Summit Family Hardware Installation Guide

for Switches Supported by ExtremeXOS 16 or Earlier

121141-04 Rev. AB
June 2022

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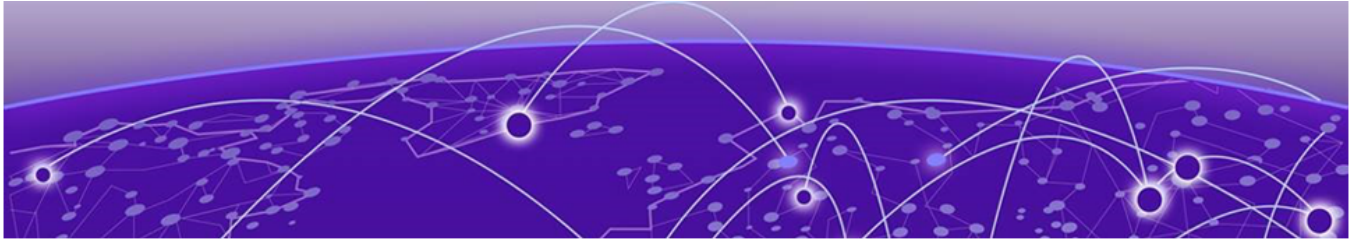

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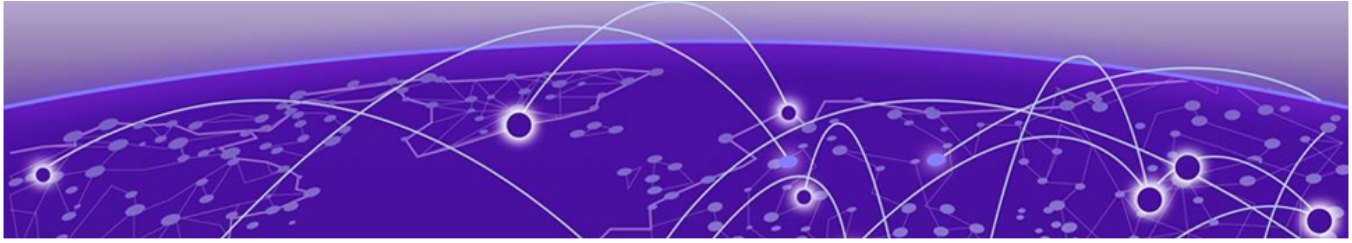

Preface

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

- #unique_3
- ExtremeSwitching X450-G2 Series Switches on page 102
- ExtremeSwitching X460-G2 Series Switches on page 122
- #unique_6
- #unique_7
- #unique_8
- ExtremeSwitching X670-G2 Series Switches on page 149
- #unique_10
- ExtremeSwitching X770 Series Switches on page 153
- #unique_12

- Summit X150 Series Switches on page 26
- Summit X250e Series Switches on page 31
- Summit X350 Series Switches on page 45
- Summit X430 Series Switches on page 50
- Summit X440 Series Switches on page 56
- Summit X450, X450a, and X450e Series Switches on page 80
- ExtremeSwitching X450-G2 Series Switches on page 102
- Summit X460 Series Switches on page 113
- ExtremeSwitching X460-G2 Series Switches on page 122
- Summit X480 Series Switches on page 135
- Summit X650 Series Switches on page 140
- Summit X670 Series Switches on page 144
- ExtremeSwitching X670-G2 Series Switches on page 149
- ExtremeSwitching X770 Series Switches on page 153

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 16.2 User Guide* and the *ExtremeXOS 16.2 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

Unless otherwise noted, information in this document applies to all supported environments for the products in question. Exceptions, like command keywords associated with a specific software version, are identified in the text.

When a feature, function, or operation pertains to a specific hardware product, the product name is used. When features, functions, and operations are the same across an entire product family, such as ExtremeSwitching switches or SLX routers, the product is referred to as *the switch* or *the router*.

Table 1: Notes and warnings

Icon	Notice type	Alerts you to...
	Tip	Helpful tips and notices for using the product.
	Note	Useful information or instructions.
	Important	Important features or instructions.

Table 1: Notes and warnings (continued)

Icon	Notice type	Alerts you to...
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.

Table 2: Text

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 in boldface, for example **Ctrl** or **Esc**. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press **Ctrl**+**Alt**+**Del**
Words in italicized type	Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles.
NEW!	New information. In a PDF, this is searchable text.

Table 3: Command syntax

Convention	Description
bold text	Bold text indicates command names, keywords, and command options.
italic text	Italic text indicates variable content.
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, such as passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	In command examples, the backslash indicates a “soft” line break. When a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Platform-Dependent Conventions

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

- ExtremeSwitching® switches
- SummitStack™

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

Terminology

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

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The Information Development team at Extreme Networks has made every effort to ensure the accuracy and completeness of this document. 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 we especially want to know about:

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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.

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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.

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- Your Extreme Networks service contract number, or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any actions 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

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1. Go to www.extremenetworks.com/support/service-notification-form.
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Find Extreme Networks product information at the following locations:

Current Product Documentation
Release Notes
Hardware and software compatibility for Extreme Networks products
Extreme Optics Compatibility
Other resources such as white papers, data sheets, and case studies

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Links to Publications for Reuse (Master List)

Extreme Networks Documentation

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

ExtremeSwitching Hardware Documentation

- *E4G Series Routers Hardware Installation Guide*
- *Extreme Hardware/Software Compatibility and Recommendation Matrices*
- Extreme Optics website
- *Extreme Networks Pluggable Transceivers Installation Guide*
- *ExtremeSwitching X8 series Series Switches Hardware Installation Guide*
- *ExtremeSwitching Hardware Installation Guide for Switches Using ExtremeXOS Version 30*
- *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 21 and 22*
- *ExtremeSwitching and Summit Switches: Hardware Installation Guide for Switches Using ExtremeXOS 16 or Earlier*
- *Environmental Guidelines for ExtremeSwitching Products*

200 Series Hardware Documentation

- *ExtremeSwitching 210 and 220 Series Switches: Hardware Installation Guide*
- *ExtremeSwitching 240 Series Switches: Hardware Installation Guide*
- *ExtremeSwitching 200 Series: Administration Guide*
- *ExtremeSwitching 200 Series: Command Reference Guide*
- *ExtremeSwitching 200 Series: Release Notes*
- *ExtremeSwitching 200 Series: Initial Configuration and Setup*

ExtremeXOS Publications

- *ACL Solutions Guide*
- *ExtremeXOS 22.6 Command Reference Guide*
- *ExtremeXOS 21.1 Command Reference Guide*
- *ExtremeXOS 22.6 EMS Messages Catalog*
- *ExtremeXOS 21.1 EMS Messages Catalog*
- *ExtremeXOS 22.6 Feature License Requirements*
- *ExtremeXOS 21.1 Feature License Requirements*
- *ExtremeXOS 22.6 User Guide*
- *ExtremeXOS 21.1 User Guide*
- *ExtremeXOS 16.2 Command Reference Guide*
- *ExtremeXOS 16.2 EMS Messages Catalog*

- *ExtremeXOS 16.2 Feature License Requirements*
- *ExtremeXOS 16.2 User Guide*
- *ExtremeXOS 16.1 Command Reference Guide*
- *ExtremeXOS 16.1 EMS Messages Catalog*
- *ExtremeXOS 16.1 Feature License Requirements*
- *ExtremeXOS 16.1 User Guide*
- *ExtremeXOS OpenFlow User Guide*
- *ExtremeXOS Quick Guide*
- *ExtremeXOS Legacy CLI Quick Reference Guide*
- *ExtremeXOS Release Notes*
- *Extreme Hardware/Software Compatibility and Recommendation Matrices*
- *Switch Configuration with Chalet for ExtremeXOS 21.x and 22.x*
- *Switch Configuration with Chalet for ExtremeXOS 16.x and Earlier*
- *Using AVB with Extreme Switches*

Extreme SDN Documentation

- *OneC-A-600 Quick Reference*
- *OneController Install and User Guide*
- *OneController Release Notes*
- *SDN Getting Started Guide*

Extreme Management Center Documentation

Extreme Management Center documentation, including release notes, are available at: www.extremenetworks.com/documentation/.

Management Center online help is available by clicking the **?** icon on all screens. The online help provides detailed explanations of how to configure and manage your network using Management Center.

For complete regulatory compliance and safety information, refer to the document *Intel® Server Products Product Safety and Regulatory Compliance*.

Ridgeline Documentation

- *Ridgeline Installation and Upgrade Guide*
- *Ridgeline Reference Guide*
- *Ridgeline REST API Quick Start*

S-, K-, and 7100-Series Documentation

- *S-, K-, and 7100 Series CLI Reference Guide*
- *S-, K-, and 7100 Series Configuration Guide*
- *Environmental Guidelines for ExtremeSwitching Products*

Other S-, K-, and 7100-Series documentation is available at: https://extranet.extremenetworks.com/. You must have a valid customer account to access this site.

ExtremeCloud Documentation

The following documentation is available for ExtremeCloud:

- *ExtremeCloud Information Center*
- *ExtremeCloud Release Notes*
- *ExtremeCloud Quick Reference*
- *ExtremeCloud REST API Reference (Documentation GUI)*
- *ExtremeCloud Hardware and Software Compatibility Matrices*

ExtremeLocation Documentation

- *ExtremeLocation User Guide*
- *ExtremeLocation Quick Reference Guide*
- *ExtremeLocation Release Notes*

Wireless Documentation

- *ExtremeWireless AP3916ic Installation Guide*
- *ExtremeWireless AP3912i Installation Guide*
- *ExtremeWireless AP3965i & AP3965e Installation Guide*
- *ExtremeWireless AP3935i & AP3935e Installation Guide*
- *ExtremeWireless AP3825i & AP3825e Installation Guide*
- *ExtremeWireless AP3805i FCC/ROW Installation Guide*
- *ExtremeWireless AP3801i Quick Reference Guide*
- *ExtremeWireless Appliance C5210 Quick Reference*
- *ExtremeWireless Appliance C5110 Quick Reference*
- *ExtremeWireless Appliance C4110 Quick Reference*
- *ExtremeWireless Appliance C25 Quick Reference*
- *ExtremeWireless Appliance C35 Quick Reference*
- *ExtremeWireless CLI Reference Guide*
- *ExtremeWireless End User License Agreements*
- *ExtremeWireless External Antenna Site Preparation and Installation Guide*
- *ExtremeWireless External Antenna with Wave 2 Site Preparation and Installation Guide*
- *ExtremeWireless Getting Started Guide*
- *ExtremeWireless Integration Guide*
- *ExtremeWireless Maintenance Guide*
- *ExtremeWireless Open Source Declaration*
- *ExtremeWireless User Guide*
- *IdentiFi Wireless WS-AP3865e Installation Guide*
- *IdentiFi Wireless WS-AP3825i & WS-AP3825e Installation Guide*
- *IdentiFi Wireless WS-AP3805i & WS-AP3805e Installation Guide*

ExtremeSecurity Analytics & SIEM

- *ExtremeSecurity API Reference Guide*
- *ExtremeSecurity Application Configuration Guide*
- *ExtremeSecurity Ariel Query Language Guide*
- *ExtremeSecurity DSM Configuration Guide*
- *ExtremeSecurity Hardware Guide*
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- *ExtremeSecurity Juniper NSM Plug-in User Guide*
- *ExtremeSecurity Log Manager Administration Guide*
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- *ExtremeSecurity Upgrade Guide*
- *ExtremeSecurity Vulnerability Assessment Configuration Guide*
- *ExtremeSecurity Vulnerability Manager User Guide*
- *ExtremeSecurity WinCollect User Guide*
- *Extreme SIEM Administration Guide*
- *Extreme SIEM Getting Started Guide*
- *Extreme SIEM High Availability Guide*
- *Extreme SIEM Tuning Guide*
- *Extreme SIEM User Guide*
- *Migrating ExtremeSecurity Log Manager to Extreme SIEM*

ExtremeSecurity Threat Protection & Intrustion Prevention System

- *ExtremeSecurity Intrusion Prevention System Hardware Replacement Guide*
- *ExtremeSecurity Threat Protection Downloads & Release Notes*
- *ExtremeSecurity Threat Protection Installation and Configuration Guide*

ISW-Series

- *ISW-Series Managed Industrial Ethernet Switch Command Reference Guide*
- *ISW-Series Managed Industrial Ethernet Switch Hardware Installation & User Guide*
- *ISW-Series Managed Industrial Ethernet Switch Quick Installation Guide*
- *ISW-Series Managed Industrial Ethernet Switch Web Configuration Guide*

Extreme Management Center

- *Extreme Management Center User Guide*

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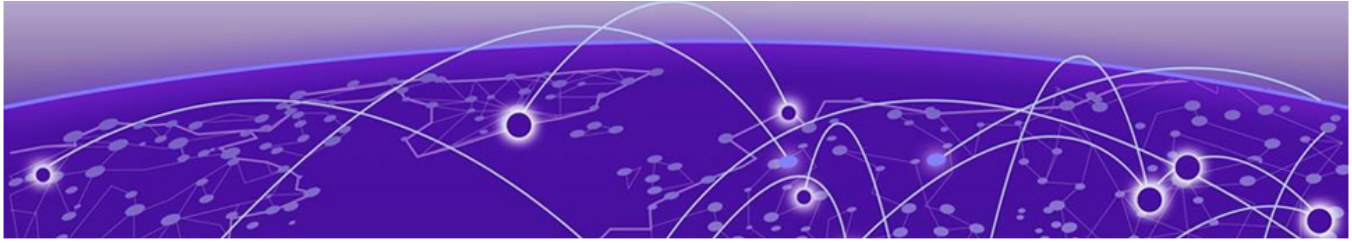


Summit Switches

The ExtremeSwitching switches are compact enclosures 1.75 inches high (1 U). Each switch model provides between 8 and 72 high-density copper or fiber optic ports operating at speeds up to 40 Gbps. Many models also provide combination copper/fiber uplink ports. PoE connections and options for adding 10-Gbps or 40-Gbps uplink connections are available on some models.

Many ExtremeSwitching switches include high-speed stacking interfaces that allow you to connect up to eight switches into a single SummitStack management entity. Models are available for AC or DC power connection; all switches make provision for redundant power supplies. Most models have connections for optional external redundant power supplies: the Summit X450-G2 (PoE models), X460, X460-G2, X480, X650, X670, X670-G2, and X770 switches provide two bays for pluggable power supplies.

Most models are available in versions that are compliant with the Trade Agreements Act (TAA); these versions are identified by a -TAA suffix on the model number. Functionally, the TAA-compliant models are completely equivalent to the matching versions that are not TAA-compliant. In all feature descriptions, references to a specific Summit switch model also apply to the equivalent TAA-compliant model.

This document describes switches that are supported on ExtremeXOS version 16 and earlier. For information about other ExtremeSwitching and ExtremeSwitching switches, refer to the *ExtremeSwitching Hardware Installation Guide for Switches Using ExtremeXOS Version 30*.

The following sections contain general information about the switches:

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 16.2 User Guide* and the *ExtremeXOS 16.2 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 16.2 User Guide*.

Summit X150 Series Switches

The Summit X150 series switches provide 24 or 48 fixed 10/100BASE-T Ethernet ports that deliver high-density copper connectivity at 2.4 Gbps or 4.8 Gbps.

Models are available with PoE and without PoE. Each Summit X150 series switch has two combination ports that provide 10/100/1000 BASE-T or SFP connectivity for 2 Gbps of copper or fiber connectivity. A serial console port on the front panel allows you to connect a terminal and perform local management. On the back of the switch, 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 of the switch provides an AC power input socket and a redundant power connector. The internal power supply operates from 100 VAC to 240 VAC. The switch automatically adjusts to the supply voltage. The redundant power connector allows you to connect the switch to the EPS-160 or EPS-500 external power supply. When a compatible external power supply is used with the Summit X150 series switch, the internal and external power supplies are fully fault tolerant and load-sharing. If one power supply fails, the other power supply will provide sufficient power to operate the switch.

The Summit X150e series switches include the following switch models:

- Summit X150-24t Switch Ports and Slots on page 27
- Summit X150-24t-TAA switch
- Summit X150-24p Switch Ports and Slots on page 28

- Summit X150-24p-TAA switch
- Summit X150-48t Switch Ports and Slots on page 29
- Summit X150-48t-TAA switch

Note

In the descriptions that follow, references to a Summit X150 series model number also apply to the equivalent TAA-compliant switch version.

Summit X150 series switches require an ExtremeXOS version of at least 12.0.2.25 but not greater than 15.3.x.

Summit X150-24t Switch Ports and Slots

The front panel of the Summit X150-24t switch includes:

- Twenty-four fixed autosensing 10/100BASE-T ports (ports 1–24) that provide 2.4 Gbps of high-density copper connectivity.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X150 Series Switch LEDs on page 30.
- Serial console port used to connect a terminal and perform local management.

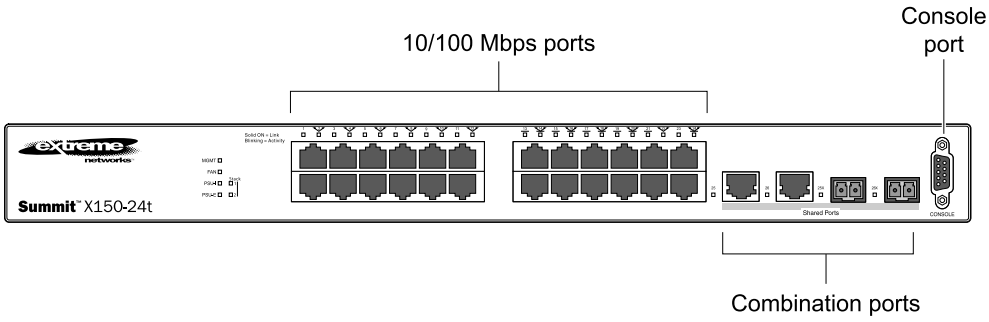


Figure 1: Summit X150-24t Switch Front Panel

The rear panel of the Summit X150-24t switch (shown in Figure 2 on page 28) includes:

- Ethernet management port with associated LEDs .
- Redundant power input connector for optional connection to the EPS-160 External Power Module.

  See EPS-160 External Power Module (with EPS-T) on page 168 for more information. The connecting redundant power supply cable is shipped with the EPS-160 unit.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

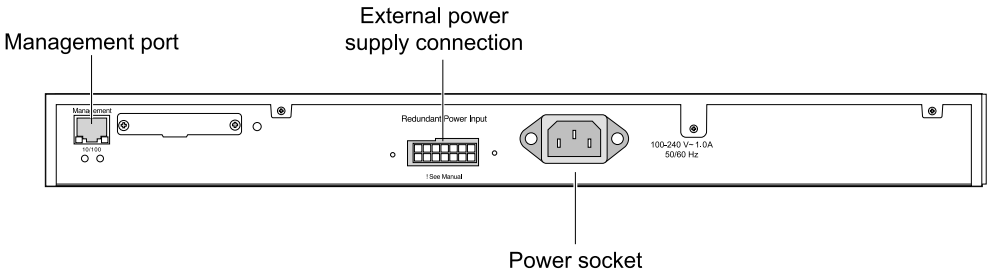


Figure 2: Summit X150-24t Switch Rear Panel

Summit X150-24p Switch Ports and Slots

The front panel of the Summit X150-24p switch includes:

- Twenty-four fixed autosensing 10/100BASE-T PoE ports (ports 1–24). In addition to 4 Gbps of high-density copper connectivity, these ports also provide a full 15.4 Watts of PoE per port.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X150 Series Switch LEDs on page 30.
- Serial console port used to connect a terminal and perform local management.

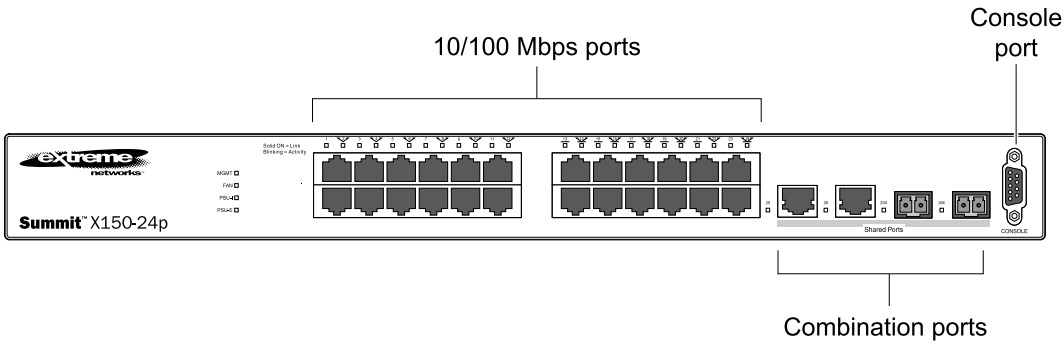


Figure 3: Summit X150-24p Switch Front Panel

The rear panel of the Summit X150-24p switch includes:

- Ethernet management port with associated LEDs.
- Redundant power input connector for optional connection to the EPS-500 External Power Supply (Model No. 10911) with full PoE power support.

  The connecting redundant power supply cable is shipped with the EPS-500 unit. See EPS-500 External Power Supply Unit on page 169 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

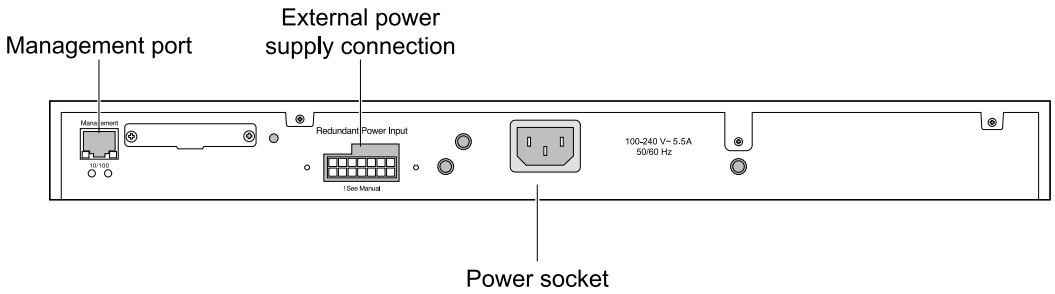


Figure 4: Summit X150-24p Switch Rear Panel

Summit X150-48t Switch Ports and Slots

The front panel of the Summit X150-48t switch includes:

- Forty-eight fixed autosensing 10/100BASE-T ports (ports 1–48) that provide 4.8 Gbps of high-density copper connectivity.
- Two combination ports (ports 49–50) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X150 Series Switch LEDs on page 30.
- Serial console port used to connect a terminal and perform local management.

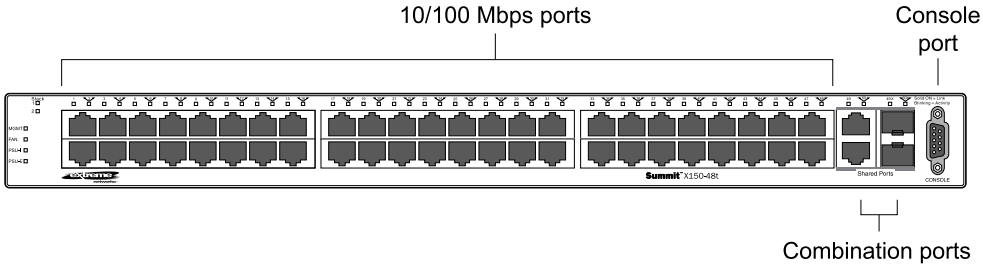


Figure 5: Summit X150-48t Switch Front Panel

The rear panel of the Summit X150-48t switch (Figure 6 on page 30) includes:

- Management port with associated LEDs.
- Redundant power input connector for optional connection to the EPS-160 External Power Module.

  The connecting redundant power supply cable is shipped with the EPS-160 unit. See EPS-160 External Power Module (with EPS-T) on page 168 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

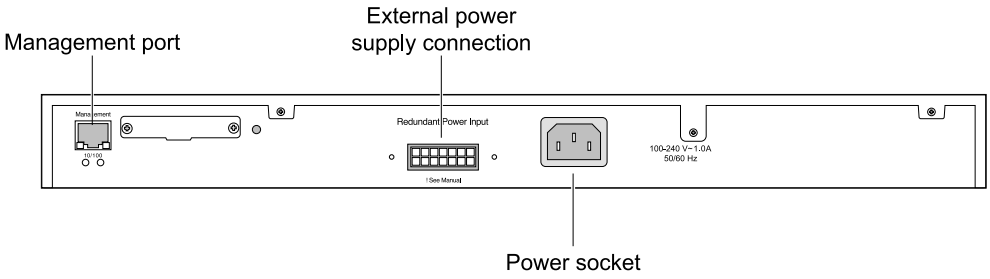


Figure 6: Summit X150-48t Switch Rear Panel

Summit X150 Series Switch LEDs

The following sections describe the meanings of the LEDs on Summit X150 switches.

LEDs on the Summit X150 Series Switches

Table 4: Front Panel

Label or Type	Color/State	Meaning
MGMT	Blinking green (fast)	Power-on self-test (POST) in progress.
	Steady green	POST passed. System is booting image.
	Blinking green (slow)	Normal operation.
	Blinking amber	Switch diagnostics are running. or System is disabled. POST failed or system overheated.
	Off	No external power attached.
FAN	Steady green	Normal operation.
	Blinking amber	Fan failure. Switch will continue to operate unless it overheats.
	Off	No power.
PSU-I (Internal power supply)	Steady green	Normal operation.
	Blinking amber	Failure.
	Off	No power.
PSU-E (External power supply)	Steady green	Normal operation.
	Blinking amber	Failure.
	Off	No external power attached.
Port number 1 – 24 or 1 – 48	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.

Table 4: Front Panel (continued)

Label or Type	Color/State	Meaning
Port number 25, 26 or 49, 50 (Shared ports)	Steady green	Link is OK.
	Blinking green	Activity.
	Off	Link is not present, or port is disabled.

Table 5: Additional Port LED Meanings for PoE Switch: Summit X150-24p

Label or Type	Color/State	Meaning
All front-panel ports	Steady green	Link 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: Rear Panel

Label or Type	Color/State	Meaning
Management Port	Right LED: Steady green	Link is OK.
	Left LED: Blinking green	Activity.
	Both LEDs off	Link is not present.

Summit X250e Series Switches

The Summit X250e series switches provide 24 or 48 Ethernet ports that deliver high-density fast Ethernet connectivity using fixed 10/100/1000BASE-T ports or installable small form pluggable (SFP) optical modules.

Fixed-port models are available either with or without PoE. Each Summit X250e series switch has two combination ports that provide 10/100/1000 BASE-T or SFP connectivity for 2 Gbps of copper or fiber connectivity. 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.

On the back of the switch, two high-speed stacking ports allow you to combine multiple units into a single SummitStack management entity. The rear panel also provides an AC or DC power input socket and a redundant power connector. (See specific switch descriptions for more information about the power options.) The switch automatically adjusts to the supply voltage. The redundant power

connector allows you to connect the switch to the EPS-160, EPS-500, or EPS-150DC external power supply. When a compatible external power supply is used with the Summit X250e series switch, the internal and external power supplies are fully fault tolerant and load-sharing. If one power supply fails, the other power supply will provide sufficient power to operate the switch.

The Summit X250e series switches include the following models:

- Summit X250e-24t Switch Ports and Slots on page 32
- Summit X250e-24t-TAA switch
- Summit X250e-24tDC Switch Ports and Slots on page 33
- Summit X250e-24tDC-TAA switch
- Summit X250e-24x Switch Ports and Slots on page 35
- Summit X250e-24x-TAA switch
- Summit X250e-24xDC Switch Ports and Slots on page 36
- Summit X250e-24xDC-TAA switch
- Summit X250e-24p Switch Ports and Slots on page 37
- Summit X250e-24p-TAA switch
- Summit X250e-48t Switch Ports and Slots on page 38
- Summit X250e-48t-TAA switch
- Summit X250e-48tDC Switch Ports and Slots on page 39
- Summit X250e-48tDC-TAA switch
- Summit X250e-48p Switch Ports and Slots on page 41
- Summit X250e-48p-TAA switch

Note

In the descriptions that follow, references to a Summit X250e series model number also apply to the equivalent TAA-compliant switch version.

Summit X250e series switches require an ExtremeXOS version of at least 12.0.1.11 but not greater than 15.3.x.

Summit X250e-24t Switch Ports and Slots

The front panel of the Summit X250e-24t switch includes:

- Twenty-four fixed autosensing 10/100BASE-T ports (ports 1–24) that provide 2.4 Gbps of high-density copper connectivity.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.

- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

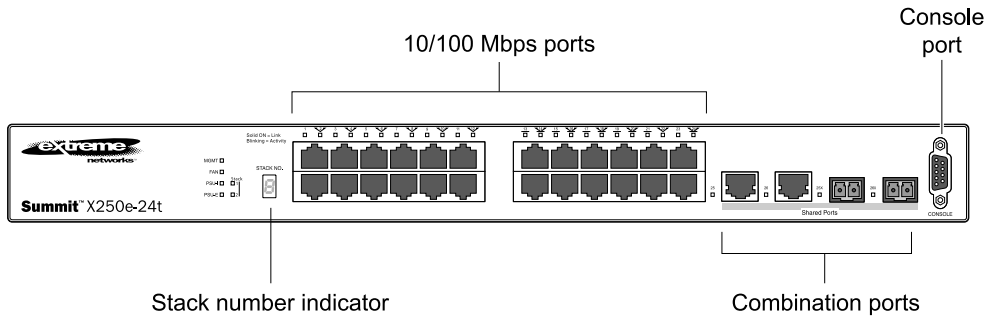


Figure 7: Summit X250e-24t Switch Front Panel

The rear panel of the Summit X250e-24t switch (shown in Figure 8 on page 33) includes:

- Ethernet management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-160 External Power Module.

  The connecting redundant power supply cable is shipped with the EPS-160 unit. See EPS-160 External Power Module (with EPS-T) on page 168 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

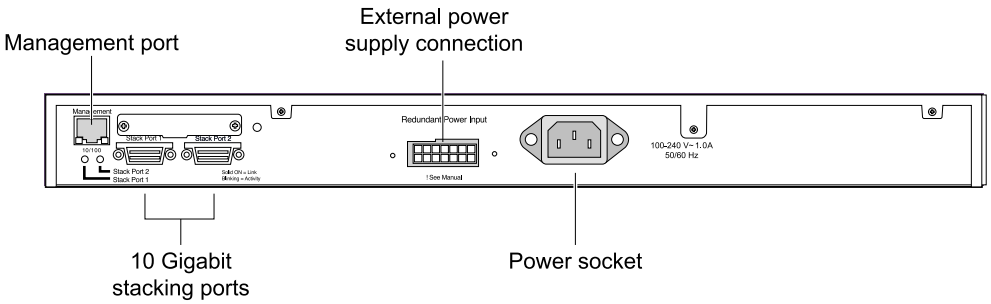


Figure 8: Summit X250e-24t Switch Rear Panel

Summit X250e-24tDC Switch Ports and Slots

The front panel of the Summit X250e-24tDC switch includes:

- Twenty-four fixed autosensing 10/100BASE-T ports (ports 1–24) that provide 2.4 Gbps of high-density copper connectivity.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

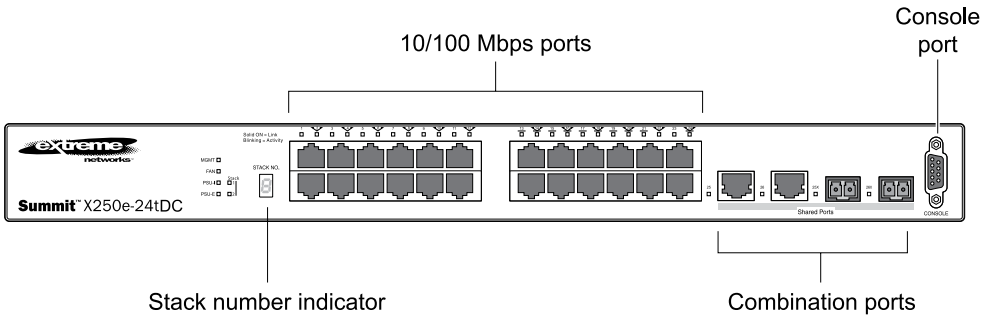


Figure 9: Summit X250e-24tDC Switch Front Panel

The rear panel of the Summit X250e-24tDC switch (shown in Figure 10 on page 34) includes:

- Ethernet management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-150DC External Power Module (Model No. 10909).

  The connecting redundant power supply cable is shipped with the EPS-150DC unit. See EPS-150DC External Power Module (with EPS-T2) on page 167 for more information.
- DC power input socket.

  The internal power supply operates from -36 VDC to -72 VDC.
- Grounding lug.

Note

For centralized DC power connection, this product is intended to be installed in a restricted access location (such as a dedicated equipment room, equipment closet, or central office) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

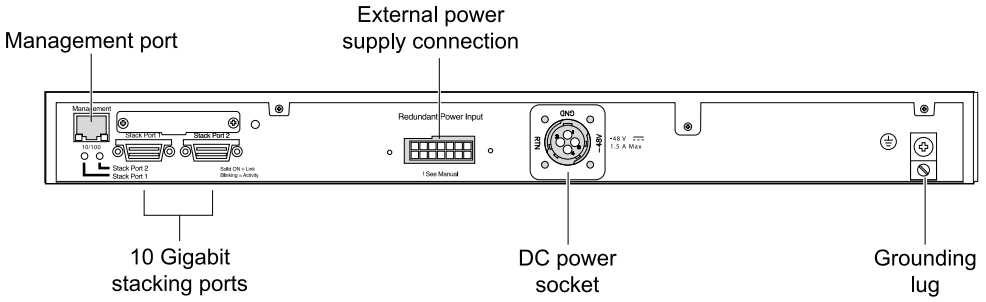


Figure 10: Summit X250e-24tDC Switch Rear Panel

Summit X250e-24x Switch Ports and Slots

The front panel of the Summit X250e-24x switch includes:

- Twenty-four 100BASE-FX ports (ports 1–24) that provide 2.4 Gbps of high-density fiber connectivity.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

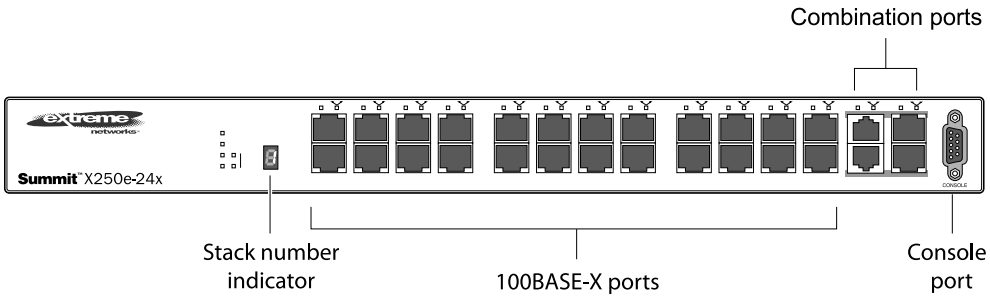


Figure 11: Summit X250e-24x Switch Front Panel

The rear panel of the Summit X250e-24x switch (shown in Figure 12 on page 35) includes:

- Ethernet management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for use with the EPS-160 External Power Module.

  The connecting redundant power supply cable is shipped with the EPS-160 unit. See EPS-160 External Power Module (with EPS-T) on page 168 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

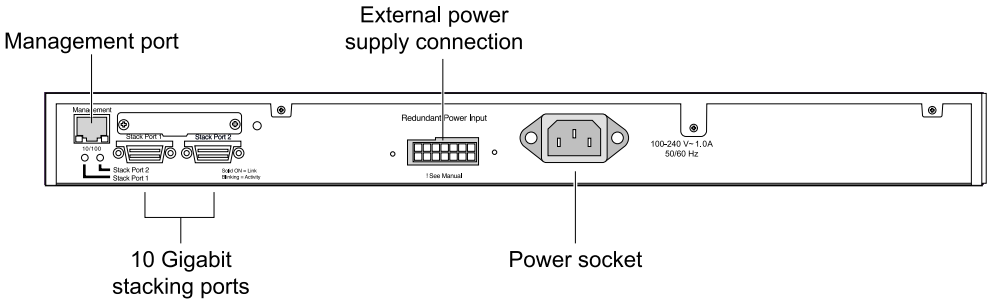


Figure 12: Summit X250e-24x Switch Rear Panel

Summit X250e-24xDC Switch Ports and Slots

The front panel of the Summit X250e-24xDC switch includes:

- Twenty-four 100BASE-FX ports (ports 1–24) that provide 2.4 Gbps of high-density fiber connectivity.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

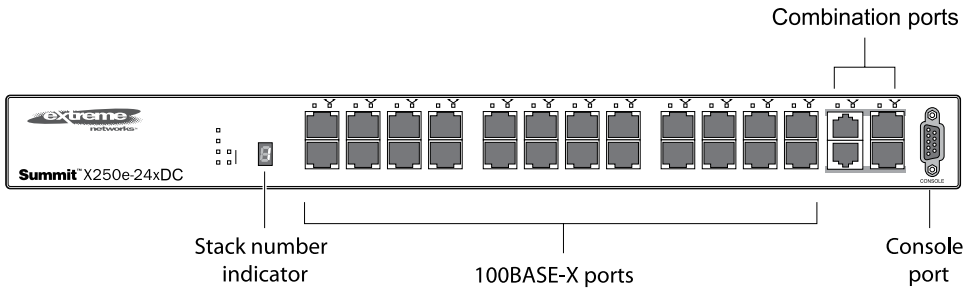


Figure 13: Summit X250e-24xDC Switch Front Panel

The rear panel of the Summit X250e-24xDC switch (Figure 14 on page 37) includes:

- Ethernet management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for use with the EPS-150DC External Power Module (Model No. 10909).

  The connecting redundant power supply cable is shipped with the EPS-150DC unit. See EPS-150DC External Power Module (with EPS-T2) on page 167 for more information.
- DC power input socket.

  The internal power supply operates from -36 VDC to -72 V DC.
- Grounding lug.

Note

For centralized DC power connection, this product is intended to be installed in a restricted access location (such as a dedicated equipment room, equipment closet, or central office) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

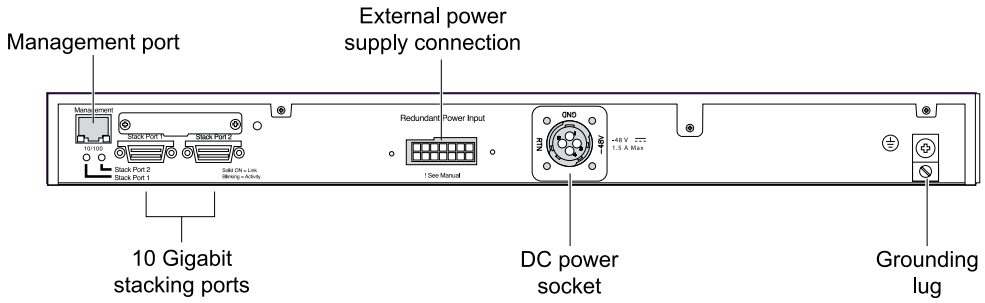


Figure 14: Summit X250e-24xDC Switch Rear Panel

Summit X250e-24p Switch Ports and Slots

The front panel of the Summit X250e-24p switch includes:

- Twenty-four fixed autosensing 10/100BASE-T PoE ports (ports 1–24). In addition to 2.4 Gbps of high-density copper connectivity, these ports also provide a full 15.4 Watts of PoE per port.
- Two combination ports (ports 25–26) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

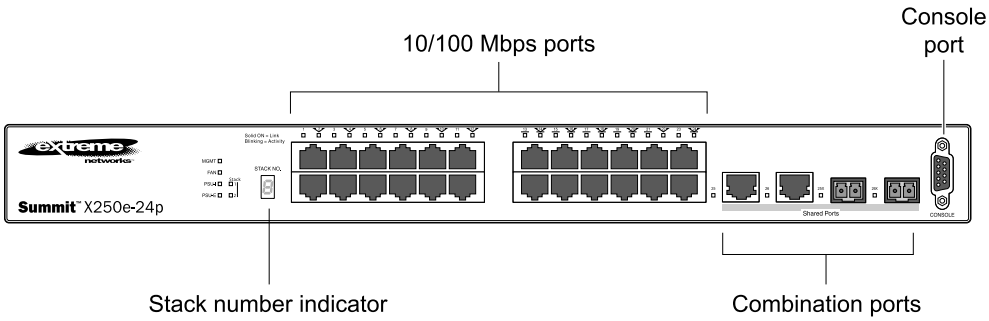


Figure 15: Summit X250e-24p Switch Front Panel

The rear panel of the Summit X250e-24p switch (shown in Figure 16 on page 38) includes:

- Ethernet management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for use with the EPS-500 External Power Supply (Model No. 10911) with full PoE power support.

The connecting redundant power supply cable is shipped with the EPS-500 unit. See EPS-500 External Power Supply Unit on page 169 for more information.

- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

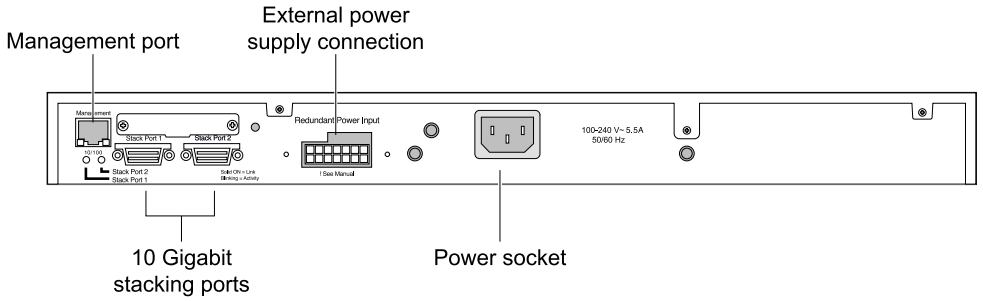


Figure 16: Summit X250e-24p Switch Rear Panel

Summit X250e-48t Switch Ports and Slots

The front panel of the Summit X250e-48t switch includes:

- Forty-eight fixed autosensing 10/100BASE-T ports (ports 1–48) that provide 4.8 Gbps of high-density copper connectivity.
- Two combination ports (ports 49–50) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

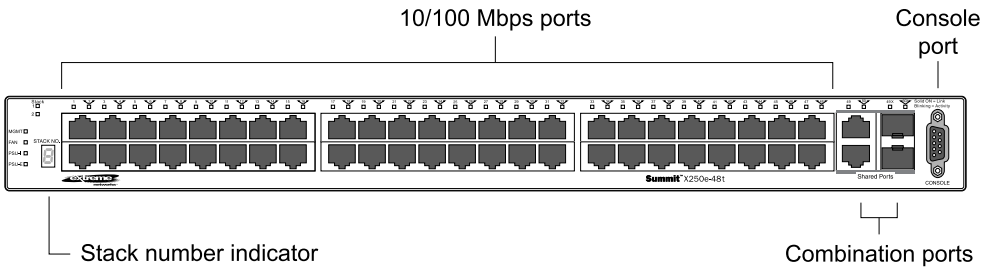


Figure 17: Summit X250e-48t Switch Front Panel

The rear panel of the Summit X250e-48t switch (Figure 18 on page 39) includes:

- Management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-160 External Power Module.

  The connecting redundant power supply cable is shipped with the EPS-160 unit. See EPS-160 External Power Module (with EPS-T) on page 168 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

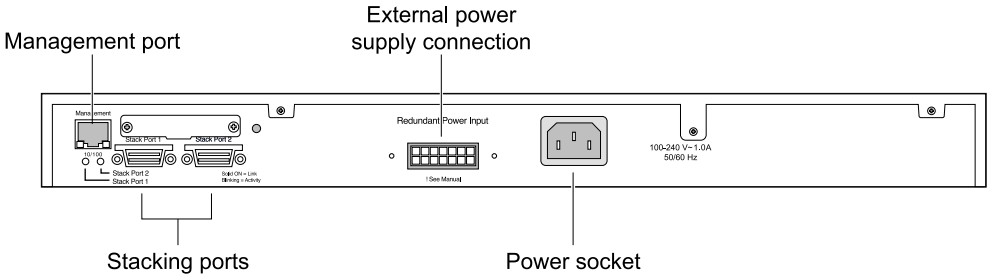


Figure 18: Summit X250e-48t Switch Rear Panel

Summit X250e-48tDC Switch Ports and Slots

The front panel of the Summit X250e-48tDC switch includes:

- Forty-eight fixed autosensing 10/100BASE-T ports (ports 1–48) that provide 4.8 Gbps of high-density copper connectivity.
- Two combination ports (ports 49–50) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

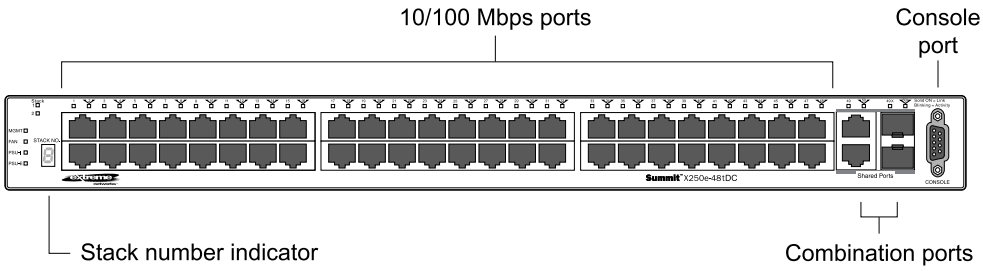


Figure 19: Summit X250e-48tDC Switch Front Panel

The rear panel of the Summit X250e-48tDC switch (shown in Figure 20 on page 40) includes:

- Management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for use with the EPS-150DC External Power Module (Model No. 10909).

  The connecting redundant power supply cable is shipped with the EPS-150DC unit. See EPS-150DC External Power Module (with EPS-T2) on page 167 for more information.
- DC power input socket.

  The internal power supply operates from -36 VDC to -72 VDC.
- Grounding lug.

Note

For centralized DC power connection, this product is intended to be installed in a restricted access location (such as a dedicated equipment room, equipment closet, or central office) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

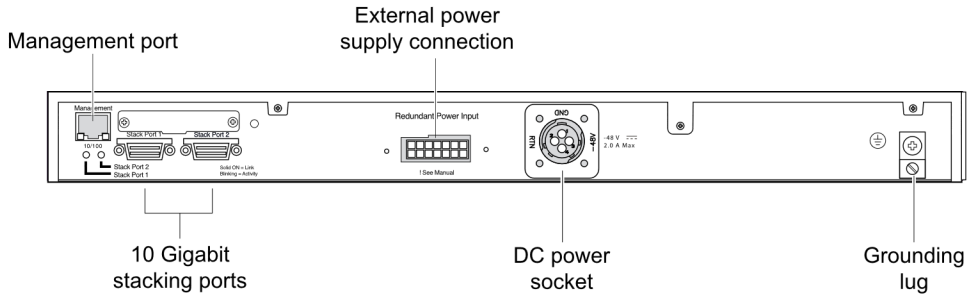


Figure 20: Summit X250e-48tDC Switch Rear Panel

Summit X250e-48p Switch Ports and Slots

The front panel of the Summit X250e-48p switch includes:

- Forty-eight fixed autosensing 10/100BASE-T PoE ports (ports 1–48). In addition to 4.8 Gbps of high-density copper connectivity, these ports provide a full 15.4 Watts of PoE per port when used with the EPS-600LS External Power Module.
- Two combination ports (ports 49–50) using RJ45 connectors and SFPs to provide 2 Gbps of copper or fiber connectivity.

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X250e Series Switch LEDs on page 43.
- Stack number indicator showing the position of this switch in a stacked configuration.
- Serial console port used to connect a terminal and perform local management.

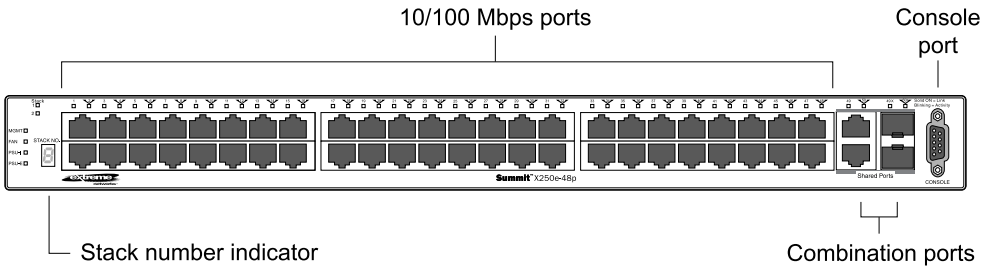


Figure 21: Summit X250e-48p Switch Front Panel

The rear panel of the Summit X250e-48p switch (shown in Figure 22 on page 42) includes:

- Ethernet management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for use with one or more EPS-600LS External Power Modules (Model No. 10913) installed in an EPS-C chassis (Model No. 10912).

  The connecting redundant power supply cable is shipped with the EPS-C chassis. The PoE capability of the Summit X250e-48p switch varies depending on the number of external power modules in use. For more information, see EPS-600LS External Power Module on page 170.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

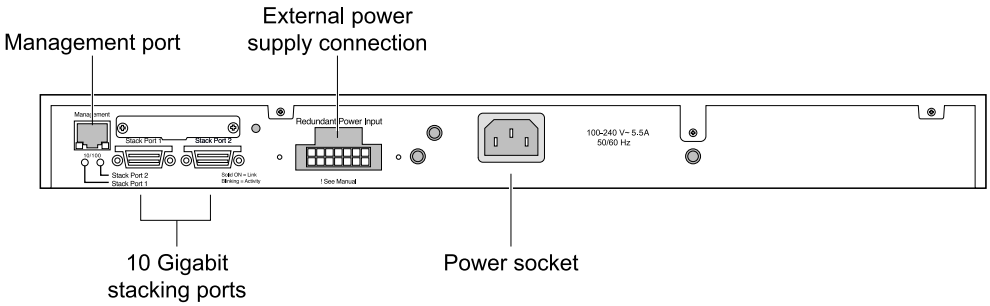


Figure 22: Summit X250e-48p Switch Rear Panel

Summit X250e-48p Power Supplies

The Summit X250e-48p switch is powered by both an internal power supply and an optional external redundant power supply system.

Internal Power Supply

The Summit X250e-48p internal power supply can provide 370 W of PoE power, as follows:

- In a 24-port configuration, it provides 15.4 W to each port.
- In a 48-port configuration or any combination of ports where total PoE power does not exceed 370 watts, it provides 7.7 W to each port.

If the total system demands exceed this power limit, you can specify one of the following:

- Port priorities to identify which ports should be ranked higher when allocating power
- Port disconnect precedence to specify the method of shutting off ports when not enough PoE power is available

Note
For a detailed discussion of these concepts, see the Power over Ethernet section in the *ExtremeXOS 22.6 User Guide*.

External Power Supplies

The EPS-600LS External Power Module provides optional redundant power for the Summit X250e-48p switch.

Through the redundant power input connector on the rear panel, the switch can be powered by one, two, or three external power modules installed in the EPS-C External Power Supply Chassis.

The PoE capability of the Summit X250e-48p varies depending on the number of external power modules in use. The following table summarizes the PoE power behavior for the Summit X250e-48p switch based on the number of power supply modules in use.

Internal Power Supply Status	EPS-600LS (1x)	EPS-600LS (2x)	EPS-600LS (3x)	External Power Supply/Chassis Failed/Disconnected
Internal power supply: Power on	370 W of redundant power	740 W of external power only; internal power supply disabled	740 W of external power only with 2:1 redundancy; internal power supply disabled	370 W of internal power only
Internal power supply: Power Failure	370 W of external power only	740 W of external power only	740 W of external power only with 2:1 redundancy	No PoE power

For specifications and installation instructions for the external power module, see EPS-600LS External Power Module on page 170.

Summit X250e Series Switch LEDs

The following sections describe the meanings of the LEDs on Summit X250e switches.

LEDs on the Summit X250e Series Switches

Table 7: Front Panel

Label or Type	Color/State	Meaning
MGMT	Blinking green (fast)	Power-on self-test (POST) in progress
	Steady green	POST passed. System is booting image.
	Blinking green (slow)	Normal operation.
	Blinking amber	Switch diagnostics are running. or System is disabled. POST failed or system overheated.
	Off	No external power attached
FAN	Steady green	Normal operation
	Blinking amber	Fan failure. Switch will continue to operate unless it overheats.
	Off	No power
PSU-I (Internal power supply)	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-E (External power supply)	Steady green	Normal operation
	Blinking amber	Failure
	Off	No external power attached

Table 7: Front Panel (continued)

Label or Type	Color/State	Meaning
Port number 1 – 24 or 1 – 48	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.
Port number 25, 26 or 49, 50 (Shared ports)	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.
Stack 1, Stack 2	Steady green	Link OK on the indicated stacking port.
	Blinking green	Activity on the indicated stacking port.
Stack Number Indicator	Off	This switch is not in stacking mode.
	Top half of number blinking	This switch is the stack master.
	Lower half of number blinking	This switch is the stack backup.
	Number lights steadily	This switch is a standby switch (neither the master nor the backup).

Table 8: Additional Port LED Meanings for PoE Switches: Summit X250e-24p & Summit X250e-48p

Label or Type	Color/State	Meaning
All front-panel ports	Steady green	Link OK. port not powered.
	Steady amber	Link OK, port is powered, no traffic
	Blinking green	Link OK, transmitting packets, port not powered.
	Blinking amber	Link OK, 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: Rear Panel

Label or Type	Color/State	Meaning
Management Port	Right LED: Steady green	Link OK
	Left LED: Blinking green	Activity
	Both LEDs off	Link is not present.
Stack Port 1, Stack Port 2	Steady green	Link OK
	Blinking green	Activity
	Off	No link

Summit X350 Series Switches

The Summit X350 series switches provide 24 or 48 Ethernet ports that deliver high-density fast Ethernet connectivity using fixed 10/100/1000BASE-T ports.

Each Summit X350 series switch has four combination ports that provide 10/100/1000 BASE-T or SFP connectivity for 2 Gbps of copper or fiber connectivity. 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 of the switch has an option slot to accommodate one of the following Summit port option cards:

- Summit XGM2-2xf option card, which allows you to add one or two 10-gigabit XFP modules.
- Summit XGM2-2xn option card, which allows you to add one or two 10-gigabit XFP modules.
- Summit XGM2-2bt option card, which allows you to add one or two fixed 10GBASE-T ports.
- Summit XGM2-2sf option card, which allows you to add one or two 10-gigabit SFP+ modules.

For option card installation instructions, see Installing Expansion Modules on page 411.

Power connectors on the rear panel of the switch include an AC power input socket and a redundant power connector. The internal AC power supply operates from 100 VAC to 240 VAC. The switch automatically adjusts to the supply voltage. The redundant power connector allows you to connect the switch to the EPS-500 external power supply. When a compatible external power supply is used with the Summit X350 series switch, the internal and external power supplies are fully fault tolerant and load-sharing. If one power supply fails, the other power supply provides sufficient power to operate the switch.

The Summit X350 series switches include the following models:

- Summit X350-24t Switch Ports and Slots on page 46
- Summit X350-24t-TAA switch
- Summit X350-48t Switch Ports and Slots on page 47
- Summit X350-48t-TAA switch

Note

In the descriptions that follow, references to a Summit X350 series model number also apply to the equivalent TAA-compliant switch version.

Summit X350 series switches require an ExtremeXOS version of at least 12.0.3.16 but not greater than 15.3.x.

Summit X350-24t Switch Ports and Slots

The front panel of the Summit X350-24t switch includes:

- Twenty fixed autosensing 10/100/1000BASE-T ports (ports 1–20) that provide 20 Gbps of high-density copper connectivity
- Four combination ports (ports 21-24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPS, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X350 Series Switch LEDs on page 49.
- Serial console port used to connect a terminal and perform local management.

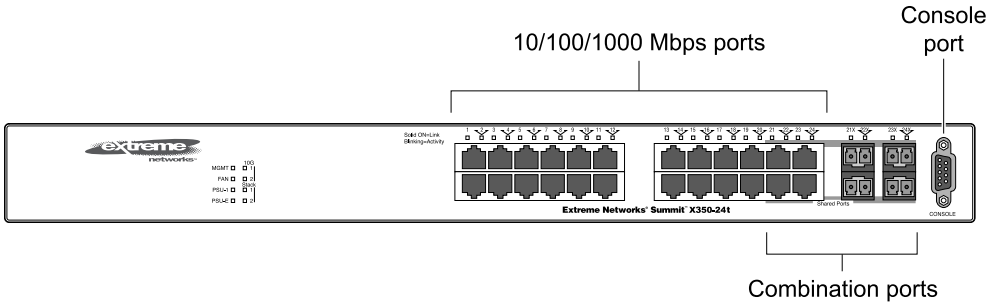


Figure 23: Summit X350-24t Switch Front Panel

The rear panel of the Summit X350-24t switch (as shown in Figure 24 on page 47) includes a slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 10: Port Option Cards for Summit X350 Series Switches

Option Card Model	Type of Added Ports	For More Information, see . . .
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

The rear panel of the Summit X350-24t switch also includes:

- Management port with associated LEDs.
- Redundant power input connector for optional connection to the EPS-500 External Power Module (Model No. 10907).

  The connecting redundant power supply cable is shipped with the EPS-500 unit. See EPS-500 External Power Supply Unit on page 169 for more information.
- AC power input socket.

The internal power supply operates from 100 VAC to 240 VAC.

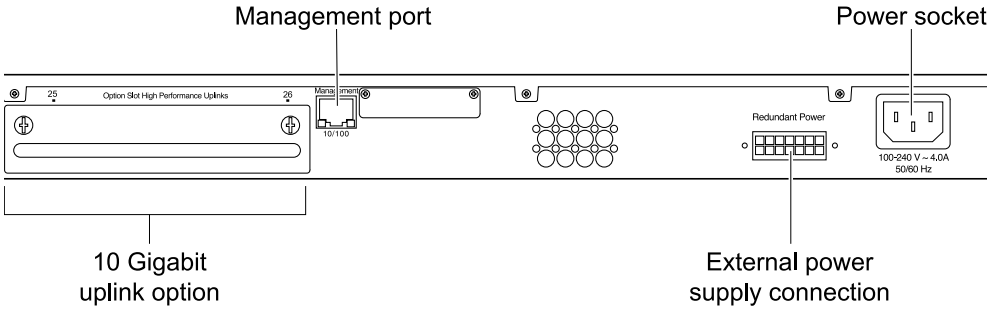


Figure 24: Summit X350-24t Switch Rear Panel

Summit X350-48t Switch Ports and Slots

The front panel of the Summit X350-48t switch includes:

- Forty-four fixed autosensing 10/100/1000 BASE-T ports (ports 1–44) that provide 44 Gbps of high-density copper connectivity.
- Four combination ports (ports 45–48) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X350 Series Switch LEDs on page 49.
- Serial console port used to connect a terminal and perform local management.

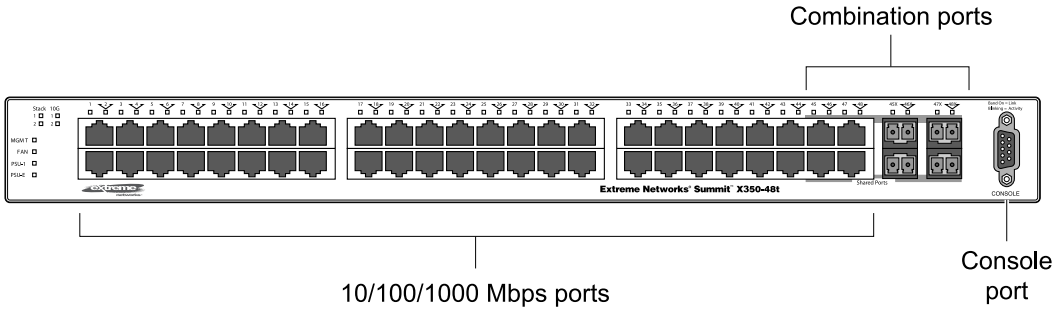


Figure 25: Summit X350-48t Switch Front Panel

The rear panel of the Summit X350-48t switch includes a slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 11: Port Option Cards for Summit X350 Series Switches

Option Card Model	Type of Added Ports	For More Information, see . . .
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

The rear panel of the Summit X350-48t switch also includes:

- Management port with associated LEDs.
- Redundant power input connector for optional connection to the EPS-500 External Power Supply Unit (Model No. 10911).

  The connecting redundant power supply cable is shipped with the EPS-500 power supply. See EPS-500 External Power Supply Unit on page 169 for more information.
- AC power input socket.

  The internal power supply operates from 100 VAC to 240 VAC.

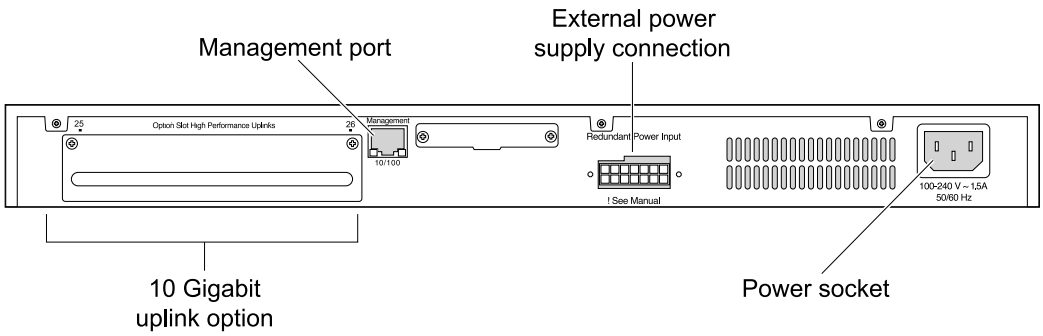


Figure 26: Summit X350-48t Switch Rear Panel

Summit X350 Series Switch LEDs

The following sections describe the meanings of the LEDs on Summit X350 switches.

Table 12: Front Panel

Label or Type	Color/State	Meaning
MGMT	Blinking green (fast)	Power-on self-test (POST) in progress.
	Steady green	POST passed. System is booting image.
	Blinking green (slow)	Normal operation
	Blinking amber	Switch diagnostics are running. or System is disabled. POST failed or system overheated.
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-I (Internal power supply)	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-E (External power supply)	Steady green	Normal operation
	Blinking amber	Failure
	Off	No external power attached.

Table 13: Front-panel Port LEDs

Label or Type	Color/State	Meaning
Ethernet Ports 1 – 24 or 1 – 48 (21 – 24 and 45 – 48 are shared ports)	Steady green	Link OK
	Blinking green	Activity
	Off	Link is not present. or Port is disabled.

Table 14: Rear Panel

Label or Type	Color/State	Meaning
Management Port	Steady green	Link OK
	Blinking green	Activity
	Off	Link is not present.

Table 14: Rear Panel (continued)

Label or Type	Color/State	Meaning
SFP+ 10G Port (on installed option card)	Steady green	Link OK
	Blinking green	Activity
	Off	Link down
XFP 10G Port (on installed option card)	Steady green	Link OK
	Blinking green	Activity
	Off	Link down

Summit X430 Series Switches

The Summit X430 series switches provide 8, 24, or 48 Ethernet ports that deliver high-density fast Ethernet or Gigabit Ethernet connectivity using fixed 10/100/1000Base-T copper or POE+ ports, plus four 100/1000Base-X fiber ports via SFP modules on some models.

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 Summit X430 series switches include the following models:

- Summit X430-8p switch
- Summit X430-24t switch
- Summit X430-24p switch
- Summit X430-48t switch

Summit X430-24t and X430-48t switches require an ExtremeXOS version of at least 16.3.2 but not greater than 16.x.

Summit X430-8p and X430-24p switches require an ExtremeXOS version of at least 15.5.2 but not greater than 16.x.

Summit X430-8p Switch Ports and Slots

The front panel of the Summit X430-8p switch includes:

- Eight fixed autosensing 10/100/1000BASE-T ports (ports 1–8) that provide 8 Gbps of high-density copper connectivity. In addition, all of these ports (ports 1-8) also support the POE protocol IEEE802.af and POE+ protocol IEEE 802.at standard. Using the POE protocol, the switch can provide 15.4 Watts of power on a single port up to a total power budget of 60 Watts. Using the POE+

protocol, the switch can provide 30 Watts of power on a single port up to a total power budget of 60 Watts.

Note
Up to 90 watts of PoE power can be configured on the switch if it is used standalone and not in a rack.

- Two unpopulated 1000BASE-X SFP ports (ports 9–10) that provide 2 Gbps of fiber connectivity.

Note
All the eight 10/100/1000BASE-T ports and all of the 1000BASE-X SFP ports can be used simultaneously.

For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.

- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X430 Series Switch LEDs on page 55.

Note
If you are desktop mounting a Summit X430-8p switches you must use the four rubber pads to maintain sufficient airflow around the unit See Installing Summit Switches in Desktop or Free-Standing Mode on page 325 for installation instructions.

Note
If you are rack mounting Summit X430-8p switches, you must use special "keep out" rack mounting hardware. Rack mounting hardware must be ordered separately and you must reserve at least 2 RU of space for the unit. For installation instructions, see Installing a Summit X430-8p or X440-8t Switch in a Rack on page 314.

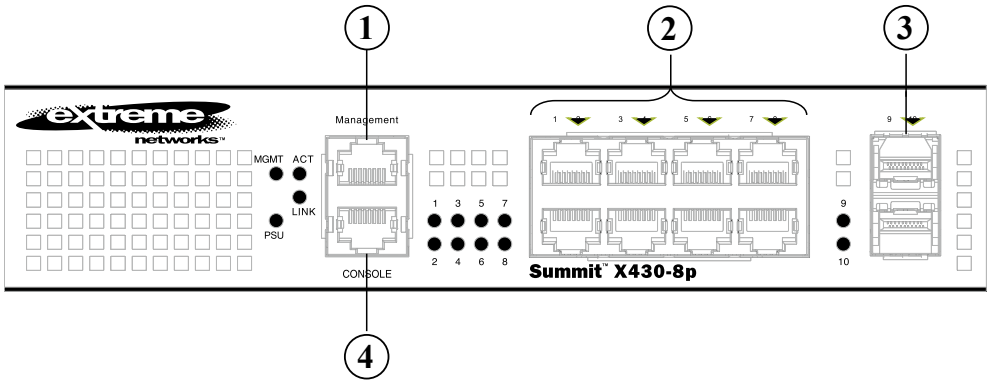


Figure 27: Summit X430-8p Switch Front Panel

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

The rear panel of the Summit X430-8p switch includes:

- AC power input socket

  The internal AC power supply operates from 100 VAC to 240 VAC.

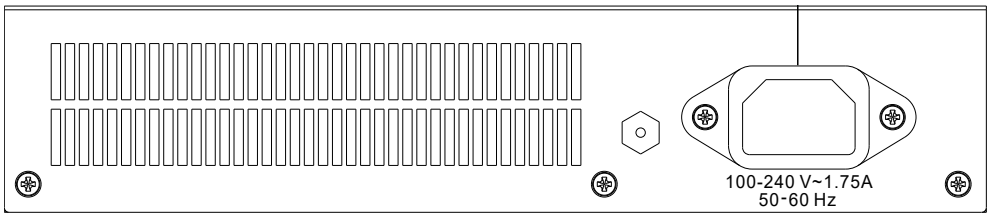


Figure 28: Summit X430-8p Switch Rear Panel

1 = AC power input connector

Summit X430-24t Switch Ports and Slots

The front panel of the Summit X430-24t switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity.
- Four unpopulated 1000BASE-X SFP ports (ports 25–28) that provide 4 Gbps of fiber connectivity.

  Note
  All of the 10/100/1000BASE-T ports and four 1000BASE-X SFP ports can be used simultaneously.

  For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X430 Series Switch LEDs on page 55.

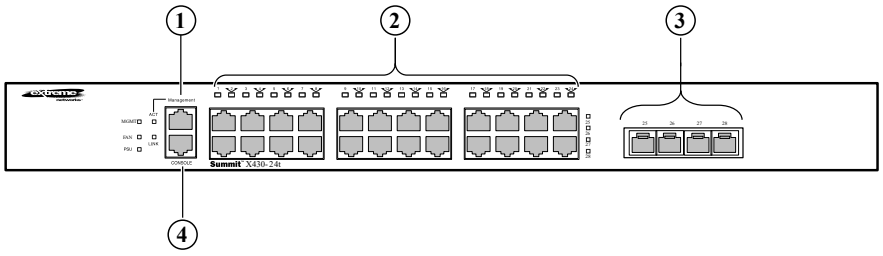


Figure 29: Summit X430-24t Switch Front Panel

1 = Ethernet management port	3 = SFP ports

2 = 10/100/1000BASE-T ports	4 = Console port

The rear panel of the Summit X430-24t switch (shown in Figure 30) includes:

- AC power input socket

  The internal AC power supply operates from 100 VAC to 240 VAC.

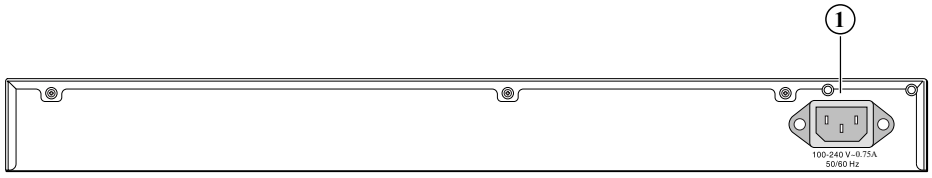


Figure 30: Summit X430-24t Switch Rear Panel

1 = AC power input connector

Summit X430-24p Switch Ports and Slots

The front panel of the Summit X430-24p switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity. In addition, all of these ports (ports 1-24) also support the POE protocol IEEE802.af and POE+ protocol IEEE 802.at standard. Using the POE protocol, the switch can provide 15.4 Watts of power on a single port up to a total power budget of 370 Watts. Using the POE+ protocol, the switch can provide 30 Watts of power on a single port up to a total power budget of 370 Watts.
- Four unpopulated 1000BASE-X SFP ports (ports 25–28) that provide 4 Gbps of fiber connectivity.

  Note
  All the twenty-four 10/100/1000BASE-T ports and all four of the 1000BASE-X SFP ports can be used simultaneously.

  For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X430 Series Switch LEDs on page 55.

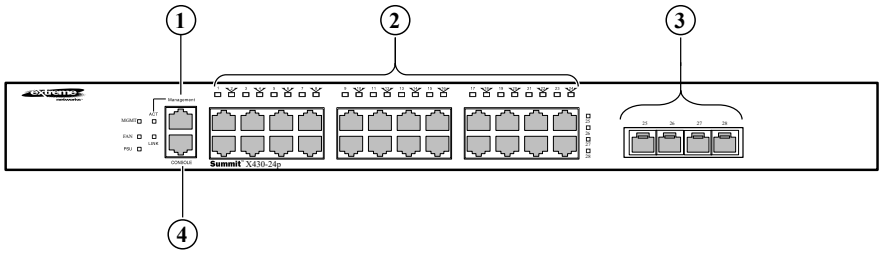


Figure 31: Summit X430-24p Switch Front Panel

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

The rear panel of the Summit X430-24p switch (shown in Figure 32) includes:

- AC power input socket

  The internal AC power supply operates from 100 VAC to 240 VAC.

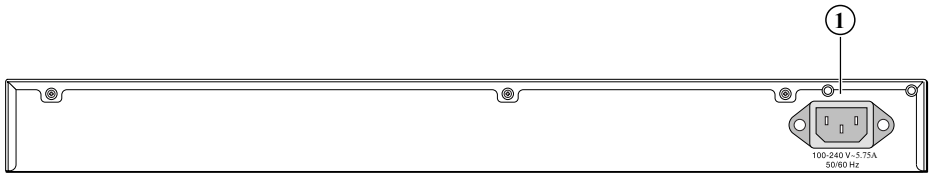


Figure 32: Summit X430-24p Switch Rear Panel

1 = AC power input connector

Summit X430-48t Switch Ports and Slots

The front panel of the Summit X430-48t switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T ports (ports 1–48) that provide 48 Gbps of high-density copper connectivity.
- Four 1000BASE-X SFP ports (ports 49–52) that provide 4 Gbps of fiber connectivity.

  Note
  All the forty-eight 10/100/1000BASE-T ports and all four of the 1000BASE-X SFP ports can be used simultaneously.

  For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X430 Series Switch LEDs on page 55.

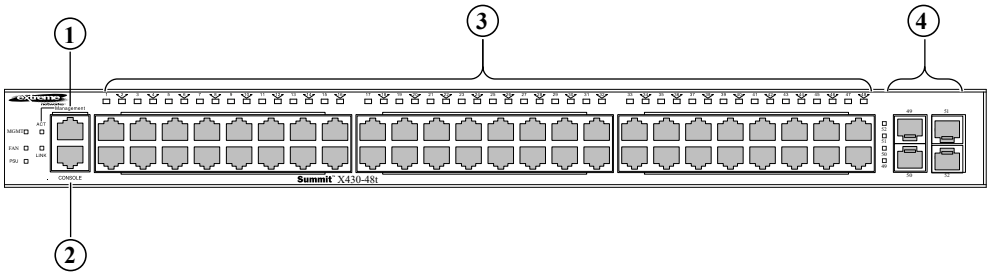


Figure 33: Summit X430-48t Switch Front Panel

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

The rear panel of the Summit X430-48t switch (shown in Figure 34) includes:

- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

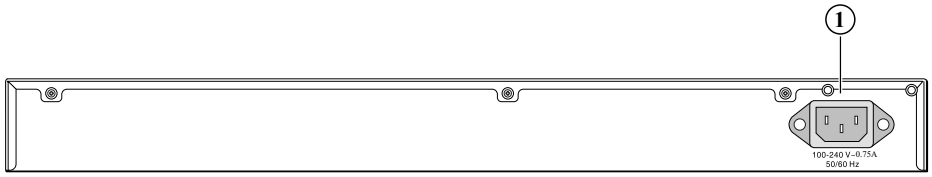


Figure 34: Summit X430-48t Switch Rear Panel

1 = AC power input connector

Summit X430 Series Switch LEDs

The following table describes the meanings of the LEDs on Summit X430 switches.

Table 15: X430 Front Panel LEDs

Label or Type	Color/State	Meaning
MGMT	Blinking green	Power-on self-test (POST) in progress.
	Steady green	POST passed. Normal operation.
	Blinking amber	System is disabled. POST failed or system overheated.
	Off	No external power attached.

Table 15: X430 Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
FAN	Steady green	Normal operation, fan is good.
	Blinking amber	Fan failure. Switch will continue to operate unless it overheats.
	Off	No power
PSU (Internal power supply)	Steady green	Normal operation.
	Off	No power is attached/Power failure.
Port number 1-8 or 1 – 24 or 1 – 48	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Solid Amber (POE only)	POE delivering with Ethernet link OK.
	Fast Blinking Amber (POE only)	POE delivering and port is transmitting packets.
	Slow Blinking Amber (POE only)	POE fault detected.
	Off	Link is not present, or port is disabled.
Port number 9-10 or 25 – 28 or 49 – 52 (SFP ports)	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.

Summit X440 Series Switches

The Summit X440 series switches provide 8, 24, or 48 Ethernet ports that deliver high-density fast Ethernet or Gigabit Ethernet connectivity using fixed 10/100/1000BASE-T or 100/1000 BASE-X ports.

Additional ports on various models include the following:

Table 16: X440 Series Switches and Port Types

	10/100/1000BASE-T RJ45	10/100/1000BASE-T POE+ RJ45	100/1000BASE-X SFP	10G BASE-X SFP+
X440-8t	8		4 (unpopulated)	
X440-8p		8	4 (unpopulated)	
X440-24t X440-24tDC	24 (four are combo ports)		4 (unpopulated combo ports)	
X440-24p		24 (four are combo ports)	4 (unpopulated combo ports)	
X440-24x	4 (four are combo ports)		24 (unpopulated) (four are combo ports)	

Table 16: X440 Series Switches and Port Types (continued)

	10/100/1000BASE-T RJ45	10/100/1000BASE-T POE+ RJ45	100/1000BASE-X SFP	10G BASE-X SFP+
X440-L2-24t	24 (four are combo ports)		4 (unpopulated combo ports)	
X440-24t-10G	24		4 (unpopulated combo ports)	2 (unpopulated)
X440-24p-10G		24 (four are combo ports)	4 (unpopulated combo ports)	2 (unpopulated)
X440-24x-10G	4 (combo ports)		24 (unpopulated) (four are combo ports)	2 (unpopulated)
X440-48t X440-48tDC	48 (four are combo ports)		4 (unpopulated combo ports)	
X440-48p		48 (four are combo ports)	4 (unpopulated combo ports)	
X440-L2-48t	48 (four are combo ports)		4 (unpopulated combo ports)	
X440-48t-10G	48 (two are combo ports)		2 (unpopulated combo ports)	2 (unpopulated)
X440-48p-10G		48 (two are combo ports)	2 (unpopulated combo ports)	2 (unpopulated)

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.

Most models have two high-speed stacking ports that allow you to combine multiple units into a single SummitStack management entity. On the 8-port models, the stacking ports are on the front panel. On the 24 and 48 port 10-G models, the SFP+ 10G ports on the front panel can be used as alternate stacking ports. On all other Summit X440 series switches (except the x440-L2-24t and x440-L2-48t which do not have stacking capability), the stacking ports are on the back panel. Stacking port locations are listed in the following table.

X440 Switch Type	Stacking Port type	Port Location
8p and 8t	High-speed stacking port	Front panel
24p, 24t, 24tDC, 24x, 48p, 48t, 48tDC	High-speed stacking port	Rear panel
24p-10G, 24t-10G, 24x-10G 48p-10G, 48t-10G	SFP+	Front panel

Note

The X440-L2-24t and the X440-L2-48t do not have stacking capability.

The rear panel provides an AC power input socket or DC input connector; 24-port and 48-port switch models also include a redundant power connector. The switch automatically adjusts to the supply voltage. The redundant power connector allows you to connect the switch to the EPS-C2 external power system. When a compatible external power supply is used with the Summit X440 series 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.

Most Summit switches have fans that can change speeds depending upon operating conditions. See Summit X440 Series Switches Technical Specifications on page 543 for specifications.

The Summit X440 series switches include the following models:

- Summit X440-8t Switch Ports and Slots on page 58
- Summit X440-8p Switch Ports and Slots on page 60
- Summit X440-24t Switch Ports and Slots on page 61
- Summit X440-24tDC Switch Ports and Slots on page 62
- Summit X440-24t-10G Switch Ports and Slots on page 63
- Summit X440-L2-24t Switch Ports and Slots on page 64
- Summit X440-24x Switch Ports and Slots on page 65
- Summit X440-24x-10G Switch Ports and Slots on page 67
- Summit X440-24p Switch Ports and Slots on page 68
- Summit X440-24p-10G Switch Ports and Slots on page 69
- Summit X440-48t Switch Ports and Slots on page 71
- Summit X440-48tDC Switch Ports and Slots on page 72
- Summit X440-48t-10G Switch Ports and Slots on page 73
- Summit X440-L2-48t Switch Ports and Slots on page 74
- Summit X440-48p Switch Ports and Slots on page 76
- Summit X440-48p-10G Switch Ports and Slots on page 77

The minimum required ExtremeXOS version for Summit X440 series switches varies by model. (See the *Extreme Hardware/Software Compatibility and Recommendation Matrices* for details.) The ExtremeXOS version cannot be greater than 16.x.

Summit X440-8t Switch Ports and Slots

The front panel of the Summit X440-8t switch includes:

- Eight fixed autosensing 10/100/1000BASE-T ports (ports 1–8) that provide 8 Gbps of high-density copper connectivity
- Four unpopulated SFP ports (ports 9–12) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.
- Two high-performance stacking ports with associated LEDs
- Ethernet management port.

- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

Note

If you are desktop mounting a Summit X440-8t switch, you must use the four rubber pads to maintain sufficient airflow around the unit See Installing Summit Switches in Desktop or Free-Standing Mode on page 325 for installation instructions.

Note

If you are rack mounting Summit X440-8t switches, you must use special "keep out" rack mounting hardware. The rack mounting hardware is included with the unit. You must reserve 3 RU of space for the installation. See Installing a Summit X430-8p or X440-8t Switch in a Rack on page 314 for installation instructions.

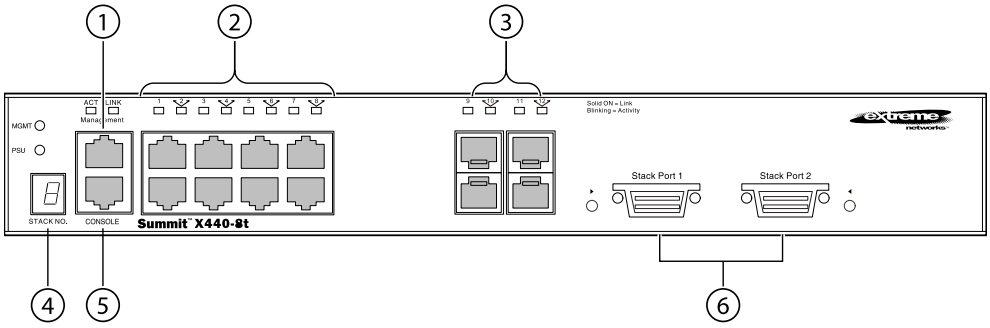


Figure 35: Summit X440-8t Switch Front Panel

1 = Ethernet management port	4 = Stack number indicator
2 = 10/100/1000BASE-T ports	5 = Console port
3 = SFP ports	6 = Stacking Ports

The rear panel of the Summit X440-8t switch provides an AC power input socket. The internal AC power supply operates from 100 VAC to 240 VAC.

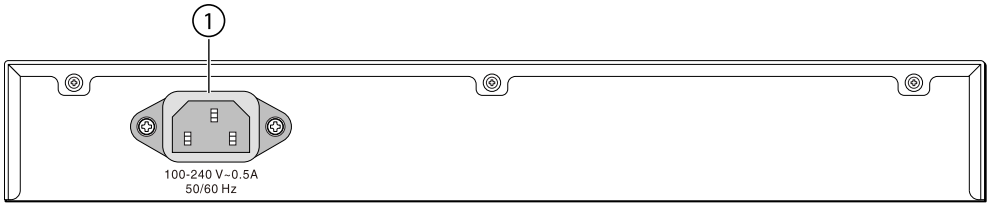


Figure 36: Summit X440-8t Switch Rear Panel

1 = AC power input connector

Summit X440-8p Switch Ports and Slots

The front panel of the Summit X440-8p switch includes:

- Eight fixed autosensing 100/1000BASE-T PoE+ ports (ports 1–8). In addition to 8 Gbps of high-density copper connectivity, these ports also supports the PoE+ IEEE 802.3a standard and provide up to 30 Watts of power per port up to a total power budget of 170 Watts.
- Four unpopulated SFP ports (ports 9–12) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Two high-performance stacking ports with associated LEDs.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

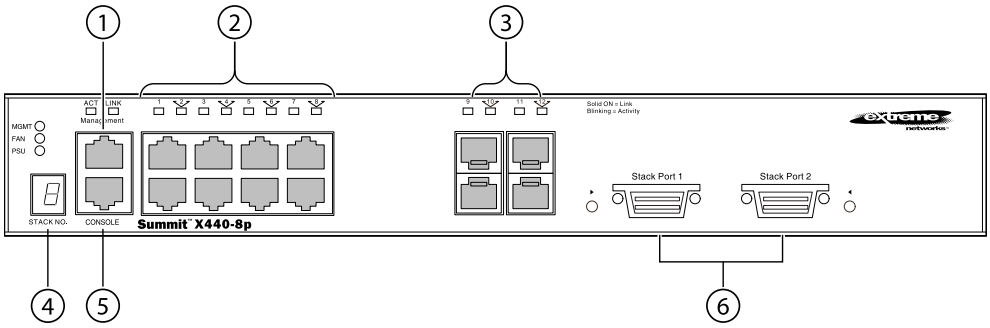


Figure 37: Summit X440-8p Switch Front Panel

1 = Ethernet management port	4 = Stack number indicator
2 = 10/100/1000BASE-T PoE ports	5 = Console port
3 = SFP ports	6 = Stacking Ports

The rear panel of the Summit X440-8t switch provides an AC power input socket. The internal AC power supply operates from 100 VAC to 240 VAC.

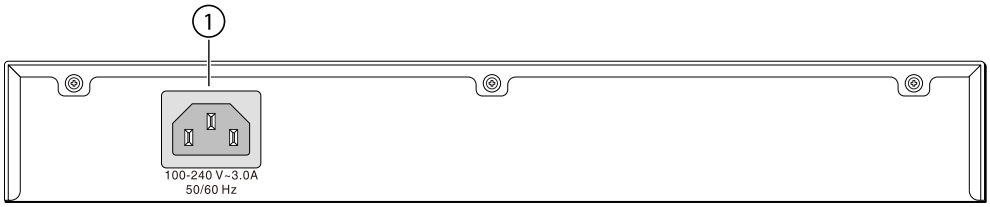


Figure 38: Summit X440-8p Switch Rear Panel

1 = AC power input connector

Summit X440-24t Switch Ports and Slots

The front panel of the Summit X440-24t switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity
- Four unpopulated SFP ports (ports 21–24) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

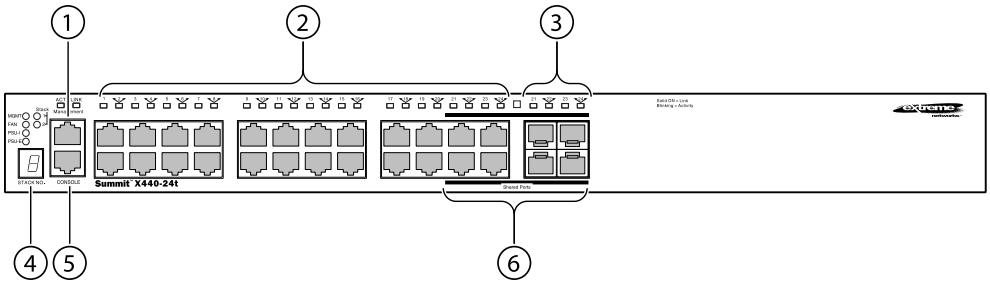


Figure 39: Summit X440-24t Switch Front Panel

1 = Ethernet management port	4 = Stack number indicator
2 = 10/100/1000BASE-T ports	5 = Console port
3 = SFP ports	6 = Combination ports

The rear panel of the Summit X440-24t switch (shown in Figure 40 on page 62) includes:

- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-C2 External Power Module.

  The connecting redundant power supply cable is shipped with the power module unit. For more information, see Installing an RPS-500p Redundant Power Supply on page 394 or Installing an EPS-C2 Power Supply on page 378.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

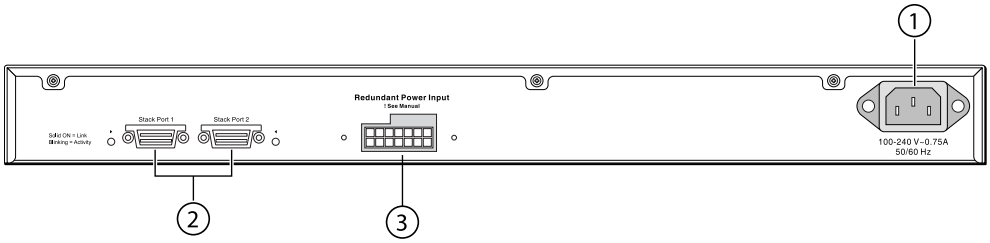


Figure 40: Summit X440-24t Switch Rear Panel

1 = AC power input connectors	3 = Redundant power connector
2 = Stacking ports	

Summit X440-24tDC Switch Ports and Slots

The front panel of the Summit X440-24tDC switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 21–24) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Interface Modules Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

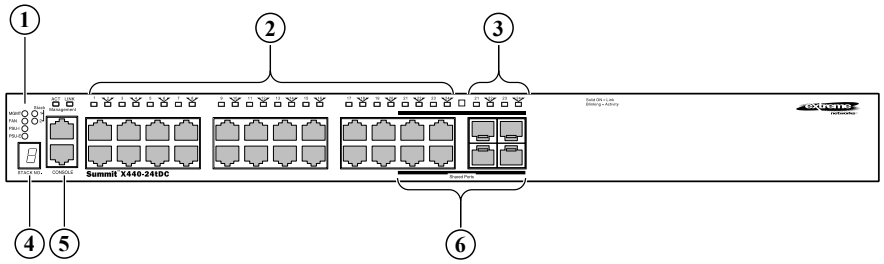


Figure 41: Summit X440-24tDC Switch Front Panel

1 = LEDs	4 = Stack number indicator
2 = 10/100/1000BASE-T ports	5 = Ethernet management port/Console port

3 = SFP ports	6 = Combination ports

The rear panel of the Summit X440-24tDC switch (shown in Figure 42 on page 63) includes:

- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-C2 External Power Module.

  The connecting redundant power supply cable is shipped with the power module unit. For more information, see Installing an RPS-500p Redundant Power Supply on page 394 or Installing an EPS-C2 Power Supply on page 378.
- DC power input connectors. The DC power supply operates at -48V.

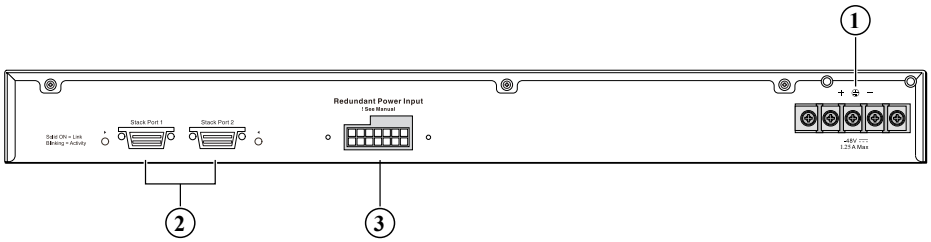


Figure 42: Summit X440-24tDC Switch Rear Panel

1 = DC power input connectors	3 = Redundant power connector
2 = Stacking ports	

Summit X440-24t-10G Switch Ports and Slots

The front panel of the Summit X440-24t-10G switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 21–24) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Two unpopulated SFP+ ports (ports 25 and 26) that provide 20 Gbps of fiber connectivity.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

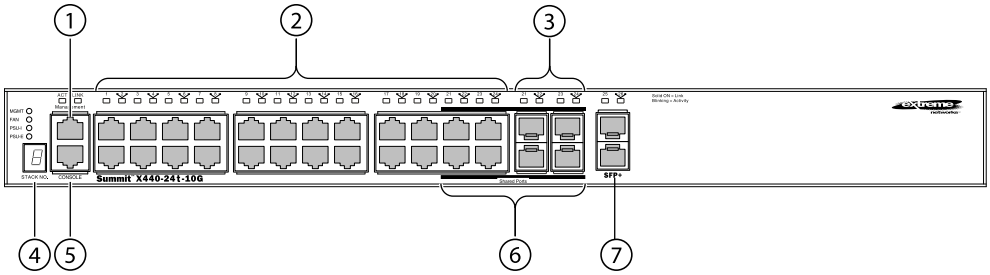


Figure 43: Summit X440-24t-10G Switch Front Panel

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

The rear panel of the Summit X440-24t-10G switch (Figure 44 on page 64) includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module.

  The connecting redundant power supply cable is shipped with the power module unit. For more information, see Installing an RPS-500p Redundant Power Supply on page 394 or Installing an EPS-C2 Power Supply on page 378.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

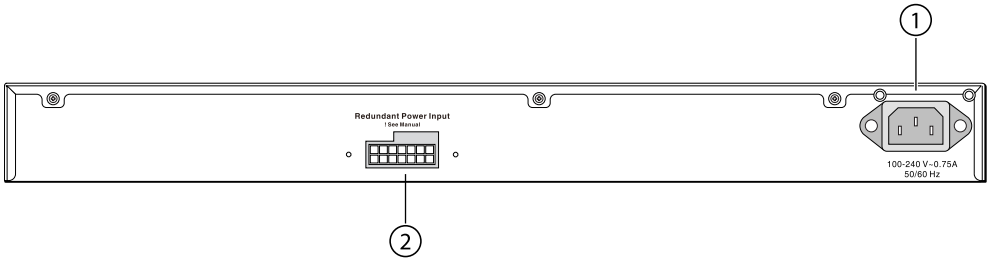


Figure 44: Summit X440-24t-10G Switch Rear Panel

1 = AC power input connector	2 = Redundant power connector

Summit X440-L2-24t Switch Ports and Slots

The front panel of the Summit X440-L2-24t switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 21–24) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

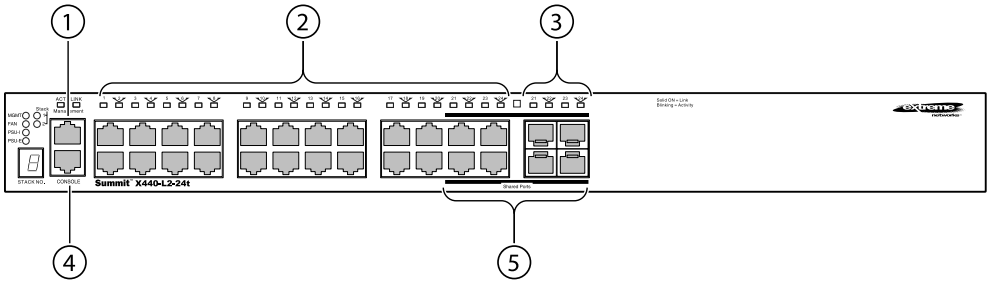


Figure 45: Summit X440-L2-24t Switch Front Panel

1 = Ethernet management port	4 = Console port
2 = 10/100/1000BASE-T ports	5 = Combination ports
3 = SFP ports	

The rear panel of the Summit X440-L2-24t switch (shown in Figure 46 on page 65) includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module.

  The connecting redundant power supply cable is shipped with the power module unit. For more information, see Installing an RPS-500p Redundant Power Supply on page 394 or Installing an EPS-C2 Power Supply on page 378.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

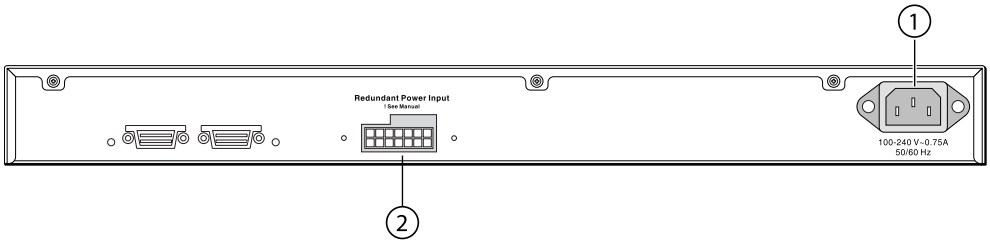


Figure 46: Summit X440-L2-24t Switch Rear Panel

1 = AC power input connector	2 = Redundant power connector

Summit X440-24x Switch Ports and Slots

The front panel of the Summit X440-24x switch includes:

- Twenty-four unpopulated SFP ports (ports 1–24) that provide 24 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

- Four autosensing 10/100/1000BASE-T ports (ports 21–24) that provide 4 Gbps of high-density copper connectivity.

  These ports are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

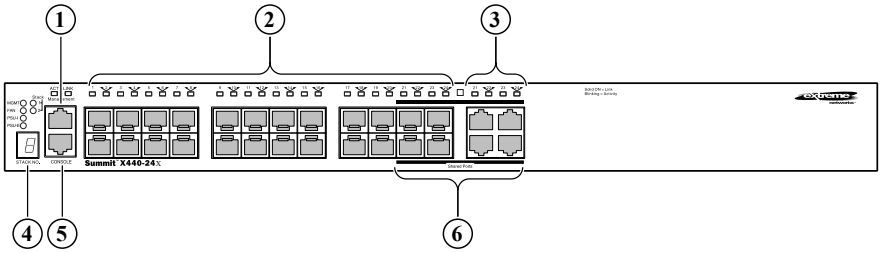


Figure 47: Summit X440-24x Switch Front Panel

1 = Ethernet management port	4 = Stack number indicator
2 = SFP ports	5 = Console port
3 = 10/100/1000BASE-T ports	6 = Combination ports

The rear panel of the Summit X440-24x switch includes:

- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module unit. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

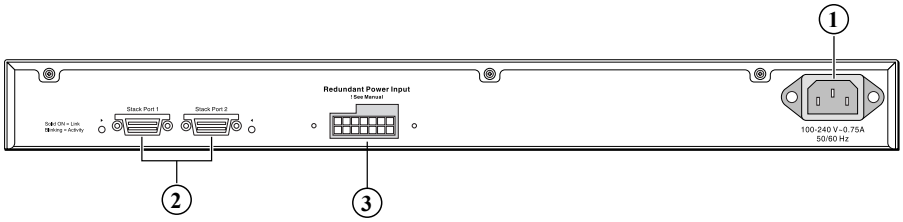


Figure 48: Summit X440-24x Switch Rear Panel

1 = AC power input connectors	3 = Redundant power connector
2 = Stacking ports	

Summit X440-24x-10G Switch Ports and Slots

The front panel of the Summit X440-24x-10G switch includes:

- Twenty-four unpopulated SFP ports (ports 1–24) that provide 24 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.
- Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port.

  For more information about combination ports, see Combination Ports and Failover on page 25

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Four autosensing 10/100/1000BASE-T ports (ports 21–24) that provide 4 Gbps of high-density copper connectivity.

  These ports are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.
- Two unpopulated SFP+ ports (ports 25 and 26) that provide 20 Gbps of fiber connectivity.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

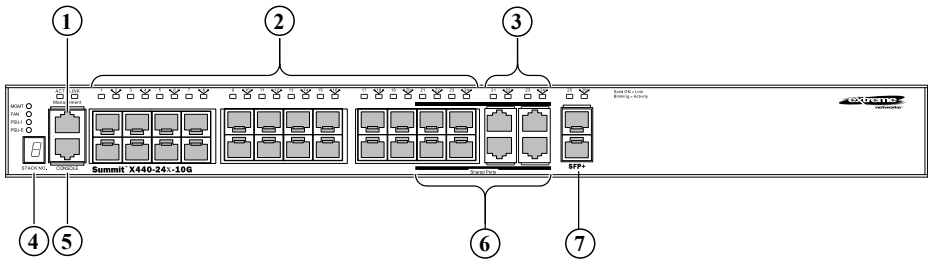


Figure 49: Summit X440-24x-10G Switch Front Panel

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

The rear panel of the Summit X440-24x-10G switch includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module unit. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket

  The internal AC power supply operates from 100 VAC to 240 VAC.

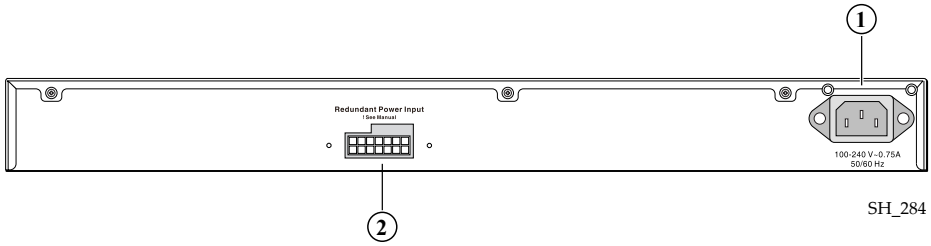


Figure 50: Summit X440-24x-10G Switch Rear Panel

1 = AC power input connectors	2 = Redundant power connector

Summit X440-24p Switch Ports and Slots

The front panel of the Summit X440-24p switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T PoE+ ports (ports 1–24). The Summit X440-24p switch supports the PoE+ IEEE 802.3a standard and provides up to 30 Watts of power per port. This switch provides a total switch PoE power budget of 380 Watts.
- Four unpopulated SFP ports (ports 21–24) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

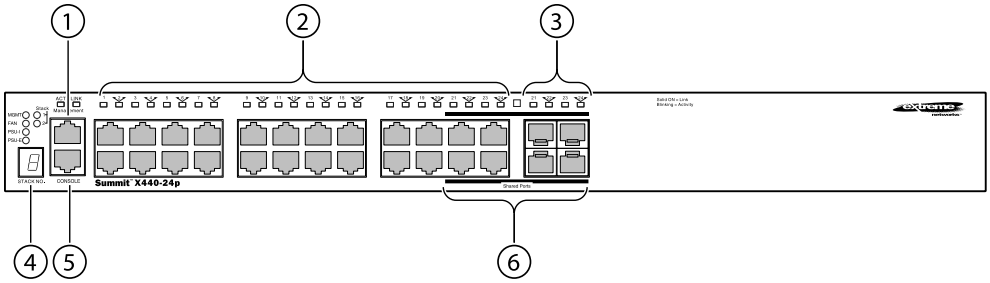


Figure 51: Summit X440-24p Switch Front Panel

1 = Ethernet management port	4 = Stack number indicator
2 = 10/100/1000BASE-T PoE ports	5 = Console port
3 = SFP ports	6 = Combination ports

The rear panel of the Summit X440-24p switch includes:

- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket

  The internal AC power supply operates from 100 VAC to 240 VAC.

