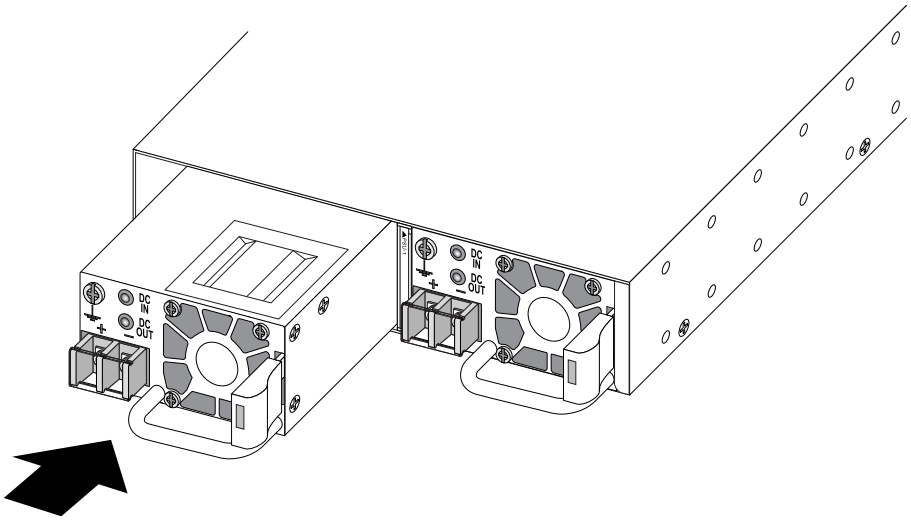

Figure 53: Installing a Summit 300 W DC Power Supply (Model 10933)

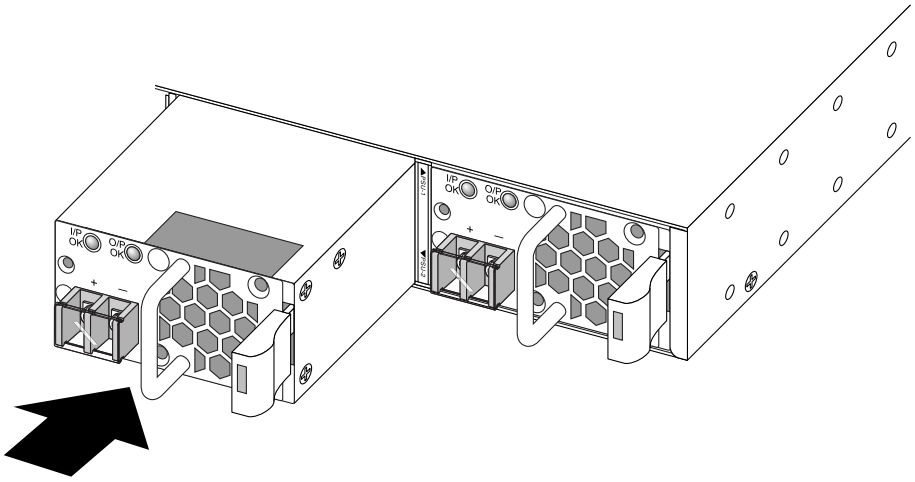

Figure 54: Installing a Summit 300 W DC Power Supply (Model 10934A)

4 If power supplies are not installed in both power supply bays, install a cover over the unoccupied bay.

The cover is required for maintaining proper system ventilation and EMI levels.

Connecting the Ground Cable

You must ground the DC power supply before connecting it to a power source.

Warning
Connect the ground cable before you connect any power cables.

Warning
Disconnect the ground cable after you disconnect all power cables.

1 Verify that the DC circuit is de-energized.
2 Identify the grounding point on the front panel of the power supply.
3 Insert an M3.5 screw (provided) through the ring terminal on the ground cable and into the grounding point on the power supply.

See the following figures.

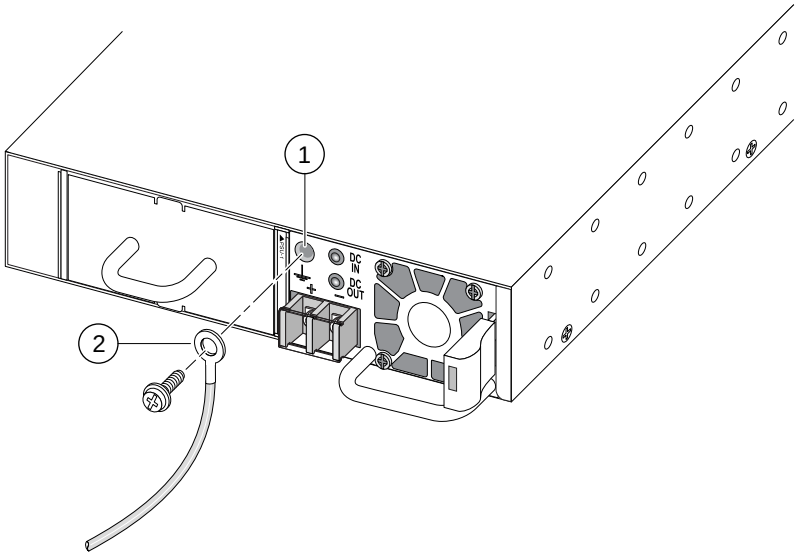

Figure 55: Connecting the Ground Cable (Model 10933)

1 = Grounding point	2 = Ground cable

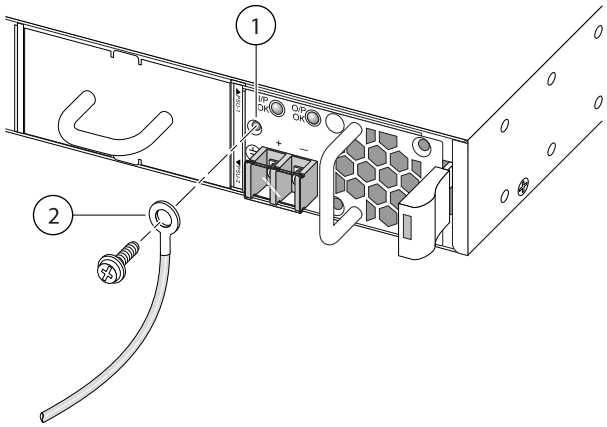

Figure 56: Connecting the Ground Cable (Model 10934A)

1 = Grounding point	2 = Ground cable

4 Tighten the screw to 12.6 pound-inches (1.42 Newton-meters).

5 Connect the other end of the cable to a known reliable earth ground point at your site.

Connecting the Replacement Power Supply to the DC Source Voltage

For information about connecting the model 10933 or 10934A power supply to the DC source voltage, refer to Connecting the Power Supply to the DC Source Voltage on page 55.

Replacing a Fan Module

To remove and replace the fan module in an E4G-400 router, you need a 1/2-inch flat-blade screwdriver.

Caution

Have the replacement fan module on hand before you begin, so that you can finish the replacement procedure promptly. The router can overheat if it is left without cooling for an extended period.

1 Completely loosen the captive retaining screws on the fan module.

2 Slide the fan module out of the router, as shown in the following figure, and set it aside.

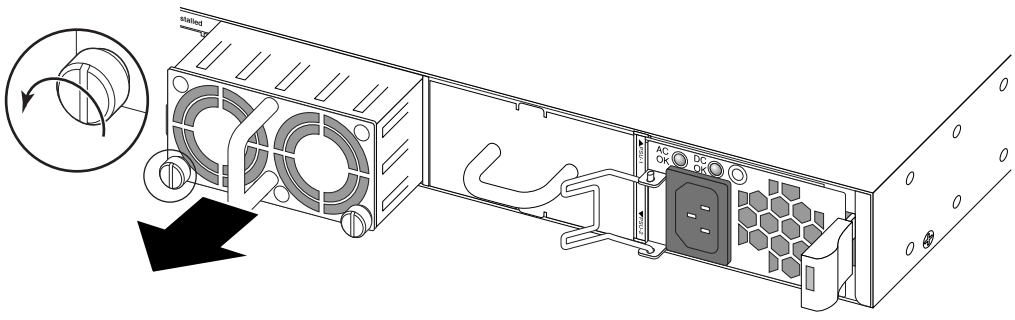

Figure 57: Removing a Fan Module

3 Carefully slide the replacement fan module into the router, as shown in the following figure.

Caution
Do not slam the fan module into the router.

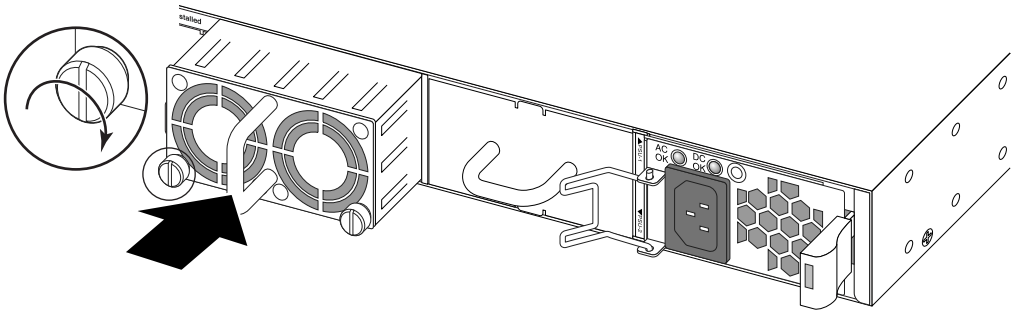

Figure 58: Installing a Fan Module

4 Align and fully tighten the captive retaining screws.

Replacing Optional Ports

Before you replace a port option card in slot A or slot B on the E4G-400 router, have the following items on hand:

- ESD-preventive wrist strap
- 1/2-inch flat-blade screwdriver

You can replace a port option card without powering down the router. However, you will need to reboot the router to initialize the newly installed card.

1 Attach an ESD-preventive wrist strap to your wrist and connect the metal end to an appropriate ground point on the rack.
2 Completely loosen the captive retaining screws and slide the installed option card out of the router, as shown in the following figures.

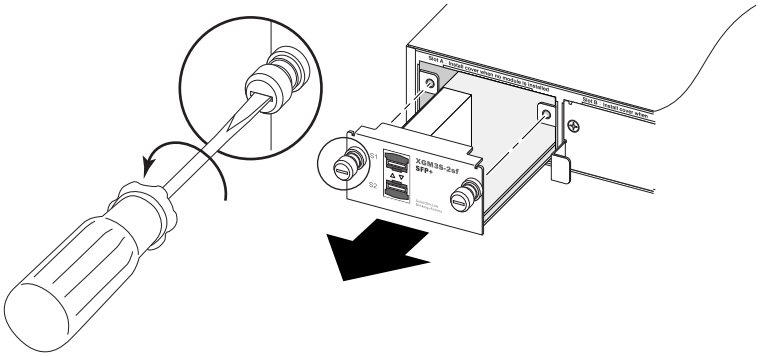

Figure 59: Removing a Port Option Card: Slot A

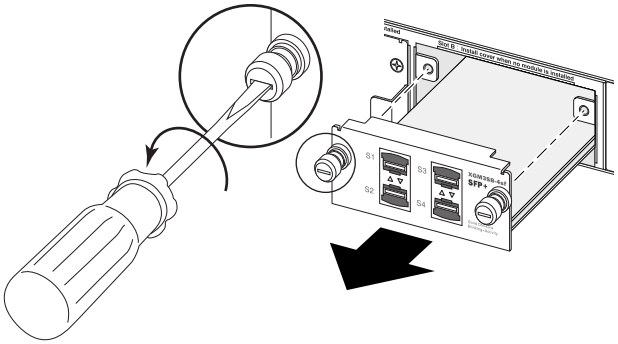

Figure 60: Removing a Port Option Card: Slot B

3 Carefully slide the replacement module into the router.

4 Align and tighten the captive retaining screws, as shown in the following figures.

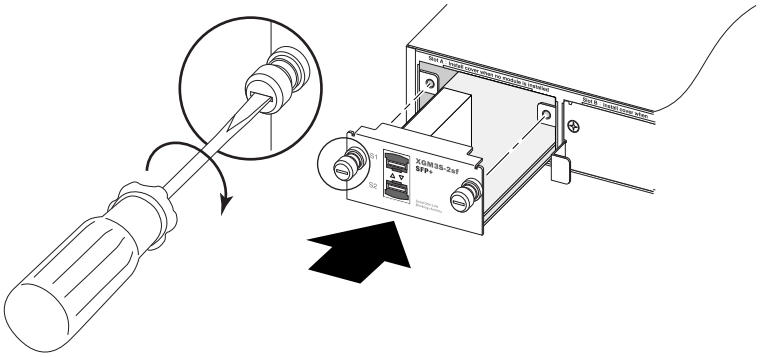

Figure 61: Installing a Port Option Card: Slot A

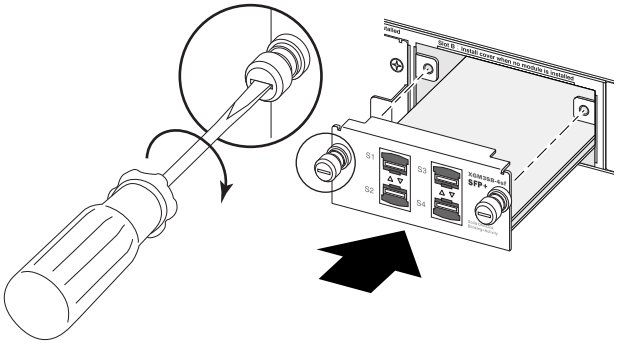

Figure 62: Installing a Port Option Card: Slot B

5 Reboot the router to initialize the newly installed port option card.

Replacing a Clock Module

Before you replace the clock module on the E4G-200 router, have the following items on hand:

- ESD-preventive wrist strap
- #1 Phillips screwdriver

You can replace a clock module without powering down the router. However, you will need to reboot the router to initialize the newly installed clock module.

