



ExtremeSwitching and Summit Switches: Hardware Installation Guide

for Switches Using ExtremeXOS 21 or 22



Copyright © 2020 Extreme Networks, Inc. All rights reserved.

Legal Notice

Extreme Networks, Inc. reserves the right to make changes in specifications and other information contained in this document and its website without prior notice. The reader should in all cases consult representatives of Extreme Networks to determine whether any such changes have been made.

The hardware, firmware, software or any specifications described or referred to in this document are subject to change without notice.

Trademarks

Extreme Networks and the Extreme Networks logo are trademarks or registered trademarks of Extreme Networks, Inc. in the United States and/or other countries.

All other names (including any product names) mentioned in this document are the property of their respective owners and may be trademarks or registered trademarks of their respective companies/owners.

For additional information on Extreme Networks trademarks, please see:

www.extremenetworks.com/company/legal/trademarks

Open Source Declarations

Some software files have been licensed under certain open source or third-party licenses. End-user license agreements and open source declarations can be found at:

www.extremenetworks.com/support/policies/software-licensing

Table of Contents

Preface.....	6
Audience.....	6
Conventions.....	6
Providing Feedback to Us.....	7
Getting Help.....	8
Documentation and Training.....	8
Chapter 1: ExtremeSwitching Switches.....	10
Overview of the Switches.....	11
ExtremeSwitching X440-G2 Series Switches.....	12
ExtremeSwitching X450-G2 Series Switches.....	30
ExtremeSwitching X460-G2 Series Switches.....	41
ExtremeSwitching X590 Series Switches.....	57
ExtremeSwitching X620 Series Switches.....	63
ExtremeSwitching X670-G2 Series Switches.....	70
ExtremeSwitching X690 Series Switches.....	74
ExtremeSwitching X770 Series Switches.....	81
ExtremeSwitching X870 Series Switches.....	85
Pluggable Interfaces for the Switches.....	90
Chapter 2: Power Supplies for Use with Your Switch.....	92
External Power Supplies.....	93
Replaceable Internal Power Supplies.....	104
Displaying the Status of Installed Power Supplies.....	111
Chapter 3: Expansion Modules.....	113
V400 Virtual Port Extender.....	114
Solid-state Drives.....	115
Optional Ports for X460-G2 Switches.....	115
Chapter 4: Site Preparation.....	120
Planning Your Site.....	120
Operating Environment Requirements.....	121
Rack Specifications and Recommendations.....	124
Evaluating and Meeting Cable Requirements.....	126
Meeting Power Requirements.....	132
Following Applicable Industry Standards.....	135
Chapter 5: Building Stacks.....	136
Introduction to Stacking.....	136
Planning to Create Your Stack.....	148
Setting up the Physical Stack.....	170
Chapter 6: Installing Your Extreme Networks Switch.....	179
Safety Considerations for Installing Switches.....	180
Pre-installation Requirements.....	180
Attaching the Switch to a Rack or Cabinet.....	181
Installing Optional Components.....	185
Installing Internal Power Supplies.....	185
Connecting Power to the Switch.....	219

Connecting Network Interface Cables.....	220
Performing Initial Management Tasks.....	220
Chapter 7: Installing External Power Supplies.....	224
Safety Considerations for Installing Power Supplies.....	224
Pre-installation Requirements.....	225
Installing an EPS-C2 Power Supply.....	225
Installing an RPS-150XT Redundant Power Supply.....	233
Installing an RPS-500p Redundant Power Supply.....	238
Installing an STK-RPS-150PS Redundant Power Supply.....	241
Installing an STK-RPS-1005PS Redundant Power Supply.....	247
Installing a VX-RPS-1000 Redundant Power Supply.....	251
Chapter 8: Installing Expansion Modules.....	255
Installing a V400 Virtual Port Extender.....	255
Installing a Half-Duplex to Full-Duplex Converter.....	256
Installing a Versatile Interface Module or Clock Module in an X460-G2 Series Switch.....	258
Install an SSD Module.....	259
Chapter 9: Replacing AC Power Supplies.....	262
Replacing a Summit 300 W AC Power Supply.....	262
Replacing a Summit 350 W or 715 W AC Power Supply.....	264
Replacing a Summit 550 W AC Power Supply.....	266
Replacing a 750 W AC Power Supply.....	268
Replacing a Summit 770 W AC Power Supply.....	272
Replacing a Summit 1100 W AC Power Supply.....	274
Removing an RPS-150XT Redundant Power Supply.....	276
Removing an RPS-500p Redundant Power Supply.....	277
Removing an STK-RPS-150PS Redundant Power Supply.....	277
Removing an STK-RPS-1005PS Redundant Power Supply.....	278
Removing a VX-RPS-1000 Redundant Power Supply.....	278
Chapter 10: Replacing DC Power Supplies.....	279
Replacing a Summit 300 W DC Power Supply.....	279
Replacing a Summit 550 W DC Power Supply.....	287
Replacing a 750 W Internal DC Power Supply.....	294
Replacing a Summit 1100 W DC Power Supply.....	299
Chapter 11: Replacing Fan Modules.....	306
Pre-Installation Requirements.....	306
Airflow Direction Requirements.....	306
Replacing a Fan Module.....	306
Chapter 12: Removing and Replacing Expansion Modules.....	308
Removing or Replacing a V400 Virtual Port Extender.....	308
Removing or Replacing a Half-Duplex to Full-Duplex Converter.....	308
Replacing a Versatile Interface Module, Solid-state Drive, or Clock Module in an X460-G2 Series or X465 Series Switch.....	309
Chapter 13: Removing Switches from Service.....	311
Removing an AC Power Supply.....	311
Removing a DC Power Supply.....	312
Removing a Switch from a Rack.....	313

Appendix A: Technical Specifications.....	315
ExtremeSwitching X435 Series Switches Technical Specifications.....	315
ExtremeSwitching X440-G2 Series Switches Technical Specifications.....	320
ExtremeSwitching X450-G2 Series Switches Technical Specifications.....	326
ExtremeSwitching X460-G2 Series Switches Technical Specifications.....	332
ExtremeSwitching X590 Series Switches Technical Specifications.....	341
ExtremeSwitching X620 Series Switches Technical Specifications.....	345
Summit X670-G2 Series Switches Technical Specifications.....	349
ExtremeSwitching X690 Series Switches Technical Specifications.....	354
ExtremeSwitching X695 Series Switch Technical Specifications.....	358
Summit X770 Series Switches Technical Specifications.....	363
ExtremeSwitching X870 Series Switches Technical Specifications.....	368
V400 Virtual Port Extender Technical Specifications.....	371
Half-Duplex to Full-Duplex Converter Technical Specifications.....	374
Summit 300 W Power Supplies Technical Specifications.....	376
Summit 550 W Power Supplies Technical Specifications.....	378
750 W Power Supplies Technical Specifications.....	379
750 W Power Supplies Technical Specifications.....	380
Summit 770 W Power Supplies Technical Specifications.....	382
EPS-C2 Redundant Power Supply Technical Specifications.....	383
RPS-90 Redundant Power Supply Technical Specifications.....	383
RPS-150XT Redundant Power Supply Technical Specifications.....	384
RPS-500p Redundant Power Supply Technical Specifications.....	386
STK-RPS-150PS and RPS Shelves Technical Specifications.....	387
STK-RPS-1005PS Redundant Power Supply Technical Specifications.....	389
VX-RPS-1000 Redundant Power Supply Technical Specifications.....	391
3-Slot Modular Shelves: Technical Specifications.....	392
Power Cord Requirements for AC-Powered Switches and AC Power Supplies.....	393
Console Connector Pinouts.....	393
Appendix B: Safety and Regulatory Information.....	396
Considerations Before Installing.....	396
General Safety Precautions.....	397
Maintenance Safety.....	397
Fiber Optic Ports and Optical Safety.....	398
Cable Routing for LAN Systems.....	399
Installing Power Supply Units and Connecting Power.....	400
Selecting Power Supply Cords.....	401
Battery Notice.....	402
Battery Warning - Taiwan.....	402
EMC Warnings.....	402
Japan (VCCI Class A).....	403
Korea EMC Statement.....	403
Index.....	404

Preface

This guide provides the instructions and supporting information needed to install the following Extreme Networks® ExtremeSwitching® and Summit® family switches:

- [ExtremeSwitching X440-G2 Series Switches](#) on page 12
- [ExtremeSwitching X450-G2 Series Switches](#) on page 30
- [ExtremeSwitching X460-G2 Series Switches](#) on page 41
- [ExtremeSwitching X590 Series Switches](#) on page 57
- [ExtremeSwitching X620 Series Switches](#) on page 63
- [ExtremeSwitching X670-G2 Series Switches](#) on page 70
- [ExtremeSwitching X690 Series Switches](#) on page 74
- [ExtremeSwitching X770 Series Switches](#) on page 81
- [ExtremeSwitching X870 Series Switches](#) on page 85

The guide includes information about site preparation, switch functionality, and switch operation.

Audience

This guide is intended for use by network administrators responsible for installing and setting up network equipment. It assumes a basic working knowledge of:

- Local area networks (LANs)
- Ethernet concepts
- Ethernet switching and bridging concepts
- Routing concepts
- Simple Network Management Protocol (SNMP)
- Basic equipment installation procedures

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for information about configuring ExtremeSwitching switches.



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.
	Warning	Risk of severe personal injury.
<i>New!</i>	New Content	Displayed next to new content. This is searchable text within the PDF.

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]
<i>Words in italicized type</i>	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.

Terminology

When features, functionality, or operation is specific to a switch family, such as ExtremeSecurity 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.

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 <https://www.extremenetworks.com/documentation-feedback/>. You can also email us directly at documentation@extremenetworks.com.

Getting Help

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

- Extreme Portal** Search the GTAC (Global Technical Assistance Center) knowledge base, manage support cases and service contracts, download software, and obtain product licensing, training, and certifications.
- The Hub** A forum for Extreme Networks customers to connect with one another, answer questions, and share ideas and feedback. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.
- Call GTAC** For immediate support: 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

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 RMA (Return Material Authorization) numbers

Subscribing to Service Notifications

You can subscribe to email notifications for product and software release announcements, Vulnerability Notices, and Service Notifications.

- 1 Go to www.extremenetworks.com/support/service-notification-form.
- 2 Complete the form with your information (all fields are required).
- 3 Select the products for which you would like to receive notifications.



Note

You can modify your product selections or unsubscribe at any time.

- 4 Click **Submit**.

Documentation and Training

To find Extreme Networks product guides, visit our documentation pages at:

- Current Product Documentation www.extremenetworks.com/documentation/
- Archived Documentation (for earlier versions and legacy products) www.extremenetworks.com/support/documentation-archives/
- Release Notes www.extremenetworks.com/support/release-notes
- Hardware/Software Compatibility Matrices <https://www.extremenetworks.com/support/compatibility-matrices/>

White papers, data sheets, case studies, <https://www.extremenetworks.com/resources/>
and other product resources

Training

Extreme Networks offers product training courses, both online and in person, as well as specialized certifications. For more information, visit www.extremenetworks.com/education/.

1 ExtremeSwitching Switches

Overview of the Switches

[ExtremeSwitching X440-G2 Series Switches](#)

[ExtremeSwitching X450-G2 Series Switches](#)

[ExtremeSwitching X460-G2 Series Switches](#)

[ExtremeSwitching X590 Series Switches](#)

[ExtremeSwitching X620 Series Switches](#)

[ExtremeSwitching X670-G2 Series Switches](#)

[ExtremeSwitching X690 Series Switches](#)

[ExtremeSwitching X770 Series Switches](#)

[ExtremeSwitching X870 Series Switches](#)

[Pluggable Interfaces for the Switches](#)

The ExtremeSwitching switches are compact enclosures 1.75 inches high (1 U). Each switch model provides high-density copper or fiber optic ports operating at speeds up to 100 Gbps. On some models, these ports can be partitioned into data lanes through the use of split cables, effectively increasing the port count. Many models also provide combination copper/fiber uplink ports. PoE connections and options for adding faster uplink connections are available on some models.

Models are available for AC or DC power connection, and many models provide bays for pluggable power supplies. All switches make provision for redundant power supplies.

Many ExtremeSwitching switches include high-speed stacking interfaces that allow you to connect up to eight switches into a stack, which can be managed as a single entity.

For information about earlier Summit-branded switches, refer to [ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier](#).

The following sections contain general information about the switches:

- [ExtremeSwitching X440-G2 Series Switches](#) on page 12
- [ExtremeSwitching X450-G2 Series Switches](#) on page 30
- [ExtremeSwitching X460-G2 Series Switches](#) on page 41
- [ExtremeSwitching X590 Series Switches](#) on page 57
- [ExtremeSwitching X620 Series Switches](#) on page 63
- [ExtremeSwitching X670-G2 Series Switches](#) on page 70
- [ExtremeSwitching X690 Series Switches](#) on page 74
- [ExtremeSwitching X770 Series Switches](#) on page 81
- [ExtremeSwitching X870 Series Switches](#) on page 85

Overview of the Switches

The following sections describe the ExtremeSwitching switches and summarize the features available in each series.

Model numbers for the switches are in the following format:

<Series>-<number of front-panel I/O ports><port type><internal power supply type>

- The number of ports ranges from 8 to 72.
- The port type can be t (copper), p (copper providing PoE), q (QSFP+), or x (fiber).
- For models with integral power supplies, the power supply type can be AC (no designation) or DC.

Models with pluggable power supplies can accommodate either AC or DC supplies and have no power designation in their model numbers.



Note

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the Summit switches and for information regarding switch configuration.

Combination Ports and Failover

ExtremeSwitching switches provide 2, 4, or 12 uplink ports implemented as combination ports that pair a copper port using RJ45 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. See the individual switch descriptions for the port numbers of the combination ports on each switch model.

ExtremeSwitching switches support 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 Summit 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 RJ45 and SFP interfaces of that port.

Gigabit Ethernet uplink redundancy on the ExtremeSwitching switches 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 switch activates the connected interface.
- The switch determines whether the port uses the fiber or copper connection based on the order in which the connectors are inserted into the switch. When the switch senses that an SFP and a copper connector are inserted, the switch enables the uplink redundancy feature. For example, if you first connect copper ports *x* and *y* on a switch, and then insert SFPs into ports *x* and *y*, the switch 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 switch 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 22.6 User Guide](#).

Port Partitioning

On some ExtremeSwitching switch models, you can configure QSFP28 and QSFP+ ports either as single ports or as multiple, partitioned ports. In a partitioned port, with appropriate cabling, the original physical port can accommodate multiple data lanes at lower bandwidths.

The following partitioning options are available:

Table 3: QSFP28 and QSFP+ Port Partitioning

Switch Model	Port Bandwidth	Each Physical Port Can Operate as...
X670-G2-48x-4q QSFP+	40 Gb	One 40 Gb port or Four 10 Gb ports
X770 (all models) QSFP+	40 Gb	One 40 Gb port or Four 10 Gb ports
X590 (all models) QSFP28 and QSFP+	100 Gb	One 100 Gb port or Two 50 Gb ports or Four 25 Gb ports
	40 Gb	One 40 Gb port or Four 10 Gb ports
X690 (all models) QSFP28 and QSFP+	100 Gb	One 100 Gb port or Two 50 Gb ports or Four 25 Gb ports
	40 Gb	One 40 Gb port or Four 10 Gb ports
X870 (all models) QSFP28 and QSFP+	100 Gb	One 100 Gb port or Two 50 Gb ports or Four 25 Gb ports Note: On X870-96x-8c series switches, an optional Switch Port Speed License is required to increase the data rate to 100 Gb on physical ports 1 through 24. No license is required for 100 Gb capability on physical ports 25 through 32.
	40 Gb	One 40 Gb port or Four 10 Gb ports

For information about configuring partitioned ports, see the [ExtremeXOS 22.6 Command Reference Guide](#).

ExtremeSwitching X440-G2 Series Switches

The ExtremeSwitching X440-G2 switches are cost-effective campus edge switches. They provide 12, 24, or 48 Ethernet ports that deliver high-density fast Ethernet or Gigabit Ethernet connectivity using fixed

10/100/1000BASE-T ports or 100/1000 BASE-X ports. In addition, some models offer IEEE 802.3at PoE + ports.



Note

An extended-temperature model, 24fx-GE4, provides 24 ports of 100Base-FX. Another extended-temperature model, 12t8fx-GE4, provides 12 ports of 10/100/1000BASE-T and eight ports of 100Base-FX.

The ExtremeSwitching X440-G2 series switches include the following base models:

- ExtremeSwitching X440-G2-12t-10GE4 switch
- ExtremeSwitching X440-G2-12p-10GE4 switch
- ExtremeSwitching X440-G2-24t-10GE4 switch
- ExtremeSwitching X440-G2-24x-10GE4 switch
- ExtremeSwitching X440-G2-24p-10GE4 switch
- ExtremeSwitching X440-G2-48t-10GE4 switch
- ExtremeSwitching X440-G2-48p-10GE4 switch
- ExtremeSwitching X440-G2-24t-10GE4-DC switch
- ExtremeSwitching X440-G2-48t-10GE4-DC switch
- ExtremeSwitching X440-G2-12t8fx-GE4 switch
- ExtremeSwitching X440-G2-24fx-GE4 switch
- ExtremeSwitching X440-G2-24t-GE4 switch

Most X440-G2 switches support both half-duplex and full-duplex communication over 10/100/1000BASE-T ports. For details, see the "Switch Ports and Slots" topics for the individual base models.

All models come equipped with four ports of SFP 1 GbE resident on either the faceplate or rear panel. On the 12-port, 24-port, and 48-port 10/100/1000 models, except for the extended-temperature models, these 1 GbE ports can be upgraded to 10 Gb SFP+ Ethernet through software licensing. The 24- and 48-port 10/100/1000 models (except the X440-G2-24t-GE4) have four 1 GbE SFP combination ports on the front panel.

ExtremeSwitching X440-G2 series switches require ExtremeXOS version 21.1.1 or later.

Security

These switches provide comprehensive security management:

- User policy and host integrity enforcement, and identity management
- Universal Port Dynamic Security Profiles to provide fine granular security policies in the network
- Threat detection and response instrumentation to react to network intrusion with CLEAR-Flow Security Rules Engine
- Denial of Service (DoS) protection and IP security against man-in-the-middle and DoS attacks to harden the network infrastructure

Stacking

Up to eight X440-G2 switches can be stacked using SummitStack-V. Each X440-G2 unit (except the extended temperature range switches) comes equipped with two stacking ports using an SFP+ interface. Standard 10 Gb Ethernet Optics and passive and active cables can be used in the SFP+ ports for stacking X440-G2s together using SummitStack-V.

ExtremeXOS supports the SummitStack-V capability using two SFP+ ports as stacking ports, enabling the use of standard cabling and optics technologies used for 10 GbE SFP+. SummitStack-V provides long-distance stacking connectivity of up to 40 km while reducing the cable complexity of implementing a stacking solution. For a list of X440-G2 ports that can be used with SummitStack-V, see [X440-G2 Stacking](#) on page 151.

On X440-G2 switches, SummitStack-V is compatible with X450-G2 and X460-G2 switches with 10 Gb uplinks and with X770, X620, and X670-G2 switches running the same version of ExtremeXOS. SummitStack-V enabled 10 GbE ports must be physically direct-connected.

Note



The SFP+ stacking ports on the base X440-G2 switches are 1 Gb Ethernet ports, not 10 Gb Ethernet ports. The switches run a 10 Gb stacking protocol by default, but they do not run the 10 Gb Ethernet protocol without licensed entitlement. Two- and four-port licenses are available to enable the ports to run the 10 Gb Ethernet protocol.

Note



SummitStack-V is not supported on the following extended temperature range switch models:

- X440-G2-12t8fx-GE4
- X440-G2-24fx-GE4
- X440-G2-24t-GE4

Operating Temperatures

Most X440-G2 switch models support an operating range from 0°C to 50°C. The following models extend the operating range from 0°C to 60°C:

- X440-G2-12t8fx-GE4
- X440-G2-24fx-GE4
- X440-G2-24t-GE4

Additional Features

For all models, a serial console port on the front panel allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configurations.

The rear panel provides an AC power input socket or DC input connector, along with a redundant power connector. The switch automatically adjusts to the supply voltage. The redundant power connector allows you to connect the switch to either a standalone external redundant power supply or the EPS-C2 external power system. When a compatible external power supply is used with the ExtremeSwitching

X440-G2 switch, the internal and external power supplies are fully fault tolerant. If one power supply fails, the other power supply will provide sufficient power to operate the switch.

All X440-G2 switches support external redundant power options. For details, refer to [Table 30](#) on page 93.



Note

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X440-G2-12t-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-12t-10GE4 switch ports and slots include:

- 12 front panel 10/100/1000BASE-T ports (RJ45), all of which support both half-duplex and full-duplex communication.
- Four unpopulated 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing.

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector (coaxial barrel connector).

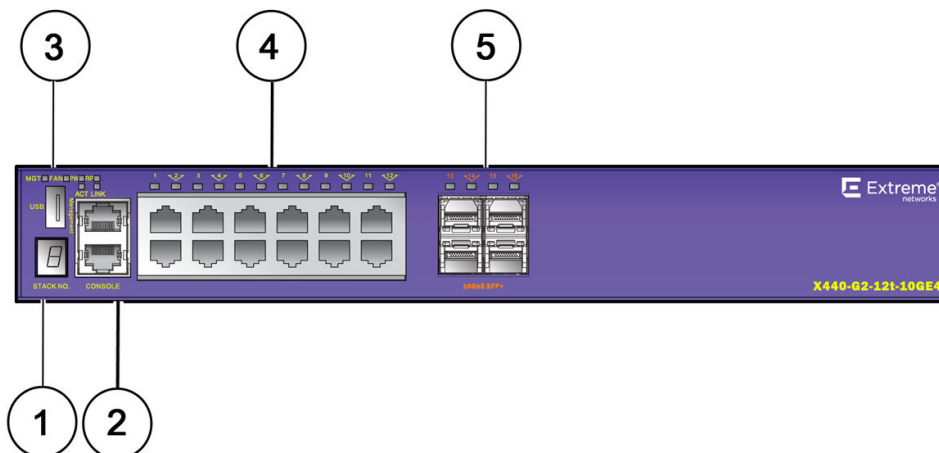


Figure 1: ExtremeSwitching X440-G2-12t-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T copper ports
2 = Console port/Ethernet management port	5 = SFP Ports upgradeable to 10GBASE-X

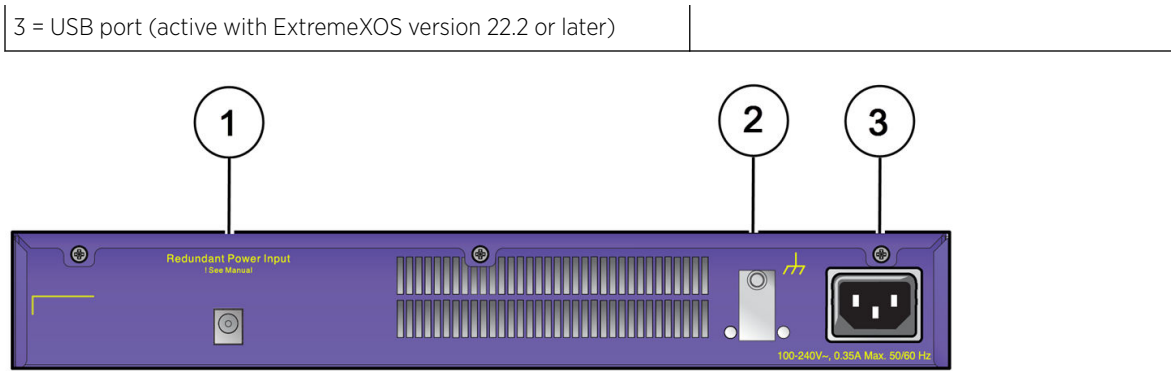


Figure 2: ExtremeSwitching X440-G2-12t-10GE4 Rear Panel

1 = Redundant power input	3 = AC power input socket
2 = Grounding lug	

ExtremeSwitching X440-G2-12p-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-12p-10GE4 switch ports and slots include:

- 12 front panel PoE+ ports of 10/100/1000BASE-T. Both half-duplex and full-duplex communication are supported on all 12 ports.
- Four unpopulated 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing.

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

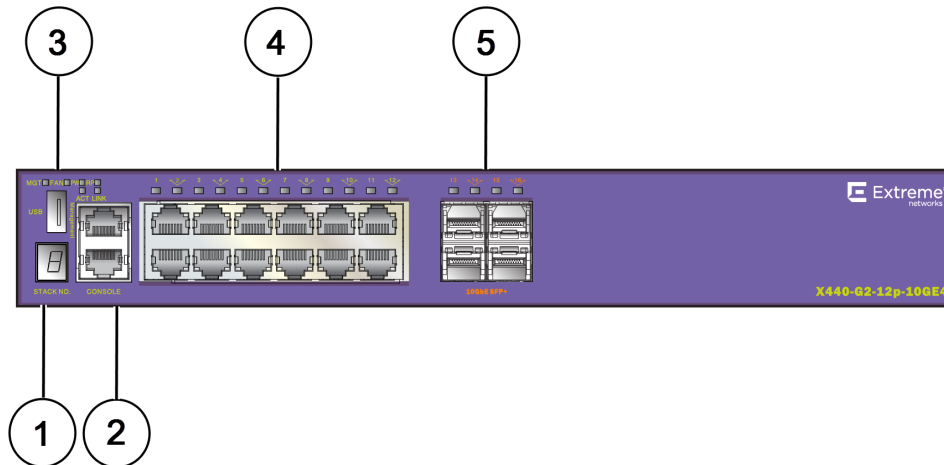


Figure 3: ExtremeSwitching X440-G2-12p-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T copper ports
2 = Console port/Ethernet management port	5 = SFP Ports upgradeable to 10GBASE-X
3 = USB port (active with ExtremeXOS version 22.2 or later)	

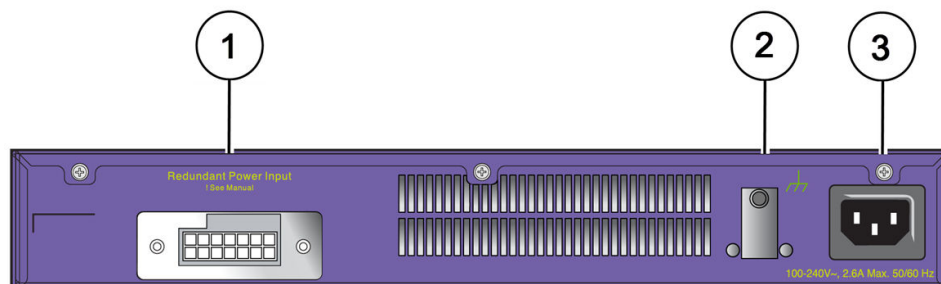


Figure 4: ExtremeSwitching X440-G2-12p-10GE4 Rear Panel

1 = Redundant power input	3 = AC power input socket
2 = Grounding lug	

ExtremeSwitching X440-G2-24t-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-24t-10GE4 switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (RJ45). Both half-duplex and full-duplex communication are supported on ports 1 through 16. Ports 17 through 24 are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP combination ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack

ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

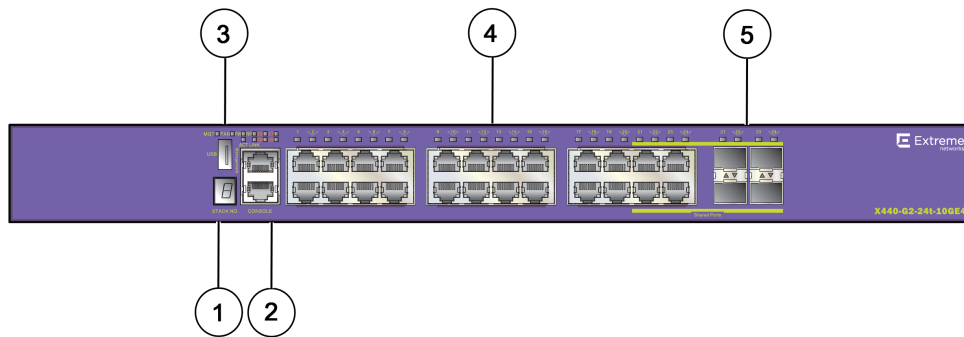


Figure 5: ExtremeSwitching X440-G2-24t-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T copper ports
2 = Console port/Ethernet management port	5 = 1000BASE-X SFP combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

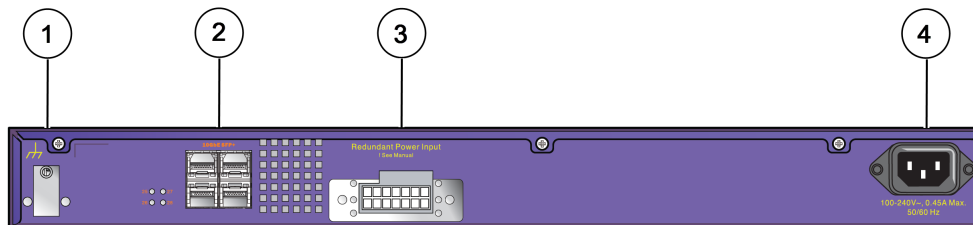


Figure 6: ExtremeSwitching X440-G2-24t-10GE4 Rear Panel

1 = Grounding lug	3 = Redundant power input
2 = SFP Ports upgradeable to 10GBASE-X	4 = AC power input socket

ExtremeSwitching X440-G2-24x-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-24x-10GE4 switch ports and slots include:

- 24 front panel 1GBASE-X SFP ports.
- Four unpopulated front panel 10/100/1000BASE-T (RJ45) ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

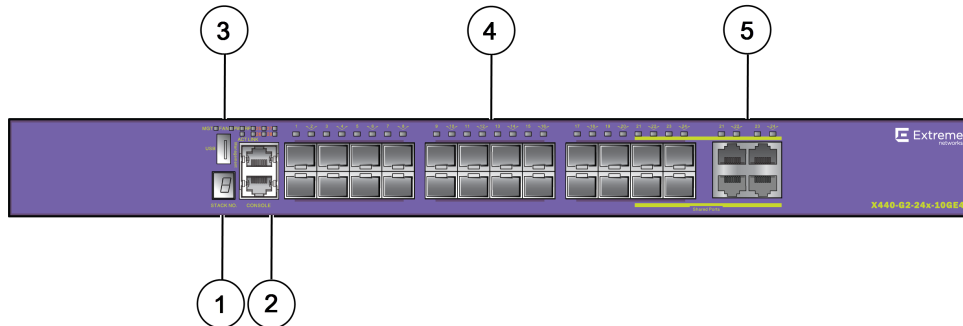


Figure 7: ExtremeSwitching X440-G2-24x-10GE4 Front Panel

1 = Stack number indicator	4 = 1GBASE-X SFP ports
2 = Console port/Ethernet management port	5 = 10/100/1000BASE-T combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

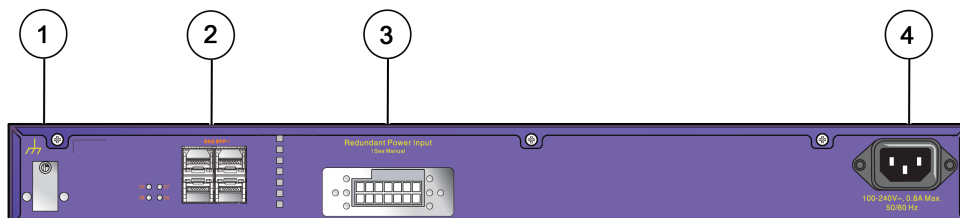


Figure 8: ExtremeSwitching X440-G2-24x-10GE4 Rear Panel

1 = Grounding lug	3 = Redundant power input
2 = SFP Ports upgradeable to 10GBASE-X	4 = AC power input socket

ExtremeSwitching X440-G2-24p-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-24p-10GE4 switch ports and slots include:

- 24 front panel PoE+ ports of 10/100/1000BASE-T. Both half-duplex and full-duplex communication are supported on ports 1 through 16. Ports 17 through 24 are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP combination ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

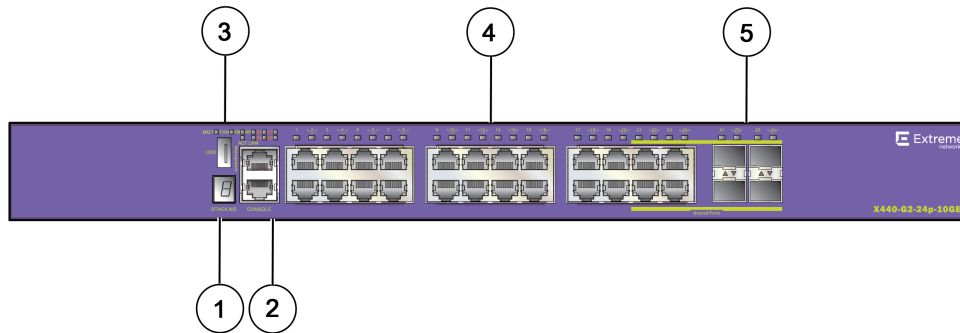


Figure 9: ExtremeSwitching X440-G2-24p-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T copper ports
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

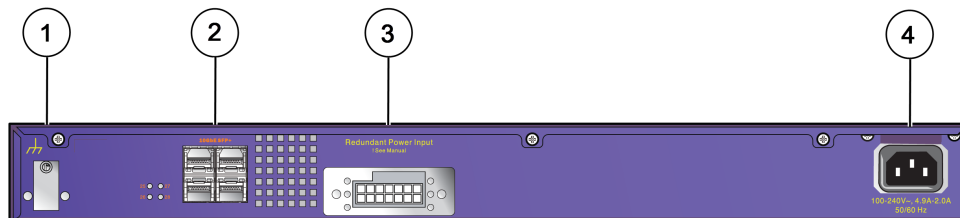


Figure 10: ExtremeSwitching X440-G2-24p-10GE4 Rear Panel

1 = Grounding lug	3 = Redundant power input
2 = SFP Ports upgradeable to 10GBASE-X	4 = AC power input socket

ExtremeSwitching X440-G2-48t-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-48t-10GE4 switch ports and slots include:

- 48 front panel ports of 10/100/1000BASE-T (RJ45). Both half-duplex and full-duplex communication are supported on ports 1 through 16 and 25 through 40. The rest of the ports are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP combination ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Two 1GbE copper combination ports that can be upgraded to 10Gb Ethernet.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

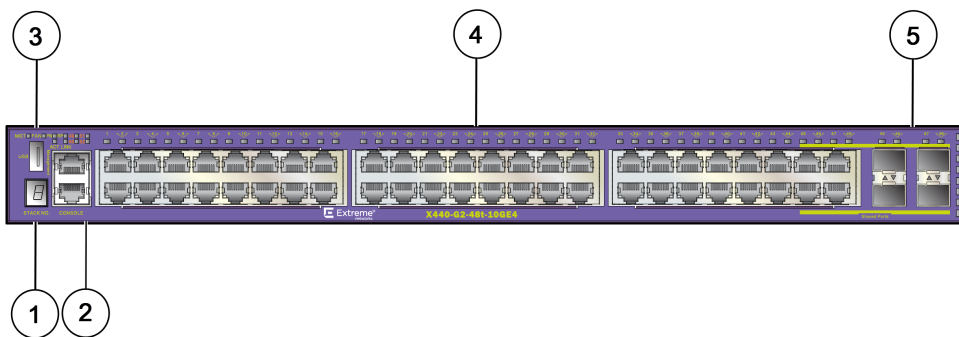


Figure 11: ExtremeSwitching X440-G2-48t-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

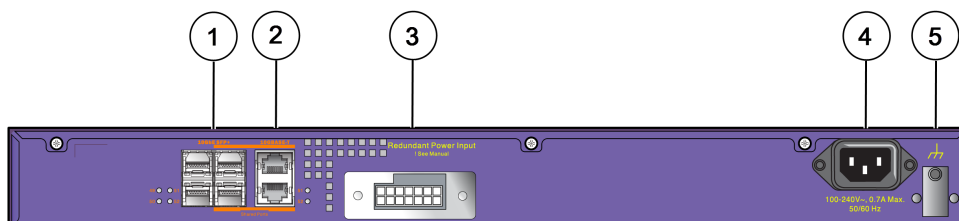


Figure 12: ExtremeSwitching X440-G2-48t-10GE4 Rear Panel

1 = SFP ports upgradeable to 10GBASE-X	4 = AC power input socket
--	---------------------------

2 = 1GBASE-T combination ports upgradeable to 10GBASE-T	5 = Grounding lug
3 = Redundant power input	

ExtremeSwitching X440-G2-48p-10GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-48p-10GE4 switch ports and slots include:

- 48 front panel PoE+ ports of 10/100/1000BASE-T. Both half-duplex and full-duplex communication are supported on ports 1 through 16 and 25 through 40. The rest of the ports are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP combination ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Two 1GbE copper combination ports that can be upgraded to 10Gb Ethernet.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

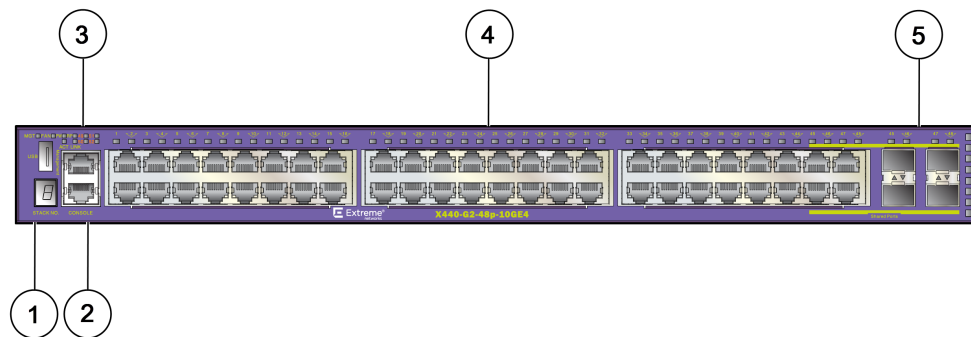


Figure 13: ExtremeSwitching X440-G2-48p-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

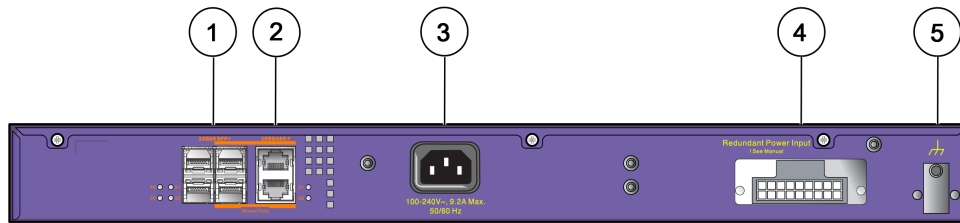


Figure 14: ExtremeSwitching X440-G2-48p-10GE4 Rear Panel

1 = SFP Ports upgradeable to 10GBASE-X	4 = Redundant power input
2 = 1GBASE-T combination ports upgradeable to 10GBASE-T	5 = Grounding lug
3 = AC power input socket	

ExtremeSwitching X440-G2-24t-10GE4-DC Switch Ports and Slots

The ExtremeSwitching X440-G2-24t-10GE4-DC switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (RJ45). Both half-duplex and full-duplex communication are supported on ports 1 through 16. Ports 17 through 24 are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP combination ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

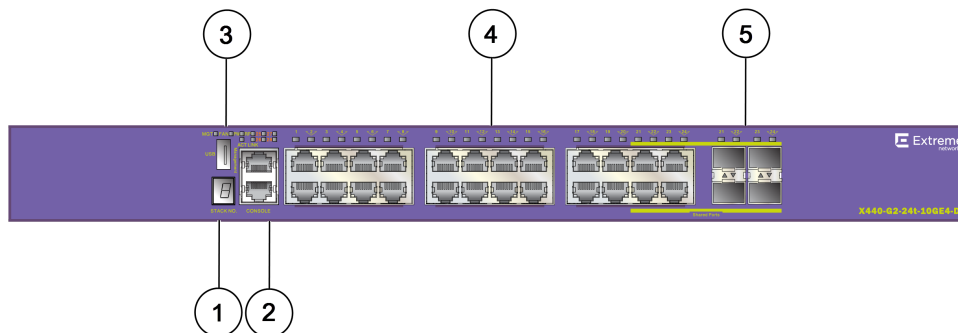


Figure 15: ExtremeSwitching X440-G2-24t-10GE4-DC Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

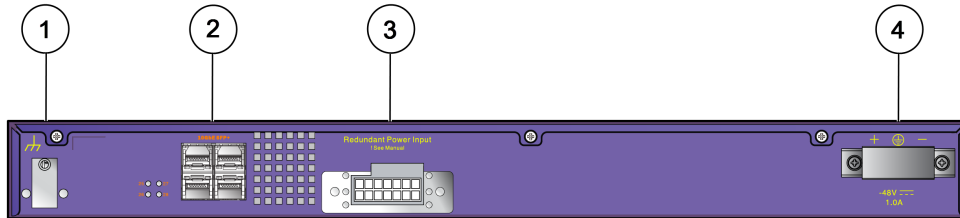


Figure 16: ExtremeSwitching X440-G2-24t-10GE4-DC Rear Panel

1 = Grounding lug	3 = Redundant power input
2 = SFP Ports upgradeable to 10GBASE-X	4 = DC power connector panel

ExtremeSwitching X440-G2-48t-10GE4-DC Switch Ports and Slots

The ExtremeSwitching X440-G2-48t-10GE4-DC switch ports and slots include:

- 48 front panel ports of 10/100/1000BASE-T (RJ45). Both half-duplex and full-duplex communication are supported on ports 1 through 16 and 25 through 40. The rest of the ports are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP combination ports.
- Four unpopulated rear panel 1GBASE-X SFP+ ports that can be used as either 1Gb ports or 10Gb ports, where the 10Gb configuration requires an upgrade through additional licensing..

Alternately, you can convert two of the ports to stacking ports using the `enable stacking-support` command. Doing so would provide you with the option of two 1Gb ports and two stack ports or two 10Gb ports and two stack ports. In the latter configuration, an additional license would be required for the 10Gb non-stacking ports.

- Two 1GbE copper combination ports that can be upgraded to 10Gb Ethernet.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

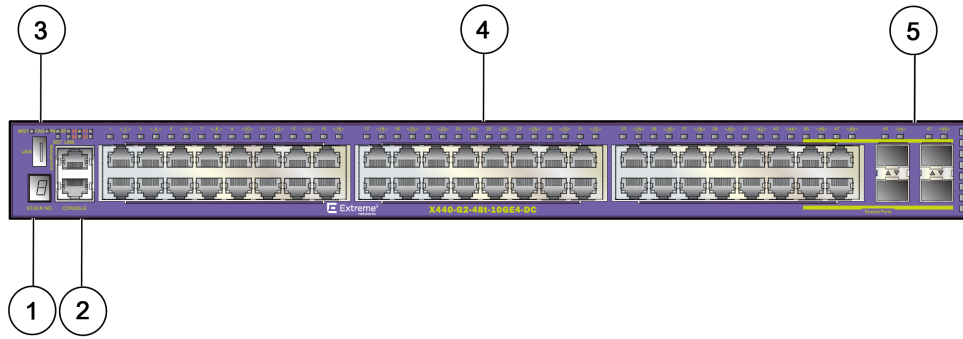


Figure 17: ExtremeSwitching X440-G2-48t-10GE4-DC Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP combination ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

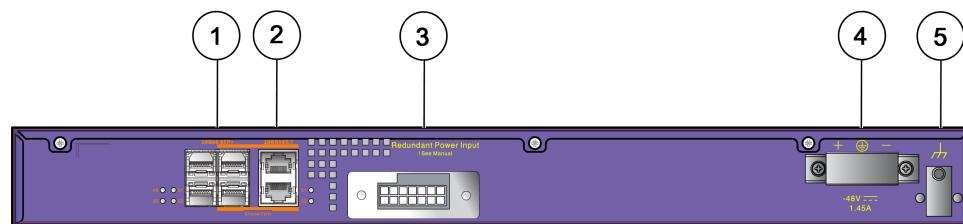


Figure 18: ExtremeSwitching X440-G2-48t-10GE4-DC Rear Panel

1 = SFP Ports upgradeable to 10GBASE-X	4 = DC power connector panel
2 = 1GBASE-T combination ports upgradeable to 10GBASE-T	5 = Grounding lug
3 = Redundant power input	

ExtremeSwitching X440-G2-12t8fx-GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-12t8fx-GE4 switch ports and slots include:

- 12 front panel 10/100/1000BASE-T ports, all of which support both half-duplex and full-duplex communication.
- Four unpopulated front panel 1GBASE-X SFP ports.
- Eight 100BASE-FX LC connectors.



Note

The LC connectors are transceivers with an LC interface.

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

The X440-G2 12t8fx-GE4 switch supports an operating range from 0°C to 60°C.

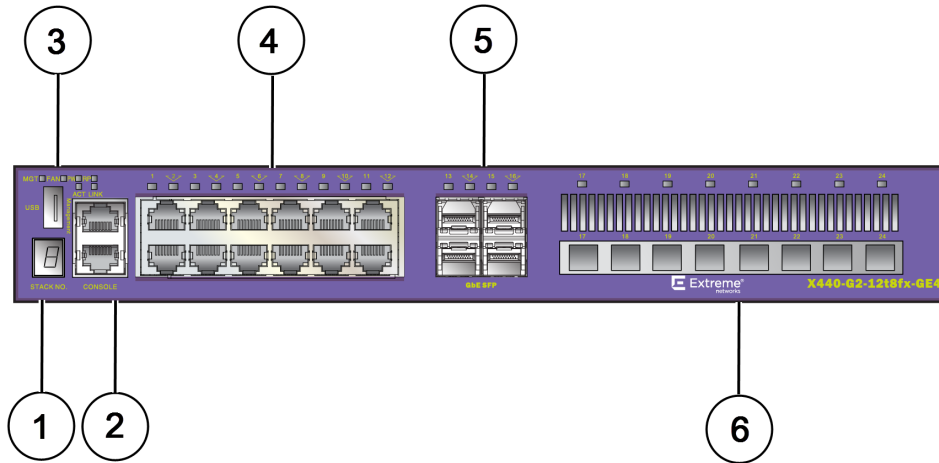


Figure 19: ExtremeSwitching X440-G2-12t8fx-GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	6 = 100BASE-FX LC connectors

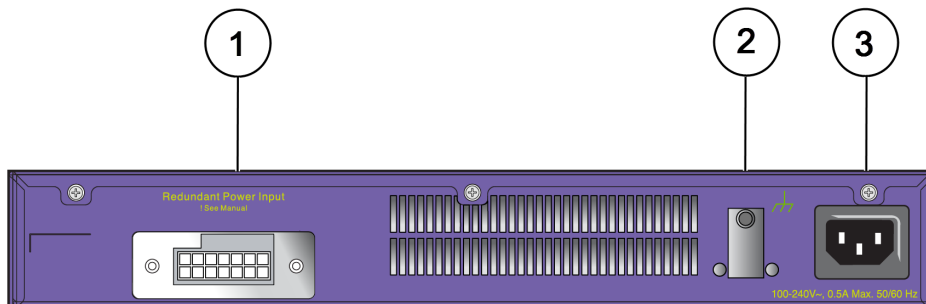


Figure 20: ExtremeSwitching X440-G2-12t8fx-GE4 Rear Panel

1 = Redundant power input	3 = AC power input socket
2 = Grounding lug	

ExtremeSwitching X440-G2-24fx-GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-24fx-GE4 switch ports and slots include:

- 24 front panel 100BASE-FX LC connectors.



Note

The LC connectors are transceivers with an LC interface.

- Four unpopulated front panel 1GBASE-X SFP ports.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

The X440-G2 24fx-GE4 switch supports an operating range from 0°C to 60°C.

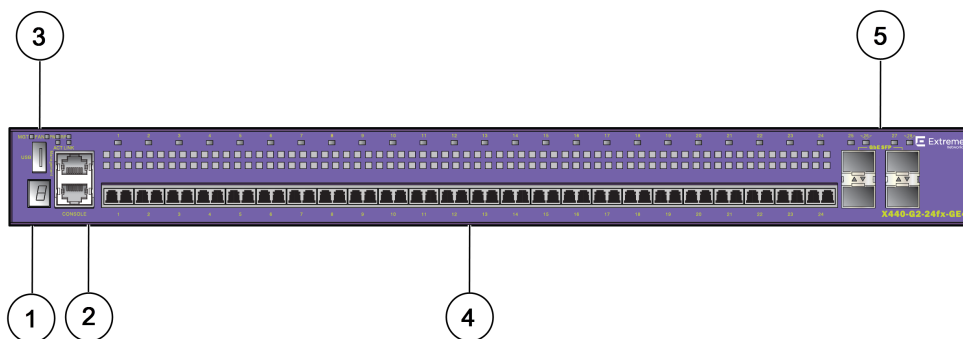


Figure 21: ExtremeSwitching X440-G2-24fx-GE4 Front Panel

1 = Stack number indicator	4 = 100BASE-FX LC connectors
2 = Console port/Ethernet management port	5 = 1GBASE-X SFP ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

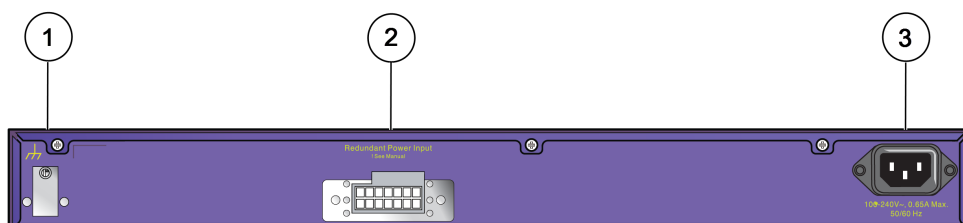


Figure 22: ExtremeSwitching X440-G2-24fx-GE4 Rear Panel

1 = Grounding lug	3 = AC power input socket
2 = Redundant power input	

ExtremeSwitching X440-G2-24t-GE4 Switch Ports and Slots

The ExtremeSwitching X440-G2-24t-GE4 switch ports and slots include:

- 24 front panel 10/100/1000BASE-T ports (RJ45). Both half-duplex and full-duplex communication are supported on ports 1 through 16. Ports 17 through 24 are full-duplex only.
- Four unpopulated front panel 1GBASE-X SFP ports.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

The X440-G2 24t-GE4 switch supports an operating range from 0°C to 60°C.

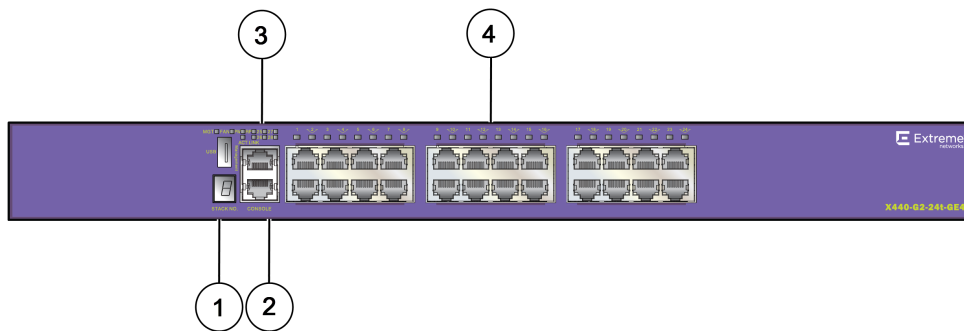


Figure 23: ExtremeSwitching X440-G2-24t-GE4 Front Panel

1 = Stack number indicator	3 = USB port (active with ExtremeXOS version 22.2 or later)
2 = Console port/Ethernet management port	4 = 10/100/1000BASE-T ports

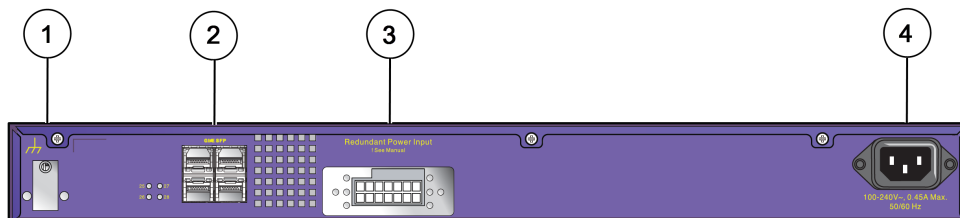


Figure 24: ExtremeSwitching X440-G2-24t-GE4 Rear Panel

1 = Grounding lug	3 = Redundant power input
2 = 1GBASE-X SFP ports	4 = AC power input socket

ExtremeSwitching X440-G2 Series Switch LEDs

The following sections describe the meanings of the LEDs on the ExtremeSwitching X440-G2 series switches.

Table 4: X440-G2 Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed: system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached
S1, S2 (Stack Management)	Steady green	Link OK on the indicated stacking port
	Blinking green	Activity on the indicated stacking port
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
Power Supply Unit (PSU)	Steady green	Normal operation
	Blinking amber	Input or output power failure
	Off	No board power
Redundant Power Supply (RPS)	Steady green	Normal operation
	Blinking amber	Power failure When RPS is present, no supply from PSU
	Off	No RPS PSU is attached
Ethernet Management Port	Blinking green (left)	Activity on the indicated port Link OK
	Off (left)	Activity on the indicated port
	Steady green (right)	Link OK
	Off (right)	No link, or port disabled
Other ports	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No link, or port disabled

Table 5: Additional Port LED Meanings for PoE Switches: X440-G2-12p-10GE4, X440-G2-24p-10GE4, and X440-G2-48p-10GE4

Label or Type	Color/State	Meaning
All front panel ports	Steady green	Link is OK; port is not powered
	Steady amber	Link is OK; port is powered; no traffic
	Blinking green	Link is OK and transmitting packets; port is not powered
	Blinking amber	Link is OK and transmitting packets; port is powered
	Slow blinking amber	No link, or disabled port; port is powered
	Alternating amber and green	Port has a power fault
	Off	Port is not powered, has no link, or is disabled

Table 6: ExtremeSwitching X440-G2 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	<i>Reserved for future use</i>	
Right digit (1 – 8)	Indicates the position of this switch in the ExtremeSwitching stack configuration	
	Upper half blinking	This switch is the stack master node
	Lower half blinking	This switch is the stack backup node
	Lit steadily	This switch is a standby node in the stack

ExtremeSwitching X450-G2 Series Switches

The X450-G2 series switches provide 24 or 48 Ethernet ports that deliver high-density fast Ethernet or Gigabit Ethernet connectivity using fixed 10/100/1000BASE-T ports. In addition, some models offer either 24 or 48 PoE+ ports. The X450-G2 series switches also provide four ports of SFP+ 10 Gb Ethernet or four ports of SFP 1 Gb Ethernet on the front panel. Each model includes two dedicated stacking ports on the rear panel.

All X450-G2 ports are full-duplex. They do not support half-duplex operation.

The X450-G2 series switches include the following base models:

- [ExtremeSwitching X450-G2-24t-GE4 Switch Ports and Slots](#) on page 31
- [ExtremeSwitching X450-G2-24t-10GE4 Switch Ports and Slots](#) on page 32
- [ExtremeSwitching X450-G2-48t-GE4 Switch Ports and Slots](#) on page 33
- [ExtremeSwitching X450-G2-48t-10GE4 Switch Ports and Slots](#) on page 34
- [ExtremeSwitching X450-G2-24p-GE4 Switch Ports and Slots](#) on page 35
- [ExtremeSwitching X450-G2-24p-10GE4 Switch Ports and Slots](#) on page 36
- [ExtremeSwitching X450-G2-48p-GE4 Switch Ports and Slots](#) on page 37
- [ExtremeSwitching X450-G2-48p-10GE4 Switch Ports and Slots](#) on page 38

Each base model supports front-to-back cooling only. Switch cooling is provided by a replaceable fan module.

**Note**

The fan module must be ordered separately.

A serial console port on the front panel of the X450-G2 series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.

The non-PoE+ switches (that is, the 24t and 48t models) have a fixed, internal power supply. The PoE+ switches (that is, the 24p and 48p models) have two power supply bays to accommodate AC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fans.

For more information about the power supplies used in the X450-G2 switches, see [Replaceable Internal Power Supplies](#) on page 104.

**Note**

X450-G2 series switches do not support back-to-front (BF) power supplies, and the switches do not support the back-to-front fan module.

X450-G2 series switches require ExtremeXOS version 16.1.1 or later, or version 21.1.1 or later.

ExtremeSwitching X450-G2-24t-GE4 Switch Ports and Slots

X450-G2-24t-GE4 switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (ports 1–24).
- Four front panel ports of 1GBASE-X SFP (ports 25–28).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One fixed power supply.
- One rear redundant power supply connector.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.

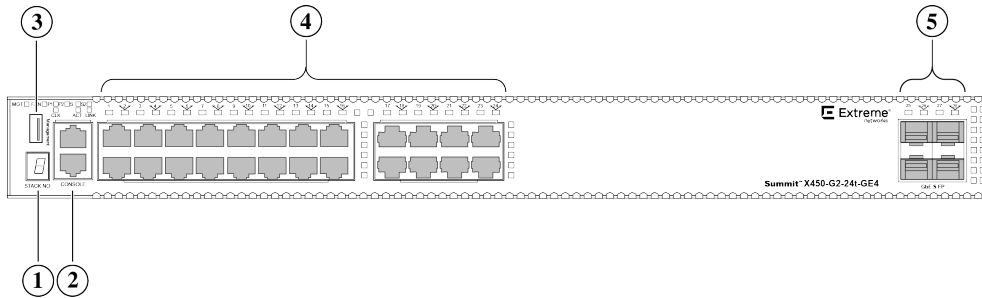


Figure 25: X450-G2-24t-GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP 1GBASE-X ports
3 = USB port	

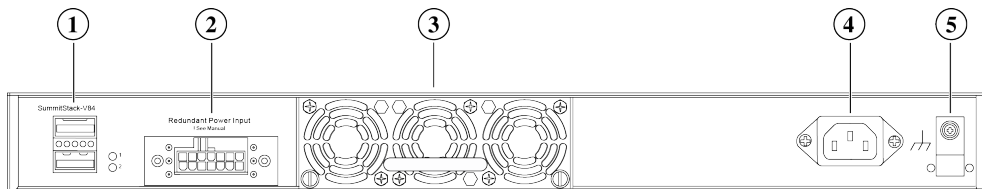


Figure 26: X450-G2-24t-GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	4 = AC power input connector
2 = Redundant power supply (RPS) connector	5 = Grounding screw
3 = Front-to-back fan module slot	

ExtremeSwitching X450-G2-24t-10GE4 Switch Ports and Slots

X450-G2-24t-10GE4 switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (ports 1–24).
- Four front panel ports of 10GBASE-X SFP+ (ports 25–28, with ports 27 and 28 configurable to be stacking ports). The SFP+ ports are dual speed (1 Gb/10 Gb).
- Front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One fixed power supply.
- One rear redundant power supply connector.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.

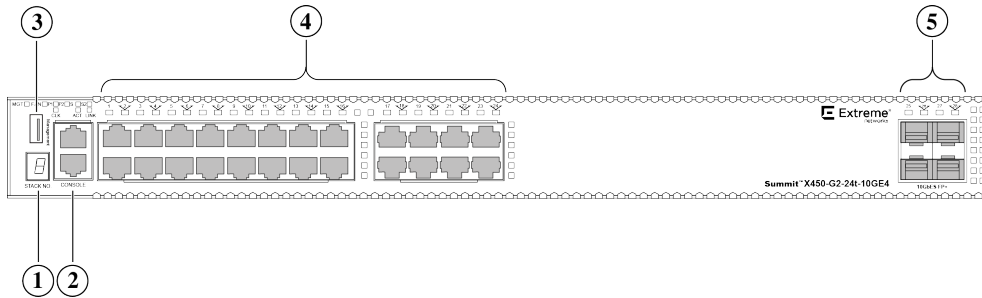


Figure 27: X450-G2-24t-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP+ 10GBASE-X ports
3 = USB port	

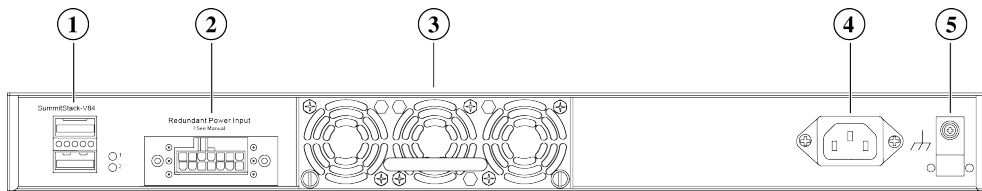


Figure 28: X450-G2-24t-10GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	4 = AC power input connector
2 = Redundant power supply (RPS) connector	5 = Grounding screw
3 = Front-to-back fan module slot	

ExtremeSwitching X450-G2-48t-GE4 Switch Ports and Slots

X450-G2-48t-GE4 switch ports and slots include:

- 48 front panel ports of 10/100/1000BASE-T (ports 1–48).
- Four front panel ports of 1GBASE-X SFP (ports 49–52).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One fixed power supply.
- One rear redundant power supply connector.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.

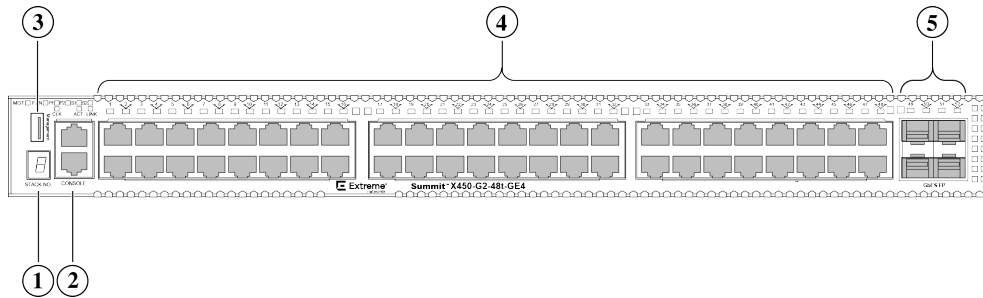


Figure 29: X450-G2-48t-GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP 1GBASE-X ports
3 = USB port	

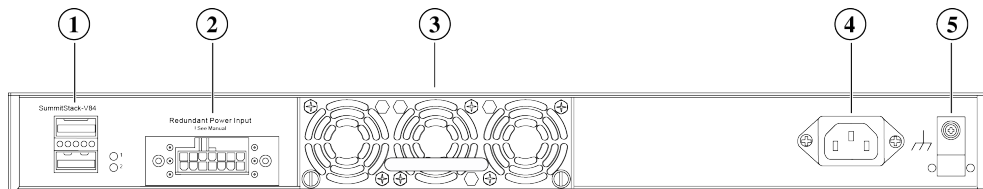


Figure 30: X450-G2-48t-GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	4 = AC power input connector
2 = Redundant power supply (RPS) connector	5 = Grounding screw
3 = Front-to-back fan module slot	

ExtremeSwitching X450-G2-48t-10GE4 Switch Ports and Slots

X450-G2-48t-10GE4 switch ports and slots include:

- 48 front panel ports of 10/100/1000BASE-T (ports 1–48).
- Four front panel ports of 10GBASE-X SFP+ (ports 49–52, with ports 51 and 52 configurable to be stacking ports). The SFP+ ports are dual speed (1 Gb/10 Gb).
- Front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One fixed power supply.
- One rear redundant power supply connector.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.

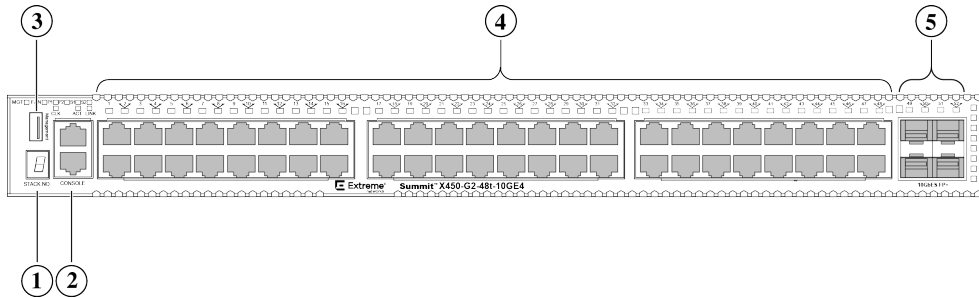


Figure 31: X450-G2-48t-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP+ 10GBASE-X ports
3 = USB port	

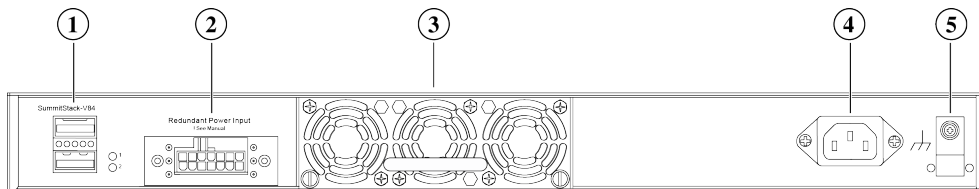


Figure 32: X450-G2-48t-10GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	4 = AC power input connector
2 = Redundant power supply (RPS) connector	5 = Grounding screw
3 = Front-to-back fan module slot	

ExtremeSwitching X450-G2-24p-GE4 Switch Ports and Slots

X450-G2-24p-GE4 switch ports and slots include:

- 24 front panel PoE+ ports of 10/100/1000BASE-T (ports 1–24).
- Four front panel ports of 1GBASE-X SFP (ports 25–28).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.
- Rear dual power supply slots with front-to-back airflow.



Note

Unused power supply slots must be covered with blank panels.

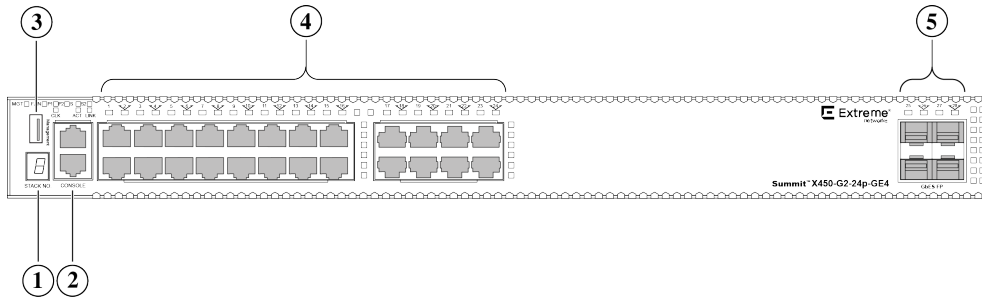


Figure 33: X450-G2-24p-GE4 Front Panel

1 = Stack number indicator	4 = PoE+ 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP 1G ports
3 = USB port	

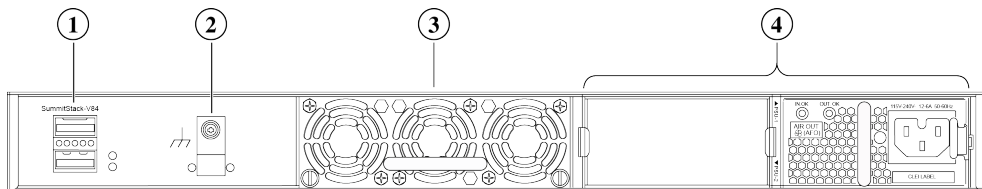


Figure 34: X450-G2-24p-GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	3 = Front-to-back fan module slot
2 = Grounding screw	4 = PoE+ power supply bays

ExtremeSwitching X450-G2-24p-10GE4 Switch Ports and Slots

X450-G2-24p-10GE4 switch ports and slots include:

- 24 front panel PoE+ ports of 10/100/1000BASE-T (ports 1–24).
- Four front panel ports of 10GBASE-X SFP+ (ports 25–28, with ports 27 and 28 configurable to be stacking ports). The SFP+ ports are dual speed (1 Gb/10 Gb).
- Front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.
- Rear dual power supply slots with front-to-back airflow.



Note

Unused power supply slots must be covered with blank panels.

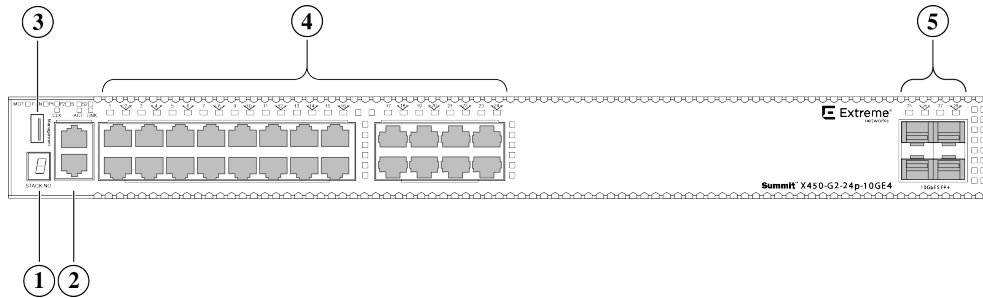


Figure 35: X450-G2-24p-10GE4 Front Panel

1 = Stack number indicator	4 = PoE+ 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP+ 10GBASE-X ports
3 = USB port	

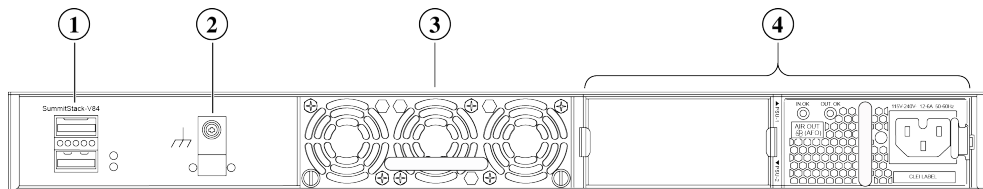


Figure 36: X450-G2-24p-10GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	3 = Front-to-back fan module slot
2 = Grounding screw	4 = PoE+ power supply bays

ExtremeSwitching X450-G2-48p-GE4 Switch Ports and Slots

X450-G2-48p-GE4 switch ports and slots include:

- 48 front panel PoE+ ports of 10/100/1000BASE-T (ports 1–48).
- Four front panel ports of 1GBASE-X SFP (ports 49–52).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.
- Rear dual power supply slots with front-to-back airflow.



Note

Unused power supply slots must be covered with blank panels.

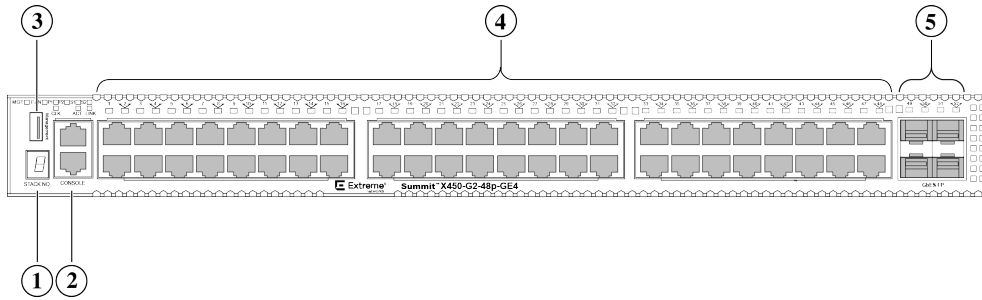


Figure 37: X450-G2-48p-GE4 Front Panel

1 = Stack number indicator	4 = PoE+ 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP 1GBASE-X ports
3 = USB port	

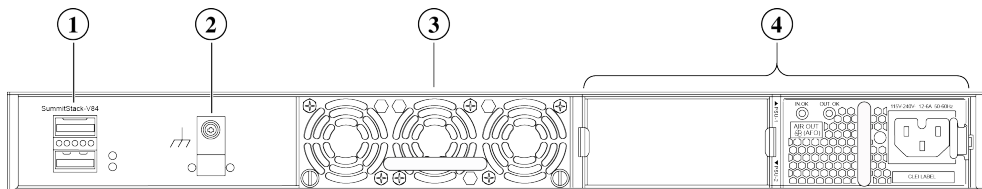


Figure 38: X450-G2-48p-GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	3 = Front-to-back fan module slot
2 = Grounding screw	4 = PoE+ power supply bays

ExtremeSwitching X450-G2-48p-10GE4 Switch Ports and Slots

X450-G2-48p-10GE4 switch ports and slots include:

- 48 front panel PoE+ ports of 10/100/1000BASE-T (ports 1–48).
- Four front panel ports of 10GBASE-X SFP+ (ports 49–52, with ports 51 and 52 configurable to be stacking ports). The SFP+ ports are dual speed (1 Gb/10 Gb).
- Front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear slot for fan module with front-to-back airflow.
- Two dedicated QSFP-form factor 21 Gb stacking ports on the rear panel.
- Rear dual power supply slots with front-to-back airflow.



Note

Unused power supply slots must be covered with blank panels.

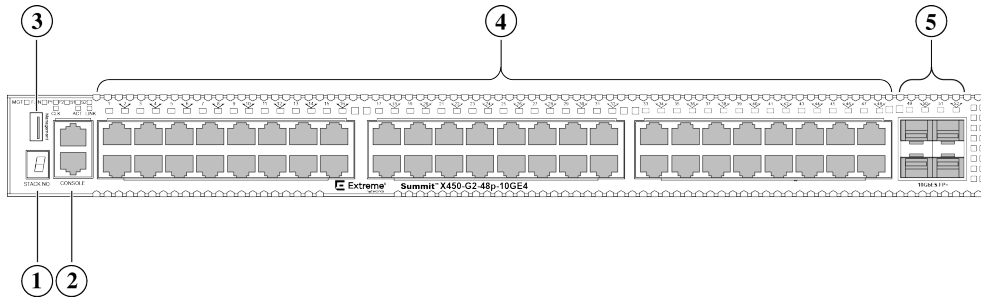


Figure 39: X450-G2-48p-10GE4 Front Panel

1 = Stack number indicator	4 = PoE+ 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP+ 10GBASE-X ports
3 = USB port	

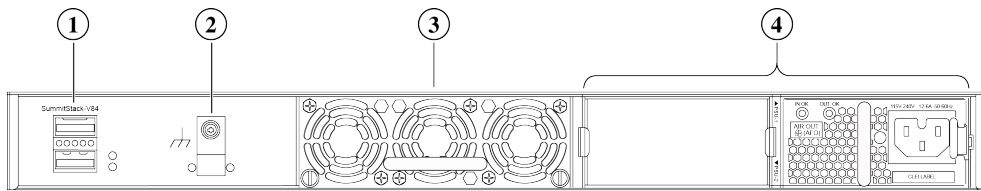


Figure 40: X450-G2-48p-10GE4 Rear Panel

1 = 21 Gb stacking ports (QSFP+)	3 = Front-to-back fan module slot
2 = Grounding screw	4 = PoE+ power supply bays

ExtremeSwitching X450-G2 Series Switch LEDs

The following sections describe the meanings of the LEDs on X450-G2 series switches.

Table 7: X450-G2 Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed: system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached
S1, S2 (Stack Management)	Steady green	Link OK on the indicated stacking port
	Blinking green	Activity on the indicated stacking port

Table 7: X450-G2 Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
P1, P2 (Power Supply)	Steady green	Normal operation
	Steady amber	Power is attached, but no power is on
	Blinking amber	Power failure
	Off	No power attached
Ethernet Port 1–24 or 1–48	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No link or port disabled
1G SFP ports or 10G SFP+ ports 25, 26, 27, and 28 or 49, 50, 51, and 52	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No 1G or 10G link, or port disabled

Table 8: Additional Port LED Meanings for PoE Switches: X450-G2-24p-GE4, X450-G2-24p-10GE4, X450-G2-48p-GE4, and X450-G2-48p-10GE4

Label or Type	Color/State	Meaning
All front panel ports 1-24 or 1-48	Steady green	Link is OK; port is not powered
	Steady amber	Link is OK; port is powered; no traffic
	Blinking green	Link is OK and transmitting packets; port is not powered
	Blinking amber	Link is OK and transmitting packets; port is powered
	Slow blinking amber	No link, or disabled port; port is powered
	Alternating amber and green	Port has a power fault
	Off	Port is not powered, has no link, or is disabled

Table 9: X450-G2 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	<i>Reserved for future use.</i>	
Right digit (1–8)	Indicates the position of this switch in the SummitStack configuration	
	Upper half blinking	This switch is the stack master node
	Lower half blinking	This switch is the stack backup node
	Lit steadily	This switch is a standby node in the stack

ExtremeSwitching X460-G2 Series Switches

The X460-G2 series switches provide 24 or 48 Ethernet ports that deliver high-density fast Ethernet or Gigabit Ethernet connectivity using fixed BASE-T and BASE-X ports. In addition, some models offer either 24 or 48 PoE+ ports.

Ports 25-48 on the X460-G2-24t-24ht-10GE4 and X460-G2-24p-24hp-10GE4 models can operate in half-duplex mode. All other X460-G2 ports are full-duplex.

The X460-G2 series switches include the following base models:

- [ExtremeSwitching X460-G2-24t-GE4 Switch Ports and Slots](#) on page 42
- [ExtremeSwitching X460-G2-24t-10GE4 Switch Ports and Slots](#) on page 43
- [ExtremeSwitching X460-G2-24x-10GE4 Switch Ports and Slots](#) on page 44
- [ExtremeSwitching X460-G2-24p-GE4 Switch Ports and Slots](#) on page 45
- [ExtremeSwitching X460-G2-24p-10GE4 Switch Ports and Slots](#) on page 46
- [ExtremeSwitching X460-G2-48t-GE4 Switch Ports and Slots](#) on page 47
- [ExtremeSwitching X460-G2-48t-10GE4 Switch Ports and Slots](#) on page 48
- [ExtremeSwitching X460-G2-24t-24ht-10GE4 Switch Ports and Slots](#) on page 49
- [ExtremeSwitching X460-G2-48x-10GE4 Switch Ports and Slots](#) on page 50
- [ExtremeSwitching X460-G2-48p-10GE4 Switch Ports and Slots](#) on page 52
- [ExtremeSwitching X460-G2-24p-24hp-10GE4 Switch Ports and Slots](#) on page 53
- [ExtremeSwitching X460-G2-16mp-32p-10GE4 Switch Ports and Slots](#) on page 54

Each base model is available with either front-to-back or back-to-front cooling. There is no operational difference between these switch versions.

A serial console port on the front panel of the X460-G2 series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.

Switch cooling is provided by a replaceable fan module. Fan modules are available in two different models that direct the airflow either from front to back or from back to front. Two power supply bays accommodate either AC or DC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fan.

Like the fan module, the power supplies are available in models with either front-to-back or back-to-front cooling airflow. For more information about the power supplies used in the X460-G2 switches, see [Replaceable Internal Power Supplies](#) on page 104.

Power supplies and fan trays are ordered separately.



Caution

Air must flow in the same direction for all installed fan modules and power supplies in a switch.

The following X460-G2 switch models require ExtremeXOS version 22.2.1 or later:

- ExtremeSwitching X460-G2-24t-24ht-10GE4

- ExtremeSwitching X460-G2-24p-24hp-10GE4
- ExtremeSwitching X460-G2-16mp-32p-10GE4

All other X460-G2 switch models are compatible with ExtremeXOS version 15.6.1.4 or later, or version 21.1.1 or later.

Versatile Interface Module (VIM) Options for X460-G2 Series Switches

The following VIMs are available for X460-G2 series switches:

- VIM-2q Ethernet Module with 2x40G ports.
- VIM-2ss SummitStack Module
- VIM-2t Ethernet Module with 2x10GBASE-T ports.
- VIM-2x Ethernet Module with 2x10GSFP+ ports.
- TM-CLK Clock Module to support SyncE and 1588

You can form stacks with X460-G2 switches using some or all of these VIMs. However, not all VIMs support stacking on all X460-G2 switch models. For details, see [X460-G2 Stacking](#) on page 153.

X460-G2 switches offer Boundary Clock (BC), Transparent Clock (TC), and Ordinary Clock (OC) for synchronizing phase and frequency and allowing the network and the connected devices to be synchronized over Ethernet connections. Precision is +-2 nanoseconds (ns) with time accuracy +50 to -65 ns.



Warning

The switch must be powered off before you install any interface module options (VIMs or Clock Modules). The interface module options are not hot swappable.



Note

If you do not plan to use the TM-CLK Clock Module, a grounding screw (16714) is available that can be inserted into the TM-CLK slot.

For more information on X460-G2 VIM and Clock module options, see [Optional Ports for X460-G2 Switches](#) on page 115.



Note

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X460-G2-24t-GE4 Switch Ports and Slots

X460-G2-24t-GE4 switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (ports 1-24, four of which are shared with SFP ports).
- Four front panel combo (shared) SFP ports and four dedicated SFP ports (100/1000BASE-X).
- Four front panel ports of 1GBASE-X SFP (ports 29-32).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.

- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

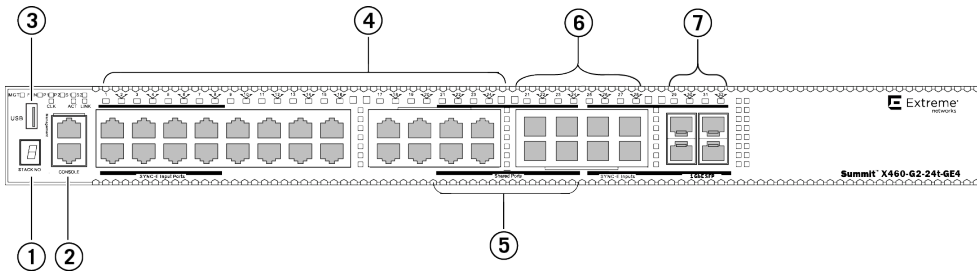


Figure 41: X460-G2-24t-GE4 Front Panel

1 = Stack number indicator	5 = Combo ports
2 = Console port/Ethernet management port	6 = SFP ports
3 = USB port	7 = SFP 10GBASE-X ports
4 = 10/100/1000BASE-T ports	

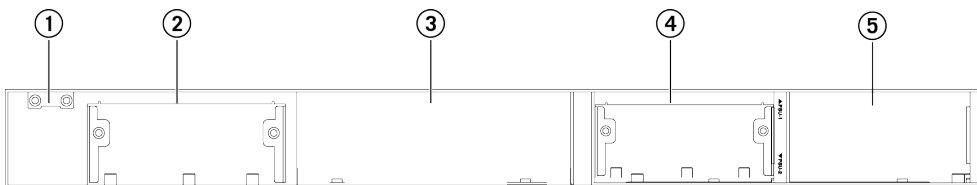


Figure 42: X460-G2-24t-GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-24t-10GE4 Switch Ports and Slots

X460-G2-24t-10GE4 switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (ports 1-24, four of which are shared with SFP ports).
- Four front panel combo (shared) SFP ports and four dedicated SFP ports (100/1000BASE-X).
- Four front panel ports of 10GBASE-X SFP+ (ports 29-32, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

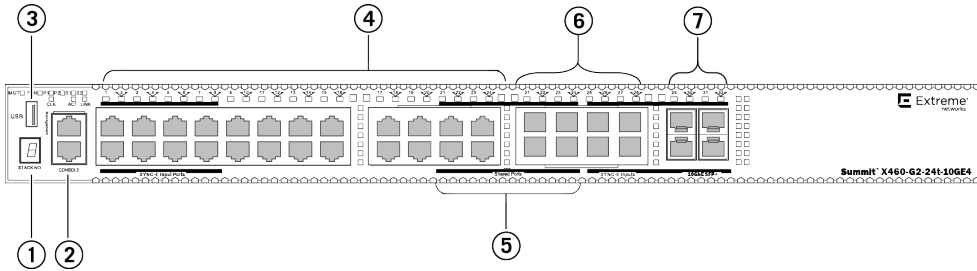


Figure 43: X460-G2-24t-10GE4 Front Panel

1 = Stack number indicator	5 = Combo ports
2 = Console port/Ethernet management port	6 = SFP ports
3 = USB port	7 = SFP+ 10GBASE-X ports
4 = 10/100/1000BASE-T ports	

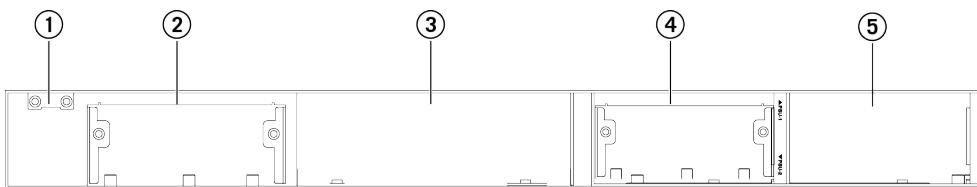


Figure 44: X460-G2-24t-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-24x-10GE4 Switch Ports and Slots

X460-G2-24x-10GE4 switch ports and slots include:

- 24 front panel ports of 100/1000BASE-X (ports 1-24, four of which are shared with 10/100/1000BASE-T ports).
- Four front panel combo (shared) 10/100/1000BASE-T ports and four dedicated 10/100/1000BASE-T ports.
- Four front panel ports of 10GBASE-X SFP+ (ports 29-32, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

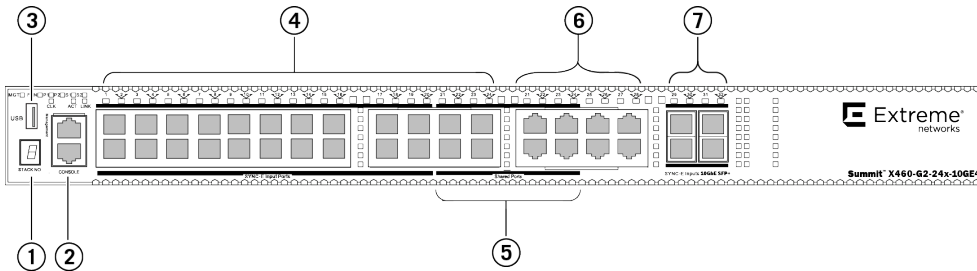


Figure 45: X460-G2-24x-10GE4 Front Panel

1 = Stack number indicator	5 = Combo ports
2 = Console port/Ethernet management port	6 = 10/100/1000BASE-T ports
3 = USB port	7 = SFP+ 10GBASE-X ports
4 = 10/100/1000BASE-X ports	

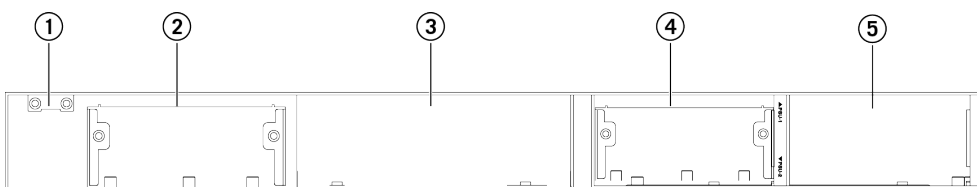


Figure 46: X460-G2-24x-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-24p-GE4 Switch Ports and Slots

X460-G2-24p-GE4 switch ports and slots include:

- 24 front panel PoE+ ports of 10/100/1000BASE-T (ports 1-24, four of which are shared with SFP ports).
- Four front panel combo (shared) SFP ports and four dedicated SFP ports (100/1000BASE-X).
- Four front panel ports of 1GBASE-X SFP (ports 29-32).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.

- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

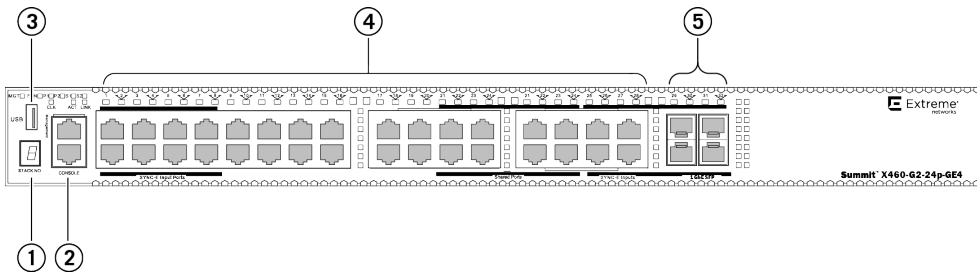


Figure 47: X460-G2-24p-GE4 Front Panel

1 = Stack number indicator	5 = Combo ports
2 = Console port/Ethernet management port	6 = SFP ports
3 = USB port	7 = SFP 10GBASE-X ports
4 = PoE+ 10/100/1000BASE-T ports	

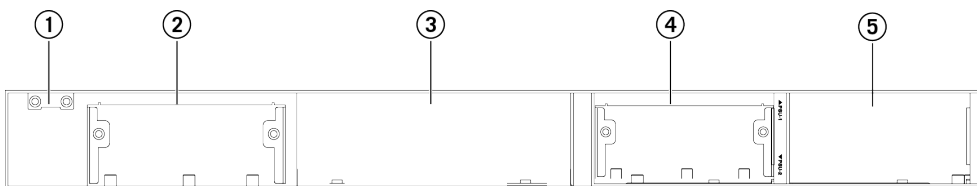


Figure 48: X460-G2-24p-GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-24p-10GE4 Switch Ports and Slots

X460-G2-24p-10GE4 switch ports and slots include:

- 24 front panel PoE+ ports of 10/100/1000BASE-T (ports 1-24, four of which are shared with SFP ports).
- Four front panel combo SFP ports and four dedicated SFP ports (100/1000BASE-X).
- Four front panel ports of 10GBASE-X SFP+ (ports 29-32, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.

- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

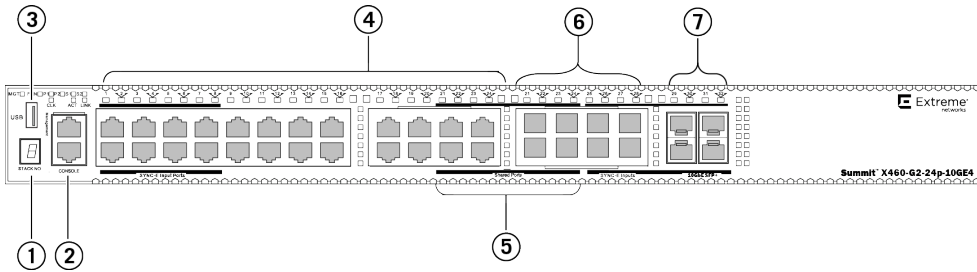


Figure 49: X460-G2-24p-10GE4 Front Panel

1 = Stack number indicator	5 = Combo ports
2 = Console port/Ethernet management port	6 = SFP ports
3 = USB port	7 = SFP+ 10GBASE-X ports
4 = PoE+ 10/100/1000BASE-T ports	

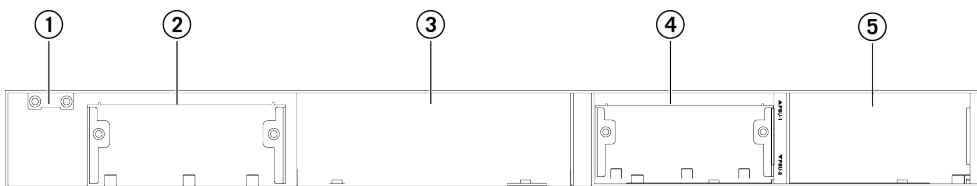


Figure 50: X460-G2-24p-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-48t-GE4 Switch Ports and Slots

X460-G2-48t-GE4 switch ports and slots include:

- 48 front panel ports of 10/100/1000BASE-T (ports 1-48).
- Four front panel ports of 1GBASE-X SFP (ports 49-52).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

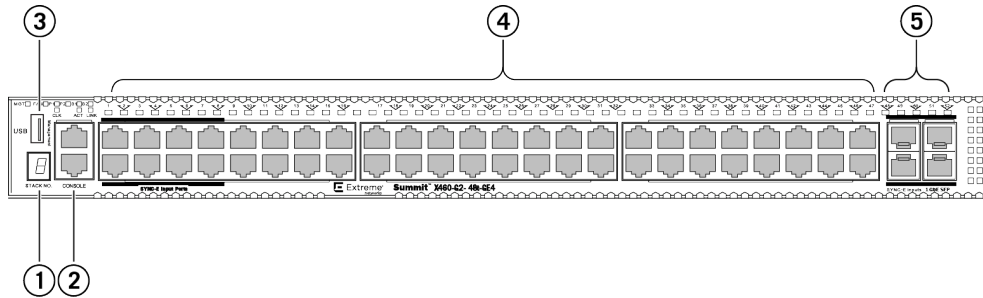


Figure 51: X460-G2-48t-GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP 1GBASE-X ports
3 = USB port	

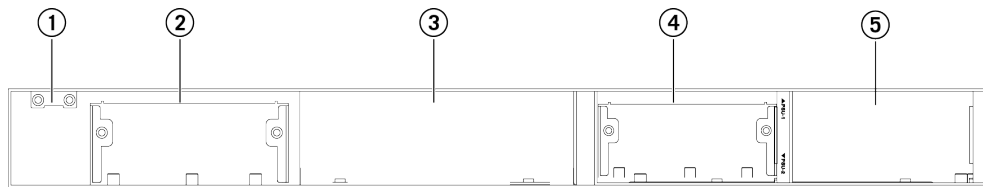


Figure 52: X460-G2-48t-GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-48t-10GE4 Switch Ports and Slots

X460-G2-48t-10GE4 switch ports and slots include:

- 48 front panel ports of 10/100/1000BASE-T (ports 1-48).
- Four front panel ports of 10GBASE-X SFP+ (ports 49-52, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

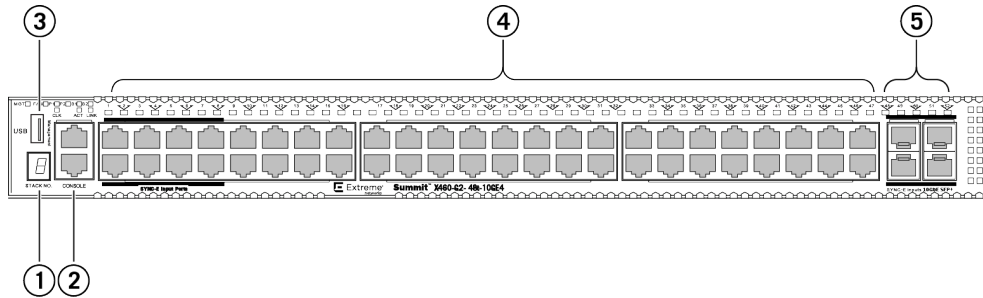


Figure 53: X460-G2-48t-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = SFP+ 10GBASE-X ports
3 = USB port	

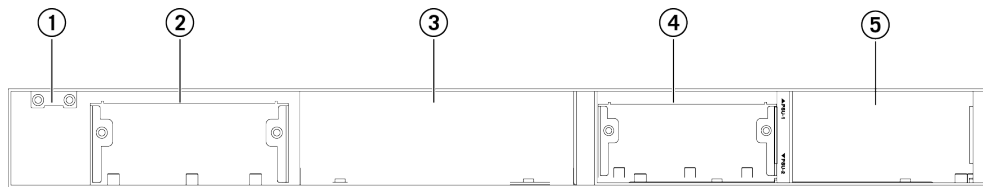


Figure 54: X460-G2-48t-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-24t-24ht-10GE4 Switch Ports and Slots

X460-G2-24t-24ht-10GE4 switch ports and slots include:

- 24 front panel ports of 10/100/1000BASE-T (ports 1-24) that support full-duplex communication only
- 24 front panel ports of 10/100/1000BASE-T (ports 25-48) that support full-duplex communication and support half-duplex communication at speeds less than 1 Gb
- Four ports of 10GBASE-X SFP+ (ports 49-52, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

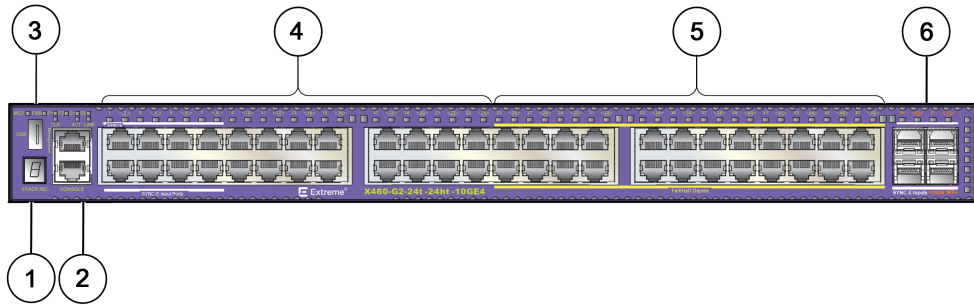


Figure 55: X460-G2-24t-24ht-10GE4 Front Panel

1 = Stack number indicator	4 = 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = 10/100/1000BASE-T ports with half-duplex
3 = USB port	6 = SFP+ 10GBASE-X ports

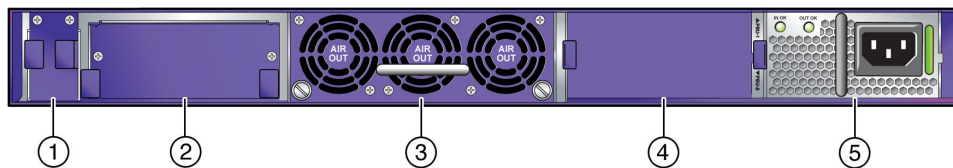


Figure 56: X460-G2-24t-24ht-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	



Note

It is not possible to collect statistics on packet collisions for the X460-G2-24t-24ht-10GE4 switch.

ExtremeSwitching X460-G2-48x-10GE4 Switch Ports and Slots

X460-G2-48x-10GE4 switch ports and slots include:

- 48 front panel ports of 100/1000BASE-X (ports 1-48).
- Four front panel ports of 10GBASE-X SFP+ (ports 49-52, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot
- One rear panel TM-CLK (clock) slot.

- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

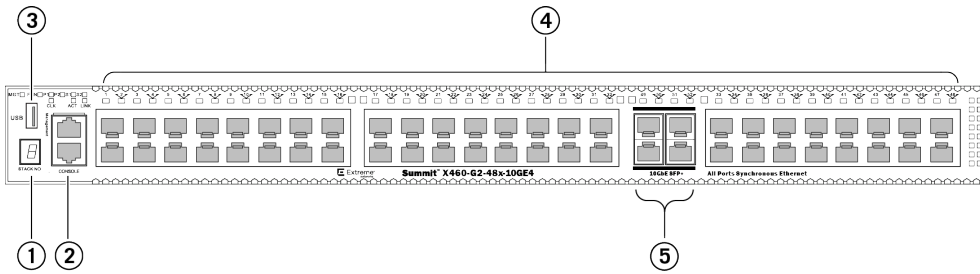


Figure 57: X460-G2-48x-10GE4 Front Panel

1 = Stack number indicator	4 = 100/1000BASE-X ports
2 = Console port/Ethernet management port	5 = SFP+ 10GBASE-X ports
3 = USB port	

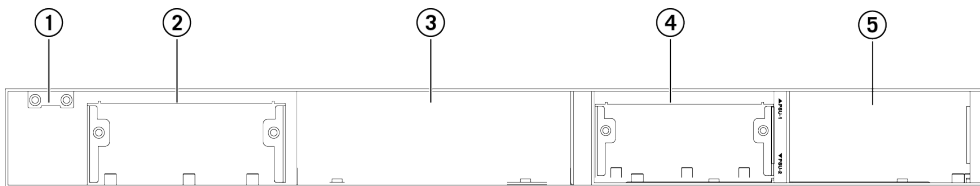


Figure 58: X460-G2-48x-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

Summit X460-G2-48p-GE4 Switch Ports and Slots

The Summit X460-G2-48p-GE4 switch ports and slots include:

- 48 front panel PoE+ ports of 10/100/1000BASE-T (ports 1-48).
- Four front panel ports of 1GBASE-X SFP (ports 49-52).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

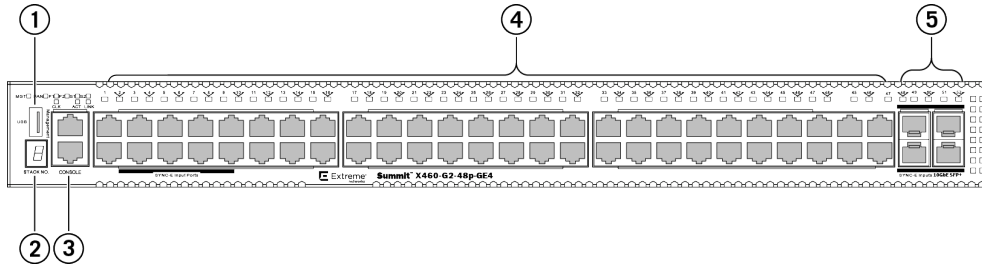


Figure 59: Summit X460-G2-48p-GE4 Front Panel

1 = USB port	4 = PoE+ 10/100/1000BASE-T ports
2 = Stack number indicator	5 = SFP 1GBASE-X ports
3 = Console port/Ethernet management port	

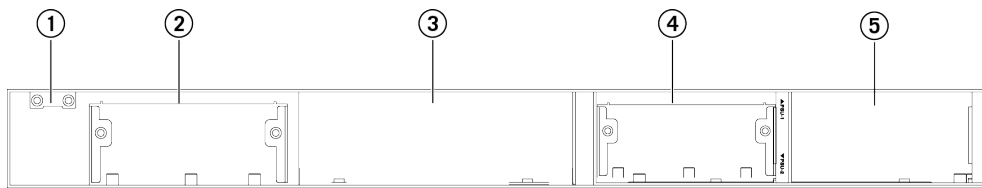


Figure 60: Summit X460-G2-48p-GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-48p-10GE4 Switch Ports and Slots

X460-G2-48p-10GE4 switch ports and slots include:

- 48 front panel PoE+ ports of 10/100/1000BASE-T (ports 1-48).
- Four front panel ports of 10GBASE-X SFP+ (ports 49-52, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

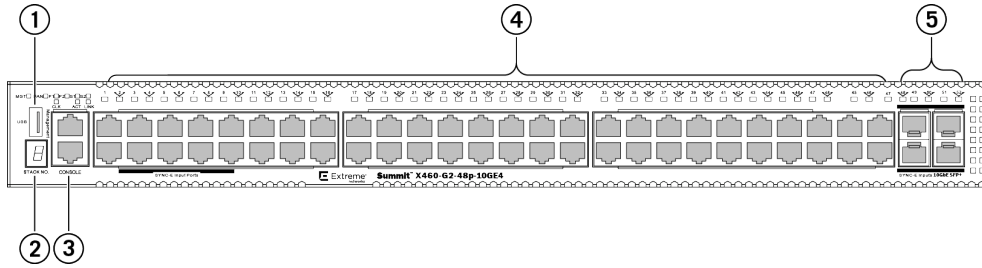


Figure 61: X460-G2-48p-10GE4 Front Panel

1 = USB port	4 = PoE+ 10/100/1000BASE-T ports
2 = Stack number indicator	5 = SFP+ 10GBASE-X ports
3 = Console port/Ethernet management port	

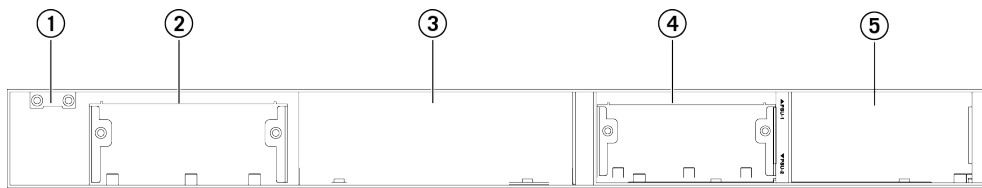


Figure 62: X460-G2-48p-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2-24p-24hp-10GE4 Switch Ports and Slots

X460-G2-24p-24hp-10GE4 switch ports and slots include:

- 24 front panel PoE+ ports of 10/100/1000BASE-T (ports 1-24) that support full-duplex communication only
- 24 front panel PoE+ ports of 10/100/1000BASE-T (ports 25-48) that support full-duplex communication and support half-duplex communication at speeds less than 1 Gb
- Four ports of 10GBASE-X SFP+ (ports 49-52, with two of these ports configurable to be stacking ports).
- One front panel USB port.
- Ethernet management port 1 x 10/100/1000BASE-T.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot.
- One rear panel TM-CLK (clock) slot.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- One rear slot for fan module with front-to-back or back-to-front airflow.

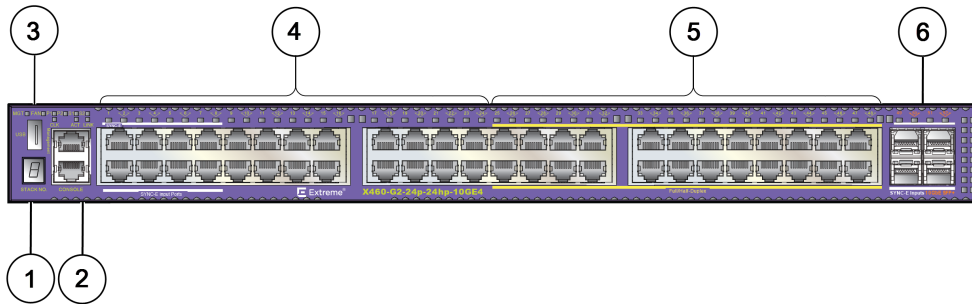


Figure 63: X460-G2-24p-24hp-10GE4 Front Panel

1 = Stack number indicator	4 = PoE+ 10/100/1000BASE-T ports
2 = Console port/Ethernet management port	5 = PoE+ 10/100/1000BASE-T ports with half-duplex
3 = USB port	6 = SFP+ 10GBASE-X ports

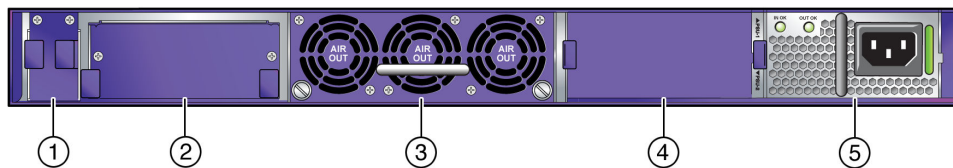


Figure 64: X460-G2-24p-24hp-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	



Note

It is not possible to collect statistics on packet collisions for the X460-G2-24p-24hp-10GE4 switch.

ExtremeSwitching X460-G2-16mp-32p-10GE4 Switch Ports and Slots

X460-G2-16mp-32p-10GE4 switch ports and slots include:

- 16 front panel PoE+ ports of 100/1000/2.5G BASE-T (ports 1-16).
- 32 front panel PoE+ ports of 10/100/1000BASE-T (ports 17-48).
- Four ports of 10G SFP+ (ports 49-52, with two of these ports configurable to be stacking ports)
- One front panel USB port
- Ethernet management port 1 x 10/100/1000BASE-T
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- One rear panel VIM slot
- One rear panel TM-CLK (clock) slot

- Rear dual PSU power slots with front-to-back or back-to-front airflow
- One rear slot for fan module with front-to-back or back-to-front airflow

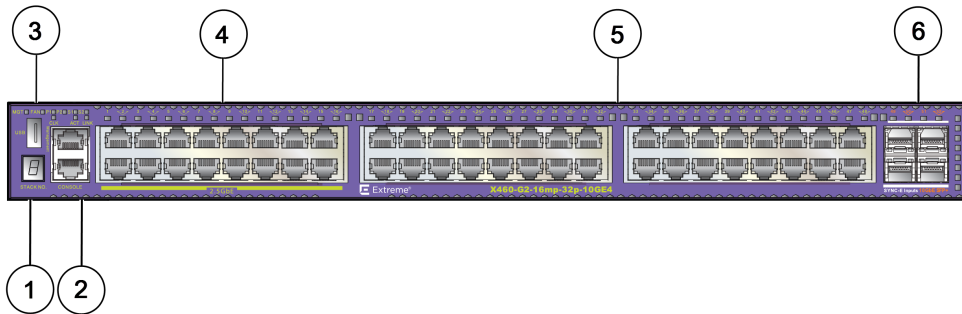


Figure 65: X460-G2-16mp-32p-10GE4 Front Panel

1 = USB port	4 = PoE+ 100/1000/2.5G BASE-T ports
2 = Stack number indicator	5 = PoE+ 10/100/1000BASE-T ports
3 = Console port/Ethernet management port	6 = SFP+ 10GBASE-X ports

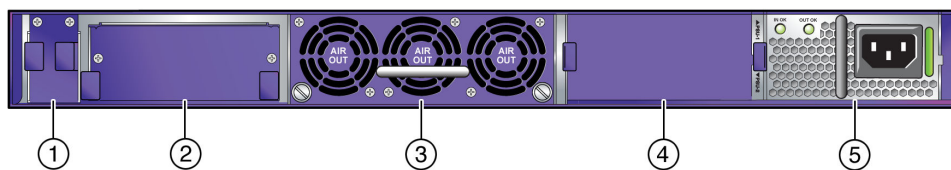


Figure 66: X460-G2-16mp-32p-10GE4 Rear Panel

1 = TM-CLK (clock) slot cover	4 = Blank power supply cover
2 = VIM slot cover	5 = Power supply slot
3 = Fan module slot	

ExtremeSwitching X460-G2 Series Switch LEDs

Table 10 describes the meanings of the front-panel LEDs on all X460-G2 series switches.

Table 10: X460-G2 Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed; system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached

Table 10: X460-G2 Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
S1, S2 (Stack Management)	Steady green	Link OK on the indicated stacking port
	Blinking green	Activity on the indicated stacking port
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
P1, P2 (Power Supply)	Steady green	Normal operation
	Steady amber	Non-PoE models: PSU present, but no input power PoE models: Not supported
	Blinking amber	Power failure
	Off	No power is attached
Ethernet Port 1-32 or 1-52	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No link or port disabled
1G SFP ports or 10G SFP+ ports 29, 30, 31, and 32 or 53, 54, 55, and 56	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No 1G or 10G link, or port disabled

Table 11 on page 56 describes the meanings of additional port LEDs on the following X460-G2 PoE switch models:

- X460-G2-24p-GE4
- X460-G2-24p-10GE4
- X460-G2-48p-GE4
- X460-G2-48p-10GE4
- X460-G2-24p-24hp-10GE4
- X460-G2-16mp-32p-10GE4

Table 11: Additional Port LED Meanings for PoE Switches

Label or Type	Color/State	Meaning
All front panel ports 1-24 or 1-48	Steady green	Link is OK; port is not powered
	Steady amber	Link is OK; port is powered; no traffic
	Blinking green	Link is OK and transmitting packets; port is not powered
	Blinking amber	Link is OK and transmitting packets; port is powered
	Slow blinking amber	No link, or disabled port; port is powered
	Alternating amber and green	Port has a power fault
	Off	Port is not powered, has no link, or is disabled

Table 12 describes the meanings of the two-digit stack number indicator on all X460-G2 series switches.

Table 12: X460-G2 two-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	<i>Reserved for future use</i>	
Right digit (1 – 8)	Indicates the position of this switch in the SummitStack configuration	
	Upper half blinking	This switch is the stack master node
	Lower half blinking	This switch is the stack backup node
	Lit steadily	This switch is a standby node in the stack

ExtremeSwitching X590 Series Switches

The X590 series switch provides 10 Gb datacenter aggregation with 100 Gb uplinks, ideally suited for use as a "leaf" switch in conjunction with "spine" switches like the X690 and X870 series.

The X590 series switches include the following base models:

- [ExtremeSwitching X590-24t-1q-2c Switch Ports and Slots](#) on page 59
- [ExtremeSwitching X590-24x-1q-2c Switch Ports and Slots](#) on page 60

Front-panel Ethernet ports provide 40 Gb and 100 Gb Ethernet connectivity using installable QSFP28 and QSFP+ optical modules, respectively. Each X590 switch has:

- One QSFP+ based 40 Gb port. With appropriate cabling, the QSFP+ port can be partitioned into four 10 Gb ports.
- Two QSFP28 based 100 Gb ports. With appropriate cabling, each of the QSFP28 ports can be partitioned into 10 Gb, 25 Gb, 40 Gb, or 50 Gb ports.

For details about the port partitioning options that are available on X590 switches, see [Partitioning X590 Switch Ports into Data Lanes](#) on page 58.

Each X590 switch also has 24 front-panel Ethernet ports that provide 10-gigabit Ethernet connectivity. Connectivity is 100Mb/1 Gb/10GBASE-T for the X590-24t-1q-2c model and 1 Gb/10GBASE-X SFP+ for the X590-24x-1q-2c model.

A serial console port on the front panel of the X590 series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.

Switch cooling is provided by replaceable fan modules. Fan modules are available in two different models that direct the airflow either from front to back or from back to front.



Note

Ensure that all fan module slots are filled when the switch is powered on. Fan modules can be hot-swapped after power has been turned on.

Two power supply bays accommodate either AC or DC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fans. Like the fan modules, the power supplies are available in models with either front-to-back or back-to-front cooling airflow.

All installed fan modules and power supplies in a X590 series switch must have the same airflow direction.

X590 series switches require ExtremeXOS version 22.6 or later.

Partitioning X590 Switch Ports into Data Lanes

Front-panel ports on X590 series switches can be configured for either 100-gigabit or 40-gigabit mode, and each port can be partitioned into data lanes through the use of split cables. This yields a total of up to 36 ports for each switch.

Port numbers are assigned depending on whether the physical ports are partitioned into data lanes. To illustrate, [Figure 67](#) shows the physical ports on the X590 front panel that can be partitioned. [Table 13](#) on page 59 and [Table 14](#) on page 59 detail how port numbers are assigned for each of the physical ports.

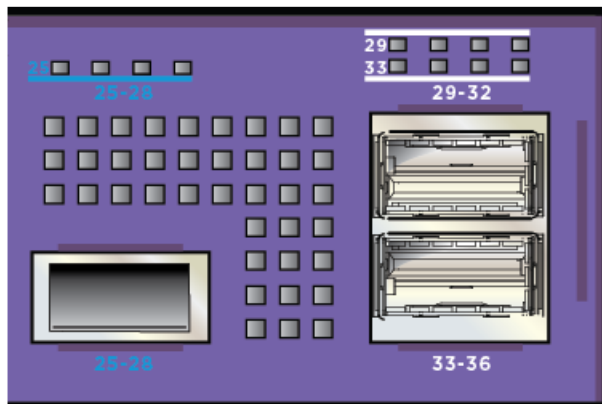


Figure 67: X590 Ports that Can Be Partitioned into Data Lanes

The port labeled 25-28 operates in 40 Gb mode, acting as a single 40 Gb port or multiple 10 Gb ports.

The ports labeled 29-32 and 33-36 operate in 40 Gb mode or 100 Gb mode, with a variety of speeds.

In 40-gigabit mode, each port can be partitioned into four 10-gigabit data lanes.

In 100-gigabit mode, each port can be partitioned into two 50-gigabit data lanes or four 25-gigabit data lanes.

Table 13: Port Number Assignments (in 40 Gb Mode)

Physical Port Number (on Switch)	Has these Assigned Port Number(s)...	...with this Port Speed
25-28	25	40 Gb
	25,26,27,28	10 Gb
29-32	29	40 Gb
	29,30,31,32	10 Gb
33-36	33	40 Gb
	33,34,35,36	10 Gb

Table 14: Port Number Assignments (in 100 Gb Mode)

Physical Port Number (on Switch)	Has these Assigned Port Number(s)...	...with this Port Speed
29-32	29	100 Gb
	29,31	50 Gb
	29,30,31,32	25 Gb
33-36	33	100 Gb
	33,35	50 Gb
	33,34,35,36	25 Gb

**Note**

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X590-24t-1q-2c Switch Ports and Slots

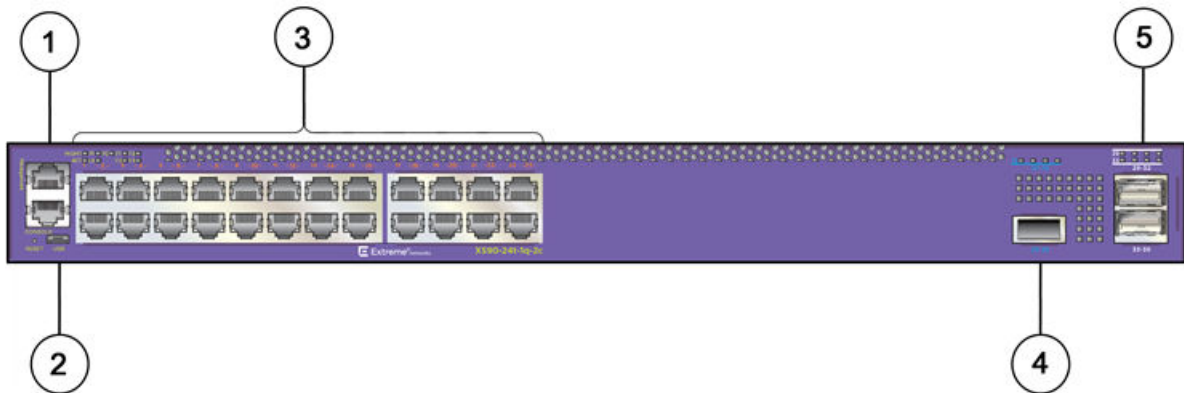
X590-24t-1q-2c switch ports and slots include:

- 24 fixed autosensing 100Mb/1 Gb/10GBASE-T ports (ports 1-24) that provide 10 Gbps copper connectivity. Two of these ports are configurable as stacking ports.
- One 40-gigabit Ethernet port capable of supporting passive copper QSFP+ and active fiber QSFP+ and configurable for 1x40 Gb or 4x10 Gb Ethernet mode.
- Two 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/QSFP+ and configurable for 100 Gb, 40 Gb, 2x50 Gb, 4x25 Gb, and 4x10 Gb modes. For information about QSFP28 and QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Front panel USB port.

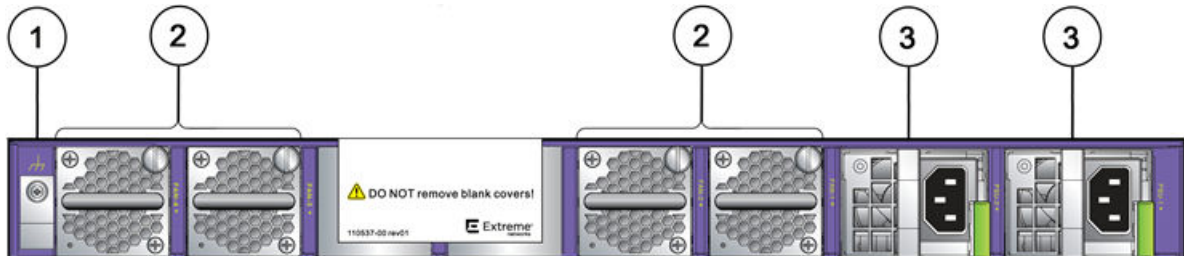
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- Four rear slots for fan modules with front-to-back or back-to-front airflow.

**Note**

Two additional fan slots are unused. Do not remove the cover plate from the unused slots.

**Figure 68: X590-24t-1q-2c Front Panel**

1 = Console/management port	4 = 10Gb/40Gb QSFP+ port
2 = USB port	5 = 10Gb/25Gb/40Gb/50Gb/100Gb QSFP28 ports
3 = 100Mb/1 Gb/10GBASE-T ports	

**Figure 69: X590-24t-1q-2c Rear Panel**

1 = Grounding lug	3 = AC power input
2 = Replaceable fan modules	

ExtremeSwitching X590-24x-1q-2c Switch Ports and Slots

X590-24x-1q-2c switch ports and slots include:

- 24 fixed autosensing 1 Gb/10GBASE-X SFP+ ports (ports 1-24) that provide 10 Gbps copper connectivity. Two of these ports are configurable as stacking ports.
- One 40-gigabit Ethernet port capable of supporting passive copper QSFP+ and active fiber QSFP+ and configurable for 1x40 Gb or 4x10 Gb Ethernet mode.
- Two 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/QSFP+ and configurable for 100 Gb, 40 Gb, 2x50 Gb, 4x25 Gb, and 4x10 Gb modes.

For information about QSFP28 and QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).

- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Front panel USB port.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- Four rear slots for fan modules with front-to-back or back-to-front airflow.



Note

Two additional fan slots are unused. Do not remove the cover plate from the unused slots.

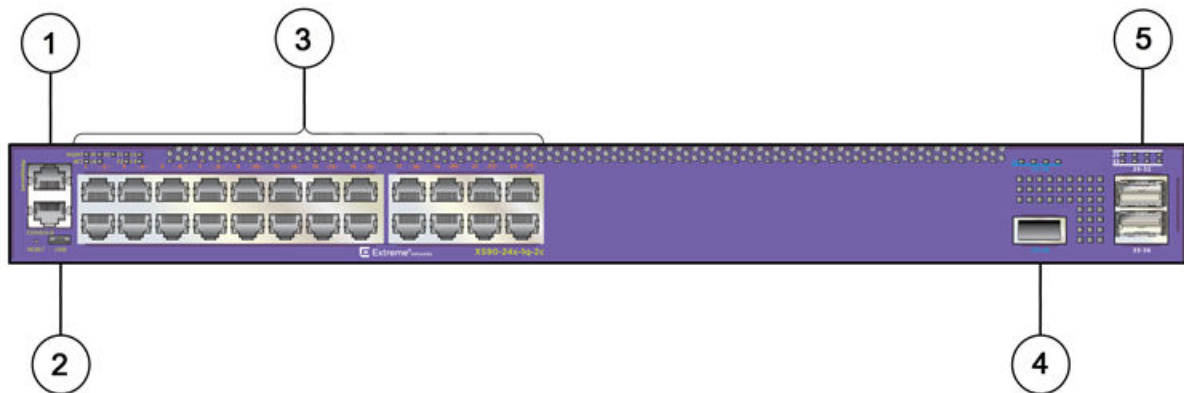


Figure 70: X590-24x-1q-2c Front Panel

1 = Console/management port	4 = 10Gb/40Gb QSFP+ port
2 = USB port	5 = 10Gb/25Gb/40Gb/50Gb/100Gb QSFP28 ports
3 = 1 Gb/10GBASE-X SFP+ ports	

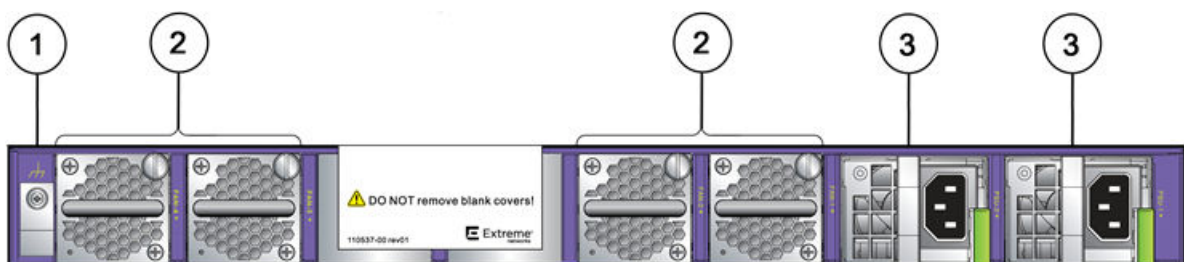


Figure 71: X590-24x-1q-2c Rear Panel

1 = Grounding lug	3 = AC power input
2 = Replaceable fan modules	

ExtremeSwitching X590 Series Switch LEDs

The following tables describe the meanings of the LEDs on the front panel of the X590 series switch.

Table 15: X590 Front Panel System LEDs

Label or Type	Color/State	Meaning
MGMT (Management)	Steady green	Normal operation Power-on self test (POST) passed
	Blinking green	POST or diagnostics in progress
	Blinking amber	Any of the following: <ul style="list-style-type: none"> • POST failed • System overheated • Power supply failed • Fan unit failed
	Off	No power
ACT	Blinking green	Management port packet transmitting or receiving
	Off	No packet transmitting or receiving
LK (Link)	Steady green	Management port link up
	Off	No link up or port disabled
P1, P2 (Power Supply)	Steady green	Power on
	Blinking amber	Any of the following: <ul style="list-style-type: none"> • Power supply failure • Over voltage • Over current • Over temperature
	Off	Power off; no power attached
F1 - F4 (Fan)	Steady green	Normal operation; all diagnostics pass
	Blinking amber	Fan module failure
	Off	No power to fan module

Table 16: X590 Front Panel Port LEDs

Location	Speed	Color/State	Meaning
Ports 1-24	10Gb/1Gb	Steady green	Link OK
		Blinking green	Port transmitting or receiving
		Off	No link, or port disabled
Ports 25-28	40Gb (no partition)	Steady blue	Link OK
		Blinking blue	Port transmitting or receiving
		Off	No link, or port disabled
	10Gb (partitioned)	Steady green	Link OK
		Blinking green	Port transmitting or receiving
		Off	No link, or port disabled

Table 16: X590 Front Panel Port LEDs (continued)

Location	Speed	Color/State	Meaning
Ports 29-36	100Gb/40Gb (no partition)	Steady white	Link OK
		Blinking white	Port transmitting or receiving
		Off	No link, or port disabled
	50Gb/25Gb/10Gb (partitioned)	Steady green	Link OK
		Blinking green	Port transmitting or receiving
		Off	No link, or port disabled

ExtremeSwitching X620 Series Switches

The X620 switches are compact 10 Gb Ethernet switches for 10 Gb edge applications with a small, one rack-unit (1 RU) form factor.

X620 switches support sophisticated and intelligent Layer 2 switching, as well as Layer 3 IPv4/IPv6 routing including policy-based switching/routing, provider bridges, bidirectional ingress and egress Access Control Lists, and bandwidth control.

The X620 series switches include the following base models:

- ExtremeSwitching X620-8t-2x switch
- ExtremeSwitching X620-10x switch
- ExtremeSwitching X620-16p switch
- ExtremeSwitching X620-16t switch
- ExtremeSwitching X620-16x switch

The X620-16p switch requires ExtremeXOS version 22.2.1 or later. Other X620 switch models require ExtremeXOS version 21.1.1 or later.

X620 Stacking

Up to eight X620 switches can be stacked using SummitStack-V. Each X620 unit can use two designated SFP+ interfaces for stacking. Standard 10 Gb Ethernet Optics and passive and active cables can be used in the SFP+ ports for stacking X620 switches using SummitStack-V.

ExtremeXOS supports the SummitStack-V capability using two of the SFP+ ports on the faceplate as stacking ports, enabling the use of standard cabling and optics technologies used for 10 GbE SFP+.

SummitStack-V is compatible with X440-G2, X450-G2 with 10 Gb uplinks, X460-G2 with 10 Gb uplinks, X770,, and X670-G2 switches running the same version of ExtremeXOS. SummitStack-V enabled 10 GbE ports must be physically direct-connected.

Additional X620 Features

All X620 switch models have:

- One 10/100/1000BASE-T RJ45 port implemented as an RJ45 connector.

- One 10/100/1000BASE-T Ethernet management port.

Additional ports on various models include the following:

Table 17: X620 Series Switches and Port Types

	100Mb/1 Gb/10GBASE-T	100Mb/1 Gb/2.5Gb/5Gb/10GBASE-T	100Mb/1 Gb/10GBASE-X with SFP+
X620-8t-2x	8		2
X620-10x			10
X620-16t	16		4 (see note)
X620-16x			16

Note: The 100Mb/1 Gb/10GBASE-X ports on the X620-16t and X620-16p are combination ports, shared with the last four 10GBASE-T ports (LRM support; no 100Mb support)

For all models, a serial console port on the front panel allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configurations.

The rear panel provides an AC power input socket. The X620-8t-2x and X620-10x switches support external redundant power options, and the 16-port switches have modular internal redundant power options.

The switch automatically adjusts to the supply voltage. The switches with redundant power connectors can connect to the RPS-150XT or EPS-C2 external power system. When a compatible external power supply is used with the X620 switch, the internal and external power supplies are fully fault tolerant. If one power supply fails, the other power supply will provide sufficient power to operate the switch.

The 16-port switches offer front-to-back or back-to-front airflow options. The X620-8t-2x and X620-10x switches have side-to-side airflow with right-side exhaust.



Note

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X620-8t-2x Switch Ports and Slots

The ExtremeSwitching X620-8t-2x switch ports and slots include:

- Eight front panel ports of 100Mb/1 Gb/10GBASE-T with EEE.
- Two front panel SFP+ ports of 100Mb/1 Gb/10GBASE-X.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Ethernet management port (10/100/1000BASE-T).

- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

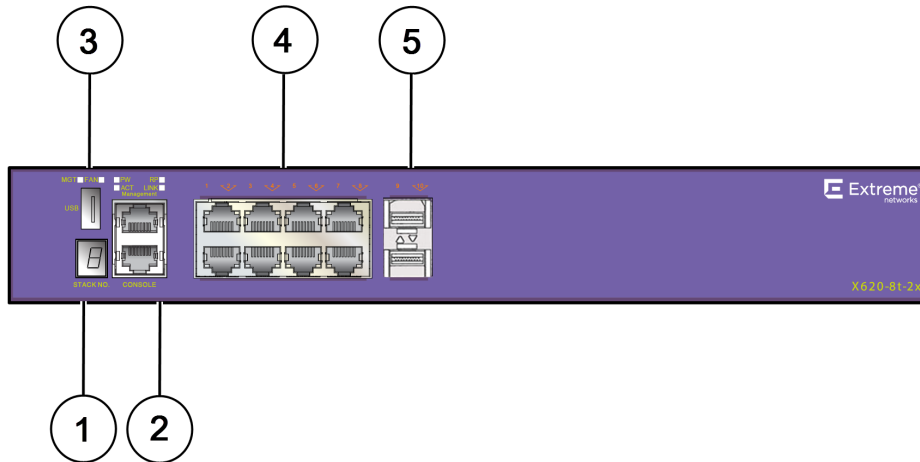


Figure 72: ExtremeSwitching X620-8t-2x Front Panel

1 = Stack number indicator	4 = 100Mb/1 Gb/10GBASE-T ports
2 = Console port/Ethernet management port	5 = 100Mb/1 Gb/10GBASE-X SFP+ ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	

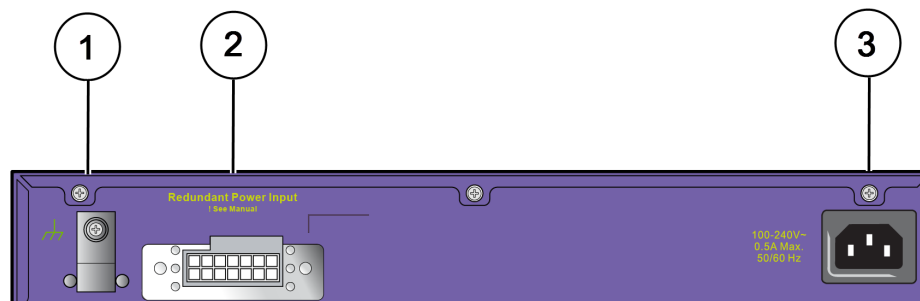


Figure 73: ExtremeSwitching X620-8t-2x Rear Panel

1 = Grounding lug	3 = AC power input socket
2 = Redundant power input	

ExtremeSwitching X620-10x Switch Ports and Slots

The ExtremeSwitching X620-10x switch ports and slots include:

- 10 front panel SFP+ ports of 100Mb/1 Gb/10GBASE-X SFP+.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- Ethernet management port (10/100/1000BASE-T).
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear redundant power supply connector.

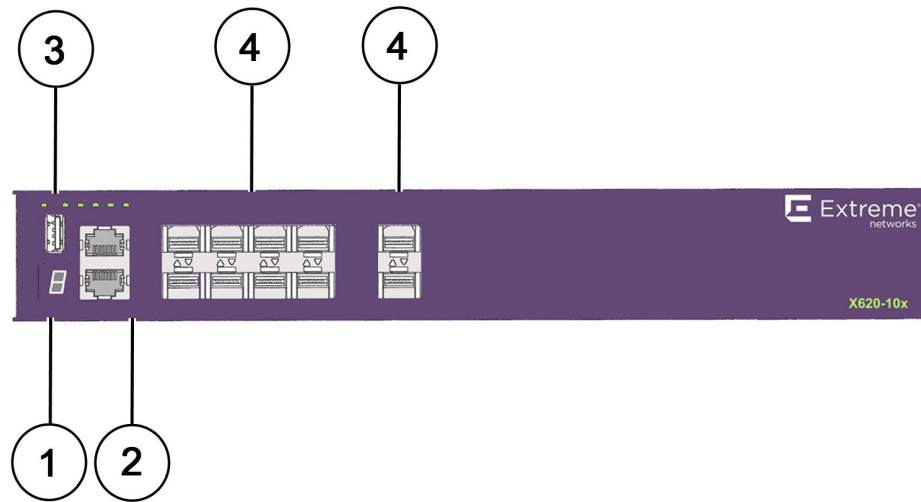


Figure 74: ExtremeSwitching X620-10x Front Panel

1 = Stack number indicator	3 = USB port (active with ExtremeXOS version 22.2 or later)
2 = Console port/Ethernet management port	4 = 100Mb/1 Gb/10GBASE-X SFP+ ports

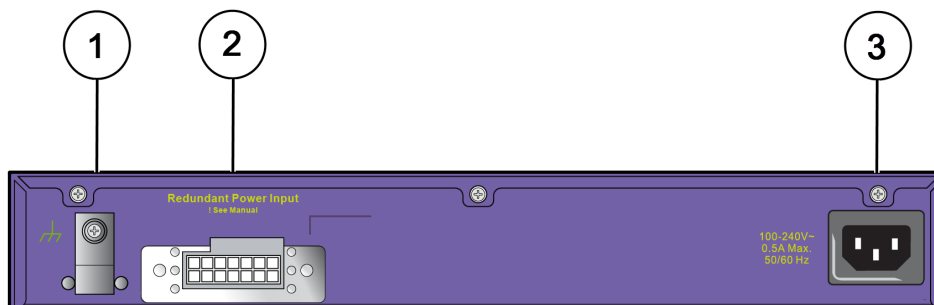


Figure 75: ExtremeSwitching X620-10x Rear Panel

1 = Grounding lug	3 = AC power input socket
2 = Redundant power input	

ExtremeSwitching X620-16t Switch Ports and Slots

The ExtremeSwitching X620-16t switch ports and slots include:

- 12 front panel ports of 100Mb/1 Gb/10GBASE-T with EEE.
- Four front panel ports of 100Mb/1 Gb/10GBASE-T with EEE, shared with four front panel SFP+ ports of 1 Gb/10GBASE-X (with LRM support).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- Ethernet management port (10/100/1000BASE-T).
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear slot for fan module with front-to-back or back-to-front airflow.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.

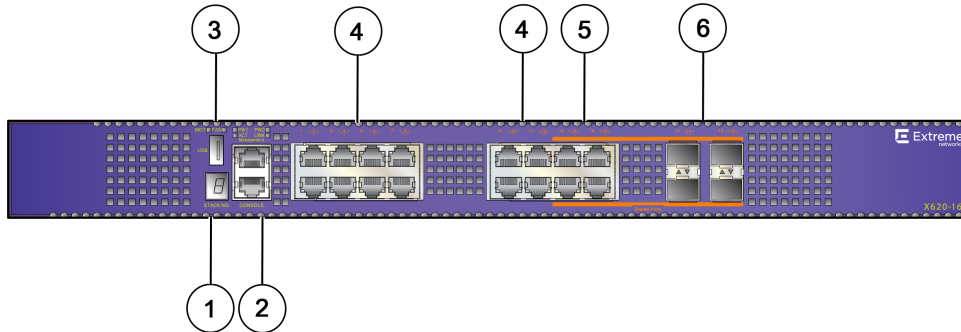


Figure 76: ExtremeSwitching X620-16t Front Panel

1 = Stack number indicator	4 = 100Mb/1 Gb/10GBASE-T ports
2 = Console port/Ethernet management port	5 = 100Mb/1 Gb/10GBASE-T combo ports
3 = USB port (active with ExtremeXOS version 22.2 or later)	6 = 1 Gb/10GBASE-X SFP+ combo ports

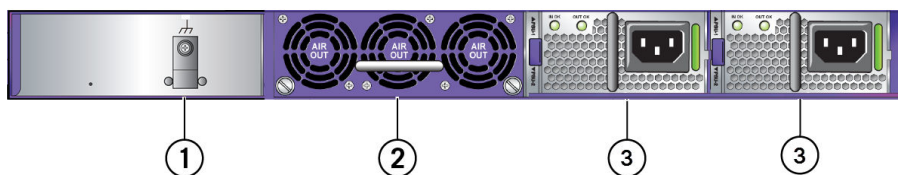


Figure 77: ExtremeSwitching X620-16t Rear Panel

1 = Grounding lug	3 = AC power supplies
2 = Fan module	

ExtremeSwitching X620-16x Switch Ports and Slots

The ExtremeSwitching X620-16x switch ports and slots include:

- 16 front panel SFP+ ports of 100Mb/1 Gb/10GBASE-X.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Ethernet management port (10/100/1000BASE-T).
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear slot for fan module with front-to-back or back-to-front airflow.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.

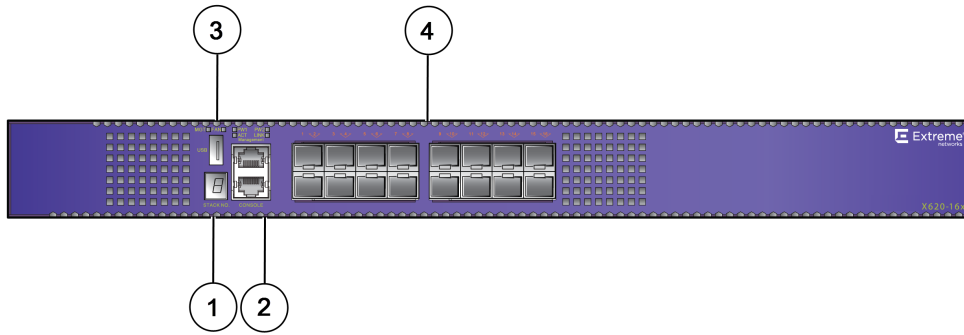


Figure 78: ExtremeSwitching X620-16x Front Panel

1 = Stack number indicator	3 = USB port (active with ExtremeXOS version 22.2 or later)
2 = Console port/Ethernet management port	4 = 100Mb/1 Gb/10GBASE-X SFP+ ports

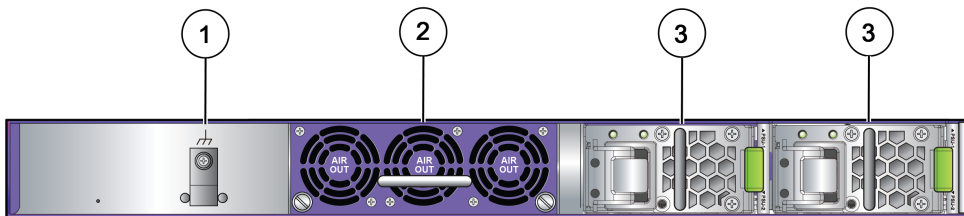


Figure 79: ExtremeSwitching X620-16x Rear Panel

1 = Grounding lug	3 = PSU slots
2 = Fan module	

ExtremeSwitching X620-16p Switch Ports and Slots

The ExtremeSwitching X620-16p switch ports and slots include:

- Eight front panel PoE++ ports of 100Mb/1 Gb/2.5Gb/5Gb/10GBASE-T (with EEE at 10 Gb).
- Four front panel PoE+ ports of 100Mb/1 Gb/2.5Gb/5Gb/10GBASE-T (with EEE at 10 Gb).
- Four front panel PoE+ ports of 100Mb/1 Gb/10GBASE-T, shared with four front panel SFP+ combination ports of 1 Gb/10GBASE-X.
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Ethernet management port (10/100/1000BASE-T).
- One front panel USB 2.0 port, operational on switches running ExtremeXOS version 22.2 or later.
- One rear slot for fan module with front-to-back or back-to-front airflow.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.

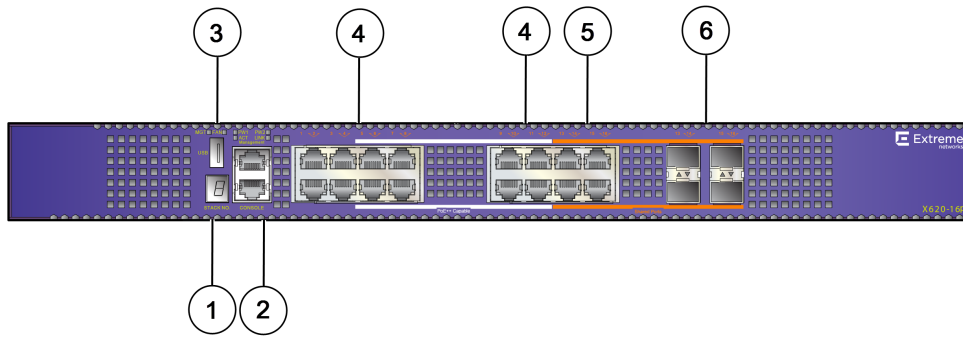


Figure 80: ExtremeSwitching X620-16p Front Panel

1 = Stack number indicator	4 = 100Mb/1 Gb/2.5G/5G/10GBASE-T ports
2 = Console port/Ethernet management port	5 = 100Mb/1 Gb/10GBASE-T ports
3 = USB port	6 = 1 Gb/10GBASE-X SFP+ combo ports

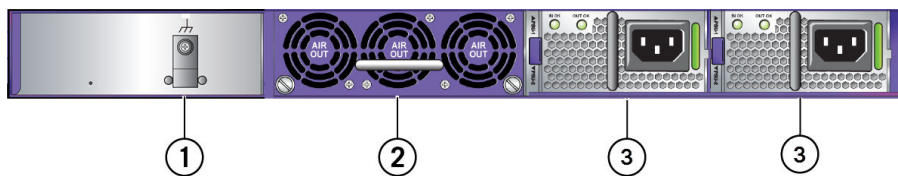


Figure 81: ExtremeSwitching X620-16p Rear Panel

1 = Grounding lug	3 = AC power supplies
2 = Fan module	

ExtremeSwitching X620 Series Switch LEDs

The following sections describe the meanings of the LEDs on the ExtremeSwitching X620 series switches.

Table 18: X620 Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed: system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached

Table 18: X620 Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
S1, S2 (Stack Management)	Steady green	Link OK on the indicated stacking port
	Blinking green	Activity on the indicated stacking port
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
Power Supply Unit (PSU)	Steady green	Normal operation
	Blinking amber	Input or output power failure
	Off	Not present
Redundant Power Supply (RPS)	Steady green	Normal operation
	Blinking amber	When RPS is present, no supply from PSU
	Off	No RPS PSU is attached
Ethernet Management Port	Blinking green (left)	Activity on the indicated port Link OK
	Off (left)	Activity on the indicated port
	Steady green (right)	Link OK
	Off (right)	No link, or port disabled
Other ports	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No link, or port disabled

Table 19: ExtremeSwitching X620 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	<i>Reserved for future use.</i>	
Right digit (1 - 8)	Indicates the position of this switch in the stack configuration	
	Upper half blinking	This switch is the stack master node
	Lower half blinking	This switch is the stack backup node
	Lit steadily	This switch is a standby node in the stack

ExtremeSwitching X670-G2 Series Switches

The X670-G2 series switches have 48 or 72 front-panel Ethernet ports that can provide 10-gigabit Ethernet connectivity using installable SFP+ optical modules. In addition, the X670-G2-48x-4q series switches offer four QSFP+ ports.

The X670-G2 series switches include the following base models:

- [ExtremeSwitching X670-G2-48x-4q Switch Ports and Slots](#) on page 71

- [ExtremeSwitching X670-G2-72x Switch Ports and Slots](#) on page 72

Each base model is available with either front-to-back or back-to-front cooling. There is no operational difference between these switch versions.

The X670-G2-48x-4q and X670-G2-72x have SFP+ ports that support dual interface speeds of Gigabit Ethernet and 10-gigabit Ethernet. SFP+ ports can accept both gigabit SFP and 10 gigabit SFP+, and depending upon the pluggable optics you choose, SFP+ ports can work in both modes.

The front panel of the X670-G2-48x-4q switch also provides four QSFP+ based 40 Gb ports. With appropriate cabling, each of the four QSFP+ ports can be partitioned into four 10 Gb ports.

A serial console port on the front panel of the X670-G2 series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.

Switch cooling is provided by replaceable fan modules. Fan modules are available in two different models that direct the airflow either from front to back or from back to front. All installed fan modules must be of the same model, so that they all direct the airflow in the same direction.



Note

Ensure that all fan module slots are filled when the switch is powered on. Fan modules can be hot-swapped after power has been turned on.

Two power supply bays accommodate either AC or DC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fans. Like the fan modules, the power supplies are available in models with either front-to-back or back-to-front cooling airflow.



Caution

Air must flow in the same direction for all installed fan modules and power supplies in a X670-G2 series switch.

X670-G2 switches offer Boundary Clock (BC), Transparent Clock (TC), and Ordinary Clock (OC) for synchronizing phase and frequency and allowing the network and the connected devices to be synchronized over Ethernet connections. Precision is +-2 nanoseconds (ns) with time accuracy +50 to -65 ns.

X670-G2 series switches require ExtremeXOS version 15.6.1.4 or later, or version 21.1.1 or later.



Note

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X670-G2-48x-4q Switch Ports and Slots

X670-G2-48x-4q switch ports and slots include:

- 48 fixed autosensing 10GBASE-X SFP+ ports (ports 1-48) that provide 10 Gbps high-density fiber connectivity. Two of these ports are configurable as stacking ports.
- Four 40GBASE-X unpopulated QSFP+ ports (ports 49, 53, 57, and 61 in unpartitioned 40G mode or ports 49 to 64 in partitioned 10G mode) that provide 40 Gbps of fiber connectivity. Of these four ports, two (using SummitStack-V160) or all four (SummitStack-V320) can be configured as stacking ports.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Front panel USB port.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- Three rear slots for fan modules with front-to-back or back-to-front airflow.
- Two rear panel mini-BNC connectors labeled OUT for connecting a Building Integrated Timing Supply (BITS) or GPS timing source:
 - 1 PPS frame output
 - 10 MHz output

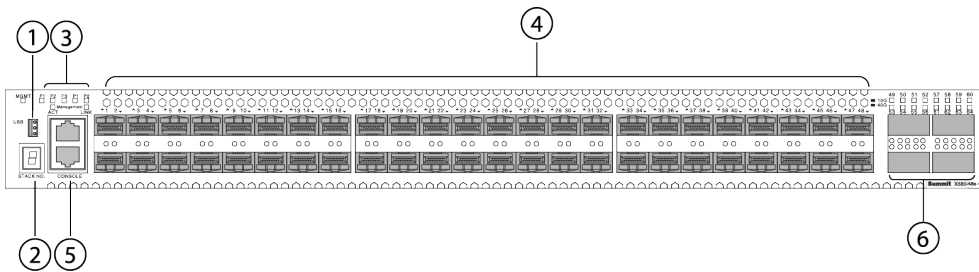


Figure 82: X670-G2-48x-4q Front Panel

1 = USB port	4 = 10GBASE-X SFP+ ports
2 = Stack number indicator	5 = Console port
3 = Ethernet management port	6 = QSFP+ ports

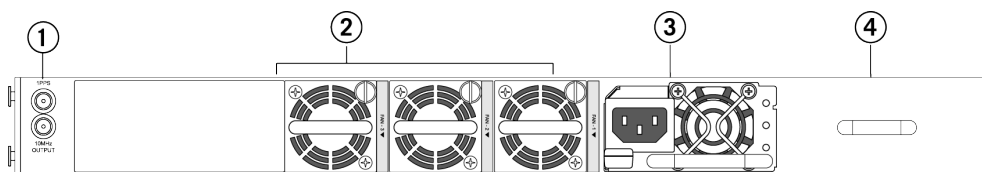


Figure 83: X670-G2-48x-4q Rear Panel

1 = BNC Timing ports	3 = Power supply
2 = Replaceable fan modules	4 = Blank power supply cover

ExtremeSwitching X670-G2-72x Switch Ports and Slots

X670-G2-72x switch ports and slots include:

- 72 fixed autosensing 10GBASE-X SFP+ ports (ports 1-72) that provide 10 Gbps high-density fiber connectivity. Two of these ports are configurable as stacking ports.
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.
- Rear panel USB port.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- Five rear slots for fan modules with front-to-back or back-to-front airflow.
- Two rear panel mini-BNC connectors labeled OUT for connecting a Building Integrated Timing Supply (BITS) or GPS timing source:
 - 1 PPS frame output
 - 10 MHz output

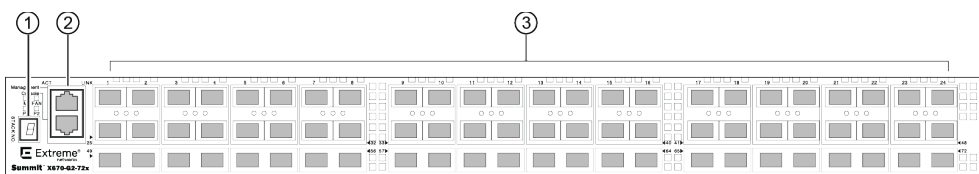


Figure 84: X670-G2-72x Front Panel

1 = Stack number indicator	3 = 10GBASE-X SFP+ ports
2 = Ethernet management port/console port	

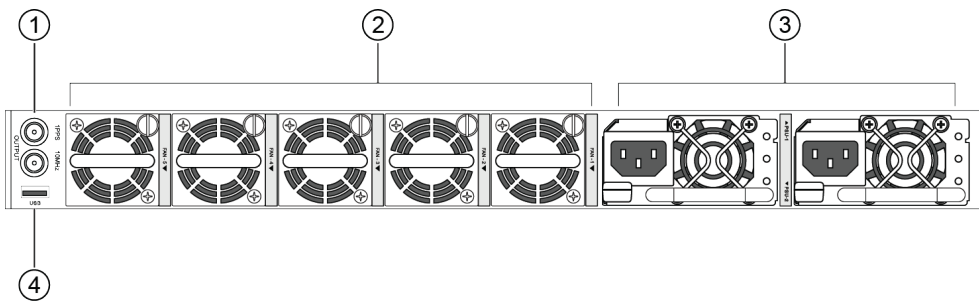


Figure 85: X670-G2-72x Rear Panel

1 = BNC Timing ports	3 = Power supplies
2 = Replaceable fan modules	4 = USB port

ExtremeSwitching X670-G2 Series Switch LEDs

The following sections describe the meanings of the LEDs on the X670-G2 series switches.

Table 20: X670-G2 Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed: system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached
FAN 1, 2, 3, 4, 5	Steady green	Normal operation.
	Blinking amber	Failure.
	Off	No power.
P1, P2 (Power Supply)	Steady green	Normal operation.
	Steady amber	Power is attached, but no power is on.
	Blinking amber	Power failure.
	Off	No power is attached.
Ethernet Port 1-48 or 1-72	Steady green	Link OK.
	Blinking green	Activity on the indicated port.
	Off	No link or port disabled.
670-G2-48x-4q QSFP+ ports 40G mode (49, 53, 57, 61)	Steady blue	Link OK
	Blinking blue	Activity on the indicated port
670-G2-48x-4q QSFP+ ports 10G mode (49-64)	Steady green	Link OK
	Blinking green	Activity on the indicated port

Table 21: X670-G2 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	<i>Reserved for future use.</i>	
Right digit (1 - 8)	Indicates the position of this switch in the SummitStack configuration.	
	Upper half blinking	This switch is the stack master node.
	Lower half blinking	This switch is the stack backup node.
	Lit steadily	This switch is a standby node in the stack.

ExtremeSwitching X690 Series Switches

The X690 series switch provides 10 Gb datacenter aggregation with 100 Gb uplinks, ideally suited for use as a "leaf" switch in conjunction with "spine" switches like the X870 series.

The X690 series switches include the following base models:

- ExtremeSwitching X690-48t-2q-4c switch
- ExtremeSwitching X690-48x-2q-4c switch

Front-panel Ethernet ports can provide 100 Gb Ethernet connectivity using installable QSFP28 and QSFP+ optical modules. The front panel of each X690 switch provides the following:

- Two QSFP+ based 40 Gb ports. With appropriate cabling, each of the two QSFP+ ports can be partitioned into four 10 Gb ports.
- Four QSFP28 based 100 Gb ports. With appropriate cabling, each of the four QSFP28 ports can be partitioned into 10 Gb, 25 Gb, 40 Gb, or 50 Gb ports.

For details about the port partitioning options that are available on X690 switches, see [Partitioning X690 Switch Ports into Data Lanes](#) on page 75.

X690 series switches also have 48 front-panel Ethernet ports that can provide 10-gigabit Ethernet connectivity using installable optical modules.

A serial console port on the front panel of the X690 series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.

Switch cooling is provided by replaceable fan modules. Fan modules are available in two different models that direct the airflow either from front to back or from back to front. All installed fan modules must be of the same model, so that they all direct the airflow in the same direction.



Note

Ensure that all fan module slots are filled when the switch is powered on. Fan modules can be hot-swapped after power has been turned on.

Two power supply bays accommodate either AC or DC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fans. Like the fan modules, the power supplies are available in models with either front-to-back or back-to-front cooling airflow.



Caution

Air must flow in the same direction for all installed fan modules and power supplies in a X690 series switch.

X690 series switches require ExtremeXOS version 22.3 or later.

Partitioning X690 Switch Ports into Data Lanes

Front-panel ports on X690 series switches can be configured for either 100-gigabit or 40-gigabit mode, and each port can be partitioned into data lanes through the use of split cables. This yields a total of up to 72 ports.

Port numbers are assigned depending on whether the physical ports are partitioned into data lanes. To illustrate, [Figure 86](#) shows the physical ports on the X690 front panel that can be partitioned. [Table 22](#) on page 76 and [Table 23](#) on page 77 detail how port numbers are assigned for each of the physical ports.

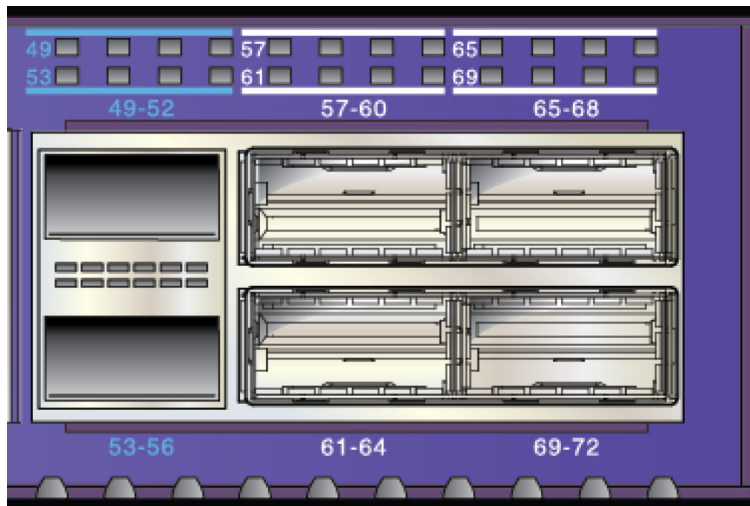


Figure 86: X690 Ports that Can Be Partitioned into Data Lanes

The ports labeled 49-52 and 53-56 operate in 40 Gb mode, acting as single 40 Gb ports or multiple 10 Gb ports.

The ports labeled 57-60 and above operate in 40 Gb mode or 100 Gb mode, with a variety of speeds.

In 40-gigabit mode, each port can be partitioned into four 10-gigabit data lanes.

In 100-gigabit mode, each port can be partitioned into two 50-gigabit data lanes or four 25-gigabit data lanes.

Table 22: Port Number Assignments (in 40 Gb Mode)

Physical Port Number (on Switch)	Has these Assigned Port Number(s)....	...with this Port Speed
49-52	49	40 Gb
	49,50,51,52	10 Gb
53-56	53	40 Gb
	53,54,55,56	10 Gb
57-60	57	40 Gb
	57,58,59,60	10 Gb
61-64	61	40 Gb
	61,62,63,64	10 Gb
65-68	65	40 Gb
	65,66,67,68	10 Gb

Table 22: Port Number Assignments (in 40 Gb Mode) (continued)

Physical Port Number (on Switch)	Has these Assigned Port Number(s)...	...with this Port Speed
69-72	69	40 Gb
	69,70,71,72	10 Gb

Table 23: Port Number Assignments (in 100 Gb Mode)

Physical Port Number (on Switch)	Has these Assigned Port Number(s)...	...with this Port Speed
57-60	57	100 Gb
	57,59	50 Gb
	57,58,59,60	25 Gb
61-64	61	100 Gb
	61,63	50 Gb
	61,62,63,64	25 Gb
65-68	65	100 Gb
	65,67	50 Gb
	65,66,67,68	25 Gb
69-72	69	100 Gb
	69,71	50 Gb
	69,70,71,72	25 Gb

**Note**

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X690-48t-2q-4c Switch Ports and Slots

The ExtremeSwitching X690-48t-2q-4c switch ports and slots include:

- 48 fixed autosensing 10GBASE-T ports (ports 1-48) that provide 10 Gbps copper connectivity.
- Two 40-gigabit Ethernet ports capable of supporting passive copper QSFP+ and active fiber QSFP+ and configurable for 1x40 Gb or 4x10 Gb Ethernet mode.
- Four 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/QSFP+ and configurable for 100 Gb, 40 Gb, 2x50 Gb, 4x25 Gb, and 4x10 Gb modes. For information about QSFP28 and QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- Front panel USB port.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- Six rear slots for fan modules with front-to-back or back-to-front airflow.

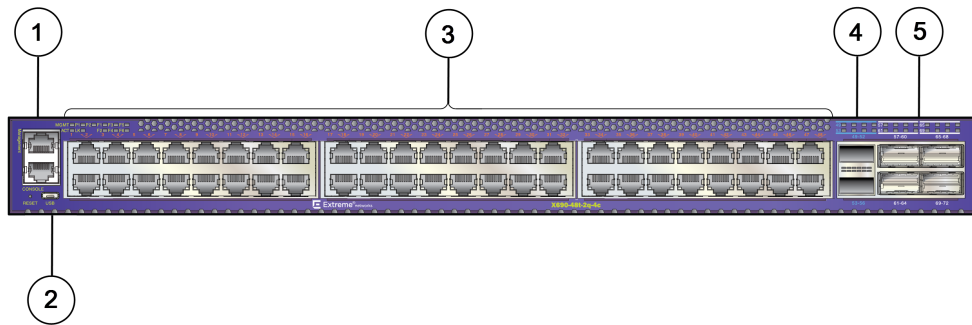


Figure 87: ExtremeSwitching X690-48t-2q-4c Front Panel

1 = Console/management port	4 = 10Gb/40Gb QSFP+ ports
2 = USB port	5 = 10Gb/25Gb/40Gb/50Gb/100Gb QSFP28 ports
3 = 10GBASE-T ports	

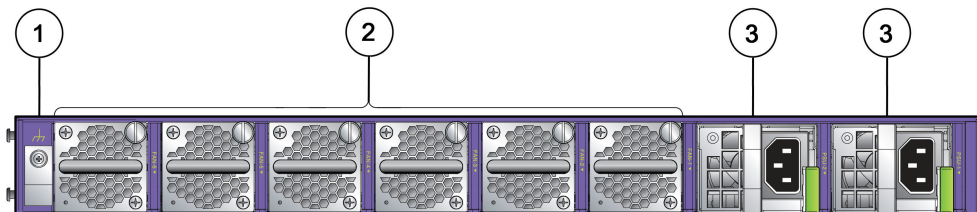


Figure 88: ExtremeSwitching X690-48t-2q-4c Rear Panel

1 = Grounding lug	3 = AC power supplies
2 = Replaceable fan modules	

ExtremeSwitching X690-48x-2q-4c Switch Ports and Slots

The ExtremeSwitching X690-48x-2q-4c switch ports and slots include:

- 48 fixed autosensing 1 Gb/10GBASE-X SFP+ ports (ports 1-48) that provide 10 Gbps high-density fiber connectivity.
- Two 40-gigabit Ethernet ports capable of supporting passive copper QSFP+ and active fiber QSFP+ and configurable for 1x40 Gb or 4x10 Gb Ethernet mode.
- Four 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/QSFP+ and configurable for 100 Gb, 40 Gb, 2x50 Gb, 4x25 Gb, and 4x10 Gb modes. For information about QSFP28 and QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).
- Ethernet management port (10/100/1000BASE-T).
- Serial console port implemented as an RJ45 connector used to connect a terminal and perform local management.

- Front panel USB port.
- Rear dual PSU power slots with front-to-back or back-to-front airflow.
- Six rear slots for fan modules with front-to-back or back-to-front airflow.

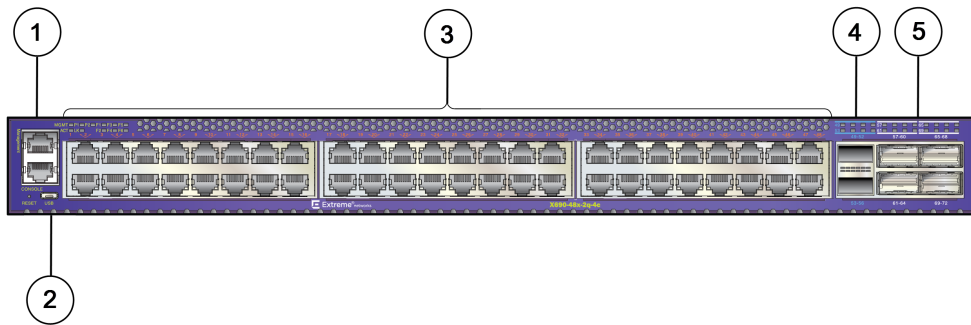


Figure 89: ExtremeSwitching X690-48x-2q-4c Front Panel

1 = Console/management port	4 = 10Gb/40Gb QSFP+ ports
2 = USB port	5 = 10Gb/25Gb/40Gb/50Gb/100Gb QSFP28 ports
3 = 1 Gb/10GBASE-X SFP+ ports	

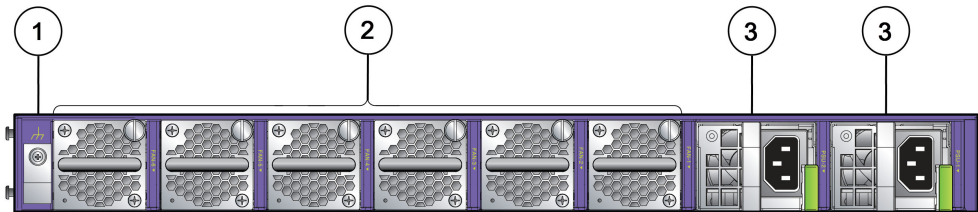


Figure 90: ExtremeSwitching X690-48x-2q-4c Rear Panel

1 = Grounding lug	3 = AC power supplies
2 = Replaceable fan modules	

ExtremeSwitching X690 Series Switch LEDs

The following tables describe the meanings of the LEDs on the front panel of the ExtremeSwitching X690 series switch.

Table 24: X690 Front Panel System LEDs

Label or Type	Color/State	Meaning
MGMT (Management)	Steady green	Normal operation Power-on self test (POST) passed
	Blinking green	POST or diagnostics in progress
	Blinking amber	Any of the following: <ul style="list-style-type: none"> • POST failed • System overheated • Power supply failed • Fan unit failed
	Off	No power
ACT	Blinking green	Management port packet transmitting or receiving
	Off	No packet transmitting or receiving
LK (Link)	Steady green	Management port link up
	Off	No link up or port disabled
P1, P2 (Power Supply)	Steady green	Power on
	Blinking amber	Any of the following: <ul style="list-style-type: none"> • Power supply failure • Over voltage • Over current • Over temperature
	Off	Power off; no power attached
F1 - F6 (Fan)	Steady green	Normal operation; all diagnostics pass
	Blinking amber	Fan module failure
	Off	No power to fan module

Table 25: X690 Front Panel Port LEDs

Location	Speed	Color/State	Meaning
Ports 1-48	10Gb/1Gb	Steady green	Link OK
		Blinking green	Port transmitting or receiving
		Off	No link, or port disabled
Ports 49-56	40Gb (no partition)	Steady blue	Link OK
		Blinking blue	Port transmitting or receiving
		Off	No link, or port disabled
	10Gb (partitioned)	Steady green	Link OK
		Blinking green	Port transmitting or receiving
		Off	No link, or port disabled

Table 25: X690 Front Panel Port LEDs (continued)

Location	Speed	Color/State	Meaning
Ports 57-72	100Gb/40Gb (no partition)	Steady white	Link OK
		Blinking white	Port transmitting or receiving
		Off	No link, or port disabled
	50Gb/25Gb/10Gb (partitioned)	Steady green	Link OK
		Blinking green	Port transmitting or receiving
		Off	No link, or port disabled

ExtremeSwitching X770 Series Switches

The X770 series switches have 32 front-panel Ethernet ports that can provide 40-gigabit Ethernet connectivity using installable QSFP+ optical modules. The ports can operate in 40-gigabit mode, or with appropriate optical modules can be partitioned into 10-gigabit data lanes. Both native stacking and alternate stacking are supported using the front panel-ports.

For details on port data capacity and numbering, see [Summit X770-32q Switch Ports and Slots](#) on page 82.

The X770 provides latency less than 600 nanoseconds and supports cut-through switching to help optimize high frequency trading applications as well as latency sensitive cluster computing.

Each base model is available with either front-to-back or back-to-front cooling. There is no operational difference between these switch versions.

A serial console port on the front panel of the X770-32q series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds. There is also a USB port.

X770 switches offer Boundary Clock (BC), Transparent Clock (TC), and Ordinary Clock (OC) for synchronizing phase and frequency and allowing the network and the connected devices to be synchronized over Ethernet connections. Precision is ± 2 nanoseconds (ns) with time accuracy ± 50 to ± 65 ns.

Switch cooling is provided by five hot-swappable fan modules providing N+1 redundancy. Fan modules are available in two different models that direct the airflow either from front to back or from back to front. All five installed fan modules must be of the same model, so that they all direct the airflow in the same direction.



Note

Ensure that all fan module slots are filled when the switch is powered on. Fan modules can be hot-swapped after power has been turned on.

Two power supply bays accommodate either AC or DC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fans. Like the fan modules, the power supplies are available in models with either front-to-back or back-to-front cooling airflow.



Note

Air must flow in the same direction for all installed fan modules and power supplies in a switch.

X770 series switches require ExtremeXOS version 15.4.1.3 or later, or any release of EXOS version 21 or 22.

Summit X770-32q Switch Ports and Slots

The front panel of the Summit X770-32q switch includes:

- 32 40-gigabit Ethernet ports capable of supporting passive copper QSFP+ and active fiber QSFP+.

With quad fan-out SFP+ cables, the QSFP+ ports can be partitioned into 10-gigabit data lanes: 24 of the ports can be partitioned into four 10-gigabit data lanes, and the remaining eight ports can be used as single 10-gigabit data lanes. This yields a total of 104 10-gigabit ports as shown in [Figure 91](#):

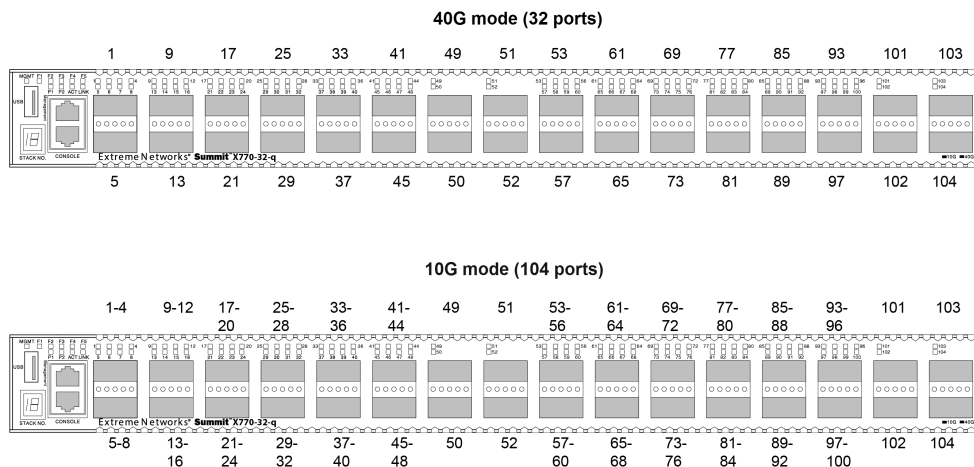


Figure 91: X770 Port Numbers for 10G mode and 40G Mode

For information about QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).

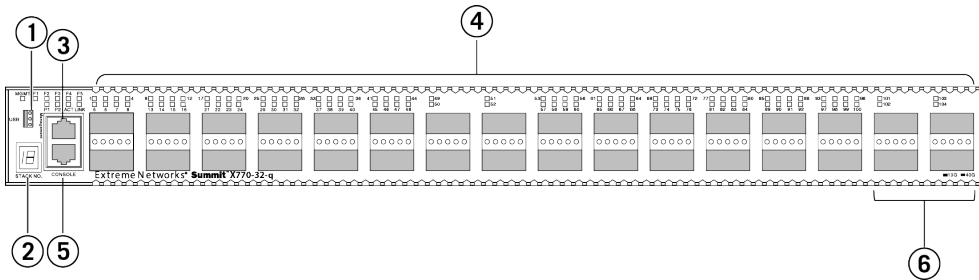
- Groups of two or four ports configurable to be stacking ports as shown in the following table:

Table 26: X770 Stacking Method and Ports

Stacking Method	Ports
SummitStack-V	103 and 104
SummitStack-V160	103 and 104
SummitStack-V-320	101 and 103, 102 and 104

When ports are used for stacking they are not available for normal Ethernet connectivity. For more information about stacking, see [Building Stacks](#) on page 136.

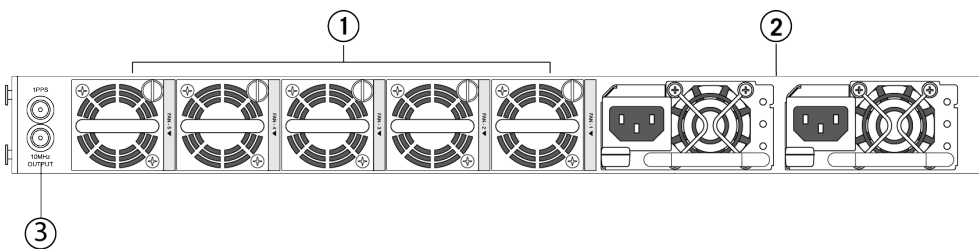
- Management port (10/100/1000-Mbps).
- Front panel USB port for access to external storage.
- RJ45 RS-232c serial console port used to connect a terminal and perform local management.
- LEDs to indicate port status and switch operating conditions. For a description of the LEDs and their operation, see [Summit X770 Series Switch LEDs](#) on page 83.
- Stack number indicator.



1 = USB port	4 = 40G/10G QSFP+ Ethernet ports
2 = Stack number indicator	5 = Console port
3 = Management port	6 = Stacking ports

The rear panel of the Summit X770-32q switch includes:

- Five replaceable fan modules
- Two power supply bays for either AC or DC power supplies (see [Summit 550 W AC and DC Power Supplies](#) on page 107).
- Two mini-BNC connectors labeled OUT for connecting a Building Integrated Timing Supply (BITS) or GPS timing source:
 - 1 PPS frame output
 - 10 MHz output



1 = Fan modules	3 = mini-BNC connectors
2 = Power supply	

Summit X770 Series Switch LEDs

The following sections describe the meanings of the LEDs on the Summit X770 series switches.

Table 27: X770 Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed: system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached
FAN 1, 2, 3, 4, 5	Steady green	Normal operation.
	Blinking amber	Failure.
	Off	No power.
P1, P2 (Power Supply)	Steady green	Normal operation.
	Steady amber	Power is attached, but no power is on.
	Blinking amber	Power failure.
	Off	No power is attached.
Ethernet Ports 40G mode 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 45, 49, 50 51, 52, 53, 57, 61, 65, 69, 73, 77, 81, 85, 89, 93, 97, 101, 102, 103, 104	Steady blue	Link OK.
	Blinking blue	Activity on the indicated port.
	Off	No link or port disabled.
Ethernet Ports 10G mode 1-104	Steady green	Link OK
	Blinking green	Activity on the indicated port
	Off	No 10G link or port disabled.

Table 28: 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	<i>Reserved for future use.</i>	
Right digit (1 - 8)	Indicates the position of this switch in the SummitStack configuration.	
	Upper half blinking	This switch is the stack master node.
	Lower half blinking	This switch is the stack backup node.
	Lit steadily	This switch is a standby node in the stack.
Stacking Ports 40G mode (V160 and V320 stacking) ports 101, 102, 103, and 104	Steady blue	Link OK
	Blinking blue	Activity
	Off	No link or port disabled.

Table 28: 2-digit Stack Number Indicator (continued)

Label or Type	Color/State	Meaning
Stacking Ports 10G mode (Alternate stacking) ports 103 and 104	Steady green	Link OK
	Blinking green	Activity
	Off	No link or port disabled

ExtremeSwitching X870 Series Switches

The X870 series switch is a 100 Gb switch suited for large datacenter applications. Front-panel Ethernet ports can provide 100-gigabit Ethernet connectivity using installable QSFP28 and QSFP+ optical modules. The ports can operate in 40- or 100-gigabit mode and can be partitioned into 10-, 25-, and 50-gigabit data lanes. (See [Partitioning X870 Switch Ports into Data Lanes](#) on page 85 for details and an example.)

The X870 provides latency less than 600 nanoseconds and supports cut-through switching to help optimize high frequency trading applications as well as latency sensitive cluster computing.

Native stacking with other X870 series switches is supported using the front panel-ports.

The X870 series includes the following base models:

- [ExtremeSwitching X870-32c Switch Ports and Slots](#) on page 87
- [ExtremeSwitching X870-96x-8c Switch Ports and Slots](#) on page 88

X870 series switches require ExtremeXOS version 22.2.1 or later.

Partitioning X870 Switch Ports into Data Lanes

Front-panel ports on X870 series switches can be configured for either 100-gigabit or 40-gigabit mode, and each port can be partitioned into data lanes through the use of split cables. This yields a total of up to 128 ports.

Port numbers are assigned depending on whether the physical ports are partitioned into data lanes. To illustrate, [Figure 92](#) shows a portion of the switch's front panel along with the port-number assignments for physical ports P1 through P8.

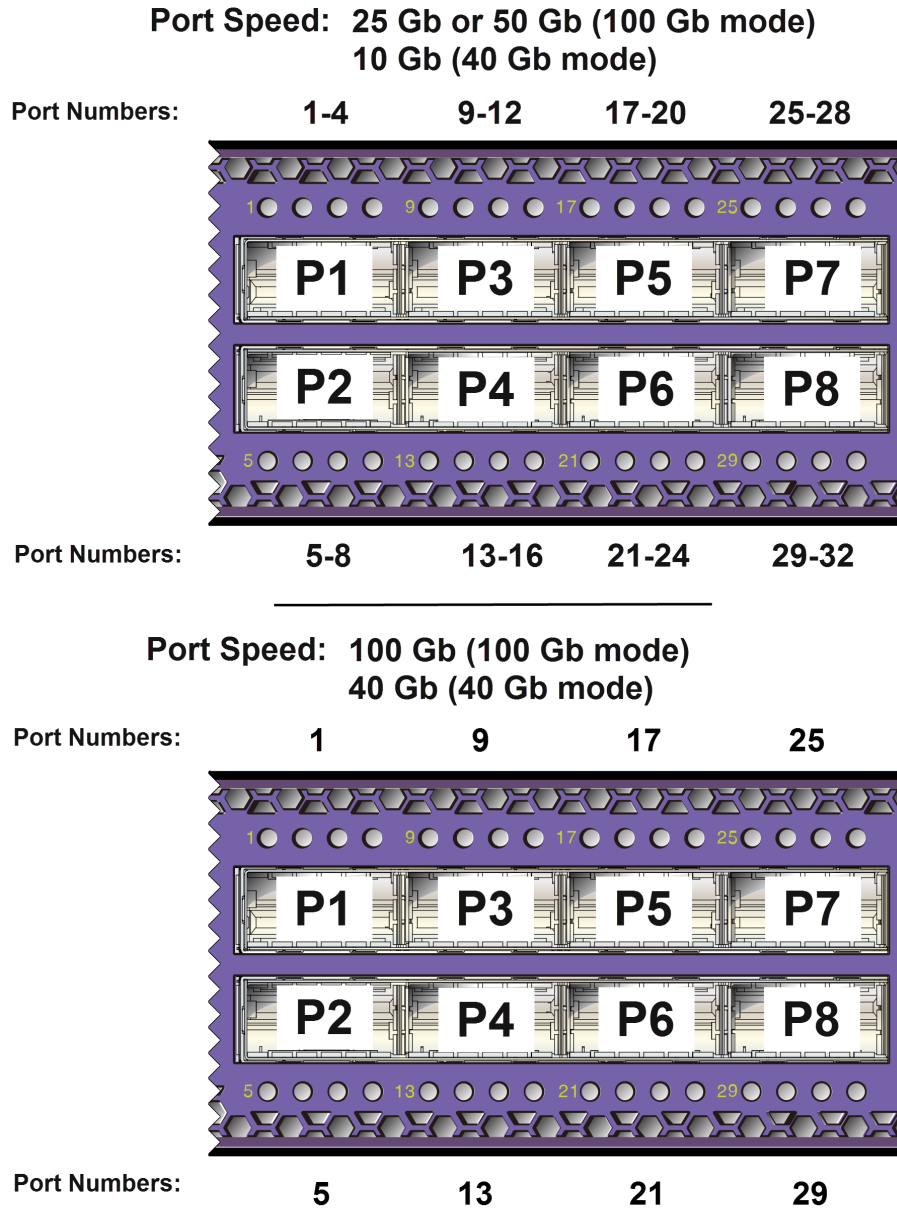


Figure 92: X870 Port Numbers for 100G Mode and 40G Modes when Ports are Partitioned into Data Lanes

In 40-gigabit mode, each port can be partitioned into four 10-gigabit data lanes.

In 100-gigabit mode, each port can be partitioned into two 50-gigabit data lanes or four 25-gigabit data lanes.

Management

A serial console port on the front panel of the X870 series switch allows you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to

connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.

There is also a USB console port. If the USB console port is connected, it will be selected over the RJ45 console port.

Cooling

Each base model is available with either front-to-back or back-to-front cooling. There is no operational difference between these switch versions.

Switch cooling is provided by six hot-swappable fan modules providing N+1 redundancy. Fan modules are available in two different models that direct the airflow either from front to back or from back to front. All six installed fan modules must be of the same model, so that they all direct the airflow in the same direction.



Note

Ensure that all fan module slots are filled when the switch is powered on. Fan modules can be hot-swapped after power has been turned on.

Power Supplies

Two power supply bays accommodate either AC or DC power supplies. Power supplies have integrated cooling fans that operate independently of the switch fans. Like the fan modules, the power supplies are available in models with either front-to-back or back-to-front cooling airflow.



Note

Air must flow in the same direction for all installed fan modules and power supplies in a switch.



Note

See the [ExtremeXOS 22.6 User Guide](#) and the [ExtremeXOS 22.6 Command Reference Guide](#) for feature-specific information about the switches and for information regarding switch configuration.

ExtremeSwitching X870-32c Switch Ports and Slots

The front panel of the ExtremeSwitching X870-32c switch includes:

- 32 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/ QSFP+ and configurable for 100 Gb, 40 Gb, 2x50 Gb, 4x25 Gb, and 4x10 Gb modes. For information about QSFP28 and QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).
- RJ45 Ethernet management port.
- USB port for access to external storage.
- USB console port.

- RJ45 RS-232c serial console port used to connect a terminal and perform local management.
- LEDs to indicate port status and switch operating conditions. For a description of the LEDs and their operation, see [ExtremeSwitching X870 Series Switch LEDs](#) on page 89.

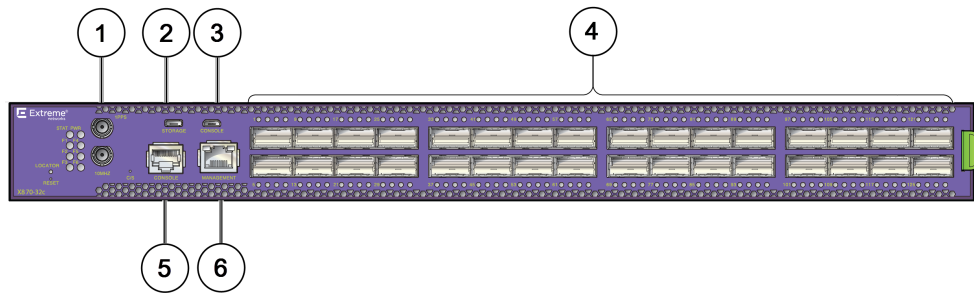


Figure 93: ExtremeSwitching X870-32c Front Panel

1 = Precision Timing ports (not supported)	4 = QSFP28/QSFP+ Ethernet ports
2 = Storage port: micro USB A	5 = Console port: RJ45
3 = Console port: micro USB B	6 = Ethernet management port: RJ45

The rear panel of the ExtremeSwitching X870-32c switch includes:

- Six replaceable fan modules.
- Two power supply bays for either AC or DC power supplies.

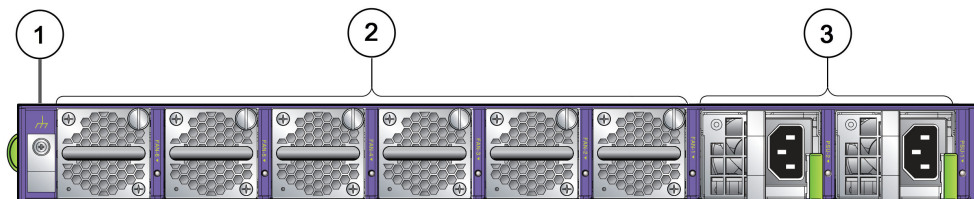


Figure 94: ExtremeSwitching X870-32c Rear Panel

1 = Grounding lug	3 = AC power supplies
2 = Fan modules	

ExtremeSwitching X870-96x-8c Switch Ports and Slots

The front panel of the ExtremeSwitching X870-96x-8c switch includes:

- Eight 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/QSFP+ and configurable for 100 Gb, 40 Gb, 2x50 Gb, 4x25 Gb, and 4x10 Gb modes. For information about QSFP28 and QSFP+ optical modules, see the [Extreme Networks Pluggable Transceivers Installation Guide](#).
- 24 100-gigabit Ethernet ports capable of supporting passive copper QSFP28/QSFP+ and active fiber QSFP28/QSFP+ and restricted to 4x10 Gb Ethernet mode

Using the optional Switch Port Speed License, these ports can be upgraded to unrestricted 100-gigabit mode in groups of six ports per license. Up to four Switch Port Speed Licenses can be applied for each X870-96x-8c switch.

- RJ45 Ethernet management port.
- USB port for access to external storage.
- USB console port.
- RJ45 RS-232c serial console port used to connect a terminal and perform local management.
- LEDs to indicate port status and switch operating conditions. For a description of the LEDs and their operation, see [ExtremeSwitching X870 Series Switch LEDs](#) on page 89.

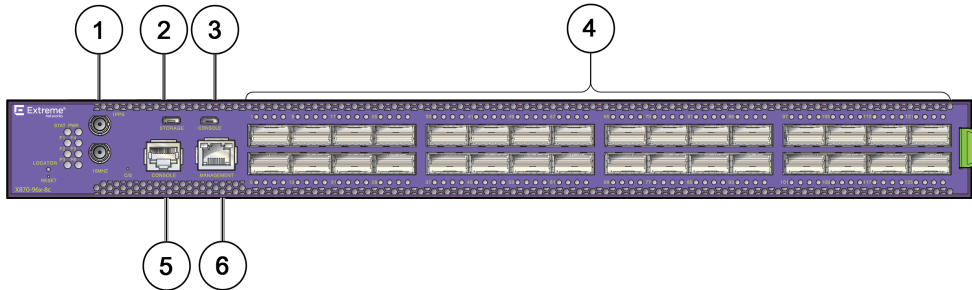


Figure 95: ExtremeSwitching X870-96x-8c Front Panel

1 = Precision Timing ports (not supported)	4 = QSFP28/QSFP+ Ethernet ports
2 = Storage port: micro USB A	5 = Console port: RJ45
3 = Console port: micro USB B	6 = Ethernet management port: RJ45

The rear panel of the ExtremeSwitching X870-96x-8c switch includes:

- Six replaceable fan modules.
- Two power supply bays for either AC or DC power supplies.

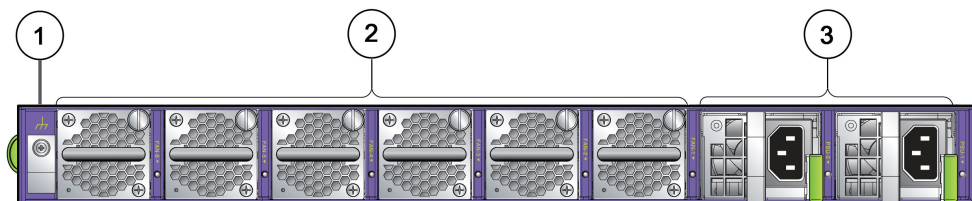


Figure 96: ExtremeSwitching X870-96x-8c Rear Panel

1 = Grounding lug	3 = AC power supplies
2 = Fan modules	

ExtremeSwitching X870 Series Switch LEDs

The following sections describe the meanings of the LEDs on the ExtremeSwitching X870 series switches.

Table 29: X870 Front Panel LEDs

Label or Type	Color/State	Meaning
STAT	Slow blinking green (1 Hz)	Normal operation
	Fast blinking green (2 Hz)	Power-on self test (POST) in progress or Switch diagnostics are running
	Steady green	POST passed: system is booting image
	Blinking amber	System is disabled: POST failed or system overheated
	Off	No external power is attached
PWR	Steady green	Power on
	Blinking amber	Power supply failure – one of: <ul style="list-style-type: none"> • Over voltage • Over current • Over temperature
	Off	Power off; no power attached
MGMT	Steady green	Link up
	Blinking green	Packet transmitting or receiving
	Off	Link not up or port disabled
FAN 1, 2, 3, 4, 5, 6	Steady green	All diagnostics passed; fan module is operational
	Blinking amber	Failure
	Off	No power to fan module
Locator	Blinking blue	Locator function enabled
	Off	Locator function disabled
Ethernet ports 1-32 (not partitioned)	Steady white	Link up, no activity
	Blinking white	Packet transmitting or receiving
	Off	Link not up or port disabled
Ethernet ports 1-128 (partitioned into data lanes – see Partitioning X870 Switch Ports into Data Lanes on page 85)	Steady green	Link up, no activity
	Blinking green	Packet transmitting or receiving
	Off	Link not up or port disabled

Pluggable Interfaces for the Switches

Many ExtremeSwitching switches include ports that are compatible with a variety of optical modules, including SFP, SFP+, SFP28, QSFP+, and QSFP28 transceivers and cables. 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 more information, refer to [*Extreme Networks Pluggable Transceivers Installation Guide*](#).

2 Power Supplies for Use with Your Switch

External Power Supplies Replaceable Internal Power Supplies Displaying the Status of Installed Power Supplies

Many Extreme Networks switches are shipped with an internal power supply that supplies all of the power needed for most switch operation. The internal power supply is fixed on some models and replaceable on other models. (See [Replaceable Internal Power Supplies](#) on page 104.)

Other switches, such as the X450-G2 and the X460-G2, require power supplies to be ordered separately.

An optional redundant power supply can be added to most models to protect against a power supply failure and to provide increased support for PoE operation on applicable switches.

The following Extreme Networks switches use external power supplies for redundancy:

- X440-G2
- X450-G2 (non-PoE models)
- X620-8t-2x and X620-10x models

V300 Virtual Port Extender high temperature (HT) models use an external power supply for redundancy.

The V400 Virtual Port Extender also uses an external power supply for redundancy.

The following switches provide power redundancy by installing a second replaceable power supply:

- X450-G2 (PoE models)
- X460-G2
- X620 (16-port models)
- X670-G2
- X770

External Power Supplies

The following tables list the compatible power supply models for ExtremeSwitching switches that use external power supplies for redundancy.



Caution

Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

For information about power supplies that work with other Extreme Networks switches, refer to *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier*.

Table 30: External Power Supplies for X440-G2 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X440-G2-12t-10GE4	90 W Redundant Power Supply Unit	RPS-90: 10948
X440-G2-12p-10GE4	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-24t-10GE4	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-24x-10GE4	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-24p-10GE4	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-48t-10GE4	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-48p-10GE4	1005 W PoE+ Redundant Power supply	STK-RPS-1005PS

Table 30: External Power Supplies for X440-G2 Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
X440-G2-24t-10GE4-DC	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-48t-10GE4-DC	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-12t8fx-GE4	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-24fx-GE4	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X440-G2-24t-GE4	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936

Table 31: External Power Supplies for X450-G2 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X450-G2-24t-GE4	150 W Non-PoE redundant power supply	STK-RPS-150PS
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X450-G2-24t-10GE4	150 W Non-PoE redundant power supply	STK-RPS-150PS
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936

Table 31: External Power Supplies for X450-G2 Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
X450-G2-48t-GE4	150 W Non-PoE redundant power supply	STK-RPS-150PS
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X450-G2-48t-10GE4	150 W Non-PoE redundant power supply	STK-RPS-150PS
	500 W PoE+ Redundant Power Supply Unit	RPS-500p: 10923
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936

Table 32: External Power Supplies for X620 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X620-8t-2x	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X620-10x	150 W Non-PoE Redundant Power Supply	STK-RPS-150PS
	150 W RPS-150XT External Power Supply Unit	RPS-150XT
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936

Table 33: External Power Supplies for V400 Virtual Port Extenders

Switch Model	Compatible External Power Supply	Model: Part Number
V400 (all models)	VX-RPS-1000 Redundant Power Supply	VX-RPS-1000 Redundant Power Supply on page 103

EPS-C2 Redundant Power System

The EPS-C2 is an external power supply system that supplies redundant power to switches.

It is a standalone unit that can be rack mounted in a regular 19-inch rack system. The EPS-C2 can be populated with up to three 750 W PoE AC PSUs (power supply units) to provide a total redundant power budget of up to 2040 W. The redundant power supply system can connect up to five switches to actively provide power to all five if needed.

The EPS-C2 redundant power system consists of the EPS-C2 chassis (Model 10936) plus one, two, or three installed 750 W AC power supplies (Model 10931).

For more information about the 750 W AC power supply including LED meanings, see [Summit 750 W AC Power Supply](#) on page 108.

The EPS-C2 system is compatible with the following switch models:

- X440-G2-12p-10GE4 switch
- X440-G2-24t-10GE4 switch
- X440-G2-24p-10GE4 switch
- X440-G2-24x-10GE4 switch
- X440-G2-48t-10GE4 switch
- X440-G2-24t-10GE4-DC switch
- X440-G2-48t-10GE4-DC switch
- X440-G2-12t8fx-GE4 switch
- X440-G2-24x-GE4 switch
- X440-G2-24t-GE4 switch
- X450-G2 series switches (all models)
- X620-8t-2x switch
- X620-10x switch

The EPS-C2 system provides redundant power for up to five switches. Redundant power connectors on the rear panel of the EPS-C2 chassis are specific to the supported switch type; a selection switch toggles between the connector type. Five 2x7 connectors are used to deliver power to the switches.

The 750 W AC PoE PSU used on the EPS-C2 has two power rails: 12V and PoE. These two power rails are independent. If the PoE rail overloads, it will shut down all PoE but the 12V rail will continue to function. If the 12V rail overloads, the 12V shuts down and the PoE rail will continue to function.

One redundant 2x7 power cable is shipped with the EPS-C2 chassis to provide the connection between the external power system and the redundant power input connector on the back of a switch. Additional redundant power cables are available from Extreme Networks.

The following table lists the power capability in watts of the EPS-C2 based on the number of installed PSUs. Check the power requirements of your switches to determine how many PSUs you need to install into the EPS-C2 chassis.

	12V Power (W)	PoE Power (W)
1 PSU	300	380
2 PSUs	600	760
3 PSUs	900	1140

For technical specifications, see [EPS-C2 Redundant Power Supply Technical Specifications](#) on page 383.

EPS-C2 connectors

The EPS-C2 delivers power in the following ways.

2x7 connector

The 2x7 connector is compatible with ExtremeSwitching X440-G2 and X620 switches. Using the 2x7 connector, the EPS-C2 provides redundant PoE power at the same level no matter how many PSUs are installed. That is, if there are one, two, or three PSUs installed into the EPS-C2, the EPS-C2 will provide redundant PoE power capability at the same 380-watt capacity as the internal power supply of the

connected switches. The PoE power supplied does not increase more than 380-watt even if additional PSUs are installed.

Internal-to-External Power Supply Transfer

When a EPS-C2 is connected to the switch and the internal power supply fails, power is drawn from the EPS-C2 without power interruption to the switch or PoE connected devices.

External-to-Internal Power Supply Transfer

When a EPS-C2 is connected to the switch and the EPS-C2 fails or is disconnected, power is drawn from the internal power supply without interruption to the switch or PoE connected devices.

Single 750 W PoE PSU Configuration: Redundant PoE Power

A single 750 W PoE PSU provides redundant PoE power capability up to a 380-watt maximum capacity. This is sufficient to supply up to 15.4 watts per port for a 24-port configuration and up to 7.7 watts per port for a 48-port configuration.

If the internal power supply fails, the external power module will provide power to the switch and PoE devices at the same power levels as the internal power supply without any power interruptions.

If the 750 W PoE PSU fails or is removed, the internal power supply of the switch continues to provide PoE power without any power interruptions.

Dual 750 W PoE PSUs Configuration: Full Power

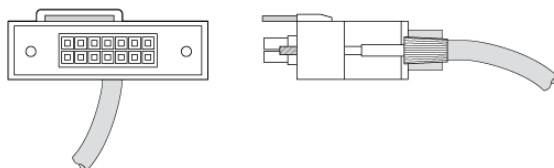
Two 750 W PoE PSUs provide full power at 760 watts; this power level allows 15.4 watts of PoE power to all 48 ports. In this full-power configuration, the internal power supply is disabled, and therefore redundant power is not available.

Triple 750 W PoE PSUs Configuration: Full Redundant Power

Three 750 W PoE PSUs provide the full 760 watts of power for 15.4 watts of PoE power to all 48 ports. In addition, this configuration provides 2:1 redundancy. If one of the 750 W PoE PSU fails, the third power module continues to provide uninterrupted full PoE power. The internal power supply of the switch is disabled in this configuration.

For information on installing the EPS-C2, see [Installing an EPS-C2 Power Supply](#) on page 225.

Each EPS-C2 power supply is shipped with a special redundant power supply cord.



XM_855

Figure 97: EPS-C2 2x7 Pin Redundant Power Cable

RPS-90 Redundant Power Supply

Notice



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

The Extreme Networks RPS-90 (model 10948) is supported as a power source for the ExtremeSwitching X440-G2-12t-10GE4 switch. It plugs into the RPS connector (coaxial barrel connector) on the rear panel of the switch.



Note

Only the Extreme Networks RPS-90 RPS is supported for use with the X440-G2-12t-10GE4 switch. RPS-90 devices from other manufacturers are not supported.

The RPS-90 power supply has a C6-format AC power input connector. As a result, you will need to obtain both a standard C13 AC power cord and a C5-to-C14 converter (Extreme Networks model 10947).



Note

The converter is not available in China. A special power cord is available for use with the RPS-90 in China.

The RPS-90 cannot be mounted in a rack.

For technical specifications, refer to [RPS-90 Redundant Power Supply Technical Specifications](#) on page 383.

RPS-150XT Redundant Power Supply

Notice



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

The RPS-150XT provides backup power to Extreme Networks stackable switches. If for some reason the switch loses power from its internal power supply, the RPS-150XT can provide up to 150 W maximum operating power to support switch operation.