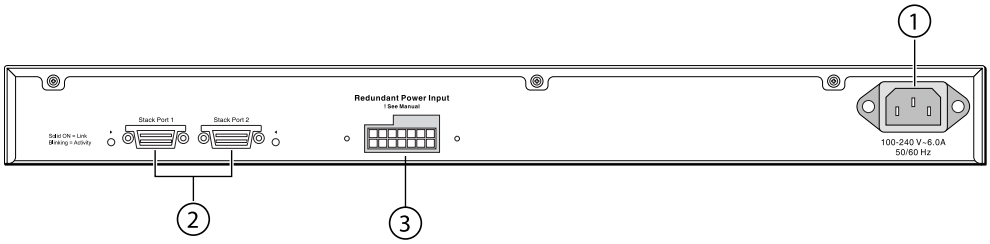


Figure 52: Summit X440-24p Switch Rear Panel

1 = AC power input connector	3 = Redundant power connector
2 = Stacking ports	

Summit X440-24p-10G Switch Ports and Slots

The front panel of the Summit X440-24p-10G switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T PoE+ ports (ports 1–24). In addition to 24 Gbps of high-density copper connectivity, these ports also provide a full 30 Watts of PoE+ per port. This switch provides a total switch PoE power budget of 380 Watts.
- Four unpopulated SFP ports (ports 21–24) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

- Two unpopulated SFP+ ports (ports 25 and 26) that provide 20 Gbps of fiber connectivity.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

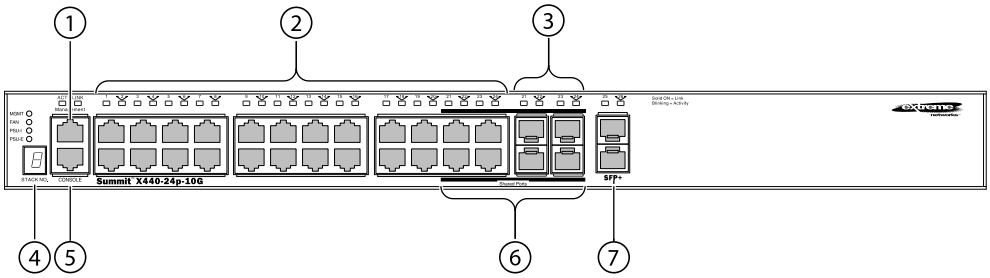


Figure 53: Summit X440-24p-10G Switch Front Panel

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

The rear panel of the Summit X440-24p-10G switch (Figure 54 on page 70) includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

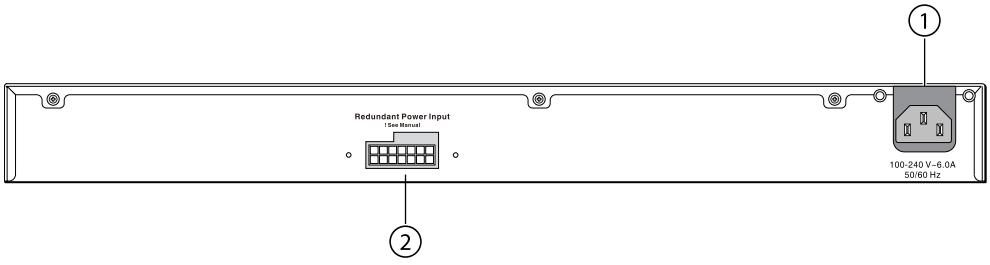


Figure 54: Summit X440-24p-10G Switch Rear Panel

1 = AC power input connector	2 = Redundant power connector

Summit X440-48t Switch Ports and Slots

The front panel of the Summit X440-48t switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T ports (ports 1–48) that provide 48 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 45–48) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 45 through 48 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

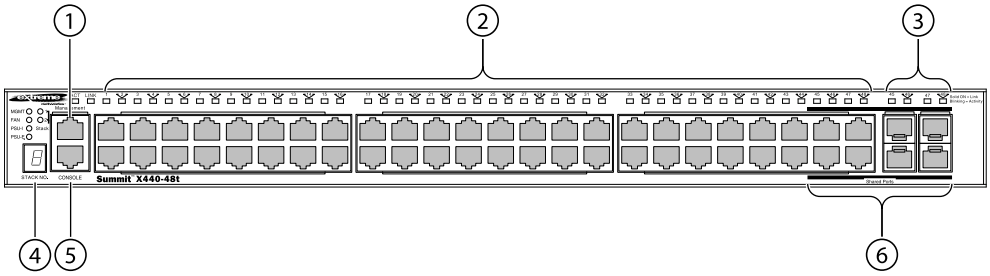


Figure 55: Summit X440-48t Switch Front Panel

1 = Ethernet management port	4 = Stack number indicator
2 = 10/100/1000BASE-T ports	5 = Console port
3 = SFP ports	6 = Combination ports

The rear panel of the Summit X440-48t switch includes:

- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module unit. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input connector.
- The internal AC power supply operates from 100 VAC to 240 VAC.

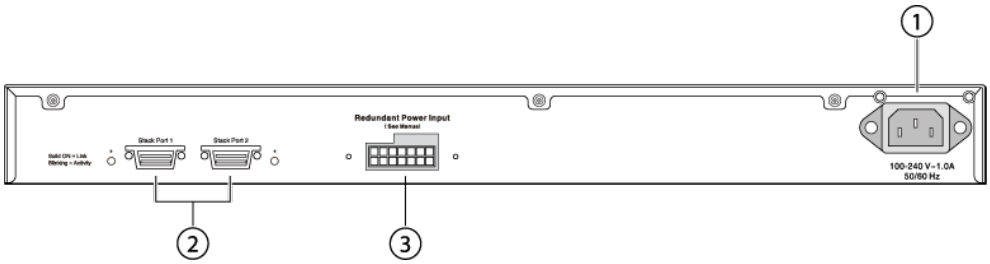


Figure 56: Summit X440-48t Switch Rear Panel

1 = AC power input connector	3 = Redundant power connector
2 = Stacking ports	

Summit X440-48tDC Switch Ports and Slots

The front panel of the Summit X440-48tDC switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T ports (ports 1–48) that provide 48 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 45–48) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 45 through 48 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator.

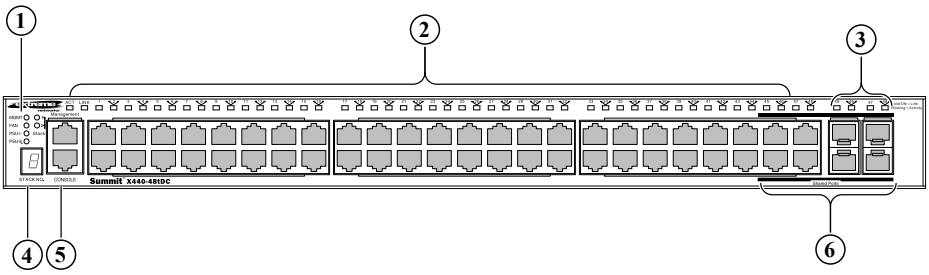


Figure 57: Summit X440-48tDC Switch Front Panel

1 = LEDs	4 = Stack number indicator
2 = 10/100/1000BASE-T ports	5 = Ethernet management port/Console port
3 = SFP ports	6 = Combination ports

The rear panel of the Summit X440-48tDC switch includes:

- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module unit. See Installing an EPS-C2 Power Supply on page 378 for more information.
- DC power input connectors. The DC power supply operates at -48V.

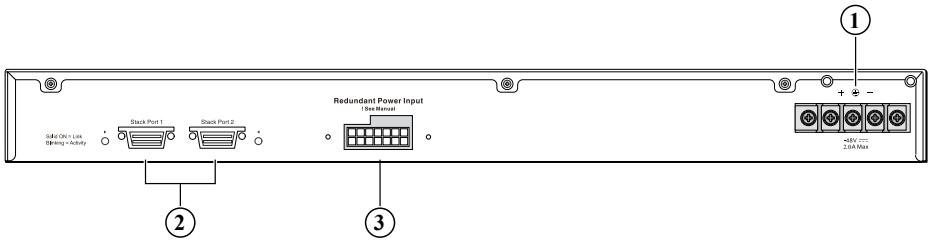


Figure 58: Summit X440-48tDC Switch Rear Panel

1 = DC power input connectors	3 = Redundant power connector
2 = Stacking ports	

Summit X440-48t-10G Switch Ports and Slots

The front panel of the Summit X440-48t-10G switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T ports (ports 1–48) that provide 48 Gbps of high-density copper connectivity.
- Two unpopulated SFP ports (ports 47 and 48) that provide 2 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 47 and 48 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Two unpopulated SFP+ ports (ports 49 and 50) that provide 20 Gbps of fiber connectivity.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

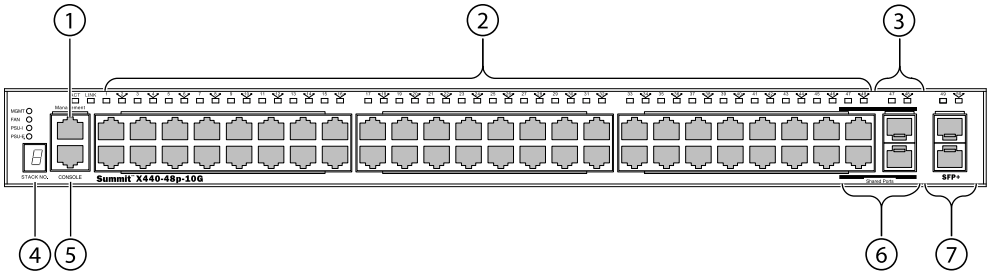


Figure 59: Summit X440-48t-10G Switch Front Panel

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

The rear panel of the Summit X440-48t-10G switch includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module unit. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

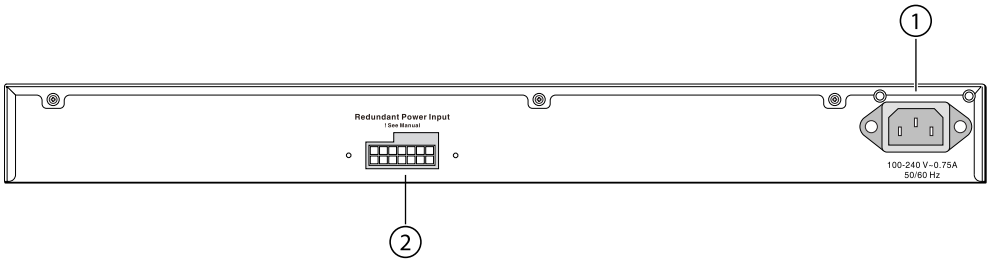


Figure 60: Summit X440-48t-10G Switch Rear Panel

1 = AC power input connector	2 = Redundant power connector

Summit X440-L2-48t Switch Ports and Slots

The front panel of the Summit X440-L2-48t switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T ports (ports 1–48) that provide 48 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 45–48) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 45 through 48 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

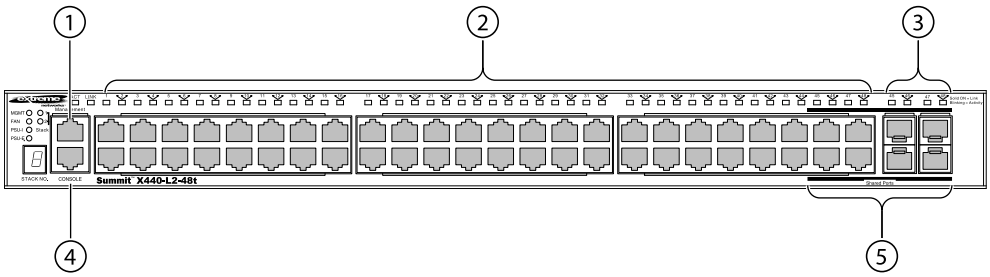


Figure 61: Summit X440-L2-48t Switch Front Panel

1 = Ethernet management port	4 = Console port
2 = 10/100/1000BASE-T ports	5 = Combination ports
3 = SFP ports	

The rear panel of the Summit X440-L2-48t switch includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module unit. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

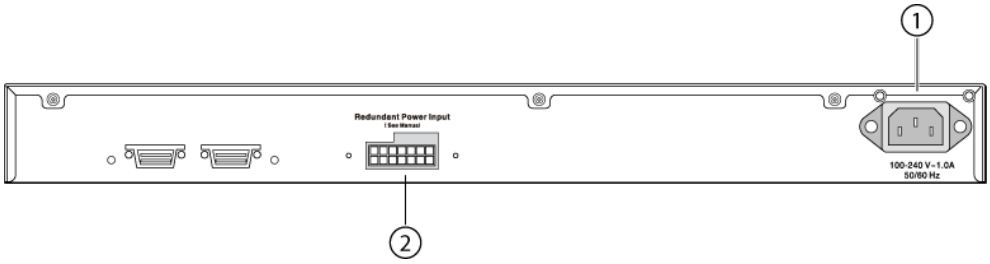


Figure 62: Summit X440-L2-48t Switch Rear Panel

1 = AC power input connector	2 = Redundant power connector

Summit X440-48p Switch Ports and Slots

The front panel of the Summit X440-48p switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T PoE+ ports (ports 1–48). In addition to 48 Gbps of high-density copper connectivity, these ports also provide a full 30 Watts of PoE+ per port. This switch provides a total switch PoE power budget of 380 Watts.
- Four unpopulated SFP ports (ports 45 – 48) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 45 through 48 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.
- Stack number indicator

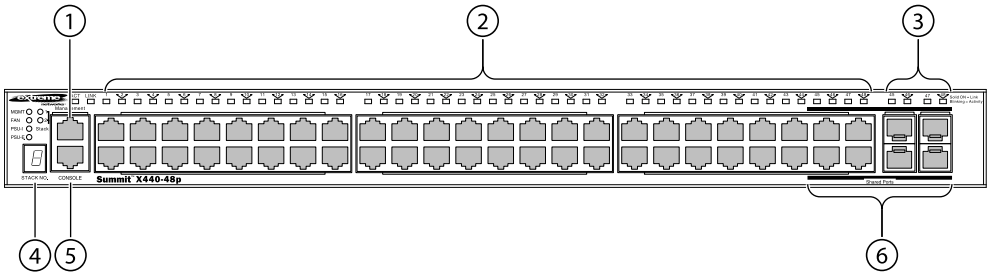


Figure 63: Summit X440-48p Switch Front Panel

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

The rear panel of the Summit X440-48p switch (Figure 64 on page 77) includes:

- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

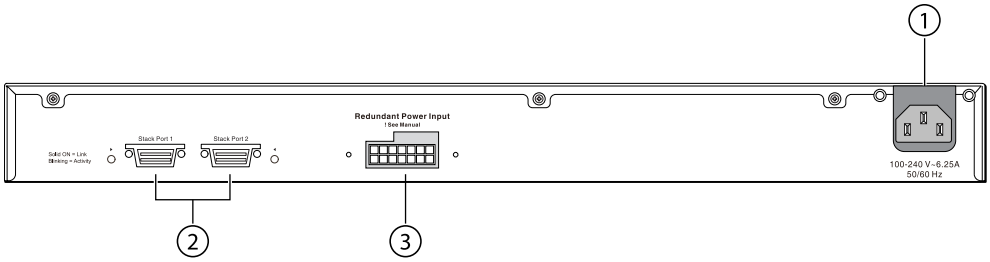


Figure 64: Summit X440-48p Switch Rear Panel

1 = AC power input connector	3 = Redundant power connector
2 = Stacking ports	

Summit X440-48p-10G Switch Ports and Slots

The front panel of the Summit X440-48p-10G switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T PoE+ ports (ports 1–48). In addition to 48 Gbps of high-density copper connectivity, these ports also provide a full 30 Watts of PoE+ per port. This switch provides a total switch PoE power budget of 380 Watts.
- Two unpopulated SFP ports (ports 47 and 48) that provide 2 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 47 and 48 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Two unpopulated SFP+ ports (ports 49 and 50) that provide 20 Gbps of fiber connectivity.
- Ethernet management port.
- Serial console port implemented as an RJ45 connector, 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 X440 Series Switch LEDs on page 78.

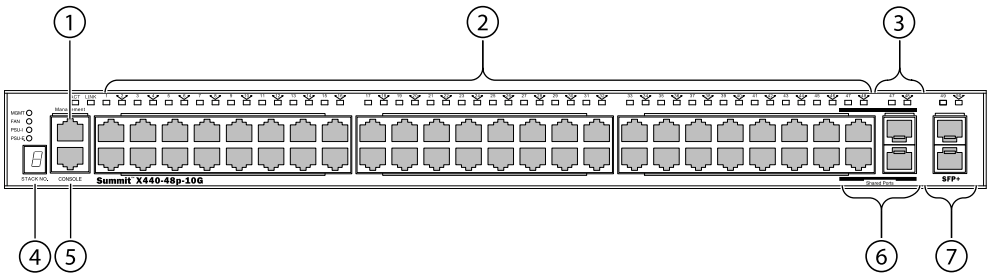


Figure 65: Summit X440-48p-10G Switch Front Panel

1 = Ethernet management port	5 = Console port
2 = 10/100/1000BASE-T PoE+ ports	6 = Combination ports

3 = SFP ports	7 = SFP+ ports
4 = Stack number indicator	

The rear panel of the Summit X440-48p-10G switch includes:

- Redundant power input connector for optional connection to the EPS-C2 External Power Module

  The connecting redundant power supply cable is shipped with the power module. See Installing an EPS-C2 Power Supply on page 378 for more information.
- AC power input socket.

  The internal AC power supply operates from 100 VAC to 240 VAC.

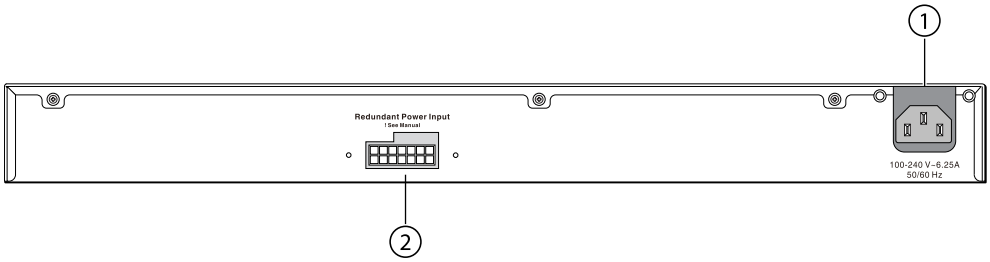


Figure 66: Summit X440-48p-10G Switch Rear Panel

1 = AC power input connector	2 = Redundant power connector

Summit X440 Series Switch LEDs

The following sections describe the meanings of the LEDs on Summit X440 switches.

LEDs on the Summit X440 Series Switches

Table 17: Front Panel

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

Table 17: Front Panel (continued)

Label or Type	Color/State	Meaning
FAN	Steady green	Normal operation, fan is good. Note: For the following Summit models, fan light is "ON" only when the fan is running: • Summit X440-24t model No. 800471-00 Revision 6 or lower • Summit X440-24t-10G model No. 800475-00 Revision 5 or lower • Summit X440-L2-24t model No. 800526-00 Revision 1
	Blinking amber	Fan failure. Switch will continue to operate unless it overheats.
	Off	No power Note: For the following Summit models, fan light "OFF" indicates either no power to the fan or temperature is below threshold where fans are needed: • Summit X440-24t model No. 800471-00 Revision 6 or lower • Summit X440-24t-10G model No. 800475-00 Revision 5 or lower • Summit X440-L2-24t model No. 800526-00 Revision 1
PSU-I (Internal 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.
PSU-E (External power supply)	Steady green	Normal operation.
	Steady amber	Power is attached, but no power is on.
	Blinking amber	Power failure.
	Off	No external power attached.
Port number 1 – 8 or 1 – 24 or 1 – 48	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.
Port number 21 – 24 or 45 – 48 (Shared ports)	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.
Port number 25 – 26 or 49 – 50 (10G ports)	Steady green	Link is OK.
	Blinking green	Port is transmitting packets.
	Off	Link is not present, or port is disabled.

Table 17: Front Panel (continued)

Label or Type	Color/State	Meaning
Stack 1, Stack 2 NOTE: The X440-L2-24t and X440-L2-48t do not have stacking capability; the stacking LEDs do not function.	Steady green	Link OK on the indicated stacking port.
	Blinking green	Activity on the indicated stacking port.
Stack Number Indicator NOTE: The X440-L2-24t and X440-L2-48t do not have stacking capability; the stacking LEDs do not function.	Top half of the stack number blinking	The switch is designated as master in the stack.
	Bottom half of the stack number blinking	The switch is designated as backup in the stack.
	Stack number steady	This switch is a standby switch (neither the master nor the backup) in the stack.
	Off	The stackable switch is not in stacking mode.

Table 18: Additional Port LED Meanings for PoE Switches: Summit X440-8p, X440-24p, X440-24p-10G, X440-48p, and X440-48p-10G

Label or Type	Color/State	Meaning
All front-panel ports	Steady green	Link 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.

Summit X450, X450a, and X450e Series Switches

The Summit X450, X450a, and X450e series switches provide 24 or 48 Ethernet ports.

These switches deliver high-density fast Ethernet connectivity using fixed 10/100/1000BASE-T ports or installable small form pluggable (SFP) optical modules. Models in different series are available both with and without PoE and in AC or DC power versions.

Each Summit X450, X450a, or X450e series switch has four combination ports that provide 10/100/1000 BASE-T or SFP connectivity for 4 Gbps of copper or fiber connectivity. A serial console port on the front panel allows you to connect a terminal and perform local management. An Ethernet management port on the back panel can be used to connect the system to a parallel management network for administration. Alternatively, you can use an Ethernet cable to connect the Ethernet management port directly to a laptop to view and locally manage the switch configurations.

The rear panel of the switch has an option slot to accommodate one of the Summit port option cards listed in the following table.

Table 19: Port Option Cards for Summit X450, X450a, and X450e Series Switches

Option Card Model	Type of Added Ports	For more information, see . . .
XGM-2xn option card	10-gigabit XENPAK modules	#unique_90
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

Option card compatibility depends on the specific switch series. See the individual switch descriptions for the option card supported on each switch. For option card installation instructions, see Installing Expansion Modules on page 411.

Two high-speed stacking ports allow you to combine multiple units into a single SummitStack management entity.

Power connectors include an AC or DC power input socket and a redundant power connector. (See specific switch descriptions for more information about the power options.) The switch automatically adjusts to the supply voltage. The redundant power connector allows you to connect the switch to the an external power supply. When a compatible external power supply is used with the Summit X450, X450a, or X450e series switch, the internal and external power supplies are fully fault tolerant. For most switches, if one power supply fails, the other power supply will provide sufficient power to operate the switch. For information about power supply redundancy with the Summit X450a-48p switch, see Summit X450e-48p Power Supplies on page 100.

For information about each switch series, see the following sections:

- Summit X450 Series Switches on page 81
- Summit X450a Series Switches on page 84
- Summit X450e Series Switches on page 93

Summit X450 Series Switches

The Summit X450 series switches are 24-port switches without PoE options.

The ports are implemented as fixed 10/100/1000BASE-t RJ45 ports or as installable SFP modules. These switches are available only with AC internal power supplies.

The Summit X450 series switches include the following models:

- Summit X450-24t Switch Ports and Slots on page 82
- Summit X450-24x Switch Ports and Slots on page 83

Summit X450-24t switches require an ExtremeXOS version of at least 11.2.2.4 but not greater than 12.4.x. Summit X450-24x switches require an ExtremeXOS version of at least 11.6.1.9 but not greater than 12.4.x.

Summit X450-24t Switch Ports and Slots

The front panel of the Summit X450-24t switch includes:

- Twenty fixed autosensing 10/100/1000BASE-T ports (ports 5–24) that provide 20 Gbps of high-density copper connectivity
- Four combination ports (ports 1–4) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

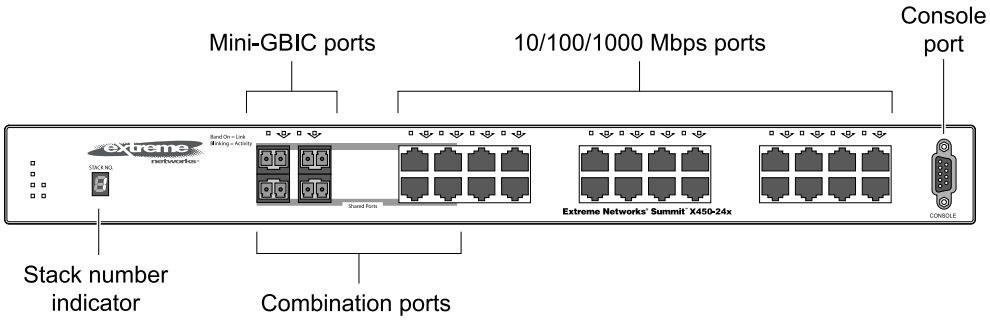


Figure 67: Summit X450-24t Switch Front Panel

The rear panel of the Summit X450-24t switch includes:

- Slot for the Summit XGM-2xn option card, which allows you to add one or two 10-gigabit XENPAK modules

  See #unique_90.
- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-160 External Power Module (Model No. 10907)

  The connecting redundant power supply cable is shipped with the EPS-160 unit. See EPS-160 External Power Module (with EPS-T) on page 168 for more information.
- AC power input socket

  The internal power supply operates from 100 VAC to 240 V AC.

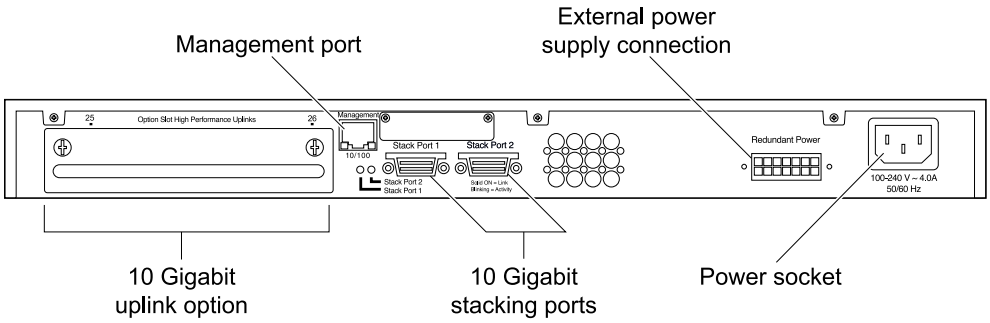


Figure 68: Summit X450-24t Switch Rear Panel

Summit X450-24x Switch Ports and Slots

The front panel of the Summit X450-24x switch includes:

- Twenty fixed SFP ports (ports 5–24) that provide 20 Gbps of high-density fiber connectivity

  For information about SFPS, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Four combination ports (ports 1–4) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

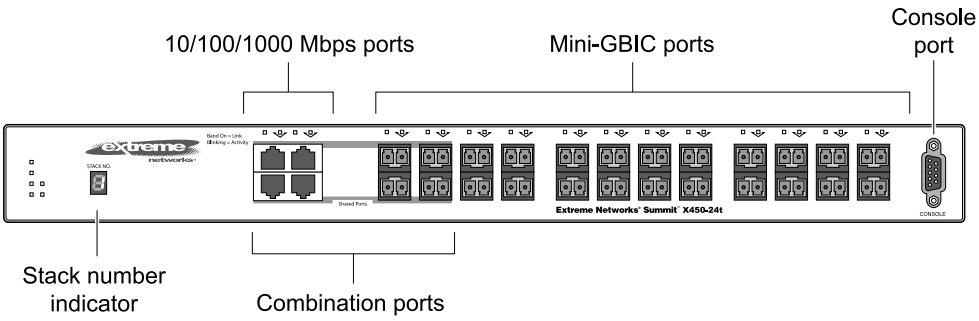


Figure 69: Summit X450-24x Switch Front Panel

The rear panel of the Summit X450-24x switch includes:

- Slot for the Summit XGM-2xn option card, which allows you to add one or two 10-gigabit XENPAK modules

  See #unique_90.
- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-160 External Power Module (Model No. 10907).

The connecting redundant power supply cable is shipped with the EPS-160 unit. See EPS-160 External Power Module (with EPS-T) on page 168 for more information.

- AC power input socket

  The internal power supply operates from 100 VAC to 240 V AC.

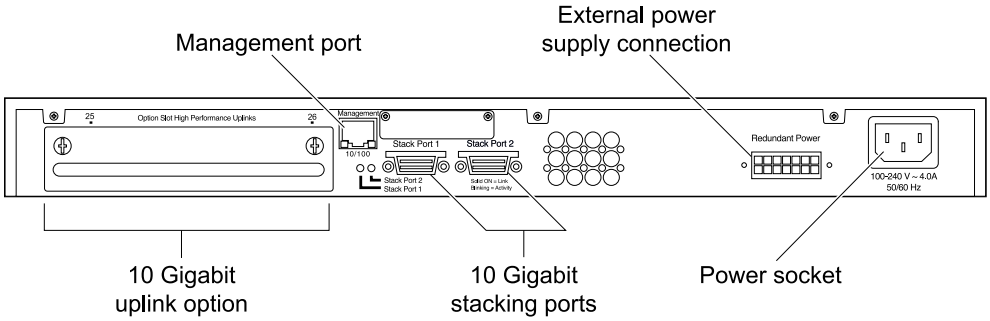


Figure 70: Summit X450-24x Switch Rear Panel

Summit X450a Series Switches

The Summit X450a series switches are 24-port or 48-port switches without PoE options.

The Ethernet ports are implemented as fixed 10/100/1000BASE-T RJ45 ports or as installable SFP modules. These switches are available with either AC or DC internal power supplies. The switch automatically adjusts to the supply voltage. The internal AC power supply operates from 100 VAC to 240 VAC. The internal DC power supply operates from -36 VDC to -72 VDC.

The Summit X450a series switches include the following switches:

- Summit X450a-24t Switch Ports and Slots on page 85
- Summit X450a-24t-TAA switch
- Summit X450a-24tDC Switch Ports and Slots on page 86
- Summit X450a-24tDC-TAA switch
- Summit X450a-24x Switch Ports and Slots on page 87
- Summit X450a-24x-TAA switch
- Summit X450a-24xDC Switch Ports and Slots on page 89
- Summit X450a-24xDC-TAA switch
- Summit X450a-48t Switch Ports and Slots on page 91
- Summit X450a-48t-TAA switch
- Summit X450a-48tDC Switch Ports and Slots on page 92
- Summit X450a-48tDC-TAA switch

Note

In the descriptions that follow, references to a Summit X450a series model number also apply to the equivalent TAA-compliant switch version.

The minimum required ExtremeXOS version for Summit X450a series switches varies by model. (See the *Extreme Hardware/Software Compatibility and Recommendation Matrices* for details.) The ExtremeXOS version cannot be greater than 15.3.x.

Summit X450a-24t Switch Ports and Slots

The front panel of the Summit X450a-24t switch includes:

- Twenty fixed autosensing 10/100/1000 BASE-T ports (ports 1–20) that provide 20 Gbps of high-density copper connectivity
- Four combination ports (ports 21–24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management

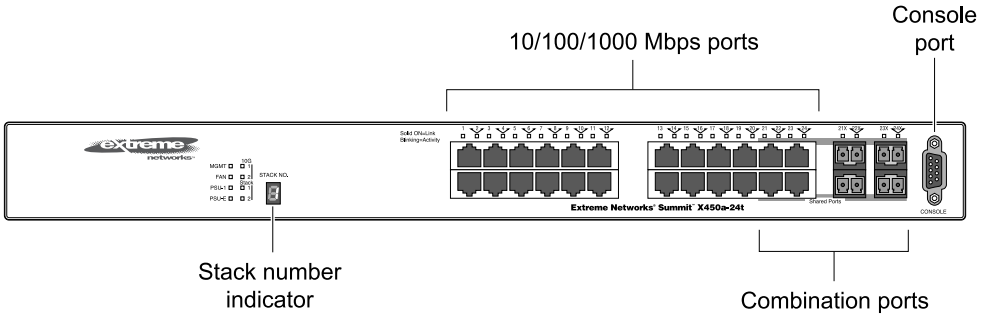


Figure 71: Summit X450a-24t Switch Front Panel

The rear panel of the Summit X450a-24t switch (Figure 72 on page 86) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 20: Port Option Cards for Summit X450a Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to one of the following redundant power supplies:
  - EPS-LD External Power Supply Unit (Model No. 45019)

    See EPS-LD External Power Supply Unit on page 175 for more information.

- EPS-500 External Power Supply (Model 10911)

  See EPS-500 External Power Supply Unit on page 169 for more information.

  The connecting redundant power supply cable is shipped with the external power supply.

- AC power input socket

The internal power supply operates from 100 VAC to 240 VAC.

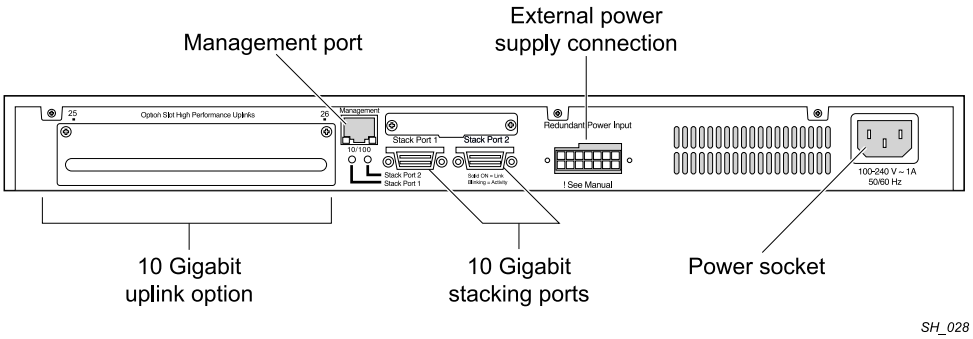


Figure 72: Summit X450a-24t Switch Rear Panel

Summit X450a-24tDC Switch Ports and Slots

The front panel of the Summit X450a-24tDC switch includes:

- Twenty fixed autosensing 10/100/1000 BASE-T ports (ports 1–20) that provide 20 Gbps of high-density copper connectivity
- Four combination ports (ports 21–24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management

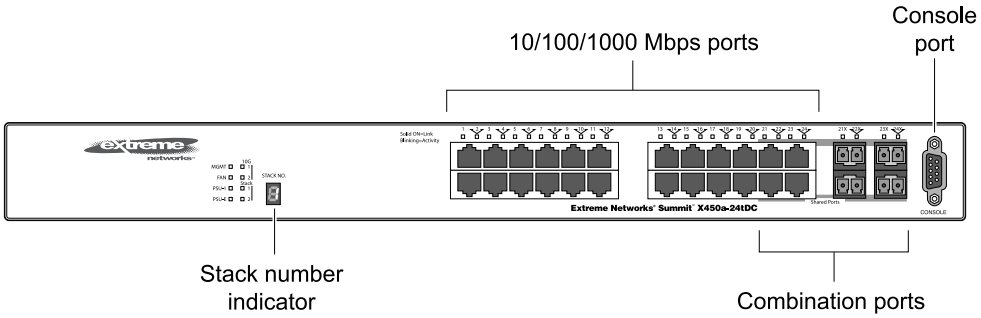


Figure 73: Summit X450a-24tDC Switch Front Panel

The rear panel of the Summit X450a-24tDC switch (shown in Figure 74 on page 87) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 21: Port Option Cards for Summit X450a Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Ethernet management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-150DC External Power Module (Model No. 10909)

  The connecting redundant power supply cable is shipped with the EPS-150DC unit. See EPS-150DC External Power Module (with EPS-T2) on page 167 for more information.
- DC power input socket

  The internal power supply operates from -36 VDC to -72 VDC.
- Grounding lug

Note
For centralized DC power connection, this product is intended to be installed in a restricted access location (such as a dedicated equipment room, equipment closet, or central office) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

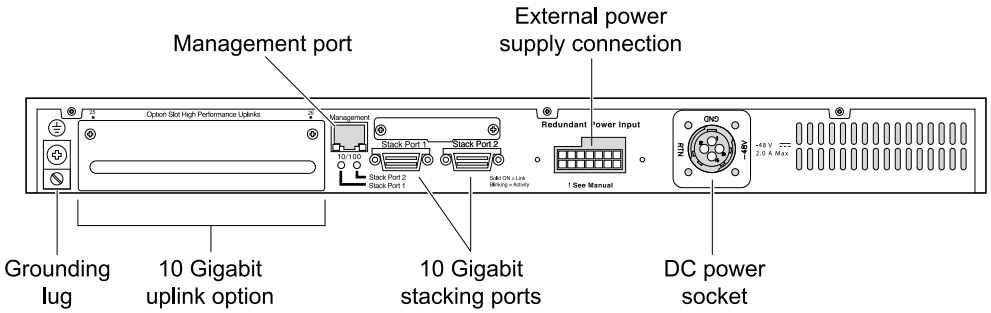


Figure 74: Summit X450a-24tDC Switch Rear Panel

Summit X450a-24x Switch Ports and Slots

The front panel of the Summit X450a-24x switch includes:

- Twenty 1000BASE-X ports (ports 1–20) that provide 20 Gbps of high-density fiber (SFP) connectivity
- Four combination ports (ports 21–24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

For more information about combination ports, see Combination Ports and Failover on page 25.

For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

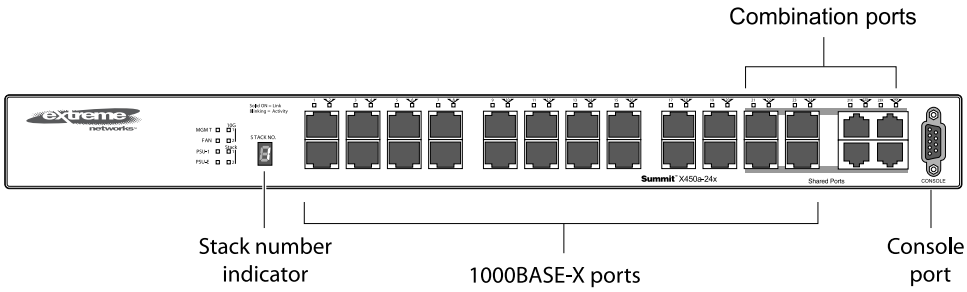


Figure 75: Summit X450a-24x Switch Front Panel

The rear panel of the Summit X450a-24x switch (Figure 76 on page 89) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 22: Port Option Cards for Summit X450a Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to one of the following external redundant power supplies:
  - EPS-LD External Power Supply Unit (Model No. 45019)

    See EPS-LD External Power Supply Unit on page 175 for more information.
  - EPS-500 External Power Supply (Model 10911)

    See EPS-500 External Power Supply Unit on page 169 for more information.

    The connecting redundant power supply cable is shipped with the external power supply.
- AC power input socket

  The internal power supply operates from 100 VAC to 240 VAC.

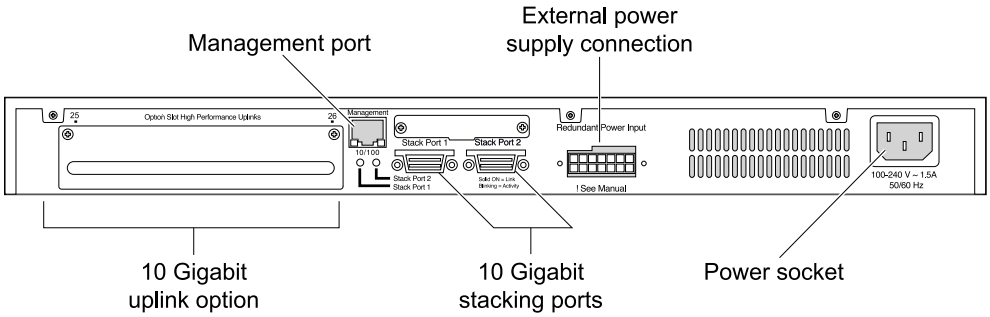


Figure 76: Summit X450a-24x Switch Rear Panel

Summit X450a-24xDC Switch Ports and Slots

The front panel of the Summit X450a-24xDC switch includes:

- Twenty fixed autosensing 1000BASE-X ports (ports 1–20) that provide 20 Gbps of high-density fiber (SFP) connectivity
- Four combination ports (ports 21–24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

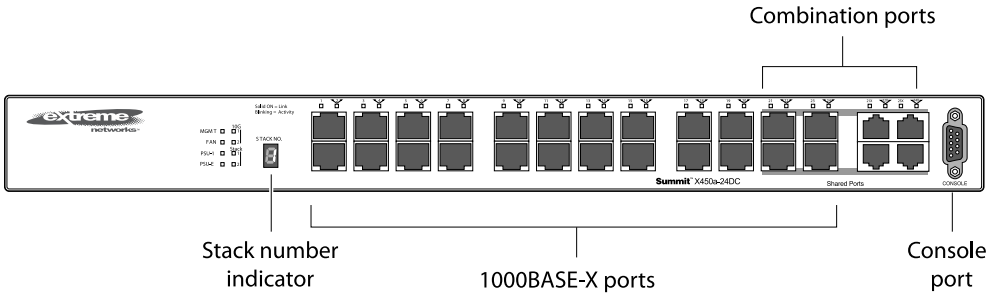


Figure 77: Summit X450a-24xDC Switch Front Panel

The rear panel of the Summit X450a-24xDC switch (Figure 78 on page 90) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 23: Port Option Cards for Summit X450a Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-150DC External Power Module (Model No. 10909)

  The connecting redundant power supply cable is shipped with the EPS-150DC unit. See EPS-150DC External Power Module (with EPS-T2) on page 167 for more information.
- DC power input socket

  The internal power supply operates from -36 VDC to -72 VDC.
- Grounding lug

Note
For centralized DC power connection, this product is intended to be installed in a restricted access location (such as a dedicated equipment room, equipment closet, or central office) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

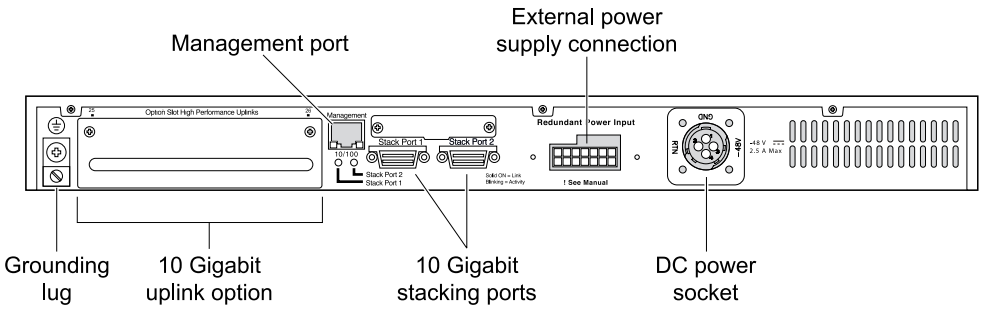


Figure 78: Summit X450a-24xDC Switch Rear Panel

Summit X450a-48t Switch Ports and Slots

The front panel of the Summit X450a-48t switch includes:

- Forty-four fixed autosensing 10/100/1000 BASE-T ports (ports 1–44) that provide 44 Gbps of high-density copper connectivity
- Four combination ports (ports 45–48) using RJ45 connectors and SFPs to provide 4 Gbps of fiber or copper connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

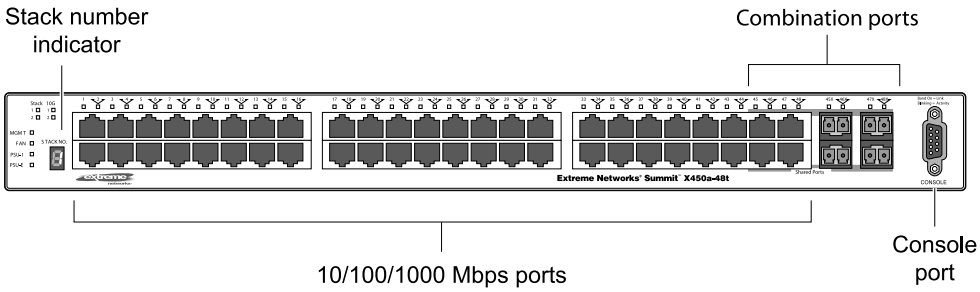


Figure 79: Summit X450a-48t Switch Front Panel

The rear panel of the Summit X450a-48t switch (Figure 80 on page 92) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 24: Port Option Cards for Summit X450a Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-500 External Power Supply Unit (Model No. 10911)

The connecting redundant power supply cable is shipped with the EPS-500 power supply. See EPS-500 External Power Supply Unit on page 169 for more information.

- AC power input socket

  The internal power supply operates from 100 VAC to 240 V AC.

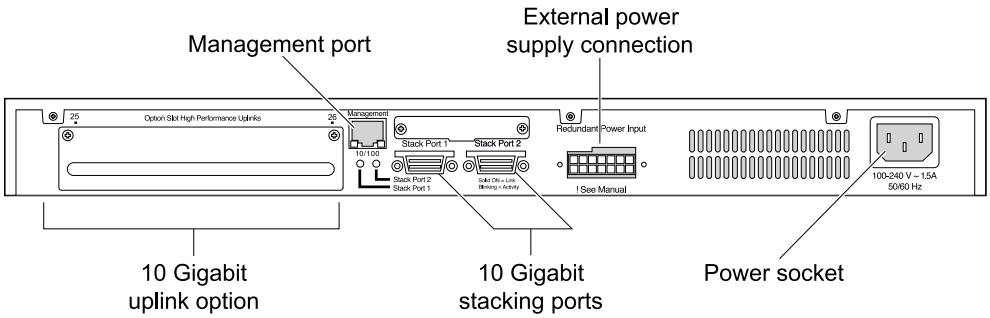


Figure 80: Summit X450a-48t Switch Rear Panel

Summit X450a-48tDC Switch Ports and Slots

The front panel of the Summit X450a-48tDC switch includes:

- Forty-four fixed autosensing 10/100/1000 BASE-T ports (ports 1–44) that provide 44 Gbps of high-density copper connectivity
- Four combination ports (ports 45–48) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

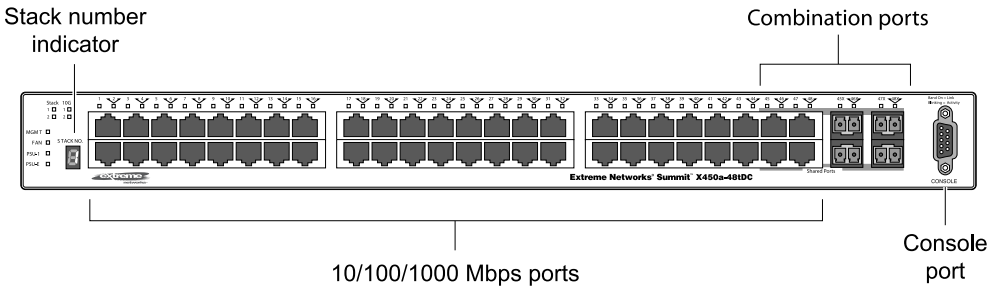


Figure 81: Summit X450a-48tDC Switch Front Panel

The rear panel of the Summit X450a-48tDC switch (Figure 82 on page 93) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 25: Port Option Cards for Summit X450a Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-150DC External Power Module (Model No. 10909)

  The connecting redundant power supply cable is shipped with the EPS-150DC unit. See EPS-500 External Power Supply Unit on page 169 for more information.
- DC power input socket

  The internal power supply operates from -36 VDC to -72 V DC.
- Grounding lug

Note
For centralized DC power connection, this product is intended to be installed in a restricted access location (such as a dedicated equipment room, equipment closet, or central office) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

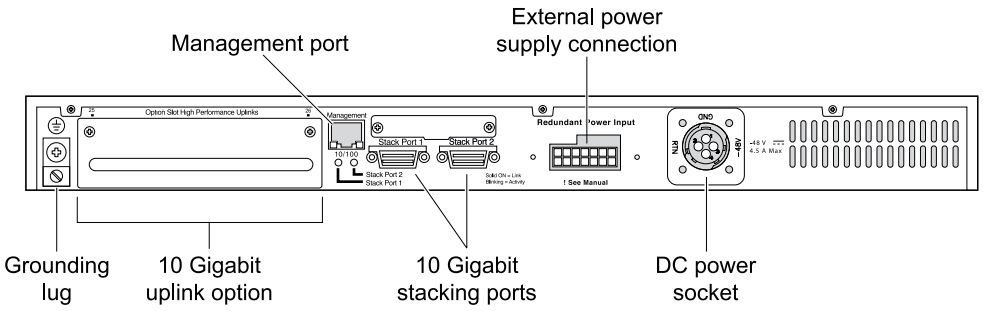


Figure 82: Summit X450a-48tDC Switch Rear Panel

Summit X450e Series Switches

The Summit X450e series switches provide 24 or 48 fixed 10/100/1000BASE-T Ethernet ports using RJ45 connectors.

Models are available with PoE and without PoE. These switches are available only in AC-powered models.

The Summit X450e series of switches consists of the following switches:

- Summit X450e-24t Switch Ports and Slots on page 94
- Summit X450e-24t-TAA switch
- Summit X450e-24p Switch Ports and Slots on page 95
- Summit X450e-24p-TAA switch
- Summit X450e-48t Switch Ports and Slots on page 97
- Summit X450e-48t-TAA switch
- Summit X450e-48p Switch Ports and Slots on page 98
- Summit X450e-48p-TAA switch

Note

In the descriptions that follow, references to a Summit X450e series model number also apply to the equivalent TAA-compliant switch version.

The minimum required ExtremeXOS version for Summit X450e series switches varies by model. (See the *Extreme Hardware/Software Compatibility and Recommendation Matrices* for details.) The ExtremeXOS version cannot be greater than 15.3.x.

Summit X450e-24t Switch Ports and Slots

The front panel of the Summit X450e-24t switch includes:

- Twenty fixed autosensing 10/100/1000BASE-T ports (ports 1–20) that provide 20 Gbps of high-density copper connectivity
- Four combination ports (ports 21–24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPS, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Serial console port used to connect a terminal and perform local management.

The rear panel of the Summit X450e-24t switch (Figure 83 on page 95) includes:

- Slot for one of the Summit option cards listed in Table 25 on page 93. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 26: Port Option Cards for Summit X450e Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60

Table 26: Port Option Cards for Summit X450e Series Switches (continued)

Option Card Model	Type of Added Ports	For More Information
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-500 External Power Module (Model No. 10907).

  The connecting redundant power supply cable is shipped with the EPS-500 unit. See EPS-500 External Power Supply Unit on page 169 for more information.
- AC power input socket

  The internal power supply operates from 100 VAC to 240 VAC.

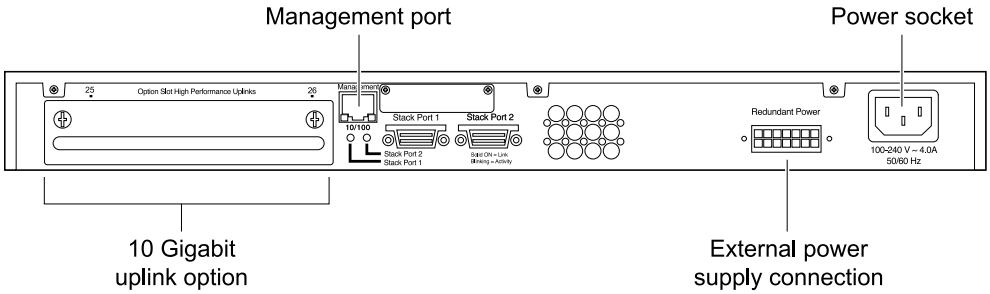


Figure 83: Summit X450e-24t Switch Rear Panel

Summit X450e-24p Switch Ports and Slots

The front panel of the Summit X450e-24p switch includes:

- Twenty fixed autosensing 10/100/1000 BASE-T PoE ports (ports 1–20) that provide high-density copper connectivity and a full 15.4 Watts of PoE per port.
- Four combination ports (ports 21–24) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

  Note
  All 24 ports can provide PoE power.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

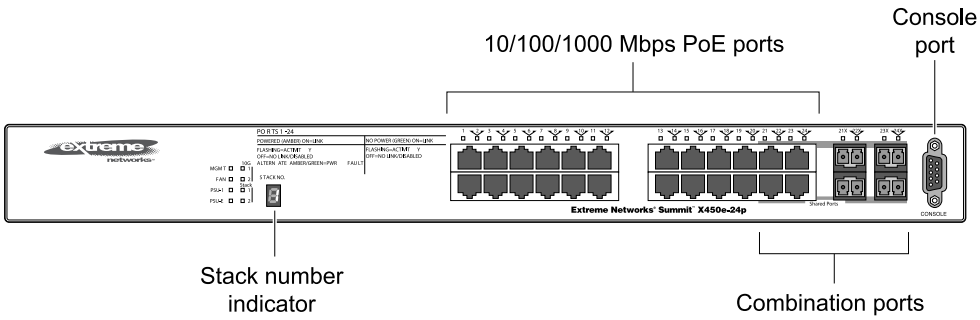


Figure 84: Summit X450e-24p Switch Front Panel

The rear panel of the Summit X450e-24p switch (Figure 85 on page 97) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 27: Port Option Cards for Summit X450e Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to one of the following external redundant power supplies with full PoE power support:
  - EPS-LD External Power Supply Unit (Model 45019)

    See EPS-LD External Power Supply Unit on page 175 for more information.
  - EPS-500 External Power Supply (Model 10911).

    See EPS-500 External Power Supply Unit on page 169 for more information.

    The connecting redundant power supply cable is shipped with the power supply.
- AC power input socket

  The internal power supply operates from 100 VAC to 240 VAC.

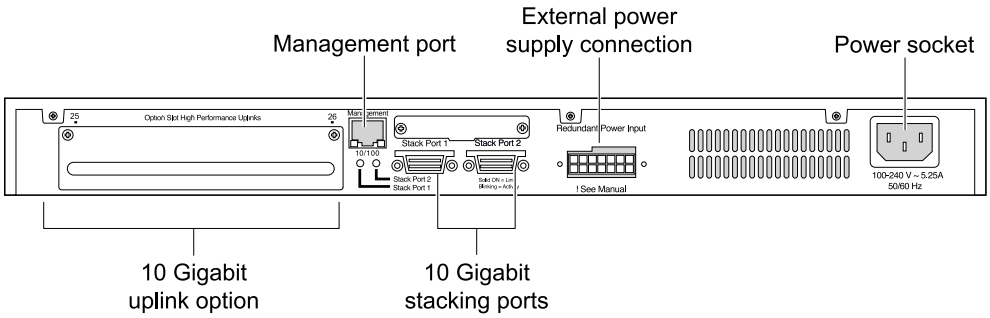


Figure 85: Summit X450e-24p Switch Rear Panel

Summit X450e-48t Switch Ports and Slots

The front panel of the Summit X450e-48t switch includes:

- Forty-four fixed autosensing 10/100/1000 BASE-T ports (ports 1–44) that provide 44 Gbps of high-density copper connectivity.
- Four combination ports (ports 45–48) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Serial console port used to connect a terminal and perform local management.

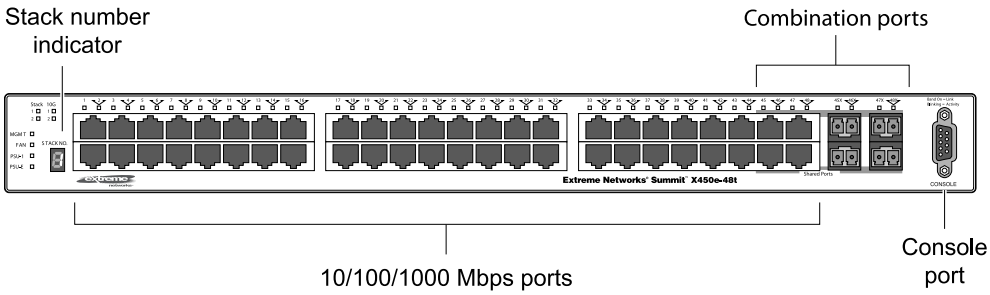


Figure 86: Summit X450e-48t Switch Front Panel

The rear panel of the Summit X450e-48t switch (Figure 87 on page 98) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 28: Port Option Cards for Summit X450e Series Switches

Option Card Model	Type of Added Ports	For More Information, see . . .
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60

Table 28: Port Option Cards for Summit X450e Series Switches (continued)

Option Card Model	Type of Added Ports	For More Information, see . . .
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs.
- Two high-performance stacking ports with associated LEDs.
- Redundant power input connector for optional connection to the EPS-500 External Power Supply Unit (Model No. 10911).

  See EPS-500 External Power Supply Unit on page 169 for more information. The connecting redundant power supply cable is shipped with the EPS-500 power supply.
- AC power input socket

  The power supply operates from 100 VAC to 240 VAC.

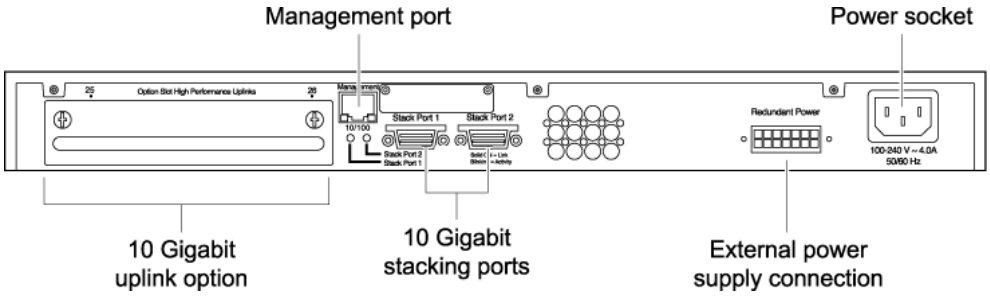


Figure 87: Summit X450e-48t Switch Rear Panel

Summit X450e-48p Switch Ports and Slots

The front panel of the Summit X450e-48p switch includes:

- Forty-four fixed autosensing 10/100/1000 BASE-T PoE ports (ports 1–44) that provide high-density copper connectivity and a full 15.4 Watts of PoE per port when used with the EPS-C/EPS-600LS
- Four combination ports (ports 45–48) using RJ45 connectors and SFPs to provide 4 Gbps of copper or fiber connectivity

  For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

  Note
  All 48 ports can provide PoE power.

- LEDs to indicate port status and switch operating conditions

  For a description of the LEDs and their operation, see Summit X450, X450a, and X450e Series Switch LEDs on page 101.
- Stack number indicator showing the position of this switch in a stacked configuration
- Serial console port used to connect a terminal and perform local management.

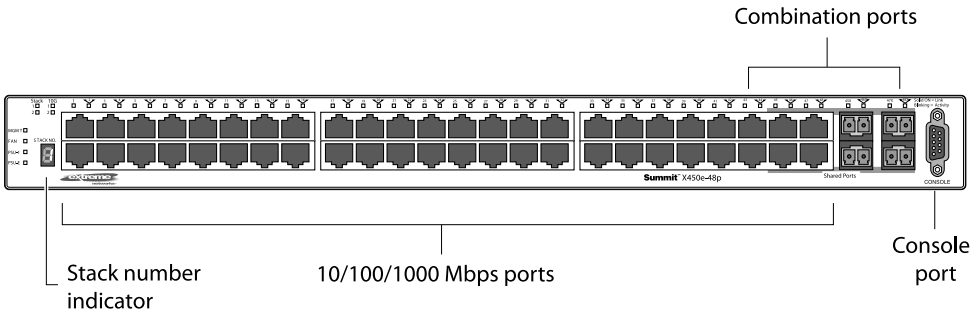


Figure 88: Summit X450e-48p Switch Front Panel

The rear panel of the Summit X450e-48p switch (Figure 89 on page 99) includes:

- Slot for one of the Summit option cards listed in the following table. These port option cards allow you to add one or two high-speed uplink ports to the switch.

Table 29: Port Option Cards for Summit X450e Series Switches

Option Card Model	Type of Added Ports	For More Information
XGM2-2xn option card	10-gigabit XENPAK modules	#unique_59
XGM2-2xf option card	10-gigabit XFP modules	#unique_60
XGM2-2sf option card	10-gigabit SFP+ modules	#unique_61
XGM2-2bt option card	Fixed 10GBASE-T copper	#unique_62

- Management port with associated LEDs
- Two high-performance stacking ports with associated LEDs
- Redundant power input connector for optional connection to the EPS-C chassis (Model No. 10912). This chassis can hold up to three EPS-600LS External Power Modules (Model No. 10913). The connecting redundant power supply cable is shipped with the EPS-C chassis.

  The PoE capability of the Summit X450e-48p switch varies depending on the number of external power modules in use. For more information, see Summit X450e-48p Power Supplies on page 100 and EPS-600LS External Power Module on page 170.
- AC power input socket

  The power supply operates from 100 VAC to 240 VAC.

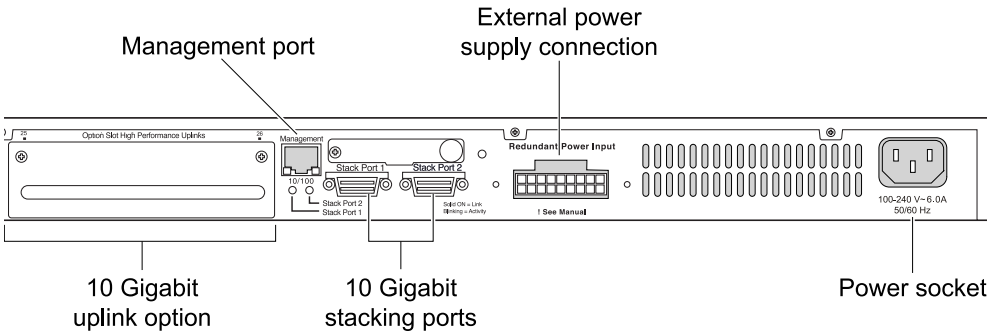


Figure 89: Summit X450e-48p Switch Rear Panel

Summit X450e-48p Power Supplies

Internal Power Supply

The Summit X450e-48p switch is powered by both an internal power supply and an optional external redundant power supply system.

The internal Summit X450e-48p power supply can provide 370 W of PoE power, as follows:

- In a 24-port configuration, it provides 15.4 W to each port.
- In 48-port configuration or any combination of ports where total PoE power does not exceed 370 watts, it provides 7.7 W to each port.

If the total system demands exceed this power limit, you can specify:

- Port priorities to identify which ports should be ranked higher when allocating power.
- Port disconnect precedence to specify the method of shutting off ports when not enough PoE power is available.

Note

For a detailed discussion of these concepts, see the Power over Ethernet section in the *ExtremeXOS 22.6 User Guide*.

External Power Supplies

The Summit X450e-48p switch can be powered by one, two, or three external power modules through the redundant power input connector on the rear of the switch.

The EPS-C (External Power Supply Chassis) is shipped with the redundant power supply cable that connects to the redundant input connector on the rear of the switch. The EPS-C chassis can hold from one to three 600-Watt EPS-600LS external power module units.

The PoE capability of the Summit X450e-48p switch varies depending on the number of external power modules in use. The following table summarizes the PoE power behavior for the Summit X450e-48p switch based on the number of power supply modules in use.

Internal Power Supply Status	EPS-600LS (1x)	EPS-600LS (2x)	EPS-600LS (3x)	External Power Supply/Chassis Failed/Disconnected
Internal Power Supply: Power On	370 W of redundant power	740 W of external power only Internal power supply disabled	740 W of external power only with 2:1 redundancy Internal power supply disabled	370 W of internal power only
Internal Power Supply: Power Failure	370 W of external power only	740 W of external power only	740 W of external power only with 2:1 redundancy	No PoE power

For more information, see EPS-600LS External Power Module on page 170.

Summit X450, X450a, and X450e Series Switch LEDs

The following sections describe the meanings of the LEDs on the Summit X450, X450a, and X450e series switches.

Table 30: Front Panel

Label or Type	Color/State	Meaning
MGMT	Blinking green (fast)	Power-on self-test (POST) in progress.
	Steady green	POST passed. System is booting image.
	Blinking green (slow)	Normal operation
	Blinking amber	Switch diagnostics running. or System is disabled. POST failed or system overheated.
	Off	No external power attached.
FAN	Steady green	Normal operation
	Steady amber*	A single fan in the array has failed. The switch can continue to operate indefinitely.
	Blinking amber	Failure or Two or more fans in the array have failed. Because system cooling is compromised, you should replace the switch.*
	Off	No power
PSU-I (Internal power supply)	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-E (External power supply)	Steady green	Normal operation
	Blinking amber	Failure
	Off	No external power attached.
Ethernet Ports 1 – 24 or 1 – 48 (21 – 24 and 45 – 48 are shared ports)	Steady green	Link OK
	Blinking green	Activity
	Off	Link is not present or port is disabled.

[1] These states for the Fan LED occur only on Summit X450a-48tDC switches with a manufacturing part number of 800294-00 and X450a-48tDC-TAA switches with a manufacturing part number of 800337-00.

Table 30: Front Panel (continued)

Label or Type	Color/State	Meaning
Stack Number Indicator	Top half of number blinking	This switch is the stack master.
	Lower half of number blinking	This switch is the stack backup.
	Number lights steadily	This switch is a standby node (neither the master nor the backup).
	LED dark	This stackable switch is not in stacking mode.

Table 31: Additional Port LED meanings for PoE switches: Summit X450e-24p & Summit X450e-48p

Label or Type	Color/State	Meaning
All front-panel ports	Steady amber	Port is powered with link, with no traffic.
	Blinking amber	Port is powered with link, with traffic.
	Slow blinking amber	Port is powered, with no link.
	Alternating amber and green	Port has a fault.
	Off	Port is not powered, has no link, or is disabled.

Table 32: Rear Panel

Label or Type	Color/State	Meaning
Management Port	Steady green	Link OK
	Blinking green	Activity
Stacking Port	Steady green	Link OK
	Blinking green	Activity
SFP 1G Port (on installed option card)	Steady green	Link OK
	Blinking green	Activity
XENPAK 10G Port (on installed option card)	Steady green	Link OK
	Blinking green	Activity
XFP 10G Port (on installed option card)	Steady green	Link OK
	Blinking green	Activity

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 103
- ExtremeSwitching X450-G2-24t-10GE4 Switch Ports and Slots on page 104
- ExtremeSwitching X450-G2-48t-GE4 Switch Ports and Slots on page 107
- ExtremeSwitching X450-G2-48t-10GE4 Switch Ports and Slots on page 108
- ExtremeSwitching X450-G2-24p-GE4 Switch Ports and Slots on page 105
- ExtremeSwitching X450-G2-24p-10GE4 Switch Ports and Slots on page 106
- ExtremeSwitching X450-G2-48p-GE4 Switch Ports and Slots on page 109
- ExtremeSwitching X450-G2-48p-10GE4 Switch Ports and Slots on page 110

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 185.

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.

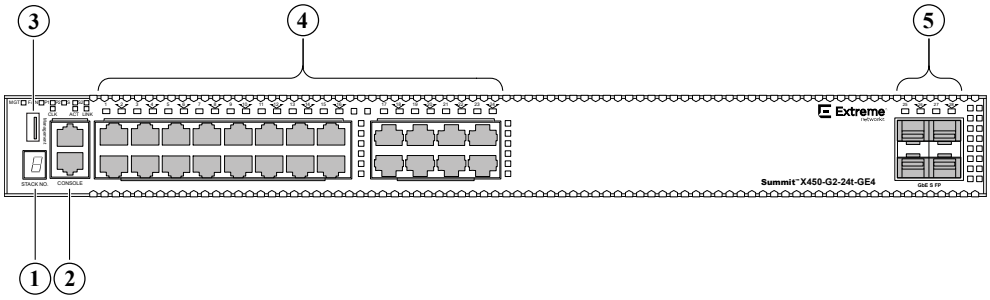


Figure 90: X450-G2-24t-GE4 Front Panel

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

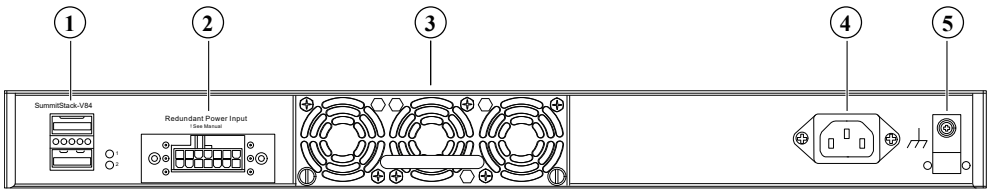


Figure 91: X450-G2-24t-GE4 Rear Panel

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.

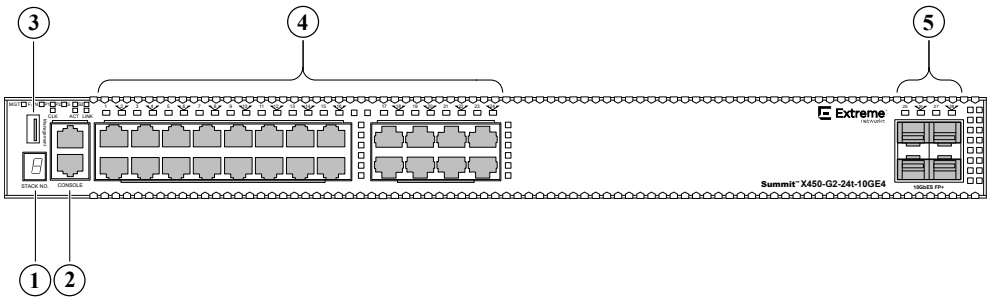


Figure 92: X450-G2-24t-10GE4 Front Panel

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

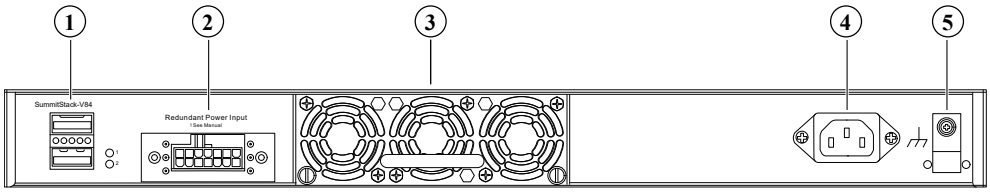


Figure 93: X450-G2-24t-10GE4 Rear Panel

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-G2-24p-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.

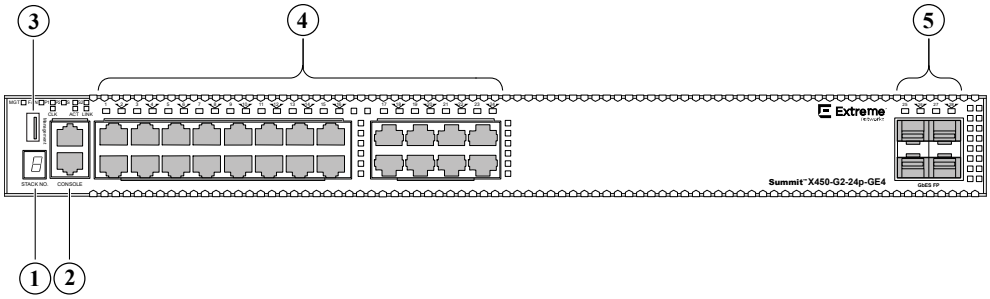


Figure 94: X450-G2-24p-GE4 Front Panel

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

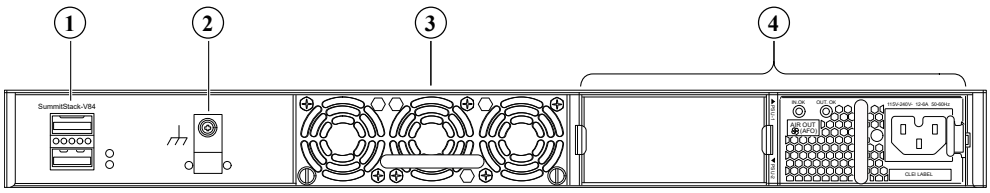


Figure 95: X450-G2-24p-GE4 Rear Panel

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.

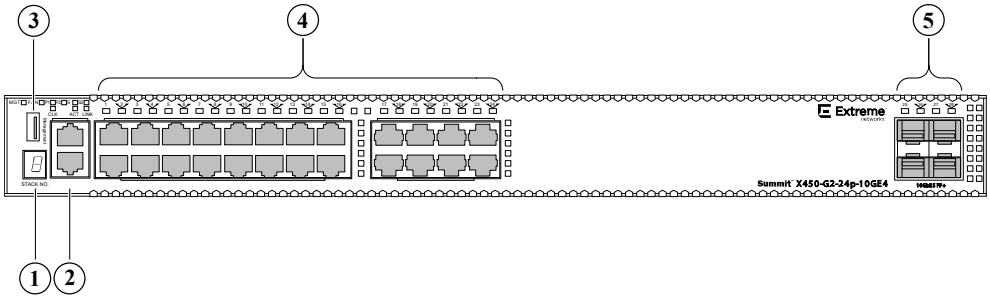


Figure 96: X450-G2-24p-10GE4 Front Panel

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	

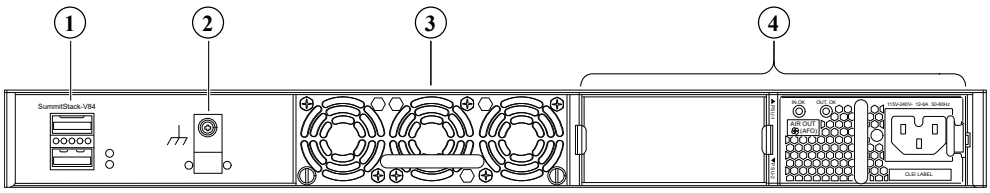


Figure 97: X450-G2-24p-10GE4 Rear Panel

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

ExtremeSwitching X450-G2-48t-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.

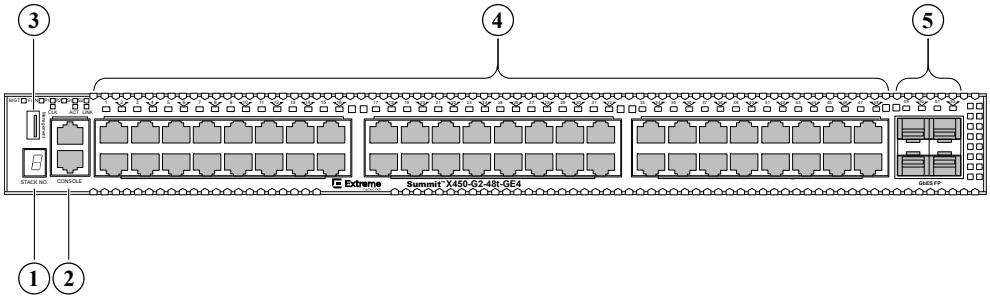


Figure 98: X450-G2-48t-GE4 Front Panel

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

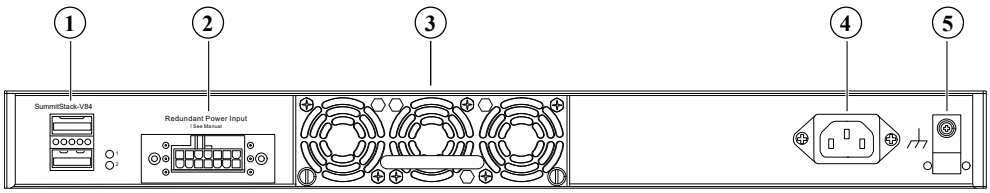


Figure 99: X450-G2-48t-GE4 Rear Panel

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.

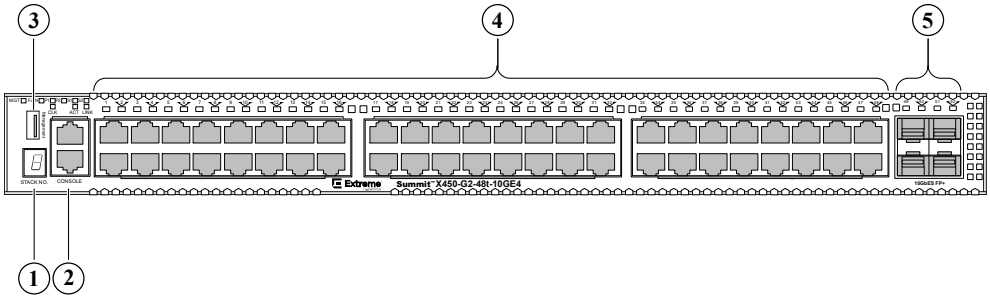


Figure 100: X450-G2-48t-10GE4 Front Panel

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

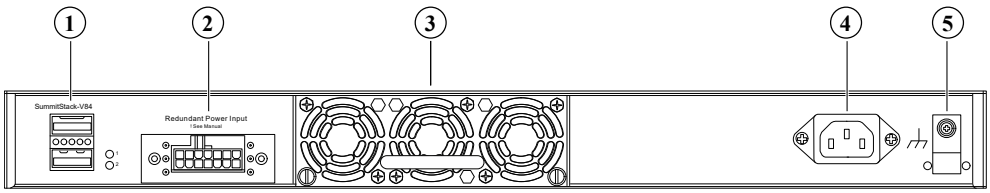


Figure 101: X450-G2-48t-10GE4 Rear Panel

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-G2-48p-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.

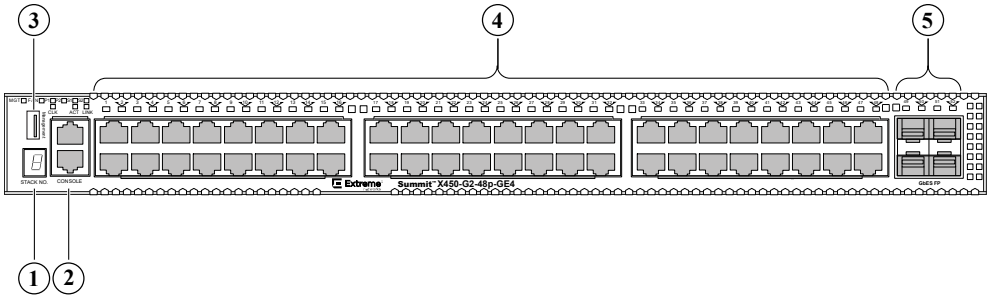


Figure 102: X450-G2-48p-GE4 Front Panel

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	

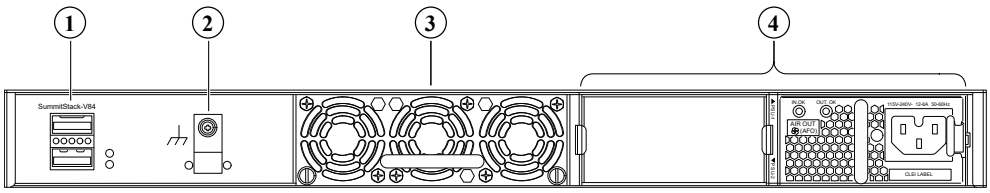


Figure 103: X450-G2-48p-GE4 Rear Panel

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.

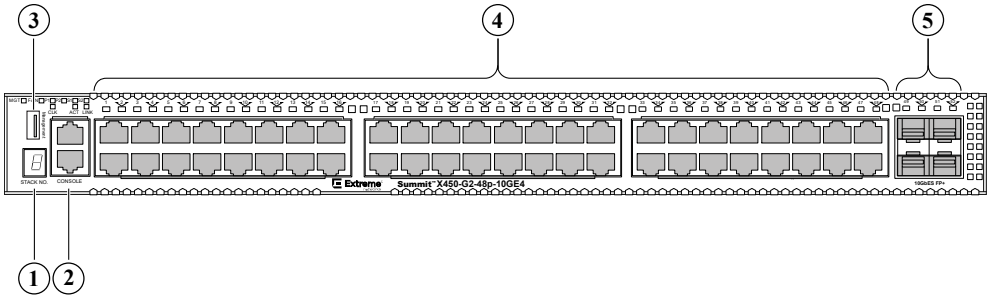


Figure 104: X450-G2-48p-10GE4 Front Panel

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	

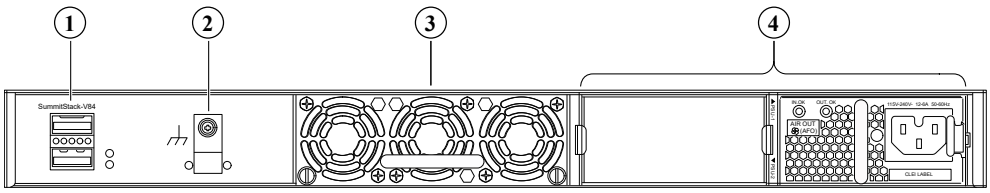


Figure 105: X450-G2-48p-10GE4 Rear Panel

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 33: 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 33: 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 34: 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 35: X450-G2 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	*Reserved for future use.*	
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

Summit X460 Series Switches

The Summit X460 series switches are 24-port or 48-port switches that provide Ethernet connectivity using fixed 10/100/1000BASE-T RJ45 ports or installable SFP or SFP+ optical modules.

Two Summit X460 models support the PoE+ IEEE 802.3at standard and provide up to 30 Watts of power per port. These models provide a total switch PoE power budget of 380 Watts with a single installed power supply and 760 Watts with two installed power supplies.

Four of the Summit X460 models include ports that support Synchronous Ethernet. Five models have four combination ports that provide 10/100/1000 BASE-T or SFP connectivity for 4 Gbps of copper or fiber connectivity.

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 Ethernet management port supports 10/100/1000 Mbps speeds.

The rear panel of the switch provides slots for installing the Summit option cards listed in the following table. These port option cards allow you to add high-speed data ports or stacking ports to the switch.

Summit X460 series switches require an ExtremeXOS version of at least 12.5.1 but not greater than 16.x.

Port Option Cards for Summit X460 Series Switches

Table 36: Slot A

Option Card Model	Connector Type	Port Type	More Information
XGM3-2sf	10-gigabit SFP+ modules	Data	#unique_119
XGM3S-2sf	10-gigabit SFP+ modules	Data with SyncE support	#unique_120
XGM3S-2xf	10-gigabit XFP modules	Data with SyncE support	#unique_121

Table 37: Slot B

Option Card Model	Connector Type	Port Type	More Information
SummitStack stacking module	Integrated stacking ports	20-Gbps bidirectional stacking	#unique_122
SummitStack-V80 stacking module	QSFP+ optical modules or QSFP+ compatible active or passive cables	20-Gbps bidirectional stacking	#unique_122
XGM3SB-4sf	10-gigabit SFP+ modules	Data with SyncE support	#unique_123

Cooling is provided by a replaceable fan module. Two power supply bays accommodate either an AC or DC power supply; the PoE-capable models require a specific AC power supply. For more information about the power supplies used in the Summit X460 switches, see Replaceable Internal Power Supplies on page 185.

The Summit X460 series switches include the following base models:

- Summit X460-24t Switch Ports and Slots on page 114
- Summit X460-24x Switch Ports and Slots on page 115
- Summit X460-24p Switch Ports and Slots on page 116
- Summit X460-48t Switch Ports and Slots on page 117
- Summit X460-48x Switch Ports and Slots on page 118
- Summit X460-48p Switch Ports and Slots on page 119

Summit X460-24t Switch Ports and Slots

The front panel of the Summit X460-24t switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24) that provide 24 Gbps of high-density copper connectivity
- Eight unpopulated SFP ports (ports 21–28) that provide 8 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X460 Series Switch LEDs on page 120.
- Stack number indicator.

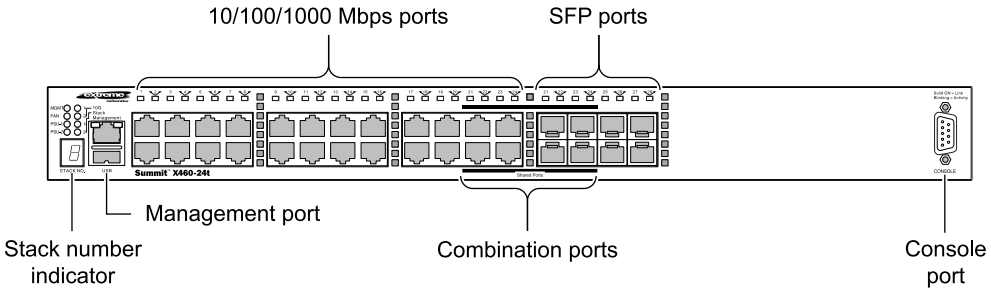


Figure 106: Summit X460-24t Switch Front Panel

The rear panel of the Summit X460-24t switch (Figure 107 on page 115) includes:

- Two slots for port option cards or stacking modules (see Port Option Cards for Summit X460 Series Switches on page 113).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 300 W AC and DC Power Supplies on page 187).

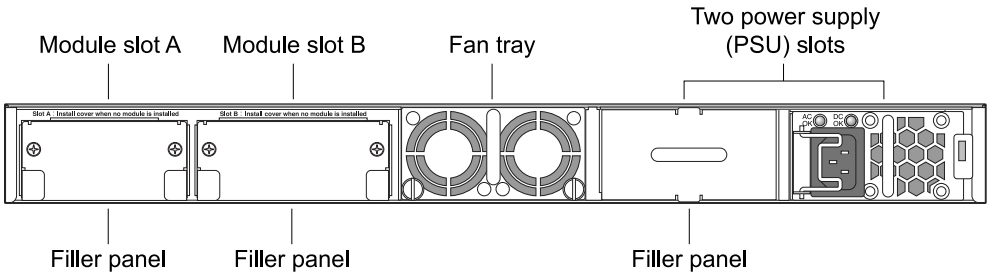


Figure 107: Summit X460-24t Switch Rear Panel

Summit X460-24x Switch Ports and Slots

The front panel of the Summit X460-24x switch includes:

- Twenty-four unpopulated SFP ports (ports 1–24) that provide 24 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Eight fixed autosensing 10/100/1000BASE-T ports (ports 21–28) that provide 8 Gbps of high-density copper connectivity.
  - Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.
  - Ports 1 through 28 support Synchronous Ethernet. For information about this feature, see the *ExtremeXOS 22.6 User Guide*.
- 10/100/1000 Mbps management port.
- 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 X460 Series Switch LEDs on page 120.
- Stack number indicator.

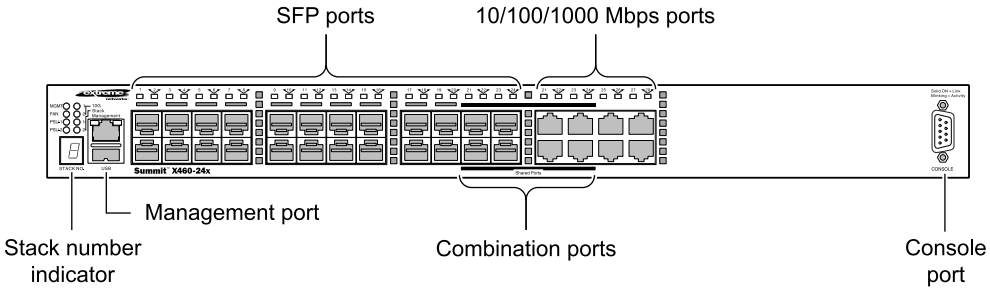


Figure 108: Summit X460-24x Switch Front Panel

The rear panel of the Summit X460-24x switch (Figure 109 on page 116) includes:

- Two slots for port option cards or stacking modules (see Port Option Cards for Summit X460 Series Switches on page 113).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 300 W AC and DC Power Supplies on page 187).

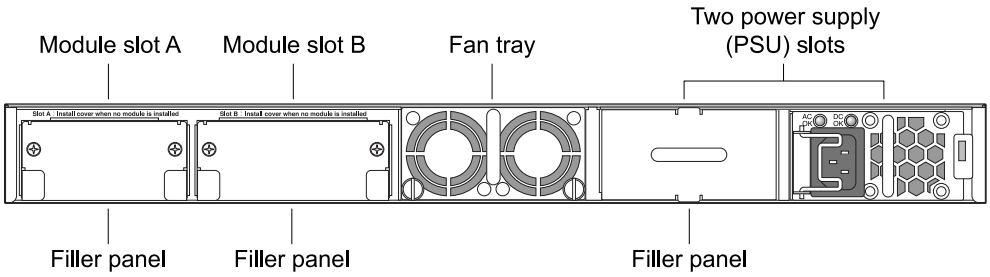


Figure 109: Summit X460-24x Switch Rear Panel

Summit X460-24p Switch Ports and Slots

The front panel of the Summit X460-24p switch includes:

- Twenty-four fixed autosensing 10/100/1000BASE-T ports (ports 1–24). In addition to 24 Gbps of high-density copper connectivity, these ports also provide up to 30 Watts of PoE per port.
- Eight unpopulated SFP ports (ports 21–28) that provide 8 Gbps of fiber connectivity. The SFP ports support both 100BASE-X and 1000BASE-X optical modules.

  Ports 21 through 24 are implemented as shared ports that pair a copper port with a fiber port. For more information about combination ports, see Combination Ports and Failover on page 25.

  For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X460 Series Switch LEDs on page 120.
- Stack number indicator.

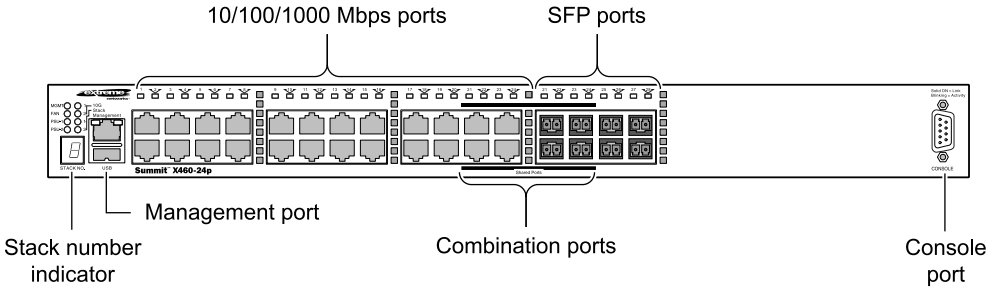


Figure 110: Summit X460-24p Switch Front Panel

The rear panel of the Summit X460-24p switch (Figure 111 on page 117) includes:

- Two slots for port option cards or stacking modules (see Port Option Cards for Summit X460 Series Switches on page 113).
- Replaceable fan tray.

- Two power supply bays for the Summit 750 W AC power supply (see Summit 750 W AC Power Supply on page 189).

Note

Only the Summit 750 W AC power supply is compatible with the Summit X460-24p switch. Other Summit replaceable power supplies do not support PoE operation in this switch.

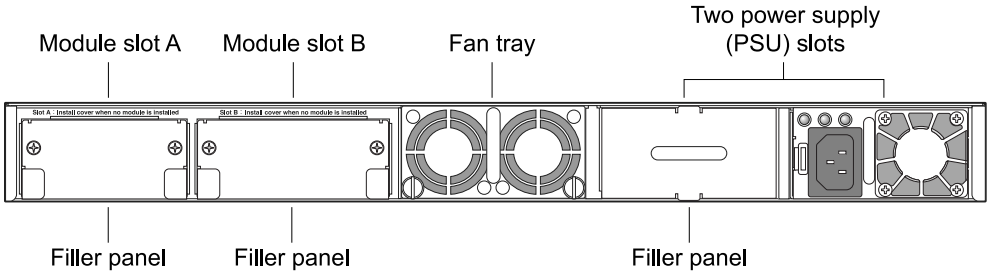


Figure 111: Summit X460-24p Switch Rear Panel

Summit X460-48t Switch Ports and Slots

The front panel of the Summit X460-48t switch includes:

- Forty-eight fixed autosensing 10/100/1000BASE-T ports (ports 1–48) that provide 48 Gbps of high-density copper connectivity.
- Four unpopulated SFP ports (ports 49–52) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X460 Series Switch LEDs on page 120.
- Stack number indicator.

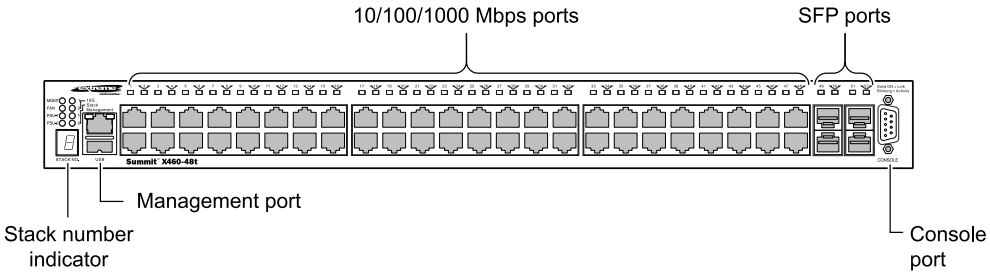


Figure 112: Summit X460-48t Switch Front Panel

The rear panel of the Summit X460-48t switch includes:

- Two slots for port option cards or stacking modules (see Port Option Cards for Summit X460 Series Switches on page 113).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 300 W AC and DC Power Supplies on page 187).

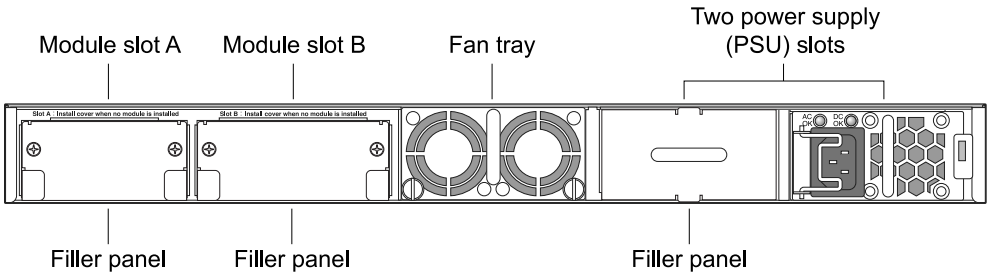


Figure 113: Summit X460-48t Switch Rear Panel

Summit X460-48x Switch Ports and Slots

The front panel of the Summit X460-48x switch includes:

- All the front-panel ports on the Summit X460-48x switch support Synchronous Ethernet. For information about this feature, see the *ExtremeXOS 22.6 User Guide*. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X460 Series Switch LEDs on page 120.
- Stack number indicator.

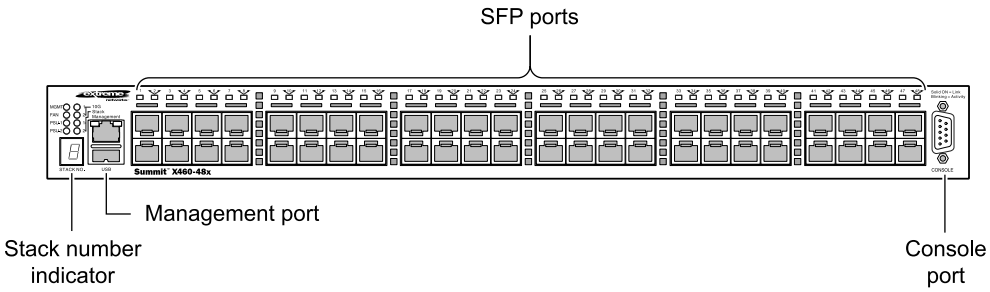


Figure 114: Summit X460-48x Switch Front Panel

The rear panel of the Summit X460-48x switch includes:

- Two slots for port option cards or stacking modules (see Port Option Cards for Summit X460 Series Switches on page 113).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 300 W AC and DC Power Supplies on page 187).

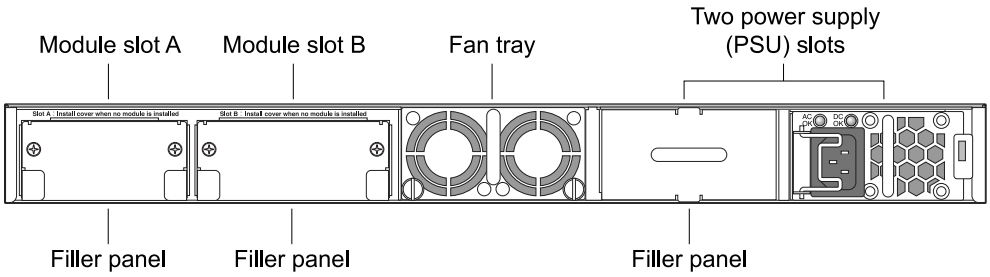


Figure 115: Summit X460-48x Switch Rear Panel

Summit X460-48p Switch Ports and Slots

The front panel of the Summit X460-48p switch includes:

- Forty-eight autosensing 10/100/1000BASE-T ports (ports 1–48). In addition to 48 Gbps of high-density copper connectivity, these ports provide up to 30 Watts of PoE per port.
- Four unpopulated SFP ports (ports 49–52) that provide 4 Gbps of fiber connectivity. The SFP ports support both 100BASE-FX and 1000BASE-X optical modules. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X460 Series Switch LEDs on page 120.
- Stack number indicator.

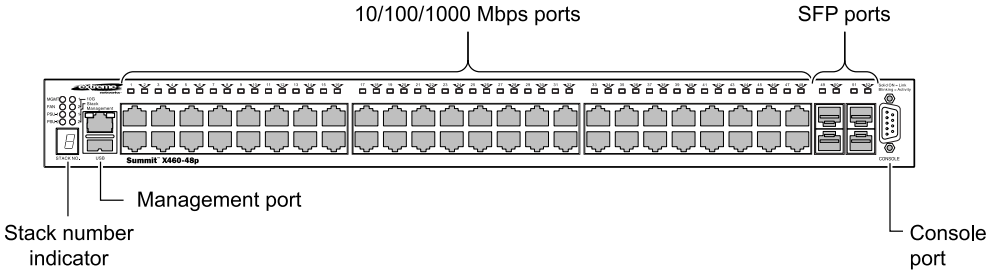


Figure 116: Summit X460-48p Switch Front Panel

The rear panel of the Summit X460-48p switch (Figure 117 on page 120) includes:

- Two slots for port option cards or stacking modules (see Port Option Cards for Summit X460 Series Switches on page 113).
- Replaceable fan tray.
- Two power supply bays for the Summit 750 W AC power supply (see Summit 750 W AC Power Supply on page 189).

Note

Only the Summit 750 W AC power supply is compatible with the Summit X460-24p switch. Other Summit replaceable power supplies do not support PoE operation in this switch.

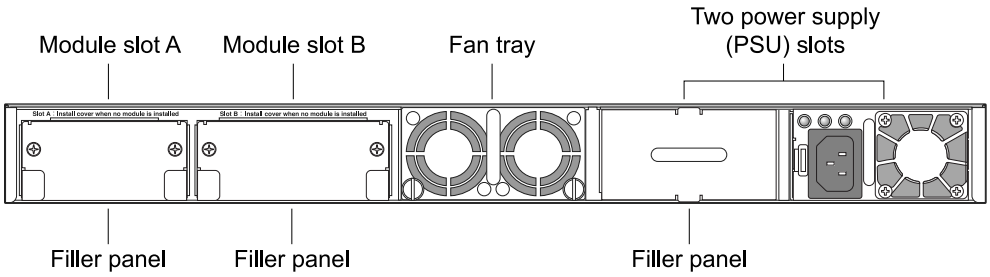


Figure 117: Summit X460-48p Switch Rear Panel

Summit X460 Series Switch LEDs

The following sections describe the meanings of the LEDs on the Summit X460 series switches.

Table 38: Front Panel LEDs

Label or Type	Color/State	Meaning
M (Management)	Fast blinking green (2 Hz)	Power-on self test (POST) in progress.
	Steady green	POST passed. System is booting image.
	Slow blinking green (1 Hz)	Normal operation
	Blinking amber	Switch diagnostics are running. or System is disabled. Post failed or system overheated.
	Off	No external power is attached.
FAN	Steady green	Normal operation.
	Blinking amber	Failure.
	Off	No power.
PSU-1, PSU-2	Steady green	Normal operation.
	Steady amber	Power is attached, but no power is on.
	Blinking amber	Failure.
	Off	No power is attached.
10G 1 – 2	Steady green	Link OK on the indicated 10-Gbps port.
	Blinking green	Activity on the indicated 10-Gbps port.

Table 38: Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
Stack Management 1 – 2	Steady green	Link OK on the indicated stacking port.
	Blinking green	Activity on the indicated stacking port.

Table 39: 2-digit Stack number Indicator

Label or Type	Color/State	Meaning
Left digit (1)		*Reserved for future use*
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.
Ethernet Ports 1 – 28 or 1 – 48	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled.

Table 40: Additional Port LED meanings for PoE switches: Summit X460-24p & Summit X460-48p

Label or Type	Color/State	Meaning
All front-panel ports	Steady amber	Port is powered with link, no traffic
	Blinking amber	Port is powered with link, traffic
	Off	Port is not powered, has no link, or is disabled
Management Port	Steady green	Link OK
	Blinking green	Activity
	Off	No link, or port is disabled.

Table 41: Back Panel

Label or Type	Color/State	Meaning
Port LED (on installed port option card)	Steady green	Link OK
	Blinking green	Activity
Stacking Port LED (on installed SummitStack or SummitStack-V80 module)	Steady green	Link OK
	Blinking green	Activity

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.

All X460-G2 ports are full-duplex. They do not support half-duplex operation.

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

- ExtremeSwitching X460-G2-24t-GE4 Switch Ports and Slots on page 123
- ExtremeSwitching X460-G2-24t-10GE4 Switch Ports and Slots on page 124
- ExtremeSwitching X460-G2-24x-10GE4 Switch Ports and Slots on page 125
- ExtremeSwitching X460-G2-24p-GE4 Switch Ports and Slots on page 126
- ExtremeSwitching X460-G2-24p-10GE4 Switch Ports and Slots on page 127
- ExtremeSwitching X460-G2-48t-GE4 Switch Ports and Slots on page 128
- ExtremeSwitching X460-G2-48t-10GE4 Switch Ports and Slots on page 129
- #unique_140
- ExtremeSwitching X460-G2-48x-10GE4 Switch Ports and Slots on page 130
- ExtremeSwitching X460-G2-48p-10GE4 Switch Ports and Slots on page 132
- #unique_143
- #unique_144

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 185.

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 260.

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 214.

Note
See the *ExtremeXOS 16.2 User Guide* and the *ExtremeXOS 16.2 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.

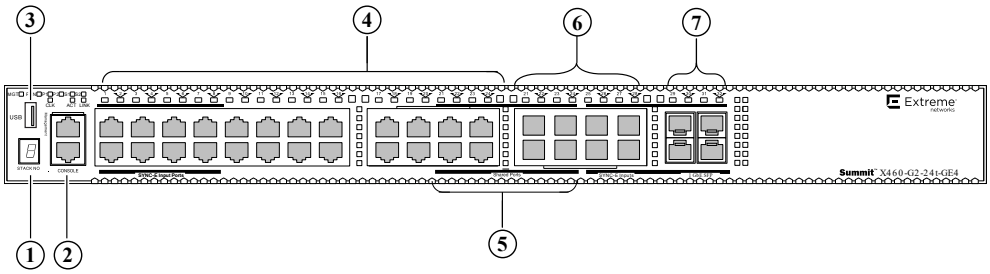


Figure 118: X460-G2-24t-GE4 Front Panel

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

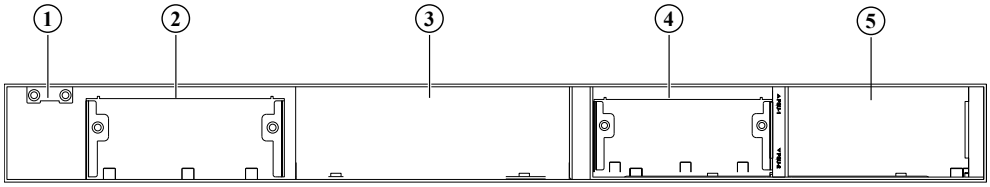


Figure 119: X460-G2-24t-GE4 Rear Panel

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.