1 Attach an ESD-preventive wrist strap to your wrist and connect the metal end to an appropriate ground point on the rack.
2 Completely loosen the captive retaining screws and slide the installed clock module out of the router, as shown in the following figure.

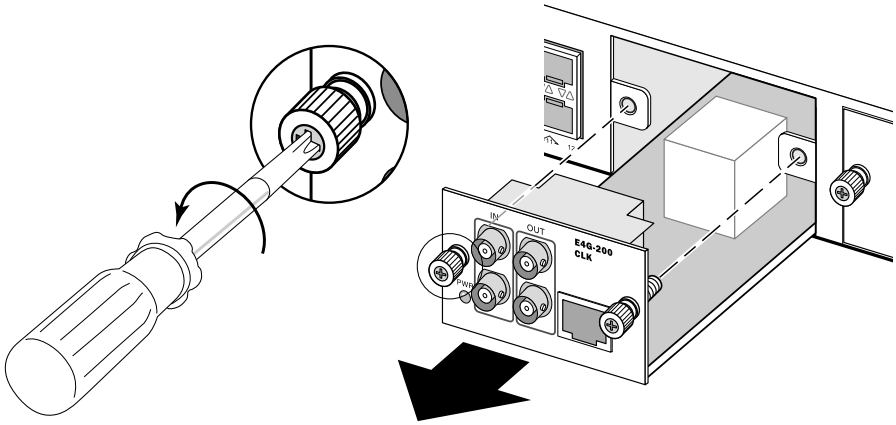

Figure 63: Removing a Clock Module

3 Align the replacement module with the card guides and carefully slide the module all the way into the slot.
4 Align and securely tighten the retaining screws as shown in the following figure.

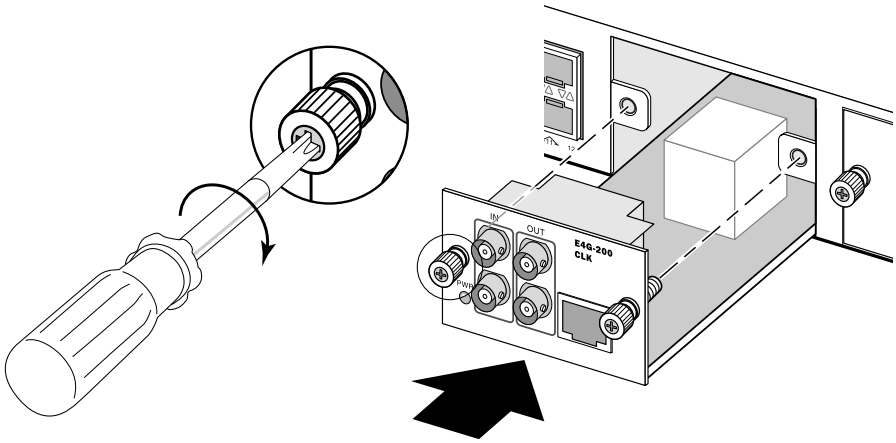

Figure 64: Installing a Clock Module

5 To initialize the clock module, reboot the router.

Replacing a T1/E1 Module

Before you replace a T1/E1 module on the E4G router, have the following items on hand:

- ESD-preventive wrist strap
- #1 Phillips screwdriver

You can replace a T1/E1 module without powering down the router. However, you will need to reboot the router to initialize the newly installed T1/E1 module.

1 Attach an ESD-preventive wrist strap to your wrist and connect the metal end to an appropriate ground point on the rack.

2 Completely loosen the captive retaining screws and slide the installed T1/E1 module out of the router, as shown in the following figure.

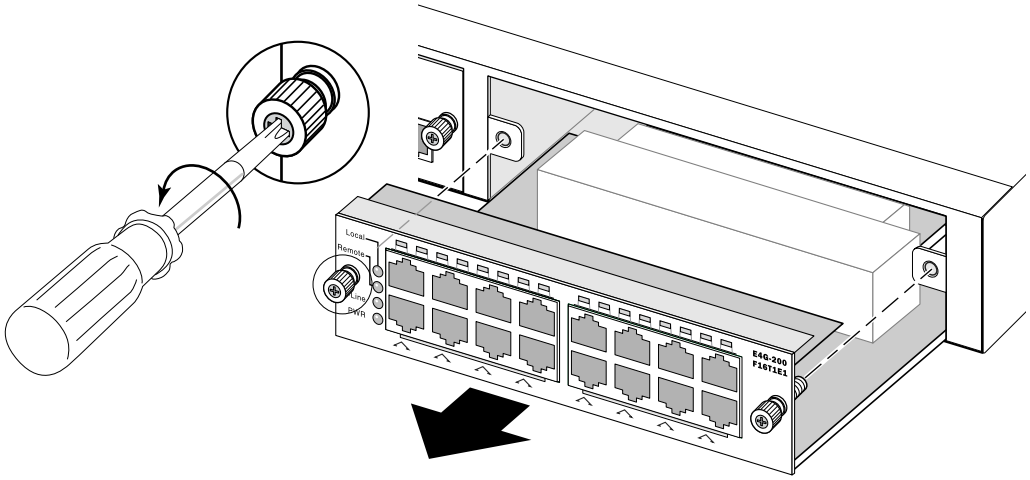

Figure 65: Removing a T1/E1 Module

3 Align the replacement module with the card guides and carefully slide the module into the slot.

4 Align and securely tighten the retaining screws, as shown in the following figure.

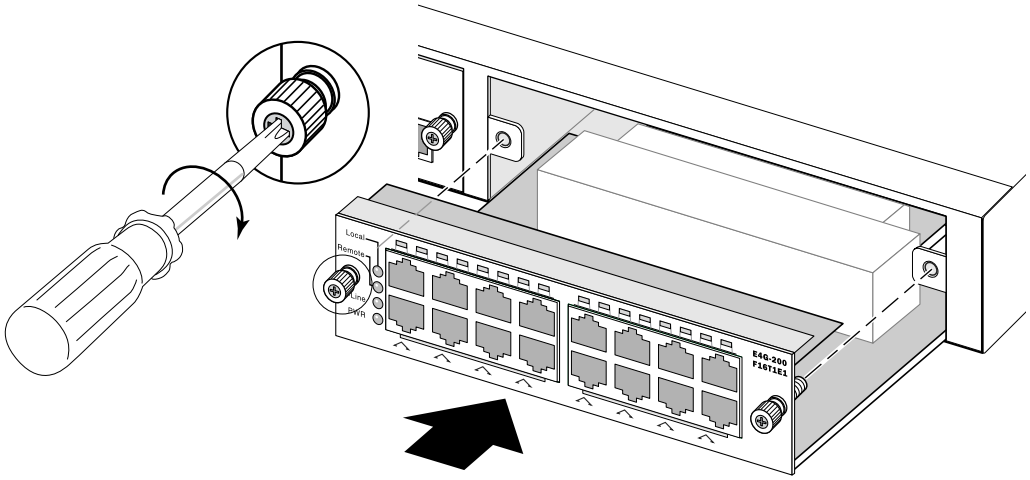

Figure 66: Installing a T1/E1 Module

5 Reboot the router to initialize the new T1/E1 module.

Removing an E4G-200 Router from an Equipment Rack

To remove an E4G-200 router from an equipment rack, follow these steps:

1 De-energize the DC circuit for all power connections.

2 Loosen the retaining screws and unplug each DC power connector from the DC power socket on the router.
3 Disconnect the ground wire:
   a Loosen the retaining screw on the ground lug.
   b Pull the ground wire out of the lug and move the ground wire out of the way.
4 Loosen and remove the four screws holding the router in place in the equipment rack.
5 Carefully remove the router from the rack and place it on a secure, flat surface.

Removing an E4G-400 Router from an Equipment Rack

Wear thermal protective gloves when handling the power supply during removal. The power supply may be hot to the touch.

To remove an E4G-400 router from an equipment rack, follow these steps.

If the router has an AC power supply, begin at step 1.

If the router has a DC power supply, begin at step 2 on page 77.

1 Remove a 300 W AC power supply.
   a Disconnect the AC power cord from the wall outlet and from the power supply.
   b Push the latching tab toward the power supply handle and pull outward on the handle, as shown in the following figure, to disengage the power supply internal connectors.

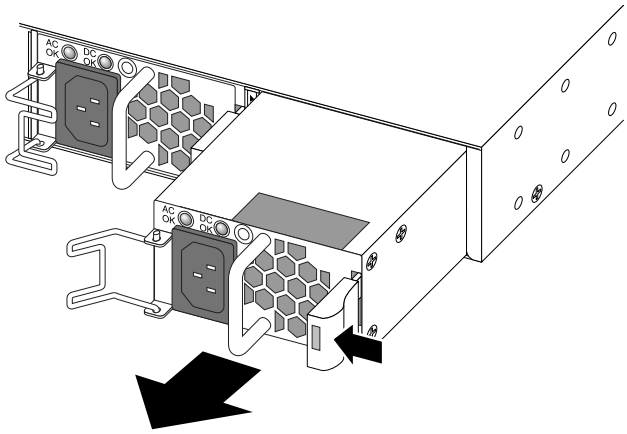

Figure 67: Removing an AC Power Supply

2 Remove a 300 W DC power supply.

a De-energize the DC circuit.

b Slide the cover off the terminal block.

c Loosen the screws that secure the cable terminals to the terminal block.

d Slide the wires out from under the captive washers.

e Remove the screw that secures the ground wire to the power supply.

f Move the wire away from the power supply.

g Push the latching tab to the left as you pull outward on the handle to disengage the power supply internal connectors, as shown in the following figure.