The power supply ships with the following:

- RPS cable
- Four rubber feet (for flat surface installation)

The RPS-150XT is compatible with the following Extreme Networks switches:

- ExtremeSwitching X440-G2-24t-10GE4 switch
- ExtremeSwitching X440-G2-24x-10GE4 switch
- ExtremeSwitching X440-G2-48t-10GE4 switch
- ExtremeSwitching X440-G2-24t-10GE4-DC switch
- ExtremeSwitching X440-G2-48t-10GE4-DC switch
- ExtremeSwitching X440-G2-12t8fx-GE4 switch
- ExtremeSwitching X440-G2-24fx-GE4 switch
- ExtremeSwitching X440-G2-24t-GE4 switch
- ExtremeSwitching X620-8t-2x switch
- ExtremeSwitching X620-10x switch

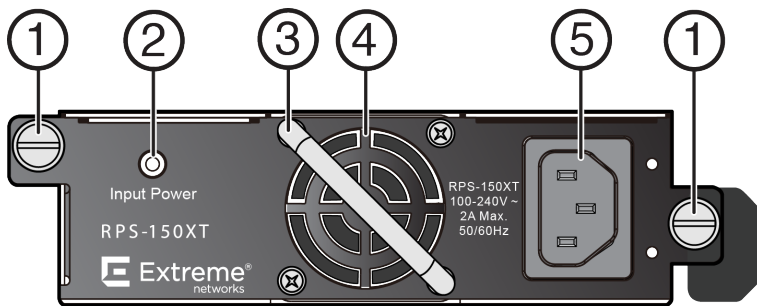


Figure 98: RPS-150XT Front Panel

1 = Captive screws	4 = Fan
2 = Status LEDs	5 = AC power input connector
3 = Handle	

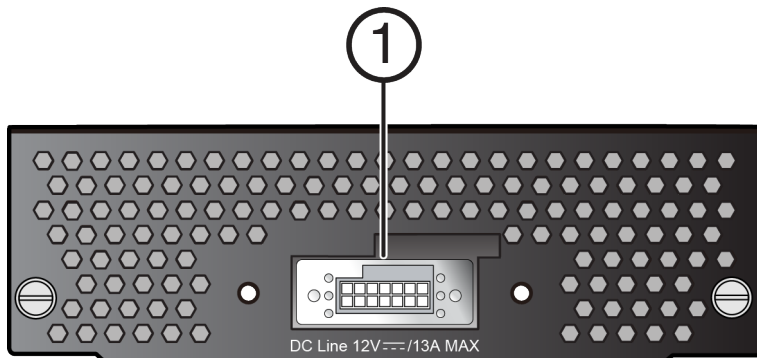


Figure 99: RPS-150XT Rear Panel

1 = 14-pin Redundant Power Supply connector

See [RPS-150XT Redundant Power Supply Technical Specifications](#) on page 384 for pin locations and function.

Table 34: RPS-150XT LED Status Definitions

LED	LED Color	Status
AC OK	Green	AC input within operational range
	Off	No AC voltage or AC voltage is outside the operational range

For technical specifications, see [RPS-150XT Redundant Power Supply Technical Specifications](#) on page 384.

RPS-500p Redundant Power Supply

Notice



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

The RPS-500p (model 10923) is a 500 watt DC power redundant power supply for use with Extreme 802.3at PoE-compliant stackable or standalone switches. The RPS-500p is a standalone unit that can be rack mounted in a standard 19-inch rack.

The power supply provides power backup to an Extreme stackable or standalone fixed switch. If for some reason the switch loses power from its internal power supply, the RPS-500p can provide up to 500 watts maximum operating power to support switch operation and the 55 VDC necessary to support 55 VDC/data connections to PDs (powered devices). The RPS-500p has one 2x7 power connector.

The power supply ships with the following:

- AC power cord
- RPS cable (1 meter long)
- Four rubber feet (for flat surface installation)
- Two rack mount brackets
- Eight flathead screws (M3x6mm)

The RPS-500p is compatible with the following Extreme Networks switches:

- X440-G2 switches (most models)
- X450-G2 switches (non-PoE models)

The RPS-500p is compatible with both PoE and non-PoE switches.

Table 35: RPS-500p LED Status Definitions

Power LED	Meaning	Recommended Action
Green, solid	AC input to power supply is within specifications	None
Off	AC input power to power supply is out of specification.	<ol style="list-style-type: none"> 1 Check AC power cord connection to the power supply. 2 Check AC power at the power outlet. 3 Swap power cord for a known good one. 4 If the problem persists, contact Extreme Networks for support.

For technical specifications, see [RPS-500p Redundant Power Supply Technical Specifications](#) on page 386.

STK-RPS-150PS Redundant Power Supply

Notice



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

The STK-RPS-150PS is a 150 watt DC power redundant power supply for use with Extreme Networks stackable or standalone fixed switch models that do not support PoE. The STK-RPS-150PS can be used as a standalone unit, or it can be installed into a two or eight slot shelf and then mounted in a standard 19-inch rack.

The STK-RPS-150PS system is compatible with the following switch models:

- X440-G2-24t-10GE4 switch
- X440-G2-24x-10GE4 switch
- X440-G2-48t-10GE4 switch
- X440-G2-24t-10GE4-DC switch
- X440-G2-48t-10GE4-DC switch
- X440-G2-12t8fx-GE4 switch
- X440-G2-24fx-GE4 switch
- X440-G2-24t-GE4 switch
- X450-G2-24t-GE4 switch
- X450-G2-24t-10GE4 switch
- X450-G2-48t-GE4 switch
- X450-G2-48t-10GE4 switch
- X620-8t-2x switch
- X620-10x switch

Table 36: STK-RPS-150PS LED Status Definitions

Power LED	Meaning	Recommended Action
Green, solid	AC input to power supply is within specifications	None
Off	AC input power to power supply is out of specification.	<ol style="list-style-type: none"> 1 Check AC power cord connection to the power supply. 2 Check AC power at the power outlet. 3 Swap power cord for a known good one. 4 If the problem persists, contact Extreme Networks for support.

For technical specifications, see [STK-RPS-150PS and RPS Shelves Technical Specifications](#) on page 387.

STK-RPS-1005PS Redundant Power Supply

Notice



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

The STK-RPS-1005PS provides load sharing, backup, or additive PoE power to some Extreme Networks 802.3at PoE-compliant stackable switch models. If the switch loses power from its internal power supply, the STK-RPS-1005PS can provide up to 1005 W maximum operating power (180 W system power and 740 W PoE power) to support switch operation and the 55 VDC necessary to support 55 VDC/data connections to powered devices.

The power supply ships with the following:

- AC power cable
- RPS cable
- Four rubber feet (for flat surface installation)

The STK-RPS-1005PS is compatible with the ExtremeSwitching X440-G2-48p-10GE4 switch.

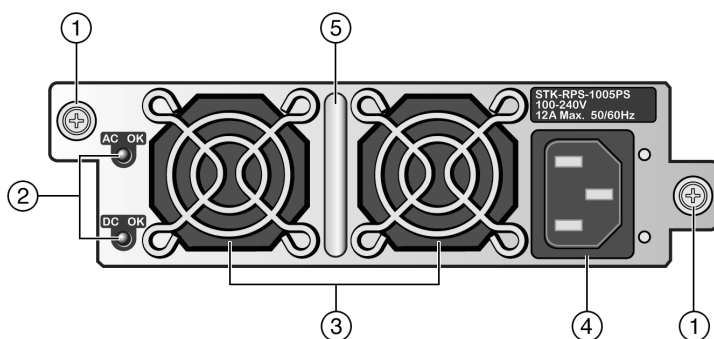


Figure 100: STK-RPS-1005PS Front Panel

1 = Captive screws	4 = AC power input connector
2 = Status LEDs	5 = Handle
3 = Fans	

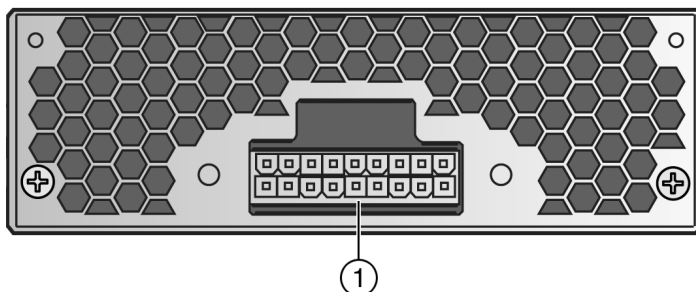


Figure 101: STK-RPS-1005PS Rear Panel

1 = 18-pin Redundant Power Supply connector

Table 37: STK-RPS-1005PS LED Status Definitions

LED	LED Color	Status
AC OK	Green	AC input within operational range
	Off	No AC voltage or AC voltage is outside the operational range
DC OK	Green	Power supply successfully providing 55 VDC to the system
	Off	Power supply malfunctioning

For technical specifications, including pin locations and functions, see [STK-RPS-1005PS Redundant Power Supply Technical Specifications](#) on page 389.

VX-RPS-1000 Redundant Power Supply

Notice



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

The VX-RPS-1000 provides load sharing, backup, or additive power for the V400 Virtual Port Extender.

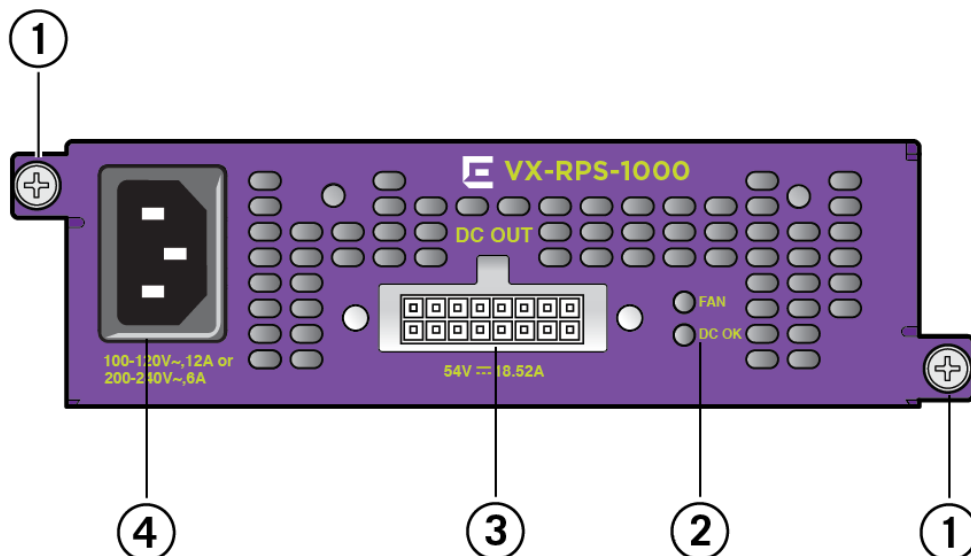


Figure 102: VX-RPS-1000 Front Panel

1 = Captive screws	3 = Connector to port extender
2 = Status LEDs	4 = AC power input connector

Table 38: VX-RPS-1000 LED Status Definitions

LED	LED Color	Status
AC OK	Green	AC input within operational range
	Off	No AC voltage or AC voltage is outside the operational range
DC OK	Green	DC input within operational range
	Off	No DC voltage or DC voltage is outside the operational range

For technical specifications, including pin locations and functions, see [VX-RPS-1000 Redundant Power Supply Technical Specifications](#) on page 391.

Replaceable Internal Power Supplies

Several ExtremeSwitching switch models have two bays for installing one or two replaceable AC or DC power supplies.

In a redundant power configuration, both power supplies are fully fault-tolerant and load-sharing. You can remove one power supply without interrupting switch operation.

Specific switch series and models are compatible with different power supply models, as shown in the following table:

Table 39: Replaceable Internal Power Supply Compatibility

Hardware Model	AC Power Supplies: Part No.	DC Power Supplies: Part No.
X450-G2 switch (PoE models)	715 W AC-FB: 10951 1100 W AC-FB: 10941	
X460-G2 switch (non-PoE models)	300 W AC-FB: 10930A 300 W AC-BF: 10943	300 W DC-FB: 10933 300 W DC-BF: 10944
X460-G2 switch (PoE models)	350 W AC-FB: 10953 350 W AC-BF: 10954 715 W AC-FB: 10951 715 W AC-BF: 10952 1100 W AC-FB: 10941 1100 W AC-BF: 10942	
X590 switches (all models)	770 W AC-FB: 10960 770 W AC-BF: 10961	1100 W DC-FB: 10962 1100 W DC-BF: 10963
X620-16t switch X620-16x switch	300 W AC-FB: 10930A 300 W AC-BF: 10943	300 W DC-FB: 10933 300 W DC-BF: 10944
X670-G2 switch	550 W AC-FB: 10925 550 W AC-BF: 10927	550 W DC-FB: 10926 550 W DC-BF: 10928
X690 switches (all models)	770 W AC-FB: 10960 770 W AC-BF: 10961	1100 W DC-FB: 10962 1100 W DC-BF: 10963
X695 switch	750 W AC and DC Power Supplies on page 108 -FB: XN-ACPWR-750W-F 750 W AC and DC Power Supplies on page 108 -BF: XN-ACPWR-750W-R	750 W AC and DC Power Supplies on page 108 -BF: XN-DCPWR-750W-F 750 W AC and DC Power Supplies on page 108 -BF: XN-DCPWR-750W-R
X770-32q switch	550 W AC-FB: 10925 550 W AC-BF: 10927	550 W DC-FB: 10926 550 W DC-BF: 10928
X870 switches (all models)	770 W AC-FB: 10960 770 W AC-BF: 10961	1100 W DC-FB: 10962 1100 W DC-BF: 10963
EPS-C2 RPS	750 W AC: 10931	

Note

AC power input cords are not provided with an 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 Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

Summit 300 W AC and DC Power Supplies

The following 300 W power supplies are available:

- Summit 300 W AC power supply: front-to-back airflow (Model 10930A)
- Summit 300 W AC power supply: back-to-front airflow (Model 10943)
- Summit 300 W DC power supply: front-to-back airflow (Model 10933)
- Summit 300 W DC power supply: back-to-front airflow (Model 10944)

These power supplies are compatible with the following switch models:

- X460-G2 switches (non-PoE models)
- X620-16t and X620-16x switches

The Summit 300 W power supplies (AC and DC) have the status LEDs listed in the following table.

Table 40: Summit 300 W Power Supply LED Status Indications

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

Summit 350 W AC Power Supplies

Summit 350 W AC power supplies are available in the following models:

- 350 W AC PSU-FB (Model 10953)—AC power supply with front-to-back ventilation airflow
- 350 W AC PSU-BF (Model 10954)—AC power supply with back-to-front ventilation airflow

Both power supplies are compatible with X460-G2 PoE switch models that have the same airflow direction as the power supply.

The Summit 350 W AC PSU-FB (Model 10953) is compatible with the X465-24S, X465-24XE, and X465-48T switch models that have the same airflow direction as the power supply.

These power supplies have a keyed power inlet (C16) that requires a notched (C15) power cord.

The Summit 350 W AC power supplies have the status LEDs listed in [Table 41](#).

Table 41: Summit 350 W AC Power Supply LED Status Indications

IN_OK (Green)	OUT_OK (Green or Red)	Description
Off	Off	No AC input power connection or low AC voltage
On	Off	AC input good; output disabled
On	(Red) On	AC input good; output fault
On	(Green) On	AC input good; output good

Summit 550 W AC and DC Power Supplies

Summit 550 W power supplies are available in the following models:

- 550 W AC PSU-FB (Part number 10925)—AC power supply with front-to-back ventilation airflow
- 550 W DC PSU-FB (Part number 10926)—DC power supply with front-to-back ventilation airflow
- 550 W AC PSU-BF (Part number 10927)—AC power supply with back-to-front ventilation airflow
- 550 W DC PSU-BF (Part number 10928)—DC power supply with back-to-front ventilation airflow

These power supplies are compatible with the following switch models:

- X670-G2 switches (all models)
- X770-32q switch

The power supply must have the same airflow direction (front-to-back or back-to-front) as the switch with which it is being used. In a redundant power configuration, the airflow direction must be the same for both power supplies, and it must match the airflow direction of the fans in the switch.

The Summit 550 W power supplies (AC and DC) have the status LEDs listed in [Table 42](#).

Table 42: Summit 550 W Power Supply LED Status Indications

Position	Color and State	Meaning
Top Power Good	Steady Green	+3.3VSB ok; 12 V ok; power supply is working properly.
Middle Power Supply Fail	Steady Amber	Fault condition (for example, 3.3VSB OCP/UCP, 12V OCP/UCP, or fan failure).
Bottom AC OK	Steady Green	Power supply is connected to power. If the cord is connected and this LED is off, the power supply is defective.

Summit 715 W AC Power Supplies

Summit 715 W AC power supplies are available in the following models:

- 715 W AC PSU-FB (Model 10951)—AC power supply with front-to-back ventilation airflow
- 715 W AC PSU-BF (Model 10952)—AC power supply with back-to-front ventilation airflow

Both power supplies are compatible with X460-G2 PoE switch models that have the same airflow direction as the power supply.

The Summit 715 W AC PSU-FB power supply (Model 10951) is compatible with the X450-G2 PoE and X465 PoE (-48P, X465-48W, X465-24MU, X465-24MU-24W, X465-24W) switch models.

The Summit 715 W AC power supplies have a keyed power inlet (C16) that requires a notched (C15) power cord.

The Summit 715 W AC power supplies have the status LEDs listed in [Table 43](#).

Table 43: Summit 715 W AC Power Supply LED Status Indications

IN_OK (Green)	OUT_OK (Green/RED)	Description
Off	Off	No AC input power connection or low AC voltage.
On	Off	AC input good, 54V output disabled.
On	(Red) On	AC input good, output (54V) fault.
On	(Green) On	AC input good, DC outputs in spec.

Summit 750 W AC Power Supply

The Summit 750 W AC power supply is used in the EPS-C2 external power system (see [EPS-C2 Redundant Power System](#) on page 95). Each installed Summit 750 W AC power supply can provide up to 380 watts of PoE power budget.

The Summit 750 W AC power supply has the status LEDs listed in the following table.

Table 44: Summit 750 W AC Power Supply LED Status Indications

Label and Color	State	Meaning
AC OK Green	Off	No AC input
	On	AC input is good.
DC OK Green	Off	Both DC outputs (55 V and 12 V) are bad or not enabled.
	Blinking	One output is enabled and good; the second output is bad or not enabled.
	On	Both the 55 V and 12 V outputs are enabled and good.
ALM Red	Off	No fault condition exists.
	Blinking	Power supply alert: power supply is likely to fail because of a developing fault, such as abnormal thermal conditions or poor fan performance. or One output (55 V or 12 V) is bad.
	On	Both outputs (55 V and 12 V) are bad. Power supply is receiving 3.3 VSB from the system. (AC OK and DC OK are off.) Thermal shutdown, fan failure, or any fault condition when both 55 V and 12 V are turned OFF.

750 W AC and DC Power Supplies

750 W power supplies are available for the ExtremeSwitching X695 switch in the following models:

- 750W AC power supply - front-to-back airflow (part no. XN-ACPWR-750W-F)
- 750W AC power supply - back-to-front airflow (part no. XN-ACPWR-750W-R)

- 750W DC power supply - front-to-back airflow (part no. XN-DCPWR-750W-F)
- 750W DC power supply - back-to-front airflow (part no. XN-DCPWR-750W-R)



Note

AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

The power supply must have the same airflow direction (front-to-back or back-to-front) as the switch with which it is being used. In a redundant power configuration, the airflow direction must be the same for both power supplies, and it must match the airflow direction of the fans in the switch.

For information on installing or replacing an AC or DC power supply, see the following topics:

- [Install a 300 W or 750 W Internal AC Power Supply](#) on page 212
- [Install a 750 W DC Power Supply](#) on page 203

The following tables describe the meanings of the LEDs on the 750 W AC power supply (part number XN-ACPWR-750W-F or XN-ACPWR-750W-R).

The LEDs are located on the end of the power supply unit, arranged vertically to the left of the terminal block.

Table 45: 750 W AC and DC Power Supplies LED Status Indications

Label and Color	Description	State	Meaning
! Amber	Fault Indicator	On (Solid)	PSU fault
		Off	No PSU fault
DC (Green)	DC output Good	On (solid)	DC output OK
		Off or Blinking	DC output fail
AC (Green)	AC input Good	On	AC input OK
		Off	AC input fail

The following tables describe the meanings of the LEDs on the 750 W DC power supply (part number XN-DCPWR-750W-F or XN-DCPWR-750W-R).

The LEDs are located on the end of the power supply unit, arranged vertically to the left of the terminal block.

Table 46: 750 W DC Power Supply LED Status Indications

Label and Color	Description	State	Meaning
! Amber	Fault Indicator	On (Solid)	PSU fault
		Off	No PSU fault
OUT OK (Green)	DC output Good	On (solid)	DC output OK
		Off or Blinking	DC output fail
IN OK (Green)	DC input Good "IN OK"	On	DC input OK
		Off	DC input fail

Summit 770 W AC Power Supplies

Summit 770 W AC power supplies are available in the following models:

- 770 W AC PSU-FB (Model 10960)—AC power supply with front-to-back ventilation airflow
- 770 W AC PSU-BF (Model 10961)—AC power supply with back-to-front ventilation airflow

These power supplies are compatible with X590, X690 and X870 switches that have the same airflow direction as the power supply.

The Summit 770 W AC power supplies employ a single, bi-color LED to indicate power supply status, as seen in [Table 47](#):

Table 47: Summit 770 W AC Power Supply LED Status Indications

LED Indicator Status	DC Power Redundancy Status (Green)	Power Supply Failures and warnings (Amber)
Off	No AC power to all power supplies or PSU is ON but with warning events	PSU is Healthy or No AC power to all power supplies
Flashing (1 Hz)	PSU is OFF but 5VSB is ON	PSU warning events: high temp, high power, high current, slow fan, under input voltage
On	PSU is switched on and is running (Output ON and OK)	PSU critical event causing a shutdown: failure, OCP, OTP, OVP, UVP, Fan Fail

Summit 1100 W AC Power Supplies

Summit 1100 W AC power supplies are available in the following models:

- 1100 W AC PSU-FB (Model 10941)—power supply with front-to-back ventilation airflow
- 1100 W AC PSU-BF (Model 10942)—power supply with back-to-front ventilation airflow

Both power supplies are compatible with X460-G2 PoE switch models that have the same airflow direction as the power supply.

The Summit 1100 W AC PSU-FB power supply (Model 10941) is compatible with the X450-G2 PoE and X465 PoE (-48P, X465-48W, X465-24MU, X465-24MU-24W, X465-24W) switch models.

The Summit 1100 W AC power supplies have a keyed power inlet (C16) that requires a notched (C15) power cord.

The Summit 1100 W AC power supplies have the status LEDs listed in [Table 48](#).

Table 48: Summit 1100 W AC Power Supply LED Status Indications

IN_OK (Green)	OUT_OK (Green/RED)	Description
Off	Off	No AC input power connection or low AC voltage.
On	Off	AC input good, 54V output disabled.
On	(Red) On	AC input good, output (54V) fault.
On	(Green) On	AC input good, DC outputs in spec.

Summit 1100 W DC Power Supplies

Summit 1100 W DC power supplies are available in the following models:

- 1100 W DC PSU-FB (Model 10962)—DC power supply with front-to-back ventilation airflow
- 1100 W DC PSU-BF (Model 10963)—DC power supply with back-to-front ventilation airflow

These power supplies are compatible with X690 and X870 switches that have the same airflow direction as the power supply.

The Summit 1100 W power supplies have the status LEDs listed in [Table 49](#).

Table 49: Summit 1100 W DC Power Supply LED Status Indications

IN_OK (Green)	OUT_OK (Green or Red)	Description
Off	Off	No DC input power connection or low DC voltage
On	Off	DC input good; output disabled
On	(Red) On	DC input good; output fault
On	(Green) On	DC input good; output good

Displaying the Status of Installed Power Supplies

Using the `show power` command, you can view detailed information about the power supplies your switch is using. This status information may be useful for your technical support representative if you have a network problem.

The switch collects the following power supply information:

- The current state of the power supply (powered off or powered on).
- Whether the unit is an internal or external power supply.
- Power input, output, and usage statistics.
- Airflow direction (for internal power supplies).
- Additional details for switches in stacked configurations.

For more information, see the [ExtremeXOS 22.6 Command Reference Guide](#).

3 Expansion Modules

V400 Virtual Port Extender Solid-state Drives Optional Ports for X460-G2 Switches

Several different hardware accessories are available for expanding the capabilities of your Extreme Networks switch. Collectively, they are referred to as expansion modules.

- Port option cards and versatile interface modules (VIMs) are installed in dedicated slots at the back of the switch to provide optional I/O ports or stacking ports. These optional items add 10-Gbps copper or fiber I/O ports to the back panel of compatible switches. If no card or module is installed, the option slot is covered by a blank panel.
- The TM-CLK Clock Module is required for Synchronous Ethernet (SyncE) processing on the X460-G2 switch.

The following table lists the types of expansion modules and the switch series with which they are compatible.

Table 50: Compatibility of Expansion Modules

Module Type	Name	No. of Ports	Type of Ports	Compatible Switch Series
VIM2	VIM-2q	2	40 gigabit QSFP+ optical ports	X460-G2
	VIM-2ss	2	high-performance SummitStack ports	X460-G2
	VIM-2t	2	10-gigabit copper BASE-T ports	X460-G2
	VIM-2x	2	10-gigabit SFP+ optical ports	X460-G2

Table 50: Compatibility of Expansion Modules (continued)

Module Type	Name	No. of Ports	Type of Ports	Compatible Switch Series
Clock	TM-CLK Clock Module	NA	Reference frequency for SyncE and 1588v2 precision time features	X460-G2
VIM5-2Y	2	25GbE SFP28 optical ports	X465	
VIM5-4X	4	10GbE SFP+ optical ports	X465	
VIM5-4XE	4	10GbE SFP+ LRM MACsec capable optical ports	X465	
VIM5-4Y	4	25GbE SFP28 optical ports	X465	
VIM5-4YE	4	25GbE SFP28 LRM MACsec capable optical ports	X465	

V400 Virtual Port Extender

Bridge port extenders (BPEs) are devices that do not fully process packets, nor make forwarding or filtering decisions. Instead, they simply receive packets from extended ports and forward packets toward the upstream controlling bridge (an ExtremeXOS-based switch) for L2/L3 processing. This scheme, based on the IEEE 802.1BR specification, is known as extended edge switching.

The V400 Virtual Port Extender offers the following features:

- 24 or 48 10/100/1000 Base-T ports that provide 10 Gbps copper connectivity.
- Two or four 1000/10G Base-X SFP+ ports that provide 10 Gbps high-density fiber connectivity.
- Serial console port.
- Front panel USB port.
- PoE+ power on some models.
- Fixed internal power-supply and fan modules.

All models include either two or four SFP+ ports on the faceplate of each base unit, which can be provisioned either as uplink or cascade ports. This gives administrators the option to create redundant links or downstream cascade ports to other V400 units. The SFP+ ports are the only ones that can be used as uplink ports in a cascading configuration.

The V400 Virtual Port Extender requires that ExtremeXOS (EXOS) version 22.5 (or later) be installed on the switch to which it is attached. For more information about configuring EXOS for use with this equipment, see the [ExtremeXOS 22.6 User Guide](#).

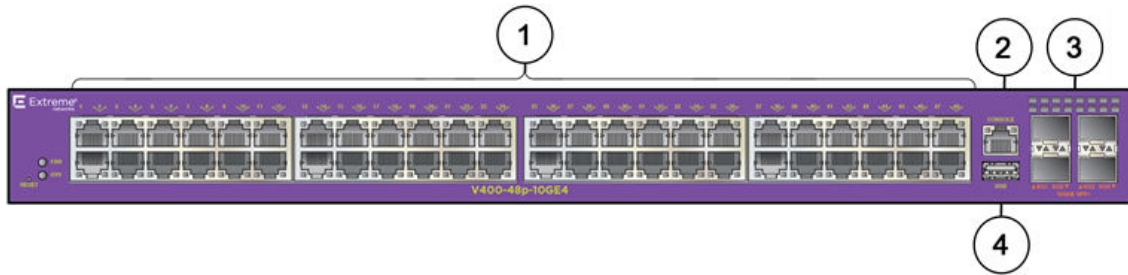


Figure 103: V400 Virtual Port Extender Front Panel (48-port Model Shown)

1 = 10/100/1000BASE-T ports	3 = 10Gb SFP+ ports
2 = Console/management port	4 = USB port

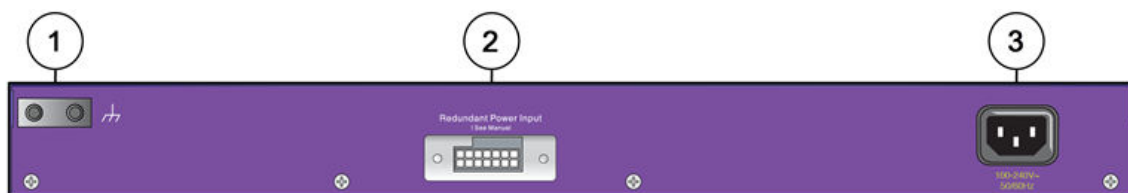


Figure 104: V400 Virtual Port Extender Rear Panel

1 = Grounding lug	3 = AC power input connector
2 = RPS connector (some models)	

Solid-state Drives

Solid-state Drives (SSD) provide modular storage support. VSP 4900 Series switches accommodate one SSD module using a reserved slot on the rear of the switch, which is supported on VOSS release 8.1.5 and later.

The following SSD module is available for VSP 4900 switches:

Table 51: Available SSD Module

SSD Module	Description	Compatible Switch Models
XN-SSD-001-120	Modular 120GB SSD	VSP4900 (all models)

Optional Ports for X460-G2 Switches

The rear panel of every X460-G2 switch provides slots to install the following:

- VIM-2q Ethernet Module with 2x40G ports
- VIM-2ss SummitStack Module with stacking ports
- VIM-2t Ethernet Module with 2x10GBASE-T ports

- VIM-2x Ethernet Module with 2x10GSFP+ ports
- TM-CLK Clock Module to support SyncE and 1588

**Note**

Optional VIM and clock modules for the X460-G2 series switches are not compatible with X460 series switches.

**Caution**

The switch must be powered off before you install any interface module options (VIMs or clock modules). The interface module options are not hot swappable.

VIM-2q Port Option Card

The VIM-2q Ethernet Module option card allows you to add one or two 40 gigabit QSFP+ optical ports to the VIM (Versatile Interface Module) slot on the rear panel of an X460-G2 series switch. The VIM-2q option card supports QSFP+ optical modules.

The ports on the VIM-2q option card can be configured as high speed stacking ports in a SummitStack configuration with a stack link speed of 40G. For more information about stacking ExtremeSwitching switches, see [Building Stacks](#) on page 136.

**Note**

40G ports on the VIM-2q cannot be partitioned into four 10G ports.

**Caution**

VIM modules are not hot swappable. You must power down the switch before installing any VIM modules.

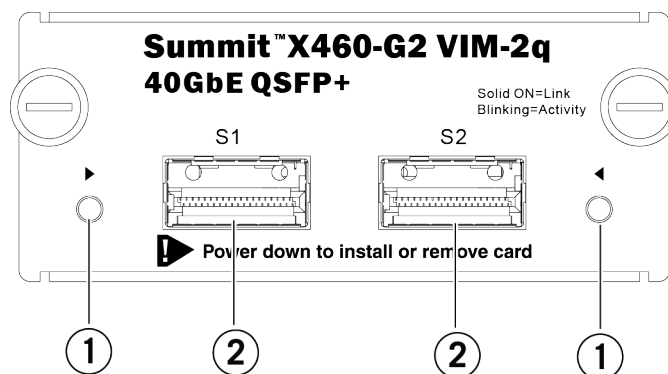


Figure 105: VIM-2q Port Option Card

1 = LEDs

2 = QSFP+ Ports

For current information about compatible QSFP+ modules and the minimum required software, refer to the most recent version of the [Extreme Hardware/Software Compatibility and Recommendation Matrices](#).

For more information about QSFP+ modules, refer to the [Extreme Networks Pluggable Transceivers Installation Guide](#).

VIM-2ss Port Option Card

X460-G2 series stacking modules allow you to add two high-performance SummitStack ports to the VIM (Versatile Interface Module) slot on the rear panel of an X460-G2 series switch. These ports allow you to combine multiple units into a single SummitStack management entity, using stacking cables that are available from Extreme Networks. The VIM-2ss stacking module, shown in [Figure 106](#), provides two integrated CX4 SummitStack 10-Gbps bidirectional stacking ports for stacking connections using Extreme Networks SummitStack cables.



Caution

VIM modules are not hot swappable. You must power down the switch before installing any VIM modules.

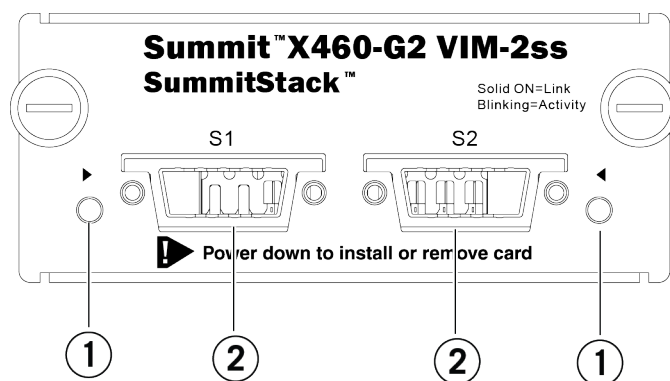


Figure 106: VIM-2ss SummitStack Module

1 = LEDs

2 = Stacking Ports

VIM-2t Port Option Card

The VIM-2t Ethernet Module option allows you to add one or two 10-gigabit copper BASE-T ports to the VIM (Versatile Interface Module) slot on the rear panel of an X460-G2 series switch. These ports support 10G BASE-T RJ45 cables. SyncE support is available on the S1 port.



Caution

VIM modules are not hot swappable. You must power down the switch before installing any VIM modules.

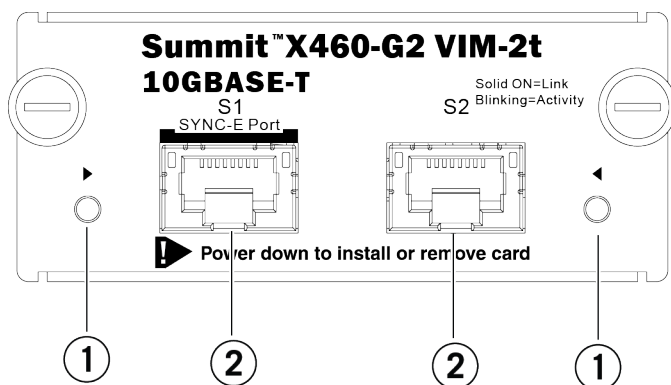


Figure 107: VIM-2t Ethernet Module Option

1 = LEDs	2 = 10G BASE-T ports
----------	----------------------

VIM-2x Ethernet Module Port Option Card

The VIM-2x Ethernet Module option card, shown in [Figure 108](#), allows you to add up to two 10-gigabit SFP+ optical ports to the VIM slot on the rear panel of the X460-G2 series switch. These ports support 1 GbE and 10 GbE SFP and SFP+ transceivers.



Caution

VIM modules are not hot swappable. You must power down the switch before installing any VIM modules.

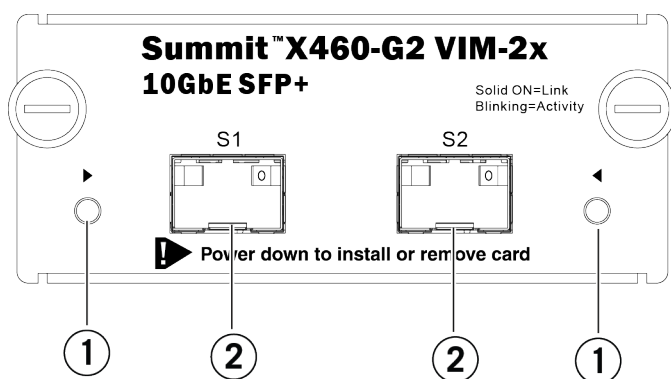


Figure 108: VIM-2x Ethernet Module Option

1 = LEDs	2 = SFP+ Ports
----------	----------------

TM-CLK Clock Module

The TM-CLK Clock Module provides an Oven-controlled Crystal Oscillator (OCXO) for use as a reference frequency for SyncE and 1588v2 precision time features. The OCXO is precise to ± 2 nanoseconds (ns) with time accuracy ± 50 to ± 65 ns. The ExtremeXOS configuration selects the input to the clock module from a SyncE master port or a 1588v2 grandmaster clock. The TM-CLK module is required for SyncE on

the X460-G2. The 1588v2 Precision Time feature on the X460-G2 requires the TM-CLK module and the Network Timing Feature Pack, and does not support stacking.

Two mini-BNC outputs deliver the following signals:

- 10MHz frequency reference
- 1 PPS signal at the top of each second



Caution

The clock module is not hot swappable. You must power down the switch before installing any VIM modules.



Note

The TM-CLK module has no inputs for timing signals, and it cannot act as a 1588v2 grandmaster clock. The module provides no RJ45 Building Integrated Timing System (BITS) output, and in particular does not provide the serial time of day output.



Note

The X460-G2 TM-CLK clock module does not accept both 10MHz and 1PPS signals at the same time, so it can take 10 to 20 minutes or more to lock onto a 1588v2 1PPS signal from the Apollo2 chip in addition to the usual 15 minutes or more for the 1588v2 servo to lock onto the remote grandmaster clock.

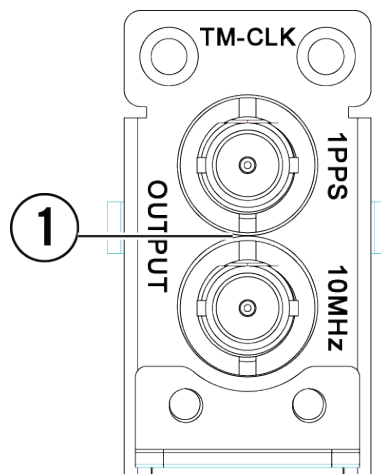


Figure 109: TM-CLK Module Option

1 = Timing signal mini-BNC outputs

4 Site Preparation

Planning Your Site

Operating Environment Requirements

Rack Specifications and Recommendations

Evaluating and Meeting Cable Requirements

Meeting Power Requirements

Following Applicable Industry Standards

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 a switch, chassis, or its components. 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, and before carrying out any maintenance procedures, read the safety information in "Technical Specifications."

Planning Your Site

To install your equipment successfully, you should plan the site carefully. The site planning process has three major parts:

1 Meeting site requirements.

The physical installation site must meet the following requirements for a safe and successful installation:

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

2 Evaluating and meeting cable requirements.

After examining your physical site and verifying that all environment requirements are met, evaluate and compare your existing cable plant with the requirements of the Extreme Networks equipment to determine if you need to install new cables.

3 Meeting power requirements.

To run your equipment safely, you must meet the specific power requirements for each switch and external power supply unit installed in the system.

For power specifications of the switches, see the specific switch listings in [Technical Specifications](#) on page 315.

Operating Environment Requirements

Verify that your site meets all environmental and safety 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.

Meeting 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

The organizations listed in [Table 52](#) are authorities on electrical codes.

Table 52: 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, MA 02169 USA	www.nfpa.org/
Underwriters' Laboratory (UL) 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 Pflugsten Road Northbrook, IL 60062 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, VA 22209 USA	www.nema.org

Table 52: Authorities on Electrical Codes (continued)

Organization	Address	Web Site URL
Electronic Components Industry Association (ECIA) Trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry.	ECIA 111 Alderman Drive Suite 400 Alpharetta, GA 30005 USA	www.ecianow.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 of 1934. The FCC regulates all U.S. telephone and cable systems.	FCC 445 12th Street S.W. Washington, DC 20554 USA	www.fcc.gov

Setting up the Wiring Closet

Be aware of the following recommendations for your wiring closet:

- Make sure that your system is easily accessible for installation and service. See [Rack Specifications and Recommendations](#) on page 124 for more information.
- Use appropriate AC or DC power, power distribution, and grounding for your specific installation.
- Use a vinyl floor covering in your wiring closet. (Concrete floors accumulate dust, and carpets can cause static electricity.)
- Prevent unauthorized access to wiring closets 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 wiring closet 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.



Note

We recommend that you consult an electrical contractor for commercial building and wiring specifications.

Controlling the Temperature

Extreme Networks equipment generates a significant amount of heat. It is essential that you provide a temperature-controlled environment for both performance and safety.

Install the equipment only in a temperature- 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.

Observe these additional thermal recommendations for the location where you plan to install your equipment:

- Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below 40°C (104°F).
- Install a reliable air conditioning and ventilation system.
- Keep the ventilation in the wiring closet running during non-business hours; otherwise, the equipment can overheat.
- Maintain a storage temperature between -40°C (-40°F) and 70°C (158°F).

Table 53 on page 123 summarizes the behavior of ExtremeSwitching switches when they experience high operating temperatures.

Table 54 on page 123 lists the ambient temperature range for ExtremeSwitching switches. As with all electrical equipment, however, Extreme Networks product lifetimes degrade with increased temperature. Ideally, therefore, temperatures should be kept at or below 25°C (77°F).

Safeguards are built into all Extreme Networks switches and power supply units to minimize the risk of fire.

Table 53: Thermal Shutdown and Restart Behavior

Switch Model(s)	Behavior
All models except those listed below	When internal system temperatures exceed the thermal shutdown temperature limit (typically about 20°C higher than normal system operating temperatures), the system's power supplies are turned off and the switch shuts down. The system remains in the OFF state until the system has sufficient time to cool and the internal thermal sensor measures a temperature lower than the maximum specified ambient temperature, at which time the system restarts automatically. Alternately, you can restart the system immediately by removing and then restoring all line power to the system.
X460-G2 (all models)	When internal system temperatures exceed the thermal shutdown temperature limit (typically about 20°C higher than normal system operating temperatures), the system's power supplies are turned off and the switch shuts down. The switch does not restart automatically, even after cooling. It remains in the OFF state until you remove and then restore all line power to the system.

Table 54: Ambient Temperature Range for Switches

Switch Series	Ambient Operating Temperature Range
X440-G2	0°C (32°F) to 50°C (122°F) Note: The maximum temperature is 60°C (140°F) for the following models: X440-G2-12t8fx-GE4, X440-G2-24fx-GE4, X440-G2-24t-GE4.
X450-G2	0°C (32°F) to 50°C (122°F)
X460-G2	0°C (32°F) to 50°C (122°F)
X590	0°C (32°F) to 45°C (113°F)
X620	0°C (32°F) to 50°C (122°F)
X670-G2	0°C (32°F) to 45°C (113°F)
X690	0°C (32°F) to 45°C (113°F)

Table 54: Ambient Temperature Range for Switches (continued)

Switch Series	Ambient Operating Temperature Range
X770	0°C (32°F) to 45°C (113°F)
X870	0°C (32°F) to 45°C (113°F)

Controlling the Humidity Level

To maximize equipment life, keep operating humidity between 50% and 70% relative humidity (non-condensing) during typical operation.

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

Protecting Your System from ESD (Electrostatic Discharge)

Your system must be protected from static electricity or 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 Specifications and Recommendations

Racks 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.
- The rack should support approximately 270 kg (600 lb).

Grounding the Rack

The rack must be properly grounded.

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

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.
- For a DC-powered switch, use a minimum 14 AWG stranded copper wire for grounding.

AC-powered switches do 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.

Providing Adequate Space 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.



Warning

Extreme Networks switches do not have a switch for turning power to the unit on and off. For systems using an AC power supply, power to the switch is disconnected by removing the wall plug from the electrical outlet.

Be sure that cables and other equipment do not block the switch's air intake or outflow.



Warning

The DC-powered switches include the following models:

- X440-G2-24t-10GE4-DC and X440-G2-48t-10GE4-DC

For these switches and the EPS-150DC power supply, 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. Disconnecting the DC power cable from the DC power source must be done by a qualified, licensed electrician.

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

Securing the Rack

The rack should be attached to the wiring closet floor with 9.5 mm (3/8 in) lag screws or equivalent hardware. The floor under the rack should be level within 5 mm (3/16 in). Use a floor-leveling cement compound if necessary or bolt the racks to the floor as shown.

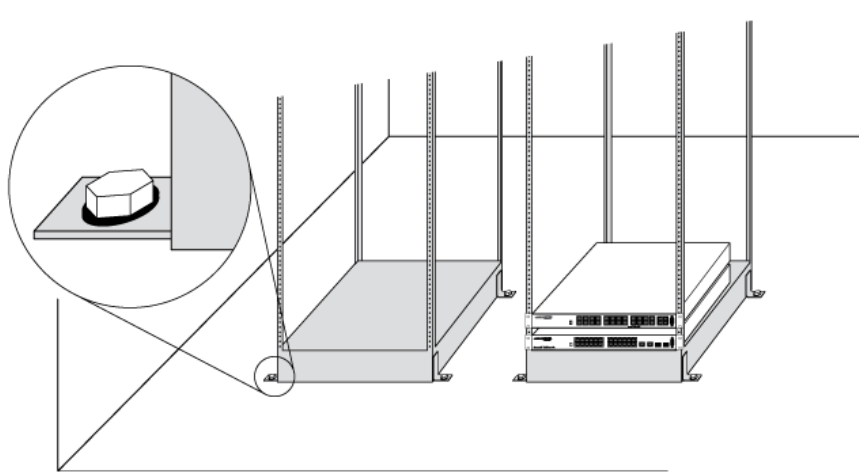


Figure 110: Properly Secured Rack

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

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.

Labeling Cables and Keeping Accurate Records

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

Keeping 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.
- Provide enough slack, approximately 5 to 7.5 cm (2 to 3 in), to provide proper strain relief as shown in [Figure 111](#) on page 128.
- 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 2.5 cm (1 in) of the cable to avoid radio frequency (RF) interference.
- Discharge the RJ45 Ethernet cable before plugging it into a port on the switch.



Caution

Unshielded twisted pair (UTP) cable can build up electrostatic 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 RJ45 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.

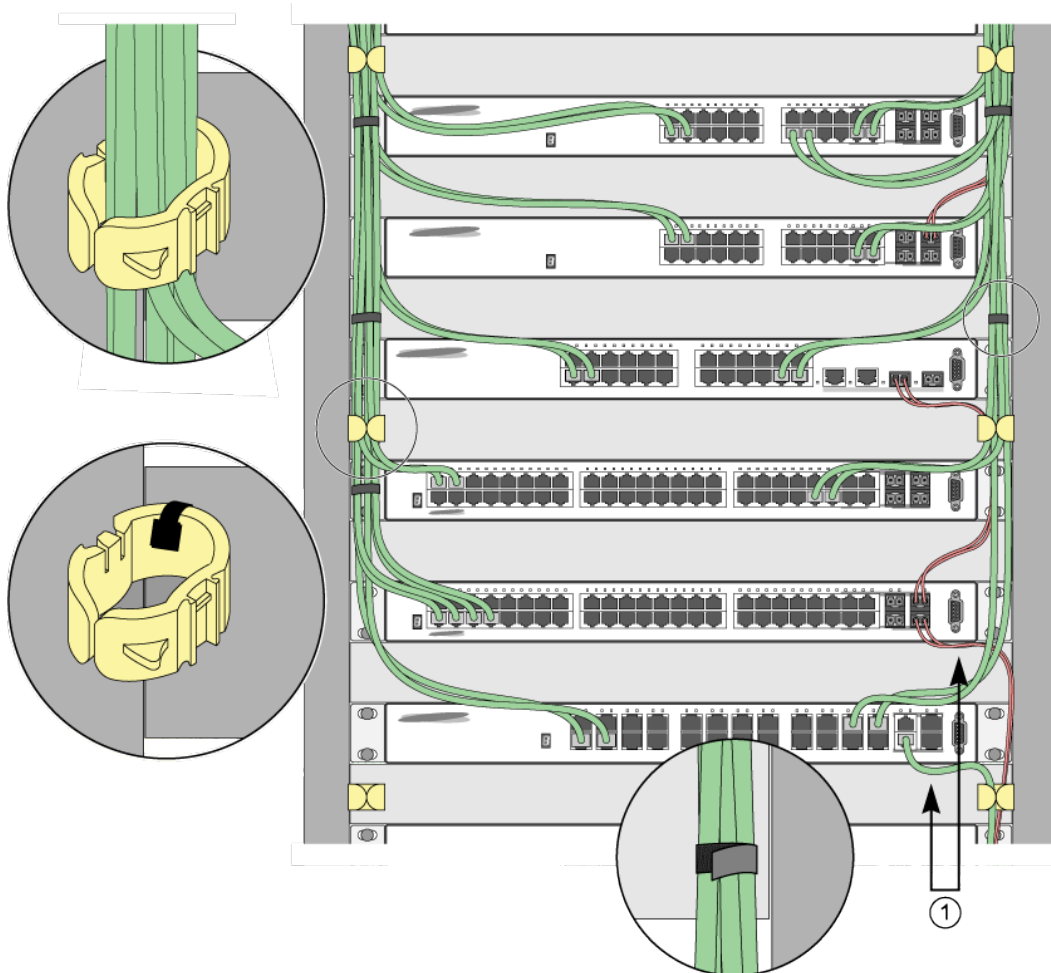


Figure 111: Properly Installed and Bundled Cable

1 = Ensure adequate slack and bend radius

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 5 cm (2 in) for each 90-degree turn as shown in [Figure 112](#).

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.

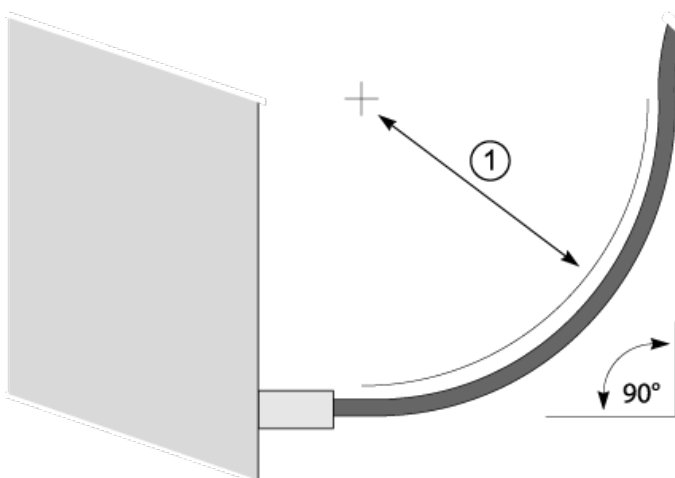


Figure 112: Bend Radius for Fiber Optic Cable

1 = Minimum 5 cm (2 in) radius in 90° bend

Cable Distances and Types

[Table 55](#) on page 129 shows one example of cable media types and maximum distances that support reliable transmission in accordance with international standards (except where noted). Refer to [Extreme Networks Pluggable Transceivers Installation Guide](#) for descriptions of optics and cables, as well as a complete list of supported cable lengths.

Refer to [Extreme Hardware/Software Compatibility and Recommendation Matrices](#) for a list of the cable types that are compatible with your equipment.

Table 55: Cable Distances and Types

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

Table 55: Cable Distances and Types (continued)

Standard	Media Type	MHz•km Rating	Maximum Distance (Meters)
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-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
10GBASE-T SFP+	(10 Gb links) Category 6A and higher UTP cable	–	30
10GBASE-SR SFP+ (850nm optical window)	62.5 mm multimode fiber	160	26
	62.5 mm multimode fiber (OM1)	200	33
	50 mm multimode fiber	400	66
	50 mm multimode fiber (OM2)	500	82
	50 mm multimode fiber (OM3)	2000	300
10GBASE-LR SFP+ (1310nm optical window)	10/125 μm single-mode fiber	–	10,000
10GBASE-ER SFP+ (1550nm optical window)	10/125 μm single-mode fiber	–	40,000
40GBASE-SR4 QSFP+ (850nm optical window)	50 mm multimode fiber (OM3)	–	100
	50 mm multimode fiber (OM4)	–	150
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

¹ 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 56 and Table 57 on page 131 list direct-attach cables available from Extreme Networks.

Table 56: Extreme Networks 100Gb Direct-Attach Cables

Cable Type	Part Number	Length
QSFP28-QSFP28 Direct attach passive copper cable	10411 or AA1405029-E6	1 meter
	10413 or AA1405031-E6	3 meters
	10414 or AA1405032-E6	5 meters
QSFP28-4xSFP28 (4x25Gb) Direct attach passive copper breakout	10421	1 meter
	10423	3 meters
	10424	5 meters
QSFP28-4xSFP28 (4x25Gb) Active optical breakout cable	10444	20 meters

Table 57: Extreme Networks 40Gb Direct-Attach Cables

Cable Type	Part Number	Length
QSFP+ to QSFP+ Direct attach cable	AA1404037-E6	0.5 meter
	AA1404029-E6	1 meter
	AA1404030-E6	2 meters
	AA1404031-E6	3 meters
	AA1404032-E6	5 meters
QSFP+ to QSFP+ Active optical cable	AA1404028-E6	10 meters active optical
QSFP+ to 4xSFP+ Breakout cable	AA1404033-E6	1 meter
	AA1404035-E6	3 meters
	AA1404036-E6	5 meters
	AA1404041-E6	10 meters active optical

Using 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 113 shows examples of recommended and non-recommended connector jacket types.

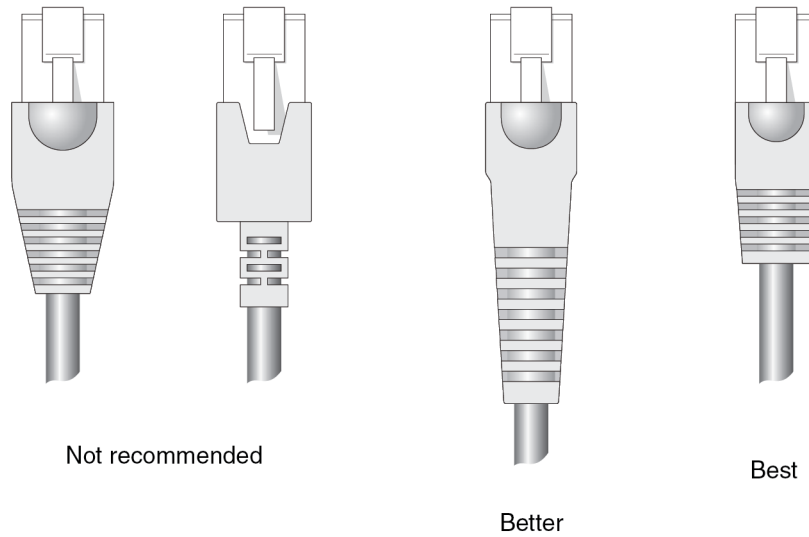


Figure 113: RJ45 Connector Jacket Types

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.

Meeting Power Requirements

Observe the following requirements and precautions for powering your hardware.

Requirements for PoE Devices

When connecting PoE devices to a PoE switch, all connections between the PoE device and the switch must remain within the same building and use a low-voltage power distribution system per IEEE 802.3af.

Power Supply Requirements

Follow these recommendations when you plan power supply connections for your equipment:

- 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 switch 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 switch power supply to which it is connected. If all switch power supplies are connected to a single power source, the entire switch 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 detailed power specifications for your equipment, see "Technical Specifications."

Requirements for Power Cords

Most ExtremeSwitching switches do 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. The web page provides specifications for power cords in each country so that you can purchase cords locally.

AC power cords must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

UPS (Uninterruptible Power Supply) Requirements

A UPS (uninterruptible power supply) 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 [Providing a Suitable UPS Transition Time](#) on page 134.)



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):
 $VA = \text{Volts} \times \text{Amperes}$
- 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.

Providing a Suitable UPS Transition Time

UPS transition time is the time required for the UPS to change from providing AC power derived from the utility (or mains) supply to providing AC power derived from the battery backup. UPS transition time 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

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

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

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.

5 Building Stacks

Introduction to Stacking

Planning to Create Your Stack

Setting up the Physical Stack

A stack consists of a group of up to eight switches that are connected to form a ring. The stack offers the combined port capacity of the individual switches. But it operates as if it were a single switch, making network administration easier.

Stacking is facilitated by the SummitStack feature – part of the ExtremeXOS Edge license.

This chapter describes the supported configurations for stacking switches, the considerations for planning a stack, and the steps for setting up the hardware. We recommend that you read this chapter before installing the switches that will make up the stack.

Refer to the Stacking chapter in the [ExtremeXOS 22.6 User Guide](#) for information about configuring a stack, maintaining the stack configuration, and troubleshooting.

Introduction to Stacking

Using the SummitStack feature – part of the ExtremeXOS Edge license – a stack can combine switches from different series, provided that every switch in the stack:

- Runs in the same partition (primary or secondary).
- Runs the same version of ExtremeXOS.
- Includes support for stacking.

The stack operates as if it were a single switch with a single IP address and a single point of authentication. One switch – called the master switch – is responsible for running network protocols and managing the stack. The master runs ExtremeXOS software and maintains all the software tables for all the switches in the stack.

All switches in the stack, including the master switch, are called nodes. [Figure 114](#) shows four nodes in a stack, connected to each other by SummitStack cables.

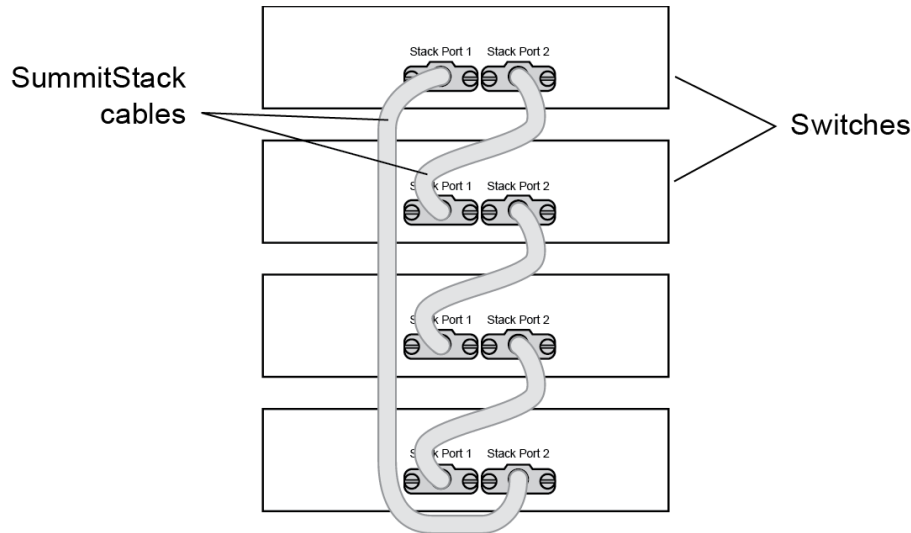


Figure 114: Switches Connected to Form a Stack

The following sections introduce you to the basic principles of stacking and provide recommendations for creating stacks.

More information to answer your questions about stacking and help you plan your configuration is available on the [Extreme Networks GTAC Knowledge Base](#).

Building Basic Stacks

A stack can be created in either of two ways:

- In native stacking, switches are connected using either designated Ethernet data ports or dedicated stacking connectors.
- In alternate stacking, switches are connected using 10-Gbps Ethernet data ports that have been configured for stacking. These ports are located either on the switch itself or on option cards installed on the rear of the switch.

When planning and building your stack, be sure to follow port compatibility and cabling recommendations as described in this chapter.

See for information about which switch series can be combined to form a stack.

Slot Numbers in Stacks

A switch stack can be thought of as a virtual chassis. Each switch (node) operates as if it were occupying a slot in a chassis and is controlled by the master. The high-speed stacking links function like the backplane links of a chassis.

Each switch in the stack is assigned a “slot number” during the initial software configuration of the stack. Starting at the switch with the console connection, numbers are assigned in numerical order following the physical path of the connected stacking cables. For example, if you follow the cabling recommendations presented in and configure a vertical stack from the console on the switch at the top of the physical stack, the switches will be assigned slot numbers 1 through 8 from the top down.

Some stackable switches have a seven-segment LED, called the stack number indicator on the front panel. (See [Figure 115](#).) When a stack is operating, the indicator displays the switch's slot number. This LED does not light on switches that are not currently operating as part of a stack.

The top half of the number blinks if the switch is the master, and the bottom half blinks if it is the backup. If the LED is steadily lit, the switch is a standby. If the LED is off the switch is not configured as a member of a stack.

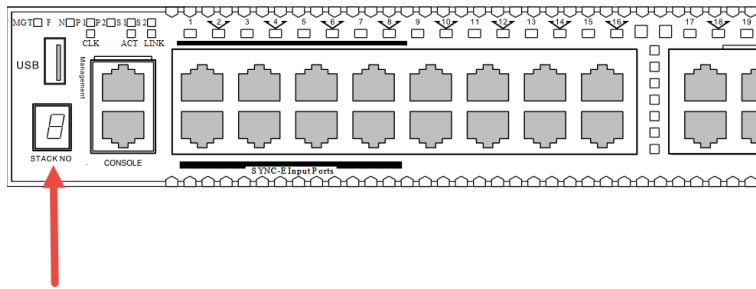


Figure 115: Position of the Stack Number Indicator (X460-G2 Switch Shown)

In addition to the Stack Number Indicator, each stacking port has an LED. The LED is steady green if the link is OK, blinking green if traffic is present, and off if no signal is present.

A quick way to verify that the cable connections match the software configuration is to check the stack number indicator on each switch. If the slot numbers do not line up in the order you arranged the switches, this might indicate that the stacking cable setup differs from what you intended when you configured the software. In this case, reconnect the cables in the correct order and perform the software configuration again.

Master/Backup Switch Redundancy

When your stack is operational, one switch is the master switch, responsible for running network protocols and managing the stack.

To provide recovery in case of a break in the stack connections, you can configure redundancy by designating a backup switch to take over as master if the master switch fails. When you perform the initial software configuration of the stack, the “easy setup” configuration option automatically configures redundancy, with slot 1 as the master and slot 2 as the backup. You can also configure additional switches as “master-capable,” meaning they can become a stack master in case the initial backup switch fails.

When assigning the master and backup roles in mixed stacks, consider the feature scalability and the speed of each switch model. The easy setup configuration process selects master and backup switches, based on capability and speed, in the following order:

- 1 Summit X670-G2
- 2 Summit X460-G2
- 3 Summit X770
- 4 Summit X450-G2
- 5 ExtremeSwitching X440-G2 and X620

For example, in a stack that combines Summit X460-G2 or X670-G2 switches with other switch models, an X460-G2 or X670-G2 switch might provide more memory and more features than other switches in

the stack. Consider these differences when selecting a master node, selecting a backup node, and configuring failover operation.

Note



We recommend that the master and backup roles be assigned to switches from the same series. For example, if the master node is an X460-G2 switch, the backup node should also be an X460-G2 switch. Similarly, if the master node is an X670-G2 series switch, the backup node should also be an X670-G2 switch.

Note



ExtremeSwitching X690 and X870 switches can be stacked with each other, but they cannot be stacked with other switch models.

When easy setup compares two switches that have the same capability, the lower slot number takes precedence.

We recommend that you follow the same ranking hierarchy when you plan the physical placement of the switches in the stack.

SummitStack Topologies

Figure 116 presents a graphical representation of a stack and some of the terms that describe stack conditions.

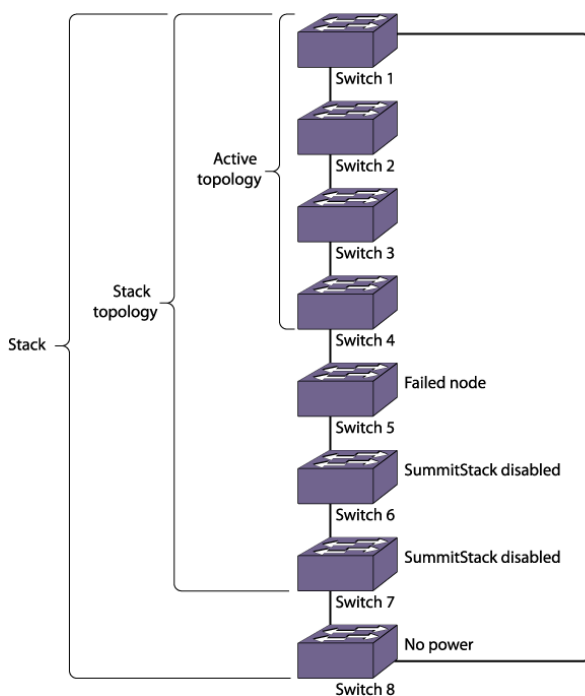


Figure 116: Example of a Stack, Showing the Active Topology and the Stack Topology

A stack is the collection of all switches, or nodes, that are cabled together to form one virtual switch using the ExtremeXOS SummitStack feature.

The maximum cable length supported between switches depends on the types of switches in your stack, the installed option cards, and the configured stacking ports. For more information, see .

A stack topology is the set of contiguous nodes that are powered up and communicating with each other. In the example shown, Switch 8 is not part of the stack topology because it is not powered up.

An active topology is the set of contiguous nodes that are active. An active node is powered up, is configured for stack operation, and is communicating with the other active nodes.

Switch 5 in the example has failed, stacking is disabled on Switches 6 and 7, and Switch 8 has no power. As a result, the active topology includes Switches 1 through 4 only.

For more information about SummitStack terminology, see [SummitStack Terms](#) on page 146.

Ring Topology: Recommended for Stacking

SummitStack nodes should be connected to each other in a ring topology. In a ring topology, one link is used to connect to a node and the other link is used to connect to another node. The result forms a physical ring connection. This topology is highly recommended for normal operation.

[Figure 117](#) represents a maximal ring topology of eight active nodes.

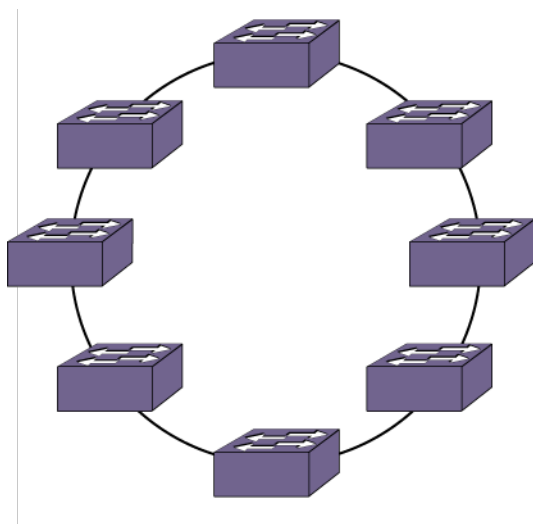


Figure 117: Graphical Representation of a Ring Topology

[Figure 118](#) shows what the same ring topology would look in actual practice. Each switch in the rack is connected to the switch above it and the switch below it. To complete the ring, a longer cable connects Switch 1 with Switch 8.

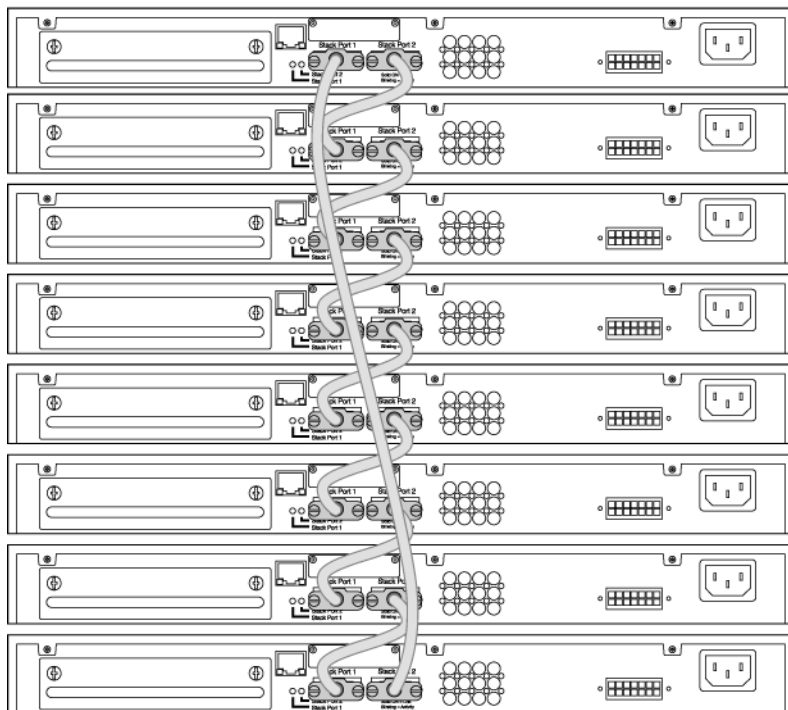


Figure 118: Switches Connected to Each Other in a Ring Topology

Note that, while a physical ring connection may be present, a ring active topology exists only when all nodes in the stack are active.

Daisy Chain Topology: Not Recommended for Stacking

Stackable switches can be connected in a daisy-chain topology. This is a **ring topology** with one of the links disconnected, inoperative, or disabled. A daisy chain can be created when a link fails or a node reboots in a ring topology, but the daisy chain topology is not recommended for normal operation.

We strongly recommend that your stack nodes be connected in a ring topology, not a daisy-chain topology, for normal operation.

In [Figure 119](#), the nodes delineated as the active topology are operating in a daisy-chain configuration, even though there is physically a ring connection in the stack.

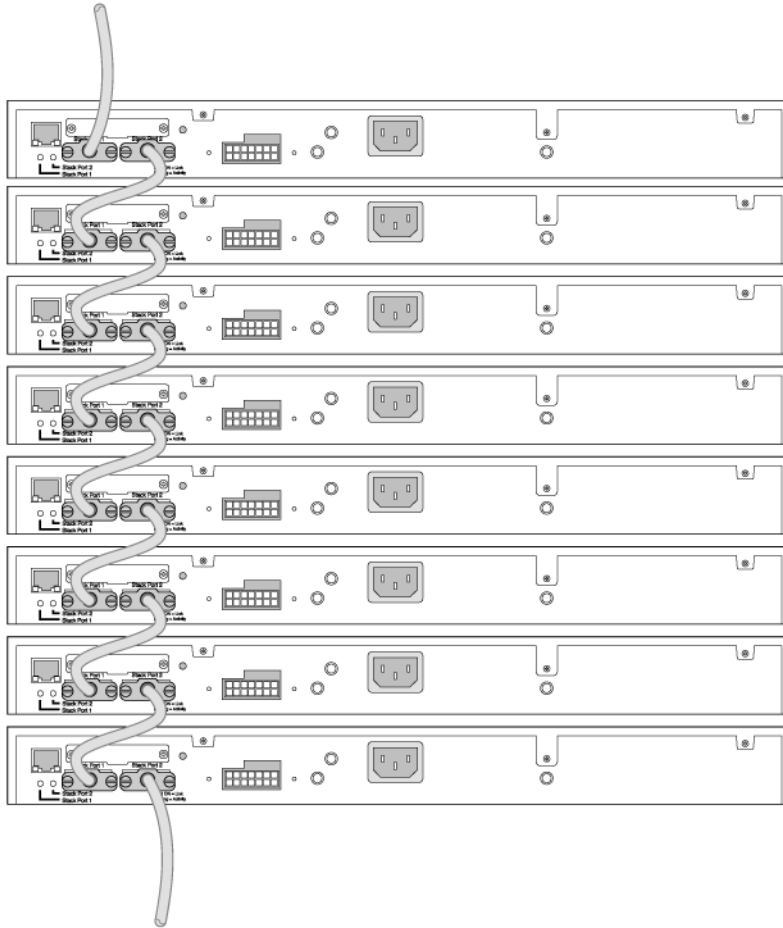


Figure 119: Daisy Chain Topology

You might need to use a daisy chain topology while adding a new node, removing a node, or joining two stacks.

If you are using a daisy chain topology, the possibility of a dual master condition increases. Before you create a daisy chain topology, read “Managing a Dual Master Situation” in the [ExtremeXOS 22.6 User Guide](#).

Using Ethernet Ports for Stacking (SummitStack-V Feature)

On many Extreme Networks switches, you can reconfigure one or two 10-Gbps Ethernet data ports to operate as stacking ports.

This feature, known as SummitStack-V or alternate stacking, means that you can use less expensive cables to connect the switches in a stack. Because copper and fiber Ethernet ports support longer cable distances, you can also extend the physical distance between stack nodes – connecting, for example, switches on different floors in a building or in different buildings on a campus.

The SummitStack-V feature means that you can stack switches that have no dedicated (or native) stacking ports but that do have at least two Ethernet ports. The ports can be configured to support

either data communications or stacking. When configured to support stacking, they are called alternate stacking ports to distinguish them from the native stacking ports that use custom cables.

A single stack can use both native stacking ports and alternate stacking ports. On one switch, for example, you can use a native stacking port to connect to a switch in the same rack, and you can use an alternate stacking port to connect to a switch on a different floor.



Note

When you connect distant nodes using alternate stacking ports, be sure to run the cables over physically different pathways to reduce the likelihood of a cut affecting multiple links.

On each switch model, only specific data ports can be used as alternate stacking ports. The alternate stacking ports must be 10-Gbps Ethernet ports, either on the front panel of the switch or on installed port option cards or versatile interface modules at the rear of the switch. Switch models that do not have native stacking ports can still use alternate stacking if they have 10-Gbps Ethernet ports.

Alternate stacking ports on different switches must be directly connected, with no intervening switch connections. This is because alternate stacking ports use the proprietary ExtremeXOS protocol for stacking, not the standard Ethernet protocol.

[Table 58](#) lists the data ports that can be used as native and alternate stacking ports for each switch model.

When the stacking-support option is enabled (with the `enable stacking-support` command), data communication stops on the physical data ports that are designated for alternate stacking. Then, when stacking is enabled (with the `enable stacking` command), those ports - listed in the Alternate Stacking Ports column of [Table 58](#) - operate as stacking ports.

Table 58: Native and Alternate Stacking Ports

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X440-G2-12t-10GE4 X440-G2-12p-10GE4	Fixed (front panel)	15,16	Front panel
X440-G2-24t-10GE4 X440-G2-24p-10GE4 X440-G2-24x-10GE4 X440-G2-24t-10GE4-DC	Fixed (rear panel)	27,28	Rear panel
X440-G2-48t-10GE4 X440-G2-48p-10GE4 X440-G2-48t-10GE4-DC	Fixed (rear panel, dedicated SFP+ port)	49,50	Rear panel
X450-G2-24t-GE4 X450-G2-48t-GE4 X450-G2-24p-GE4 X450-G2-48p-GE4	Fixed (rear panel)	Not applicable	Not applicable
X450-G2-24t-10GE4 X450-G2-24p-10GE4	Fixed (rear panel)	27,28	Front panel
X450-G2-48t-10GE4 X450-G2-48p-10GE4	Fixed (rear panel)	51,52	Front panel

Table 58: Native and Alternate Stacking Ports (continued)

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X460-G2-24t-GE4 X460-G2-24p-GE4	VIM-2ss or VIM-2q	33,34	VIM-2x
X460-G2-48t-GE4 X460-G2-48p-GE4	VIM-2ss or VIM-2q	53,54	VIM-2x
X460-G2-24t-10GE4 X460-G2-24x-10GE4 X460-G2-24p-10GE4	VIM-2ss or VIM-2q	31,32	Front panel
X460-G2-48t-10GE4 X460-G2-48x-10GE4 X460-G2-48p-10GE4	VIM-2ss or VIM-2q	51,52	Front panel
X590-24t-1q-2c X590-24x-1q-2c	Ports 29, 33	None	Not applicable
X620-8t-2x X620-10x	None	9,10	Front panel
X620-16t X620-16x X620-16p	None	15,16	Front panel
X670-G2-48x-4q	Ports 49,53,57,61	47,48	Front panel
X670-G2-72x	None	71,72	Front panel
X690-48t-2q-4c	Ports 61,69	None	Not applicable
X690-48x-2q-4c	Ports 61,69	None	Not applicable
X770-32q	Ports 101,102,103,104	103,104	Front panel
X870-32c	Ports 121,125	None	Not applicable
X870-96x-8c	Ports 121,125	None	Not applicable

Available Stacking Methods

Most Extreme Networks switch models can use various methods of stacking.

[Table 59](#) shows the switch models that can participate in each stacking method.

Table 59: SummitStack Methods

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths	Switch Models
SummitStack	10 Gbps	0.5 m, 1.5 m, 3.0 m, 5.0 m, 20 Gb Stacking Cable	X460-G2
SummitStack-V	10 Gbps	0.5 m - 40 km SFP+, XENPAK (with SR, LR, and ER)	X440-G2 X450-G2 (10G models) X460-G2 (1G models with VIM-2x, VIM-2ss) X460-G2 (10G models) X620 X670-G2 X770 (ports 103,104)
SummitStack-V80 (supported in EXOS 30.1 and prior releases only)	20 Gbps	0.5 m - 100 m QSFP+ only	X670-G2-48x-4q (ports 57, 61)
SummitStack-V84	21 Gbps	0.5 m - 5 m QSFP+ passive copper	X450-G2 (rear panel 21G stacking ports)
SummitStack-V160	42 Gbps	0.5 m - 100 m QSFP+ only	X460-G2 (VIM-2q) X670-G2-48x-4q (ports 57, 61) X770 (ports 103 and 104)
SummitStack-V160	40 Gbps	0.5 m - 100 m QSFP28	X695 (ports 61, 62)
SummitStack-V320	80 Gbps	0.5 m - 100 m QSFP+ only	X670-G2-48x-4q (ports 49, 53, 57, 61) X770-32q (ports 101 and 103, and 102 and 104)
SummitStack-V400	106 Gbps	0.5 m - 20 m QSFP28 only	X590 (ports 61, 69) X690 (ports 61, 69) X695 (ports 61, 62) X870 (ports 121, 125)
SummitStack-V400 Alternative Configuration	100 Gbps	V400 Alternative Configuration is required when using specific fiber cables. This mode sets the stack ports to 100G, enables pre-emphasis, and FEC (clause_91). <ul style="list-style-type: none"> • QSFP28 SR4 • QSFP28 LR4 • QSFP28 CWDM4 • QSFP28 PSM4 • QxQ AOC cable - 5m • QxQ AOC cable - 7m • QxQ AOC cable - 10m • QxQ AOC cable - 20m 	X590 (ports 61, 69) X690 (ports 61, 69) X695 (ports 61, 62) X870 (ports 121, 125)

² Combined over paired ports

For more details about the stacking methods that are available for each switch series, see the topics listed in [Stacking Considerations for Each Switch Model](#) on page 151.



Note

Because all switches in the stack must run the same version of ExtremeXOS, it is not possible to stack switches that require ExtremeXOS version 21, for example the X440-G2 and the X620, with switches that are incompatible with ExtremeXOS version 21, for example the X440 and the X460.

SummitStack Terms

[Table 60](#) describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

Table 60: List of Stacking Terms

Term	Description
Stackable switch	An ExtremeSwitching switch that provides two stacking ports and can participate in a stack.
Stacking port	A physical interface of a stackable switch that is used to allow the connection of a stacking link. Stacking ports are point-to-point links that are dedicated for the purpose of forming a stack.
Native stacking	A stacking configuration in which stack members are connected using either designated Ethernet data ports or dedicated stacking connectors.
Alternate stacking	A stacking configuration in which stack members are connected using 10-Gbps Ethernet data ports that have been configured for stacking. These ports are located either on the switch itself or on option cards installed on the rear of the switch.
Stacking link	A cable that connects a stacking port of one stackable switch to a stacking port of another stackable switch, plus the stacking ports themselves.
Node	A switch that runs the ExtremeXOS operating system and is part of a stack. Synonymous with stackable switch.
Stack	A set of stackable switches and their connected stacking links made with the intentions that: (1) all switches are reachable through their common connections; (2) a single stackable switch can manage the entire stack; and (3) configurable entities such as VLANs and link trunk groups can have members on multiple stackable switches. A stack consists of all connected nodes regardless of the state of the nodes.
Stack topology	A contiguously connected set of nodes in a stack that are currently communicating with one another. All nodes that appear in the <code>show stacking</code> command display are present in the stack topology.
Stack path	A data path that is formed over the stacking links for the purpose of determining the set of nodes that are present in the stack topology and their locations in the stack. Every node is always present in a stack path whether or not stacking is enabled on the node.

Table 60: List of Stacking Terms (continued)

Term	Description
Control path	A data path that is formed over the stacking links that is dedicated to carrying control traffic, such as commands to program hardware or software image data for software upgrade. A node must join the control path to fully operate in the stack. A node that is disabled for stacking does not join the control path, but does communicate over the stack path.
Active node	A node that has joined the control path. The active node can forward the control path messages or can process them. It can also forward data traffic. Only an active node can appear as a card inserted into a slot when the <code>show slot {slot} {detail} detail</code> command is executed on the master node of the stack.
Active topology	A contiguous set of active nodes in a stack topology plus the set of stacking links that connect them. When an active topology consists of more than one node, each node in the active topology is directly and physically connected to at least one other node in the active topology. Thus, the active topology is a set of physically contiguous active nodes within a stack topology.
Candidate node	A node that is a potential member of an active topology, or an active node that is already a member of an active topology. A candidate node may or may not be an active node – that is, it may or may not have joined the control path.
Node role	The role that each active node plays in the stack – either master (or primary), backup, or standby.
Master node	The node that is elected as the master (or primary) node in the stack. The master node runs all of the configured control protocols such as OSPF (Open Shortest Path First), RIP (Routing Information Protocol), Spanning Tree, and EAPS (Extreme Automatic Protection Switching). The master node controls all of its own data ports as well as all data ports on the backup and standby nodes. To accomplish this, the master node issues specific programming commands over the control path to the backup and standby nodes.
Backup node	The node assigned to take over the role of master if the master node fails. The master node keeps the backup node's databases synchronized with its own databases in preparation for such an event. If and when the master node fails, the backup node becomes the master node and begins operating with the databases it has previously received. In this way, all other nodes in the stack can continue operating.
Standby node	A node that is prepared to become a backup node in the event that the backup node becomes the master node. When a backup node becomes a master node, the new master node synchronizes all of its databases to the new backup node. When a node operates in a standby role, most databases are not synchronized – except those few that directly relate to hardware programming.
Acquired node	A standby or backup node that is acquired by a master node. This means that the master node has used its databases to program the hardware of the standby or backup node. The standby or backup node has acted as a hardware programming proxy, accepting the instructions of the master node to do so. An acquired backup node maintains the databases needed to reflect why the hardware is programmed as it is. However, a standby node does not. An acquired node can be re-acquired (without a reboot) by the backup node only when the backup node becomes the master node, and only when both the backup and standby nodes were already acquired by the same master node at the time of its failure.

Table 60: List of Stacking Terms (continued)

Term	Description
Data ports	The set of ports on a stackable switch that are available for connection to your data networks. Such ports can be members of a user-configured VLAN or trunk group. They can be used for Layer 2 and 3 forwarding of user data traffic, for mirroring, or other features you can configure. Data ports are different from stacking ports.
Failover	The process of changing the backup node to the master node when the original master node has failed. When a master node fails, if a backup node is present, and if that node has completed its initial synchronization with the master node, then the backup node assumes the role of master node. The standby nodes continue their operation and their data ports do not fail.
Hitless failover	A failover in which all data ports in the stack, except those of the failing master node, continue normal operation when the master node fails.
Node address	The unique MAC address that is factory-assigned to each node.
Node role election	The process that determines the role for each node. The election takes place during initial stack startup and elects one master node and one backup node. An election also takes place after a master node failover, when a new backup node is elected from the remaining standby nodes.
Node role election priority	A priority assigned to each node, to be used in node role election. The node with the highest node role election priority during a role election becomes the master node. The node with the second highest node role election priority becomes the backup.
Operational node	A node that has achieved operational state as a card in a slot. The operational state can be displayed using the <code>show slot {slot {detail} detail }</code> command.
System uptime	The amount of time that has passed since the last node role election. You can display the system uptime by entering the <code>show switch {detail }</code> command on the master node.
Stack segment	A collection of nodes that form a stack topology. The term is useful when a stack is severed. Each severed portion of the stack is referred to as a stack segment.
Stack state	A state assigned by the stack to a node. You can display the stack state by entering the <code>show stacking</code> command.
Easy Setup	A procedure that automatically configures the essential stacking parameters on every node for initial stack deployment, and then automatically reboots the stack to put the parameters into effect. The choice to run Easy Setup is offered when you run the <code>enable stacking {node-address node-address}</code> command and the essential stacking parameters are unconfigured or inconsistent. It can also be invoked directly by running the <code>configure stacking easy-setup</code> command.

Planning to Create Your Stack

Use the information in the following topics to plan the physical makeup of your stack – switches, versatile interface modules (VIMs), and cables – and the stacking protocols you will use. Included are:

- Guidelines and other information for each switch model in your stack

- Considerations for combining different switch models in a stack
- Information about stacking cables

Enabling and Disabling the Stacking-Support Option

The stacking-support option is enabled by default for many switch and option card configurations. However, some configurations require you to enable the stacking-support option before a switch can participate in a stack.

The topics in [Stacking Considerations for Each Switch Model](#) on page 151 describe whether or not each switch model has stacking support enabled by default.

- To enable stacking-support, issue the `enable stacking-support` command.
You must enable stacking-support individually for every switch in the stack that does not have stacking support enabled by default.
- To disable stacking support, configure the switch data ports to use the Ethernet protocol instead of the stacking protocol.
Use the `disable stacking-support` command.

Recommendations for Placing Switches for Stacked Operation

For best results in a SummitStack configuration, follow these recommendations for physically situating your equipment:

- Use the shortest possible stacking cables to connect the switches in the stack. This reduces the likelihood that the stacking cables might accidentally be damaged or disconnected. Stacking cables are available in lengths ranging from 0.3 meters to 100 meters.
- When possible, place all switches for the stack in the same rack or in adjacent racks. This facilitates using shorter stacking cables.
- The stack master is the switch, or node, through which you will perform the initial stack configuration, using the console port. For simplicity and ease of connecting the stacking cables, plan to designate the top switch in a vertical physical stack as the stack master. If switches are installed in several adjacent racks, place the stack master at one end of the row.
- Physically locate the intended master and backup nodes adjacent to each other, and plan to connect these nodes to each other directly so that ExtremeXOS application synchronization traffic is localized to a single stack link.
- On the master node, connect the Ethernet management port to your management network.
- To provide management access to the stack in case of a failure in the master switch, connect all switches that will participate in redundancy to your management network using the Ethernet management port on each switch.
- Use stacking cables to interconnect the stack nodes into a ring topology (see [Ring Topology: Recommended for Stacking](#) on page 140). Include only the nodes that you expect to be active in the stack.
- When you use the SummitStack 128G cable, SummitStack 64G cable, or SummitStack 128G/64G cable, we strongly recommend the use of cable management hardware to support the weight of the cables and to provide strain relief at the connectors.

Follow the recommendations in [Recommendations for Configuring Stacks](#) on page 150 to configure the software for your stack.

The recommended procedures for installing and interconnecting a stack are found in [Setting up the Physical Stack](#) on page 170.

Recommendations for Configuring Stacks

When deploying a new stack, follow these recommendations for configuring the software:

- Plan to use the stack as if it were a single multi-slot switch. You need to decide the number and type of stackable switches in the stack and how the stack ports will be connected to the network.
- You can physically connect the stack to your networks before the nodes are configured. However, the default configuration on a switch in non-stacking mode assumes a default untagged VLAN that contains all switch ports. When first powered on, the switch acts as a Layer 2 switch, possibly resulting in network loops.
- Make sure all nodes support the SummitStack feature and are running the same ExtremeXOS software version. (See the [ExtremeXOS 22.6 Feature License Requirements](#).) To view the ExtremeXOS software version on a node, restart the node and run the command:

```
show version {detail | process name | images {partition partition}
{slot slot_number} } .
```

If any node does not have the right version, install the correct version on that node. Use the same image partition on all nodes. After stacking is enabled, images can be upgraded from the stack only if the same image is selected on all nodes.

- If you intend to deploy new units that might be part of a stack in the future, turn on stacking mode during initial deployment to avoid the need for a future restart. The only disadvantages of stacking mode are the loss of QoS (quality of service) profile QP7 and the reservation of some of the packet buffer space for stacking control traffic.
- You can configure the stack by logging into the master or any of the other nodes.
- If the master-capable stackable switches have different purchased license levels, you might need to configure license level restrictions on some nodes before those nodes can join the stack. See the [ExtremeXOS 22.6 User Guide](#) for more information about managing licenses.
- If the stack supports any feature pack license (such as MPLS or Direct Attach), that feature pack license must be installed on all master-capable nodes to support that feature and to prevent traffic interruption if a failover event occurs.
- Most stacking specific configurations are effective only after a restart. However, most non-stacking configuration commands take effect immediately and require no restart.
- A basic stack configuration can be achieved by using the Easy Setup procedure, as described in the [ExtremeXOS 22.6 User Guide](#).
- If EAPS, Spanning Tree, or any Layer 2 redundancy protocol is not running on the network, make sure that your network connections do not form a network loop.

Follow the recommendations in [Recommendations for Placing Switches for Stacked Operation](#) on page 149 for physically situating your equipment.

[Stacking Considerations for Each Switch Model](#) on page 151 contains additional recommendations for the specific switch models in your stack.

Stacking Considerations for Each Switch Model

The following topics list basic information and special considerations pertaining to stacking for each of the ExtremeSwitching switch models.

- [X440-G2 Stacking](#) on page 151
- [X450-G2 Stacking](#) on page 152
- [X460-G2 Stacking](#) on page 153
- [X590 Stacking](#) on page 157
- [X620 Stacking](#) on page 157
- [X670-G2 Stacking](#) on page 158
- [X690 Stacking](#) on page 159
- [ExtremeSwitching X695 Stacking](#) on page 160
- [Summit X770 Stacking](#) on page 160
- [X870 Stacking](#) on page 162

X440-G2 Stacking

The stacking-support option is not enabled by default for X440-G2 10G switch models. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X440-G2 10G switch models. For more information, see [Selecting Native and Alternate Stacking Ports](#) on page 162.

Table 61: Stacking Methods for X440-G2 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V (Front panel 10G models)	10 Gbps	0.5m–40km SFP+

Alternate stacking support is available on all X440-G2 10-gigabit models (10GE4) using two SFP+ ports, when the switch has been enabled for stacking (`enable stacking-support` command). 10G upgrade licensing is not required to enable stacking on the designated stack ports. [Table 62](#) summarizes alternate stacking support for the various X440-G2 switch models.

Table 62: Alternate Stacking Ports for X440-G2 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X440-G2-12t-10GE4 X440-G2-12p-10GE4	Fixed (front panel)	15,16	Front panel
X440-G2-24t-10GE4 X440-G2-24p-10GE4 X440-G2-24x-10GE4 X440-G2-24t-10GE4-DC	Fixed (rear panel)	27,28	Rear panel
X440-G2-48t-10GE4 X440-G2-48p-10GE4 X440-G2-48t-10GE4-DC	Fixed (rear panel, dedicated SFP+ port)	49,50	Rear panel

X450-G2 Stacking

The stacking-support option is enabled by default for X450-G2 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X450-G2 switches. For more information, see [Selecting Native and Alternate Stacking Ports](#) on page 162.

Table 63: Stacking Methods for X450-G2 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V84 Uses rear panel dedicated 21 Gb stacking ports Available only in stacks of X450-G2 switches running the same version of ExtremeXOS	21 Gbps	0.5m, 1.0m, 3.0m, 5.0m QSFP+ passive copper cable
SummitStack-V (Front panel 10G models)	10 Gbps	0.5m–40km SFP+

Native Stacking for X450-G2 Switches

For native stacking with the X450-G2 switch, use the two fixed 21 Gb QSFP+ stacking ports on the rear of the switch, as shown in [Figure 120](#). These stacking ports provide SummitStack-V84 stacking and can be stacked natively only with other X450-G2 switches.

SummitStack-V84 connections require direct-connect QSFP+ copper cables.

The X450-G2 is the only Extreme Networks switch that supports SummitStack-V84.

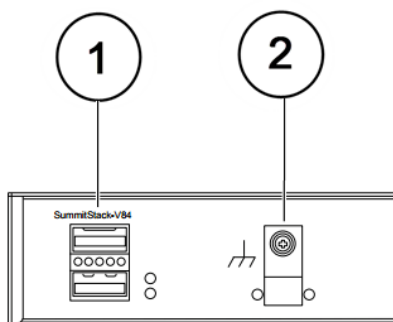


Figure 120: X450-G2 Switch: Native Stacking Ports

1 = 21 Gb QSFP+ stacking ports

2 = Grounding lug

Alternate Stacking for X450-G2 Switches

Alternate stacking (SummitStack-V) is supported for the X450-G2 10GE4 switch models, as summarized in [Table 64](#). Use the front-panel 10G ports for alternate stacking.

Table 64: Alternate Stacking Ports for X450-G2 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X450-G2-24t-10GE4 X450-G2-24p-10GE4	Fixed (rear panel)	27,28	Front panel
X450-G2-48t-10GE4 X450-G2-48p-10GE4	Fixed (rear panel)	51,52	Front panel

Additional Stacking Considerations for X450-G2 switches

Before deploying a new stack with X450-G2 switches, consider the following guidelines:

- Only the SummitStack-V and SummitStack-V84 stacking protocols are supported for the X450-G2 switch. SummitStack-V80 is not supported.
- In a stack that contains X450-G2 switches and other switch models, the X450-G2 switch might provide more memory and more features than the other switch models. Take this into account when you decide which switches will serve as the master and backup nodes, and when you configure failover operation.
- To use the failover feature in the stack, a second X450-G2 switch is recommended. It must be the backup node.
- If any supported feature pack is installed on the master-capable X450-G2 nodes, the following guidelines apply:
 - Every switch in the stack must meet the software and hardware requirements listed in the Feature License Requirements document.
 - Only the enhanced stacking protocol is supported for the X450-G2 switch. Every node that shares a stack with an X450-G2 switch must have enhanced stacking configured.
 - We recommend against mixing X450-G2, X460-G2, X770, and X670-G2 switches in a stack.
 - X450-G2 switches support multiple types of QSFP+ stacking cables for connection between rear stacking ports (21 Gb ports) and QSFP+ ports on other Extreme Networks switches. For information on which cables to use with each type of Summit family switch, see [Selecting Stacking Cables](#) on page 166.

X460-G2 Stacking

The stacking-support option is enabled by default for X460-G2 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X460-G2 switches. For more information, see [Selecting Native and Alternate Stacking Ports](#) on page 162.

Table 65: Stacking Methods for X460-G2 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack (rear panel, with VIM) See Native Stacking for X460-G2 Switches on page 154.	10 Gbps	0.5m, 1.5m, 3.0m, 5.0m
SummitStack-V160 (rear panel, with VIM) See Native Stacking for X460-G2 Switches on page 154.	40 Gbps	QSFP+
SummitStack-V (front panel 10G models) See Alternate Stacking for X460-G2 Switches on page 155.	10 Gbps	0.5m-40km SFP+

Native Stacking for X460-G2 Switches

X460-G2 1-gigabit switch models (GE4) support native stacking through an attached VIM-2ss or VIM-2q module.

The VIM-2ss module permits stacking using the standard SummitStack cables.

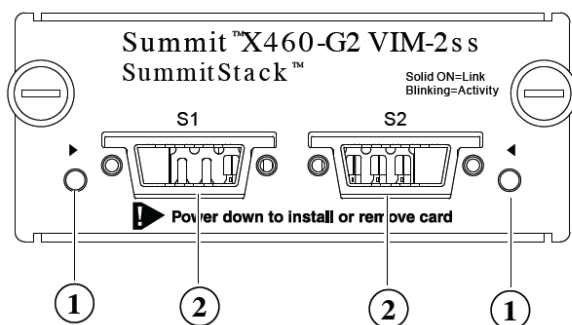


Figure 121: VIM-2ss SummitStack Module

1 = LEDs	2 = Stacking ports
----------	--------------------

The VIM-2q module connects to QSFP+ cables to form stacks using the SummitStack-V160 protocol.

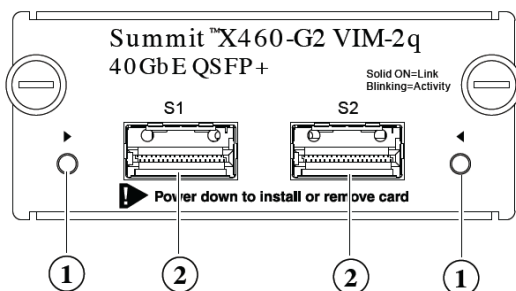


Figure 122: VIM-2q Port Option Card

1 = LEDs

2 = QSFP+ ports

**Note**

VIMs are not hot swappable. You must power down the switch before installing any VIMs.

Alternate Stacking for X460-G2 Switches

X460-G2 10-gigabit switch models (10GE4) support alternate stacking (SummitStack-V feature) through the 10G SFP+ ports located on the front panel. See [Summit X460-G2 \(10G Models\) Stack Configuration Guidelines](#) on page 156 for additional considerations.

X460-G2 1-gigabit switch models (GE4) support alternate stacking through an attached VIM-2x module. See [Summit X460-G2 \(1G Models Using VIM Ports\) Stack Configuration Guidelines](#) on page 157 for additional considerations.

**Note**

40G ports on the VIM-2q cannot be partitioned into four 10G ports.

[Table 66](#) summarizes alternate stacking support for X460-G2 switches.

When the stacking-support option is enabled (with the `enable stacking-support` command), data communication stops on the physical data ports that are designated for alternate stacking. Then, when stacking is enabled (with the `enable stacking` command), those ports – listed in the Alternate Stacking Ports column of [Table 66](#) – operate using the stacking protocol for the logical stacking ports.

Table 66: Alternate Stacking Ports for X460-G2 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X460-G2-24t-GE4 X460-G2-24p-GE4	VIM-2ss or VIM-2q	33,34	VIM-2x
X460-G2-48t-GE4 X460-G2-48p-GE4	VIM-2ss or VIM-2q	53,54	VIM-2x
X460-G2-24t-10GE4 X460-G2-24x-10GE4 X460-G2-24p-10GE4	VIM-2ss or VIM-2q	31,32	Front panel
X460-G2-48t-10GE4 X460-G2-48x-10GE4 X460-G2-48p-10GE4	VIM-2ss or VIM-2q	51,52	Front panel

Note

- On X460-G2 24-port 10GE4 switches, ports 31 and 32 are not available as data ports when the alternate stacking ports are used.
- On X460-G2 48-port 10GE4 switches, ports 51 and 52 are not available as data ports when the alternate stacking ports are used.

Additional Stacking Considerations for X460-G2 Switches

When planning to use X460-G2 switches in a stack, note the following additional considerations:

- When using the VIM-2ss module, you can enable stacking without enabling stacking-support because the ports are native to the switch. All other VIMs require stacking-support to be enabled.
- The X460-G2 switch has “protocol enhanced” set by default. (Older switches, such as the X460, have “protocol standard” set by default. When you add a switch to a stack, make sure the new switch has “protocol enhanced” set so that it can communicate with the X460-G2 switch and the other switches in the stack.)
- See also [Summit X460-G2 \(10G Models\) Stack Configuration Guidelines](#) on page 156.
- See also [Summit X460-G2 \(1G Models Using VIM Ports\) Stack Configuration Guidelines](#) on page 157.