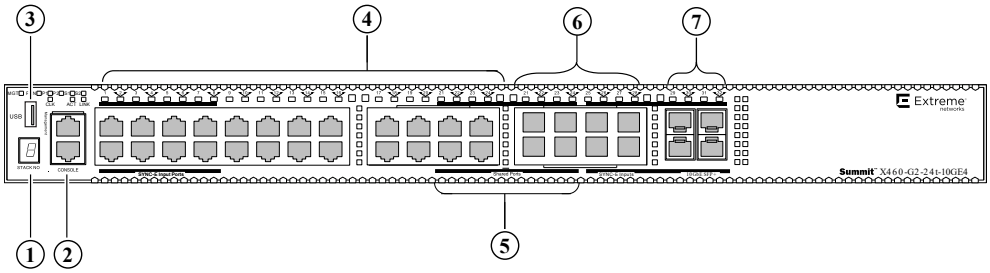


Figure 120: X460-G2-24t-10GE4 Front Panel

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	

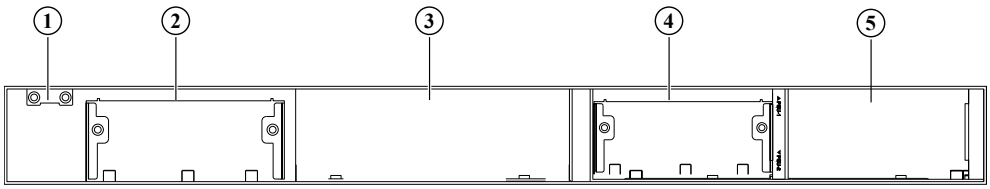


Figure 121: X460-G2-24t-10GE4 Rear Panel

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.

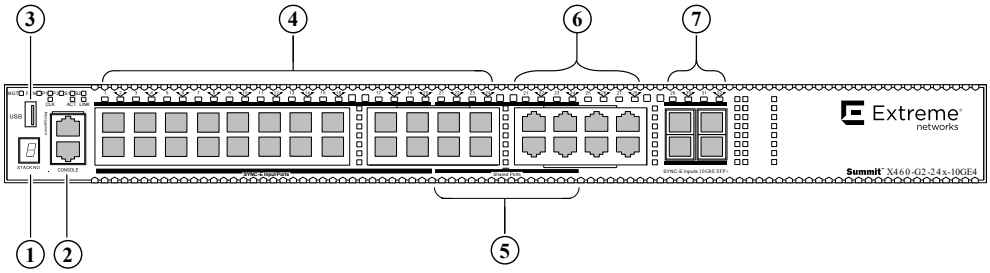


Figure 122: X460-G2-24x-10GE4 Front Panel

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	

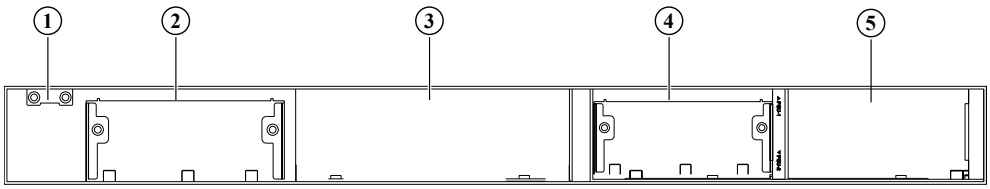


Figure 123: X460-G2-24x-10GE4 Rear Panel

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.

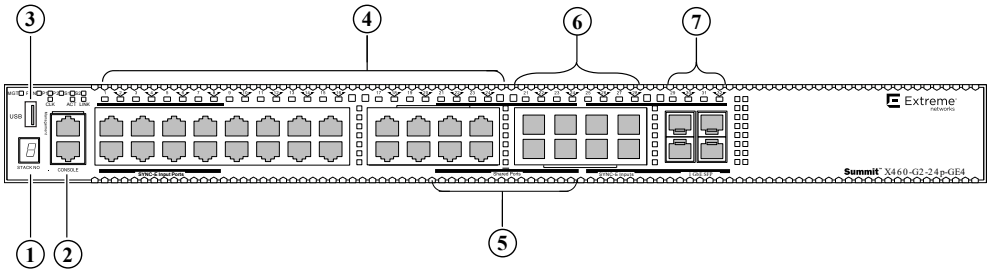


Figure 124: X460-G2-24p-GE4 Front Panel

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

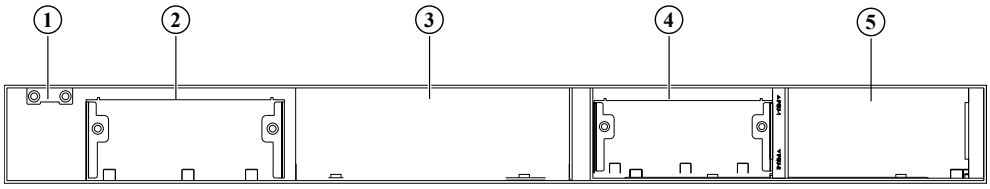


Figure 125: X460-G2-24p-GE4 Rear Panel

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.

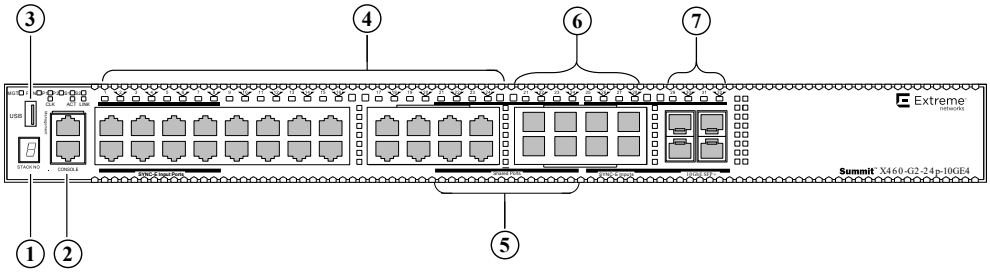


Figure 126: X460-G2-24p-10GE4 Front Panel

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	

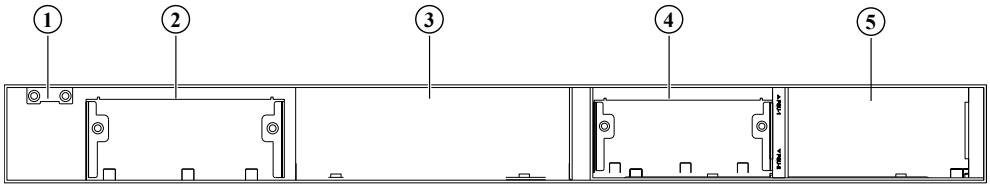


Figure 127: X460-G2-24p-10GE4 Rear Panel

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.

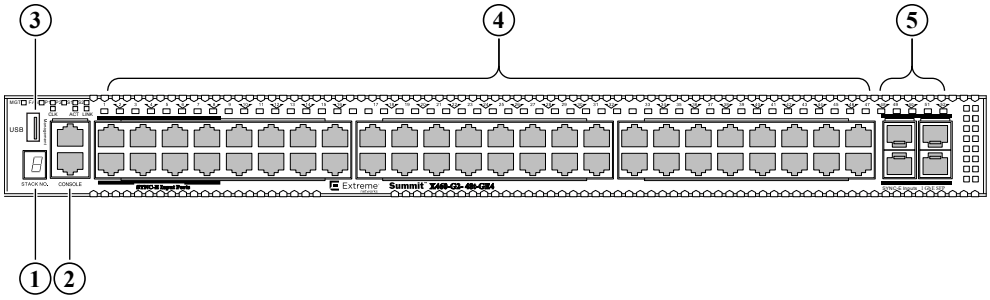


Figure 128: X460-G2-48t-GE4 Front Panel

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

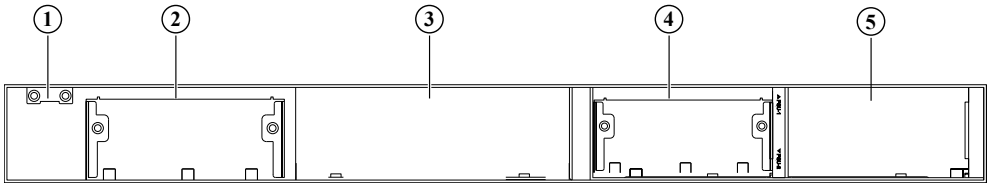


Figure 129: X460-G2-48t-GE4 Rear Panel

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.

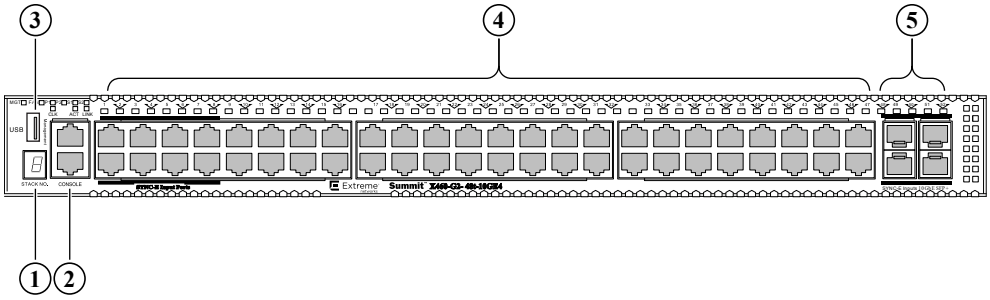


Figure 130: X460-G2-48t-10GE4 Front Panel

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

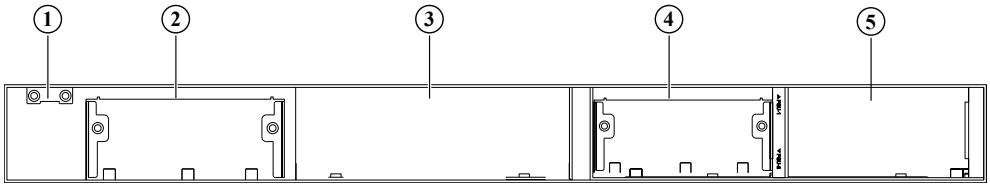


Figure 131: X460-G2-48t-10GE4 Rear Panel

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-G2-48x-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.

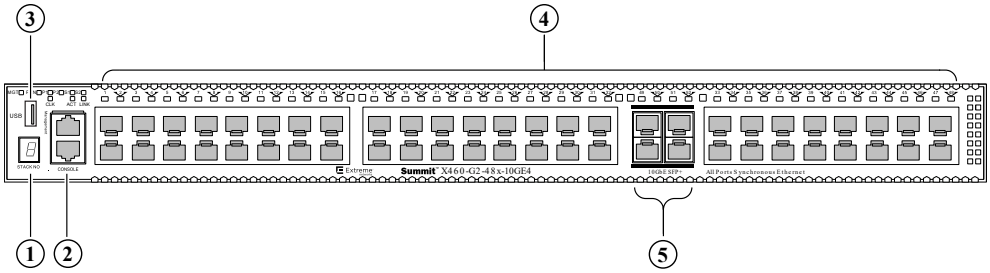


Figure 132: X460-G2-48x-10GE4 Front Panel

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

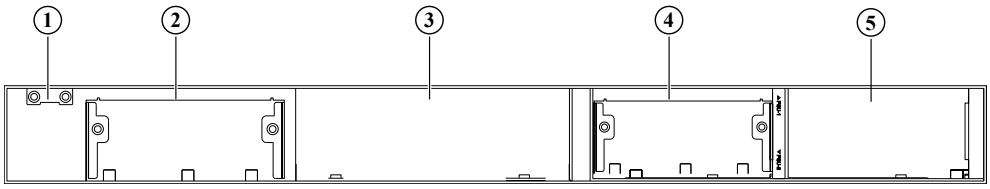


Figure 133: X460-G2-48x-10GE4 Rear Panel

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.

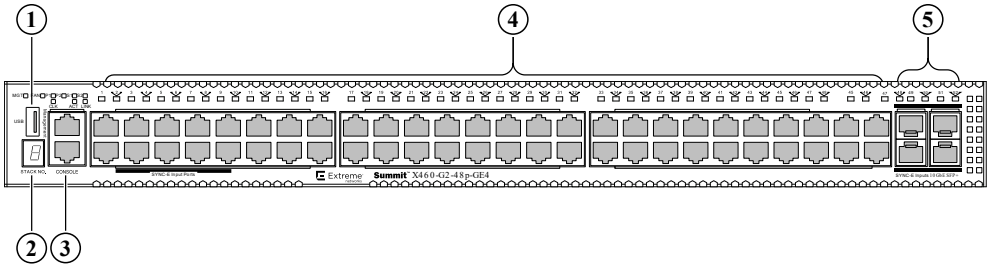


Figure 134: Summit X460-G2-48p-GE4 Front Panel

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	

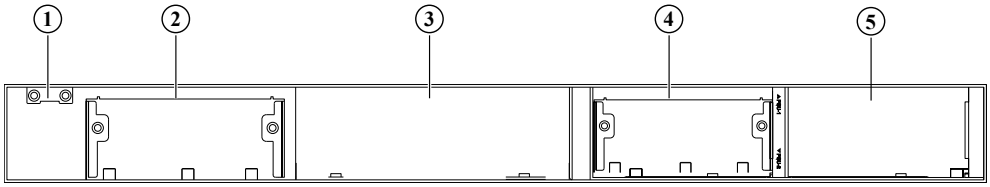


Figure 135: Summit X460-G2-48p-GE4 Rear Panel

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.

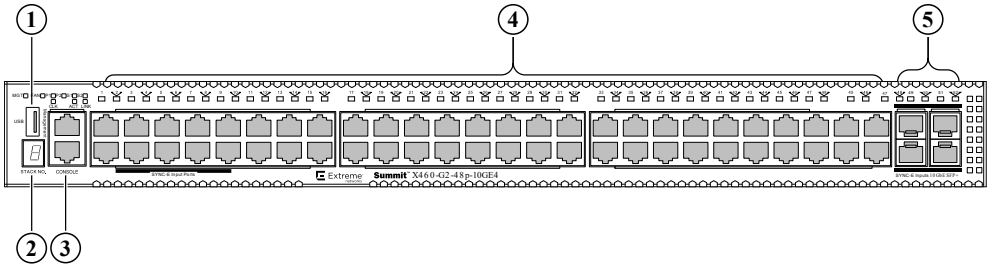


Figure 136: X460-G2-48p-10GE4 Front Panel

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	

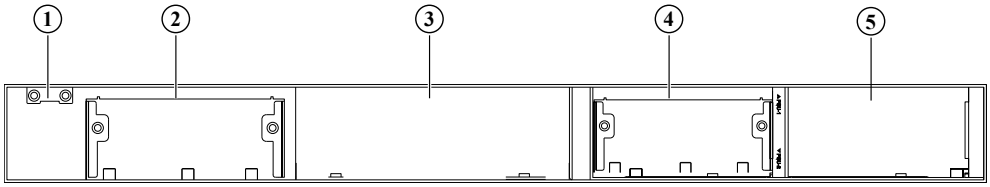


Figure 137: X460-G2-48p-10GE4 Rear Panel

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 Series Switch LEDs

Table 42 describes the meanings of the front-panel LEDs on all X460-G2 series switches.

Table 42: 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
S1, S2 (Stack Management)	Steady green	Link OK on the indicated stacking port
	Blinking green	Activity on the indicated stacking port

Table 42: X460-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	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 43 on page 134 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 43: 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 44 describes the meanings of the two-digit stack number indicator on all X460-G2 series switches.

Table 44: X460-G2 two-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	*Reserved for future use*	
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

Summit X480 Series Switches

The Summit X480 series switches are 24-port or 48-port switches that provide Ethernet connectivity using fixed 10/100/1000BASE-T RJ45 ports, installable SFP optical modules, or installable XFP optical modules. The Summit X480 series switches include the following base models:

- Summit X480-24x Switch Ports and Slots on page 136
- Summit X480-48t Switch Ports and Slots on page 137
- Summit X480-48x Switch Ports and Slots on page 137

Summit X480 series switches require an ExtremeXOS version of at least 12.4.1 but not greater than 16.x.

A serial console port on the front panel of the Summit X480 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 rear panel of the switch provides a slot for an installed option card called a versatile interface module or VIM. The VIMs allow you to add high-speed data ports or stacking ports to the switch. The following table lists the available VIM types for the Summit X480 series switches.

Note
Only VIM2 modules are compatible with the Summit X480 switches. Other VIM types that may appear to be mechanically compatible with the Summit X480 switches will not function if they are installed in these switches.

Table 45: Versatile Interface Modules for Summit X480 Series Switches

VIM Model	Number of Ports	Port Type	For More Information
VIM2-10G4X	4	10-Gbps XFP data	#unique_152
VIM2-SummitStack	2	20-Gbps stacking	#unique_153
VIM2-SummitStack128	2	64-Gbps stacking	#unique_154
VIM2-SummitStack-V80	2	40-Gbps stacking	#unique_155

Switch cooling is provided by a replaceable fan module. Two power supply bays accommodate either AC or DC power supplies.

Summit X480-24x Switch Ports and Slots

The front panel of the Summit X480-24x switch includes:

- Twelve autosensing 100/1000BASE-X ports (ports 1–12) that provide 12 Gbps of high-density fiber (SFP) connectivity.
- Twelve combination ports (ports 13–24) using RJ45 connectors or SFPs to provide 12 Gbps of copper or fiber connectivity. The SFP ports support both 100BASE-X and 1000BASE-X optical modules. For more information about combination ports, see Combination Ports and Failover on page 25. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- Two unpopulated 10-Gbps XFP-based ports.
- 10/100/1000 Mbps management port.
- 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 X480 Series Switch LEDs on page 138.
- Stack number indicator.

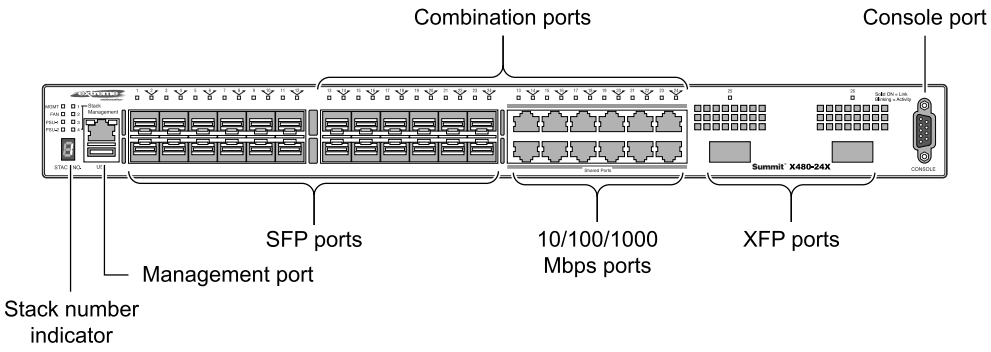


Figure 138: Summit X480-24x Switch Front Panel

The rear panel of the Summit X480-24x switch (Figure 139 on page 136) includes:

- Slot for a VIM2 versatile interface module (see #unique_157).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 450 W AC and DC Power Supplies on page 188).

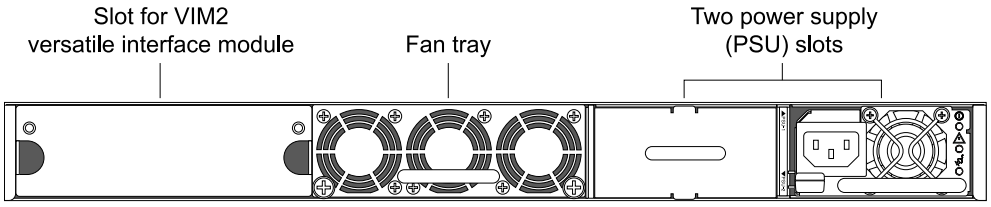


Figure 139: Summit X480-24t Rear Panel

Summit X480-48t Switch Ports and Slots

The front panel of the Summit X480-48t switch includes:

- Forty-four fixed 10/100/1000BASE-T autosensing ports (ports 1–44) that provide 44 Gbps of high-density copper connectivity.
- Four combination ports (ports 45–48) using RJ45 connectors or SFPs to provide 4 Gbps of copper or fiber connectivity. The SFP ports support both 100BASE-X and 1000BASE-X optical modules. For more information about combination ports, see Combination Ports and Failover on page 25. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X480 Series Switch LEDs on page 138.
- Stack number indicator.

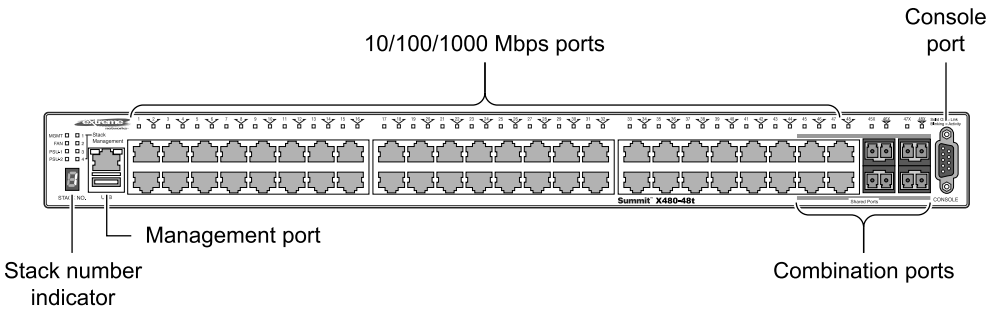


Figure 140: Summit X480-48t Switch Front Panel

The rear panel of the Summit X480-48t switch (Figure 141 on page 137) includes:

- Slot for a VIM2 versatile interface module (see #unique_157).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 450 W AC and DC Power Supplies on page 188).

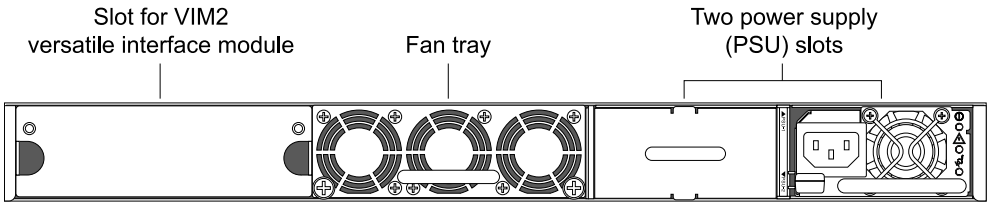


Figure 141: Summit X480-48t Rear Panel

Summit X480-48x Switch Ports and Slots

The front panel of the Summit X480-48x switch includes:

- Forty-eight 100/1000BASE-X SFP ports that provide 48 Gbps of high-density fiber connectivity. For information about SFPs, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000 Mbps management port.
- 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 X480 Series Switch LEDs on page 138.
- Stack number indicator.

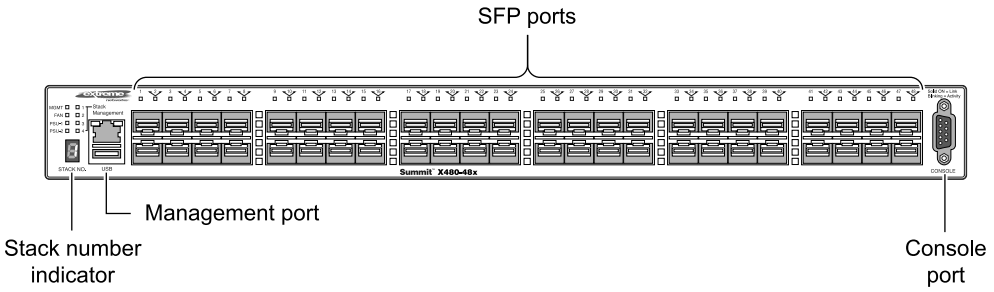


Figure 142: Summit X480-48x Switch Front Panel

The rear panel of the Summit X480-48x switch (Figure 143 on page 138) includes:

- Slot for a VIM2 versatile interface module (see #unique_157).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 450 W AC and DC Power Supplies on page 188).

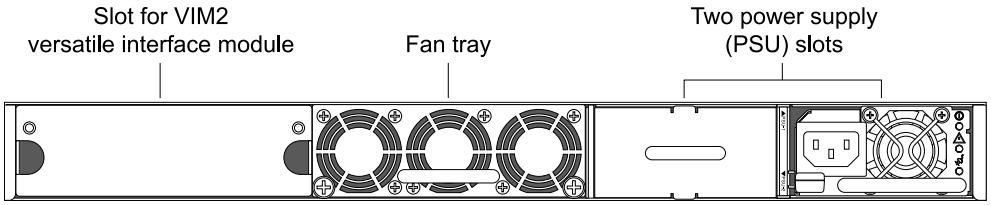


Figure 143: Summit X480-48x Rear Panel

Summit X480 Series Switch LEDs

The following sections describe the meanings of the LEDs on Summit X480 switches.

Table 46: Front Panel LEDs

Label or Type	Color/State	Meaning
MGMT	Blinking green (slow)	Normal operation
	Blinking green (rapid)	Switch is booting; power-on self test (POST) is in progress.
	Blinking amber	Power-on self test (POST) failed.
	Off (FAN and PSU are also off.)	No external power is attached.
	Off (FAN and PSU are lit.)	Switch is booting.

Table 46: Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
FAN	Steady green	Normal operation
	Blinking green (rapid)	Power-on self test (POST) is in progress.
	Blinking amber	Failure
	Off	No power
PSU-1	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power; no power supply present.
PSU-2	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power; no power supply present.
Stack Management 1 – 4	Steady green	Link OK on the indicated stacking port.
	Blinking green	Activity on the indicated stacking port.

Table 47: 2-digit Stack number Indicator

Label or Type	Color/State	Meaning
Left digit (1)		*Reserved for future use.*
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.
Ethernet Ports 1 – 24 or 1 – 48	Steady green	Link OK
	Blinking green	Activity
	Off	No link; port is disabled.

Table 48: Management Port

Label or Type	Color/State	Meaning
Left LED	Blinking green	Activity
	Off	No link; 10/100-Mbps link

Table 48: Management Port (continued)

Label or Type	Color/State	Meaning
Right LED	Steady green	1-Gbps link
	Off	No link; 10/100-Mbps link

Table 49: Back Panel

Label or Type	Color/State	Meaning
Stacking Port LED (on installed VIM)	Steady green	Link OK
	Blinking green	Activity
XFP Port LED (on installed VIM)	Steady green	Link OK
	Blinking green	Activity
	Off	Port is disabled.

Summit X650 Series Switches

The Summit X650 series switches have 24 front-panel Ethernet ports that provide 10-gigabit Ethernet connectivity using fixed 10GBASE-T RJ45 ports or installable SFP+ optical modules. The Summit X650 series switches include the following base models:

- Summit X650-24t Switch Ports and Slots on page 141
- Summit X650-24x Switch Ports and Slots on page 142

The X650-24t switch requires an ExtremeXOS version of at least 12.2.1 but not greater than 15.3.x. The X650-24x switch requires an ExtremeXOS version of at least 12.2.2 but not greater than 15.3.x.

A serial console port on the front panel of the Summit X650 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 rear panel of the switch requires an installed versatile interface module or VIM. The following table lists the types of VIM available for the Summit X650 series switch.

Table 50: Versatile Interface Modules for Summit X650 Series Switches

VIM Model	Number of Ports	Port Type	More Information
VIM1-SummitStack	2 4	20-Gbps stacking 1-Gbps SFP data	#unique_161
VIM1-10G8X	2 8	20-Gbps stacking 10-Gbps SFP+ data	#unique_162
VIM1-SummitStack512	4	128-Gbps stacking	#unique_163

Table 50: Versatile Interface Modules for Summit X650 Series Switches (continued)

VIM Model	Number of Ports	Port Type	More Information
VIM1-SummitStack256	2	128-Gbps stacking	#unique_164
VIM3-40G4X	4	40-Gbps QSFP+ data	#unique_165

The Summit X650 series switch must have an installed VIM; the switch will not operate correctly and enter into reboot loop without a VIM.

Note
The Summit X650 switches require VIM1 or VIM3 modules. Other VIM types that may appear to be mechanically compatible with the Summit X650 switches will not function if they are installed in these switches.

Cooling is provided by a replaceable fan module. Two power supply bays accommodate either AC or DC power supplies.

Summit X650-24t Switch Ports and Slots

The front panel of the Summit X650-24t switch includes:

- Twenty-four fixed autosensing 1000/10000 BASE-T ports (ports 1–24) that provide high-density copper connectivity.
- 10/100/1000 Mbps management port.
- 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 X650 Series Switch LEDs on page 143.
- Stack number indicator.

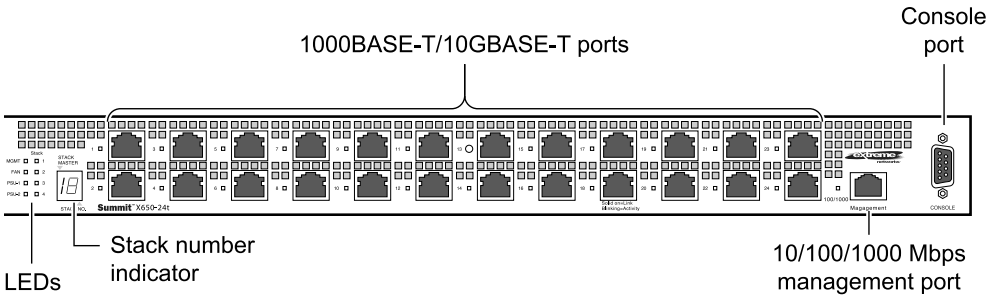


Figure 144: Summit X650-24t Front Panel

The rear panel of the Summit X650-24t switch (Figure 145 on page 142) includes:

- Installed VIM1 versatile interface module (VIM1-SummitStack shown) (see #unique_167).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 850 W AC and DC Power Supplies on page 192).

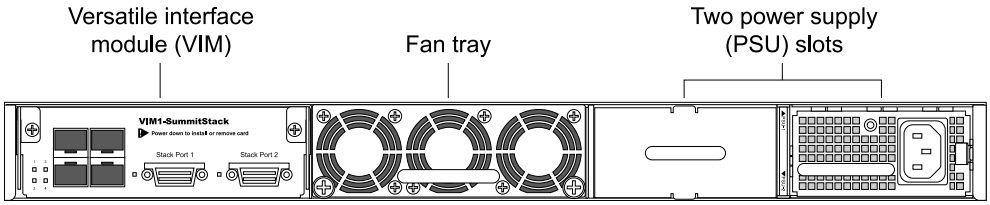


Figure 145: Summit X650-24t Rear Panel

Summit X650-24x Switch Ports and Slots

The front panel of the Summit X650-24x switch includes:

- Twenty-four ports that can use 10GBASE-X SFP+ optical modules. (Ports 1–24 can also be populated with 1000BASE-X SFP modules.)

  For information about supported optical modules, see the latest version of the *ExtremeXOS Release Notes*.
- 10/100/1000 Mbps management port.
- Console port.
- LEDs to indicate port status and switch operating conditions.

  For a description of the LEDs and their operation, see Summit X650 Series Switch LEDs on page 143.
- Stack number indicator.

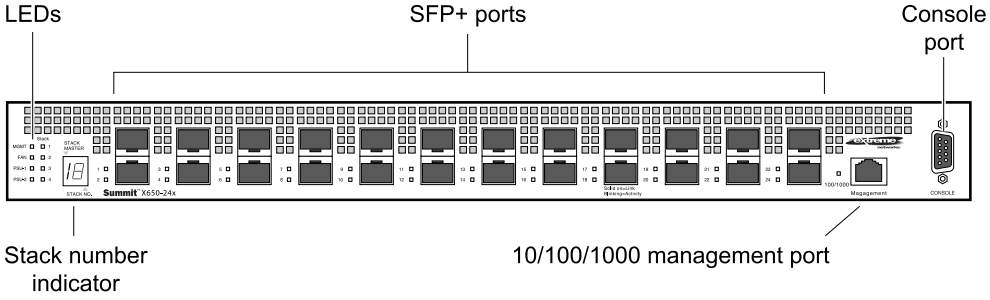


Figure 146: Summit X650-24x Front Panel

The rear panel of the Summit X650-24x switch (Figure 147 on page 142) includes:

- Installed VIM1 versatile interface module (VIM1-SummitStack shown) (see #unique_167).
- Replaceable fan tray.
- Two power supply bays for either AC or DC power supplies (see Summit 850 W AC and DC Power Supplies on page 192).

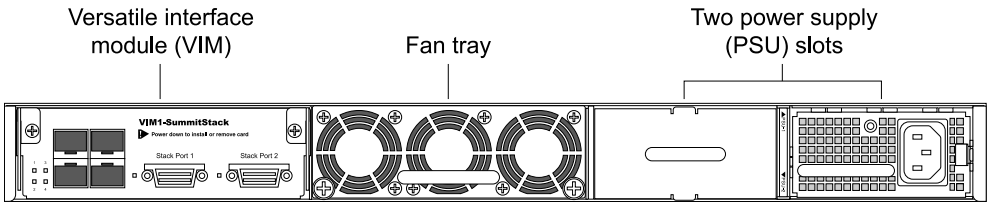


Figure 147: Summit X650-24x Rear Panel

Summit X650 Series Switch LEDs

The following sections describe the meanings of the LEDs on the Summit X650 series switches.

Table 51: Front Panel LEDs

Label or Type	Color/State	Meaning
MGMT	Blinking green	Normal operation
	Blinking amber	Power-on self test (POST) failed; diagnostic test in progress.
	Off	No external power is attached.
FAN	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-1	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
PSU-2	Steady green	Normal operation
	Blinking amber	Failure
	Off	No power
Stack 1 – 4	Steady green	Link OK on the indicated stacking port.
	Blinking green	Activity on the indicated stacking port.

Table 52: 2-digit Stack number Indicator

Label or Type	Color/State	Meaning
Left digit (1)		*Reserved for future use.*
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.
Ethernet Ports 1 – 24	Steady green	Link OK
	Blinking green	Activity
Management Port	Steady green	Link OK
	Blinking green	Activity

Table 53: Back Panel

Label or Type	Color/State	Meaning
	Steady green	Link OK

Table 53: Back Panel (continued)

Label or Type	Color/State	Meaning
Stacking Port LED (on installed VIM1 module)	Blinking green	Activity
SFP/SFP+ port LED (on installed VIM1 module)	Steady green	Link OK
	Blinking green	Activity

Summit X670 Series Switches

The Summit X670 series switches have 48 front-panel Ethernet ports that can provide 10-gigabit Ethernet connectivity using copper ports or installable SFP+ optical modules.

The Summit X670 series switches have 48 front-panel Ethernet ports that provide 10-gigabit Ethernet connectivity using installable SFP+ optical modules. The Summit X670 series switches include the following base models:

- Summit X670-48x Switch Ports and Slots on page 145
- Summit X670V-48x Switch Ports and Slots on page 147
- Summit X670V-48t Switch Ports and Slots on page 146

The minimum required ExtremeXOS version for Summit X670 series switches varies by model. (See the *Extreme Hardware/Software Compatibility and Recommendation Matrices* for details.) The ExtremeXOS version cannot be greater than 16.x.

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 Summit X670-48x and Summit 670V-48x have SFP+ ports 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+ modules can work in both modes.

The Summit X670V-48t has 10G BASE-T copper ports. The switch also has fiber combination ports that support dual interface speeds of Gigabit Ethernet and 10-Gigabit Ethernet.

A serial console port on the front panel of the Summit X670 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 X670-48x and X670V-48x models are equipped with a motion sensor. A motion sensor on the front of the switch allows you to control the power to the port LEDs. When the motion sensor is enabled, the port LEDs are turned off if motion is not detected during a specified amount of time. When motion is detected, the port LEDs are turned back on. You can adjust how long the LEDs stay lit after motion is detected. When the motion sensor is disabled, the port LEDs are always on.

Note

The X670V-48t switch does not have a motion sensor.

The rear panel of the Summit X670V-48t and the X670V-48x switches provides a slot for an option card called a versatile interface module or VIM. The VIM4-40G4X (Part No. 17122) module adds four QSFP+-based 40-Gbps ports to the Summit X670V series switches.

Note
Only VIM4 modules are compatible with the Summit X670 series switches. Other VIM types that may appear to be mechanically compatible with the Summit X670 series switches will not function if they are installed in these switches.

Switch cooling is provided by three 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.

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

Summit X670-48x Switch Ports and Slots

The front panel of the Summit X670-48x switch includes:

- Forty-eight unpopulated optical ports that can accommodate 10GBASE-X SFP+ or 1000BASE-X SFP optical modules to provide high-density fiber connectivity. For information about SFP+ and SFP optical modules, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000-Mbps management port.
- Serial console port used to connect a terminal and perform local management.
- USB port for access to external storage.
- Motion sensor.
- Grounding stud.
- LEDs to indicate port status and switch operating conditions. For a description of the LEDs and their operation, see Summit X670 Series Switch LEDs on page 148.
- Stack number indicator.

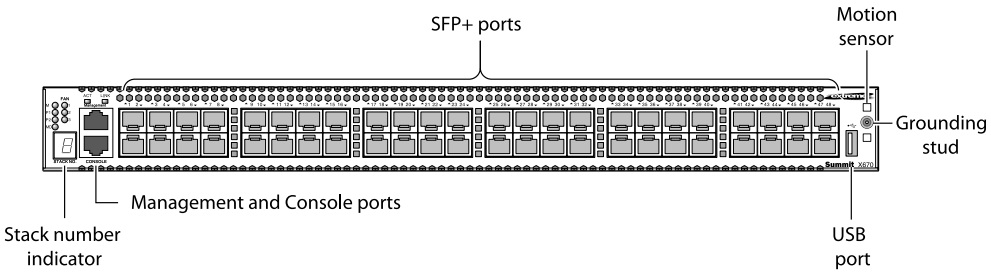


Figure 148: Summit X670-48x Front Panel

The rear panel of the Summit X670-48x switch (Figure 149) includes:

- Three replaceable fan modules.
- Two power supply bays for either AC or DC power supplies (see Summit 450 W AC and DC Power Supplies on page 188 and Summit 550 W AC and DC Power Supplies on page 188).

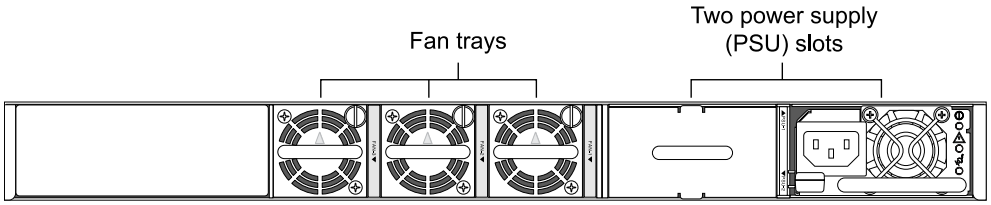


Figure 149: Summit X670-48x Rear Panel

Summit X670V-48t Switch Ports and Slots

The front panel of the Summit X670V-48t switch includes:

- Forty-four 100/1000/10000 BASE-T copper ports plus four combo ports of 10G BASE-X SFP+ and 10G BASE-T (1G/10G dual speed for the combo ports), For information about SFP+ and SFP optical modules, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000-Mbps management port.
- Serial console port used to connect a terminal and perform local management.
- Grounding stud.
- LEDs to indicate port status and switch operating conditions. For a description of the LEDs and their operation, see Summit X670 Series Switch LEDs on page 148.
- Stack number indicator.

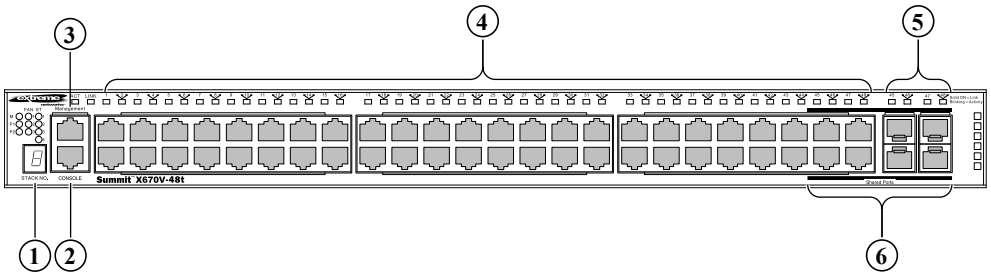


Figure 150: Summit X670V-48t Front Panel

1 = Stack number indicator	4 = 10G BASE-T (100 Mbps/1G/10G Tri-speed) ports

2 = Console port	5 = SFP+ ports
3 = Ethernet management port	6 = Combination ports (1G/10G only)

The rear panel of the Summit X670-48t switch (Figure 151 on page 147) includes:

- Slot for a VIM4-40G4X versatile interface module (see #unique_174).
- Three 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 188).

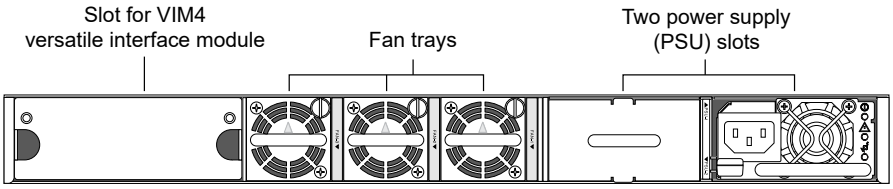


Figure 151: Summit X670V-48t Rear Panel

Summit X670V-48x Switch Ports and Slots

The front panel of the Summit X670V-48x switch includes:

- Forty-eight unpopulated optical ports that can accommodate 10GBASE-X SFP+ or 1000BASE-X SFP optical modules to provide high-density fiber connectivity. For information about SFP+ and SFP optical modules, see the *Extreme Networks Pluggable Transceivers Installation Guide*.
- 10/100/1000-Mbps management port.
- Serial console port used to connect a terminal and perform local management.
- USB port for access to external storage.
- Motion sensor.
- Grounding stud.
- LEDs to indicate port status and switch operating conditions. For a description of the LEDs and their operation, see Summit X670 Series Switch LEDs on page 148.
- Stack number indicator.

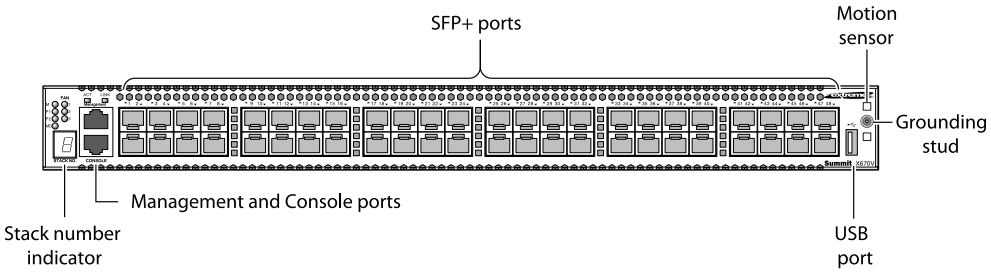


Figure 152: Summit X670V-48x Front Panel

The rear panel of the Summit X670-48x switch includes:

- Slot for a VIM4-40G4X versatile interface module (see #unique_174).
- Three replaceable fan modules.
- Two power supply bays for either AC or DC power supplies (see Summit 450 W AC and DC Power Supplies on page 188 and Summit 550 W AC and DC Power Supplies on page 188).

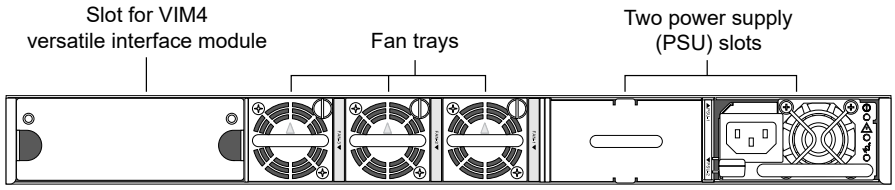


Figure 153: Summit X670V-48x Rear Panel

Summit X670 Series Switch LEDs

The following sections describe the meanings of the LEDs on the Summit X670 and X670V series switches.

Table 54: Front Panel LEDs

Label or Type	Color/State	Meaning
MGT (Management)	Fast blinking green (2 Hz)	Power-on self test (POST) in progress.
	Steady green	POST passed. System is booting image.
	Slow blinking green (1 Hz)	Normal operation
	Blinking amber	Switch diagnostics are running. or System is disabled. Post failed or system overheated.
	Off	No external power is attached.
FAN 1, 2, 3	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.
Stack 1 – 4	Steady green	Link OK on the indicated stacking port.
	Blinking green	Activity on the indicated stacking port.

Table 54: Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
MD	Steady green	The motion detector feature is enabled. This LED stays lit if the motion detector feature shuts down the other LEDs on the switch.
	Blinking green (other switch LEDs are also lit)	Motion has been detected. The green blinking continues for a few seconds, and then the MD LED lights steady green.
	Blinking amber (other switch LEDs are off)	Motion has been detected. The motion detector feature turns on the other switch LEDs. The amber blinking continues for a few seconds, and then the MD LED lights steady green.
	Off	The motion detector feature is disabled.

Table 55: 2-digit Stack number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	*Reserved for future use.*	
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.
Ethernet Ports 1 – 48	Steady green	Link OK
	Blinking green	Activity
	Off	No link or port disabled.
Management Port	Steady green	Link OK
	Blinking green	Activity

Table 56: Back Panel

Label or Type	Color/State	Meaning
QSFP+ port LED (on installed VIM3 module)	Steady green	Link OK
	Blinking green	Activity

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 151

- ExtremeSwitching X670-G2-72x Switch Ports and Slots on page 152

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 16.2 User Guide* and the *ExtremeXOS 16.2 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

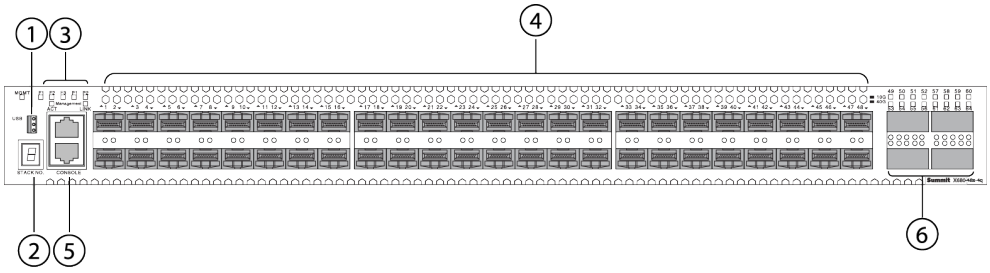


Figure 154: X670-G2-48x-4q Front Panel

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

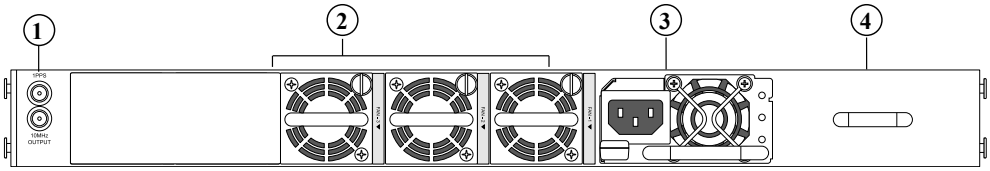


Figure 155: X670-G2-48x-4q Rear Panel

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

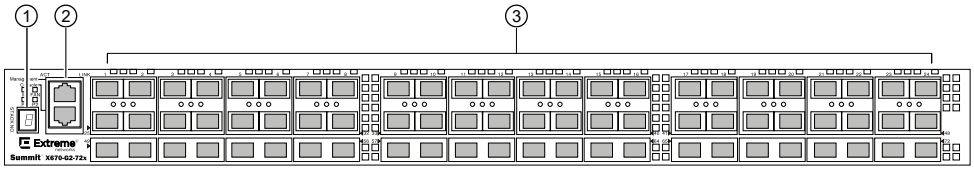


Figure 156: X670-G2-72x Front Panel

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

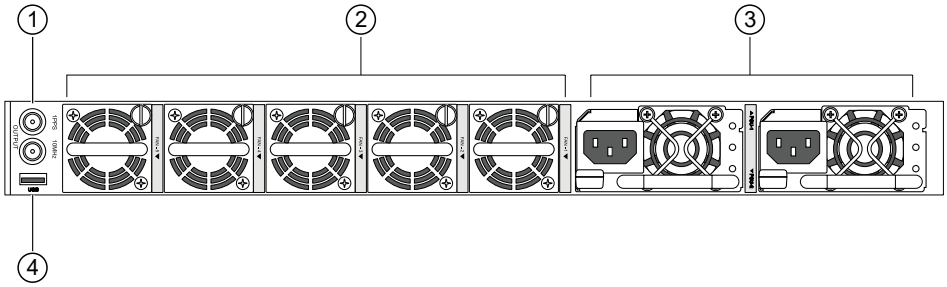


Figure 157: X670-G2-72x Rear Panel

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 57: 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 58: X670-G2 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	*Reserved for future use.*	
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 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 154.

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 accurancy +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 158:

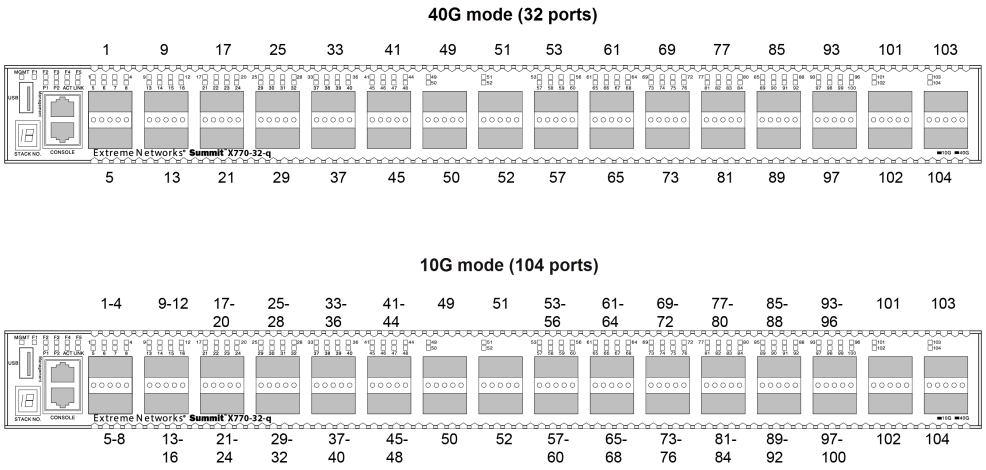


Figure 158: X770 Port Numbers for 10G mode and 40G Mode

For information about QSFP+ optical modules, see the *Extreme Networks Pluggable Transceivers Installation Guide*.

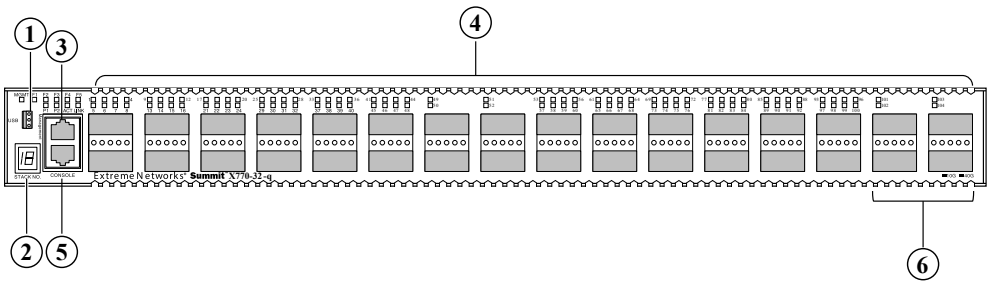
- Groups of two or four ports configurable to be stacking ports as shown in the following table:

Table 59: 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 236.

- 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 156.
- Stack number indicator.

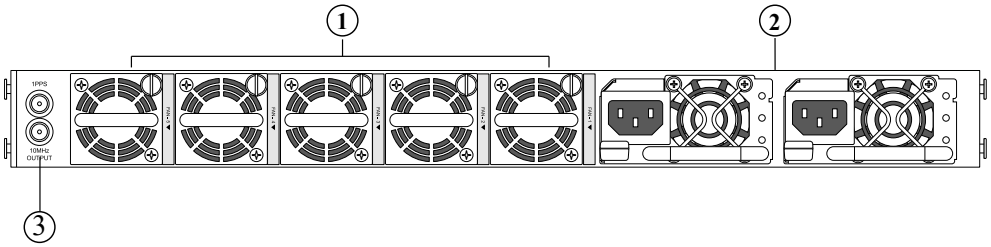


1 = USB port	4 = 40G/10G QSFP+ Ethernet ports

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 188).
- 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 60: 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.

Table 60: X770 Front Panel LEDs (continued)

Label or Type	Color/State	Meaning
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 61: 2-digit Stack Number Indicator

Label or Type	Color/State	Meaning
Left digit (1)	*Reserved for future use.*	
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.
Stacking Ports 10G mode (Alternate stacking) ports 103 and 104	Steady green	Link OK
	Blinking green	Activity
	Off	No link 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.

Many Summit switches include ports that are compatible with a variety of optical modules, including SFP, SFP+, QSFP+, and XFP modules. Extreme Networks optical modules are tested to work in all

supported Extreme Networks devices. We recommend that all customers use Extreme Networks optical modules in their Extreme Networks devices.

Extreme Networks assumes no liability for third-party optical modules. Although Extreme Networks does not block third-party optical modules, we cannot ensure that all third-party optical modules operate properly in all Extreme Networks devices. The customer assumes all risks associated with using third-party optical modules in Extreme Networks devices.

For more information, refer to *Extreme Networks Pluggable Transceivers Installation Guide*.

Concept Title

This is a term: *ExtremeXOS*. This is a term with a key reference. *ExtremeXOS*.

This is an abbreviated form with a key reference to EXOS: *ExtremeXOS*.

This is an abbreviated form with a key reference to Chalet: *Chalet*.

This is an abbreviated form with a key reference to CLI: *CLI (Command Line Interface)*.

This is an abbreviated form with a key reference to DCC: *DCC (Data Center Connect)*.

This is an abbreviated form with a key reference to EtremeCloud: *ExtremeCloud*.

This is an abbreviated form with a key reference to ECA: *ExtremeCloud Appliance*.

This is an abbreviated form with a key reference to EAC: *ExtremeControl*.

This is an abbreviated form with a key reference to Wireless: *ExtremeWireless*.

This is an abbreviated form with a key reference to EtremeSwitching: *ExtremeSwitching*.

This is an abbreviated form with a key reference to EAA: *EAA (Extreme Application Analytics)*.

This is an abbreviated form with a key reference to EMC: *Extreme Management Center*.

This is a paragraph with an inline image. 

Notes

This is a paragraph inside a section.

Important
This is an attention.

Caution
This is a caution.

Warning
This is a danger.

Note
This is a fastpath (shortcut).

Important
This is an important note.

Tip
This is a notice.

Note
This is a note.

Note
This is a remember.

Note
This is a restriction.

Tip
This is a tip.

Warning
This is a warning.

Reviewer Notice
This is an “other” note (@type=“other”; @othertype=“Reviewer Notice”)

Lists (Section Title)

- This is an unordered list item.

  This is a <p> inside a list.
- This is an unordered list item.

  This is a simple list item inside of a
  This is a simple list item inside of a
  This is a simple list item inside of a
- This is an unordered list item with an image.

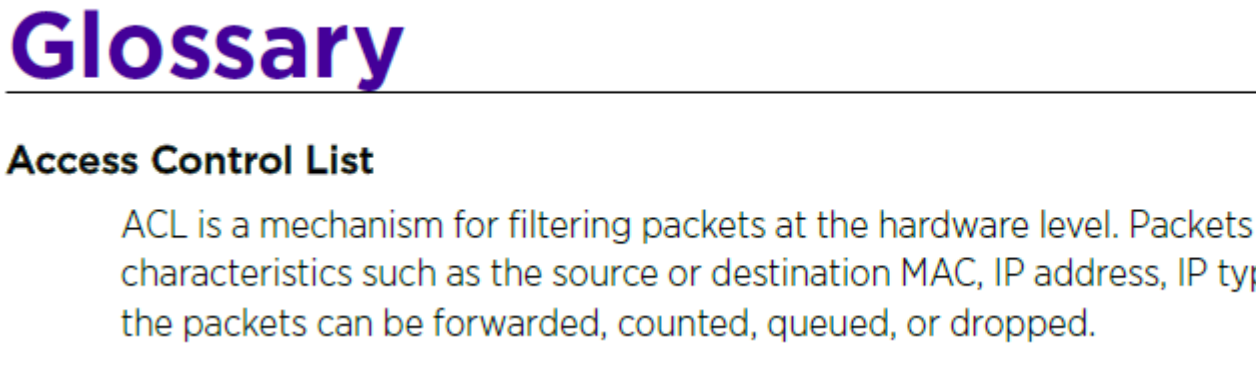


Figure 159: Image in List

- This is an unordered list item with an inline image .
- This is an unordered list item with a cross-reference to a figure: Figure 159
- This is an unordered list item with a cross reference to another topic: Preface
- This is an unordered list item with a note:

  Note
  This is a note with a paragraph.

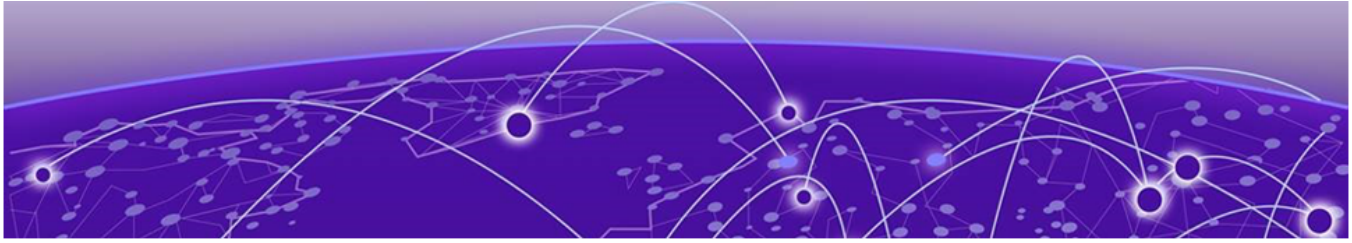
1. This is an ordered list item.
2. This is an ordered list item.

   This is a paragraph inside an ordered list.
3. This is an ordered list item with an inline image:

   This is a simple list item in a section.
   This is a simple list item in a section.
   This is a simple list item in a section.

Lines (Section Title)

This is line 1.
This is line 2.
This is line 3.
This is line 4.



Power Supplies for Use with Your Switch

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 185.)

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:

- X150
- X250e
- X350
- X440
- X440-G2
- X450
- X450a
- X450e
- 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
- X460-G2
- X465
- X480

- X620 (16-port models)
- X650
- X670
- 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 62: External Power Supplies for X150 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X150-24t	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906
X150-24x	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906
X150-24p	EPS-500 External Power Supply Unit	EPS-500: 10911
X150-48t	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906

Table 63: External Power Supplies for X250e Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X250e-24t	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906
X250e-24p	EPS-500 External Power Supply Unit	EPS-500: 10911
X250e-24x	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906
X250e-48t	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906

Table 63: External Power Supplies for X250e Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
X250e-48p	EPS-600LS External Power Module with EPS-C chassis	EPS-600LS: 10913 EPS-C: 10912
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936

Table 64: External Power Supplies for X350 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X350-24t	EPS-500 External Power Supply Unit	EPS-500: 10911
X350-48x	EPS-500 External Power Supply Unit	EPS-500: 10911

Table 65: External Power Supplies for X440 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X440-24t	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
X440-24t-10G	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-L2-24t	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
X440-24p	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
X440-24p-10G	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
X440-48t	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
X440-48t-10G	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-L2-48t	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 65: External Power Supplies for X440 Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
X440-48p	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
X440-48p-10G	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 66: 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
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

Table 66: External Power Supplies for X440-G2 Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
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 67: External Power Supplies for X450 Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X450-24t	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906
X450-24x	EPS-160 External Power Module with EPS-T	EPS-160: 10907 EPS-T: 10906

Table 68: External Power Supplies for X450a Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X450a-24t	EPS-LD External Power Supply Unit	EPS-LD: 45019
	EPS-500 External Power Supply Unit	EPS-500: 10911
X450a-24tDC	EPS-150DC External Power Module with EPS-T2	EPS-150DC: 10909 EPS-T2: 10910
X450a-24x	EPS-LD External Power Supply Unit	EPS-LD: 45019
	EPS-500 External Power Supply Unit	EPS-500: 10911

Table 68: External Power Supplies for X450a Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
X450a-24xDC	EPS-150DC External Power Module with EPS-T2	EPS-150DC: 10909 EPS-T2: 10910
X450a-48t	EPS-500 External Power Supply Unit	EPS-500: 10911

Table 69: External Power Supplies for X450e Series Switches

Switch Model	Compatible External Power Supply	Model: Part Number
X450e-24p	EPS-LD External Power Supply Unit	EPS-LD: 45019
	EPS-500 External Power Supply Unit	EPS-500: 10911
X450e-48p	EPS-600LS External Power Module with EPS C chassis	EPS-600LS: 10913 EPS-C: 10912
	750 W Power Supply with EPS-C2 chassis	750 W AC PSU: 10931 EPS-C2: 10936
X450e-24t	EPS-500 External Power Supply Unit	EPS-500: 10911
X450e-48t	EPS-500 External Power Supply Unit	EPS-500: 10911

Table 70: 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
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

Table 70: External Power Supplies for X450-G2 Series Switches (continued)

Switch Model	Compatible External Power Supply	Model: Part Number
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 71: 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 72: 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 184

Note

Most of the switches listed in each section of this chapter run ExtremeXOS software. For information about compatible switches running ExtremeWare® software, refer to the Consolidated “i” and “e” Series Hardware Installation Guide.

EPS-150DC External Power Module (with EPS-T2)

The EPS-150DC External Power Module (Model 10909) is a modular power supply for use in the EPS-T2 External Power System Tray.

You can use the EPS-150DC as a redundant power supply with the following Extreme Networks switches:

- Summit X250e-24tDC switch
- Summit X250e-24xDC switch
- Summit X250e-48tDC switch
- Summit X450a-24tDC switch

- Summit X450a-24xDC switch
- Summit X450a-48tDC switch

When this power supply is used with one of the listed Summit switches, the internal and external power supplies are fully fault tolerant and load-sharing. If one power supply fails, the other power supply will provide sufficient power to operate the switch.

The EPS-T2 is a rack-mountable chassis or tray that holds one or two EPS-150DC power supplies. Each EPS-150DC provides one-to-one redundancy to an attached Extreme switch. You must install the EPS-150DC power supply in the EPS-T2 tray.

The front panel of the EPS-150DC unit has a green LED to indicate operating status as shown in the following table.

Power LED	Meaning
Green, solid	The external power module is operating normally.
Off	The external power module is not connected.

Note

For centralized DC power connection, this product is intended to be installed in restricted access locations (dedicated equipment rooms, equipment closets, or the like) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

Each EPS-150DC power supply is shipped with a special redundant power supply cord.

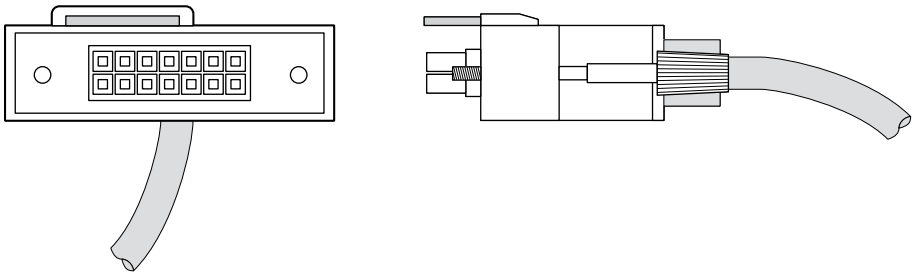


Figure 160: EPS-150DC Redundant Power Cord Connector

EPS-160 External Power Module (with EPS-T)

The EPS-160 External Power Module (Model 10907) is a modular power supply for use with the EPS-T chassis.

You can use the EPS-160 as a redundant power supply with the following Extreme Networks switches:

- Summit X150-24t switch
- Summit X150-24x switch
- Summit X150-48t switch
- Summit X250e-24t switch
- Summit X250e-24x switch
- Summit X250e-48t switch

- Summit X450-24t switch
- Summit X450-24x switch

The EPS-T is a rack-mountable chassis or tray that holds one or two EPS-160 power supplies. Each EPS-160 power supply provides one-to-one redundancy for an attached Extreme Networks switch.

You can order the EPS-T chassis with one or two EPS-160 power supplies already installed. You can also order an additional power supply from your Extreme Networks reseller.

The front of the EPS-160 unit has a green LED to indicate operating status, as explained in the table below.

Table 73: EPS-160 LED Indications

Power LED	Meaning
Green, solid	The external power supply is operating normally.
Off	The external power supply is not connected.

Note
An AC power input cord is not provided; 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 651.

Each EPS-160 power supply is shipped with a special redundant power supply cord.

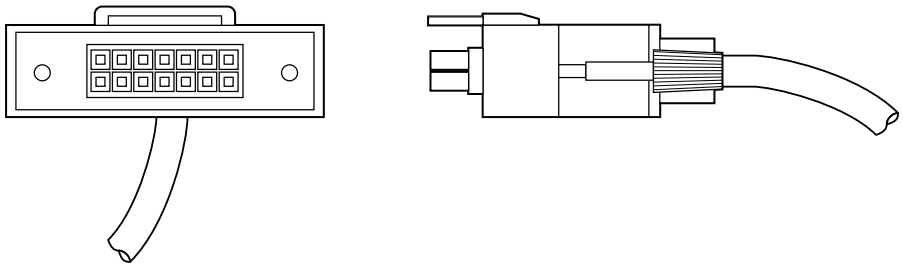


Figure 161: EPS-160 Redundant Power Cord Connector

EPS-500 External Power Supply Unit

The Extreme Networks EPS-500 External Power Supply Unit (Model 10911) provides additional power to compatible PoE switches and other Extreme switches. You can use the EPS-500 power supply as a redundant power supply with the following Extreme Networks switches:

- Summit X150-24p switch
- Summit X250e-24p switch
- Summit X350-24t switch
- Summit X350-48t switch
- Summit X450a-24t switch
- Summit X450a-24x switch

- Summit X450a-48t switch
- Summit X450e-24p switch
- Summit X450e-24t switch
- Summit X450e-48t switch

The EPS-500 power supply provides up to 500 W of total power and up to 375 W of power dedicated to PoE applications. When this power supply is used with one of the listed Summit switches, the internal and external power supplies are fully fault tolerant and load-sharing. If one power supply fails, the other power supply will provide sufficient power to operate the switch.

The front of the EPS-500 has a green LED to indicate operating status as shown in the following table.

Power LED	Meaning
Green, solid	The external power supply is operating normally.
Off	The external power supply is not connected.

Note
An AC power input cord is not provided; 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 651.

Each EPS-500 power supply is shipped with a special redundant power supply cord.

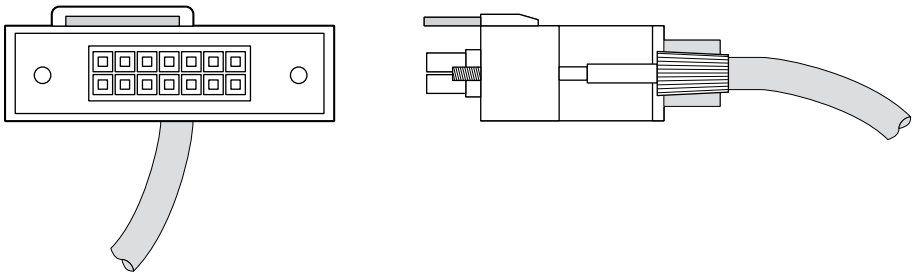


Figure 162: EPS-500 Redundant Power Cord Connector

EPS-600LS External Power Module

The EPS-600LS External Power Module (Model 10913) is a 600-watt redundant power supply unit that can be used with the following Extreme Networks switches:

- Summit X450e-48p switch
- Summit X250e-48p switch

Install one, two, or three EPS-600LS power modules in the EPS-C chassis (Model 10912) to build an external redundant power system for the Summit switch. A redundant power cable shipped with the EPS-C chassis provides the connection between the external power system and the redundant power input connector on the back of the switch.

LEDs on the front panel of the EPS-C indicate operating status for the installed EPS-600LS modules as shown in the following table.

Label	Color and State	Meaning
DC Good (PSU1, PSU2, and PSU3)	Green steady	Power supply is present and DC power is good.
	Off	No power.
AC Good (PSU1, PSU2, and PSU3)	Green steady	Power supply is present and AC power is good.
	Off	No power.

Note
An AC power input cord is not provided with the EPS-600LS power module. 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 651.

Each EPS-C chassis is shipped with a special redundant power supply cord for connection to the Summit switch. Make sure that the EPS-C chassis is installed in the equipment rack before installing an EPS-600LS power module.

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 189.

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

- X250e-48p switch
- X440-8t switch
- X440-8p switch
- X440-24t switch
- X440-24t-10G switch
- X440-24t-DC switch
- X440-24p switch
- X440-24p-10G switch
- X440-24x switch
- X440-24x-10G switch

- X440-48t switch
- X440-48p switch
- 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
- X450e-48p switch
- X450-G2 series switches (all models)
- X620-8t-2x switch
- X620-10x switch

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

- 240-8mt-16t-10GE4 switch
- 240-8mp-16p-10GE4 switch
- 240-32t-16mt-10GE6 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 EPS-C2 system connects to 240 series switches using a 2x9 connector.

The EPS-C2 system provides redundant power for up to five X440 series switches or for a single X450e-48p or X250e-48p switch. 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 for the X440 switches, and one 2x9 connector for the other switch models.

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 649.

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.The 2x7 connector is compatible with Summit X440 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.

2x9 connector

The 2x9 connector is compatible with the Summit X450e-48p or Summit X250e-48p switch. Unlike the function on the 2x7 connector, the PoE capability of the EPS-C2 using the 2x9 connector for the Summit X450e-48p or X250e-48p varies depending on the number of PSUs installed in the EPS-C2.

The following table summarizes the PoE power provided using the 2x9 connector to a Summit X450e-48p or X250e-48p switch based on the number of installed PSUs.

Warning

The 2x9 cable is not hot-pluggable. Do not attach a powered EPS-C2 to any Summit switch using the 2x9 connector. See Installing an EPS-C2 Power Supply on page 378 for installation instructions.

Table 74: Meaning of Switch Internal Power Supply Status Indicators

Switch Internal Power Supply Status	One installed 750 W PoE PSU	Two installed 750 W PoE PSU	Three installed 750 W PoE PSU	External Power Supply/Chassis Failed/Disconnected
Power On	380 W of redundant power	760 W of external power only Internal power supply disabled	760 W of external power only with 2 + 1 redundancy Internal power supply disabled	380 W of internal power only
Power Failure	380 W of external power only	760 W of external power only	760 W of external power only with 2 + 1 redundancy	No PoE power

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 378.

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

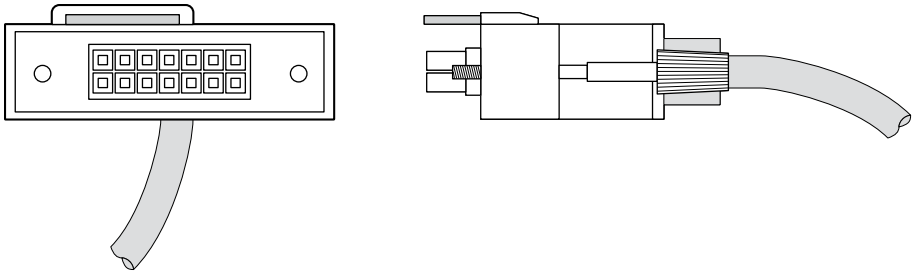


Figure 163: EPS-C2 2x7 Pin Redundant Power Cable

EPS-LD External Power Supply Unit

You can use the Extreme Networks EPS-LD External Power Supply Unit (Model 45019) as a redundant power supply with the following Extreme Networks switches:

- Summit X450a-24t switch
- Summit X450e-24p switch

When attached to the Summit X450e-24p switch, the EPS-LD provides 465 W total power with 375 W dedicated for PoE applications.

The front of the EPS-LD has a green LED to indicate operating status as shown in the following table:

Power LED	Meaning
Green, solid	The external power supply is operating normally.
Off	The external power supply is not connected.

Note
An AC power input cord is not provided; 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 651.

Each EPS-160 power supply is shipped with a special redundant power supply cord.

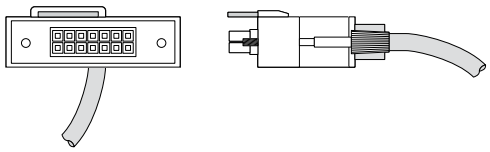


Figure 164: EPS-LD Redundant Power Cord Connector

X450 and X250 PoE Redundant Power Configurations

The PoE capability of the Summit X450e-48p or X250e-48p varies depending on the number of external power modules in use.

The following table summarizes the PoE power behavior for the Summit X450e-48p or X250e-48p switch based on the number of power modules in use.

Table 75: PoE Power Behavior

Internal Power Supply Status	EPS-600LS (1x)	EPS-600LS (2x)	EPS-600LS (3x)	External Power Supply/Chassis Failed/Disconnected
Internal Power Supply: Power On	370 W of redundant power	740 W of external power only Internal power supply disabled	740 W of external power only with 2 + 1 redundancy Internal power supply disabled	370 W of internal power only
Internal Power Supply: Power Failure	370 W of external power only	740 W of external power only	740 W of external power only with 2 + 1 redundancy	No PoE power

Single 600-LS Module Configuration: Redundant PoE Power

A single EPS-600LS power module provides redundant PoE power capability with the same 370-watt capacity as the internal power supply.

The internal Summit X450e-48p or X250e-48p power supply is capable of 370 W of PoE power: 15.4 W supplied to each port for a 24-port configuration and 7.7 W supplied to each port for a 48-port configuration.

- If the internal power supply fails, the external power module will provide power to PoE devices at the same power levels as the internal power supply without any power interruptions.
- If the EPS-600LS power module fails or is removed, the internal power supply continues to provide PoE power without any power interruptions.

Dual 600-LS Module Configuration: Full Power

Two EPS-600LS power modules provide full power at 740 W; 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 600-LS Module Configuration: Full Redundant Power

Three EPS-600LS power modules provide the full 740 W of power for 15.4 W of PoE power to all 48 ports.

In addition, this configuration provides 2:1 redundancy. If one of the EPS-600LS power modules fails, the third power module continues to provide uninterrupted full PoE power. The internal power supply is disabled in this configuration.

Internal-to-External Power Supply Transfer

This section describes the conditions that would cause the Summit X450e-48p or X250e-48p switch to draw power from the external power unit.

Internal Power Supply Failure with Single EPS-600LS Module

When an EPS-C with a single EPS-600LS is connected to the Summit X450e-48p or X250e-48p switch and the internal power supply fails, power is drawn from the EPS-600LS without power interruption to the PoE-connected devices.

Two or Three EPS-600LS Modules

When the Summit X450e-48p or X250e-48p switch detects that an EPS-C is connected and providing stable power from two or three EPS-600LS power modules, the PoE power budget is automatically recalculated to enable 740 W of PoE power. The internal power supply is disabled to prevent damage from excessive current demands beyond the capabilities of the internal power supply.

External-to-Internal Power Supply Transfer

This section describes what happens if power from an external power module either fails or is disconnected.

Active Internal Power Supply with Single 600-LS Module Failure

When an EPS-C with a single EPS-600LS module is connected to the Summit X450e-48p or X250e-48p switch and the EPS-600LS fails or is disconnected, power is drawn from the internal power supply without power interruption to the PoE-connected devices.

Inactive Internal Power Supply with a Dual EPS-600LS Configuration and Module Failure

In an EPS-C2 chassis with two EPS-600-LS power modules, it is possible for one external power module to fail while the second power module continues to function. If one EPS-600LS fails, the PoE power budget is automatically reduced to 370 W for the Summit X450e-48p or X250e-48p switch. PoE port power management occurs as described in the Power over Ethernet section of the *ExtremeXOS 16.2 User Guide*. With only a single operating power module, the remaining EPS-600LS behaves as a redundant power module. The internal power supply is returned to an active state to provide redundant capability.

If both external power modules fail or are disconnected, PoE power is interrupted while transferring PoE power back to the internal power supply. The internal power supply is then limited to 370 W of PoE power. The PoE power budget is automatically adjusted accordingly. Power management will occur as described in the Power over Ethernet section of the *ExtremeXOS 16.2 User Guide*.

Disconnect the EPS-C/EPS-600LS

To manually disconnect an EPS-C or to remove the EPS-600LS modules, the recommended practice is to disconnect the EPS-600LS modules one at a time, pausing two seconds after each EPS-600LS disconnect.

This enables a graceful power transition from the external power supplies to the internal power supply.

Example: Two active EPS-600LS modules in an EPS-C

1. Unplug one EPS-600LS unit from its power source.

   PoE power is automatically reduced to 370 watts and the internal switch power supply is enabled, providing redundant 370 watt PoE power.
2. Wait at least two seconds before disconnecting the remaining EPS-600LS unit.

3. Unplug the second EPS-600LS unit from its power source.

   The internal power supply is already enabled and provides uninterrupted 370 watts of PoE power.

   Note
   After an EPS-600LS unit is disconnected from its power source, it may be removed from the EPS-C. See Removing an EPS-600LS Power Module on page 467 for disconnection and removal instructions.

4. Disconnect the EPS-C from the switch.

RPS-90 Redundant Power Supply

Tip
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 #unique_215.

RPS-150XT Redundant Power Supply

Tip
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

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

- ExtremeSwitching 220-24t-10GE2 switch
- ExtremeSwitching 220-48t-10GE4 switch

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

- ExtremeSwitching 240-8mt-16t-10GE4 switch
- ExtremeSwitching 240-32t-16mt-10GE6 switch

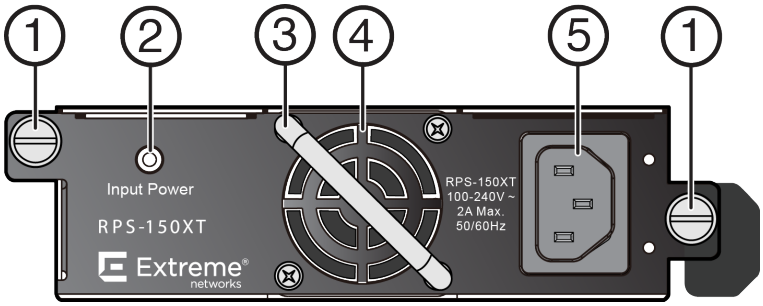


Figure 165: RPS-150XT Front Panel

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

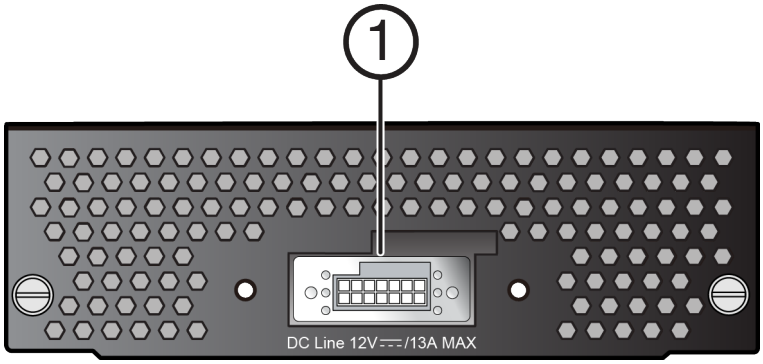


Figure 166: RPS-150XT Rear Panel

1 = 14-pin Redundant Power Supply connector

See #unique_216 for pin locations and function.

Table 76: 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 #unique_216.

RPS-500p Redundant Power Supply

Tip

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 switches (all models that are compatible with external power supplies)
- X440-G2 switches (most models)
- X450-G2 switches (non-PoE models)

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

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

- ExtremeSwitching 220-24p-10GE2 switch
- ExtremeSwitching 220-48p-10GE4 switch

The RPS-500p is compatible with the ExtremeSwitching 240-8mp-16p-10GE4 switch.

Table 77: 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.	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 649.

STK-RPS-150PS Redundant Power Supply

Tip

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 78: 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.	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 629.

STK-RPS-1005PS Redundant Power Supply

Tip

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.

The STK-RPS-1005PS is compatible with the ExtremeSwitching 240-32p-16mp-10GE6 switch.

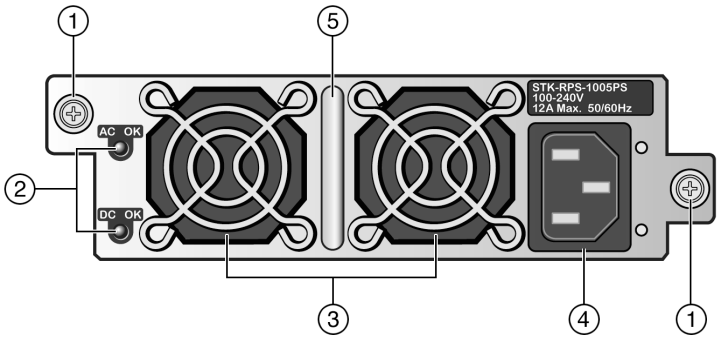


Figure 167: STK-RPS-1005PS Front Panel

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

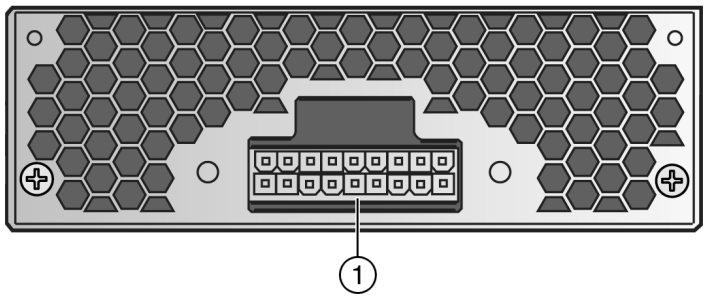


Figure 168: STK-RPS-1005PS Rear Panel

1 = 18-pin Redundant Power Supply connector

Table 79: 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 #unique_219.

VX-RPS-1000 Redundant Power Supply

Tip

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.

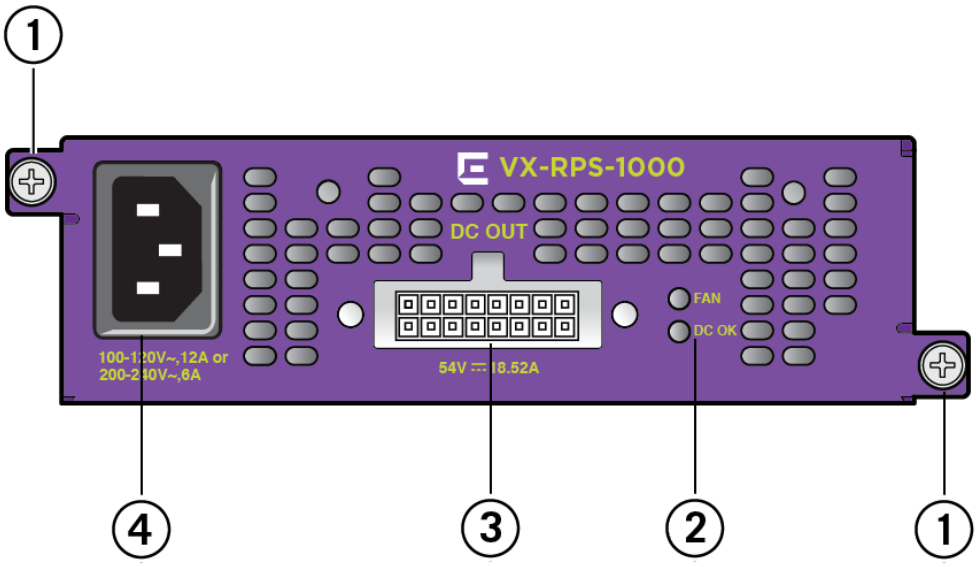


Figure 169: VX-RPS-1000 Front Panel

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

Table 80: 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 #unique_220.

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 81: 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	
X465 Switch (non-PoE model)	350 W AC-FB: XN-ACPWR-350W-FB and 10953	
X465 Switch (PoE models)	715 W AC-FB: XN-ACPWR-715W-FB and 10951 1100 W AC-FB: XN-ACPWR-1100W-FB and 10941 2000 W AC Power Supply on page 194 -FB: XN-ACPWR-2000W-FB and XN-ACPWR-2000W-F	
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
X620-16p switch	750 W AC: 10931	
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 190 -FB:XN-ACPWR-750W-F 750 W AC and DC Power Supplies on page 190 -FB:XN-ACPWR-750W-R	750 W AC and DC Power Supplies on page 190 -BF:XN-DCPWR-750W-F 750 W AC and DC Power Supplies on page 190 -BF:XN-DCPWR-750W-R

Table 81: Replaceable Internal Power Supply Compatibility (continued)

Hardware Model	AC Power Supplies: Part No.	DC Power Supplies: Part No.
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	

Table 82: 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 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 switch (PoE models)	750 W AC: 10931	
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	
X480 switch	450 W AC: 10917	450 W DC: 10918
X650 switch	850 W AC: 10914	850 W DC: 10915
X670-48x switch (FB) X670V-48x switch (FB)	450 W AC: 10917 550 W AC-FB: 10925	450 W DC: 10918 550 W DC-FB: 10926
X670-48x switch (BF) X670V-48x switch (BF)	550 W AC-BF: 10927	550 W DC-BF: 10928
X670-G2 switch	550 W AC-FB: 10925 550 W AC-BF: 10927	550 W DC-FB: 10926 550 W DC-BF: 10928
X770-32q switch (FB)	550 W AC-FB: 10925	550 W DC-FB: 10926
X770-32q switch (BF)	550 W AC-BF: 10927	550 W DC-BF: 10928

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 651.

* We recommend against combining an AC and DC power supply in the same X650 series switch.

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 83: 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 (models XN-ACPWR-350W-FB and 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 (models XN-ACPWR-350W-FB and 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 84.

Table 84: 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 450 W AC and DC Power Supplies

The following Summit 450 W power supplies are available:

- Summit 450 W AC power supply (Model 10917)
- Summit 450 W DC power supply (Model 10918)

The Summit 450 W power supplies (AC and DC) have the status LEDs listed in the following table.

Table 85: Summit 450 W Power Supply LED Status Indications

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

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:

- X670-48x switch
- X670V-48x switch
- 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 86.

Table 86: 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 87.

Table 87: 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 (Model 10931) is available for PoE models of the Summit X460 series switches.

The Summit 750 W AC power supply (Model 10931) is available for PoE models of the Summit X460 and ExtremeSwitching X620 series switches.

The Summit 750 W AC power supply is also used in the EPS-C2 external power system (see EPS-C2 Redundant Power System on page 171). 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 88: 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 651.

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 349
- #unique_229

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 89: 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 90: 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 91:

Table 91: 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 850 W AC and DC Power Supplies

The following 850 W power supplies are available:

- Summit 850 W AC power supply (Model 10914)
- Summit 850 W DC power supply (Model 10915)

These power supplies are compatible with the Summit X650 series switches.

Note
We do not recommended using the Summit 850 W DC power supply in combination with a Summit 850 W AC power supply in the same Summit X650 series switch.

The Summit 850 W AC and DC power supplies have the status LED described in the following table.

Table 92: Summit 850 W Power Supply LED Status Indications

Color and State	Meaning
Blinking green	AC in; no output
Steady green	Normal operation
Blinking red	Output error
Steady red	Critical error

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 93.

Table 93: 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 94.

Table 94: 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

2000 W AC Power Supply

The 2000 W AC PSU-FB (models XN-ACPWR-2000W-FB and XN-ACPWR-2000W-F with front-to-back ventilation airflow) are compatible with VSP4900-48P and VSP4900-12MXU-12XE switch models that have the same airflow direction as the power supply.

Note

In order to obtain 2000W output from this power supply, the PSU must be connected to a 200-240VAC source.

The ExtremeSwitching 2000 W AC power supply has a keyed power inlet (C16) that requires a notched (C15) power cord.

The ExtremeSwitching 2000 W AC power supply has the status LEDs listed in the following table:

Table 95: ExtremeSwitching 2000 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, 54V output disabled.
On	(Red) On	AC input good, output (54V) fault.
On	(Green) On	AC input good, DC outputs in spec.

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 16.2 Command Reference Guide*.

Expansion Modules

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

- Versatile interface modules (VIM) are installed in one dedicated slot in the front of the switch to provide a dedicated 10/25/40G high speed port. If no module is installed, the option slot is covered by a blank panel.
- Solid-state Drives (SSDs) provide modular storage support.

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

Table 96: Compatibility of Expansion Modules

Module Type	Name	No. of Ports	Type of Ports
SSD	XN-SSD-001-120	1	Modular 120GB SSD
VIM5	VIM5-4X	4	10GbE SFP+ optical ports
	VIM5-4XE	4	10GbE SFP+ LRM MACsec capable optical ports
	VIM5-2Y	2	25GbE SFP28 optical ports
	VIM5-4Y	4	25GbE SFP28 optical ports
	VIM5-4YE	4	25GbE SFP28 LRM MACsec capable optical ports
	VIM5-2Q	2	40GbE QSFP optical ports

V300 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 V300 Virtual Port Extender offers the following models:

- V300-8P-2X Model on page 196
- V300-8T-2X Model on page 197
- V300-8P-2T-W Model on page 198
- V300HT-8P-2X Model on page 198
- V300HT-8T-2X Model on page 200

In general, the V300 Virtual Port Extender offers the following features:

- Eight 10/100/1000BASE-T half/full duplex ports or 10/100/1000BASE-T half/full duplex PoE+ ports
- Two 10Gb SFP+ uplinks
- PoE+ power on some models
- Fixed internal power-supply (non-PoE models), fanless

With the exception of the V300-8P-2T-W model, the V300 Virtual Port Extender requires that ExtremeXOS (EXOS) version 30.5 (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 16.2 User Guide*.

V300-8P-2X Model

The Virtual Port Extender V300-8P-2X model offers the following features:

- Eight 10/100/1000BASE-T half/full duplex PoE+ ports
- Two 10Gb SFP+ ports
- One USB port
- One console/management port
- One DC input port

The V300-8P-2X model requires that ExtremeXOS (EXOS) version 30.6 (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 16.2 User Guide*.

The V300-8P-2X model is shipped with one 40W AC PS FRU (Model XN-ACPWR-280W).

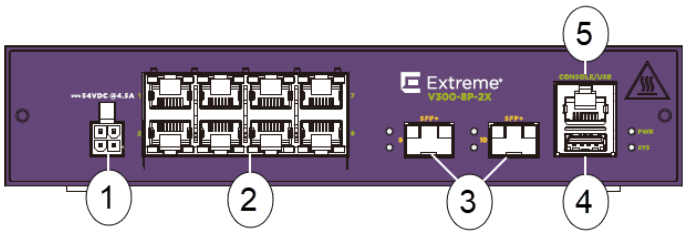


Figure 170: V300-8P-2X Front Panel

1 = DC input	2 = 10/100/1000BASE-T PoE+ ports
3 = 10Gb SFP+ ports	4 = USB port
5 = Console/Management port	

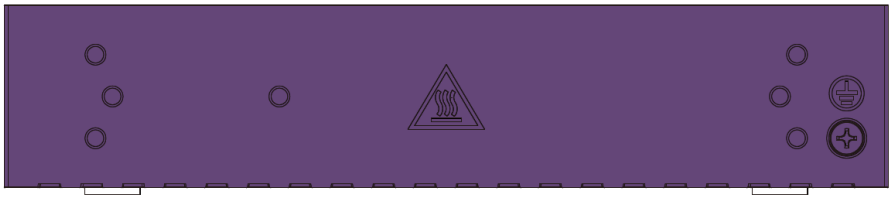


Figure 171: V300 Virtual Port Extender Rear Panel

V300-8T-2X Model

The Virtual Port Extender V300-8T-2X model offers the following features:

- Eight 10/100/1000BASE-T half/full duplex ports
- Two 10Gb SFP+ ports
- One USB port
- One console/management port
- One DC input jack

The V300-8T-2X model requires that ExtremeXOS (EXOS) version 30.6 (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 16.2 User Guide*.

The V300-8T-2X model is shipped with one 40W AC PS FRU (Model XN-ACPWR-40W).

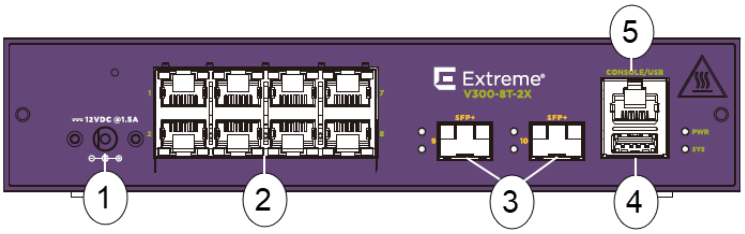


Figure 172: V300-8T-2X Front Panel

1 = DC input	2 = 10/100/1000BASE-T ports
3 = 10Gb SFP+ ports	4 = USB port
5 = Console/Management port	

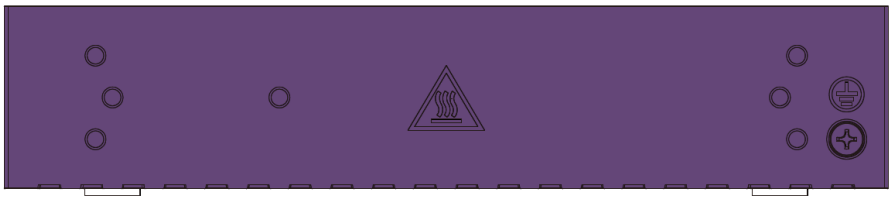


Figure 173: V300 Virtual Port Extender Rear Panel

V300-8P-2T-W Model

The Virtual Port Extender V300-8P-2T-W model offers the following features:

- 8 10/100/1000BASE-T half duplex PoE+ ports
- 2 1000/BASE-T 802.3bt Type 4 ports
- PoE power
- Fanless

The V300-8P-2T-W model requires that ExtremeXOS (EXOS) version 30.2.2 (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 16.2 User Guide*.

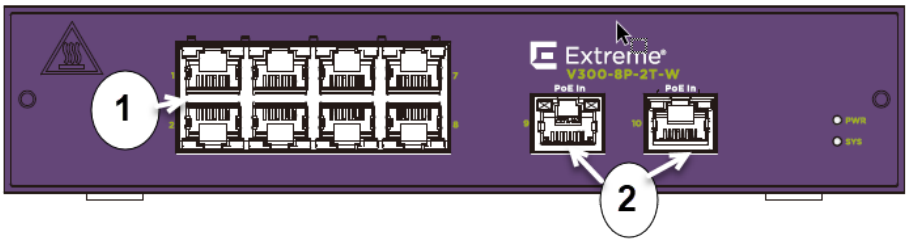


Figure 174: V300-8P-2T-W Front Panel

1 = 10/100/1000BASE-T PoE ports	2 = 1000/BASE-T 802.3bt PD up-link

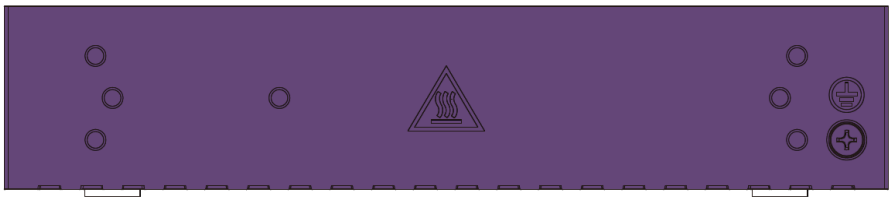


Figure 175: V300-8P-2T-W Rear Panel

V300HT-8P-2X Model

The Virtual Port Extender V300HT-8P-2X model is a high-temperature model that offers the following features:

- Eight 10/100/1000BASE-T half/full duplex PoE+ ports
- Two 10Gb SFP+ ports

- One USB port
- One console/management port
- Two DC input ports

The V300HT-8P-2X model requires that ExtremeXOS (EXOS) version 30.5 (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 16.2 User Guide*.

The V300HT-8P-2X model is compatibile with the following power supplies: 40W AC PS FRU (Model XN-ACPWR-40W).

- Model XN-ACPWR-320W-HT - a 320W AC power supply high temperature
- Model 16807 - an IS AC-DC power supply with 240W output and DIN rail compatible

Important
The high temperature power supplies for the V300HT models require field wiring. Power supplies must be installed in accordance with local electrical codes by a licensed electrician.

Note
Power supplies for this model are sold separately.

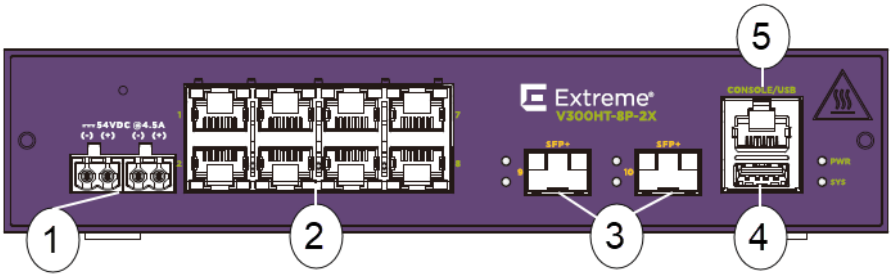


Figure 176: V300HT-8P-2X Front Panel

1 = DC inputs	2 = 10/100/1000BASE-T PoE+ ports
3 = 10Gb SFP+ ports	4 = USB port
5 = Console/Management port	

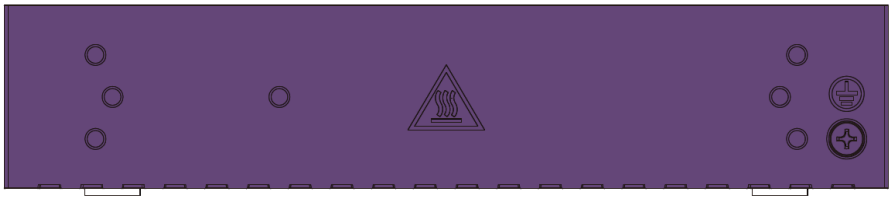


Figure 177: V300 Virtual Port Extender Rear Panel

V300HT-8T-2X Model

The Virtual Port Extender V300HT-8T-2X model is a high-temperature model that offers the following features:

- Eight 10/100/1000BASE-T half/full duplex ports
- Two 10Gb SFP+ ports
- One USB port
- One console/management port
- Two DC input ports

The V300HT-8T-2X model requires that ExtremeXOS (EXOS) version 30.6 (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 16.2 User Guide*.

The V300HT-8T-2X model is compatibile with the following power supplies:

- Model XN-ACPWR-40W-HT - a 40W AC power supply high temperature
- Model XN-ACPWR-60W-HT-DIN - a 60W AC power supply high temperature DIN rail compatible

Important
The high temperature power supplies for the V300HT models require field wiring. Power supplies must be installed in accordance with local electrical codes by a licensed electrician.

Note
Power supplies for this model are sold separately.

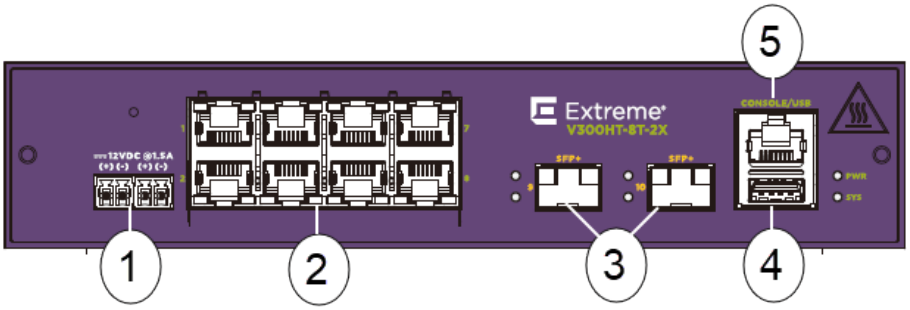


Figure 178: V300HT-8T-2X Front Panel

1 = DC inputs	2 = 10/100/1000BASE-T ports
3 = 10Gb SFP+ ports	4 = USB port
5 = Console/Management port	

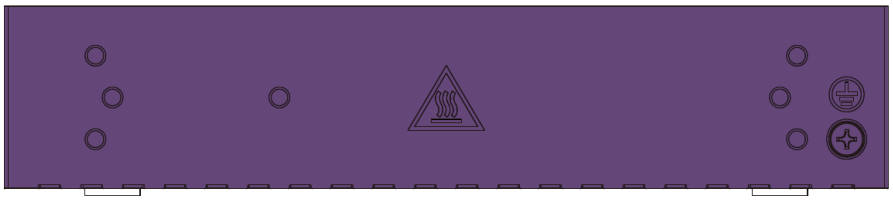


Figure 179: V300 Virtual Port Extender Rear Panel

V300 Virtual Port Extender LEDs

The V300 Virtual Port Extender front panel LEDs observe the following behavior:

Table 97: V300 Virtual Port Extender LEDs

Location	LED Indicative	Color	Status	Description
LED Per device	PWR LED (Top)	Green	Off	Power off
			Solid	Power on
		Amber	Solid	External PSU 2 fail (For non-PD model)
			Flash	External PSU 1 fail (For non-PD model)
	System LED (Bottom)	Green	Off	System off
			Solid	System on and ready
			Flash	Booting
		Amber	Flash	Fail (Controlled by MPP)
LED Per RJ45 Port 1-8 (PSE)	Link/Act (left)	Green	Off	No Link
			Solid	Link is established
			Flash	Link activity
	PoE (right)	Amber	Off	No PD detected
			Solid	PD is detected
LED Per RJ45 Port 9-10 (PD)	Link/Act (left)	Green	Off	No link
			Solid	Link is established
			Flash	Link activity
	PoE (right) PoE model	Amber	Off	No PSE power is provided
			Solid	PSE power is supplied

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 16.2 User Guide*.

Optionally, you can use the VX-RPS-1000 redundant power supply to provide backup or additive power for the V400 Virtual Port Extender. For more information, see VX-RPS-1000 Redundant Power Supply on page 184.