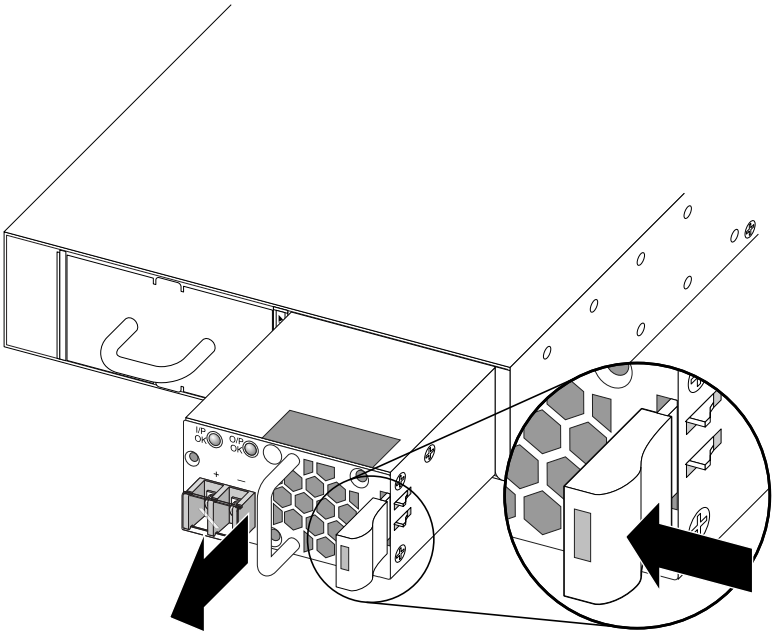

Figure 68: Removing a 300 W DC Power Supply

3 Carefully slide the power supply the rest of the way out of the router.

4 Support the router as you remove the screws that hold the router to the rack.

5 Carefully remove the router from the rack and place it on a secure, flat surface.

A Safety Information

Only trained and qualified service personnel (as defined in IEC 60950-1 and AS/NZS 3260) should install, replace, or perform service to Extreme Networks switches and their components.

Warning
Read the safety information in this appendix thoroughly before installing Extreme Networks products. Failure to follow this safety information can lead to personal injury or damage to the equipment.

Qualified personnel have read all related installation manuals, have the technical training and experience necessary to be aware of the hazards to which they are exposed in performing a task, and are aware of measures to minimize the danger to themselves or other persons.

If you are in the USA, install the system in accordance with the U.S. National Electrical Code (NEC).

Safety Considerations Before Installing

Before installing the equipment, consider the following:

- For equipment designed to operate in a typical Telco environment that is environmentally controlled, choose an indoor area that has the following characteristics:
  - Temperature-controlled and humidity-controlled, such that the maximum ambient room temperature shall not exceed the temperature specified in the product data sheet
  - Clean and free from airborne materials that can conduct electricity
  - Well ventilated and away from sources of heat including direct sunlight
  - Away from sources of vibration or physical shock
  - Isolated from strong electromagnetic fields produced by electrical devices
  - Secured, enclosed, and restricted-access, ensuring that only trained and qualified service personnel have access to the equipment
- For equipment designed to be installed in environments that are not environmentally controlled, such as outdoor enclosures, see the product data sheet or Technical Specifications on page 91 for environmental conditions, temperature, and humidity.
- Establish at least 3 inches (8 cm) clearance on all sides for effective ventilation. Do not obstruct air intake vents or ventilation grills on the front, side, or rear panel. Locate the system away from heat sources.
- Make sure that your equipment is placed in an area that accommodates the power consumption and component heat dissipation specifications.
- Make sure that your power supplies meet the site DC power or AC power requirements of all the network equipment.
- Racks for Extreme Networks equipment must be permanently attached to the floor. Failure to stabilize the rack can cause the rack to tip over when the equipment is removed for servicing.
- Do not operate the system unless all modules, faceplates, front covers, and rear covers are in place. Blank faceplates and cover panels are required for the following functions:
  - Preventing exposure to hazardous voltages and currents inside the equipment
  - Containing electromagnetic interference (EMI) that might disrupt other equipment
  - Directing the flow of cooling air through the equipment
- Ultimate disposal of this product should be handled according to all national laws and regulations.

General Safety Precautions

To avoid injury and damage to the equipment, follow these safety guidelines.

- Do not try to lift objects that you think are too heavy for you.
- When you install equipment in a rack, load heavier devices in the lower half of the rack first to avoid making the rack top-heavy.

- Use only tools and equipment that are in perfect condition. Do not use equipment with visible damage.
- Route cables in a manner that prevents possible damage to the cables and avoids causing accidents, such as tripping.
- Do not place a monitor or other objects on top of the equipment. The chassis cover is not designed to support weight.
- To reduce the risk of fire, use only #26 AWG or larger telecommunications line cord. Use only copper conductors.
- Do not work on the system or connect or disconnect cables during periods of lightning activity.
- This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor.

Maintenance Safety

When maintaining your equipment, follow these safety guidelines to avoid injury and damage to the equipment.

- Use only authorized accessories or components that are approved for use with this system. Failure to follow these instructions may damage the equipment or violate required safety and EMC regulations.
- This system contains no customer serviceable components. Do not attempt to repair a chassis, power supply, module, or other component. In the event of failure, return the defective unit to Extreme Networks for repair or replacement, unless otherwise instructed by an Extreme Networks representative.
- To remove power from the system, you must unplug all power cords from wall outlets. The power cord is the disconnect device to the main power source.
- Disconnect all power cords before working near power supplies, unless you are instructed otherwise by a product-specific maintenance procedure.
- Replace a power cord immediately if it shows any signs of damage.
- When you work with optical devices, power supplies, or other modular accessories, put on an ESD-preventive wrist strap to reduce the risk of electronic damage to the equipment. Connect the other end of the strap to an appropriate grounding point on the equipment rack or to an ESD jack on the chassis if one is provided. Leave the ESD-preventive wrist strap permanently attached to the equipment rack or chassis so that it is always available when you need to handle components that are sensitive to ESD.
- Install all cables in a manner that avoids strain. Use tie wraps or other strain relief devices.

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

LAN systems are designed only for intra-building installations; that is, cable runs between devices must be in the same building as the connected units.

As allowed in the USA by the National Electrical Code (NEC), this equipment can be connected between buildings if any one of the following conditions is true:

- Cable runs between buildings are less then 140 feet (42.6 m) long.
- Cable runs between buildings are directly buried.

- Cable runs between buildings are in an underground conduit, where a continuous metallic cable shield or a continuous metallic conduit containing the cable is bonded to each building grounding electrode system.

Caution

Failure to follow these requirements for cable routing conditions may expose the user to electrical shock and may expose the unit to damage that can cause errors.

Warning

The Ethernet ports of the equipment and its sub-assemblies are suitable only for intra-building connections (within the same building) or for connections to unexposed wiring or cabling. (See the conditions listed above.) The Ethernet ports of this equipment or its sub-assemblies must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. Ethernet interfaces are designed for use only as intra-building interfaces (described as Type 2 or Type 4 ports in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP wiring. The addition of Primary Protectors is not sufficient protection to connect these interfaces metallically to OSP wiring. This warning does not apply to T1/E1 ports because T1/E1 ports have built-in isolation and surge protection that allows them to be connected to OSP wiring.

Installing Power Supply Units and Connecting Power

Be sure to satisfy the requirements listed in this section when you install Extreme Networks power supplies or connect power.

Check the ratings and power requirements of each power supply unit or router.

For more information, see Technical Specifications on page 91 or the data sheet for the equipment at: http://www.extremenetworks.com.

When you install any power supply:

- Do not use excessive force when you insert a power supply into the bay.
- Do not attempt to open the power supply enclosure for any reason; the power supply does not contain user-serviceable parts. In the event of failure, return the defective power supply to Extreme Networks for repair or replacement.
- Do not put your hand into an open power supply bay when a power supply is not present. An empty power supply bay requires a cover at all times.
- Before you work on equipment that is connected to power lines, remove all jewelry, including watches. Metal objects heat up when they are connected to power and ground and can cause serious burns or weld the metal object to the terminals.
- An electrical arc can occur when you connect or disconnect the power with power applied. This could cause an explosion in hazardous area installations. Be sure that power is removed from the device.
- When you install or replace equipment, always make the ground connection first and disconnect the ground connection last.

When you install AC power supplies:

- For equipment with field-replaceable power supplies, do not connect the power supply to an electrical source when the power supply is not installed in the equipment; doing so would expose a hazardous energy and poses a potential shock and fire hazard.
- Plug power supplies only into properly grounded electrical outlets to help prevent electrical shock and to comply with international safety standards.
- Use only power cords that are certified for use within the country of use. Do not attempt to modify AC power cords.
- Make sure that the voltage and frequency of your power outlet match the system electrical ratings for the equipment. The building and/or power source must provide overload protection.
- Use a surge suppressor, line conditioner, or uninterruptible power supply to protect the system from momentary increases or decreases in electrical power.
- When multiple power supplies are used with a system, connect each power supply to a different, independent over-current protection device, such as a circuit breaker. If a single power source fails, it will affect only that power supply to which it is connected. See the data sheet of the power supply for proper sizing of the circuit breaker.
- Extreme Networks AC power supplies do not have switches for turning the unit on and off. Remove all wall plugs from the electrical outlet to disconnect the power. Make sure that these connections are easily accessible.

When you install DC power supplies or connect DC power:

- Making the connection to your facility DC source voltage must be performed by a qualified, licensed electrician.
- Extreme Networks DC power supplies and DC-powered devices do not have switches for turning the unit on and off. Make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cord at the DC power input socket.
- Do not connect a DC power supply to the DC source power when the power supply is not installed in the chassis; doing so would expose a hazardous energy and poses a potential shock and fire hazard.
- Connect the system or power supply only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-based safety standards.
- DC-powered equipment must be installed in a restricted-access area to ensure that only trained and qualified service personnel have access to the equipment. A restricted-access area can be entered only through the use of a special tool, lock and key, or other means of security.

Note

Building codes vary worldwide; therefore, Extreme Networks strongly recommends that you consult an electrical contractor to ensure proper equipment grounding and power distribution for your specific installation and country.

Selecting Power Supply Cords

Extreme Networks does not include AC power input cords in the product box.

You can purchase a power cord for your product and for your specific country from your local Extreme Networks Channel Account Manager or Sales Manager, or you can purchase a cord from your local supplier. Requirements for the power cord are listed in Power Cord Requirements for AC Power Supplies on page 106.

To locate a Sales Manager or Partner in your region, visit www.extremenetworks.com/partners/where-to-buy.

Note

This equipment is not intended to be directly powered by power distribution systems where phase-phase voltages exceed 240 VAC (2P+PE), such as those used in Norway, France, and other countries. For these applications we recommend that a transformer be used to step down the voltage to less than 240 VAC from phase-phase, or that you make a connection to a (P+N+PE) power distribution where voltages do not exceed 240 VAC.

All installations should confirm that the product is reliably grounded according to the country's local electrical codes.

Battery Replacement and Disposal

Batteries included with Extreme Networks products are encapsulated and must be replaced by qualified Extreme Service personnel only.

Do not attempt to replace the battery. Contact your Extreme Service personnel for product replacement.

If these instructions are disregarded and replacement of these batteries is attempted, the following guidelines must be followed to avoid danger of explosion:

- Replace with the same or equivalent battery type as recommended by the battery manufacturer.
- Dispose of the battery in accordance with the battery manufacturer's recommendation.

Fiber Optic Ports and Optical Safety

The following safety warnings apply to all optical devices used in Extreme Networks equipment that are removable or directly installed in an I/O module or chassis system.

Such devices include but are not limited to gigabit interface converters (GBICs), small form factor pluggable (SFP) modules (or mini-GBICs), QSFP+ modules, XENPAK transceivers, and XFP laser optic modules.

Warning

Laser optic modules become very hot after prolonged use. Be careful when removing a laser optic module from the chassis or option card. If the laser optic module is too hot to touch, disengage the laser optic module and allow it to cool before removing it completely.

When you work with laser optic modules, always take the precautions listed below to avoid exposure to hazardous radiation.

- Never look at the transmit LED/laser through a magnifying device while the LED or laser is powered on.
- Never look directly at a fiber port on the router or at the ends of a fiber cable when they are powered on.
- Invisible laser radiation can occur when the connectors are open. Avoid direct eye exposure to the beam when optical connections are unplugged.
- Never alter, modify, or change an optical device in any way other than suggested in this document.

SFP (Mini-GBIC), SFP+, and XFP Regulatory Compliance

Extreme Networks pluggable optical modules meet the following regulatory requirements:

- Class 1 or Class 1M Laser Product
- EN60825-1:2007 2nd Ed. or later, European standard
- FCC 21 CFR Chapter 1, Subchapter J in accordance with FDA & CDRH requirements
- Application of CE Mark in accordance with 2004/108/EEC EMC Directive and the 2006/95/EC Low Voltage Directives
- UL and/or CSA registered component for North America
- 47 CFR Part 15, Class A when installed into Extreme products

Safety Information for the E4G Series Routers

The statements in this section apply specifically to the E4G series routers.