Summit X460-G2 (10G Models) Stack Configuration Guidelines

Before deploying a new stack with Summit X460-G2 10-gigabit switch models (10GE4), consider the following guidelines:

- In a stack that contains X460-G2 switches and other switch models, the X460-G2 switch might provide more memory and more features than the other switch models. Take this into account when you decide which switches will serve as the master and backup nodes, and when you configure failover operation.
- To use the failover feature in the stack, a second Summit X460-G2 switch is recommended. It must be the backup node.
- X460-G2 (10GE4) switches support SummitStack-V stacking on front panel 10G SFP+ ports, as well as native stacking through an attached VIM-2q or VIM-2ss module.
- Only the master and master-capable nodes require a license to support special features such as MPLS (Multiprotocol Label Switching).
- If the MPLS feature pack is installed on the master-capable nodes, the following guidelines apply:
 - Every switch in the stack must meet the software and hardware requirements listed in the Feature License Requirements document.
 - Only the enhanced stacking protocol is supported for the X460-G2 switch. Every node that shares a stack with an X460-G2 switch must have enhanced stacking configured.
 - We recommend against mixing X450-G2, X460-G2, X770, and X670-G2 switches in a stack.
 - Summit X460-G2 switches support multiple types of QSFP+ stacking cables for connection between VIM-2q ports and QSFP+ ports on other Summit switches. For information on which cables to use with each type of Summit family switch, see [Selecting Stacking Cables](#) on page 166.
 - The last two front panel 10G ports are used for alternate stacking (SummitStack-V feature).
 - VIM-2q ports are used for SummitStack-V160G stacking.
 - VIM-2t ports are not used for stacking. These ports are used for user data.
 - A VIM-2q module attached to an X460-G2 switch supports LR4 PSM in 40G mode.
 - The X460-G2 switch supports the LR4 Parallel Single Mode (PSM) optical transceiver on 40G optical QSFP+ ports.
 - The LR4 PSM is supported on the following platforms: X440-G2, X450-G2, X460-G2, X620, X770, X670-G2.

Summit X460-G2 (1G Models Using VIM Ports) Stack Configuration Guidelines

Before deploying a new stack with Summit X460-G2 1-gigabit switch models (GE4), consider the following guidelines:

- SummitStack-V stacking is supported through an attached VIM: VIM-2x, VIM-2q, or VIM-2ss.
- We recommend against mixing X450-G2, X460-G2, X770, and X670-G2 switches in a stack if the desired routing table exceeds the supported limit.
- Support is available on ExtremeXOS version 16.1 or later.

X590 Stacking

X590 series switches can be stacked with other X590 switches, with X690 switches, X695 switches, and with X870 switches. X590 series switches support native stacking using front-panel data ports 29 and 33.

Alternate stacking is not supported for X590 switches.

The stacking-support option is disabled by default for all X590 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

[Table 67](#) summarizes stacking support for X590 switches.



Note

Only QSFP28 direct-attach passive copper cable, at lengths up to 5 meters, can be used in X590 stacking ports.

Table 67: Stacking Methods for X590 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V400 (Front panel ports 29, 33)	106 Gbps	0.5 m - 5 m QSFP28
SummitStack-V160 (Front panel ports 29, 33)	42 Gbps	0.5 m - 5 m QSFP28

X620 Stacking

See [X620 Stacking](#) on page 63 for a full description of the X620 switch's stacking capabilities.

The stacking-support option is enabled by default for X620 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X620 switches. For more information, see [Selecting Native and Alternate Stacking Ports](#) on page 162.

Table 68: Stacking Methods for X620 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V (Front panel 10G models)	10 Gbps	0.5m-40km SFP+

Table 69 summarizes alternate stacking support for X620 switches.

Table 69: Alternate Stacking Ports for X620 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X620-8t-2x X620-10x	None	9,10	Front panel
X620-16t X620-16x X620-16p	None	15,16	Front panel



Note

The stacking ports on X620 switches do not support 10GBASE-T optics.

X670-G2 Stacking

The stacking-support option is enabled by default for X670-G2 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X670-G2 switches. For more information, see [Selecting Native and Alternate Stacking Ports](#) on page 162.

Table 70: Stacking Methods for X670-G2 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V all X670-G2 switch models	10 Gbps	SFP+ to SFP+
SummitStack-V80 (supported in EXOS 30.1 and prior releases only) model 48x-4q only	20 Gbps	QSFP+ to QSFP+
SummitStack-V160 model 48x-4q only	40 Gbps	QSFP+ to QSFP+
SummitStack-V320 model 48x-4q only	80 Gbps	QSFP+ to QSFP+

Native Stacking for X670-G2 Switches

For X670-G2 native stacking, use the 4 x 40 Gb interfaces that are fixed on the front of the switch. Use any Extreme Networks certified 40G QSFP+ cable or optical transceiver to make the connections among the switches to be stacked.

For a complete listing of compatible cables and optical transceivers, see the [Extreme Hardware/Software Compatibility and Recommendation Matrices](#).

X670-G2-48x-4q switches support native stacking using V160 and V320.

- For SummitStack-V160 stacking, use ports 57 and 61.

³ Combined over paired ports

- For SummitStack-V320 stacking, use ports 49, 53, 57, and 61.

X670-G2-72x switches support do not support native stacking.

Alternate Stacking for X670-G2 Switches

Table 71 summarizes alternate stacking support for X670-G2 switches.

Table 71: Alternate Stacking Ports for X670-G2 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X670-G2-48x-4q	Ports 49,53,57,61	47,48	Front panel
X670-G2-72x	None	71,72	Front panel

Note



- On X670-G2-48x-4q switches, ports 47 and 48 are not available as data ports when the alternate stacking ports are used.
- On X670-G2-72x switches, ports 71 and 72 are not available as data ports when the alternate stacking ports are used.

Additional Stacking Considerations for X670-G2 Switches

Before deploying a new stack with X670-G2 switches, consider the following guidelines:

- In a stack that contains X670-G2 switches and other switch models, the X670-G2 switch might provide more memory and more features than the other switch models. Take this into account when you decide which switches will serve as the master and backup nodes, and when you configure failover operation.
- To use the failover feature in the stack, a second X670-G2 switch is recommended. It must be the backup node.
- Only the master and master-capable nodes require a license to support special features such as MPLS.
- If the MPLS feature pack is installed on the master-capable nodes, the following guidelines apply:
 - Every switch in the stack must meet the software and hardware requirements listed in the Feature License Requirements document.
 - Every node that shares a stack with an X450-G2 switch must have enhanced stacking configured.
 - We recommend against mixing X450-G2, X460-G2, X770, and X670-G2 switches in a stack.
 - The X670-G2-48x-4q switch supports the LR4 Parallel Single Mode (PSM) optical transceiver on 40G optical QSFP+ ports.

X690 Stacking

X690 series switches can be stacked with other X690 switches, with X590 switches, X695 switches, and with X870 switches. They support native stacking using front-panel data ports 61 and 69.



Note

The front-panel ports used for stacking on the X690 switch are located side by side, rather than above and below as on most other switch models.

**Note**

Only QSFP28 direct-attach passive copper cable, at lengths up to 5 meters, can be used in X690 stacking ports.

Alternate stacking is not supported for X690 switches.

The stacking-support option is disabled by default for all X690 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

[Table 72](#) summarizes stacking support for X690 switches.

Table 72: Stacking Methods for X690 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V400 (Front panel ports 61,69)	106 Gbps	0.5 m - 5 m QSFP28
SummitStack-V160 (Front panel ports 61,69)	42 Gbps	0.5 m - 5 m QSFP28

ExtremeSwitching X695 Stacking

The stacking-support option is disabled by default for X695 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

Table 73: Stacking Methods for the X695 Switch

Stacking method	Type or location of dedicated stacking ports	Speed per link (HDX)	Cable type and lengths
ExtremeSwitching (front panel, dedicated)	61, 62	42 Gbps	0.5m, 1.0m, 3.0m, 5.0m, 10.0m, 20.0m QSFP
		106 Gbps	0.5m, 1.0m, 3.0m, 5.0m, 10.0m, 20.0m QSFP28

For details about the enable stacking-support command, see the [ExtremeXOS 22.6 Command Reference Guide](#).

Summit X770 Stacking

The stacking-support option is enabled by default for X770 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X770 switches. For more information, see [Selecting Native and Alternate Stacking Ports](#) on page 162.

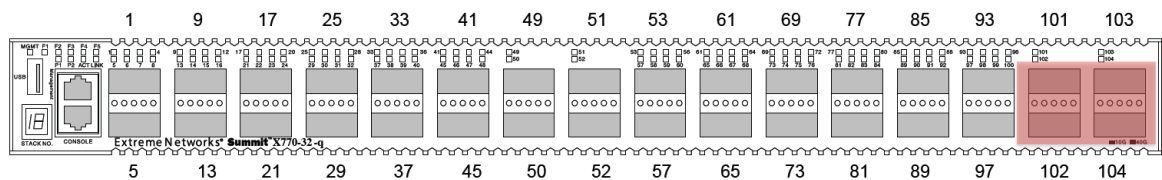
Table 74: Stacking Methods for X770 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V (ports 103 and 104)	10 Gbps	1m and 2m QSFP+ 4xSFP+ fan-out cable
SummitStack-V160 (ports 103 and 104)	40 Gbps	0.5m, 1m, and 3m (26 AWG) QSFP+
SummitStack-V320 (ports 101 and 103, and 102 and 104)	80 Gbps (combined over paired ports)	0.5m, 1m, and 3m (26 AWG) QSFP+

Native Stacking for X770 Switches

The X770 supports SummitStack-V80, V160, and V320 stacking. Use any Extreme Networks certified 40G QSFP+ cable or optical transceiver to make the connections among the switches to be stacked.

For X770 native stacking, use the fixed 40G QSFP+ ports numbered 101, 102, 103, and 104 (shown in Figure 123).

**Figure 123: Location of Stacking Ports (101 through 104) on an X770 Switch**

For a complete listing of compatible cables and optical transceivers, see the [Extreme Hardware/Software Compatibility and Recommendation Matrices](#).

Alternate Stacking for X770 Switches

Table 75 summarizes alternate stacking support for X770 switches.

Table 75: Alternate Stacking Ports for X770 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X770-32q	Ports 101,102,103,104	103,104	Front panel

**Note**

Ports 103 and 104 are not available as data ports when the alternate stacking ports are used. Ports 101 and 102 remain available to use as data ports.

Additional Stacking Considerations for X770 Switches

Before deploying a new stack with Summit X770 switches, consider the following guidelines:

- To use the failover feature in the stack, a second Summit X770 switch is recommended. It must be the backup node.
- Only the master and master-capable nodes require a license to support special features such as MPLS (Multiprotocol Label Switching).

- If the MPLS feature pack is installed on the master-capable nodes, the following guidelines apply:
 - Enhanced stacking must be configured on each switch in the stack. (In ExtremeXOS version 22.2 and later, enhanced stacking is configured automatically.)
 - We recommend against mixing X450-G2, X460-G2, X670-G2, and X770 switches in a stack if the desired routing table exceeds the supported limit. For the X770 switch, the limit is 98K IPv4 LPM routes.
- X770 switches support multiple types of QSFP+ stacking cables for connection between ports 101-104 and other Summit switches. For information on which cables to use with each type of switch, see [Selecting Stacking Cables](#) on page 166.

X870 Stacking

X870 series switches support native stacking using front-panel data ports 121 and 125. They can be stacked with other X870 switches, with X590 switches, and with X690 switches. Alternate stacking is not supported.

The stacking-support option is disabled by default for all X870 switches. For more information, see [Enabling and Disabling the Stacking-Support Option](#) on page 149.

[Table 76](#) summarizes stacking support for X870 switches.



Note

Only QSFP28 direct-attach passive copper cable, at lengths up to 5 meters, can be used in X870 stacking ports.

Table 76: Stacking Methods for X870 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V400 (Front panel ports 121,125)	106 Gbps	0.5 m – 5.0 m QSFP28

Selecting Native and Alternate Stacking Ports

On switches that provide both native stacking ports and alternate stacking ports (described in [Stacking Considerations for Each Switch Model](#) on page 151), you can configure each logical stacking port to use either the native stacking port or the alternate stacking port. You can configure logical stacking ports to use any of the following physical stacking port configurations:

- Two native stacking ports
- Two alternate stacking ports
- One native stacking port and one alternate stacking port

When the Stacking Port Selection Control option is enabled in a switch's configuration, you can choose between native and alternate stacking ports. The default selection is the native stacking ports.

- To select between the native and alternate stacking ports, use the following command for each switch in the stack:

```
configure stacking-support stack-port [stack-ports | all] selection
[native { | V160 | V320 | V400 } | alternate]
```



Note

Not all options are available for all switches. Refer to [Stacking Considerations for Each Switch Model](#) on page 151 for details.

- To display the stacking and stacking-support configuration, use the following commands:

```
show stacking-support
```

```
show stacking stack-ports
```

```
show stacking {node-address node_address | slot slot_number} detail
```

- To unconfigure the stacking-support feature, use the following command:

```
unconfigure stacking-support
```

Note

Commands that contain the **stacking-support** keyword apply to the local switch only.



This means that each switch that will use alternate stacking ports must be configured separately. When the stack is fully active, you can use the `telnet slot slot-number` command to log in to another node over the stack to unconfigure SummitStack-V on that node only. There is no way to intentionally or accidentally unconfigure the stacking-support options on all nodes in a stack.

- When the stacking-support feature has been configured as required on all nodes in a stack, reboot each node.
- Run the `show stacking stack-ports` command to verify that the stack has been properly connected.

Combining Switches from Different Series

ExtremeSwitching switches can be stacked in the combinations listed in [Table 77](#) on page 164. For each combination, one or more of the following stacking methods are displayed:

40G	40G mode (X460-G2 switches with VIM)
SS	SummitStack
V	SummitStack-V
V80	SummitStack-V80
V84	SummitStack-V84 (X450-G2 switches)
V160	SummitStack-V160
V320	SummitStack-V320
V400	SummitStack-V400

Table 77: Matrix of Switches and Stacking Methods

Stack with	X440-G2 ¹	X450-G2 ²	X460-G2 ¹	X590 ³	X465	X620	X670-G2 ⁴	X690	X695	X870
X440-G2 ¹	V	V	V			V	V			
X450-G2 ²	V	V V84	V			V	V			
X460-G2 ¹	V	V	40G SS V V160			V	V V160			
X590 ³				V400	V160			V400	V400	V400
X465				V160				V160	V160	
X620	V	V	V			V	V			
X670-G2 ⁴	V	V	V V160			V	V V80 (support ed in EXOS 30.1 and prior releases) V160 V320			
X690				V400	V160			V400	V400	V400
X695				V400	V160			V400	V400	V400
X870				V400				V400	V400	V400

Note

- 1 For X440-G2 and X460-G2, SummitStack-V is available only on 10G models.
- 2 For X450-G2, SummitStack-V is available only on 10G models. SummitStack-V84 is available only in stacks that consist entirely of X450-G2 switches.
- 3 The X590 is not supported with ExtremeXOS version 30.1.
- 4 The X670-G2-72x can stack only with SummitStack V using front panel 10G ports.

In a stack that has switch models from more than one series, we recommend that the stack master and backup nodes be from the same switch series. For example, if an X460-G2 switch is the stack master, the backup node should also be an X460-G2 switch. Refer to the list in [Master/Backup Switch Redundancy](#) on page 138.

Stack configuration, easy setup, and redundancy are fully described in the [ExtremeXOS 22.6 User Guide](#).

ExtremeSwitching switches can be stacked in the combinations listed in [Table 78](#) on page 165. For each combination, one or more of the following stacking methods are displayed:

40G 40G mode (X460-G2 switches with VIM)

SS	SummitStack
V	SummitStack-V
V80	SummitStack-V80 (supported in EXOS 30.1 and prior releases)
V84	SummitStack-V84 (X450-G2 switches)
V160	SummitStack-V160
V320	SummitStack-V320
V400	SummitStack-V400

Table 78: Matrix of Switches and Stacking Methods

Stack with	X440-G2 ¹	X450-G2 ²	X460-G2 ¹	X590	X620	X670-G2 ³	X690	X770	X870
X440-G2 ¹	V	V	V		V	V		V	
X450-G2 ²	V	V V84	V		V	V		V	
X460-G2 ¹	V	V	40G SS V V160		V	V V160		V V160	
X590				V400			V400		V400
X620	V	V	V		V	V		V	
X670-G2 ³	V	V	V V160		V	V V80 V160 V320		V V160 V320	
X690				V400			V400		V400
X770	V	V	V V160		V	V V160 V320		V V160 V320	
X870				V400			V400		V400

Note

- 1 For X440-G2 and X460-G2, SummitStack-V is available only on 10G models.
- 2 For X450-G2, SummitStack-V is available only on 10G models. SummitStack-V84 is available only in stacks that consist entirely of X450-G2 switches.
- 3 The X670-G2-72x can stack only with SummitStack V using front panel 10G ports.

In a stack that has switch models from more than one series, we recommend that the stack master and backup nodes be from the same switch series. For example, if an X460-G2 switch is the stack master, the backup node should also be an X460-G2 switch. Refer to the list in [Master/Backup Switch Redundancy](#) on page 138.

Stack configuration, easy setup, and redundancy are fully described in the [ExtremeXOS 22.6 User Guide](#).

Selecting Stacking Cables

Depending on the switch model and the number and type of stacking ports, the bidirectional stacking link provides 40 Gbps, 80 Gbps, or 160 Gbps full-duplex bandwidth.

Stacking connections using the native stacking ports require stacking cables that are specific to the type of stacking port. These cables are available from Extreme Networks in lengths from 0.5 meter to 100 meters.

Table 79 lists the cable types that have been verified by Extreme Networks for use as stack connection hardware, along with the switches or modules with which each type is compatible.



Caution

Use of non-recommended cables or optics could cause stack instability.



Note

You can use certain other fiber cables and optical transceivers for stacking on X590, X690, and X870 switches. Additional configuration is required. For details, see [Alternative Configuration for Optics on X590, X690, X695, and X870 Switches](#) on page 167.

Table 79: Available Stacking Cables for Extreme Networks Switches

Part Number	Cable Type, Length	Compatible Ports and Devices
16105	SummitStack, 5 meter	20-Gbps stacking ports on VIM-2ss on X460-G2 switches
16106	SummitStack, 0.5 meter	
16107	SummitStack, 1.5 meter	
16108	SummitStack, 3 meter	
10202	QSFP+ to 4x SFP+ fan-out copper cable, 26 AWG, 1 meter	X770 alternate stacking
10203	QSFP+ to 4x SFP+ fan-out copper cable, 26 AWG, 2 meters	
10304	10GBASE-CR SFP+ pre-terminated twin-ax copper cable, 1 meter	10G stacking ports on X440-G2, X450-G2 10G, and X620 switches
10305	10GBASE-CR SFP+ pre-terminated twin-ax copper cable, 3 meters	
10306	10GBASE-CR SFP+ pre-terminated twin-ax copper cable, 5 meters	
10307	10GBASE-CR SFP+ pre-terminated twin-ax copper cable, 10 meters	10G stacking ports on X440-G2 (48-port switches only) and X450-G2 10G switches
10311	QSFP+ direct-attach passive copper cable, 0.5 meter	21-Gbps stacking ports on X450-G2 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches
10312	QSFP+ direct-attach passive copper cable, 1 meter	21-Gbps stacking ports on X450-G2 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches

Table 79: Available Stacking Cables for Extreme Networks Switches (continued)

Part Number	Cable Type, Length	Compatible Ports and Devices
10313	QSFP+ direct-attach passive copper cable, 3 meters	21-Gbps stacking ports on X450-G2 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches
10313A	QSFP+ direct-attach passive copper cable, 3 meters, 26 AWG (for X770 to X770 stacking)	21-Gbps stacking ports on X450-G2 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches
10315	QSFP+ direct-attach active optical cable, 10 meters	QSFP+ ports on X670-G2-48x-4q switches
10317	QSFP+ direct-attach active optical cable, 50 meters	QSFP+ ports on X670-G2-48x-4q switches
10318	QSFP+ direct-attach active optical cable, 100 meters	
10323	QSFP+ direct-attach passive copper cable, 5 meters	21-Gbps stacking ports on X450-G2 switches
10336	QSFP+ active optical cable, 3 meters	40-Gbps ports on X670-G2 switches; 40-Gbps ports on X770 switches; 40-Gbps VIM ports on X460-G2 switches
10337	QSFP+ active optical cable, 5 meters	
10410	QSFP28 passive copper cable, 0.5 meters	100-Gbps ports on X590, X690, and X870 switches
10411	QSFP28 passive copper cable, 1 meter	
10413	QSFP28 passive copper cable, 3 meters	
10414	QSFP28 passive copper cable, 5 meters	
10441	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable, 5 meters	
10442	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable, 7 meters	
10443	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable, 10 meters	
10444	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable, 20 meters	

Note

For the most recent information about available cables, contact your Extreme Networks sales representative or refer to [Extreme Hardware/Software Compatibility and Recommendation Matrices](#).

Alternative Configuration for Optics on X590, X690, X695, and X870 Switches

To use certain fiber cables and optical transceivers for stacking on X590, X690, X695, and X870 switches, you must use the `v400 alternative-configuration` option on the `configure stacking-support` command. This option sets the stacking ports to 100 Gb, enables pre-emphasis, and enables error correction using IEEE 802.3bj Clause 91 RS-FEC.

Table 80 lists cables and transceivers that require the use of `v400 alternative-configuration`:

Table 80: Cables and Transceivers that Require Alternative Configuration

Part Number	Cable or Transceiver
10401	100Gb SR4 QSFP28 MMF transceiver
10403	100Gb LR4 QSFP28 transceiver
10404	100Gb CWDM4 QSFP28 SMF transceiver
10405	100Gb PSM4 QSFP28 SMF transceiver
10441	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable - 5 meters
10442	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable - 7 meters
10443	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable - 10 meters
10444	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable - 20 meters

For details about the `configure stacking-support` command, see the [ExtremeXOS 22.6 Command Reference Guide](#).

Using the Extreme Stacking Tool

The Extreme Stacking Tool provides an easy way to plan your stack. As you select various switch models and stacking methods, the tool shows you:

- What switch models can be stacked together and which cannot.
- Whether switching methods – for example, SummitStack-V and SummitStack-V80 (supported in EXOS 30.1 and prior releases only) – are compatible with the selected switches.
- Statistics showing the routing options that are available with every stack combination.
- Recommendations about which switches should be the stack master and backup.
- Information about the supported versions of ExtremeXOS for every combination.

To use the Stacking Tool, follow these steps.

- 1 Open the Stacking Tool (<https://stackingtool.extremenetworks.com/StackingTool/>) in a web browser.



Note

The Stacking Tool is also available in the Support Tools section of the Extreme Portal.

- 2 Find a switch model in the **Switches** column.

Each switch model is represented by a rectangle, as shown in the example in the following figure. In this example, stacking ports are represented by S1 and S2 on the right side.

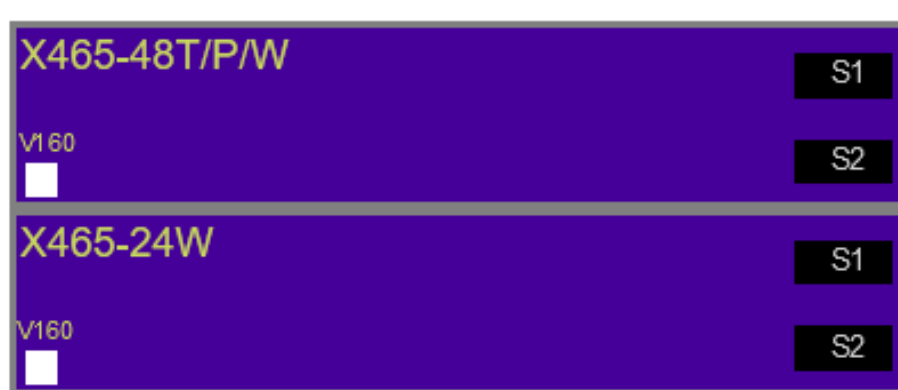


Figure 124: X465 Switches Shown in the Stacking Tool



Tip

Click a rectangle to display more information about the switch model and the VIMs (if any) that it can use for stacking.

- 3 Drag the rectangle to the first slot in the Stack column in the middle of the page.

To the right of the Stack column, the tool displays statistics about available routes, supported software versions, and master/backup recommendations.



Tip

If you don't see statistics and other information, click the arrow (> symbol) to the immediate right of the Stack column.

- 4 Use the tool in any of the following ways:

- Select other switches and drag them to the slots in the stacking column.
- For any switch in the stack, click the S1 and S2 symbols to choose stacking methods – for example, SummitStack-V and SummitStack-V80 (supported in EXOS 30.1 and prior releases only).
- To remove a switch from the stack, drag it away from the stacking column.

Whenever you add or remove a switch from the stack, the statistics and recommendations update automatically.

In addition to statistics and recommendations, colors in the display show whether the selected switch models and stacking methods are compatible.

Table 81: Colors in the Stacking Tool Display

Color	Meaning
Green	Compatible and preferred
Blue	Compatible

Table 81: Colors in the Stacking Tool Display (continued)

Color	Meaning
Yellow	Incompatible with the selected master node
Red	Incompatible

Setting up the Physical Stack

After you have installed the individual switches (see "Installing Your Switch"), follow these steps to create the physical stack.

- 1 Connect the switches that will form the stack.
See [Connecting the Switches to Form the Stack Ring](#) on page 170.
- 2 Connect stacking cables to the switches.
See [Connecting Stacking Cables](#) on page 176.
- 3 Connect the switches to your management network.
See [Connecting Your Stack to the Management Network](#) on page 177.

After setting up and connecting the switches, perform software configuration for the stack. See "Configuring a New Stack" in the [ExtremeXOS 22.6 User Guide](#).

Connecting the Switches to Form the Stack Ring

After you have installed the individual switches, connect them together using the stacking cables.

The examples in this section show cable connections and the recommended order for connecting ports to facilitate the easy setup configuration.

In general, it is best to connect Stack Port 2 on one switch to Stack Port 1 on the switch with the next higher slot number. Although you can connect the switches in any order, connecting them as shown in these examples will produce better predictability and easier software configuration.

All connections between stack ports must be directly between switches. A stacking connection cannot pass through a third device, for example a Virtual Port Extender or an LRM/MACsec Adapter.

It is essential to create an unbroken data path through all the switches in the stack.

For instructions to connect specific types of stacking cables, see [Connecting Stacking Cables](#) on page 176.

Combining Different Types of Stacking Ports

[Figure 125](#) shows an example stack configuration using the following switches: X440-G2, X450-G2, X460-G2, and X620.

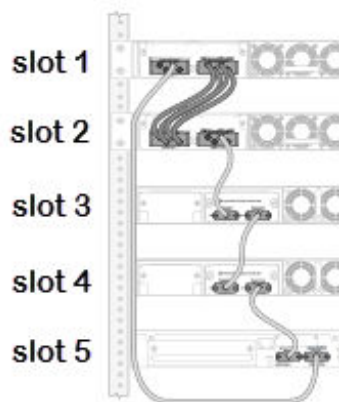


Figure 125: Combining Stacking Port Types: Example



Note

The figure is intended to show cable connections between switches. Details of the switches themselves, such as the location of the stacking ports and fan modules, might differ from those of the switches that actually would be used.

The following cables are used to make the stacking connections:

- QSFP+ cable connecting the two switches at the top (slot 1 and slot 2)
- SFP+ cable connecting the switch in slot 2 with the switch in slot 3
- SFP+ cable connecting the switch in slot 3 with the switch in slot 4
- SFP+ cable connecting the switch in slot 4 with the switch in slot 5
- SFP+ cable connecting the switch in slot 5 with the switch in slot 1

Table 82 lists the recommended order for connecting the stacking ports in this example.

Table 82: Combining Stacking Port Types: Connections

Connect this slot and port To this slot and port	
Slot 1	Stack Port 2	Slot 2	Stack Port 1
Slot 2	Stack Port 2	Slot 3	Stack Port 1
Slot 3	Stack Port 2	Slot 4	Stack Port 1
Slot 4	Stack Port 2	Slot 5	Stack Port 1
Slot 5	Stack Port 2	Slot 1	Stack Port 1

Using SummitStack-V160 Stacking

A stacking rate of 160 Gbps can be achieved using certain configurations of Extreme Networks switches. For example, an X460-G2 switch can be connected to an X670-G2-48x-4q switch through 40-Gbps stacking connections that provide 160 Gbps full-duplex bandwidth. This connection is performed using the VIM-2q module in the X460-G2 switch and the QSFP+ ports on the X670-G2-48x-4q switch. V-160 stacking is also supported on the X770 switch using the QSFP+ ports.

For SummitStack V-160 on the X770, ports 103 and 104 are the stacking ports.

Using SummitStack-V320 Stacking

A stacking rate of 320 Gbps can be achieved across a stack of X670-G2-48x-4q and X770 switches using the QSFP+ connection and cables. These switches can use 80-Gbps stacking connections that provide 320 Gbps full-duplex bandwidth.

Table 83 lists the port pairings for SummitStack V-320 using the front panel ports on the Summit X770 switch.

Table 83: Physical Port Pairings for Front Panel Ports

Summit X770-32q	
Paired physical ports	Stacking port
101 and 103	S1
102 and 104	S2

Examples of Valid Stacking Configurations

The X460-G2 accommodates the VIM-2ss SummitStack module, which provides SummitStack ports.

The examples in the following sections show various physical stacking arrangements: all switches in a single rack, switches in two adjacent racks, and switches at the tops of several racks in a row.

Example: Basic Stack with Four Switches

This example shows a stack of four switches in a single rack.

The slot numbers presume a console connection to the switch at the top of the physical stack.

Figure 126 shows cable connections for a 4-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

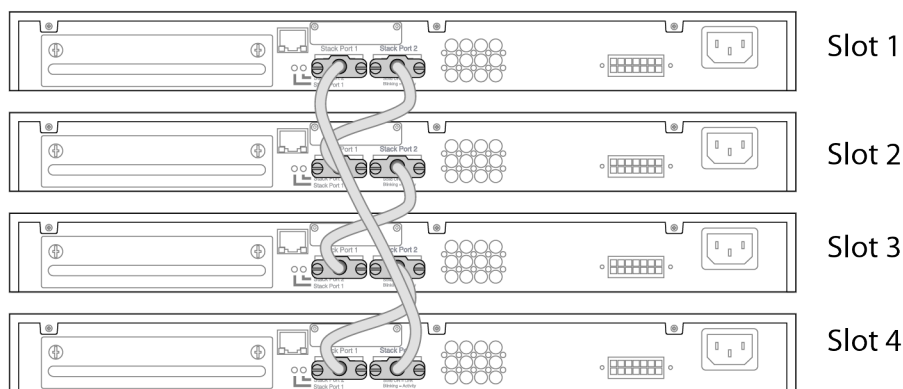


Figure 126: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

Table 84 lists the recommended order for connecting the stacking ports in this example.

Table 84: Basic Stack with Four Switches: Connections

Connect this slot and port To this slot and port	
Slot 1	Stack Port 2	Slot 2	Stack Port 1
Slot 2	Stack Port 2	Slot 3	Stack Port 1
Slot 3	Stack Port 2	Slot 4	Stack Port 1
Slot 4	Stack Port 2	Slot 1	Stack Port 1

Example: Basic Stack with Eight Switches

Figure 127 shows cable connections for an 8-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.



Figure 127: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

Table 85 lists the recommended order for connecting the stacking ports in this example.

Table 85: Basic Stack with Eight Switches: Connections

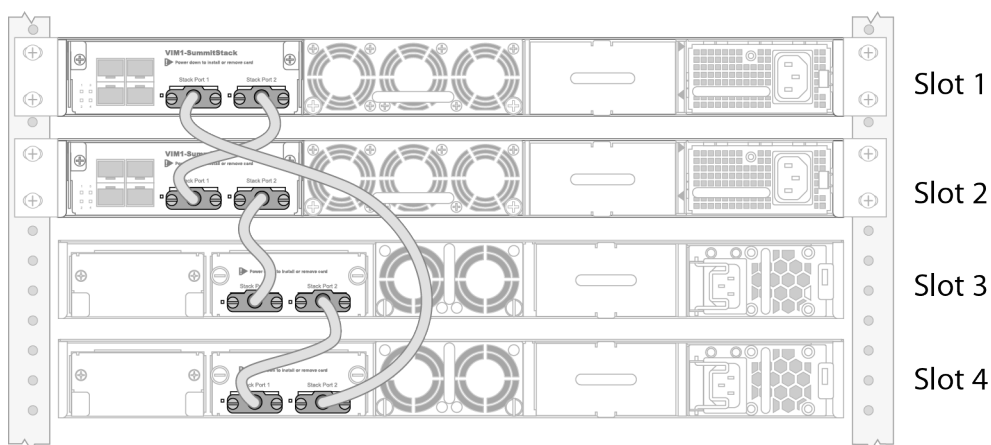
Connect this slot and port To this slot and port	
Slot 1	Stack Port 2	Slot 2	Stack Port 1
Slot 2	Stack Port 2	Slot 3	Stack Port 1
Slot 3	Stack Port 2	Slot 4	Stack Port 1
Slot 4	Stack Port 2	Slot 5	Stack Port 1
Slot 5	Stack Port 2	Slot 6	Stack Port 1
Slot 6	Stack Port 2	Slot 7	Stack Port 1

Table 85: Basic Stack with Eight Switches: Connections (continued)

Connect this slot and port To this slot and port	
Slot 7	Stack Port 2	Slot 8	Stack Port 1
Slot 8	Stack Port 2	Slot 1	Stack Port 1

Example: Stack with VIM1-SummitStack Modules

Figure 128 shows an example of a four-switch stack that combines two different switch models: two of each model; four switches in all. For the first switch model, the stacking ports are on installed VIM1-SummitStack modules. For the second switch model, the stacking ports are on installed SummitStack stacking modules. The recommended order for connecting the stacking ports is the same as for the example in [Example: Basic Stack with Eight Switches](#) on page 173.

**Figure 128: SummitStack Configuration Using Different Switch Models and SummitStack 40G Cables****Example: Stacked Switches across Two Racks**

The following example shows four switches – two of one model, two of another model – physically located in two adjacent racks.

Each rack has a switch of one model at the top, with a switch of another model below it. The switches are connected into a stack using SummitStack ports on installed VIM2-SummitStack and VIM1-SummitStack modules. In this example, start by connecting the top switches together; they will be designated the stack master and backup nodes (slot 1 and slot 2, respectively).

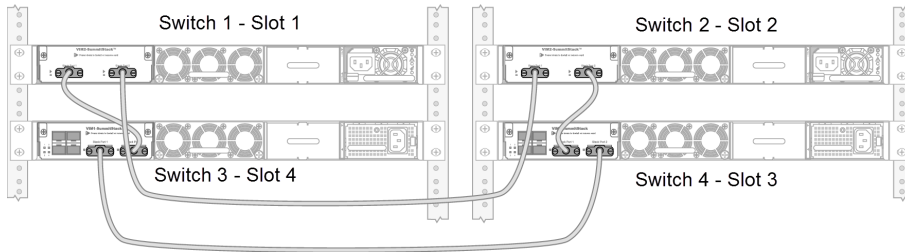


Figure 129: SummitStack Connections Using Four Switches with SummitStack Ports on VIMs

Table 86 lists the recommended order for connecting the stacking ports in this example.

Table 86: Stacked Switches across Two Racks: Connections

Connect this slot and port To this slot and port	
Slot 1	Stack Port 2	Slot 2	Stack Port 1
Slot 2	Stack Port 2	Slot 3	Stack Port 1
Slot 3	Stack Port 2	Slot 4	Stack Port 1
Slot 4	Stack Port 2	Slot 1	Stack Port 1

Example: Stacked Switches across Several Racks

Figure 130 shows five switches installed at the tops of five adjacent racks. To accommodate the shortest possible cables, immediately adjacent switches are not always connected together. Port 2 on one switch is connected to Port 1 on the next connected switch. If the easy setup feature is used to configure the stack parameters, the assigned slot numbers will be as shown in the figure.

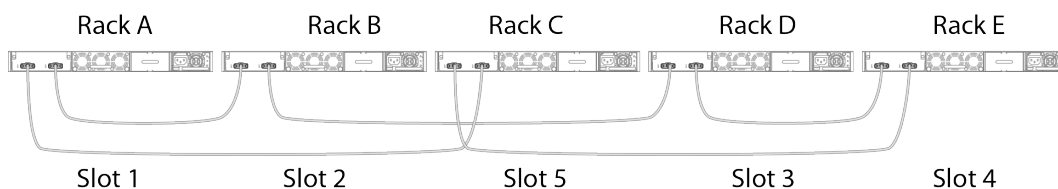


Figure 130: Top-of-Rack Stack Installation

Table 87 lists the recommended order for connecting the stacking ports in this example.

Table 87: Stacked Switches across Several Racks: Connections

Connect this slot and port To this slot and port		
Slot 1	Rack A	Port 2	Slot 2	Rack B	Port 1
Slot 2	Rack B	Port 2	Slot 3	Rack D	Port 1
Slot 3	Rack D	Port 2	Slot 4	Rack E	Port 1
Slot 4	Rack E	Port 2	Slot 5	Rack C	Port 1
Slot 5	Rack C	Port 2	Slot 1	(Rack A)	Port 1

Connecting Stacking Cables

To connect switches in a SummitStack configuration, use the appropriate stacking cables for the specific stacking ports on the switches.

Connecting a SummitStack Cable to a Stacking Port

SummitStack cables are used to connect 20-Gbps SummitStack ports on the X460-G2 switch with the SummitStack plug-in module.

To connect a SummitStack cable, follow these steps:

- 1 Align the cable connector with the stacking port connector on the rear of the first switch (see [Figure 131](#)).
- 2 Firmly press the cable connector into place on the mating stacking port connector.
- 3 Align and tighten the retaining screws on the cable connector.
- 4 Repeat steps 1 through 3 to connect the cable to the second switch.

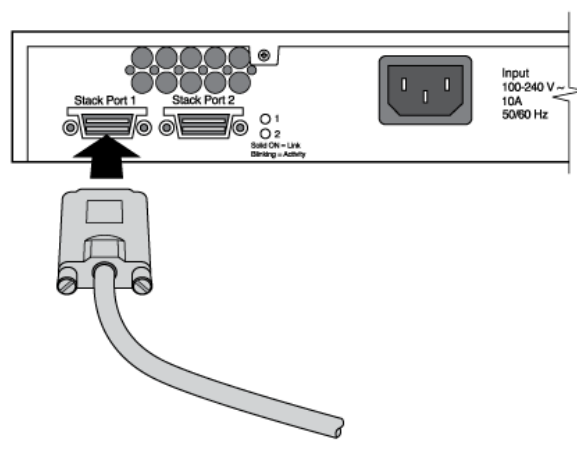


Figure 131: Connecting a SummitStack Cable



Caution

Avoid making sharp bends in the cable. Sharp bends can stress the cable and cause damage.

Connecting Active or Passive QSFP+ Cables

The QSFP+ direct-attach cable is used to connect ports on any of the following modules:

- X460-G2 switch with VIM-2q module, which supports SummitStack-V160
- X670-G2-48x-4q switch, which supports SummitStack-V80 (supported in EXOS 30.1 and prior releases only), V-160, or V-320
- X770 switch, which supports SummitStack-V160 or V-320

Follow these steps to connect a QSFP+ direct-attach cable.

- 1 Holding the QSFP+ connector by its sides, insert the connector into the port on the switch as shown in the following figures.

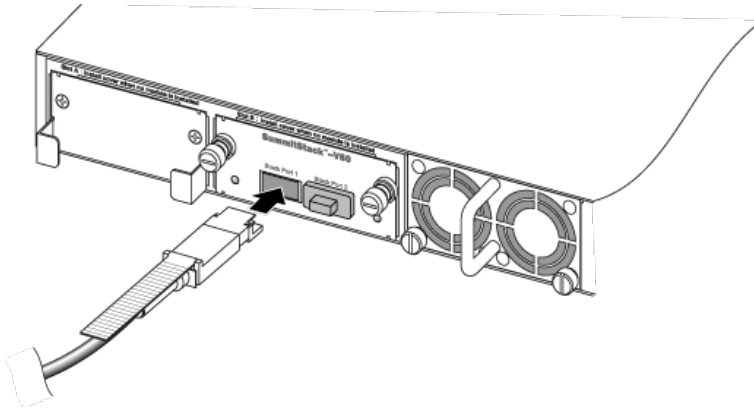


Figure 132: Connecting a QSFP+ Passive Copper Direct-Attach Cable to a SummitStack-V Module

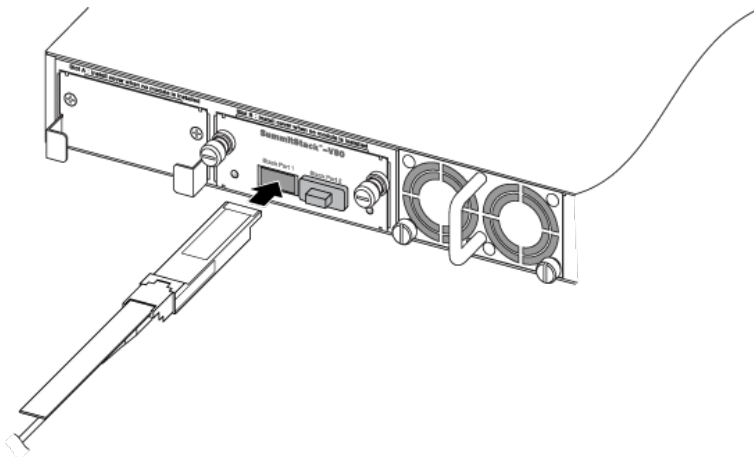


Figure 133: Connecting a QSFP+ Active Optical Direct-Attach Cable to a SummitStack-V Module

- 2 Push the connector into the port until you hear it click into place.

Connecting Your Stack to the Management Network

Before you can configure ExtremeXOS for a new stack, your management console must be connected to at least one switch in the stack.

Connect your management console to the Ethernet management port on the switch that will become the stack master node. If you plan to configure redundancy, we recommend connecting to the console ports of all switches in the stack that will be master-capable.

If you followed the cabling examples in [Connecting the Switches to Form the Stack Ring](#) on page 170, and if you use the Easy Setup configuration procedure, only slots 1 and 2 will be allowed to become the master node. However, you may connect all switch management ports in the stack if you choose to do

so. There is an alternate IP address configuration that will enable you to log in directly to each switch in the stack through its Ethernet management port.

See the [ExtremeXOS 22.6 User Guide](#) for instructions to perform the software configuration for your stack.

6 Installing Your Extreme Networks Switch

Safety Considerations for Installing Switches

Pre-installation Requirements

Attaching the Switch to a Rack or Cabinet

Installing Optional Components

Installing Internal Power Supplies

Connecting Power to the Switch

Connecting Network Interface Cables

Performing Initial Management Tasks

Before you attempt to install or remove an Extreme Networks switch, read the precautions in [Safety Considerations for Installing Switches](#) on page 180.

If you are installing switches for use in a SummitStack configuration, read [Building Stacks](#) on page 136 before you install the switches.



Note

For information about installing older Summit-branded switches, refer to [ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier](#).

Extreme Networks switches fit into standard 19-inch equipment racks.

The provided rack-mounting brackets attach to the front of the switch and are adaptable to either a front-mount or mid-mount installation. Optional rear-mounting brackets are also included for four-post racks or cabinets.

The installation process includes the following tasks:

- 1 Prepare the site for installing the switch.
See [Pre-installation Requirements](#) on page 180.
- 2 Install the switch in the rack.
See [Attaching the Switch to a Rack or Cabinet](#) on page 181.
- 3 Install optional components: optical transceivers, port option cards, versatile interface modules (VIMs), and stacking modules.
See the instructions in [Installing Optional Components](#) on page 185.

- 4 Install one or two power supplies (for switches that require them) and connect to an electrical source.

See [Installing Internal Power Supplies](#) on page 185.

**Note**

Be aware of whether you are installing an AC-powered switch or a DC-powered switch. The installation instructions are different depending upon what type of power is used.

- 5 Connect power to the switch.
See [Connecting Power to the Switch](#) on page 219.
- 6 For a stacked configuration, connect stacking cables.
See [Connecting the Switches to Form the Stack Ring](#) on page 170.
- 7 Connect network interface cables.
See [Connecting Network Interface Cables](#) on page 220.
- 8 Perform initial network connection and configuration.
See [Performing Initial Management Tasks](#) on page 220.

Safety Considerations for Installing Switches

Read the information in this chapter thoroughly before you attempt to install or remove an Extreme Networks switch.

Ensure that proper ESD (electrostatic discharge) controls are in use before switch maintenance is performed. This includes but is not limited to wrist straps that are grounded to the switch housing and earth grounds.

**Warning**

Connect the chassis ground wire **before** you connect any DC power cables.
Disconnect the ground wire **after** you disconnect all DC power cables.

Take care to load the equipment rack so that it is not top-heavy. Start installing equipment at the bottom of the rack and work up.

Do not cover vents that would restrict airflow.

**Note**

See [Safety and Regulatory Information](#) on page 396 for additional safety information.
See [Technical Specifications](#) on page 315 for additional information regarding regulatory compliance certifications.

Pre-installation Requirements

Prepare the site for the installation, and ensure that you have the appropriate people and tools on hand.

Installing most ExtremeSwitching series switches requires two people to maneuver the switch and attach mounting hardware.

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.

Some ExtremeSwitching switches give you the option of choosing the airflow direction: front-to-back or back-to-front. If your switch has internal power supplies, make sure they have the same airflow direction as the fans in the switch.

Other switches support airflow in only one direction. If your switch model supports only front-to-back airflow and requires the purchase of internal power supplies, make sure that the power supplies are for front-to-back ventilation airflow.

The following items are provided with ExtremeSwitching switches:

- Screws for attaching mounting brackets to the switch housing.
- Two rack mounting brackets adaptable for either a front-mount or mid-mount installation.
- Two rear mounting brackets (rails) for rear mounting in a four-post or cabinet installation.

Note

Rails are supplied only with the following switches:

- X450-G2
- X460-G2 PoE models:
 - X460-G2-24p-GE4
 - X460-G2-24p-10GE4
 - X460-G2-24p-24hp-10GE4
 - X460-G2-16mp-32p-10GE4
 - X460-G2-48p-GE4
 - X460-G2-48p-10GE4
- X670-G2
- X690
- X770
- X870



You need the following additional tools and equipment. These are not provided with your switch.

- Rack mounting screws: eight for a four-post installation; four for other installations. The screw size will vary based on your organization's rack system. Screws are not provided.
- Screwdriver for securing the switch to the rack. The screwdriver size will vary based on the requirements for the rack system you are using.
- #2 Phillips screwdriver to attach bracket screws that are provided with the switch. We recommend using a magnetic screwdriver.
- AC power cord. For switches with removable AC power supplies, a separate power cord is needed for each installed power supply. The cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.
- ESD-preventive wrist strap for installing optional ports at the back of the switch.

Attaching the Switch to a Rack or Cabinet

To attach a switch to a two-post rack, a four-post rack, or a cabinet, follow these steps.

Take care to load the rack so that it is not top-heavy. Start installing equipment at the bottom and work up.

**Note**

The X440-G2 and X620 switches can be front-mounted or mid-mounted to a two-post rack only. They cannot be attached to a four-post rack or cabinet.

- 1 On one side of the switch, set a mounting bracket against the switch housing.
Set the flange even with the front panel of the switch – or, if you are mid-mounting the switch in a two-post rack, set the flange toward the back of the switch.

The following figures illustrate how to attach the brackets for two common mounting options.

- [Figure 134](#) shows a mid-mount configuration using a long mounting bracket.
- [Figure 135](#) shows a front-mount configuration using a short mounting bracket.

**Note**

For some switch models, only short mounting brackets are provided.

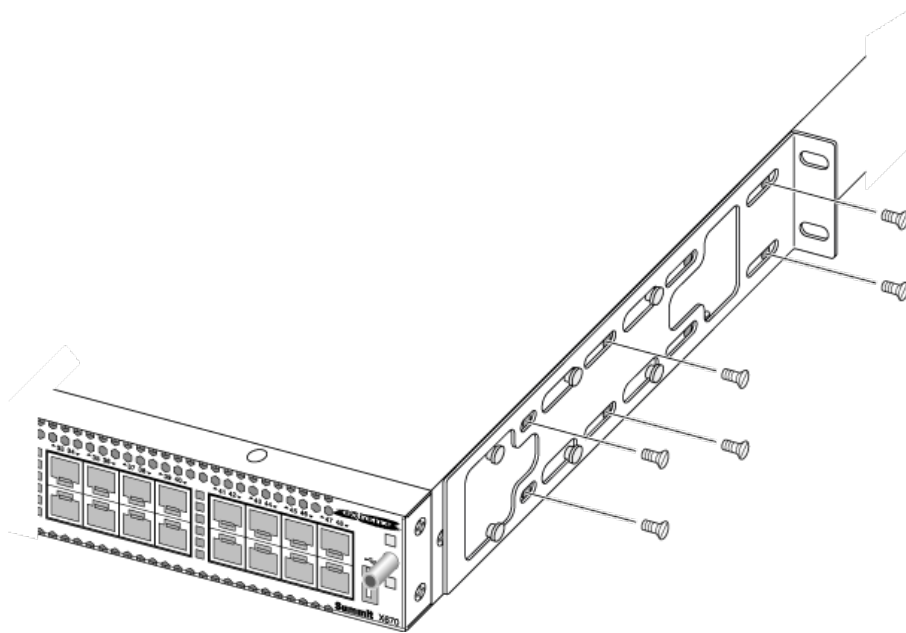


Figure 134: Mid-Mount: Attaching a Long Mounting Bracket

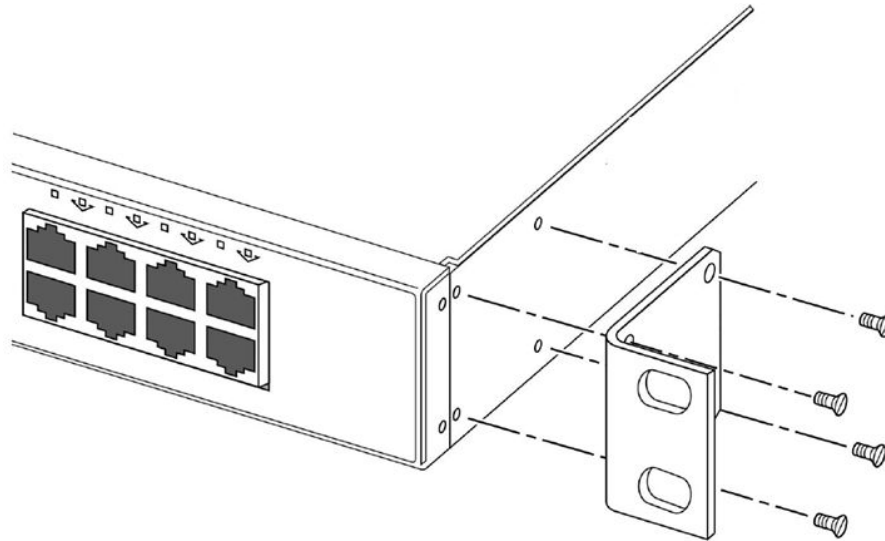


Figure 135: Front Mount: Attaching a Short Mounting Bracket

- 2 Use the small bracket-mounting screws (provided) to secure the bracket to the switch housing.
- 3 Repeat step 1 and step 2 to attach the other bracket to the other side of the switch.
- 4 Slide the switch into the equipment rack or cabinet.

Figure 136 shows an example of a mid-mount installation.

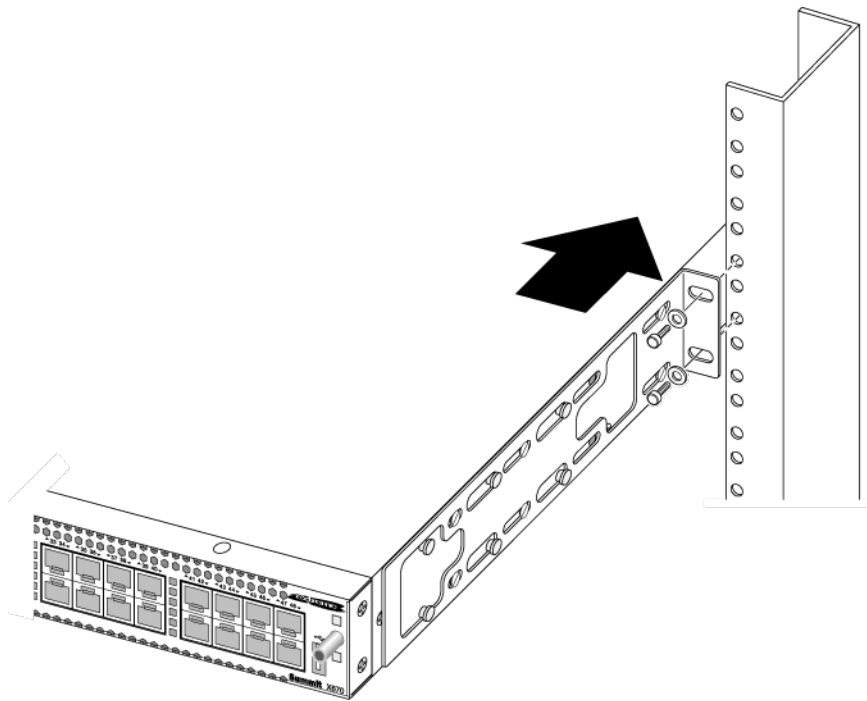


Figure 136: Sliding the Switch into the Rack

- 5 Secure the mounting bracket flanges to the rack, using screws that are appropriate for the rack. (Rack-mounting screws are not provided.)

- 6 If you are mounting the switch in a four-post rack or a cabinet, secure the rear mounting brackets (rails).

Otherwise, skip to step 7 on page 184.

- a At the rear of the rack or cabinet, for each side, slide the rails between the two rows of pegs on either side of the switch.



Note

It is best practice to extend the rear rails no more than 33 inches (83cm) from the front of the chassis.

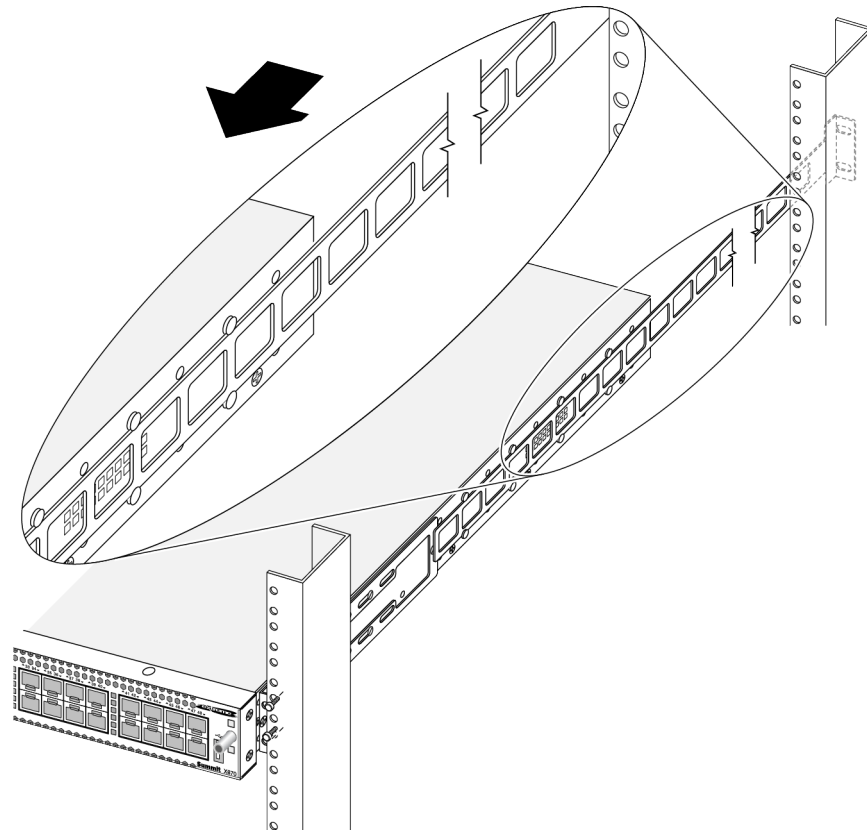


Figure 137: Inserting the Rear Mounting Brackets Between the Pegs on the Side of the Switch

- b Secure the rear mounting brackets to the rack posts using suitable screws.
Be sure the switch is level.
- 7 If a grounding lug is present, ground the switch.
For X450-G2 series switches, ground the switch as follows:
- At one end of the wire, strip the insulation to expose 1/2 inch (12 mm) of bare wire.
 - Identify the grounding lug on the back of the switch.
 - Insert the stripped wire into the grounding lug.
 - Using a straight-tip torque screwdriver, tighten the retaining screw to 20 in-lb (2.25 N m).
 - Connect the other end of the wire to a known reliable earth ground point at your site.

After the switch is secured to the rack or cabinet, install optional components using the instructions in [Installing Optional Components](#) on page 185.

Then, if your switch does not have an installed power supply, install one or two power supplies using the instructions in [Installing Internal Power Supplies](#) on page 185.

To determine which internal power supplies are compatible with your switch, see [Replaceable Internal Power Supplies](#) on page 104.

Installing Optional Components

After the switch is secured to the rack or cabinet, install optional components.

Pluggable Transceiver Modules

Extreme Networks offers several optical transceiver modules for transmitting and receiving data over optical fiber rather than through electrical wires. Install these modules using the instructions in [Extreme Networks Pluggable Transceivers Installation Guide](#).

Other Optional Components

To install other optional components – port option cards, versatile interface modules (VIMs), and stacking modules – refer to the instructions in [Installing Expansion Modules](#) on page 255.

What to Do Next

After you have installed optional components, if your switch comes with an installed power supply, skip to [Connecting Power to the Switch](#) on page 219.

If your switch does not come with an installed power supply, install one or two power supplies using the instructions in [Installing Internal Power Supplies](#) on page 185.

To see which internal power supplies are compatible with your switch, see [Table 39](#) on page 105 .

Installing Internal Power Supplies

If your switch does not have an installed internal power supply, you can install one or two power supplies.

To see which internal power supplies are compatible with your switch, see [Table 39](#) on page 105.

Follow the instructions in the following sections to install the appropriate power supply and connect power to the switch.

Install a 300 W Internal DC Power Supply



Caution

Make sure that the DC power supply circuit is not overloaded. Use proper overcurrent protection, such as a circuit breaker, to prevent overcurrent conditions. You may use up to a 30-Amp breaker.

To install a 300 W DC power supply (part no. 10933 or 10944) in a switch, perform the following tasks in the order listed:

- 1 Make sure you have the tools and materials you need.
See [Required Tools and Materials for Installing a 300 W DC Power Supply](#) on page 186.
- 2 Prepare the power cables and ground cable by attaching the provided connection lugs to the cables.
See [Preparing the Cables for a 300 W DC Power Supply](#) on page 187.
- 3 Insert the power supply into the switch.
See [Installing a 300 W DC Power Supply](#) on page 187.
- 4 Connect the ground wire.
See [Connecting the Ground Wire to a 300 W DC Power Supply](#) on page 189.
- 5 Connect the power supply to the DC source voltage.
See [Connecting a 300 W DC Power Supply to the Source Voltage](#) on page 190.
- 6 Energize the DC circuit.

Required Tools and Materials for Installing a 300 W DC Power Supply

You need the following tools and materials to install or remove a 300 W DC power supply.

- Two spade terminals (Tyco part number 328281 or equivalent) for connecting the input power cables (provided)
- 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 wire (both provided)
- #14 AWG copper cable for grounding the power supply and connecting the power supply to the DC power source. (DC power and grounding cables are not included with the power supply.)
Recommended insulation colors are:
 - Red for the -48 V connection (-)
 - Black for the -48 V RTN connection (+)
 - Green or green with yellow stripe for the ground connection
- Connection hardware appropriate to the installation site:
 - Hardware for connecting the power wires to the DC source
 - Hardware for connecting the ground wire to the site grounding point
- Stripping tool
- Crimping tool for attaching the lug to the ground wire
- #1 Phillips screwdriver
- Torque screwdriver and wrench or torque driver with attachments for tightening screws and nuts
- ESD-preventive wrist strap
- Thermal protective gloves (required for removal of a power supply)

Connection lugs for power and ground and a screw for connecting the ground wire are shipped with the power supply.

Preparing the Cables for a 300 W DC Power Supply

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

To prepare the cable wires, follow these steps:

- 1 On each cable wire, strip 6 mm (0.25 inch) of insulation from one end.
- 2 Insert the end of one power cable wire all the way into the barrel of a spade terminal and crimp the terminal securely to the wire.

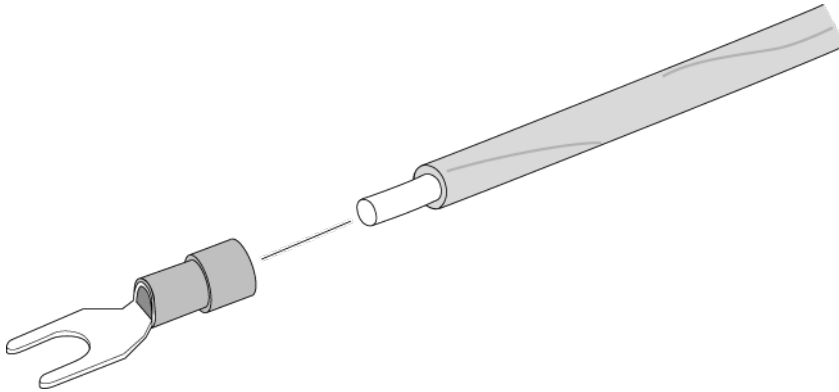


Figure 138: Attaching a Spade Terminal to a Cable

- 3 Repeat step [Preparing the Cables for a 300 W DC Power Supply](#) on page 187 for the other power cable wire.
- 4 Insert the end of the stripped ground wire (green or green and yellow) all the way into the barrel of the ring terminal and crimp the terminal securely to the wire.

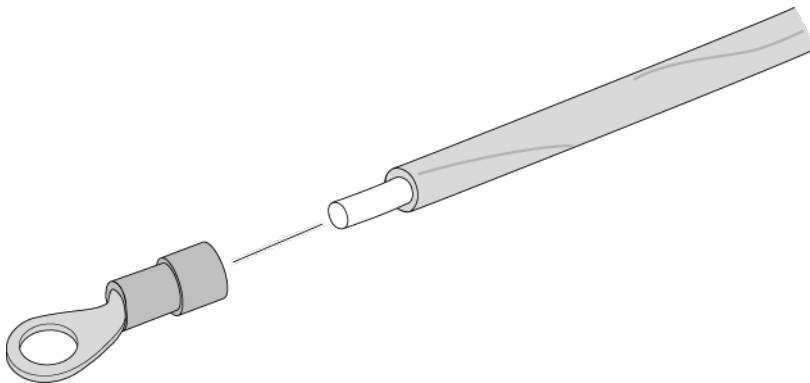


Figure 139: Attaching a Ring Terminal to a Ground Cable

Installing a 300 W DC Power Supply

Before installing a Summit 300 W power supply (part no. 10933 or 10944):

- Verify that the switch chassis has been grounded.
- Verify that the airflow direction for the power supply is the same as the airflow direction of the installed fan modules in the switch.

To install the power supply, follow these steps:



Caution

The handle on the power supply is not designed to be used to lift or carry the power supply or the switch to which it is attached.

- 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 If necessary, remove a blank panel from the rear of the switch.

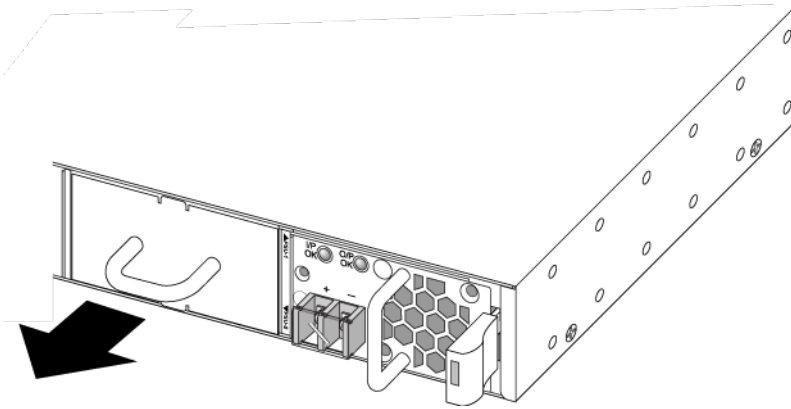


Figure 140: Removing a Blank Panel

- 3 Verify that the power supply is right side up.
The power supply should be oriented as shown in [Figure 141](#).
- 4 Carefully slide the power supply all the way into the power supply bay.

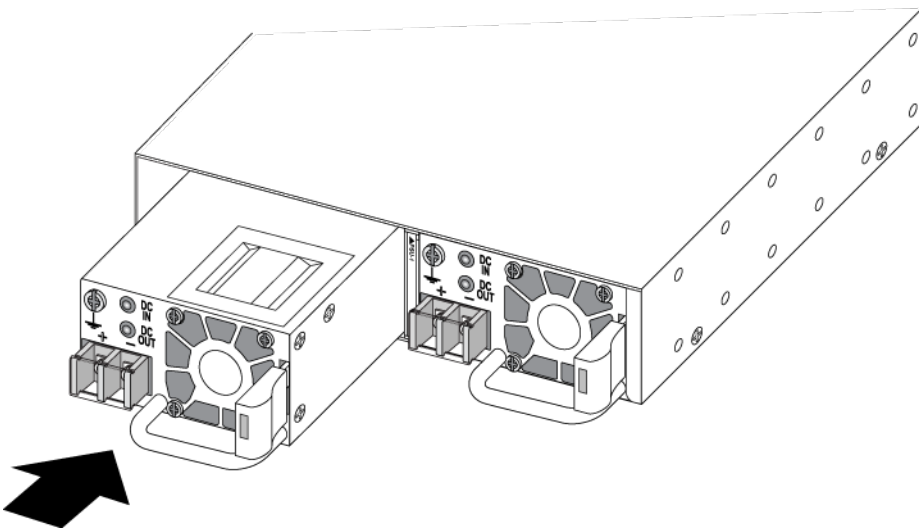


Figure 141: Installing a Summit 300 W DC Power Supply (Back-to-Front Model 10933 Shown)

- 5 Push the power supply in until the latch snaps into place.

**Caution**

Do not slam the power supply into the switch.

- 6 To install a second power supply, repeat the procedure.
- 7 Connect the ground wire, following the steps in [Connecting the Ground Wire to a 300 W DC Power Supply](#) on page 189.

Connecting the Ground Wire to a 300 W DC Power Supply

Follow these steps to connect the ground wire to a Summit 300 W DC power supply.

**Warning**

Be sure to connect the chassis ground wire before you connect any power cables.

**Warning**

Be sure to disconnect the ground wire 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 Pull the cover off the terminal block.
- 4 Identify the grounding point on the front panel of the power supply.
- 5 Connect the ground wire to the grounding point as follows:
 - a Insert a 6-32 UNC screw (provided) through the ring terminal and into the grounding point on the power supply.

See [Figure 142](#).

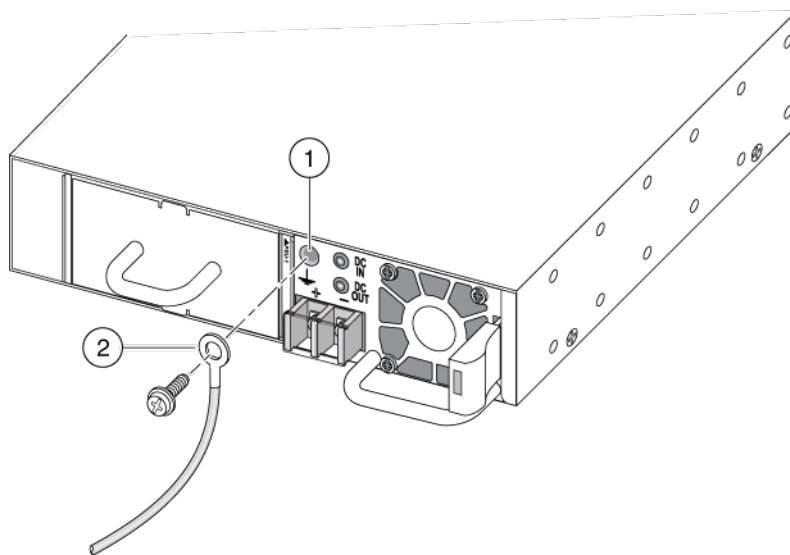


Figure 142: Connecting the Ground Wire (Front-to-Back Model 10933 Shown)

1 = Grounding point	2 = Ground wire
---------------------	-----------------

- b Tighten the screw to 12.6 in-lb (1.42 N m).
- 6 Connect the other end of the wire to a known reliable earth ground point at your site.
- 7 Connect the power supply to the source, following the instructions in [Connecting a 300 W DC Power Supply to the Source Voltage](#) on page 190.

Connecting a 300 W DC Power Supply to the Source Voltage

Two 300 W DC power supplies are available: model 10933 (front-to-back airflow) and model 10944 (back-to-front airflow). Both can connect to either a +24 V or a -48 V power source.

The connection instructions, starting at step 4 on page 190, are different depending upon whether you are connecting to a +24 V power source or a -48 V power source.

The DC power connection at your facility must be made by a qualified electrician, following these instructions.



Warning

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



Caution

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

-
- 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 as follows:
 - When connecting the power supply to a +24 V source:

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

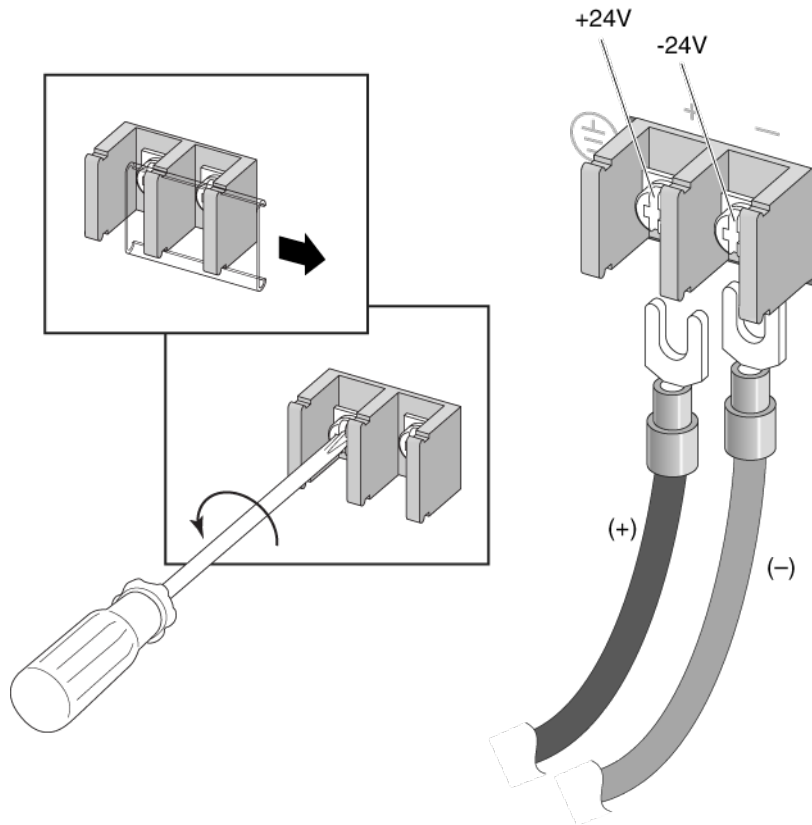


Figure 143: Loosening Terminal Screws (Connecting to a +24 V Source)

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

- c Slide the spade terminal of the **positive** wire (+24 V) under the captive square washer on the **positive** terminal (+24 V).
- d Tighten both screws on the terminal block to 11 in-lb (1.25 N m).

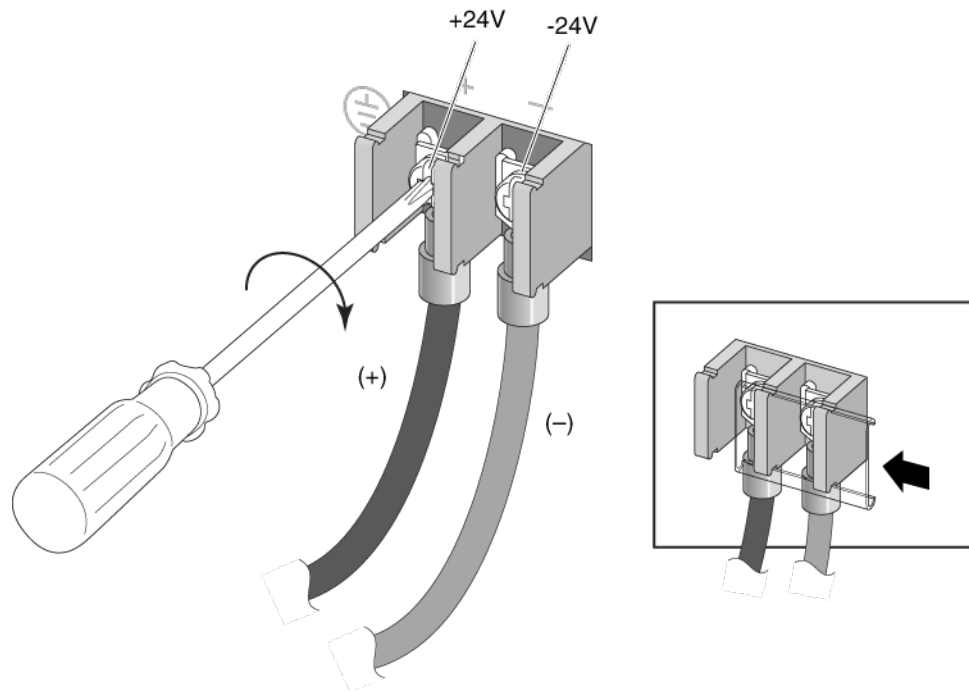


Figure 144: Tightening Terminal Screws (Connecting to a +24 V Source)

When connecting the power supply to a -48 V source:

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

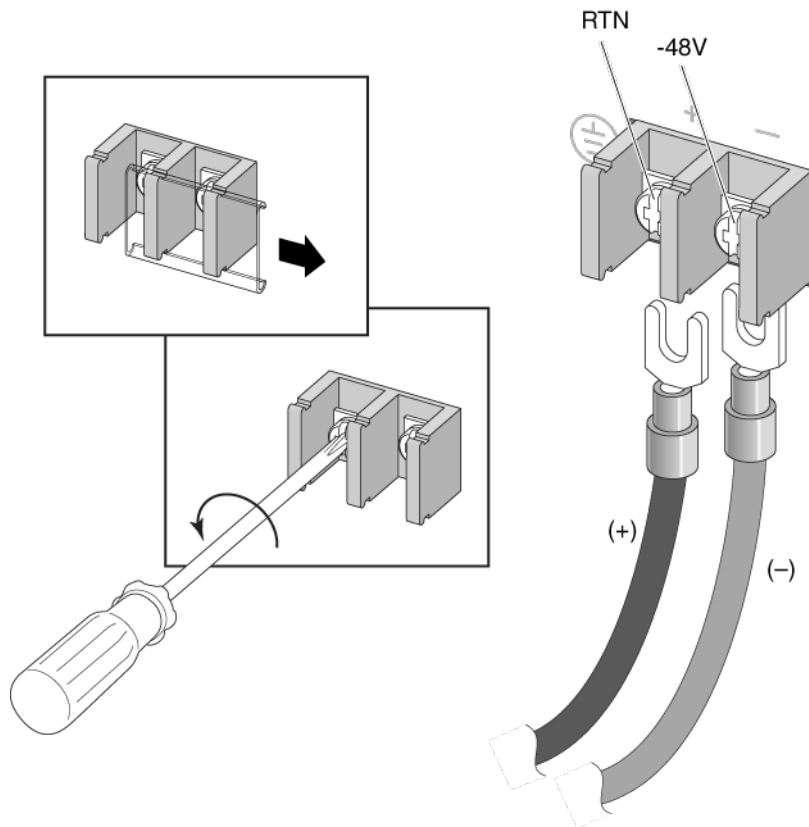


Figure 145: Loosening Terminal Screws (Connecting to a -48 V Source)

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

- c Slide the spade terminal of the **positive** wire (-48 V RTN) under the captive square washer on the **positive** terminal (labeled RTN).
- d Tighten both screws on the terminal block to 11 in-lb (1.25 N m).

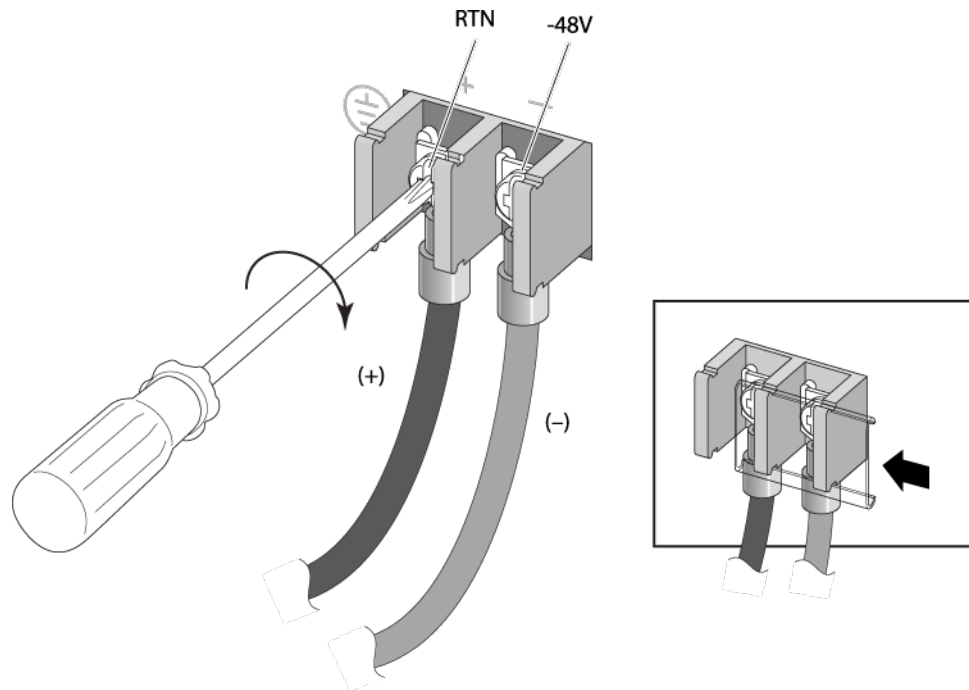


Figure 146: Tightening Terminal Screws (Connecting to a -48 V Source)

- 5 Slide the cover into place over the terminal block.
- 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.

You can now connect network interface cables to the switch, using the instructions in [Connecting Network Interface Cables](#) on page 220.

Install a 550 W Internal DC Power Supply

Summit 550 W power supply units (PSUs) are available with either front-to-back or back-to-front airflow. If you install two PSUs, both must have the same airflow direction.



Note

You cannot combine power supplies of different wattages in the same switch.

To install a Summit 550 W DC power supply, refer to the following sections as needed:

- 1 Make sure you have the tools and materials you need.
See [Required Tools and Materials for Installing a 550 W DC Power Supply](#) on page 195.

- 2 Prepare the power cables and ground cable by attaching the provided connection lugs to the cables.
See [Preparing the Cables for a 550 W DC Power Supply](#) on page 195.
- 3 Insert the power supply into the switch.
See [Installing a 550 W DC Power Supply](#) on page 196.
- 4 Connect the ground wire.
See [Connecting the Ground Wire to a 550 W DC Power Supply](#) on page 197.
- 5 Connect the power supply to the electrical source and energize the DC circuit.
See [Connecting a 550 W DC Power Supply to the Source Voltage](#) on page 199.

Required Tools and Materials for Installing a 550 W DC Power Supply

You need the following tools and materials to install or remove a 550 W DC power supply.

- Three spade terminals (Panduit part number PN14-6FN or equivalent) for connecting the ground and input power cables (provided)
- #14 AWG copper cable for grounding the power supply and connecting the power supply to the DC power source. (DC power and grounding cables are not included with the power supply.)
Recommended insulation colors are:
 - Red for the -48 V connection (-)
 - Black for the -48 V RTN connection (+)
 - Green or green with yellow stripe for the ground connection
- Connection hardware appropriate to the installation site:
 - Hardware for connecting the power wires to the DC source
 - Hardware for connecting the ground wire to the site grounding point
- Stripping tool
- Crimping tool for attaching the lug to the ground wire
- #1 Phillips screwdriver
- Torque screwdriver and wrench or torque driver with attachments for tightening screws and nuts
- ESD-preventive wrist strap
- Thermal protective gloves (required for removal of a power supply)

Spade-type connection lugs for power and ground are shipped with the power supply.

Preparing the Cables for a 550 W DC Power Supply

Three spade-type terminals are provided with the power supply.

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

To prepare the cable wires, follow these steps:

- 1 On each cable wire, strip 6 mm (0.25 inch) of insulation from one end.

- 2 Insert the end of one power cable wire all the way into the barrel of a spade terminal and crimp the terminal securely to the wire.

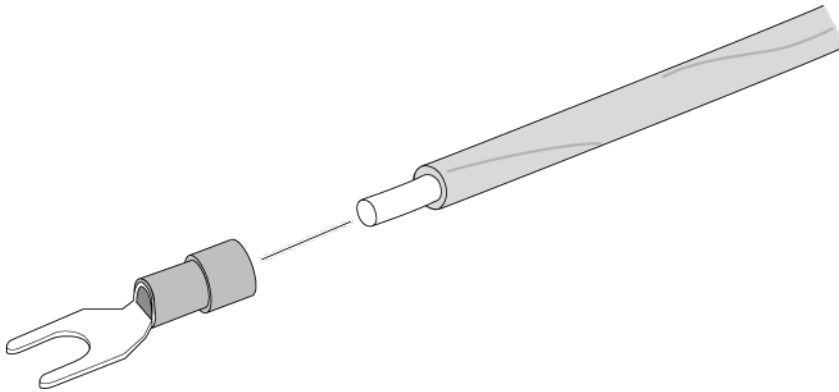


Figure 147: Attaching a Spade Terminal to a Cable

- 3 Repeat step 2 for the other power cable wire and for the ground wire.

Installing a 550 W DC Power Supply

Before installing a Summit 550 W DC power supply:

- Verify that the switch rack or chassis has been grounded.
- Verify that the airflow direction for the power supply is the same as the airflow direction of the installed fan modules in the switch.

To install the power supply, follow these steps:

- 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 If necessary, remove a blank panel from the rear of the switch.

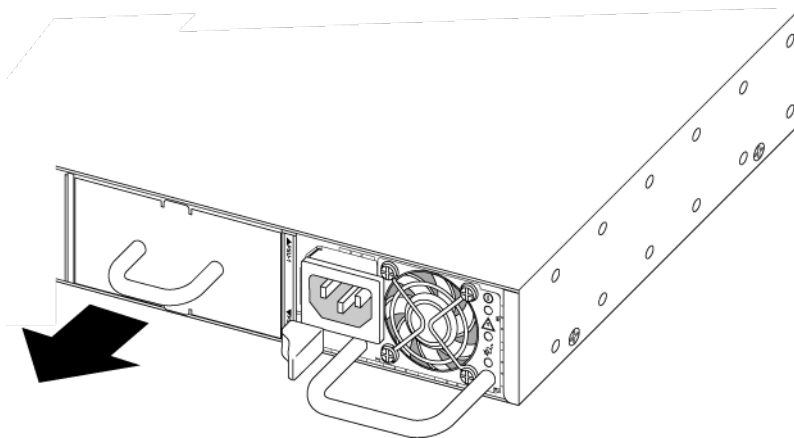


Figure 148: Removing a Blank Panel

- 3 Verify that the power supply is right side up.
The power supply should be oriented as shown in [Figure 149](#).

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

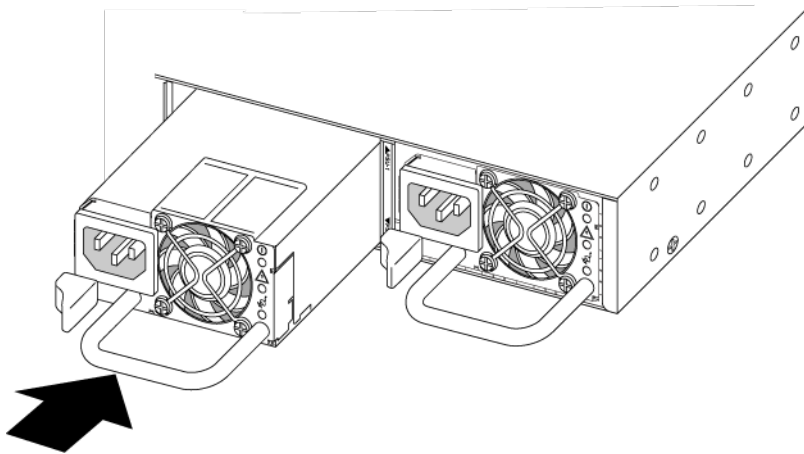


Figure 149: Installing a Power Supply

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



Caution

Do not slam the power supply into the switch.

- To install a second power supply, repeat the procedure.



Note

If power supplies are not installed in both power supply bays, be sure to install a cover over the unoccupied bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

- Connect the ground wire, following the steps in [Connecting the Ground Wire to a 550 W DC Power Supply](#) on page 197.

Connecting the Ground Wire to a 550 W DC Power Supply

You need a #1 Phillips screwdriver to secure the ground wire to the power supply.



Warning

Be sure to connect the chassis ground wire before you connect any power cables.



Warning

Be sure to disconnect the ground wire after you disconnect all power cables.

To connect the ground wire to a Summit 550 W DC power supply, follow these steps:

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

See [Figure 150](#).

- 5 Connect the ground wire to the grounding point as follows:
 - a Loosen the screw enough to allow the spade terminal to slide underneath the captive square washer.

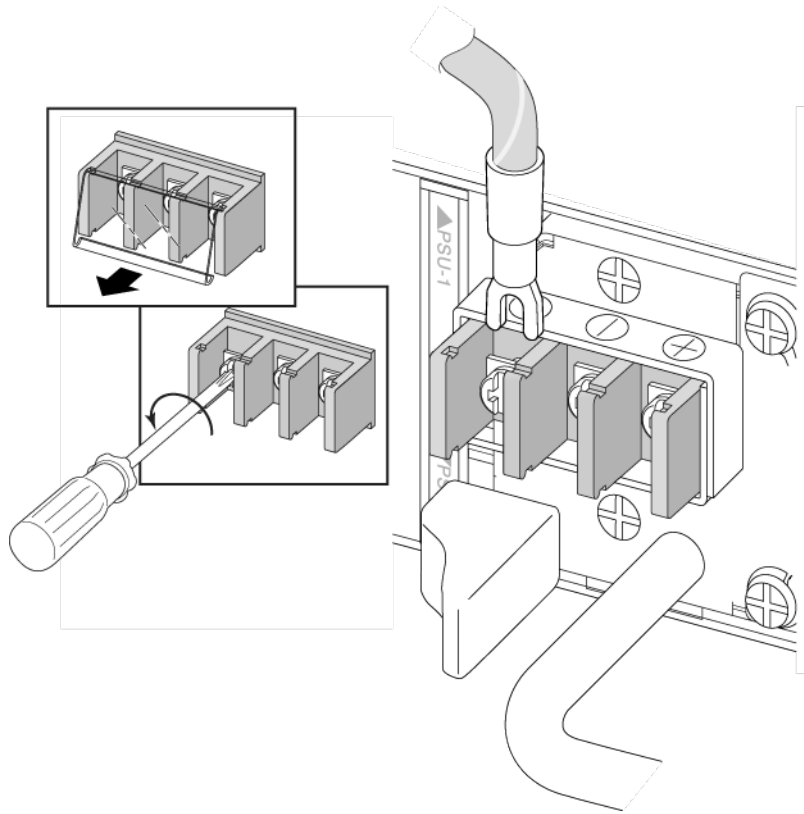


Figure 150: Connecting the Ground Wire

- b Slide the spade terminal of the ground wire under the captive square washer.

- c Tighten the screw to 7 in-lb (0.79 N m) as shown in [Figure 151](#).

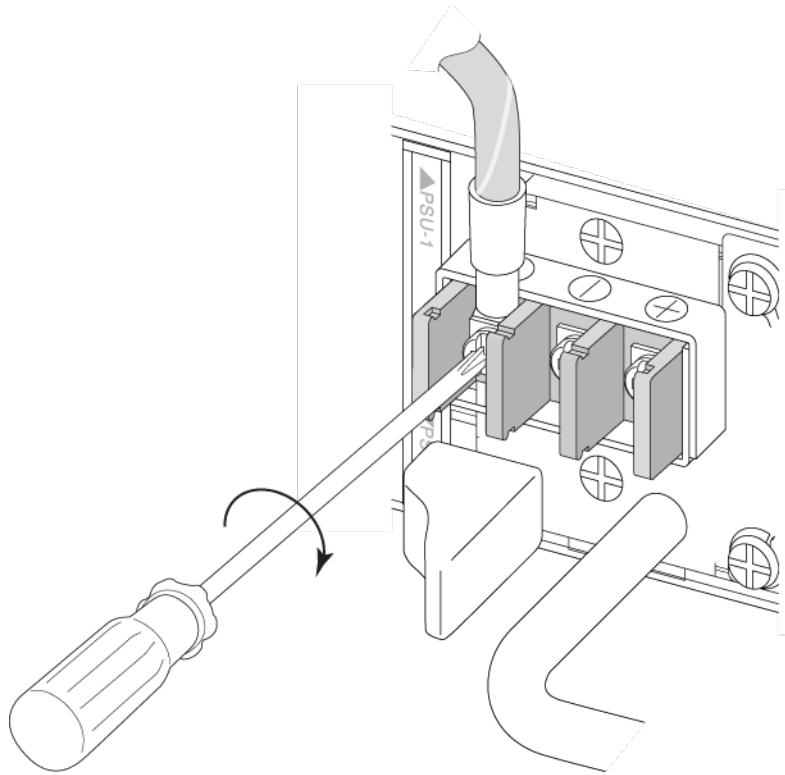


Figure 151: Securing the Ground Wire

- 6 Connect the other end of the wire to a known reliable earth ground point at your site.
- 7 Connect the power supply to the source, following the instructions in [Connecting a 550 W DC Power Supply to the Source Voltage](#) on page 199.

Connecting a 550 W DC Power Supply to the Source Voltage

Summit 550 W DC power supply units must connect to a -48V source.

The DC power connection at your facility must be made by a qualified electrician, following these instructions.



Warning

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

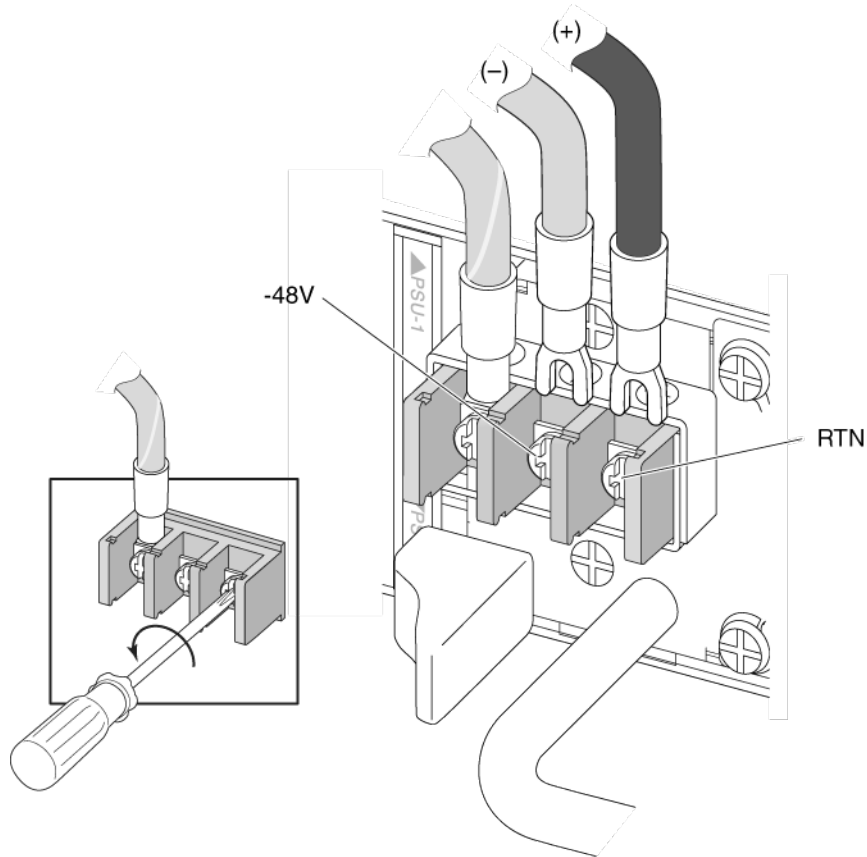


Caution

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

- 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.

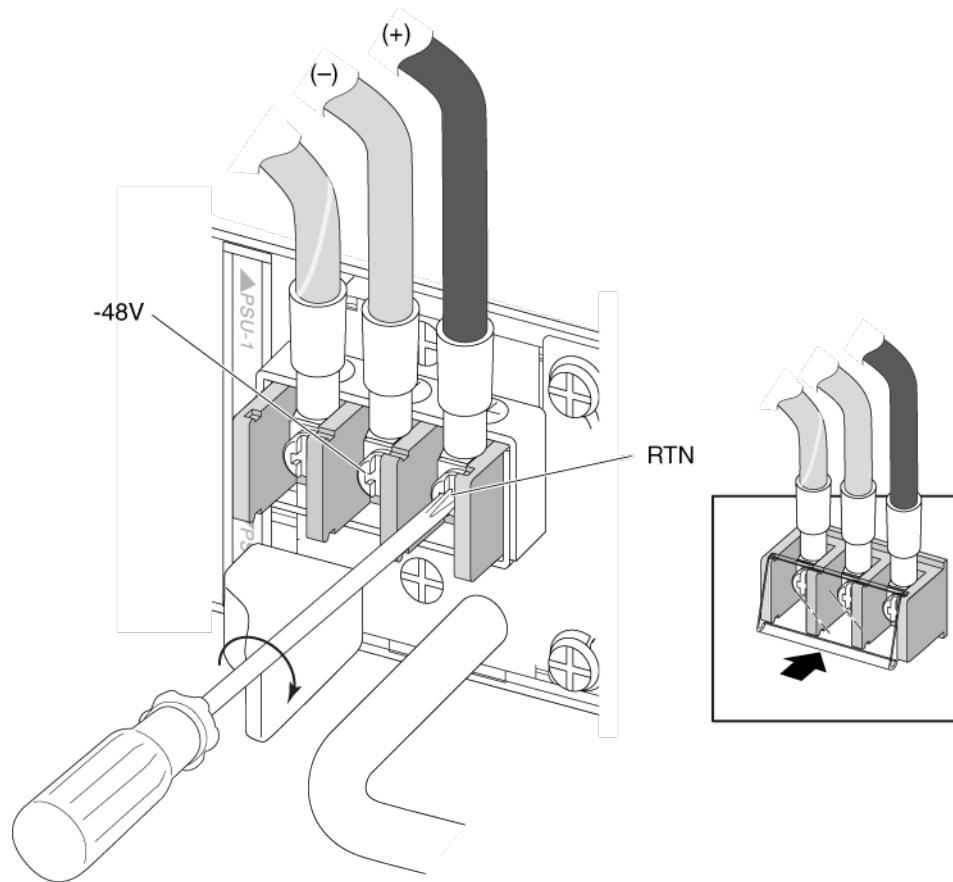
- 4 On each terminal, loosen the screw enough to allow the spade terminal to slide underneath the captive square washer.
- 5 Connect the DC power input cables as follows:
 - a Slide the spade terminal of the **negative** wire (-48 V) under the captive square washer on the **negative** terminal (labeled -).



SH_161

Figure 152: Connecting the Negative Power Wire to a -48V Source (550 W DC Power Source)

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



SH.162

Figure 153: Connecting the Positive Power Wire to a -48V Source (550 W DC Power Source)

- 6 Tighten both screws on the terminal block to 7 in-lb (0.79 N m).
- 7 Snap the cover into place over the terminal block.
- 8 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.
- 9 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.

You can now connect network interface cables to the switch, using the instructions in [Connecting Network Interface Cables](#) on page 220.

Installing a 750 W Internal DC Power Supply



Caution

Make sure that the DC power supply circuit is not overloaded. Use proper overcurrent protection, such as a circuit breaker, to prevent overcurrent conditions. You may use up to a 30-Amp breaker.

To install a 750 W DC power supply in a switch, perform the following tasks in the order listed:

- 1 Make sure you have the tools and materials you need.
See [Required Tools and Materials for Installing a 750 W DC Power Supply](#) on page 202.
- 2 Prepare the power cables and ground cable by stripping off the insulation.
See [Preparing the Cables for a 750 W DC Power Supply](#) on page 202.
- 3 Ground the switch chassis.
See [Grounding the Switch Chassis](#) on page 203.
- 4 Insert the power supply into the switch.
See [Installing a 750 W Internal DC Power Supply](#) on page 202.
- 5 Connect the ground wire.
See [Connecting the Ground Wire to a 750 W DC Power Supply](#) on page 204.
- 6 Connect the power supply to the DC source voltage.
See [Connecting a 750 W DC Power Supply to the Source Voltage](#) on page 204.
- 7 Energize the DC circuit.

Required Tools and Materials for Installing a 750 W DC Power Supply

You need the following tools and materials to install or remove a 750 W DC power supply in an ExtremeSwitching X695 switch.