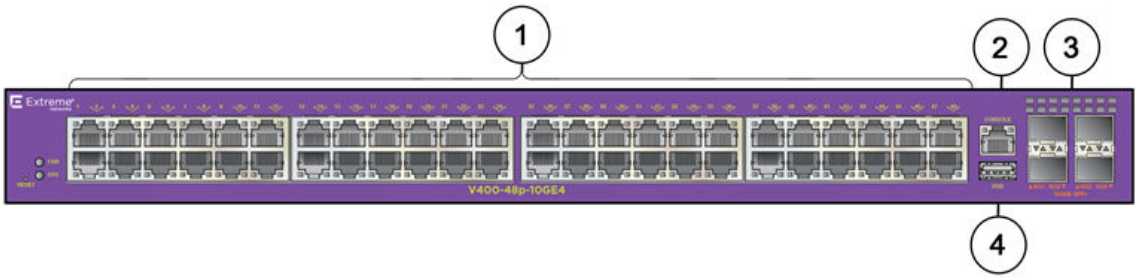


Figure 180: V400 Virtual Port Extender Front Panel (48-port Model Shown)

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

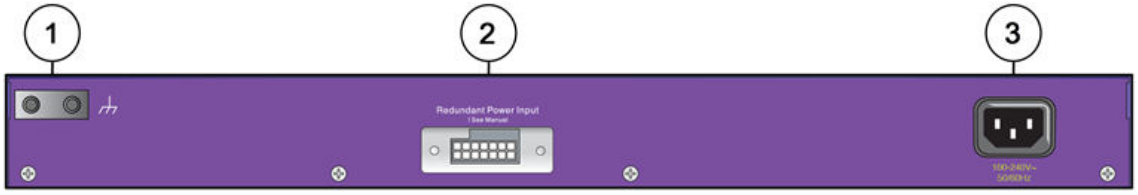


Figure 181: V400 Virtual Port Extender Rear Panel

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

LRM/MACsec Adapter

The LRM/MACsec Adapter offers:

- Support for 10Gb Long Reach Multimode (LRM) connections. The adapter plugs into SFP+ ports that do not support LRM, effectively turning them into LRM-capable ports.
- Improved security through MACsec link encryption for connections leaving a building or campus.

Deploy the LRM/MACsec Adapter by connecting both ports – using a dedicated SFP cable called the *host cable* – to SFP or SFP+ ports on a switch that does not natively support LRM and MACsec connections. The switch is referred to as the *host switch*.

Caution
Connect the adapter to the host switch using only the host cable that is provided for this purpose. The use of other cables can damage the equipment.

The LRM/MACsec Adapter can be physically mounted on a standard equipment rack. You can also purchase a bracket that attaches to the rack and holds up to five adapters together. For installation instructions, see Installing an LRM/MACsec Adapter on page 433.

The LRM/MACsec Adapter receives power through its connection to the host switch's SFP port. Auxiliary power is supplied through a USB (micro-B) cable that connects the adapter to a power source that is capable of providing at least 0.5A of current. The auxiliary power cable is required for MACsec connections. It is optional for LRM-only connections.

To use the LRM/MACsec Adapter, you must have ExtremeXOS (EXOS) version 30.1 installed on the host switch to which the adapter is attached. An ExtremeXOS feature pack license is required if you use the adapter to provide MACsec support.

Note
LRM/MACsec Adapter initialization may take extended time - about 40-85 seconds per adapter plus 15-35 seconds per transceiver, depending on the platform type used with the adapter.

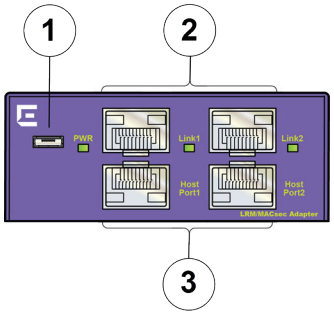


Figure 182: LRM/MACsec Adapter: Front Panel

1 = Auxiliary power connector	3 = SFP+ ports (connect to the host switch)
2 = SFP+ ports (connect to the network)	

Maximum Capacity for Using the LRM/MACsec Adapter with Supported Switch Models

The following table details the maximum number of LRM/MACsec Adapters you can use with each supported host switch model. The maximum number varies according to:

- Whether you are running in LRM mode only, or in LRM plus MACsec mode.

- Whether you are using an auxiliary power (USB) cable to draw additional power beyond what is provided by the host switch.

Note

- The figures listed assume that, in every case, both adapter ports are connected to the host switch. The adapter will not operate properly if only one port is connected to the host switch.
- Unless noted otherwise, all switch models listed have SFP+ ports that can be configured for 10Gb. For some X440-G2 models, a license upgrade is required for 10 Gb functionality.
- For X460-G2 switches, connecting the LRM/MACsec Adapter to SFP+ ports on the VIM-2x module is not supported.

Table 98: Maximum Number of LRM/MACsec Adapters, by Switch Model and Connection Type

Switch Model	Mode: LRM Only		Mode: LRM and MACsec	
	Two ports no aux. power	Two ports 0.5A aux. power	Two ports aux. power (see note 1)	One port One bypass aux. power (see note 1)
X440-G2-12t X440-G2-12p Four 10Gb SFP+ ports (see note 2)	1	2	1	2
X440-G2-24t-GE4 Four 1Gb SFP ports	NA	NA	1	2
X440-G2-24t X440-G2-24p Four1Gb SFP ports Four10Gb SFP+ ports (see note 2)	2	2	3	3
X440-G2-24x 24 1Gb SFP ports Four10Gb SFP+ ports (see note 2)	2	2	9	10
X440-G2-48t X440-G2-48p Four1Gb SFP ports Four10Gb SFP+ ports (see note 2)	2	2	3	3
X450-G2-24t X450-G2-24p Four10Gb SFP+ ports	Already LRM		2	2
X450-G2-48t X450-G2-48p Four10Gb SFP+ ports	Already LRM		2	2
X460-G2-24t Eight1Gb SFP ports Four10Gb SFP+ ports	2	2	5	6

Table 98: Maximum Number of LRM/MACsec Adapters, by Switch Model and Connection Type (continued)

Switch Model	Mode: LRM Only		Mode: LRM and MACsec	
	Two ports no aux. power	Two ports 0.5A aux. power	Two ports aux. power (see note 1)	One port One bypass aux. power (see note 1)
X460-G2-24p Eight1Gb SFP ports Four10Gb SFP+ ports	2	2	6	6
X460-G2-24x 24 1Gb SFP ports Four10Gb SFP+ ports	2	2	10	12
X460-G2-48t Four10Gb SFP+ ports	2	2	2	2
X460-G2-48p Four10Gb SFP+ ports	2	2	2	2
X460-G2-48x 48 1Gb SFP ports Four10Gb SFP+ ports	2	2	17	20
X590-24x 24 10Gb SFP+ ports	9	12	11	12
X620-8t-2x Two 10Gb SFP+ ports	1	1	1	1
X620-10x 10 10Gb SFP+ ports	2	4	3	4
X620-16t X620-16p Four10Gb SFP+ ports	Already LRM		2	2
X620-16x 16 10Gb SFP+ ports	4	7	5	6
X670-G2-48x 48 10Gb SFP+ ports	14	24	18	20
X670-G2-72x 72 10Gb SFP+ ports	21	34	26	29
X690-48x 48 10Gb SFP+ ports	16	24	20	23

Notes:

1. With 1W optics modules (SR, LR, LRM, 10 km bidirectional, AOC, DAC, and most 1 Gb optics), use 0.5A auxiliary power sources.

   With 1.5W optics modules (ZR, ER, 40 km bidirectional, DWDM ZR, 1 Gb - 120km bidirectional), use 1.0A auxiliary power sources. Refer also to temperature limitations in Limitations for Some Optical Devices on page 206.
2. This model requires a license upgrade for 10 Gb functionality on the SFP+ ports.

Limitations for Some Optical Devices

Temperature Limitations

In most circumstances, the LRM/MACsec Adapter can operate at temperatures up to 45°C (113°F). However, the maximum operating temperature is 40°C (104°F) when the adapter is used with any of the following optical transceivers:

- 10Gb ER SMF (part no. 10309)
- 10Gb ZR SMF (part no. 10310)
- 10Gb Tunable DWDM ZR (part no. 10325)
- 1000BASE-BX-U bidirectional SFP 120 km (part no. MGBIC-BX120-U)
- 1000BASE-BX-D bidirectional SFP 120 km (part no. MGBIC-BX120-D)

You can find a complete listing of cables and optical transceivers that are compatible with the LRM/MACsec Adapter in the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

Power Limitations

When the host switch is an X590 or X690, and when both ports on the LRM/MACsec Adapter are used with the optical transceivers listed in Temperature Limitations, ensure that you are using the USB (micro-B) cable to supply auxiliary power. The host switch, by itself, will not provide sufficient power for the transceivers.

LRM/MACsec Adapter LEDs

The LEDs on the front panel of the LRM/MACsec Adapter have the following meanings:

Table 99: LRM/MACsec Adapter LEDs

LED	Meaning
PWR	Green: Normal operation. The adapter is receiving power, either from the host switch or through the USB connector. Amber: The adapter is receiving insufficient power. Off: The adapter is not receiving power.
Link1	Steady green: The Link1 connection – from the host switch, through the adapter, to the network – is ready. Blinking green: Link1 is active. Off: Link1 is not ready.
Link2	Steady green: The Link2 connection – from the host switch, through the adapter, to the network – is ready. Blinking green: Link2 is active. Off: Link2 is not ready.

Versatile Interface Modules for the ExtremeSwitching VSP 4900 Series Switches

You can install a VIM5 versatile interface module in a dedicated slot in the front panel of the ExtremeSwitching VSP 4900 Series switch to provide 10/25/40G dedicated high speed ports. The front panel of every VSP 4900 switch provides one slot to install the following:

- VIM5-4X versatile interface module that provides four 10-GbE (SFP+) ports.
- VIM5-4XE versatile interface module that provides four 10-GbE (SFP+) ports, LRM/MACsec capable.

- VIM5-2Y versatile interface module that provides two 25-GbE (SFP28) ports.
- VIM5-4Y versatile interface modulethat provides four 25-GbE (SFP28) ports.
- VIM5-4YE versatile interface module that provides four 25-GbE (SFP28) MACsec capable ports.
- VIM5-2Q versatile interface module that provides two 40-GbE (QSFP) ports.

For 24 and 48-port models, the VIM5 ports are 2/1, 2/2, 2/3, 2/4 depending on the VIM installed.

VIM5s are ordered separately. Each VIM5 label can be found on the bottom side of the device, as seen in the following figure:

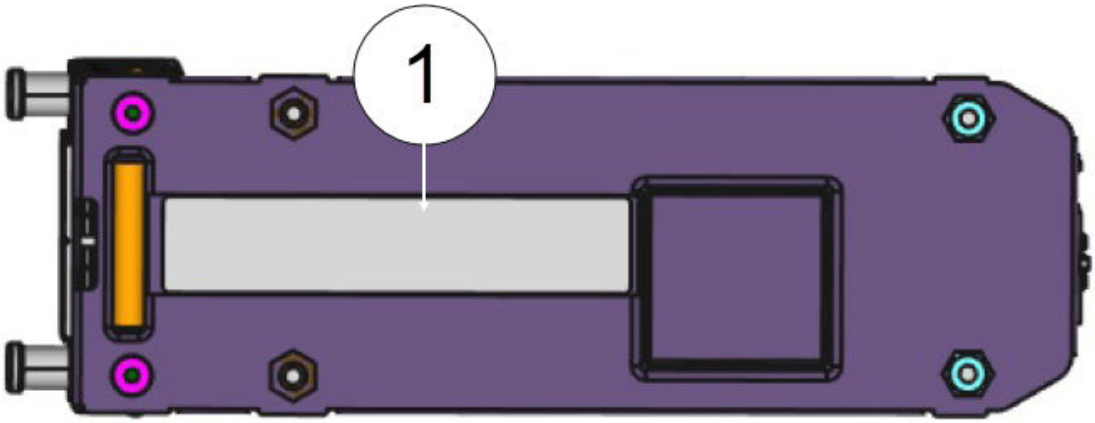


Figure 183: VIM5 Label

1 = VIM5 label

Table 100: VSP 4900 VIM5 Matrix

	VIM5-4X	VIM5-4XE	VIM5-2Y	VIM5-4Y	VIM5-4YE	VIM5-2Q
Usable ports (VSP4900-48P and VSP4900-24S)	4	4	2	2	2	1
Usable ports (VSP4900-24XE and VSP4900-12MXU-12XE)	4	4	2	4	4	2
Operational speeds	1Gbps & 10Gbps	1Gbps & 10Gbps	10Gbps & 25Gbps	10Gbps & 25Gbps	10Gbps & 25Gbps	4x10Gbps w/ channelization & 40Gbps
PHY present	No	Yes	Yes	Yes	Yes	No
1000BASE-T & 10GBASE-T	10GBASE-T only	Both	10GBASE-T only	10GBASE-T only	10GBASE-T only	
Mixed speeds	1Gbps & 10Gbps	1Gbps & 10Gbps	Not supported*	Not supported*	Not supported*	

Table 100: VSP 4900 VIM5 Matrix (continued)

	VIM5-4X	VIM5-4XE	VIM5-2Y	VIM5-4Y	VIM5-4YE	VIM5-2Q
1G Auto-negotiation	Disabled	Enabled				
10G Auto-negotiation	Disabled	Disabled	Disabled	Disabled	Disabled	
25G Auto-negotiation			Disabled	Disabled	Enabled for DAC Disabled for Fiber	
FEC	Not supported	Not supported	Not supported	Not supported	Auto-FEC enabled for DAC and Fiber	Not supported
MACsec	Not supported	128/256bit	Not supported	Not supported	128/256bit	Not supported

* You must set `sys vim-speed` to 10G or 25G for VIM5-2Y and VIM5-4YE. The default is 25G. A reboot is not necessary after setting the speed.

See #unique_246 for VIM5 LED details.

VIM5-2Q Versatile Interface Module

The VIM5-2Q versatile interface module provides two 40-GbE (QSFP) ports.

Note

For VSP4900-48P and VSP4900-24S, only the first 40-GbE (QSFP) port is supported.

For information about the supported optical modules, refer to the most recent version of the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

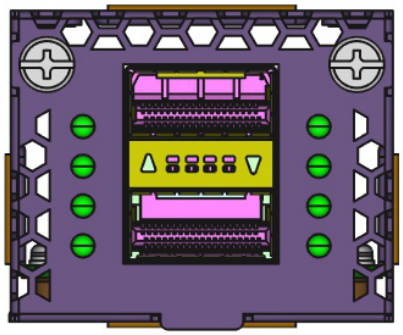


Figure 184: VIM5-2Q Versatile Interface Module

Table 101: Port Numbers for Ports on the VIM5-2Q Module

ExtremeSwitching VSP 4900 port numbers for 24-port models	ExtremeSwitching VSP 4900 port numbers for 48-port models
2/1 in 1x40 mode 2/1, 2/2, 2/3, 2/4 in 4x10 mode	2/1 in 1x40 mode 2/1, 2/2, 2/3, 2/4 in 4x10 mode

VIM5-2Y Versatile Interface Module

The VIM5-2Y versatile interface module provides two 25-GbE (SFP28) ports.

You must set `sys vim-speed` to 10G or 25G for VIM5-2Y. The default is 25G. A reboot is not necessary after setting the speed. For details about the `sys vim-speed` command, see the .

For information about the supported optical modules, refer to the most recent version of the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

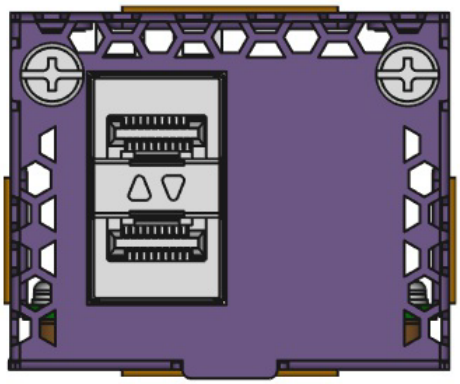


Figure 185: VIM5-2Y Versatile Interface Module

Table 102: Port Numbers for Ports on the VIM5-2Y Module

ExtremeSwitching VSP 4900 port number for 24-port models	ExtremeSwitching VSP 4900 port numbers for 48-port models
2/1, 2/1	2/1, 2/1

VIM5-4X Versatile Interface Module

The VIM5-4X versatile interface module provides four 10-GbE (SFP+) ports.

For information about the supported optical modules, refer to the most recent version of the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

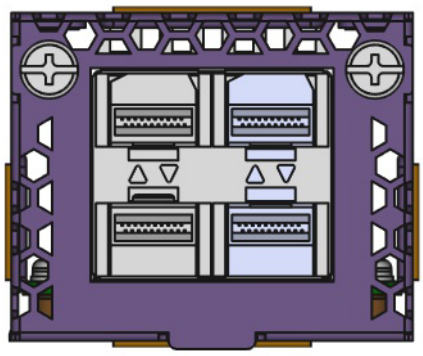


Figure 186: VIM5-4X Versatile Interface Module

Table 103: Port Numbers for Ports on the VIM5-4X Module

ExtremeSwitching VSP 4900 port numbers for 24-port models	ExtremeSwitching VSP 4900 port numbers for 48-port models
2/1, 2/2, 2/3, 2/4	2/1, 2/2, 2/3, 2/4

VIM5-4XE Versatile Interface Module

The VIM5-4XE versatile interface module provides four 10-GbE (SFP+) ports, LRM/MACsec capable.

For information about the supported optical modules, refer to the most recent version of the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

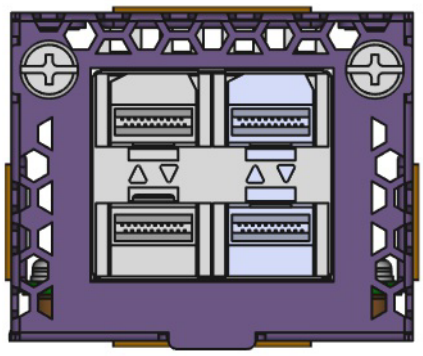


Figure 187: VIM5-4XE Versatile Interface Module

Table 104: Port Numbers for Ports on the VIM5-4XE Module

ExtremeSwitching VSP 4900 port numbers for 24-port models	ExtremeSwitching VSP 4900 port numbers for 48-port models
2/1, 2/2, 2/3, 2/4	2/1, 2/2, 2/3, 2/4

VIM5-4Y Versatile Interface Module

The VIM5-4Y versatile interface module provides four 25-GbE (SFP28) ports.

Note

For VSP4900-48P and VSP4900-24S, only the first two 25-GbE (SFP28) ports are supported.

The VIM5-4Y can be configured to provide four 10GbE ports using the port partitioning CLI. For details about the `configure ports partition` command, see the .

For information about the supported optical modules, refer to the most recent version of the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

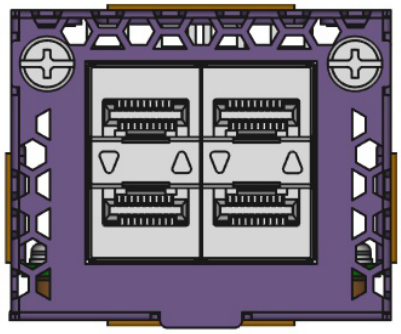


Figure 188: VIM5-4Y Versatile Interface Module

Table 105: Port Numbers for Ports on the VIM5-4Y Module

ExtremeSwitching VSP 4900 port number for 24-port models	ExtremeSwitching VSP 4900 port number for 48-port models
25-28	49-52

VIM5-4YE Versatile Interface Module

The VIM5-4YE versatile interface module provides four 25-GbE (SFP28) LRM/MACsec capable ports.

Note

For VSP4900-24S, only the first 25-GbE (SFP28) port is supported.

For VSP4900-48P, VSP4900-24XE, and VSP4900-12MXU-12XE, only the first two 25-GbE (SFP28) ports are supported.

You must set `sys vim-speed` to 10G or 25G for VIM5-4YE. The default is 25G. A reboot is not necessary after setting the speed. For details about the `sys vim-speed` command, see the .

For information about the supported optical modules, refer to the most recent version of the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

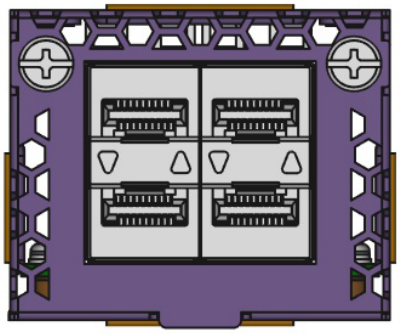


Figure 189: VIM5-4YE Versatile Interface Module

Table 106: Port Numbers for Ports on the VIM5-4YE Module

ExtremeSwitching VSP 4900 port number for VSP4900-24S	ExtremeSwitching VSP 4900 port numbers for VSP4900-48P, 24XE, and 12MXU-12XE models
2/1	2/1, 2/2

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 107: 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 236.

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.

Note
Alternate stacking with the VIM-2q is supported with ExtremeXOS version 16.1. However, alternate stacking is not supported with earlier versions of the ExtremeXOS software.

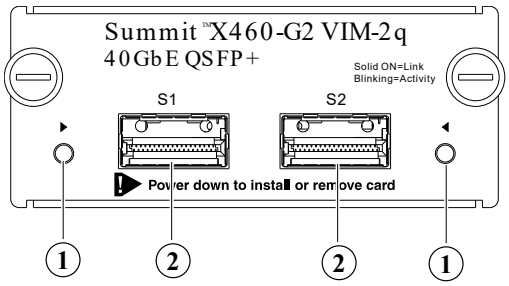


Figure 190: VIM-2q Port Option Card

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 191, 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.

Note
Alternate stacking with the VIM-2ss is supported with ExtremeXOS version 16.1. However, alternate stacking is not supported with earlier versions of the ExtremeXOS software.

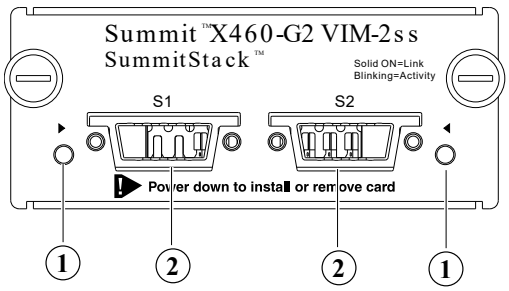


Figure 191: VIM-2ss SummitStack Module

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.

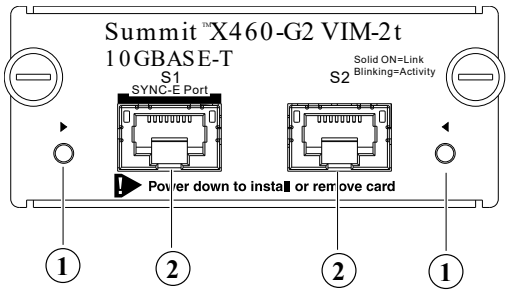


Figure 192: VIM-2t Ethernet Module Option

1 = LEDs	2 = 10G BASE-T ports

VIM-2x Ethernet Module Port Option Card

The VIM-2x Ethernet Module option card, shown in Figure 193, 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.

Note
Alternate stacking with the VIM-2x is supported with ExtremeXOS version 16.1. However, alternate stacking is not supported with earlier versions of the ExtremeXOS software.

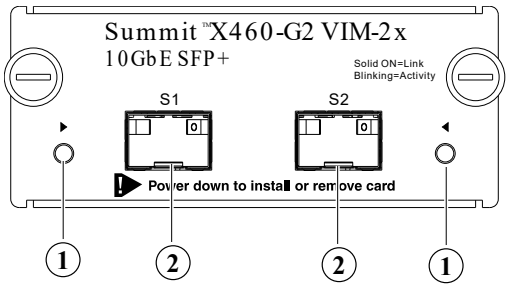


Figure 193: VIM-2x Ethernet Module Option

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.

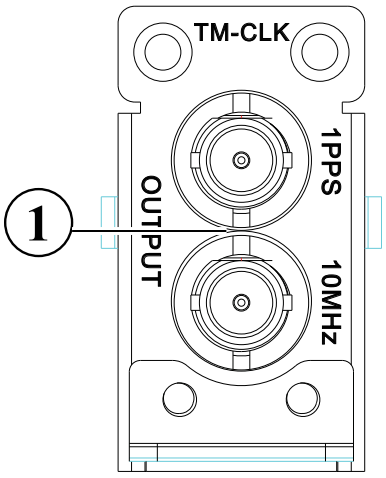
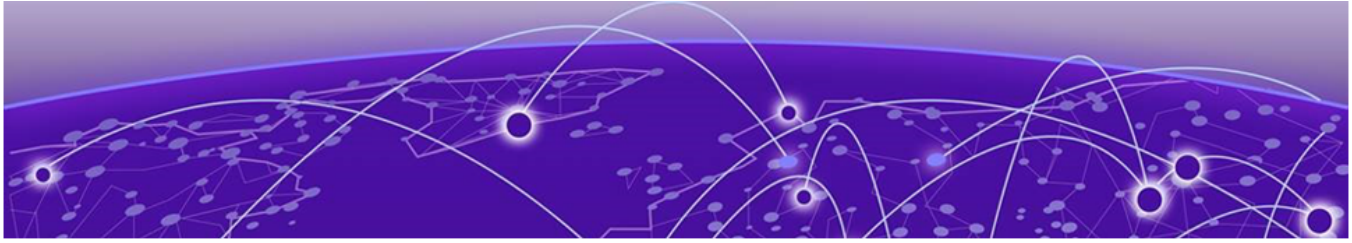


Figure 194: TM-CLK Module Option

1 = Timing signal mini-BNC outputs



Site Preparation

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

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

Only qualified service personnel should install, maintain, or remove 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 522.

   For power specifications of the external power supplies, see Summit External Power Supplies Technical Specifications on page 645.

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 108 are authorities on electrical codes.

Table 108: 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 Pfingsten 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
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 of1934. 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 224 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
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.

The ambient operating temperature for most ExtremeSwitching switches ranges from 0°C (32°F) to 45°C (113°F) or 50°C (122°F). (Check the descriptions in Summit Switches on page 24 for the temperature range that applies to your switch model.) 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).

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 109 on page 223 summarizes the behavior of ExtremeSwitching switches when they experience high operating temperatures.

Table 110 on page 223 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 109: 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.

X430-8p	The switch is not equipped with a mechanism for thermal shutdown. When internal system temperatures exceed the thermal shutdown temperature limit (typically about 20°C higher than normal system operating temperatures), the system reboots and immediately restarts. You then have the option, through the command-line interface, of allowing the boot cycle to continue:
	`ALERT: Switch rebooted after reaching emergency shut-off temperature.`
	`Please evaluate the situation and make sure the causes of switch`
	`overheating are fixed before continuing.`
	`Continue booting? (Y/N)`
	Alternately, you can restart the system immediately by removing and then restoring all line power to the system.

X430-24t X430-24p X430-48t	The switch is not equipped with a mechanism for thermal shutdown. When high operating temperatures are experienced, the system fans are set to full speed and the switch remains powered. Alternately, you can restart the system 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 110: Ambient Temperature Range for Switches

Switch Series	Ambient Operating Temperature Range
X430	0°C (32°F) to 45°C (113°F) Note: The maximum temperature is 40°C (104°F) for X430-8p model switches.
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)

Table 110: Ambient Temperature Range for Switches (continued)

Switch Series	Ambient Operating Temperature Range
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)
X770	0°C (32°F) to 45°C (113°F)
X870	0°C (32°F) to 45°C (113°F)
All other models	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, 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.

In some switches, airflow moves from side to side. For these switches, it is best to leave at least 3 inches (8 cm) of clear space in front of the air intake and outflow vents on both sides of the switch.

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
- X450a-24tDC, X450a-24xDC, and X450a-48tDC
- X460, X480, and X650 series switches with installed DC power supplies

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.

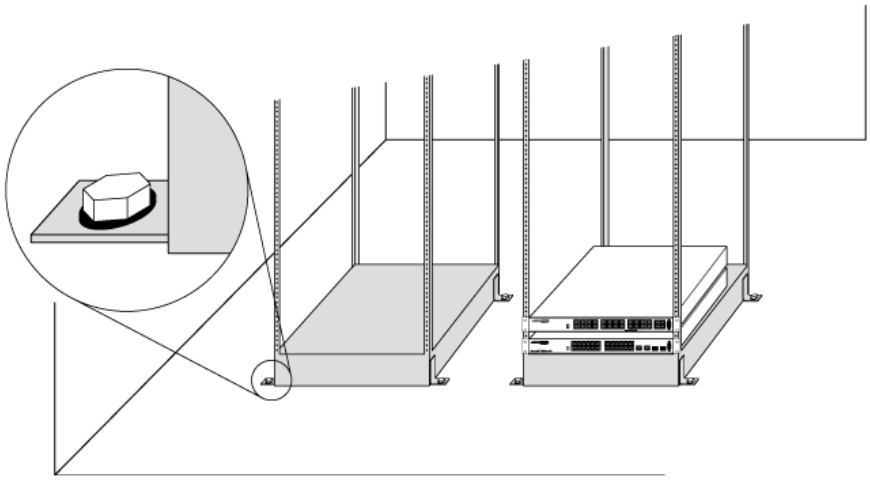


Figure 195: Properly Secured Rack

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.

The Building Industry Consulting Service International (BICSI) Registered Communications Distribution Designer (RCDD), which is globally recognized as a standard in site planning and cabling, can be used.

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 196 on page 228.
- 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.

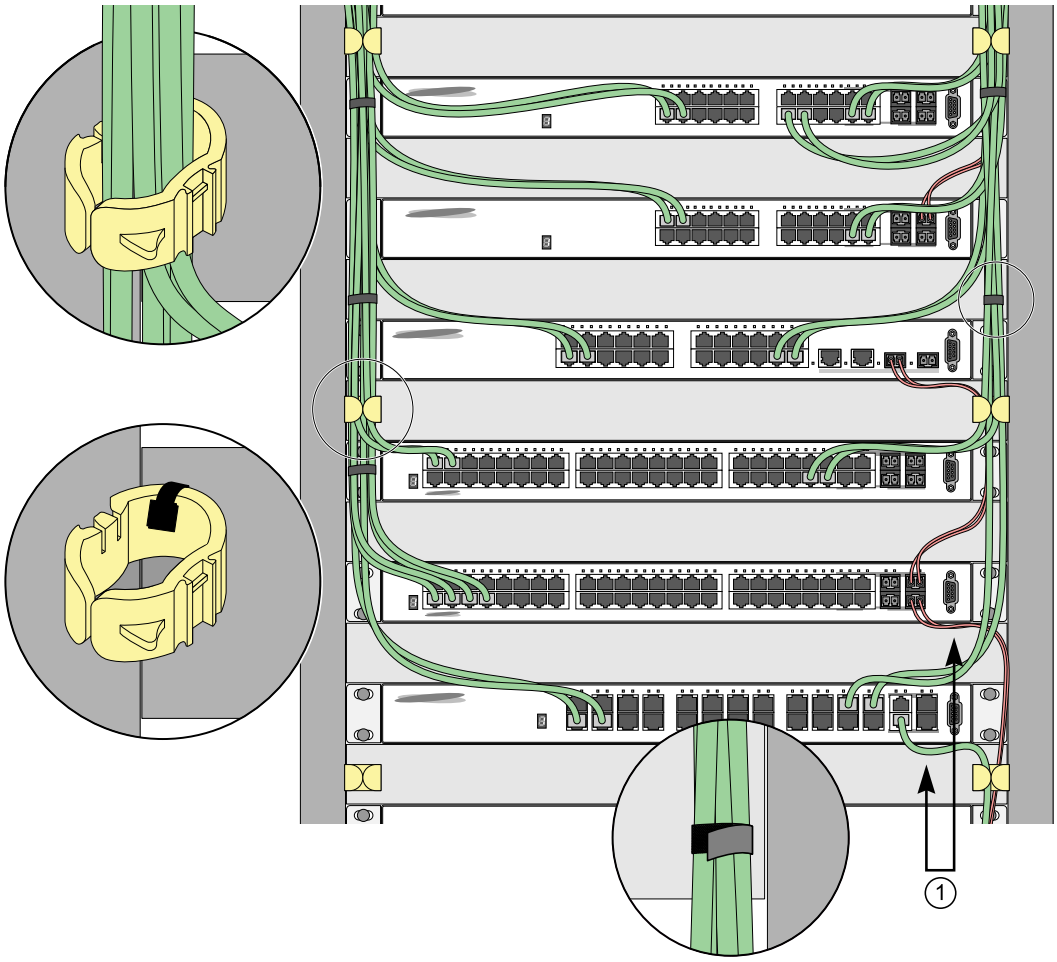


Figure 196: Properly Installed and Bundled Cable

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. Ensure that the bend radius for fiber optic cables is equal to at least 5 cm (2 in) for each 90-degree turn as shown in Figure 197.

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.

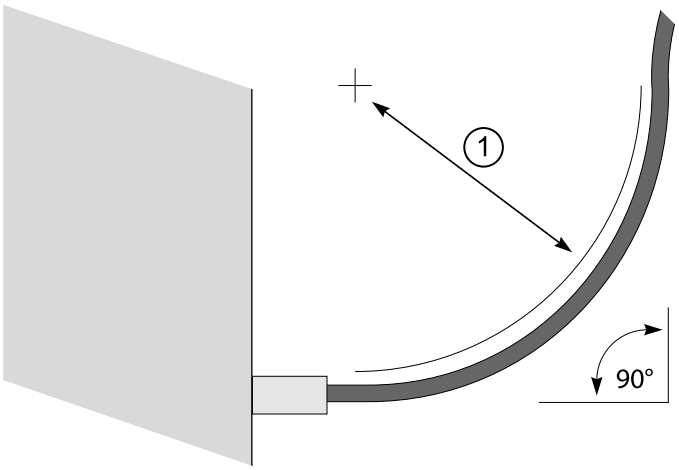


Figure 197: Bend Radius for Fiber Optic Cable

1 = Minimum 5 cm (2 in) radius in 90° bend

Cable Distances and Types

Table 111 on page 229 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 111: 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
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

[2] 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 111: Cable Distances and Types (continued)

Standard	Media Type	MHz•km Rating	Maximum Distance (Meters)
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-LRM SFP+ (1310nm optical window)	62.5/125 μm multimode fiber	–	220
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

Table 112 and Table 113 on page 231 list direct-attach cables available from Extreme Networks.

Table 112: 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 113: 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 198 shows examples of recommended and non-recommended connector jacket types.

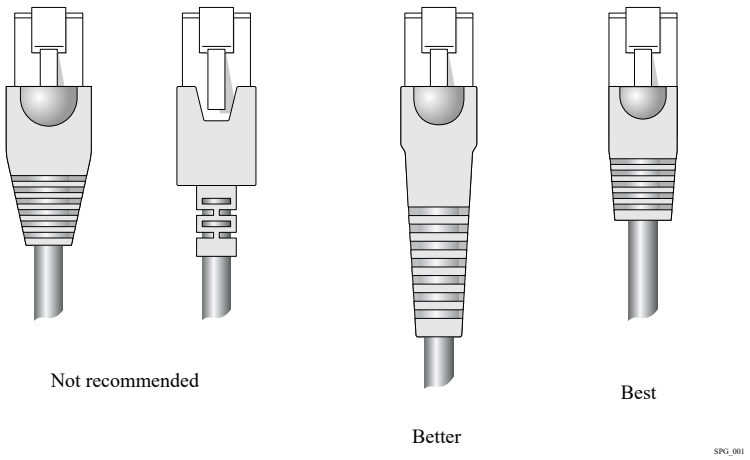


Figure 198: RJ45 Connector Jacket Types

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, 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 651.

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 234.)

Note
Use a UPS that provides online protection.

Calculating Volt-Amperage Requirements

To determine the size of UPS that you need:

1. Locate the voltage and amperage requirements for each piece of equipment.

   These numbers are usually found on a sticker on the back or bottom of your equipment.
2. Multiply the numbers together to get Volt-Amperes (VA):

   VA = Volts x Amperes
3. Add the VA from all the pieces of equipment together to find the total VA requirement.

   To determine the minimum volt-amperage requirements for your UPS, 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, a UPS transition time of 20 milliseconds or less ensures optimum performance and minimizes service interruptions.

For high-availability and fault-tolerant installations in which the switches use redundant power supply units (PSUs), ensure that each PSU in a switch is connected to a different UPS and that each UPS is 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.

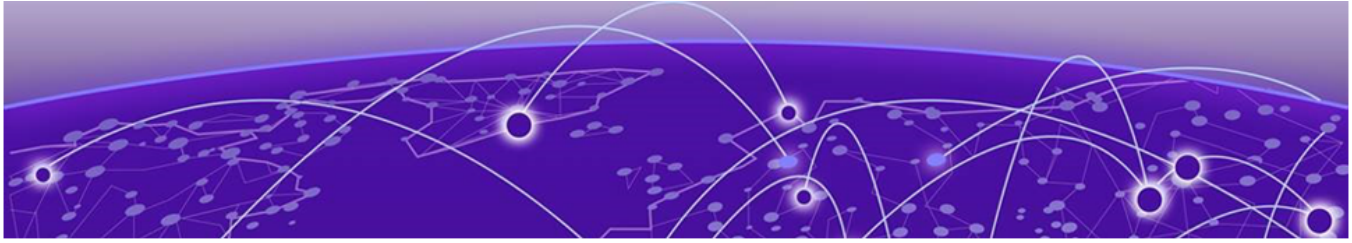
Following Applicable Industry Standards

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.



Building Stacks

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 16.2 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 199 shows four nodes in a stack, connected to each other by SummitStack cables.

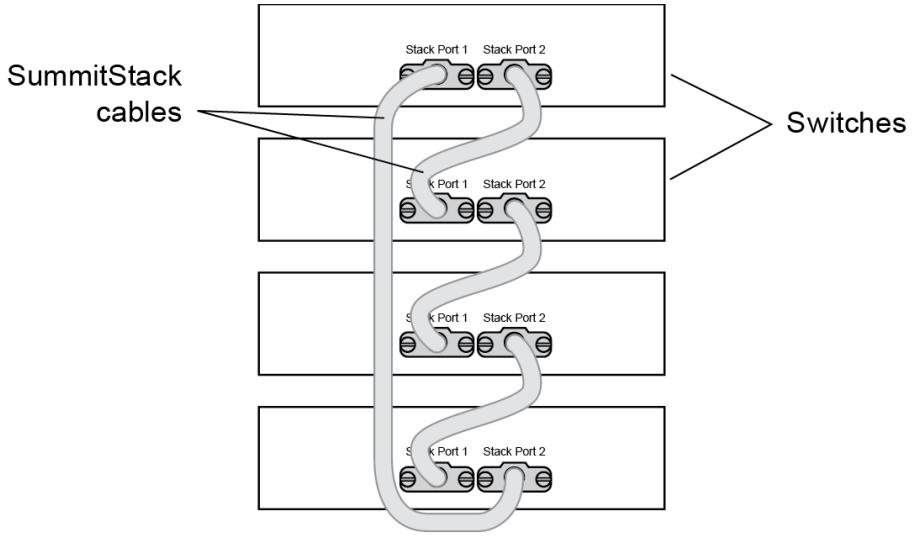


Figure 199: Switches Connected to Form a Stack

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 Combining Switches from Different Series on page 275 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 Connecting the Switches to Form the Stack Ring on page 286 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 200.) 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.

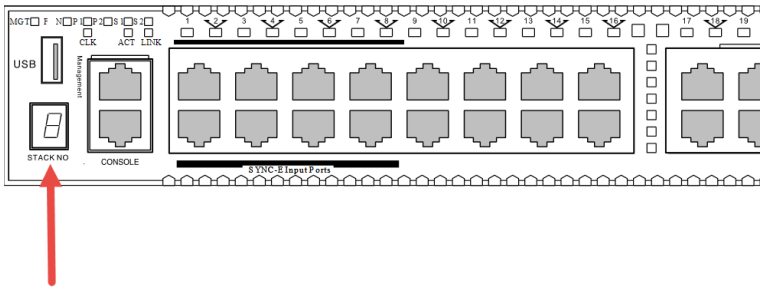


Figure 200: Position of the Stack Number Indicator (X460-G2 Switch Shown)

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 201 presents a graphical representation of a stack and some of the terms that describe stack conditions.

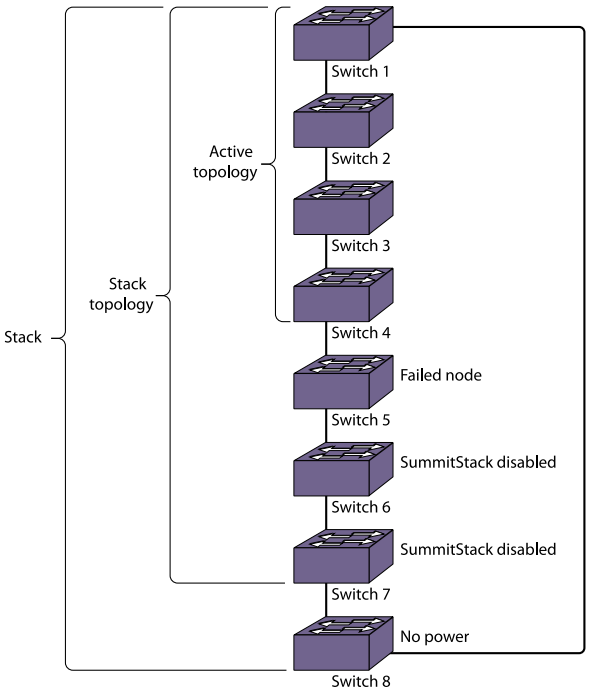


Figure 201: Example of a Stack, Showing the Active Topology and the Stack Topology

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 Plan to Create Your Stack on page 251.

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 248.

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 202 represents a maximal ring topology of eight active nodes.

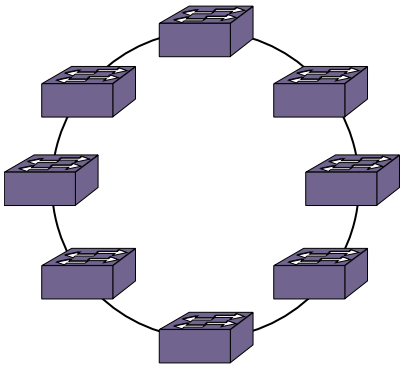


Figure 202: Graphical Representation of a Ring Topology

Figure 203 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.

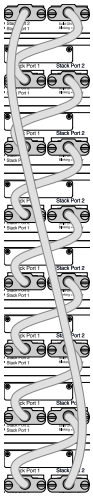


Figure 203: Switches Connected to Each Other in a Ring Topology

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.

Connect your stack nodes in a ring topology, not a daisy-chain topology, for normal operation.

In Figure 204, 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.

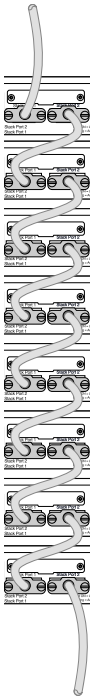


Figure 204: Daisy Chain Topology

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 primary condition increases. Before you create a daisy chain topology, read "Managing a Dual Primary Situation" in the *ExtremeXOS 16.2 User Guide*.

Use 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 the stacking protocol. 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 stacking protocol, not the standard Ethernet protocol.

Table 114 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 114 – operate using the stacking protocol for the logical stacking ports.

Table 114: Native and Alternate Stacking Ports

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X440-24t-10G X440-24x-10G X440-24p-10G	None	25,26	Front panel
X440-48t-10G X440-48p-10G	None	49,50	Front panel
X450a-24t X450a-24tDC X450a-24x X450a-24xDC X450e-24t X450e-24p	Fixed (rear panel)	25,26	XGM2-2xf or XGM2-2xn or XGM2-2sf or XGM2-2bt
X450a-48t X450a-48tDC X450e-48t X450e-48p	Fixed (rear panel)	49,50	XGM2-2xf or XGM2-2xn or XGM2-2sf or XGM2-2bt
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 114: Native and Alternate Stacking Ports (continued)

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X460-24t X460-24x X460-24p	SummitStack module or SummitStack-V80 module	S1,S2 (29,30)	XGM3-2sf or XGM3S-2sf or XGM3S-2xf
X460-48t X460-48p	SummitStack module or SummitStack-V80 module	S1,S2 (53,54)	XGM3-2sf or XGM3S-2sf or XGM3S-2xf
X460-48x	SummitStack module or SummitStack-V80 module	S1,S2 (49,50)	XGM3S-2sf or XGM3S-2xf
X460-G2-24t-GE4 X460-G2-24p-GE4	VIM-2ss or VIM-2q	33,34	VIM-2t or VIM-2x
X460-G2-48t-GE4 X460-G2-48p-GE4	VIM-2ss or VIM-2q	53,54	VIM-2t or 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
X480-24x	None: VIM has only data ports	S3,S4 (29,30)	VIM2-10G4X module
	None: No installed VIM	25,26	Front panel
	VIM2-SummitStack module VIM2-SummitStack128 module VIM2-SummitStack-V80 module VIM3-40G4X	25,26	Front panel
X480-48t X480-48x	None: VIM has only data ports	S3,S4 (51,52)	VIM2-10G4X module
X670-48x	None	47,48	Front panel
X670V-48t X670V-48x	VIM4-40G4X	47,48	Front panel
X670-G2-48x-4q	Ports 49,53,57,61	47,48	Front panel
X670-G2-72x	None	71,72	Front panel
X770-32q	Ports 101,102,103,104	103,104	Front panel

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 115 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 115 – operate as stacking ports.

Table 115: 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

Table 115: Native and Alternate Stacking Ports (continued)

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
X460-G2-24t-GE4 X460-G2-24p-GE4	VIM-2ss or VIM-2q	33,34	VIM-2t or VIM-2x
X460-G2-48t-GE4 X460-G2-48p-GE4	VIM-2ss or VIM-2q	53,54	VIM-2t or 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
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 116 shows the switch models that can participate in each stacking method.

Table 116: 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 X440, X460, X460-G2, X480
SummitStack-V	10 Gbps	0.5 m - 40 km SFP+, XENPAK (with SR, LR, and ER)	X440 X440-G2 X450-G2 (10G models) X460 (with XGM3-2sf, 2xsf), X460-G2 (1G models with VIM-2x, VIM-2ss) X460-G2 (10G models) X480 (VIM2,3) X620 X670 and X670V (ports 47 and 48), 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	X460 (SSv80) X480 (VIM2,3) X670V (VIM4-40G4X) 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) X480 (VIM3) X670 (VIM4) X670-G2-48x-4q (ports 57, 61) X770 (ports 103 and 104)
SummitStack-V160	42 Gbps	0.5 m - 100 m QSFP+	X590 X465 X690
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	X480 (VIM3) X670 (VIM4) 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)

[3] Combined over paired ports

Table 116: SummitStack Methods (continued)

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths	Switch Models
SummitStack128	32 Gbps	0.5 m, 1.5 m, 3.0m	X480 (VIM2-SS128)
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). • 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)

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 254.

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 117 describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

Table 117: List of Stacking Terms

Term	Description
Stackable switch	An ExtremeSwitching or Summit family 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.

[4] The VIM2-SS128 module can be used for stacking X480 switches. It can also stack with SS256 with a conversion cable.

Table 117: List of Stacking Terms (continued)

Term	Description
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 `show stacking` 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.
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 `show slot {`*`slot`* `{`**`detail`**`} | `**`detail`**` }` 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 mode – 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.

Table 117: List of Stacking Terms (continued)

Term	Description
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.
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 (Virtual LAN)* 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.

Table 117: List of Stacking Terms (continued)

Term	Description
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 bee 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 `show slot {`*`slot`* `{`**`detail`**`} | `**`detail`**` }`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 `show switch {`**`detail`**` }` 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 `show stacking` 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 `enable stacking {`**`node-address`** *`node-address`*`}` command and the essential stacking parameters are unconfigured or inconsistent. It can also be invoked directly by running the `configure stacking easy-setup` command.

Plan 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 254 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 240). 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 253 to configure the software for your stack.

The recommended procedures for installing and interconnecting a stack are found in Set up the Physical Stack on page 286.

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 16.2 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 16.2 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 16.2 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 252 for physically situating your equipment.

Stacking Considerations for Each Switch Model on page 254 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.

Summit X250e and X450a/e Stacking

Many switches, including most Summit X250e, X450a, and X450e series models, have standard stacking ports built in. The stacking ports are found on the rear of the switch.

Use any standard SummitStack stacking cables to connect the stacking ports.

The stacking-support option is disabled by default for Summit X250e, X450a, and X450e switches. For more information, see Enabling and Disabling the Stacking-Support Option on page 251.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X450a and X450e switches. For more information, see Selecting Native and Alternate Stacking Ports on page 274.

To use alternate stacking on a Summit X450a or X450e switch, you must install an XGM2-2xf, XGM2-2xn, XGM2-2sf, or XGM2-2bt port option card to add 10-Gbps ports to the switch.

Table 118 summarizes alternate stacking support for X450a and X450e switches.

Table 118: Alternate Stacking Ports for X450a and X450e Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X450a-24t X450a-24tDC X450a-24x X450a-24xDC X450e-24t X450e-24p	Fixed (rear panel)	25,26	XGM2-2xf or XGM2-2xn or XGM2-2sf or XGM2-2bt
X450a-48t X450a-48tDC X450e-48t X450e-48p	Fixed (rear panel)	49,50	XGM2-2xf or XGM2-2xn or XGM2-2sf or XGM2-2bt

Summit X440 Stacking

The stacking-support option is enabled by default for Summit X440 switches. For more information, see Enabling and Disabling the Stacking-Support Option on page 251.

The stacking port selection option, which allows you to choose between native and alternate ports, is disabled by default for X440 switches. For more information, see Selecting Native and Alternate Stacking Ports on page 274.

Table 119: Stacking Methods for X440 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack (Front panel for 8t and 8p models. Rear panel for all other models except 10G models; 10G models do not have native stacking ports)	10 Gbps	0.5m, 1.5m, 3.0m 20 Gb Stacking Cable
SummitStack-V (Front panel 10G models)	10 Gbps	0.5m–40km SFP+

Many switches, including most Summit X440 series models, have standard stacking ports built in. Except in the case of the X440 8-port models, the stacking ports are found on the rear of the switch, as shown in the following illustration.

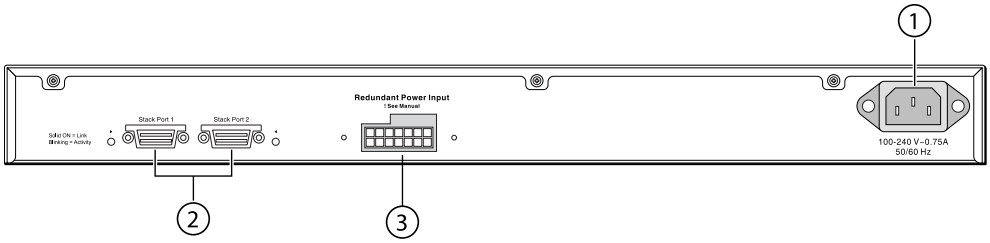


Figure 205: Stacking Ports on Rear of Switch (Summit X440-24t Shown)

1 = AC power input connectors	3 = Redundant power connector

2 = Stacking ports	

Use any standard SummitStack stacking cables to connect the stacking ports.

Alternate stacking is supported for most X440 switches, as summarized in Table 120.

Table 120: Alternate Stacking Ports for X440 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X440-24t-10G X440-24x-10G X440-24p-10G	None	25,26	Front panel
X440-48t-10G X440-48p-10G	None	49,50	Front panel

Note

- On X440 24-port switches, ports 25 and 26 are not available as data ports when the alternate stacking ports are used.
- On X440 48-port switches, ports 49 and 50 are not available as data ports when the alternate stacking ports are used.

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 251.

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 274.

Table 121: 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 122 summarizes alternate stacking support for the various X440-G2 switch models.

Table 122: 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 251.

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 274.

Table 123: 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 206. 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.

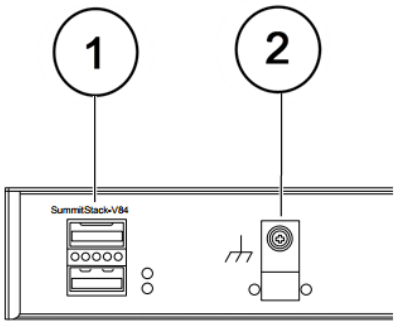


Figure 206: X450-G2 Switch: Native Stacking Ports

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 124. Use the front-panel 10G ports for alternate stacking.

Table 124: 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 280.

Summit X460 Stacking

The stacking-support option is disabled by default for Summit X460 switches. For more information, see Enabling and Disabling the Stacking-Support Option on page 251.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X460 switches. For more information, see Selecting Native and Alternate Stacking Ports on page 274.

Table 125: Stacking Methods for X460 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack (rear panel, with module)	10 Gbps	0.5m, 1.5m, 3.0m, 5m 20 Gb Stacking Cable
SummitStack-V80 (with SSv80)	20 Gbps	0.5m–100m QSFP+ only
SummitStack-V (with XGM3-2sf, XGM3S-2sf, XGM3S-2xf)	10 Gbps	0.5m–40km SFP+, XFP

For X460 native stacking, install a VIM2-SummitStack or VIM2-SummitStack-V80 port option card into the rear of the switch.

The VIM2-SummitStack port option card requires standard SummitStack cables.

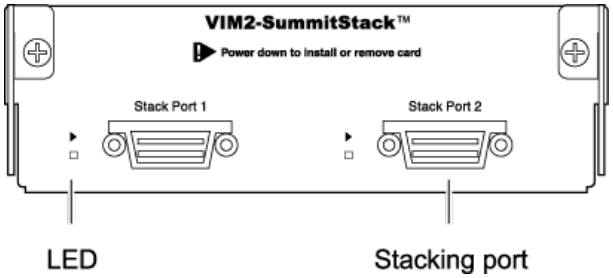


Figure 207: VIM2-SummitStack Port Option Card

The VIM2-SummitStack-V80 port option card uses 40G QSFP+ cables to make the stacking port connections.

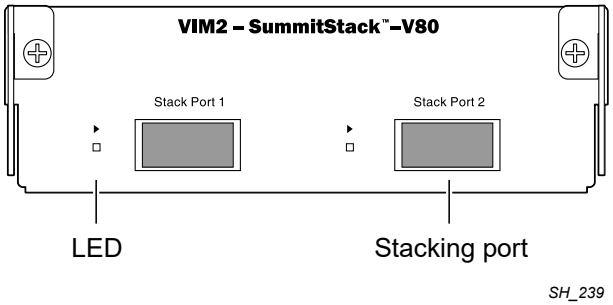


Figure 208: VIM2-SummitStack-V80 Port Option Card

For a complete listing of compatible cables and optical transceivers, see the Extreme Optics Compatibility website.

To use alternate stacking on a Summit X460 switch, you must install an XGM3-2sf, XGM3S-2sf, or XGM3S-2xf port option card to add 10-Gbps ports to the switch. Table 126 shows which port option cards are compatible with each X460 switch model for alternate stacking.

Table 126: Alternate Stacking Ports for X460 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X460-24t X460-24x X460-24p	SummitStack module or SummitStack-V80 module	S1,S2 (29,30)	XGM3-2sf or XGM3S-2sf or XGM3S-2xf
X460-48t X460-48p	SummitStack module or SummitStack-V80 module	S1,S2 (53,54)	XGM3-2sf or XGM3S-2sf or XGM3S-2xf
X460-48x	SummitStack module or SummitStack-V80 module	S1,S2 (49,50)	XGM3S-2sf or XGM3S-2xf

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 251.

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 274.

Table 127: 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 260.	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 260.	40 Gbps	QSFP+
SummitStack-V (front panel 10G models) See Alternate Stacking for X460-G2 Switches on page 261.	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. With this module it is possible to stack with X460 and X480 switches.

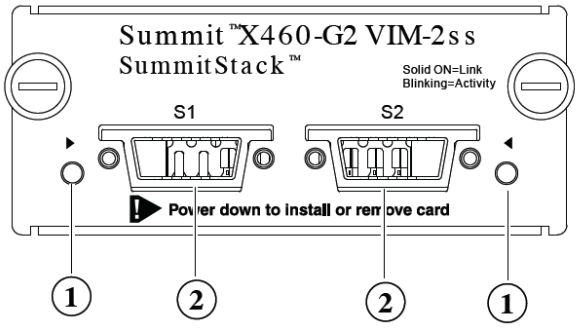


Figure 209: VIM-2ss SummitStack Module

1 = LEDs	2= Stacking ports

The VIM-2q module connects to QSFP+ cables to form stacks using the SummitStack-V160 protocol. This module is not compatible with the SummitStack-V80 module that is used on the X460 and X480 switches.

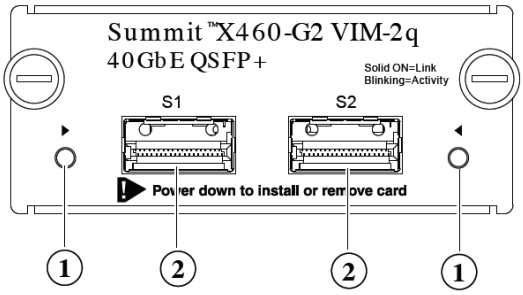


Figure 210: VIM-2q Port Option Card

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 262 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 263 for additional considerations.

Note
40G ports on the VIM-2q cannot be partitioned into four 10G ports.

Table 128 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 128 – operate using the stacking protocol for the logical stacking ports.

Table 128: 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-2t or VIM-2x
X460-G2-48t-GE4 X460-G2-48p-GE4	VIM-2ss or VIM-2q	53,54	VIM-2t or 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.)
- Because the X460-G2 switch must run with ExtremeXOS version 15.7 or later, it cannot be stacked with older switch series like the X250 and X450e. Those switch series are not compatible with the ExtremeXOS levels that are required for X460-G2 switches.
- See also Summit X460-G2 (10G Models) Stack Configuration Guidelines on page 262.
- See also Summit X460-G2 (1G Models Using VIM Ports) Stack Configuration Guidelines on page 263.

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 280.
  - 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.

ExtremeSwitching X465 Stacking

The stacking-support option is enabled by default for X465 switches. For more information, see Enabling and Disabling the Stacking-Support Option on page 251.

Table 129: Stacking Methods for X465 Switches

Stacking Method	Type or Location of Dedicated Stacking Ports	Speed per Link (HDX)	Cable Type and Lengths
ExtremeSwitching (front panel, dedicated)	S1, S2	42 Gbps	.5m, 1.0m, 3.0m, 5.0m, 10m, 20m QSFP+

For details about the `configure stacking-support` command, see the *ExtremeXOS 16.2 Command Reference Guide*.

Summit X480 Stacking

The stacking-support option is enabled by default for X480 switches except in the case of X480-24x switches with a VIM2-SummitStack, VIM2-SummitStack128, or VIM2-SummitStack-V80 module installed. For more information, see Enabling and Disabling the Stacking-Support Option on page 251.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X480-24x switches with a VIM2-SummitStack, VIM2-SummitStack128, or VIM2-SummitStack-V80 module installed. For other X480 switch configurations, the option is disabled. For more information, see Selecting Native and Alternate Stacking Ports on page 274.

Table 130: Stacking Methods for X480 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack (with VIM2-SummitStack) See Native Stacking for X480 Switches on page 265.	10 Gbps	0.5m, 1.5m, 3.0m, 5.0m 20 Gb Stacking Cable
SummitStack-V (with VIM2-10G4X) See Alternate Stacking for X480 Switches on page 265.	10 Gbps	0.5m–40km XFP
SummitStack-V80 (with VIM2-SSV80 and VIM3-40G4X)	20 Gbps	0.5m–100m QSFP+ only
SummitStack-V160 (with VIM3-40G4X)	40 Gbps	0.5m–100m QSFP+ only
SummitStack-V320 (with VIM3-40G4X)	80 Gbps	0.5m–100m QSFP+ only
SummitStack128 (With VIM2-SS128)	32 Gbps	0.5m, 1.5m, 3.0m

[5] VIM2-SS128 is a module that can stack with other X480 switches using VIM2-SS128. It can also stack using SS256 with a conversion cable.

Native Stacking for X480 Switches

For Summit X480 native stacking, install VIM2 or VIM3 versatile interface module (VIM) into the rear of the switch. See #unique_157 for more information about the VIMs supported.

The VIM3-40G4X module can be used for native stacking with a Extreme Networks certified 40G QSFP + cable. Other SummitStack ports require standard SummitStack cables.

For a complete listing of compatible cables and optical transceivers, see the Extreme Optics Compatibility website.

Note
Stack Port 1 is port S3 and Stack Port 2 is port S4 on the VIM3-40G4X.

Alternate Stacking for X480 Switches

Summit X480-48t and X480-48x switches do not have 10-Gbps ports on the base model switch. To use the SummitStack-V feature on these switches, you must install a VIM2-10G4X module – after which ports S3 (51) and S4 (52) can be configured as alternate stacking ports. Alternate stacking ports are not supported with the VIM3-40G4X.

On an X480-24x switch with an installed VIM2-10G4X module, you can configure ports S3 (29) and S4 (30) as alternate stacking ports for the SummitStack-V feature. If you use a VIM3-40G4X module for stacking, ports 25 and 26 are configured as the alternate stacking ports.

On an X480-24x switch with installed native stacking ports on a VIM2 module, you can do either of the following:

- Configure both ports 25 and 26 on the switch front panel as alternate stacking ports.
- Configure one alternate stacking port on the switch front panel and use a native stacking port on the installed VIM2 module.

On an X480-24x switch with no installed VIM2 module, you can configure ports 25 and 26 on the switch front panel as alternate stacking ports.

Table 131 summarizes alternate stacking support for X480 switches.

Table 131: Alternate Stacking Ports for X480 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X480-24x	None: VIM has only data ports	S3,S4 (29,30)	VIM2-10G4X module
	None: No installed VIM	25,26	Front panel
	VIM2-SummitStack module VIM2-SummitStack128 module VIM2-SummitStack-V80 module VIM3-40G4X	25,26	Front panel
X480-48t X480-48x	None: VIM has only data ports	S3,S4 (51,52)	VIM2-10G4X module

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 251.

Table 132 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 132: Stacking Methods for X590 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V400 (Front panel ports 29, 33)	106 Gbps	0.5m - 20m QSFP28
SummitStack-V160 (Front panel ports 29, 33)	42 Gbps	0.5m - 40Km QSFP+

X620 Stacking

See #unique_334/unique_334_Connect_42_X620_STACKING 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 251.

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 274.

Table 133: 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 134 summarizes alternate stacking support for X620 switches.

Table 134: 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.

Summit X650 Stacking

For Summit X650 native stacking, install VIM1 or VIM3 versatile interface module (VIM) into the rear of the switch. Link speeds and cable types vary depending on which VIM you selected. See #unique_167 for more information about the VIMs supported.

Table 135: Stacking Methods for X650 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack (with VIM1 module)	varies	varies
SummitStack (with VIM3-40G4X)	40 Gbps	0.5m–100m QSFP+ only

The VIM1-SummitStack256/512 modules require a non-standard stacking cable.

Other SummitStack ports require standard SummitStack cables.

For a complete listing of compatible cables and optical transceivers, see the Extreme Optics Compatibility website.

Note
When using native stacking on an X650 switch, data ports 23 and 24 do not function.

Summit X670 Stacking

Both X670-48x switches and X670V switches can participate in alternate stacking configurations using SummitStack-V.

Native stacking is possible only for X670V switches.

The stacking-support option is enabled by default for all X670-48x and X670V switches. For more information, see Enabling and Disabling the Stacking-Support Option on page 251.

The stacking port selection option, which allows you to choose between native and alternate ports, is enabled by default for X670-48x and X670V switches. For more information, see Selecting Native and Alternate Stacking Ports on page 274.

Table 136: Stacking Methods for X670-48x Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V (front panel)	10 Gbps	0.5m–40km SFP+
SummitStack-V160	40 Gbps	0.5m–100m QSFP+ only
SummitStack-V320	80 Gbps	0.5m–100m QSFP+ only

Table 137: Stacking Methods for X670V Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V (front panel)	10 Gbps	0.5m–40km SFP+
SummitStack-V80 (with VIM3-40G4X)	20 Gbps	0.5m–100m QSFP+ only
SummitStack-V160 (with VIM4-40G4X)	40 Gbps	0.5m–100m QSFP+ only
SummitStack-V320 (with VIM4-40G4X)	80 Gbps[6]	0.5m–100m QSFP+ only

Native Stacking for X670V Switches

For X670V native stacking, install a VIM4-40G4X module into the rear of the switch. Use any Extreme Networks certified 40G QSFP+ cable or optical transceiver to make the connections among the switches to be stacked.

In SummitStack-V160 mode:

- Port S3 on the VIM4-40G4X module serves as stack port 1. The ExtremeXOS operating system displays this port as port 57.
- Port S4 on the VIM4-40G4X module serves as stack port 2. The ExtremeXOS operating system displays this port as port 61.

In SummitStack-V320 mode:

- Ports S1 and S3 on the VIM4-40G4X module serve collectively as stack port 1. The ExtremeXOS operating system displays these ports as ports 49 and 57.
- Ports S2 and S4 on the VIM4-40G4X module serve collectively as stack port 2. The ExtremeXOS operating system displays these ports as port 53 and 61.

6 Combined over paired ports

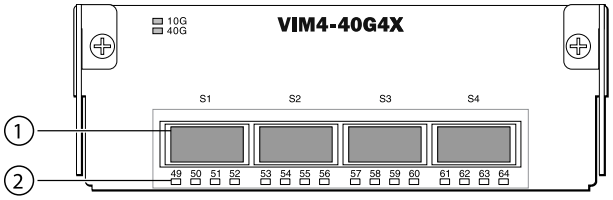


Figure 211: VIM4-40G4X Port Option Card for X670V Switch

1 = QSFP+ ports (S3 and S4 are used for stacking)	2= Port LEDs

If ports 47 and 48 on an X670V switch are used as alternate stacking ports, ports 45 and 46 are not available to use as data ports.

For a complete listing of compatible cables and optical transceivers, see the Extreme Optics Compatibility website.

To join an X670-48x switch to an X460 switch in a stack, use SummitStack-V80 stacking.

To join an X670-48x switch to an X460-G2 switch in a stack, use SummitStack-V160 stacking.

Alternate Stacking for X670-48x and X670V Switches

Table 138 summarizes alternate stacking support for X670-48x and X670V switches.

Table 138: Alternate Stacking Ports for X670 Switches

Switch Model	Type or location of Native Stacking Ports	Alternate Stacking Ports	Location of Alternate Stacking Ports
X670-48x	None	47,48	Front panel
X670V-48t X670V-48x	VIM4-40G4X	47,48	Front panel

Note

- Ports 45 and 46 are not available as data ports when the alternate stacking ports are used.
- On X670V-48t switches, alternate stacking ports are fiber medium only.

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 251.

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 274.

Table 139: 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.
- For SummitStack-V320 stacking, use ports 49, 53, 57, and 61.

X670-G2-72x switches support do not support native stacking.

[7] Combined over paired ports

Alternate Stacking for X670-G2 Switches

Table 140 summarizes alternate stacking support for X670-G2 switches.

Table 140: 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 251.

Table 141 summarizes stacking support for X690 switches.

Table 141: Stacking Methods for X690 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V400 (Front panel ports 61,69)	106 Gbps	0.5m - 20m QSFP28
SummitStack-V160 (Front panel ports 61,69)	42 Gbps	0.5m - 40Km QSFP+

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 251.

Table 142: 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 - 40Km QSFP+
		106 Gbps	0.5m - 20m QSFP28

For details about the `enable stacking-support` command, see the *ExtremeXOS 16.2 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 251.

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 274.

Table 143: 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 212).

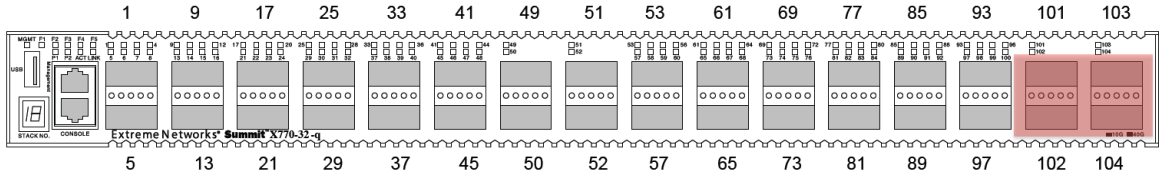


Figure 212: Location of Stacking Ports (101 through 104) on an X770 Switch

For a complete listing of compatible cables and optical transceivers, see the Extreme Optics Compatibility website.

Alternate Stacking for X770 Switches

Table 144 summarizes alternate stacking support for X770 switches.

Table 144: 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 280.

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 251.

Table 145 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 145: Stacking Methods for X870 Switches

Stacking Method	Speed per Link (HDX)	Cable Type and Lengths
SummitStack-V400 (Front panel ports 121,125)	106 Gbps	0.5m - 20m 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 254), 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 254 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 146 on page 276. 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 146: 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	
5520										
X620	V	V	V			V	V			
X670-G2[4]	V	V	V V160			V	V V80 (supported 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 238.

Stack configuration, easy setup, and redundancy are fully described in the *ExtremeXOS 16.2 User Guide*.

ExtremeSwitching switches can be stacked in the combinations listed in Table 147 on page 277. 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 147: 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	

Table 147: Matrix of Switches and Stacking Methods (continued)

Stack with	X440-G2[1]	X450-G2[2]	X460-G2[1]	X590	X620	X670-G2[3]	X690	X770	X870
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 238.

Stack configuration, easy setup, and redundancy are fully described in the *ExtremeXOS 16.2 User Guide*.

Summit switches can be stacked in the combinations listed in Table 148 on page 279. For each combination, one or more of the following stacking methods are displayed:

40G
: 40G mode

128G
: 128G mode (X480-24x switches with VIM2-SummitStack128)

SS
: SummitStack

V
: SummitStack-V

V80
: SummitStack-V80

V84
: SummitStack-V84 (X450-G2 switches)

V160
: SummitStack-V160

V320

SummitStack-V320

Table 148: Matrix of Switches and Stacking Methods

Stack with	X440[1]	X440-10G	X450-G2[3]	X460	X460-G2[2]	X480	X670	X670V	X670-G2[4]	X770
X440[1]	40G	-	-	40G	40G	40G	-	-	-	-
X440-10G	-	V	V	V	V	V	V	V	V	V
X450-G2[3]	-	V	V V84	V	V	V	V	V	V	V
X460	40G	V	V	40G V V80	40G V	40G V V80	V	V V80	V V80	V
X460-G2[2]	40G	V	V	40G V	40G SS V V160	40G V V160	V	V V160	V V160	V V160
X480	40G	V	V	40G V V80	40G V V160	40G 128G V V80 V160 V320	V	V V80 V160 V320	V V80 V160 V320	V V160 V320
X670	-	V	V	V	V	V	V	V	V	V
X670V	-	V	V	V V80	V V160	V V80 V160 V320	V	V V160 V320	V V80 V160 V320	V V160 V320
X670-G2[4]	-	V	V	V V80	V V160	V V80 V160 V320	V	V V80 V160 V320	V V80 V160 V320	V V160 V320
X770	-	V	V	V	V V160	V V160 V320	V	V V160 V320	V V160 V320	V V160 V320

Notes:

1. X440-L2 models cannot be stacked.
2. X460-G2 SummitStack-V is available only on 10G models.
3. X450-G2 SummitStack-V is available only on 10G models. SummitStack-V84 is available only in stacks of Summit X450-G2 switches running the same version of ExtremeXOS.
4. 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 Summit series, refer to the list in Master/Backup Switch Redundancy on page 238 and follow these guidelines:

- The stack master and backup nodes should be from the same switch series. For example, if a Summit X480 series switch is the stack master, the backup node should also be a Summit X480 series switch.
- Follow these guidelines for the specific listed switch combinations:
  - If Summit X480 series and X650 switches are both present in the stack, the master and backup nodes should both be X480 switches.
  - If Summit X480 switches and X670 switches are both present in the stack, the master and backup nodes should both be X670 switches.
- Although you can combine Summit X460, X480, and X670 switches in a stack, you should be aware that the routing table limit for the Summit X460 series is lower than the limits for the other two switch series. For more information, refer to the *ExtremeXOS 16.2 User Guide*.

Stack configuration, easy setup, and redundancy are fully described in the *ExtremeXOS 16.2 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.

Depending on the switch model and the number and type of stacking ports, the bidirectional stacking link provides 40 Gbps, 80 Gbps, 128 Gbps, 160 Gbps, 256 Gbps, or 512 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 149 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 284.

Table 149: 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 20-Gbps fixed stacking ports on X250e, X440 (except 10G models) X450, X450a, X450e, and X460 (with stacking module) switches, 20-Gbps stacking ports on VIM-2ss on X460-G2 switches, 20-Gbps stacking ports on VIM1-SummitStack or VIM1-10G8X modules in X650 switches, 20-Gbps stacking ports on VIM2-SummitStack modules in X480 switches
16106	SummitStack, 0.5 meter	
16107	SummitStack, 1.5 meter	
16108	SummitStack, 3 meter	
17021	SummitStack 128G, 0.5 meter	128-Gbps ports on VIM1-SummitStack256 or VIM1-SummitStack512 modules in X650 switches
17022	SummitStack 128G, 1.0 meter	
17023	SummitStack 128G, 3.0 meter	
17026	SummitStack 128G/64G, 1.0 meter	128-Gbps ports on VIM1-SummitStack256 modules in X650 switches and 64-Gbps ports on VIM2-SummitStack128 modules in X480 switches
17030	SummitStack 64G, 1.0 meter	64-Gbps ports on VIM2-SummitStack128 modules in X480 switches
17034	SummitStack 128G/20G, 1.0 meter	128-Gbps ports on VIM1-SummitStack256 modules in X650 switches and 20-Gbps fixed stacking ports on X250e, X450, X450a, X450e switches, 20-Gbps stacking ports on VIM1-SummitStack or VIM1-10G8X modules in X650 switches, 20-Gbps stacking ports on VIM2-SummitStack modules in X480 switches
17038	SummitStack 64G/20G, 1.0 meter	64-Gbps ports on VIM2-SummitStack128 modules in X480 switches and 20-Gbps fixed stacking ports on X250e, X450, X450a, X450e switches, 20-Gbps stacking ports on VIM1-SummitStack or VIM1-10G8X modules in X650 switches, 20-Gbps stacking ports on VIM2-SummitStack modules in X480 switches
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 10G stacking ports on X450-G2 10G switches
10305	10GBASE-CR SFP+ pre-terminated twin-ax copper cable, 3 meters	

Table 149: Available Stacking Cables for Extreme Networks Switches (continued)

Part Number	Cable Type, Length	Compatible Ports and Devices
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 10G stacking ports on 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 21-Gbps stacking ports on X450-G2 switches, 80-Gbps stacking ports on VIM3-40G4X modules in X480 and X650 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches 40-Gbps stacking ports on X465, VIM5-4x, and VIM5-4XE
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 21-Gbps stacking ports on X450-G2 switches, 80-Gbps stacking ports on VIM3-40G4X modules in X480 and X650 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches 40-Gbps stacking ports on X465, VIM5-4x, and VIM5-4XE
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 21-Gbps stacking ports on X450-G2 switches, 80-Gbps stacking ports on VIM3-40G4X modules in X480 and X650 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches 40-Gbps stacking ports on X465, VIM5-4x, and VIM5-4XE
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 21-Gbps stacking ports on X450-G2 switches, 80-Gbps stacking ports on VIM3-40G4X modules in X480 and X650 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670 switches, QSFP+ ports on X670-G2-48x-4q switches, and QSFP+ ports on X770 switches

Table 149: Available Stacking Cables for Extreme Networks Switches (continued)

Part Number	Cable Type, Length	Compatible Ports and Devices
10315	QSFP+ direct-attach active optical cable, 10 meters	40-Gbps stacking ports on X465, VIM5-4x, and VIM5-4XE QSFP+ ports on X670-G2-48x-4q switches 80-Gbps stacking ports on VIM3-40G4X modules in x480 and X650 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670 switches, QSFP+ ports on X670-G2-48x-4q switches
10316	QSFP+ direct-attach active optical cable, 20 meters	40-Gbps stacking ports on X465, VIM5-4x, and VIM5-4XE
10317	QSFP+ direct-attach active optical cable, 50 meters	QSFP+ ports on X670-G2-48x-4q switches 80-Gbps stacking ports on VIM3-40G4X modules in x480 and X650 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670 switches, 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 21-Gbps stacking ports on X450-G2 switches, 80-Gbps stacking ports on VIM4-40G4X modules in X670V switches 40-Gbps stacking ports on X465, VIM5-4x, and VIM5-4XE
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 40-Gbps ports on X670-G2 switches; 40-Gbps ports on X770 switches; 40-Gbps VIM ports on X460, X460-G2, X480, and X670V 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	100-Gbps ports on X590, X690, and X870 switches (see Alternative Configuration for Optics on X590, X690, X695, and X870 Switches on page 284 for more information)
10442	QSFP28 x 4SFP28 (4x25Gb) active optical breakout cable, 7 meters	

Table 149: Available Stacking Cables for Extreme Networks Switches (continued)

Part Number	Cable Type, Length	Compatible Ports and Devices
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 150 lists cables and transceivers that require the use of `V400 alternative-configuration`:

Table 150: 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 16.2 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.

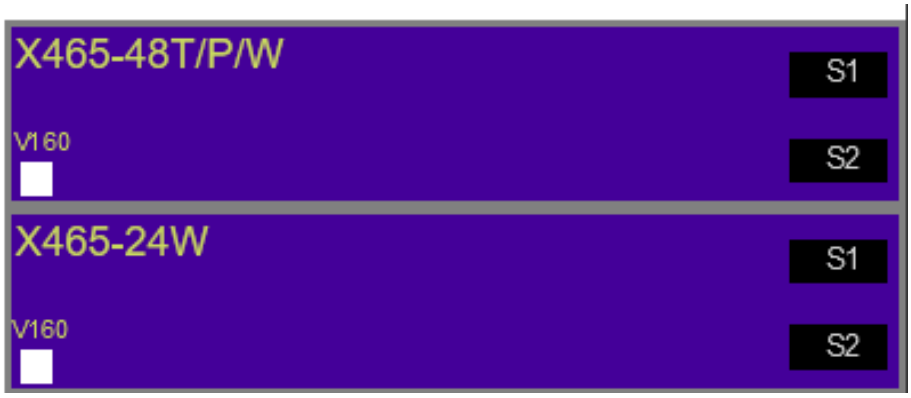


Figure 213: X465 Switches Shown in the Stacking Tool

   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 151: Colors in the Stacking Tool Display

Color	Meaning
Green	Compatible and preferred
Blue	Compatible
Yellow	Incompatible with the selected master node
Red	Incompatible

Set 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 286.
2. Connect the switches to your management network.

   See Connect Your Stack to the Management Network on page 309.

After setting up and connecting the switches, perform software configuration for the stack. See "Configuring a New Stack" in the *ExtremeXOS 16.2 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.

Note
The connection recommendations in this section do not apply to Summit X650 series switches with installed VIM1-SummitStack512 modules. For information about connecting the ports on the VIM1-SummitStack512 modules, see Use the VIM1-SummitStack512 Module on page 293.

For instructions to connect specific types of stacking cables, see Connect Stacking Cables on page 298.

Combine Different Types of Stacking Ports

Figure 214 shows a sample configuration using the following switches:

- Summit X650 series switches with installed VIM1-SummitStack256 modules
- Summit X450a series switch with integrated SummitStack ports
- Summit X480 series switch with installed VIM2-SummitStack module

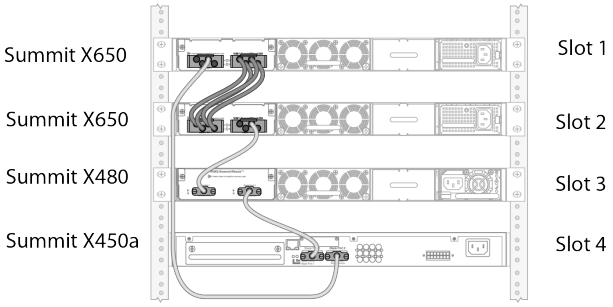


Figure 214: Combining Stacking Port Types: Example 1

The following cables are used to make the stacking connections:

- SummitStack 128G cable between the two Summit X650 series switches at the top (slot 1 and slot 2)
- SummitStack 128G/20G stacking cable between the Summit X650 series switch and the Summit X480 series switch (between slot 2 and slot 3)
- SummitStack 20G stacking cable between the Summit X480 series switch and the Summit X450a series switch (between slot 3 and slot 4)
- SummitStack 128G/20G stacking cable between the Summit X450a series switch and the Summit X650 series switch (between slot 4 and slot 1)

Table 152 lists the recommended order for connecting the stacking ports in this example.

Table 152: Combining Stacking Port Types (Example 1): 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

Figure 215 shows a similar stack configuration using the following switches:

- Summit X650 series switches with installed VIM1-SummitStack256 modules
- Summit X460 series switches with installed SummitStack stacking modules
- Summit X450a series switch with integrated stacking ports

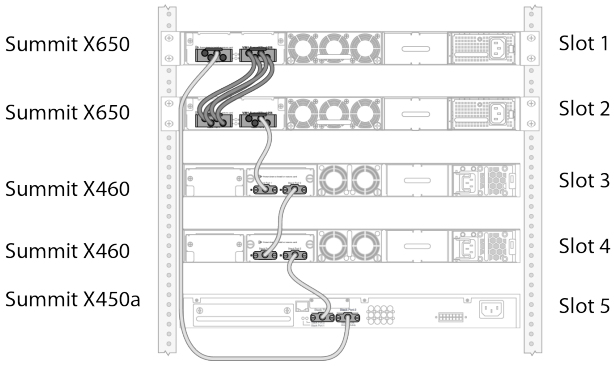


Figure 215: Combining Stacking Port Types: Example 2

The following cables are used to make the stacking connections:

- SummitStack 128G cable between the two Summit X650 series switches at the top (slot 1 and slot 2)
- SummitStack 128G/20G stacking cable between the Summit X650 series switch and the Summit X460 series switch (between slot 2 and slot 3)
- SummitStack 20G stacking cable between the two Summit X460 series switches (between slot 3 and slot 4)
- SummitStack 20G stacking cable between the Summit X460 series switch and the Summit X450a series switch (between slot 4 and slot 5)
- SummitStack 128G/20G stacking cable between the Summit X450a series switch and the Summit X650 series switch (between slot 5 and slot 1)

Table 153 lists the recommended order for connecting the stacking ports in this example.

Table 153: Combining Stacking Port Types (Example 2): 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

Combine Different Types of Stacking Ports

Figure 216 shows an example stack configuration using the following switches: X440-G2, X450-G2, X460-G2, and X620.

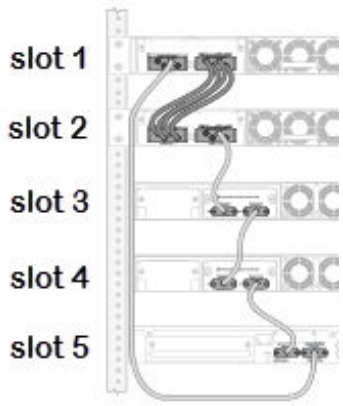


Figure 216: Combining Stacking Port Types: Example

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 154 lists the recommended order for connecting the stacking ports in this example.

Table 154: 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

Use the SummitStack-V80 Stacking Module or VIM2-SummitStack-V80 Module

The SummitStack-V80 stacking module and VIM2-SummitStack-V80 module allow you to use active or passive direct-attach QSFP+ cables to connect stack members across rows in a data center.

In Figure 217, passive copper cables are used to connect adjacent switches in the same rack, and the active fiber cables provide connections up to 100 meters long between racks. The illustration shows Summit X460 series switches; Summit X480 series switches could be used in the same way.

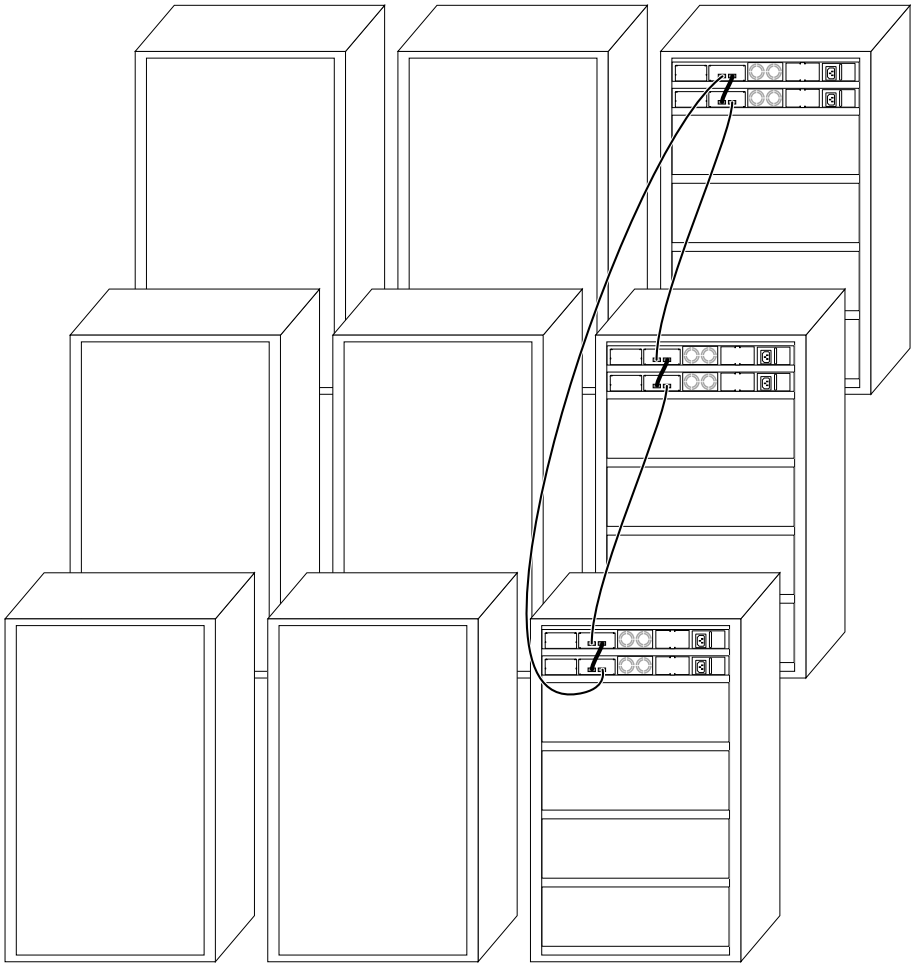


Figure 217: Using the SummitStack-V80 Stacking Module or VIM2-SummitStack-V80 Module

Use 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.

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 VIM4-2q 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 X480 series switch using the VIM3-40G4x module, and on the X770 switch using the QSFP+ ports.

On the VIM4-40G4X module, ports S3 and S4 are the stacking ports.

Figure 218 shows an example stack using X670, X650, X480, and X460 series switches.

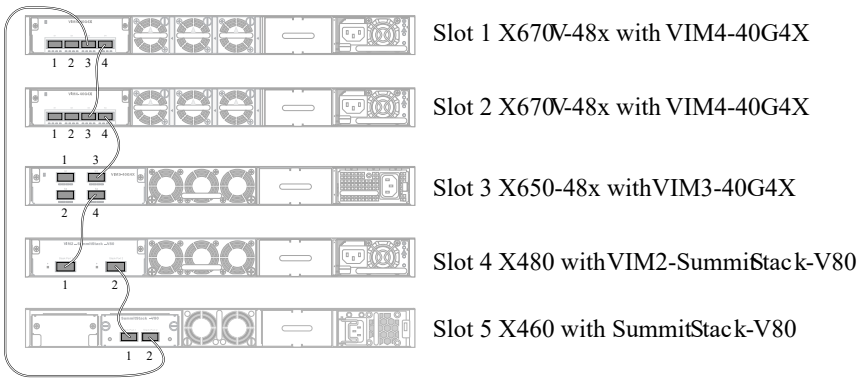


Figure 218: SummitStack-V160 Configuration

Table 155 lists the recommended order for connecting the stacking ports in this example.

Table 155: Using the SummitStack-V160 Stacking: 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

To connect a VIM3-40G4X or VIM4-40G4X stacking port to a stacking port on a VIM2-SummitStack-V80 or SummitStack-V80 module, you must set the VIM3 or VIM4 port to operate at the slower speed of the SummitStack-V80 port. To do so, use the configure stacking-support stack-ports selection command. For more information about configuring stacking ports, see the *ExtremeXOS 16.2 User Guide*.

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.

A stacking rate of 320 Gbps can be achieved across a stack of X480 (with VIM3-40G4X), X650 (with VIM3-40G4X), X670V (with VIM4-40G4X), and X770 switches using the QSFP+ connection and cables. These switches can use 80-Gbps stacking connections that provide 320 Gbps full-duplex bandwidth.

The following figure shows an example of a SummitStack-V320 stack using Summit X670 and X650 series switches.

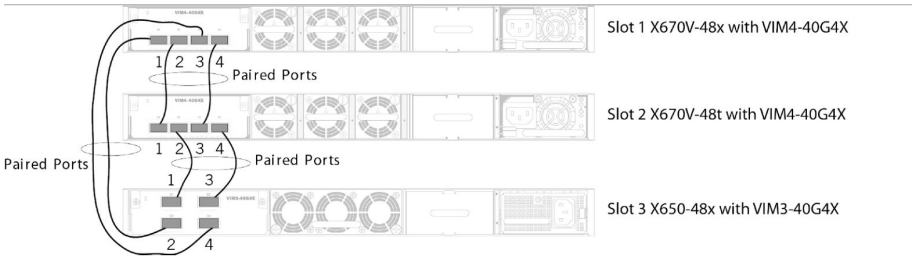


Figure 219: Example SummitStack-V320 Configuration

Slot 1: Summit X670V-48x switch with VIM4-40G4X
Slot 2: Summit X670V-48x switch with VIM4-40G4X
Slot 3: Summit X650 series switch with VIM3-40G4X

SummitStack V-320 stacking can be done with installable modules or using front panel ports, depending upon the type of switch you have. For SummitStack V-320 Stacking using the VIM3-40G4X and VIM4-40G4X modules, connections between the stacking ports must be done using paired bundles of physical ports. V320 stacking will not function unless the physical ports on the modules are paired to form stacking ports. Table 156 lists the port pairings using installable modules.

Table 156: Port Pairings Using Installable Modules

VIM3-40G4X		VIM4-40G4X	
Paired physical ports	Stacking port	Paired physical ports	Stacking port
S1 and S3	S1	S1 and S3	S1
S2 and S4	S2	S2 and S4	S2

Table 157 lists the recommended order for connecting the stacking ports in the example stack shown in Figure 219 on page 292.

Table 157: Recommended Order for Connecting Stacking Ports

Connect this slot and port . . .		. . . To this slot and port	
Slot 1	Stack Port 2 (physical ports 2 and 4)	Slot 2	Stack Port 1 (physical ports 1and 3)
Slot 2	Stack Port 2 (physical ports 2 and 4)	Slot 3	Stack Port 1 (physical ports 1 and 3)
Slot 3	Stack Port 2 (physical ports 2 and 4)	Slot 1	Stack Port 1 (physical ports 1 and 3)

Note

SummitStack-V320 stacking can be mixed with V160, V80, and 10G alternate port stacking. For example, a Summit X460 with SummitStack-V80 could be added to the sample stack in Figure 219 on page 292. However, you must restrict the speed of the ports on the VIM3-40G4X and VIM4-40G4X that connect to any ports on nodes operating at slower speeds. To reduce the speed of ports on the VIM3-40G4X or VIM4-40G4X, use the configure stacking-support stack-ports selection command. For more information about configuring stacking ports, see the *ExtremeXOS 16.2 User Guide*.

Table 158 lists the port pairings for SummitStack V-320 using the front panel ports on the Summit X770 switch.

Table 158: Physical Port Pairings for Front Panel Ports

Summit X770-32q	
Paired physical ports	Stacking port
101 and 103	S1
102 and 104	S2

Use the VIM1-SummitStack512 Module

The VIM1-SummitStack512 versatile interface module allows you to connect two Summit X650 series switches in a cross-over or back-to-back configuration, using SummitStack 128G cables.

This configuration provides two bidirectional links operating at 256 Gbps between the two switches.

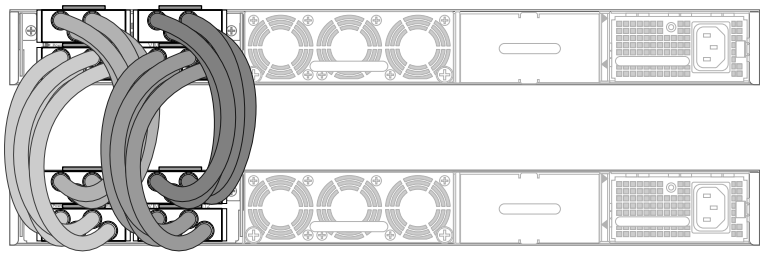


Figure 220: Stacking Connections Using VIM1-SummitStack512 Modules and SummitStack 128G Cables

Unlike other stacking configurations, with the VIM1-SummitStack512 modules, ports are connected in pairs of matching port numbers. When you connect stacking cables to installed VIM1-SummitStack512 modules, match the stacking ports as listed in Table 159.

Table 159: Using the V1M1-SummitStack512 Module: Connections

Connect this slot and port . . .		. . . To this slot and port	
Slot 1	Stack Port 1	Slot 2	Stack Port 1
Slot 1	Stack Port 2	Slot 2	Stack Port 2
Slot 1	Stack Port 3	Slot 2	Stack Port 3
Slot 1	Stack Port 4	Slot 2	Stack Port 4

Examples of Valid Stacking Configurations

SummitStack ports are integrated into the rear panel of X250e, X440, X450, X450a, and X450e series switches.

The X460-G2 accommodates the VIM-2ss SummitStack module, which provides SummitStack ports.

The X460, X480, and X650 also accommodate VIMs or stacking modules that provide 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 221 shows cable connections for a 4-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

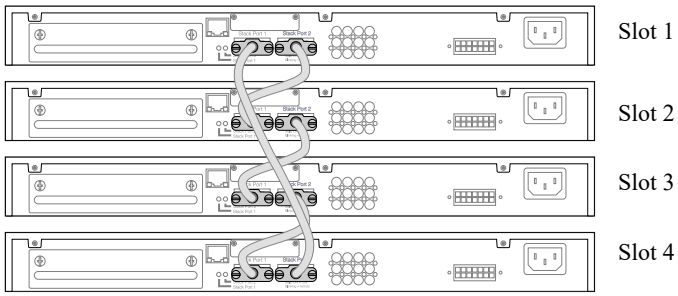


Figure 221: SummitStack Cable Connections Using Four Switches with Integrated SummitStack Ports

Table 160 lists the recommended order for connecting the stacking ports in this example.

Table 160: 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 222 shows cable connections for an 8-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

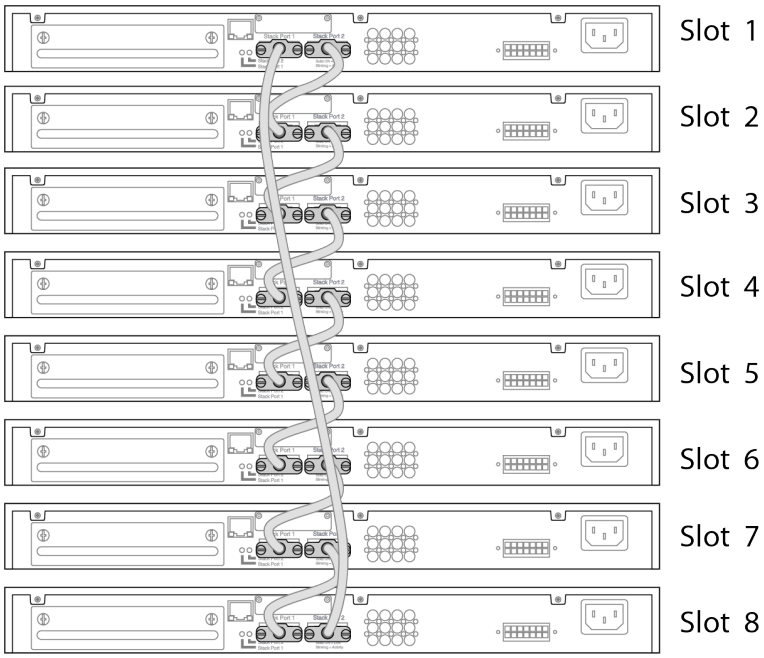


Figure 222: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

Table 161 lists the recommended order for connecting the stacking ports in this example.

Table 161: 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

Table 161: Basic Stack with Eight Switches: Connections (continued)

Connect this slot and port . . .		. . . To this slot and port	
Slot 6	Stack Port 2	Slot 7	Stack Port 1
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 223 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 295.

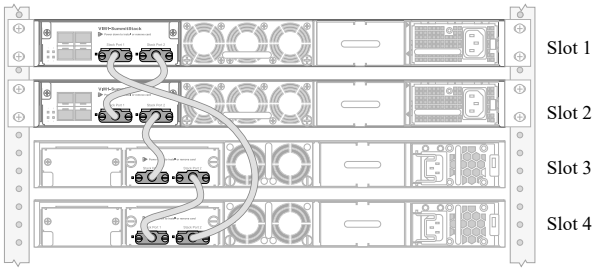


Figure 223: SummitStack Configuration Using Different Switch Models and SummitStack 40G Cables

Example: Stacked X650 Switches with VIM1-SummitStack Modules

Figure 224 shows an example of a four-switch stack that includes two Summit X650 series switches. In the Summit X650 series switches. the SummitStack ports are on installed VIM1-SummitStack modules. The Summit X650 series switches are placed at the top of the stack and will be designated the stack primary and backup nodes. The recommended order for connecting the stacking ports is the same as for the example in Example: Basic Stack with Eight Switches on page 295.

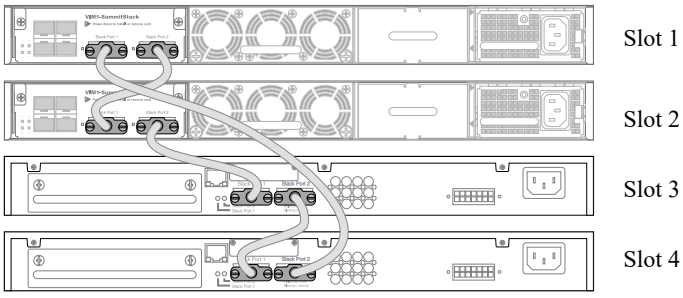


Figure 224: SummitStack Configuration Using SummitStack X650 Series Switches and SummitStack 40G Cables

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.

In each rack, an X480 series switch is placed at the top, with an X650 series switch 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 X480 switches together; they will be designated the stack primary and backup nodes (slot 1 and slot 2, respectively).

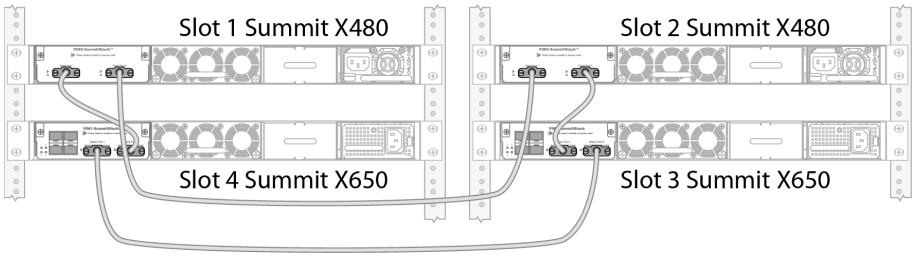


Figure 225: SummitStack Connections Using Four Switches with SummitStack Ports on VIMs

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 primary and backup nodes (slot 1 and slot 2, respectively).

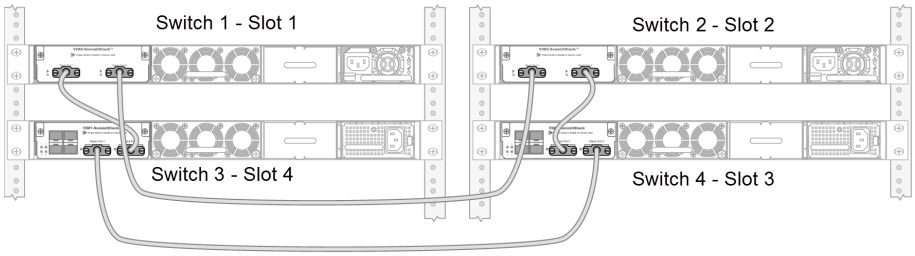


Figure 226: SummitStack Connections Using Four Switches with SummitStack Ports on VIMs

Table 162 lists the recommended order for connecting the stacking ports in this example.

Table 162: 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 227 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.

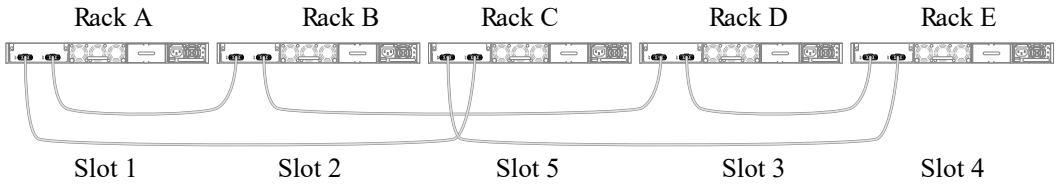


Figure 227: Top-of-Rack Stack Installation

Table 163 lists the recommended order for connecting the stacking ports in this example.

Table 163: 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

Connect Stacking Cables

To connect switches in a SummitStack configuration, use the appropriate stacking cables for the specific stacking ports on the switches.

Connect 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.

SummitStack cables are used to connect 20-Gbps SummitStack ports on the following switches:

- Summit X250e, X440, X450, X450a, and X450e series switches with integrated SummitStack ports
- Summit X480 series switches with installed VIM2-SummitStack modules
- Summit X650 switches with installed VIM1-SummitStack modules

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 228).
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.

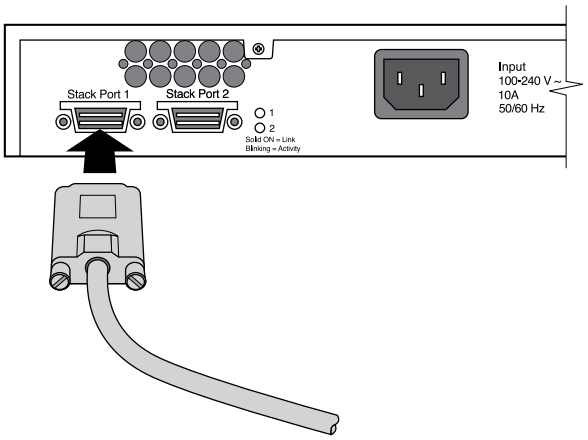


Figure 228: Connecting a SummitStack Cable

Caution
Avoid making sharp bends in the cable. Sharp bends can stress the cable and cause damage.