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV-1) circuits.

Note
LAN ports contain SELV circuits, and WAN ports contain TNV-1 circuits. Both LAN and WAN ports may use RJ-45 connectors. Use care when connecting cables.

Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Do not use this equipment near a water hazard, such as a wet wall, drain path, or other source of water.

Sicherheitshinweise

Warning
Lesen Sie die folgenden Sicherheitshinweise aufmerksam durch, ehe Sie Extreme Networks-Produkte installieren. Eine Missachtung dieser Sicherheitshinweise kann zu Verletzungen oder zu einer Beschädigung des/r Geräte/s führen.

Extreme Networks-Geräte und deren Komponenten dürfen nur durch geschulte und qualifizierte Wartungstechniker (wie in IEC 60950-1 und AS/NZS 3260 definiert) installiert, ausgetauscht oder gewartet werden. Dieses qualifizierte Personal muss den Inhalt aller zugehörigen Installationsanleitungen kennen sowie über die technische Ausbildung und Erfahrung verfügen, um die Gefahren, die mit der Ausführung einer Aufgabe assoziiert sind, zu kennen und zu wissen, wie sie diese Gefahren für sich selbst und Dritte minimieren können.

In den USA muss das System gemäß dem US National Electrical Code (NEC) installiert werden.

Überlegungen vor der Installation

Berücksichtigen Sie vor der Installation der Geräte folgende Punkte.

- Wählen Sie für Geräte, die in einer typischen Telekommunikationsumgebung mit kontrollierten Umweltbedingungen eingesetzt werden, einen Ort mit folgenden Merkmalen:

  - Temperatur und Feuchtigkeit werden kontrolliert, und die maximale Raumtemperatur liegt nicht über 40 ºC.
  - Sauber und frei von in der Luft enthaltenen Stoffen, die Elektrizität übertragen können.
  - Gut belüftet und fern von Wärmequellen inklusive direkter Sonneneinstrahlung.
  - Fern von Quellen für Erschütterungen oder mechanische Einwirkungen.
  - Getrennt von starken elektromagnetischen Feldern, die von elektrischen Geräten erzeugt werden.
- Bei Geräten, die nicht für eine Installation in Umgebungen mit kontrollieren Umweltbedingungen vorgesehen sind, wie z. B. Gehäuse im Freien, beachten Sie bitte das Produktdatenblatt oder Anhang B dieser Anleitung mit den Spezifikationen für Umgebungsbedingungen, Temperatur und Feuchtigkeit.
- Lassen Sie auf allen Seiten mindestens 3 Zoll Platz, um eine ausreichende Luftzirkulation zu gewährleisten. Die Lüftungsschlitze an der Vorder- oder Rückseite und an den Seiten dürfen nicht blockiert werden. Stellen Sie das System nicht in der Nähe von Wärmequellen auf.
- Versichern Sie sich, dass Ihre Geräte in einem Bereich aufgestellt werden, der für den Stromverbrauch und die damit verbundene Wärmestrahlung der Komponenten geeignet ist.
- Versichern Sie sich, dass Ihre Netzteile den Gleichstrom- bzw. Wechselstrombedarf aller Netzwerkgeräte decken können.
- Racks für Extreme Networks-Geräte müssen fest am Boden verankert werden. Bei nicht vorschriftsmäßiger Fixierung des Racks besteht die Gefahr, dass das Rack bei Wartungsarbeiten umkippt.
- Voraussetzung für den Betrieb des Systems ist die vollständige Anbringung aller Module, Blenden, Frontabdeckungen und rückseitigen Abdeckungen. Blenden und Abdeckplatten erfüllen folgende Funktionen:
  - Schutz vor gefährlich hohen Spannungen und Strömen im Inneren des Gerätes
  - Eindämmung von elektromagnetischen Interferenzen (EMI), die andere Geräte stören könnten
  - Vorgabe der Luftströmungsrichtung durch das Gerät
- Bei der Entsorgung des Gerätes sind alle nationalen Gesetze und Vorschriften zu beachten.

Allgemeine Sicherheitshinweise

Befolgen Sie die Richtlinien.

- Heben Sie keine Gegenstände, die zu schwer für Sie sind.
- Bei der Installation von Geräten in einem Rack platzieren Sie die schwereren Geräte in der unteren Hälfte, damit das Rack nicht kopflastig wird.
- Verwenden Sie nur Werkzeuge und Geräte, die sich in einem einwandfreien Zustand befinden. Werkzeuge, die sichtbar beschädigt sind, dürfen nicht benutzt werden.
- Achten Sie bei der Verlegung von Kabeln darauf, mögliche Beschädigungen der Kabel zu vermeiden und Risiken, z. B. Stolpergefahren, auszuschalten.
- Stellen Sie keinen Bildschirm oder anderen Gegenstände auf die Geräte. Die Chassisabdeckung ist keine Abstellfläche.
- Zum Schutz vor Selbstentzündung verwenden Sie nur Datenübertragungskabel der Größe 26 AWG oder größer. Verwenden Sie nur Kupferleiter.
- Arbeiten Sie während eines Gewitters nicht an dem System und stecken Sie keine Kabel an oder ab.
- Das Gerät muss geerdet werden. Der Schutzleiter darf nicht manipuliert oder umgangen werden und das Gerät darf auf keinen Fall ohne einen entsprechend installierten Schutzleiter betrieben werden.

Sicherheit bei Wartungsarbeiten

Befolgen Sie bei allen Wartungsarbeiten an Extreme Networks-Geräten folgende Empfehlungen.

- Verwenden Sie nur zugelassene Zubehörteile oder Komponenten, die für den Einsatz mit diesem System genehmigt sind. Eine Missachtung dieser Hinweise kann zu einer Beschädigung des/r Geräte/s führen und die einschlägigen Sicherheits- und EMV-Vorschriften verletzen.
- Das System enthält keinerlei Teile, die vom Benutzer zu warten sind. Versuchen Sie nicht, Chassis, Netzteil, Modul oder andere Komponenten eigenmächtig zu reparieren. Senden Sie im Falle einer Störung das defekte Teil zur Reparatur oder zum Austausch an Extreme Networks ein, sofern ein Extreme Networks-Vertreter nicht etwas anderes angibt.
- Um das System spannungslos zu machen, müssen Sie alle Netzkabel aus den Netzsteckdosen ziehen. Das Netzkabel ist der "Trennschalter" für die Netzspannungsquelle.
- Trennen Sie vor allen Arbeiten in der unmittelbaren Nähe von Netzteilen alle Netzkabel von der Spannungsquelle, sofern die produktspezifische Wartungsanleitung nicht etwas anderes angibt.
- Legen Sie für alle Arbeiten an optischen Geräten, Netzteilen oder sonstigen modularen Zubehörteilen ein geerdetes Massearmband an, um das Risiko einer Beschädigung des Gerätes durch elektrostatische Aufladung zu reduzieren. Schließen Sie das eine Ende des Armbands an einem geeigneten Erdungspunkt am Rack oder an einer ESD-Buchse am Chassis (sofern vorhanden) an. Lassen Sie das geerdete Massearmband am Rack oder am Chassis angeschlossen, damit Sie es jederzeit parat haben, wenn Sie mit Komponenten umgehen, die empfindlich gegenüber elektrostatischer Aufladung sind.
- Die Kabel sind spannungsfrei zu installieren. Verwenden Sie Kabelbinder oder sonstige Zugentlastungsvorrichtungen.

Kabelverlegung für LAN-Systeme

Extreme Networks-Geräte erfüllen die Anforderungen für Geräte für LAN-Systeme.

LAN-Systeme sind für gebäudeinterne Installationen konzipiert, das heißt, die Kabel zwischen den einzelnen Einheiten müssen im gleichen Gebäude verlaufen, in dem auch die Geräte untergebracht. Hiervon ausgenommen sind nur die unten aufgeführten Bedingungen.

Laut dem US-amerikanischen National Electrical Code (NEC) darf diese Ausrüstung zwischen Gebäuden verbunden werden, sofern eine der folgenden Bedingungen erfüllt ist:

- Die Länge der zwischen Gebäuden verlegten Kabel beträgt höchsten 140 Fuß.
- Die Kabel sind zwischen den Gebäuden direkt erdverlegt.
- Die Kabel zwischen den Gebäuden sind in einem unterirdischen Kanal verlegt, wobei ein durchgehender metallischer Kabelschirm oder eine durchgehende Metallleitung, die das Kabel umschließt, an den Erdungselektrodensystemen der einzelnen Gebäude angeschlossen ist.

Caution

Eine Missachtung dieser Bedingungen für die Kabelverlegung kann Nutzer der Gefahr eines elektrischen Stromschlages aussetzen und das Gerät so beschädigen, dass es nicht mehr einwandfrei arbeitet.

Warning

Die Ethernet-Anschlüsse des Gerätes und der zugehörigen Baugruppen sind nur für gebäudeinterne (innerhalb ein und desselben Gebäudes) Verbindungen oder für Anschlüsse an nicht exponierte Verdrahtungen oder Verkabelungen geeignet (siehe die oben aufgeführten Bedingungen). Die Ethernet-Anschlüsse des Gerätes und der zugehörigen Baugruppen dürfen nicht mit Metallkontakt an Schnittstellen angeschlossen werden, die mit einer externen Anlage (Outside Plant, OSP) oder deren Verdrahtung verbunden sind. Ethernet-Schnittstellen sind nur für eine Verwendung als gebäudeinterne Schnittstellen konzipiert (sog. Ports vom Typ 2 oder Typ 4 gemäß GR-1089-CORE, Ausgabe 6) und müssen durch Isolierung von exponierter OSP-Verdrahtung getrennt werden. Primäre Protektoren sind kein ausreichender Schutz für den Anschluss dieser Schnittstellen über einen Metallkontakt mit OSP-Verdrahtung.

Diese Warnung gilt nicht für Ports vom Typ T1/E1, weil diese Ports über eine integrierte Isolierung und einen Schutz vor Spannungsspitzen verfügen, der den Anschluss an OSP-Verdrahtung gestattet.

Installation der Netzteile und Netzanschluss

Die Leistungsdaten und die Anforderung der einzelnen Netzteile an den Leistungseingang entnehmen Sie bitte Anhang B dieser Anleitung oder dem Datenblatt für die Netzversorgung unterhttp://www.extremenetworks.com.

Warning

Die in diesem Abschnitt aufgeführten Anforderungen müssen bei der Installation von Extreme Networks-Netzteilen und beim Netzanschluss unbedingt erfüllt werden.

Bei Installation eines Netzteils:

- Schieben Sie das Netzteil nicht mit Gewalt in den Einschub.
- Versuchen Sie nicht, das Gehäuse des Netzteils zu öffnen; das Netzteil enthält keinerlei Teile, die vom Nutzer zu warten sind. Senden Sie im Falle einer Störung das defekte Netzteil zur Reparatur oder zum Austausch an Extreme Networks ein.
- Fassen Sie nicht mit der Hand in einen offenen Netzteileinschub, wenn das Netzteil entfernt wurde.
- Legen Sie vor allen Arbeiten an einem an Leistungskabeln angeschlossenen Gerät sämtlichen Schmuck sowie Ihre Armbanduhr ab. Im Falle eines Kurzschlusses (Kontakt mit Leistung und Erde) erwärmen sich Metallgegenstände, was zu ernsthaften Verbrennungen führen oder den Metallgegenstand mit den Anschlüssen verschweißen kann.
- Legen Sie vor allen Arbeiten an einem an Leistungskabeln angeschlossenen Gerät sämtlichen Schmuck sowie Ihre Armbanduhr ab. Metallgegenstände erwärmen sich, wenn sie an Leistung und an Erde angeschlossen werden, was zu ernsthaften Verbrennungen führen oder den Metallgegenstand mit den Anschlüssen verschweißen kann.
- Wenn das Netz bei angeschlossener Netzversorgung angeschlossen oder getrennt wird, kann ein elektrischer Lichtbogen entstehen. Dies kann bei Installationen in Gefahrenbereichen zu einer Explosion führen. Achten Sie unbedingt darauf, dass das Gerät nicht mit der Netzversorgung verbunden ist.
- Achten Sie bei der Installation oder beim Austausch von Geräten darauf, dass Sie zuerst den Erdungsanschluss herstellen bzw. den Erdungsanschluss zuletzt trennen.