- #14 AWG copper cable for grounding the power supply and connecting the power supply to the DC power source. (DC power cables and grounding cables are not included with the power supply.) Recommended insulation colors are:
 - Red for the -48 V connection (-)
 - Black for the -48 V RTN connection (+)
 - Green or green with yellow stripe for the ground connection
- Connection hardware appropriate to the installation site:
 - Hardware for connecting the power wires to the DC source
 - Hardware for connecting the ground wire to the site grounding point
- Stripping tool
- Cross-head (Phillips) torque screwdriver
- #1 cross-head (Phillips) screwdriver
- ESD-preventive wrist strap
- Thermal protective gloves (for removal of a warm power supply)

Preparing the Cables for a 750 W DC Power Supply

You will need three cable wires for each installed DC power supply: two input cables and a grounding cable. We recommend that each cable have differently colored insulation, as described in [Required Tools and Materials for Installing a 750 W DC Power Supply](#) on page 202.

To prepare the cable wires, follow these steps:

- 1 On each cable wire, strip 6 mm (0.25 inch) of insulation from one end.
- 2 Repeat the previous step for the other two cable wires.

Grounding the Switch Chassis

Before installing DC power supply units in your switch, perform these steps:

- 1 Verify that the DC circuit is de-energized.
- 2 Identify the grounding lug on the rear of the switch.

The grounding lug is identified by the international symbol for earth ground:



- 3 Attach the ground wire to the grounding lug as follows.

Use stranded copper wire, sized between 14 AWG and 6 AWG.

- a At one end of the ground wire, strip the insulation to expose 12 mm (1/2 in) of bare wire.
 - b Insert the stripped wire into the grounding lug.
 - c Using a straight-tip torque screwdriver, tighten the retaining screw to 2.25 N m (20 in-lb).
- 4 Connect the other end of the wire to a known reliable earth ground point at your site.

You can now install one or two DC power supplies, following the steps in [Install a 750 W DC Power Supply](#) on page 203.

Install a 750 W DC Power Supply

Before installing a 750 W DC power supply (part no. XN-DCPWR-750W-F or XN-DCPWR-750W-R):

- Verify that the switch chassis has been grounded (see [Grounding the Switch Chassis](#) on page 203).
- Verify that the airflow direction for the power supply is the same as the airflow direction of the installed fan modules in the switch.

To install the power supply, follow these steps:



Caution

The handle on the power supply is not designed to be used to lift or carry the power supply or the switch to which it is attached.

- 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 If necessary, remove a blank panel from the rear of the switch.
- 3 Verify that the power supply is right side up.
- 4 Carefully slide the power supply all the way into the power supply bay.
- 5 Push the power supply in until the latch snaps into place.



Caution

Do not slam the power supply into the switch.

- 6 To install a second power supply, repeat the procedure.

When you are finished, connect the ground wire to each power supply. See [Connecting the Ground Wire to a 750 W DC Power Supply](#) on page 204.

Connecting the Ground Wire to a 750 W DC Power Supply

Follow these steps to connect the ground wire to a 750 W DC power supply.




Warning

Be sure to connect the chassis ground wire before you connect any power cables.



Warning

Be sure to disconnect the ground wire 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 Connect the ground wire to the grounding point on the power supply.
The grounding point is the middle of the three slots. Directly beneath it, you will see the international symbol for earth ground -  - on the body of the switch.

Refer to [Figure 154](#) for the slot location.

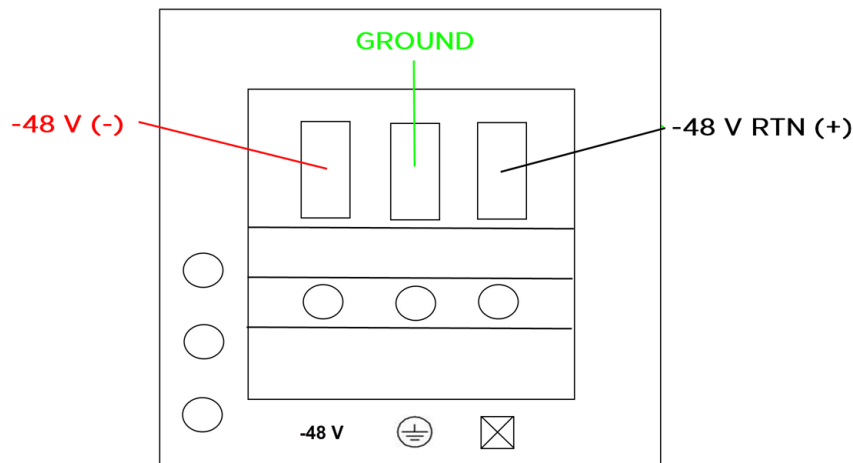


Figure 154: Slots for Connecting Wires to the 750 W DC Power Supply

- a Insert the stripped end of the ground wire all the way into the slot.
 - b Insert a #1 Phillips screwdriver into the hole below the slot, and tighten.
 - c Gently tug the ground wire to make sure it is fastened securely.
- 4 Connect the other end of the wire to a known reliable earth ground point at your site.

When you have connected the ground wire, connect the power supply to the power source using the two input cables. Follow the instructions in [Connecting a 750 W DC Power Supply to the Source Voltage](#) on page 204.

Connecting a 750 W DC Power Supply to the Source Voltage

Two 750 W DC power supplies are available: model XN-DCPWR-750W-F (front-to-back airflow) and model XN-DCPWR-750W-R (back-to-front airflow). Both can connect to a -48 V power source.

The DC power connection at your facility must be made by a qualified electrician, following these instructions.



Warning

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



Caution

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

- 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 Connect the **negative** wire (-48 V) to the power supply as follows:
 - a Insert the stripped end of the wire all the way into the leftmost of the three slots on the terminal block.

Refer to [Figure 155](#) for slot locations.

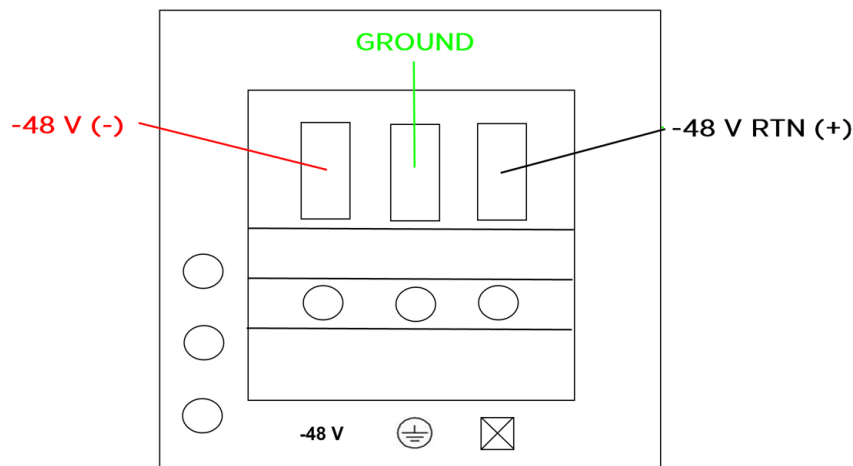


Figure 155: Slots for Connecting Wires to the 750 W DC Power Supply

- b Insert a #1 Phillips screwdriver into the hole below the slot, and tighten.
 - c Gently tug the wire to make sure it is fastened securely.
- 4 Connect the **positive** wire (-48 V) as follows:
 - a Insert the stripped end of the wire all the way into the rightmost of the three slots on the terminal block.
 - b Insert a #1 Phillips screwdriver into the hole below the slot, and tighten.
 - c Gently tug the wire to make sure it is fastened securely.
- 5 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.

Turn on the switch, following the steps in [Connecting Power to the Switch](#) on page 219.

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

Install an 1100 W Internal DC Power Supply

The ExtremeSwitching X690 and X870 series switches accommodate one or two Summit 1100 W power supply units (PSUs) with either front-to-back or back-to-front airflow.



Note

You cannot combine power supplies of different wattages in the same switch.

To install a Summit 1100 DC power supply, refer to the following sections as needed:

- 1 Make sure you have the tools and materials you need.
See [Required Tools and Materials for Installing an 1100 W DC Power Supply](#) on page 206.
- 2 Prepare the power cables and ground cable by attaching the provided connection lugs to the cables.
See [Preparing the Cables for an 1100 W DC Power Supply](#) on page 206.
- 3 Insert the power supply into the switch.
See [Installing an 1100 W DC Power Supply](#) on page 207.
- 4 Connect the ground wire.
See [Connecting the Ground Wire to an 1100 W DC Power Supply](#) on page 208.
- 5 Connect the power supply to the electrical source and energize the DC circuit.
See [Connecting an 1100 W DC Power Supply to the Source Voltage](#) on page 209.

Required Tools and Materials for Installing an 1100 W DC Power Supply

You need the following tools and materials to install or remove an 1100 W DC power supply.

- Three copper cables, between #10 and #24 AWG, for grounding the power supply and connecting the power supply to the DC power source. (DC power and grounding cables are not included with the power supply.) Recommended insulation colors are:
 - Red for the -48 V connection (-)
 - Black for the -48 V RTN connection (+)
 - Green or green with yellow stripe for the ground connection
- Connection hardware appropriate to the installation site:
 - Hardware for connecting the power wires to the DC source
 - Hardware for connecting the ground wire to the site grounding point
- Stripping tool
- #1 Phillips screwdriver
- Torque screwdriver and wrench or torque driver with attachments for tightening screws and nuts
- ESD-preventive wrist strap
- Thermal protective gloves (required for removal of a power supply)

Preparing the Cables for an 1100 W DC Power Supply

You need three cable wires: two power input cables and one ground cable. Refer to [Required Tools and Materials for Installing an 1100 W DC Power Supply](#) on page 206 for details.

To prepare the cable wires for the 1100 W DC power supply unit, follow these steps:

- 1 Strip 0.4 inch (10 mm) of insulation from one end of each cable wire.
- 2 Insert the end of the stripped ground wire (green or green and yellow) all the way into the barrel of the ring terminal and crimp the terminal securely to the wire.

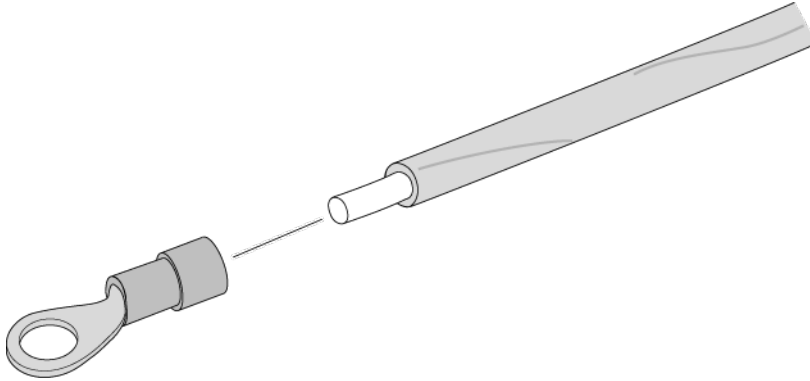


Figure 156: Attaching a Ring Terminal to a Ground Cable

No ring terminal is required to connect the cable wires (non-ground wires) to the 1100 W DC power supply.

Installing an 1100 W DC Power Supply

Before installing a Summit 1100 W DC power supply:

- Verify that the switch rack or chassis has been grounded.
- Verify that the airflow direction for the power supply is the same as the airflow direction of the installed fan modules in the switch.

To install the power supply, follow these steps:

- 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 If necessary, remove a blank panel from the rear of the switch.
- 3 Verify that the power supply is right side up.

The power supply should be oriented as shown in [Figure 157](#) on page 208.

- 4 Verify that the direction of ventilation airflow is the same for both the power supply and the switch.

In a switch with front-to-back airflow, the fan modules are labeled **Air Out**.

In a switch with back-to-front airflow, the fan modules are labeled **Air In**.

- Carefully slide the power supply all the way into the power supply bay.
See [Figure 157](#).

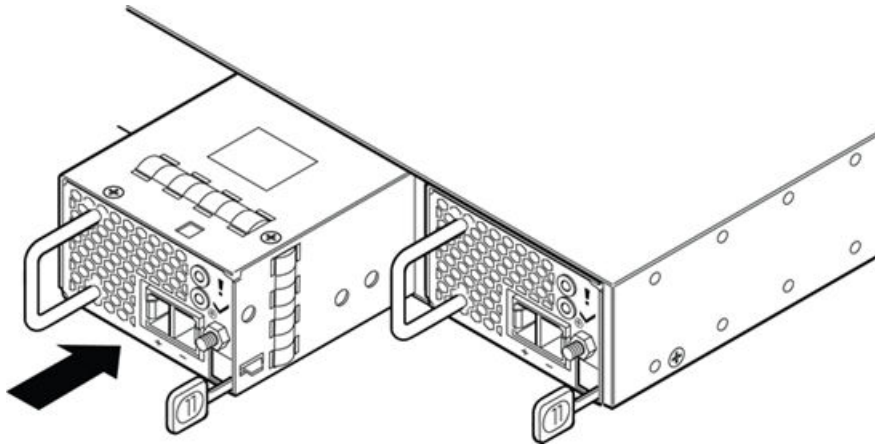


Figure 157: Installing an 1100 W DC Power Supply

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



Caution

Do not slam the power supply into the switch.

- To install a second power supply, repeat the procedure.



Note

If power supplies are not installed in both power supply bays, be sure to install a cover over the unoccupied bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

- Connect the ground wire, following the steps in [Connecting the Ground Wire to a 550 W DC Power Supply](#) on page 197.

Connecting the Ground Wire to an 1100 W DC Power Supply

To connect the ground wire to the 1100 W DC power supply, follow these steps:



Warning

Be sure to connect the ground wire before you connect any power cables to the power supply.

- Verify that the DC circuit is de-energized.
- Identify the grounding post on the right side of the power supply, above the latching tab.

- 3 Connect the ground wire to the grounding post as follows:
 - a Remove the nut from the grounding post.
 - b Slide the ring terminal of the ground wire onto the grounding post (callout 1 in [Figure 158](#)).

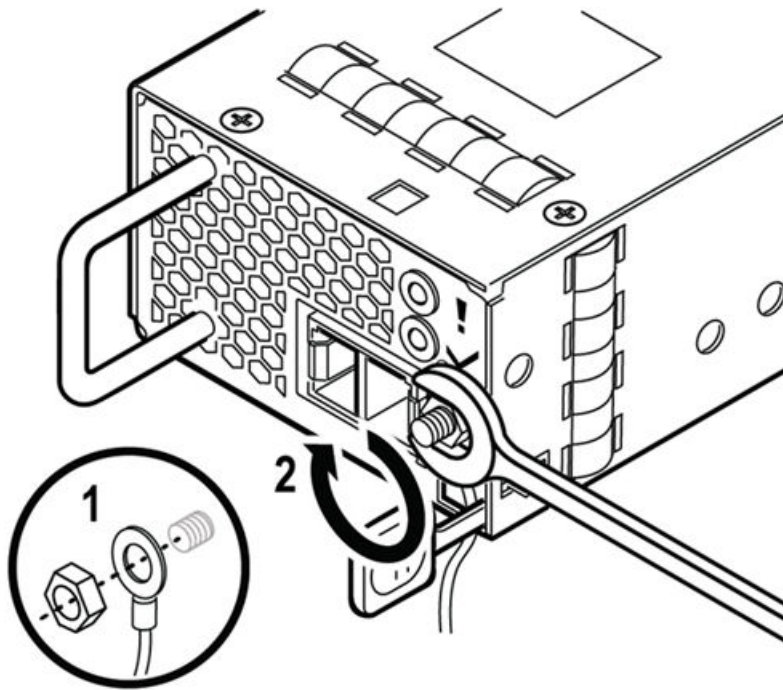


Figure 158: Securing the Ground Wire

- c Screw the nut onto the grounding post (callout 2).
 - d Tighten the nut to 7 in-lb (0.79 N m).
- 4 Connect the other end of the wire to a known reliable earth ground point at your site.

Connect the power supply to the power source, following the instructions in [Connecting an 1100 W DC Power Supply to the Source Voltage](#) on page 209.

Connecting an 1100 W DC Power Supply to the Source Voltage

Summit 1100 W DC power supply units must connect to a -48V source.

The DC power connection at your facility must be made by a qualified electrician, following these instructions.



Warning

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



Caution

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

- 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 Verify that the ground wire is attached to the power supply.
See [Figure 158](#) on page 209.
- 4 Insert a screwdriver into both slots on the top of the terminal connector and loosen the screws enough to accommodate a stripped power input cable.
- 5 Insert the DC power cables into the connector.
 - a Slide the end of the **positive** wire (-48 V RTN) into the **positive** terminal (labeled **+**, on the left side of the connector).
 - b Tighten the screw on the top of the positive terminal connector to between 4.4 in-lb (0.50 N m) and 7.1 in-lb (0.8 N m).

See [Figure 159](#).

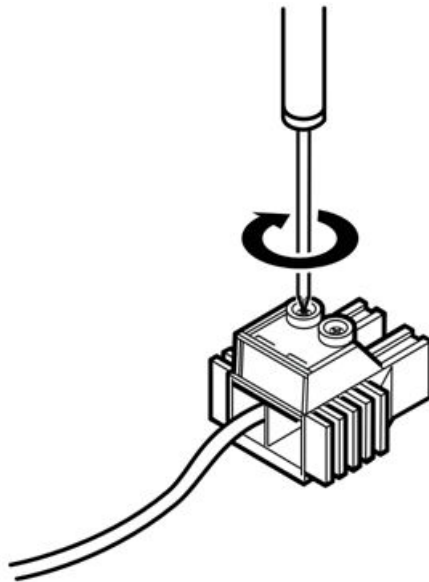


Figure 159: Inserting the DC Power Cables into the Connector

- c Slide the end of the **negative** wire (-48 V) into the **negative** terminal (labeled **-**, on the right side of the connector).
- d Tighten the screw on the top of the negative terminal connector to between 4.4 in-lb (0.50 N m) and 7.1 in-lb (0.8 N m).

- 6 Insert the connector into the slot on the power supply.

See [Figure 160](#).

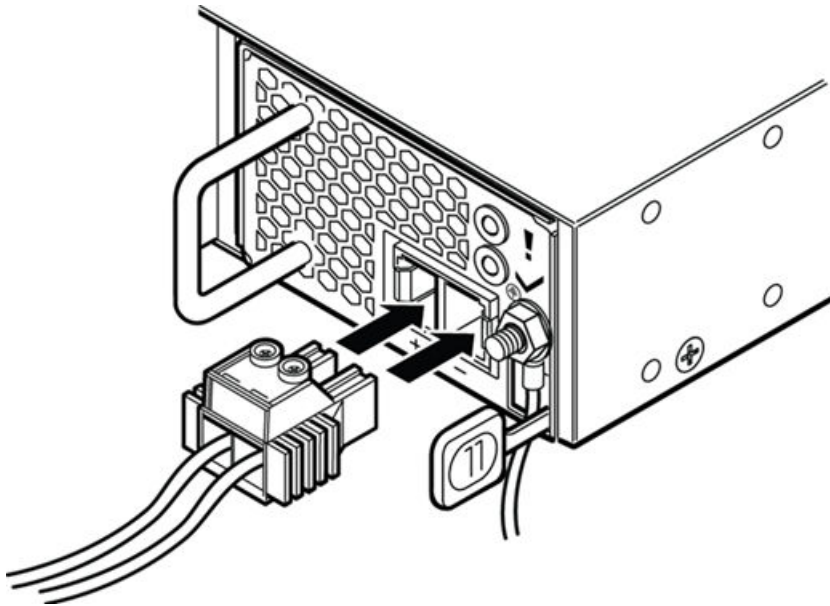


Figure 160: Inserting the Connector into the Power Supply

- 7 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.
- 8 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 network interface cables to the switch, using the instructions in [Connecting Network Interface Cables](#) on page 220.

Installing Internal AC Power Supplies

The following AC internal power supplies (PSUs) are available for Extreme Networks switches:

300 W AC PSU	Part numbers 10930 and 10930A. Compatible with X460-G2 switches, X620-16t switches, and X620-16x switches. For installation instructions, see Install a 300 W or 750 W Internal AC Power Supply on page 212.
350 W AC PSU	Part numbers 10953 and 10954 are compatible with X460-G2 PoE switches. Part number 10953 is compatible with X465-48T the switch model. For installation instructions, see Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 218.
550 W AC PSU	Part numbers 10925 through 10928. Compatible with X670-G2 and X770-32q switches. For installation instructions, see Install a 550 W Internal AC Power Supply on page 216.
715 W AC PSU	Part numbers 10951 and 10952 are compatible with X450-G2 and X460-G2 PoE switches. Part number 10951 is compatible with ExtremeSwitching X465 PoE switch models. For installation instructions, see Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 218.

750 W AC PSU	Part number 10931. For PoE switches. Compatible with the EPS-C2 external power supply. For installation instructions, see Install a 300 W or 750 W Internal AC Power Supply on page 212.
770 W AC PSU	Part numbers 10960 and 10961. Compatible with X690 and X870 series switches. For installation instructions, see Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 218.
1100 W AC PSU	Part numbers 10941 and 10942 are compatible with X450-G2 and X460-G2 PoE switches. Part number 10941 is compatible with ExtremeSwitching X465 PoE switch models. For installation instructions, see Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 218.
2000 W AC PSU	Part number XN-ACPWR-200W-F. Compatible with ExtremeSwitching X465 PoE switches. For installation instructions, see Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 218.

Selecting Power Cords for AC Power Supplies

An AC power cord is not included with an AC power supply.

You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed under [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

Install a 300 W or 750 W Internal AC Power Supply

To install a 300 W or 750 W AC power supply in a switch, follow these instructions.



Warning

To prevent an electrical hazard, make sure that the AC power cord is not connected to the power supply before you install the power supply in the power supply bay.



Caution

Make sure that the AC power supply circuit is not overloaded. Use proper over-current protection, such as a circuit-breaker, to prevent over-current conditions.

- 1 If necessary, remove a blank panel from the back of the switch (see the following figures).

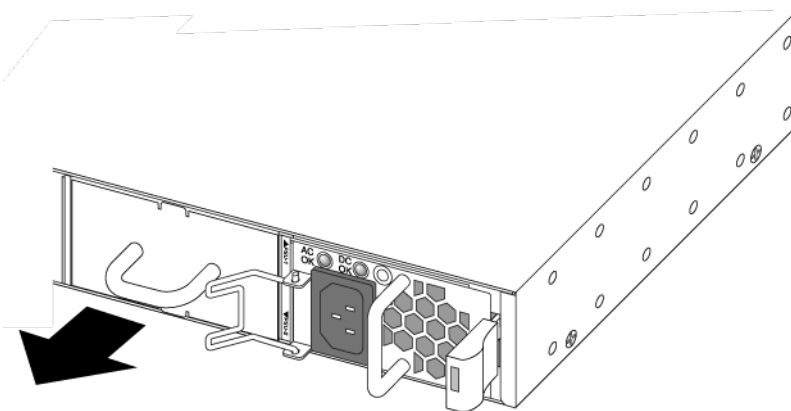


Figure 161: Removing a Blank Panel (300 W Power Supply Unit)

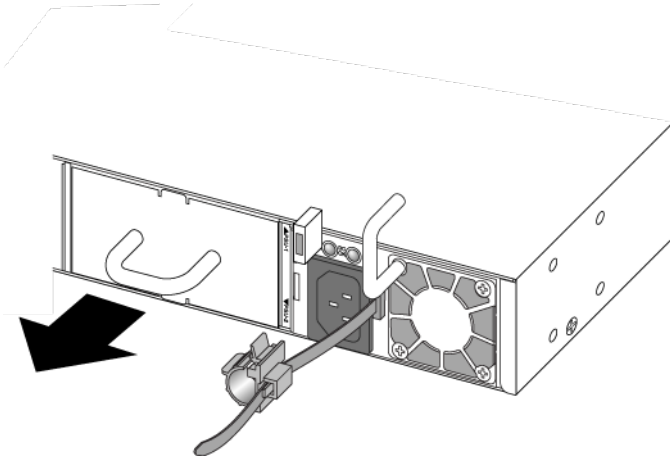


Figure 162: Removing a Blank Panel (750 W Power Supply Unit)

- 2 Verify that the power supply is right side up.
- 3 Verify that the power supply's airflow direction (front-to-back or back-to-front) is compatible with the switch.
- 4 Carefully slide the power supply all the way into the power supply bay (see the following figures).

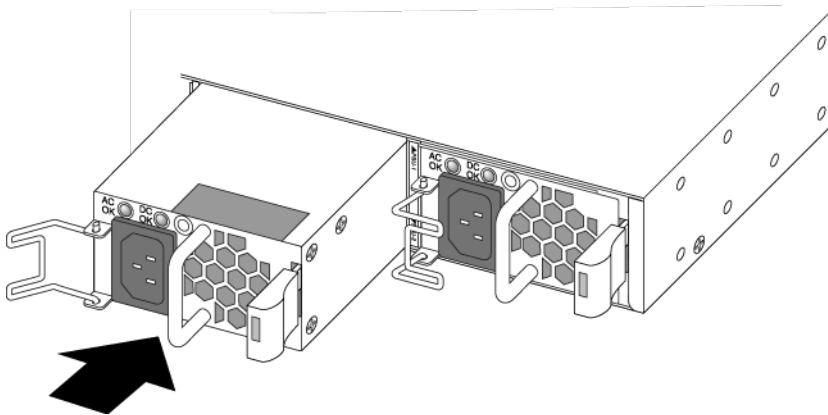


Figure 163: Installing a 300 W AC Power Supply

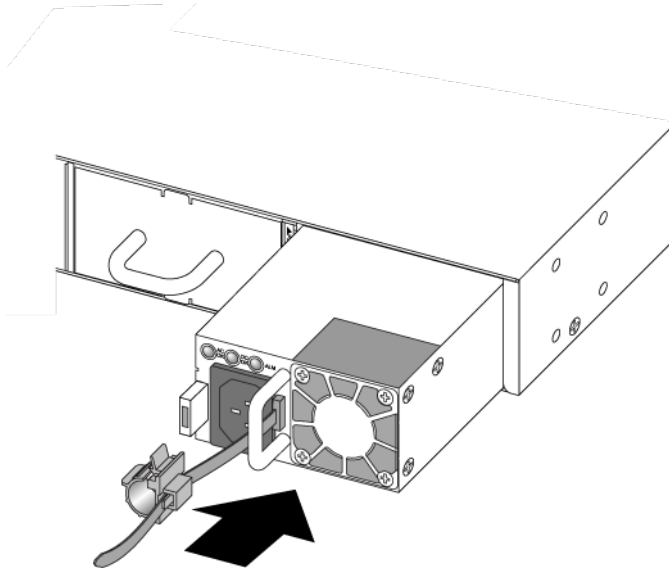


Figure 164: Installing a 750 W AC Power Supply

- 5 Push the power supply in until the latch snaps into place.



Caution

Do not slam the power supply into the switch.



Note

If power supplies are not installed in both power supply bays, be sure to install a cover over the unoccupied bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

- 6 Connect the AC power cord.

For 300 W AC power supplies: 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.

For 750 W AC power supplies:

- a If necessary, slide the plastic cord retainer farther away from the back of the switch (see [Figure 165](#)).

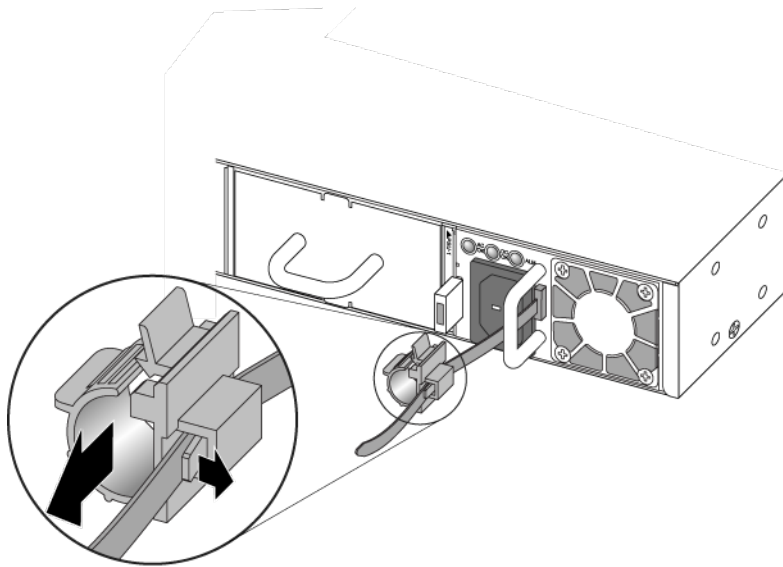


Figure 165: Moving the Power Cord Retainer

- b Connect the AC power cord to the input connector (see [Figure 166](#)).

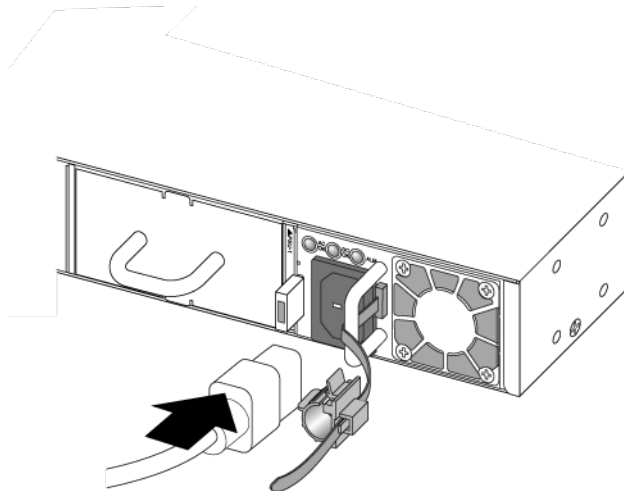


Figure 166: Connecting the Power Cord

- c Open the clip and slip it over the barrel of the connector (see [Figure 167](#)).

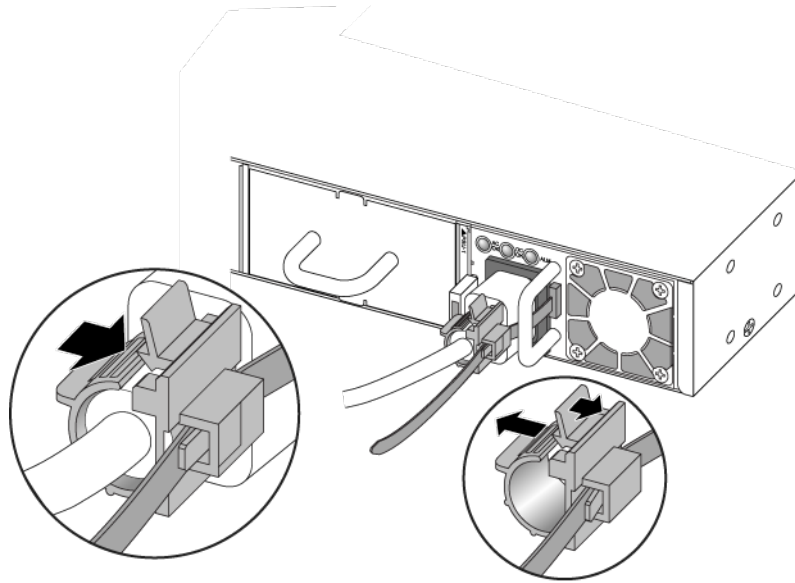


Figure 167: Attaching the Power Cord Retainer

- d Snap the clip firmly around the connector.
- 7 Connect the other end of the power cord to an AC power outlet.



Warning

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

To install a second power supply, repeat step 1 on page 212 through step 7.

Install a 550 W Internal AC Power Supply

Some switches are shipped without installed power supplies. They accommodate one or two Summit 550 W AC power supply units.

Summit 550 W AC power supplies are available for switches with either front-to-back or back-to-front airflow.

An AC power cord is not included with the AC power supply. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

Before installing the power supply:

- Verify that the switch rack or chassis has been grounded.
- Verify that the airflow direction for the power supply is the same as the airflow direction of the installed fan modules in the switch.

When installing an AC power supply, be sure to observe the following precautions:

**Warning**

To prevent an electrical hazard, make sure that the AC power cord is not connected to the power supply before you install the power supply in the power supply bay.

**Caution**

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

To install a Summit 550 W power supply (AC power), follow these steps:

- 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 If necessary, remove a blank panel from the rear of the switch.

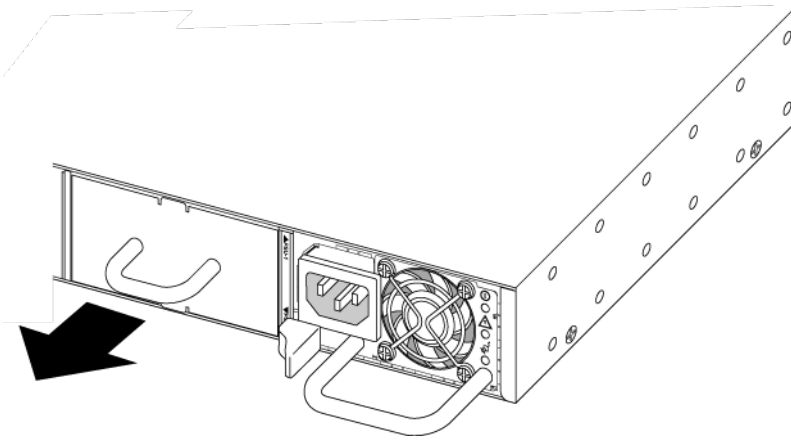


Figure 168: Removing a Blank Panel

- 3 Verify that the power supply is right side up.
The power supply should be oriented as shown in [Figure 169](#).
- 4 Carefully slide the power supply all the way into the power supply bay.

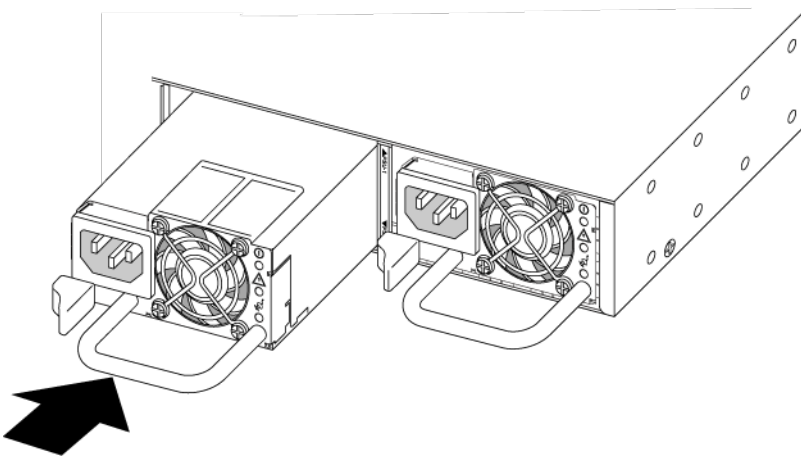


Figure 169: Installing a Power Supply

- 5 Push the power supply in until the latch snaps into place.

**Caution**

Do not slam the power supply into the switch.

- 6 To install a second power supply, repeat the procedure.

**Note**

If power supplies are not installed in both power supply bays, be sure to install a cover over the unoccupied bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

- 7 Connect the AC power cord to the input connector on the power supply.

**Warning**

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

- 8 Connect power. See [Connecting Power to the Switch](#) on page 219.

Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply

**Warning**

To prevent an electrical hazard, make sure that the AC power cord is not connected to the power supply before you install the power supply in the power supply bay.

**Caution**

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

An AC power cord is not included with the AC power supply. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

To install a 350 W, 715 W, 770 W, 1100 W, or 2000 W AC power supply in a switch, follow these steps:

- 1 If necessary, remove a blank panel from the back of the switch.
- 2 Verify that the power supply is right side up.
- 3 Verify that the power supply's airflow direction (front-to-back or back-to-front) is compatible with the switch.
- 4 Carefully slide the power supply all the way into the power supply bay, as shown in [Figure 170](#).

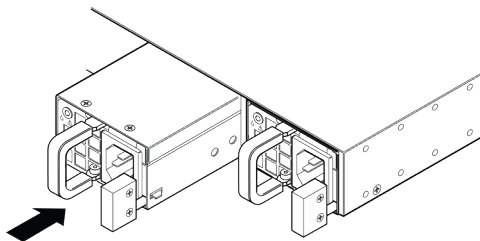


Figure 170: Installing a Summit AC Power Supply (770 W Model Shown)

- 5 Push the power supply in until the latch snaps into place.



Caution

Do not slam the power supply into the switch.



Note

If power supplies are not installed in both power supply bays, be sure to install a cover over the unoccupied bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

- 6 Connect the power cord to the power supply.
If the power supply is equipped with a power cord retainer, use the retainer to secure the power cord to the power supply.
- 7 Connect the power cord to a grounded AC power outlet.



Warning

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

- 8 To install a second power supply, repeat the procedure.

Connecting Power to the Switch

An AC power cord is not included with the AC power supply. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

To turn on an Extreme Networks switch, do the following.

- 1 For switches that are connected to AC power, connect the power cord to the AC power input socket on the switch (or power supply) and to an AC power outlet.
- 2 For switches that are connected to DC power, do the following:
 - a Verify that the DC circuit is de-energized.
 - b Identify the grounding lug on the rear of the switch.

The grounding lug is identified by the international symbol for earth ground:



- c Connect the spade terminal end of the ground wire to the grounding lug with the M4x0.7 screw provided. Connect the other end to a reliable earth ground.
Use stranded copper wire, sized between 14 AWG and 6 AWG.
 - d Using a cross-head (Phillips) torque screwdriver, tighten the retaining screw to 20 in-lb (2.25 N m).
 - e Connect the DC power input cables to the DC input terminal block on the rear of the switch.
 - f Energize the circuit.
- 3 If applicable, attach the cable from your redundant power supply (RPS) into the switch's redundant power supply receptacle.

- 4 When power is connected, verify that the PSU LED and RPS LED (if applicable) turns green.

When both LEDs have turned green, follow the instructions in [Connecting Network Interface Cables](#) on page 220.

If the PSU and RPS LEDs do not turn green, see the *Switch LEDs* topic for your switch model (in the [ExtremeSwitching Switches](#) on page 10 section) for troubleshooting information.

Connecting Network Interface Cables

Use the appropriate type of cable to connect the ports of your switch to another switch or router.

Cable Type	Maximum Distance
CAT5E	55 meters
CAT6	55 meters
CAT6A	100 meters

Working carefully, one port at a time, do the following:

- 1 Verify that you have identified the correct cable for the port.
- 2 Use an alcohol wipe or other appropriate cleaning agent to clean the cable connectors; make sure they are free of dust, oil, and other contaminants.
- 3 If you are using optical fiber cable, align the transmit (Tx) and receive (Rx) connectors with the correct corresponding connectors on the switch or the I/O module.
- 4 Press the cable connectors into their mating connectors on the switch or I/O module until the cable connector is firmly seated.
- 5 Repeat the preceding steps for the remaining cables on this or other switches or I/O modules.
- 6 Dress and secure the cable bundle to provide appropriate strain relief and protection against bends and kinks.

Performing Initial Management Tasks

When you set up a switch for the first time, you must connect to the console to access the switch and log in to perform initial security configuration.

Check <http://ezcloudx.com/supportedhardware> to see what switch models can be managed with ExtremeCloud. If your switch is entitled for management by ExtremeCloud, you can optionally use the installation instructions at <http://ezcloudx.com/quickstart>.

Otherwise, to perform normal setup and configuration, follow the instructions in these topics:

- [Connecting a Switch to the Management Console](#) on page 221
- [Logging in for the First Time](#) on page 221

You can also:

- [Configuring the Switch's IP Address for the Management VLAN](#) on page 222
- [Configuring ExtremeXOS on the Switch](#) on page 223

Connecting a Switch to the Management Console

Connect each switch to a central console to enable direct local management of the switch.

Each switch should be connected to a management console – a terminal or PC with terminal-emulation software. For all Extreme Networks switches, the terminal or PC must be configured with the following settings:

- Baud rate: 115200 (for X465, X590, X690, or X870) or 9600 (for other models) (see note)
- Data bits: 8
- Stop bit: 1
- Parity: None
- Flow control: XON/XOFF



Note

Set the baud rate to 115200 when using the RJ45 Ethernet management port on an X465, X590, X690 or X870 series switch.

For information about setting the proper values, refer to the documentation supplied with the terminal or PC.

Ensure that the connection between the switch and the management console is over either an RJ45-to-serial adapter or a DB9 serial cable. Appropriate cables are available from your local supplier, or you can make your own. To ensure the electromagnetic compatibility of the unit, use only shielded serial cables. For connector pinouts associated with the console port, see [Console Connector Pinouts](#) on page 393.

Logging in for the First Time

After your switch has completed all power-on self-tests, it is operational. Before logging in, verify that the switch LEDs are on (solid green or blinking green) and that it is connected to a management console as described in [Connecting a Switch to the Management Console](#) on page 221.

To perform the initial login and complete initial configuration tasks, follow these steps.

- 1 Using a terminal emulator such as PuTTY or TeraTerm, connect to the switch using the serial port connection.

Be sure that your serial connection is set properly:

- Baud rate: Baud rate: 115200 (for X465, X590, X690, or X870) or 9600 (for other models) (see note)
- Data bits: 8
- Stop bit: 1



Note

Set the baud rate to 115200 when using the RJ45 Ethernet management port on an X465, X590, X690 or X870 series switch.

- 2 At the management console, press **[Enter]** one or more times until you see the login prompt.

- At the login prompt, log in using the default user name `admin`.

For example:

```
login: admin
```



Note

For the initial password, simply press **[Enter]**.

When you have successfully logged on to the system, the command line prompt displays the system name (for example, `SummitX670-G2#`) in its prompt. You are logged in with administrator privileges, which gives you access to all switch functions.

- Respond to the screen prompts to configure the level of security you need.



Note

For more information about logging in to the switch and configuring switch management access, see the [ExtremeXOS 22.6 User Guide](#).

- Enter `show version`.

The switch serial number is displayed, as highlighted in the following example. Make a note of this number for future reference.

```
Transit.3 # show version
Switch : 800444-00-05 0723G-01234 Rev 5.0 BootROM:
```

Configure the switch's IP address for the management virtual LAN (VLAN) by following the steps in [Configuring the Switch's IP Address for the Management VLAN](#) on page 222.

Configuring the Switch's IP Address for the Management VLAN

You can configure the switch's IP address for the management virtual LAN (VLAN).



Note

The management port is part of the `mgmt` VLAN. This VLAN membership cannot be changed.

Log in to the management console, connect to the switch, and follow these steps.

- Assign a name, IP address, and default subnetwork mask for the VLAN as shown in the following example.

```
configure vlan vlan_name ipaddress nn.nn.nn.nn 255.255.255.0
```

Your changes take effect immediately.

- Enter `save` to save your configuration changes so that they will be in effect after the next system reboot.



Note

For more information about saving configuration changes, see the [ExtremeXOS 22.6 User Guide](#).

The configuration is saved to the configuration database of the switch.

Configure the ExtremeXOS software on the switch by following the steps in [Configuring ExtremeXOS on the Switch](#) on page 223.

Configuring ExtremeXOS on the Switch

To make a switch ready for use, ExtremeXOS must be downloaded and configured. To do this, log in to the management console, connect to the switch, and follow these steps.



Note

The management console can run on a terminal or a PC with terminal-emulation software. In these steps, the term PC is used to refer to both.

- 1 Go to the [Product Registration](#) page and provide the requested information.
- 2 Enter the serial number of the switch.
You can obtain the serial number by entering `show version` on the management console, as described in step 5 on page 222.
- 3 From the [Software Download](#) page, download the ExtremeXOS image file to the PC.
- 4 When the download is complete, connect back to the switch through the management console.
Then connect an Ethernet cable from the switch's management port to a serial port on your PC. (Alternatively, you can connect to the PC using a serial-USB adapter.)



Note

To avoid an IP address conflict, you might need to change the IP address for the PC, for example to 10.10.10.10 255.255.255.0.

- 5 Start a TFTP session using a program such as TFTP64.
Set the TFTP Server's IP address option to match the one configured in step 4.
- 6 At the switch, download the new software to the switch, for example:

```
download image 10.10.10.10 summitX-22.2.1.5.xos
```
- 7 When you are asked whether you want to install the downloaded software, enter `y`.
- 8 When the download and installation have completed, use the `reboot` command to begin using the version just installed.

The switch is ready for use.

7 Installing External Power Supplies

Safety Considerations for Installing Power Supplies

Pre-installation Requirements

Installing an EPS-C2 Power Supply

Installing an RPS-150XT Redundant Power Supply

Installing an RPS-500p Redundant Power Supply

Installing an STK-RPS-150PS Redundant Power Supply

Installing an STK-RPS-1005PS Redundant Power Supply

Installing a VX-RPS-1000 Redundant Power Supply

Read the information in the following sections thoroughly before you attempt to install or remove an external power supply.

For information about installing external power supplies that work with other Extreme Networks switches, refer to [ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier](#).

Safety Considerations for Installing Power Supplies

Only trained service personnel should perform service to Extreme Networks switches and their components.

Trained service 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.

Caution



Extreme Redundant Power Supplies (RPS) do not support the ability for the RPS to be connected to an operational switch. Connecting an RPS to an operational switch can have an adverse effect on the switch. It is best practice that both the switch and the RPS be powered down prior to cabling them together. Once the cabling is completed, turn on the RPS, then turn on the switch.

Warning



Extreme Networks AC power supplies do not have switches for turning the unit on and off. To disconnect the power to an Extreme Networks AC power supply, remove the wall plug from the electrical outlet. Make sure that this connection is easily accessible.

Warning



When the power supply is outside the chassis (not installed), do not plug the power supply into an electrical outlet. Plugging an uninstalled AC power supply into an electrical outlet exposes you to a hazardous energy and is a potential fire hazard.

**Caution**

Before installing or removing any components of the system, or before carrying out any maintenance procedures, read the safety information provided in [Safety and Regulatory Information](#) on page 396. Not following these precautions can result in equipment damage or shock.

**Caution**

Be sure that proper ESD controls are in use before switch maintenance is performed. This includes but is not limited to wrist straps that are grounded to the switch chassis and earth grounds.

**Note**

See "Technical Specifications" for additional information regarding regulatory compliance certifications.

Pre-installation Requirements

You need the following tools and equipment to install an external power supply:

- # 1 Phillips screwdriver
- Rack mount screws suitable for your organization's equipment rack
- Screwdriver suitable for use with your rack-mount screws
- AC power cord

An AC power cord is not included with the external power supply. Obtain a power supply cord that meets the requirements listed under [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

**Note**

When you connect an external power supply, consider all of the equipment that is connected to the power supply circuit to ensure that the circuit is not overloaded. Use proper overcurrent protection, such as a circuit breaker, to prevent overcurrent conditions.

The switch and each redundant power supply source should be plugged into separate branch circuits to provide redundancy.

Installing an EPS-C2 Power Supply

Install one, two, or three Summit 750 W AC power supplies (model 10931) in the EPS-C2 chassis (model 10936) to build an external redundant power system for one or more compatible switches

One redundant power cable is shipped with the EPS-C2 chassis to provide the connection between the external power system and the redundant power input connector on the back of a switch. Additional redundant power cables are available from Extreme Networks.

When installing an EPS-C2 chassis at the same time as a switch, install the components in the following order:

- 1 Install the switch into a rack.

- 2 Install the EPS-C2 chassis into a rack.
- 3 Install power supplies into the EPS-C2 chassis.
- 4 Attach the redundant power cable from the EPS-C2 chassis to the switch.
- 5 Attach an AC power cord to the switch's internal power supply.
Then plug it into an AC power source.
- 6 Connect AC power cords to the internal power supplies of the EPS-C2 chassis.
Then plug each cord into an AC power source.



Warning

Be sure to attach power to components in the order listed in this section. If you attach power out of the order listed, you can damage your equipment.

The following sections describe the specific steps for installing the EPS-C2 chassis.



Note

An AC power cord is not provided with the Summit 750 W AC power supply. See [Selecting Power Supply Cords](#) on page 401 for information about selecting a power cord.

Installing an EPS-C2 Chassis

Figure 171 shows an EPS-C2 chassis mounted above a switch in a rack.

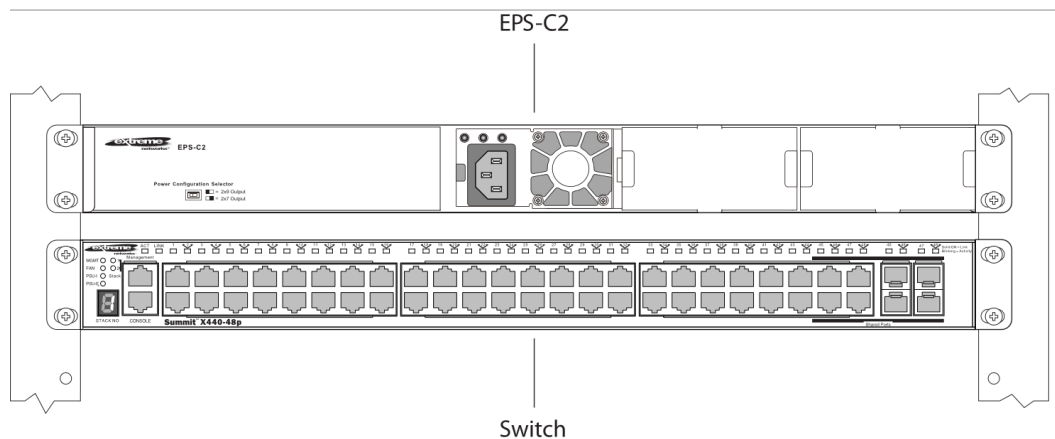


Figure 171: EPS-C2 Power System Chassis and Switch

To mount the EPS-C2 chassis in a 19-inch rack, follow these steps:

- 1 Place the EPS-C2 chassis upright on a secure work surface.
- 2 Remove the mounting bracket kit from the packaging.

- 3 Attach the mounting brackets as follows:
 - a Place a mounting bracket over the mounting holes on one side of the EPS-C2 (see [Figure 172](#)).
 - b Insert the screws and fully tighten them using a screwdriver.

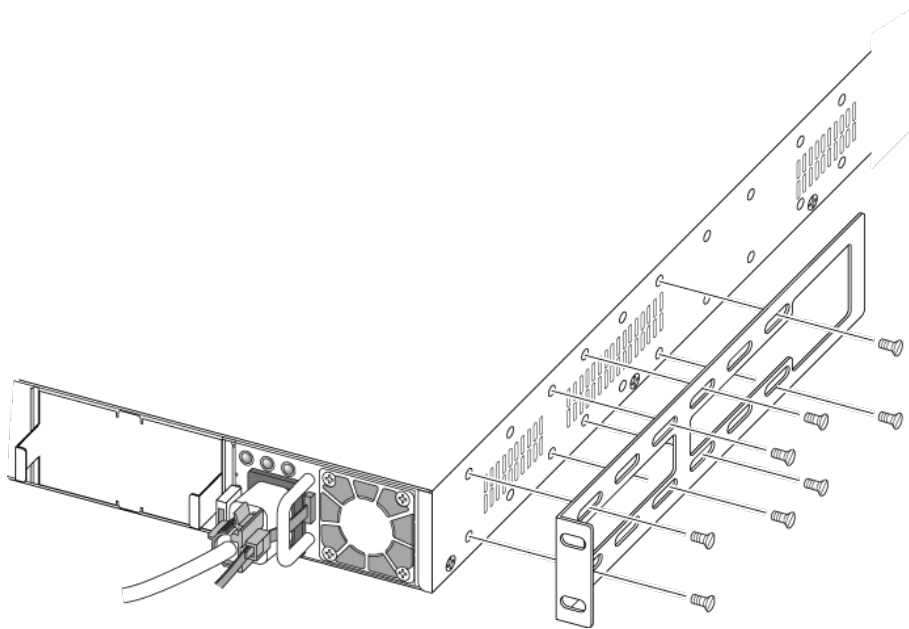


Figure 172: Attaching the Mounting Bracket to the EPS-C2 Chassis

- c Attach the mounting bracket for the other side of the EPS-C2.
- 4 Slide the EPS-C2 into the rack and secure it using appropriate rack-mount screws. See [Figure 173](#).

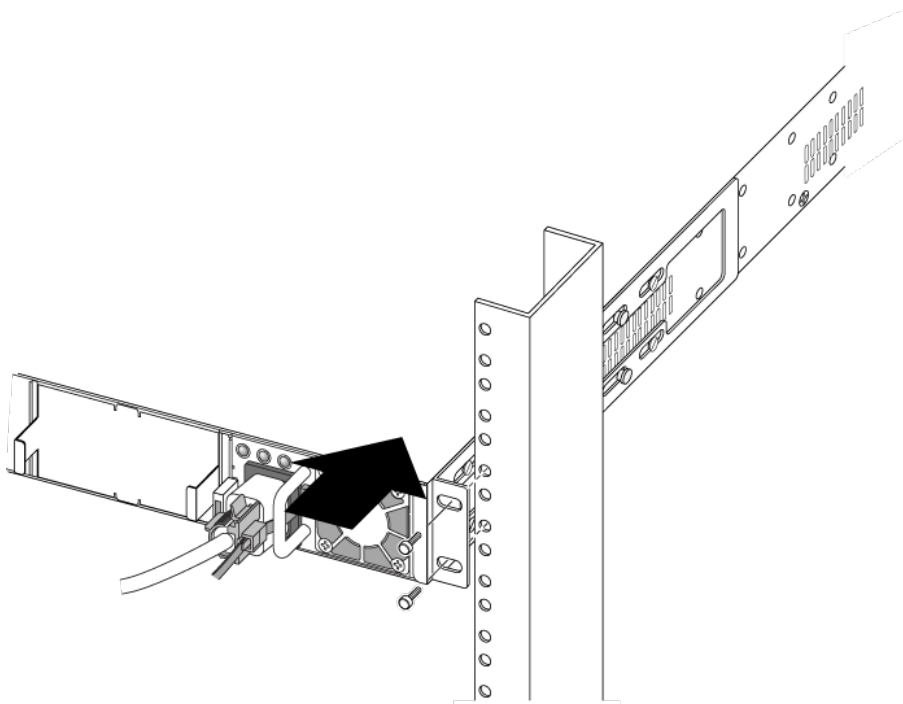


Figure 173: Sliding the EPS-C2 into the Rack and Securing it

Installing a Summit 750 W AC Power Supply into the EPS-C2

The EPS-C2 chassis is shipped with slots 2 and 3 covered and slot 1 open.

We recommend that you install a power supply first in slot 1, but this is not required. You can install power supplies into any of the slots in the EPS-C2 chassis. The installation sequence does not affect the performance of the power supply units, but empty slots must be covered at all times.



Warning

To prevent an electrical hazard, make sure that the AC power cord is not connected to the power supply before you install the power supply in the power supply bay.

After the EPS-C2 has been installed in a rack, do the following to install a 750 W AC power supply in an EPS-C2 chassis:

- 1 If necessary, grasp the two tabs on either side of the slot cover and pull gently to remove it from the front of the EPS-C2 chassis.

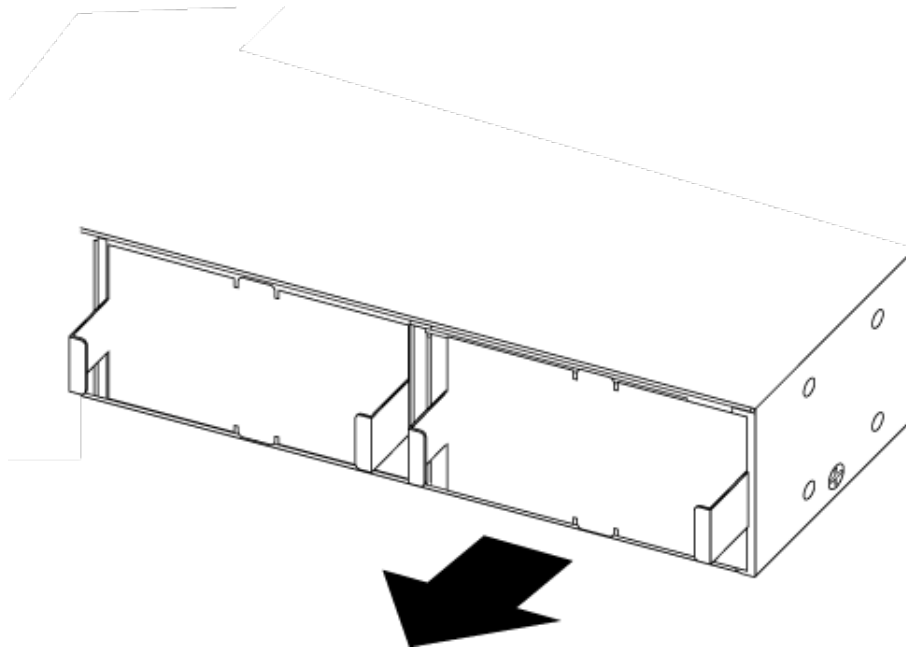


Figure 174: Removing a Blank Panel from the EPS-C2 Chassis

- 2 Verify that the power supply is right side up (there is a sticker labeled “This Side Up”).
- 3 Carefully slide the power supply all the way into the slot in the EPS-C2 chassis (see [Figure 175](#)).

- 4 Push the power supply in until the latch snaps into place.



Caution

Do not slam the power supply into the chassis.

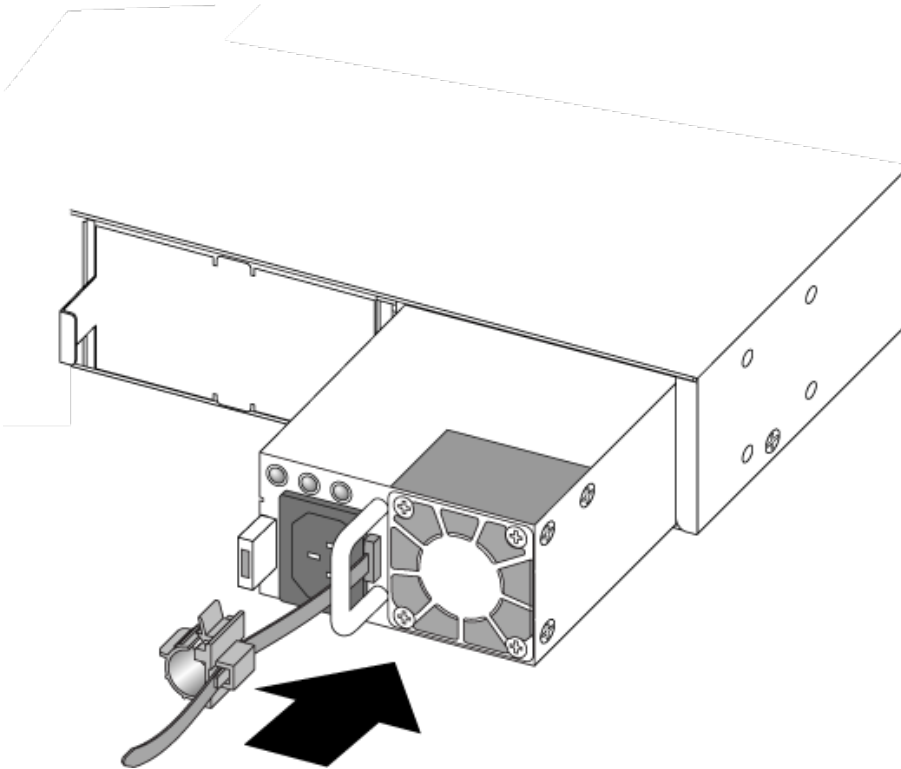


Figure 175: Installing a 750 W AC Power Supply in an EPS-C2 Chassis



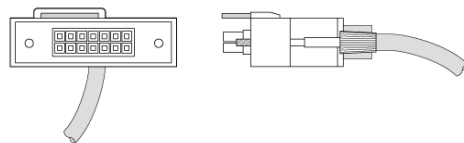
Note

If power supplies are not installed in all three slots, be sure to install a cover over each unoccupied slot. Unoccupied slots must always be covered to maintain proper system ventilation and EMI levels.

Repeat the procedure to install each additional power supply.

Connecting Redundant Power Cables for the EPS-C2 Chassis

The EPS-C2 chassis can use up to five 2x7-pin redundant power connectors, shown in [Figure 176](#), which connect the power supply to ExtremeSwitching X440-G2 and X620 switches.



XM_055

Figure 176: EPS-C2 2x7 Pin Redundant Power Cable with Connector Key Tab

The redundant power cable has keyed ends. The key is a plastic tab on the cable connector housing to ensure correct alignment of the connector. The keyed ends of the 2x7 cable are not symmetrical; one end of the cable will fit into the EPS-C2 chassis and the other end will fit into the switch.

After the EPS-C2 has been installed in a rack and the power supplies have been installed, do the following to connect the redundant power cables:

- 1 Set the connector selection switch, located on the front of the EPS-C2 chassis, for the 2x7 connector.

See [Figure 177](#).

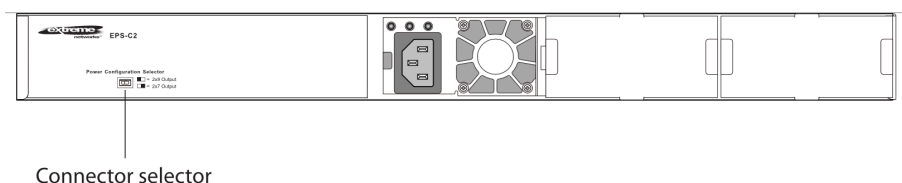


Figure 177: EPS-C2 Connector Selector Switch

- 2 Connect the keyed end (for the 2x7 connector cable, the end with the tab offset from the edge of the connector pins) of the redundant power cord to the EPS-C2 chassis.

See [Figure 178](#).

- 3 Verify that the side of the connector marked TOP is facing up.

- 4 Connect the other end of the redundant power cable (for the 2x7 connector cable, the end with the key flush with the edge of the connector pins) to the switch.

See [Figure 178](#).

Be sure that the side of the connector marked TOP is facing up.

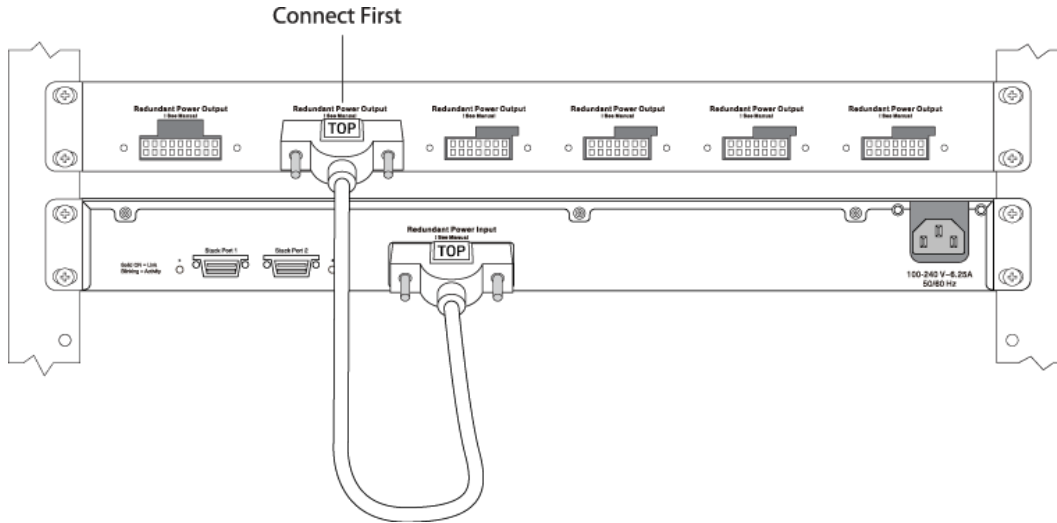


Figure 178: Installing the Redundant Power Cord



Note

The EPS-C2 2x9 connector, shown in the figure to the left of where the cable is connected, is used only with older switch models that are not compatible with ExtremeXOS version 21.1 and later.

- 5 Repeat the preceding steps to connect any additional redundant power cords.

Connecting the AC Power cord to the EPS-C2



Attention

When performing this task, observe all of the precautions listed in [Safety Considerations for Installing Power Supplies](#) on page 224.

After the redundant power cord is connected between the EPS-C2 and the switch, and an AC power cord to the internal power supply of the switch is attached to a power source, install the AC power cord to the power supplies in the EPS-C2 as follows:

- 1 If necessary, slide the plastic cord retainer farther away from the back of the power supply.
See [Figure 179](#).

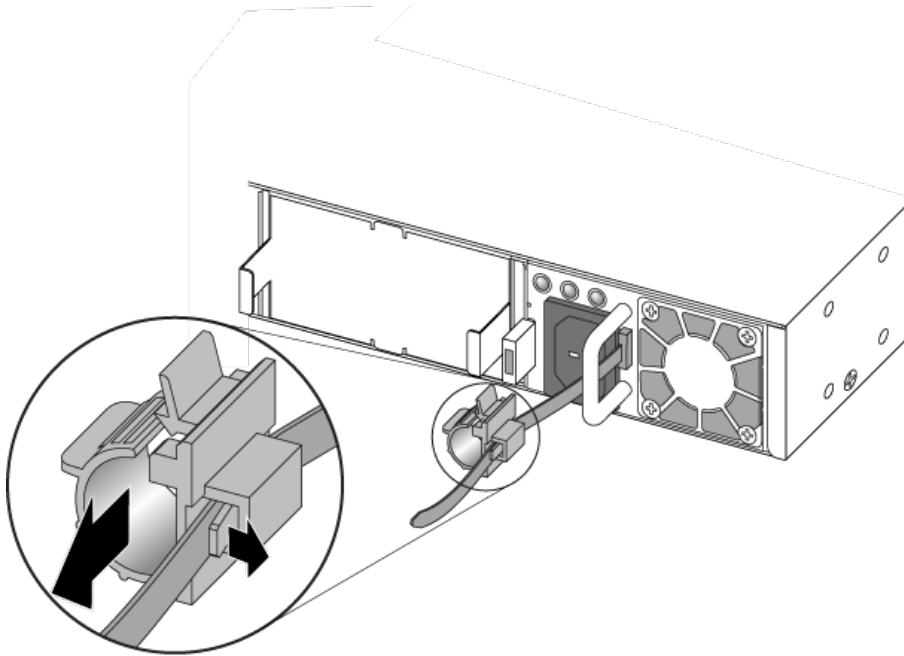


Figure 179: Moving the Power Cord Retainer on the 750 W AC Power Supply

- 2 Connect the AC power cord to the input connector.

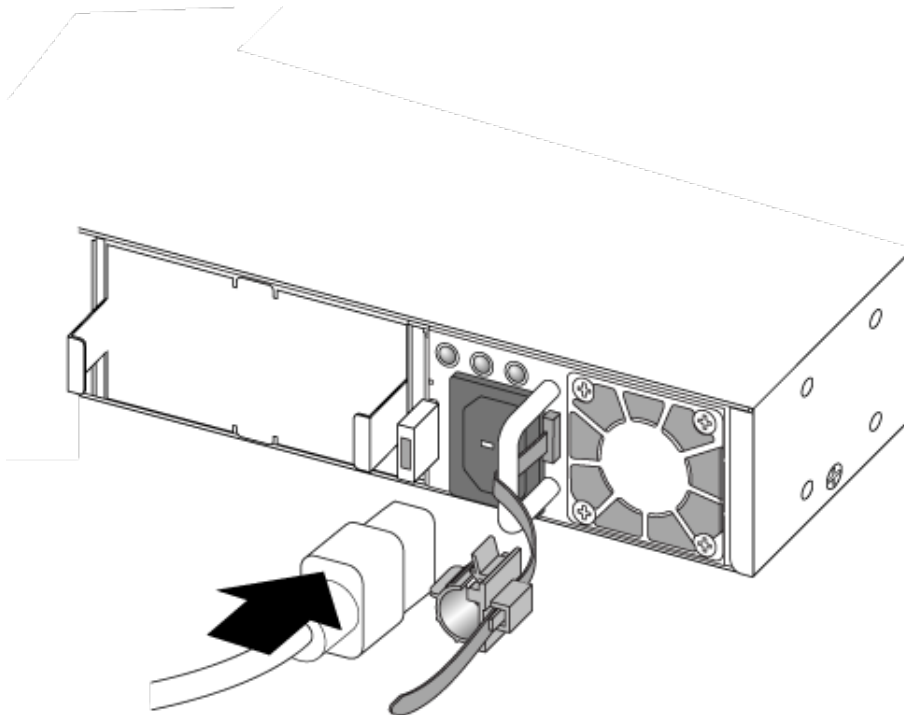


Figure 180: Connecting the Power Cord on the 750 W AC Power Supply

- 3 Open the clip and slip it over the barrel of the connector.

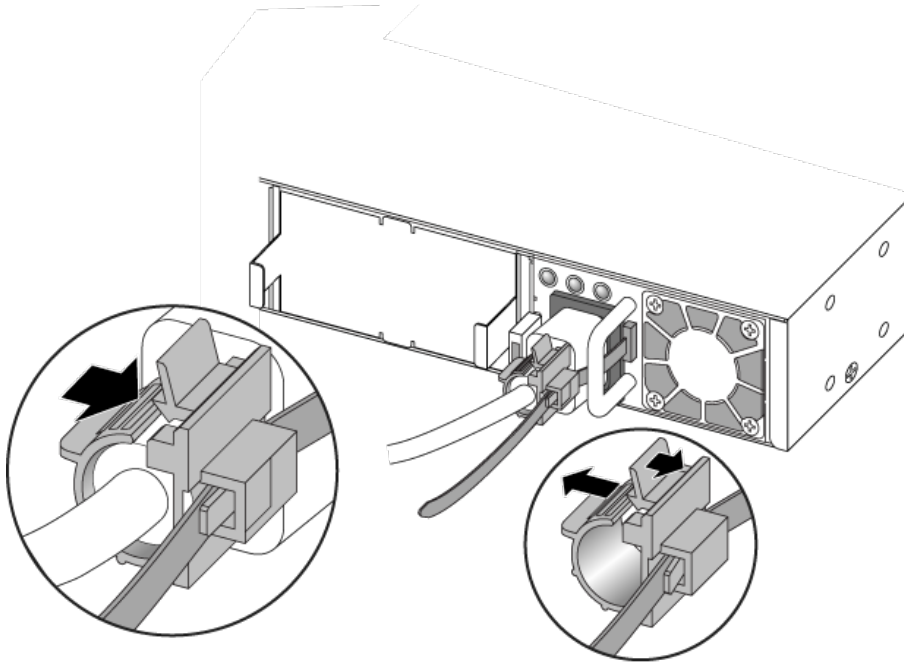


Figure 181: Attaching the Power Cord Retainer on the 750 W AC Power Supply

- 4 Snap the clip firmly around the connector.
- 5 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.



Caution

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

Installing an RPS-150XT Redundant Power Supply

You can install the RPS-150XT power supply on a flat surface or in a 19-inch rack in the three-slot modular shelf (STK-RPS-1005CH3), which is available for purchase separately.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

Only qualified personnel should install redundant power supply (RPS) units.

Unpacking the RPS-150XT

To prevent electrostatic damage, attach an electrostatic discharge (ESD) wrist strap to your wrist before handling the RPS-150XT.

Unpack the power supply as follows:

- 1 Remove the packing material protecting the power supply.
- 2 Perform a visual inspection of the power supply for any signs of physical damage. Contact Extreme Networks if there are any signs of damage.

Installation Requirements

The installation site must be within reach of the network cabling and meet the following requirements:

- Appropriate grounded power receptacles must be located within six feet of the site.
- A temperature of between 0°C (32°F) to 60°C (140°F) with fluctuations of less than 10°C (18°F) per hour must be maintained.
- A readily accessible disconnect device shall be incorporated into the building wiring.

A Phillips screwdriver and four rack screws (not supplied) are needed to install the RPS-150XT in a rack using the three-slot modular shelf.

Installing an RPS-150XT in a Rack

To install the RPS-150XT in the three-slot modular shelf (STK-RPS-1005CH3), you must first install the shelf in a 19-inch rack.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Caution

Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

To install the RPS-150XT in a rack, follow these steps.

- 1 Secure the front of the three-slot modular shelf (STK-RPS-1005CH3) to the rack by screwing four rack screws into the mounting ears on the right and left front of the shelf.

See [Figure 182](#).

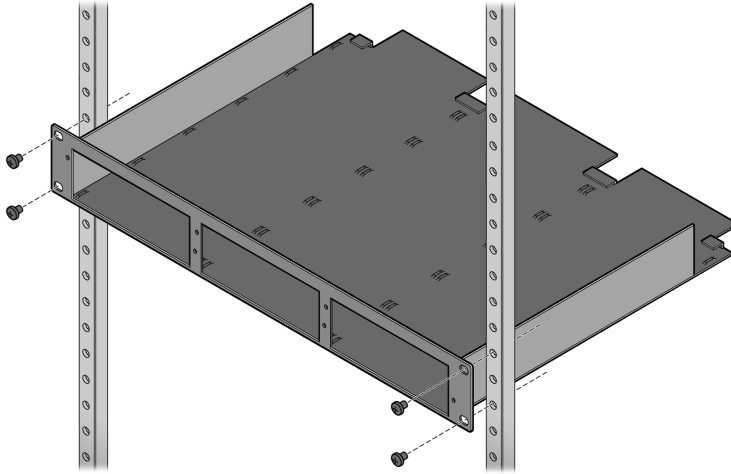


Figure 182: Securing the Three-slot Modular Shelf to a Rack

- 2 Slide the power supply into an empty bay in the shelf.

See [Figure 183](#).

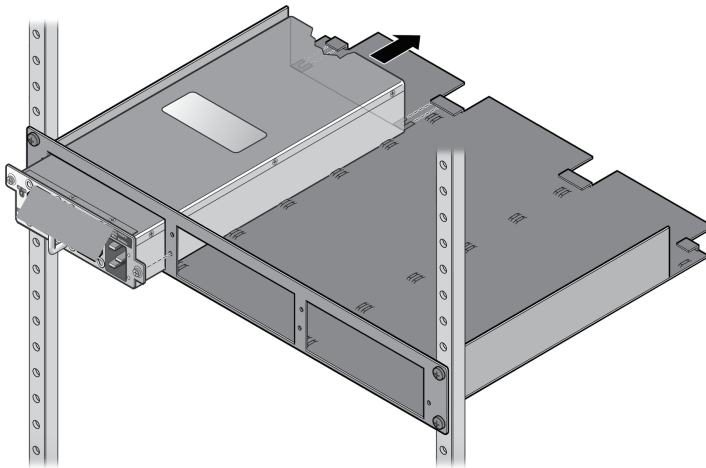


Figure 183: Installing an RPS-150XT Power Supply Unit in a Shelf

- 3 Tighten the captive screws to secure the power supply to the shelf.
- 4 Connect the RPS-150XT to its power source.

See [Connecting the RPS Cable and AC Power Cord to an RPS-150XT](#) on page 236.

Installing an RPS-150XT on a Flat Surface



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

When installing the RPS-150XT power supply on a flat surface, we recommend installing the rubber feet to prevent the power supply from sliding.



Note

Do not install the rubber feet on the power supply if you are installing the power supply in the three-slot modular shelf (STK-RPS-1005CH3).

To prepare the RPS-150XT for use on a flat surface, follow these steps.

- 1 On a sturdy flat surface, lay the power supply on its top.
- 2 Remove the four rubber feet from their plastic bag in the shipping box.
- 3 Remove the protective strip from the back of one rubber foot and position it on a bottom corner of the power supply.

Press the rubber foot firmly into place.

Repeat this step for each of the remaining three rubber feet.

- 4 After installing the rubber feet, return the power supply to its upright position.
- 5 Connect the RPS-150XT to its power source.

See [Connecting the RPS Cable and AC Power Cord to an RPS-150XT](#) on page 236.

Connecting the RPS Cable and AC Power Cord to an RPS-150XT

The RPS-150XT power supply is connected to the switch using the supplied RPS cable, as follows.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Note

The switch should not be powered on during installation or removal of the power supply. This is not a hot-swap procedure. Follow the steps in the order specified.



Warning

For some X440-G2 models, when the RPS is not powered on and is connected to a powered switch, there is potential for a sudden load change that causes the switch to reset. It is best practice to unplug the switch before connecting the RPS.

- 1 Connect one end of the RPS cable to the Redundant Power Supply connector at the rear of the power supply.
- 2 Connect the other end of the RPS cable to the Redundant Power Supply connector on the switch.

See [Figure 184](#).

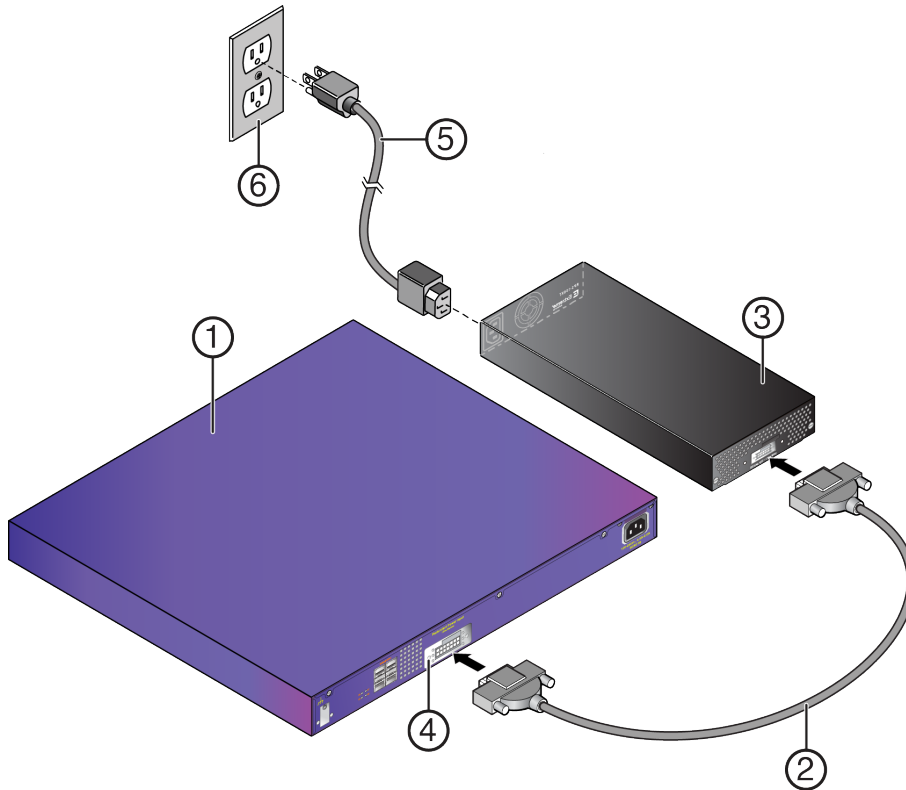


Figure 184: RPS Cable and AC Power Cord Connections for the RPS-150XT

1 = Switch	4 = Redundant Power Supply connector
2 = RPS cable	5 = AC power cord
3 = RPS-150XT	6 = AC power outlet with ground connection



Note

AC power cords and outlets vary depending on country.

- 3 Connect the AC power cord to the AC input power connector on the power supply.
- 4 Plug the AC power cord into the main AC power outlet.

The AC OK and DC OK LEDs on the front of the power supply turn green to indicate that the connection was successful and the power supply is operating properly.

If the LEDs do not light properly, follow these steps to troubleshoot:

- Check the AC power cord connection at the AC power source and make sure the power source is within specification.
- Check the AC power connection to the power supply.
- Swap the AC power cord with one that is known to work properly.

Installing an RPS-500p Redundant Power Supply

You can install the RPS-500p power supply on a flat surface or in a 19-inch rack.

**Caution**

Observe all ESD precautions when handling sensitive electronic equipment.

Locate the RPS-500p within 6 ft (1.8 m) of its power source.

Only qualified personnel should install redundant power supply (RPS) units.

Installing an RPS-500p in a Rack

To install the RPS-500p power supply in a 19-inch rack, you need the following:

- Two rack-mounting brackets and mounting screws (rack-mounting kit) shipped with the power supply
 - Four customer-supplied screws to attach the power supply to a standard 19-inch rack
-

**Caution**

Observe all ESD precautions when handling sensitive electronic equipment.

**Caution**

Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

To install the RPS-500p in a rack, follow these steps.

- 1 Attach the rack-mounting brackets to the RPS-500p using the eight M3x6mm flathead screws shipped with the power supply.

See [Figure 185](#).

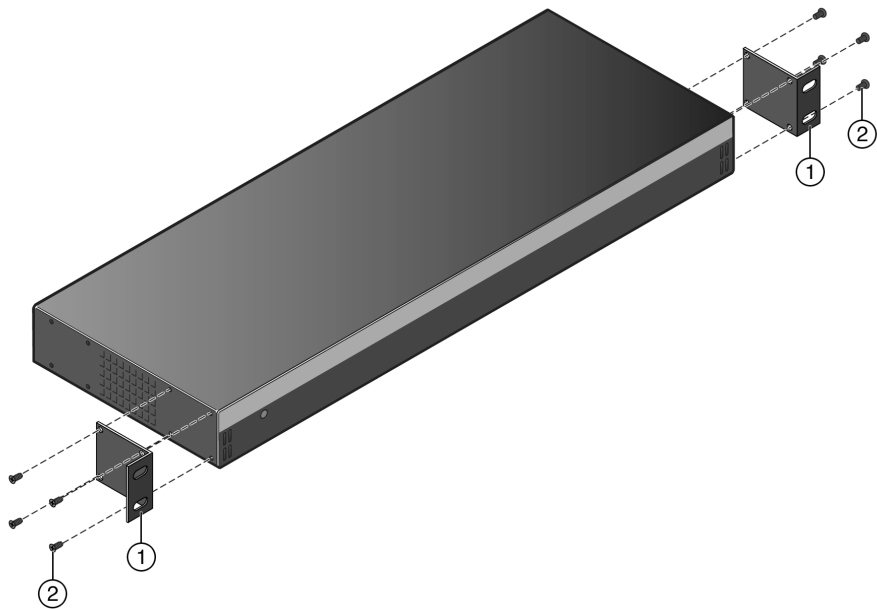


Figure 185: Attaching the Rack-Mounting Brackets

1 = Rack-mounting brackets (2)	2 = M3x6mm flathead screws (8)
--------------------------------	--------------------------------

- 2 With the rack-mounting brackets attached, position the RPS-500p between the vertical rack rails of the 19-inch rack as shown in [Figure 186](#).

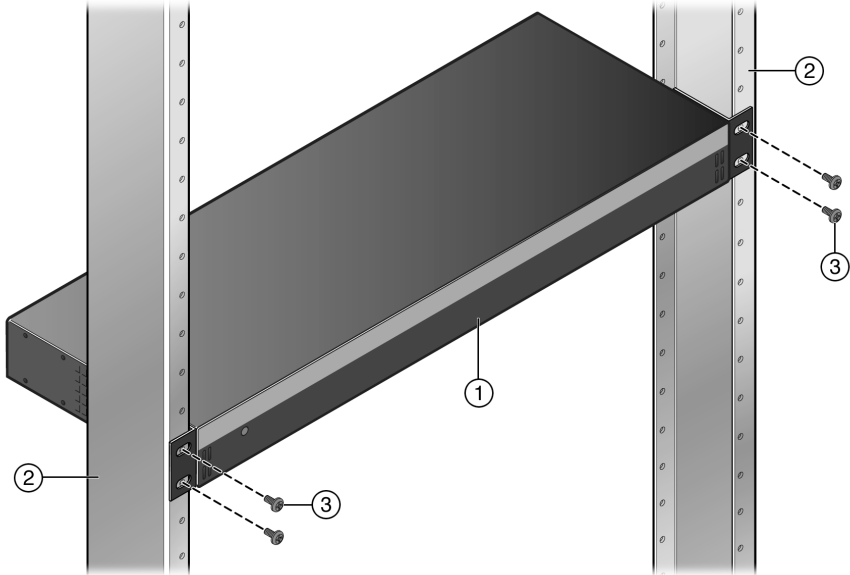


Figure 186: Fastening the RPS-500p to the Rack

1 = RPS-500p	3 = Mounting screws (4)
2 = Rails of 19-inch rack	

- 3 Fasten the RPS-500p securely to the rack rails using four customer-supplied rack screws.



- 4 If you are installing the RPS-500p in a stacked configuration, repeat this procedure for each power supply.
- 5 Connect the RPS-500p to its power source.
See [Connecting the RPS Cable and AC Power Cord to an RPS-500p](#) on page 240.

Installing an RPS-500p on a Flat Surface



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

When installing the RPS-500p power supply on a flat surface, we recommend installing the rubber feet to prevent the power supply from sliding.

To prepare the RPS-500p for use on a flat surface, follow these steps.

- 1 On a sturdy flat surface, lay the power supply on its top.
- 2 Remove the four rubber feet from their plastic bag in the shipping box.
- 3 Remove the protective strip from the back of one rubber foot and position it on a bottom corner of the power supply.

Press the rubber foot firmly into place.

Repeat this step for each of the remaining three rubber feet.

- 4 After installing the rubber feet, return the power supply to its upright position.
- 5 Connect the RPS-500p to its power source.

See [Connecting the RPS Cable and AC Power Cord to an RPS-500p](#) on page 240.

Connecting the RPS Cable and AC Power Cord to an RPS-500p



Attention

When performing this task, observe all of the precautions listed in [Safety Considerations for Installing Power Supplies](#) on page 224.

Connect the RPS-500p power supply to the PoE-compliant switch using the supplied RPS cable, as follows.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

- 1 Connect one end of the RPS cable to the Redundant Power Supply connector at the rear of the power supply.
- 2 Connect the other end of the RPS cable to the Redundant Power Supply connector on the switch.

See [Figure 187](#).

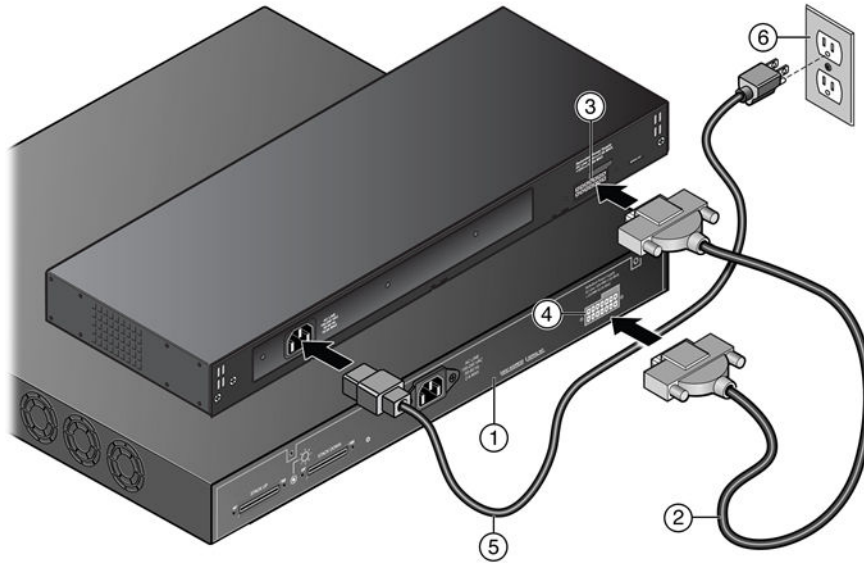


Figure 187: RPS Cable and AC Power Cord Connections for the RPS-500p

1 = PoE-compliant switch	4 = Redundant Power Supply connector on switch
2 = RPS cable	5 = AC power cord
3 = Redundant Power Supply connector on power supply	6 = AC power outlet with ground connection



Note

AC power cords and outlets vary depending on country.

- 3 Connect the AC power cord to the AC input power connector on the power supply.
- 4 Plug the AC power cord into the main AC power outlet.

The AC OK and DC OK LEDs on the front of the power supply turn green to indicate that the connection was successful and the power supply is operating properly.

If the LEDs do not light properly, follow these steps to troubleshoot:

- Check the AC power cord connection at the AC power source and make sure the power source is within specification.
- Check the AC power connection to the power supply.
- Swap the AC power cord with one that is known to work properly.

Installing an STK-RPS-150PS Redundant Power Supply

You can install an STK-RPS-150PS as a standalone unit or in one of the following RPS shelves:

- STK-RPS-150CH2, a two-slot shelf
- STK-RPS-150CH8, an eight-slot shelf

If you are installing the STK-RPS-150PS as a standalone unit, see [Connecting the RPS Cable and AC Power Cord](#) on page 246.

To install an STK-RPS-150PS in an RPS shelf, see [Installing an STK-RPS-150PS in an RPS Shelf](#) on page 242.

Required Tools

A flat-blade screwdriver is required to install the STK-RPS-150CH2 or STK-RPS-150CH8 shelf and STK-RPS-150PS power supplies.

Unpacking the Shelf and Power Supply

The shelf and the power supply are shipped separately. To unpack them, follow these steps:

- 1 Open the box and remove the packing material protecting the shelf or power supply.
- 2 Verify that the unit your ordered and a quick reference guide is included in the package.
- 3 Perform a visual inspection of the contents for any signs of physical damage. Contact Extreme Networks if there are any signs of damage.

Installing an STK-RPS-150PS in an RPS Shelf



Caution
Observe all ESD precautions when handling sensitive electronic equipment.

On the STK-RPS-150CH8 shelf, a cover plate will be in place over each power-supply slot.

To install the power supplies:

- 1 Place the RPS shelf on a sturdy flat surface where you plan to install power supplies.
- 2 Align the power supply with one of the slots, then slide the power supply forward until its front panel is flush against the RPS shelf front panel.

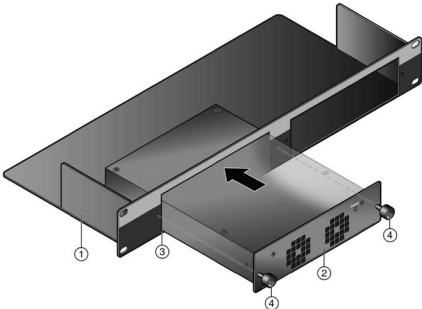


Figure 188: STK-RPS-150PS Installation in an STK-RPS-150CH2 Shelf

1 = STK-RPS-150CH2 shelf	3 = Shelf power supply slot
2 = STK-RPS-150PS power supply	4 = Captive screws (2)

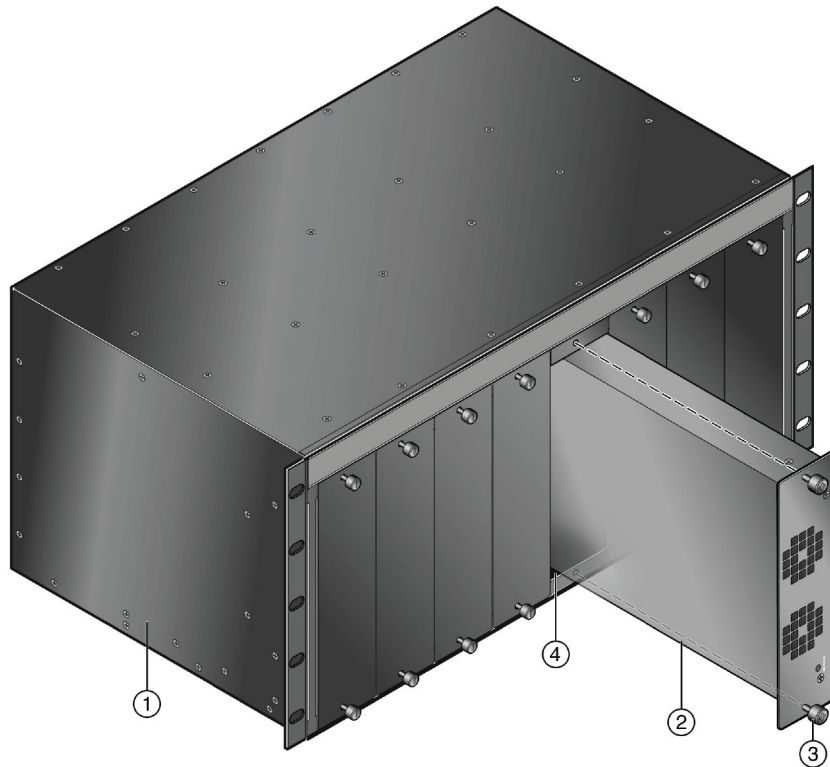


Figure 189: STK-RPS-150PS Installation in an STK-RPS-150CH8 Shelf

1 = STK-RPS-150CH8 shelf	3 = Captive screws (2)
2 = STK-RPS-150PS power supply	4 = Shelf power supply slot

- 3 Fasten the power supply to the RPS shelf using the captive screws on the PSM front panel.
- 4 Repeat the two previous steps for each additional power supply.
- 5 Proceed to [Installing the RPS Shelf into the Rack](#) on page 243.

Installing the RPS Shelf into the Rack

To install an STK-RPS-150CH2 or STK-RPS-150CH8 into a 19-inch (48.3 cm) rack, you need the following:

- For the STK-RPS-150CH2: four customer-supplied screws to fasten the shelf to the rack rails.
- For the STK-RPS-150CH8: ten customer-supplied screws to fasten the shelf to the rack rails.

After installing the power supplies as described in [Installing an STK-RPS-150PS in an RPS Shelf](#) on page 242, rack mount the RPS shelf as follows:

- 1 Refer to the installation guidelines ([Guidelines for Rack Mount Installation](#)).
- 2 Install the RPS shelf into the rack ([Rack Mounting the RPS Shelf](#) on page 244).
- 3 Connect the RPS cables and AC power cords of the power supplies ([Connecting the RPS Cable and AC Power Cord](#) on page 246).

Guidelines for Rack Mount Installation

The installation site must be within reach of the network cabling and meet the requirements listed below:

- Shelf placement must be close enough to connect the 6.6-foot (2-meter) AC power cords from the power supplies to the AC power source.
- One or two three-pronged power receptacles capable of delivering the current and voltage specified in [STK-RPS-150PS and RPS Shelves Technical Specifications](#) on page 387. One or two AC outlets on independently-fused circuits must be within 6 feet (1.8 meters) from the installation site. If there is an AC power source failure, this will prevent the powering down of redundant power supplies due to a single source power failure.
- Power cords and type of outlet are dependent on the country. In the United States, one power cord with an NEMA 5-15P plug is provided with each STK-RPS-150PS.
- An ambient temperature of between 32°F (0°C) and 122°F (50°C) must be maintained at the installation site with fluctuations of less than 18°F (10°C) per hour.

**Caution**

To ensure proper ventilation and prevent overheating, leave a minimum clearance space of 3 inches (7.6 cm) at the front and rear of the unit.

**Warning**

Before installing the shelf into a rack, ensure that the rack can support the device(s) without compromising the stability of the rack. Otherwise, personal injury and/or equipment damage may result.

Rack Mounting the RPS Shelf

To install the RPS shelf into a 19-inch (48.3 cm) rack:

- 1 Position the RPS shelf between the vertical rails and align the mounting holes in the RPS shelf brackets with those in the rack frame.
- 2 Fasten the RPS shelf securely to the rails using the customer-supplied mounting screws (four for the STK-RPS-150CH2, ten for the STK-RPS-150CH8).

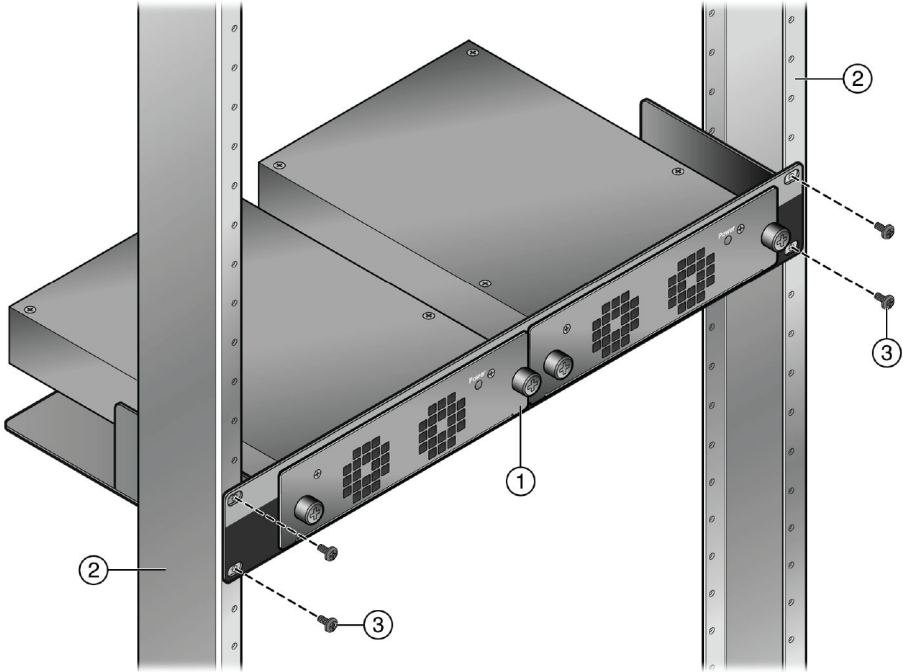


Figure 190: Fastening the STK-RPS-150CH2 to the Rack

1 = STK-RPS-150CH2 shelf	3 = Mounting screws
2 = Rails of rack	

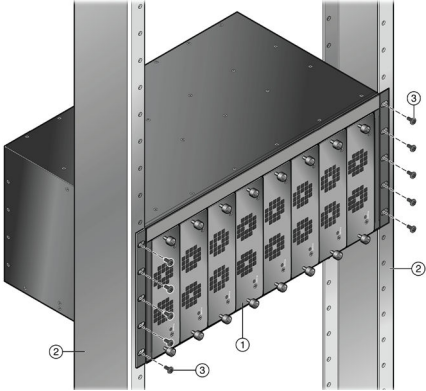


Figure 191: Fastening the STK-RPS-150CH8 to the Rack

1 = STK-RPS-150CH8 shelf	3 = Mounting screws
2 = Rails of rack	



Connecting the RPS Cable and AC Power Cord



Attention

When performing this task, observe all of the precautions listed in [Safety Considerations for Installing Power Supplies](#) on page 224.

The redundant power supply is connected to a switch using a 1-meter RPS cable.

To connect a redundant power supply, proceed as follows:



Note

No change in switch configuration is necessary for this installation.

- 1 Connect one end of the RPS cable to the redundant power supply connector at the rear of the RPS. Then connect the other end of the cable to the redundant power supply connector on the switch.

See the following figures.