Connect a SummitStack 128G Cable

Because of the weight of the SummitStack 128G cable, Extreme Networks strongly recommends the use of cable management hardware to support the cables and provide strain relief at the connectors. The following figures show representative types of cable management hardware. Your particular rack configuration may require other cable management solutions.

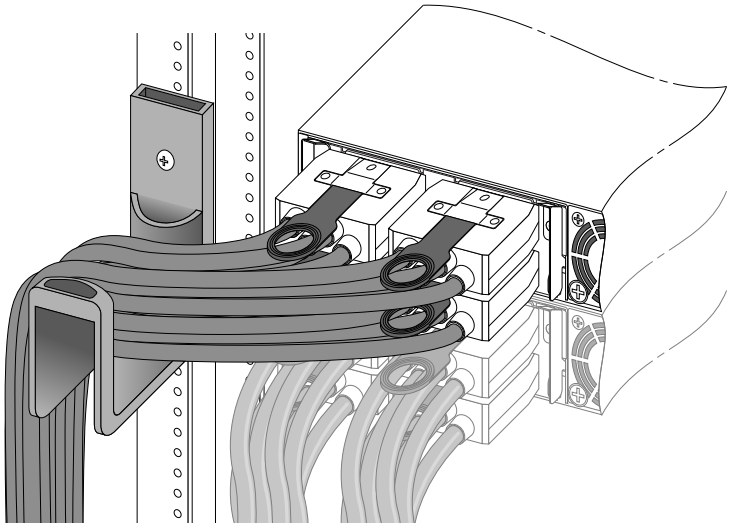


Figure 229: Cable Management Using a J-Shaped Support Bracket

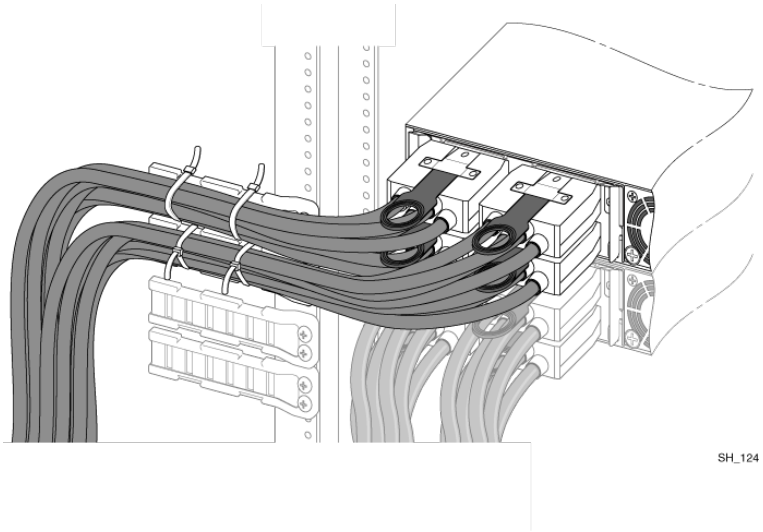


Figure 230: Cable Management Using Tie-Wraps and a Stand-Off

Port Covers on the VIM1-SummitStack512 Module

On the VIM1-SummitStack512 module, EMI-protective covers are installed over the port connectors.

Before connecting the stacking cables, remove the connector covers from the ports that will be used.

To remove a connector cover:

1. On the side of the connector nearest to the inserter/ejector lever, find the notch between the two end tabs on the cover (see Figure 231).
2. At the notch, set a small flat-blade screwdriver firmly against the connector housing.

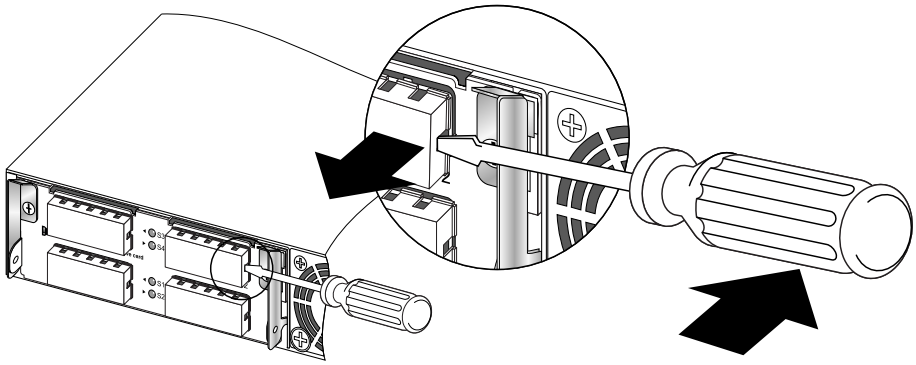


Figure 231: Removing a Connector Cover

3. Brace the screwdriver against the module inserter/ejector lever and pry the end of the connector cover loose.

4. Slide the cover off the connector.

Note

Store the connector covers for later re-use if the switch will be operated without connecting these ports.

Caution

To ensure satisfactory protection from EMI, leave the covers on all ports that are not connected to another VIM1-SummitStack512 module.

Connect the Cable

To connect a SummitStack 128G cable, follow these steps:

1. Holding the cable connector with the release tab on top, align the connector with the stacking port on the VIM1 module in the Summit X650 series switch (see Figure 232).

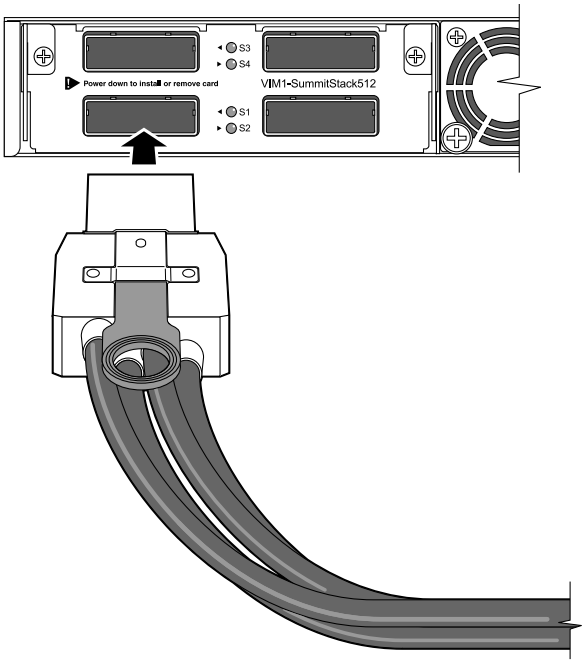


Figure 232: Connecting a SummitStack 128G Cable

2. Firmly press the cable connector into the stacking port until the spring latch on top of the connector clicks into place.
3. Repeat the process to connect the other end of the cable.

Connect a SummitStack 128G/20G Stacking Cable

SummitStack 128G/20G cables are used to connect the 128-Gbps stacking ports on Summit X650 series switches to 20-Gbps stacking ports on Summit X650 series or other Summit series switches.

The 128-Gbps ports are on VIM1-SummitStack256 modules in Summit X650 series switches. The 20-Gbps ports are on one of the following:

- VIM1-10G8X module installed in a Summit X650 series switch
- VIM1-SummitStack module in a Summit X650 series switch
- VIM2-SummitStack module in a Summit X480 series switch
- Rear panel of Summit X250e, X450, X450a, or X450e series switches

To connect a SummitStack 128G/20G cable, follow these steps:

1. Connect the 128-Gbps connector to the VIM1-SummitStack256 module as follows:
   a. Holding the cable connector with the release tab on top, align the connector with the stacking port on the VIM1 module in the Summit X650 series switch.

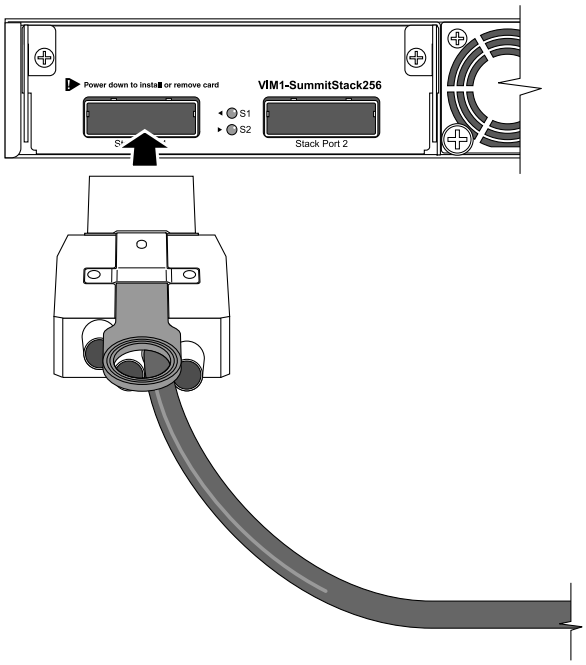


Figure 233: Connecting the 128G Connector

   b. Firmly press the cable connector into the stacking port until the spring latch on top of the connector clicks into place.
2. Connect the 20G connector as follows:
   a. Align the cable connector with the stacking port connector on the rear of the switch (see Figure 234).
   b. Firmly press the cable connector into place on the mating stacking port connector.

c. Align and tighten the retaining screws on the cable connector.

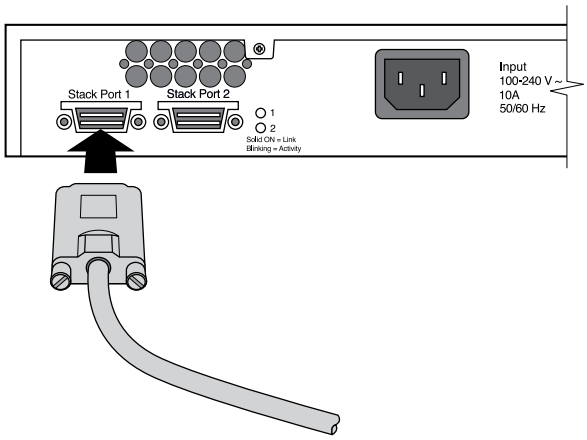


Figure 234: Connecting the 20G Connector

Connect a SummitStack 128G/64G Stacking Cable

SummitStack 128G/64G cables are used to connect the 128-Gbps stacking ports on Summit X650 series switches to 64-Gbps stacking ports on Summit X480 series switches.

The 128-Gbps stacking ports are on VIM1-SummitStack256 modules; the 64-Gbps stacking ports are on VIM2-SummitStack128 modules.

Because of the weight of the SummitStack 128G/64G cable, Extreme Networks strongly recommends the use of cable management hardware to support the cables and provide strain relief at the connectors. The following figures show representative types of cable management hardware. Your particular rack configuration might require other cable management solutions.

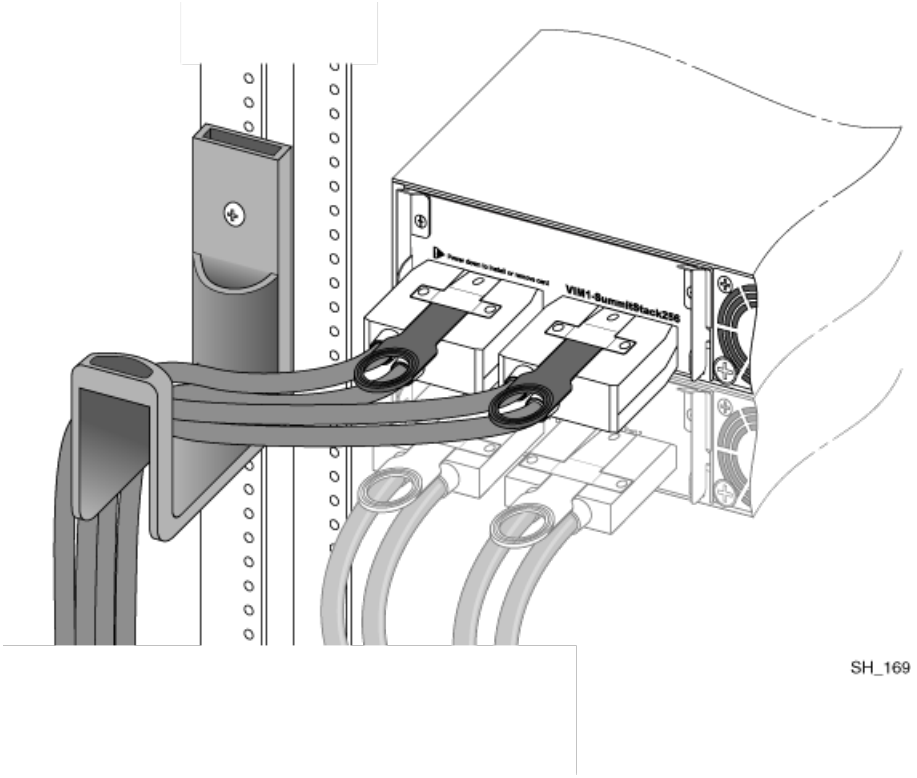


Figure 235: Cable Management Using a J-Shaped Support Bracket

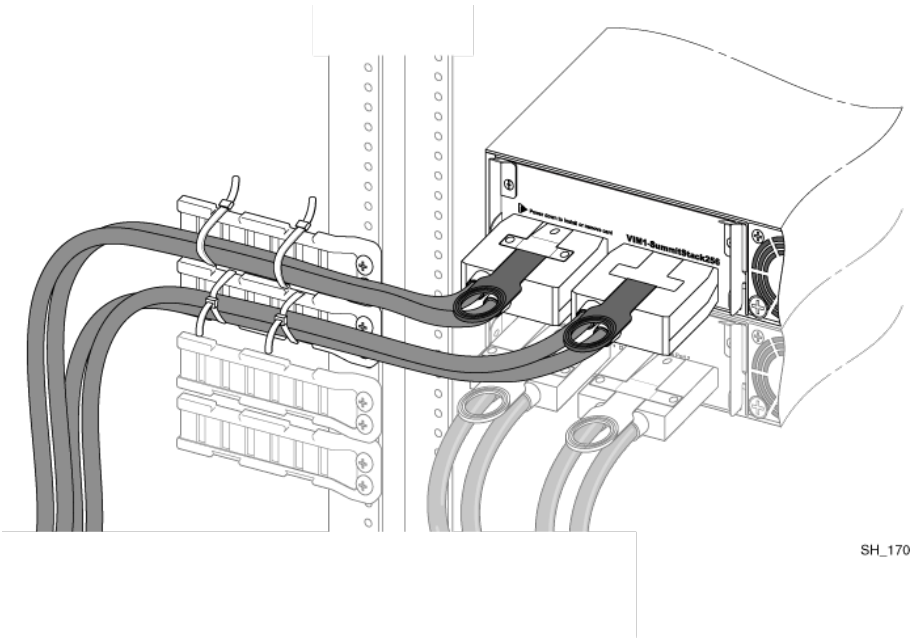


Figure 236: Cable Management Using Tie-Wraps and Stand-Offs

At the Summit X650 series switch, connect the 128G connector to the VIM1-SummitStack256 module. At the Summit X480 series switch, connect the 64G connector to the VIM2-SummitStack128 module. The connection process is the same for each connector and the compatible VIM model.

Follow these steps to connect a 128G Connector to a VIM1-SummitStack256 Module, or a 64G Connector to a VIM2-SummitStack128 Module.

1. Holding the cable connector with the release tab on top, align the connector with the stacking port on the VIM.

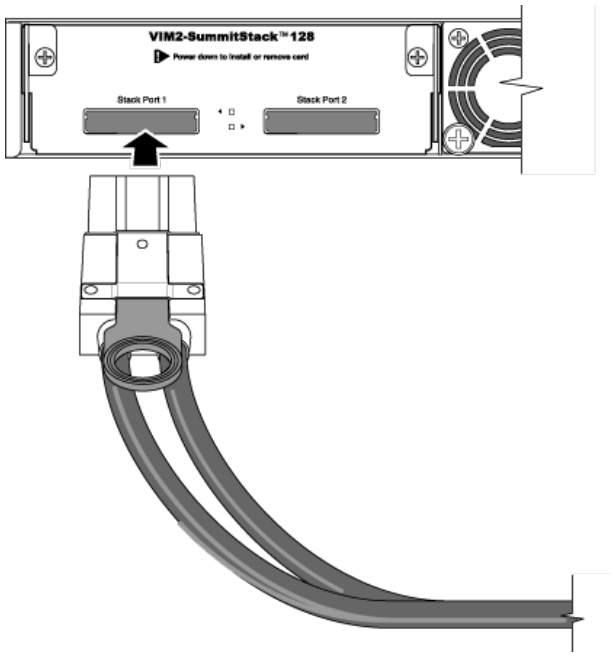


Figure 237: Connecting the 128G/64G Cable

2. Firmly press the cable connector into the stacking port until the spring latch on top of the connector clicks into place.

Connect a SummitStack 64G Stacking Cable

SummitStack 64G cables are used to connect the 64-Gbps stacking ports on the VIM2-SummitStack128 module in Summit X480 series switches.

Because of the weight of the SummitStack 64G cable, Extreme Networks strongly recommends the use of cable management hardware to support the cables and provide strain relief at the connectors. The following figures show representative types of cable management hardware. Your particular rack configuration may require other cable management solutions.

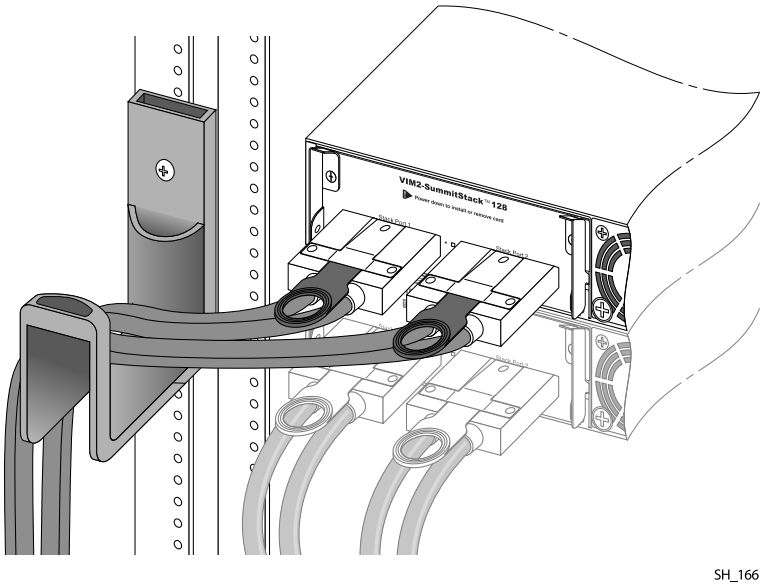


Figure 238: Cable Management Using a J-Shaped Support Bracket

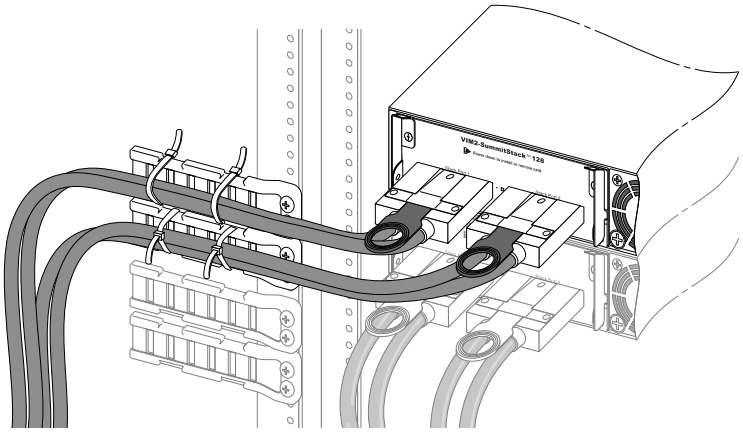


Figure 239: Cable Management Using Tie-Wraps and Stand-Offs

Follow these steps to connect a SummitStack 64G cable:

1. Holding the cable connector with the release tab on top, align the connector with the stacking port on the VIM2 module in the Summit X480 series switch (see Figure 240).

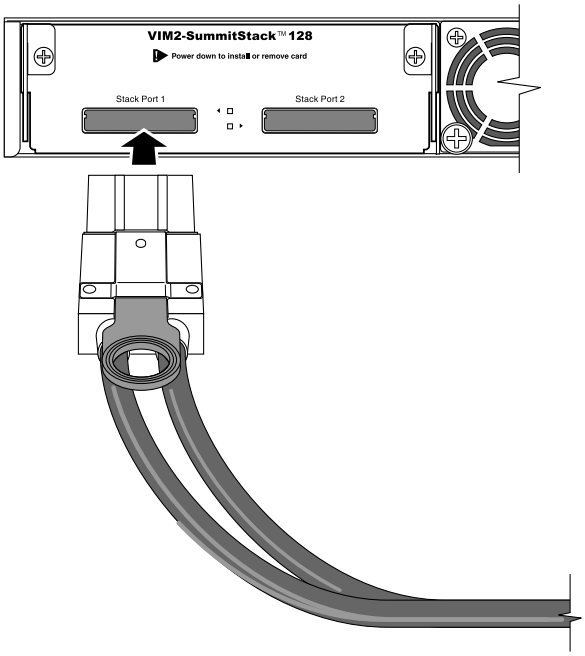


Figure 240: Connecting a SummitStack 64G Cable

2. Firmly press the cable connector into the stacking port until the spring latch on top of the connector clicks into place.
3. Repeat steps 1 and 2 to connect the other end of the cable.

Connect a SummitStack 64G/20G Stacking Cable

SummitStack 64G/20G cables are used to connect the 64-Gbps stacking ports on Summit X480 series switches to 20-Gbps stacking ports on Summit X480 series, Summit X650 series, or other Summit series switches.

The 64-Gbps ports are on VIM2-SummitStack128 modules in Summit X480 series switches. The 20-Gbps ports are on one of the following:

- VIM1-10G8X module installed in a Summit X650 series switch
- VIM1-SummitStack module in a Summit X650 series switch
- VIM2-SummitStack module in a Summit X480 series switch
- Rear panel of Summit X250e, X450, X450a, or X450e series switches

Follow these steps to connect a SummitStack 64G/20G cable:

1. Connect the 64-Gbps connector to the VIM2 module as follows:
   a. Holding the cable connector with the release tab on top, align the connector with the stacking port on the VIM2 module in the Summit X480 series switch.

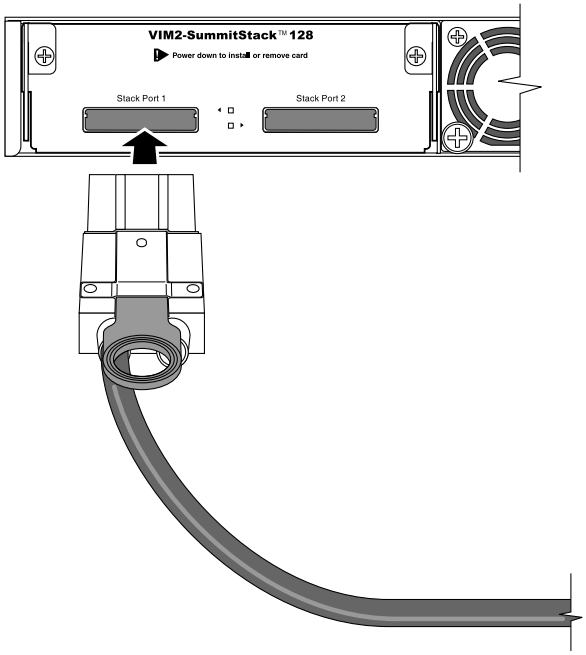


Figure 241: Connecting the 64G Connector

   b. Firmly press the cable connector into the stacking port until the spring latch on top of the connector clicks into place.
2. Connect the 20G connector as follows:
   a. Align the cable connector with the stacking port connector on the rear of the switch (see Figure 242).
   b. Firmly press the cable connector into place on the mating stacking port connector.
   c. Align and tighten the retaining screws on the cable connector.

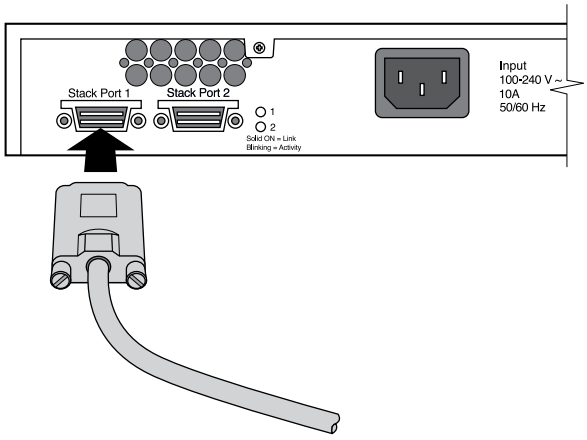


Figure 242: Connecting the 20G Connector

Connect Active or Passive QSFP+ Cables

The QSFP+ direct-attach cable is used to connect ports on any of the following modules:

- X460 switch, which supports SummitStack-V80
- X460-G2 switch with VIM-2q module, which supports SummitStack-V160
- X480 switch with VIM2-SummitStack-V80 module
- X670-G2-48x-4q switch, which supports SummitStack-V80, 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.

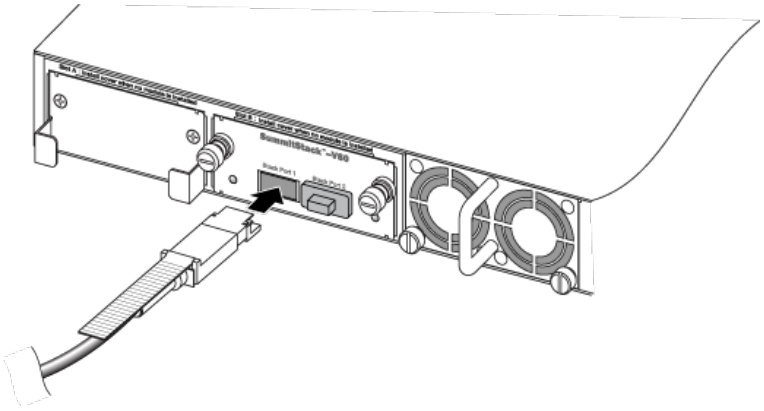


Figure 243: Connecting a QSFP+ Passive Copper Direct-Attach Cable to a SummitStack-V Module

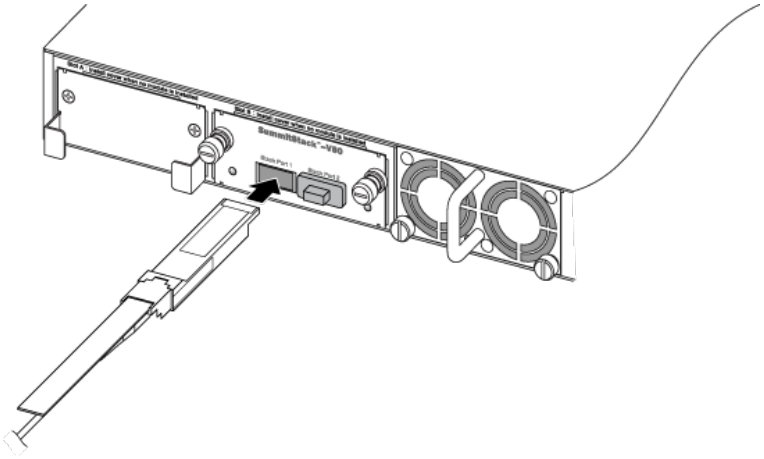


Figure 244: Connecting a QSFP+ Active Optical Direct-Attach Cable to a SummitStack-V Module

2. Push the connector into the port until you hear it click into place.

Connect 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 primary node. If you plan to configure redundancy, connect to the console ports of all switches in the stack that will be primary-capable.

If you followed the cabling examples in Connecting the Switches to Form the Stack Ring on page 286, and if you use the Easy Setup configuration procedure, only slots 1 and 2 can become the primary node. However, you can 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 16.2 User Guide* for instructions to perform the software configuration for your stack.

Installing Switches

This chapter describes how to install ExtremeSwitching switches and associated components. You will also find information about connecting network interface cables and establishing management access.

Note
The installation instructions are different depending upon what type of power – AC or DC – the switch uses.

If you intend to use the SummitStack feature, see Building Stacks on page 236 before you install the switches. That chapter provides guidance for locating stacked switches and connecting the stacking cables.

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 514 for additional safety information.

See Technical Specifications on page 522 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
  - X465
  - X480
  - X670 and X670V
  - 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 651.
- ESD-preventive wrist strap for installing optional ports at the back of the switch.

Installing a Summit Family Switch

Before you attempt to install or remove an Extreme Networks switch, read the precautions in Safety Considerations for Installing Switches on page 311 and Pre-installation Requirements on page 312.

If you are installing switches for use in a SummitStack configuration, read Building Stacks on page 236 before you install the switches.

Note
This document describes the installation process for switches that are supported on ExtremeXOS version 16.x. For information about installing other series switches, refer to for *ExtremeSwitching Hardware Installation Guide for Switches Using ExtremeXOS Version 30*.

ExtremeSwitching and 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. Rear-mounting brackets are included with some switch models for four-post racks or cabinets.

To install an Extreme Networks switch, refer to the specific instructions for your switch model.

Installing a Summit X430-8p or X440-8t Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

An X430-8p switch or an X440-8t switch can be installed in either of two ways:

- To install the switch in desktop or free-standing mode see Installing Summit Switches in Desktop or Free-Standing Mode on page 325.
- To front-mount the switch in a two-post rack, perform the following steps.

1. See Figure 245.

Note
The mounting brackets have special “keep out” flanges to ensure that there is enough empty space above and below the switch. Place the brackets with the "keep out" flanges on either side of the switch.

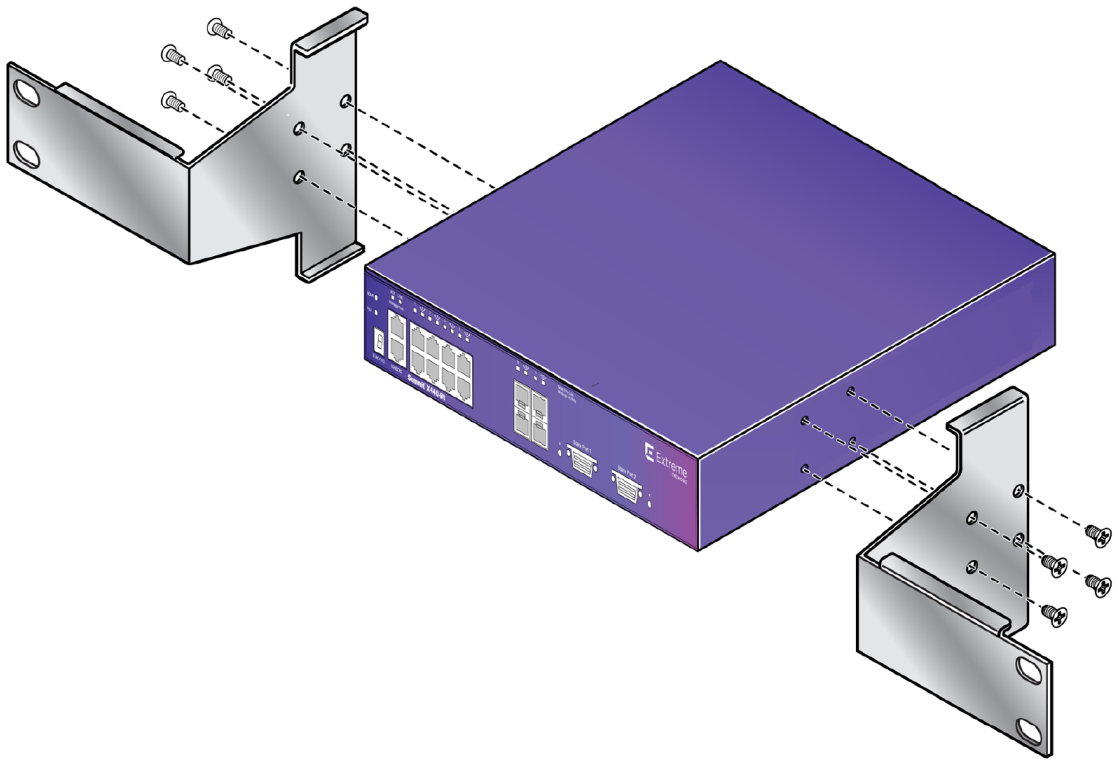


Figure 245: Attaching brackets to the Summit X430-8p or X440-8t Series Switch (X440-8t shown)

2. Connect the power cables.

   For AC-powered units, connect the power cable to the AC power connector on the back of the switch. Then connect the power cable to an AC power socket.

   For DC-powered units, see Connecting DC-Powered Switches to a Power Source on page 327.
3. Connect the switch to the redundant power supply (if applicable). For instructions to install and connect redundant power supplies, see Installing External Power Supplies on page 362.

Installing a Summit X450-G2 Switch in a Rack

In addition to the equipment listed in Pre-installation Requirements on page 312, you will also need the following items for grounding the X450-G2 switch:

- #14 AWG copper cable

  The recommended insulation color is green or green with yellow stripe.
- Straight-tip torque screwdriver

The Summit X450-G2 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit 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.

1. a. See Figure 246.

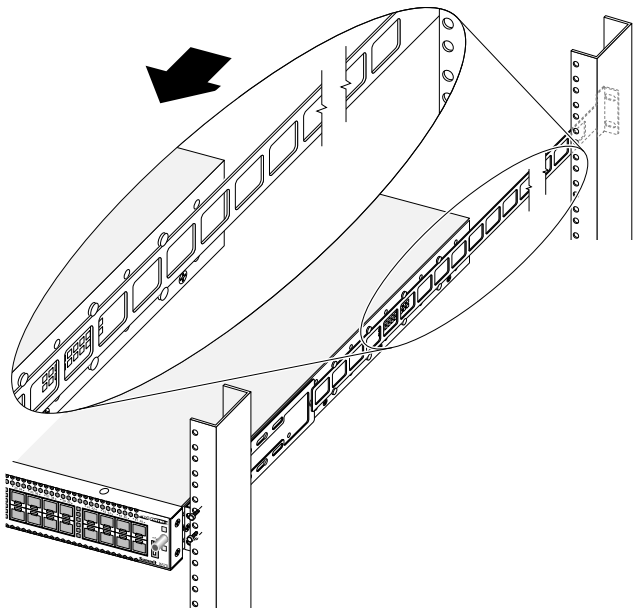


Figure 246: Inserting the Rear Mounting Brackets Between the Pegs on the Side of the Switch

b.

2. Ground the switch.
   a. At one end of the wire, strip the insulation to expose 1/2 inch (12 mm) of bare wire.
   b. Identify the grounding screw on the back of the switch.
   c. Insert the stripped wire into the grounding lug.
   d. Using a straight-tip torque screwdriver, tighten the retaining screw to 20 in-lb (2.25 N m).
   e. Connect the other end of the wire to a known reliable earth ground point at your site.

Summit X450-G2 series PoE+ switches are shipped without installed power supplies. You can install one or two 715W or 1100W AC power supplies.

After the switch is secured to the rack, install the necessary power supplies. Follow the instructions in Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 355.

Installing a Summit X460 Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

The Summit X460 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the back of the switch unit and are adaptable to a mid-mount installation.

To mid-mount the switch, set the flange toward the back of the switch as shown in Figure 247.

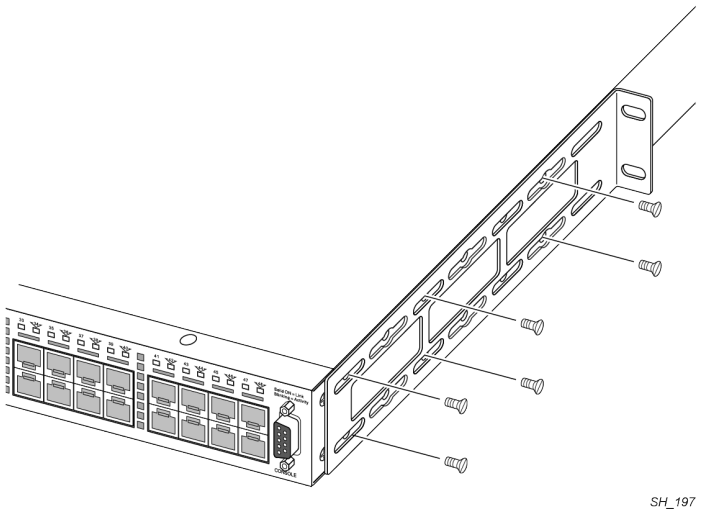


Figure 247: Attaching a Rack-mounting Flange

The Summit X460 series switch is shipped without installed power supplies. You can install one or two power supplies. After the switch is secured to the rack, install the necessary power supplies for your configuration. For instructions, see the following topics:

- Install a 300 W or 750 W Internal AC Power Supply on page 349
- Install a 300 W Internal DC Power Supply on page 331

To install an XGM3-2sf port card, see Installing a Summit XGM3 Series Port Option Card on page 441.

To install a stacking module, see Installing an Option Card in Slot B of a Summit X460 Series Switch on page 442.

Installing a Summit X460-G2 Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

The Summit X460-G2 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit and are adaptable to either a front-mount or mid-mount installation.

Optionally, PoE models (X460-G2-24p-GE4, X460-G2-24p-10GE4, X460-G2-48p-GE4, and 460-G2-48p-10GE4) can be mounted in a four-post rack or cabinet. Rear-mounting brackets are included for this purpose.

Summit X460-G2 series switches are shipped without installed power supplies.

After the switch is secured to the rack, install the necessary power supplies.

- For POE+ switches, follow the instructions in Installing a 350 W, 715 W, 770 W, 1100 W, or 2000 W Internal AC Power Supply on page 355.
- For non-POE+ switches, follow the instructions in Install a 300 W or 750 W Internal AC Power Supply on page 349 or Install a 300 W Internal DC Power Supply on page 331.

Installing a Summit X480 Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

The Summit X480 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit 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.

a. See Figure 248.

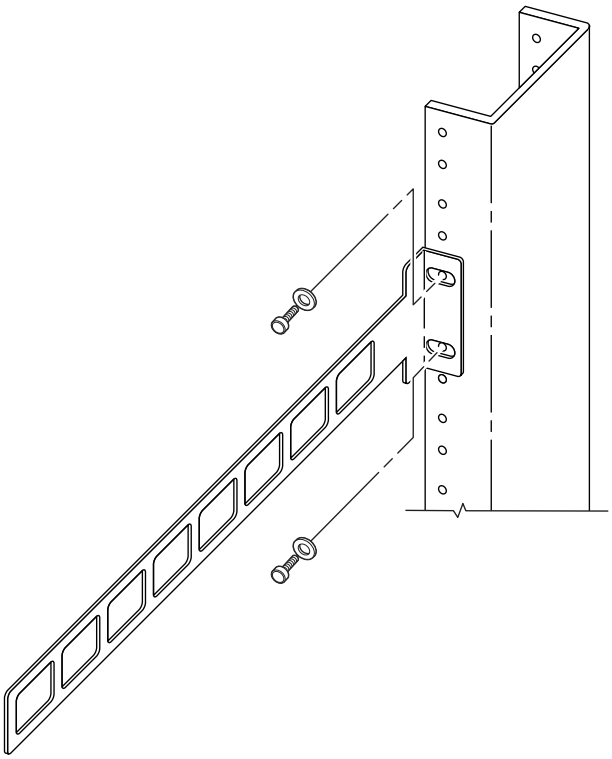


Figure 248: Attaching a Rear Mounting Bracket

b. Securely tighten the rack mounting screws, as shown in Figure 249.

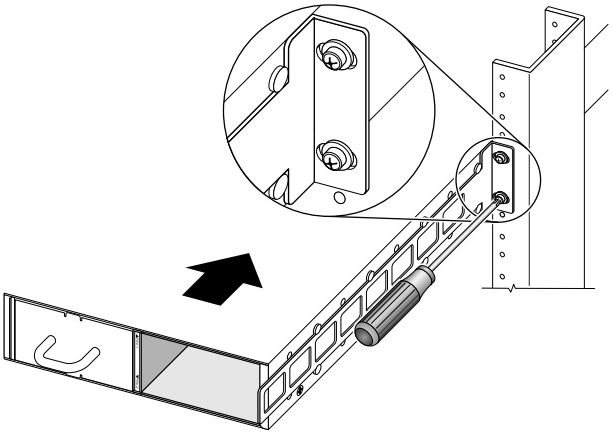


Figure 249: Fastening the Rear Mounting Brackets

Summit X480 series switches are shipped without installed power supplies. You can install one or two 450W AC or DC power supplies.

After the switch is secured to the rack, install the necessary power supplies for your configuration. Follow the instructions in Install a 450 W or 550 W Internal AC Power Supply on page 353 or Install a 450 W or 550 W Internal DC Power Supply on page 337.

Installing a Summit X650 Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

The Summit X650 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit 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.

a. See Figure 250.

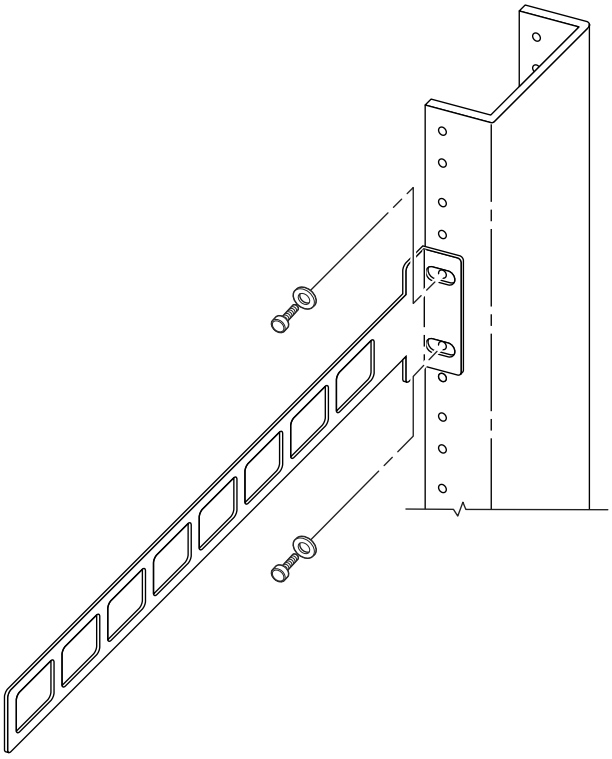


Figure 250: Attaching a Rear Mounting Bracket

b. Securely tighten the rack mounting screws, as shown in Figure 251.

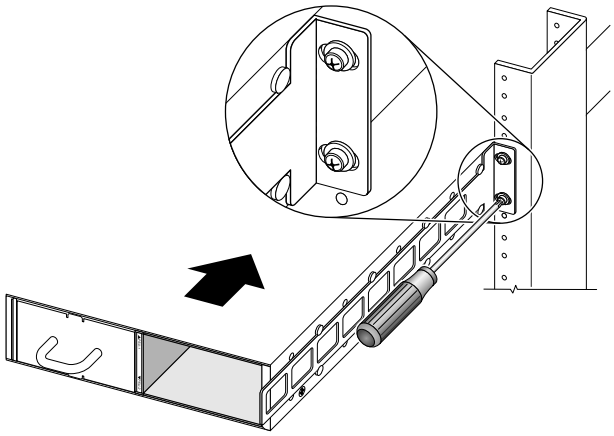


Figure 251: Fastening the Rear Mounting Brackets

Summit X650 series switches are shipped without installed power supplies. You can install one or two 850W AC or DC power supplies.

After the switch is secured to the rack, install the necessary power supplies for your configuration. Follow the instructions in Installing an 850 W Internal AC Power Supply on page 356 or Installing an 850 W Internal DC Power Supply on page 343.

Installing a Summit X670 Switch in a Rack

In addition to the equipment listed in Pre-installation Requirements on page 312, you will also need the following items for grounding the Summit X670 switch:

- #14 AWG copper cable

  The recommended insulation color is green or green with yellow stripe.
- Crimping tool for attaching the ring terminal to the ground wire

A grounding kit – consisting of a ring terminal (equivalent to Panduit PV14-8R-E) and M4 screw with captive washer – is provided.

The Summit X670 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit 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.

1. a. See Figure 252.

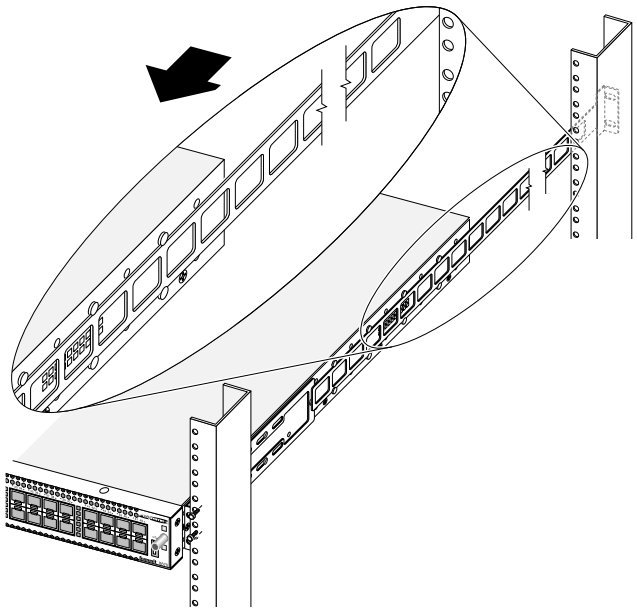


Figure 252: Inserting the Rear Mounting Brackets Between the Pegs on the Side of the Switch

   b.
2. Ground the switch as shown in Figure 253 on page 322.
   a. Strip 0.25 inch from the end of the AWG # 14 copper wire.
   b. Securely crimp the provided ring terminal onto the stripped wire.

c. Insert the provided M4 screw through the ring terminal and into the grounding stud on the front of the switch.
d. Securely tighten the screw.

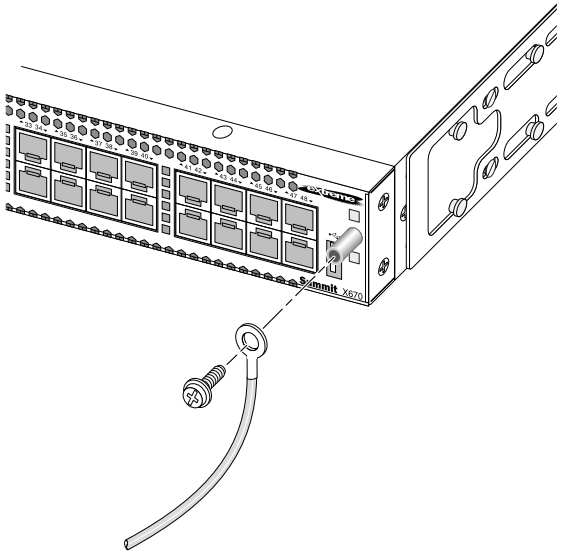


Figure 253: Grounding a Summit X670 Series Switch

If you are installing a VIM4 module in the Summit X670V-48x switch, install it in the switch before you connect the switch to power. (See Installing a Versatile Interface Module in a Summit X460, X480, X650, or X670 Series Switch on page 444.)

Summit X670 series switches are shipped without installed power supplies. You can install one or two 450W or 550W AC or DC power supplies.

After the switch is secured to the rack, install the necessary power supplies for your configuration. Follow the instructions in Install a 450 W or 550 W Internal AC Power Supply on page 353 or Install a 450 W or 550 W Internal DC Power Supply on page 337.

Installing a Summit X670-G2 Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

The Summit X670-G2 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit 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.

Summit X670-G2 series switches are shipped without installed power supplies. You can install one or two 550W AC or DC power supplies.

After the switch is secured to the rack, install the necessary power supplies for your configuration. Follow the instructions in Installing Internal Power Supplies on page 330.

Installing a Summit X770 Switch in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

The Summit X770 series switch fits into a standard 19-inch equipment rack.

The provided rack-mounting brackets attach to the front of the switch unit 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.

a. See Figure 254.

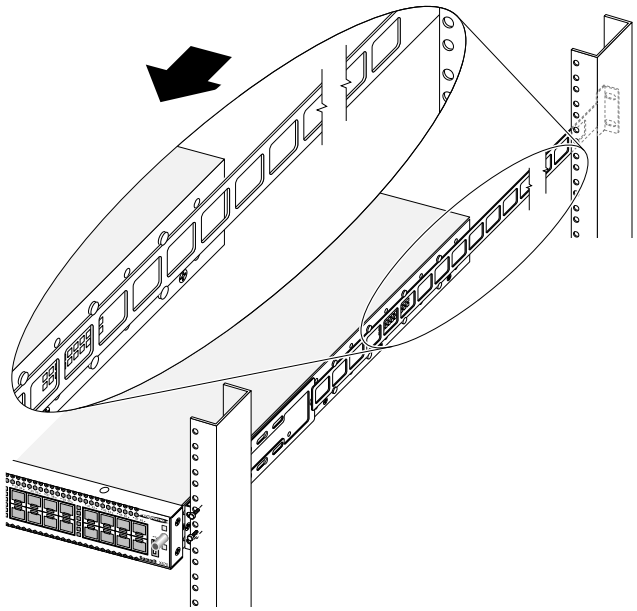


Figure 254: Inserting the Rear Mounting Brackets Between the Pegs on the Side of the Switch

b.

Summit X770 series switches are shipped without installed power supplies. You can install one or two 550W AC or DC power supplies.

After the switch is secured to the rack, install the necessary power supplies for your configuration. Follow the instructions in Install a 450 W or 550 W Internal AC Power Supply on page 353 or Install a 450 W or 550 W Internal DC Power Supply on page 337.

Installing Other Summit Switches in a Rack

Before you begin the installation, refer to Pre-installation Requirements on page 312.

This section describes how to install the following Summit switch models:

- Summit X150
- Summit X250e
- Summit X350

- Summit X430 (except X430-8p)
- Summit X440 (except X440-8t)
- Summit X450
- Summit X450a
- Summit X450e

The following items are provided with your Summit switch:

- Mounting brackets
- Screws to secure the mounting brackets to the switch
- Eight M3 screws for Summit X350, X440, X450, X450a, and X450e series switches
- Twelve M4 screws for Summit X150 and X250e series switches
- Four rubber mounting feet for table top stacking

Your Summit switch fits into a standard 19-inch equipment rack. it can be installed in either of two ways:

- To install the switch in desktop or free-standing mode see Installing Summit Switches in Desktop or Free-Standing Mode on page 325.
- To mid-mount the switch in a two-post rack, perform the following steps.

1. Place the switch upright on a stable work surface.
2. Place a mounting bracket over the mounting holes on one side of the unit.
3. Insert the screws and fully tighten with a suitable screwdriver, as shown in the following figures.

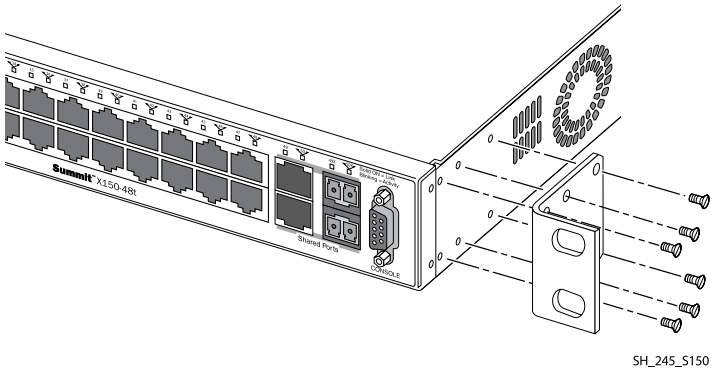


Figure 255: Attaching the Mounting Bracket: Summit X150 and X250e

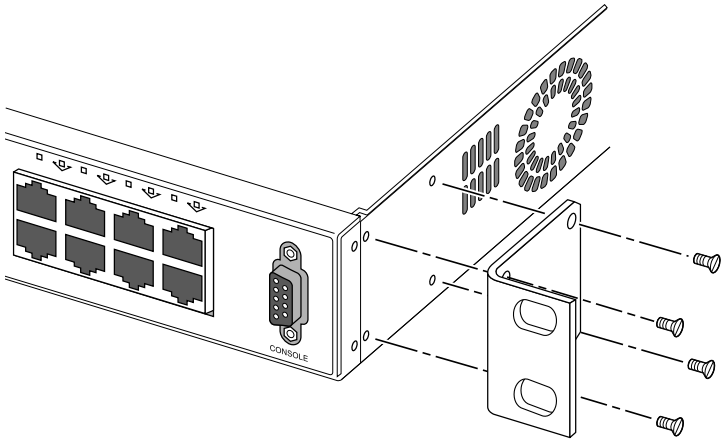


Figure 256: Attaching the Mounting Bracket: Summit X350, X440, X450, X450a, and X450e

4. Secure the switch with suitable screws (not provided).
5. Connect the power cables.

   For AC-powered units, connect the power cable to the AC power connector on the back of the switch. Then connect the power cable to an AC power socket.

   For DC-powered units, see Connecting DC-Powered Switches to a Power Source on page 327.
6. Connect the switch to the redundant power supply (if applicable). For instructions to install and connect redundant power supplies, see Installing External Power Supplies on page 362.

Installing Summit Switches in Desktop or Free-Standing Mode

Before you begin the installation, refer to Pre-installation Requirements on page 312.

Summit family switches are supplied with four self-adhesive rubber pads for desktop mounting.

The pads keep the switch from scratching the supporting surface and help ensure adequate airflow around the switches when they are mounted on top of one another.

For all Summit switches other than the X430-8p, you can safely place up to four switches on top of one another.

Caution
Do not place any equipment on top of a desktop-mounted Summit X430-8p switch.

To mount your Summit switches on a desktop (or any firm, flat surface), follow these steps:

1. Carefully separate the four included rubber pads for each switch you are mounting.

2. Apply the pads to the underside of each device by placing a pad in the marked area at each corner of the switch, ensuring that all corners are aligned.

   See Figure 257.

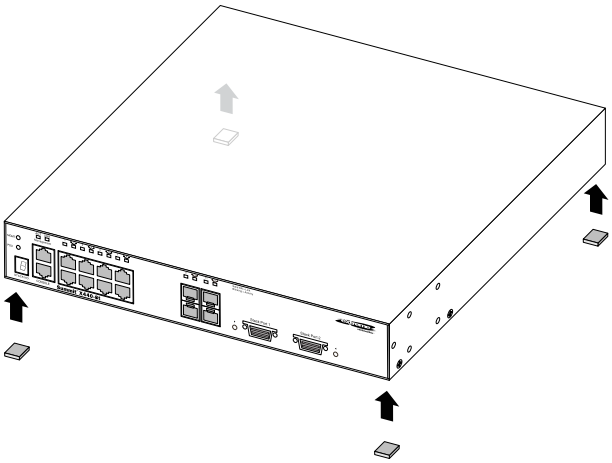


Figure 257: Applying the Rubber Pads to the Underside Corners of a Summit Switch

3. Connect the power cables.

   For AC-powered units, connect the power cable to the AC power connector on the back of the switch. Then connect the power cable to an AC power socket.

   For DC-powered units, see Connecting DC-Powered Switches to a Power Source on page 327.
4. Connect the switch to the external (redundant) power supply, if applicable. For instructions to install and connect external power supplies, see Installing External Power Supplies on page 362.

Connecting AC-Powered Switches to a Power Source

Note
For DC-powered switches, do not use this procedure. Instead, see Connecting DC-Powered Switches to a Power Source on page 327.

To power up an Extreme Networks AC-powered switch, do the following:

1. Connect the AC power cord to the AC power input socket on the switch and an AC power outlet.
2. If applicable, attach the cable from your redundant power supply (RPS) into the switch's redundant power supply receptacle.
3. 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 Connect Network Interface Cables on page 357.

If the PSU and RPS LEDs do not turn green, see the *Switch LEDs* topic for your switch model (in Summit Switches on page 24) for troubleshooting information.

Connecting DC-Powered Switches to a Power Source

Some Summit switches come with installed power supplies that are designed to be connected to DC power. The instructions in this section provides additional details about connecting the following Summit switches:

- Summit X250e-24tDC
- Summit X250e-24xDC
- Summit X250e-48tDC
- Summit X440-24tDC
- Summit X440-48tDC
- Summit X450a-24tDC
- Summit X450a-24xDC
- Summit X450a-48tDC

You must adhere to specific safety requirements when you connect any of these Summit switches to a DC power source.

Note

For centralized DC power connection, these products are intended to be installed in Restricted Access Locations – like dedicated equipment rooms and equipment closets – in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

An optional redundant power supply, the EPS-150DC, is available for use with the Summit DC-powered switches. When the EPS-150DC is used with a DC-powered Summit switch, the power supplies (internal and redundant) are fully fault tolerant and load-sharing. If one power supply fails, the other power supply will provide sufficient power to operate the switch. See EPS-150DC External Power Module (with EPS-T2) on page 167 for further details.

Before you connect the switch to a power source, complete the physical installation of the switch as described in Installing Other Summit Switches in a Rack on page 323.

Then follow the instructions in the following sections:

1. Grounding a Summit X250e or X450a DC-Powered Switch on page 327.
2. Connecting the X250e or X450a DC Wiring Harness to the DC Source Voltage on page 329.
3. Attaching the DC Wiring Harness to the DC Power Socket on the Switch on page 329.

Grounding a Summit X250e or X450a DC-Powered Switch

Before you connect the power input cable to a Summit DC-powered switch, you must ground the chassis, following the instructions in this section.

Gather the following materials to ground the Summit X250e or X450a DC-powered switch:

- Stranded copper wire cable, minimum size 14 AWG, maximum size 6 AWG

  The wire should be long enough to reach from the installed switch to the facility ground point
- Torque screwdriver with 1/4-inch flat blade

- Additional grounding hardware appropriate to the earth ground connection at your site

Warning
Be sure to connect the chassis ground wire before you connect any power cables.

To ground the switch:

1. At one end of the wire, strip the insulation to expose 1/2-inch (12 mm) of bare wire.
2. Identify the grounding lug on the back of the switch.

   The grounding lug is next to the edge of the back panel, identified by the international symbol for earth ground: ⏚

   On a Summit X250e series switch, the grounding lug is on the right side.

   On a Summit X450a series switch, the grounding lug is on the left side.
3. Insert the stripped wire into the grounding lug.
4. Using a straight-tip torque screwdriver, tighten the retaining screw to 20 in-lb (2.25 N m).

   See the following figures.

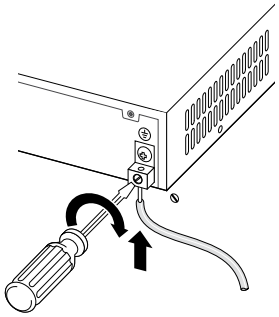


Figure 258: Attaching the Ground Wire to a Summit X250e Series Switch

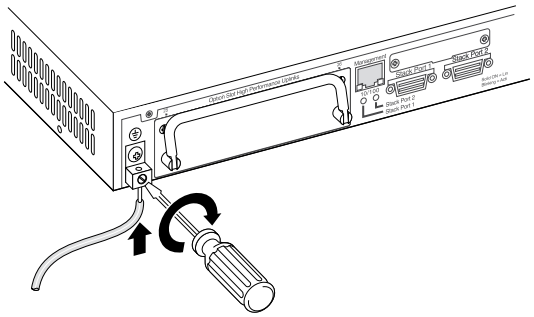


Figure 259: Attaching the Ground Wire to a Summit x450a Series Switch

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

After grounding the switch, follow the instructions in Connecting the X250e or X450a DC Wiring Harness to the DC Source Voltage on page 329.

Connecting the X250e or X450a DC Wiring Harness to the DC Source Voltage

A three-wire, six-foot long DC wiring harness is included with each Summit X250e or X450a DC-powered switch.

The DC wiring harness must be properly connected to the DC source voltage at your facility by a qualified electrician before you attach the connector on the wiring harness to the DC power supply socket on the switch. Figure 260 on page 329 shows the wiring harness and connector. For information about the wire-to-pin connection, see Table 518 on page 648 and Table 525 on page 651.

Warning

The Summit DC-powered switch and rack must be connected to protective earth ground before installing any switch components. See Grounding a Summit X250e or X450a DC-Powered Switch on page 327.

A qualified, licensed electrician is required to wire the DC input power harness to your facility's DC source voltage. After the wiring harness is connected, you can remove, replace, and maintain a Summit DC-powered switch without further assistance from an electrician. However, always be sure that the DC circuit is de-energized before connecting or disconnecting the DC power connections at the rear of the switch.

Caution

The DC wiring harness must be properly connected to a DC main circuit breaker rated no greater than 20 A.

Provide proper connection and strain relief on the DC wiring harness in accordance with all local and national electrical codes.

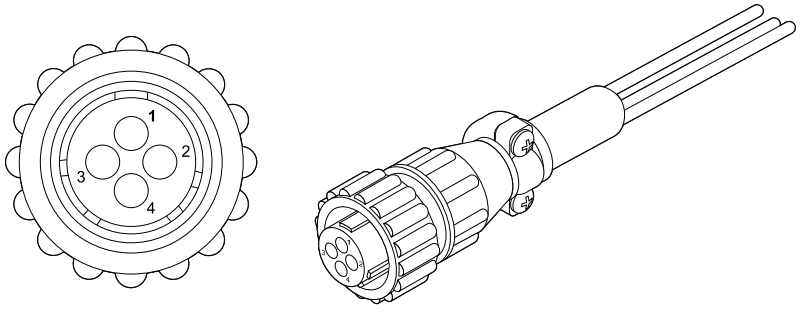


Figure 260: Three-wire Cable Harness

Note

Each wire on the harness has been properly marked for proper attachment to the DC power source. Leave these labels on each lead wire for future reference.

After the DC wiring harness has been connected to the DC power source, follow the instructions in Attaching the DC Wiring Harness to the DC Power Socket on the Switch on page 329.

Attaching the DC Wiring Harness to the DC Power Socket on the Switch

After the DC wiring harness has been connected to a permanent DC voltage source by a qualified, licensed electrician (see Connecting the X250e or X450a DC Wiring Harness to the DC Source Voltage on page 329), you can remove, replace, and maintain a Summit DC-powered switch without further

assistance from an electrician. Always be sure, however, that the DC circuit is de-energized before you connect or disconnect the DC power connections at the rear of the switch.

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.

To attach the DC wiring harness to the internal DC power supply, follow these steps:

1. Plug the DC wiring harness connector into the DC power supply socket on the rear of the switch (see Figure 261).

   The pins must align properly for the cable to completely connect. Do not force the cable into the socket until the keyway is aligned properly. Figure 260 on page 329 shows the DC wiring harness connector.

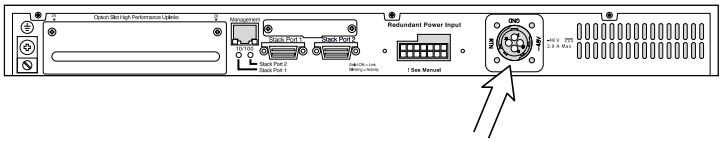


Figure 261: DC Power Socket on a DC-Powered Switch (Summit X450a Shown)

Note
The figure shows the rear panel of a Summit X450a DC-powered switch. Although the rear panels of other Summit DC-powered switches might vary slightly, the DC power socket is of the same type and the connection process is the same.

2. Tighten the retainer nut on the connector until it is finger-tight.
3. Energize the DC circuit.

The switch ports can now be connected to other switches or routers. See Connect Network Interface Cables on page 357.

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 81 on page 185.

To see which internal power supplies are compatible with your switch, see Table 82 on page 186.

Note
If you are installing a VIM4 module in the Summit X670V-48x switch, install it in the switch before you connect the switch to power (see Installing a Versatile Interface Module in a Summit X460, X480, X650, or X670 Series Switch on page 444).

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 331.
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 332.
3. Insert the power supply into the switch.

   See Installing a 300 W DC Power Supply on page 332.
4. Connect the ground wire.

   See Connecting the Ground Wire to a 300 W DC Power Supply on page 334.
5. Connect the power supply to the DC source voltage.

   See Connecting a 300 W DC Power Supply to the Source Voltage on page 334.
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 #8, M4 stud size, 16-14 AWG (1.25 to 2mm) wire size (Tyco part number 325199 or equivalent) for connecting the input power cables
- One ring terminal #8, M4 stud size, 16-14 AWG (1.25 to 2mm) wire size (Tyco part number 1-51864 or equivalent) and screw with captive lock washer 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
- #2 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.

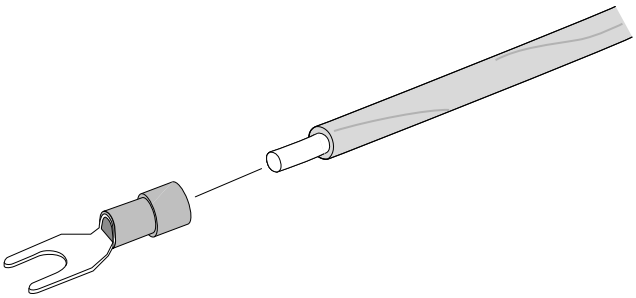


Figure 262: Attaching a Spade Terminal to a Cable

3. Repeat step Preparing the Cables for a 300 W DC Power Supply on page 332 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.

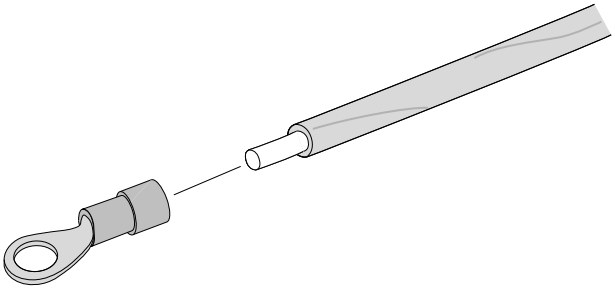


Figure 263: Attaching a Ring Terminal to a Ground Cable

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.

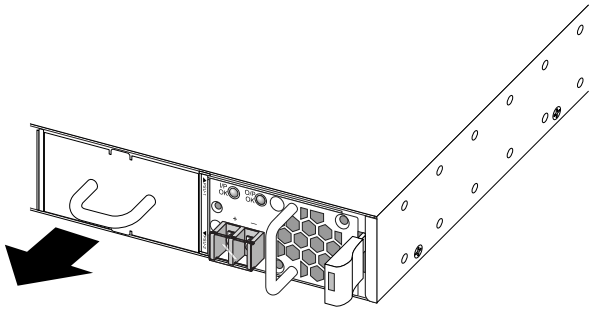


Figure 264: Removing a Blank Panel

3. Verify that the power supply is right side up.

   The power supply should be oriented as shown in Figure 265.
4. Carefully slide the power supply all the way into the power supply bay.

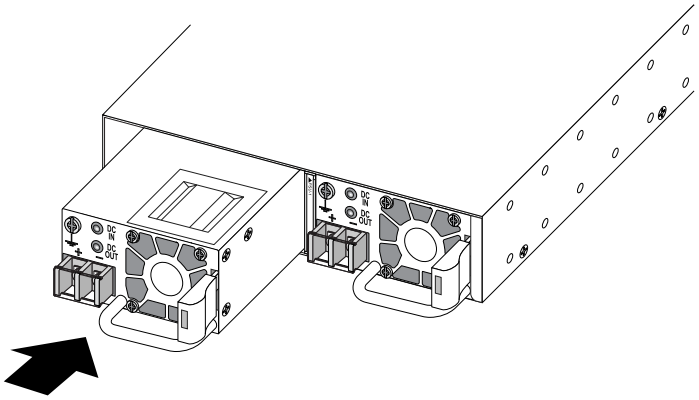


Figure 265: Installing a Summit 300 W DC Power Supply (Back-to-Front Model 10933 Shown)

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 334.

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 266.

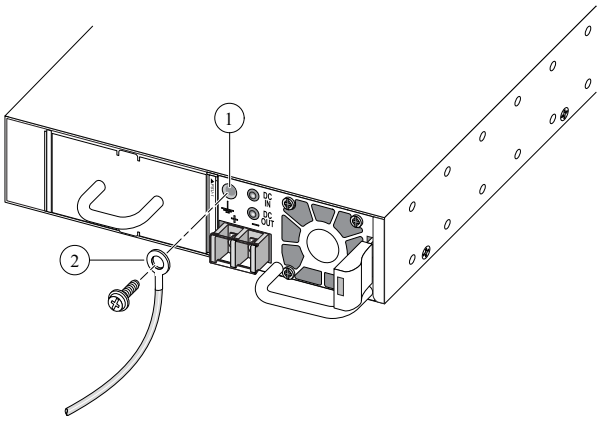


Figure 266: Connecting the Ground Wire (Front-to-Back Model 10933 Shown)

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 334.

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 335, 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 so that the spade terminal can slide underneath the captive square washer.

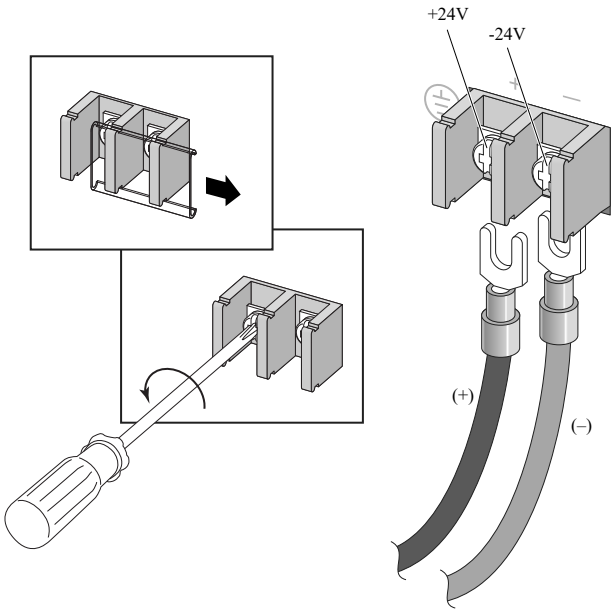


Figure 267: Loosening Terminal Screws (Connecting to a +24 V Source)

   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).

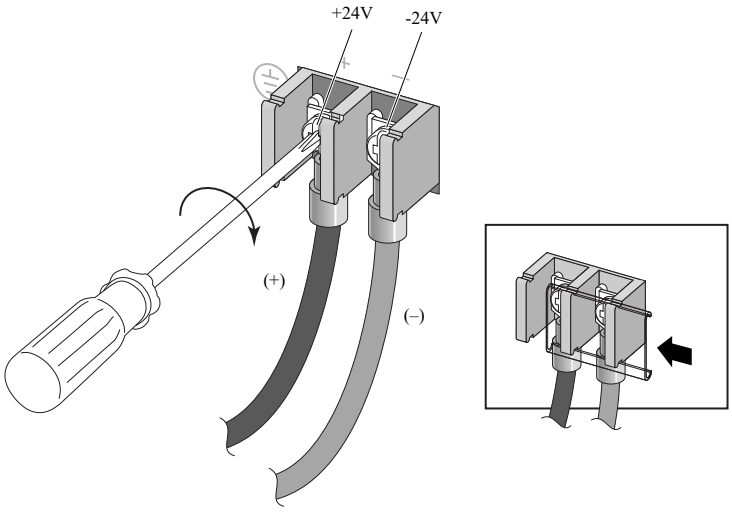


Figure 268: Tightening Terminal Screws (Connecting to a +24 V Source)

When connecting the power supply to a –48 V source:

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

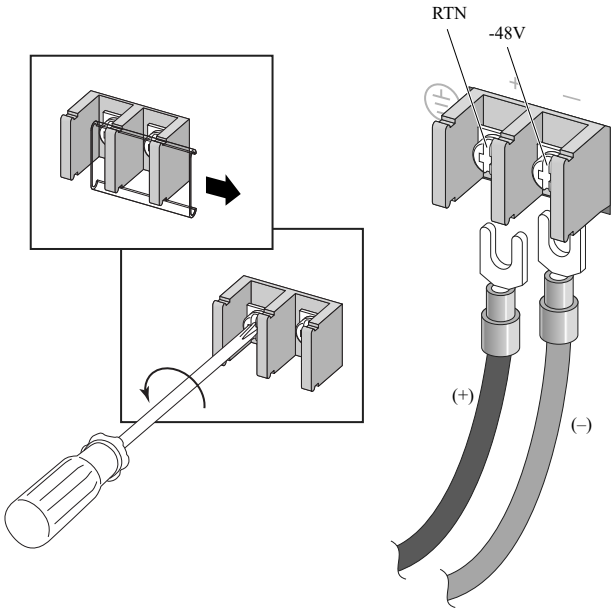


Figure 269: Loosening Terminal Screws (Connecting to a –48 V Source)

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).

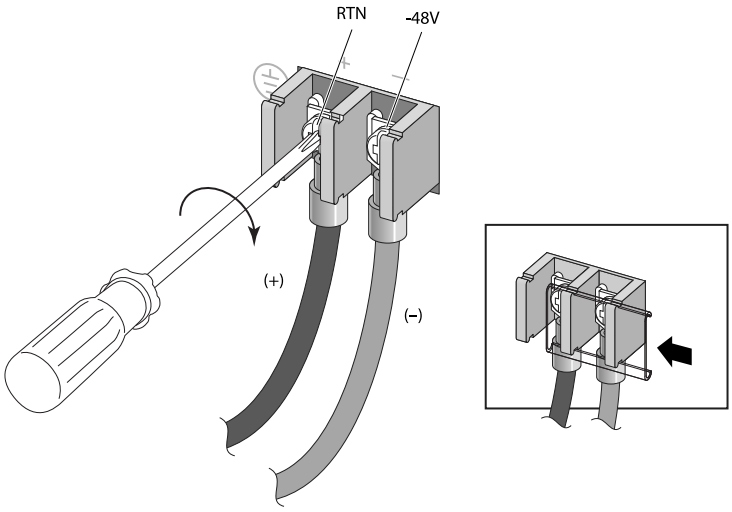


Figure 270: Tightening Terminal Screws (Connecting to a –48 V Source)

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 Connect Network Interface Cables on page 357.

Install a 450 W or 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.

Summit 450 W power supplies are compatible with Summit X480 series switches and with Summit X670 series switches that have front-to-back ventilation airflow.

Summit 550 W power supplies are compatible with Summit X670 and X770 series switches. They are available in versions for switches 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 450 W or 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 450 W or 550 W DC Power Supply on page 338.

2. Prepare the power cables and ground cable by attaching the provided connection lugs to the cables.

   See Preparing the Cables for a 450 W or 550 W DC Power Supply on page 338.
3. Insert the power supply into the switch.

   See Installing a 450 W or 550 W DC Power Supply on page 339.
4. Connect the ground wire.

   See Connecting the Ground Wire to a 450 W or 550 W DC Power Supply on page 340.
5. Connect the power supply to the electrical source and energize the DC circuit.

   See Connecting a 450 W or 550 W DC Power Supply to the Source Voltage on page 342.

Required Tools and Materials for Installing a 450 W or 550 W DC Power Supply

You need the following tools and materials to install or remove a 450 W or 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
- #2 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 450 W or 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.

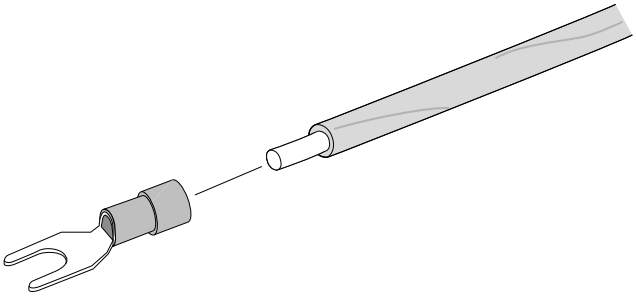


Figure 271: Attaching a Spade Terminal to a Cable

3. Repeat step 2 for the other power cable wire and for the ground wire.

Installing a 450 W or 550 W DC Power Supply

Before installing a Summit 450 W or 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.

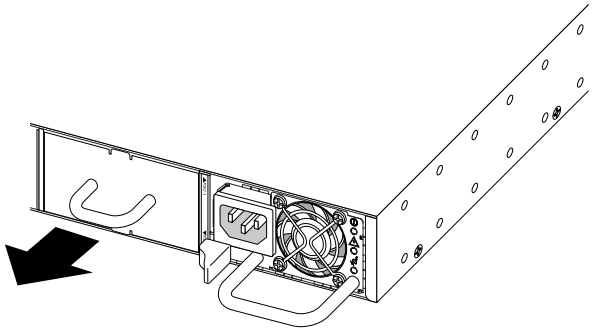


Figure 272: Removing a Blank Panel

3. Verify that the power supply is right side up.

   The power supply should be oriented as shown in Figure 273.

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

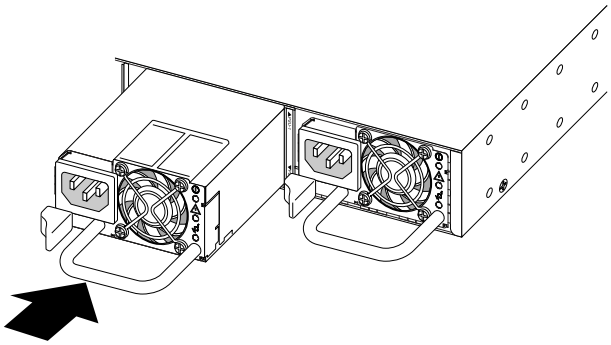


Figure 273: Installing a Power Supply

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 ground wire, following the steps in Connecting the Ground Wire to a 450 W or 550 W DC Power Supply on page 340.

Connecting the Ground Wire to a 450 W or 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 450 W or 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. Slide the cover off the terminal block.
4. Identify the grounding point at the left of the terminal block.

   See Figure 274.

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.

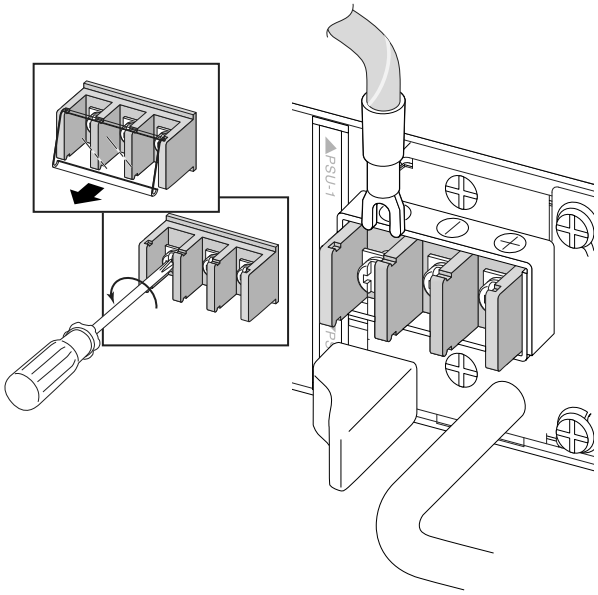


Figure 274: Connecting the Ground Wire

   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 275.

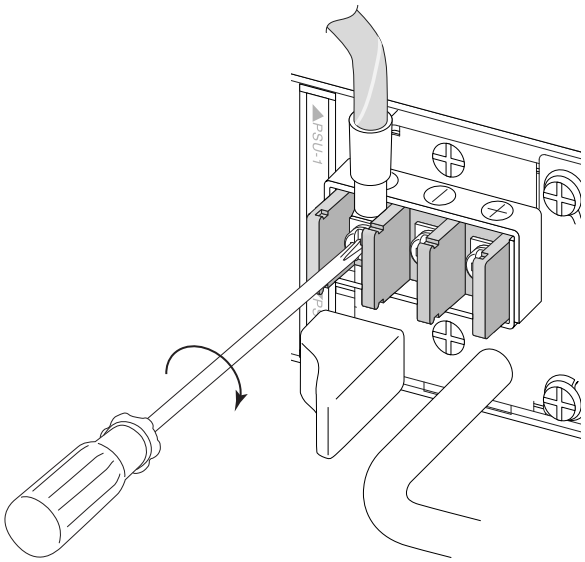


Figure 275: Securing the Ground Wire

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 450 W or 550 W DC Power Supply to the Source Voltage on page 342.

Connecting a 450 W or 550 W DC Power Supply to the Source Voltage

Summit 450 W or 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 so that the spade terminal can 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 **–**).

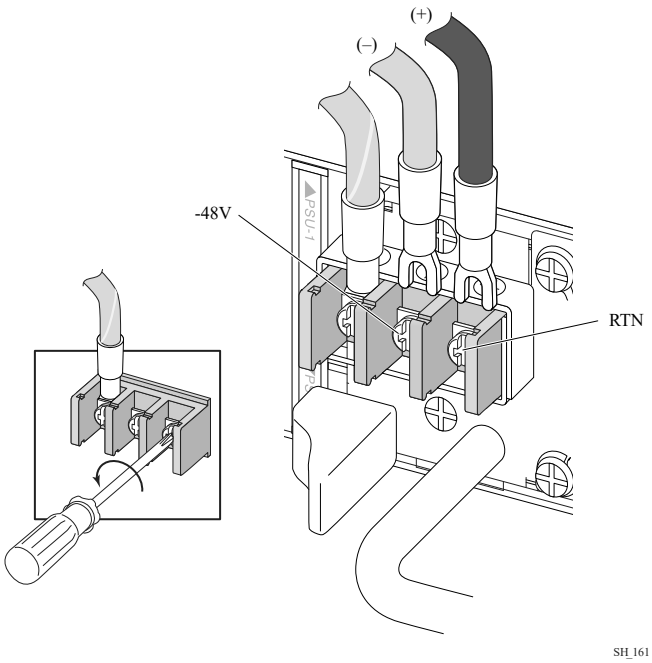


Figure 276: Connecting the Negative Power Wire to a –48V Source (450 W or 550 W DC Power Source)

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

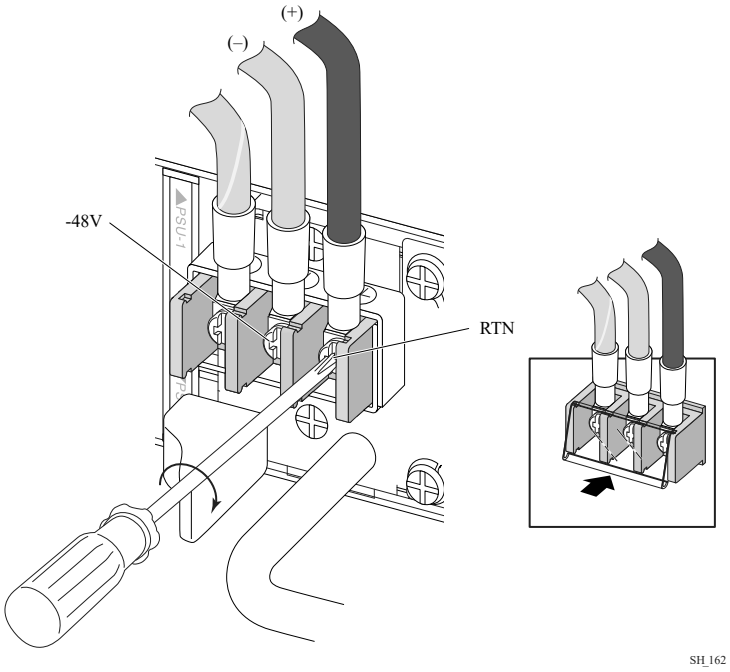


Figure 277: Connecting the Positive Power Wire to a –48V Source (450 W or 550 W DC Power Source)

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 Connect Network Interface Cables on page 357.

Installing an 850 W Internal DC Power Supply

The Summit X650 series switch is shipped without installed power supplies.

The switch accommodates one or two Summit 850 W power supply units.

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 the 850 W DC power supply, 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 an 850 W DC Power Supply on page 344.
2. Prepare the power cables and ground cable by attaching the provided connection lugs to the cables.
   See Preparing the Cables for an 850 W DC Power Supply on page 344.
3. Insert the power supply into the switch.
   See Installing an 850 W DC Power Supply on page 345.
4. Connect the ground wire.
   See Connecting the Ground Wire to an 850 W DC Power Supply on page 346.
5. Connect the power supply to the DC source voltage.
   See Connecting an 850 W DC Power Supply to the DC Source Voltage on page 346.
6. Energize the DC circuit.

Required Tools and Materials for Installing an 850 W DC Power Supply

You need the following tools and materials to install or remove an 850 W DC power supply in a Summit X650 series switch.

- Two spade terminals #8, M4 stud size, 16-14 AWG (1.25 to 2mm) wire size (Tyco part number 325199 or equivalent) for connecting the input power cables
- One ring terminal (Tyco part number 130496 or equivalent) and screw with captive lock washer (type M3.5) for connecting the ground wire (both provided)
- #12 AWG stranded copper cable for grounding the power supply and connecting the power supply to the DC power source. (A DC power cord is 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
- #2 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 an 850 W DC Power Supply

A ring terminal and two spade 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:

Repeat step #unique_404/unique_404_Connect_42_INSERT_SPADE for the other cable wire.

Installing an 850 W DC Power Supply

Before installing an 850 W DC power supply in a Summit X650 series switch:

- 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:

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. See Figure 278.

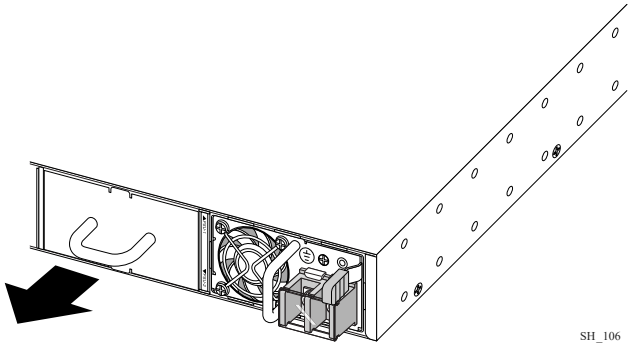


Figure 278: Removing a Blank Panel

2. The proper orientation is shown in Figure 279.
3. See Figure 279.

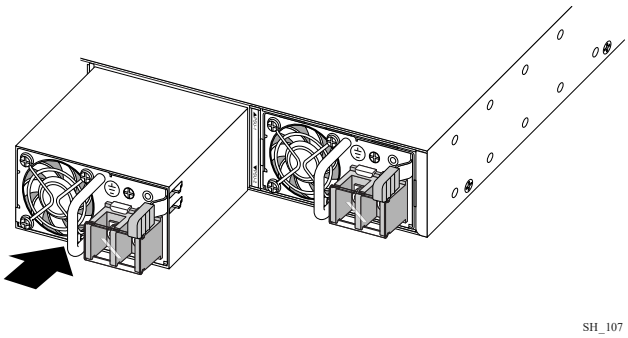


Figure 279: Installing an 850 W DC Power Supply

4. To install more power supplies, repeat the procedure.
5. Connect the ground wire, following the steps in Connecting the Ground Wire to an 850 W DC Power Supply on page 346.

Connecting the Ground Wire to an 850 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.

To connect the ground wire:

1. Verify that the DC circuit is de-energized.
2. Identify the grounding point on the front panel of the power supply.

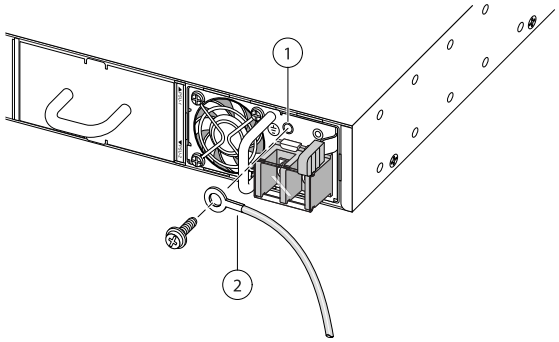


Figure 280: Connecting the Ground Wire

1 = Grounding point	2 = Ground wire

3. Insert an M3.5 screw (provided) through the ring terminal and into the grounding point on the power supply.
4. Tighten the screw to 12.6 in-lb (1.42 N m).
5. Connect the other end of the wire to a known reliable earth ground point at your site.

Connecting an 850 W DC Power Supply to the DC Source Voltage

The DC power connection at your facility must be made by a qualified electrician, following the instructions in this section.

Warning
Always make sure the DC circuit is de-energized before connecting or disconnecting the DC power cables on the 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 input cables:

1. Verify that the DC circuit is de-energized.
2. Slide the cover off the terminal block (see Figure 281 on page 347).

3. 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 –48V).
   c. Slide the spade terminal of the positive wire (–48 V RTN) under the captive square washer on the positive terminal (labeled RTN).

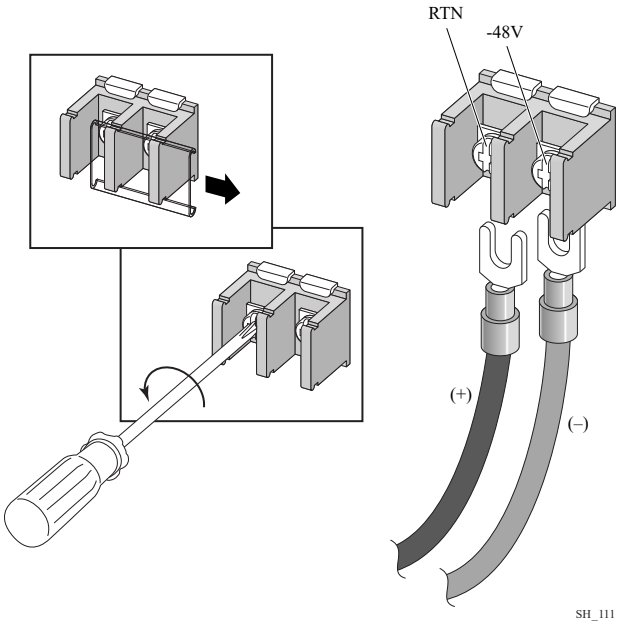


Figure 281: Connecting the DC Power Cables (Part 1)

   d. Tighten both screws on the terminal block to 11 in-lb (1.2 N m).

4. Slide the cover into place over the terminal block.

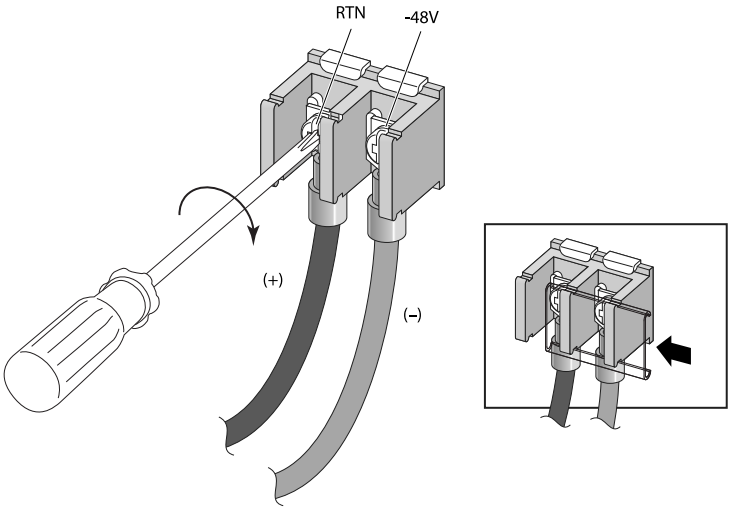


Figure 282: Connecting the DC Power Cables (Part 2)

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

You can now connect network interface cables to the switch, using the instructions in Connect Network Interface Cables on page 357.

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 349.

300 W AC PSU

Part numbers 10930 and 10930A. Compatible with X460 and X460-G2 switches. For installation instructions, see Install a 300 W or 750 W Internal AC Power Supply on page 349.

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 355.

450 W AC PSU

Part numbers 10917 and 10918. Compatible with X480 and X670 switches. For installation instructions, see Install a 450 W or 550 W Internal AC Power Supply on page 353.

550 W AC PSU

Part numbers 10925 through 10928. Compatible with X670, X670-G2 and X770-32q switches. For installation instructions, see Install a 450 W or 550 W Internal AC Power Supply on page 353.

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 355.

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 349.

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 355.

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 355.

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 355.

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 651.

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).

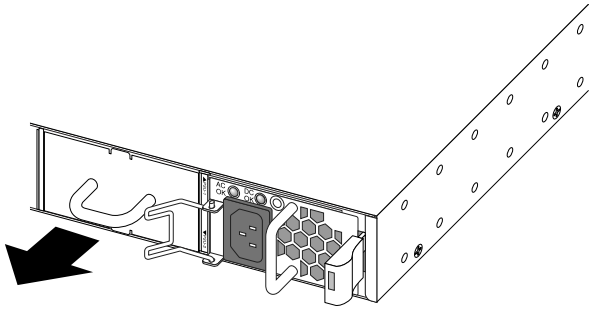


Figure 283: Removing a Blank Panel (300 W Power Supply Unit)

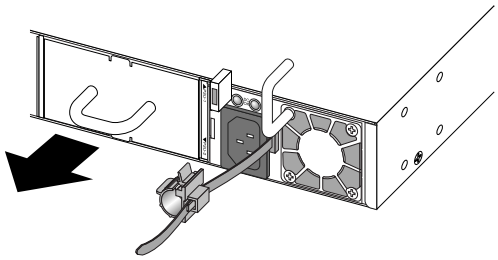


Figure 284: Removing a Blank Panel (750 W Power Supply Unit)

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).

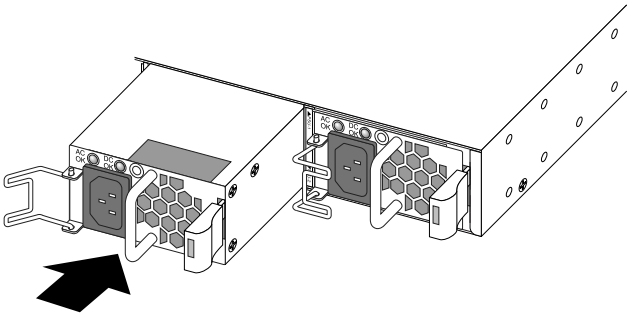


Figure 285: Installing a 300 W AC Power Supply

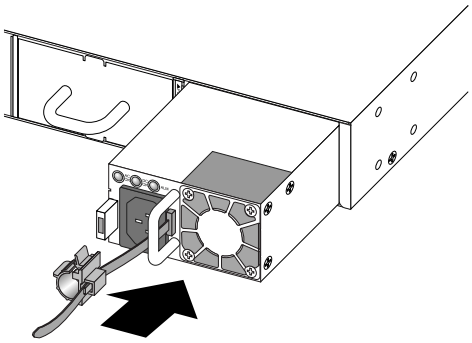


Figure 286: Installing a 750 W AC Power Supply

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 287).

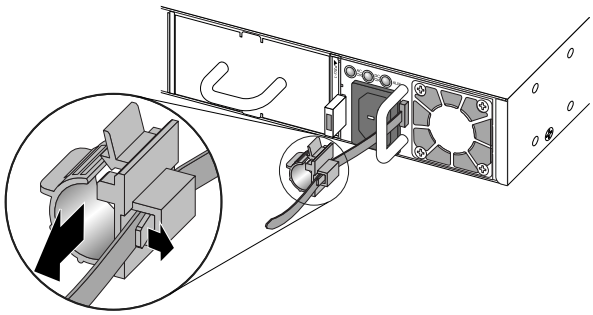


Figure 287: Moving the Power Cord Retainer

b. Connect the AC power cord to the input connector (see Figure 288).

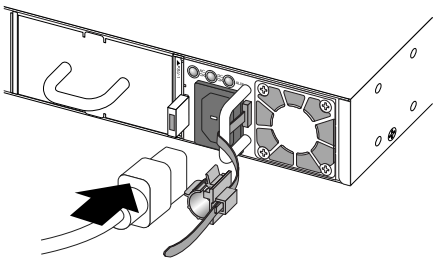


Figure 288: Connecting the Power Cord

c. Open the clip and slip it over the barrel of the connector (see Figure 289).

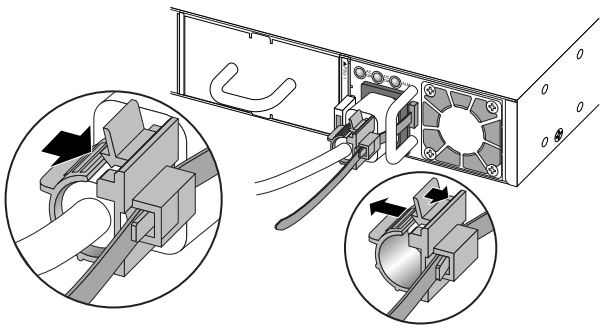


Figure 289: Attaching the Power Cord Retainer

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 350 through step 7.

Install a 450 W or 550 W Internal AC Power Supply

Some switches are shipped without installed power supplies. They accommodate one or two Summit 450 W or 550 W AC power supply units.

Summit 450 W AC power supplies are compatible with switches that have front-to-back ventilation airflow. Summit 550 W AC power supplies are available for switches with either front-to-back or back-to-front airflow.

Note

You cannot combine 450 W power supplies and 550 W power supplies in the same 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 651.

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 450 W or 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.

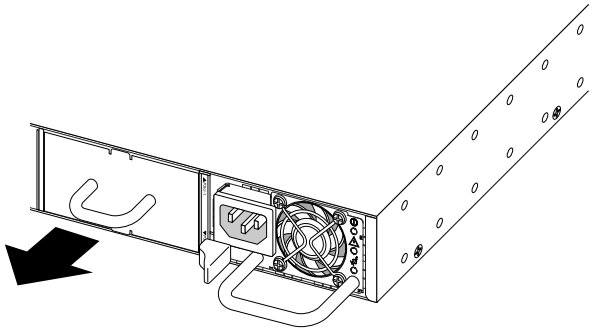


Figure 290: Removing a Blank Panel

3. Verify that the power supply is right side up.

   The power supply should be oriented as shown in Figure 291.
4. Carefully slide the power supply all the way into the power supply bay.

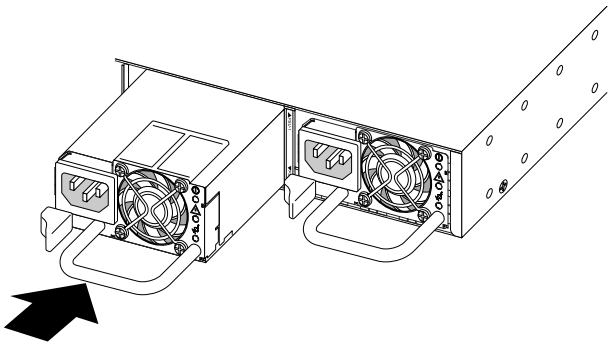


Figure 291: Installing a Power Supply

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 #unique_410.

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 651.

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 292.

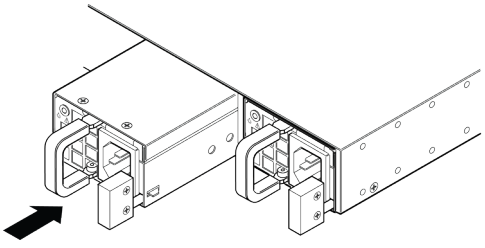


Figure 292: Installing a Summit AC Power Supply (770 W Model Shown)

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.

Installing an 850 W Internal AC Power Supply

The Summit X650 series switch is shipped without installed power supplies.

The switch accommodates one or two Summit 850 W power supply units.

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.

To install an 850 W AC power supply in a Summit X650 series switch, follow these steps:

1. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate grounding point.
2. If necessary, remove a blank panel from the back of the Summit X650 series switch.

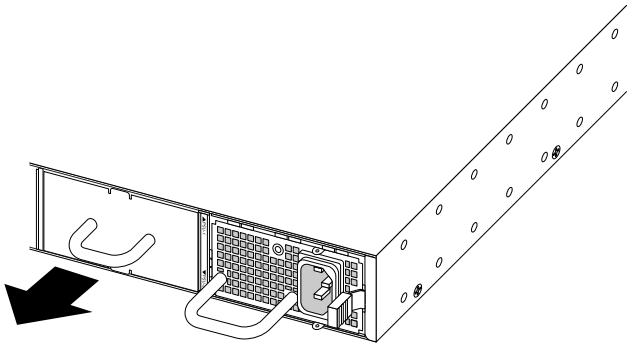


Figure 293: Removing a Blank Panel

3. Verify that the power supply is right side up, with the latching tab at the right of the unit (see Figure 294 on page 357).

4. Carefully slide the power supply all the way into the power supply bay (see Figure 294).
5. Push the power supply in until the latch snaps into place.

Caution
Do not slam the power supply into the switch.

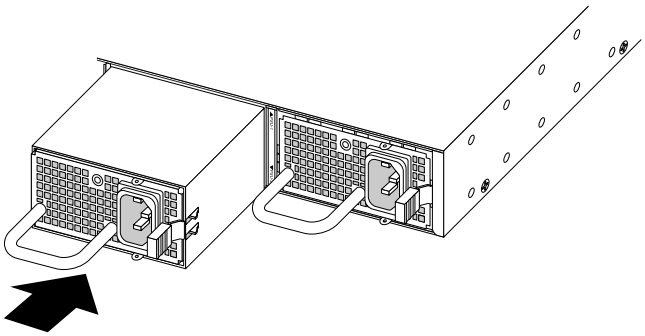


Figure 294: Installing a Power Supply

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 an appropriate AC power cord to the power input socket; connect the other end of the power cord 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 unit.

Connect 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 358
- Logging in for the First Time on page 359

You can also:

- Configuring the Switch's IP Address for the Management VLAN on page 360
- Configuring ExtremeXOS on the Switch on page 360

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 651.

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 358.

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.
3. 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.
4. 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 16.2 User Guide*.

5. 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 360.

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.

1. 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.
2. 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 16.2 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 360.

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 360.
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 TFTPD64.

   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.

Installing External Power Supplies

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 514. 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 651.

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-150DC External Power Module (with EPS-T2)

The EPS-150DC power supply is a modular power supply for use in the EPS-T2 External Power System Tray.

The EPS-T2 is a rack-mountable chassis or tray that holds one or two EPS-150DC power supplies. Each EPS-150DC provides one-to-one redundancy to an attached Extreme Networks switch. You must install the EPS-150DC power supply in the EPS-T2 tray.

Warning
Always be sure that the DC circuit is de-energized before connecting or disconnecting the DC wiring harness at the DC power socket on the rear of the EPS-150DC unit, and before connecting or disconnecting the redundant power cord between the switch and the EPS-150DC unit.