Bei Installation von AC-Netzteilen:

- Schließen Sie bei Switches mit einem vor Ort austauschbaren Netzteil die Spannungsversorgung nicht an einer elektrischen Spannungsquelle an, wenn das Netzteil nicht im Switch eingebaut ist; andernfalls kann gefährliche Energie freigesetzt werden und es besteht potenzielle Stromschlag- und Brandgefahr.
- Stecken Sie Netzteile nur an vorschriftsmäßig geerdete Netzsteckdosen an, um die Gefahr eines elektrischen Stromschlages zu vermeiden und internationale Sicherheitsstandards zu erfüllen.
- Verwenden Sie nur Netzkabel, die in dem jeweiligen Einsatzland zugelassen sind. Versuchen Sie nicht, modifizierte AC-Netzkabel zu verwenden.
- Versichern Sie sich, dass Spannung und Frequenz Ihrer Steckdose mit den elektrischen Daten Ihres Gerätes übereinstimmen. Das Gebäude und/oder die Spannungsquelle muss gegen Überlast geschützt sein.
- Verwenden Sie einen Überspannungsschutz, einen Netzfilter oder eine unterbrechungsfreie Spannungsversorgung, um das System plötzlichen Spannungsschwankungen zu schützen.
- Bei Systemen mit mehreren Netzteilen schließen Sie jedes Netzteil an einer anderen, unabhängigen Überstromschutzvorrichtung an, z. B. an einem Schütz. Bei Ausfall einer Spannungsquelle ist nur das daran angeschlossene Netzteil betroffen. Für die korrekte Auslegung des Schützes siehe das Datenblatt des Netzteils.
- AC-Netzteile von Extreme Networks haben keinen Ein-/Ausschalter. Trennen Sie alle Netzstecker von den elektrischen Steckdosen, um die Spannungsversorgung zu unterbrechen. Achten Sie auf gute Zugänglichkeit der Steckdosen.

Installation von DC-Netzteilen und Anschluss von Gleichspannung:

- Der Anschluss an die Gleichspannungsquelle Ihrer Einrichtung muss von einem qualifizierten, geprüften Elektriker vorgenommen werden.
- DC-Netzteile von Extreme Networks haben keinen Ein-/Ausschalter. Versichern Sie sich, dass der DC-Kreis spannungslos ist, ehe Sie das Gleichstromkabel an einer Gleichstromeingangsbuchse an- oder abstecken.
- Schließen Sie eine Gleichstromversorgung nicht an die DC-Quelle an, wenn das Netzteil nicht im Chassis eingebaut ist; andernfalls kann gefährliche Energie freigesetzt werden und es besteht potenzielle Stromschlag- und Brandgefahr.
- Schließen Sie das System oder das Netzteil nur an eine DC-Spannungsquelle an, die die Bestimmungen für Sicherheitskleinspannung (SELV) in den IEC 60950-basierten Sicherheitsstandards erfüllt.
- DC-Geräte müssen in einem zugangsbeschränkten Bereich installiert werden, damit gewährleistet ist, dass nur geschultes und qualifiziertes Wartungspersonal Zugang zu den Geräten hat. Ein zugangsbeschränkter Bereich kann beispielsweise nur mithilfe eines Spezialwerkzeugs, Schloss und Schlüssel oder einer anderen Sicherheitsvorrichtung geöffnet werden.

Note

Da die Gebäudevorschriften in aller Welt unterschiedlich sind, empfiehlt Extreme Networks dringend, sich bezüglich der korrekten Erdung und Spannungsverteilung für Ihre Installation in Ihrem Land an einen Elektrofachbetrieb zu wenden.

Auswahl der Netzkabel

Im Lieferumfang von Extreme Networks-Produkten sind keine Netzkabel enthalten.

Ein für Ihr Produkt und Land passendes Netzkabel erhalten Sie entweder von Ihrem zuständigen Extreme Networks Channel Account Manager oder Sales Manager oder im örtlichen Fachhandel. Die Anforderungen an das Netzkabel entnehmen Sie Anhang B zu dieser Anleitung.

Hier finden Sie Ihren zuständigen Sales Manager oder Fachhändler:http://www.extremenetworks.com/how-to-buy/how-to-buy.aspx

Note

Dieses Gerät ist nicht für eine direkte Versorgung von einem Spannungsverteilungssystem vorgesehen, wo die Leiter-Leiter-Spannung den Wert von 240 VAC (2 Phasen+Schutzerde), wie zum Beispiel in Norwegen, Frankreich und anderen Ländern. Für derartige Anwendungen wird ein Transformator empfohlen, um die Spannung auf einen Wert unter < 240 VAC (Leiter-Leiter) herunterzutransformieren oder ein Anschluss an eine (P+N+Schutzerde) Spannungsverteilung, wo die Spannung 240 VAC nicht überschreitet.

Alle Installationen müssen eine zuverlässige Erdung gemäß den nationalen Elektrovorschriften vorsehen.

Wechseln und Entsorgen der Batterie

Die Batterien in Extreme Produkten sind gekapselt und dürfen nur durch qualifiziertes Extreme-Wartungspersonal ausgewechselt werden.

1 Wenden Sie sich für den Austausch eines Produktes an das Wartungspersonal von Extreme Networks. Versuchen Sie nicht, die Batterie selbst auszuwechseln.

2 Bei einer Missachtung dieser Anweisungen und dem Versuch, die Batterien eigenmächtig zu wechseln, müssen folgende Richtlinien eingehalten werden, um eine mögliche Explosion zu vermeiden:

   a Tauschen Sie die Batterie nur gegen eine Batterie des gleichen Typs (wie vom Hersteller empfohlen)aus.

   b Entsorgen Sie die Batterie gemäß den Empfehlungen des Batterieherstellers.

LWL-Ports und optische Sicherheit

Folgende Sicherheitswarnung gilt für alle optischen Geräte, die in Extreme Networks-Geräten eingesetzt werden und entweder herausnehmbar sind oder direkt in einem E/A-Modul oder im Chassissystem eingebaut sind.

Solche Geräte sind nicht nur Gigabit-Interface-Konverter (GBICs), steckbare Kleinformfaktormodule (SFP) (oder Mini-GBICs), QSFP+ Module, XENPAK Sendeempfänger und laseroptische XFP-Module.

Warning

Laseroptische Module können bei längerem Gebrauch sehr heiß werden. Seien Sie beim Ausbau eines laseroptischen Moduls aus dem Modul oder der Optionskarte äußerst vorsichtig. Wenn das laseroptische Modul zum Anfassen zu heiß ist, trennen Sie das laseroptische Modul und lassen Sie es abkühlen, ehe Sie es komplett ausbauen.

Ergreifen Sie beim Arbeiten mit laseroptischen Modulen die nachfolgenden Vorsichtsmaßnahmen, um eine Aussetzung gegenüber gefährlicher Strahlung zu vermeiden.

- Blicken Sie auf keinen Fall durch ein Vergrößerungsglas in die Sendediode/den Laser, solange die Sendediode aktiv ist.
- Blicken Sie auf keinen Fall in den LWL-Port am Switch oder auf die Stirnflächen eines aktiven LWL-Kabels.
- Bei offenen Anschlüssen kann unsichtbare Laserstrahlung abgegeben werden. Vermeiden Sie eine direkte Aussetzung der Augen gegenüber dem Strahl, wenn die optischen Anschlüsse offen (ohne Stecker) sind.
- Optische Geräte dürfen auf keine andere Weise als in diesem Dokument empfohlen verändert, modifiziert oder umgebaut werden.

Konformität von GBIC, SFP (Mini-GBIC), QSFP+, XENPAK undXFP

Steckbare optische Module von Extreme Networks und direkt angeschlossene Kabel erfüllen folgende gesetzliche Vorschriften:

- Laserprodukt der Klasse 1 oder Klasse 1M
- EN60825-1:2007 2. Ausgabe oder später, Europäische Norm
- FCC 21 CFR Kapitel 1, Paragraph J in Übereinstimmung mit FDA- und CDRH-Bestimmungen
- Anwendung des CE-Zeichens gemäß der EMV-Richtlinie 2004/108/EEC und der Niederspannungsrichtlinie 2006/95/EC
- UL und/oder CSA-geprüfte Komponente für Nordamerika
- 47 CFR Teil 15, Klasse A bei Einbau in Extreme-Produkte

Sicherheitsinformationen für Router der Serie E4G

Die Aussagen in diesem Abschnitt gelten speziell für Router der Serie E4G.

- Zur Vermeidung von elektrischen Stromschlägen dürfen Sicherheitskleinspannungsschaltungen (SELV) nicht an Telefonnetzspannungsschaltungen (TNV-1) angeschlossen werden. LAN-Ports enthalten SELV-Schaltungen, WAN-Ports enthalten TNV-1-Schaltungen. Sowohl LAN- als auch WAN-Ports können RJ-45-Stecker verwenden. Seien Sie beim Anschließen der Kabel äußerst vorsichtig.
- Berühren Sie auf keinen Fall nicht isolierte Telefonkabel oder -anschlüsse, solange die Telefonleitung nicht von der Netzwerkschnittstelle getrennt wurde.
- Verwenden Sie diese Geräte nicht in der Nähe von Wasser, wie einer Nasswand, einem Ablaufkanal oder einer anderen Wasserquelle.

B Technical Specifications

This appendix includes specifications for E4G series routers and related components.

E4G-200 Cell Site Router Technical Specifications

Table 17: Physical Dimensions

E4G-200 router	Height: 1.75 inches (4.4 cm) Width: 17.25 inches (43.8 cm) Depth: 10.75 inches (27.3 cm) (Includes connectors and ground lug)
Clock/timing module	Height: 1.75 inches (4.4 cm) Width: 2.5 inches (6.4 cm) Depth: 8 inches (20.32 cm) (includes connectors)
T1/E1 module	Height: 1.75 inches (4.4 cm) Width: 6.25 inches (15.9 cm) Depth: 9.5 inches (24.1 cm) (includes connectors)

Table 18: Weight

E4G-200 router	7.14 lb (5.46 kg)
Clock/timing module	0.75 lb (0.34 kg)
T1/E1 module	2.0 lb (0.9 kg)

Table 19: Packaged Dimensions

E4G-200 router	Height: 5.25 inches (13.3 cm) Width: 22.5 inches (57.2 cm) Depth: 14 inches (35.6 cm)
E4G-200 CLK Clock/timing module	Height: 3.0 inches (7.62 cm) Width: 8.5 inches (21.6 cm) Depth: 6.0 inches (15.2 cm)
T1/E1 module	Height: 4.5 inches (11.4 cm) Width: 7.25 inches (18.4 cm) Depth: 14.0 inches (35.6 cm)

Table 20: Packaged Weight

E4G-200 router	9.0 lb (4.1 kg)
E4G-200 CLK Clock/timing module	0.75 lb (0.34 kg)
T1/E1 module	2.75 lb (1.25 kg)

Table 21: Average Latency: Model E4G-200-12x

Frame Size (Bytes)	Average Latency (ms)
64	3.324
128	3.339
256	3.270
512	3.323
1024	3.323
1280	3.329
1518	3.334
2176	3.315
4096	3.311
6144	3.315
9216	3.312

Table 22: Fan Behavior: Model E4G-200-12x

Normal condition	< 40°C	40°C to 50°C	> 50°C
Fan no. 1 (AVC)	ON (6,500 RPM +/- 20%)	ON (10,500 RPM +/- 20%)	ON (10,500 RPM +/- 20%)
Fan no. 2 (Sunon)	OFF	OFF	ON (18,500 RPM +/- 20%)
Abnormal condition	< 50°C		> 50°C
Fan no. 1 abnormal	N/A		N/A
Fan no. 2 (Sunon)	ON (12,500 RPM +/- 20%)		ON (18,500 RPM +/- 20%)