Figure 192: Power Connectors on STK-RPS-150PS (rear view)

1 = Redundant power supply connector

2 = AC power connector

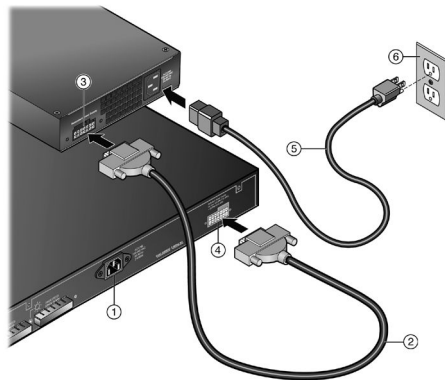


Figure 193: RPS and AC Power Cord Connections

1 = Switch

4 = Switch Redundant Power Supply connector (location varies depending upon switch)

2 = High speed RPS cable (1 meter)

5 = AC power cord (type varies depending on country)

3 = RPS Redundant Power Supply connector

6 = AC power outlet with ground connection (type varies depending on country)

- 2 Connect the AC power cord to the AC input power connector on the RPS shown in [the figure above](#).
- 3 Plug the AC power cord into the main AC power outlet.

The green Power LED on the front of the RPS will illuminate to indicate a successful connection. On certain switches, an LED indicator on the switch will show that a redundant power supply is now in operation.

If the green power LED is not lit, proceed as follows:

- Check the AC power cord connection at the AC power source and make sure the power source is within specification.
- Check the AC power connection to the power supply.
- Swap the AC power cord with one that is known to work properly.

If the green LED remains off, contact Extreme Networks support.

Installing an STK-RPS-1005PS Redundant Power Supply

You can install the STK-RPS-1005PS power supply on a flat surface or in a 19-inch rack in the three-slot modular shelf (STK-RPS-1005CH3), which is available for purchase separately.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

Locate the STK-RPS-1005PS within 6 ft (1.8 m) of its power source.

Only qualified personnel should install redundant power supply (RPS) units.

Installation Requirements

A Phillips screwdriver and four rack screws (not supplied) are needed to install the STK-RPS-1005PS in a rack using the three-slot modular shelf.

Installing an STK-RPS-1005PS in a Rack

To install the STK-RPS-1005PS in the three-slot modular shelf (STK-RPS-1005CH3), you must first install the shelf in a 19-inch rack.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Caution

Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

To install the STK-RPS-1005PS in a rack, follow these steps.

- 1 Secure the front of the three-slot modular shelf (STK-RPS-1005CH3) to the rack by screwing four rack screws into the mounting ears on the right and left front of the shelf.

See [Figure 194](#).

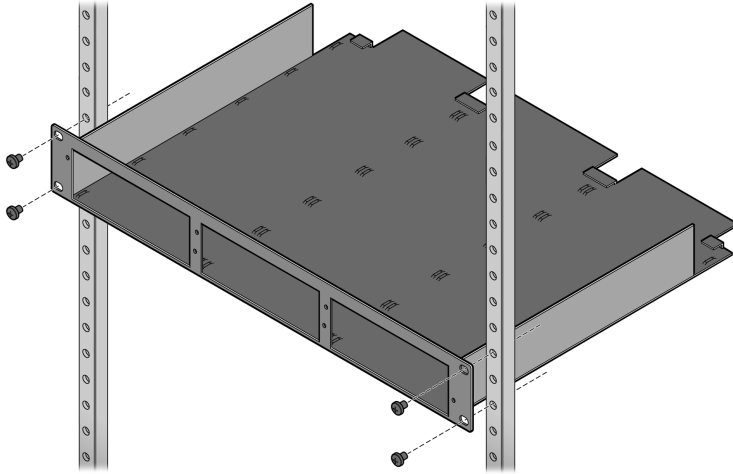


Figure 194: Securing the Three-slot Modular Shelf to a Rack

- 2 Slide the power supply into an empty bay in the shelf.

See [Figure 195](#).

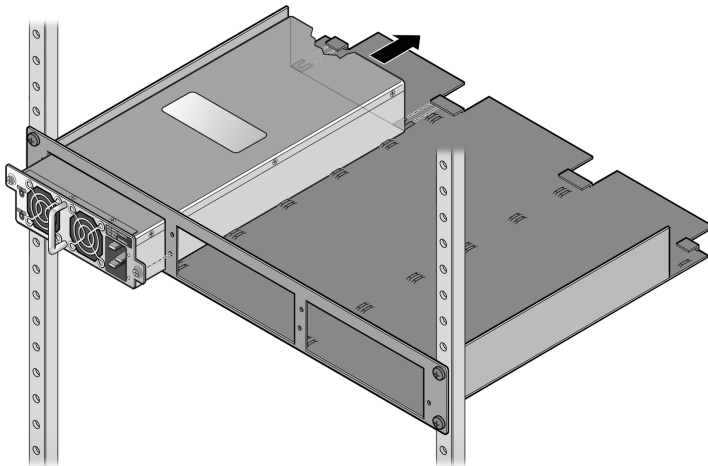


Figure 195: Installing an STK-RPS-1005PS Power Supply Unit in a Shelf

- 3 Tighten the captive screws to secure the power supply to the shelf.
- 4 Connect the STK-RPS-1005PS to its power source.

See [Connecting the RPS Cable and AC Power Cord to an STK-RPS-1005PS](#) on page 249.

Installing an STK-RPS-1005PS on a Flat Surface

**Caution**

Observe all ESD precautions when handling sensitive electronic equipment.

When installing the STK-RPS-1005PS power supply on a flat surface, we recommend installing the rubber feet to prevent the power supply from sliding.

**Note**

Do not install the rubber feet on the power supply if you are installing the power supply in the three-slot modular shelf (STK-RPS-1005CH3).

To prepare the STK-RPS-1005PS for use on a flat surface, follow these steps.

- 1 On a sturdy flat surface, lay the power supply on its top.
- 2 Remove the four rubber feet from their plastic bag in the shipping box.
- 3 Remove the protective strip from the back of one rubber foot and position it on a bottom corner of the power supply.

Press the rubber foot firmly into place.

Repeat this step for each of the remaining three rubber feet.

- 4 After installing the rubber feet, return the power supply to its upright position.
- 5 Connect the STK-RPS-1005PS to its power source.

See [Connecting the RPS Cable and AC Power Cord to an STK-RPS-1005PS](#) on page 249.

Connecting the RPS Cable and AC Power Cord to an STK-RPS-1005PS

**Attention**

When performing this task, observe all of the precautions listed in [Safety Considerations for Installing Power Supplies](#) on page 224.

The STK-RPS-1005PS RPS (redundant power supply) is connected to the switch using the supplied RPS cable. Use [Figure 196](#) to guide you through the steps.

**Caution**

Observe all ESD precautions when handling sensitive electronic equipment.

**Note**

The switch should not be powered on during installation of the power supply. This is not a hot-swap procedure. Follow the steps in the order specified.

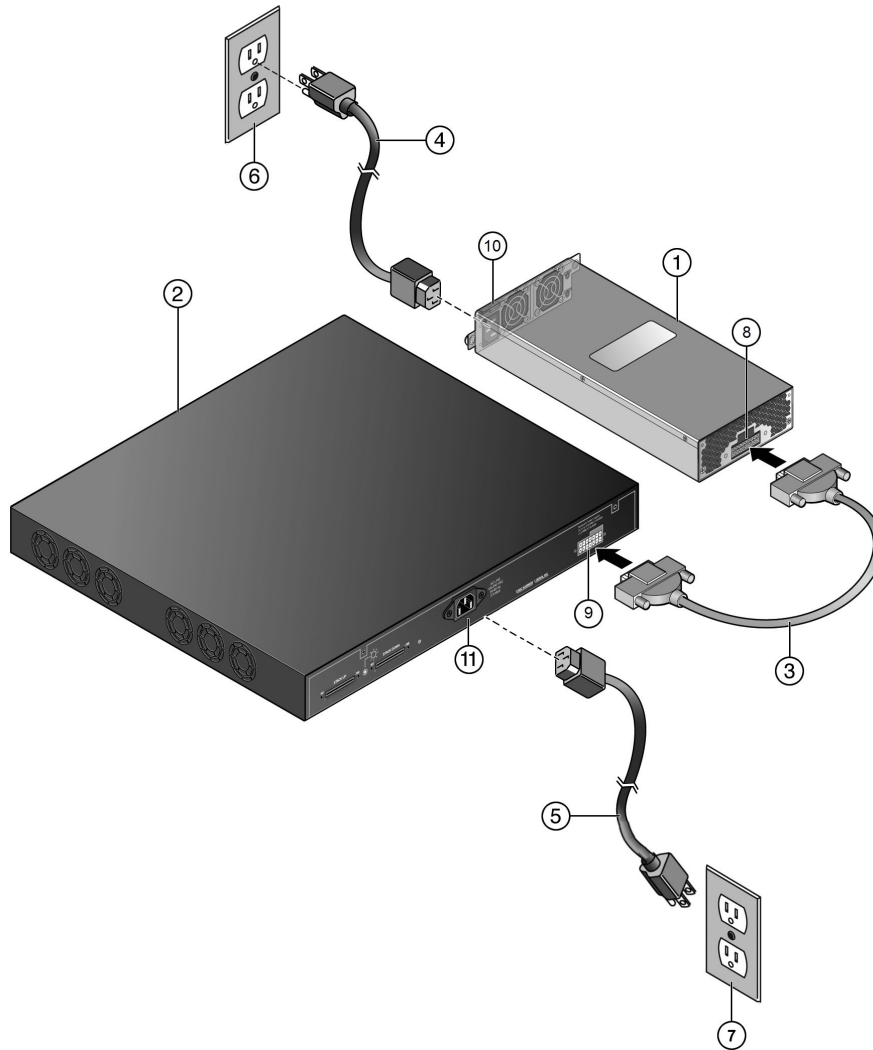


Figure 196: RPS Cable and AC Power Cord Connections for the STK-RPS-1005PS

1 = STK-RPS-1005PS power supply	7 = AC power outlet with ground connection for switch
2 = Switch	8 = Redundant power supply connector on power supply
3 = RPS cable	9 = Redundant power supply connector on switch
4 = RPS AC power cord	10 = AC connector on power supply
5 = Switch AC power cord	11 = AC connector on switch
6 = AC power outlet with ground connection for power supply	

- 1 Connect one end of the RPS cable (3) to the RPS connector at the rear of the power supply (8).
- 2 Connect the other end of the RPS cable (3) to the RPS connector on the switch (9).



Note

AC power cords and outlets vary depending on country. See [Selecting Power Supply Cords](#) on page 401 for more information.

- 3 Connect the AC power cord (4) to the AC input power connector on the power supply (10).
- 4 Plug the AC power cord (4) into the main AC power outlet (6).
- 5 Connect the second AC power cord (5) to the AC input power connector on the switch (11).
- 6 Plug the AC power cord (5) into the main AC power outlet (7), preferably on a different circuit for better redundancy.

The AC OK and DC OK LEDs on the front of the power supply turn green to indicate that the connection was successful and the power supply is operating properly.

If the LEDs do not light properly, follow these steps to troubleshoot:

- Check the AC power cord connection at the AC power source and make sure the power source is within specification.
- Check the AC power connection to the power supply.
- Swap the AC power cord with one that is known to work properly.

Installing a VX-RPS-1000 Redundant Power Supply

The VX-RPS-1000 redundant supply (Part no. 18202) is designed as a backup power source for the V400 Virtual Port Extender.

You can install the VX-RPS-1000 in a 19-inch rack in either of two ways:

- [Installing a Single VX-RPS-1000 Power Supply in a Rack](#) on page 251
- [Installing up to Three VX-RPS-1000 Power Supplies on a Shelf](#) on page 252



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

Locate each VX-RPS-1000 unit within 6 ft (1.8 m) of its power source.

Only qualified personnel should install redundant power supply (RPS) units.

Installing a Single VX-RPS-1000 Power Supply in a Rack

To install the VX-RPS-1000 power supply in a 19-inch rack, you need four customer-supplied screws to attach the power supply to a standard 19-inch rack.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Caution

Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

To install a single VX-RPS-1000 power supply in a rack, follow these steps.

- 1 Use screws (provided) to attach a long bracket to one side of the power supply.
Use the holes closest to the rear of the power supply.

- 2 Attach the other bracket to the other side of the power supply.

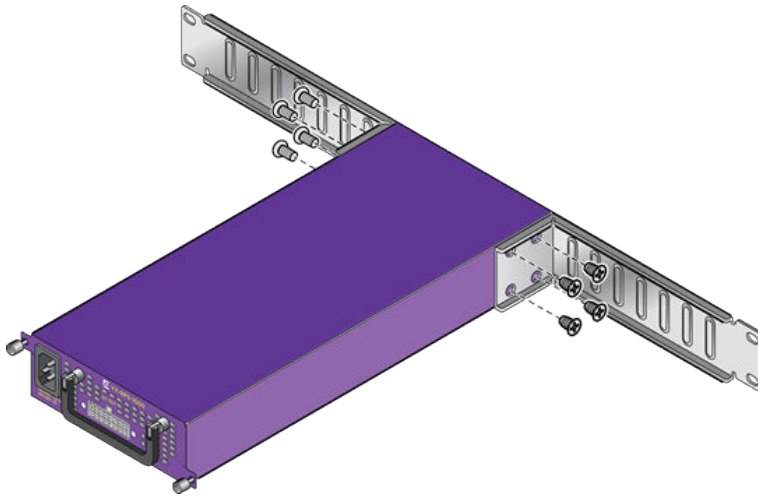


Figure 197: Long Brackets Attached to VX-RPS-1000 Power Supply

- 3 Align the holes at the end of each bracket with the rack post holes.
- 4 Secure the power supply to the rack with rack-mounting screws.
- 5 Connect a power cable (included with the power supply) to the output socket on the power supply and the RPS input connector on the rear of the V400 unit.
- 6 Connect an AC power cord (not included) to the AC power input socket on the power supply and to an AC power outlet.

When power is connected, verify that the power supply's DC OK LED turns green. Verify that the port extender's PWR LED turns green.

Installing up to Three VX-RPS-1000 Power Supplies on a Shelf

You can install up to three VX-RPS-1000 power supplies in the 3-Slot Modular Shelf (Part no. 18201). The shelf is mounted in a standard equipment rack.

You will need four customer-supplied screws to attach the shelf to a standard 19-inch rack.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Caution

Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

To install the VX-RPS-1000 in the 3-slot shelf, follow these steps.

- 1 Attach mounting brackets to the shelf, following the instructions included in the shelf packaging.

- 2 Attach the shelf to the rack, using the screws provided, as shown in [Figure 198](#).

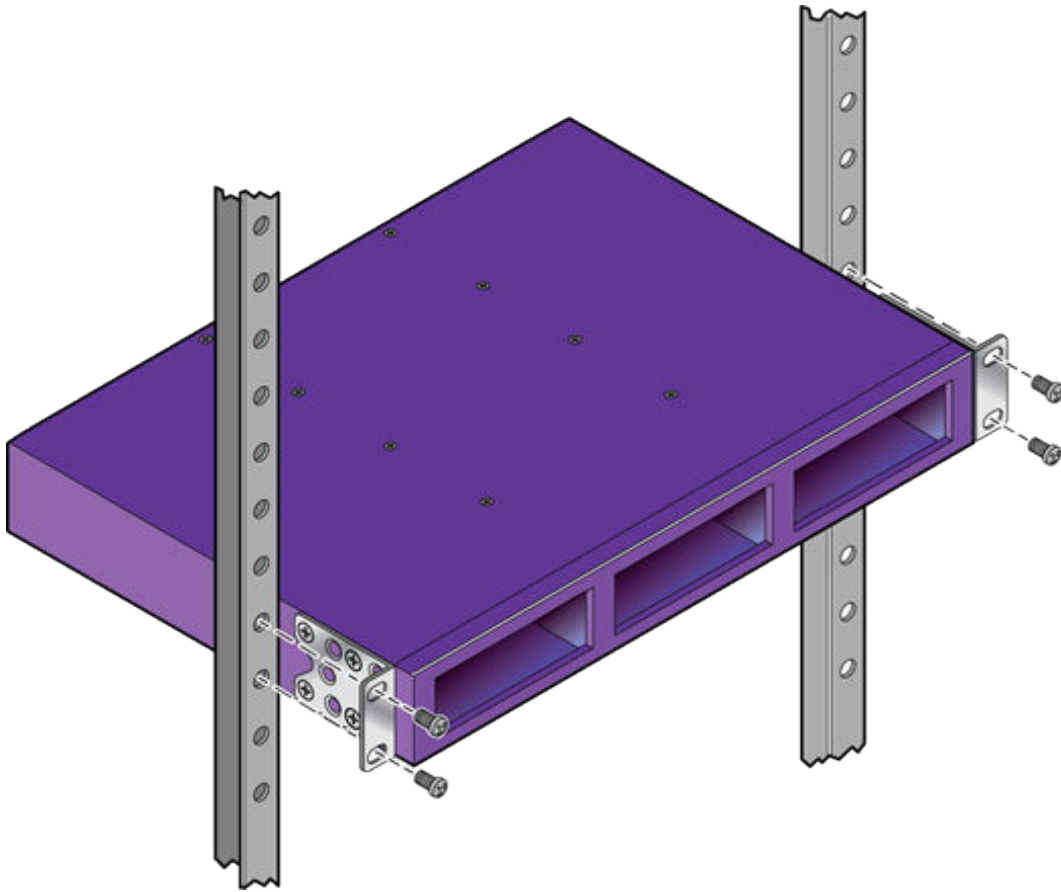


Figure 198: VX-RPS-1000 Shelf Mounted in a Rack

- 3 Slide a power supply into an empty bay in the shelf, as shown in [Figure 199](#).

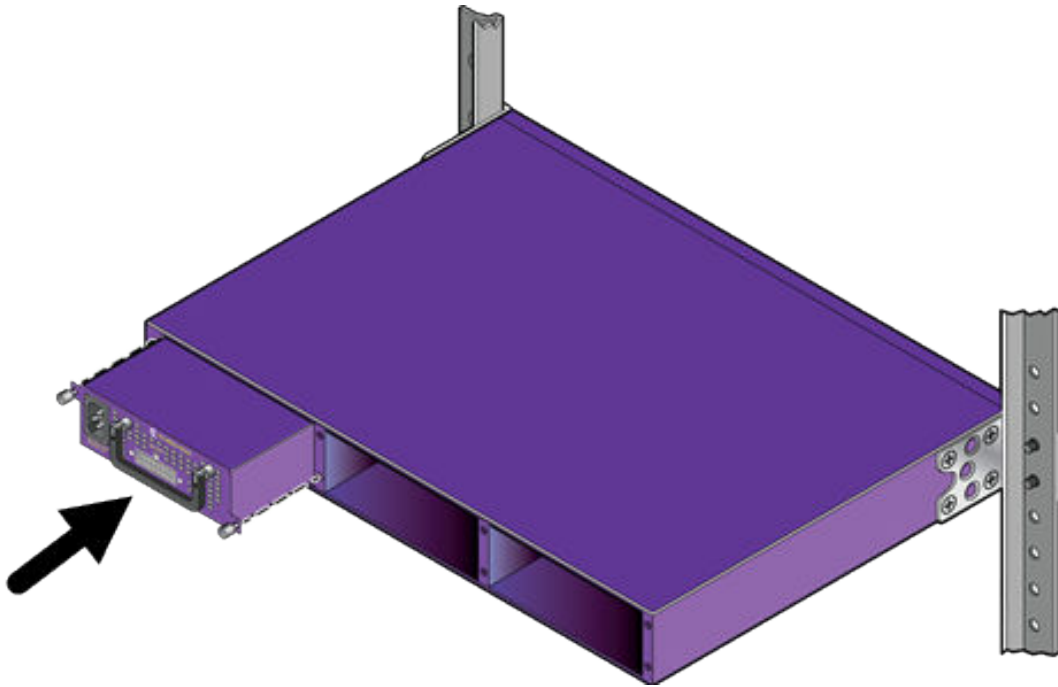


Figure 199: Inserting a VX-RPS-1000 Power Supply into the Shelf

- 4 Tighten the two retaining screws until the power supply is firmly attached to the shelf.
- 5 Connect a power cable (included with the power supply) to the output socket on the power supply and the RPS input connector on the rear of the V400 unit.
- 6 Connect an AC power cord (not included) to the AC power input socket on the power supply and to an AC power outlet.

When power is connected, verify that the power supply's DC OK LED turns green. Verify that the port extender's PWR LED turns green.

- 7 Secure the power supply to the shelf using two captive screws on the front panel of the power supply.
- 8 Optionally, install additional power supplies on the shelf - up to three in all.

8 Installing Expansion Modules

Installing a V400 Virtual Port Extender

Installing a Half-Duplex to Full-Duplex Converter

Installing a Versatile Interface Module or Clock Module in an X460-G2 Series Switch

Install an SSD Module

This chapter describes how to install expansion modules:

- The V400 Virtual Port Extender
- The Half-Duplex to Full-Duplex Converter
- Versatile interface modules (VIM/VIM5s)
- Solid-state Drive (SSD) modules



Note

Read the information in this chapter thoroughly before trying to install or remove an expansion module.

To install port option cards, VIMs, and stacking modules that work with other Extreme Networks switches, refer to *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier*.

Installing a V400 Virtual Port Extender

You need the following tools and materials to install a V400 Virtual Port Extender:

- ESD-preventive wrist strap
- #1 Phillips screwdriver (for clock module) or flat-bladed screwdriver (for all other VIM modules)

Your V400 Virtual Port Extender comes with two mounting brackets and screws for attaching them. Mount the equipment in a standard equipment rack, in either a front or mid-mount configuration, in the same way you would mount a switch.

To install a V400 Virtual Port Extender, follow these steps:

- 1 Attach the mounting brackets to the sides of the port extender using four screws (included) for each bracket.
- 2 Align the holes in the brackets with the rack post holes.
- 3 Secure the port extender to each post with rack-mounting screws (not provided).
- 4 Connect an AC power cord to the AC power input socket on the port extender and to an AC power outlet.
- 5 When power is connected, verify that the SYS LED on the port extender turns green.
If the SYS LED does not turn green, verify that the power source is powered on and the connection was made properly.

Installing a Half-Duplex to Full-Duplex Converter

The following options are available for installing the Half-Duplex to Full-Duplex Converter:

- 1 On a shelf that is mounted in an equipment rack. (The shelf can accommodate up to three converters.)

See [Installing Half-Duplex to Full-Duplex Converters in a 3-Slot Modular Shelf](#) on page 256.

- 2 On a flat surface.

See [Mounting a Half-Duplex to Full-Duplex Converter on a Flat Surface](#) on page 256.

- 3 On a wall.

See [Mounting a Half-Duplex to Full-Duplex Converter on a Wall](#) on page 257.

Installing Half-Duplex to Full-Duplex Converters in a 3-Slot Modular Shelf

Refer to [Installing a Half-Duplex to Full-Duplex Converter](#) on page 256 for installation options for the Half-Duplex to Full-Duplex Converter.

Before installing the converter in the 3-slot modular shelf (part no. STK-RPS-1005CH3), mount the shelf in the rack. Follow the steps in the [3-Slot Modular Shelf Quick Reference Guide](#).

To install up to three Half-Duplex to Full-Duplex Converter units in the 3-slot modular shelf, follow these steps:

- 1 Attach the four rubber feet (included) to the bottom of the converter, one at each corner.
- 2 Set the converter on the shelf.
- 3 Connect the converter to its power adapter, following the instructions in [Connecting a Half-Duplex to Full-Duplex Converter to its Power Adapter](#) on page 257.
- 4 Secure the converter to the shelf using cable ties (included with the shelf).
Pass the ties through the holes in the shelf and secure them firmly around the converter.
- 5 Connect the full-duplex ports (FD1 - FD4) to the switch.
- 6 Connect the half-duplex ports (HD1 - HD4) to your half-duplex devices.
- 7 Install one or two additional Half-Duplex to Full-Duplex Converter units in the shelf, as described in steps 1 on page 256 through 4.

Mounting a Half-Duplex to Full-Duplex Converter on a Flat Surface

Refer to [Installing a Half-Duplex to Full-Duplex Converter](#) on page 256 for installation options for the Half-Duplex to Full-Duplex Converter.

To install a Half-Duplex to Full-Duplex Converter unit on a flat surface, follow these steps:

- 1 Attach the four rubber feet (included) to the bottom of the converter, one at each corner.
- 2 Set the converter on a flat, stable surface.
- 3 Connect the converter to its power adapter, following the instructions in [Connecting a Half-Duplex to Full-Duplex Converter to its Power Adapter](#) on page 257.
- 4 Connect the full-duplex ports (FD1 - FD4) to the switch.

- 5 Connect the half-duplex ports (HD1 - HD4) to your half-duplex devices.

Mounting a Half-Duplex to Full-Duplex Converter on a Wall

Refer to [Installing a Half-Duplex to Full-Duplex Converter](#) on page 256 for installation options for the Half-Duplex to Full-Duplex Converter.

To mount a Half-Duplex to Full-Duplex Converter unit on a wall, follow these steps:

- 1 Drill two holes in the wall, each 4 mm (0.16 in.) in diameter.
The holes should be 10.5 cm (4.13 in.) apart so that they correspond to the locations of the holes in the bottom of the converter.
- 2 Insert an anchor bolt (not provided) into each hole in the wall.
- 3 Place a screw (not provided) into each anchor bolt and tighten so that the screw head protrudes slightly from the wall.
- 4 Place the converter onto the screws and gently lower it so that it locks into place.
- 5 Connect the converter to its power adapter, following the instructions in [Connecting a Half-Duplex to Full-Duplex Converter to its Power Adapter](#) on page 257.
- 6 Connect the full-duplex ports (FD1 - FD4) to the switch.
- 7 Connect the half-duplex ports (HD1 - HD4) to your half-duplex devices.

Connecting a Half-Duplex to Full-Duplex Converter to its Power Adapter

Before connecting the Half-Duplex to Full-Duplex Converter to power, install it using one of the options described in [Installing a Half-Duplex to Full-Duplex Converter](#) on page 256.

The Half-Duplex to Full-Duplex Converter operates on DC power, which it receives from its power adapter.

Connection points to the power adapter are located on the sides of the converter, as shown in [Figure 200](#).

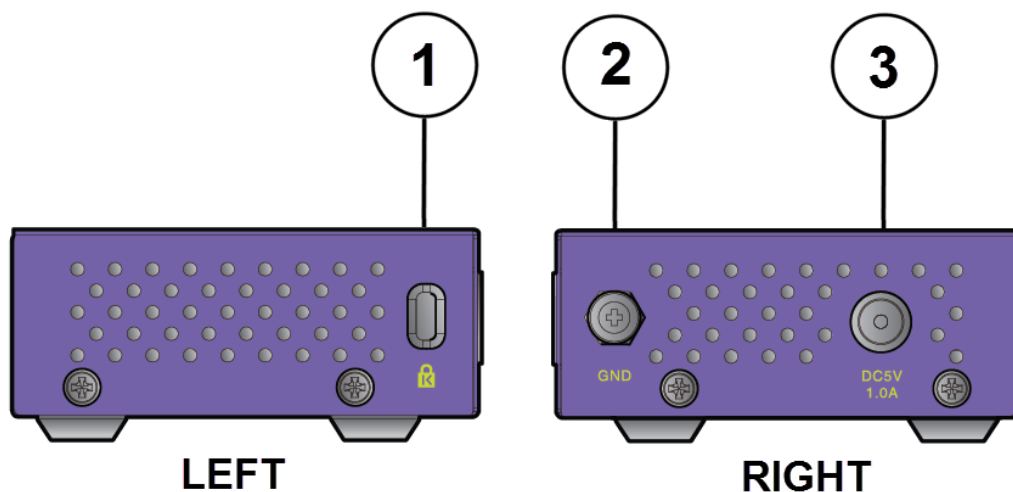


Figure 200: Half-Duplex to Full-Duplex Converter: Side Panels

1 = Kensington lock point	3 = DC power connector
2 = Grounding point	

To connect your Half-Duplex to Full-Duplex Converter to power, follow these steps:

- 1 Attach a grounding wire to the grounding point on the side of the converter.
- 2 Connect a DC power cable to the DC input socket on the same side of the converter.
- 3 Connect the other end of the DC power cable to the power adapter.
- 4 Connect the power adapter to an AC power source.
- 5 When power is connected, verify that the converter's power LED turns green.

If the power LED does not turn on, recheck the connections from the connector to the power source.

Installing a Versatile Interface Module or Clock Module in an X460-G2 Series Switch

This section describes how to install a versatile interface module (VIM) or a clock module in the rear slot of an X460-G2 switch.



Note

Clock module ports are output ports. They are not to be used as input ports.

You need the following tools and materials to install a VIM or clock module:

- ESD-preventive wrist strap
- #1 Phillips screwdriver (for clock module) or flat-bladed screwdriver (for all other VIM modules)



Caution

Extreme Networks VIMs and clock modules are not hot-swappable. Disconnect power to the switch before removing an installed VIM or clock module or installing a new VIM or clock module.

The installation procedure is the same for all X460-G2 VIMs and clock modules, with the exception that the VIMs use slotted retaining screws and the clock module uses Phillips retaining screws.

To install a versatile interface module or clock module, follow these steps:

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

- 3 Remove the cover plate from the VIM or clock module slot:
 - a Remove the retaining screws at the top corners of the slot cover plate, and set the screws aside in a safe place.
 - b Save the retaining screws to secure the new module in the switch.
 - c Pull the cover plate away from the module slot.

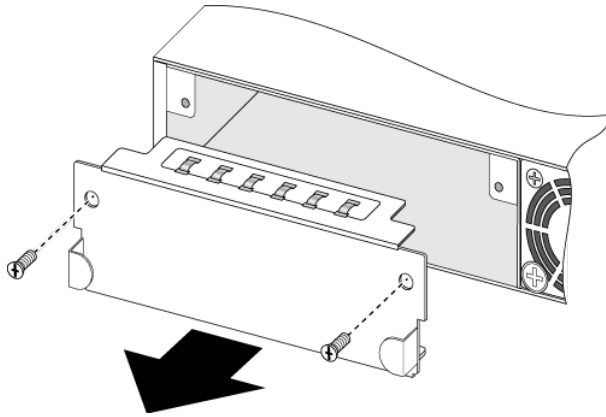


Figure 201: Removing a slot Cover Plate (VIM slot cover shown)

- 4 Remove the new VIM or clock module from its anti-static packaging.
- 5 Install the VIM or clock module in the switch:
 - a Carefully slide the module into the switch.
 - b Insert and tighten the retaining screws you removed in step 3. The clock module uses Phillips screws and the VIM modules use slotted screws.



Figure 202: Tighten Screws on the Inserted VIM Module

1 = VIM module retaining screw locations

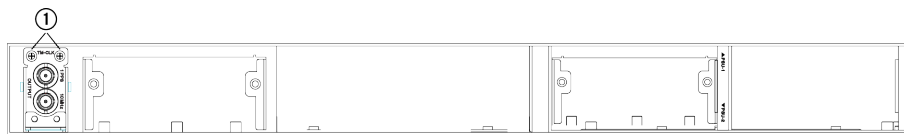


Figure 203: Tighten Screws on the Inserted Clock Module

1 = clock module retaining screw locations

Install an SSD Module

This section describes how to install a Solid-state Drive (SSD) module in the rear slot of a switch.

You need the following tools and materials to install an SSD module:

- ESD-preventive wrist strap
- #2 Phillips screwdriver

**Warning**

To prevent damage to the switch or VIM, the switch must be powered OFF when removing or installing SSD modules.

To install an SSD module, follow these steps:

- 1 Attach the ESD wrist strap to your wrist and connect the metal end to an appropriate ground point on the rack.
- 2 Ensure that the switch is completely powered down.
- 3 Remove the cover plate from the SSD slot (#2 Phillips screwdriver required).



Figure 204: Switch with SSD Rear Panel

- 4 Remove the SSD module from its packaging.

- 5 Carefully slide the SSD module into the slot on the rear panel until it is firmly in place.

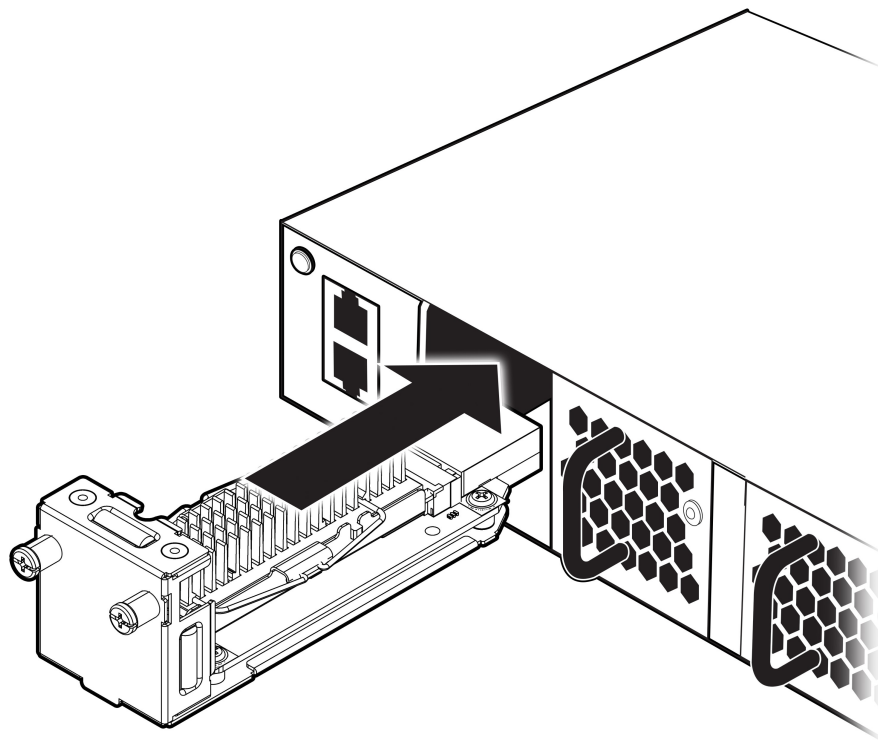


Figure 205: Insert SSD Module

- 6 Secure the SSD module using the screws provided.

9 Replacing AC Power Supplies

Replacing a Summit 300 W AC Power Supply
Replacing a Summit 350 W or 715 W AC Power Supply
Replacing a Summit 550 W AC Power Supply
Replacing a 750 W AC Power Supply
Replacing a Summit 770 W AC Power Supply
Replacing a Summit 1100 W AC Power Supply
Removing an RPS-150XT Redundant Power Supply
Removing an RPS-500p Redundant Power Supply
Removing an STK-RPS-150PS Redundant Power Supply
Removing an STK-RPS-1005PS Redundant Power Supply
Removing a VX-RPS-1000 Redundant Power Supply

This chapter describes how to replace AC power supplies in a switch. It also describes how to remove EPS series AC redundant power supplies and the STK-RPS-150PS.

To replace and remove AC power supplies that work with other Extreme Networks switches, refer to *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier*.

Replacing a Summit 300 W AC Power Supply

You need the following tools and materials to replace a Summit 300 W AC power supply:

- Thermal protective gloves
- 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 a Summit AC power supply. You must obtain a power supply cord that meets the requirements listed in *Power Cord Requirements for AC-Powered Switches and AC Power Supplies* on page 393.

These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one Summit AC power supply without powering down the switch. To replace a Summit 300 W AC power supply:

- 1 Disconnect the AC power cord from the wall outlet and from the power supply.
- 2 Note the orientation of the installed power supply.

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

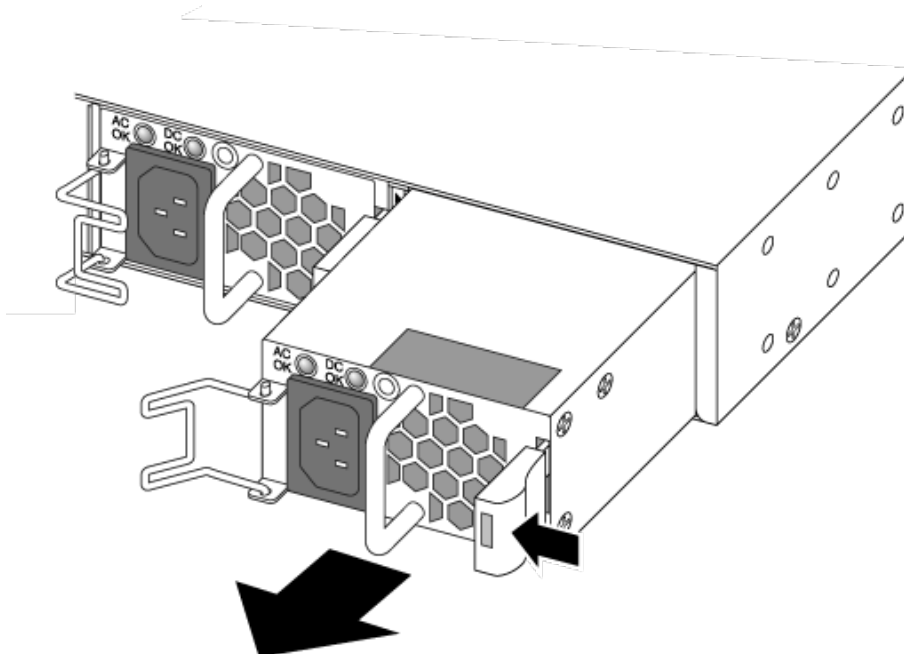


Figure 206: Removing a Summit 300 W AC Power Supply

- 4 Carefully slide the power supply the rest of the way out of the switch.



Caution

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



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 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.

See [Figure 207](#)

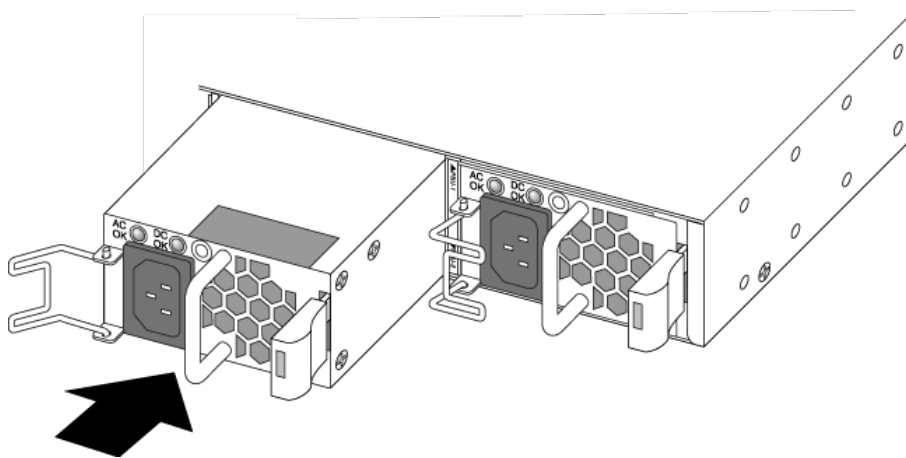


Figure 207: Installing a Summit 300 W AC Power Supply

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



Caution

Do not slam the power supply into the switch.

- 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 Summit 350 W or 715 W AC Power Supply

The Summit 350 W AC power supplies are compatible with X460-G2 PoE switch models that have the same airflow direction as the power supply. Part number 10953 is compatible with the X465-48T model switch.

The Summit 715 W AC power supplies are compatible with the X450-G2, X460-G2, and X465 PoE series switches.

These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one Summit AC power supply without powering down the switch.

You need the following tools and materials to replace a Summit 715 W AC power supply:

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

To replace a Summit 350 W or 715 W AC power supply, 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.

See [Figure 208](#).

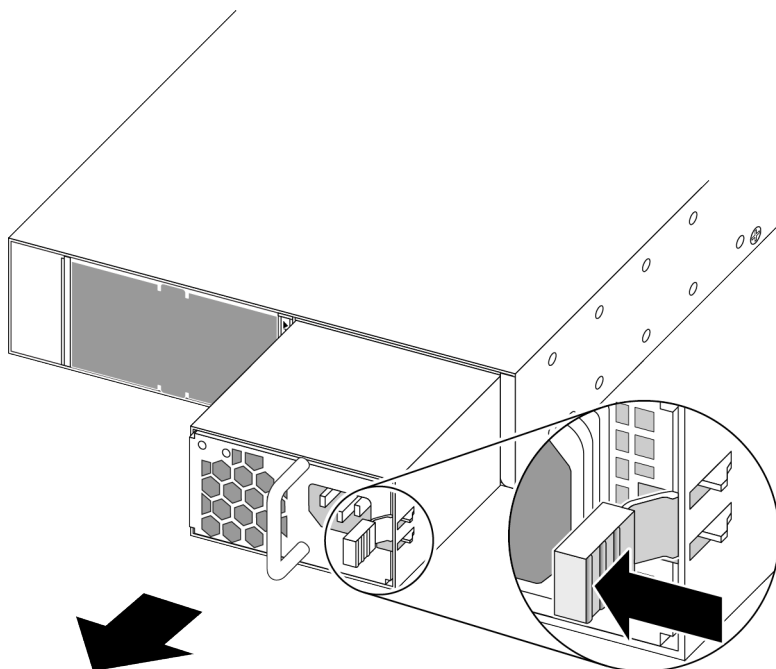


Figure 208: Removing a Summit 350 W or 715 W AC Power Supply

- 4 Carefully slide the power supply the rest of the way out of the switch.



Caution

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



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 EMI levels.

- 5 Verify that the replacement power supply is oriented the same way as the unit you removed, and has the same airflow direction.
- 6 Carefully slide the power supply all the way into the power supply bay, as shown in [Figure 209](#).

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



Caution

Do not slam the power supply into the switch.

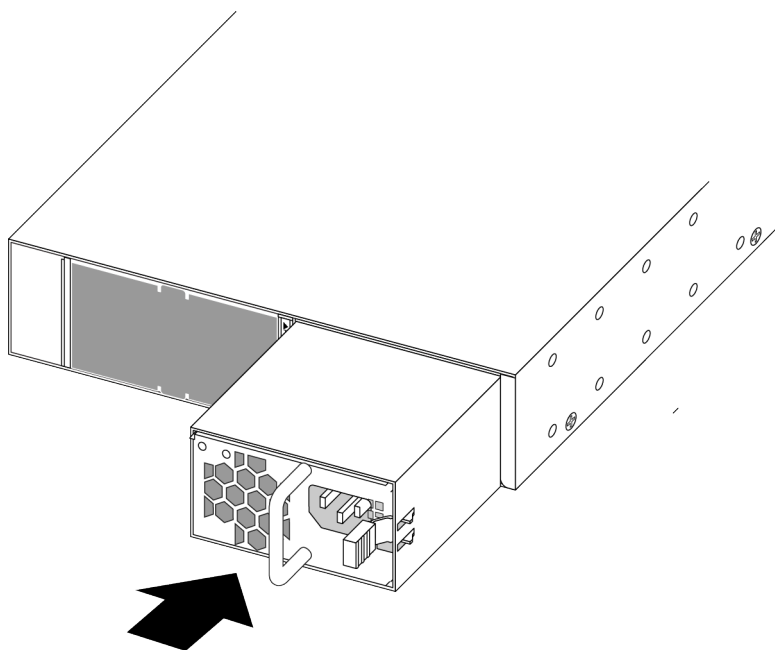


Figure 209: Installing A Summit 350 W or 715 W AC Power Supply

- 8 Connect the power cord to the power supply and to a grounded 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.

- 9 If the power supply is equipped with a power cord retainer, use the retainer to secure the power cord to the power supply.

Replacing a Summit 550 W AC Power Supply

Summit 550 W power supplies are available for switches with either front-to-back or back-to-front airflow.

You need the following tools and materials to replace a 550 W AC power supply:

- Thermal protective gloves
- 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 Summit AC power supply. You must obtain a power supply cord that meets the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

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

To replace a 550 W AC power supply:

- 1 Disconnect the AC power cord from the wall outlet and from the power supply.
- 2 Note the orientation of the installed power supply.
- 3 Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors.

See [Figure 210](#).

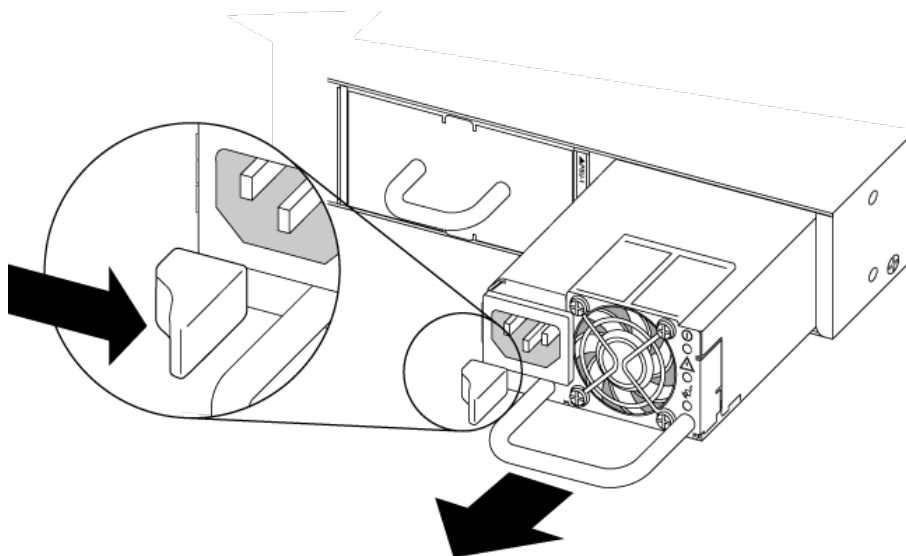


Figure 210: Removing a 550 W AC Power Supply

- 4 Carefully slide the power supply the rest of the way out of the switch.



Caution

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



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 EMI levels.

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

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

See [Figure 211](#).

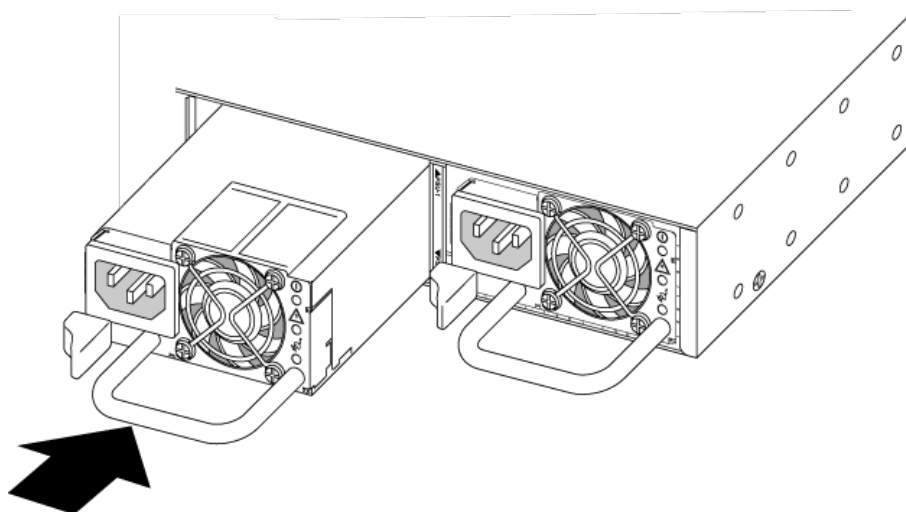


Figure 211: Installing a 550 W AC Power Supply

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



Caution

Do not slam the power supply into the switch.

- Connect the power cord to the power supply and to a grounded 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.

- If the power supply is equipped with a power cord retainer, use the retainer to secure the power cord to the power supply.

Replacing a 750 W AC Power Supply

You need the following tools and materials to replace a 750 W AC power supply:

- Thermal protective gloves
- 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 an AC power supply. You must obtain a power supply cord that meets the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 393.

These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one AC power supply without powering down the switch.

To replace a 750 W AC power supply, follow these steps:

- Disconnect the AC power cord from the wall outlet and from the power supply.

- 2 Note the orientation of the installed power supply.
- 3 Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors.

See [Figure 212](#).

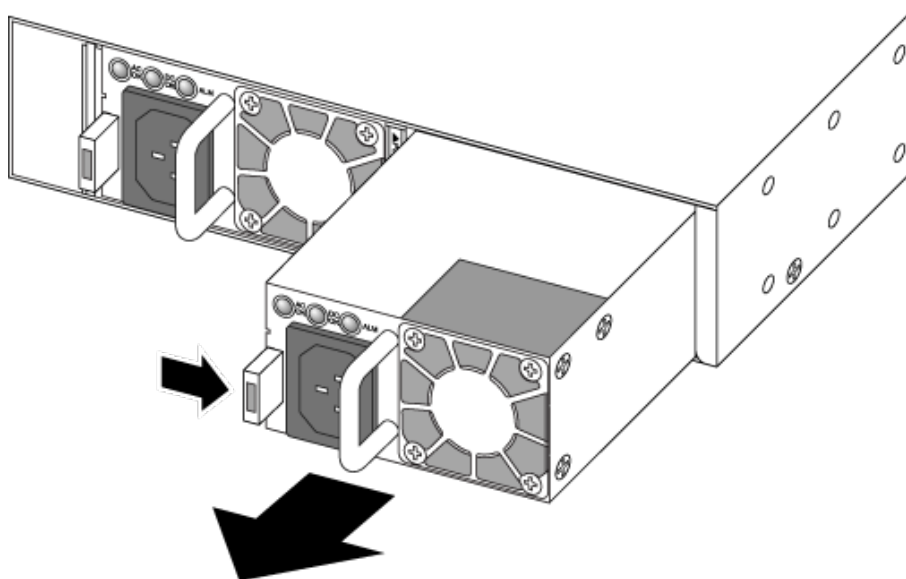


Figure 212: Removing a 750 W AC Power Supply

- 4 Carefully slide the power supply the rest of the way out of the switch.



Caution

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



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 EMI levels.

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

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

See [Figure 213](#).

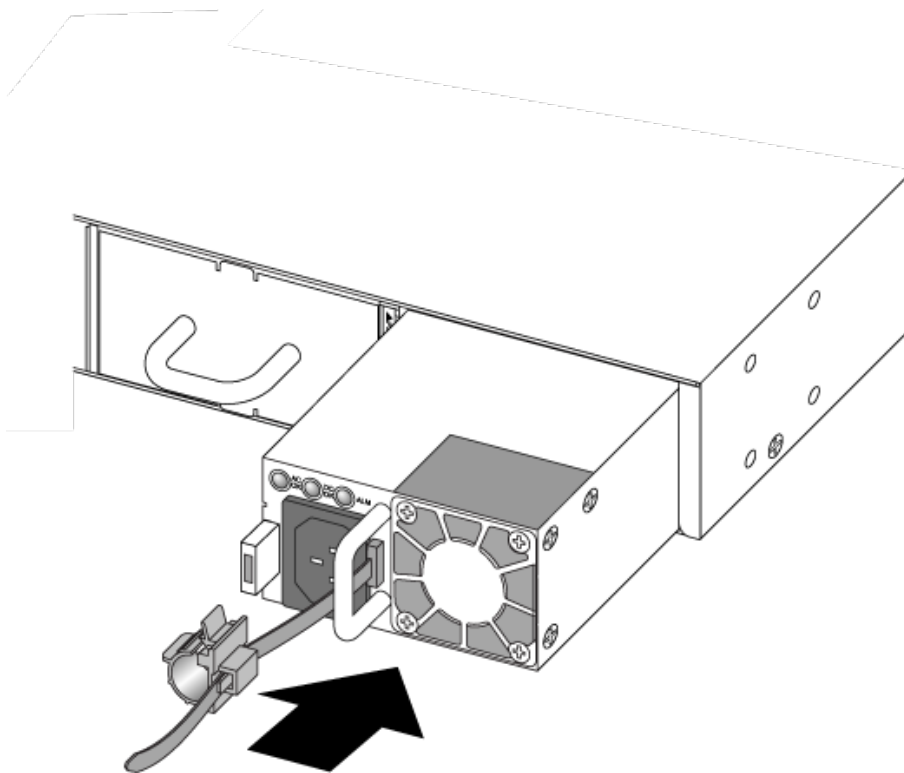


Figure 213: Installing a 750 W AC Power Supply

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



Caution

Do not slam the power supply into the switch.

- 8 If necessary, slide the plastic cord retainer farther away from the back of the switch.
See [Figure 214](#).

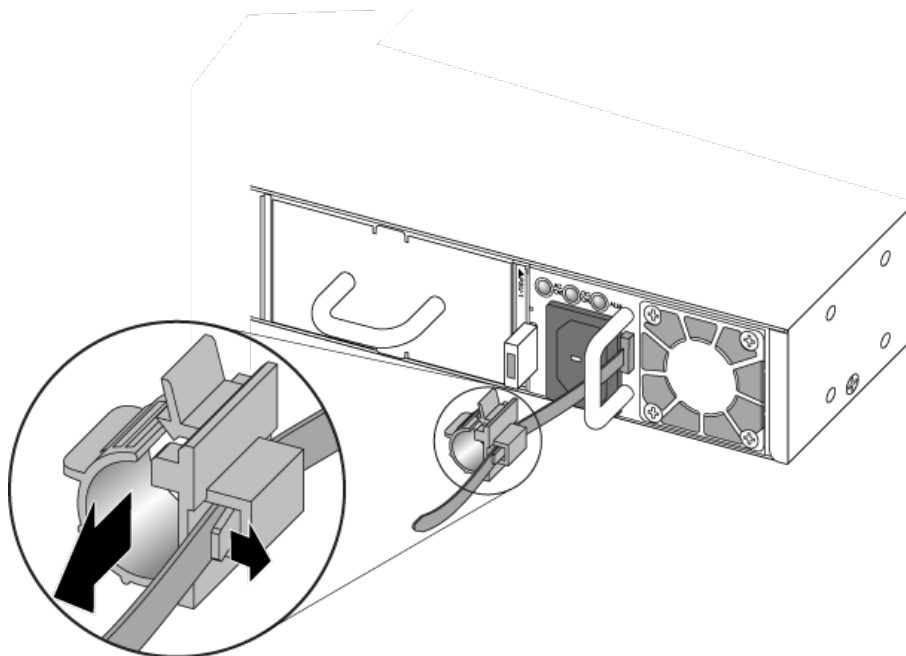


Figure 214: Moving the Power Cord Retainer

- 9 Connect the AC power cord to the input connector.
See [Figure 215](#).

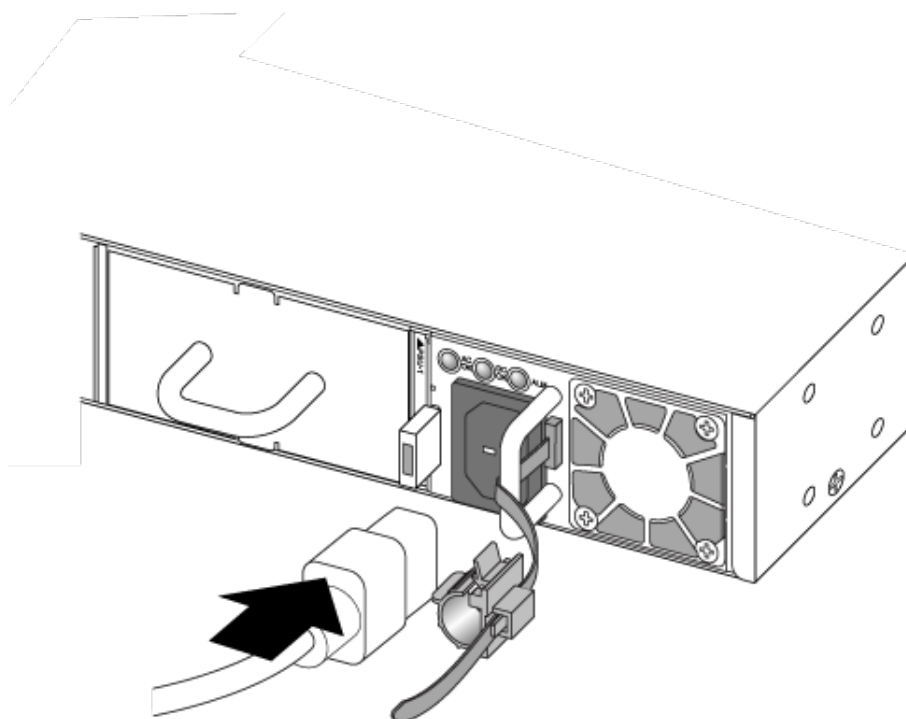


Figure 215: Connecting the Power Cord

10 Open the clip and slip it over the barrel of the connector.

See [Figure 216](#).

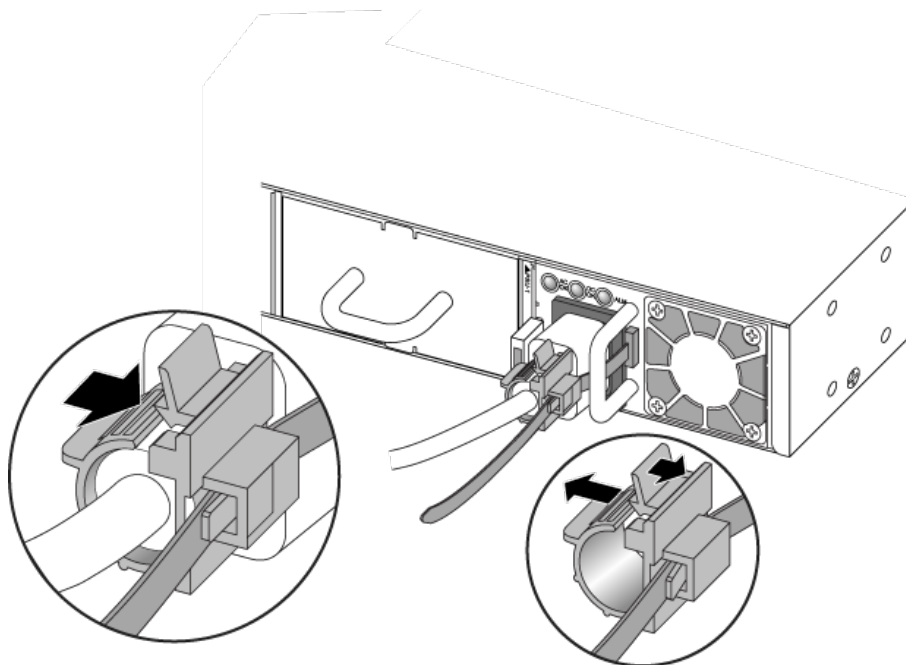


Figure 216: Attaching the Power Cord Retainer

11 Snap the clip firmly around the connector.

12 Connect the other end of the power cord to an AC power outlet.

Replacing a Summit 770 W AC Power Supply

The Summit 770 W AC power supplies are compatible with the ExtremeSwitching X690 and X870 series switches.

Note



The X690 and X870 models also can accommodate one or two 1100 W DC PSUs. For information on replacing those units, see [Replacing a Summit 1100 W DC Power Supply](#) on page 299. Bear in mind that you cannot combine power supplies of different wattages in the same switch.

These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one Summit AC power supply without powering down the switch.

You need the following tools and materials to replace a Summit 770 W AC power supply:

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

To replace a Summit 770 W AC power supply, 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.

See [Figure 217](#).

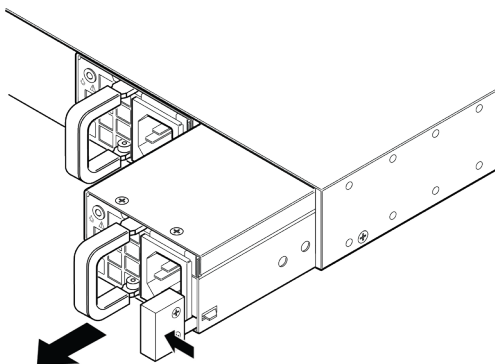


Figure 217: Removing a Summit 770 W AC Power Supply

- 4 Carefully slide the power supply the rest of the way out of the switch.



Caution

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



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 EMI levels.

- 5 Verify that the replacement power supply is oriented the same way as the unit you removed, and has the same airflow direction.
- 6 Carefully slide the power supply all the way into the power supply bay.

See [Figure 218](#).

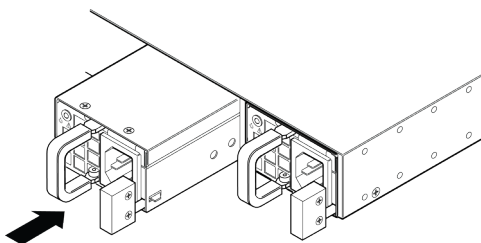


Figure 218: Installing A Summit 770 W AC Power Supply

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



Caution

Do not slam the power supply into the switch.

- 8 Connect the power cord to the power supply and to a grounded 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.

- 9 If the power supply is equipped with a power cord retainer, use the retainer to secure the power cord to the power supply.

Replacing a Summit 1100 W AC Power Supply

The Summit 1100 W AC power supplies are compatible with the X450-G2 and X460-G2 PoE switches. Part number 10941 is compatible with ExtremeSwitching X465 PoE switch models.

These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one Summit AC power supply without powering down the switch.

You need the following tools and materials to replace a Summit 1100 W AC power supply:

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

To replace a Summit 1100 W AC power supply, 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.

See [Figure 219](#).

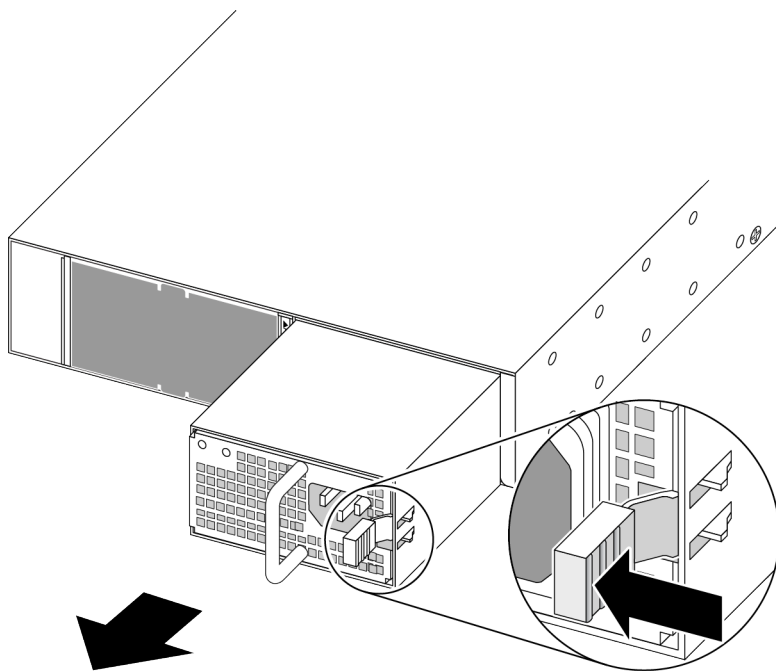


Figure 219: Removing a Summit 1100 W AC Power Supply

- 4 Carefully slide the power supply the rest of the way out of the switch.



Caution

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



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 EMI levels.

- 5 Verify that the replacement power supply is oriented the same way as the unit you removed, and has the same airflow direction.

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

See [Figure 220](#).

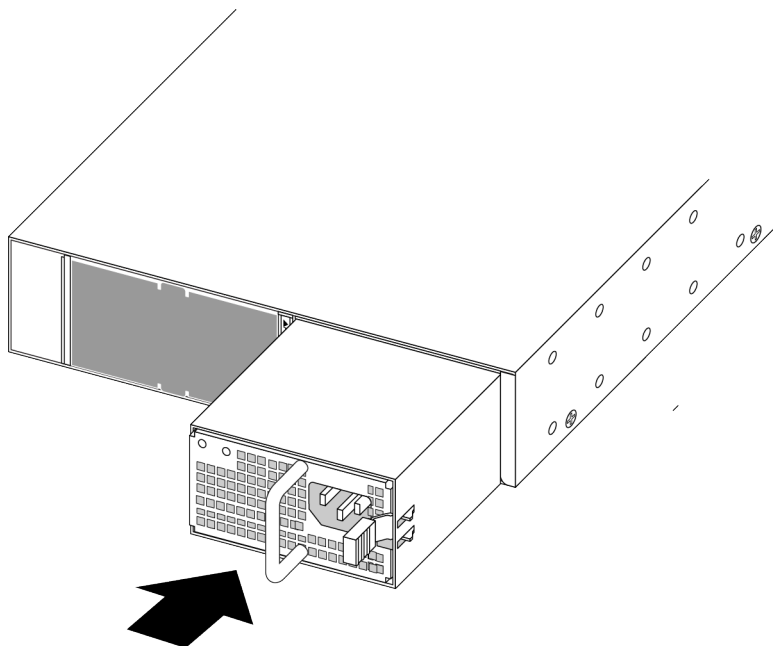


Figure 220: Installing a Summit 1100 W AC Power Supply

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



Caution

Do not slam the power supply into the switch.

- 8 Connect the power cord to the power supply and to a grounded 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.

- 9 If the power supply is equipped with a power cord retainer, use the retainer to secure the power cord to the power supply.

Removing an RPS-150XT Redundant Power Supply

To remove an installed RPS-150XT that is attached to a switch, follow these steps.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Note

The switch should not be powered on during installation or removal of the power supply. This is not a hot-swap procedure. Follow the steps in the order specified.

- 1 Unplug the AC power cord from the AC power source first and then from the power supply.
- 2 Disconnect the RPS cable from the Redundant Power Supply connector at the rear of the power supply.
- 3 Disconnect the RPS cable from the Redundant Power Supply connector on the switch.
- 4 If the power supply is installed in a rack, remove it from the rack:
 - a Holding the power supply securely, remove the captive screws that secure it to the STK-RPS-1005CH3 shelf.
 - b Carefully slide the power supply out of the shelf.
- 5 If you want to replace the power supply with another one, follow the instructions in [Installing an RPS-150XT Redundant Power Supply](#) on page 233.

Removing an RPS-500p Redundant Power Supply

To remove an installed RPS-500p that is attached to a switch, follow these steps.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

- 1 Unplug the AC power cord from the AC power source first and then from the power supply.
- 2 Disconnect the RPS cable from the Redundant Power Supply connector at the rear of the power supply.
- 3 Disconnect the RPS cable from the Redundant Power Supply connector on the switch.
- 4 If the power supply is installed in a rack, remove it from the rack:
 - a Holding the power supply securely, remove the screws that attach it to the rack rails.
 - b Place the power supply onto a sturdy flat surface.
 - c Optionally, remove the rack-mounting brackets from the power supply.
- 5 If you want to replace the power supply with a new one, follow the instructions in [Installing an RPS-500p Redundant Power Supply](#) on page 238.

Removing an STK-RPS-150PS Redundant Power Supply



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Note

The switch should not be powered on during installation or removal of the power supply. This is not a hot-swap procedure. Follow the steps in the order specified.

To remove a power supply installed in an operating system, proceed as follows:

- 1 Unplug the AC power cord of the power supply from the AC power source first, then from the rear of the power supply.
- 2 Loosen the captive screws securing the power supply until it is released from the RPS shelf front panel.
- 3 Pull the power supply out and remove it from the RPS shelf.

- 4 Repeat steps 1 through 3 for each additional power supply you plan to remove.

Removing an STK-RPS-1005PS Redundant Power Supply

To remove an installed STK-RPS-1005PS that is attached to a switch, follow these steps.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.



Note

The switch should not be powered on during installation or removal of the power supply. This is not a hot-swap procedure. Follow the steps in the order specified.

- 1 Unplug the AC power cord from the AC power source first and then from the power supply.
- 2 Disconnect the RPS cable from the Redundant Power Supply connector at the rear of the power supply.
- 3 Disconnect the RPS cable from the Redundant Power Supply connector on the switch.
- 4 If the power supply is installed in a rack, remove it from the rack:
 - a Holding the power supply securely, remove the captive screws that secure it to the STK-RPS-1005CH3 shelf.
 - b Carefully slide the power supply out of the shelf.
- 5 If you want to replace the power supply with another one, follow the instructions in [Installing an STK-RPS-1005PS Redundant Power Supply](#) on page 247.

Removing a VX-RPS-1000 Redundant Power Supply

To remove an installed VX-RPS-1000 power supply that is attached to a V400 Virtual Port Extender, follow these steps.



Caution

Observe all ESD precautions when handling sensitive electronic equipment.

- 1 Unplug the AC power cord from the AC power source first and then from the power supply.
- 2 Disconnect the power cable from the output socket at the rear of the power supply.
- 3 Disconnect the power cable from the RPS input connector on the rear of the V400 unit..
- 4 Remove the power supply from the rack:
 - a If the power supply is attached to the rack with mounting brackets, hold it securely and remove the screws that attach the brackets to the rack posts.
 - b If the power supply is installed on a shelf, loosen the two retaining screws and carefully slide the power supply out of the shelf..
 - c Place the power supply onto a sturdy flat surface.
 - d Optionally, remove the rack-mounting brackets from the power supply.
- 5 If you want to replace the power supply with a new one, follow the instructions in [Installing a VX-RPS-1000 Redundant Power Supply](#) on page 251.

10 Replacing DC Power Supplies

Replacing a Summit 300 W DC Power Supply
Replacing a Summit 550 W DC Power Supply
Replacing a 750 W Internal DC Power Supply
Replacing a Summit 1100 W DC Power Supply

This chapter describes how to replace internal DC power supplies in an Extreme Networks switch. These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one DC power supply without powering down the switch.

See [Replaceable Internal Power Supplies](#) on page 104 for a list of which internal DC power supplies are compatible with the switch you are using.

Replacing a Summit 300 W DC Power Supply

The following instructions apply to both of the 300 W DC power supplies (part numbers 10933 and 10944).

You need the following tools and materials to replace a Summit 300 W DC power supply:

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



Warning

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

Removing a 300 W DC Power Supply

To remove an installed Summit 300 W DC power supply, follow these steps:

- 1 De-energize the DC circuit.
- 2 Disconnect the DC power cables:
 - a Pull 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.



Warning

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

- 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 toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors.

See [Figure 221](#).

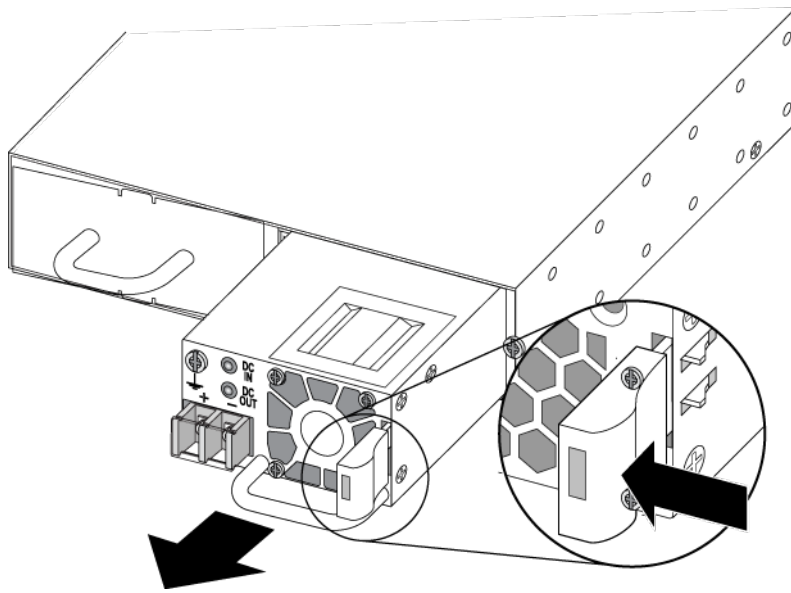


Figure 221: Removing a Summit 300 W DC Power Supply (Front-to-Back Model 10933 Shown)

- 5 Carefully slide the power supply the rest of the way out of the switch.

Installing a Replacement 300 W DC Power Supply

To install a replacement Summit 300 W DC power supply, follow these steps:

- 1 Verify that the power supply is right side up.

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

See [Figure 222](#).

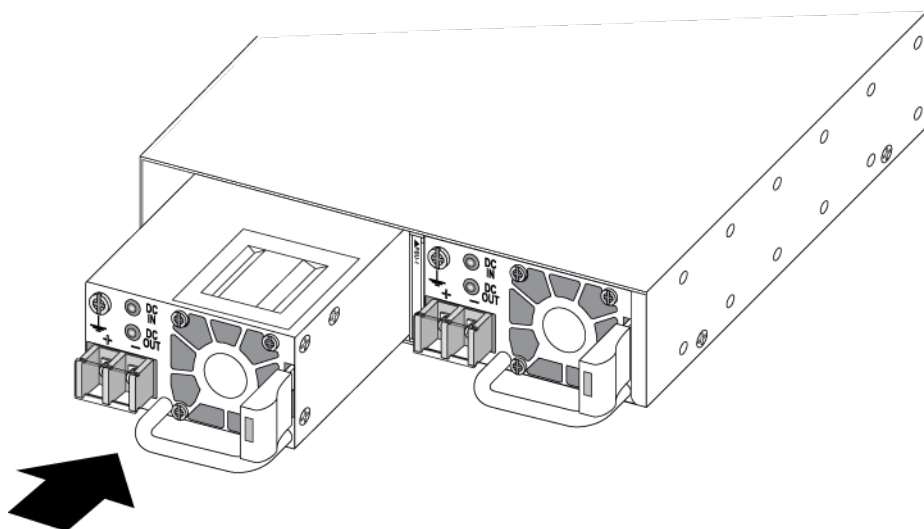


Figure 222: Installing a Summit 300 W DC Power Supply (Front-to-Back Model 10933 Shown)

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



Caution

Do not slam the power supply into the switch.

- Reconnect the ground wire as described in [Connecting the Ground Wire to a 300 W DC Power Supply](#) on page 281.

Connecting the Ground Wire to a 300 W DC Power Supply

To connect the ground wire to the Summit 300 W DC power supply, follow these steps:

- Verify that the DC circuit is de-energized.
- Identify the grounding point on the front panel of the power supply.

See [Figure 223](#).

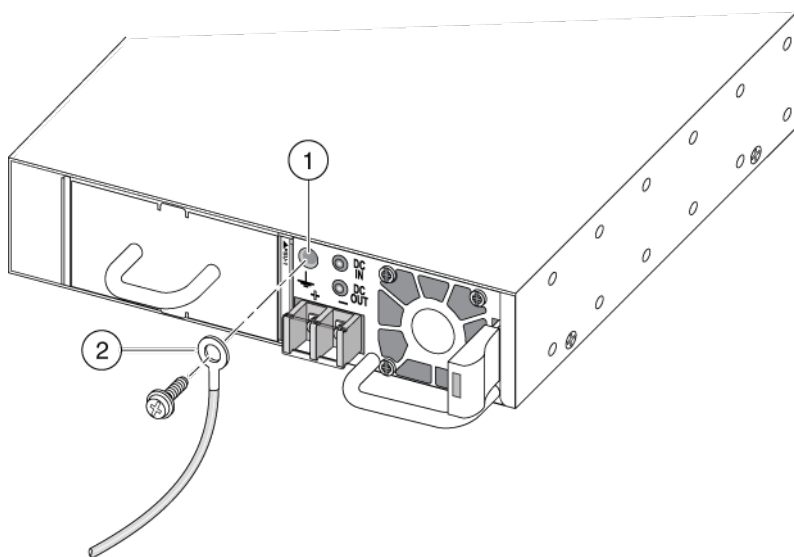


Figure 223: Connecting the Ground Wire (Front-to-Back Model 10933 Shown)

1 = Grounding point

2 = Ground wire

- 3 Insert an M3.5 screw (provided) through the ring terminal on the ground and into the grounding point on the power supply.
- 4 Tighten the screw to 1.4 N m (12.6 in-lb).
- 5 Connect the other end of the wire to a known reliable earth ground point at your site.
- 6 Connect the switch to the DC power source. See the instructions in [Connecting DC Power Cables to a 300 W DC Power Supply](#) on page 282.

Connecting DC Power Cables to a 300 W DC Power Supply

Your Summit 300 W DC power supply (part no. 10933 or 10944) can connect to both +24 V and -48 V power sources. The connection instructions are different depending upon the power source voltage.

For connection instructions, refer to the appropriate topic:

- [Connecting the DC Power Cables to a +24 V Source](#) on page 282
- [Connecting the DC Power Cables to a -48 V Source](#) on page 285

Connecting the DC Power Cables to a +24 V Source

To connect the DC power cables for the 300 W Summit DC power supply (part no. 10933 or 10944) to a +24 V 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 Verify that the ground wire is attached to the power supply.
See [Connecting the Ground Wire to a 300 W DC Power Supply](#) on page 281.
- 4 Slide the cover off the terminal block.

- 5 Connect the DC power input cables as follows:
 - 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 -24 V).

- c Slide the spade terminal of the **positive** wire (+24 V) under the captive square washer on the **positive** terminal (labeled +24 V).
See [Figure 224](#).

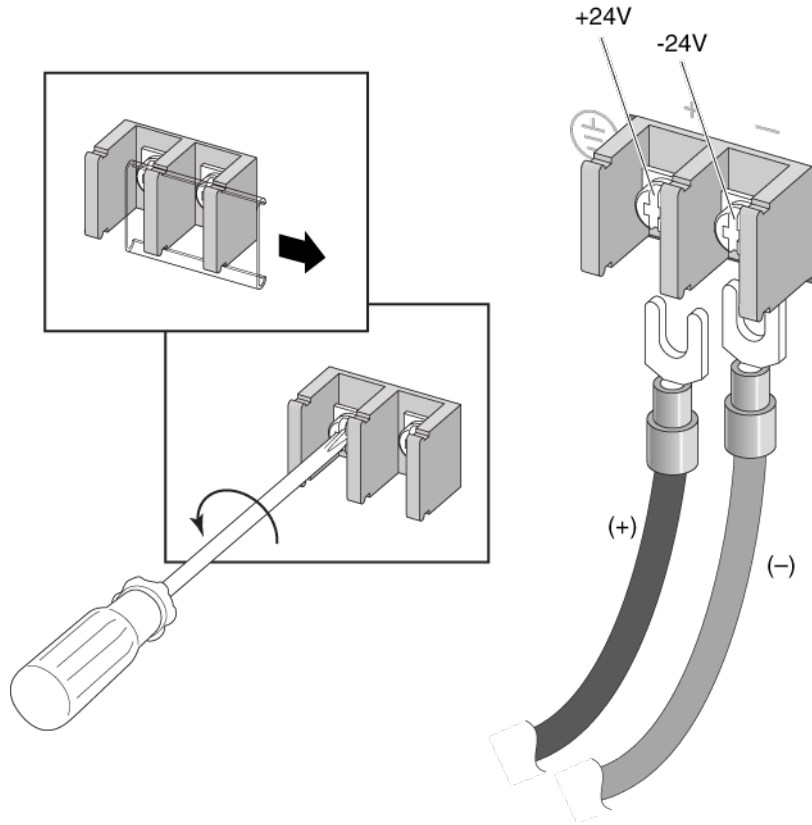


Figure 224: Connecting the DC Power Cables: Part 1

- d Tighten both screws on the terminal block to 15.9 in-lb (1.8 N-m) as shown in [Figure 225](#).

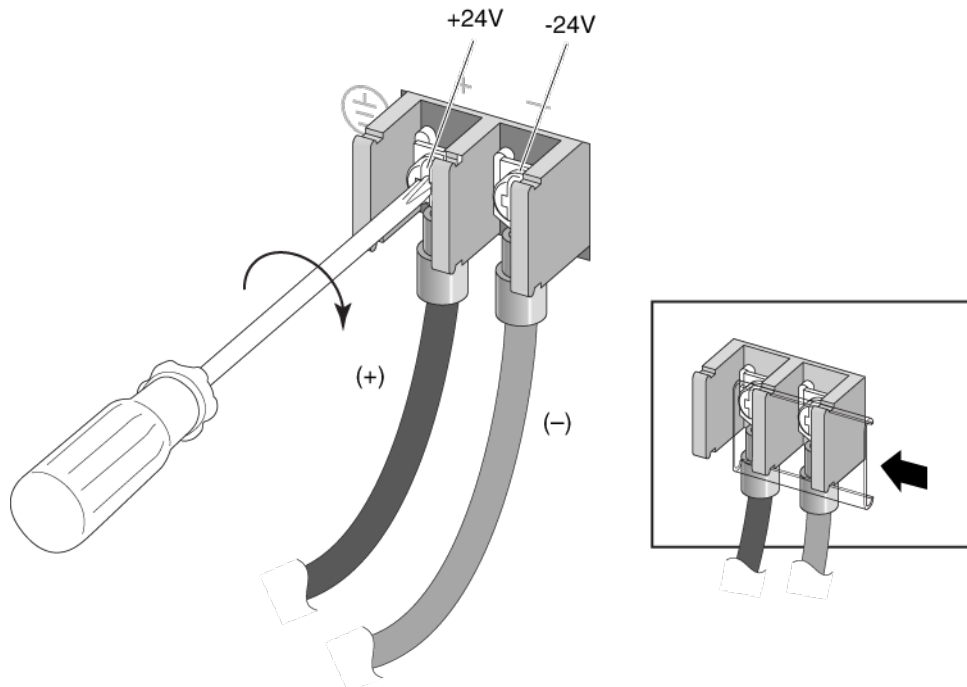


Figure 225: Connecting the DC Power Cables: Part 2

- 6 Slide the cover into place over the terminal block.
- 7 Energize the DC circuit.

Connecting the DC Power Cables to a -48 V Source

To connect the DC power cables for the 300 W Summit DC power supply (part no. 10933 or 10944) to a -48 V 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 Verify that the ground wire is attached to the power supply.
See [Connecting the Ground Wire to a 300 W DC Power Supply](#) on page 281.
- 4 Slide the cover off the terminal block.
- 5 Connect the DC power input cables as follows:
 - 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 -48 V).

- c Slide the spade terminal of the **positive** wire (-48 V RTN) under the captive square washer on the **positive** terminal (labeled RTN).
See [Figure 226](#).

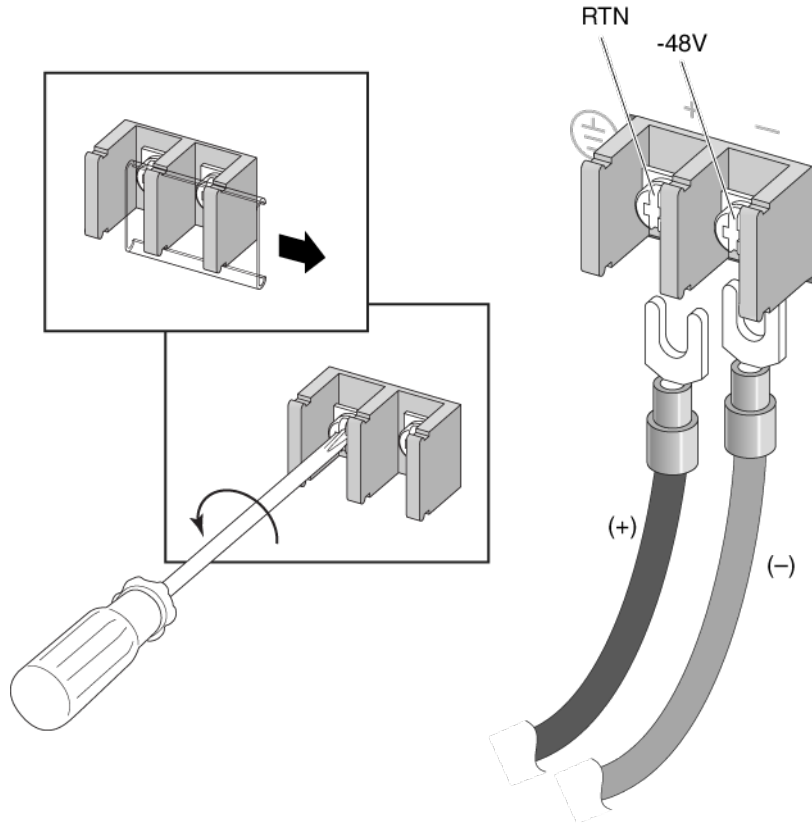


Figure 226: Connecting the DC Power Cables: Part 1

- d Tighten both screws on the terminal block to 15.9 in-lb (1.8 N-m) as shown in [Figure 227](#).

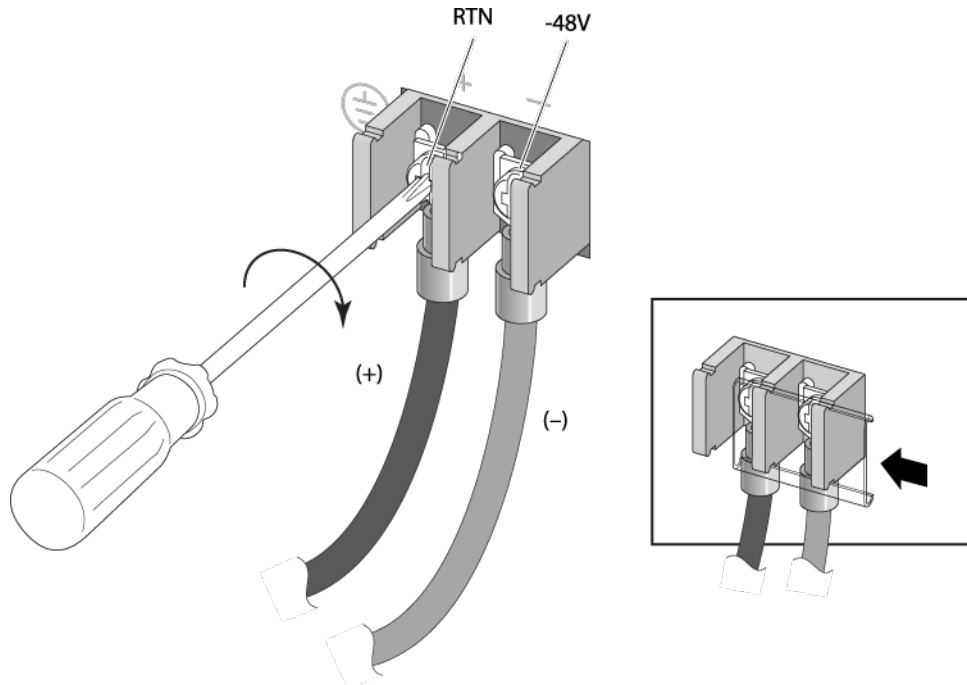


Figure 227: Connecting the DC Power Cables: Part 2

- 6 Slide the cover into place over the terminal block.
- 7 Energize the DC circuit.

Replacing a Summit 550 W DC Power Supply

Summit 550 W power supply units (PSUs) are available with either front-to-back or back-to-front airflow. If you install two PSUs, both must have the same airflow direction.



Note

You cannot combine power supplies of different wattages in the same switch.

You need the following tools and materials to replace a 550 W DC power supply:

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

Removing a 550 W DC Power Supply

To remove an installed 550 W DC power supply, follow these steps:



Caution

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

- 1 De-energize the DC circuit.
- 2 Disconnect the DC power cables:
 - a Pull 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.



Warning

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

- 3 Disconnect the ground wire as follows:
 - a Loosen the screw that secures the ground wire to the terminal block.
 - b Slide the wire out from under the captive washer.
- 4 Note the orientation of the installed power supply.

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

See [Figure 228](#).

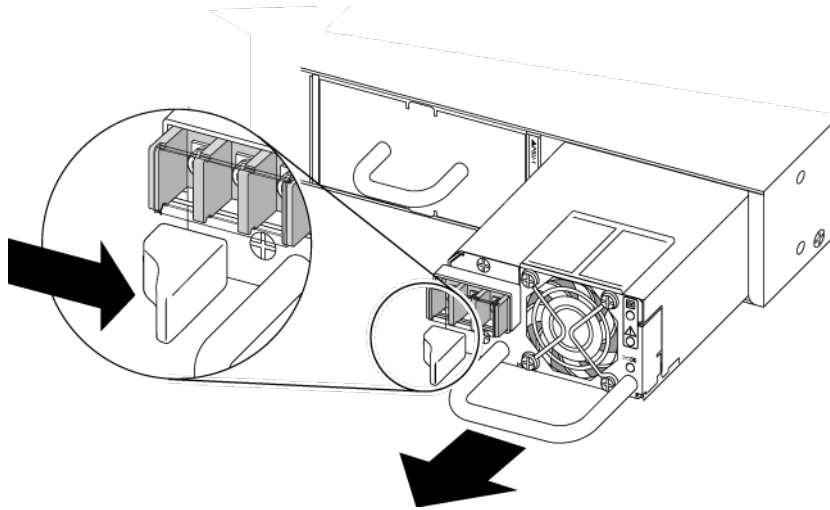


Figure 228: Removing a Summit 550 W Power Supply

- 6 Carefully slide the power supply the rest of the way out of the switch.
- 7 If a replacement power supply will not be installed, install a cover over the unoccupied power supply bay.



Note

Unoccupied power supply bays must always be covered to maintain proper system ventilation and EMI levels.

Installing a Replacement 550 W DC Power Supply

To install a replacement 550 W DC power supply, follow these steps:

- 1 Verify that the replacement power supply is oriented the same as the unit you removed and that it has the same airflow direction as the switch.

- Carefully slide the power supply all the way into the power supply bay.
See [Figure 229](#).

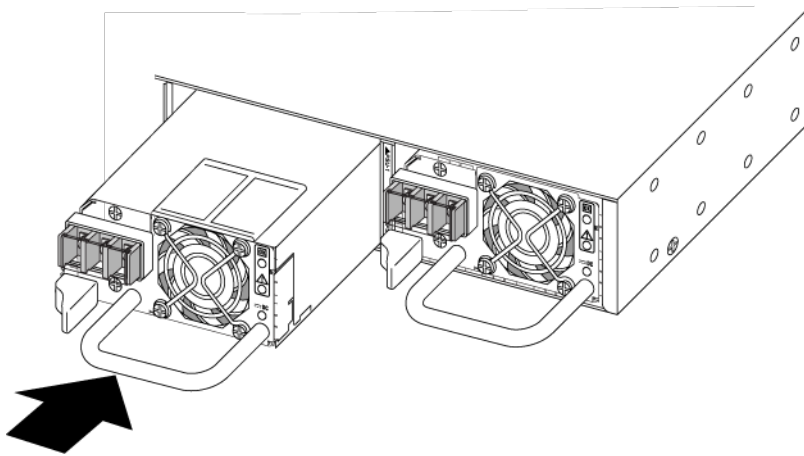


Figure 229: Installing a 550 W DC Power Supply

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



Caution

Do not slam the power supply into the switch.

- Reconnect the ground wire as described in [Connecting the Ground Wire to a 550 W DC Power Supply](#) on page 289.

Connecting the Ground Wire to a 550 W DC Power Supply

To connect the ground wire to the 550 W DC power supply:



Warning

Be sure to connect the chassis ground wire before you connect any power cables.

- Verify that the DC circuit is de-energized.
- Pull the cover off the terminal block.
- Identify the grounding point on the front panel of the power supply.

See [Figure 230](#).

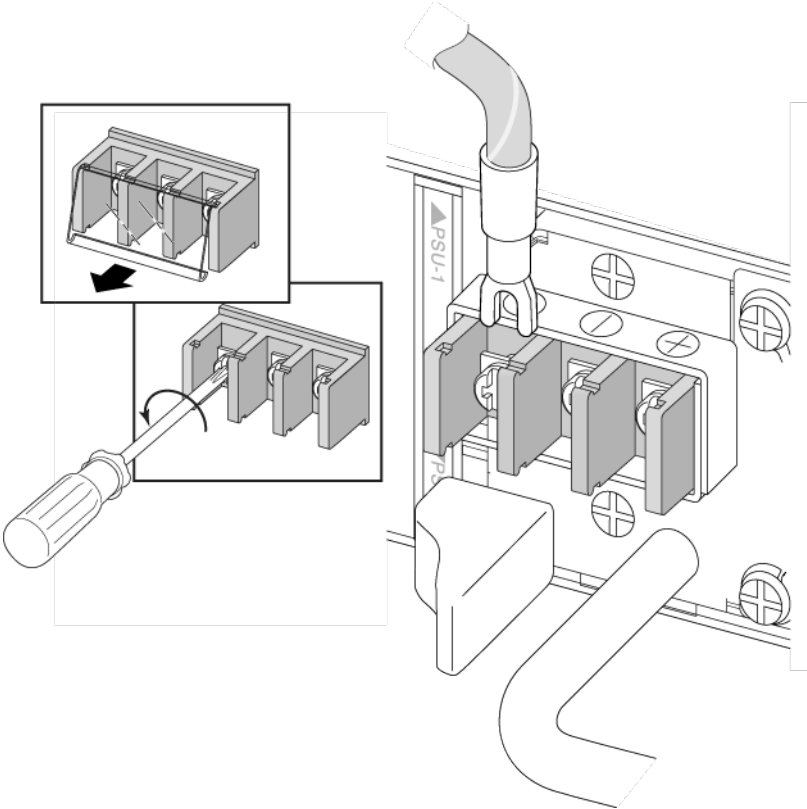


Figure 230: Connecting the Ground Wire

1 = Grounding point	2 = Ground wire
---------------------	-----------------

- 4 Connect the ground wire to the grounding point as follows:
 - a Loosen the screw enough to allow the spade terminal to slide underneath the captive square washer (see [Figure 231](#)).
 - b Slide the spade terminal of the ground wire under the captive square washer.
 - c Tighten the screw to 7 in-lb (0.79 N m).

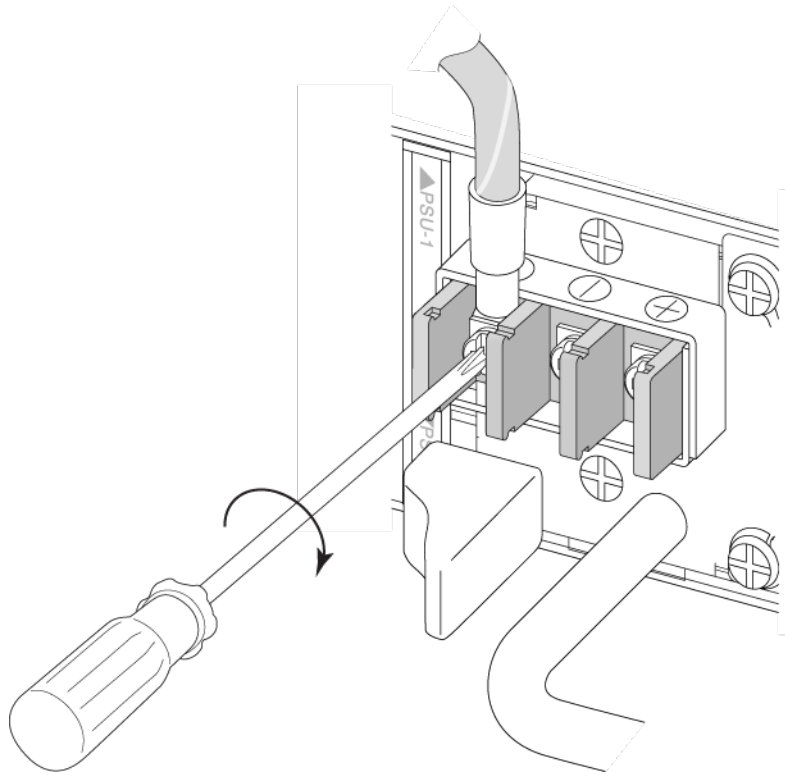


Figure 231: Securing the Ground Wire

- 5 Connect the other end of the wire to a known reliable earth ground point at your site.
- 6 Connect the switch to the DC power source. See the instructions in [Connecting DC Power Cables to a 550 W DC Power Supply](#) on page 291.

Connecting DC Power Cables to a 550 W DC Power Supply

The DC power connection at your facility must be made by a qualified electrician.



Warning

Always make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cables on the 550 W DC power supply.



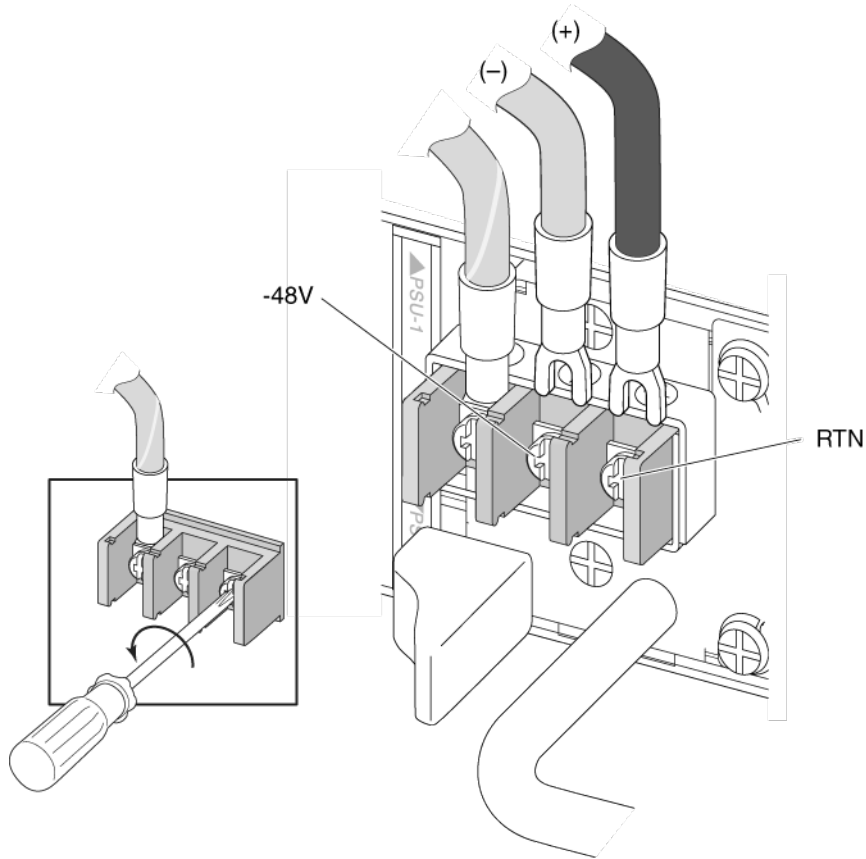
Caution

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

To connect the DC power cables to the 550 W DC power supply, 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 Verify that the ground wire is attached to the power supply.
See [Connecting the Ground Wire to a 550 W DC Power Supply](#) on page 289.
- 4 Connect the DC power input cables as follows:
 - a On each terminal, loosen the screw enough to allow the spade terminal to slide underneath the captive square washer (see [Figure 232](#) on page 293).
 - b Slide the spade terminal of the **negative** wire (-48 V) under the captive square washer on the **negative** terminal (labeled -).