Caution
Do not use the rack-mount brackets to suspend the EPS-T2 from under a table or desk, or to attach the EPS-T2 to a wall.

Note
For centralized DC power connection, this product is intended to be installed in restricted access locations (dedicated equipment rooms, equipment closets, or the like) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

Rack-mounting the EPS-T2

To install the EPS-T2 into a 19-inch rack:

1. Place the EPS-T2 upright on a secure surface, with the front facing you.
2. Remove the mounting bracket kit from the packaging.
3. Attach the mounting brackets:
   a. Place a mounting bracket over the mounting holes on one side of the EPS-T2 (see Figure 295).
   b. Insert the provided screws and fully tighten with a screwdriver.

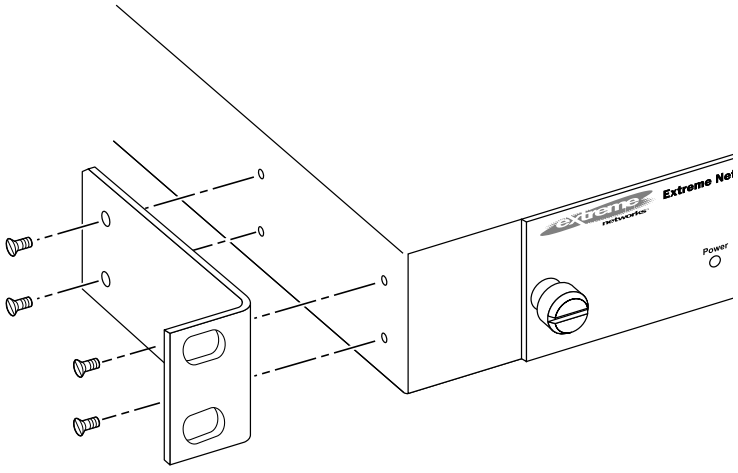


Figure 295: Attaching the Mounting Bracket

c. Attach the mounting bracket for the other side of the EPS-T2.

4. Slide the EPS-T2 into the rack and secure it using appropriate rack-mounting screws.

Installing the EPS-150DC Power Supply

Note
Install the EPS-T2 before you begin installing the EPS-150DC.

Warning
Always be sure that the DC circuit is de-energized before connecting or disconnecting the DC wiring harness at the DC power socket on the rear of the EPS-150DC unit, and before connecting or disconnecting the redundant power cord between the switch and the EPS-150DC unit.

To install an EPS-150DC unit, perform the following tasks in order:

1. Connecting the DC Wiring Harness to the DC Source Voltage on page 365

   This task must be performed by a licensed, qualified electrician.
2. Installing an EPS-150DC Unit into an EPS-T2 on page 366
3. Connecting the DC Wiring Harness to the DC Power Socket on the EPS-150DC on page 366
4. Connecting the EPS-150DC to a Switch on page 367

Connecting the DC Wiring Harness to the DC Source Voltage

A three-wire, 6-foot long DC wiring harness (shown in Figure 296 on page 366) is included with the EPS-150DC unit. The DC wiring harness must be properly connected to the DC source voltage at your facility by a qualified electrician before the connector on the wiring harness can be attached to the DC power supply socket on the rear of the unit. See Technical Specifications on page 522 for information about connector pinouts and for DC power specifications to be used in connecting the wiring harness to the DC source voltage.

Warning
Wiring the EPS-150DC DC wiring harness to your facility's DC source voltage must be performed by a qualified, licensed electrician. After the wiring harness is connected to a permanent DC voltage source by a qualified, licensed electrician, you can remove, replace and maintain the ESP-150DC without further electrician assistance. However, always be sure that the DC circuit is de-energized before connecting or disconnecting the DC power connection at the rear of the EPS-150DC unit.

Caution
The DC wiring harness must be properly connected to a DC main circuit breaker or fuse rated no greater than 20 A.

Provide proper connection and strain relief on the DC wiring harness in accordance with all local and national electrical codes.

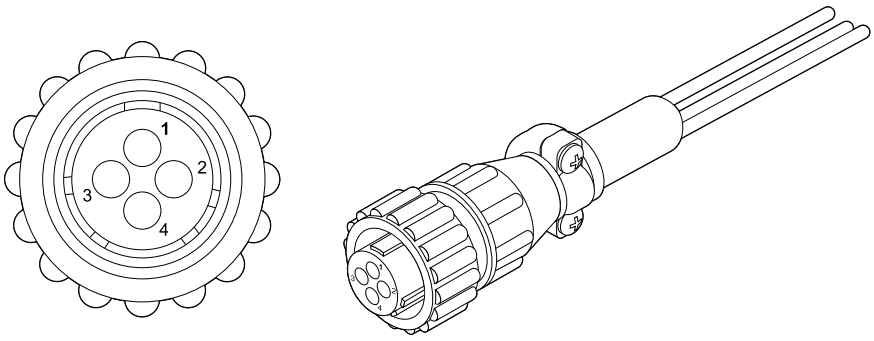


Figure 296: Three-wire Cable Harness

Note

Each wire on the harness has been properly marked for proper attachment to the DC power source. Leave these labels on each lead wire for future reference.

Installing an EPS-150DC Unit into an EPS-T2

Warning

The EPS-150DC unit and rack must be connected to protective earth ground.

To install an individual EPS-150DC unit into an EPS-T2:

1. Remove the EPS-150DC unit from the packing material.
2. Insert the EPS-150DC unit into the front of the EPS-T2.
3. Tighten the captive thumbscrews to secure the power supply to the tray.

Connecting the DC Wiring Harness to the DC Power Socket on the EPS-150DC

After the DC wiring harness is connected to a permanent DC voltage source by a qualified, licensed electrician, you can remove, replace, and maintain the EPS-150DC unit without further electrician assistance.

Warning

Always be sure that the DC circuit is de-energized before connecting the DC wiring harness to the DC power socket.

To connect the DC wiring harness to the EPS-150DC unit:

1. Verify that the DC power is turned off at the source.

2. Plug the DC cable connector into the DC power supply socket on the rear of the EPS-150DC unit.

   The pins must align properly for the cable to completely connect. Do not force the cable into the socket until the keyway is aligned properly. Refer to Figure 296 on page 366 for the DC wiring harness connector and to Figure 297 for the DC power socket location on the rear of the EPS-150DC unit.

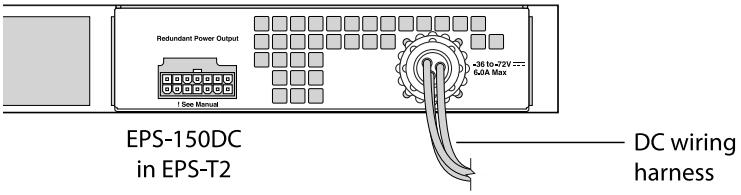


Figure 297: Connecting the Input Cable to the EPS-150DC Unit

3. Tighten the retainer nut on the connector until it is finger tight.

Connecting the EPS-150DC to a Switch

If you are connecting the EPS-150DC unit to a Summit X450a-48tDC switch, you must ground the switch before connecting power. For instructions on grounding the switch, see Grounding a Summit X250e or X450a DC-Powered Switch on page 327.

Warning

Always be sure that the DC circuit is de-energized before connecting the EPS-150DC to the switch.

One end of the EPS-150DC cord has a keyed connector to ensure correct alignment of the connector. The key is a plastic tab on the connector housing that fits into the EPS-150DC unit.

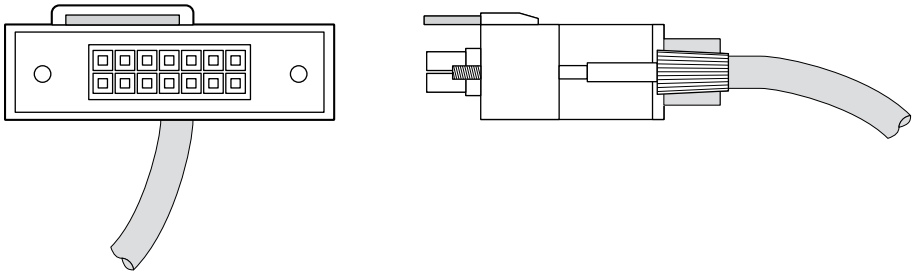


Figure 298: EPS-150DC Redundant Power Cord with Connector Key

To connect the EPS-150DC to a switch:

1. Verify that the DC power is turned off at the source.
2. Identify the keyed end of the redundant power cable.
3. Holding the keyed connector so that the side labeled “Top” is facing up, connect the EPS-150DC redundant power cable to the power supply unit (see Figure 299 on page 368).
4. Align and tighten the connector retaining screws to secure the cable connector to the power supply unit.
5. Connect the other end of the redundant power cord to the Extreme switch.

   The connector fits the slot in only one direction.

6. Align and tighten the captive retaining screws to secure the cable connector to the switch.

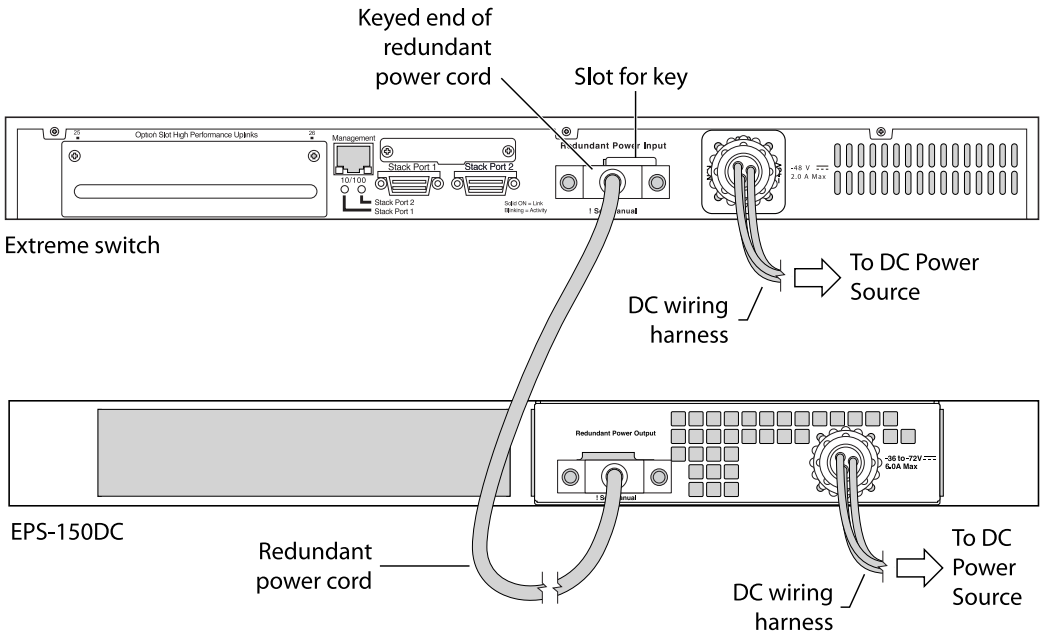


Figure 299: Connecting an EPS-150DC Unit to a Switch

7. Energize the DC circuit.

The Power LED on the front of the EPS-150DC unit turns solid green to indicate that it is ready.

Installing an EPS-160 External Power Module (with EPS-T)

You can order the EPS-T chassis with one or two EPS-160 power supplies already installed. You can also order an additional power supply from your Extreme Networks reseller.

The EPS-T can be mounted in a rack or placed free-standing on a table.

Rack-mounting the EPS-T

Caution

Do not use the rack-mount brackets to suspend the EPS-T from under a table or desk, or to attach the EPS-T to a wall.

To rack-mount the EPS-T in a 19-inch rack:

1. Place the EPS-T upright on a stable surface, with the front facing you.
2. Remove the mounting bracket kit from the packaging.
3. Attach the mounting brackets as shown in Figure 300:
   a. Place a mounting bracket over the mounting holes on one side of the EPS-T (see the figure below).

b. Insert the screws and fully tighten them using a screwdriver.

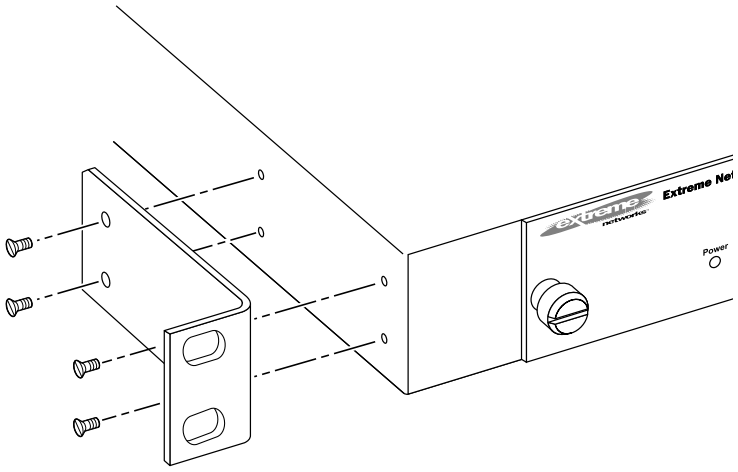


Figure 300: Attaching the Mounting Bracket

c. Attach the mounting bracket for the other side of the EPS-T.

4. Slide the EPS-T into the rack and secure it using appropriate rack-mount screws.

Installing the EPS-160 Power Supply into an EPS-T

To install an EPS-160 power supply into the EPS-T, follow these steps:

1. Remove the EPS-160 power supply from the packing material.
2. Remove the cover plate from an empty slot on the EPS-T.
3. Insert the power supply into the empty slot on the EPS-T.
4. Tighten the captive thumbscrews to secure the power supply to the EPS-T.

Connect the EPS-160 power supply to the Summit switch, following the instructions in Connecting the EPS-160 Power Supply to the Switch on page 369.

Connecting the EPS-160 Power Supply to the Switch

One end of the EPS-160 redundant power cord has a keyed connector to ensure correct alignment of the connector.

The key is a plastic tab on the cord connector housing that fits into the EPS-160 unit.

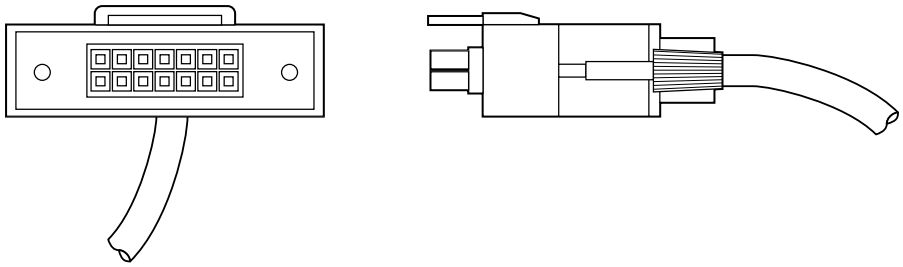


Figure 301: Redundant Power Cord Connector

Caution

Always connect the redundant power supply cord before you attach the AC power cord to the EPS-160 power supply.

To connect the EPS-160 power supply to the switch:

1. Connect the keyed end of the redundant power supply cord to the EPS-160 power supply (see Figure 302).
2. Connect the other end of the redundant power supply cord to the Extreme switch (see Figure 302).

   This connector end can only be inserted into the switch with the end marked TOP facing up.

Note

If your switch was shipped with a metal cover plate over the redundant power input connector, remove the cover.

Warning

The redundant power input connector on the rear of the switch contains high energy and is a burn hazard. Use care when connecting the redundant power supply cord to the rear of the switch.

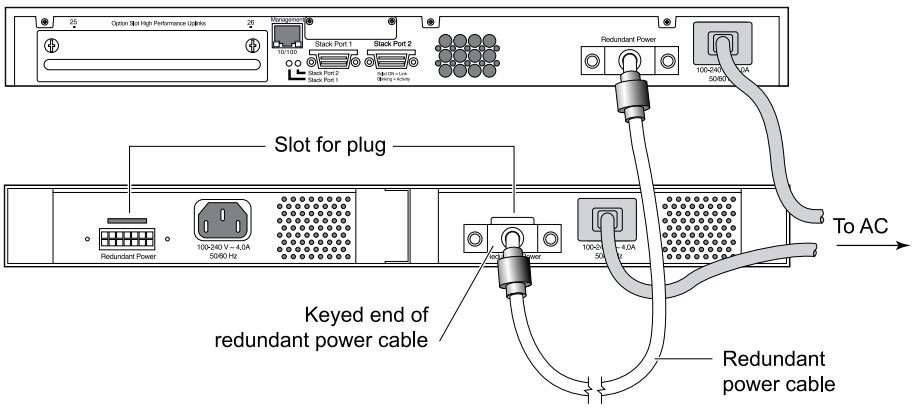


Figure 302: Redundant Power Connections

3. Connect an appropriate AC power cord to the AC connector on each unit.

Note
An AC power cord is not provided with the EPS-160 unit. For information about selecting a power cord, see Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651.

The Power LED on the front of the EPS-160 should light solid green to indicate that it is ready.

Installing an EPS-500 External Power Supply Unit

You can position the EPS-500 facing either the front or the back of the rack.

For this reason, each unit has two sets of mounting holes on each side. Extreme Networks recommends that you position the EPS-500 unit so that the power output connectors of the EPS-500 unit are on the same side as the external connector on the connecting switch.

The EPS-500 unit can be mounted in a rack or placed free-standing on a table.

Note
An AC power cord is not provided with the EPS-500 unit. See Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651 for information about selecting a power cord.

Rack-mounting the EPS-500 Power Supply

Caution
When you install an EPS-500 in an equipment rack, make sure that the air vents are not restricted. Allow for elevated ambient operating temperatures when the unit is installed adjacent to other equipment. To avoid hazardous conditions due to uneven mechanical loading, make sure that the equipment is mounted properly in the equipment rack.

Caution
Do not use the rack-mount brackets to suspend the EPS-500 from under a table or desk, or to attach the unit to a wall.

To rack-mount an EPS-500 in a 19-inch rack, follow these steps:

1. Place the EPS-500 upright on a stable surface, with the side you want to face to the front of the switch toward you.
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-500 (see Figure 303).

b. Insert the provided screws and fully tighten the screws using a screwdriver.

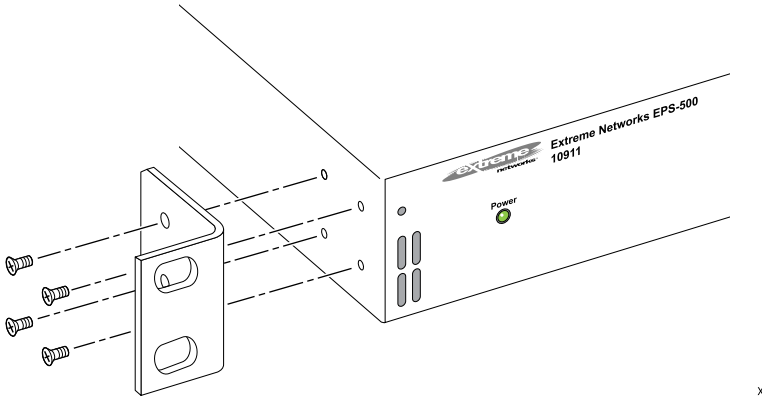


Figure 303: Attaching a Mounting Bracket

c. Attach the mounting bracket on the opposite side of the EPS-500.

4. Slide the EPS-500 into the rack and secure it using appropriate rack-mount screws.

Note
We recommend that you position the EPS-500 so that the output connectors are on the same side as the external connector on the connecting switch. If you position the EPS-500 with the connectors facing in the opposite direction from the Summit switch connector, leave at least 1 U between the switch and the EPS-500 through which to slide the power cords. Do not route the power cords around the equipment rack.

Connecting the EPS-500 Power Supply

Caution
Do not attach the AC power cord to the EPS-500 unit until the unit is properly grounded at the electrical outlet and the redundant power cord is connected.

One end of the EPS-500 cord has a keyed connector to ensure correct alignment of the connector. The key is a plastic tab on the connector housing that fits into the EPS-500 unit.

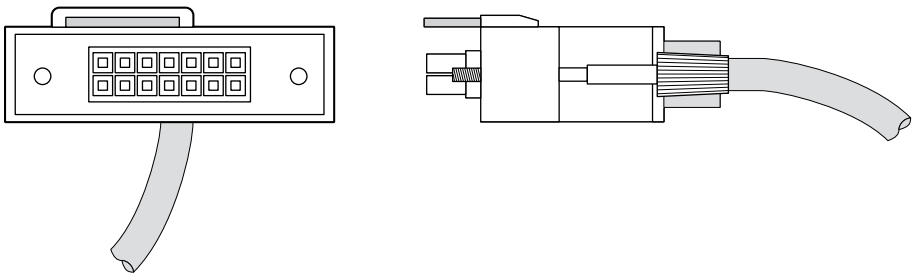


Figure 304: EPS-500 Redundant Power Cord with Connector Key

1. Connect the keyed end of the EPS-500 redundant power cord to the power supply unit (see Connecting an EPS-500 Unit to a Switch).

2. Connect the other end of the redundant power cord to the Extreme switch.

   The connector fits the slot in only one direction.

Note
If your switch was shipped with a metal cover plate over the redundant power input connector, remove the cover.

Warning
The redundant power input connector on the rear of the switch contains high energy and is a burn hazard. Use care when connecting the redundant power supply cord to the rear of the switch.

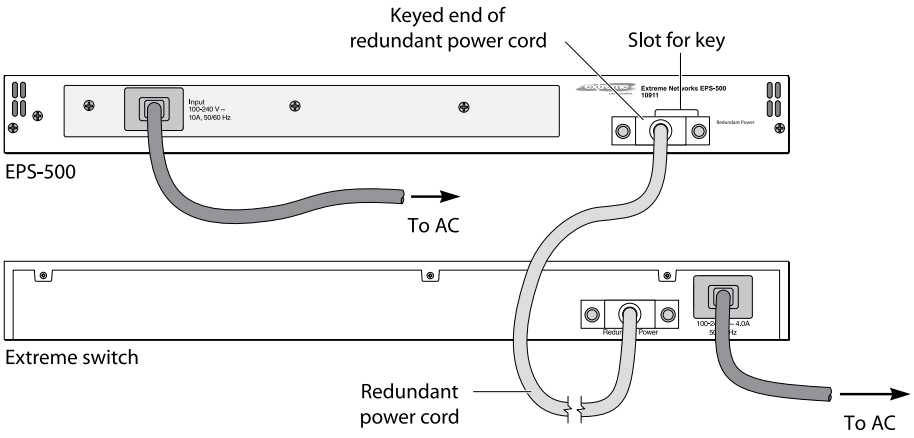


Figure 305: Connecting an EPS-500 Unit to a Switch

3. Connect an appropriate AC input power cord to the AC connector on the EPS-500 unit.

Note
An AC power cord is not provided with the EPS-500 unit. See Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651 for information about selecting a power cord.

Caution
The EPS-500 unit does not have a switch for turning the unit on and off. Disconnect power to the EPS-500 unit by removing the plug from the electrical outlet. Be sure that this connection is where you can easily reach it.

4. Connect the other end of the AC power cord to the electrical outlet.

   Be sure that the electrical outlet is properly grounded.

The Power LED on the front of the EPS-500 unit should light solid green to indicate that it is ready.

Installing an EPS-600LS External Power Module

Install one, two, or three EPS-600LS power modules (model no. 10913) in the EPS-C chassis (model no. 10912) to build an external redundant power system for a PoE-capable switch.

A redundant power cable shipped with the EPS-C chassis provides the connection between the external power system and the redundant power input connector on the back of the switch.

Note
An AC power cord is not provided with the EPS-600LS power module. See Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651 for information about selecting a power cord.

Note
Each EPS-C chassis is shipped with a special redundant power supply cord for connection to the Summit switch. Make sure that the EPS-C chassis is installed in the rack system before installing an EPS-600LS unit.

Installing the EPS-C Chassis

Caution
Do not use the rack-mount brackets to suspend the EPS-C from under a table or desk, or to attach the EPS-C unit to a wall.

The EPS-C is intended for use only with a Summit X450e-48p or X250e-48p switch. You can install the EPS-C above or below the switch.

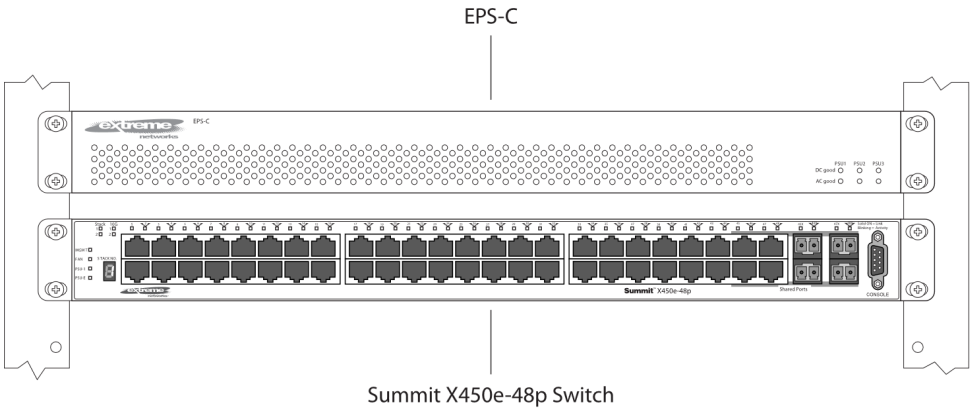


Figure 306: EPS-C and Summit Switch

To rack-mount the EPS-C in a 19-inch rack, follow these steps:

1. Place the EPS-C 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 rack-mount bracket over the mounting holes on one side of the unit.

b. Insert the provided screws and tighten them securely.

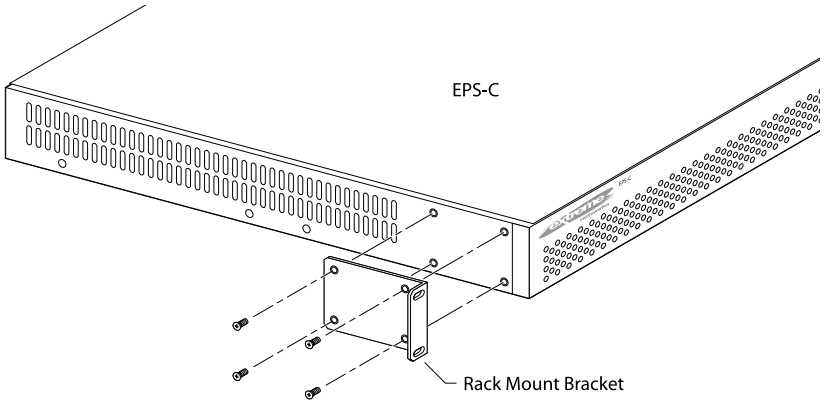


Figure 307: Attaching the Mounting Bracket

c. Attach the mounting bracket for the other side of the EPS-C.

4. Slide the EPS-C into the rack and secure it using appropriate rack-mount screws.
5. Connect the keyed end of the redundant power cord to the EPS-C (see Figure 308). Verify that the side of the connector marked TOP is facing up.

   The key is a plastic tab on the cable connector housing that fits into the EPS-C to ensure correct alignment of the connector.
6. Connect the other end of the redundant power cord to the Summit X450e-48p or X250e-48p switch. Be sure that the side of the connector marked TOP is facing up (see Figure 308).

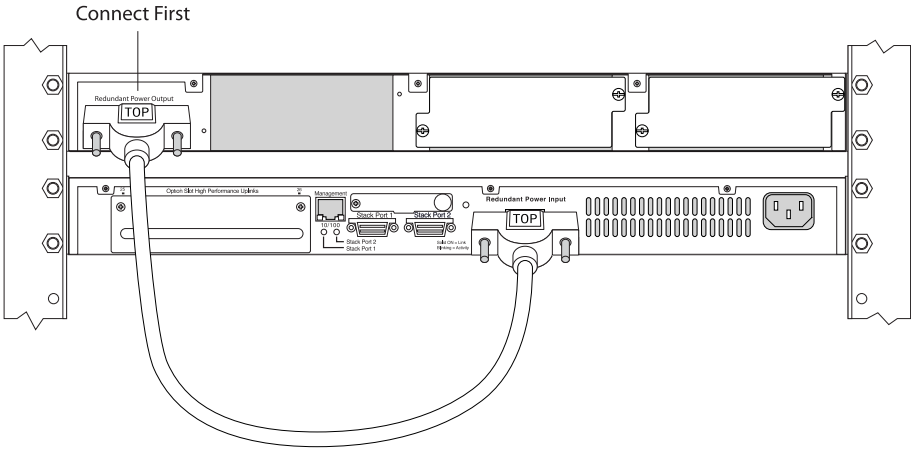


Figure 308: Installing the Redundant Power Cord

Installing the EPS-600LS Power Supply

To install an EPS-600LS unit into an EPS-C, follow these steps:

1. If necessary, remove a cover plate from a slot in the EPS-C.

2. Slide the EPS-600LS into an empty slot in the EPS-C.

Caution

Be sure that empty slots in the EPS-C chassis are always covered by a cover plate when not in use. The EPS-C is shipped with slots 2 and 3 covered and slot 1 open. Extreme Networks recommends that you populate slot 1 with an EPS-600LS unit first, but this is not required. You can install EPS-600LS units into any of the slots in the EPS-C. The installation sequence does not affect the performance of the power supply units, but empty slots must be covered at all times.

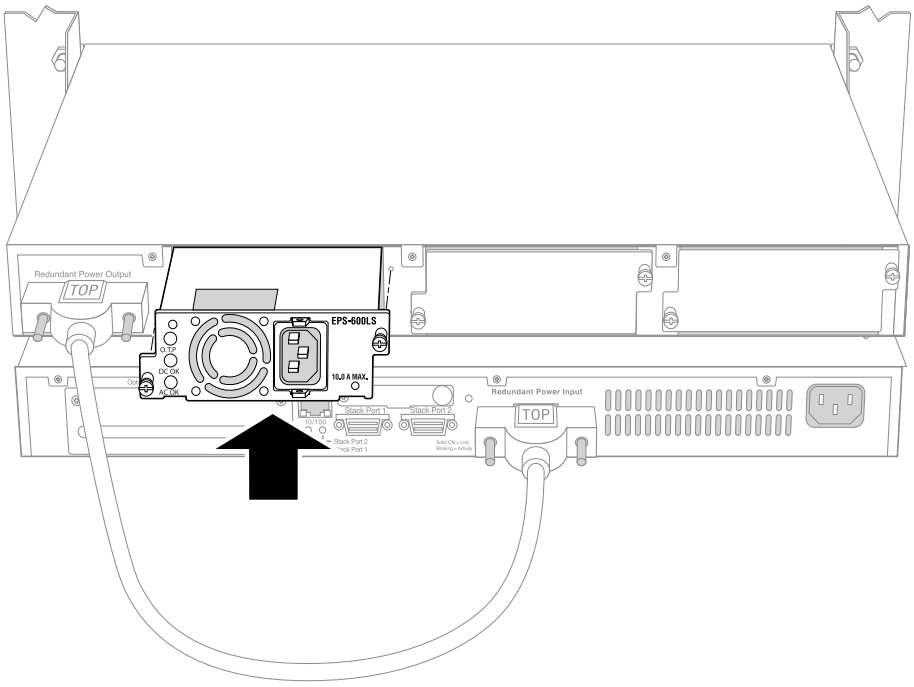


Figure 309: Installing the EPS-600LS Unit in the EPS-C Chassis

3. Slide the unit completely into the chassis until the front of the EPS-600LS is flush with the surface of the EPS-C (see Figure 310).

4. Align and tighten the captive screws to secure the EPS-600LS unit in place in the EPS-C (see Figure 310).

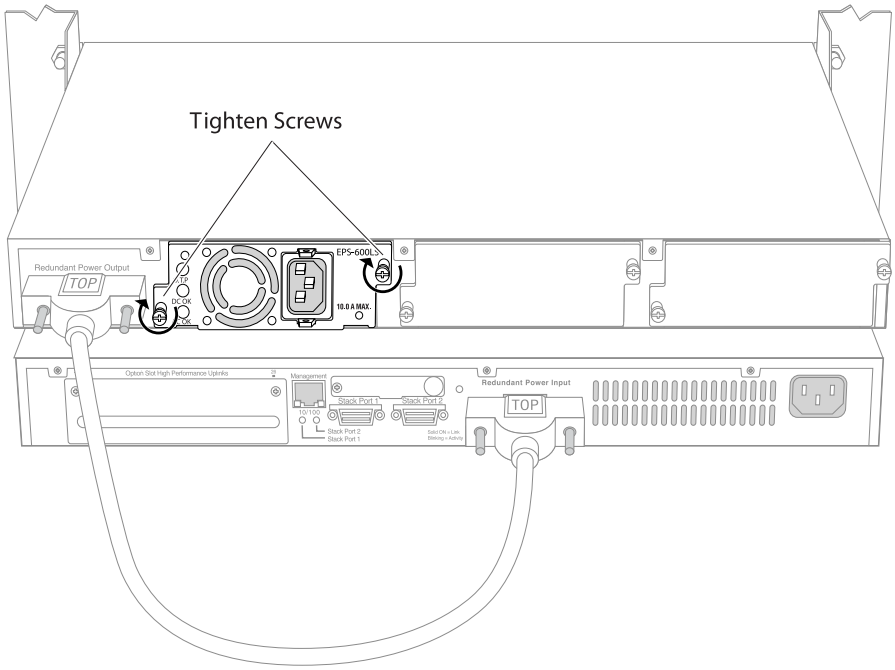


Figure 310: Securing the EPS-600LS to the EPS-C Chassis

5. Connect an appropriate AC power cord to the AC connector on the EPS-600LS unit (see Figure 311 on page 378).

   Use the cable clip on the EPS-600LS unit to hold the AC power cord in place (see Figure 311).

Caution
The EPS-600LS unit does not have a switch for turning the unit on and off. Disconnect power to the EPS-600LS unit by removing the plug from the electrical outlet. Make sure that this connection is easily accessible to you.

Note
An AC power cord is not provided with the EPS-600LS unit. See Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651 for information about selecting a power cord.

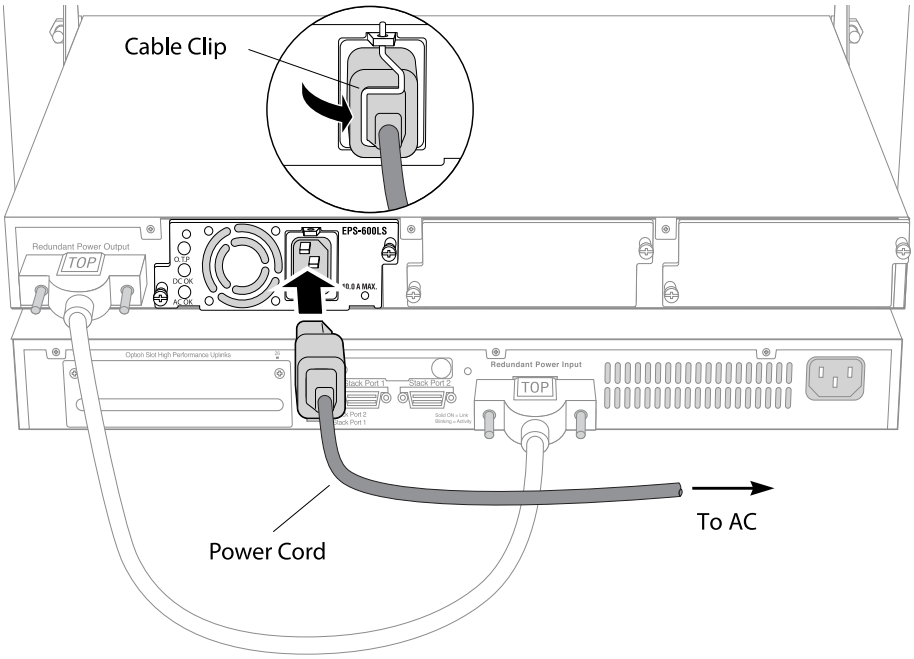


Figure 311: Connecting the AC Power Cord

6. Connect the other end of the AC power cord to the electrical outlet (see the figure above).

   Be sure that the electrical outlet is properly grounded.

7. Repeat the procedure for each additional EPS-600LS unit.

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 519 for information about selecting a power cord.

Installing an EPS-C2 Chassis

Figure 312 shows an EPS-C2 chassis mounted above a switch in a rack.

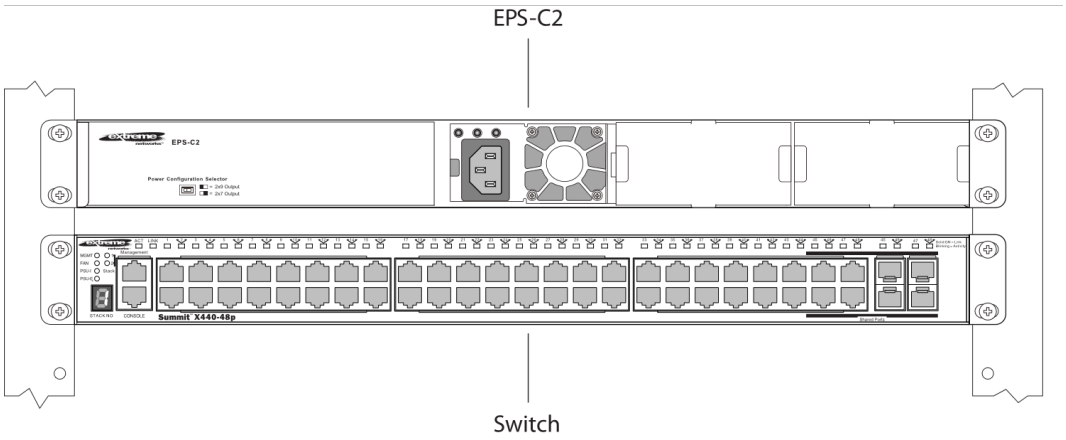


Figure 312: EPS-C2 Power System Chassis and Switch

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 313).

b. Insert the screws and fully tighten them using a screwdriver.

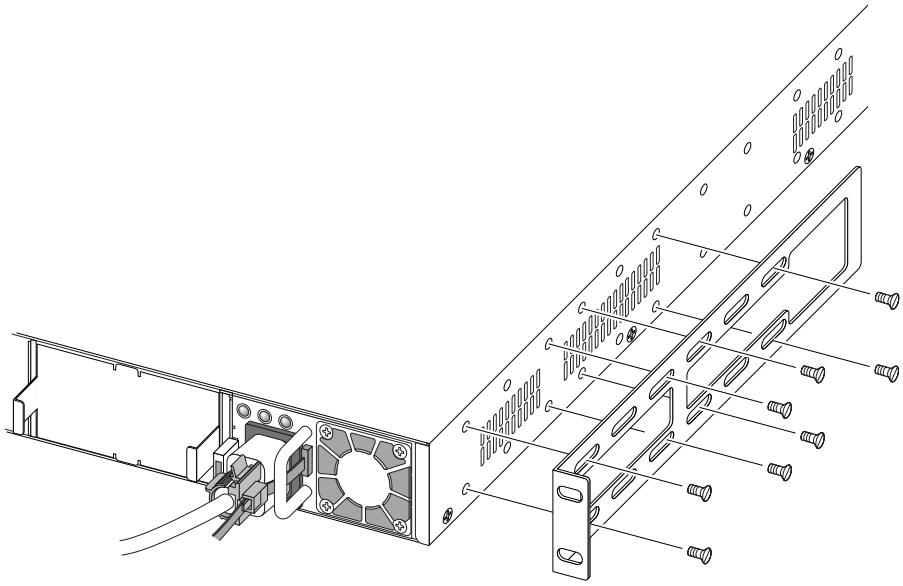


Figure 313: Attaching the Mounting Bracket to the EPS-C2 Chassis

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 314.

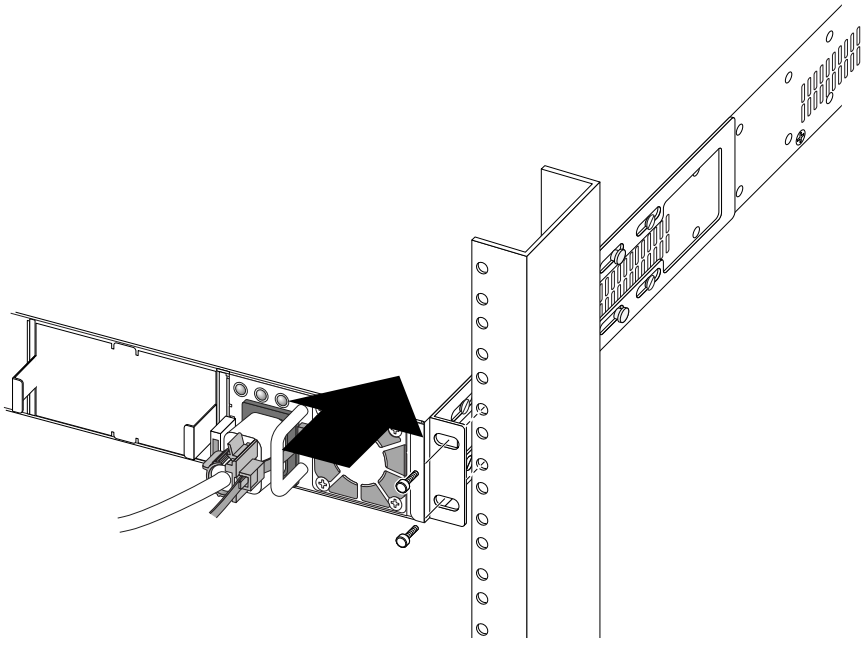


Figure 314: Sliding the EPS-C2 into the Rack and Securing it

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.

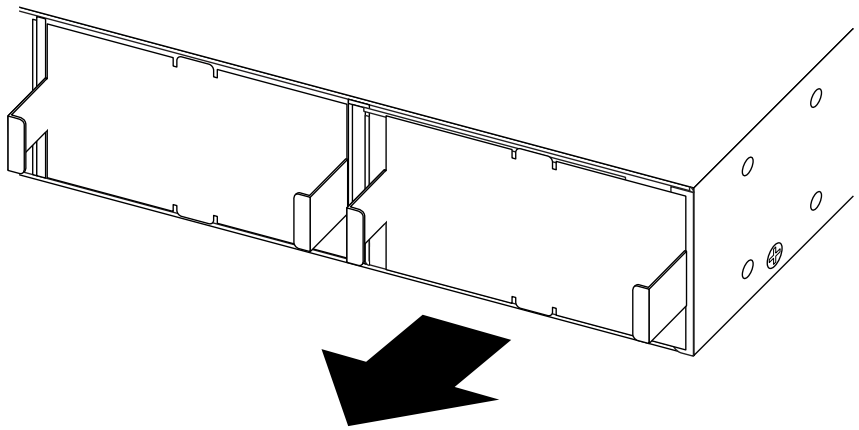


Figure 315: Removing a Blank Panel from the EPS-C2 Chassis

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 316).

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

Caution
Do not slam the power supply into the chassis.

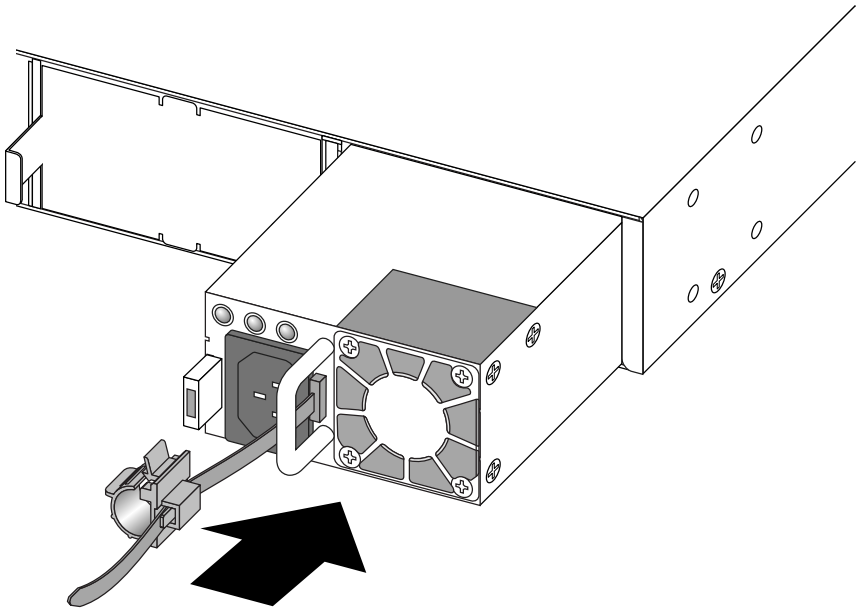


Figure 316: Installing a 750 W AC Power Supply in an EPS-C2 Chassis

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 317, which connect the power supply to ExtremeSwitching X440-G2 and X620 switches.

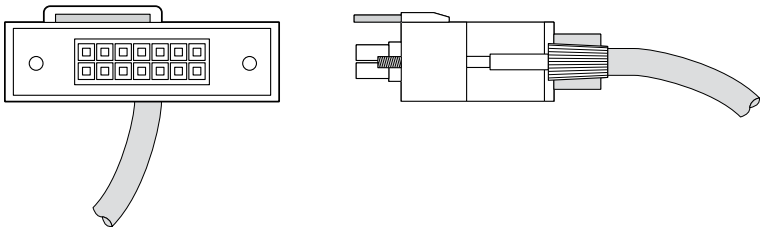


Figure 317: EPS-C2 2x7 Pin Redundant Power Cable with Connector Key Tab

The EPS-C2 chassis can use the following types of redundant power connectors:

- Five 2x7-pin connectors, shown in Figure 318, which connect the power supply to X440 switches.

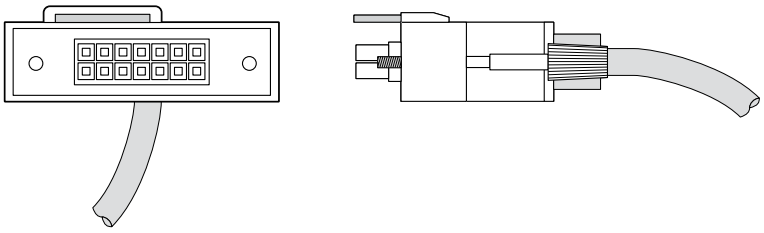


Figure 318: EPS-C2 2x7 Pin Redundant Power Cable with Connector Key Tab

- One 2x9-pin connector, shown in Figure 319, which connects the power supply to X250e-48p and X450e-48p switches.

> **Warning**
> The 2x9 cable is not hot-pluggable. Do not attach a powered EPS-C2 to any switch using the 2x9 connector.

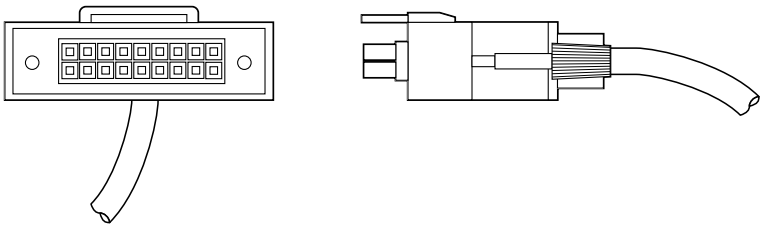


Figure 319: EPS-C2 2x9 Pin Redundant Power Cable with Connector Key Tab

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 320.

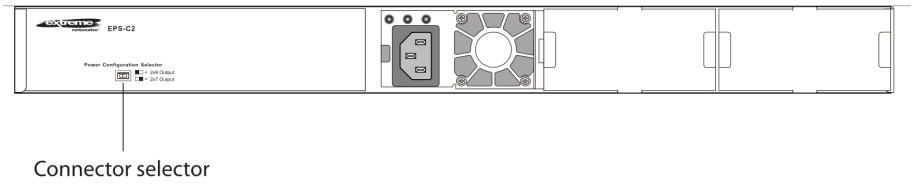


Figure 320: EPS-C2 Connector Selector Switch

2. Set the connector selection switch, located on the front of the EPS-C2 chassis, for either the 2x9 or the 2x7 connector.

   See Figure 321.

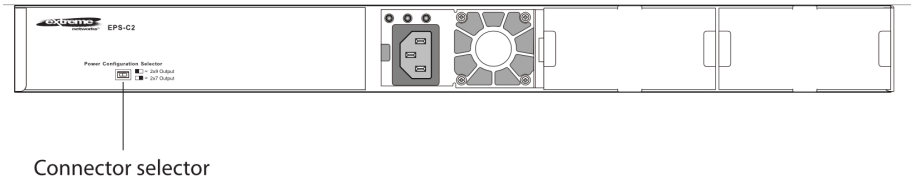


Figure 321: EPS-C2 Connector Selector Switch

3. 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 322.
4. Verify that the side of the connector marked TOP is facing up.
5. 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 322.

   Be sure that the side of the connector marked TOP is facing up.

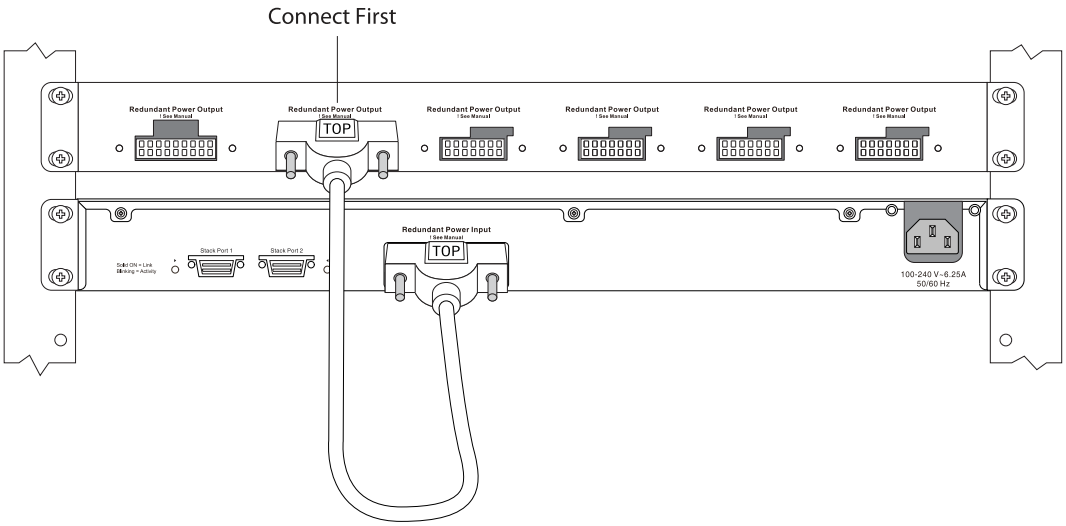


Figure 322: Installing the Redundant Power Cord

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.

6. Repeat the preceding steps to connect any additional redundant power cords.

Connecting the AC Power cord to the EPS-C2

Important
When performing this task, observe all of the precautions listen in Safety Considerations for Installing Power Supplies on page 362.

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 323.

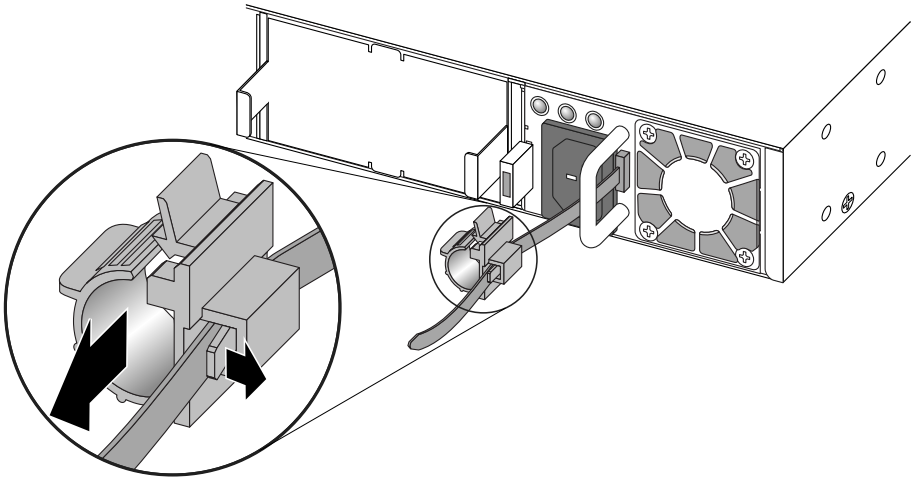


Figure 323: Moving the Power Cord Retainer on the 750 W AC Power Supply

2. Connect the AC power cord to the input connector.

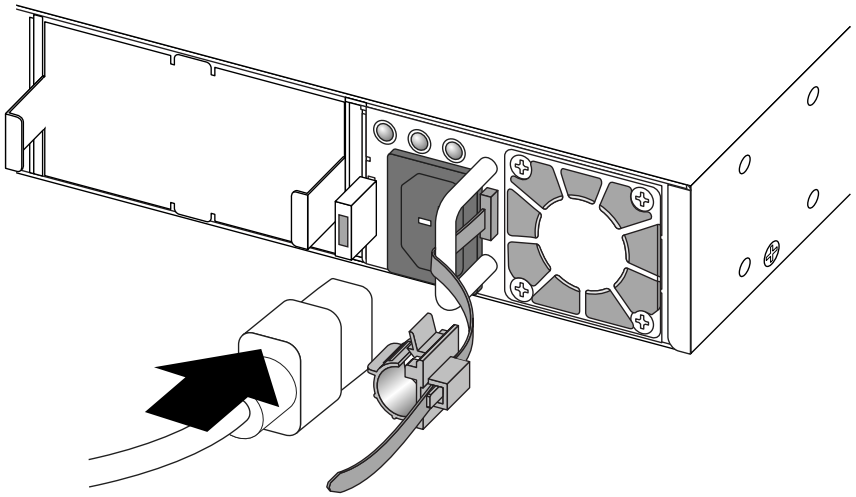


Figure 324: Connecting the Power Cord on the 750 W AC Power Supply

3. Open the clip and slip it over the barrel of the connector.

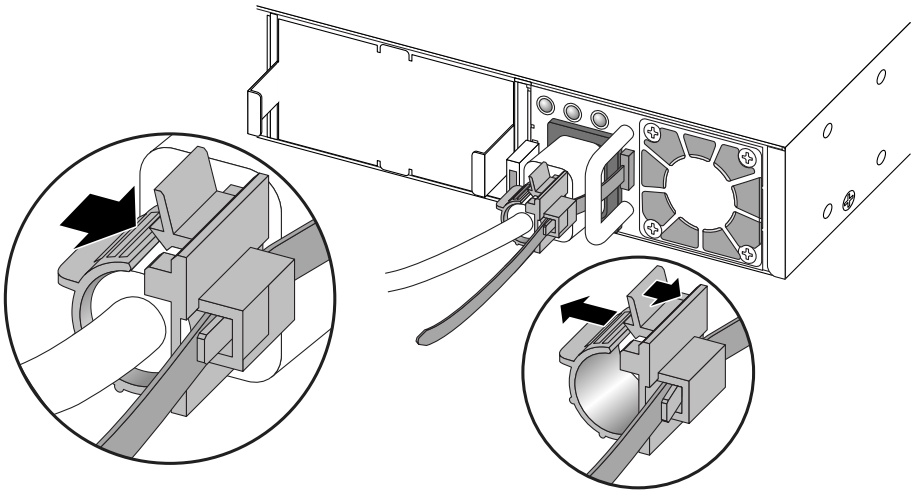


Figure 325: Attaching the Power Cord Retainer on the 750 W AC Power Supply

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 EPS-LD External Power Supply

The EPS-LD power supply can be mounted in a rack or placed free-standing on a table.

You can position the EPS-LD facing either the front or the back of the rack. For this reason, each unit has two sets of mounting holes on each side. Extreme Networks recommends that you position the EPS-LD so that the power output connectors on the EPS-LD unit are on the same side as the external connector on the connecting switch.

Caution
Do not use the rack-mount brackets to suspend the EPS-LD from under a table or desk, or to attach the unit to a wall.

Note
An AC power cord is not provided with the EPS-LD power supply. See Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651 for information about selecting a power cord.

Rack-mount the EPS-LD Power Supply

Note
When installing an EPS-LD in a rack, make sure air vents are not restricted. Allow for elevated ambient operating temperatures when the EPS-LD is installed adjacent to other equipment. Be sure you mount the equipment in the rack so that the load is evenly distributed.

To rack-mount each EPS-LD unit in a 19-inch rack:

1. Place the EPS-LD unit upright on a stable surface, with the side you want to face to the front of the switch toward you.
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 unit (see the figure below).

b. Insert the provided screws and fully tighten them using a screwdriver.

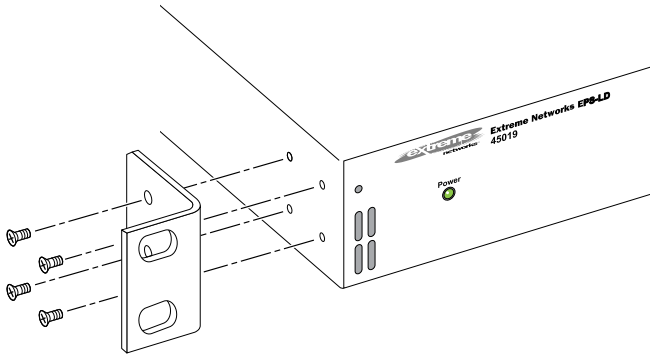


Figure 326: Attaching the Mounting Bracket

c. Attach the mounting bracket for the other side of the EPS-LD unit.

4. Slide the EPS-LD into the rack and secure it using appropriate rack-mount screws.

Note

We recommend that you position the EPS-LD so that the output connectors are on the same side as the external connector on the connecting switch. If you mount the EPS-LD with the connectors facing in the opposite direction from the Summit switch connector, leave at least 1 U between the switch and the EPS-LD through which to slide the power cords. Do not route the power cords around the equipment rack.

Connecting the EPS-LD to the Switch

Caution

Do not attach the AC power cord to the EPS-LD unit until the unit is properly grounded at the electrical outlet and the redundant power supply cord is connected.

One end of the EPS-LD cord has a keyed connector to ensure correct alignment of the connector. The key is a plastic tab on the cord connector housing that fits into the EPS-LD unit.

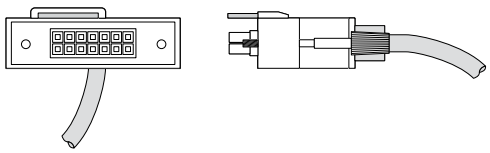


Figure 327: EPS-LD Connector with Key

To connect the EPS-LD to the switch:

1. Connect the keyed end of the cord to the power supply unit (see Figure 328 on page 389).
2. Align and tighten the captive retaining screws on the connector.

3. Connect the other end of the EPS-LD cord to the Extreme switch.

   The connector fits in only one direction.

Note

If your switch was shipped with a metal cover plate over the redundant power input connector, remove the cover.

Warning

The redundant power input connector on the rear of the switch contains high energy and is a burn hazard. Use care when connecting the redundant power supply cord to the rear of the switch.

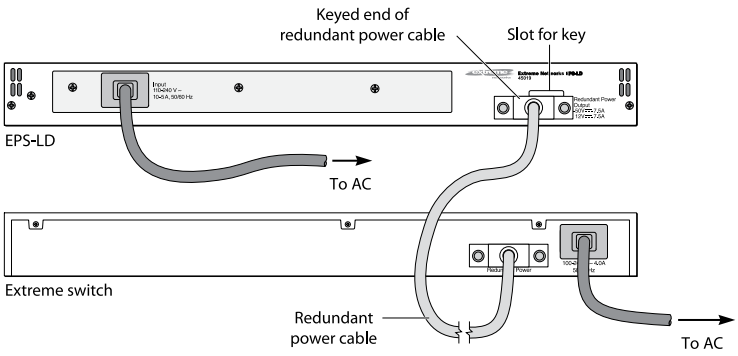


Figure 328: Connecting an EPS-LD Unit to a Switch

Connecting the EPS-LD to Power

An AC input power cord is not provided with the EPS-LD.

Make sure the EPS-LD is connected to the switch before you connect the AC power.

Caution

The EPS-LD does not have a switch for turning the unit on and off. You disconnect power to the EPS-LD by removing the plug from the electrical outlet. Make sure that this connection is easily accessible.

To connect the EPS-LD to power:

1. Connect the AC input power cord to the AC connector on the EPS-LD.
2. Connect the other end of the AC cord to the electrical outlet.
   a. Make sure the electrical outlet is properly grounded.

      The Power LED on the front of the EPS-LD lights solid green to indicate that it is ready.

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 can 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 4.

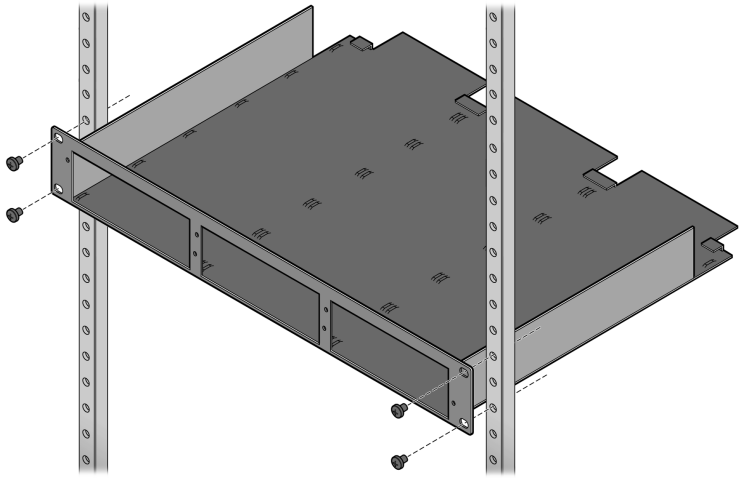


Figure 329: Securing the Three-slot Modular Shelf to a Rack

2. Slide the power supply into an empty bay in the shelf.

   See Figure 330.

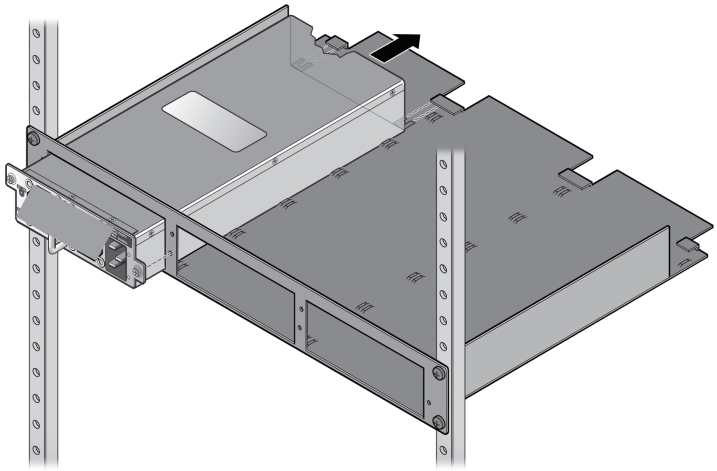


Figure 330: Installing an RPS-150XT Power Supply Unit in a Shelf

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 392.

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 392.

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 331.

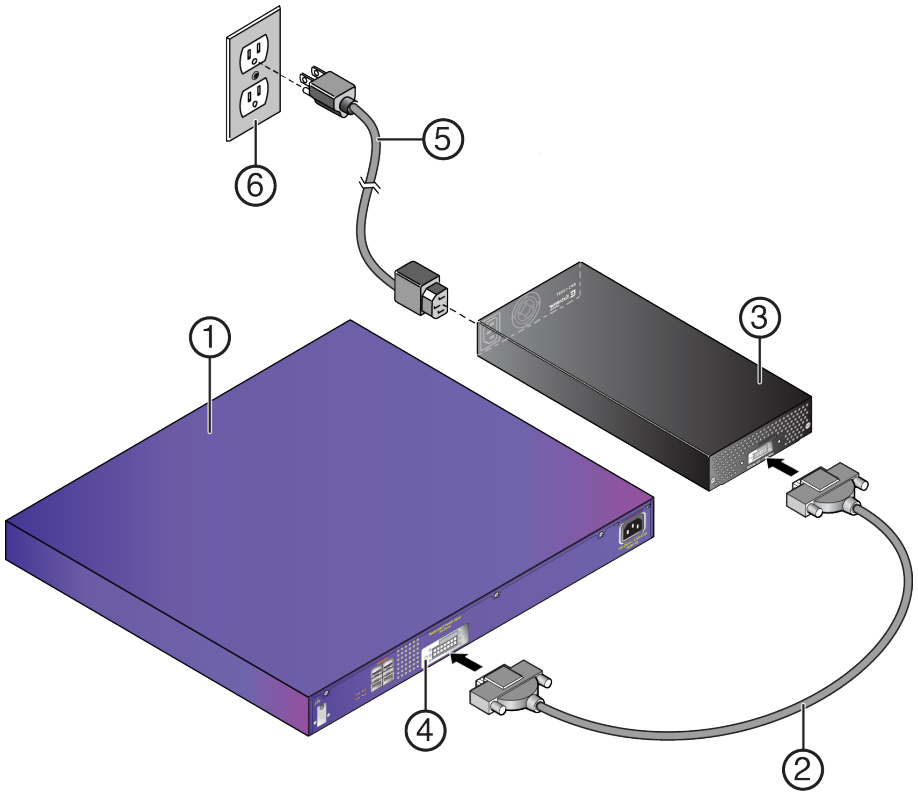


Figure 331: RPS Cable and AC Power Cord Connections for the RPS-150XT

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 can 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 332.

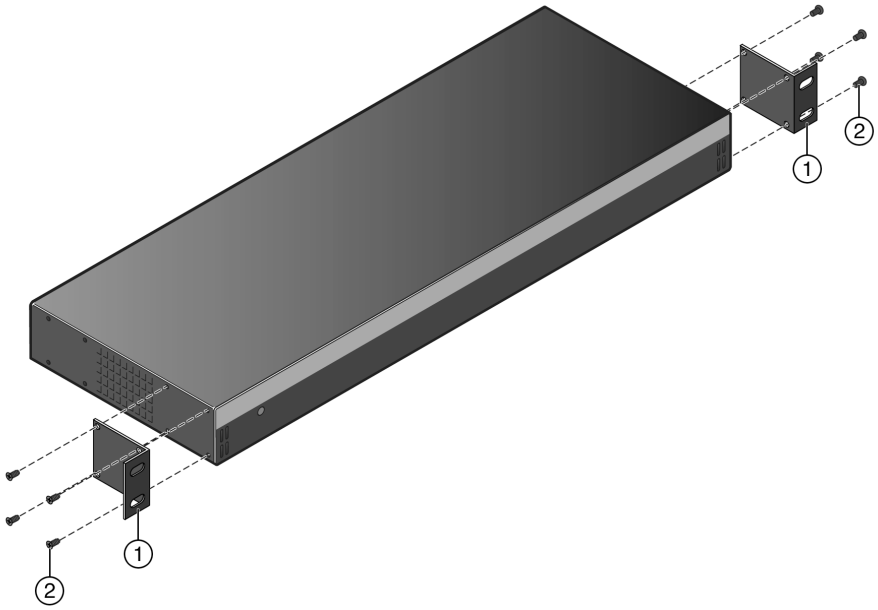


Figure 332: Attaching the Rack-Mounting Brackets

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 333.

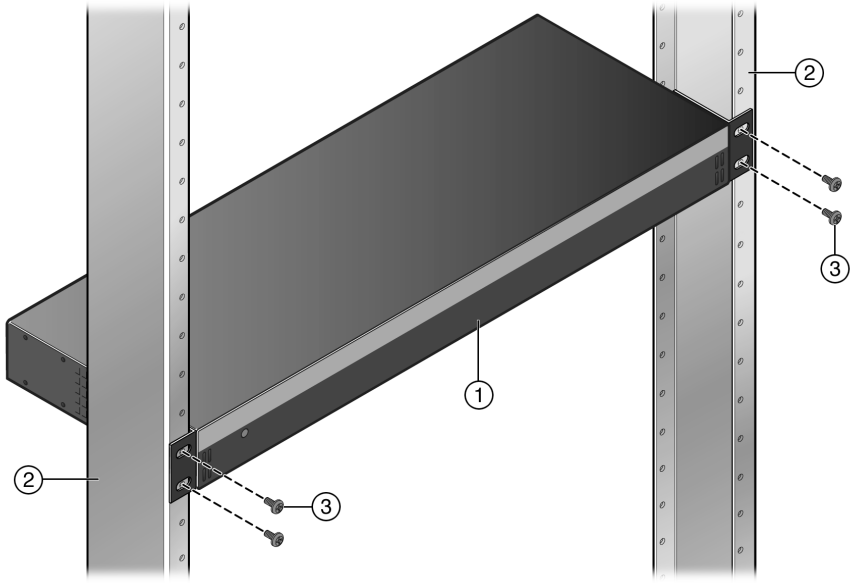


Figure 333: Fastening the RPS-500p to the Rack

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 396.

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 396.

Connecting the RPS Cable and AC Power Cord to an RPS-500p

Important
When performing this task, observe all of the precautions listen in Safety Considerations for Installing Power Supplies on page 362.

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 334.

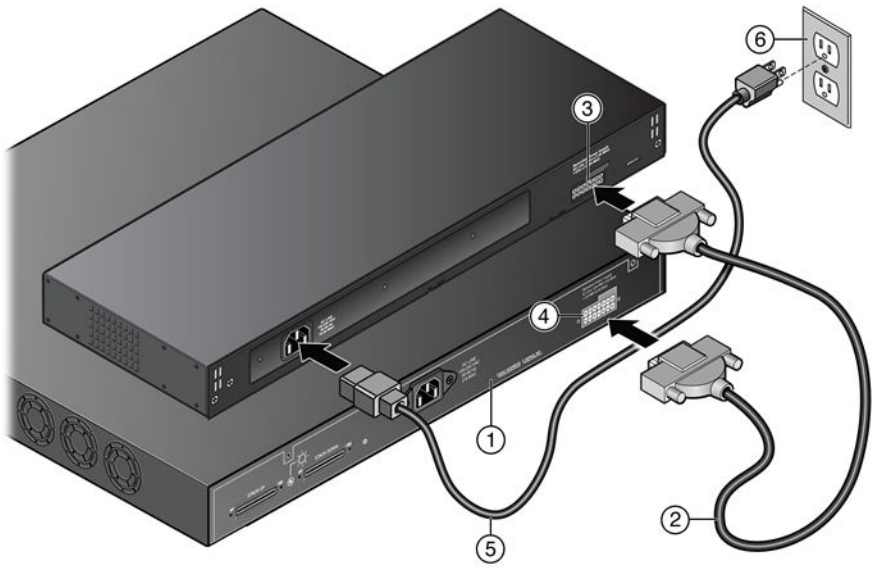


Figure 334: RPS Cable and AC Power Cord Connections for the RPS-500p

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 401.

To install an STK-RPS-150PS in an RPS shelf, see Installing an STK-RPS-150PS in an RPS Shelf on page 398.

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.

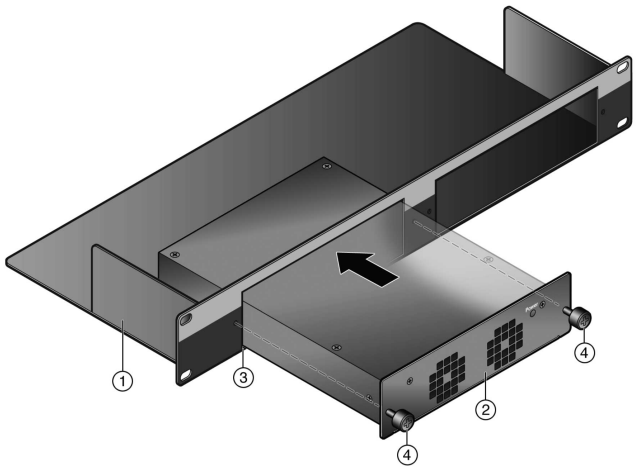


Figure 335: STK-RPS-150PS Installation in an STK-RPS-150CH2 Shelf

1 = STK-RPS-150CH2 shelf	3 = Shelf power supply slot
2 = STK-RPS-150PS power supply	4 = Captive screws (2)

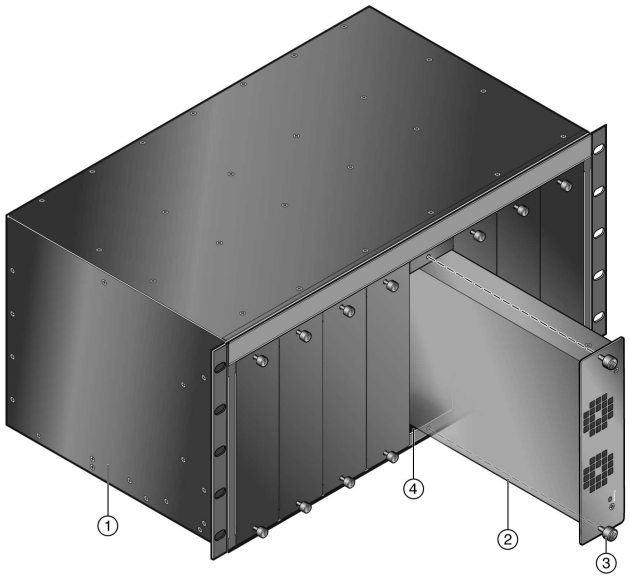


Figure 336: STK-RPS-150PS Installation in an STK-RPS-150CH8 Shelf

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 399.

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 398, 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 400).
3. Connect the RPS cables and AC power cords of the power supplies (Connecting the RPS Cable and AC Power Cord on page 401).

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 629. 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).

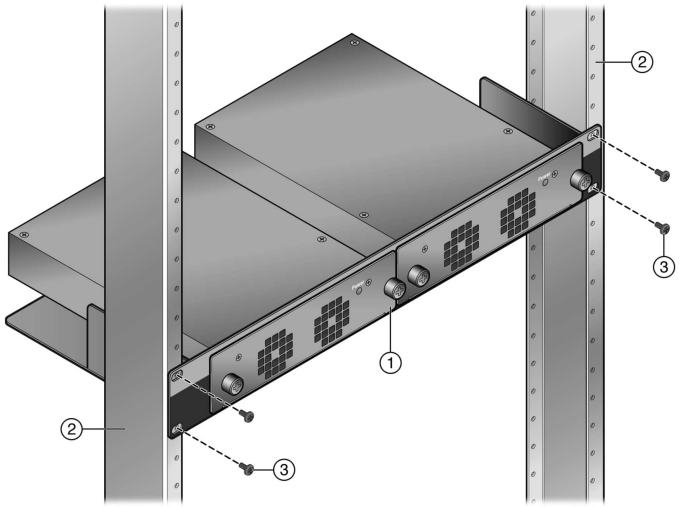


Figure 337: Fastening the STK-RPS-150CH2 to the Rack

1 = STK-RPS-150CH2 shelf	3 = Mounting screws
2 = Rails of rack	

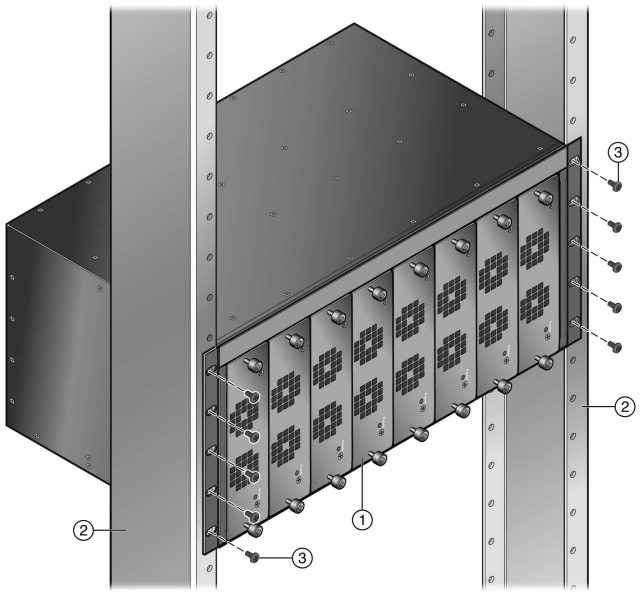


Figure 338: Fastening the STK-RPS-150CH8 to the Rack

1 = STK-RPS-150CH8 shelf	3 = Mounting screws
2 = Rails of rack	

Connecting the RPS Cable and AC Power Cord

Important
When performing this task, observe all of the precautions listen in Safety Considerations for Installing Power Supplies on page 362.

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.

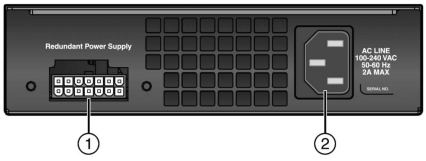


Figure 339: Power Connectors on STK-RPS-150PS (rear view)

1 = Redundant power supply connector	2 = AC power connector

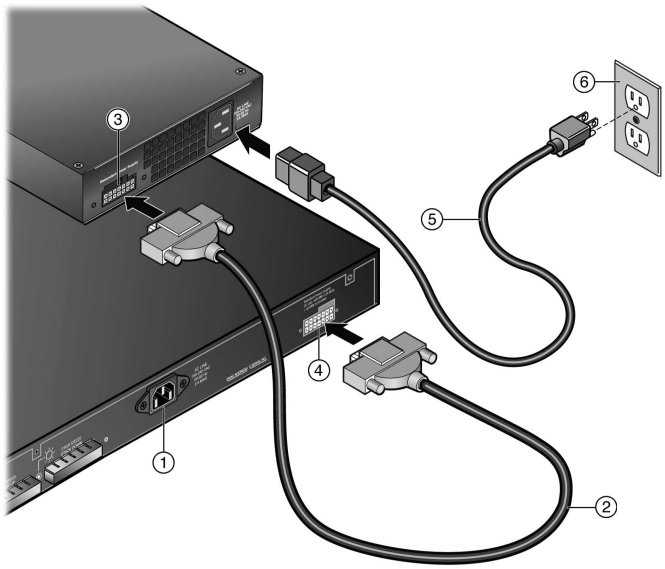


Figure 340: RPS and AC Power Cord Connections

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 can 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 4.

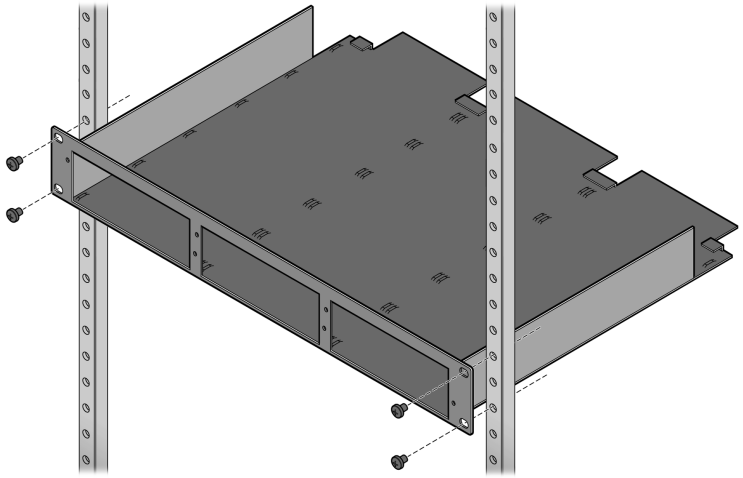


Figure 341: Securing the Three-slot Modular Shelf to a Rack

2. Slide the power supply into an empty bay in the shelf.

   See Figure 342.

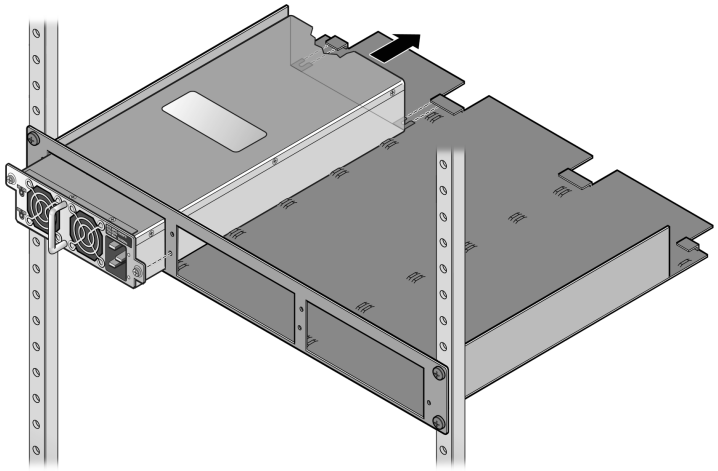


Figure 342: Installing an STK-RPS-1005PS Power Supply Unit in a Shelf

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 405.

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 405.

Connecting the RPS Cable and AC Power Cord to an STK-RPS-1005PS

Important
When performing this task, observe all of the precautions listen in Safety Considerations for Installing Power Supplies on page 362.

The STK-RPS-1005PS RPS (redundant power supply) is connected to the switch using the supplied RPS cable. Use Figure 343 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.

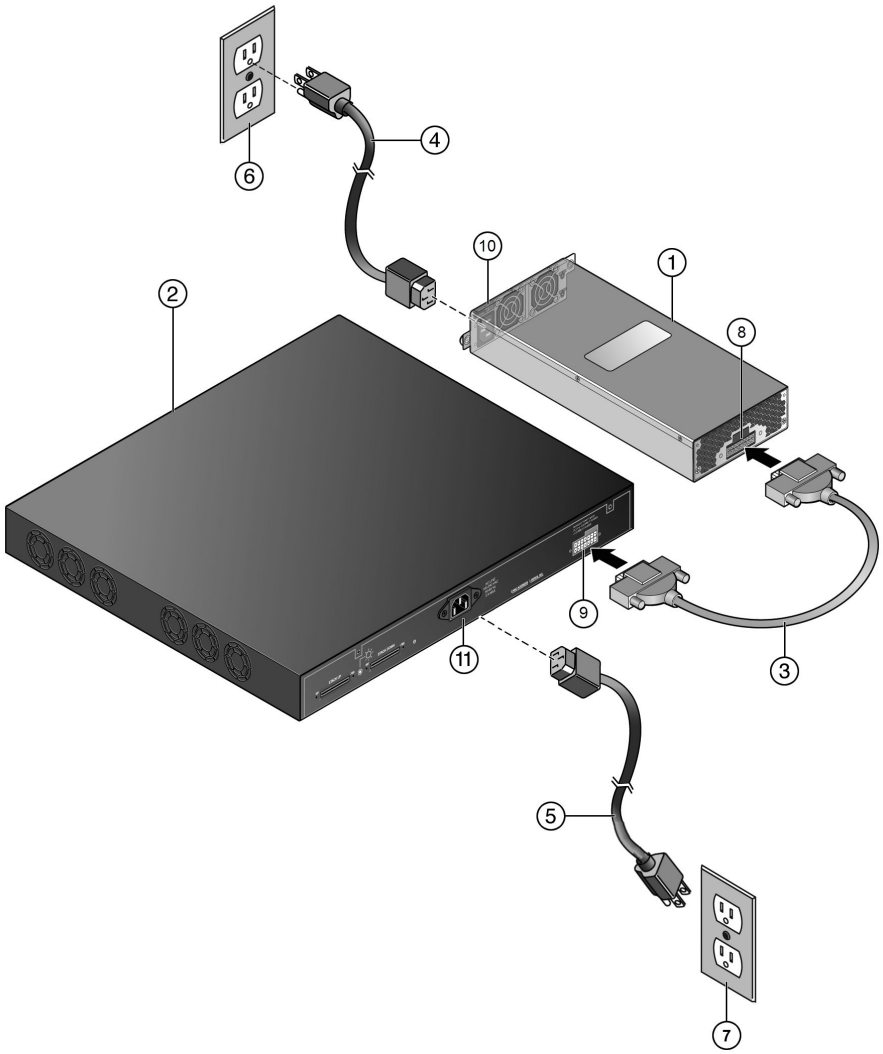


Figure 343: RPS Cable and AC Power Cord Connections for the STK-RPS-1005PS

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 519 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 407
- Installing up to Three VX-RPS-1000 Power Supplies on a Shelf on page 408

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 can 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.

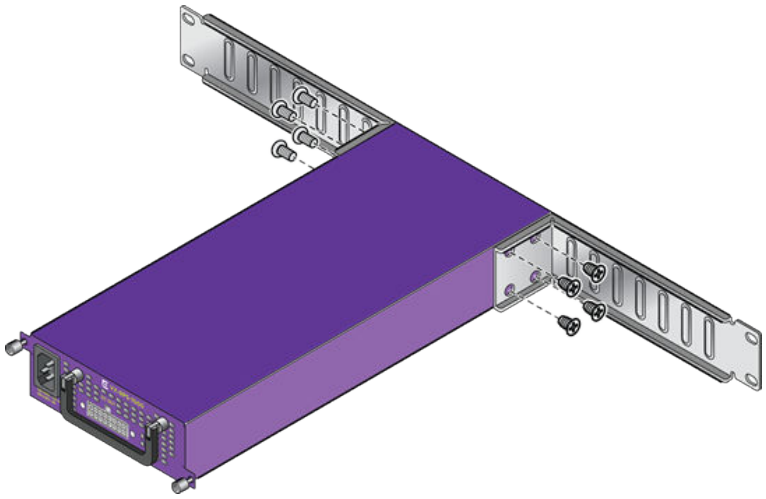


Figure 344: Long Brackets Attached to VX-RPS-1000 Power Supply

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 can 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 345.

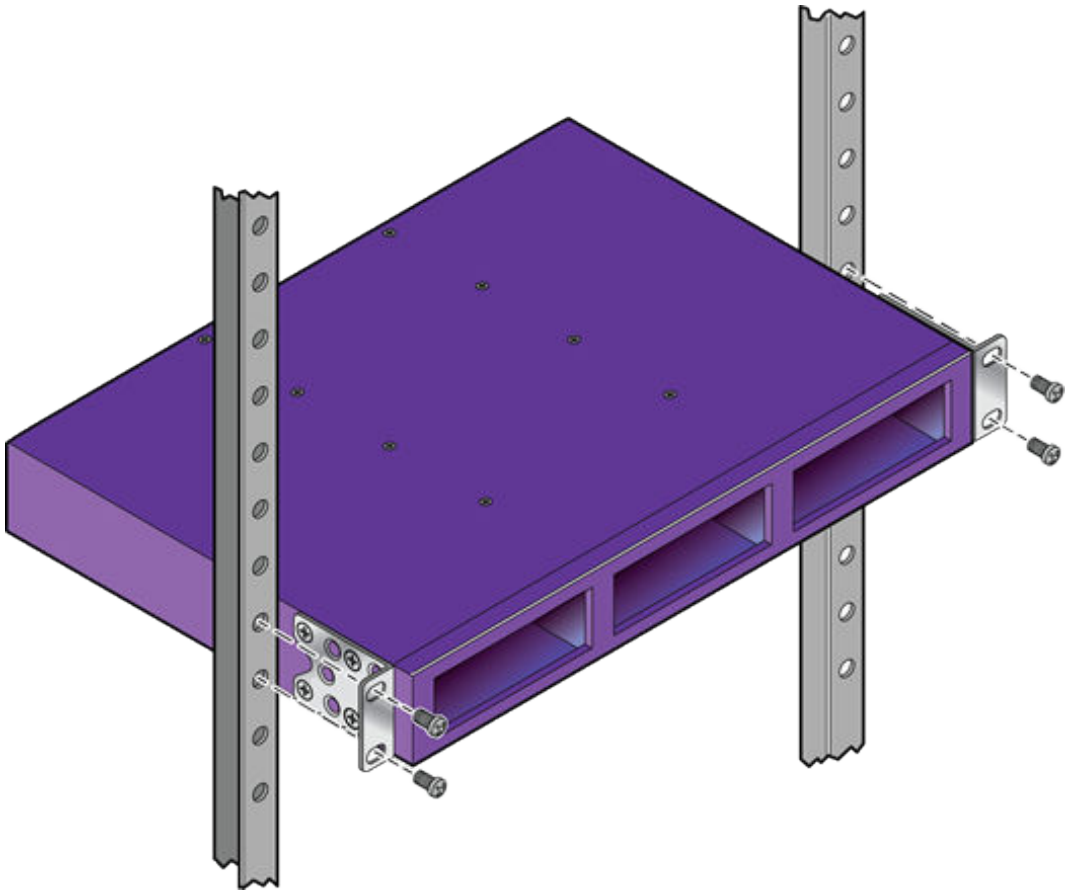


Figure 345: VX-RPS-1000 Shelf Mounted in a Rack

3. Slide a power supply into an empty bay in the shelf, as shown in Figure 346.

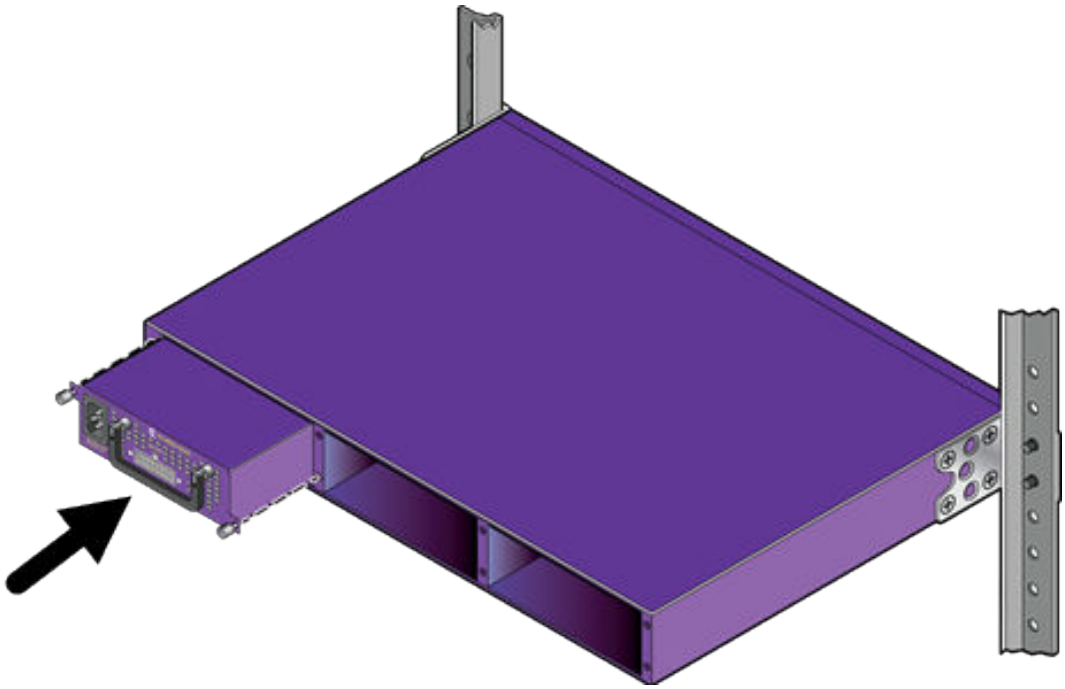


Figure 346: Inserting a VX-RPS-1000 Power Supply into the Shelf

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.

Installing Expansion Modules

This chapter describes how to install expansion modules:

- The V300 Virtual Port Extender
- The V400 Virtual Port Extender
- The LRM/MACsec Adapter
- The Half-Duplex to Full-Duplex Converter
- Port option cards
- Versatile interface modules (VIM/VIM5s)
- Solid-state Drive (SSD) modules

Note
Read the information in this chapter thoroughly before trying 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 V300 Virtual Port Extender

The following installation instructions are applicable to the V300-8P-2T-W (PoE) model. The V300-8P-2X, V300-8T-2X, V300HT-8P-2X, and V300HT-8T-2X models will be referred to as non-PoE models from this point on.

You need the following tools and materials to install a V300 Virtual Port Extender:

- ESD-preventive wrist strap
- M3.5 or M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

The V300 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-mount or mid-mount configuration, in the same way you would mount a switch.

To install a V300 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 on and the connection was made properly.
6. Optionally, connect the port extender to a redundant power source, depending on the model.

The following mounting kits are available for non-PoE V300 models:

Table 164: V300 Mounting Kits

Kit part number	Description
XN-2P-RMTKIT-1CS-001	Single rack mount kit
XN-2P-RMTKIT-2CS-001	Dual rack mount kit
XN-DIN-MT-001	DIN Rail mount kit
XN-MTKIT-CS-001	Replacement surface mount kit
XN-PS-MT-001	PSU mount kit

For additional installation options, including non-PoE V300 Mounting Kit installation, see the following topics:

- Install a V300 Virtual Port Extender on a Wall on page 413
- Install a V300 Virtual Port Extender Under or on a Table Surface on page 416
- Install a V300 Virtual Port Extender in a VESA Mount on page 418
- Install a V300 in a Single Rack Mount on page 420
- Install a V300 in a Dual Rack Mount on page 423
- Install a V300 in a DIN Rail Mount on page 426
- Install a V300-8P-2T-W Model in a Single or Dual Rack Mount on page 429
- Installing a V300-8P-2T-W Model in a DIN Rail Mount on page 430

Install a V300 Virtual Port Extender on a Wall

The following tools and materials are required to install a V300 Virtual Port Extender to a wall:

- ESD-preventive wrist strap
- M3.5 #2 Phillips screwdriver (magnetic screwdriver recommended)
- M4 #2 Phillips screwdriver (magnetic srewdriver recommended) for non-PoE models

Note

The mounting surface, item, and hardware must be able to support the extender in all environmental conditions. The mounting surface must also be flat.

Typical installation for the V300-8P-2T-W model include wall or table installations, in addition to VESA mounting.

There are several orientations for installation on a wall. To install the V300-8P-2T-W model on a wall:

1. Attach the short brackets to both sides of the extender

   The orientation for wall mounting should be front panel facing down.

   Two short brackets attached to the extender by 4 wood screws and 4 anchors, provided in the accessory kit.

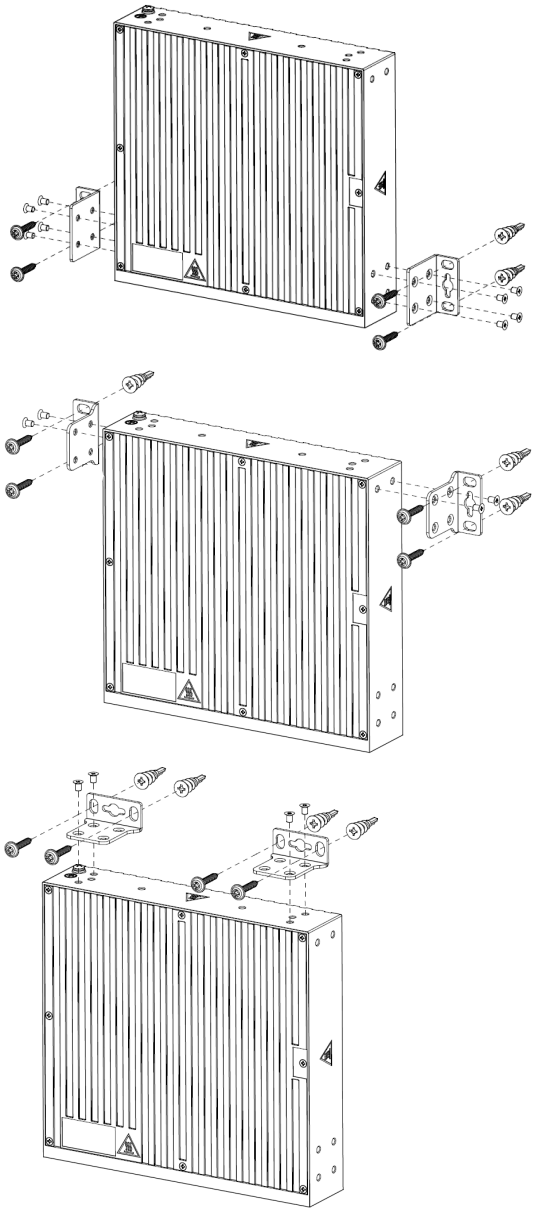


Figure 347: V300-8P-2T-W Wall Mounting

2. Use the optional short bracket as a template and mark the holes to be used. Extreme recommends using 2 holes per short rack ear.

3. For non-PoE models, after attaching the short brackets, attach the PSUs to the PSU mounting brackets using two cable ties.

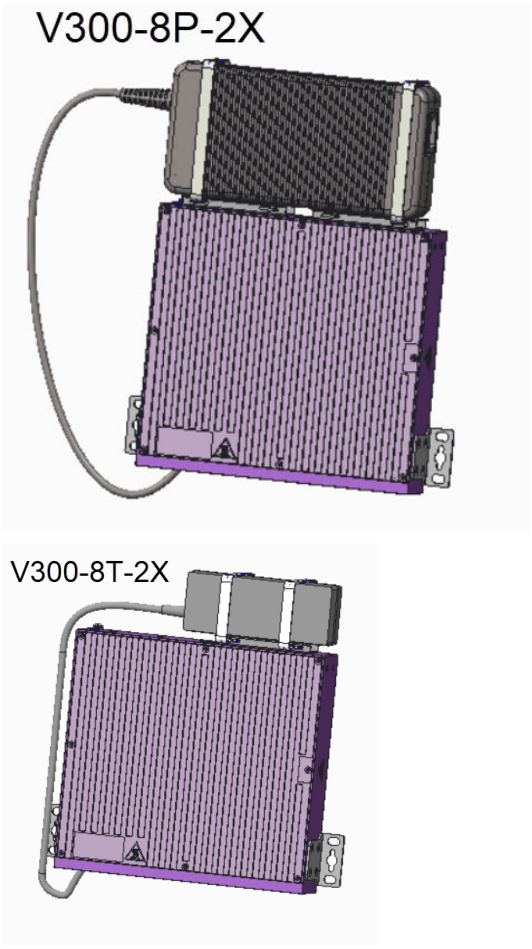


Figure 348: V300-8P/8T-2X Wall Mount with PSU

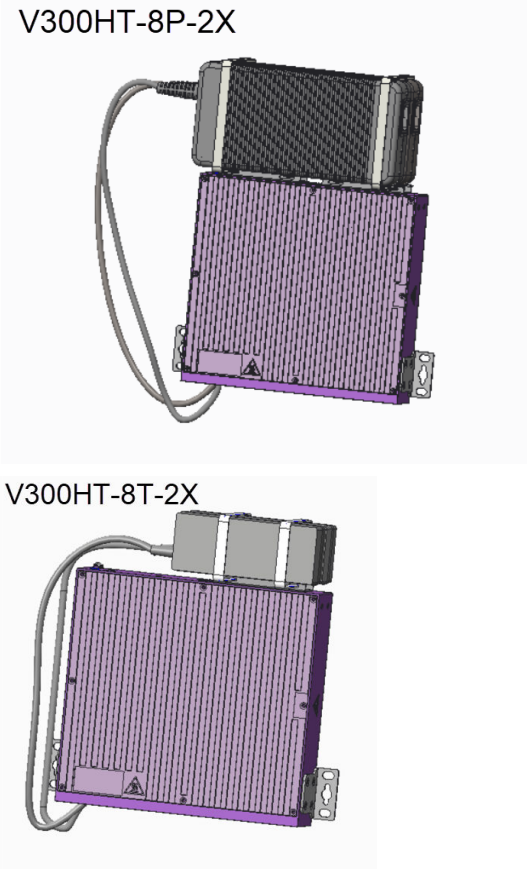


Figure 349: V300HT-8P/8T-2X Wall Mount with PSU

4. Drill the holes and attach the bracket using the provdied woodscrews and anchors.
5. Connect the LAN/Ethernet cables to the extender.
6. When power is connected, verify that the SYS LED on the port extender turns green.

Install a V300 Virtual Port Extender Under or on a Table Surface

The following tools and materials are required to install a V300 Virtual Port Extender under a table:

- ESD-preventive wrist strap
- M3.5 #2 Phillips screwdriver (magnetic screwdriver recommended) for PoE model
- M4 #2 Phillips screwdriver (magnetic srewdriver recommended) for non-PoE models

Typical installation for the V300-8P-2T-W model include wall or table installations, in addition to VESA mounting.

For table surface or other flat surface installation, attach the rubber feet to the underside of the virtual port extender, then place the device to the table or flat surface:

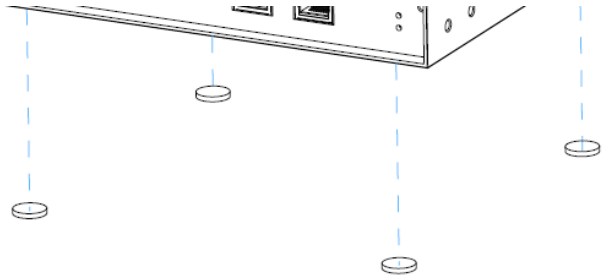


Figure 350: Table Surface Mounting

There are several orientations for installtion under a table. To install a V300-8P-2T-W model under a table:

1. Attach the short mounting brackets (included in kit) to the sides of the port extender using four screws (included) for each bracket.