Table 23: Power: Model E4G-200

Operational Voltage Ranges	–22 to 60 V⎓
Nominal Input Ratings	–48 V⎓, 1.25 A or +24 V⎓, 2.5 A
Nominal Input Current	0.95 A @ –48 V⎓ 2.2 A @ +24 V⎓
Inrush Current	35 A at 72 V⎓ peak
DC Voltage Input Range	–22 to 60 V⎓
DC Power Supply Input Socket	3-pin terminal block: refer to Preparing the DC Power Input Cable on page 41
Minimum wire size	14 AWG (1.5 mm^2) copper stranded

Table 24: Power: Model E4G-200-12x

Operational Voltage Ranges	18 to 75 V⎓
Nominal Input Ratings	–48 V⎓, 1.25 A or +24 V⎓, 2.5 A
Nominal Input Current	1.02 A @ –48 V⎓ 2.02 A @ +24 V⎓
Inrush Current	2.7 A at 48 V
DC Voltage Input Range	18 to 75 V⎓
DC Power Supply Input Socket	3-pin terminal block: refer to Preparing the DC Power Input Cable on page 41
Minimum wire size	14 AWG (1.5 mm^2) copper stranded

Table 25: Power: Model E4G-200 with no Installed Optional Modules

Input current	0.68 A @ +24 V⎓ 0.52 A @ –48 V⎓
Heat dissipation	33 W, 113 BTU/hr
Power consumption	33 W, 113 BTU/hr

Table 26: Power: Model E4G-200-12x with no Installed Optional Modules

Input current	1.41 A @ +24 V⎓ 0.73 A @ –48 V⎓
Heat dissipation	35 W, 120 BTU/hr
Power consumption	35 W, 120 BTU/hr

Table 27: Power: Model E4G-200 with Clock Module

Input current	0.83 A @ +24 V⎓ 0.64 A @ –48 V⎓
Heat dissipation	40 W, 137 BTU/hr
Power consumption	40 W, 137 BTU/hr

Table 28: Power: Model E4G-200-12x with Clock Module

Input current	1.61 A @ +24 V⎓ 0.82 A @ –48 V⎓
Heat dissipation	40 W, 137 BTU/hr
Power consumption	40 W, 137 BTU/hr

Table 29: Power: Model E4G-200 with T1/E1 Module

Input current	0.89 A @ +24 V⎓ 0.69 A @ –48 V⎓
Heat dissipation	43 W, 147 BTU/hr
Power consumption	43 W, 147 BTU/hr

Table 30: Power: Model E4G-200-12x with T1/E1 Module

Input current	1.81 A @ +24 V⎓ 0.93 A @ –48 V⎓
Heat dissipation	44.5 W, 152 BTU/hr
Power consumption	44.5 W, 152 BTU/hr

Table 31: Power: Model E4G-200 with Clock Module and T1/E1 Module

Input current	1.02 A @ +24 V⎓ 0.78 A @ –48 V⎓
Heat dissipation	49 W, 167 BTU/hr
Power consumption	49 W, 167 BTU/hr

Table 32: Power: Model E4G-200-12x with Clock Module and T1/E1 Module

Input current	2.02 A @ +24 V⎓ 1.03 A @ –48 V⎓
Heat dissipation	49.5 W, 169 BTU/hr
Power consumption	49.5 W, 169 BTU/hr

Table 33: Safety Standards

North American Safety	UL 60950-1:2007 2nd Ed., Listed Device (US) CSA 22.2 #60950-1-03 2nd Ed. 2006-07 (Canada) Complies with FCC 21 CFR Chapter 1, Subpart J (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety	CB Scheme IEC 60950-1: 2005 2nd Ed.+National Differences IEC/EN 60825-1:2007 (Lasers Safety) IEC/EN 60825-2:2004+A2:2010 (Optic Fiber Systems)
International Safety	GS-TUV Mark EN 60950-1:2006 2nd Ed. AS/NZS 60950-1 (Australia /New Zealand)

Table 34: EMI/EMC Standards

North America EMC	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC	EN 55022:2010 Class A EN 55024:2010 Class A includes EN 61000-4-2, 3, 4, 5, 6, 11 EN 55011:2009+A1:2010 EN 61000-3-2,8-2006+A2:2009 (Harmonics) EN 61000-3-3 2008 (Flicker) EN 61000-6-4:2007 (Emissions for Industrial, Scientific & Medical) EN 61000-6-2:2005 (Immunity for Industrial, Scientific & Medical)
International EMC	CISPR 22: 2010 Ed 5.2, Class A (International Emissions) CISPR 24:2010 Class A (International Immunity) IEC 61000-4-2:2008/EN 61000-4-2:2009 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC 61000-4-3:2008/EN 61000-4-3:2006+A1:2008 Radiated Immunity 10V/m, Criteria A IEC 61000-4-4:2004 am1 ed.2./EN 61000-4-4:2004/A1:2010 Transient Burst, 1 kV, Criteria A IEC 61000-4-5:2005 /EN 61000-4-5:2006 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC 61000-4-6:2008/EN 61000-4-6:2009 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC-61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Table 35: Directives

	1999/5/EC R&TTE 2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 2002/96/EC WEEE 2002/95/EC RoHS China RoHS Order No. 39
Country-specific (see Conformity Statements on page 112)	Canada, ICES-003, (IC) Japan, Class A, (VCCI) Taiwan, CNS 13438(95) Class A, CNS 14336-1(10), (BSMI) Australia/New Zealand, C-Tick (ACMA) South Korea: KN22, KN24 (KCC) Brazil, Res 442, (ANATEL) Mexico, NOM-19 (NRTL) Russia (GOST-R)

Table 36: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 37: Environmental Data

Environmental Standards	EN/ETSI 300 019-2-1 v2.1.2 (2009-09) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.2.1 (2011-11) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.2.2 (2003-04) - Class 3.1e Operational EN/ETSI 300 753 (2009-07) - Acoustic Noise
Operating conditions	Temperature range: –40°C to +65°C (–40° to 149°F) Humidity: 5% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2, 60 shocks in each direction Random vibration: 3 to 500 MHz @ 1.5 G rms
Storage & transportation conditions (packaged)	Temperature: –40°C to 70°C (–40°F to 158°F) Humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s^2, 100 shocks in each direction Packaged sine vibration: 5 to 62 Hz @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD, 20 to 200 Hz @–3 dB/octave 14 drops minimum on sides & corners @ 42 inches (<15 kg box)

Table 38: Sound: Model E4G-200

Sound pressure	Low fan speed: 28.2 dB(A) per ISO 7779:2010 High fan speed: 52.9 dB(A) per ISO 7779:2010
Sound power in accordance with EN 300 753 v1.3.1 (2011-11)	Low fan speed: 33.2 dB(A) per ISO 3744:1994 High fan speed: 57.9 dB(A) per ISO 3744:1994
Declared sound power in accordance with EN 300 753 v1.3.1 (2011-11)	Low fan speed: 3.3 B(A) in accordance with ISO 9296:1998 High fan speed: 5.7 B(A) in accordance with ISO 9296:1998

Table 39: Sound: Model E4G-200-12x

Declared sound power in accordance with ISO 9296:1988 ISO 3744:2010(E) ISO 7779:2010(E) ETSI 300 753:2007(E)	Low (< 40°C) = 5.2 bels(A) (L_{WAd}) Medium (40°C to 50°C) = 6.3 bels(A) (L_{WAd}) High (> 50°C) = 7.2 bels(A) (L_{WAd})

E4G-400 Cell Site Aggregation Router Technical Specifications

Table 40: Physical Dimensions

E4G-400 router	Height: 1.75 inches (4.4 cm) Width: 17.25 inches (43.8 cm) Depth: 18.75 inches (43.2 cm) (Includes connectors and fan module handles)
XGM3S-2sf option card XGM3S-2xf option card	Height: 1.4 inches (3.55 cm) Width: 2.9 inches (7.4 cm) Depth: 4.9 inches (12.5 cm) (includes retaining screws)

Table 40: Physical Dimensions (continued)

XGM3SB-4sf option card	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Depth: 5.5 inches (13.9 cm) (includes retaining screws)
E4G-B16T1E1 module	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Depth: 9.5 inches (24.1 cm)
Fan module	Height: 1.6 inches (4.15 cm) Width: 3.25 inches (8.26 cm) Depth: 4.9 inches (12.53 cm)

Table 41: Weight

E4G-400 router Note: The router weight includes an installed fan module. It does not include installed port option modules or power supplies.	13.75 lb (6.2 kg)
XGM3S-2sf option card	0.5 lb (0.23 kg)
XGM3S-2xf option card	0.5 lb (0.23 kg)
XGM3SB-4sf option card	0.5 lb (0.23 kg)
E4G-B16T1E1 module	1.25 lb (0.57 kg)
E4G-400 fan module	0.66 lb (0.30 kg)

Table 42: Packaged Dimensions

E4G-400 router	Height: 6.5 inches (16.5 cm) Width: 23.4 inches (59.3 cm) Depth: 26.2 inches (66.5 cm)

Table 43: Packaged Weight

E4G-400 router	21 lb (9.5 kg) (Router is shipped with one power supply in package)
XGM3S-2sf option card	1.0 lb (0.45 kg)
XGM3S-2xf option card	1.0 lb (0.45 kg)
XGM3SB-4sf option card	1.0 lb (0.45 kg)
E4G-B16T1E1 module	2.25 lb (1.0 kg)
E4G-400 fan module	0.79 lb (0.36 kg)

Table 44: Fan Speed

Minimum speed	2500 RPM
Maximum speed	15900 RPM

Power (with AC Power Supplies)

Table 45: E4G-400 Router with No Installed Optional Ports (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	87 W, 297 BTU/hr (with 1 power supply)
Power consumption	87 W, 297 BTU/hr (with 1 power supply)

Table 46: E4G-400 Router with XGM3S-2sf Option Card (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	93 W, 317 BTU/hr (with 1 power supply)
Power consumption	93 W, 317 BTU/hr (with 1 power supply)

Table 47: E4G-400 Router with XGM3S-2xf Option Card (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	107 W, 365 BTU/hr (with 1 power supply)
Power consumption	107 W, 365 BTU/hr (with 1 power supply)

Table 48: E4G-400 Router with XGM3SB-4sf Option Card (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	93 W, 317 BTU/hr (with 1 power supply)
Power consumption	93 W, 317 BTU/hr (with 1 power supply)

Table 49: E4G-400 Router with E4G-B16T1E1 Module (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	91 W, 311 BTU/hr (with 1 power supply)
Power consumption	91 W, 311 BTU/hr (with 1 power supply)

Table 50: E4G-400 Router with XGM3S-2sf Option Card and XGM3SB-4sf Option Card (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	100 W, 341 BTU/hr (with 1 power supply)
Power consumption	100 W, 341 BTU/hr (with 1 power supply)

Table 51: E4G-400 Router with XGM3S-2sf Option Card and E4G-B16T1E1 Module (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	99 W, 339 BTU/hr (with 1 power supply)
Power consumption	99 W, 339 BTU/hr (with 1 power supply)

Table 52: E4G-400 Router with XGM3S-2xf Option Card and XGM3SB-4sf Module (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	104 W, 355 BTU/hr (with 1 power supply)
Power consumption	104 W, 355 BTU/hr (with 1 power supply)

Table 53: E4G-400 Router with XGM3S-2xf Option Card and E4G-B16T1E1 Module (AC Power)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5 A
Maximum Input current	5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	104 W, 355 BTU/hr (with 1 power supply)
Power consumption	104 W, 355 BTU/hr (with 1 power supply)

Power (with DC Power Supplies)

Table 54: E4G-400 Router with No Installed Optional Ports (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)

Table 54: E4G-400 Router with No Installed Optional Ports (DC Power) (continued)

Heat dissipation	87 W, 297 BTU/hr (with 1 power supply)
Power consumption	87 W, 297 BTU/hr (with 1 power supply)

Table 55: E4G-400 Router with XGM3S-2sf Option Card (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	94 W, 321 BTU/hr (with 1 power supply)
Power consumption	94 W, 321 BTU/hr (with 1 power supply)

Table 56: E4G-400 Router with XGM3S-2xf Option Card (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	107 W, 366 BTU/hr (with 1 power supply)
Power consumption	107 W, 366 BTU/hr (with 1 power supply)

Table 57: E4G-400 Router with XGM3SB-4sf Option Card (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	94 W, 319 BTU/hr (with 1 power supply)
Power consumption	94 W, 319 BTU/hr (with 1 power supply)