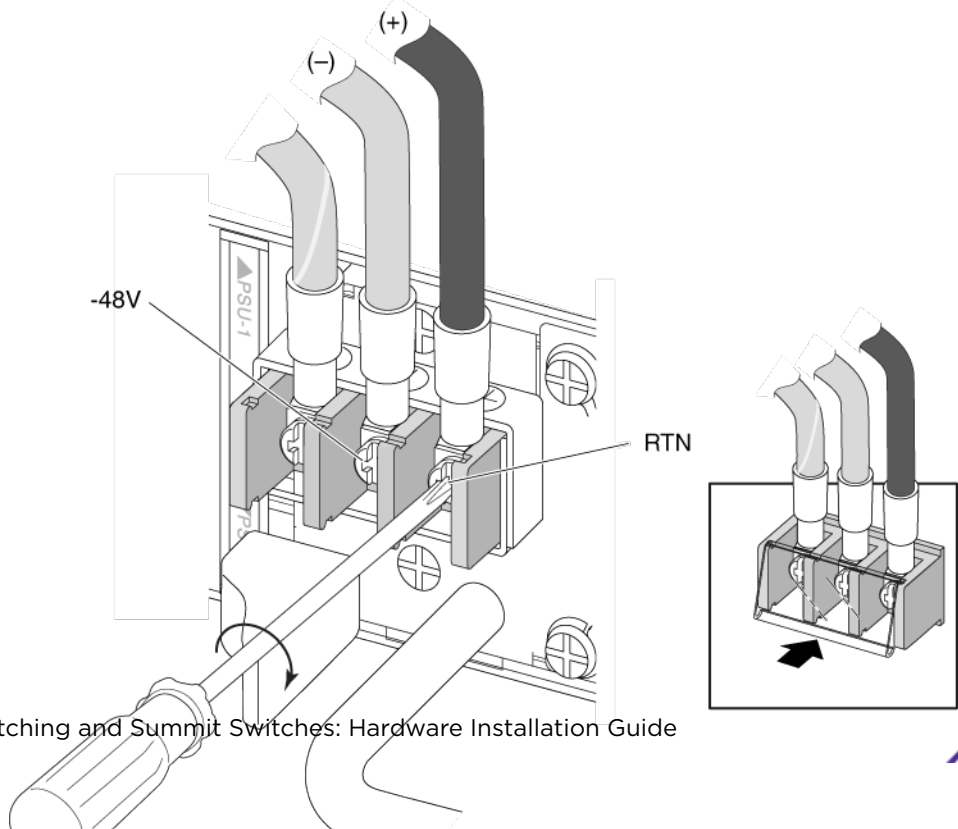
- c Slide the spade terminal of the **positive** wire (-48 V RTN) under the captive square washer on the **positive** terminal (labeled +).



SH161

Figure 232: Connecting the DC Power Cables: Part 1

- d Tighten both screws on the terminal block to 7 in-lb (0.79 N m), as shown in [Figure 233](#).



- 5 Snap the cover into place over the terminal block.
- 6 Energize the DC circuit.

Replacing a 750 W Internal DC Power Supply

The ExtremeSwitching X695 switch can accommodate two 750 W DC power supply units (PSU) with either front-to-back or back-to-front airflow.



Note

For information on replacing those units, see [Install a Replacement 750 W DC Power Supply](#) on page 295. Bear in mind that you cannot combine power supplies of different wattages in the same switch.

You need the following tools and materials to replace an 750 W DC power supply:

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

Remove a 750 W DC Power Supply

To remove an installed 750 W DC power supply, follow these steps:



Caution

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

- 1 De-energize the DC circuit.
 - 2 Disconnect the DC power cables:
 - a Pull 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.
-



Warning

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

- 3 Disconnect the ground wire as follows:
 - a Loosen the screw that secures the ground wire to the terminal block.
 - b Slide the wire out from under the captive washer.

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

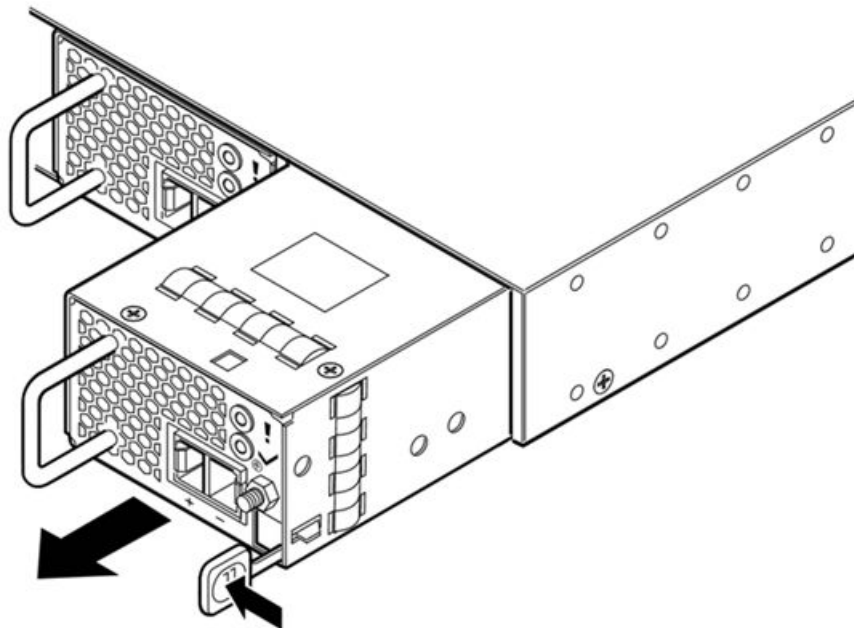


Figure 234: Removing a Summit 750 W Power Supply

- 5 Carefully slide the power supply the rest of the way out of the switch.
- 6 If a replacement power supply will not be installed, install a cover over the unoccupied power supply bay.



Note

Unoccupied power supply bays must always be covered to maintain proper system ventilation and EMI levels.

Install a Replacement 750 W DC Power Supply

To install a replacement 750 W DC power supply unit (PSU), follow these steps:

- 1 Verify that the replacement power supply is oriented the same as the one you removed.
- 2 Verify that the direction of ventilation airflow is the same for both the power supply and the switch.
In a switch with front-to-back airflow, the fan modules are labeled **Air Out**.

In a switch with back-to-front airflow, the fan modules are labeled **Air In**.

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

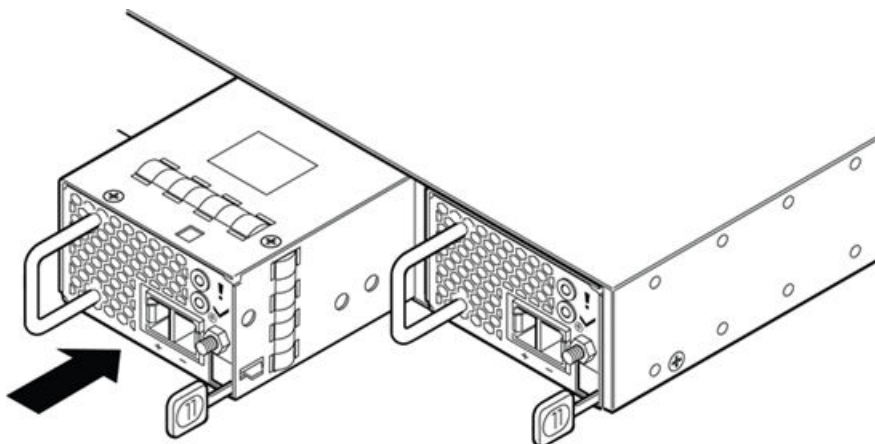


Figure 235: Installing an 750 W DC Power Supply

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



Caution

Do not slam the power supply into the switch.

- Reconnect the ground wire as described in [Connect the Ground Wire to an 750 W DC Power Supply](#) on page 296.

Connect the Ground Wire to an 750 W DC Power Supply

To connect the ground wire to the 750 W DC power supply, follow these steps:



Warning

Be sure to connect the ground wire before you connect any power cables to the power supply.

- Verify that the DC circuit is de-energized.
- Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
- Identify the grounding post on the right side of the power supply, above the latching tab.

- 4 Connect the ground wire to the grounding post as follows:
 - a Remove the nut from the grounding post.
 - b Slide the ring terminal of the ground wire onto the grounding post (callout 1 in the following figure).

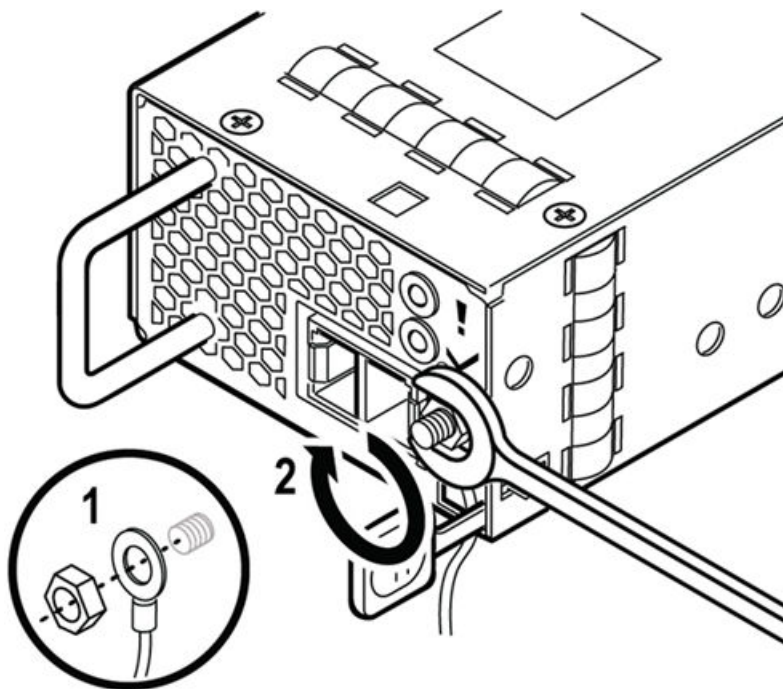


Figure 236: Securing the Ground Wire

- c Screw the nut onto the grounding post (callout 2).
 - d Tighten the nut to 7 in-lb (0.79 N m).
- 5 Connect the other end of the wire to a known reliable earth ground point at your site.
- 6 Connect the power supply to the DC power source. See the instructions in [Connect DC Power Cables to an 750 W DC Power Supply](#) on page 297.

Connect DC Power Cables to an 750 W DC Power Supply

The DC power connection at your facility must be made by a qualified electrician.



Warning

Always make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cables on the 750 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.

To connect the DC power cables to the 750 W DC power supply, 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 Verify that the ground wire is attached to the power supply.
See [Connect the Ground Wire to an 750 W DC Power Supply](#) on page 296.
- 4 Insert a screwdriver into both slots on the top of the terminal connector and loosen the screws enough to accommodate a stripped power input cable.
- 5 Insert the DC power cables into the connector.
 - a Slide the end of the **positive** wire (-48 V RTN) into the **positive** terminal (labeled +, on the left side of the connector).
 - b Tighten the screw on the top of the positive terminal connector to between 4.4 in-lb (0.50 N m) and 7.1 in-lb (0.8 N m).

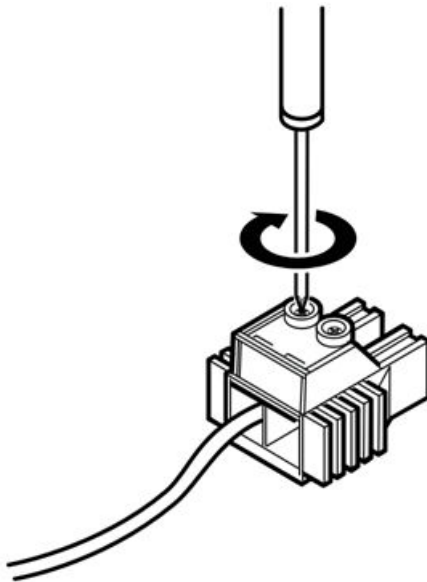


Figure 237: Inserting the DC Power Cables into the Connector

- c Slide the end of the **negative** wire (-48 V) into the **negative** terminal (labeled -, on the right side of the connector).
- d Tighten the screw on the top of the negative terminal connector to between 4.4 in-lb (0.50 N m) and 7.1 in-lb (0.8 N m).

- 6 Insert the connector into the slot on the power supply.

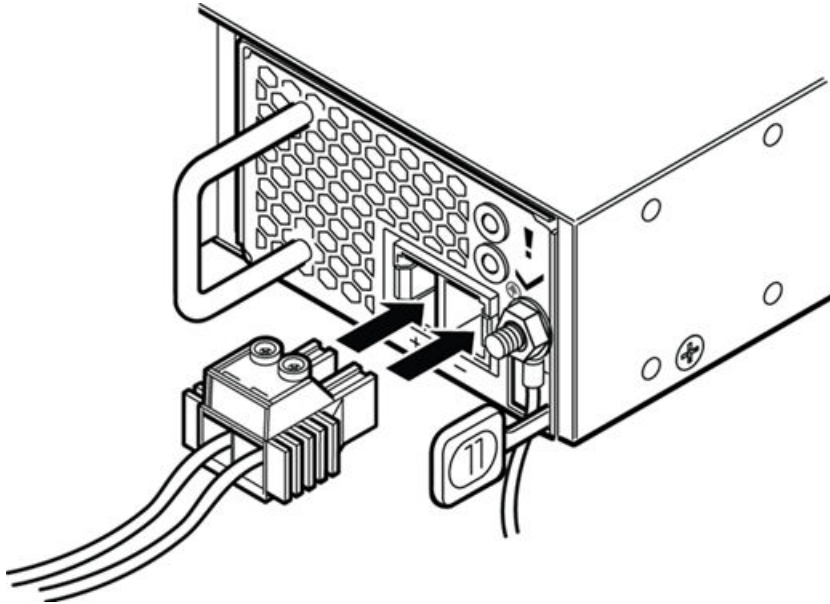


Figure 238: Inserting the Connector into the Power Supply

- 7 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.
- 8 Energize the DC circuit.

Replacing a Summit 1100 W DC Power Supply

The ExtremeSwitching X690 and X870 series switches accommodate one or two Summit 1100 W DC power supply units (PSUs) with either front-to-back or back-to-front airflow.

Note



The X690 and X870 models also can accommodate one or two 770 W AC PSUs. For information on replacing those units, see [Replacing a Summit 770 W AC Power Supply](#) on page 272. Bear in mind that you cannot combine power supplies of different wattages in the same switch.

You need the following tools and materials to replace an 1100 W DC power supply:

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

Removing an 1100 W DC Power Supply

To remove an installed 1100 W DC power supply, follow these steps:



Caution

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

- 1 De-energize the DC circuit.
- 2 Disconnect the DC power cables:
 - a Pull 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.



Warning

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

- 3 Disconnect the ground wire as follows:
 - a Loosen the screw that secures the ground wire to the terminal block.
 - b Slide the wire out from under the captive washer.
- 4 Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors.

See [Figure 239](#).

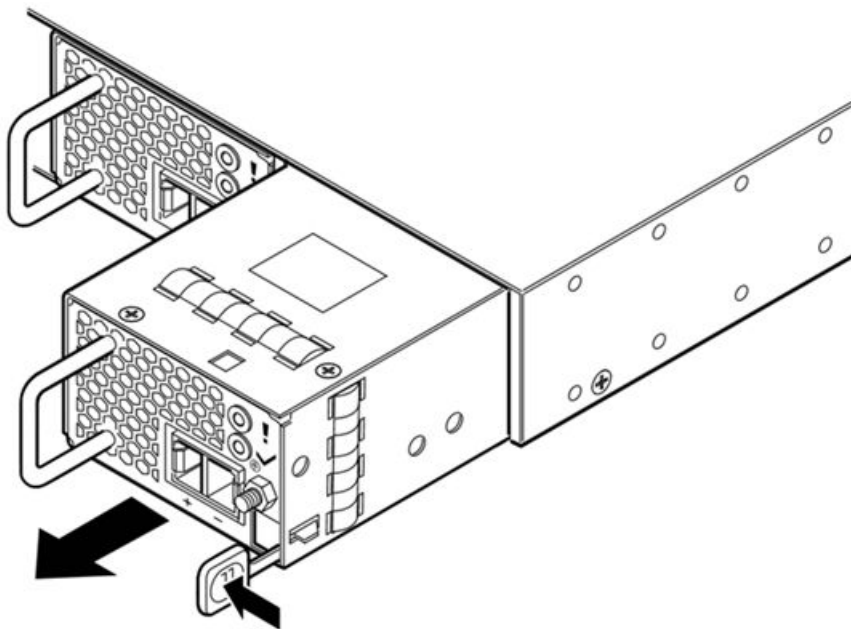


Figure 239: Removing a Summit 1100 W Power Supply

- 5 Carefully slide the power supply the rest of the way out of the switch.

- 6 If a replacement power supply will not be installed, install a cover over the unoccupied power supply bay.

**Note**

Unoccupied power supply bays must always be covered to maintain proper system ventilation and EMI levels.

Install a Replacement 1100 W DC Power Supply

To install a replacement 1100 W DC power supply unit (PSU), follow these steps:

- 1 Verify that the replacement power supply is oriented the same as the one you removed.
- 2 Verify that the direction of ventilation airflow is the same for both the power supply and the switch.
In a switch with front-to-back airflow, the fan modules are labeled **Air Out**.

In a switch with back-to-front airflow, the fan modules are labeled **Air In**.

- 3 Carefully slide the power supply all the way into the power supply bay.

See [Figure 240](#).

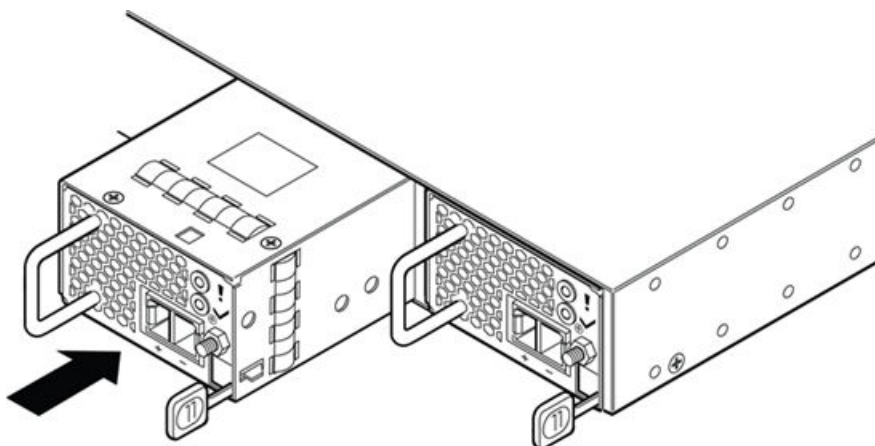


Figure 240: Installing an 1100 W DC Power Supply

- 4 Push the power supply in until the latch snaps into place.

**Caution**

Do not slam the power supply into the switch.

- 5 Reconnect the ground wire as described in [Connect the Ground Wire to an 1100 W DC Power Supply](#) on page 302.

Connect the Ground Wire to an 1100 W DC Power Supply

To connect the ground wire to the 1100 W DC power supply, follow these steps:



Warning

Be sure to connect the ground wire before you connect any power cables to the power supply.

- 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 post on the right side of the power supply, above the latching tab.
- 4 Connect the ground wire to the grounding post as follows:
 - a Remove the nut from the grounding post.
 - b Slide the ring terminal of the ground wire onto the grounding post (callout 1 in [Figure 241](#)).

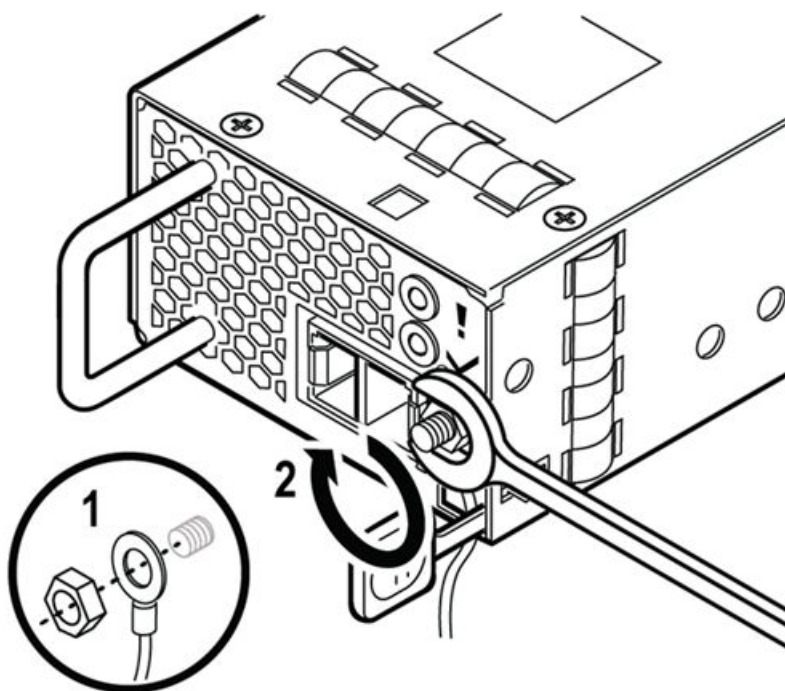


Figure 241: Securing the Ground Wire

- c Screw the nut onto the grounding post (callout 2).
 - d Tighten the nut to 7 in-lb (0.79 N m).
- 5 Connect the other end of the wire to a known reliable earth ground point at your site.
- 6 Connect the power supply to the DC power source. See the instructions in [Connect DC Power Cables to an 1100 W DC Power Supply](#) on page 303.

Connect DC Power Cables to an 1100 W DC Power Supply

The DC power connection at your facility must be made by a qualified electrician.

**Warning**

Always make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cables on the 1100 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.

To connect the DC power cables to the 1100 W DC power supply, 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 Verify that the ground wire is attached to the power supply.
See [Connect the Ground Wire to an 1100 W DC Power Supply](#) on page 302.
- 4 Insert a screwdriver into both slots on the top of the terminal connector and loosen the screws enough to accommodate a stripped power input cable.

- 5 Insert the DC power cables into the connector.
 - a Slide the end of the **positive** wire (-48 V RTN) into the **positive** terminal (labeled **+**, on the left side of the connector).
 - b Tighten the screw on the top of the positive terminal connector to between 4.4 in-lb (0.50 N m) and 7.1 in-lb (0.8 N m).

See [Figure 242](#).

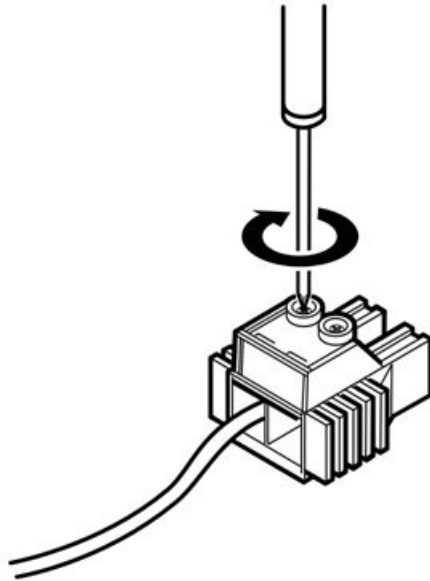


Figure 242: Inserting the DC Power Cables into the Connector

- c Slide the end of the **negative** wire (-48 V) into the **negative** terminal (labeled **-**, on the right side of the connector).
 - d Tighten the screw on the top of the negative terminal connector to between 4.4 in-lb (0.50 N m) and 7.1 in-lb (0.8 N m).

- 6 Insert the connector into the slot on the power supply.

See [Figure 243](#).

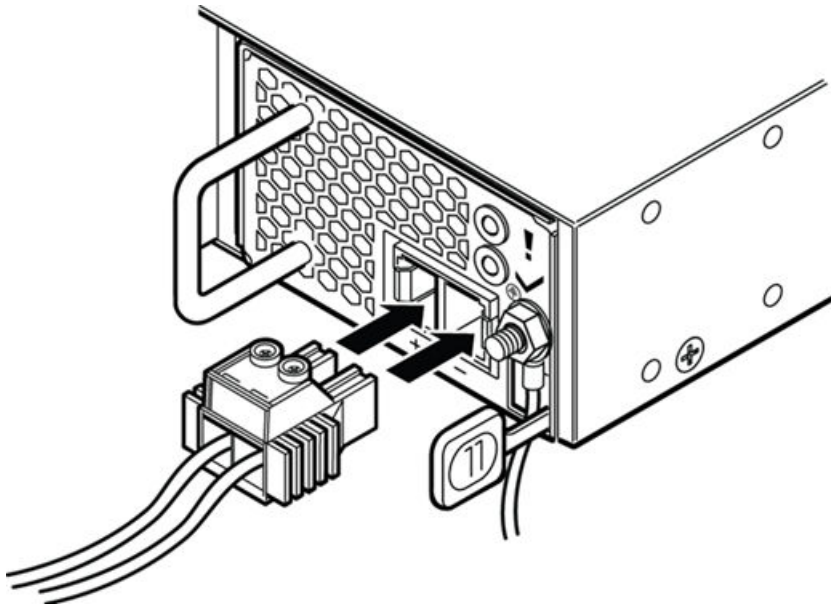


Figure 243: Inserting the Connector into the Power Supply

- 7 Connect the cables to the DC source voltage, using hardware appropriate to the installation site and following local and national electrical codes.
- 8 Energize the DC circuit.

11 Replacing Fan Modules

Pre-Installation Requirements Airflow Direction Requirements Replacing a Fan Module

For switches with replaceable fan modules, refer to the following information to replace the fan modules.

Illustrations in this chapter show switches that might not be identical to the ones you are using. However, the procedure for replacing a fan module is the same for all ExtremeSwitching switches.



Note

Read all of the information in this chapter thoroughly before attempting to replace a fan module.

Pre-Installation Requirements

You need a 1/4-inch flat-blade screwdriver to replace a fan module.



Caution

Be sure to finish the replacement procedure promptly. The switch could overheat if left without cooling for an extended period.

Airflow Direction Requirements

- The air flows from front to back. In these switch models, the fan modules are labeled **Air Out**.
- The air flows from back to front. In these switch models, the fan modules are labeled **Air In**.

X465 switches are available with front-to-back airflow. In this switch, the fan modules are labeled **Air Out**.

All installed fan modules must blow air in the same direction and must match the airflow direction of the installed power supplies.

Replacing a Fan Module

To replace the fan module in a switch, do the following:

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

On most switch models, the fan module has two retaining screws at the bottom corners of the module, as shown in [Figure 244](#).

On some switch models, the fan module has a single retaining screw at the top right corner of the module.

- 2 Slide the fan module out of the switch and set it aside.

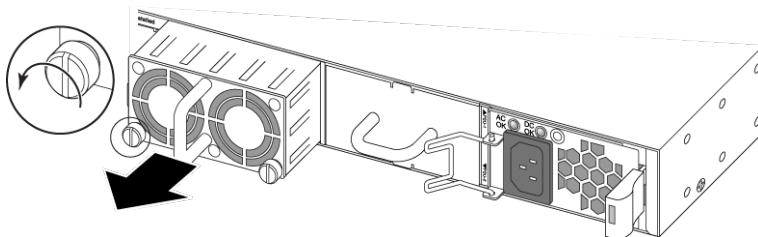


Figure 244: Removing a Fan Module

- 3 Verify that the airflow direction on the replacement fan module matches that of the installed fan modules.

Fans with front-to-back airflow are labeled **Air Out**.

Fans with back-to-front airflow are labeled **Air In**.

- 4 Carefully slide the replacement fan module into the switch.

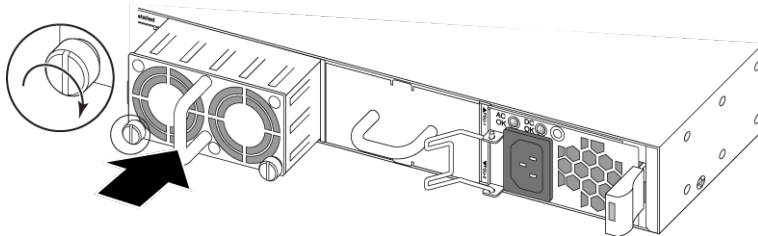


Figure 245: Installing a Fan Module

- 5 Align and fully tighten the captive retaining screws.

12 Removing and Replacing Expansion Modules

Removing or Replacing a V400 Virtual Port Extender

Removing or Replacing a Half-Duplex to Full-Duplex Converter

Replacing a Versatile Interface Module, Solid-state Drive, or Clock Module in an X460-G2 Series or X465 Series Switch

This chapter describes how to replace the following equipment:

- [Removing or Replacing a V400 Virtual Port Extender](#) on page 308
- [Removing or Replacing a Half-Duplex to Full-Duplex Converter](#) on page 308
- [Replacing a Versatile Interface Module, Solid-state Drive, or Clock Module in an X460-G2 Series or X465 Series Switch](#) on page 309

Removing or Replacing a V400 Virtual Port Extender

For instructions for installing a V400 Virtual Port Extender, refer to [Installing a V400 Virtual Port Extender](#) on page 255.

To replace a V400 Virtual Port Extender or remove it from service, follow these steps:

- 1 Disconnect the port extender from its power source and, if applicable, from its redundant power supply.
- 2 Support the port extender while you remove the rack-mounting screws that hold the front mounting brackets in place against the rack posts.
- 3 Carefully slide the port extender out of the rack.
- 4 Place the port extender on a secure, flat surface.
Optionally, remove the mounting brackets from the sides.
- 5 Install a new port extender using the instructions in [Installing a V400 Virtual Port Extender](#) on page 255.

Removing or Replacing a Half-Duplex to Full-Duplex Converter

Refer to [Installing a Half-Duplex to Full-Duplex Converter](#) on page 256 for installation options for the Half-Duplex to Full-Duplex Converter.

To replace a Half-Duplex to Full-Duplex Converter or remove it from service, follow these steps:

- 1 Disconnect the half-duplex ports (HD1 - HD4) from your half-duplex devices.
- 2 Disconnect the full-duplex ports (FD1 - FD4) from the switch.

- 3 Disconnect the converter to its power adapter.
 - a Disconnect the power adapter from its AC power source.
 - b Disconnect the DC power cable from the power adapter and from the DC input socket on the side of the converter.
 - c Remove the grounding wire from the converter.
- 4 If the converter is attached to a 3-slot modular shelf, loosen the cable ties and remove it from the shelf.
- 5 Optionally, install a new converter using the instructions in [Installing a Half-Duplex to Full-Duplex Converter](#) on page 256.

Replacing a Versatile Interface Module, Solid-state Drive, or Clock Module in an X460-G2 Series or X465 Series Switch

This section describes how to replace versatile interface modules (VIMs) or a clock module in the rear slot of an X460-G2 switch, or VIM5 in the front and SSD in the rear slot of an X465 switch.



Note

Clock module ports are output ports; clock module ports are not to be used as input ports.

You need the following tools and materials to install a VIM or clock module:

- ESD-preventive wrist strap
- #2 Phillips screwdriver



Caution

VIMs, SSDs, and clock modules are not hot-swappable. Disconnect power to the switch before removing an installed VIM, SSD, or clock module or installing a new one.

The replacement procedure is the same for all X460-G2 VIMs and clock modules, and all X465 VIM5s and SSDs, with the exception that the VIMs and SSDs use slotted retaining screws and the clock module uses Phillips retaining screws.

To replace a VIM, SSD, or 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 Disconnect the switch power.
- 3 Remove the existing VIM, SSD, or clock module:
 - a Remove the retaining screws holding the existing module in place.
 - b Save the retaining screws to secure the new module in the switch.
 - c Pull the old module out of the module slot.
- 4 Remove the new VIM, SSD, or clock module from its anti-static packaging.
- 5 Install the VIM, SSD, or clock module in the switch:
 - a Carefully slide the module into the switch.

- b Insert and tighten the retaining screws you removed in step 3. The clock module uses Phillips screws and the VIM and SSD modules use slotted screws.



Figure 246: Tighten Screws on the Inserted VIM5 Module



Figure 247: Tighten Screws on the Inserted SSD Module



Figure 248: Tighten Screws on the Inserted Clock Module

1= retaining screw locations

13 Removing Switches from Service

Removing an AC Power Supply
Removing a DC Power Supply
Removing a Switch from a Rack

Removing a switch from service is a two-step process:

- 1 Disconnect the switch from its power source, following these steps as applicable:
 - Disconnect and remove the switch's removable AC power supply. See [Removing an AC Power Supply](#) on page 311.
 - Disconnect and remove the switch's removable DC power supply. See [Removing a DC Power Supply](#) on page 312.
 - Disconnect the switch from its redundant power supply.
- 2 Remove the switch from the rack, following the steps in [Removing a Switch from a Rack](#) on page 313.



Note

Read the information in this chapter thoroughly before you attempt to remove a switch.

Removing an AC Power Supply

To remove an AC power supply unit (PSU) from a switch, follow these steps:

- 1 Disconnect the AC power cord from the wall outlet and from the power input connector on the power supply.

- 2 Push the latching tab to the right as you pull outward on the handle to disengage the power supply internal connectors.

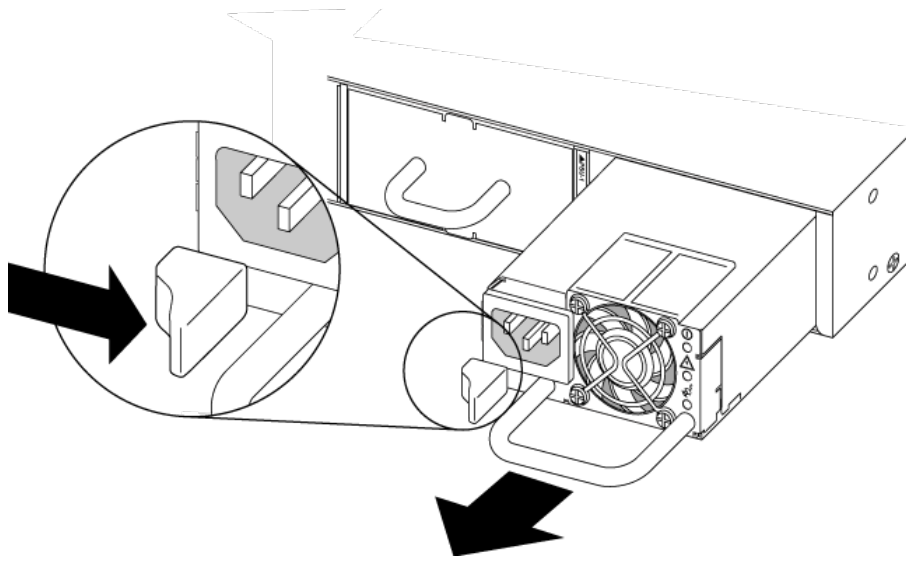


Figure 249: Removing an AC Power Supply

- 3 Carefully slide the power supply the rest of the way out of the switch.

Removing a DC Power Supply

To remove a DC power supply unit (PSU) from a switch, follow these steps:

- 1 De-energize the DC circuit.



Warning

Removing the DC wiring harness from your facility's DC source voltage must be performed by a qualified, licensed electrician.

- 2 Disconnect the DC power cables as follows:
 - 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 as follows:
 - 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.

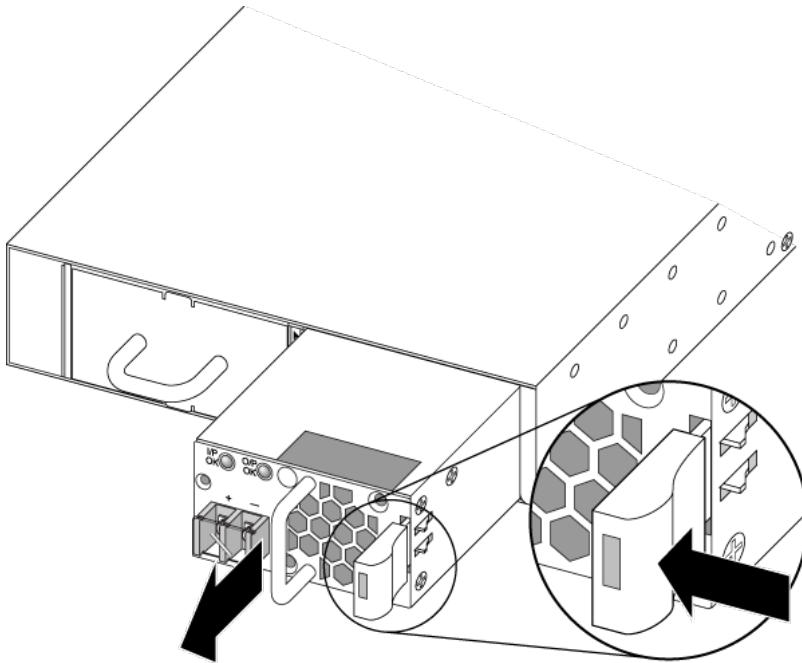


Figure 250: Removing a DC Power Supply

- 5 Carefully slide the power supply the rest of the way out of the switch.

Removing a Switch from a Rack

Before removing a switch from a rack, verify that:

- All removable power supplies have been removed. See [Removing an AC Power Supply](#) on page 311 or [Removing a DC Power Supply](#) on page 312.
- The switch has been disconnected from any redundant power supplies.
- The switch has been disconnected from all other sources of electrical power.



Note

Read the following steps thoroughly before you attempt to remove a switch from a rack.

To remove a switch from a rack, follow these steps:

- 1 Support the switch while you remove the rack-mounting screws that hold the front mounting brackets in place against the rack posts.
- 2 Remove the switch from the rack.
 - For two-post installations, carefully slide the switch out of the rack.
 - For four-post installations, carefully slide the switch forward out of the cabinet and off the rear mounting brackets.

See the following figures.

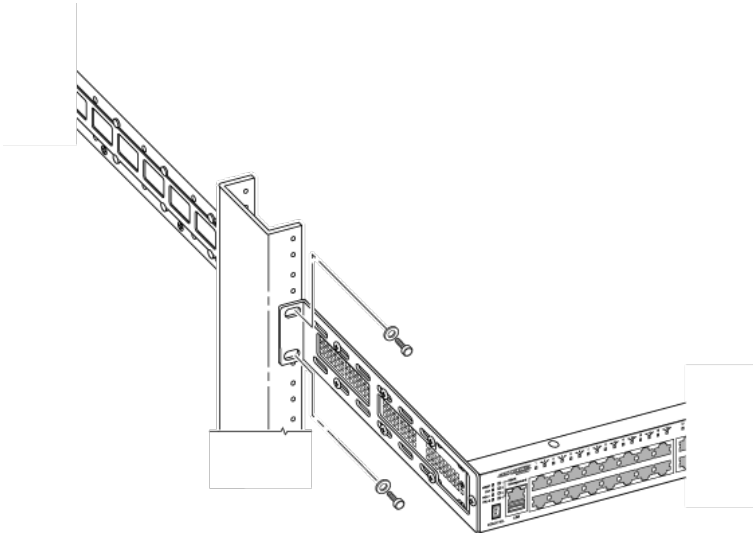


Figure 251: Removing a Front-Mounted Switch from a Two-Post Rack

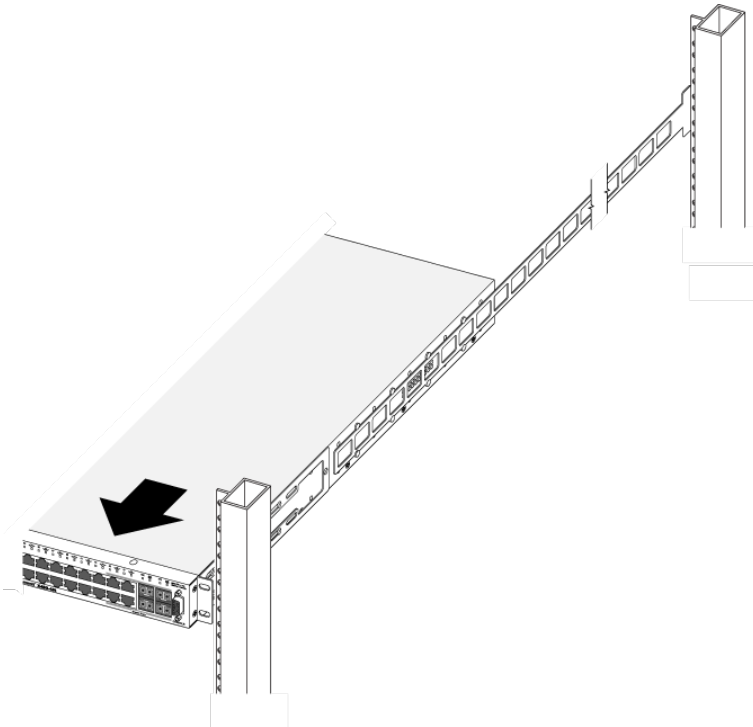


Figure 252: Removing the Switch from a Four-Post Rack

- 3 Place the switch on a secure, flat surface.
- 4 Using a #2 Phillips screwdriver, remove the front mounting brackets from the sides of the switch.
- 5 For four-post installations, remove the rear mounting brackets from the rear rack posts.

A Technical Specifications

ExtremeSwitching X435 Series Switches Technical Specifications
ExtremeSwitching X440-G2 Series Switches Technical Specifications
ExtremeSwitching X450-G2 Series Switches Technical Specifications
ExtremeSwitching X460-G2 Series Switches Technical Specifications
ExtremeSwitching X590 Series Switches Technical Specifications
ExtremeSwitching X620 Series Switches Technical Specifications
Summit X670-G2 Series Switches Technical Specifications
ExtremeSwitching X690 Series Switches Technical Specifications
ExtremeSwitching X695 Series Switch Technical Specifications
Summit X770 Series Switches Technical Specifications
ExtremeSwitching X870 Series Switches Technical Specifications
V400 Virtual Port Extender Technical Specifications
Half-Duplex to Full-Duplex Converter Technical Specifications
Summit 300 W Power Supplies Technical Specifications
Summit 550 W Power Supplies Technical Specifications
750 W Power Supplies Technical Specifications
750 W Power Supplies Technical Specifications
Summit 770 W Power Supplies Technical Specifications
EPS-C2 Redundant Power Supply Technical Specifications
RPS-90 Redundant Power Supply Technical Specifications
RPS-150XT Redundant Power Supply Technical Specifications
RPS-500p Redundant Power Supply Technical Specifications
STK-RPS-150PS and RPS Shelves Technical Specifications
STK-RPS-1005PS Redundant Power Supply Technical Specifications
VX-RPS-1000 Redundant Power Supply Technical Specifications
3-Slot Modular Shelves: Technical Specifications
Power Cord Requirements for AC-Powered Switches and AC Power Supplies
Console Connector Pinouts

This section lists technical specifications for the hardware products described in this document.

NEW! ExtremeSwitching X435 Series Switches Technical Specifications

The ExtremeSwitching X435 series includes the following switches:

- X435-8T-4S switch
- X435-8P-4S switch

- X435-8P-2T-W switch
- X435-24T-4S switch
- X435-24P-4S switch

Table 88: X435 Unpackaged Dimensions

X435-8T-4S switch X435-8P-4S switch	Height: 1.71 inches (4.34 cm) Width: 12.6 inches (32.0 cm) Length: 7.9 inches (20.06 cm)
X435-8P-2T-W switch	Height: 1.73 inches (4.39 cm) Width: 8.2 inches (20.82 cm) Length: 10.1 inches (25.65 cm)
X435-24T-4S switch X435-24P-4S switch	Height: 1.73 inches (4.39 cm) Width: 17.4 inches (44.19 cm) Length: 10.0 inches (25.4 cm)

Table 89: X435 Unpackaged Weight (With Blanks; No PSU or Fan Module)

X435-8T-4S switch	4.12 lb (1.87 kg)
X435-8P-4S switch	4.85 lb (2.2 kg)
X435-8P-2T-W switch	3.15 lb (1.43 kg)
X435-24T-4S switch	6.5 lb (2.95 kg)
X435-24P-4S switch	7.67 lb (3.48 kg)

Table 90: X435 Packaged Dimensions

X435-8T-4S switch X435-8P-4S switch X435-8P-2T-W switch	Height: 5.24 inches (13.3 cm) Width: 16.78 inches (42.6 cm) Length: 12.73 inches (32.3 cm)
X435-24T-4S switch X435-24P-4S switch	Height: 5.20 inches (13.2 cm) Width: 22.18 inches (56.3 cm) Length: 15.13 inches (38.4 cm)

Table 91: X435 Packaged Weight (No PSU or Fan Module)

X435-8T-4S switch	6 lb (2.72 kg)
X435-8P-4S switch	6.72 lb (3.05 kg)
X435-8P-2T-W switch	4.41 lb (2 kg)
X435-24T-4S switch	8.86 lb (4.02 kg)
X435-24P-4S switch	10.03 (4.55 kg)

Power Options

Table 92: X435 Power Supply Options

Switch Model	Nominal input ratings
X435-8T-4S switch	100 to 240 V \sim , 50-60 Hz, 0.7 A
X435-8P-4S switch	100 to 240 V \sim , 50-60 Hz, 3 A
X435-8P-2T-W switch	802.3bt PD input power 46-57VDC 1.8AX2: <ul style="list-style-type: none"> PoE ports load to 0W, 25W, or 45W for 1 input PoE ports load to 25W, 65W, or 100W for 2 inputs
X435-24T-4S switch	100 to 240 V \sim , 50-60 Hz, 0.7 A
X435-24P-4S switch	100 to 240 V \sim , 50-60 Hz, 6 A

Table 93: Power Cords

Extreme Networks equipment does not ship with power cords. Click the following link for locating the correct power cord for purchase and use on specific Extreme Networks equipment. Specifications for power cords in each country are also provided within this link allowing end user to purchase cords locally. www.extremenetworks.com/product/powercords/

Table 94: X435 PoE Power Budget

Switch Model	Max PoE Budget
X435-8P-4S	124W
X435-8P-2T-W	100W*
X435-24P-4S	370W

* See the following table:

Table 95: X435-8P-2T-W PoE Power Budget

Source Wattage (P9 + P10)	Output (W)
0+0	0W
30+0	0W
60+0	25W
90+0	45W
0+30	0W
30+30	25W
60+30	45W
90+30	65W
0+60	25W

Table 95: X435-8P-2T-W PoE Power Budget (continued)

Source Wattage (P9 + P10)	Output (W)
30+60	45W
60+60	65W
90+60	85W
0+90	45W
30+90	65W
60+90	85W
90+90	100W

Table 96: CPU, Memory

CPU/Memory
ARM Cortex A9, 1.2 GHz CPU
512MB DDR3 memory
128MB Flash Memory
512KB packet buffer per chip

Standards and Environmental Data

Table 97: Safety Standards

North American Safety of ITE	UL 60950-1 2nd Ed., A2:2014 (US) CSA 22.2 No. 60950-1-07 2nd Ed. 2014-10(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	IEC 60950-1:2005 2nd+A1:2009+A2:2013 IEC 60950-1:2006+A11+A1+A12+A2 EN 60825-1:2007 (Lasers Safety)
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 98: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55032: 2015, Class A EN 55024:1998+A1:2001+A2:2003 EN 55035:2017 (Multimedia Equipment Immunity) Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) 2014/35/EU Low Voltage Directive
International EMC certifications	CISPR 32: 2015, Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) BSMI (Taiwan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark (China) KCC Mark, EMC Approval (Korea)

Table 99: Telecom Standards

	EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN
--	---

Table 100: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X IEEE 802.3bz 2.5GBASE-T and 5GBASE-T (for X460-G2-16mp-32p-10GE4) IEEE 802.3at PoE Plus IEEE 802.3az (EEE)
--	---



Table 101: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G
Operating conditions	Temperature range: 0°C to 40°C (32°F to 104°F) up to 3000 m (9,842 ft.) for X435-8T/8P-4S, and X435-8P-2T-W 0°C to 45°C (32°F to 113°F) up to 3000 m (9,842 ft) for X435-24T/24P-4S Humidity: 10% to 93% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,842 feet) Operational shock (half sine): 30 m/s ² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms
Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 93% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)

ExtremeSwitching X440-G2 Series Switches Technical Specifications

The ExtremeSwitching X440-G2 series includes the following switches:

- X440-G2-12t-10GE4 switch
- X440-G2-12p-10GE4 switch
- X440-G2-24t-10GE4 switch
- X440-G2-24x-10GE4 switch
- X440-G2-24p-10GE4 switch
- X440-G2-48t-10GE4 switch
- X440-G2-48p-10GE4 switch
- X440-G2-24t-10GE4-DC switch
- X440-G2-48t-10GE4-DC switch
- X440-G2-12t8fx-GE4 switch
- X440-G2-24fx-GE4 switch
- X440-G2-24t-GE4 switch

Physical Dimensions

Table 102: Physical Dimensions (Unpackaged)

X440-G2-12t-10GE4	Height: 1.73 inches (4.4 cm)
X440-G2-12p-10GE4	Width: 12.01 inches (30.51 cm)
X440-G2-12t8fx-GE4	Length: 10.28 inches (26.11 cm)
X440-G2-24t-10GE4	Height: 1.73 inches (4.4 cm)
X440-G2-24p-10GE4	Width: 17.38 inches (44.15 cm)
X440-G2-24t-10GE4-DC	Length: 10.01 inches (25.43 cm)
X440-G2-24x-10GE4	
X440-G2-24fx-GE4	
X440-G2-24t-GE4	
X440-G2-48t-10GE4	Height: 1.73 inches (4.4 cm)
X440-G2-48p-10GE4	Width: 17.38 inches (44.15 cm)
X440-G2-48t-10GE4-DC	Length: 14.51 inches (36.86 cm)

Weight (Unpackaged)

Table 103: Weight

X440-G2-12t-10GE4	5.82 lb (2.64 kg)
X440-G2-12p-10GE4	6.66 lb (3.04 kg)
X440-G2-24t-10GE4	8.07 lb (3.66 kg)
X440-G2-24p-10GE4	9.44 lb (4.28 kg)
X440-G2-24x-10GE4	8.22 lb (3.77 kg)
X440-G2-48t-10GE4	11.22 lb (5.09 kg)
X440-G2-48p-10GE4	14.55 lb (6.60 kg)
X440-G2-24t-10GE4-DC	8.07 lb (3.66 kg)
X440-G2-48t-10GE4-DC	11.20 lb (5.08 kg)
X440-G2-12t8fx-GE4	6.50 lb (2.95 kg)
X440-G2-24fx-GE4	8.66 lb (3.97 kg)
X440-G2-24t-GE4	7.98 lb (3.62 kg)

Physical Dimensions (Packaged)

Table 104: Physical Dimensions (Packaged)

X440-G2-12t-10GE4	Height: 6.07 inches (15.42 cm)
X440-G2-12p-10GE4	Width: 14.78 inches (37.54 cm)
X440-G2-12t8fx-GE4	Length: 17.53 inches (44.53 cm)
X440-G2-24t-10GE4	Height: 5.48 inches (13.92 cm)
X440-G2-24p-10GE4	Width: 14.85 inches (37.72 cm)
X440-G2-24t-10GE4-DC	Length: 22.38 inches (56.85 cm)
X440-G2-24x-10GE4	
X440-G2-24fx-GE4	
X440-G2-24t-GE4	
X440-G2-48t-10GE4	Height: 7.09 inches (18.01 cm)
X440-G2-48p-10GE4	Width: 19.09 inches (48.49 cm)
X440-G2-48t-10GE4-DC	Length: 22.83 inches (57.99 cm)

Packaged Weight

Table 105: Packaged Weight

X440-G2-12t-10GE4	8.86 lb (4.07 kg)
X440-G2-12p-10GE4	9.66 lb (4.43 kg)
X440-G2-24t-10GE4	11.40 lb (5.29 kg)
X440-G2-24p-10GE4	12.81 lb (5.88 kg)
X440-G2-24x-10GE4	11.57 lb (5.31 kg)
X440-G2-48t-10GE4	16.42 lb (7.53 kg)
X440-G2-48p-10GE4	19.62 lb (9.00 kg)
X440-G2-24t-10GE4-DC	11.35 lb (5.21 kg)
X440-G2-48t-10GE4-DC	16.23 lb (7.44 kg)
X440-G2-12t8fx-GE4	9.57 lb (4.39 kg)
X440-G2-24fx-GE4	12.08 lb (5.54 kg)
X440-G2-24t-GE4	11.33 lb (5.20 kg)

Fan and Acoustic Sound

Table 106: Fan and Acoustic Sound

	Bystander Sound Pressure ⁴ in dB(A)	Declared Sound Power (L _{WAd}) ⁴ in bels
X440-G2-12t-10GE4	14.7 fan off	2.7 fan off
X440-G2-12p-10GE4	14.7 fan off	2.7 fan off

Table 106: Fan and Acoustic Sound (continued)

	Bystander Sound Pressure ⁴ in dB(A)	Declared Sound Power (L _{WAd}) ⁴ in bels
X440-G2-24t-10GE4	28.1	4.3
X440-G2-24p-10GE4	39.4	5.5
X440-G2-24x-10GE4	26.8	4.0
X440-G2-48t-10GE4	37.9	5.4
X440-G2-48p-10GE4	48.7	6.4
X440-G2-24t-10GE4-DC	28.1	4.3
X440-G2-48t-10GE4-DC	37.9	5.4
X440-G2-12t8fx-GE4	23.3	4.0
X440-G2-24fx-GE4	24.7	3.9
X440-G2-24t-GE4	28.1	4.3

Power Specifications

Table 107: Power Specifications

	Minimum ⁵ Heat Dissipation (BTU/hr)	Minimum ⁵ Power Consumption (Watts)	Maximum ⁵ Heat Dissipation (BTU/hr)	Maximum ⁵ Power Consumption (Watts)
X440-G2-12t-10GE4	52	15	109	32
X440-G2-24t-10GE4	87	26	136	40
X440-G2-48t-10GE4	141	41	208	61
X440-G2-12p-10GE4	72	21	216 (@ 200 W PoE)	264
X440-G2-24p-10GE4	121	35	410 (@ 380 W PoE)	500
X440-G2-48p-10GE4	196	53	755 (@ 740 W PoE)	961
X440-G2-24t-10GE4-DC	77	23	134	39
X440-G2-48t-10GE4-DC	137	40	207	61
X440-G2-24x-10GE4	87	26	172	51
X440-G2-24fx-GE4	166	49	223	65

⁴ At 25°C and 50% PoE load where applicable

Table 107: Power Specifications (continued)

	Minimum ⁵ Heat Dissipation (BTU/hr)	Minimum ⁵ Power Consumption (Watts)	Maximum ⁵ Heat Dissipation (BTU/hr)	Maximum ⁵ Power Consumption (Watts)
X440-G2-12t8fx-GE4	108	32	159	47
X440-G2-24t-GE4	76	22	130	38

The following power specifications pertain to all X440-G2 switches, both PoE and non-PoE.

Table 108: Power Specifications: Fixed Internal Power Supply

Voltage input range	100-240 VAC ⁶
Line frequency range	47 to 63 Hz
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Operating temperature	0° to 60°C (extended temperature ⁷ switches) 0° to 50°C (all other switches)

PoE + Power Budget

Table 109: PoE + Power Budget

	Internal Power Supply	External RPS
X440-G2-12p-10GE4	200 W	200 W - Redundant power only
X440-G2-24p-10GE4	380 W	380 W - Redundant power only
X440-G2-48p-10GE4	740 W	1440 W - Additive power 740 W - Redundant power

External Redundant Power Supplies for Non-PoE Switches

All X440-G2 series non-PoE switches ship with one fixed internal power supply. If redundancy is required, an external RPS can be attached to the switch.

⁵ Minimum is defined as idle, with no ports linked. Maximum is defined as fans high, all ports 100% traffic.

⁶ The power supplies will continue to operate at +/- 10% of the rated input to accommodate temporary loss of input voltage regulation.

⁷ The extended temperature switches are the X440-G2-24fx-GE4, X440-G2-12p-10GE4, and X440-G2-24t-GE4.

CPU, Memory

Table 110: CPU, Memory

CPU/Memory
64-bit MIPS processor, 1 GHz clock, single core
1 GB ECC DDR3 DRAM
4 GB eMMC Flash
1.5 MB packet buffer

Environmental Data

Table 111: Environmental Data

Environmental specifications	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	Temp: 0°C to 50°C (32°F to 122°F) – all models Temp: 0°C to 60°C (32°F to 140°F) – extended temperature range models only (16539, 16540 and 16541) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,842 feet) – All switch models Shock (half sine): 30 m/s ² (3 G), 11 ms, 6 shocks Random vibration: 3 to 500 Hz at 1.5 G rms
Packaging and storage specifications	Temp: -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 (18 G), 6 ms, 600 shocks Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Standards

Table 112: Safety Standards

North American ITE	UL 60950-1 2nd Ed., Listed Device (US) CSA 22.2 #60950-1-03 2nd Ed. (Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European ITE	EN 60950-1:2007 2nd Ed. EN 60825-1+A2:2001 (Lasers Safety) 2006/95/EC Low Voltage Directive
International ITE	CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 113: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:A2-2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2,8-2006 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386 v1.4.1, 2008-04 (EMC Telecommunications) 2004/108/EC EMC Directive
International EMC certifications	CISPR 22: 2006 Ed 5.2, Class A (International Emissions) CISPR 24:A2:2003 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/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) ACMA RCM (Australia Emissions) CCC Mark KCC Mark, EMC Approval (Korea)

Table 114: Telecom Standards

CE 2.0 Compliant

Table 115: IEEE 802.3 Media Access Standards

<p>IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3at PoE-Plus IEEE 802.3az IEEE 802.3u, 100BASE-FX</p>
--

ExtremeSwitching X450-G2 Series Switches Technical Specifications

The ExtremeSwitching X450-G2 series includes the following switches:

- X450-G2-24t-GE4
- X450-G2-24t-10GE4
- X450-G2-48t-GE4
- X450-G2-48t-10GE4

- X450-G2-24p-GE4
- X450-G2-24p-10GE4
- X450-G2-48p-GE4
- X450-G2-48p-10GE4

Table 116: X450-G2 Unpackaged Dimensions

X450-G2-24t-GE4	Height: 1.73 inches (4.4 cm)
X450-G2-24t-10GE4	Width: 17.4 inches (44.1 cm)
X450-G2-48t-GE4	Depth: 19.2 inches (43.2 cm)
X450-G2-48t-10GE4	
X450-G2-24p-GE4	
X450-G2-24p-10GE4	
X450-G2-48p-GE4	
X450-G2-48p-10GE4	

Table 117: X450-G2 Unpackaged Weight

X450-G2-24t-GE4	13.71 lb (6.22 kg)
X450-G2-24t-10GE4	
X450-G2-48t-GE4	14.22 lb (6.45 kg)
X450-G2-48t-10GE4	
X450-G2-24p-GE4	13.93 lb (6.32 kg)
X450-G2-24p-10GE4	
X450-G2-48p-GE4	14.51 lb (6.58 kg)
X450-G2-48p-10GE4	

Table 118: X450-G2 Packaged Dimensions

X450-G2-24t-GE4	Height: 6.70 inches (17.02 cm)
X450-G2-24t-10GE4	Width: 22.85 inches (58.04 cm)
X450-G2-48t-GE4	Depth: 24.03 inches (60.96 cm)
X450-G2-48t-10GE4	
X450-G2-24p-GE4	
X450-G2-24p-10GE4	
X450-G2-48p-GE4	
X450-G2-48p-10GE4	

Table 119: X450-G2 Packaged Weight

X450-G2-24t-GE4	20.72 lb (9.50 kg)
X450-G2-24t-10GE4	
X450-G2-48t-GE4	21.23 lb (9.74 kg)
X450-G2-48t-10GE4	
X450-G2-24p-GE4	20.94 lb (9.61 kg)
X450-G2-24p-10GE4	
X450-G2-48p-GE4	21.52 lb (9.87 kg)
X450-G2-48p-10GE4	



Table 120: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure	Declared Sound Power
X450-G2-24t-GE4 X450-G2-24t-10GE4 Fixed AC or DC power supply with front-to-back (FB) airflow	49.8 dB(A), 0°C to 39°C 64.9 dB(A), 50°C	6.1 bels, 0°C to 39°C 7.6 bels, 50°C
X450-G2-48t-GE4 X450-G2-48t-10GE4 Fixed AC or DC power supply with front-to-back (FB) airflow	49.9 dB(A), 0°C to 39°C 64.8 dB(A), 50°C	6.1 bels, 0°C to 39°C 7.6 bels, 50°C
X450-G2-24p-GE4 X450-G2-24p-10GE4 Dual 715 W AC or DC power supply with front-to-back (FB) airflow	51.1 dB(A), 0°C to 39°C 65.5 dB(A), 50°C	6.2 bels, 0°C to 39°C 7.7 bels, 50°C
X450-G2-24p-GE4 X450-G2-24p-10GE4 Dual 715 W AC or DC power supply with front-to-back (FB) airflow with applied PoE load	50.1 dB(A), 0°C to 39°C 64.5 dB(A), 50°C	6.1 bels, 0°C to 39°C 7.6 bels, 50°C
X450-G2-48p-GE4 X450-G2-48p-10GE4 Dual 1100 W AC or DC power supply with front-to-back (FB) airflow	50.8 dB(A), 0°C to 39°C 65.4 dB(A), 50°C	6.2 bels, 0°C to 39°C 7.6 bels, 50°C
X450-G2-48p-GE4 X450-G2-48p-10GE4 Dual 1100 W AC or DC power supply with front-to-back (FB) airflow with applied PoE load	56.5 dB(A), 0°C to 39°C 66.8 dB(A), 50°C	6.8 bels, 0°C to 39°C 7.8 bels, 50°C


Note

Acoustic noise levels represent noise emitted by the switch at room ambient temperatures. Values are based on a fully configured system consisting of two PSUs operating under full load. Normal operating temperature range: 0°C to 50°C.

Table 121: X450-G2 Fan Speed and Power Consumption

Fan Speed	Fan Module RPM (typical)		Power	
	Inlet Fan	Outlet Fan	Maximum	Typical
Full	14,000 (±15%)	7,000 (±15%)	36 W	30.6
Low	6,400 (±15%)	2,900 (±15%)	3.96 W (typical)	

⁸ Sound pressure is presented for comparison per ISO 7779

⁹ Declared Sound Power is presented in accordance with ISO 7779, ISO 9296 per ETSI/EN 300 753

Power Options

Table 122: X450-G2 Power Supply Options

Switch Model	Power Supply
Fixed power supply with front-to-back airflow	
X450-G2-24t-GE4 X450-G2-24t-10GE4	100-240 V, 50/60 Hz, 1.0 A
X450-G2-48t-GE4 X450-G2-48t-10GE4	100-240 V, 50/60 Hz, 1.0 A
Modular power supply with front-to-back airflow	
X450-G2-24p-GE4 X450-G2-24p-10GE4	1100 W AC PS FB (front-to-back) Part # 10941, Model: PSSF112101A 100-127V/200-240 V, 50/60 Hz, 10.0 A/5.0 A max per PS
X450-G2-24p-GE4 X450-G2-24p-10GE4	715 W AC PS FB (front-to-back) Part # 10951, Model: PSSF711101A 100-127V/200-240 V, 50/60 Hz, 7.0 A/3.5 A max per PS
X450-G2-48p-GE4 X450-G2-48p-10GE4	1100 W AC PS FB (front-to-back) Part # 10941, Model: PSSF112101A 100-127V/200-240 V, 50/60 Hz, 12.0 A/6.0 A max per PS
X450-G2-48p-GE4 X450-G2-48p-10GE4	715 W AC PS FB (front-to-back) Part # 10951, Model: PSSF711101A 100-127V/200-240 V, 50/60 Hz, 8.0 A/4.0 A max per PS

Table 123: X450-G2 Power Consumption

Switch Model	Minimum Heat Dissipation	Minimum Power Consumption	Maximum Heat Dissipation	Maximum Power Consumption
X450-G2-24t-GE4 X450-G2-24t-10GE4	149.4 BTU/hr	43.8 W	244.6 BTU/hr	71.1 W
X450-G2-48t-GE4 X450-G2-48t-10GE4	178.1 BTU/hr	52.2 W	290.0 BTU/hr	85.0 W
X450-G2-24p-GE4 (@ 720 W PoE)	214.3 BTU/hr	62.8 W	604.7 BTU/hr	127.2 W
X450-G2-24p-10GE4 (@ 720 W PoE)	214.3 BTU/hr	62.8 W	604.7 BTU/hr	847.2 W
X450-G2-48p-GE4 (@ 1440 W PoE)	238.8 BTU/hr	70.0 W	778 BTU/hr	228 W
X450-G2-48p-10GE4 (@ 1440 W PoE)	238.8 BTU/hr	70.0 W	778 BTU/hr	1668 W

Table 124: X450-G2 PoE Power Budget

Switch Model	1 PSU of 715 W	1 PSU of 1100 W	2 PSUs of 715 W	1 PSU of 715 W & 1 PSU of 1100 W	2 PSUs of 1100 W
X450-G2-24p-GE4	500 W	720 W	720 W	720 W	720 W
X450-G2-24p-10GE4	500 W	720 W	720 W	720 W	720 W
X450-G2-48p-GE4	500 W	850 W	1031 W	1350 W	1440 W
X450-G2-48p-10GE4	500 W	850 W	1031 W	1350 W	1440 W
X450-G2-24p-GE4	16 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W
X450-G2-24p-10GE4	16 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W	24 ports @ 30 W 24 ports @ 15.4 W
X450-G2-48p-GE4	16 ports @ 30 W 32 ports @ 15.4 W	28 ports @ 30 W 48 ports @ 15.4 W	34 ports @ 30 W 48 ports @ 15.4 W	45 ports @ 30 W 48 ports @ 15.4 W	48 ports @ 30 W 48 ports @ 15.4 W
X450-G2-48p-10GE4	16 ports @ 30 W 32 ports @ 15.4 W	28 ports @ 30 W 48 ports @ 15.4 W	34 ports @ 30 W 48 ports @ 15.4 W	45 ports @ 30 W 48 ports @ 15.4 W	48 ports @ 30 W 48 ports @ 15.4 W

Table 125: CPU, Memory

CPU/Memory
1 GHz 64-bit CPU
1 GB DDR3 ECC DRAM
4 GB eMMC Flash Memory
4 MB packet buffer per chip

Standards and Environmental Data

Table 126: Safety Standards

North American Safety of ITE	UL 60950-1 1st Ed., Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006 2nd Ed. TUV-R GS EN 60825-1:2007 (Lasers Safety) 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 127: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:1998+A1:2001+A2:2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) 2004/108/EC EMC Directive
International EMC certifications	CISPR 22: 2008 (Ed 6.0), Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) BSMI (Taiwan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark (China) KCC Mark, EMC Approval (Korea)

Table 128: Telecom Standards

EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN

Table 129: IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3at PoE Plus IEEE 802.3az (EEE)
--

Table 130: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G
Operating conditions	Temperature range: 0°C to 50°C (32°F to 122°F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 5,000 meters (16,404 feet) - PoE switches Altitude: 0 to 2,000 meters (6,562 feet) - non-PoE switches Operational shock (half sine): 30 m/s ² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms
Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)

ExtremeSwitching X460-G2 Series Switches Technical Specifications

The ExtremeSwitching X460-G2 series includes the following switches:

- X460-G2-24t-24ht-10GE4 switch
- X460-G2-24p-24hp-10GE4 switch
- X460-G2-16mp-32p-10GE4 switch
- X460-G2-24t-GE4 switch
- X460-G2-24t-10GE4 switch
- X460-G2-24x-10GE4 switch
- X460-G2-24p-GE4 switch
- X460-G2-24p-10GE4 switch
- X460-G2-48t-GE4 switch
- X460-G2-48t-10GE4 switch
- X460-G2-48x-10GE4 switch
- X460-G2-48p-GE4 switch
- X460-G2-48p-10GE4 switch

Table 131: X460-G2 Unpackaged Dimensions

X460-G2-24t-GE4 X460-G2-24t-10GE4 X460-G2-24x-10GE4 X460-G2-48t-GE4 X460-G2-48t-10GE4 X460-G2-24t-24ht-10GE4 X460-G2-48x-10GE4	Height: 1.73 inches (4.4 cm) Width: 17.38 inches (44.1 cm) Length: 16.94 inches (43.0 cm)
X460-G2-24p-GE4 X460-G2-24p-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-16mp-32p-10GE4	Height: 1.73 inches (4.4 cm) Width: 17.38 inches (44.1 cm) Length: 19.11 inches (48.5 cm)

Table 132: X460-G2 Unpackaged Weight (With Blanks; No PSU or Fan Module)

X460-G2-24t-GE4 X460-G2-24t-10GE4	12.92 lb (5.86 kg)
X460-G2-24x-10GE4	13.14 lb (5.96 kg)
X460-G2-24p-GE4 X460-G2-24p-10GE4	14.68 lb (6.66 kg)
X460-G2-48t-GE4 X460-G2-48t-10GE4	13.27 lb (6.02 kg)
X460-G2-48x-10GE4	13.62 lb (6.18 kg)
X460-G2-48p-GE4 X460-G2-48p-10GE4	15.21 lb (6.90 kg)
X460-G2-24t-24ht-10GE4	14.77 lb (6.70 kg)
X460-G2-24p-24hp-10GE4	16.31 lb (7.40 kg)
X460-G2-16mp-32p-10GE4	15.43 lb (7.00 kg)

Table 133: X460-G2 Packaged Dimensions

X460-G2-24t-GE4 X460-G2-24t-10GE4 X460-G2-24x-10GE4 X460-G2-48t-GE4 X460-G2-48t-10GE4 X460-G2-24t-24ht-10GE4 X460-G2-48x-10GE4	Height: 6.70 inches (17.0 cm) Width: 21.87 inches (55.5 cm) Length: 22.85 inches (58.0 cm)
X460-G2-24p-GE4 X460-G2-24p-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-16mp-32p-10GE4	Height: 6.70 inches (17.0 cm) Width: 22.85 inches (58.0 cm) Length: 24.03 inches (61.0 cm)

Table 134: X460-G2 Packaged Weight (No PSU or Fan Module)

X460-G2-24t-GE4 X460-G2-24t-10GE4	18.83 lb (8.56 kg)
X460-G2-24x-10GE4	18.70 lb (8.50 kg)
X460-G2-24p-GE4 X460-G2-24p-10GE4	21.83 lb (9.92 kg)
X460-G2-48t-GE4 X460-G2-48t-10GE4	19.27 lb (8.76 kg)
X460-G2-48x-10GE4	18.96 lb (8.62 kg)
X460-G2-48p-GE4 X460-G2-48p-10GE4	22.4 lb (10.2 kg)
X460-G2-24t-24ht-10GE4	18.52 lb (8.40 kg)
X460-G2-24p-24hp-10GE4	20.50 lb (9.30 kg)
X460-G2-16mp-32p-10GE4	20.94 lb (9.50 kg)

Table 135: VIM and Clock Module Weights and Dimensions

VIM/Module	Weight	Dimensions
X460-G2 VIM-2x	0.5 lb (0.23 kg)	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Length: 5.5 inches (13.9 cm)
X460-G2 VIM-2t	0.5 lb (0.23 kg)	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Length: 5.5 inches (13.9 cm)
X460-G2 VIM-2ss	0.5 lb (0.23 kg)	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Length: 5.5 inches (13.9 cm)
X460-G2 VIM-2q	0.5 lb (0.23 kg)	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Length: 5.5 inches (13.9 cm)
X460-G2 TM-CLK	0.25 lb (0.12 kg)	Height: 1.4 inches (3.55 cm) Width: 1.0 inches (2.54 cm) Length: 6.5 inches (16.6 cm)

Table 136: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure	Declared Sound Power (L _{WAd})
X460-G2-24t-GE4 X460-G2-24t-10GE4 Dual 300 W AC or DC power supply with front-to-back (FB) airflow	49.1 dB(A), 0°C to 45°C 54.9 dB(A), 50°C	6.0 bels, 0°C to 45°C 6.6 bels, 50°C
X460-G2-24t-GE4 X460-G2-24t-10GE4 Dual 300 W AC or DC power supply with back-to-front (BF) airflow	48.9 dB(A), 0°C to 35°C 59.5 dB(A), 45°C 65.5 dB(A), 50°C	5.9 bels, 0°C to 35°C 7.2 bels, 45°C 7.8 bels, 50°C
X460-G2-24x-10GE4 Dual 300 W AC or DC power supply with front-to-back (FB) airflow	48.8 dB(A), 0°C to 45°C 61.9 dB(A), 50°C	6.0 bels, 0°C to 45°C 7.5 bels, 50°C
X460-G2-24x-10GE4 Dual 300 W AC or DC power supply with back-to-front (BF) airflow	48.8 dB(A), 0°C to 35°C 58.7 dB(A), 45°C 66.7 dB(A), 50°C	6.0 bels, 0°C to 35°C 6.9 bels, 45°C 7.8 bels, 50°C
X460-G2-24p-GE4 X460-G2-24p-10GE4 Dual 715 W or 1100 W AC power supply with front-to-back (FB) airflow	52.2 dB(A), 0°C to 45°C 61.8 dB(A), 50°C	7.3 bels, 0°C to 45°C 7.4 bels, 50°C
X460-G2-24p-GE4 X460-G2-24p-10GE4 Dual 715 W or 1100 W AC power supply with back-to-front-to-back (BF) airflow	50.8 dB(A), 0°C to 35°C 69.8 dB(A), 50°C	7.3 bels, 0°C to 35°C 8.1 bels, 50°C
X460-G2-48t-GE4 X460-G2-48t-10GE4 X460-G2-24t-24ht-10GE4 Dual 300 W AC or DC power supply with front-to-back (FB) airflow	47.6 dB(A), 0°C to 45°C 64.5 dB(A), 50°C	5.9 bels, 0°C to 45°C 7.7 bels, 50°C
X460-G2-48t-GE4 X460-G2-48t-10GE4 X460-G2-24t-24ht-10GE4 Dual 300 W AC or DC power supply with back-to-front (BF) airflow	47.7 dB(A), 0°C to 35°C 58.7 dB(A), 45°C 65.3 dB(A), 50°C	5.9 bels, 0°C to 35°C 7.2 bels, 45°C 7.8 bels, 50°C
X460-G2-48x-10GE4 Dual 300 W AC or DC power supply with front-to-back (FB) airflow	48.9 dB(A), 0°C to 45°C 60.5 dB(A), 50°C	6.0 bels, 0°C to 45°C 7.4 bels, 50°C
X460-G2-48x-10GE4 Dual 300 W AC or DC power supply with back-to-front (BF) airflow	48.8 dB(A), 0°C to 35°C 57.5 dB(A), 45°C 66.1 dB(A), 50°C	6.0 bels, 0°C to 35°C 6.9 bels, 45°C 7.8 bels, 50°C

¹⁰ Bystander Sound pressure is presented for comparison to other products measured using Bystander Sound Pressure.

¹¹ Declared Sound Power is presented in accordance with ISO 7779:2010(E), ISO 9296:2010 per ETSI/EN 300 753:2012-01.

Table 136: Fan and Acoustic Noise (continued)

Switch Model	Bystander Sound Pressure	Declared Sound Power (L _{WAd})
X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-16mp-32p-10GE4 Dual 715 W or 1100 W AC power supply with front-to-back (FB) airflow	52.2 dB(A), 0°C to 45°C 64.3 dB(A), 50°C	6.9 bels, 0°C to 45°C 7.6 bels, 50°C
X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-16mp-32p-10GE4 Dual 715 W or 1100 W AC power supply with back-to-front-to-back (BF) airflow	50.9 dB(A), 0°C to 31°C 64.2 dB(A), 35°C 70.8 dB(A), 50°C	7.2 bels, 0°C to 31°C 7.6 bels, 35°C 7.9 bels, 50°C
X460-G2-24p-GE4 X460-G2-24p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-16mp-32p-10GE4 Dual 350 W AC power supply with front-to-back (FB) airflow	52.2 dB(A), 0°C to 45°C 64.3 dB(A), 50°C	6.9 bels, 0°C to 45°C 7.6 bels, 50°C
X460-G2-24p-GE4 X460-G2-24p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-16mp-32p-10GE4 Dual 350 W AC power supply with back-to-front (FB) airflow	50.9 dB(A), 0°C to 31°C 64.2 dB(A), 35°C 70.8 dB(A), 50°C	7.2 bels, 0°C to 31°C 7.6 bels, 35°C 7.9 bels, 50°C
<p>Note: Acoustic noise levels shown here represent noise emitted by the switch at room ambient temperatures. Values are based on a fully configured system consisting of two PSUs and two I/O modules operating under full load. Normal operating temperature range: 0°C to 50°C.</p>		

Table 137: X460-G2 Fan Speed and Power Consumption

Fan Speed	Fan Module RPM (typical)		Power	
	Inlet Fan	Outlet Fan	Maximum	Typical
Full	14,000 (±15%)	7,000 (±15%)	36W	30.6
Low	6,400 (±15%)	2,900 (±15%)	3.96W (typical)	

¹⁰ Bystander Sound pressure is presented for comparison to other products measured using Bystander Sound Pressure.

¹¹ Declared Sound Power is presented in accordance with ISO 7779:2010(E), ISO 9296:2010 per ETSI/EN 300 753:2012-01.

Power Options

Table 138: X460-G2 Power Supply Options

Switch Model	Power Supply
X460-G2-24t-GE4 X460-G2-24t-10GE4 X460-G2-24t-24ht-10GE4 X460-G2-24x-10GE4 X460-G2-48t-GE4 X460-G2-48t-10GE4 X460-G2-48x-10GE4	300 W AC power supply: Part no. 10930A 300 W AC PS FB (front-to-back) Model EDPS-300AB CA Part no. 10943 300 W AC PS BF (back-to-front) Model EDPS-300AB A 100-240 V \sim , 50/60 Hz, 1.25 A max per PS
X460-G2-24t-GE4 X460-G2-24t-10GE4 X460-G2-24x-10GE4	300 W DC power supply: Part no. 10933 300 W DC PS FB (front-to-back) Model PSSW301201A Part no. 10944 300 W DC PS BF (back-to-front) Model PSSW301202A +24 VDC or -48 VDC, 4.75 A max per PS
X460-G2-24t-24ht-10GE4 X460-G2-48t-GE4 X460-G2-48t-10GE4 X460-G2-48x-10GE4	300 W DC power supply: Part no. 10933 300 W DC PS FB (front-to-back) Model PSSW301201A Part no. 10944 300 W DC PS BF (back-to-front) Model PSSW301202A +24 VDC or -48 VDC, 4.75 A max per PS
X460-G2-24p-GE4 X460-G2-24p-10GE4 X460-G2-24p-24hp-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4 X460-G2-16mp-32p-10GE4	350 W AC power supply: Part no. 10953 350 W AC PS FB (front-to-back) Model PSSF351101A Part no. 10954 350 W AC PS BF (back-to-front) Model PSSF351102A 100-240 V \sim 200-240 V \sim 50/60 Hz, 1.25 A max per PS
X460-G2-24p-GE4 X460-G2-24p-10GE4	715 W AC power supply: Part no. 10951 715 W AC PS FB (front-to-back) Model PSSF711101A Part no. 10952 715 W AC PS BF (back-to-front) Model PSSF711102A 100-127 V \sim 200-240 V \sim 50/60 Hz, 5.75A/2.75 A max per PS
X460-G2-24p-24hp-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4	715 W AC power supply: Part no. 10951 715 W AC PS FB (front-to-back) Model PSSF711101A Part no. 10952 715 W AC PS BF (back-to-front) Model PSSF711102A 100-127 V \sim 200-240 V \sim 50/60 Hz, 7.5A/3.75 A max per PS
X460-G2-16mp-32p-10GE4	715 W AC power supply: Part no. 10951 715 W AC PS FB (front-to-back) Model PSSF711101A Part no. 10952 715 W AC PS BF (back-to-front) Model PSSF711102A 100-127 V \sim 200-240 V \sim 50/60 Hz, 7.7A/3.7 A max per PS

Table 138: X460-G2 Power Supply Options (continued)

Switch Model	Power Supply
X460-G2-24p-GE4 X460-G2-24p-10GE4	1100 W AC power supply: Part no. 10941 1100 W AC PS FB (front to back), Model PSSF112101A Part no. 10942 1100 W AC PS BF (back to front), Model PSSF112102A 100-127 V \sim 200-240 V \sim 50/60 Hz, 10.5A/5.0 A max per PS
X460-G2-24p-24hp-10GE4 X460-G2-48p-GE4 X460-G2-48p-10GE4	1100 W AC power supply: Part no. 10941 1100 W AC PS FB (front to back), Model PSSF112101A Part no. 10942 1100 W AC PS BF (back to front), Model PSSF112102A 100-127 V \sim 200-240 V \sim 50/60 Hz, 10.75A/5.0 A max per PS
X460-G2-16mp-32p-10GE4	1100 W AC power supply: Part no. 10941 1100 W AC PS FB (front to back), Model PSSF112101A Part no. 10942 1100 W AC PS BF (back to front), Model PSSF112102A 100-127 V \sim 200-240 V \sim 50/60 Hz, 11.5A/5.5 A max per PS

Table 139: X460-G2 Power Consumption

Switch Model	Minimum Heat Dissipation	Minimum Power Consumption	Maximum Heat Dissipation	Maximum Power Consumption
X460-G2-24t-GE4	215 BTU/hr	63 W	427 BTU/hr	125 W
X460-G2-24t-10GE4	229 BTU/hr	67 W	427 BTU/hr	125 W
X460-G2-24x-10GE4	209 BTU/hr	61 W	443 BTU/hr	130 W
X460-G2-24p-GE4 (@ 720 W PoE)	250 BTU/hr	73 W	761 BTU/hr	943 W
X460-G2-24p-10GE4 (@ 720 W PoE)	260 BTU/hr	76 W	761 BTU/hr	943 W
X460-G2-48t-GE4	243 BTU/hr	71 W	427 BTU/hr	127 W
X460-G2-48t-10GE4	250 BTU/hr	73 W	427 BTU/hr	125 W
X460-G2-24t-24ht-10GE4	250 BTU/hr	73 W	427 BTU/hr	125 W
X460-G2-48x-10GE4	202 BTU/hr	59 W	485 BTU/hr	143 W
X460-G2-48p-GE4 (@ 1440 W PoE)	284 BTU/hr	83 W	1116 BTU/hr	1767 W
X460-G2-48p-10GE4 (@ 1440 W PoE)	287 BTU/hr	84 W	1116 BTU/hr	1767 W
X460-G2-24p-24hp-10GE4 (@ 1440 W PoE)	287 BTU/hr	84 W	1116 BTU/hr	1767 W
X460-G2-16mp-32p-10GE4 (@ 1440 W PoE)	287 BTU/hr	84 W	1116 BTU/hr	1767 W

Table 140: X460-G2 PoE Power Budget

PSU Configuration	X460-G2-24p-GE4 X460-G2-24p-10GE4	X460-G2-48p-GE4 X460-G2-48p-10GE4	X460-G2-24p-24hp-10GE4	X460-G2-16mp-32p-10GE4
1 PSU of 350 W	168 W 5 ports @ 30 W 10 ports @ 15.4 W	168 W 5 ports @ 30 W 10 ports @ 15.4 W	168 W 5 ports @ 30 W 10 ports @ 15.4 W	118 W 3 ports @ 30 W 7 ports @ 15.4 W
1 PSU of 715 W	500 W 16 ports @ 30 W 24 ports @ 15.4 W	500 W 16 ports @ 30 W 32 ports @ 15.4 W	500 W 16 ports @ 30 W 32 ports @ 15.4 W	450 W 15 ports @ 30 W 29 ports @ 15.4 W
1 PSU of 1100 W	720 W 24 ports @ 30 W 24 ports @ 15.4 W	850 W 28 ports @ 30 W 48 ports @ 15.4 W	850 W 28 ports @ 30 W 48 ports @ 15.4 W	800 W 26 ports @ 30 W 48 ports @ 15.4 W
2 PSUs of 350 W	NA	NA	428 W 14 ports @ 30 W 27 ports @ 15.4 W	378 W 12 ports @ 30 W 24 ports @ 15.4 W
2 PSUs of 715 W	720 W 24 ports @ 30 W 24 ports @ 15.4 W	1031 W 34 ports @ 30 W 48 ports @ 15.4 W	1031 W 34 ports @ 30 W 48 ports @ 15.4 W	981 W 32 ports @ 30 W 48 ports @ 15.4 W
2 PSUs of 1100 W	720 W 24 ports @ 30 W 24 ports @ 15.4 W	1668 W 48 ports @ 30 W 48 ports @ 15.4 W	1668 W 48 ports @ 30 W 48 ports @ 15.4 W	1440 W 48 ports @ 30 W 48 ports @ 15.4 W
1 PSU of 350 W & 1 PSU of 715 W	NA	NA	730 W 24 ports @ 30 W 47 ports @ 15.4 W	680 W 22 ports @ 30 W 44 ports @ 15.4 W
1 PSU of 350 W & 1 PSU of 1100 W	NA	NA	1048 W 34 ports @ 30 W 48 ports @ 15.4 W	998 W 33 ports @ 30 W 48 ports @ 15.4 W
1 PSU of 715 W & 1 PSU of 1100 W	720 W 24 ports @ 30 W 24 ports @ 15.4 W	1350 W 45 ports @ 30 W 48 ports @ 15.4 W	1350 W 45 ports @ 30 W 48 ports @ 15.4 W	1300 W 43 ports @ 30 W 48 ports @ 15.4 W

Table 141: CPU, Memory

CPU/Memory
1 GHz 64-bit CPU
1 GB DDR3 ECC SDRA
4 GB eMMC Flash Memory
4 MB packet buffer per chip

Standards and Environmental Data

Table 142: Safety Standards

North American Safety of ITE	UL 60950-1 2nd Ed., A2:2014 (US) CSA 22.2 No. 60950-1-07 2nd Ed. 2014-10(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	IEC 60950-1:2005 2nd+A1:2009+A2:2013 IEC 60950-1:2006+A11+A1+A12+A2 EN 60825-1:2007 (Lasers Safety)
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 143: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55032: 2015, Class A EN 55024:1998+A1:2001+A2:2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) 2014/35/EU Low Voltage Directive
International EMC certifications	CISPR 32: 2015, Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) BSMI (Taiwan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark (China) KCC Mark, EMC Approval (Korea)

Table 144: Telecom Standards

	EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN
--	---

Table 145: IEEE 802.3 Media Access Standards

<p>IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X IEEE 802.3bz 2.5GBASE-T and 5GBASE-T (for X460-G2-16mp-32p-10GE4) IEEE 802.3at PoE Plus IEEE 802.3az (EEE)</p>
--

Table 146: Environmental Data

Environmental standards	<p>EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G</p>
Operating conditions	<p>Temperature range: 0°C to 50°C (32°F to 122°F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms</p>
Storage & transportation conditions (packaged)	<p>Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)</p>

ExtremeSwitching X590 Series Switches Technical Specifications

The ExtremeSwitching X590 series includes the following switches:

- X590-24t-1q-2c
- X590-24x-1q-2c

Table 147: X590 Unpackaged Dimensions

X590-24t-1q-2c X590-24x-1q-2c	<p>Height: 1.71 in (4.35 cm) Width: 19.19 in (48.7 cm) Length: 17.38 in (44.1 cm)</p>
----------------------------------	---

Table 148: X590 Unpackaged Weight

X590-24t-1q-2c	14.99 lb (6.8 kg)
X590-24x-1q-2c	14.55 lb (6.6 kg)

Table 149: X590 Packaged Dimensions

X590-24t-1q-2c X590-24x-1q-2c	Height: 6.07 in (15.4 cm) Width: 21.35 in (54.2 cm) Length: 23.17 in (58.8 cm)
----------------------------------	--

Table 150: X590 Packaged Weight

X590-24t-1q-2c	20.5 lb (9.3 kg)
X590-24x-1q-2c	19.5 lb (8.85 kg)

Fan and Acoustic Noise

Table 151: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure (at 25°C)	Declared Sound Power (at 25°C)
X590-24t-1q-2c (part no. 16791) FB airflow	54.7 db(A) up to 25°C 61.9 db(A) up to 35°C 79.4 db(A) at 45°C (max)	6.8 bels up to 25°C 7.6 bels up to 35°C 9.4 bels at 45°C (max)
X590-24t-1q-2c (part no. 16791) BF airflow	55.5 db(A) up to 25°C 62.6 db(A) up to 35°C 79.7 db(A) at 45°C (max)	6.8 bels up to 25°C 7.5 bels up to 35°C 9.2 bels at 45°C (max)
X590-24x-1q-2c (part no. 16790) FB airflow	55.6 db(A) up to 30°C 57.8 db(A) up to 40°C 79.8 db(A) at 45°C (max)	6.9 bels up to 30°C 7.1 bels up to 40°C 9.5 bels at 45°C (max)
X590-24x-1q-2c (part no. 16790) BF airflow	55.8 db(A) up to 30°C 57.9 db(A) up to 40°C 79.1 db(A) at 45°C (max)	6.9 bels up to 30°C 7.1 bels up to 40°C 9.4 bels at 45°C (max)

Power Options

Table 152: X590 Power Options

X590-24t-1q-2c (part # 16791) X590-24x-1q-2c (part # 16790)	770 W AC power supply: Part # 10960 770 W AC PS FB (front-back) Part # 10961 770 W AC PS FB (back-front) AC Input: 100-240 VAC, 50/60 Hz PSU Input Socket: IEC 320 C14 Power cord input plug: IEC 320 C13
	1100 W DC power supply: Part # 10962 1100 W DC PS FB (front-back) Part # 10963 1100 W DC PS FB (back-front) DC Input: -48 VDC

Table 153: Power Specifications

Switch Model	
X590-24t-1q-2c	AC Input: 100-127 VAC, 2.5 A max. per PSU, 50/60 Hz
X590-24x-1q-2c	AC Input: 200-240 VAC, 1.25 A max. per PSU, 50/60 Hz DC Input: -48 to -60 VDC, 5.0 A max. per PSU

Table 154: Power and Heat Dissipation

	Minimum ¹² Heat Dissipation (1 PSU)	Minimum ¹² Power Consumption	Maximum ¹² Heat Dissipation (2 PSUs)	Maximum ¹² Power Consumption
X590-24t-1q-2c-AC	310.97 BTU/hr	91.14 W	792.27 BTU/hr	232.20 W
X590-24t-1q-2c-DC	332.63 BTU/hr	97.49 W	833.62 BTU/hr	244.32 W
X590-24x-1q-2c-AC	278.42 BTU/hr	81.60 W	743.82 BTU/hr	218.00 W
X590-24x-1q-2c-DC	286.61 BTU/hr	84.00 W	786.12 BTU/hr	230.40 W

CPU, Memory

CPU/Memory
1GHz 64-bit CPU
2GB DDR3 ECC SDRAM memory
4GB eMMC Flash Memory
12 MB buffer, per chip

Standards and Environmental Data

Table 155: Safety Standards

North American Safety of ITE	UL 60950-1 2nd Ed., A2:2014, Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed., 2014-10 Canada Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 2nd Ed. EN 60825-1:2007 IEC 60825-1:2007 Class 1 (Lasers Safety) 2014/35/EU Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005+A1:2009+A2:2013 + National Differences AS/NZX 60950-1 (Australia /New Zealand)

¹² Minimum is defined as idle, with no ports linked. Maximum is defined as fans high, all ports 100% traffic.

Table 156: EMI/EMC Standards

North America EMC for ITE	FCC 47 CFR part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55032:2015 Class A EN 55024:2010 EN 61000-3-2,2014 (Harmonics) EN 61000-3-3,2013 (Flicker) 2014/30/EU EMC Directive EN 300 386: v1.6.1 (EMC Telecommunications)
International EMC certifications	CISPR 32: 2015, Class A (International Emissions) CISPR 24: 2010, Class A (International Immunity) AS/NZS CISPR32:2015 IEC 61000-4-2:2008/EN 61000-4-2:2009 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC 61000-4-3:2010/EN 61000-4-3:2006+A1:2008+A2:2010 Radiated Immunity 10V/m, Criteria A IEC 61000-4-4:2012/EN 61000-4-4:2012 Transient Burst, 1 kV, Criteria A IEC 61000-4-5:2014/EN 61000-4-5:2014 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC 61000-4-6:2013/EN 61000-4-6:2014 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	ACMA RCM (Australia Emissions) VCCI Class A (Japan Emissions) CCC mark (China) KCC mark, EMC Approval (Korea)

Table 157: Telecom Standards

CE 2.0 Compliant

Table 158: IEEE 802.3 Media Access Standards

IEEE 802.3ba /802.3bm 40GBASE-X and 100GBASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3 10GBASE-T (up to 100 m using Cat 6a cabling or better) 25Gb and 50Gb Ethernet implemented per 25G/50G Ethernet Consortium specification and IEEE 802.3 standard

Table 159: 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 1.5G
Environmental compliance	EU RoHS - 2011/65/EU EU WEEE - 2012/19/EU China RoHS - SJ/T 11363-2006 Taiwan RoHS - CNS 15663 (2013.7)

Table 159: Environmental Data (continued)

Operating conditions	Temperature range: 0°C to 45°C (32°F to 113°F) Humidity: 5% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s ² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms
Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 in (<15 kg box)

ExtremeSwitching X620 Series Switches Technical Specifications

The ExtremeSwitching X620 series includes the following switches:

- X620-8t-2x switch
- X620-10x switch
- X620-16t switch
- X620-16x switch

Physical Dimensions

Table 160: Physical Dimensions

X620-8t-2x X620-10x	Height: 1.73 inches (4.4 cm) Width: 12.01 inches (30.5 cm) Depth: 10.28 inches (26.1 cm)
X620-16t X620-16x	Height: 1.73 inches (4.4 cm) Width: 17.38 inches (44.1 cm) Depth: 16.94 inches (43.0 cm)

Weight

Table 161: Weight

X620-8t-2x	6.37 lb (2.92 kg)
X620-10x	6.04 lb (2.77 kg)
X620-16t	12.04 lb (5.52 kg)
X620-16x	11.11 lb (5.10 kg)

Packaged Dimensions

Table 162: Packaged Dimensions

X620-8t-2x X620-10x	Height: 6.23 inches (15.8 cm) Width: 15.17 inches (38.5 cm) Depth: 22.46 inches (57.0 cm)
X620-16t X620-16x	Height: 6.66 inches (16.9 cm) Width: 21.63 inches (54.9 cm) Depth: 22.93 inches (58.2 cm)

Packaged Weight

Table 163: Packaged Weight

X620-8t-2x	9.41 lb (4.32 kg)
X620-10x	9.04 lb (4.15 kg)
X620-16t	17.79 lb (8.16 kg)
X620-16x	16.91 lb (7.76 kg)

Fan Speed

Table 164: Fan Speed

X620-8t-2x	Continuously variable speed as needed
X620-10x	Continuously variable speed as needed
X620-16t	Continuously variable speed as needed
X620-16x	Continuously variable speed as needed

Acoustic Sound

Table 165: Acoustic Sound

	Bystander Sound Pressure	Declared Sound Power
X620-8t-2x (side-side airflow)	35.6 db(A) up to 25°C 38.8 db(A) up to 30°C 65.4 db(A) at 50°C (max)	4.8 bels up to 25°C 5.2 bels up to 30°C 7.9 bels at 50°C (max)
X620-10x (side-side airflow)	28.2 db(A) up to 35°C 66.3 db(A) at 50°C (max)	3.8 bels up to 35°C 7.9 bels at 50°C (max)
X620-16t (front-back airflow)	47.2 db(A) up to 35°C 65.6 db(A) at 50°C (max)	6.2 bels up to 35°C 8.0 bels at 50°C (max)

Table 165: Acoustic Sound (continued)

	Bystander Sound Pressure	Declared Sound Power
X620-16t (back-front airflow)	46.9 db(A) up to 30°C 65.2 db(A) at 50°C (max)	6.2 bels up to 30°C 8.1 bels at 50°C (max)
X620-16x (front-back airflow)	47.0 db(A) up to 40°C 65.7 db(A) at 50°C (max)	6.1 bels up to 40°C 8.0 bels at 50°C (max)
X620-16x (back-front airflow)	46.9 db(A) up to 40°C 64.8 db(A) at 50°C (max)	6.1 bels up to 40°C 8.0 bels at 50°C (max)

Power Specifications

Table 166: Power Specifications

	Minimum ¹³ Heat Dissipation (BTU/hr)	Minimum ¹³ Power Consumption (Watts)	Maximum ¹³ Heat Dissipation (BTU/hr)	Maximum ¹³ Power Consumption (Watts)
X620-8t-2x	74	22	177	52
X620-10x	60	18	123	36
X620-16t	175	51	347	102
X620-16t (DC)	148	43	326	96
X620-16x	111	33	214	63
X620-16x (DC)	80	23	180	53

Power Supplies

Table 167: Power Supplies

	Power Supplies
X620-8t-2x	Integrated 100 W AC PSU RPS connector for external redundant PSU Side-to-side airflow
X620-10x	
X620-16t	Modular 300 W power supply (up to two PSU) AC and DC power options Mix AC and DC configuration Front-to-back or back-to-front airflow options
X620-16x	

¹³ Minimum is defined as idle, with no ports linked. Maximum is defined as fans high, all ports 100% traffic.

CPU, Memory

Table 168: CPU, Memory

CPU/Memory
1 GHz CPU
1 GB DDR3 ECC memory
4 GB eMMC Flash memory

Environmental Data

Table 169: Environmental Data

Environmental specifications	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	Temp: 0°C to 50°C (32°F to 122°F) – all models Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,842 feet) – All switch models Shock (half sine): 30 m/s ² (3 G), 11 ms, 6 shocks Random vibration: 3 to 500 Hz at 1.5 G rms
Packaging and storage specifications	Temp: -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 (18 G), 6 ms, 600 shocks Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Scaling and Performance

For scaling and performance specifications, refer to the [product data sheet](#).