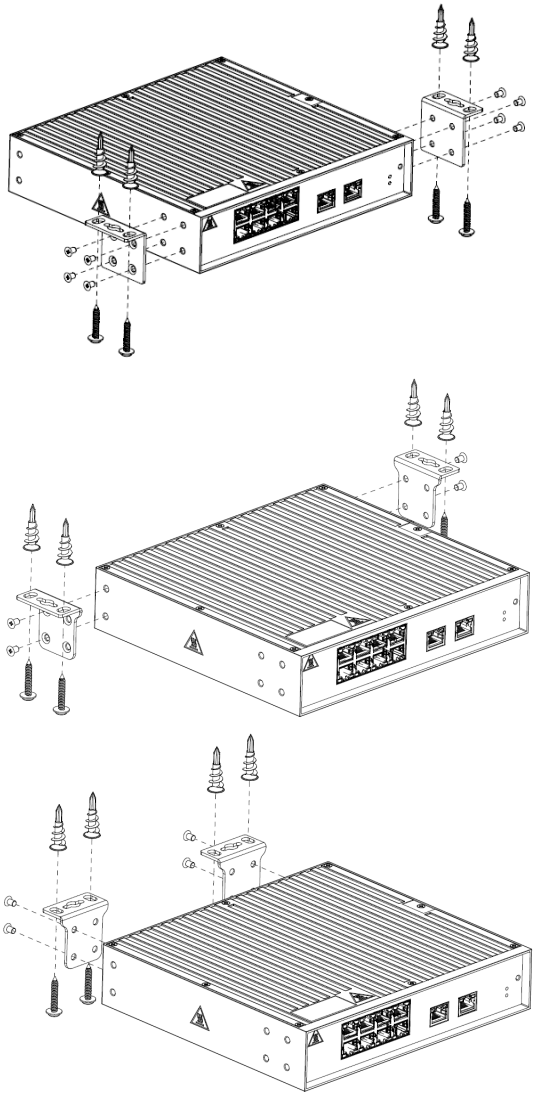


Figure 351: Under Table Mounting

2. For non-PoE models, after attaching short brackets and PSU bracket to the V300, attach the PSU(s) to the PSU mounting bracket using two cable ties:

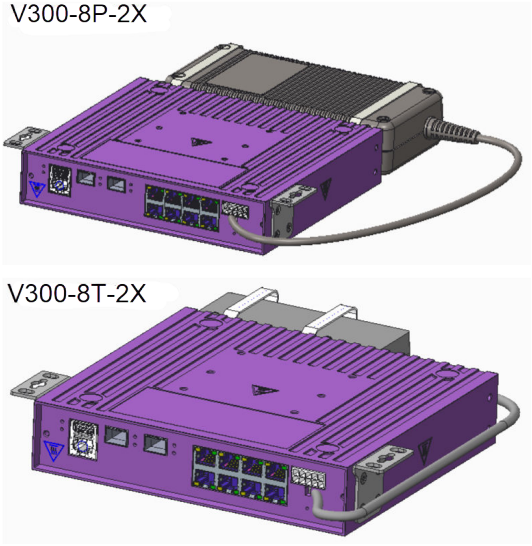


Figure 352: V300-8P/8T-2X Under Table Mounting with PSU

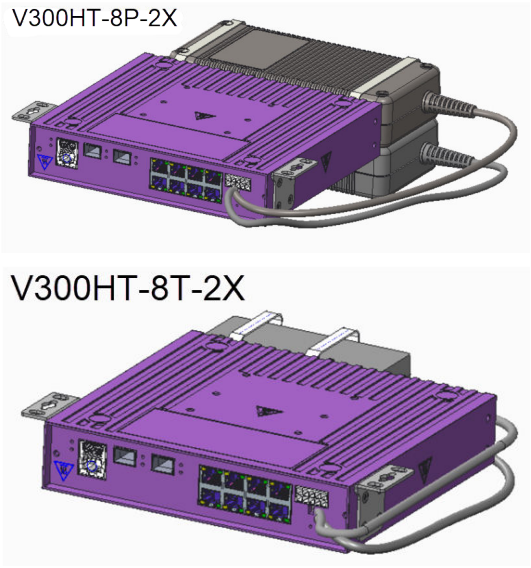


Figure 353: V300HT-8P/8T-2X Under Table Mounting with PSU

3. Secure the port extender to to the underside of the table using the provided 4 wood screws and 4 anchors.
4. When power is connected, verify that the SYS LED on the port extender turns green.

Install a V300 Virtual Port Extender in a VESA Mount

The following tools and materials are required to install a V300 Virtual Port Extender with a VESA mount:

- ESD-preventive wrist strap

- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

The VESA mount comes with 4 screws and should be used when mounting the V300 Virtual Port Extender to a VESA mount for 75mm x 75mm or 35mm x 75mm mounting dimensions. To install a V300 Virtual Port Extender in a VESA Mount:

1. Attach the VESA mount to the underside of the port extender using four screws (included):

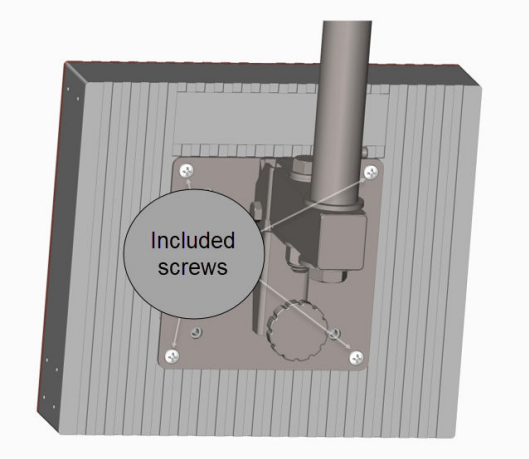


Figure 354: VESA Mounting

2. For non-PoE models, after attaching the PSU bracket to the V300, attach the PSU(s) to the PSU mounting brackets using two cable ties:

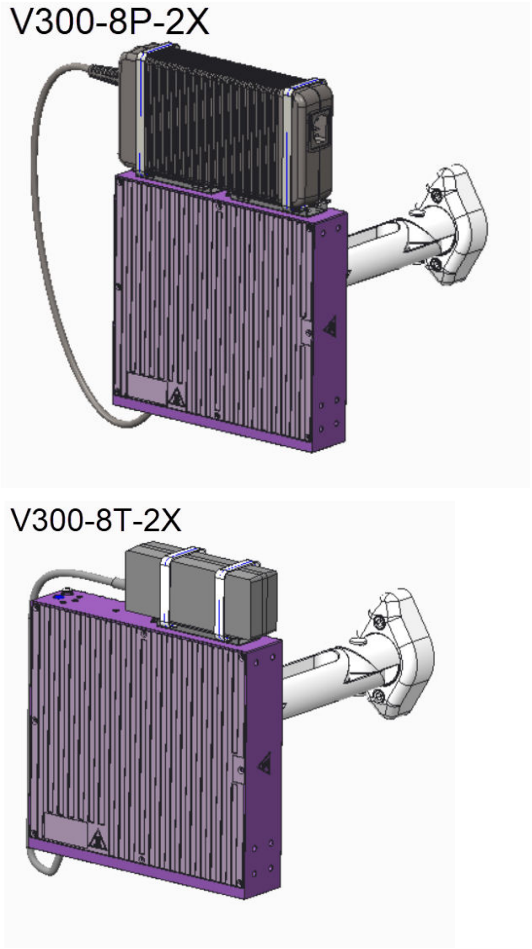


Figure 355: V300-8P/8T-2X VESA Mounting with PSU

3. Connect the LAN/Ethernet cables to the extender.
4. When power is connected, verify that the SYS LED on the port extender turns green.

Install a V300 in a Single Rack Mount

The following tools and materials are required to install a non-PoE V300 Virtual Port Extender to a single rack mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)
- XN-2P-RMTKIT-1CS-001 - Single rack mount kit

1. Remove all contents of the single rack mount kit (XN-2P-RMTKIT-1CS-001).
2. Attach the short and long ear brackets to the V300 using the screws provided.
3. Secure the bracket flanges to the rack using the customer-provided screws appropriate for the rack you are using.

4. After attaching the PSU bracket to the V300, attach the PSU to the PSU mounting brackets using two or four cable ties:

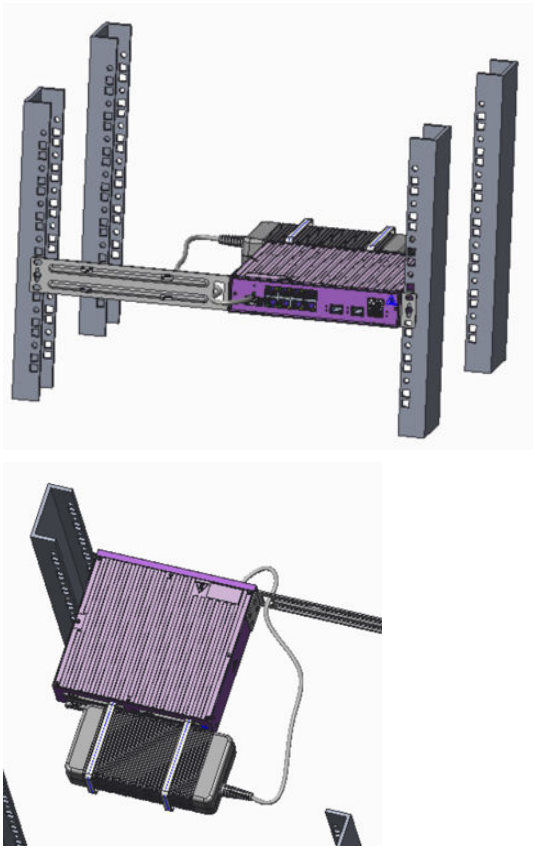


Figure 356: V300-8P-2X Single Rack Mounting with PSU

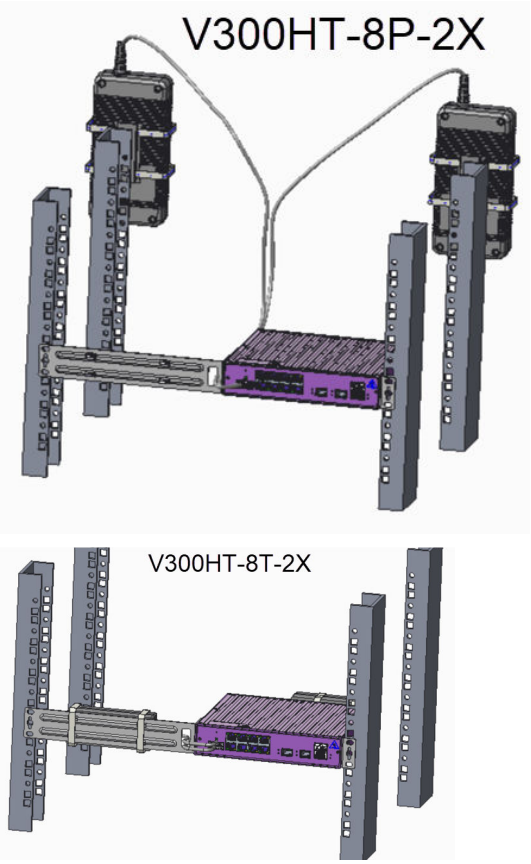


Figure 357: V300HT-8P/8T-2X Single Rack Mounting with PSUs

5. For a more secure attachment, attach the two PSU mounting brackets to the rack using customer-provided screws:

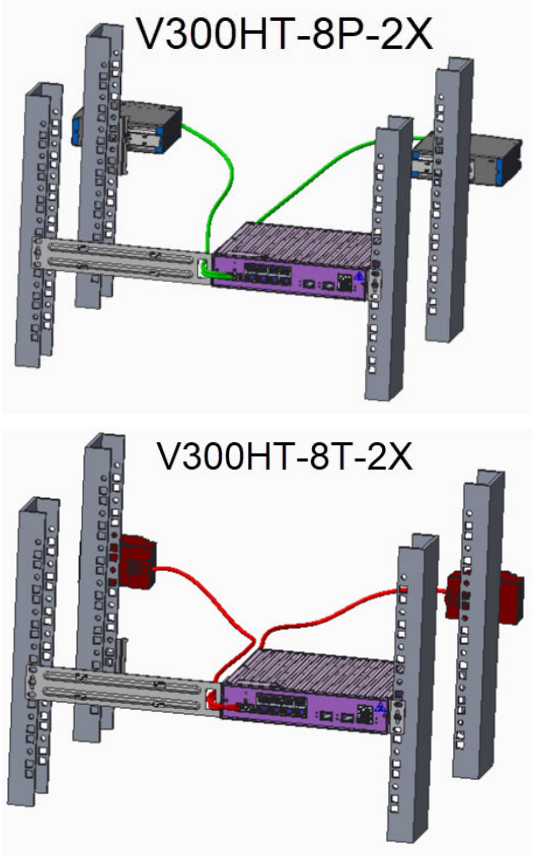


Figure 358: V300HT-8P/8T-2X Single Rack Mounting with DIN Rail and PSUs

6. Alternatively, the PSU can be mounted to the long rack ear using cable ties.

Install a V300 in a Dual Rack Mount

The following tools and materials are required to install a non-PoE V300 Virtual Port Extender to a dual rack mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)
- XN-2P-RMTKIT-2CS-001 - Dual rack mount kit

1. Remove all contents of the dual rack mount kit (XN-2P-RMTKIT-2CS-001).
2. Attach one short ear bracket to the outer side of each V300 using the screws provided.
3. Attach the joint brackets to the inward side of each V300 (one with tapped screw holes facing forward, one facing rearward, using the screws provided).
4. Attach the two joint brackets together using the screws provided.

5. After attaching the PSU bracket to the V300 using the provided screws, attach the PSU to the PSU mounting brackets using two, four, or eight cable ties:

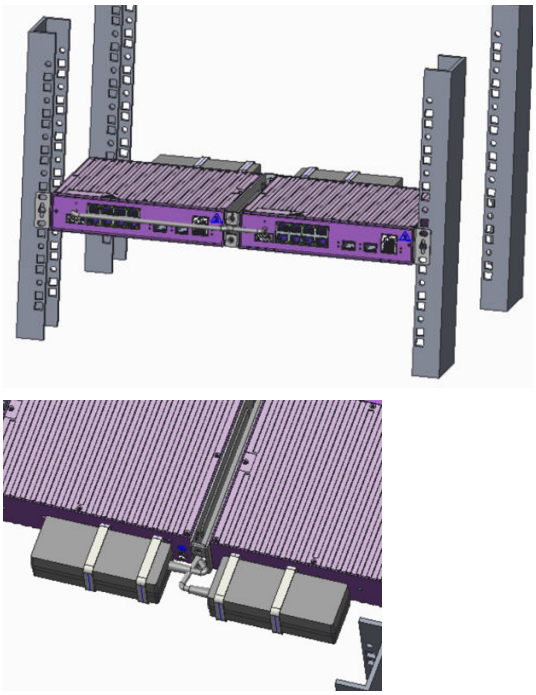


Figure 359: V300-8T-2X Dual Rack Mounting with PSU

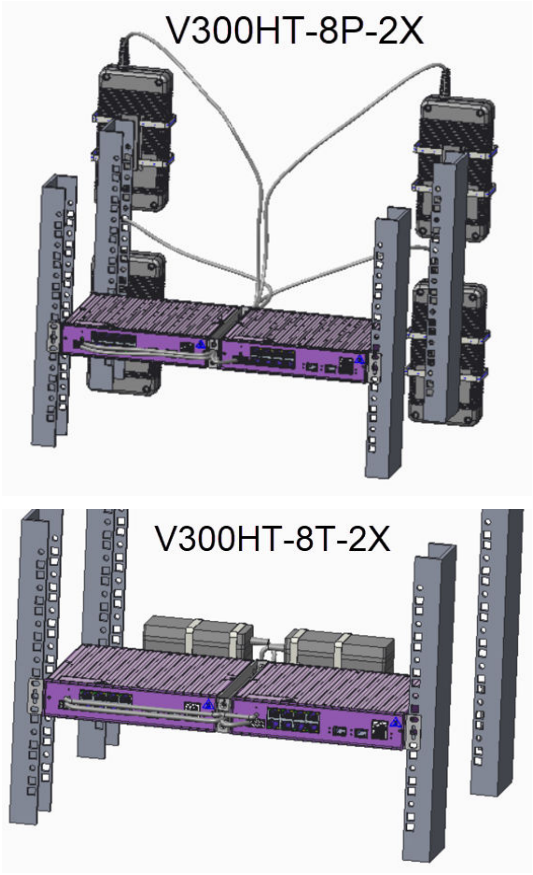


Figure 360: V300HT-8P/8T Dual Rack Mounting with PSUs

6. For a more secure attachment, attach the PSU mounting brackets to the rack using customer-provided screws:

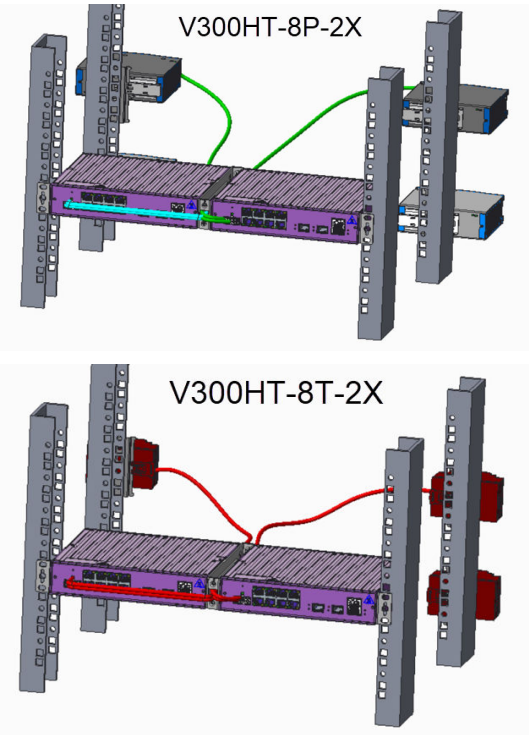


Figure 361: V300HT-8P/8T Dual Rack Mounting with DIN Rail and PSUs

Install a V300 in a DIN Rail Mount

The following tools and materials are required to install a non-PoE V300 Virtual Port Extender to a DIN Rail mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)
- XN-DIN-MT-001 - DIN Rail mount kit

For PSU XN-ACPWR-320W-HT or XN-ACPWR-40W-HT:

1. Remove all contents of the DIN Rail mount kit (XN-DIN-MT-001).
2. Attach the port extender to the DIN Rail using one DIN bracket and the screws provided.

3. Attach the PSUs to the DIN bracket using cable ties, and then attach the bracket to the DIN Rail:

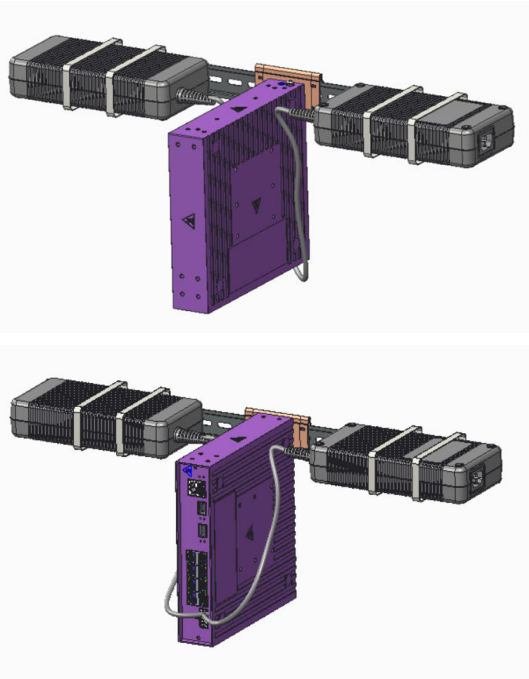


Figure 362: V300HT-8P-2X DIN Rail Mount with dual XN-ACPWR-320W-HT PSUs

4. For PSU 16807, attach the port extender to the DIN Rail using one DIN bracket and the screws provided.

5. Attach the PSUs directly to the DIN rail:

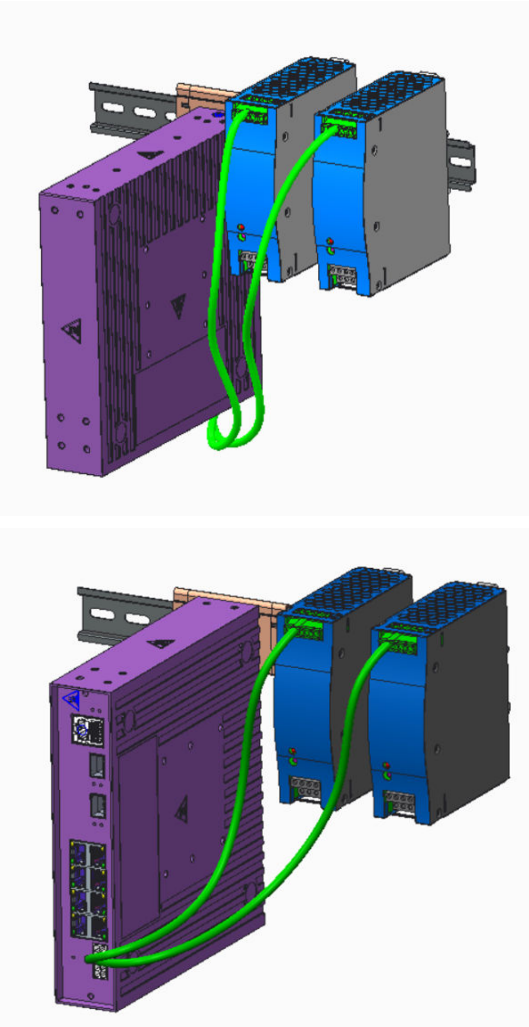


Figure 363: V300HT-8P-2X DIN Rail Mount with dual 16807 PSUs

6. For XN-ACPWR-60W-HT-DIN, attach the port extender to the DIN Rail using one DIN bracket and the screws provided.

7. Attach the PSUs directly to the DIN rail:

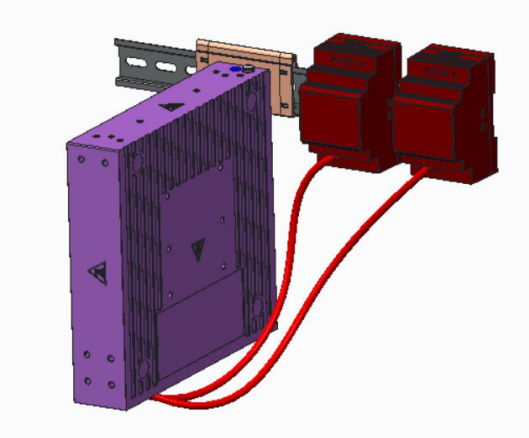


Figure 364: V300HT-8T-2X DIN Rail Mount with dual XN-ACPWR-60W-HT-DIN PSUs

Install a V300-8P-2T-W Model in a Single or Dual Rack Mount

You need the following tools and materials to install a V300-8P-2T-W model to a rack mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

Typical installation for the V300-8P-2T-W model include wall or table installations, in addition to VESA mounting. In order to rack-mount this model, an accessory mountin kit is required.

To install the V300-8P-2T-W model in a single or dual rack mount kit:

1. Remove all contents of the single rack mount kit (XN-1S-RKMT-V300) or dual rack mount kit (XN-2S-RKMT-V300).
2. Attach the short mounting brackets (included) to the sides of the port extender using the four screws (included) for each bracket.

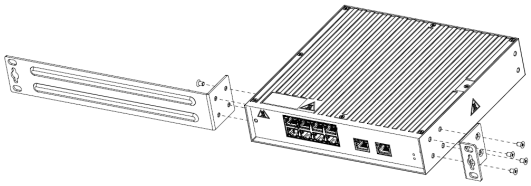


Figure 365: Single Rack Mounting

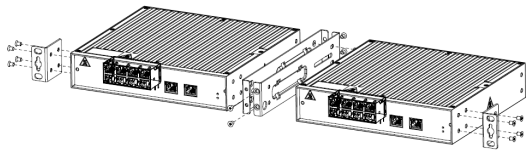


Figure 366: Dual Rack Mounting

3. Align the holes in the brackets with the rack post holes.

4. Secure the port extender to each post with rack-mounting screws (not provided).
5. Connect the LAN/Ethernet cables to the extender.
6. When power is connected, verify that the SYS LED on the port extender turns green.

Installing a V300-8P-2T-W Model in a DIN Rail Mount

You need the following tools and materials to install a V300 Virtual Port Extender to a DIN Rail mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

There are two DIN Rail mounting options. To install a V300-8P-2T-W model in a DIN Rail Mount:

1. Remove all contents of the DIN Rail Mount Kit (XN-DIN-MT-V300).
2. For option 1, attach the DIN mounting bracket to the rear of the port extender using the two screws (included) for each bracket:

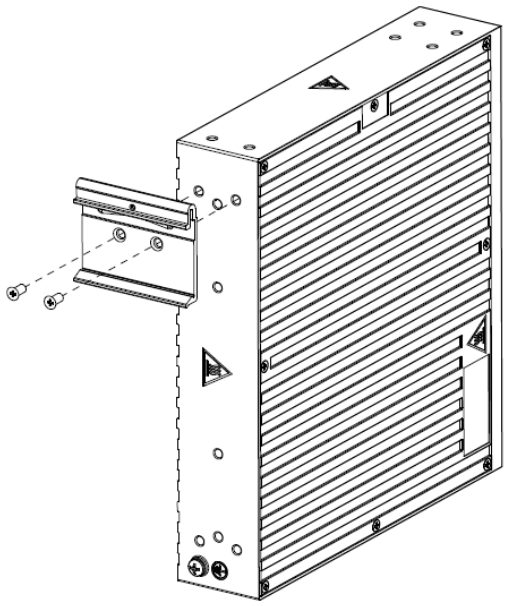


Figure 367: DIN Rail Mounting Option 1: Attach the Bracket

3. Align the DIN bracket with the DIN rail and attach the port extender:

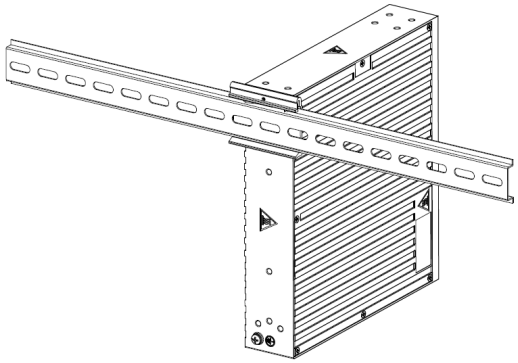


Figure 368: DIN Rail Mounting Option 1: Secure the Port Extender

4. For option 2, attach the DIN mounting bracket to the side panel of the port extender:

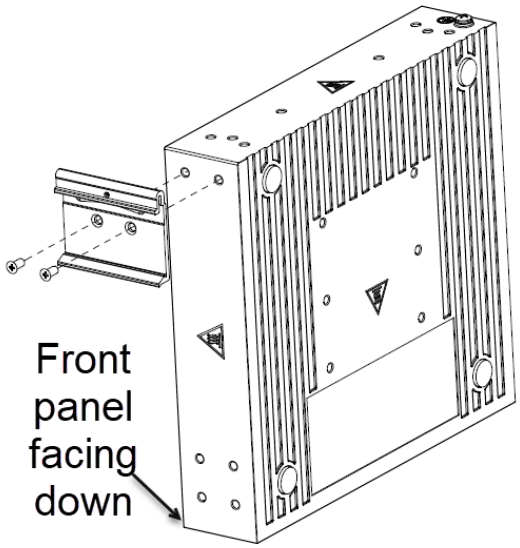


Figure 369: Din Rail Mounting Option 2: Attach the Bracket

5. Align the DIN bracket with the DIN rail and attach the port extender:

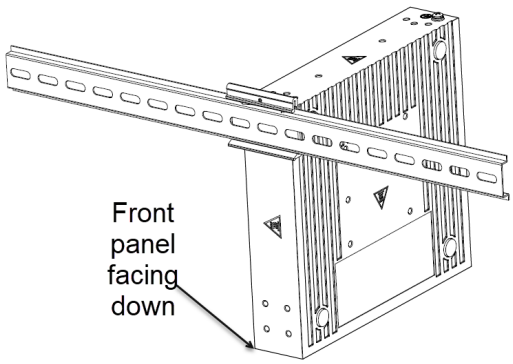


Figure 370: DIN Rail Mounting Option 2: Secure the Port Extender

6. When power is connected, verify that the SYS LED on the port extender turns green.

Connecting the V300 Virtual Port Extender to Power

V300-8P-2W and V300-8T-2W models run on AC power with included power supply unit(s).

V300HT-8P-2W and V300HT-8T-2W models can run on redundant power supplies (RPS). HT model power supplies are sold separately.

See the following topics to connect non-PoE V300 models to power:

- Connect the V300 to a Primary Power Source on page 432
- Connect the V300 to a Redundant Power Source on page 432

Connect the V300 to a Primary Power Source

Note
Installing the system as described in this guide meets the protective earth grounding requirements of the National Electrical Code (NEC) UL 60950 and IEC 60950 standards. However, in some cases, it may be necessary to use an alternative grounding method. In these cases, a 14 AWG wire can be connected between the grounding lug on the chassis and a nearby building ground point.

To attach the V300 switch to a power source, do the following:

1. Connect the PSU to the V300 with the integrated power cable.
2. Connect the AC power cord to the AC power input socket on the power supply and plug the other end into an AC power outlet.

   To attach the V300HT model to a primary power source, do the following:
3. Connect the PSU to the included screw terminal connector (use adequate AWG wire for DIN PSUs).
4. Plug the screw terminal connector into the port extender DC input (PSU1 recommended).
5. Connect the:
   - AC power cord to the AC power input socket on the PSU and plug the other end into an AC power outlet for non-DIN PSUs; or
   - PSU to an AC power source using the instructions included with the PSU for DIN PSUs.

When power is connected, verify that the PWR LED on the switch turns green. If the PWR LED does not turn green, verify that the power source is powered on and the connection was made properly.

Connect the V300 to a Redundant Power Source

Note
Installing the system as described in this guide meets the protective earth grounding requirements of the National Electrical Code (NEC) UL 60950 and IEC 60950 standards. However, in some cases, it may be necessary to use an alternative grounding method. In these cases, a 14 AWG wire can be connected between the grounding lug on the chassis and a nearby building ground point.

To attach the V300 switch to a redundant power source (HT models only), do the following:

1. Connect the RPS to the included screw terminal connector (use adequate AWG wire for DIN PSUs).
2. Plug the screw terminal connector into the port extender DC input (PSU2 recommended).
3. Connect the:
   - AC power cord to the AC power input socket on the PSU and plug the other end into an AC power outlet for non-DIN PSUs; or
   - PSU to an AC power source using the instructions included with the PSU for DIN PSUs.

When power is connected, verify that the PWR LED on the switch turns green. If the PWR LED does not turn green, verify that the power source is powered on and the connection was made properly.

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.
6. Optionally, connect the port extender to a redundant power source.

   PoE models (V400-24p-10GE2 and V400-48p-10GE4) can be connected to the VX-RPS-1000 redundant power supply, using an AC power cord. For information about installing the VX-RPS-1000 unit, see Installing a VX-RPS-1000 Redundant Power Supply on page 407.

Installing an LRM/MACsec Adapter

The three options for attaching the LRM/MACsec Adapter to a standard equipment rack are shown in Figure 371 on page 434.

Before installing the LRM/MACsec Adapter, refer to Maximum Capacity for Using the LRM/MACsec Adapter with Supported Switch Models on page 203 to understand the requirements for connecting the adapter to your host switch.

See the following sections for installation instructions.

1. Attaching the adapter to the rack so that it is oriented horizontally.

   See Installing an LRM/MACsec Adapter Horizontally on page 434.
2. Attaching up to five adapters to the five-slot mounting bracket (part no. 10966).

   See Installing LRM/MACsec Adapters in the Five-Slot Bracket on page 435.
3. Attaching the adapter to the rack so that it is oriented vertically.

   See Installing an LRM/MACsec Adapter Vertically on page 436.

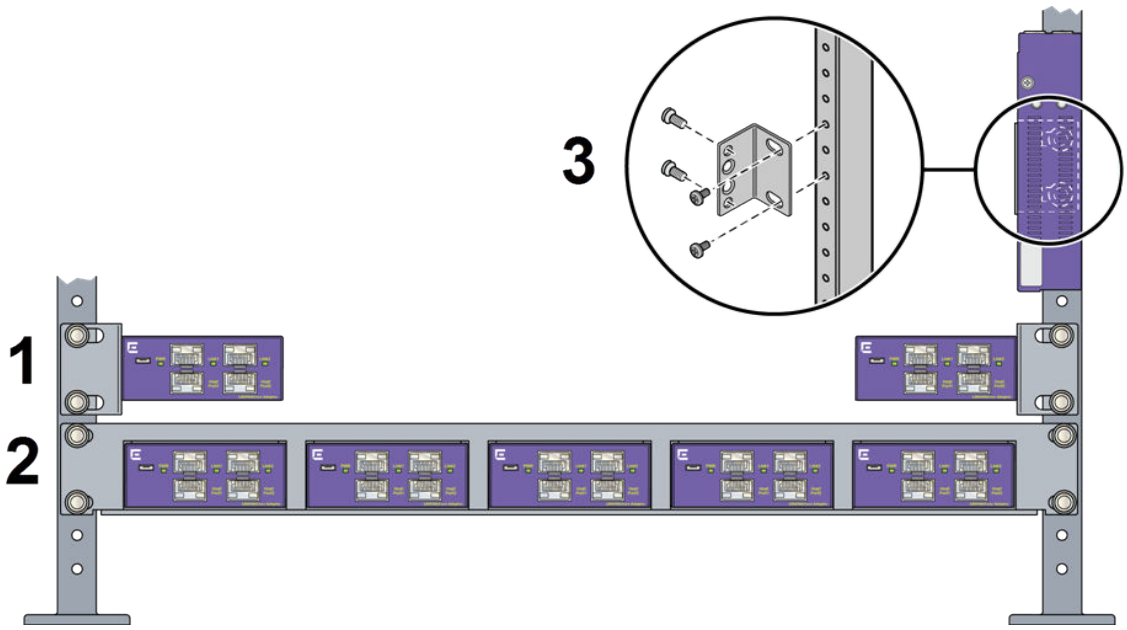


Figure 371: Three Ways to Install the LRM/MAC Adapter

Note
The LRM/MACsec Adapter is hot-swappable.

Installing an LRM/MACsec Adapter Horizontally

Refer to Installing an LRM/MACsec Adapter on page 433 for installation options for the LRM/MACsec Adapter.

To install an LRM/MACsec Adapter horizontally in an equipment rack, follow these steps:

1. Using two small M 4 x 6.5 mm screws (included), attach the bracket to the holes in one side of the adapter so that the mounting ear extends away from the adapter.
   Figure 372 shows the bracket attached to the adapter.

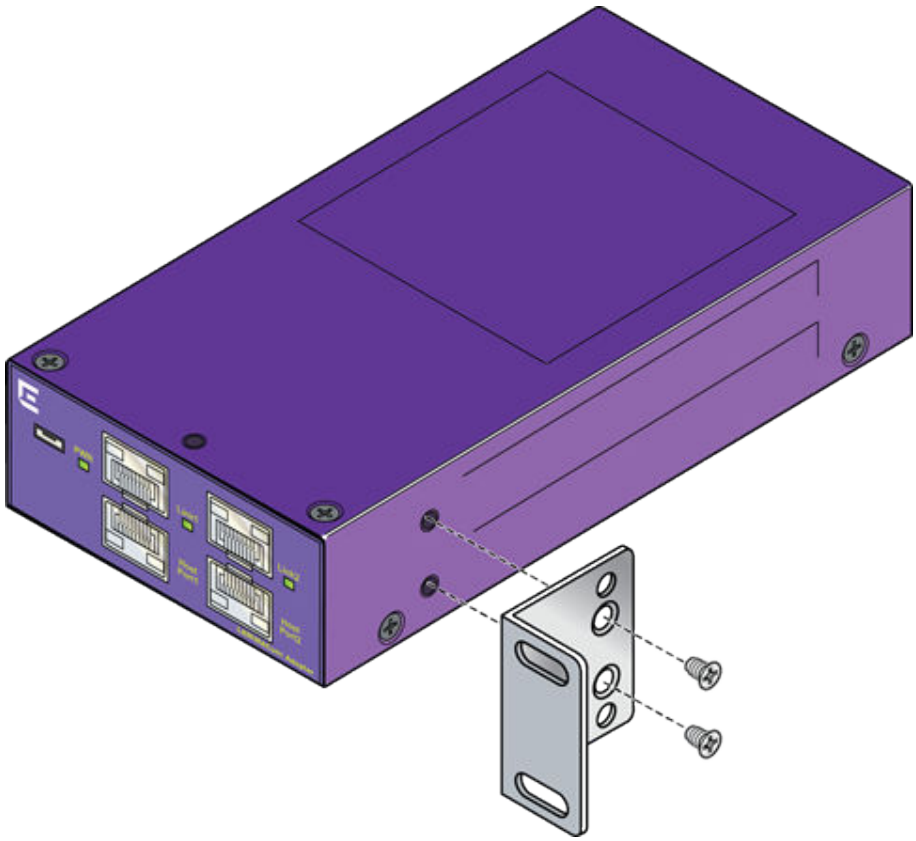


Figure 372: Attaching the Mounting Bracket to the LRM/MACsec Adapter

2. Using two rack mounting screws (not included) attach the mounting ear to the rack.
   The adapter ports should face toward the front.
3. Connect the adapter to the switch, following the instructions in Connecting the LRM/MACsec Adapter to the Host Switch and to Power on page 436.

Installing LRM/MACsec Adapters in the Five-Slot Bracket

Refer to Installing an LRM/MACsec Adapter on page 433 for installation options for the LRM/MACsec Adapter.

To install up to five LRM/MACsec Adapter units in the five-slot bracket (part no. 10966), follow these steps:

1. Using standard rack mounting screws (not included), secure the bracket to the rack.
2. Set an LRM/MACsec Adapter in one of the bracket slots.
3. Secure the adapter to the bracket using one of the M4 x 6.5 mm screws provided with the bracket.
4. Mount up to four additional LRM/MACsec Adapter units on the bracket, as described in steps 2 and 3.

5. Connect the adapters to the switch, following the instructions in Connecting the LRM/MACsec Adapter to the Host Switch and to Power on page 436.

Installing an LRM/MACsec Adapter Vertically

Refer to Installing an LRM/MACsec Adapter on page 433 for installation options for the LRM/MACsec Adapter.

To install an LRM/MACsec Adapter vertically in an equipment rack, follow these steps:

1. Using two rack mounting screws (not included), attach the vertical mounting bracket to the rack so that the mounting ear extends outward from the front of the rack.
2. Using two small M4 x 6.5 mm screws (included), attach the bracket to the holes in the bottom of the adapter.

   The adapter ports can face upward or downward as needed.
3. Connect the adapter to the switch, following the instructions in Connecting the LRM/MACsec Adapter to the Host Switch and to Power on page 436.

Connecting the LRM/MACsec Adapter to the Host Switch and to Power

Before connecting the LRM/MACsec Adapter to the host switch, install it in the equipment rack using one of the options described in Installing an LRM/MACsec Adapter on page 433.

The LRM/MACsec Adapter connects to two ports the host switch, providing LRM and/or MACsec functionality for those ports. The adapter also draws power from the host switch.

Caution

Connect the adapter to the host switch using only the SFP cable that is provided for this purpose. The use of other cables can damage the equipment.

To connect an LRM/MACsec Adapter to its host switch, follow these steps:

1. Insert one of the 50 cm SFP cables, included with the adapter, into Host Port1 on the front of the LRM/MACsec Adapter.

   This SFP cable is provided especially for use with the LRM/MACsec Adapter, and is labeled as such. It is not a standard SFP cable.
2. Insert the other end of the cable into an SFP port on the switch.
3. Repeat steps 1 and 2 to connect Host Port2 to the switch.

   Both Host Port1 and Host Port2 must be connected to the same host switch.
4. If additional power is needed, attach a USB cable to the adapter's USB connector and to a power source.

   The LRM/MACsec Adapter receives power through its connection to the host switch's SFP port. Additional power is supplied through a USB cable that connects the adapter to a power source. The USB cable is required for MACsec connections. It is optional for LRM-only connections.
5. When the LRM/MACsec Adapter is connected to the host switch, verify that the adapter's power LED turns on.

   If the power LED does not turn on, recheck the connections from the adapter to the switch and to the optional power source.

Refer to the Security chapter in the *ExtremeXOS 16.2 User Guide* for information about configuring the host switch to work with the LRM/MACsec Adapter.

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 437.
2. On a flat surface.

   See Mounting a Half-Duplex to Full-Duplex Converter on a Flat Surface on page 437.
3. On a wall.

   See Mounting a Half-Duplex to Full-Duplex Converter on a Wall on page 438.

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 437 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 438.
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 437 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 437 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 438.
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 437 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 438.
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 437.

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 373.

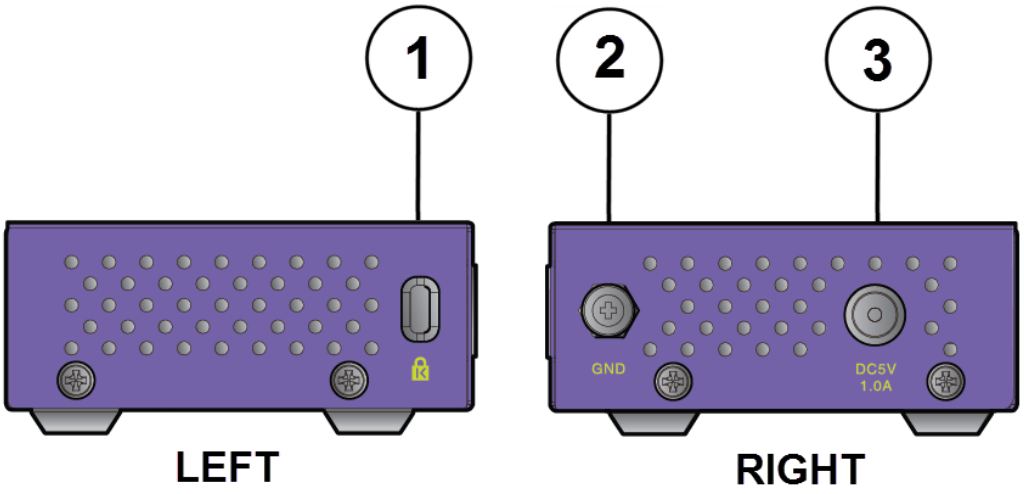


Figure 373: Half-Duplex to Full-Duplex Converter: Side Panels

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 Summit Port Option Card

You need the following tools and equipment to install a Summit option card:

- ESD-preventive wrist strap
- # 1 Phillips screwdriver

- Straight-tip screwdriver for the XGM3-2sf option card

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.

Pluggable optical modules can become very hot after prolonged use. Take care when removing a pluggable optical module from the option card. If the pluggable optical module is too hot to touch, disengage the module and allow it to cool before removing it completely.

Summit port option cards are not hot-swappable. Disconnect power to the switch before installing or removing any option card. After the Summit port option card is installed in a compatible switch, you can hot-swap the pluggable optical modules. Use only optical modules approved by Extreme Networks.

Installing XGM and XGM2 Series Port Option Cards

All Summit XGM and XGM2 series port option cards are installed the same way. The instructions in this section apply to all option cards for the Summit X350, X450a, and X450e series switches.

To install a Summit XGM or XGM2 series port option card:

1. Disconnect the AC power and any redundant power supply from the Summit switch.
2. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the equipment rack.
3. Remove the screws holding the filler panel over the option slot on the back of the switch (see the figure below).
4. Remove the filler panel and set it aside.
   a. Save the screws for re-use.

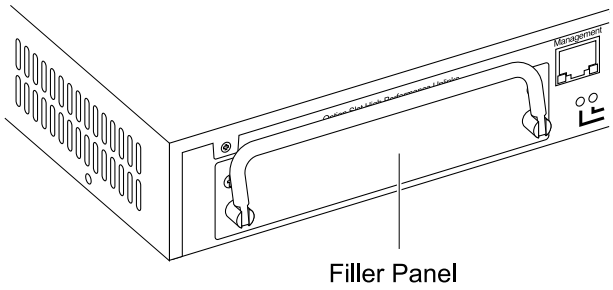


Figure 374: Option Slot Filler Panel

5. Align the sheet metal edges on the option card with the card guides in the switch housing.

6. Carefully slide the option card into the switch housing until the connectors engage and the card is flush with the back panel of the switch.

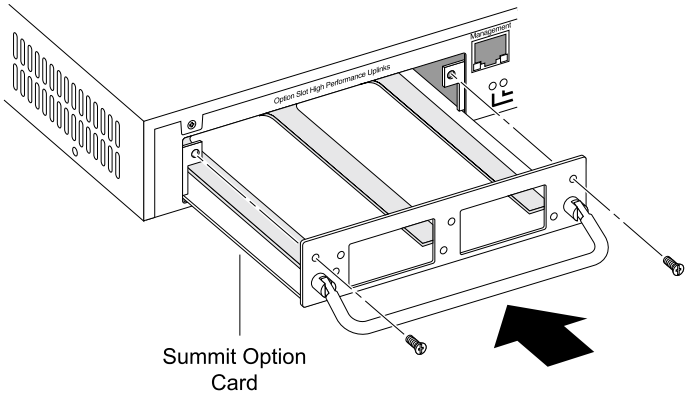


Figure 375: Installing a Summit Port Option Card (XGM-2xn Shown)

7. Using the screws from the cover plate, secure the option card to the back panel of the switch.

If you install only one pluggable optical module in the Summit option card, attach the appropriate cover plate or dust cover over the remaining open optical module slot or cage.

Note

Be sure that the switch option slot always has either an installed Summit option card or a faceplate over the opening. An open slot could divert air from the switch and cause overheating.

For information about installing or replacing the pluggable optical modules in the Summit option card, refer to the *Extreme Networks Pluggable Transceivers Installation Guide*.

Installing a Summit XGM3 Series Port Option Card

The XGM3 series port option cards can be installed only in a Summit X460 series switch; they are not mechanically compatible with any other Summit switch series.

To install an XGM3 series port option card:

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

2. At the back of the switch, remove the blank cover over slot A.

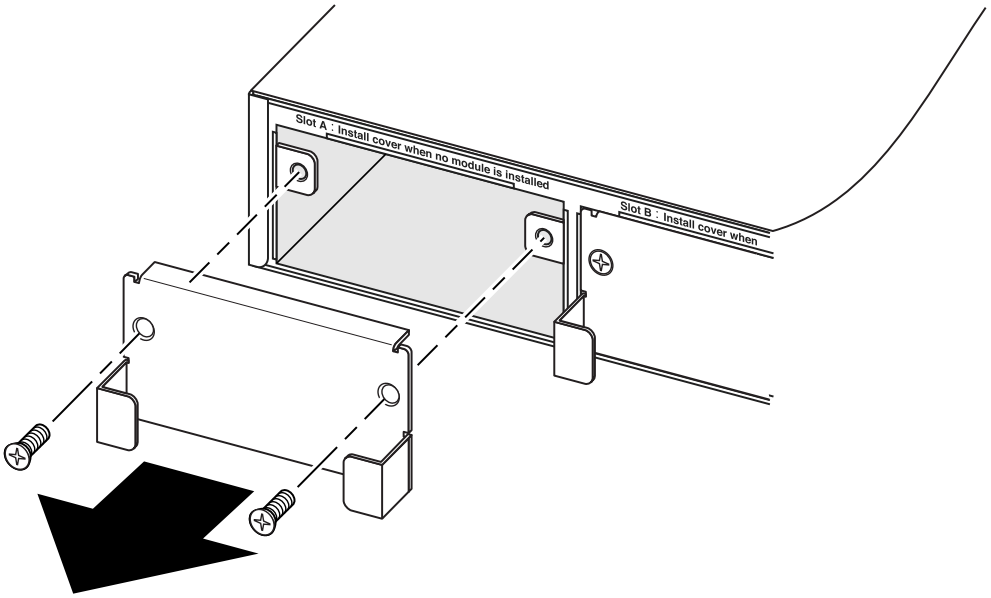


Figure 376: Removing the Slot A Cover

3. Carefully slide the XGM3 series port option card all the way into the slot (see the figure below).
4. Align and fully tighten the captive retaining screws.

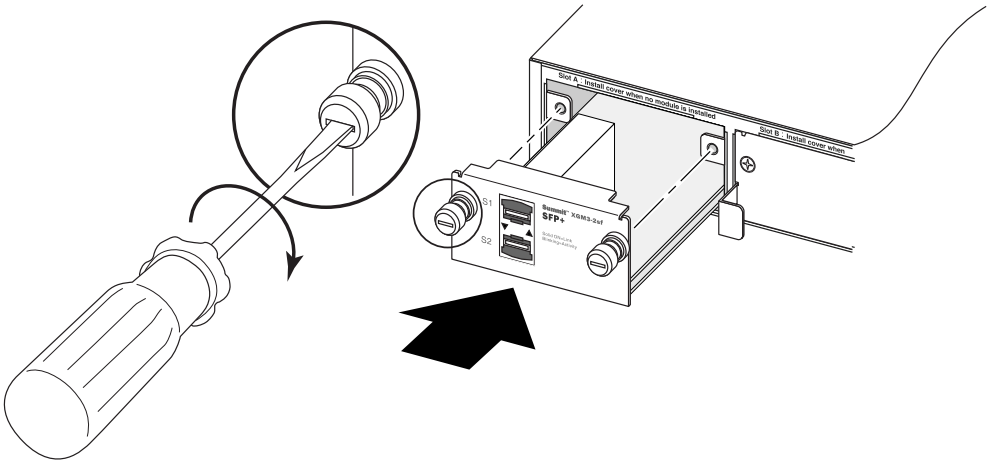


Figure 377: Installing an XGM3-2sf Port Option Card

Installing an Option Card in Slot B of a Summit X460 Series Switch

Slot B of a Summit X460 series switch accommodates either a Summit X460 stacking module or an XGM3SB-4sf port option card

In the Summit X460 series switch, a stacking module or XGM3SB-4sf option card can be installed in Slot B on the back panel of the switch.

To install an option card in Slot B, 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. At the back of the switch, remove the cover from Slot B.

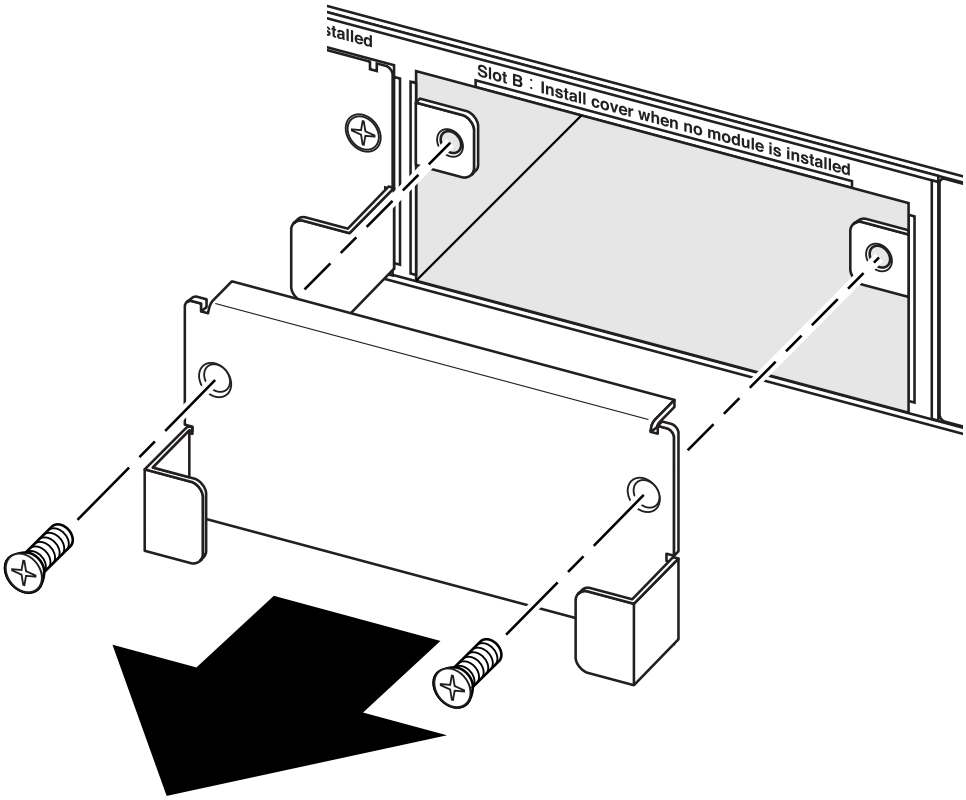


Figure 378: Removing the Slot B Cover

3. Carefully slide the stacking module or option card all the way into the slot (see the figure below).
4. Align and fully tighten the captive retaining screws.

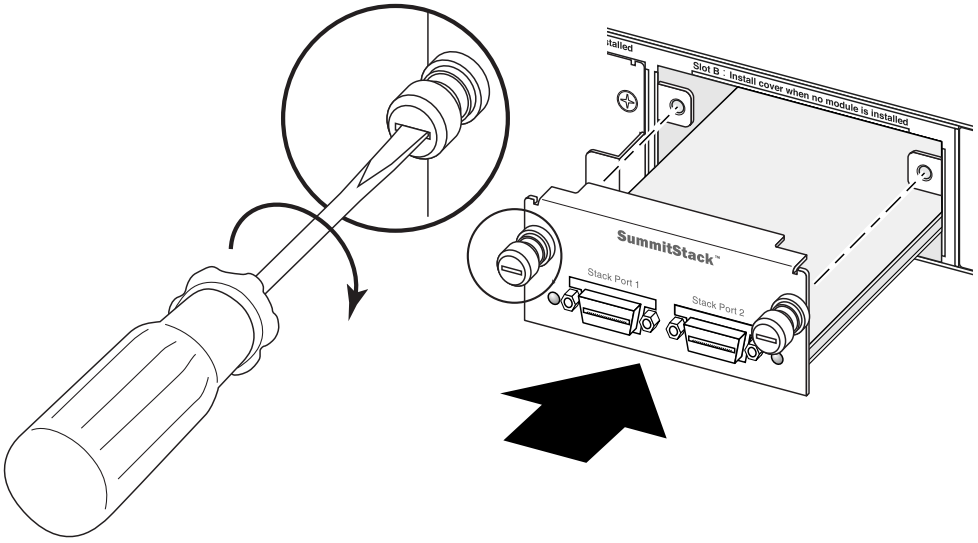


Figure 379: Installing a Stacking Module (SummitStack module shown)

Installing a Versatile Interface Module in a Summit X460, X480, X650, or X670 Series Switch

This section describes how to install versatile interface modules (VIMs).

You need the following tools and materials to install a VIM:

- ESD-preventive wrist strap
- #1 Phillips screwdriver

Caution
Summit VIMs are not hot-swappable. Disconnect power to the switch before removing an installed VIM or installing a new VIM.

The installation procedure is the same for all VIMs attached to Summit X480, X650, and X670 series switches.

To install a VIM, 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 slot:
   a. Remove the retaining screws at the top corners of the cover plate or module, 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.

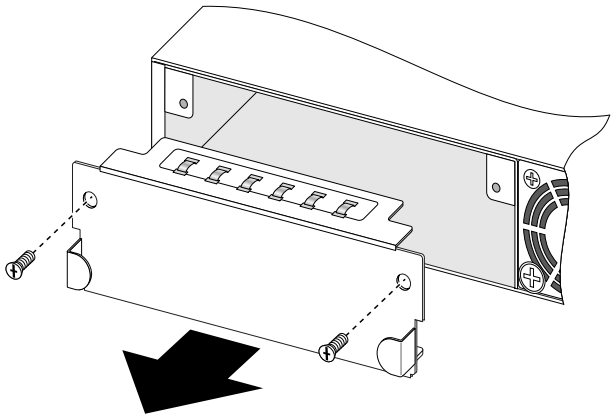


Figure 380: Removing a VIM Cover Plate

4. Remove the new VIM from its anti-static packaging.
5. Install the VIM in the switch (see Figure 381 on page 445):
   a. Make sure the inserter/ejector levers are rotated down.
   b. Carefully slide the module into the switch until the inserter/ejector levers begin to rotate upward.

c. Simultaneously rotate both levers upward to seat the module internal connectors.
d. Insert and tighten the retaining screws you removed earlier.

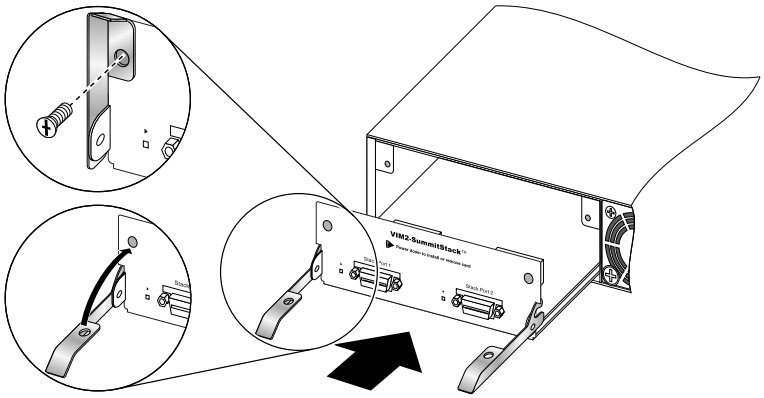


Figure 381: Installing a Versatile Interface Module

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.

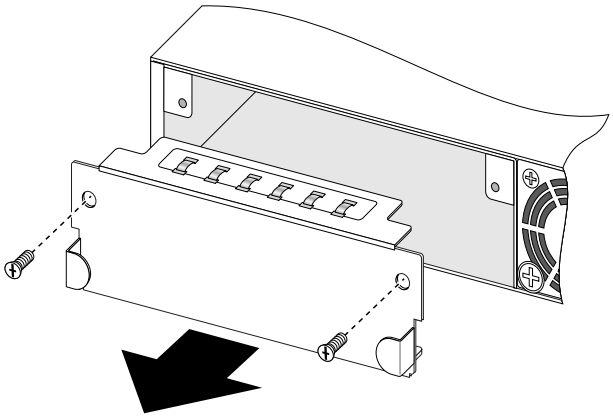


Figure 382: Removing a slot Cover Plate (VIM slot cover shown)

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.

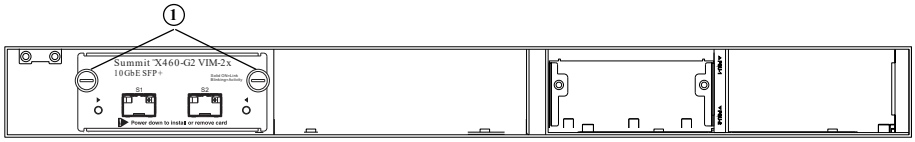


Figure 383: Tighten Screws on the Inserted VIM Module

1 = VIM module retaining screw locations

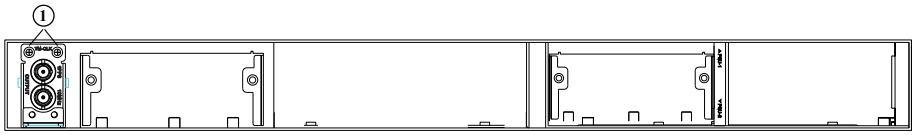


Figure 384: Tighten Screws on the Inserted Clock Module

1 = clock module retaining screw locations

Install a Versatile Interface Module in a 5520 Series Switch

This section describes how to install a versatile interface module (VIM) in the front slot of a 5520 Series switch.

You need the following tools and materials to install a VIM:

- ESD-preventive wrist strap

- Flat head screwdriver

Caution

Extreme Networks VIMs are not hot-swappable. Disconnect power to the switch before removing an installed VIM or installing a new VIM.

To install a versatile interface 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. Using two fingers, remove the cover plate from the VIM slot.
   a. Squeeze the sides to release the plate, and pull down from the top to open. The plate will remain attached at the bottom.

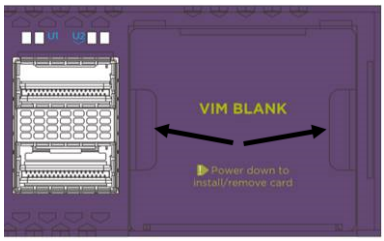


Figure 385: Removing a slot Cover Plate (VIM slot cover shown)

4. Remove the new VIM from its anti-static packaging.
5. Install the VIM in the switch:
   a. Carefully slide the VIM module into the switch.
   b. Insert and tighten the retaining screws you previously removed, using the screws provided.

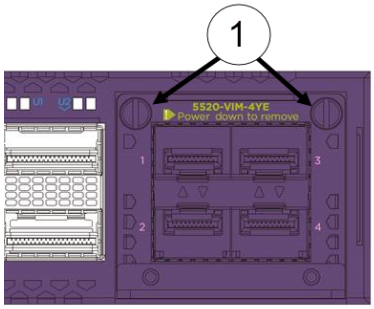


Figure 386: Tighten Screws on the Inserted VIM Module

1 = VIM 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 387: 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.

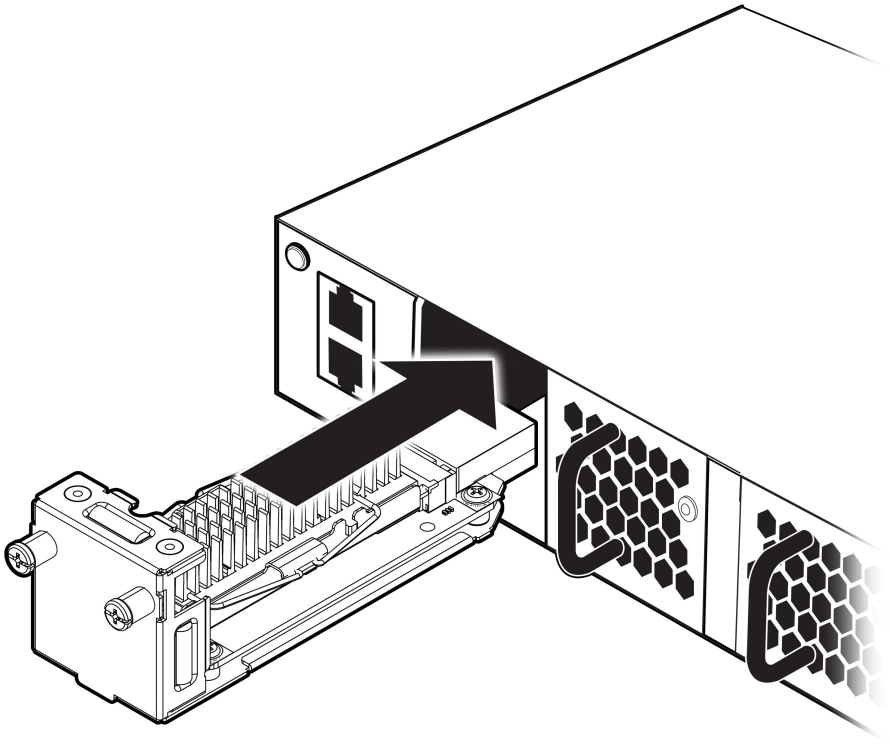


Figure 388: Insert SSD Module

6. Secure the SSD module using the screws provided.

Replacing AC Power Supplies

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.

Note
Read the information in this chapter thoroughly before attempting to replace one of the listed X650 components.

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

The Summit 300 W AC power supplies are compatible with the Summit X460 series non-PoE switches.

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 651.

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.

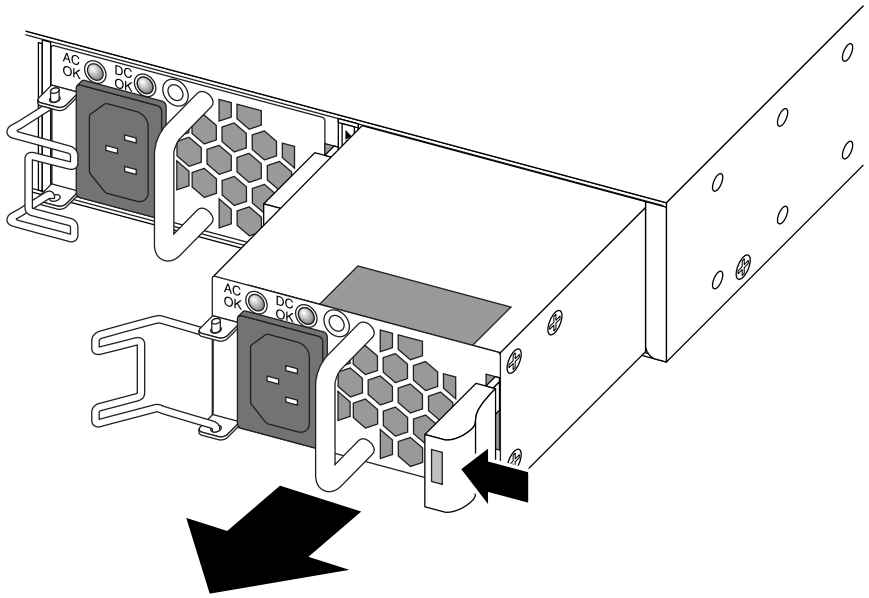


Figure 389: Removing a Summit 300 W AC Power Supply

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 390

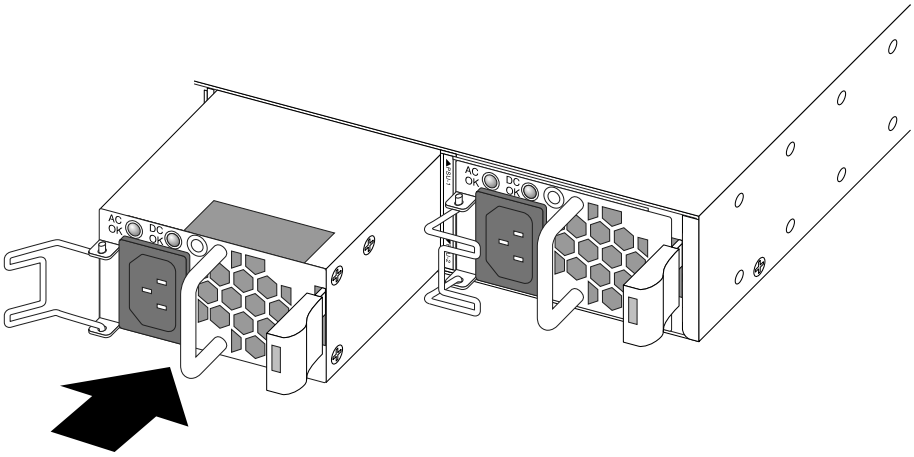


Figure 390: Installing a Summit 300 W AC Power Supply

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 391.

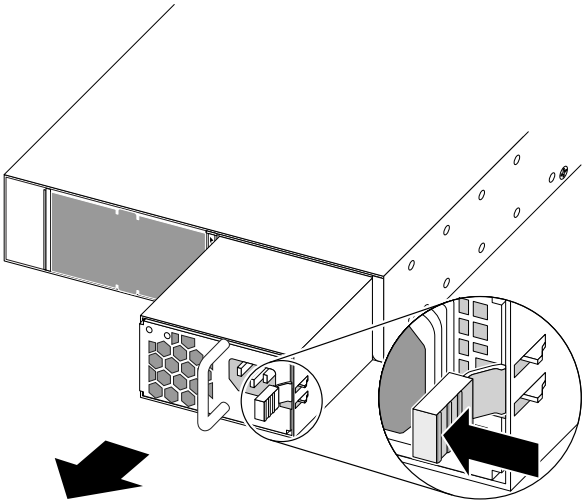


Figure 391: Removing a Summit 350 W or 715 W AC Power Supply

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 392.

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

   Caution
   Do not slam the power supply into the switch.

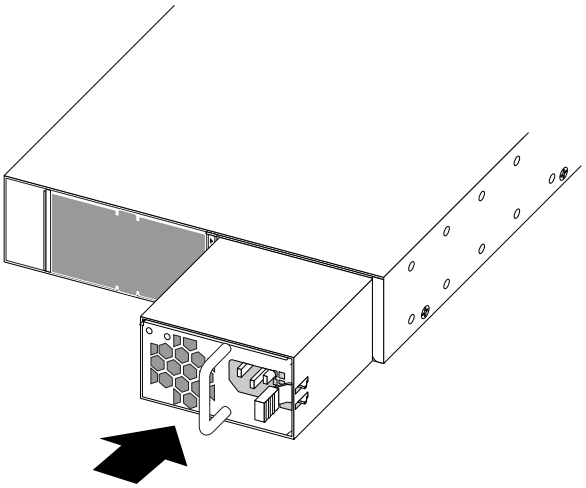


Figure 392: Installing A Summit 350 W or 715 W AC Power Supply

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 450 W or 550 W AC Power Supply

Summit 450 W power supplies are compatible with switches that have front-to-back ventilation airflow. 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 450 W or 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 651.

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

Note
You cannot combine 450 W power supplies and 550 W power supplies in the same switch.

To replace a 450 W or 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. For a Summit X670 series switch, note the direction of ventilation airflow, and verify that the power supply airflow direction is the same as that of the switch.

   In a switch with front-to-back airflow, the fan modules are labeled Air Out.

   In a switch with back-to-front, the fan modules are labeled Air In.
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 393.

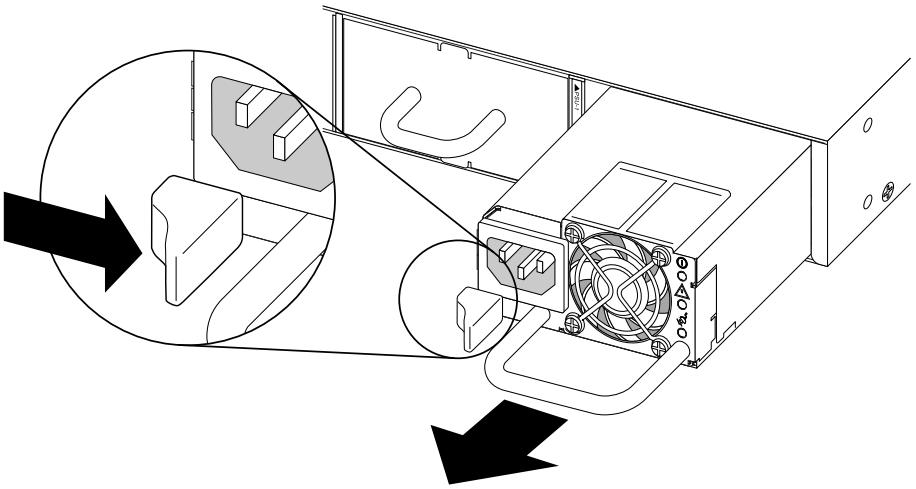


Figure 393: Removing a 450 W or 550 W AC Power Supply

5. 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.

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

   For a Summit X670 series switch, verify that the airflow direction of the power supply matches the airflow direction of the switch.

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

   See Figure 394.

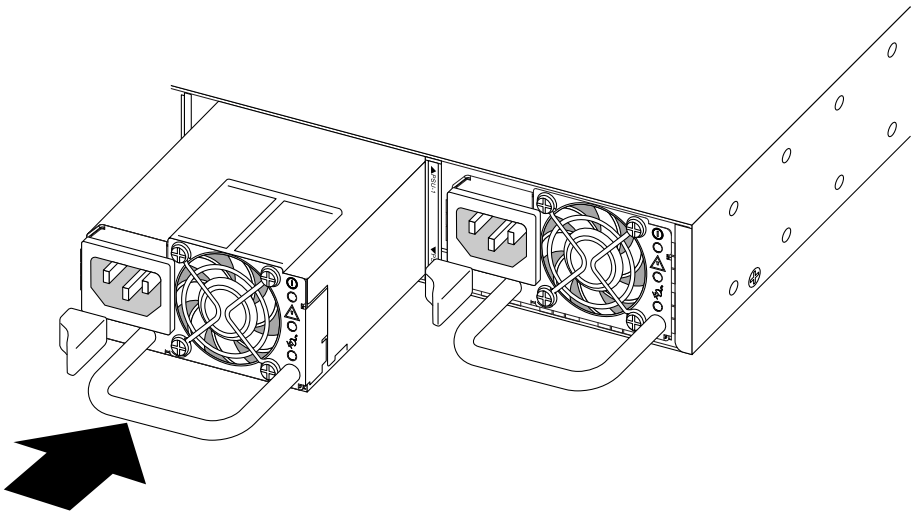


Figure 394: Installing a 450 W or 550 W AC Power Supply

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

   Caution
   Do not slam the power supply into the switch.

9. 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.

10. 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

The 750 W AC power supply is compatible with the Summit X460 series PoE-capable switches.

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 651.

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:

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 395.

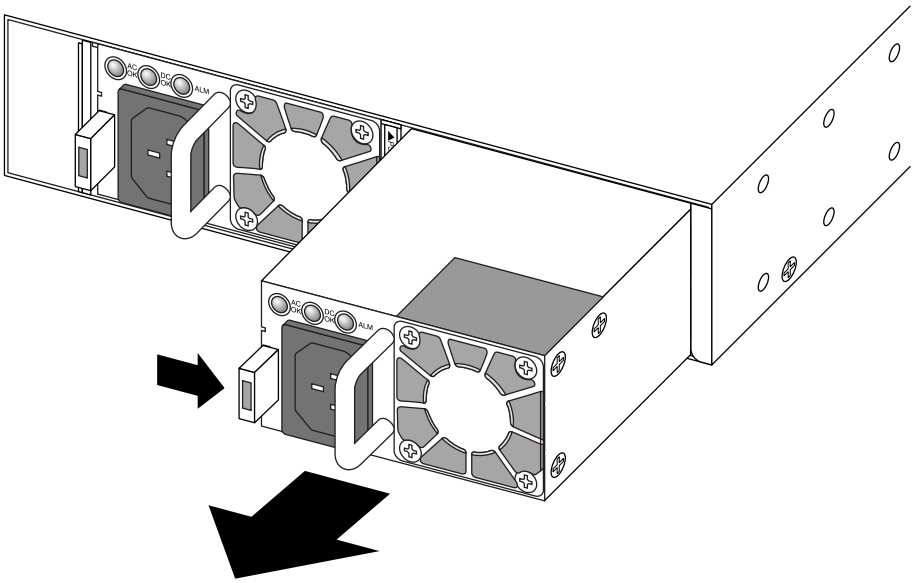


Figure 395: Removing a 750 W AC Power Supply

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.

6. Carefully slide the power supply all the way into the power supply bay.
   See Figure 396.

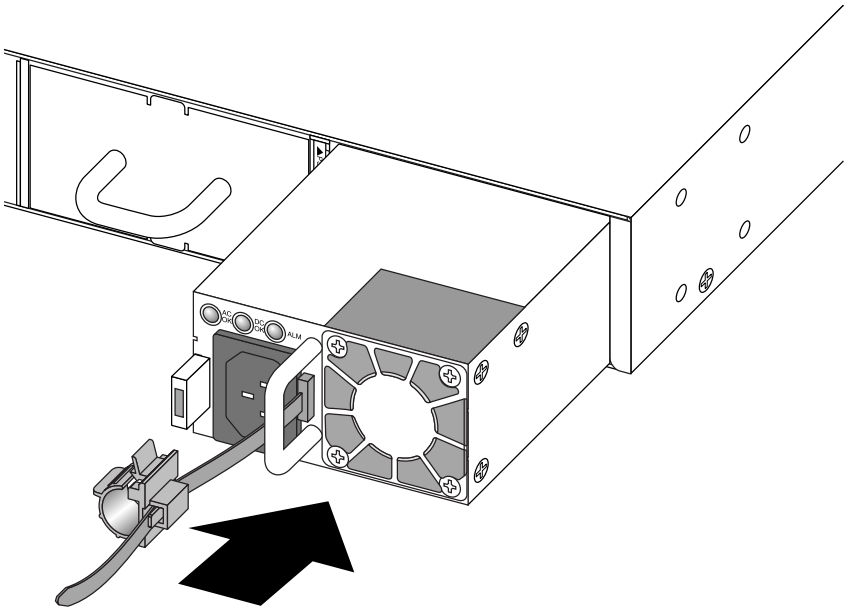


Figure 396: Installing a 750 W AC Power Supply

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

   Caution
   Do not slam the power supply into the switch.

8. If necessary, slide the plastic cord retainer farther away from the back of the switch.
   See Figure 397.

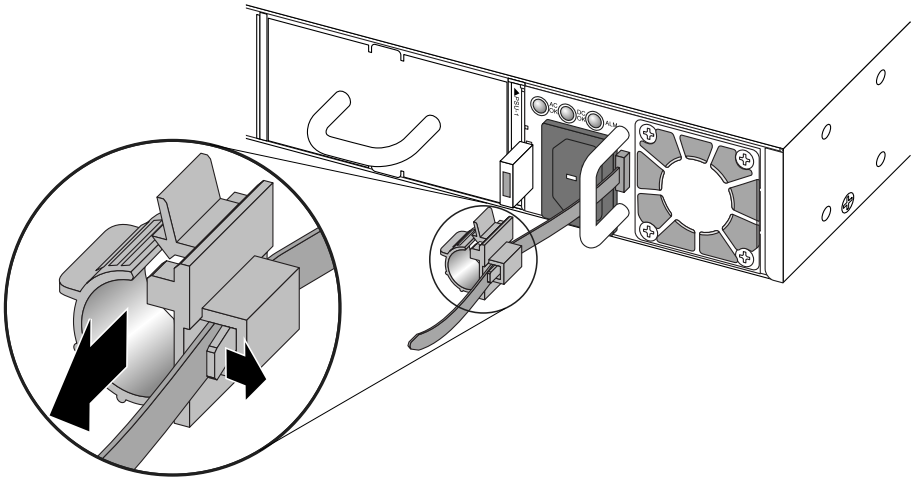


Figure 397: Moving the Power Cord Retainer

9. Connect the AC power cord to the input connector.
   See Figure 398.

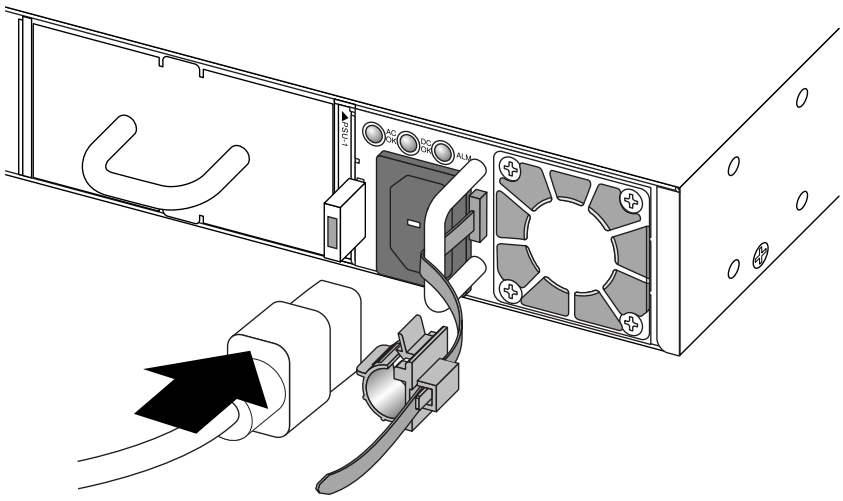


Figure 398: Connecting the Power Cord

10. Open the clip and slip it over the barrel of the connector.
    See Figure 399.

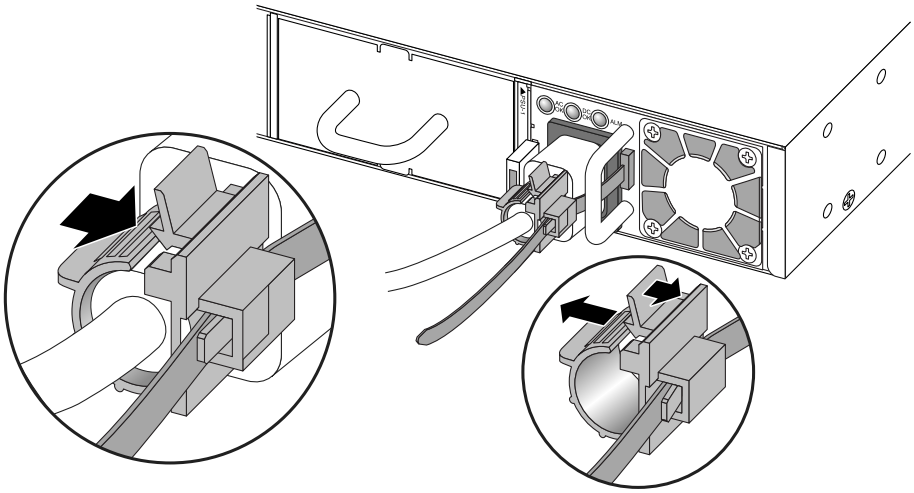


Figure 399: Attaching the Power Cord Retainer

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 492. 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 400.

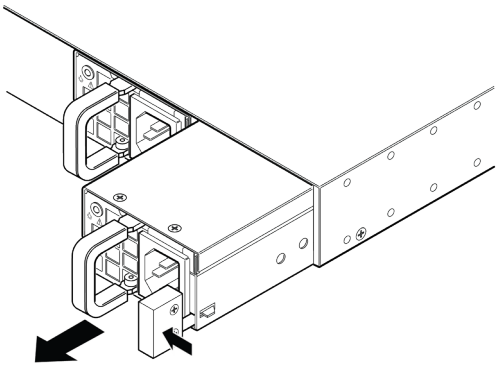


Figure 400: Removing a Summit 770 W AC Power Supply

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 401.

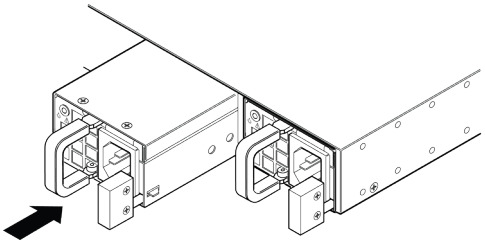


Figure 401: Installing A Summit 770 W AC Power Supply

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 850 W AC Power Supply

The Summit 850 W AC power supplies are compatible with the Summit X650 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 850 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 850 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 402.

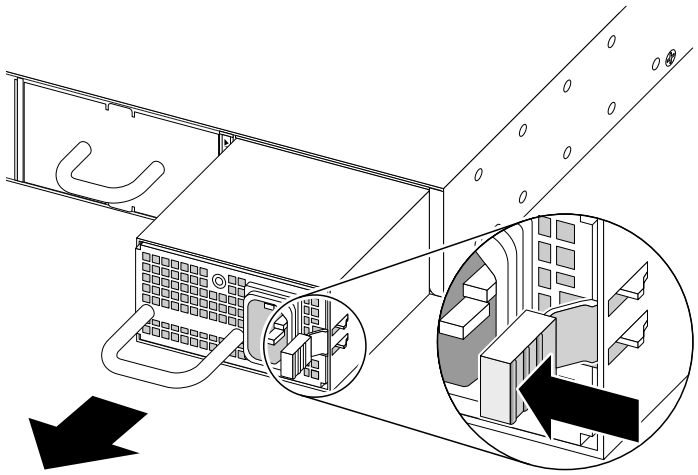


Figure 402: Removing a Summit 850 W AC Power Supply from an X650 Switch

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, as shown in Figure 403.

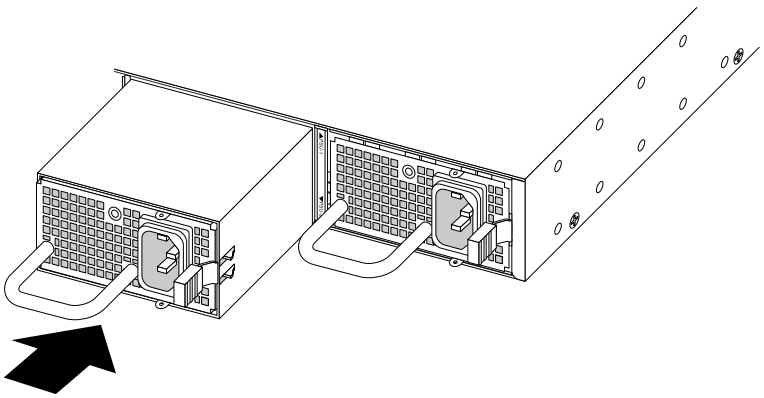


Figure 403: Installing a Summit 850 W AC Power Supply in an X650 Switch

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 404.

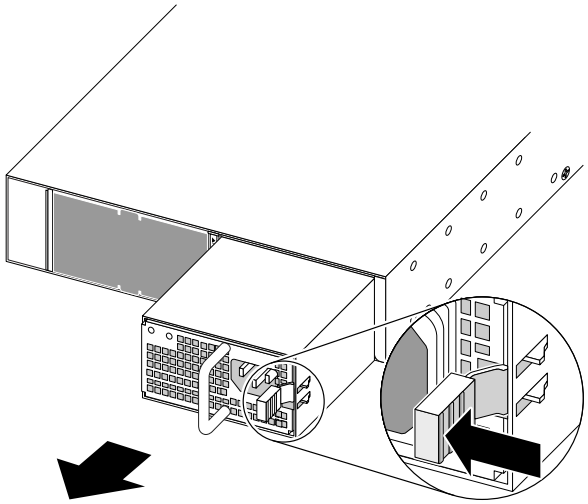


Figure 404: Removing a Summit 1100 W AC Power Supply

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 405.

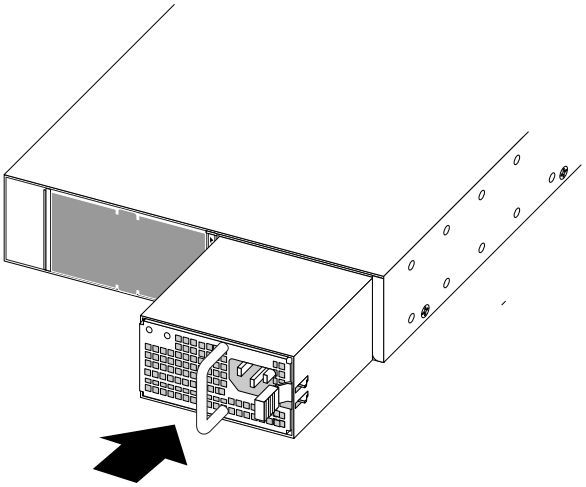


Figure 405: Installing a Summit 1100 W AC Power Supply

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.

Replace a 2000 W AC Power Supply

The ExtremeSwitching 2000 W AC power supplies with part numbers XN-ACPWR-2000W-FB and XN-ACPWR-2000W-F are compatible with VSP4900-48P and VSP4900-12MXU-12XE models.

These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one Summit or ExtremeSwitching AC power supply without powering down the switch.

You need the following tools and materials to replace an ExtremeSwitching 2000 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 an ExtremeSwitching 2000 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.

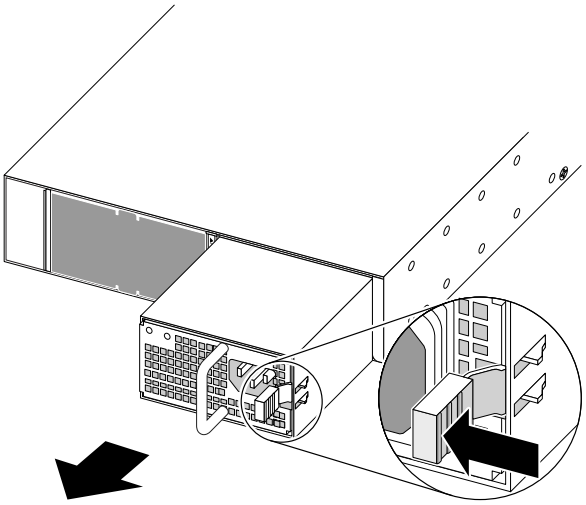


Figure 406: Removing an ExtremeSwitching 2000 W AC Power Supply

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.

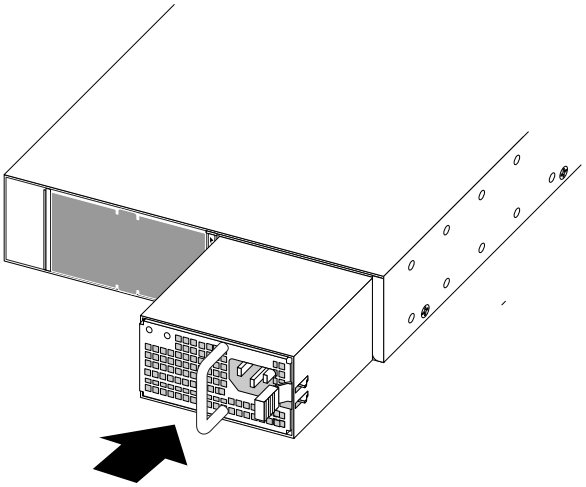


Figure 407: Installing an ExtremeSwitching 2000 W AC Power Supply

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 EPS-LD or EPS-500 Power Supply

To remove an EPS-LD or EPS-500 power supply, follow these steps:

1. Disconnect the AC power by removing the plug from the wall.
2. Disconnect the AC power cord from the power supply.
3. Disconnect the redundant power cord that connects the switch to the power supply.
4. Remove the mounting screws securing the power supply to the rack.
5. Slide the power supply out of the rack.

Removing an EPS-160 Power Supply from an EPS-T

To remove an EPS-160 power supply from an EPS-T, follow these steps:

1. Disconnect the AC power by removing the plug from the wall.
2. Disconnect the AC power cord from the EPS-160.
3. Disconnect the redundant power cord from the EPS-160.
4. Loosen the captive retaining screws on the front of the EPS-160 and slide it out of the EPS-T.

Removing an EPS-600LS Power Module

Removing an EPS-600LS power module enables a graceful power transition from the external power supplies to the internal power supply.

To remove the power module, follow these steps:

1. Disconnect the AC power by removing the plug from the wall.
2. Release the cable clip securing the AC power cord to the EPS-600LS power module.
3. Disconnect the AC power cord from the EPS-600LS power module.
4. On the EPS-600LS power module, loosen the captive screws that secure it to the EPS-C chassis.
5. Slide the EPS-600LS power module out of the EPS-C chassis.

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 390.

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 394.

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 403.

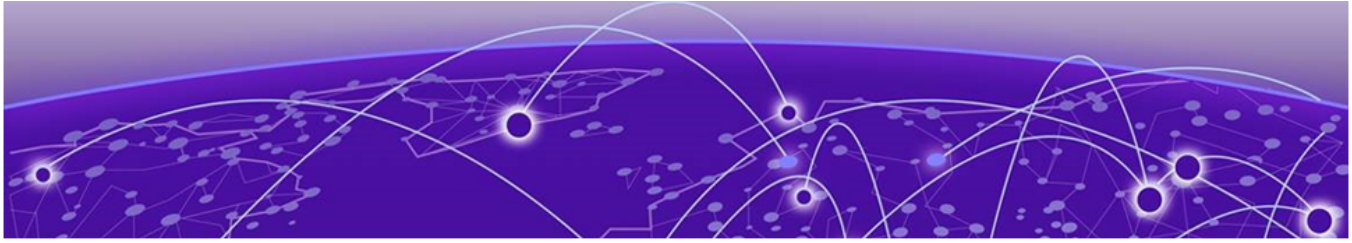
Removing a VX-RPS-1000 Redundant Power Supply

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 407.



Replacing DC Power Supplies

This chapter describes how to replace internal DC power supplies in a Summit X460, X460-G2, X480, X650, X670, X670-G2, or X770 series switch. These switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one Summit DC power supply without powering down the switch.

Note
Read the information in this chapter thoroughly before attempting to replace one of the listed Summit X650 components.

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 185 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

Summit switches have two bays for hot-swappable power supplies. In a redundant power configuration, you can replace one Summit DC power supply without powering down the switch.

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 408.

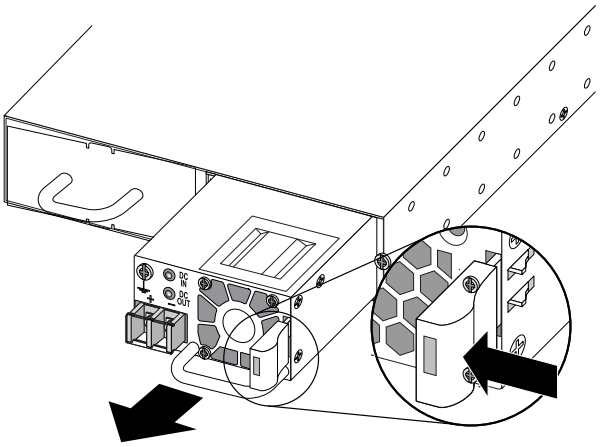


Figure 408: Removing a Summit 300 W DC Power Supply (Front-to-Back Model 10933 Shown)

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.

2. Carefully slide the power supply all the way into the power supply bay.
   See Figure 409.

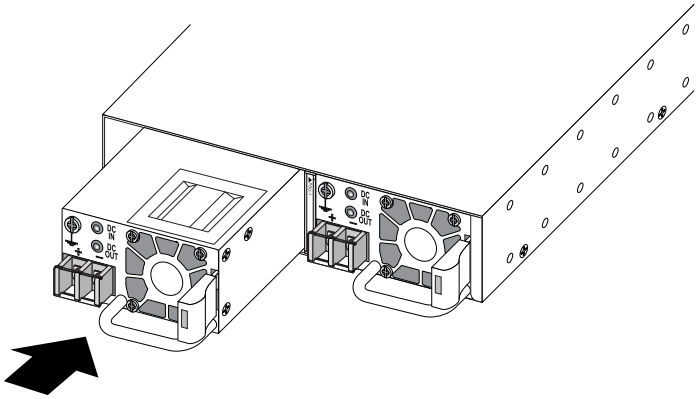


Figure 409: Installing a Summit 300 W DC Power Supply (Front-to-Back Model 10933 Shown)

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

   Caution
   Do not slam the power supply into the switch.

4. Reconnect the ground wire as described in Connecting the Ground Wire to a 300 W DC Power Supply on page 473.

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:

1. Verify that the DC circuit is de-energized.
2. Identify the grounding point on the front panel of the power supply.
   See Figure 410.

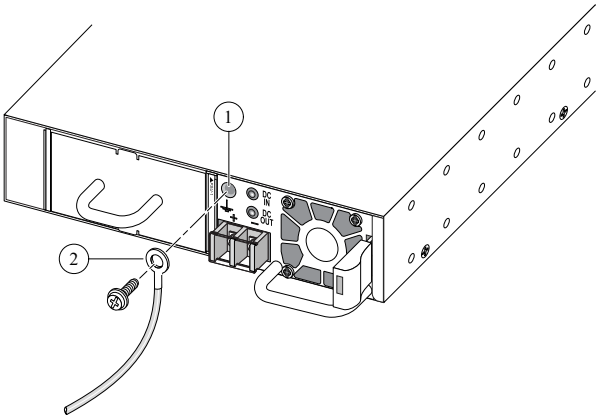


Figure 410: Connecting the Ground Wire (Front-to-Back Model 10933 Shown)

1 = Grounding point	2 = Ground wire

3. Insert an M4 screw (provided) through the ring terminal on the ground and into the grounding point on the power supply.

4. Tighten the screw to 15.9 in-lb (1.8 N-m).
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 474.

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 474
- Connecting the DC Power Cables to a -48 V Source on page 476

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 473.
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 411.

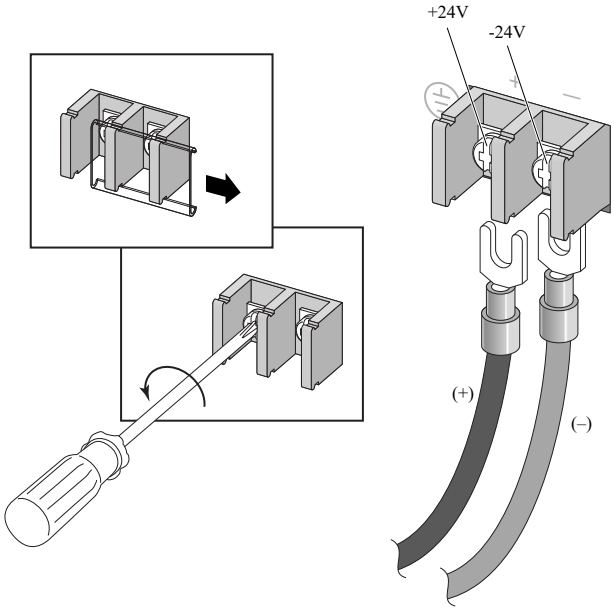


Figure 411: Connecting the DC Power Cables: Part 1

d. Tighten both screws on the terminal block to 15.9 in-lb (1.8 N-m) as shown in Figure 412.

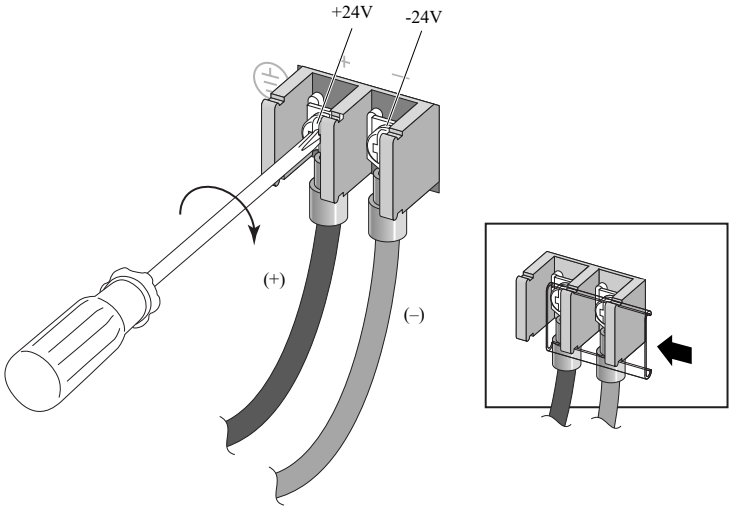


Figure 412: Connecting the DC Power Cables: Part 2

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 473.
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 413.

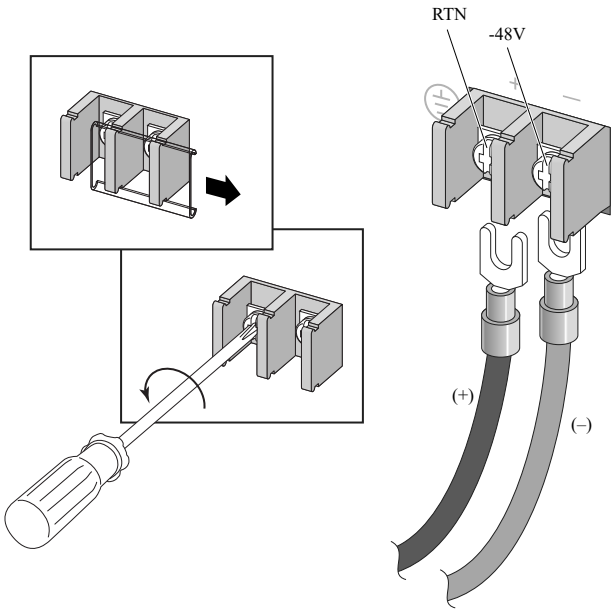


Figure 413: Connecting the DC Power Cables: Part 1

d. Tighten both screws on the terminal block to 15.9 in-lb (1.8 N-m) as shown in Figure 414.

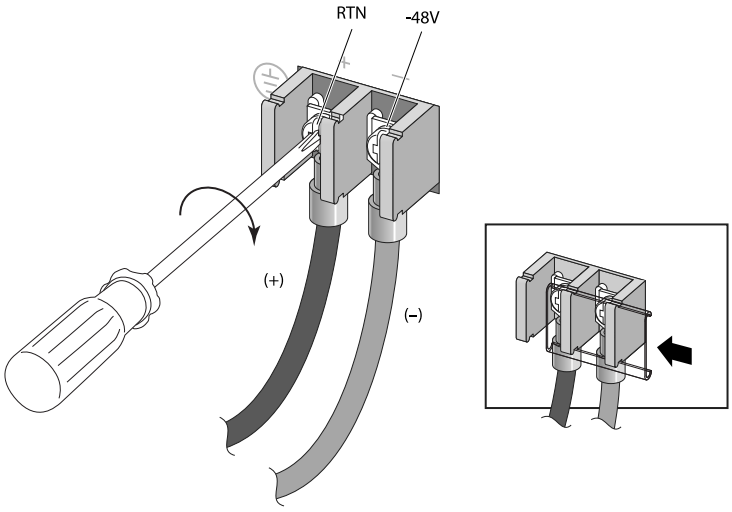


Figure 414: Connecting the DC Power Cables: Part 2

6. Slide the cover into place over the terminal block.
7. Energize the DC circuit.

Replacing a Summit 450 W or 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.

Summit 450 W power supplies are compatible with Summit X480 series switches and with Summit X670 series switches that have front-to-back ventilation airflow.

Summit 550 W power supplies are compatible with Summit X670, X670-G2, and X770 series switches. They are available in versions for switches with either front-to-back or back-to-front airflow.

Note
You cannot combine power supplies of different wattages in the same switch.

You need the following tools and materials to replace a 450 W or 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 450 W or 550 W DC Power Supply

To remove an installed 450 W or 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. For a Summit X670 series switch, note the direction of ventilation airflow, and verify that the power supply airflow direction is the same as that of 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.

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

   See Figure 415.

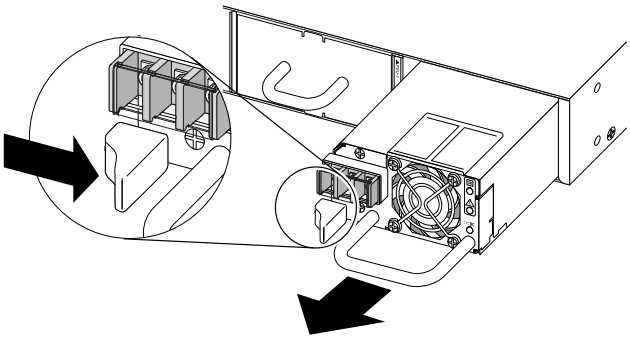


Figure 415: Removing a Summit 450 W or 550 W Power Supply

7. Carefully slide the power supply the rest of the way out of the switch.
8. 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 450 W or 550 W DC Power Supply

To install a replacement 450 W or 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.
2. Carefully slide the power supply all the way into the power supply bay.

   See Figure 416.

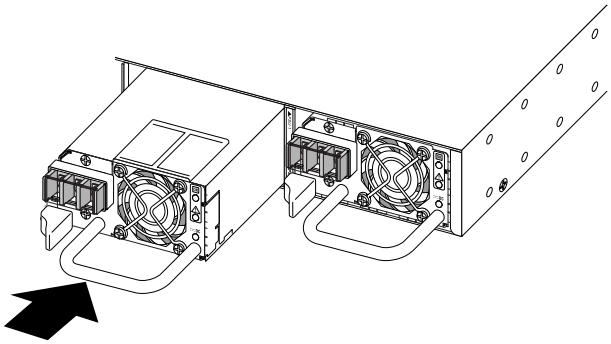


Figure 416: Installing a 450 W or 550 W DC Power Supply

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

   Caution
   Do not slam the power supply into the switch.

4. Reconnect the ground wire as described in Connecting the Ground Wire to a 450 W or 550 W DC Power Supply on page 480.

Connecting the Ground Wire to a 450 W or 550 W DC Power Supply

To connect the ground wire to the 450 W or 550 W DC power supply:

Warning
Be sure to connect the chassis ground wire before you connect any power cables.

1. Verify that the DC circuit is de-energized.
2. Pull the cover off the terminal block.
3. Identify the grounding point on the front panel of the power supply.

   See Figure 417.