Table 58: E4G-400 Router with E4G-B16T1E1 Module (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	92 W, 314 BTU/hr (with 1 power supply)
Power consumption	92 W, 314 BTU/hr (with 1 power supply)

Table 59: E4G-400 Router with XGM3S-2sf Option Card and XGM3SB-4sf Option Card (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)

Table 59: E4G-400 Router with XGM3S-2sf Option Card and XGM3SB-4sf Option Card (DC Power) (continued)

Heat dissipation	100 W, 341 BTU/hr (with 1 power supply)
Power consumption	100 W, 341 BTU/hr (with 1 power supply)

Table 60: E4G-400 Router with XGM3S-2sf Option Card and E4G-B16T1E1 Module (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	100 W, 341 BTU/hr (with 1 power supply)
Power consumption	100 W, 341 BTU/hr (with 1 power supply)

Table 61: E4G-400 Router with XGM3S-2xf Option Card and XGM3SB-4sf Option Card (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	105 W, 358 BTU/hr (with 1 power supply)
Power consumption	105 W, 358 BTU/hr (with 1 power supply)

Table 62: E4G-400 Router with XGM3S-2xf Option Card and E4G-B16T1E1 Module (DC Power)

Nominal input ratings	40 to 72 V⎓, 9 A
Maximum Input current	7 A @ 48 V⎓ (low-line) 5.6 A @ 60 V⎓ (high-line)
Heat dissipation	104 W, 356 BTU/hr (with 1 power supply)
Power consumption	104 W, 356 BTU/hr (with 1 power supply)

Table 63: Safety Standards

North American Safety	UL 60950-1:2007 2nd Ed., Listed Device (US) CSA 22.2 #60950-1-03 2nd Ed. 2006-07 (Canada) Complies with FCC 21 CFR Chapter 1, Subpart J (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety	CB Scheme IEC 60950-1: 2005 2nd Ed.+National Differences IEC/EN 60825-1:2007 (Lasers Safety) IEC/EN 60825-2:2004+A2:2010 (Optic Fiber Systems)
International Safety	GS-TUV Mark EN 60950-1:2006 2nd Ed. AS/NZS 60950-1 (Australia /New Zealand)

Table 64: EMI/EMC Standards

North America EMC	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC	EN 55022:2010 Class A EN 55024:2010 Class A includes EN 61000-4-2, 3, 4, 5, 6, 11 EN 55011:2009+A1:2010 EN 61000-3-2,8-2006+A2:2009 (Harmonics) EN 61000-3-3 2008 (Flicker) EN 61000-6-4:2007 (Emissions for Industrial, Scientific & Medical) EN 61000-6-2:2005 (Immunity for Industrial, Scientific & Medical)
International EMC	CISPR 22: 2010 Ed 5.2, Class A (International Emissions) CISPR 24:2010 Class A (International Immunity) IEC 61000-4-2:2008/EN 61000-4-2:2009 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC 61000-4-3:2008/EN 61000-4-3:2006+A1:2008 Radiated Immunity 10V/m, Criteria A IEC 61000-4-4:2004 am1 ed.2./EN 61000-4-4:2004/A1:2010 Transient Burst, 1 kV, Criteria A IEC 61000-4-5:2005 /EN 61000-4-5:2006 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC 61000-4-6:2008/EN 61000-4-6:2009 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC-61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Table 65: Directives

	1999/5/EC R&TTE 2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 2002/96/EC WEEE 2002/95/EC RoHS China RoHS Order No. 39
Country-specific (see Conformity Statements on page 112)	Canada, ICES-003, (IC) Japan, Class A, (VCCI) Taiwan, CNS 13438(95) Class A, CNS 14336-1(10), (BSMI) Australia/New Zealand, C-Tick (ACMA) South Korea: KN22, KN24 (KCC) Brazil, Res 442, (ANATEL) Mexico, NOM-19 (NRTL) Russia (GOST-R)

Table 66: Telecommunications Standards

	ETSI EN 300 386 v1.5.1, 2010-4 (EMC Telecommunications) ETSI EN 300 019 Series for Packaging, Transportation & Operation ACTA Telecom per TIA-968-A:2009 (Formerly Part 68) Mexico, NOM-152 (COFETEL) Industry Canada CS-03, Issue 9 Japan, JATA Green book Taiwan, NCC Australia/New Zealand, AS/ACIF S016 (ACMA) TBR 12/13 (European Union) Telcordia GR-1089, Issue 6 per SR 3580 issue 4, Level 3 Compliant VZ.TPR.9305 ATT.-TP.76200

Table 67: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 68: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5 G
Operating conditions	Temperature range: -10°C to 50°C (14°F to 122°F) Humidity: 5% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2, 60 shocks in each direction Random vibration: 3 to 500 MHz @ 1.5 G rms
Storage & transportation conditions (packaged)	Temperature: –40°C to 70°C (–40°F to 158°F) Humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s^2, 100 shocks in each direction Packaged sine vibration: 5 to 62 Hz @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD 20 to 200 Hz @–3 dB/octave 14 drops minimum on sides & corners @ 42 inches (<15 kg box)
Sound pressure (in dBA per ISO 7779:2010)	Low fan speed: 48.8 dB(A) per ISO 7779:2010 High fan speed: 69.3 dB(A) per ISO 7779:2010
Sound power in accordance with EN 300 753 v1.3.1 (2011-11)	Low fan speed: 53.7 dB(A) per ISO 3744:1994 High fan speed: 74.3 dB(A) per ISO 3744:1994
Declared sound power in accordance with EN 300 753 v1.3.1 (2011-11)	Low fan speed: 5.3 B(A) in accordance with ISO 9296:1998 High fan speed: 7.4 B(A) in accordance with ISO 9296:1998

Power Supplies for the E4G-400 Router

The following power supplies are available for use in the E4G-400 router.

- 300 W AC power supply (model number 10930A)

- 300 W DC power supply (model number 10933)
- 300 W DC power supply (model number 10934A)

300 W AC Power Supply (Model 10930A)

Table 69: Physical Specifications

Dimensions	Height: 1.57 inches (4.0 cm) Width: 3.15 inches (8.0 cm) Depth: 9.5 Inches (24.1 cm)
Weight	2.30 lb (1 kg)

Table 70: Power Specifications

Voltage input range	85 to 264 V~
Nominal input ratings	100 to 240 V~, 50 to 60 Hz, 5 A
Nominal input current at full loads	4.2 A @ 90 V~ (low-line) 1.7 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	30 A
Output	12 V⎓, 25 A max, 300 Watts 3.3 V⎓, 3.03 A max, 10 Watts
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Power supply cord gauge	18 AWG (0.75 mm^2) up to 6 feet or 2 meters or 16 AWG (1.0 mm^2) over 6 feet
Efficiency	Low Line: 85% at 50% load and 88% at 100% load High Line: 86% at 50% load and 89% at 100% load

Table 71: Environmental Specifications

Operating temperature	–10°C to 50°C (14°F to 122°F), normal operation
Storage temperature	-40°C to 70°C (-40°F to 158°F)
Operating humidity	20% to 90% relative humidity, non-condensing
Operational shock	30 m/s^2 (3 G)

Dimensions	Height: 1.57 inches (4.0 cm) Width: 3.15 inches (8.0 cm) Depth: 9.14 Inches (23.2 cm)
Weight	1.5 lb (0.68 k)

Summit 300 W DC Power Supply (Model 10933)

Table 72: Power Specifications

Nominal Input Rating	+24 V 4A, -48 V 2A
DC Voltage Input Range	18 V — 72 V
Maximum Input Amperages	14.6A at 24 V 7.3A at 48 V 4.8A at 72 V
Inrush Current	35A at 72 V peak
Minimum wire size	14 AWG (1.5 mm^2) copper stranded
DC Output Power (W)	300 W

Table 73: Environmental Specifications

Operating temperature	0°C to 50°C (32°F to 122°F), normal operation
Storage temperature	-40°C to 70°C (-40°F to 158°F)
Operating humidity	20% to 90% relative humidity, non-condensing
Operational shock	30 m/s^2 (3 G)

Summit 300 W DC Power Supply (Model 10934A)

Table 74: Physical Specifications

Dimensions	Height: 1.57 inches (4.0 cm) Width: 3.15 inches (8.0 cm) Depth: 9.5 Inches (24.1 cm)
Weight	2.30 lb (1.0 kg)

Table 75: Power Specifications

Nominal Input	–48 V⎓
DC Voltage Input Range	–40 to –72 V⎓, 9 A
Maximum Input Amperages	9 A @ 40 V⎓ 7.5 A @ 48 V⎓ 4.7 A @ 72 V⎓
Inrush Current	50 A at 72 V⎓ peak
Minimum wire size	14 AWG (1.5 mm^2) copper stranded
DC Output	12 V⎓, 25 A/3.3 V⎓, 3.0 A
DC Output Power (W)	310 W

Table 76: Environmental Specifications

Operating temperature	-10°C to 50°C (14°F to 122°F), normal operation
Storage temperature	-40°C to 70°C (-40°F to 158°F)

Table 76: Environmental Specifications (continued)

Operating humidity	20% to 90% relative humidity, non-condensing
Operational shock	30 m/s^2 (3 G)

Power Cord Requirements for AC Power Supplies

Power cords used on AC-powered E4G series routers must meet specific requirements.

- The power cord must be agency-certified for the country of use.
- The power cord must have an IEC320-C13 connector for connection to the router.
- The power cord must have an appropriately rated and approved wall plug applicable to the country of installation.
- For cords up to 6 feet (2 m) long, the wire size must be 18 AWG (.75 mm^2) minimum; over 6 feet, the minimum wire size is 16 AWG (1.0 mm^2).

E4G-200 Connector Pinouts

The following table shows the pinouts for the RJ-45 connector on the E4G-200 clock module.

Table 77: E4G-200 Clock Module RJ-45 Connector

Pin	Description	Direction	Comment
1	BITS_IN_P	In	1.544 MHz, 2.048 MHz RS-422
2	BITS_IN_N	In	1.544 MHz, 2.048 MHz RS-422
3	1_PPS_P	Out	1 PPS RS-422
4	—	—	
5	—	—	
6	1_PPS_N	Out	1 PPS RS-422
7	ToD_N	I/O	RS-422
8	ToD_P	I/O	RS-422

Table 78 shows the mini-BNC connectors on the E4G-200 clock module, and the signal descriptions for these connectors.

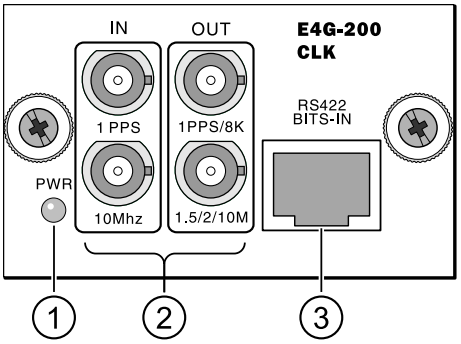

Figure 69: Mini-BNC Connectors on the E4G-200 CLK Module

Table 78: Signals for the E4G-200 Mini-BNC Connectors

Connector Position	Label	
	IN	OUT
Upper	1 PPS input, 3.3 V level	1 PPS/8 KHz frame output, 3.3 V level
Lower	10-Mhz clock input, 3.3 V level	1.5 MHz/2 MHz/10 MHz clock output, 3.3 V level

The following table shows the pinouts for the RJ-48 connectors on the E4G-200 F16T1E1 module.

Table 79: Pinouts for the E4G-200 F16T1E1 Module

Pin	Description
1	RX_RING
2	RX_TIP
3	—
4	TX_RING
5	TX_TIP
6	—
7	—
8	—

The following table shows the pinouts for the RJ-45 console port connector on the E4G-200 cell site router.

Table 80: RJ-45 Console Port on the E4G-200 Router

Function	Pin Number	Direction
CTS (clear to send)	1	In
DTR (data carrier detect)	2	Out

Table 80: RJ-45 Console Port on the E4G-200 Router (continued)

Function	Pin Number	Direction
TXD (transmit data)	3	Out
GND (ground)	4	—
GND (ground)	5	—
RXD (receive data)	6	In
DSR (data set ready)	7	In
RTS (request to send)	8	Out

The following table shows the pinouts for an RJ-45-to-DB-9 adapter.