Safety Standards

Table 170: Safety Standards

North American ITE	UL 60950-1 2nd Ed., Listed Device (US) CSA 22.2 #60950-1-03 2nd Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European ITE	EN 60950-1:2007 2nd Ed. EN 60825-1+A2:2001 (Lasers Safety) 2014/35/EU Low Voltage Directive
International ITE	CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences AS/NZX 60950-1 (Australia /New Zealand)

EMI/EMC Standards

Table 171: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:A2-2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2,8-2006 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386 v1.4.1, 2008-04 (EMC Telecommunications) 2014/30/EUC EMC Directive
International EMC certifications	CISPR 22: 2006 Ed 5.2, Class A (International Emissions) CISPR 24:A2:2003 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/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) ACMA RCM (Australia Emissions) CCC Mark KCC Mark, EMC Approval (Korea)

Telecom Standards

Table 172: Telecom Standards

CE 2.0 compliant

IEEE 802.3 Media Access Standards

Table 173: IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3at PoE-Plus IEEE 802.3az (EEE) IEEE 802.3u, 100BASE-FX

Summit X670-G2 Series Switches Technical Specifications

The Summit X670-G2 series includes the following switches:

- X670-G2-48x-4q
- X670-G2-72x

Table 174: X670-G2 Unpackaged Dimensions

X670-G2-48x-4q X670-G2-72x	Height: 1.73 inches (4.4 cm) Width: 17.38 inches (44.1 cm) Length: 19.20 inches (48.7 cm)
-------------------------------	---

Table 175: X670-G2 Unpackaged Weight

X670-G2-48x-4q	14.7 lb (6.7 kg)
X670-G2-72x	15.42 lb (7.0 kg)

Table 176: X670-G2 Packaged Dimensions

X670-G2-48x-4q X670-G2-72x	Height: 13.99 inches (35.5 cm) Width: 24.23 inches (61.5 cm) Length: 27.58 inches (70.0 cm)
-------------------------------	---

Table 177: X670-G2 Packaged Weight

X670-G2-48x-4q	20.1 lb (9.1 kg)
X670-G2-72x	20.7 lb (9.4 kg)

Table 178: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure	Declared Sound Power (L _{WAd})
X670-G2-48x-4q Dual 550 W AC power supply with front-to-back (FB) airflow	60.2 dB(A), 0°C to 45°C	7.3 bels, 0°C to 45°C
X670-G2-48x-4q Dual 550 W DC power supply with front-to-back (FB) airflow	61.3 dB(A), 0°C to 45°C	7.4 bels, 0°C to 45°C
X670-G2-48x-4q Dual 550 W AC power supply with back-to-front (BF) airflow	58.3 dB(A), 0°C to 35°C 70.1 dB(A), 45°C	7.0 bels, 0°C to 35°C 8.4 bels, 45°C
X670-G2-48x-4q Dual 550 W DC power supply with back-to-front (BF) airflow	55.0 dB(A), 0°C to 35°C 68.7 dB(A), 45°C	6.5 bels, 0°C to 35°C 8.1 bels, 45°C

¹⁴ Bystander Sound pressure is presented for comparison to other products measured using Bystander Sound Pressure.

¹⁵ Declared Sound Power is presented in accordance with ISO 7779:2010(E), ISO 9296:2010 per ETSI/EN 300 753:2012-01.

Table 178: Fan and Acoustic Noise (continued)

Switch Model	Bystander Sound Pressure	Declared Sound Power (L _{WA} d)
X670-G2-72x Dual 550 W AC power supply with front-to-back (FB) airflow	58.9 dB(A), 0°C to 35°C 62.5 dB(A), 45°C	7.3 bels, 0°C to 35°C 7.6 bels, 45°C
X670-G2-72x Dual 550 W DC power supply with front-to-back (FB) airflow	58.5 dB(A), 0°C to 35°C 62.4 dB(A), 45°C	7.3 bels, 0°C to 35°C 7.6 bels, 45°C
X670-G2-72x Dual 550 W AC power supply with back-to-front (BF) airflow	59.8 dB(A), 0°C to 35°C 72.6 dB(A), 45°C	7.3 bels, 0°C to 35°C 8.2 bels, 45°C
X670-G2-72x Dual 550 W DC power supply with back-to-front (BF) airflow	56.4 dB(A), 0°C to 35°C 73.0 dB(A), 45°C	6.7 bels, 0°C to 35°C 8.3 bels, 45°C

Power Options

Table 179: Summit X670-G2 Power Options

X670-G2-48x-4q (part # 17310)	550 W AC power supply: Part # 10925 550 W AC PS FB (front-to-back), Model # DS550HE-3 Part # 10927 550 W AC PS BF (back-to-front), Model # DS550HE-3-02 100-240 V, 50/60 Hz, 2.25 A max per PS
	550 W DC power supply: Part # 10926 550 W DC PS FB (front-to-back), Model # DS550DC-3 Part # 10928 550 W DC PS BF (back-to-front), Model # DS550DC-3-003 -48 VDC, 5.75 A max per PS
X670-G2-72x (part # 17300)	550 W AC power supply: Part # 10925 550 W AC PS FB (front-to-back), Model # DS550HE-3 Part # 10927 550 W AC PS BF (back-to-front), Model # DS550HE-3-02 100-240 V, 50/60 Hz, 2.75 A max per PS
	550 W DC power supply: Part # 10926 550 W DC PS FB (front-to-back), Model # DS550DC-3 Part # 10928 550 W DC PS BF (back-to-front), Model # DS550DC-3-003 -48 VDC, 6.75 A max per PS

¹⁴ Bystander Sound pressure is presented for comparison to other products measured using Bystander Sound Pressure.

¹⁵ Declared Sound Power is presented in accordance with ISO 7779:2010(E), ISO 9296:2010 per ETSI/EN 300 753:2012-01.

Table 180: Power Consumption

Switch Model	Minimum Heat Dissipation	Minimum Power Consumption	Maximum Heat Dissipation	Maximum Power Consumption
X670-G2-48x-4q	325 BTU/hr	95 W	768 BTU/hr	225 W
X670-G2-72x	325 BTU/hr	95 W	939 BTU/hr	275 W

Table 181: CPU, Memory

CPU/Memory
1 GHz 64-bit CPU
2 GB DDR3 ECC SDRAM memory
4 GB eMMC Flash Memory
12 MB buffer, per chip

Standards and Environmental Data

Table 182: Safety Standards

North American Safety of ITE	UL 60950-1 1st Ed., Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006 2nd Ed. TUV-R GS EN 60825-1:2007 (Lasers Safety) 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 183: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:1998+A1:2001+A2:2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) 2004/108/EC EMC Directive

Table 183: EMI/EMC Standards (continued)

International EMC certifications	CISPR 22: 2008 (Ed 6.0), Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) BSMI (Taiwan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark (China) KCC Mark, EMC Approval (Korea)

Table 184: Telecom Standards

EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN

Table 185: IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X



Table 186: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G
Operating conditions	Temperature range: 0°C to 45°C (32°F to 113°F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s ² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms
Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)

ExtremeSwitching X690 Series Switches Technical Specifications

The ExtremeSwitching X690 series includes the following switches:

- X690-48t-2q-4c
- X690-48x-2q-4c

Table 187: X690 Unpackaged Dimensions

X690-48t-2q-4c X690-48x-2q-4c	Height: 1.71 inches (4.35 cm) Width: 19.19 inches (48.7 cm) Length: 17.38 inches (44.1 cm)
----------------------------------	--

Table 188: X690 Unpackaged Weight

X690-48t-2q-4c	15.65 lb (7.1 kg)
X690-48x-2q-4c	14.88 lb (6.8 kg)

Table 189: X690 Packaged Dimensions

X690-48t-2q-4c X690-48x-2q-4c	Height: 6.07 inches (15.4 cm) Width: 21.35 inches (54.2 cm) Length: 23.17 inches (58.8 cm)
----------------------------------	--

Table 190: X690 Packaged Weight

X690-48t-2q-4c	21.01 lb (9.5 kg)
X690-48x-2q-4c	20.28 lb (9.2 kg)

Fan and Acoustic Noise

Table 191: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure (at 25°C)	Declared Sound Power (at 25°C)
X690-48t-2q-4c (front-back airflow)	76.3 db(A)	9.0 bels
X690-48t-2q-4c (back-front airflow)	77.5 db(A)	9.0 bels
X690-48x-2q-4c (front-back airflow)	76.8 db(A)	9.0 bels
X690-48x-2q-4c (back-front airflow)	77.4 db(A)	9.1 bels

Power Options

Table 192: X690 Power Options

X690-48t-2q-4c (part # 17360) X690-48x-2q-4c (part # 17350)	770 W AC power supply: Part # 10960 770 W AC PS FB (front-back) Part # 10961 770 W AC PS FB (back-front) AC Input: 100-240 VAC, 50/60 Hz PSU Input Socket: IEC 320 C14 Power cord input plug: IEC 320 C13
	1100 W DC power supply: Part # 10962 1100 W DC PS FB (front-back) Part # 10963 1100 W DC PS FB (back-front) DC Input: -48 VDC

Table 193: Power Specifications

Switch Model	
X690-48t-2q-4c	AC Input: 100-127 VAC, 4.0 A max. per PSU, 50/60 Hz AC Input: 200-240 VAC, 2.0 A max. per PSU, 50/60 Hz DC Input: -48 to 60 VDC, 8.0 A max. per PSU
X690-48x-2q-4c	AC Input: 100-127 VAC, 3.0 A max. per PSU, 50/60 Hz AC Input: 200-240 VAC, 1.5 A max. per PSU, 50/60 Hz DC Input: -48 to 60 VDC, 6.0 A max. per PSU

Table 194: X690 Power Consumption

Switch Model	Minimum Heat Dissipation (BTU/hr)	Minimum Power Consumption (W)	Maximum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)
X690-48x-2q-4c AC	282 BTU/hr	83 W	1124 BTU/hr	329 W
X690-48x-2q-4c DC	311 BTU/hr	91 W	1178 BTU/hr	345 W
X690-48t-2q-4c AC	425 BTU/hr	125 W	1271 BTU/hr	373 W
X690-48t-2q-4c DC	421 BTU/hr	123 W	1315 BTU/hr	385 W
	1 PSU		2 PSU	

CPU, Memory

CPU/Memory
1 GHz 64-bit CPU
2 GB DDR3 ECC SDRAM memory
4 GB eMMC Flash Memory
12 MB buffer, per chip

Standards and Environmental Data

Table 195: Safety Standards

North American Safety of ITE	UL 60950-1 1st Ed., Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006 2nd Ed. TUV-R GS EN 60825-1:2007 (Lasers Safety) 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 196: EMI/EMC Standards

North America EMC for ITE	FCC 47 CFR part 15 subpart B Class A (USA) ICES-003 (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:1998+A1:2001+A2:2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) 2014/30/EU EMC Directive ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) ETSI EN 50121-1 (Railroad) EN 55011 (ISM) EN 61000-6-2 (Industrial Immunity)
International EMC certifications	CISPR 22: 2008 (Ed 6.0), Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	RCM (Australia) VCCI Class A (Japan Emissions) KCC mark, EMC Approval (Korea) BSMI (Taiwan Emissions) ANATEL (Brazil) CCC mark (China)

Table 197: Telecom Standards

EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN

Table 198: IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X

Table 199: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G
Operating conditions	Temperature range: 0°C to 45°C (32°F to 113°F) Humidity: 5% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s ² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms
Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)

ExtremeSwitching X695 Series Switch Technical Specifications

The ExtremeSwitching X695-48Y-8C switch includes six unpopulated fan slots and two unpopulated power supply slots.

Table 200: X695 Unpackaged Dimensions

X695-48Y-8C switch	Height: 4.34 cm (1.71 in) Width: 43.96 cm (17.31 in) Length: 53.95 cm (21.24 in)
Fan unit, front-to-back or back-to-front	Height: 4.0 cm (1.57 in) Width: 4.0 cm (1.57 in) Length: 13.4 cm (5.28 in)
Four-post rack mount kit (included with switch)	Height: 2.1 cm (0.83 in) Width: 4.4 cm (17.3 in) Length: 63.0 cm - 90.0 cm (24.80 in - 35.43 in)
Two-post rack mount kit (ordered separately)	Height: 4.2 cm (1.65 in) Width: 2.4 cm (0.93 in) Length: 12.5 cm (4.92 in)

Table 201: X695 Unpackaged Weight

X695-48Y-8C switch with no PSUs	7.39 kg (16.29 lb)
Fan unit, front-to-back or back-to-front	0.14 kg (0.31 lb)
Four-post rack mount kit (included with switch)	2.65 kg (5.84 lb)
Two-post rack mount kit (ordered separately)	0.45 kg (0.99 lb)

Table 202: X695 Packaged Dimensions

X695-48Y-8C switch	Height: 18.5 cm (7.28 in) Width: 60.0 cm (23.62 in) Length: 88.0 cm (34.65 in)
Fan unit, front-to-back or back-to-front	Height: 24.0 cm (9.45 in) Width: 20.6 cm (8.11 in) Length: 22.1 cm (8.70 in)
Four-post rack mount kit (included with switch)	Height: 7.0 cm (2.76 in) Width: 11.0 cm (4.33 in) Length: 84.0 cm (33.07 in)
Two-post rack mount kit (ordered separately)	Height: 24.0 cm (9.45 in) Width: 20.6 cm (8.11 in) Length: 22.1 cm (8.70 in)

Table 203: X695 Packaged Weight

X695-48Y-8C switch with no PSUs	14.59 kg (32.17 lb)
Fan unit, front-to-back or back-to-front	1.82 kg (4.01 lb)
Four-post rack mount kit (included with switch)	2.71 kg (5.97 lb)
Two-post rack mount kit (ordered separately)	3.20 kg (7.05 lb)

Fan and Acoustic Noise

Table 204: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure (at 25°C)	Declared Sound Power (at 25°C)
X695-48Y-8C-F (FB airflow)	52.2 db(A)	6.8 bels
X695-48Y-8C-R (BF airflow)	50.5 db(A)	6.7 bels

Fan Tray and Speed Variation

Fan speeds are adjusted based on calculations of the temperatures on all sensors. Due to one fan being located behind the other, air pushed from one fan may cause the other fan in the module to run at a higher speed. One fan can run at medium speed while the other can spin at high speed if one is close to the temperature boundary.

Table 205: Fan Tray Speed Variation

Description	Operation Status	Operation Speed	Airflow Direction
Tray 1 Fan 1	up	high speed	unknown*
Tray 1 Fan 2	up	medium speed	unknown*

Table 205: Fan Tray Speed Variation (continued)

Description	Operation Status	Operation Speed	Airflow Direction
Tray 2 Fan 1	up	high speed	unknown*
Tray 2 Fan 2	up	medium speed	unknown*
Tray 3 Fan 1	up	high speed	unknown*
Tray 3 Fan 2	up	medium speed	unknown*
Tray 4 Fan 1	up	high speed	unknown*
Tray 4 Fan 2	up	medium speed	unknown*
Tray 5 Fan 1	up	high speed	unknown*
Tray 5 Fan 2	up	medium speed	unknown*
Tray 6 Fan 1	up	high speed	unknown*
Tray 6 Fan 2	up	medium speed	unknown*

*The color of the tab on the fan tray indicates the airflow direction:

- Red = Front-to-Back
- Blue = Back-to-Front

Power Options

Table 206: X695 Power Options

X695-48Y-8C	<p>750 W AC power supply: Part # XN-ACPWR-750W-F (front-to-back) Part # XN-ACPWR-750W-R (back-to-front) AC Input: 100-120/200-240 VAC, 50/60 Hz 3.5/1.8 A max. for each PSU PSU Input Socket: IEC 320 C14 Power cord input plug: IEC 320 C13</p> <hr/> <p>750 W DC power supply: Part # XN-DCPWR-750W-F (front-to-back) Part # XN-DCPWR-750W-R (back-to-front) DC Input: -54 VDC, 7.0 A max. for each PSU</p>
-------------	--

Power Consumption

Table 207: X695 Power Consumption

Switch Model	Minimum Heat Dissipation (BTU/hr)	Minimum Power Consumption (W)	Maximum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)
X695-48Y-8C	553	167	1600	469



Mean Time Between Failures (MTBF)

Table 208: X695-48Y-8C MTBF

Switch	Mean Time Between Failures
X695-48Y-8C-AC-F	389719 hrs @ 25°C
X695-48Y-8C-AC-R	450269 hrs @ 25°C

CPU, Memory

Table 209: CPU, Memory

2.2 GHz 64-bit CPU
16 Gb memory, 128 Gb SSD
4GB eMMC Flash Memory
32 MB buffer, per chip

Standards

Table 210: Safety Standards

North American Safety of ITE	UL 62368-1 2nd Ed., 2014-12-01, Listed Device (US) UL 60950-1 2nd Ed., 2014-10-14, Listed Device (US) CAN/CSA 22.2 #62368-1-14 2nd Ed., Canada CAN/CSA 22.2 #60950-1-07 2nd Ed., Canada 2014-10 Complies with FCC 21 CFR Chapter 1, Sub-chapter J in accordance with FDA & CDRH requirements (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 62368-1 EN 60950 2014/35/EU Low Voltage Directive
International Safety of ITE	CNS 14336-1 AS/NZX 60950-1 (Australia /New Zealand) GB4943.1 IEC/EN 60825, IEC/EN 60825-2 (Lasers Safety) IEC 62368-1 IEC 60950-1

Table 211: EMI/EMC Standards

North America EMC for ITE	FCC 47 CFR part 15 subpart B Class A (USA) ICES-003 (Canada)
European EMC standards	EN 300 386 V2.1.1(2016-07) Class A EN 55032:2015/AC:2016-07 Class A EN 55024:2010/A1:2015 EN 55011:2009+A1:2010 (Group 1, Class A) EN 61000-6-2:2005+AC:2005 EN 61000-6-4:2007+A1:2011 EN 61000-3-2:2014 Class A EN 61000-3-3:2013 EN 61000-4-2:2009 EN 61000-4-3:2006+A1:2008+A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2014 EN 61000-4-6:2014/AC:2015 EN 61000-4-8:2010 EN 61000-4-11:2004/A1:2017
International EMC certifications	IEC 61000-6-2:2016 ED 3.0 IEC 61000-6-4:2018 ED 3.0 IEC 61000-4-2:2008 ED 2.0 IEC 61000-4-3:2006+AMD1:2007+AMD2:2010 ED 3.2 IEC 61000-4-4:2012 ED 3.0 IEC 61000-4-5:2014+AMD1:2017+ ED 3.1 IEC 61000-4-6:2013+ ED 4.0 IEC 61000-4-8:2009+ ED 2.0 IEC 61000-4-11:2004+AMD1:2017+ ED 2.1 CISPER 32:2015 ED 2.0 Class A CISPER 24:2010+AMD1:2015 Class A CISPER 11:2009 ED 5.0 Group 1, Class A AS/NZS CISPER 32:2015 Class A GB/T9254-2008 Class A ANSI C63.4:2014
Country-specific	RCM (Australia) VCCI Class A (Japan) MSIP KCC (Korea) BSMI (Taiwan) ANATEL (Brazil) CCC mark (China) SABS & NRCS (South Africa) UL, FCC (North America) EAC mark (Custom Union)



Table 212: Telecom Standards

<p>EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN</p>
--

Table 213: IEEE 802.3 Media Access Standards

<p>IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X</p>
--

Environmental Data

Table 214: Environmental Data

Environmental standards	<p>EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G</p>
Temperature range	<ul style="list-style-type: none"> • Front-to-back airflow: 0°C to 50°C (32°F to 122°F) up to 1800m (6000 ft) • Front-to-back airflow: 0°C to 45°C (32°F to 113°F) above 1800m (6000 ft) • Back-to-front airflow: 0°C to 45°C (32°F to 113°F) up to 1800m (6000 ft) • Back-to-front airflow: 0°C to 40°C (32°F to 104°F) above 1800m (6000 ft)
Other operating conditions	<p>Humidity: 5% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms</p>
Storage & transportation conditions (packaged)	<p>Transportation temperature: -40°C to 70°C (-40°F to 158°F) Humidity: 5% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 in (<15 kg box)</p>

Summit X770 Series Switches Technical Specifications

The Summit X770 series includes the following switch:

- Summit X770-32q switch

Table 215: Physical Dimensions

Summit X770-32q switch	Height: 1.73 inches (4.4 cm) Width: 17.6 inches (44.8 cm) Depth: 20.4 inches (51.9 cm) including the PSU and installed fan modules.
------------------------	---

Table 216: Weight

Summit X770-32q switch	18.0 lb (8.2 kg)
Summit X770 fan module	0.36 lb (0.16 kg)
550 W AC PSU	2.75 lb (1.2 kg)
550 W DC PSU	2.50 lb (1.1 kg)

Table 217: Packaged Dimensions

Summit X770-32q switch	Height: 6.5 inches (16.5 cm)
	Width: 23.4 inches (59.3 cm)
	Depth: 26.2 inches (66.5 cm)

Table 218: Packaged Weight

Summit X770-32q switch	23.2 lb (10.5 kg)
Summit X770 fan module	0.50 lb (0.20 kg)

Table 219: Fan Speed

Minimum speed	4500 RPM
Maximum speed	18000 RPM

Power: Summit X770-32q

Table 220: Summit X770-32q: Power for Each of the Two Installed AC Power Supplies

Nominal input ratings	100 to 240 V _~ , 50/60 Hz, 2.5 A
Input current	2.25 A @ 100 V _~ (low-line) 0.9 A @ 240 V _~ (high-line)
Heat dissipation	225 W, 768 BTU/hr
Power consumption	225 W, 768 BTU/hr

¹⁶ Switch weights include installed fan module. They do not include power supplies.

Table 221: Summit X770-32q: Power for Each of the Two Installed DC Power Supplies

Nominal input ratings	48 to 60 V _{DC} , 5.0 A
Input current	4.25 A @ 48 V _{DC} (low-line) 3.35 A @ 60 V _{DC} (high-line)
Heat dissipation	210 W, 717 BTU/hr
Power consumption	210 W, 717 BTU/hr

Summit X770 Power Supply Unit (PSU) and Fan Tray Configurations

Table 222: X770-32q PSU and Fan Tray Configurations

Configuration No.	Quantity PSU	PSU Part No.	Power Supply Description	Quantity Fan Tray	Fan Tray Part No.	Fan Tray Description
1	1	10927z	Summit 550 W AC PSU Back to Front airflow (DS550HE-3)	5	17112z	Summit X670 fan module Back to Front airflow (JDD0405612UB3A01)
2	1	10925z	Summit 550 W AC PSU Front to Back airflow (DS550HE-3)	5	17111z	Summit X670 fan module Front to Back airflow (AS04012UB565300)
3	2	10927z	Summit 550 W AC PSU Back to Front airflow (DS550HE-3)	5	17112z	Summit X670 fan module Back to Front airflow (JDD0405612UB3A01)
4	2	10925z	Summit 550 W AC PSU Front to Back airflow (DS550HE-3)	5	17111z	Summit X670 fan module Front to Back airflow (AS04012UB565300)
5	1	10928z	Summit 550 W DC PSU Back to Front airflow (DS550DC-3-003)	5	17112z	Summit X670 fan module Back to Front airflow (JDD0405612UB3A01)
6	1	10926z	Summit 550 W DC PSU Front to Back airflow (DS550DC-3)	5	17111z	Summit X670 fan module Front to Back airflow (AS04012UB565300)
7	2	10928z	Summit 550 W DC PSU Back to Front airflow (DS550DC-3-003)	5	17112z	Summit X670 fan module Back to Front airflow (JDD0405612UB3A01)
8	2	10926z	Summit 550 W DC PSU Front to Back airflow (DS550DC-3)	5	17111z	Summit X670 fan module Front to Back airflow (AS04012UB565300)
9	1	10927z	Summit 550 W AC PSU Back to Front airflow (DS550HE-3)	5	17112z	Summit X670 fan module Back to Front airflow (JDD0405612UB3A01)
	1	10928z	Summit 550 W DC PSU Back to Front airflow (DS550DC-3-003)			

Table 222: X770-32q PSU and Fan Tray Configurations (continued)

Configuration No.	Quantity PSU	PSU Part No.	Power Supply Description	Quantity Fan Tray	Fan Tray Part No.	Fan Tray Description
10	1	10925z	Summit 550 W AC PSU Front to Back airflow (DS550HE-3)	5	17111z	Summit X670 fan module Front to Back airflow (AS04012UB565300)
	1	10926z	Summit 550 W DC PSU Front to Back airflow (DS550DC-3)			

CPU, Memory

Table 223: CPU, Memory

1GHz CPU
1GB memory
12 MB packet buffer, per chip

Standards and Environmental Data

Table 224: Safety Standards

North American Safety of ITE	UL 60950-1 1st Ed., Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006 2nd Ed. TUV-R GS EN 60825-1:2007 (Lasers Safety) 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 225: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:1998+A1:2001+A2:2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) 2004/108/EC EMC Directive

Table 225: EMI/EMC Standards (continued)

International EMC certifications	<p>CISPR 22: 2008 (Ed 6.0), Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C</p>
Country-specific	<p>VCCI Class A (Japan Emissions) BSMI (Taiwan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark (China) KCC Mark, EMC Approval (Korea)</p>

Table 226: Telecom Standards

<p>EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN</p>
--

Table 227: IEEE 802.3 Media Access Standards

<p>IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X</p>
--

Table 228: Environmental Data

Environmental standards	<p>EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G</p>
Operating conditions	<p>Temperature range: 0°C to 45°C (32°F to 113°F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms</p>



Table 228: Environmental Data (continued)

Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)
Acoustic noise	Summit X770-32q: 56.6 dB(A) min

ExtremeSwitching X870 Series Switches Technical Specifications

The ExtremeSwitching X870 series includes the following switches:

- X870-32c
- X870-96x-8c

Table 229: X870 Unpackaged Dimensions

X870-32c X870-96x-8c	Height: 1.75 inches (4.5 cm) Width: 17.00 inches (43.2 cm) Length: 19.00 inches (48.3 cm)
-------------------------	---

Table 230: X870 Unpackaged Weight

X870-32c X870-96x-8c	15.21 lb (6.9 kg)
-------------------------	-------------------

Table 231: X870 Packaged Dimensions

X870-32c X870-96x-8c	Height: 6.69 inches (17.0 cm) Width: 22.05 inches (56.0 cm) Length: 23.43 inches (59.5 cm)
-------------------------	--

Table 232: X870 Packaged Weight

X870-32c X870-96x-8c	20.33 lb (9.2 kg)
-------------------------	-------------------

Fan and Acoustic Noise

Table 233: Fan and Acoustic Noise

Switch Model	Bystander Sound Pressure	Declared Sound Power
X870-32c X870-96x-8c (front-back airflow)	54.8 db(A) up to 25°C 57.5 db(A) up to 30°C 76.5 db(A) at 45°C (max)	7.0 bels up to 25°C 7.2 bels up to 30°C 9.2 bels at 45°C (max)
X870-32c X870-96x-8c (back-front airflow)	54.9 db(A) up to 25°C 62.8 db(A) up to 30°C 76.4 db(A) at 45°C (max)	7.4 bels up to 25°C 7.8 bels up to 30°C 9.1 bels at 45°C (max)

Power Options

Table 234: X870 Power Options

X870-32c (part # 17800) X870-96x-8c (part # 17810)	770 W AC power supply: Part # 10960 770 W AC PS FB (front-back) Part # 10961 770 W AC PS FB (back-front) AC Input: 100-240 VAC, 50/60 Hz PSU Input Socket: IEC 320 C14 Power cord input plug: IEC 320 C13
	1100 W DC power supply: Part # 10962 1100 W DC PS FB (front-back) Part # 10963 1100 W DC PS FB (back-front) DC Input: -48 VDC

Table 235: Power Specifications

Switch Model	
X870-32c	AC Input: 100-127 VAC, 5.3 A max. per PSU, 50/60 Hz
X870-96x-8c	AC Input: 200-240 VAC, 2.7 A max. per PSU, 50/60 Hz DC Input: -48 VDC, 11 A max. per PSU

CPU, Memory

CPU/Memory
1 GHz 64-bit CPU
2 GB DDR3 ECC SDRAM memory
4 GB eMMC Flash Memory
12 MB buffer, per chip

Standards and Environmental Data

Table 236: Safety Standards

North American Safety of ITE	UL 60950-1 1st Ed., Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006 2nd Ed. TUV-R GS EN 60825-1:2007 (Lasers Safety) 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed., + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 237: EMI/EMC Standards

North America EMC for ITE	FCC 47 CFR part 15 subpart B Class A (USA) ICES-003 (Canada)
European EMC standards	EN 55022:2006+A1:2007 Class A EN 55024:1998+A1:2001+A2:2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2: 2006+A2:2009 (Harmonics) EN 61000-3-3:2008 (Flicker) 2014/30/EU EMC Directive ETSI EN 300 386: v1.4.1 (2008-04) (EMC Telecommunications) ETSI EN 50121-1 (Railroad) EN 55011 (ISM) EN 61000-6-2 (Industrial Immunity)
International EMC certifications	CISPR 22: 2008 (Ed 6.0), Class A (International Emissions) EN 55024:1998+A1:2001+A2:2003 Class A (International Immunity) IEC/EN 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC/EN 61000-4-3:2008 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A IEC/EN 61000-4-5:2005 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC/EN 61000-4-6:2008 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	RCM (Australia) VCCI Class A (Japan Emissions) KCC mark, EMC Approval (Korea) BSMI (Taiwan Emissions) ANATEL (Brazil) CCC mark (China)

Table 238: Telecom Standards

EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications) MEF9 and MEF14 certified for EPL, EVPL, and ELAN

Table 239: IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X

Table 240: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 (2000 - 2009) - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 (1999 - 09) - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 (2003 - 04) - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5G
Operating conditions	Temperature range: 0°C to 45°C (32°F to 113°F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Operational shock (half sine): 30 m/s ² (3 G), 11 ms, 60 shocks Operational random vibration: 3 to 500 Hz at 1.5 G rms
Storage & transportation conditions (packaged)	Transportation temperature: -40°C to 70°C (-40°F to 158°F) Storage and transportation humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s ² (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides and corners at 42 inches (<15 kg box)

V400 Virtual Port Extender Technical Specifications

The following V400 Virtual Port Extender models are available:

- V400-24t-10GE2 (part no. 18101)
- V400-24p-10GE2 (part no. 18102)
- V400-48t-10GE4 (part no. 18103)
- V400-48p-10GE4 (part no. 18104)

Table 241: V400 Unpackaged Dimensions

V400-24t-10GE2	Height: 1.70 in (4.32 cm) Width: 9.97 in (25.3 cm) Length: 17.34 in (44.0 cm)
V400-24p-10GE2	Height: 1.70 in (4.32 cm) Width: 9.97 in (25.3 cm) Length: 17.34 in (44.0 cm)

Table 241: V400 Unpackaged Dimensions (continued)

V400-48t-10GE4	Height: 1.70 in (4.32 cm) Width: 9.97 in (25.3 cm) Length: 17.34 in (44.0 cm)
V400-48p-10GE4	Height: 1.70 in (4.32 cm) Width: 15.25 in (38.7 cm) Length: 17.34 in (44.0 cm)

Table 242: V400 Unpackaged Weight

V400-24t-10GE2	6.62 lb (3.00 kg)
V400-24p-10GE2	9.08 lb (4.12 kg)
V400-48t-10GE4	7.14 lb (3.26 kg)
V400-48p-10GE4	14.06 lb (6.38 kg)

Table 243: V400 Packaged Dimensions

V400-24t-10GE2	Height: 4.49 in (11.4 cm) Width: 14.66 in (37.2 cm) Length: 22.02 in (55.9 cm)
V400-24p-10GE2	Height: 4.49 in (11.4 cm) Width: 14.66 in (37.2 cm) Length: 22.02 in (55.9 cm)
V400-48t-10GE4	Height: 4.49 in (11.4 cm) Width: 14.66 in (37.2 cm) Length: 22.02 in (55.9 cm)
V400-48p-10GE4	Height: 4.49 in (11.4 cm) Width: 19.86 in (50.4 cm) Length: 22.02 in (55.9 cm)

Table 244: V400 Packaged Weight

V400-24t-10GE2	9.00 lb (4.08 kg)
V400-24p-10GE2	11.44 lb (5.19 kg)
V400-48t-10GE4	9.69 lb (4.39 kg)
V400-48p-10GE4	16.56 lb (7.50 kg)

Power Specifications



Note

When you use a redundant power supply (RPS), only redundant power – not additive power – is supported. Thus, the PoE ports load does not increase when an RPS is added.

Table 245: V400 Power Options

V400-24t-10GE2	AC Input: 100-240 VAC, 50/60 Hz, 0.6 A max
V400-24p-10GE2	AC Input: 100-240 VAC, 50/60 Hz, 2.2 A max DC RPS input: 54 VDC, 18.52 A max <ul style="list-style-type: none"> PoE ports load to 382 W for AC input only. PoE ports load to 720 W for DC input only. PoE ports load to 720 W for AC+DC input.
V400-48t-10GE4	AC Input: 100-240 VAC, 50/60 Hz, 1.0 A max
V400-48p-10GE4	AC Input: 100-240 VAC, 50/60 Hz, 12.0 - 6.0 A max DC RPS input: 54 VDC, 18.52 A max <ul style="list-style-type: none"> PoE ports load to 740 W for AC input only. PoE ports load to 900 W for DC input only. PoE ports load to 1440 W for AC+DC input.

Table 246: Power Specifications

	Minimum ¹⁷ Heat Dissipation (BTU/hr)	Minimum ¹⁷ Power Consumption (Watts)	Maximum ¹⁷ Heat Dissipation (BTU/hr)	Maximum ¹⁷ Power Consumption (Watts)
V400-24t-10GE2	36.1	10.6	75.2	22.1
V400-24p-10GE2	109.8	32.2	336.8	478.7
V400-48t-10GE4	66.0	19.3	134.8	39.5
V400-48p-10GE4	168.9	49.5	583.2	910.9
VX-RPS-1000	141.3	41.4	3152.8	924

Fan and Acoustic Sound

Table 247: Fan and Acoustic Sound

	Bystander Sound Pressure ¹⁸ in dB(A)	Declared Sound Power (L _{WA}) ¹⁸ in bels
V400-24t-10GE2	41.6 (Duty 30%) / 59.4 (max.)	4.4 (Duty 30%) / 6.2 (max.)
V400-24p-10GE2	47.5 (Duty 30%) / 64.0 (max.)	5.0 (Duty 30%) / 6.7 (max.)

¹⁷ Minimum is defined as idle, with no ports linked. Maximum is defined as fans high, all ports 100% traffic.

Table 247: Fan and Acoustic Sound (continued)

	Bystander Sound Pressure ¹⁸ in dB(A)	Declared Sound Power (L _{WAd}) ¹⁸ in bels
V400-48t-10GE4	43.4 (Duty 30%) / 61.1 (max.)	4.6 (Duty 30%) / 6.4 (max.)
V400-48p-10GE4	48.5 (Duty 30%) / 65.5 (max.)	5.1 (Duty 30%) / 6.8 (max.)

Standards and Environmental Data

Table 248: Safety Standards

North American Safety of ITE	UL 60950-1 2nd Ed., A2:2014, Listed Device (US) CSA 22.2 #60950-1-07 2nd Ed., 2014-10 Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval)
European Safety of ITE	EN 60950-1:2006 +A11+A1+A12+A2 EN 60825-1:2007 (Lasers Safety) IEC 60950-1:2005 2nd+A1:2009+A2:2013 2014/35/EU Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2005 2nd Ed. + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 249: V400 Environmental Data

Operating conditions	Temperature: 0°C to 50°C (32°F to 122°F) for non-PoE models Temperature: 0°C to 45°C (32°F to 113°F) for PoE models Storage and transportation temperature: -40°C to 70°C (-40°F to 158°F) Humidity: 5% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet)
----------------------	---

Half-Duplex to Full-Duplex Converter Technical Specifications

The Half-Duplex to Full-Duplex Converter can be attached to switch ports to enable communication over half-duplex connections with older Ethernet devices.

Order the converter using one of the following part numbers:

- 10958: HDX to FDX Converter, Rest of World
- 10959: HDX to FDX Converter: North America

Other specifications:

- 8.8 Gbps switching capacity

¹⁸ At 25°C and 50% PoE load where applicable

- 4 priority queues
- 192Kb packet buffer

Table 250: Half-Duplex to Full-Duplex Converter Packaged Dimensions

Height	2.69 cm (1.06 in)
Width	12.9 cm (5.08 in)
Depth	6.91 cm (2.72 in)
Weight	200 g (0.44 lb)

Half-Duplex to Full-Duplex Converter Power Specifications

Table 251: Rest of the World External Power Pack (10958-CEE 7/1)

Voltage input range	200-240 VAC
Line frequency range	50 to 60 Hz
Operating temperature	0°C to 40°C (32°F to 104°F) normal operation

Table 252: North American External Power Pack (10959-NEMA 1-15P)

Voltage input range	100-120 VAC
Line frequency range	50 to 60 Hz
Operating temperature	0°C to 40°C (32°F to 104°F) normal operation

Half-Duplex to Full-Duplex Converter Environmental Data and Standards

Table 253: Environmental Data

Environmental conditions	<p>Operating temperature: -40°C to 70°C (-40°F to 158°F) Storage temperature: 0°C to 40°C (32°F to 104°F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 2,000 meters (6,562 feet) Packaged shock (half sine): 180 m/s² (18 G), 6 ms, 600 shocks Packaged vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/-3 dB/oct. from 20 to 200 Hz Packaged drop height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)</p>
--------------------------	---

Table 254: Safety Standards

North American ITE	<p>UL 60950-1 2nd Ed., Listed Device (U.S.) CSA 22.2 #60950-1-03 2nd Ed. (Canada) Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)</p>
European/International ITE	<p>EN 60950-1:2007 2nd Ed. CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences AS/NZS 60950-1 (Australia /New Zealand)</p>

Table 254: Safety Standards (continued)

EMI/EMC Standards	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada) EN 55022: Class A EN 55024:A2 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 EN 61000-3-2,8 (Harmonics) EN 61000-3-3 (Flicker) 2014/30/EU EMC Directive
International EMC Certifications	CISPR 22: Ed 5.2, Class A (International Emissions) CISPR 24:A2: Class A (International Immunity) IEC 61000-4-2: EN 61000-4-2:2009 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A IEC 61000-4-3: EN 61000-4-3:2006+A1:2008 Radiated Immunity 10V/m, Criteria A IEC 61000-4-4: am1 ed.2./EN 61000-4-4:2004/A1:2010 Transient Burst, 1 kV, Criteria A IEC 61000-4-5: EN 61000-4-5:2006 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A IEC 61000-4-6: EN 61000-4-6:2009 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11: Power Dips & Interruptions, >30%, 25 periods, Criteria C
IEEE 802.3 Media Access Standards	IEEE 802.3ab 1000BASE-T IEEE 802.az EEE
Environmental specifications	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 ASTM D3580 Random Vibration Unpackaged 1.5 G

Summit 300 W Power Supplies Technical Specifications

The following Summit 300 W power supplies are available for use:

- Summit 300 W AC power supply Front-to-Back airflow Model 10930A
- Summit 300 W AC power supply Back-to-Front airflow Model 10943
- Summit 300 W DC power supply Front-to-Back airflow Model 10933
- Summit 300 W DC power supply Back-to-Front airflow Model 10944

These power supplies are for use with the X460-G2 series switches (non-PoE models).

Summit 300 W AC Power Supply (Model 10930A and 10943)

Table 255: 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	2.25 lb (1 kg)

Table 256: Power Specifications

Voltage input range	85 to 264 V \sim
Nominal input ratings	100 to 240 V \sim , 50 to 60 Hz, 5 A
Nominal input current at full loads	4.2 A @ 90 V \sim (low-line) 1.7 A @ 230 V \sim (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	30 A
Output	12 V $_{DC}$, 25 A max, 300 Watts 3.3 V $_{DC}$, 3.03 A max, 10 Watts
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 393.
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 257: Environmental Specifications

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

Summit 300 W DC Power Supply (Model 10933 and 10944)

Table 258: 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	1.83 lb (0.83 kg)

Table 259: Power Specifications

Nominal Input	-40 to -72 V, 9 A
DC Voltage Input Range	18V to -72V $_{DC}$

Table 259: Power Specifications (continued)

Maximum Input Amperages	9 A @ 40 V _{DC} 7.5 A @ 48 V _{DC} 5 A @ 72 V _{DC}
Inrush Current	82 A at 72 V _{DC} peak
Minimum wire size	14 AWG (1.5 mm ²) copper stranded
DC Output	12 V _{DC} , 25 A/3.3 V _{DC} , 3.0 A
DC Output Power (W)	300 W

Table 260: Environmental Specifications

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

Summit 550 W Power Supplies Technical Specifications

The following power supplies are available for use in X670-G2 and X770 series switches:

- 550 W AC PSU-FB (Model 10925)—AC power supply with front-to-back ventilation airflow
- 550 W AC PSU-BF (Model 10927)—AC power supply with back-to-front ventilation airflow
- 550 W DC PSU-FB (Model 10926)—DC power supply with front-to-back ventilation airflow
- 550 W DC PSU-BF (Model 10928)—DC power supply with back-to-front ventilation airflow

Table 261: Physical Specifications

Dimensions	Height: 1.57 inches (4.0 cm) Width: 3.07 inches (7.8 cm) Depth: 13.31 inches (33.8 cm)
Weight	3.64 lb (1.65 kg)

Table 262: AC Power Specifications (Models 10925 and 10927)

Voltage input range	90 to 264 V \sim
Nominal input ratings	100 to 240 V \sim , 50 to 60 Hz, 8 A
Nominal input current at full loads	8 A @ 90 V \sim (low-line), 4 A @ 230 V \sim (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	15 A at 25°C (77°F)
Output	12 V _{DC} , 45 A max, 540 Watts, 3 V _{DC} , 3 A max, 10 Watts Maximum continuous DC output shall not exceed 550 Watts.
Power supply input socket	IEC 320 C14

Table 262: AC Power Specifications (Models 10925 and 10927) (continued)

Power cord input plug	IEC 320 C13
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 393.
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	87% at 110 V \sim with full load 88% at 220 V \sim with full load

Table 263: DC Power Specifications (Models 10926 and 10928)

Nominal Input	-40 V to -60 V, 18 A
DC Voltage Input Range	-36 to -75 V \equiv
Maximum Input Amperages	18 A @ 36 V \equiv , 13.5 A @ 48 V \equiv 8.5 A @ 75 V \equiv
Inrush Current	25 A peak
Inrush Energy	0.625 A ² S
Minimum wire size	14 AWG (1.5 mm ²) copper stranded
DC Output	12 V \equiv , 45 A/3.3 V \equiv , 3.0 A
DC Output Power (W)	550 W

Table 264: Environmental Specifications

Operating temperature	0°C to 45°C (normal operation)
Storage temperature	-40°C to 70°C
Operating humidity	20% to 90% relative humidity, non-condensing
Operating altitude	Up to 10,000 feet
Operational shock	
Frequency Range	5 to 350 Hz, 200 to 2000 Hz PSD: 0.0001g ² /Hz 350 to 500 Hz -6dB/Octave, 500 Hz 0.000052 Hz
Acceleration	0.21.0 gRMS (Typical Level) Duration: 20 min per axis

750 W Power Supplies Technical Specifications

The Summit 750 W AC power supply (part no. 10931) is available for use with ExtremeSwitching X620-16p switches. It is compatible with the EPS-C2 power supply.

The Summit 750 W AC power supply is used in the EPS-C2 external power system.

Table 265: 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	2.25 lb (1 kg)

Table 266: Power Specifications

Voltage input range	85 to 264 V \sim
Nominal input ratings	100 to 240 V \sim , 50 to 60 Hz, 10 A
Nominal input current at full loads	10 A at 90 V \sim (low-line) 3.7 A at 230 V \sim (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	35 A
Output	12 V \equiv , 25 A max, 300 Watts 55 V \equiv , 8.18 A max, 450 Watts 3.3 V \equiv , 3.03 A max, 10 Watts
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 393.
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: 88% at 50% load and 86% at 100% load High Line: 90% at 50% and 100% loads

Table 267: Environmental Specifications

Operating temperature	0°C to 45°C (normal operation)
Storage temperature	-40°C to 70°C
Operating humidity	20% to 90% relative humidity, non-condensing
Operational shock	30 m/s ² (3 G)

750 W Power Supplies Technical Specifications

Four 750 W power supply units are available for use with ExtremeSwitching X695 switches:

- 750W AC power supply - front-to-back airflow (part no. XN-ACPWR-750W-F)
- 750W AC power supply - back-to-front airflow (part no. XN-ACPWR-750W-R)
- 750W DC power supply - front-to-back airflow (part no. XN-DCPWR-750W-F)
- 750W DC power supply - back-to-front airflow (part no. XN-DCPWR-750W-R)

Table 268: 750 W Power Supplies: Unpackaged Dimensions

750 W power supply – AC front-to-back or back-to-front airflow	Height: 4.00 cm (1.57 in) Width: 8.00 cm (3.15 in) Depth: 20.60 cm (8.11 in)
750 W power supply – DC front-to-back or back-to-front airflow	Height: 4.00 cm (1.57 in) Width: 8.00 cm (3.15 in) Depth: 20.60 cm (8.11 in)

Table 269: 750 W Power Supplies: Unpackaged Weight

750 W power supply – AC front-to-back or back-to-front airflow	0.81 kg (1.79 lb)
750 W power supply – DC front-to-back or back-to-front airflow	0.85 kg (1.86 lb)

Table 270: 750 W Power Supplies: Packaged Dimensions

750 W power supply – AC front-to-back or back-to-front airflow	Height: 44.5 cm (17.52 in) Width: 27.5 cm (10.83 in) Depth: 42.5 cm (16.73 in)
750 W power supply – DC front-to-back or back-to-front airflow	Height: 44.5 cm (17.52 in) Width: 27.5 cm (10.83 in) Depth: 42.5 cm (16.73 in)

Table 271: 750 W Power Supplies: Packaged Weight

750 W power supply – AC front-to-back or back-to-front airflow	10.22 kg (22.53 lb)
750 W power supply – DC front-to-back or back-to-front airflow	10.50 kg (23.15 lb)

Table 272: Power Specifications (AC Power Supplies)

Voltage input range	85 to 264 V \sim
Nominal input ratings	100-140/200-240V \sim , 10/5.36A max., 50/60Hz
Nominal input current at full loads	10 A at 90 V \sim (low-line) 3.7 A at 230 V \sim (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	35 A
Output	+12 V, 61.5 A +12 Vsb, 3 A Total output power not to exceed 750W
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13

Table 272: Power Specifications (AC Power Supplies) (continued)

Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 393.
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: 88% at 50% load and 86% at 100% load High Line: 90% at 50% and 100% loads

Table 273: Power Specifications (DC Power Supplies)

Nominal input	-48 to -60 VDC, 20.4 A
DC Voltage input range	-35 to -75 V
Inrush Current	21 A peak
Maximum wire size	14 AWG (1.5 mm ² copper stranded).
DC Output	+12.2VDC, 61.5A; +12Vaux, 2.5A
Power (W)	750 W

Table 274: Environmental Specifications (All Power Supply Units)

Operating temperature	0°C to 55°C (normal operation)
Storage temperature	-40°C to 70°C
Operating humidity	20% to 90% relative humidity, non-condensing
Operational shock	30 m/s ² (3 G)

Summit 770 W Power Supplies Technical Specifications

The following Summit 770 W power supplies are available for use in ExtremeSwitching X690 and X870 series switches.

- Summit 770 W AC power supply: front-to-back airflow (part no. 10960)
- Summit 770 W AC power supply: back-to-front airflow (part no. 10961)

Table 275: Physical Specifications

Dimensions	Height: 1.57 inches (4.0 cm) Width: 3.25 inches (8.3 cm) Length: 10.22 inches (26.0 cm)
Weight	2.55 lb (1.12 kg)

Table 276: Power Specifications

Voltage input range	100-127/200-240~ 47 to 63Hz
Nominal input ratings	12.5 A max at 115VAC and 6A max at 230VAC at Full 770 W load
Maximum inrush current	45A at Max 264 VAC at 25C with cold start
Output	54 V, 13.2 A max, 770 W
Power supply input socket and cord	IEC/EN 60320-1/C16 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 393.
Efficiency	Minimum efficiency: 88% at maximum power output.

Table 277: Environmental Specifications

Operating temperature	-10°C to 50°C (normal operation)
Storage temperature	-40°C to 70°C
Operating humidity	93% relative humidity, non-condensing at 30C
Operational shock	30 m/s ² (3 G)

EPS-C2 Redundant Power Supply Technical Specifications

The following tables list the specifications for the EPS-C2 redundant power supply unit (model 10936).

Table 278: Physical Specifications

Dimensions	4.4 cm H x 44.1 cm W x 38.4 cm D 1.73 in H x 17.4 in W x 15.1 in D
Weight (unit only)	1.03 kg (2.27 lb)

Table 279: Other Specifications

Allowable PSU	Summit 750W PoE AC PSU
Power cord input plug/socket	IEC 320 C13/C14
Power cord gauge	Min 18AWG

RPS-90 Redundant Power Supply Technical Specifications

The following tables list the specifications for the RPS-90 redundant power supply unit (model RPS-90).

Table 280: Power Specifications

AC input frequency range	47-63 Hz
AC input voltage range	90-264 VAC
AC input current	1.5 A maximum at 100 VAC 0.8 A maximum at 240 VAC
Output voltage	19 VDC
Maximum output power	90 W

Table 281: Environmental Specifications

Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-20°C to 85°C (-4°F to 185°F)
Operating relative humidity	10% to 90%
Storage relative humidity	5% to 95%

RPS-150XT Redundant Power Supply Technical Specifications

The following tables list the specifications for the 150 W RPS-150XT Redundant Power Supply unit (model 10932).

Table 282: Physical Specifications

Dimensions	4.1 H x 15.4 W x 30.0 D (cm) 1.61 H x 6.1 W x 11.8 D (in)
Weight (unit only)	1.5 kg (3.3 lb)
Weight (unit and packaging)	approximately 3 kg (6.6 lb)

Table 283: Power Specifications

AC input frequency	50/60 Hz (range 47-63 Hz)
AC input voltage	100-240 V \sim (range 90-264 V \sim)
AC input current	2 A maximum (range 2 A at 100 V, 1 A at 200 V)
DC output	+12.0 V $\overline{=}$, 13 A maximum
Maximum output power	156 W

Table 284: Environmental Specifications

Operating temperature	0°C to 60°C (32°F to 140°F)
Storage temperature	-45°C to 85°C (-49°F to 185°F)
Operating relative humidity	10% to 90% operating/95% non-condensing

RPS-150XT Connector

See [Figure 253](#) and [Table 285](#) on page 385 for pin locations and function.



Note

The following information is for troubleshooting purposes only. For proper operation, use only the RPS cable supplied with the RPS-150XT. This cable is specially designed for this application and meets all necessary regulatory and safety standards.



Caution

The use of non-approved cables will void your warranty.

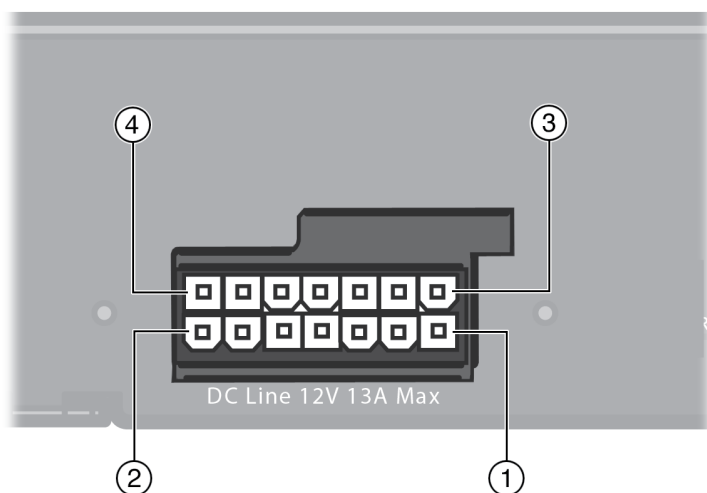


Figure 253: RPS-150XT Connector Pin Locations

1 = Pin 1	3 = Pin 8
2 = Pin 7	4 = Pin 14

Table 285: RPS-150XT Connector Pin Functions

Pin	Function	Pin	Function
1	Ground	8	Spare pin
2	Spare pin	9	Spare pin
3	12 V power	10	Power present
4	12 V power	11	Start 1
5	12 V power	12	Start 2
6	12 V power	13	Power good
7	Ground	14	Ground

RPS-500p Redundant Power Supply Technical Specifications

External Power Supplies for PoE Switches

The following tables list the specifications for the 500 W DC RPS-500p (model 10923).

Table 286: Physical Specifications

Dimensions	4.45 H x 44.5 W x 16.5 D (cm) 1.75 H x 17.5 W x 6.5 D (in)
Weigh (unit only)	3.47 kg (7.63 lb)
Weigh (unit and packaging)	4.95 kg (10.89 lb)

Table 287: Power Specifications

AC input frequency	50/60 Hz (range 47-63 Hz)
AC input voltage	100-240 V _~ (range 90-264 V _~)
AC input current	8 A maximum
DC output	-54 V ₌₌₌ , 7.8 A maximum +12.0 V ₌₌₌ , 14 A maximum
Maximum DC output power	500 W

Table 288: Environmental Specifications

Operating temperature	0°C to 50°C (normal operation) (32°F to 122°F)
Storage temperature	-40°C to 70°C (-40°F to 158°F)
Operating humidity	5% to 95% relative humidity, non-condensing

RPS-500p Connector

See [Figure 254](#) and [Table 289](#) on page 387 for pin locations and function.

Note



The following information is for troubleshooting purposes only. For proper operation, use only the 1 meter RPS cable supplied with the RPS-500p. This cable is specially designed for this application and meets all necessary regulatory and safety standards. The use of non-approved cables will void your warranty.

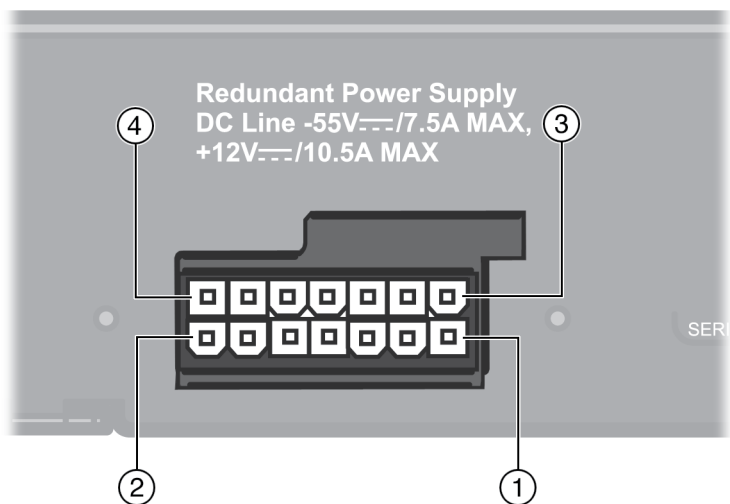


Figure 254: RPS-500p Connector Pin Locations

Table 289: RPS-500p Connector Pins

Pin	Function	Pin	Function
1	- 55 V return	8	Ground
2	- 55 VDC	9	No connection
3	12 VDC output	10	RPS present
4	12 VDC output	11	Status 1 Status
5	12 VDC output	12	Status 2
6	12 VDC output	13	Power good
7	Ground	14	Ground

STK-RPS-150PS and RPS Shelves Technical Specifications

The Extreme Networks STK-RPS-150PS is a 150 watt DC power redundant power supply for use with an Extreme Networks stackable or standalone fixed switch model that does not support PoE.



Caution

The STK-RPS-150PS does not support pliant fixed switch models. Do not connect the power cable from an STK-RPS-150PS to a PoE-compliant fixed switch. Otherwise, damage to the switch may result.

The STK-RPS-150PS can be installed as a standalone unit or with the following rack-mounted shelves:

- STK-RPS-150CH2, a two-slot shelf
- STK-RPS-150CH8, an eight-slot shelf

STK-RPS-150PS Specifications

Table 290: Physical Specifications

Dimensions	7.7 H x 2.04 W x 10.1 D (in.) 19.6 H x 5.2 W x 25.7 D (cm)
Unpackaged Weight	3.85 lb (1.75 kg)

Table 291: Power Specifications

AC input frequency range	50 to 60 Hz
AC input voltage range	100-240 VAC
Output Voltage	12VDC
Output Current	1.0 A min., 8.5 A or 13.0 A max.

Table 292: Environmental Specifications

Operating temperature	0°C to 50°C (32°F to 122°F)
Storage temperature	-40°C to 70°C (32°F to 122°F)
Operating humidity	5% to 95% (non-condensing)

STK-RPS-150CH2 Specifications

Table 293: Physical Specifications

Dimensions without mounting brackets	5.5 H x 44.0 W x 18.0 D (cm) 2.2 H x 17.3 W x 7.0 D (in.)
Unpackaged Weight	2.09 lb (0.95 kg)

STK-RPS-150CH8 Specifications

Table 294: Physical Specifications

Dimensions without mounting brackets	22.26 H x 44.0 W x 26.4 D (cm) 8.77 H x 17.3 W x 10.4 D (in.)
Unpackaged Weight	11.6 lb (5.27 kg)

STK-RPS-150PS Connector Pin Locations

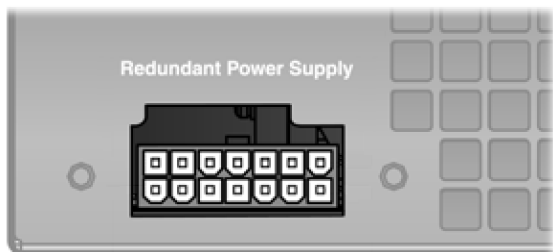


Figure 255: STK-RPS-150PS Connector Pin Locations

Table 295: STK-RPS-150PS Connector Pin Functions

Pin	Function	Pin	Function
1	- 50 V return	8	Ground
2	- 50 VDC	9	No connection
3	12 VDC output	10	RPS present
4	12 VDC output	11	Status 1
5	12 VDC output	12	Status 2
6	12 VDC output	13	Power good
7	Ground	14	Ground

STK-RPS-1005PS Redundant Power Supply Technical Specifications

The following tables list the specifications for the 1005 W PoE+ Redundant Power supply unit (model STK-RPS-1005PS) .

Table 296: Physical Specifications

Dimensions	4.3 H x 15.4 W x 34.0 D (cm) 1.7 H x 6.1 W x 13.4 D (in.)
Weight (unit only)	2.1 kg (4.6 lb)
Weight (unit and packaging)	3.5 kg (7.8 lb)

Table 297: Power Specifications

AC input frequency range	50/60 Hz
AC input voltage range	115-230 VAC
AC input current	12 A maximum at 115 VAC, 60 Hz 6.0 A maximum at 230 VAC, 50 Hz

Table 297: Power Specifications (continued)


DC output	-55 VDC, 15 A maximum +12.0 VDC, 0.1 A minimum, 15 A maximum
Maximum output power	1005 W


Table 298: Environmental Specifications

Operating temperature	0°C to 50°C (32°F to 122°F)
Storage temperature	-40°C to 70°C (-40°F to 158°F)
Operating relative humidity	10% to 90% non-condensing

STK-RPS-1005PS Connector

For pin location and function, refer to [Figure 256](#) and [Table 299](#) on page 391, respectively.

Note
 The following information is for troubleshooting purposes only. For proper operation, use only the RPS cable supplied with the STK-RPS-1005PS. This cable is specially designed for this application and meets all necessary regulatory and safety standards.

Caution
 The use of non-approved cables will void your warranty.

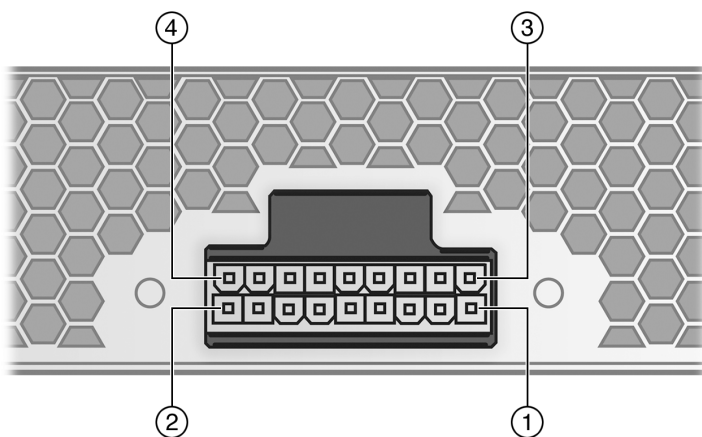


Figure 256: STK-RPS-1005PS Connector Pin Locations

1 = Pin 1	3 = Pin 10
2 = Pin 9	4 = Pin 18

Table 299: STK-RPS-1005PS Connector Pin Functions

Pin	Function	Pin	Function
1	12 V power	10	Power good of RPS
2	12 V power	11	Power supply present
3	12 V power	12	12 V current sharing
4	Ground	13	Ground
5	Ground	14	Spare pin
6	Spare pin	15	-55 V current sharing
7	-55 V power	16	-55 V power
8	-55 V power	17	-55 V power return
9	-55 V power return	18	-55 V power return

VX-RPS-1000 Redundant Power Supply Technical Specifications

The following tables list the specifications for the model VX-RPS-1000 Redundant Power Supply.

Table 300: VX-RPS-1000 Unpackaged Dimensions

Height: 1.64 inches (4.17 cm)
Width: 5.27 inches (13.4 cm)
Length: 15.21 inches (38.6 cm)
Weight: 11.51 lb (5.22 kg)

Table 301: VX-RPS-1000 Packaged Dimensions

Height: 5.04 inches (12.8 cm)
Width: 12.57 inches (31.9 cm)
Length: 21.91 inches (55.6 cm)
Weight: 13.00 lb (5.89 kg)

Table 302: VX-RPS-1000 Power Specifications

AC input frequency range	50/60 Hz
AC input voltage range	100-120 VAC or 200-240 VAC
AC input current	12 A maximum at 120 VAC, 60 Hz 6.0 A maximum at 240 VAC, 50 Hz
DC output	+54.0 VDC, 18.52 A maximum
Maximum output power	1000 W



Table 303: VX-RPS-1000 Environmental Specifications

Operating temperature	0°C to 45°C (32°F to 113°F)
Storage temperature	-40°C to 70°C (-40°F to 158°F)
Operating relative humidity	5% to 90% non-condensing

Table 304: VX-RPS-1000 Connector Pin Functions

Pin	Function	Pin	Function
1	12 V power	9	Power good of RPS
2	12 V power	10	Power supply present
3	12 V power	11	12 V current sharing
4	Ground	12	Ground
5	Ground	13	Spare pin
6	Spare pin	14	-55 V current sharing
7	-55 V power	15	-55 V power return
8	-55 V power	16	-55 V power return

3-Slot Modular Shelves: Technical Specifications

Model STK-RPS-1005CH3-E

The following table lists the specifications for the 3-slot modular shelf (model STK-RPS-1005CH3-E). The shelf is designed for use with the following equipment:

- [STK-RPS-1005PS Redundant Power Supply](#) on page 102 (model STK-RPS-1005PS)
- [RPS-150XT Redundant Power Supply](#) on page 98 (model 10932)
- Half-Duplex to Full-Duplex Converter (models 10958 and 10959)

Table 305: Physical Specifications

Length	48.20 cm (18.99 in.)
Depth	35.16 cm (13.85 in.)
Height	5.00 cm (1.97 in.)
Weight	2.39 kg (5.27 lb)

Model VX-RPS-CH3

The following table lists the specifications for the 3-slot modular shelf (model VX-RPS-CH3). The shelf is designed for use with the following equipment:

- [VX-RPS-1000 Redundant Power Supply](#) on page 103 (model 18202)

Table 306: Physical Specifications

Length	44.0 cm (17.34 in.)
Depth	38.7 cm (15.25 in.)
Height	4.4 cm (1.73 in.)
Weight	2.89 kg (6.37 lb)

Power Cord Requirements for AC-Powered Switches and AC Power Supplies

An AC power cord is not included with the AC power supply.

Power cords used with AC-powered switches or AC power supplies must meet the following 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 switch or power supply.
- 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 mm²) minimum; over 6 feet, the minimum wire size is 16 AWG (1.0 mm²).

The power cords for switches that use either the 1100 W or 715 W power supplies are keyed with a “notch” to ensure the proper orientation when plugged in. These cords are of 3x14 AWG.

For details about obtaining AC power cords for use in your country, refer to <http://www.extremenetworks.com/product/powercords/>.

Console Connector Pinouts

Table 307 describes the pinouts for a DB-9 console plug connector.

Table 307: 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

Figure 257 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

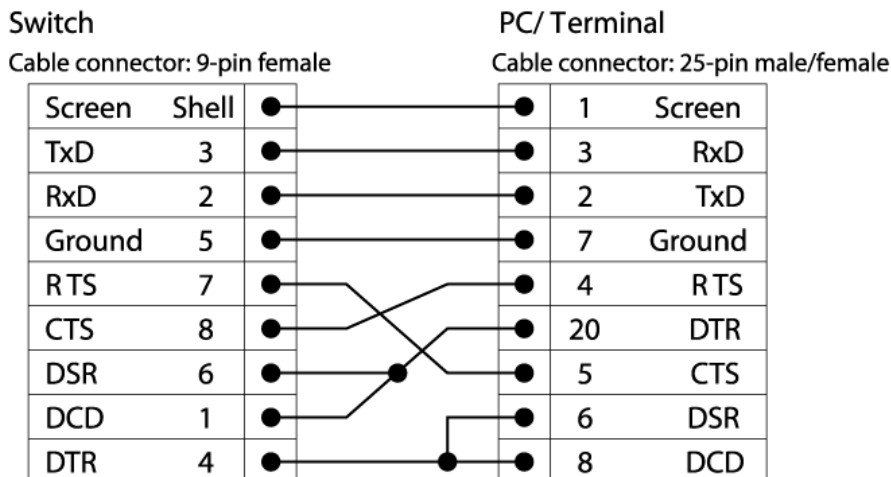


Figure 257: Null-Modem Cable Pinouts

Figure 258 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

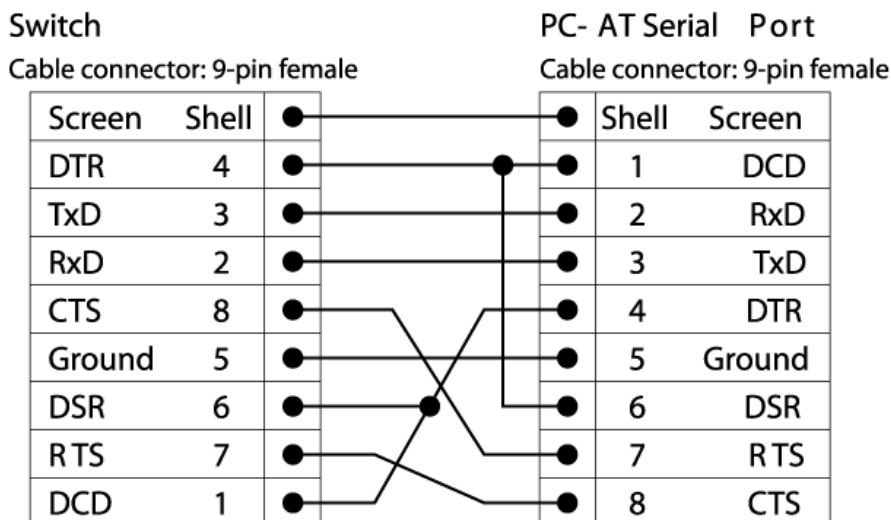


Figure 258: PC-AT Serial Null-modem Cable Pinouts

Table 308 shows the pinouts for the RJ45 console port on the ExtremeSwitching switches.

Table 308: RJ45 Console Port on Switch

Function	Pin Number	Direction
CTS (clear to send)	1	In
DTR (data carrier detect)	2	Out
TXD (transmit data)	3	Out
GND (ground)	4	—
GND (ground)	5	—
RXD (receive data)	6	In

Table 308: RJ45 Console Port on Switch (continued)

Function	Pin Number	Direction
DSR (data set ready)	7	In
RTS (request to send)	8	Out

Table 309 shows the pinouts for an RJ45-to-DB-9 adapter.

Table 309: Pinouts for an RJ45 to DB-9 Adapter

Signal	RJ45 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



B Safety and Regulatory Information

Considerations Before Installing
General Safety Precautions
Maintenance Safety
Fiber Optic Ports and Optical Safety
Cable Routing for LAN Systems
Installing Power Supply Units and Connecting Power
Selecting Power Supply Cords
Battery Notice
Battery Warning - Taiwan
EMC Warnings
Japan (VCCI Class A)
Korea EMC Statement



Warning

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

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. 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 located in the United States, install the system in accordance with the U.S. National Electrical Code (NEC).

Considerations Before Installing

Consider the following items before you install equipment.

- For equipment designed to operate in a typical Telco environment that is environmentally controlled, choose a site that has the following characteristics:
 - Temperature-controlled and humidity-controlled, such that the maximum ambient room temperature shall not exceed 50°C (122°F).
 - 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.
- For equipment designed to be installed in environments that are not environmentally controlled, such as outdoor enclosures, see the product data sheet or for environmental conditions, temperature, and humidity.
- Establish at least 3 inches clearance on all sides for effective ventilation. Do not obstruct the air intake vent on the front, side, or rear ventilation grills. 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

Follow these 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 you perform maintenance procedures on Extreme Networks equipment, follow these recommendations:

- Use only authorized accessories or components 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 otherwise instructed 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.

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. Take care when removing a laser optic module from the module 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 working 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 transmit LED is powered on.
- Never look directly at a fiber port on the switch 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.

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

Extreme Networks pluggable optical modules and direct-attach cables 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

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

LAN systems are designed for intra-building installations; that is, cable runs between devices must be in the same building as the connected units, except under the conditions listed in the next paragraph.

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 than 140 feet 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 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 metalically 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 metalically 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

For the ratings and power input requirements of each power supply unit, see [Technical Specifications](#) on page 315 or the data sheet for the power supply at www.extremenetworks.com.



Warning

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

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.
- 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 switches with field-replaceable power supplies, do not connect the power supply to an electrical source when the power supply is not installed in the switch; 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 overcurrent 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 outlets 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 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 input power 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

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



Warning

Extreme Networks power supplies do not have switches for turning the unit on and off. Disconnect all power cords to remove power from the device. Make sure that these connections are easily accessible.

Extreme Networks alimentations n'ont pas de contact pour mettre l'appareil sous et hors tension. Débranchez tous les cordons d'alimentation pour couper l'alimentation de l'appareil. Assurez-vous que ces connexions sont facilement accessibles.

Selecting Power Supply Cords

Extreme Networks does not include 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 the Technical Specifications for your product.

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 it is recommended that a transformer be used to step down the voltage to < 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 Notice



Warning: This product contains a battery used to maintain product information. If the battery should need replacement it must be replaced by Service Personnel. Please contact Technical Support for assistance.

Risk of explosion if battery is replaced by an incorrect type. Dispose of expended battery in accordance with local disposal regulations.



Attention: Ce produit renferme une pile servant à conserver les renseignements sur le produit. Le cas échéant, faites remplacer la pile par le personnel du service de réparation. Veuillez communiquer avec l'assistance technique pour du soutien.

Il y a risque d'explosion si la pile est remplacée par un type de pile incorrect. Éliminez les piles usées en conformité aux règlements locaux d'élimination des piles.

Battery Warning - Taiwan

警告

如果更換不正確之電池型式會有爆炸的風險，
請依製造商說明書處理用過之電池。

EMC Warnings

Taiwan BSMI Warning

警告使用者:

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

China CCC Warning

警告使用者:

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。

在这种情况下，可能需要用户对干扰采取切实可行的措施。

Japan (VCCI Class A)**Warning**

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

Korea EMC Statement

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

Index

Numerics

- 10933 DC power supply
 - connecting ground wire 189
 - connecting to source voltage 190
- 10934A DC power supply, see 10944 DC power supply
- 10944 DC power supply
 - connecting ground wire 189
 - connecting to source voltage 190
- 1100 W AC power supply
 - features 110
 - installing 218
 - replacing 274
- 1100 W DC power supply
 - connecting ground wire 208
 - connecting to source voltage 209
 - features 111
 - installation 206
 - installing 207, 301–303
 - preparing cables 206
 - removing 300
 - replacing 299, 301–303
- 2000 W AC power supply
 - installing 218
- 3-slot modular shelf
 - and Half-Duplex to Full-Duplex Converter 256
 - specifications 392
- 300 W AC power supply
 - features 105
 - removing 262
 - specifications 376, 377
- 300 W DC power supply
 - connecting ground wire 189
 - features 105
 - installing 186, 187, 282, 285
 - preparing cables 187
 - replacing 279, 282, 285
 - specifications 377
- 350 W AC power supply
 - features 106
 - replacing 264
- 40G cable 176
- 550 W AC power supply
 - features 107
 - installing 216
 - replacing 266
 - specifications 378
- 550 W DC power supply
 - connecting ground wire 197
 - connecting to source voltage 199
 - features 107
 - installation 194
 - installing 196, 288, 289, 291
 - preparing cables 195
 - removing 287
 - replacing 287–289, 291
- 715 W AC power supply
 - features 107
 - installing 218
 - replacing 264
- 715 W DC power supply
 - features 107
- 750 W AC power supply
 - features 108
 - installing in EPS-C2 228
 - removing 268
 - specifications 379, 381
- 750 W DC power supply
 - connecting ground wire 204
 - connecting to source voltage 204
 - features 108
 - installing 202, 203, 295–297
 - LEDs 108
 - preparing cables 202
 - removing 294
 - replacing 294–297
 - specifications 382
- 770 W AC power supply
 - features 110
 - installing 218
 - replacing 272
 - specifications 382

A

- AC power
 - connecting to switch 203, 219
 - external power supplies 93
 - installing power supply 218
 - removing PSU 311
 - replaceable power supplies 104
 - requirements for cords 393
- AC power supply
 - installing 212
- access 122
- acoustic noise
 - V400 Virtual Port Extender 373
 - X440-G2 switch 322
 - X450-G2 switch 328
 - X460-G2 switch 334
 - X590 switch 342
 - X620 switch 346
 - X670-G2 switch 350
 - X690 switch 355
 - X695 switch 359
 - X770 switch 368
 - X870 switch 368
- acquired node
 - definition 147
- active node 147
- active topology 147
- airflow 306

- alert, power supply 105, 108
 - alternate stacking
 - ports 142, 144
 - X440-G2 series switches 151
 - X450-G2 series switches 152, 153
 - X460-G2 series switches 153–156
 - X590 series switches 157
 - X620 series switches 157
 - X670-G2 series switches 158, 159
 - X690 series switches 159
 - X770 series switches 160, 161
 - X870 series switches 162
 - alternate stacking ports 162
 - alternative configuration 167
 - amperage
 - calculating for UPS 134
 - ANSI standards 135
 - automatic failover
 - setting up 11
- B**
- back-to-front cooling 306
 - backup node
 - definition 147
 - redundancy 138
 - battery notice 402
 - bend radius 127, 128
 - BICSI 126
 - building codes 121
 - Building Industry Consulting Service International, *see* BICSI
- C**
- cabinet
 - attaching switch 181
 - cable
 - 1100 W power supply 206
 - 300 W DC power supply 187
 - 550 W power supply 195
 - 750 W DC power supply 202
 - alternative configuration 167
 - ANSI standards 135
 - bend radius 128
 - bundling 127
 - category 5 127
 - connecting to EPS-C2 229
 - fiber optic 128, 220
 - for stacking 166, 167, 176
 - for switch ports 220
 - installing 127, 128
 - labeling 126
 - network interface 220
 - plenum-rated 127
 - QSFP+ direct-attach 176
 - RJ45 131
 - slack 127
 - standards 126
 - cable (*continued*)
 - SummitStack 176
 - SummitStack 128G 149
 - types and distances 129
 - candidate node 147
 - category 5 cable 127
 - clock module
 - replacing 309
 - combination ports 11
 - combining
 - switches in a stack 163
 - commercial building standards 135
 - components
 - optional 185
 - configuration
 - ExtremeXOS 223
 - IP address 222
 - VLAN 222
 - connecting DC power
 - 10933 DC power supply 190
 - 10944 DC power supply 190
 - 1100 W DC power supply 209
 - 550 W DC power supply 199
 - 750 W DC power supply 204
 - connecting management console 221
 - connecting power 203, 219
 - connector jackets
 - RJ45 131
 - connector pinouts
 - DB-9 console connector 393
 - null-modem cable 393
 - console port
 - for stacked configurations 177
 - on switch 393
 - settings 221
 - X440-G2 series 12–14
 - X450-G2 series 30
 - X460-G2 series 41, 42
 - X590 series 57, 58
 - X620 series 63
 - X670-G2 series 70
 - X690 series 74, 75
 - X770 series 81
 - X870 series 85–87
 - control path 147
 - conventions
 - notice icons 6
 - text 6
 - cooling 306
 - cords
 - requirements 393
 - selecting 401
- D**
- daisy chain topology 141
 - data port 148
 - DB-9 console connector pinouts 393
 - DB-9 pinouts 393

- DC power
 - connecting to switch 190, 199, 203, 204, 209, 219
 - external power supplies 93
 - removing PSU 312
 - replaceable power supplies 104
 - DC power supply
 - connecting ground wire 204
 - DC-I battery return configuration 135
 - DC-powered switches
 - X440-G2-24t-10GE4-DC switch 23
 - X440-G2-48t-10GE4-DC switch 24
 - design standards 135
 - distances
 - cables 129
 - documentation
 - feedback 7
 - location 8, 9
 - downloading
 - ExtremeXOS to switch 223
 - dual master condition 141
- E**
- Easy-Setup 148
 - election
 - node role 148
 - priority 148
 - electric power
 - connecting to switch 203, 219
 - electrical codes 121
 - electrostatic discharge, *see* ESD
 - environmental data
 - X695 switch 363
 - environmental requirements
 - building codes 121
 - electrical codes 121
 - electrostatic discharge (ESD) 124
 - humidity 124
 - temperature 122
 - wiring closet 122
 - EPS-C2
 - 2x7 connector 96, 97
 - power delivery 96, 97
 - specifications 383
 - EPS-C2 power supply
 - connecting cables 229
 - connecting power cord 231
 - installing 225, 228
 - installing chassis 226
 - overview 95
 - equipment rack
 - grounding 125
 - mechanical recommendations 124
 - mounting holes 124
 - securing 126
 - service access 125
 - space requirements 125
 - ESD
 - discharge from cable 127
 - ESD (*continued*)
 - system protection 124
 - EXOS, *see* ExtremeXOS
 - external power supply
 - displaying status 111
 - EPS-C2 95
 - list of supported 93
 - RPS-150XT 98
 - RPS-500p 100
 - RPS-90 98
 - STK-RPS-1005PS 102
 - STK-RPS-150PS 101
 - VX-RPS-1000 103
 - Extreme Stacking Tool 168
 - ExtremeXOS
 - configuring 223
 - downloading to switch 223
- F**
- failover
 - setting up 11
 - fan
 - airflow 306
 - back-to-front 81, 85–87
 - replacing 306
 - fan speed
 - X450-G2 switch 328
 - X460-G2 switch 336
 - X620 switch 346
 - fiber optic cable
 - bend radius 128
 - connecting 220
 - handling 128
 - installing 128
 - first switch login 221
 - frequency, *see* radio frequency interference (RFI)
 - front-to-back cooling 306
- G**
- ground wire
 - connecting 189, 197, 204, 208
 - grounding
 - 1100 W DC power supply 208
 - 300 W DC power supply 189
 - 550 W DC power supply 197
 - 750 W DC power supply 204
 - racks 125
 - requirements 135
 - wiring closet 122
- H**
- Half-Duplex to Full-Duplex Converter
 - connecting to power 257
 - installing 256, 257
 - mounting in a rack 256
 - mounting on a flat surface 256

Half-Duplex to Full-Duplex Converter (*continued*)

- mounting on a shelf 256
- mounting on a wall 257
- removing 308
- replacing 308
- specifications 374, 375

hitless failover 148

humidity 124

I

industry standards 135

initial switch login 221

installing

- 10933 DC power supply 189, 190
 - 10944 DC power supply 189, 190
 - 1100 W AC power supply 218
 - 1100 W DC power supply 206, 301–303
 - 1100 W power supply 207–209
 - 2000 W AC power supply 218
 - 300 W AC power supply 212
 - 300 W DC power supply 186, 187, 280, 282, 285
 - 550 W AC power supply 216
 - 550 W DC power supply 194, 288, 289, 291
 - 550 W power supply 196, 197, 199
 - 715 W AC power supply 218
 - 750 W AC power supply 212
 - 750 W DC power supply 202–204, 295–297
 - connecting power 203, 219
 - DC power supply 204
 - EPS-C2 power supply 225, 226, 229, 231
 - fiber optic cable 128
 - Half-Duplex to Full-Duplex Converter 256, 257
 - optical transceivers 185
 - optional components 185
 - personnel 180
 - power supply in EPS-C2 chassis 228
 - power supply unit (PSU) 224
 - preparing 180
 - safety information 180
 - STK-RPS-150PS power supply 242–244, 246
 - switches 179–181
 - tools 180
 - V400 Virtual Port Extender 255
 - VIM2 module 258
- internal power supply
- displaying status 111
 - list of supported 104
- IP settings
- configuring 222

J

jackets

- RJ45 connector 131

L

labeling cables 126

LEDs

- 750 W AC power supply 108
- stack number indicator 137
- X440-G2 28
- X450-G2 39
- X460-G2 55
- X590 61
- X620 69
- X670-G2 73
- X690 79
- X770 83
- X870 89

local management connection 221

logging in to the switch 221

M

MAC address 148

management port

- connecting to switch 221
- for stacked configurations 177
- settings 221
- X440-G2 series 12–14
- X450-G2 series 30
- X460-G2 series 41, 42
- X590 series 57, 58
- X620 series 63
- X670-G2 series 70
- X690 series 74, 75
- X770 series 81
- X870 series 85–87

master node

- definition 147
- redundancy 138

model numbers 11

multiple-rack stacking 174, 175

N

native stacking 146

native stacking ports 137

network interface connections 220

node address 148

node role

- definition 147
- election 148

noise specifications, see acoustic noise

null-modem cable pinouts 393

O

Open Source Declaration 8, 9

operating environment requirements 122

operational node 148

optical transceivers

- alternative configuration 167
- for stacking 167
- installing 185

optional components

optional components (*continued*)

installing 185

optional ports

X460-G2 series 115

P

partitioning

of ports 12

X590 ports 58

X670-G2 ports 71

X690 ports 75

X770 ports 82

X870 ports 85

pinouts

DB-9 console connector 393

null-modem cable 393

planning

site 120

plenum-rated cable 127

port option cards

types 113

VIM-2q 116

VIM-2ss 117

VIM-2t 117

VIM-2x 118

ports

alternate stacking 142, 151-162

combination 11

console port settings 221

for stacked configurations 177

management 221

native stacking 137

partitioning 12

X440-G2 series switches 15-20, 22-27

X450-G2 series switches 31-38

X460-G2 series switches 42-54

X590 series switches 59, 60

X620 series switches 64-68

X670-G2 series switches 71, 72

X690 series switches 77, 78

X770 series switches 82

power

connecting to switch 190, 199, 203, 204, 209, 219

requirements for cords 393

power cables, *see* cable

power consumption

X695 switch 360

power cords

connecting to EPS-C2 231

selecting 133, 401

power over Ethernet (PoE)

power requirements 132

power requirements

PoE devices 132

power supply 133

power specifications

Summit X430 switch 317

V400 Virtual Port Extender 372, 373

power specifications (*continued*)

X435 switch 317

X440-G2 switch 323, 324

X450-G2 switch 329

X460-G2 switch 338

X590 switch 342, 343

X620 switch 347

X670-G2 switch 351

X690 switch 355

X695 switch 360

X770 switch 364

X870 switch 369

power supply

RPS-150XT 233, 234, 236, 276, 384, 385

RPS-500p 238, 240, 277

RPS-90 383

STK-RPS-1005PS 247, 249, 278, 389, 390

VX-RPS-1000 251, 252, 278, 391

power supply unit (PSU)

1100 W 206, 299, 301-303

1100 W AC 110, 218

1100 W DC 111

2000 W AC 218

300 W 282, 285

300 W AC 105, 212, 376, 377

300 W DC 186, 187, 280, 377

350 W AC 106

550 W 194, 195, 287-289, 291

550 W AC 107, 378

715 W AC 107, 218

750 W 294-297

750 W AC 108, 212, 228, 379

750 W DC 202

770 W AC 110, 382

alert 105, 108

displaying status 111

external 93

for X435 switches 316

for X450-G2 switches 328

for X460-G2 switches 336

for X770 switches 365

installing 212, 218, 224, 280

power requirements 133

removing from switch 311, 312

replaceable 104

replacing 280

safety 224

specifications 380

priority

for node role election 148

Q

QSFP+ cables 176

QSFP+ ports

partitioning 12

R

- rack
 - attaching switch 181
 - removing switch 313
 - rack specifications
 - grounding 125
 - securing to floor 126
 - space requirements 125
 - radio frequency interference (RFI)
 - patch panel installation 127
 - preventing 132
 - redundancy
 - in a stack 138
 - redundant power supply (RPS)
 - 3-slot modular shelf 392
 - EPS-C2 95, 383
 - RPS-150XT 98, 233, 234, 236, 276, 384, 385
 - RPS-500p 100, 238, 240, 277, 386
 - RPS-90 98, 383
 - STK-RPS-1005PS 102, 247, 249, 278, 389, 390
 - STK-RPS-150PS 101
 - tools for installing 225
 - VX-RPS-1000 103, 251, 252, 278, 391
 - redundant uplink ports 11
 - regulatory information 396
 - removing
 - 1100 W AC power supply 274
 - 1100 W DC power supply 300
 - 300 W AC power supply 262
 - 300 W DC power supply 279
 - 350 W AC power supply 264
 - 550 W DC power supply 287
 - 715 W AC power supply 264
 - 750 W AC power supply 268
 - 750 W DC power supply 294
 - 770 W AC power supply 272
 - fan module 306
 - Half-Duplex to Full-Duplex Converter 308
 - STK-RPS-150PS power supply 277
 - switch 311–313
 - V400 Virtual Port Extender 308
 - replaceable power supply
 - displaying status 111
 - list of supported 104
 - replacing
 - 1100 W AC power supply 274
 - 1100 W DC power supply 299–303
 - 300 W AC power supply 262
 - 300 W DC power supply 279, 280, 282, 285
 - 350 W AC power supply 264
 - 550 W AC power supply 266
 - 550 W DC power supply 287–289, 291
 - 715 W AC power supply 264
 - 750 W AC power supply 268
 - 750 W DC power supply 294–297
 - 770 W AC power supply 272
 - clock module 309
 - fan module 306
 - replacing (*continued*)
 - Half-Duplex to Full-Duplex Converter 308
 - V400 Virtual Port Extender 308
 - versatile interface module (VIM) 309
 - restricted 122
 - restricted access 122
 - RFI, see radio frequency interference (RFI)
 - ring topology 140
 - RJ45 cable 131
 - RPS, see redundant power supply (RPS)
 - RPS-150XT power supply
 - connecting to power 236
 - installing 233, 234, 236
 - overview 98
 - removing 276
 - specifications 384, 385
 - RPS-500p power supply
 - connecting to power 240
 - installing 238, 240
 - overview 100
 - removing 277
 - specifications 386
 - RPS-90 power supply
 - overview 98
 - specifications 383
 - rules for redundant uplink ports 11
- S**
- safety
 - precautions when installing 180
 - requirements 396
 - when installing PSUs 224
 - service access to the rack 125
 - settings
 - for management console 221
 - signal quality 132
 - single-rack stacking 172–174
 - site planning 120
 - site preparation 180
 - slack in cable 127
 - slot number 137
 - slots
 - X440-G2 series switches 15–20, 22–27
 - X450-G2 series switches 31–38
 - X460-G2 series 115
 - X460-G2 series switches 42–54
 - X590 series switches 59, 60
 - X620 series switches 64–68
 - X670-G2 series switches 71, 72
 - X690 series switches 77, 78
 - X770 series switches 82
 - space requirements, rack 125
 - specifications
 - 300 W AC power supply 376, 377
 - 300 W DC power supply 377
 - 550 W AC power supply 378
 - 750 W AC power supply 379, 381
 - 750 W DC power supply 382

- specifications (*continued*)
 - 770 W AC power supply 382
 - EPS-C2 383
 - equipment racks 124
 - Half-Duplex to Full-Duplex Converter 374, 375
 - RPS-500p 386
 - STK-RPS-150PS power supply 387–389
 - V400 virtual port extender 371–374
 - X435 switch 315, 317, 318
 - X440-G2 switch 320–325
 - X450-G2 switch 326, 329, 330
 - X460-G2 switch 332, 337, 340
 - X590 switch 341–343
 - X620 switch 345–349
 - X670-G2 switch 349, 351, 352
 - X690 switch 354–356
 - X695 switch 358–361, 363
 - X770 switch 363–366
 - X870 switch 368–370
- SSD module 115, 259
- stack 146
- stack master 149
- stack number indicator 137
- stackable switch 146
- stacking
 - 40G cables 176
 - available methods 144
 - backup 138
 - cables 166, 167
 - combining switch models 163
 - connecting cables 176, 177
 - connecting management port 177
 - connection order 170
 - daisy chain 141
 - definition 137
 - dual master condition 141
 - examples 172–175
 - guidelines 149, 150
 - LEDs 28, 39, 55, 69, 73, 83, 89, 137
 - master 138
 - mixing stacking port types 170
 - multiple-rack 174, 175
 - native stacking ports 137
 - ports, native 157, 159, 162
 - ports, native and alternate 142, 151–162
 - priority 138
 - recommendations 149, 150
 - redundancy 138
 - ring topology 140
 - single-rack 172–174
 - slot number 137
 - stack number indicator 28, 39, 55, 69, 73, 83, 89, 137
 - SummitStack-V160 171
 - SummitStack-V320 172
 - terminology 146
 - tool 168
 - top of rack 174
 - troubleshooting 137
- stacking (*continued*)
 - VIM2 171
 - web app 168
 - with VIM1-SummitStack Modules 174
 - with VIMs 174
 - X440-G2 switch 151
 - X450-G2 series switches 152, 153
 - X460-G2 series switches 153–157
 - X590 series switches 157
 - X620 series switches 157
 - X670-G2 series switches 158, 159
 - X690 series switches 159
 - X695 switches 160
 - X770 series switches 160, 161
 - X870 series switches 162
- stacking link 146
- stacking port 146
- standards
 - cabling 126, 135
 - commercial building 135
 - design 135
 - grounding 135
 - X695 switch 361
- standby node
 - definition 147
- status of power supply 111
- STK-RPS-1005PS power supply
 - connecting to power 249
 - installing 247, 249
 - overview 102
 - removing 278
 - specifications 389, 390
- STK-RPS-150PS power supply
 - connecting to power 246
 - installing in RPS shelf 242
 - installing shelf into rack 243, 244
 - LEDs 101
 - overview 101
 - removing 277
 - specifications 387–389
 - unpacking 242
- SummitStack
 - available methods 144
 - path 146
 - segment 148
 - state 148
 - topology 139, 146
 - web app 168
- SummitStack 128G cable 149
- SummitStack configuration 136
- SummitStack stacking module
 - VIM-2ss 117
- SummitStack-V feature 142, 144, 151–162
- SummitStack-V160 171
- SummitStack-V320 172
- SummitStack-V84 152, 153
- support, *see* technical support
- switch ports, *see* ports

switches

- attaching to cabinet 181
- attaching to rack 181
- connecting power 203, 219
- initial login 221
- installing 179
- installing optional components 185
- preparing to install 180
- removing 311, 313
- removing PSU 311, 312
- safety information 180

T

technical support

- contacting 8

temperature 122, 363

TM-CLK module 118

tools for installing equipment

- 1100 W DC power supply 206
- 300 W DC power supply 186
- 550 W DC power supply 195
- 750 W DC power supply 202
- redundant power supply (RPS) 225
- switches 180

top-of-rack stacking configuration 174

transition time

- UPS 134

troubleshooting stack connections 137

U

unshielded twisted pair, *see* UTP cable

uplink redundancy

- on switches 11
- setting up 11

UPS (uninterruptible power supply)

- requirements 133
- selecting 134
- transition time 134

UTP cable

- bend radius 127
- category 5 127
- discharge ESD 127
- preventing RFI 132

V

V-320 stacking 172

V400 virtual port extender

- specifications 371-374

V400 Virtual Port Extender

- acoustic noise 373
- environmental data 374
- installing 255
- mounting in a rack 255, 308
- power specifications 372, 373
- replacing 308

versatile interface module (VIM)

versatile interface module (VIM) (*continued*)

- installing 258
- replacing 309
- stacking example 174
- types 113

VIM-2q 116

VIM-2q module

- for stacking 153-157

VIM-2ss 117

VIM-2ss module

- for stacking 153-157

VIM-2t 117

VIM-2x 118

VIM1-SummitStack module

- stacking example 174

VIM2

- stacking 171

VIM2-SummitStack module

- stacking example 174

virtual port extender 114

VLAN

- configuring 222

VSP 7400 Series switches

- power supplies 380

VX-RPS-1000 power supply

- installing in rack 251
- installing on shelf 252
- overview 103
- removing 278
- specifications 391

W

web app

- SummitStack 168

wire

- connecting 189, 197, 204, 208

wiring closet

- electrostatic discharge (ESD) 124
- floor coverings 122
- grounding 122
- humidity 124
- rack, securing 126
- temperature 122

wiring terminals 125

X

X435 series switches

- power specifications 317
- power supply unit (PSU) 316
- specifications 315, 317, 318

X440-G2 series switches

- acoustic noise 322
- alternate stacking 151
- features 12-14
- LEDs 28
- power specifications 323, 324
- power supply 324

- X440-G2 series switches (*continued*)
 - specifications 320–325
 - stacking 151
 - X440-G2-12p-10GE4 switch 16
 - X440-G2-12t-10GE4 switch 15
 - X440-G2-12t8fx-GE4 switch 25
 - X440-G2-24fx-GE4 switch 26
 - X440-G2-24p-10GE4 switch 19
 - X440-G2-24t-10GE4 switch 17
 - X440-G2-24t-10GE4-DC switch 23
 - X440-G2-24t-GE4 switch 27
 - X440-G2-24x-10GE4 switch 18
 - X440-G2-48p-10GE4 switch 22
 - X440-G2-48t-10GE4 switch 20
 - X440-G2-48t-10GE4-DC switch 24
- X450-G2 series switches
 - 350 W AC power supply 218
 - 715 W AC power supply 264
 - acoustic noise 328
 - fan speed 328
 - features 30
 - LEDs 39
 - power specifications 329
 - power supply unit (PSU) 328
 - specifications 326, 329, 330
 - stacking 152, 153
 - X450-G2-24p-10GE4 switch 36
 - X450-G2-24p-GE4 switch 35
 - X450-G2-24t-10GE4 switch 32
 - X450-G2-24t-GE4 switch 31
 - X450-G2-48p-10GE4 switch 38
 - X450-G2-48p-GE4 switch 37
 - X450-G2-48t-10GE4 switch 34
 - X450-G2-48t-GE4 switch 33
- X460-G2 series switches
 - 350 W AC power supply 218, 264
 - 715 W AC power supply 264
 - acoustic noise 334
 - fan speed 336
 - features 41, 42
 - LEDs 55
 - optional ports 115
 - power specifications 338
 - power supplies 376, 377
 - power supply unit (PSU) 336
 - replacing optional modules 309
 - slots 115
 - specifications 332, 337, 340
 - stacking 153–157
 - X460-G2-16mp-32p-10GE4 switch 54
 - X460-G2-24p-10GE4 switch 46
 - X460-G2-24p-24hp-10GE4 switch 53
 - X460-G2-24p-GE4 switch 45
 - X460-G2-24t-10GE4 switch 43
 - X460-G2-24t-24ht-10GE4 switch 49
 - X460-G2-24t-GE4 switch 42
 - X460-G2-24x-10GE4 switch 44
 - X460-G2-48p-10GE4 switch 52
- X460-G2 series switches (*continued*)
 - X460-G2-48p-GE4 switch 51
 - X460-G2-48t-10GE4 switch 48
 - X460-G2-48t-GE4 switch 47
 - X460-G2-48x-10GE4 switch 50
- X590 series switches
 - 770 W AC power supply 110
 - acoustic noise 342
 - features 57, 58
 - LEDs 61
 - power specifications 342, 343
 - specifications 341–343
 - stacking 157
 - X590-24t-1q-2c switch 59
 - X590-24x-1q-2c switch 60
- X620 series switches
 - acoustic noise 346
 - fan speed 346
 - features 63
 - LEDs 69
 - power specifications 347
 - power supplies 347, 376, 377, 379
 - specifications 345–349
 - stacking 157
 - X620-10x switch 65
 - X620-16p switch 68
 - X620-16t switch 66
 - X620-16x switch 67
 - X620-8t-2x switch 64
- X670-G2 series switches
 - acoustic noise 350
 - features 70
 - installing 550 W AC power supply 216
 - LEDs 73
 - power specifications 351
 - replacing 550 W AC power supply 266
 - specifications 349, 351, 352
 - stacking 158, 159
 - X670-G2-48x-4q switch 71
 - X670-G2-72x switch 72
- X690 series switches
 - 1100 W DC power supply 111, 206
 - 770 W AC power supply 110, 382
 - acoustic noise 355
 - features 74, 75
 - LEDs 79
 - power specifications 355
 - specifications 354–356
 - stacking 159
 - X690-48t-2q-4c switch 77
 - X690-48x-2q-4c switch 78
- X695 series switches
 - specifications 358–361, 363
- X695 Series switches
 - acoustic noise 359
 - environmental data 363
 - power consumption 360
 - power specifications 360

- X695 Series switches (*continued*)
 - standards 361
- X695 switches
 - stacking 160
- X770 series switches
 - acoustic noise 368
 - airflow options 81
 - features 81
 - installing 550 W AC power supply 216
 - LEDs 83
 - power specifications 364
 - power supplies 378
 - power supply unit (PSU) 365
 - replacing AC power supply 266
 - specifications 363–366
 - stacking 160, 161
 - X770-32q switch 82
- X870 series switches
 - 1100 W DC power supply 111, 206, 301
 - 750 W DC power supply 295
 - 770 W AC power supply 110, 218, 382
 - acoustic noise 368
 - airflow options 85–87
 - features 85–87
 - LEDs 89
 - power specifications 369
 - specifications 368–370
 - stacking 162
 - X870-32c switch 87
 - X870-96x-8c switch 88