Table 81: Pinouts for an RJ-45 to DB-9 Adapter

Signal	RJ-45 Pin	DB-9 Pin
CTS (clear to send)	1	8
DTR (data carrier detect)	2	6
TXD (transmit data)	3	2
GND (ground)	4	5
GND (ground)	5	5
RXD (receive data)	6	3
DSR (data set ready)	7	4
RTS (request to send)	8	7

The following table shows the pinouts for a T1/E1 crossover cable. This cable is used for connecting the ports on the E4G-200 T1/E1 module.

Table 82: Pinouts for a T1/E1 RJ-48C Crossover Cable

RJ-48C Connector Pin	Description	RJ-48C Connector Pin
1	RX_RING to TX_RING	4
2	RX_TIP to TX_TIP	5
3	—	6
4	TX_RING to RX_RING	1
5	TX_TIP to RX_RING	2
6	—	3
7	—	—
8	—	—

E4G-400 Connector Pinouts

The following table describes the pinouts for a DB-9 console plug connector.

Table 83: Pinouts for the DB-9 Console Connector

Function	Pin Number	Direction
DCD (data carrier detect)	1	In
RXD (receive data)	2	In
TXD (transmit data)	3	Out
DTR (data terminal ready)	4	Out
GND (ground)	5	—
DSR (data set ready)	6	In
RTS (request to send)	7	Out
CTS (clear to send)	8	In

The following figure shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

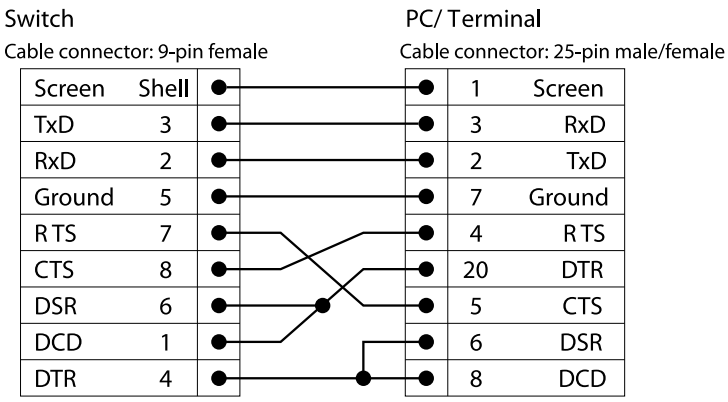

Figure 70: Null-Modem Cable Pinouts

The following figure shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

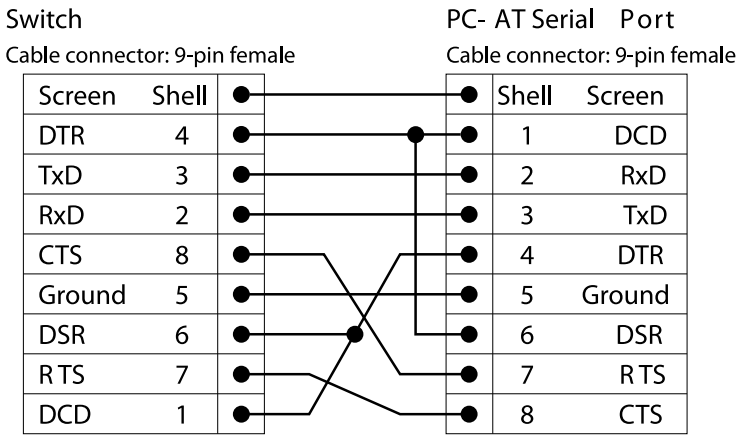

Figure 71: PC-AT Serial Null-modem Cable Pinouts

The following table shows port mapping between the MRJ21 connector on the E4G-B16T1E1 module and the E1/T1 ports.

Table 84: Port Mapping between the E4G-B16T1E1 MRJ21 Connectors and T1/E1 Ports

MRJ21 Connector 1	MRJ21 Connector 2
Port 1	Port 9
Port 2	Port 10
Port 3	Port 11
Port 4	Port 12
Port 5	Port 13
Port 6	Port 14
Port 7	Port 15
Port 8	Port 16

The following figure shows the connector-to-port mapping for the MRJ21-to-RJ-48 fan-out cable.

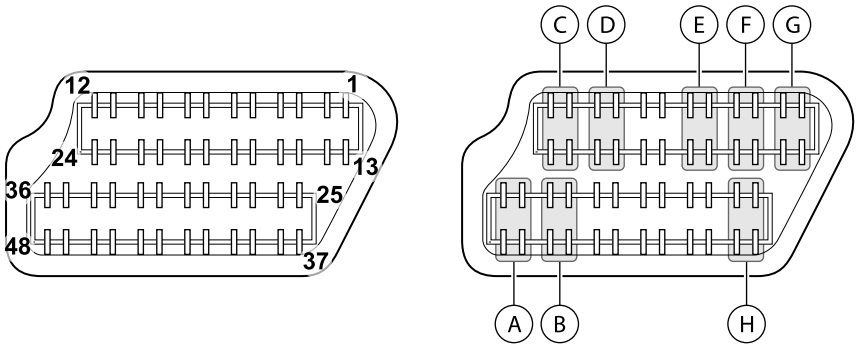

Figure 72: MRJ21-to-RJ-48 Fan-out Mapping

A = Port 1 or 9	E = Port 5 or 13
B = Port 2 or 10	F = Port 6 or 14
C = Port 3 or 11	G = Port 7 or 15
D = Port 4 or 12	H = Port 8 or 16

The following table shows the pinouts for the MRJ21 connector on the E4G-B16T1E1 module.

Table 85: MRJ21 Connector Pinouts

T1/E1 Port Number	Signal	Pin Number	T1/E1 Port Number	Signal	Pin Number
Port 1 or 9	RX-Ring	35	Port 5 or 13	RX-Ring	5
	RX-Tip	36		RX-Tip	6
	TX-Ring	48		TX-Ring	18
	TX-Tip	47		TX-Tip	17
Port 2 or 10	RX-Ring	33	Port 6 or 14	RX-Ring	3
	RX-Tip	34		RX-Tip	4
	TX-Ring	46		TX-Ring	16
	TX-Tip	45		TX-Tip	15
Port 3 or 11	RX-Ring	11	Port 7 or 15	RX-Ring	1
	RX-Tip	12		RX-Tip	2
	TX-Ring	24		TX-Ring	14
	TX-Tip	23		TX-Tip	13
Port 4 or 12	RX-Ring	9	Port 8 or 16	RX-Ring	25
	RX-Tip	10		RX-Tip	26
	TX-Ring	22		TX-Ring	38
	TX-Tip	21		TX-Tip	37

The following table shows the T1/E1 pinout for the RJ-48C connector on the fan-out cable for the E4G-B16T1E1 module.

Table 86: Pinouts for the Fan-out Cable RJ-48C Connector

Pin	Description
1	RX_RING
2	RX_TIP
3	Shield/Ground
4	TX_RING
5	TX_TIP

Table 86: Pinouts for the Fan-out Cable RJ-48C Connector (continued)

Pin	Description
6	Shield/Ground
7	—
8	—

Conformity Statements

Declaration of Conformity

Declarations of conformity to R&TTE Directive 1999/5/EC for the European Community, Switzerland, Norway, Iceland, and Liechtenstein.

Български: [Bulgarian]:	**Това оборудване отговаря на съществените изисквания и приложими клаузи на Директива 1999/5/ЕС.**
Dansk [Danish]:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 1999/5/EF.
Deutsch [German]:	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechendenVorgaben der Richtlinie 1999/5/EU.
Eesti [Estonian]:	See seade vastab direktiivi 1999/5/EÜ olulistele nõuetele ja teistele asjakohastele sätetele.
Español [Spanish]:	Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directiva 999/5/CE.
Français [French]:	Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/EC.
Íslenska [Icelandic]:	Þetta tæki er samkvæmt grunnkröfum og öðrum viðeigandi ákvæðum Tilskipunar 1999/5/EC.
Italiano [Italian]:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/CE.
Nederlands [Dutch]:	Dit apparaat voldoet aan de essentiele eisen en andere van toepassing zijnde bepalingen van de Richtlijn 1999/5/EC.
Norsk [Norwegian]:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 1999/5/EF.
Português [Portuguese]	Este equipamento está em conformidade com os requisitos essenciais e outras provisões relevantes da Directiva 1999/5/EC.
Româna [Romanian]	Acest echipament este in conformitate cu cerintele esentiale si cu alte prevederi relevante ale Directivei 1999/5/EC.
Slovensko [Slovenian]:	Ta naprava je skladna z bistvenimi zahtevami in ostalimi relevantnimi pogoji Direktive 1999/5/EC.
Slovensky [Slovak]:	Toto zariadenie je v zhode so základnými požiadavkami a inými príslušnými nariadeniami direktív: 1999/5/EC.

EMC Class A Statements

Class statements as they apply to various geographic regions/countries.

International—CISPR 22 Class A

This is a Class A product.

In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate remedial measures.

FCC Class A

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 you are required to correct the interference at your own expense.

Canada Class A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Japan (VCCI Class A)

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

この装置は，クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

Class A Notice for Taiwan and Other Traditional Chinese Markets

Warning
This is a Class A product. In a residential environment this product may cause radio interference, in which case the user may be required to take appropriate measures.

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，

可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

警告:此为A级产品，在生活环境中，该产品可能造成线电干扰。在这种情下，可能需要用户对干扰采取切实可行的措施。

Telecom Approvals

FCC Par68 Notice

This equipment has been tested and complies with:

- 47 CFR Part 68 of FCC rules.
- TIA/EIA/IS-968, Technical Criteria for Terminal Equipment To Prevent Harm to the Telephone Network, July 2001, as adopted by the Administrative Council on Terminal Attachments (ACTA).

Canada CS-03 Certification

The Extreme Networks E4G series routers meet the requirements of the Industry Canada label (CS-03) for telecommunications equipment.

Le présent materiel est conforme aux specifications techniques applicables d'Industrie Canada.

Observe the following general information and safety precautions:

- This equipment meets certain telecommunications network protection, operation, and safety requirements as described in the appropriate terminal equipment requirements document(s). The department does not guarantee the equipment will operate to the user's satisfaction.
- Before installing the equipment, check that you have permission to connect it to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.
- Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or any equipment malfunctions, may cause the telecommunications company to request that the user disconnect the equipment.
- Ensure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Japan: JATE Green Book

The Extreme Networks E4G series routers meet the requirements of the Japan Approvals Institute for Telecommunications Equipment (JATE).

The certification ID number is pending at the time of publication.

GR-1089-CORE Issue 6 Documentation Statements

Documentation statements.

ESD Mitigation

Always use an ESD ankle or wrist strap before handling equipment. Connect the equipment end of the ESD strap to an unfinished surface of the equipment chassis or to the ESD jack on the equipment if provided.

Telcordia GR-1089 NEBS Standard for Electromagnetic Compatibility and Safety

Warning

The Ethernet ports of the equipment and its sub-assemblies are suitable only for intra-building connections (within the same building) or for connections to unexposed wiring or cabling. (See the conditions listed above.) The Ethernet ports of this equipment or its sub-assemblies must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. Ethernet interfaces are designed for use only as intra-building interfaces (described as Type 2 or Type 4 ports in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP wiring. The addition of Primary Protectors is not sufficient protection to connect these interfaces metallically to OSPwiring. This warning does not apply to T1/E1 ports because T1/E1 ports have built-in isolation and surge protection that allows them to be connected to OSP wiring.

Intrabuilding Lightning Surge and AC Power Fault

Warning

The E4G series router does not require shielded LAN or WAN cables for compliance with EMC or safety requirements.

For compliance with NEBS GR-1089 Issue 6, however, shielded cables may be required, depending on your application. When shielded cables are required, ports shall be grounded at both ends of the cable.

Equipment Bonding Networks

This equipment is suitable for installations utilizing the Common Bonding Network (CBN).

Equipment Interfacing with AC Power Ports

This equipment shall be connected to AC mains provided with a surge protective device (SPD) at the service equipment complying with NFPA 70, the National Electrical Code (NEC).

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