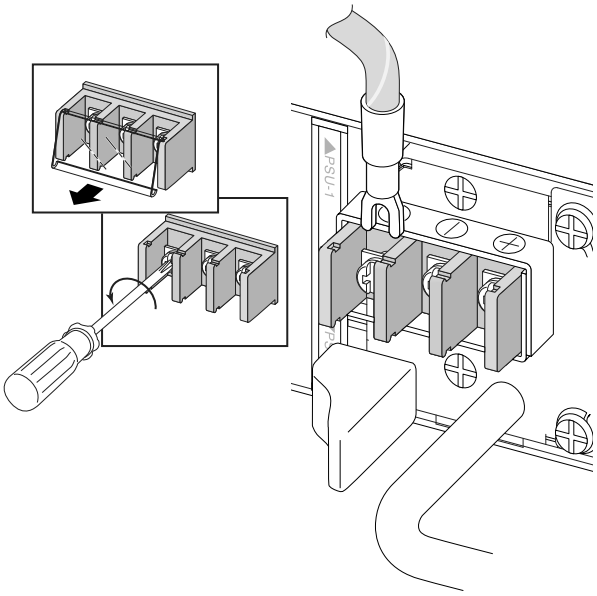


Figure 417: Connecting the Ground Wire

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 418).
   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).

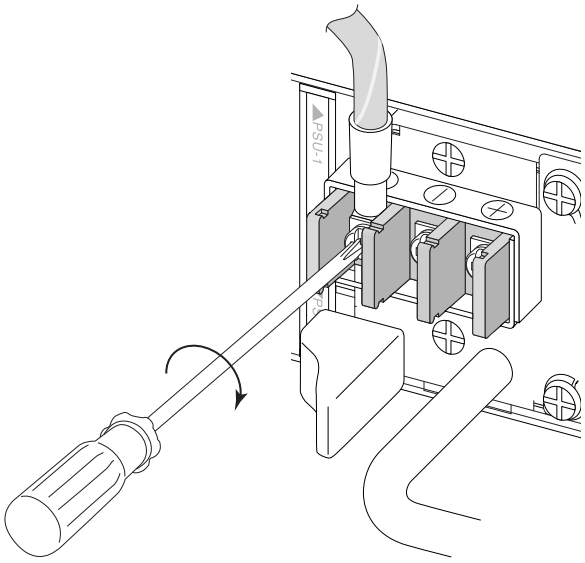


Figure 418: Securing the Ground Wire

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 450 W or 550 W DC Power Supply on page 481.

Connecting DC Power Cables to a 450 W or 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 450 W or 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 450 W or 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 450 W or 550 W DC Power Supply on page 480.
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 419 on page 482).
   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 +).

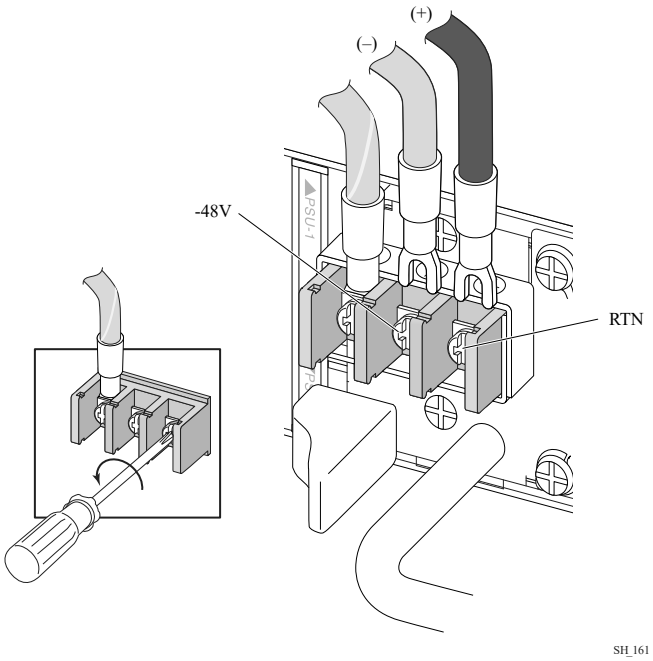


Figure 419: Connecting the DC Power Cables: Part 1

d. Tighten both screws on the terminal block to 7 in-lb (0.79 N m), as shown in Figure 420.

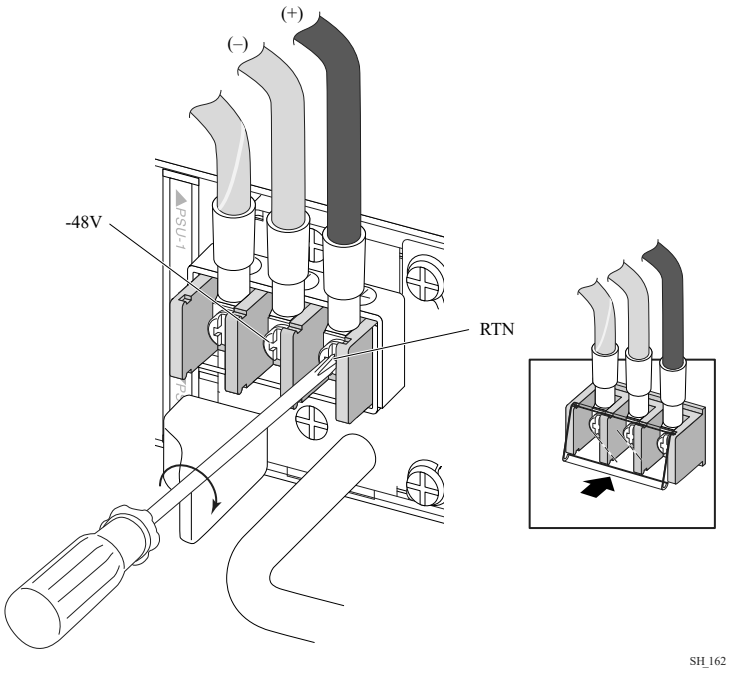


Figure 420: Connecting the DC Power Cables: Part 2

5. Snap the cover into place over the terminal block.
6. Energize the DC circuit.

Replacing a Summit 850 W DC Power Supply

You need the following tools and materials to replace a Summit 850 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)

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

Removing an 850 W DC Power Supply

To remove an installed Summit 850 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 421.

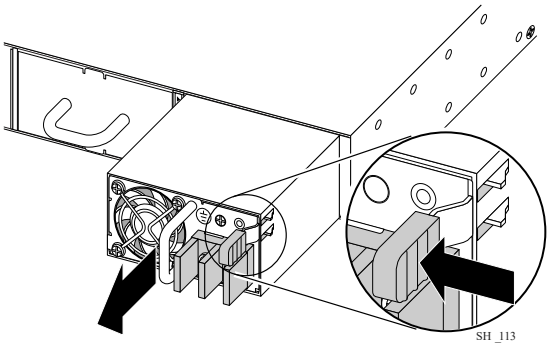


Figure 421: Removing a Summit 850 W DC Power Supply

5. Carefully slide the power supply the rest of the way out of the switch.

Installing a Replacement 850 W DC Power Supply

To install a replacement Summit 850 W DC power supply:

1. Verify that the power supply is right side up.
2. Carefully slide the power supply all the way into the power supply bay.

   See Figure 422.

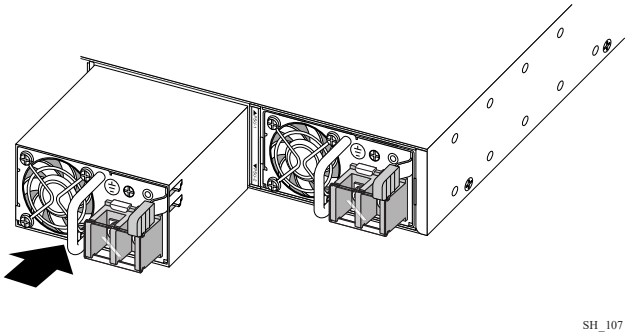


Figure 422: Installing a Summit 850 W DC Power Supply

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

   Caution
   Do not slam the power supply into the switch.

4. Reconnect the ground wire as described in Connecting the Ground Wire to an 850 W DC Power Supply on page 484.

Connecting the Ground Wire to an 850 W DC Power Supply

To connect the ground wire to the Summit 850 W DC power supply, follow these steps:

1. Verify that the DC circuit is de-energized.
2. Identify the grounding point on the front panel of the power supply.

   See Figure 423.

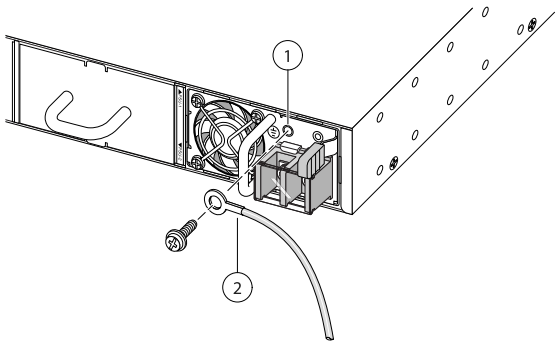


Figure 423: Connecting the Ground Wire

1 = Grounding point	2 = Ground wire

3. Insert an M4 screw (provided) through the ring terminal on the ground and into the grounding point on the power supply.
4. Tighten the screw to 15.9 in-lb (1.8 N-m).
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 an 850 W DC Power Supply on page 485.

Connecting DC Power Cables to an 850 W DC 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. Slide the cover off the terminal block.
4. Verify that the ground wire is attached to the power supply.

   See Connecting the Ground Wire to an 850 W DC Power Supply on page 484.
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).

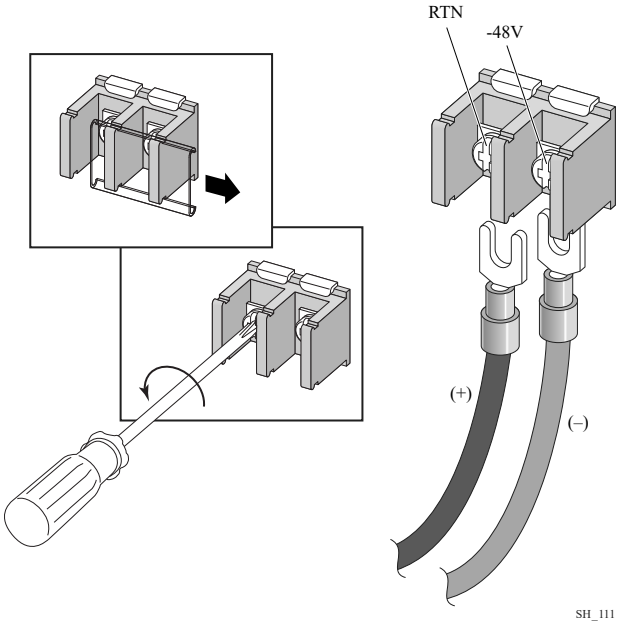


Figure 424: Connecting the DC Power Cables: Part 1

d. Tighten both screws on the terminal block to 11 in-lb (1.24 N m).

See Figure 425.

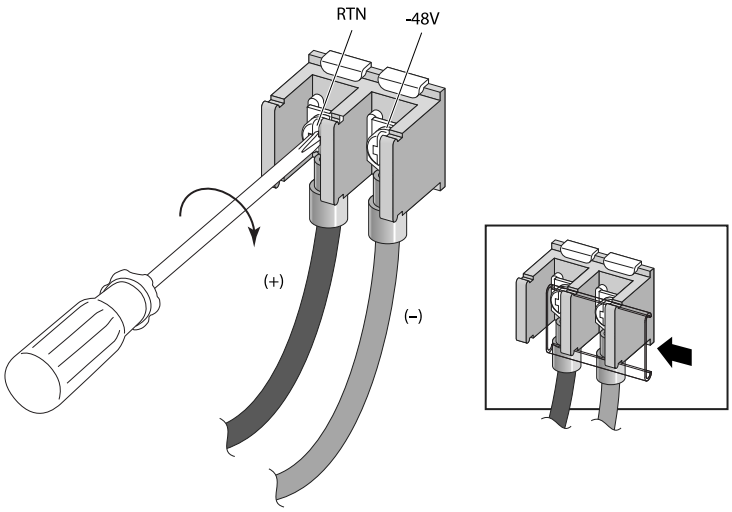


Figure 425: Connecting the DC Power Cables: Part 2

6. Slide the cover into place over the terminal block.
7. 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 488. 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.

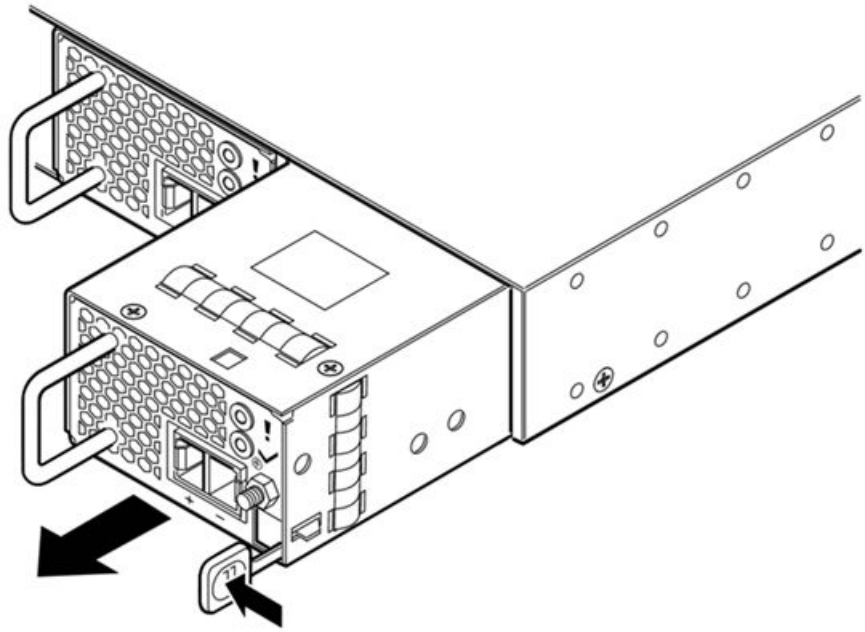


Figure 426: Removing a Summit 750 W Power Supply

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.

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

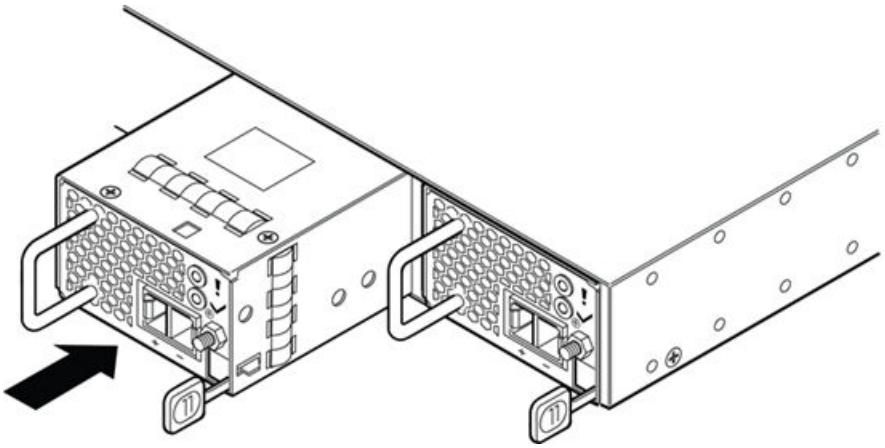


Figure 427: Installing an 750 W DC Power Supply

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 750 W DC Power Supply on page 489.

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.

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 the following figure).

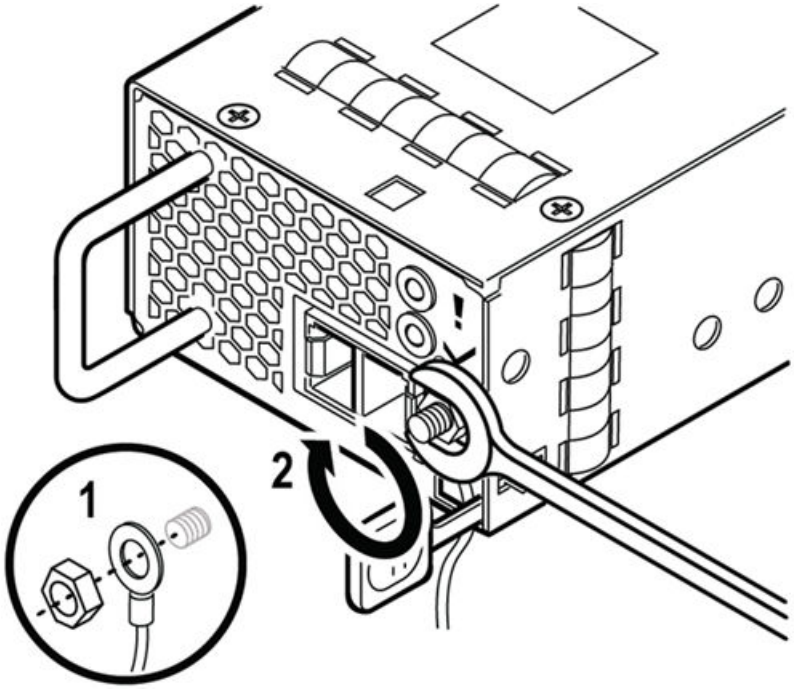


Figure 428: Securing the Ground Wire

   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 490.

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 489.
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).

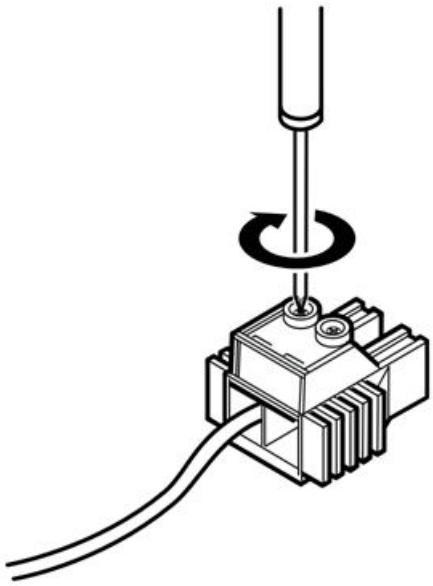


Figure 429: Inserting the DC Power Cables into the Connector

   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.

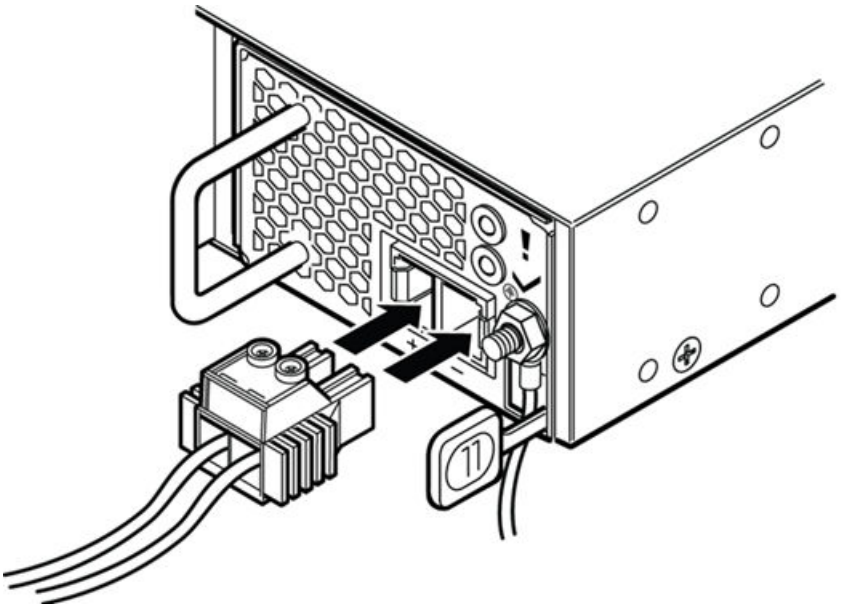


Figure 430: Inserting the Connector into the Power Supply

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 460. 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 431.

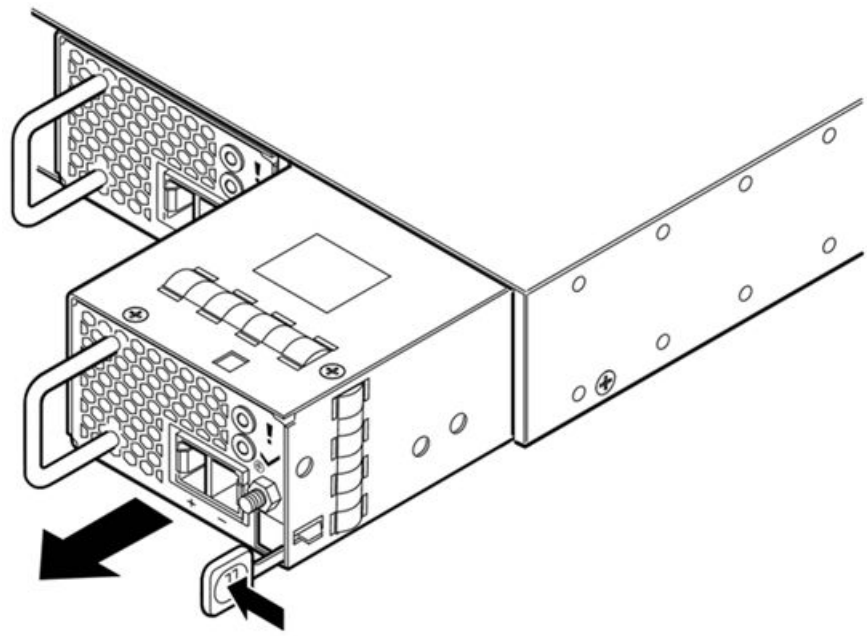


Figure 431: Removing a Summit 1100 W Power Supply

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 432.

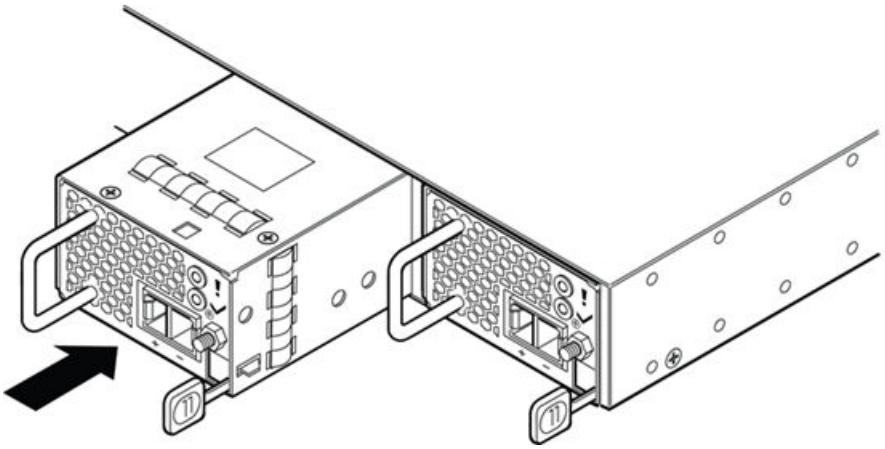


Figure 432: Installing an 1100 W DC Power Supply

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 495.

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 433).

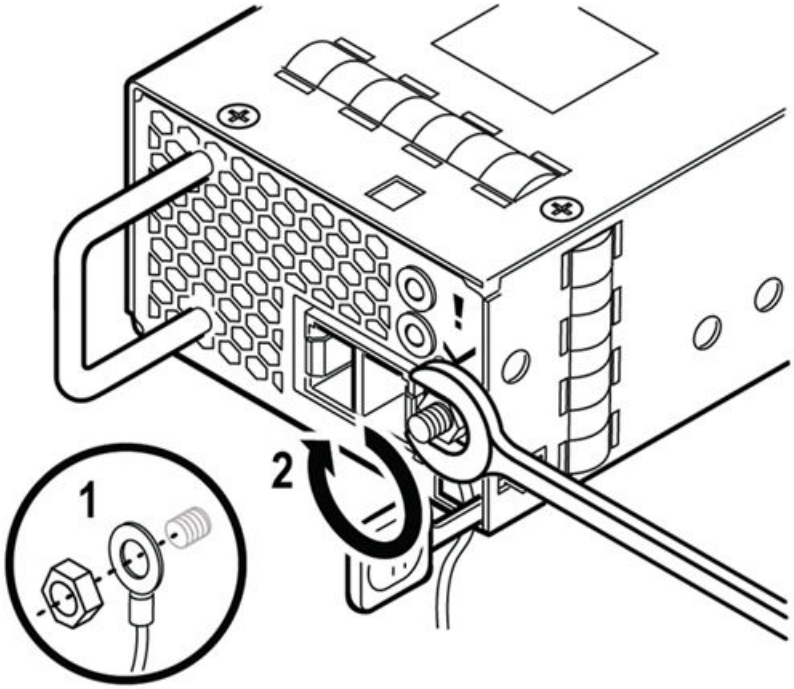


Figure 433: Securing the Ground Wire

   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 496.

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 495.
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 434.

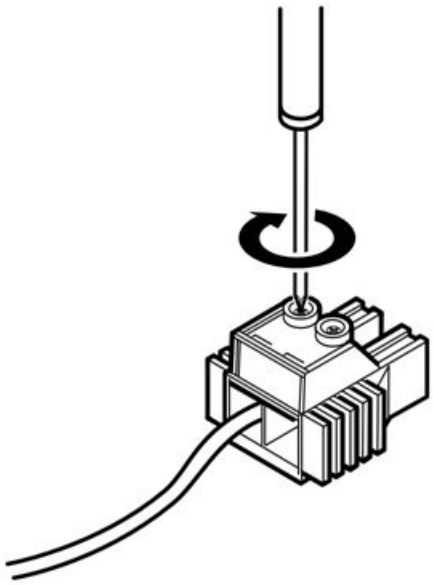


Figure 434: Inserting the DC Power Cables into the Connector

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 435.

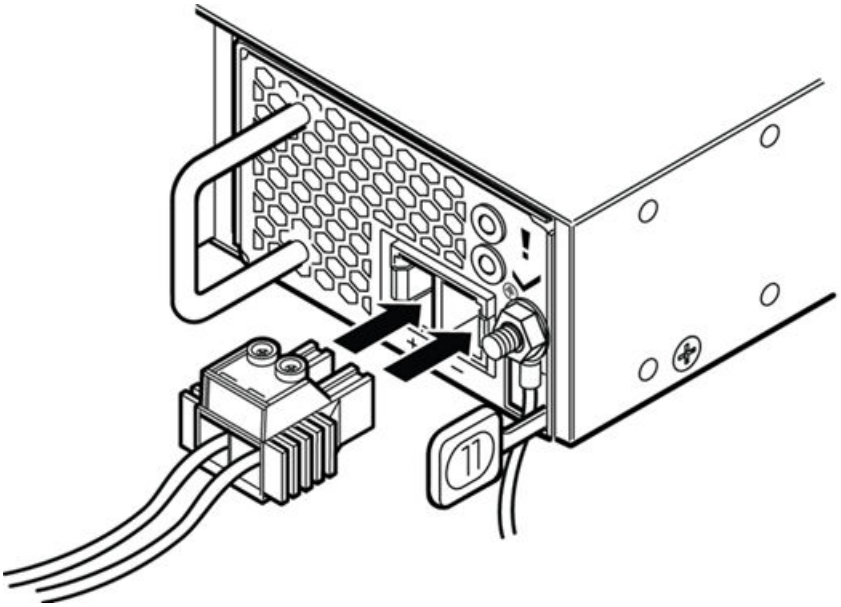


Figure 435: Inserting the Connector into the Power Supply

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.

Removing an EPS-150DC Power Module from an EPS-T2 Tray

Warning
Always be sure that the DC circuit is de-energized before disconnecting any cables and attempting to remove an EPS-150DC power module.

Warning
Removing the DC wiring harness from your facility's DC source voltage must be done by a qualified, licensed electrician.

To disconnect and remove an EPS-150DC power module, follow these steps:

1. Attach an ESD-preventive strap to your bare wrist and connect the metal end to the an appropriate ground point on the equipment rack.
2. De-energize the DC circuit.
3. At the rear of the unit, loosen the retainer nut on the DC power connector.
4. Unplug the DC connector from the DC power supply socket on the rear of the unit.

   Power has now been disconnected from the unit.

5. At each end of the redundant power cable, unscrew the captive retaining screws on the power connector.
6. Disconnect the redundant power cable from the switch and the EPS-150DC unit.
7. Loosen the thumbscrews on the front of the EPS-150DC unit until they are completely free of the EPS-T2 tray.
8. Slide the EPS-150DC unit out of the tray.

Replace Fan Modules

For switches with replaceable fan modules, refer to the following information to replace the fan modules.

Illustrations in this topic 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

Summit switches are available in models with the following ventilation airflow direction:

- 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 labled 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 436.

   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.

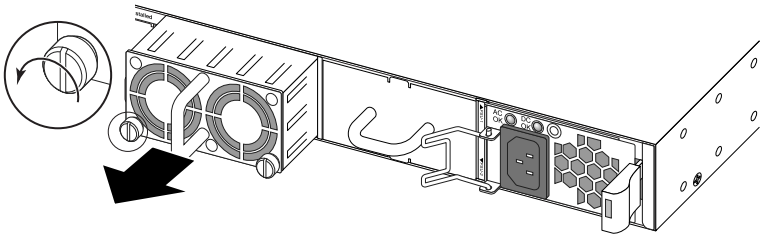


Figure 436: Removing a Fan Module

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.

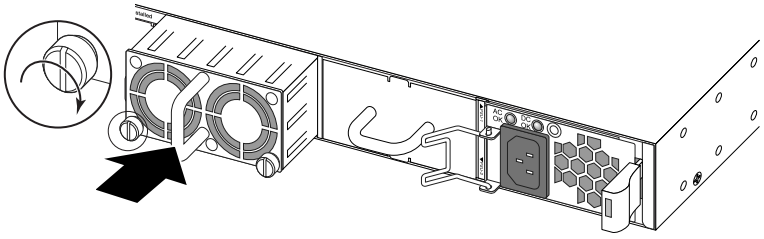


Figure 437: Installing a Fan Module

5. Align and fully tighten the captive retaining screws.

Removing and Replacing Expansion Modules

This chapter describes how to replace the following equipment:

- Removing or Replacing a V300 Virtual Port Extender on page 501
- Removing or Replacing a V400 Virtual Port Extender on page 502
- Removing or Replacing an LRM/MACsec Adapter on page 502
- Removing or Replacing a Half-Duplex to Full-Duplex Converter on page 503
- Replacing a Stacking Module or Option Card in Slot B of a Summit X460 Series Switch on page 503
- Replacing an XGM3/XGM3S Series Port Option Card in a Summit X460 Series Switch on page 504
- Replacing a Versatile Interface Module (VIM) in a Summit X480, X650 or X670 Series Switch on page 505
- Replacing an XGM or XGM2 Series Port Option Card on page 507
- Replacing a Versatile Interface Module, Solid-state Drive, or Clock Module in an X460-G2 Series or X465 Series Switch on page 508

Note
Read the information in this chapter thoroughly before attempting to replace one of the listed Summit X650 components.

Removing or Replacing a V300 Virtual Port Extender

For instructions on installing a V300 Virtual Port Extender, refer to Installing a V300 Virtual Port Extender on page 411.

To replace a V300 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 V300 Virtual Port Extender on page 411.

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 433.

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 433.

Removing or Replacing an LRM/MACsec Adapter

Refer to Installing an LRM/MACsec Adapter on page 433 for installation options for the LRM/MACsec Adapter.

Note
The LRM/MACsec Adapter is hot-swappable.

To replace an LRM/MACsec Adapter or remove it from service, follow these steps:

1. If a USB cable is used to supply power to the adapter, unplug the USB cable from the front of the adapter.
2. Disconnect network cables or transceivers from the Link1 and Link2 slots on the front of the adapter.
3. Disconnect the 50 cm SFP cables from the HostPort1 and HostPort2 slots on the front of the adapter.
4. Carefully holding the adapter, loosen and remove the screws that secure the adapter to the rack posts or to the five-slot bracket.
5. Remove the adapter.
6. Install a new adapter using any of the installation options listed in Installing an LRM/MACsec Adapter on page 433.

7. Connect the new adapter to the switch and to power, following the instructions in Connecting the LRM/MACsec Adapter to the Host Switch and to Power on page 436.

Caution

Connect the adapter to the host switch using only the SFP cable that is provided for this purpose. The use of other cables can damage the equipment.

8. Reconnect network cables and transceivers to the Link1 and Link2 slots on the front of the new adapter.

Removing or Replacing a Half-Duplex to Full-Duplex Converter

Refer to Installing a Half-Duplex to Full-Duplex Converter on page 437 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 437.

Replacing a Stacking Module or Option Card in Slot B of a Summit X460 Series Switch

Slot B on the back of a Summit X460 series switch accommodates a SummitStack or a SummitStack-V80 stacking module, or an XGM3SB-4sf port option card. The replacement process is the same for either of these options.

You need the following tools to replace a stacking module:

- ESD-preventive wrist strap
- Screwdriver

To replace a stacking module or option card in Slot B:

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

2. Completely loosen the captive retaining screws and slide the installed option card or stacking module out of the switch.

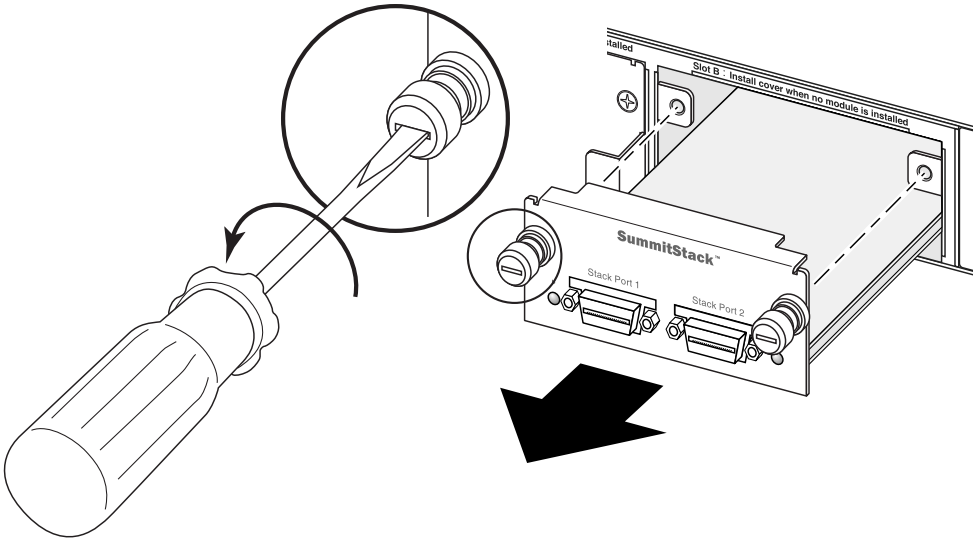


Figure 438: Removing a SummitStack Module

3. Carefully slide the replacement module or card into the switch (see Figure 439).
4. Align and tighten the captive retaining screws.

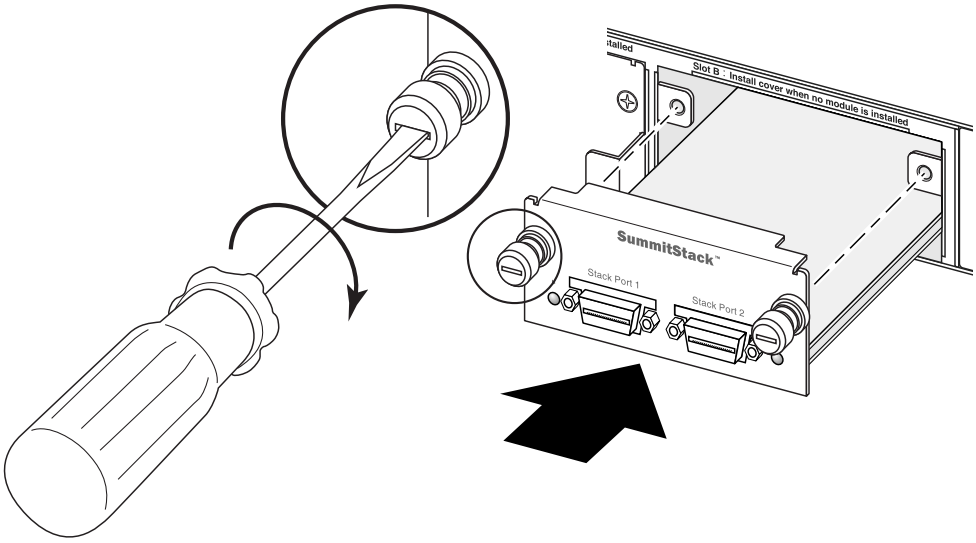


Figure 439: Installing a SummitStack Module

Replacing an XGM3/XGM3S Series Port Option Card in a Summit X460 Series Switch

Note

After you replace an XGM3-2sf port option card, you must reboot the switch before the ports on the card will become operational.

To replace an XGM3/XGM3S series port option card:

1. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
2. Loosen the captive retaining screws on the option card until they are completely loose (see Figure 440).
3. Carefully slide the option card out of the slot.

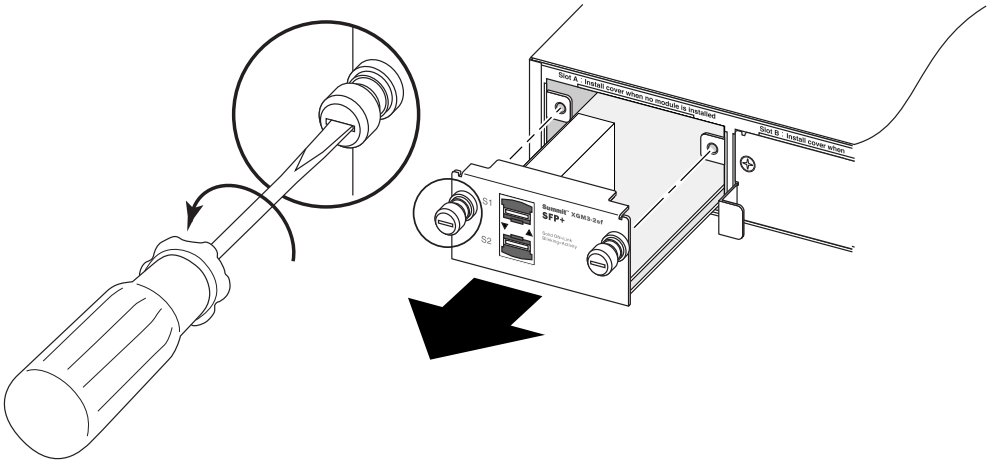


Figure 440: Removing an XGM3-2sf Port Option Card

4. Carefully slide the replacement option card into the switch.

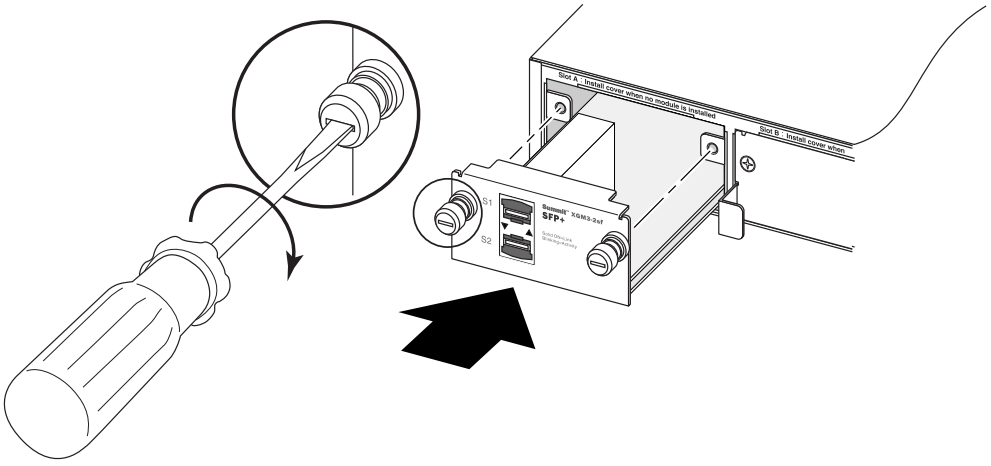


Figure 441: Installing an XGM3-2sf Port Option Card

5. Align and tighten the captive retaining screws.

Replacing a Versatile Interface Module (VIM) in a Summit X480, X650 or X670 Series Switch

You need the following tools and materials to replace a VIM:

- ESD-preventive wrist strap

- #2 Phillips screwdriver

Caution
Summit VIMs are not hot-swappable. Disconnect power to the switch before removing an installed VIM. After a VIM is installed in a compatible switch, you can hot-swap the installed SFP, SFP+, and QSFP+ modules. Use only SFP, SFP+, and QSFP+ modules approved by Extreme Networks.

Note
VIM1 modules must be installed in Summit X650 series switches, VIM2 modules must be installed in Summit X480 series switches, and VIM4 modules must be installed in Summit X670 series switches. VIM3 modules can be installed in X480, X650, and X670 series switches. AVIM will not operate if it is installed in the wrong switch series.

To replace a VIM, 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. Disconnect the switch power.
3. Remove the installed VIM (see Figure 442 on page 506):
   a. Remove the retaining screws at the top corners of the module, and set the screws aside in a safe place.
   b. Save the retaining screws to secure the new module in the switch.
   c. Rotate the inserter/extractor levers downward to disconnect the internal module connectors.
   d. Carefully slide the module out of the switch and set it on an anti-static surface.

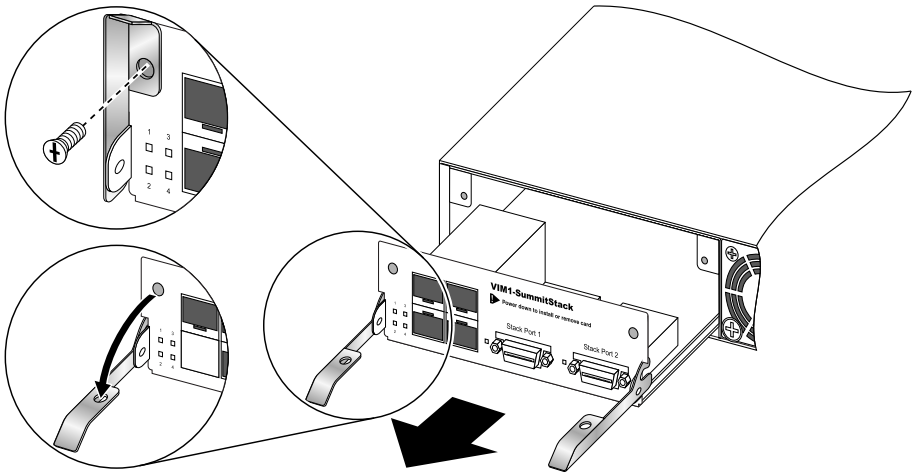


Figure 442: Removing a VIM (VIM1-SummitStack Module Shown)

4. Remove the replacement VIM from its anti-static packaging.
5. Install the replacement VIM in the switch (see Figure 443 on page 507):
   a. Make sure the inserter/ejector levers are rotated down.
   b. Carefully slide the module into the switch until the inserter/ejector levers begin to rotate upward.

c. Simultaneously rotate both levers upward to seat the module internal connectors.
d. Insert and tighten the retaining screws you removed earlier.

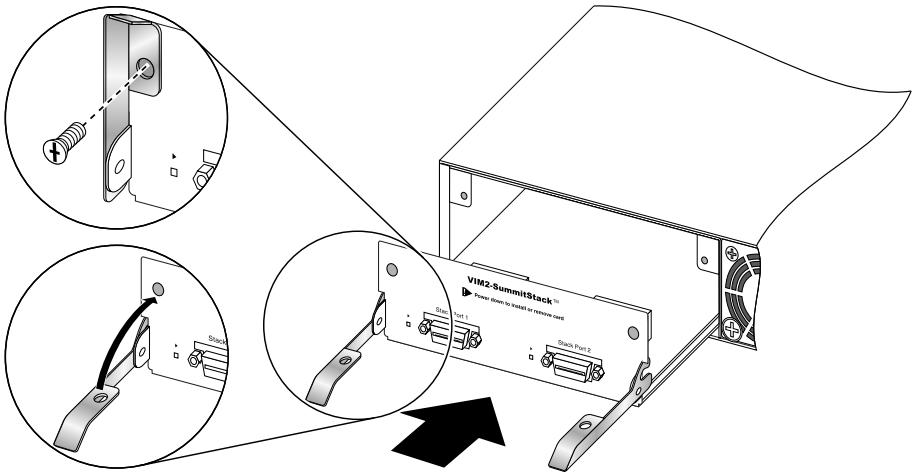


Figure 443: Installing a VIM

Replacing an XGM or XGM2 Series Port Option Card

This section describes how to replace XGM and XGM2 series port option cards in Summit X350, X450a, and X450e series switches.

Caution
Pluggable optical modules can become very hot after prolonged use. Take care when removing a pluggable optical module from the option card. If the pluggable optical module is too hot to touch, disengage the module and allow it to cool before removing it completely.

Caution
Summit port option cards are not hot-swappable. Disconnect power to the switch before installing or removing a Summit XGM or XGM2 series option card. After the Summit port option card is installed in a compatible switch, you can hot-swap pluggable optical modules. Use only optical modules approved by Extreme Networks.

To replace a port option card, follow these steps:

1. Disconnect the AC power and any redundant power supply from the Summit switch.
2. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the equipment rack.
3. Remove the screws that secure the option card to the switch.
   a. Save the screws for re-use.
4. Pull the option card out of the switch and set it on an ESD-preventive surface.
5. Align the sheet metal edges on the new option card with the card guides in the switch housing.

6. Carefully slide the option card into the switch housing until the connectors engage and the card is flush with the back panel of the switch.

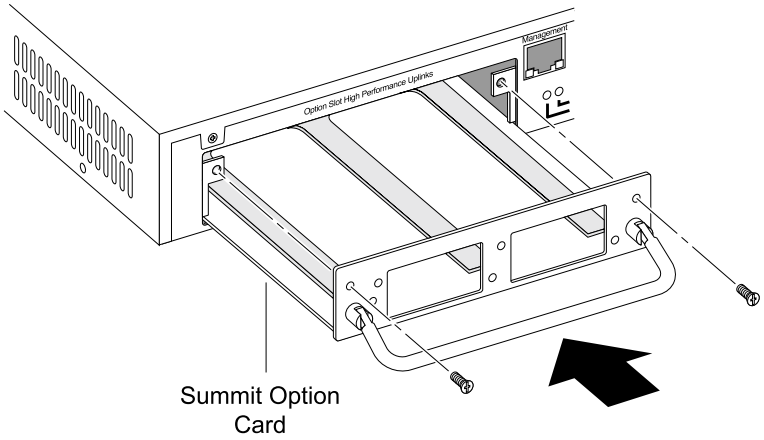


Figure 444: Installing a Summit Port Option Card (XGM-2xn Shown)

7. Use the screws you removed from the old option card to secure the new option card to the back panel of the switch.

Note
If you remove a Summit option card and do not install a replacement, you must install a faceplate over the opening. An open slot could divert air from the switch and cause overheating.

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.

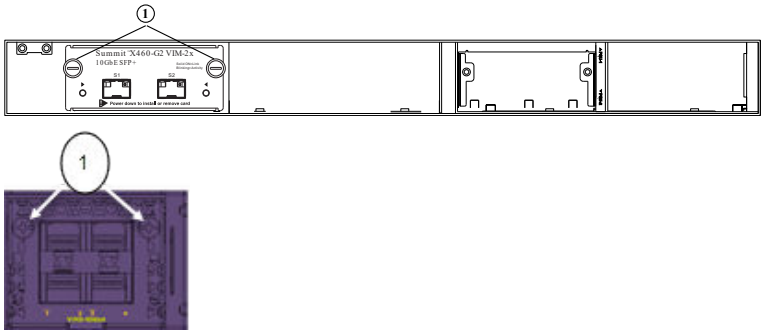


Figure 445: Tighten Screws on the Inserted VIM5 Module

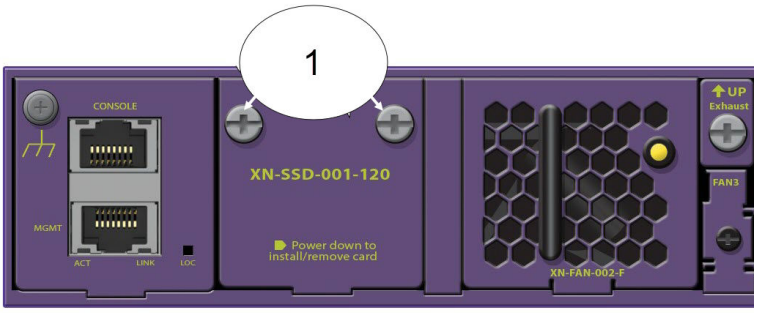


Figure 446: Tighten Screws on the Inserted SSD Module

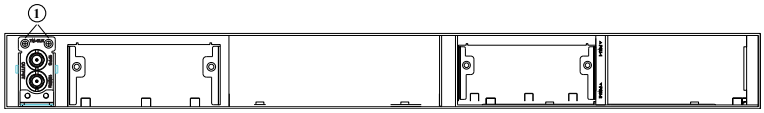


Figure 447: Tighten Screws on the Inserted Clock Module

1= retaining screw locations

Removing Switches from Service

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 510.
   - Disconnect and remove the switch's removable DC power supply. See Removing a DC Power Supply on page 511.
   - 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 512.

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.

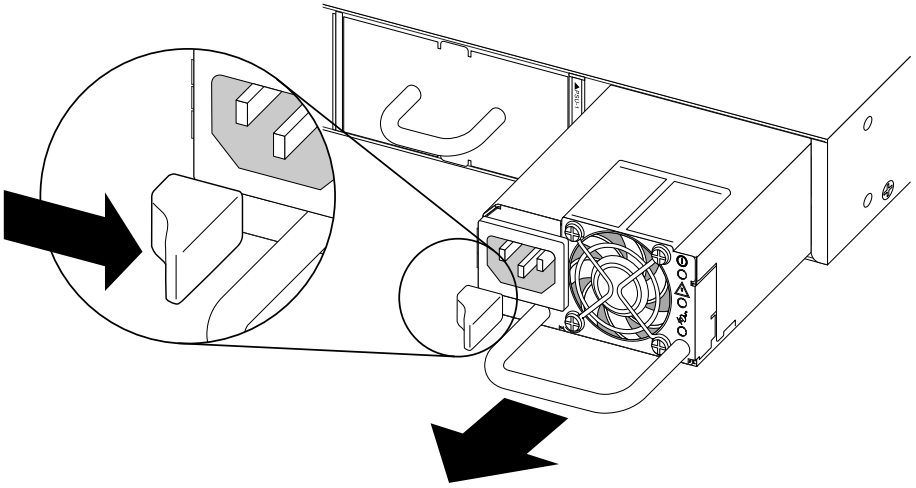


Figure 448: Removing an AC Power Supply

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.

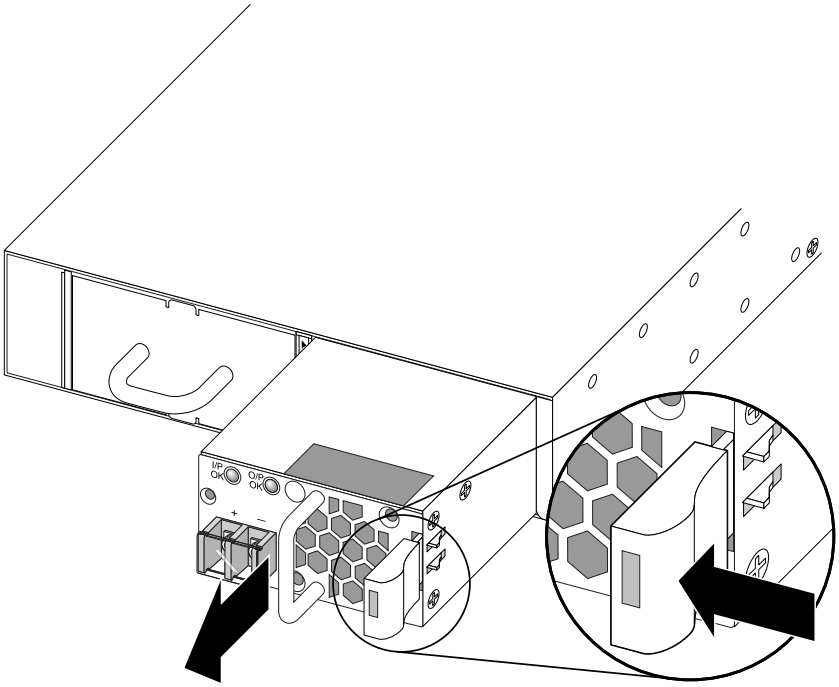


Figure 449: Removing a DC Power Supply

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 510 or Removing a DC Power Supply on page 511.
- 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.

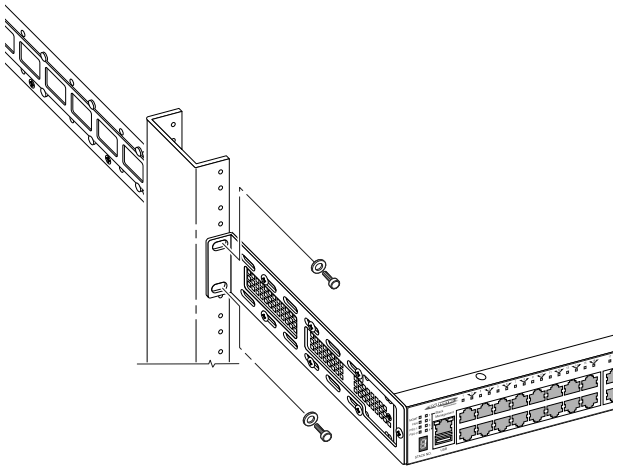


Figure 450: Removing a Front-Mounted Switch from a Two-Post Rack

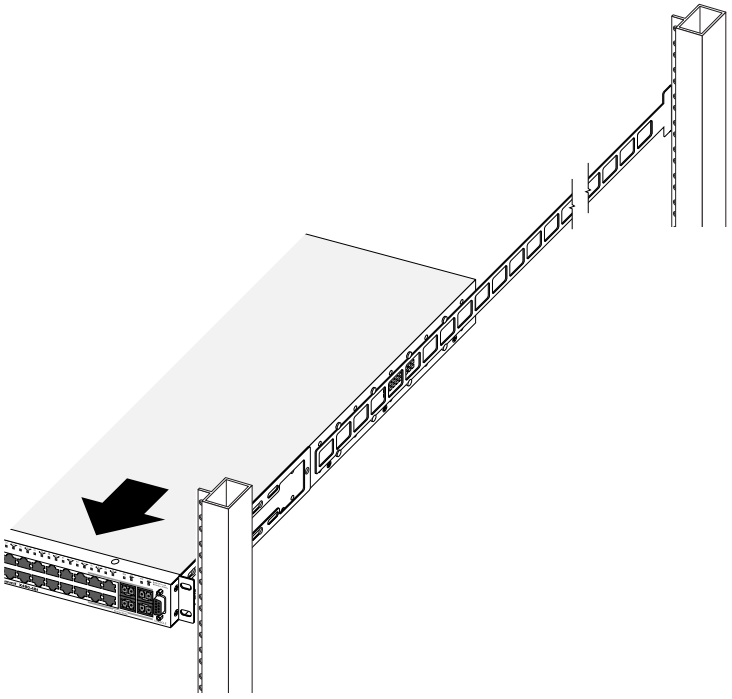


Figure 451: Removing the Switch from a Four-Post Rack

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.

Safety and Regulatory Information

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 (122ºF).
  - 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 2014/30/EU EMC Directive and the 2014/35/EU 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 metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. Ethernet interfaces are designed for use only as intra-building interfaces (described as Type 2 or Type 4 ports in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP wiring. The addition of Primary Protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

This warning does not apply to T1/E1 ports because T1/E1 ports have built-in isolation and surge protection that allows them to be connected to OSP wiring.

Installing Power Supply Units and Connecting Power

For the ratings and power input requirements of each power supply unit, see #unique_561 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, 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.

A power input cord is included in the product packaging for your switch .If additional cords are needed, you can obtain them as follows.

A power input cord is included in the product packaging for your switch .If additional cords are needed, you can obtain them as follows.

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, use a transformer to step down the voltage to < 240 VAC from phase-phase, or 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

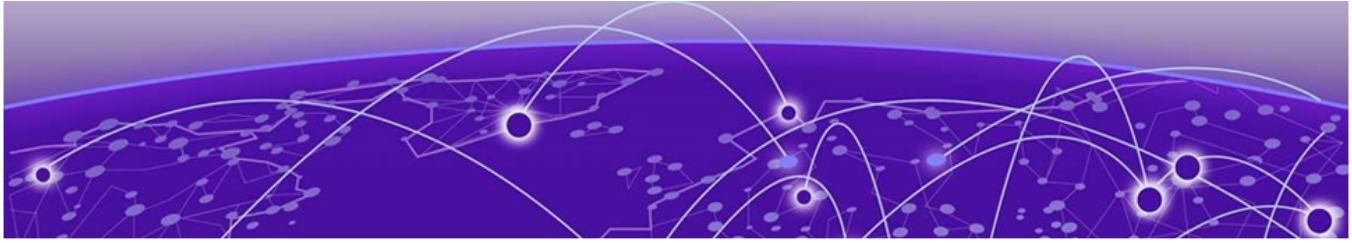
This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

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.



Technical Specifications

Korea EMC Statement on page 654

This section lists technical specifications for the hardware products described in this document.

Summit X150 Series Switches Technical Specifications

The Summit X150 series includes the following switches:

- Summit X150-24t switch
- Summit X150-24p switch
- Summit X150-48t switch

Table 165: Physical Dimensions

Summit X150-24t switch Summit X150-24p switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 12.13 inches (30.8 cm)
Summit X150-48t switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 15.28 inches (38.8 cm)

Table 166: Weight

Summit X150-24t switch	12.01 lb (5.46 kg)
Summit X150-24p switch	14.9 lb (6.8 kg)
Summit X150-48t switch	15.1 lb (6.9 kg)

Table 167: Packaged Dimensions

Summit X150-24t switch Summit X150-24p switch	Height: 12.6 inches (32 cm) Width: 23.6 inches (60 cm) Depth: 18.5 inches (47 cm)
Summit X150-48t switch	Height: 12.2 inches (31 cm) Width: 22.8 inches (58 cm) Depth: 22 inches (56 cm)

Table 168: Packaged Weight

Summit X150-24t switch	10.5 lb (4.8 kg)
Summit X150-24p switch	12.1 lb (5.5 kg)
Summit X150-48t switch	12.1 lb (5.5 kg)

Table 169: Summit X150-24t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A

Table 169: Summit X150-24t Power (continued)

Input current	0.5 A @ 115 V~ (low-line) 0.25 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	83% with 60% to 100% load
Heat dissipation (Watts, BTU)	36 W (122.8 BTU/hr)
Power consumption (Watts, BTU)	36 W (122.8 BTU/hr)

Table 170: Summit X150-24p Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.5 A
Input current (without PoE	0.75 A @ 115 V~ (low-line) 0.5 A @ 230 V~ (high-line)
Input current (with PoE full load)	4.4 A @ 115 V~ (low-line) 2.2 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Power cord wall plug	Refer to .
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	81% with 60% to 100% load

Table 170: Summit X150-24p Power (continued)

Heat dissipation (Watts, BTU)	60 W (204.7 BTU/hr
Power consumption (Watts, BTU)	500 W (1706 BTU/hr)

Table 171: Summit X150-48t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	0.5 A @ 115 V~ (low-line) 0.25 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	83% with 60% to 100% load
Heat dissipation (Watts, BTU)	36 W (123 BTU/hr)
Power consumption (Watts, BTU)	36 W (123 BTU/hr)

Table 172: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 173: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA)

Table 173: EMI/EMC Standards (continued)

	ICES-003 Class A (Canada)
European EMC standards	EN 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV L-L, 2kV L-G, Level 3, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (Korea)

Table 174: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications) ETSI EN 300 019 (Environmental for Telecommunications)

Table 175: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 176: 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
Operating conditions	Temperature range: 0° C to 40° C (32° F to 104° F) Humidity: 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks Random vibration: 3 to 500 MHz @ 1.5 G rms

Table 176: Environmental Data (continued)

Storage & transportation conditions (packaged)	Temperature: –40° C to 70° C (–40° F to 158° F) Humidity: 10% to 95% relative humidity, non-condensing Packaged shock (half sine): 180 m/s^2 (18 G), 6 ms, 600 shocks Packaged sine vibration: 5 to 62 Hz @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 42 inches (<15 kg box)
Acoustic noise (in dBA per ISO 7779)	Summit X150-24t: 45 (high fan speed) 37 (low fan speed) Summit X150-24p: 44 (high fan speed) 39 (low fan speed) Summit X150-48t: 45 (high fan speed) 37 (low fan speed)

Summit X250e Series Switches Technical Specifications

The Summit X250e series includes the following switches:

- Summit X250e-24t switch
- Summit X250e-24tDC switch
- Summit X250e-24p switch
- Summit X250e-24x switch
- Summit X250e-24xDC switch
- Summit X250e-48t switch
- Summit X250e-48tDC switch
- Summit X250e-48p switch

Table 177: Physical Dimensions

Summit X250e-24t switch Summit X250e-24tDC switch Summit X250e-24p switch Summit X250e-24x switch Summit X250e-24xDC switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 12.13 inches (30.8 cm)
Summit X250e-48t switch Summit X250e-48tDC Summit X250e-48p switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 15.28 inches (38.8 cm)

Table 178: Weight

Summit X250e-24t switch	10.5 lb (4.8 kg)
Summit X250e-24tDC switch	9.9 lb (4.5 kg)
Summit X250e-24p switch	121.1 lb (5.5 kg)
Summit X250e-24x switch	10.2 lb (4.6 kg)
Summit X250e-24xDC switch	10 lb (4.6 kg)

Table 178: Weight (continued)

Summit X250e-48t switch	12.1 lb (5.5 kg)
Summit X250e-48tDC switch	12.1 lb (5.5 kg)
Summit X250e-48p switch	12.1 lb (5.5 kg)

Table 179: Packaged Dimensions

Summit X250e-24t switch Summit X250e-24tDC switch Summit X250e-24p switch Summit X250e-24x switch Summit X250e-24xDC switch	Height: 12.6 inches (32 cm) Width: 23.6 inches (60 cm) Depth: 18.5 inches (47 cm)
Summit X250e-48t switch Summit X250e-48tDC switch Summit X250e-48p switch	Height: 12.2 inches (31 cm) Width: 22.8 inches (58 cm) Depth: 22 inches (56 cm)

Table 180: Packaged Weight

Summit X250e-24t switch Summit X250e-24x switch	13.2 lb (6.0 kg)
Summit X250e-24tDC switch	13.1 lb (6.0 kg)
Summit X250e-24xDC switch	13.2 lb (6.0 kg)
Summit X250e-24p switch	14.9 lb (6.8 kg)
Summit X250e-48t switch	15.1 lb (6.9 kg)
Summit X250e-48tDC switch	15.5 lb (7.0 kg)
Summit X250e-48p switch	17.0 lb (7.7 kg)

Table 181: Summit X250e-24t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	0.5 A @ 115 V~ (low-line) 0.25 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.

Table 181: Summit X250e-24t Power (continued)

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	83% at 60% to 100% load
Heat dissipation (Watts, BTU)	36 W (122.8 BTU/hr)
Power consumption (Watts, BTU)	36 W (122.8 BTU/hr)

Table 182: Summit X250e-24p Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.25 A
Input current (without PoE\)	0.75 A @ 115 V~ (low-line) 0.5 A @ 230 V~ (high-line)
Input current (with PoE full load)	4.4 A @ 115 V~ (low-line) 2.2 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	81% with 60% to 100% load
Heat dissipation (without PoE)	75W (256 BTU/hr)
Power consumption (without PoE)	75 W (256 BTU/hr)
Heat dissipation (with PoE full load)	130 W (444 BTU/hr)
Power consumption (with PoE full load)	525 W (1,791 BTU/hr)

Table 183: Summit X250e-24x Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	1.0 A @ 115 V~ (low-line) 0.5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz

Table 183: Summit X250e-24x Power (continued)

Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation	49 W (167.2 BTU/hr)
Power consumption	49 W (167.2 BTU/hr)

Table 184: Summit X250e-24xDC Power

Operational voltage range	-40 to -72 V⎓
Nominal input ratings	-48 V⎓, 2.0 A
Input current	1.25 A at -40 V⎓ (low-line) 0.75 A at -72 V⎓ (high-line)
Inrush current	20 A at -48 V⎓ 30 A at -72 V⎓
Power supply cord type	DC
Power supply input socket	TYCO 206061-1
Power cord input plug	TYCO 206060-1
Power cord wall plug	None provided
Power supply cord gauge	14 AWG (2.0 mm^2)
Efficiency	83%
Heat dissipation	42 W (143.3 BTU/hr)
Power consumption (Watts)	47 W (160.4 BTU/hr)

Table 185: Summit X250e-24tDC Power

Operational voltage range	-40 to -72 V⎓
Nominal input ratings	-48 V⎓, 2.0 A
Input current	0.8 A at -40 V⎓ (low-line) 0.5 A at -72 V⎓ (high-line)
Inrush current	20 A at 48 V⎓, 30 A at V⎓
Power supply cord type	DC

Table 185: Summit X250e-24tDC Power (continued)

Power supply input socket	TYCO 206061-1
Power cord input plug	TYCO 206060-1
Power cord wall plug	None provided
Power supply cord gauge	14 AWG (2.0 mm^2)
Efficiency	78%
Heat dissipation	31 W (105.8 BTU/hr)
Power consumption (Watts)	31 W (105.8 BTU/hr)

Table 186: Summit X250e-48t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	0.6 A @ 115 V~ (low-line) 0.3 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	83% with 60% to 100% load
Heat dissipation (Watts)	51 W (174 BTU/hr)
Power consumption (Watts)	51 W (174 BTU/hr)

Table 187: Summit X250e-48p Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.5 A
Input current with PoE full load	4.5 A @ 115 V~ (low-line) 2.25 A @ 230 V~ (high-line)
Input current without PoE	0.75 A @ 115 V~ (low-line) 0.5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V

Table 187: Summit X250e-48p Power (continued)

Power supply cord type	AC
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 651.
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	78% with 60% to 100% load
Heat dissipation with PoE full load	130 W (444 BTU/hr)
Heat dissipation without PoE	75 W (256 BTU/hr)
Power consumption with PoE full load	525 W (1791.4 BTU/hr)
Power consumption without PoE	75 W (256 BTU/hr)

Table 188: Summit X250e-48tDC Power

Operational voltage range	-40 to -72 V⎓
Nominal input ratings	-48 V⎓, 2.0 A
Input current	1.25 A at -40 V⎓ (low-line) 0.75 A at -57.6 V⎓ (high-line)
Inrush current	20 A @ 48 V⎓, 30 A @ 72 V⎓
Power supply cord type	DC
Power supply input socket	TYCO 206061-1
Power cord input plug	TYCO 206060-1
Power cord wall plug	None provided
Power supply cord gauge	14 AWG (2.0 mm^2)
Efficiency	78%
Heat dissipation	47 W (160.4 BTU/hr)
Power consumption	47 W (160.4 BTU/hr)

Table 189: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety)

Table 189: Safety Standards (continued)

	TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 190: 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 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV L-L, 2kV L-G, Level 3, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (South Korea)

Table 191: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications) ETSI EN 300 019 (Environmental for Telecommunications)

Table 192: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 193: 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

Table 193: Environmental Data (continued)

	ASTM D3580 Random Vibration Unpackaged 1.5G
Operating conditions	Temperature range: 0° C to 40° C (32° F to 104° F) Humidity: 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks Random vibration: 3 to 500 Hz @ 1.5 G rms
Storage & transportation conditions (packaged)	Storage temperature: –40° C to 85° C (–40° F to 185° 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 @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 42 inches (<15 kg box)
Acoustic noise (in dBA per ISO 7779)	Summit X250e-24t: 45 (high fan speed) 37 (low fan speed) Summit X250e-24p: 44 (high fan speed) 39 (low fan speed) Summit X250e-24x: 45 (high fan speed) 37 (low fan speed) Summit X250e-24xDC: 47 (high fan speed) 37 (low fan speed) Summit X250e-24tDC: 45 (high fan speed) 37 (low fan speed) Summit X250e-48t: 47 (high fan speed) 37 (low fan speed) Summit X250e-48p: 46 (high fan speed) 39 (low fan speed) Summit X250e-48tDC: 47 (high fan speed) 37 (low fan speed)

Summit X350 Series Switches Technical Specifications

The Summit X350 series includes the following switches:

- Summit X350-24t

- Summit X350-48t

Table 194: Physical Dimensions

Summit X350-24t switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 15.3 inches (38.7 cm)
Summit X350-48t switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 17.0 inches (43.2 cm)

Table 195: Weight

Summit X350-24t switch	13.75 lb (6.24 kg)
Summit X350-48t switch	15.75 lb (7.14 kg)

Table 196: Packaged Dimensions

Summit X350-24t switch Summit X350-48t switch	Height: 5.9 inches (15 cm) Width: 22.4 inches (57cm) Depth: 21.7 inches (55 cm)

Table 197: Packaged Weight

Summit X350-24t switch	18.7 lb (8.5 kg)
Summit X350-48t switch	20.4 lb (9.3 kg)

Table 198: Summit X350-24t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	0.75 A @ 115 V~ (low-line) 0.4A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load

Table 198: Summit X350-24t Power (continued)

Heat dissipation	75 W (256 BTU/hr)
Power consumption	75 W (256 BTU/hr)

Table 199: Summit X350-48t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	1.45 A @ 100 V~ (low-line) 0.65 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation	115W (393 BTU/hr)
Power consumption	115W (393 BTU/hr)

Table 200: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 201: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA)

Table 201: EMI/EMC Standards (continued)

	ICES-003 Class A (Canada)
European EMC standards	EN 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV L-L, 2kV L-G, Level 3, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (Korea)

Table 202: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications) ETSI EN 300 019 (Environmental for Telecommunications)

Table 203: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 204: 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
Operating conditions	Temperature range: 0° C to 40° C (32° F to 104° F) Humidity: 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks Random vibration: 3 to 500 MHz @ 1.5 G rms

Table 204: Environmental Data (continued)

Storage & transportation conditions (packaged)	Storage 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 @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 42 inches (<15 kg box)
Acoustic noise	Sound power in accordance with EN 300 753 (10-1997): Summit X350-24t: 48.7 dBA Summit X350-48t: 49.9 dBA Declared sound power: 6.4 belsA per ISO 7779 & ISO 9296 Bystander sound pressure in accordance with NEBS GR-63 Issue 2: Summit X350-24t: 38.9 dBA Summit X350-48t: 39.7 dBA

Summit X430 Series Switches Technical Specifications

The Summit X430 series includes the following switches:

- Summit X430-8p
- Summit X430-24t
- Summit X430-24p
- Summit X430-48t

Table 205: Physical Dimensions

Summit X430-8p switch	Height: 1.75 inches (4.4 cm) Width: 8.25 inches (21.0 cm) Depth: 10.31 inches (26.2 cm)
Summit X430-24t switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 8.2 inches (20.8 cm)
Summit X430-24p switch	Height: 1.75 inches (4.4 cm) Width: 17.31 inches (44.0 cm) Depth: 10.25 inches (26.0 cm)
Summit X430-48t switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 10.0 inches (25.4 cm)

Table 206: Weight

Summit X430-8p switch	3.1 lbs (1.4 kg)
Summit X430-24t switch	6.0 lbs (2.72 kg)

Table 206: Weight (continued)

Summit X430-24p switch	9.9 lbs (4.5 kg)
Summit X430-48t switch	9.1 lb (4.13 kg)

Table 207: Packaged Dimensions

Summit X430-8p switch	Height: 5.9 inches (15.2 cm) Width 13.79 inches (35.0 cm) Depth: 13.32 inches (33.8 cm)
Summit X430-24t switch	Height: 3.7 inches (9.4 cm) Width 22.0 inches (55.9 cm) Depth: 12.1 inches (30.7 cm)
Summit X430-24tp switch	Height: 6.0 inches (15.3 cm) Width 22.26 inches (56.5 cm) Depth: 13.79 inches (35.0 cm)
Summit X430-48t switch	Height: 5.1 inches (13.0 cm) Width 22.3 inches (56.6 cm) Depth: 14.0 inches (35.6 cm)

Table 208: Packaged Weight

Summit X430-8p switch	6.0 lb (2.7 kg)
Summit X430-24t switch	11.1 lb (5.05 kg)
Summit X430-24p switch	13.2 lb (6.0 kg)
Summit X430-48t switch	11.7 lb (5.31 kg)

Table 209: Sound Pressure (LpA)

Summit X430-8p switch	0 dB(A) (No fan)
Summit X430-24t switch	Fans low speed: 41 dB(A) Fans high speed 49 dB(A)
Summit X430-24p switch	Fans low speed: 41 dB(A) Fans high speed 53 dB(A)
Summit X430-48t switch	Fans low speed: 38 dB(A) Fans High speed 50 dB(A)
Note: *Sound pressure is measured in accordance with ISO 7779:2010(E).*	

Table 210: Declared Sound Power (L_{WAd})

Summit X430-8p switch	0 bels (No Fan)
Summit X430-24t switch	Fans low speed: 5.7 bels Fans high speed: 6.6 bels

Table 210: Declared Sound Power (L_{WAd}) (continued)

Summit X430-24p switch	Fans low speed: 5.6 bels Fans high speed: 6.8 bels
Summit X430-48t switch	Fans low speed: 5.3 bels Fans High speed: 6.5 bels
Note: *Declared Sound Power is presented in accordance with ISO-7779, ISO 9296:2010 per ETSI/EN 300 753:2012-01.*	

Table 211: Power: Summit X430-8p

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.75 A
Heat dissipation	24.2 W, 82.6 BTU/hr
Power consumption	24.2 W, 82.6 BTU/hr

Table 212: Power: Summit X430-24t

Nominal input ratings	100 to 240 V~, 50/60 Hz, 0.75 A
Heat dissipation	28.7 W, 97.9 BTU/hr
Power consumption	28.7 W, 97.9 BTU/hr

Table 213: Power: Summit X430-24p

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.75 A
Heat dissipation	55 W, 188 BTU/hr
Power consumption	55 W, 188 BTU/hr

Table 214: Power: Summit X430-48t

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.25 A
Heat dissipation	55.9 W, 191 BTU/hr
Power consumption	55.9 W, 191 BTU/hr

Table 215: 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 216: CPU, Memory

CPU/Memory

Table 216: CPU, Memory (continued)

CPU/Memory
400 MHz CPU
256 MB Memory
1.5 MB packet buffer per chip

Table 217: Safety Standards

North American Safety of 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 Safety of ITE	EN 60950-1:2007 2nd Ed. EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 218: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada) 2004/108/EC EMC Directive EN 55022:2010 Class A (Emissions for ITE Equipment) EN 55024:2010 Class A includes EN 61000-4-2, 3, 4, 5, 6, 11 EN 55011 :2009+A1:2010 (Emissions for Industrial, Scientific & Medical Radio Frequency Equipment) EN 61000-3-2: 2006+A2 2009 (Harmonics) EN 61000-3-3:2008 (Flicker) EN 61000-6-4: 2007+A1: 2011 (General Emissions for Industrial, Scientific & Medical) EN 61000-6-2:2005 (General Immunity for Industrial, Scientific & Medical) EN 50121-4:2006 (Emission and immunity of the signaling and telecommunications apparatus)

Table 218: EMI/EMC Standards (continued)

International EMC certifications	CISPR 22:2008 Class A (International Emissions for ITE Equipment) CISPR 24:2010 Class A (International Immunity for ITE Equipment) IEC 61000-4-2:2008/EN 61000-4-2:2009 (Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A) IEC 61000-4-3:2010/EN 61000-4-3:2006+A12008 +A2:2010 Radiated Immunity 20V/m, 80-960MHz, Criteria A Radiated Immunity 10V/m, 960-2100MHz, Criteria A Radiated Immunity 5V/m, 2100-2700MHz, Criteria A IEC 61000-4-4:2011/EN 61000-4-4: 2004+A1: 2010 Transient Burst, Power AC, ± 2.0kV, Criteria A Power DC, ± 2.0kV CM, 1kV DM, Criteria A I/O Cables, ± 2.0kV for all I/O longer than 3m IEC 61000-4-5:2005/EN 61000-4-5:2006 Surge, Test to 2/4kV, Level 3 AC Power, 1kV DM, 2kV CM, Criteria A DC Power 1kV DM, 2kV CM, Criteria A I/O 1kV L-G, Criteria A IEC 61000-4-6:2008/EN 61000-4-6:2009 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC 61000-4-8:2009/EN 61000-4-8:2010 Magnetic Immunity, Not applicable to Extreme's equipment IEC 61000-4-11:2004/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark KCC Mark, EMC Approval (Korea)

Table 219: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications) ETSI EN 300 019 (Environmental for Telecommunications) MEF 9 compliant MEF 14 compliant

Table 220: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3at PoE Plus

Table 221: 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

Table 221: Environmental Data (continued)

	ASTM D3580 Random Vibration Unpackaged 1.5 G
Operating conditions	Temperature: X430-8p: 0° C to 40° C (32° F to 104° F) X430-24t, X430-24p, X430-48t: 0° C to 45° C (32° F to 113° F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: X430-8p: 0 to 3,048 meters (10,000 feet) X430-24t: 0 to 4,000 meters (13,123 feet) X430-24p: 0 to 2,000 meters (6,567 feet) X430-48t: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks 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)

Summit X440 Series Switches Technical Specifications

The Summit X440 series includes the following switches:

- Summit X440-8t
- Summit X440-8p
- Summit X440-24t
- Summit X440-24tDC
- Summit X440-24x
- Summit X440-L2-24t
- Summit X440-24p
- Summit X440-24t-10G
- Summit X440-24p-10G
- Summit X440-24x-10G
- Summit X440-48t
- Summit X440-48tDC
- Summit X440-L2-48t
- Summit X440-48p

- Summit X440-48t-10G switch
- Summit X440-48p-10G switch

Table 222: Physical Dimensions

Summit X440-8t switch Summit X440-8p switch	Height: 1.73 inches (4.4 cm) Width: 12.0 inches (30.5 cm) Depth: 10.3 inches (26.1 cm)
Summit X440-24t switch Summit X440-24tDC switch Summit X440-L2-24t switch Summit X440-24p switch Summit X440-24x switch Summit X440-24t-10G switch Summit X440-24p-10G switch Summit X440-24x-10G switch Summit X440-48t switch Summit X440-48tDC switch Summit X440-L2-48t switch Summit X440-48p switch Summit X440-48t-10G switch Summit X440-48p-10G switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 10.0 inches (25.4 cm)

Table 223: Weight

Summit X440-8t switch	5.8 lb (2.64 kg)
Summit X440-8p switch	6.7 lb (3.04 kg)
Summit X440-24t switch Summit X440-L2-24t switch	8.4 lb (3.83 kg)
Summit X440-24tDC	8.47 lb (3.84)
Summit X440-24p switch Summit X440-24x switch	9.8 lb (4.47 kg)
Summit X440-24t-10G switch	8.5 lb (3.87 kg)
Summit X440-24p-10G switch Summit X440-24x-10G switch	9.8 lb (4.48 kg)
Summit X440-48t switch Summit X440-L2-48t switch	9.1 lb (4.13 kg)
Summit X440-48tDC	9.13 lb (4.14 kg)
Summit X440-48p switch	10.7 lb (4.85 kg)
Summit X440-48t-10G switch	9.1 lb (4.13 kg)
Summit X440-48p-10G switch	10.6 lb (4.83 kg)

Table 224: Packaged Dimensions

Summit X440-8t switch Summit X440-8p switch	Height: 3.31 inches (8.4 cm) Width 14.8 inches (37.5 cm)

Table 224: Packaged Dimensions (continued)

	Depth: 24.1 inches (61.2 cm)
Summit X440-24t switch Summit X440-24tDC switch Summit X440-L2-24t switch Summit X440-24p switch Summit X440-24x switch Summit X440-24t-10G switch Summit X440-24p-10G switch Summit X440-24x-10G switch Summit X440-48t switch Summit X440-48t DC switch Summit X440-L2-48t switch Summit X440-48p switch Summit X440-48t-10G switch Summit X440-48p-10G switch	Height: 5.12 inches (13.2 cm) Width: 22.13 inches (56.2 cm) Depth: 15.16 inches (38.5 cm)

Table 225: Packaged Weight

Summit X440-8t switch	8.29 lb (3.76 kg)
Summit X440-8p switch	9.17 lb (4.16 kg)
Summit X440-24t switch Summit X440-L2-24t switch Summit X440-24x switch	11.1 lb (5.05 kg)
Summit X440-24tDC	10.3 (4.69 kg)
Summit X440-24p switch	12.5 lb (5.65 kg)
Summit X440-24t-10G switch	11.1 lb (5.02 kg)
Summit X440-24p-10G switch Summit X440-24x-10G switch	12.5 lb (5.68 kg)
Summit X440-48t switch Summit X440-L2-48t switch	11.7 lb (5.31 kg)
Summit X440-48tDC	11.0 lb (4.99 kg)
Summit X440-48p switch	13.3 lb (6.02 kg)
Summit X440-48t-10G switch	11.7 lb (5.30 kg)
Summit X440-48p-10G switch	13.3 lb (6.02 kg)

Table 226: Fan Speed

	Note: Summit fans have the ability to change speeds depending upon operating conditions.
Summit X440-8t switch	Low speed: 0 RPM, High speed: 0 RPM (No fan)
Summit X440-8p switch	Low speed: 6800 RPM, High speed: 11000 RPM
Summit X440-24t switch	Low speed: 0 RPM, High speed 11000 RPM

Table 226: Fan Speed (continued)

Summit X440-24tDC switch	Low speed: 0 RPM, High speed 11000 RPM
Summit X440-L2-24t switch	Low speed: 0 RPM, High speed 11000 RPM
Summit X440-24x switch	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-24p switch	Low speed: 5900 RPM, High speed: 11000 RPM
Summit X440-24t-10G switch	Low speed: 0 RPM, High speed: 11000 RPM
Summit X440-24p-10G switch	Low speed: 5900 RPM, High speed: 11000 RPM
Summit X440-24x-10G	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-48t switch	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-48tDC switch	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-L2-48t switch	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-48p switch	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-48t-10G switch	Low speed: 5900 RPM, High speed 11000 RPM
Summit X440-48p-10G switch	Low speed: 5900 RPM, High speed: 11000 RPM

Table 227: Acoustic Sound

Summit X440-8t switch	Low speed: 0 dB(A), High speed: 0 dB(A) (No fan)
Summit X440-8p switch	Low speed: 44 dB(A), High speed: 55 dB(A)
Summit X440-24t switch Summit X440-L2-24t switch Summit X440-24tDC switch	Low speed: 0 dB(A) (fan not on), High speed: 51.6 dB(A)
Summit X440-24x	Low speed: 0 bels, High speed: 6.5 bels, Declared Sound Power (LWAd) Low speed: 0 dB(A), High speed: 62.4 dB(A), Sound Power (LWAm) Low speed: 0 dB(A), High speed: 51.7 dB(A), Sound Pressure (LpA)
Summit X440-24p switch	Low speed: 46.3 dB(A), High speed: 56.1 dB(A)
Summit X440-24t-10G switch	Low speed: 0 dB(A) (fan not on), High speed: 51.6 dB(A)
Summit X440-24x-10G	Low speed: 5.5 bels, High speed: 6.6 bels, Declared Sound Power (LWAd) Low speed: 51.6 dB(A), High speed: 62.9 dB(A), Sound Power (LWAm) Low speed: 41.2 dB(A), High speed: 52.4 dB(A), Sound Pressure (LpA)
Summit X440-24p-10G switch	Low speed: 42 dB(A), High speed: 57 dB(A)
Summit X440-48t switch Summit X440-L2-48t switch	Low speed: 39 dB(A), High speed: 55 dB(A)
Summit X440-48tDC switch	Low speed: 39 dB(A), High speed: 52.1 dB(A)
Summit X440-48p switch	Low speed: 42 dB(A), High speed: 57 dB(A)

Table 227: Acoustic Sound (continued)

Summit X440-48t-10G switch	Low speed: 39 dB(A), High speed: 55 dB(A)
Summit X440-48p-10G switch	Low speed: 42 dB(A), High speed: 57 dB(A)

Table 228: PSUs and X440 Models

60W	100W	250W POE	525 W POE
X440-8t	X440-24t	X440-8p	X440-24p
	X440-24t-10G		X440-24p-10G
	X440-24x		X440-48p
	X440-24x-10G		X440-48p-10G
	X440-48t		
	X440-48t-10G		

Table 229: Power: Summit X440-8t

Nominal input ratings	100 to 240 V~, 50/60 Hz, 0.50 A
Input current	0.35 A @ 110 V~ (low-line) 0.23 A @ 220 V~ (high-line)
Maximum inrush current	60 A @ 230VAC (25C)
Heat dissipation	39 W, 133 BTU/hr
Power consumption	39 W, 133 BTU/hr

Table 230: Power: Summit X440-8p

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.0 A
Input current	2.2 A @ 110 V~ (low-line) 1.1A @ 220 V~ (high-line)
Maximum inrush current	40 A @ 115VAC 60 Hz (25C) 70 A @ 230VAC 50 Hz (25C)
Heat dissipation	81 W, 276 BTU/hr
Power consumption	251 W, 856 BTU/hr

Table 231: Power: Summit X440-24t and X440-L2-24t

Nominal input ratings	100 to 240 V~, 50/60 Hz, 0.75 A
Input current	0.40 A @ 110 V~ (low-line) 0.20 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 40 A @ 230VAC 50 Hz (25C)

Table 231: Power: Summit X440-24t and X440-L2-24t (continued)

Heat dissipation	37 W, 126 BTU/hr
Power consumption	37 W, 126 BTU/hr

Table 232: Power: Summit X440-24tDC

Nominal input ratings	-36V to -72V, 1.25A
Heat dissipation	38 W, 129 BTU/hr
Power consumption	38 W, 129 BTU/hr

Table 233: Power: Summit X440-24p

Nominal input ratings	100 to 240 V~, 50/60 Hz, 6.0 A
Input current	5.3 A @ 110 V~ (low-line) 2.65 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 60 A @ 230VAC 50 Hz (25C)
With PoE	
Heat dissipation	205 W, 700 BTU/hr
Power consumption	585 W, 2000 BTU/hr
Without PoE	
Heat dissipation	37 W, 126 BTU/hr
Power consumption	37 W, 126 BTU/hr

Table 234: Power: Summit X440-24x

Nominal input ratings	100 to 240 V~, 50/60 Hz, 0.75 A
Input current	0.48 A @ 110 V~ (low-line) 0.27 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 40 A @ 230VAC 50 Hz (25C)
Heat dissipation	54 W, 184 BTU/hr
Power consumption	54 W, 184 BTU/hr

Table 235: Power: Summit X440-24t-10G

Nominal input ratings	100 to 240 V~, 50/60 Hz, 0.75 A
Input current	0.4 A @ 110 V~ (low-line) 0.2 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 40 A @ 230VAC 50 Hz (25C)

Table 235: Power: Summit X440-24t-10G (continued)

Heat dissipation	44 W, 150 BTU/hr
Power consumption	44 W, 150 BTU/hr

Table 236: Power: Summit X440-24p-10G

Nominal input ratings	100 to 240 V~, 50/60 Hz, 6.0 A
Input current	5.3 A @ 110 V~ (low-line) 2.65 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 60 A @ 230VAC 50 Hz (25C)
Heat dissipation	205 W, 700 BTU/hr
Power consumption	585 W, 2000 BTU/hr

Table 237: Power: Summit X440-24x-10G

Nominal input ratings	100 to 240 V~, 50/60 Hz, 0.75 A
Input current	0.5 A @ 110 V~ (low-line) 0.3 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 40 A @ 230VAC 50 Hz (25C)
Heat dissipation	56 W, 191 BTU/hr
Power consumption	56 W, 191 BTU/hr

Table 238: Power: Summit X440-48t and X440-L2-48t

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	0.85 A @ 110 V~ (low-line) 0.50 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 40 A @ 230VAC 50 Hz (25C)
Heat dissipation	57 W, 194 BTU/hr
Power consumption	57 W, 194 BTU/hr

Table 239: Power: Summit X440-48tDC

	-36V to -72V, 2.0 A

Table 239: Power: Summit X440-48tDC (continued)

Nominal input ratings	
Heat dissipation	57 W, 195 BTU/hr
Power consumption	57 W, 195 BTU/hr

Table 240: Power: Summit X440-48p

Nominal input ratings	100 to 240 V~, 50/60 Hz, 6.25 A
Input current	5.5 A @ 110 V~ (low-line) 2.75 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 60 A @ 230VAC 50 Hz (25C)
With PoE	
Heat dissipation	220 W, 750 BTU/hr
Power consumption	600 W, 2050 BTU/hr
Without PoE	
Heat dissipation	78 W, 266 BTU/hr
Power consumption	78 W, 266 BTU/hr

Table 241: Power: Summit X440-48t-10G

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	0.85 A @ 110 V~ (low-line) 0.5 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 40 A @ 230VAC 50 Hz (25C)
Heat dissipation	95 W, 325 BTU/hr
Power consumption	95 W, 325 BTU/hr

Table 242: Power: Summit X440-48p-10G

Nominal input ratings	100 to 240 V~, 50/60 Hz, 6.25 A
Input current	5.5 A @ 110 V~ (low-line) 2.75 A @ 220 V~ (high-line)
Maximum inrush current	30 A @ 115VAC 60 Hz (25C) 60 A @ 230VAC 50 Hz (25C)

Table 242: Power: Summit X440-48p-10G (continued)

Heat dissipation	220 W, 750 BTU/hr
Power consumption	600 W, 2050 BTU/hr

Table 243: CPU, Memory

CPU/Memory
500 MHz CPU
512 MB Memory
1.5 MB packet buffer per chip

Table 244: Safety Standards

North American Safety of 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 Safety of ITE	EN 60950-1:2007 2nd Ed. EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 245: EMI/EMC Standards

North America EMC for ITE	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada)
European EMC standards	FCC CFR 47 part 15 Class A (USA) ICES-003 Class A (Canada) 2004/108/EC EMC Directive EN 55022:2010 Class A (Emissions for ITE Equipment) EN 55024:2010 Class A includes EN 61000-4-2, 3, 4, 5, 6, 11 EN 55011 :2009+A1:2010 (Emissions for Industrial, Scientific & Medical Radio Frequency Equipment) EN 61000-3-2: 2006+A2 2009 (Harmonics) EN 61000-3-3:2008 (Flicker) EN 61000-6-4: 2007+A1: 2011 (General Emissions for Industrial, Scientific & Medical) EN 61000-6-2:2005 (General Immunity for Industrial, Scientific & Medical) EN 50121-4:2006 (Emission and immunity of the signaling and telecommunications apparatus)

Table 245: EMI/EMC Standards (continued)

International EMC certifications	CISPR 22:2008 Class A (International Emissions for ITE Equipment) CISPR 24:2010 Class A (International Immunity for ITE Equipment) IEC 61000-4-2:2008/EN 61000-4-2:2009 (Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A) IEC 61000-4-3:2010/EN 61000-4-3:2006+A12008 +A2:2010 Radiated Immunity 20V/m, 80-960MHz, Criteria A Radiated Immunity 10V/m, 960-2100MHz, Criteria A Radiated Immunity 5V/m, 2100-2700MHz, Criteria A IEC 61000-4-4:2011/EN 61000-4-4: 2004+A1: 2010 Transient Burst, Power AC, ± 2.0kV, Criteria A Power DC, ± 2.0kV CM, 1kV DM, Criteria A I/O Cables, ± 2.0kV for all I/O longer than 3m IEC 61000-4-5:2005/EN 61000-4-5:2006 Surge, Test to 2/4kV, Level 3 AC Power, 1kV DM, 2kV CM, Criteria A DC Power 1kV DM, 2kV CM, Criteria A I/O 1kV L-G, Criteria A IEC 61000-4-6:2008/EN 61000-4-6:2009 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A IEC 61000-4-8:2009/EN 61000-4-8:2010 Magnetic Immunity, Not applicable to Extreme's equipment IEC 61000-4-11:2004/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark KCC Mark, EMC Approval (Korea)

Table 246: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications) ETSI EN 300 019 (Environmental for Telecommunications) MEF 9 compliant MEF 14 compliant

Table 247: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3at PoE Plus IEEE 802.3i 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ae 10GBASE-T

Table 248: 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

Table 248: Environmental Data (continued)

	EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5 G
Operating conditions	Temperature: 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) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks 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)

Summit X450 Series Switches Technical Specifications

The Summit X450 series includes the following switches:

- Summit X450-24t switch
- Summit X450-24x switch

Summit X450 Series Switch Technical Specifications

Table 249: Physical Dimensions

Summit X450-24t switch Summit X450-24x switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 16.38 inches (41.6 cm)

Table 250: Weight

Summit X450-24t switch	14 lb (6.35 kg)
Summit X450-24x switch	13.8 lb (6.26 kg)

Table 251: Power

Summit switch	Auto-ranging 100 V to 240 VAC, 50/60 Hz
Min voltage/associated current	1.5 A at 100 V
Max voltage/associated current	1 A at 240 VAC
Line frequency	50 to 60 Hz

Table 251: Power (continued)

Heat dissipation, Watts/BTU	160 W/546 BTU/hr
Power supply cord selection	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651.

Table 252: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) NOM/NYCE (Mexico) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 253: 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 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV, 4kV, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (South Korea)

Table 254: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications)

Table 254: Telecom Standards (continued)

	ETSI EN 300 019 (Environmental for Telecommunications)

Table 255: 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
Operating conditions	Temperature range 0 °C to 40 °C (32 °F to 104 °F) Humidity:10% to 95% relative humidity, non-condensing Shock (half sine): 30 m/s^2 (3 G), 11ms, 18 shocks Random vibration: 3 to 500 Hz @ 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): 100 m/s^2 (6 G), 6 ms, 600 shocks Packaged random vibration: 5 to 200 Hz @ 1.0 ASD ($1m^2/s^2$), w/–3 dB/octave 14 drops minimum on sides & corners @ 36 inches (<15 kg box)

Table 256: Acoustic Sound

Sound power in accordance with EN 300 753 (10-1997)	Sound power: 61 dBA per ISO 7779 Declared sound power: 6.3 belsA per ISO 7779 & ISO 9296
Sound pressure in accordance with NEBS GR-63 Issue 2	Bystander sound pressure: 49 dBA rear @ 0.6m

Summit X450a Series Switches Technical Specifications

The Summit X450a series includes the following switches:

- Summit X450a-24t switch
- Summit X450a-24tDC switch
- Summit X450a-24x switch

- Summit X450a-24xDC switch
- Summit X450a-48t switch

Table 257: Physical Dimensions

Summit X450a-24t switch Summit X450a-24tDC switch Summit X450a-24x switch Summit X450a-24xDC switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 15.3 inches (38.9 cm)
Summit X450a-48t switch Summit X450a-48tDC switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 17.0 inches (43.2 cm)

Table 258: Weight

Summit X450a-24t switch	13.8 lb (6.24 kg)
Summit X450a-24tDC switch	12.3 lb (5.56 kg)
Summit X450a-24x switch	13.0 lb (5.9 kg)
Summit X450a-24xDC switch	12.50 lb (5.67 kg)
Summit X450a-48t switch	15.8 lb (7.14 kg)
Summit X450a-48tDC switch	15.5 lb (7.03 kg)

Table 259: Packaged Dimensions

Summit X450a-24t switch Summit X450a-24tDC switch Summit X450a-24x switch Summit X450a-24xDC switch Summit X450a-48t switch Summit X450a-48tDC switch	Height: 5.9 inches (15 cm) Width: 22.4 inches (57 cm) Depth: 21.7 inches (55 cm)

Table 260: Packaged Weight

Summit X450a-24t switch	18.7 lb (8.5 kg)
Summit X450a-24tDC switch	16.8 lb (7.7 kg)
Summit X450a-24x switch	18.7 lb (8.5 kg)
Summit X450a-24xDC switch	16.8 lb (7.7 kg)
Summit X450a-48t switch	20.4 lb (9.3 kg)
Summit X450a-48tDC switch	17.75 lb (8.0 kg)

Table 261: Fan Speed

	2900 RPM/11.3 CFM

Table 261: Fan Speed (continued)

Delta Blower	
Sunon Fan	7200 RPM/8.9 CFM

Table 262: Summit X450a-24t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Input current	1.0 A @ 115 V~ (low-line) 0.5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation	100 W (341.2 BTU/hr)
Power consumption	100 W (341.2 BTU/hr)

Table 263: Summit X450a-24tDC Power

Operational voltage range	–36 to –72 V⎓
Nominal input ratings	–48 V⎓, 2.0 A
Nominal input current	2.0 A @ -36 V⎓ (low-line) 1.0 A @ -72 V⎓ (high-line)
Inrush current	20 A @ 48 V, 30 A @ 72 V
Power supply cord type	DC
Power supply input socket	TYCO PN 206061-1
Power cord input plug	TYCO PN 206060-1
Power cord wall plug	None provided
Power supply cord gauge	14 AWG (2.0 mm^2)

Table 263: Summit X450a-24tDC Power (continued)

Heat dissipation, Watts, BTU	75 W, 255.9 BTU/hr
Power consumption, Watts, BTU	75 W, 255.9 BTU/hr

Table 264: Summit X450a-48t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.5 A
Nominal input current	1.45 A @ 115 V~ (low-line) 0.65 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation	160 W (512 BTU/hr)
Power consumption, Watts, BTU	160 W (512 BTU/hr)

Table 265: Summit X450a-48tDC Power

Operational voltage range	–36 to –72 V⎓
Nominal input voltage	–48 V⎓, 4.5 A
Input current	4.0 A @ –36 VDC (low-line) 2.0 A @ –72 VDC (high-line)
Inrush current	29 A @ 48 V, 30 A @ 72 V
Input wire harness	Extreme part number 250088
Power supply cord gauge	14 AWG (2.0 mm^2)
Power cord input plug	TYCO PN 206060-1
Power supply input socket	TYCO PN 206061-1

Table 266: Summit X450a-24x Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.5 A

Table 266: Summit X450a-24x Power (continued)

Nominal input current	1.0 A @ 115 V~ (low-line) 0.5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation	80 W (273 BTU/hr)
Power consumption	80 W (273 BTU/hr)

Table 267: Summit X450a-24xDC Power

Operational voltage range	–36 to –72 V⎓
Nominal input ratings	–48 V⎓, 2.5 A
Input current	2.5 A @ -36 V⎓ (low-line) 1.25 A @ -72 V⎓ (high-line)
Inrush current	40 A peak maximum
Input wire harness	Extreme Networks PN 250088
Power supply input socket	TYCO PN 206061-1
Power cord input plug	TYCO PN 206060-1
Power cord wall plug	None provided
Power supply cord gauge	14 AWG (2.0 mm^2)
Heat dissipation	98 W (334 BTU/hr)
Power consumption	98 W (334 BTU/hr)

Table 268: CPU, Memory

CPU/Memory

Table 268: CPU, Memory (continued)

CPU/Memory
400 MHz CPU
256 MB memory

Table 269: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 270: 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 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV L-L, 2kV L-G, Level 3, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (South Korea)

Table 271: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications)

Table 271: Telecom Standards (continued)

	ETSI EN 300 019 (Environmental for Telecommunications)

Table 272: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 273: 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
Operating conditions	Temperature range: 0° C to 40° C (32° F to 104° F) Humidity: 10% to 93% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks Random vibration: 3 to 500 Hz @ 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 @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 42 inches (<15 kg box)
Sound power in accordance with EN 300 753 (10-1997) Summit X450a-24t and X450a-48t	Sound power: 62 dBA per ISO 7779 Declared sound power: 6.4 belsA per ISO 7779 & ISO 9296
Bystander sound pressure in accordance with NEBS GR-63 Issue 2 Summit X450a-24t and X450a-48t	Bystander sound pressure: 54 dBA right side @ 0.6m

Summit X450e Series Switches Technical Specifications

The Summit X450e series includes the following switches:

- Summit X450e-24p switch
- Summit X450e-48p switch

- Summit X450e-24t switch
- Summit X450e-48t switch

Table 274: Physical Dimensions

Summit X450e-24p switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 15.30 inches (38.7 cm)
Summit X450e-48p switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 17 inches (43.2 cm)
Summit X450e-24t switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 15.3 inches (38.9 cm)
Summit X450e-48t switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 17.0 inches (43.2 cm)

Table 275: Weight

Summit X450e-24p switch	14 lb (6.4 kg)
Summit X450e-48p switch	16.25 lb (7.4 kg)
Summit X450e-24t switch	11.8 lb (5.4 kg)
Summit X450e-48t switch	15.75 lb (7.14 kg)

Table 276: Packaged Dimensions

Summit X450e-24p switch Summit X450e-48p switch	Height: 5.9 inches (15 cm) Width: 22.4 inches (57 cm) Depth: 21.7 inches (55 cm)

Table 277: Packaged Weight

Summit X450e-24p switch	18.9 lb (8.6 kg)
Summit X450e-48p switch	21 lb (9.6 kg)
Summit X450e-24t switch	26.8 lb (12.16 kg)
Summit X450e-48t switch	29.9 lb (13.6 kg)

Table 278: Summit X450e-24p Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.25 A
Input current	4.25 A @ 115 V~ (low-line) 2.0 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz

Table 278: Summit X450e-24p Power (continued)

Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation with PoE full load	120 W (410 BTU/hr)
Power consumption with PoE full load	488 W (1,665 BTU/hr)
Heat dissipation without PoE	54 W (184 BTU/hr)
Power consumption without PoE	54 W (184 BTU/hr)

Table 279: Summit X450e-48p Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 6.0 A
Nominal input current	5.25 A @ 115 V~ (low-line) 2.5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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	80% with 60% to 100% load
Heat dissipation with PoE full load	180 W (614 BTU/hr)
Power consumption with PoE full load	507 W (1,730 BTU/hr)

Table 279: Summit X450e-48p Power (continued)

Heat dissipation without PoE	73 W (250 BTU/hr)
Power consumption without PoE	73 W (250 BTU/hr)

Table 280: Summit X450e-24t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.0 A
Nominal input current	0.52 A @ 100 V~ (low-line) 0.31 A @ 240 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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
Heat dissipation, Watts, BTU	52 W (178 BTU/hr)
Power consumption, Watts, BTU	52 W (178 BTU/hr)

Table 281: Summit X450e-48t Power

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50/60 Hz, 6 A
Nominal input current	0.94 A @ 100 V~ (low-line) 0.43 A @ 240 V~ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	30 A @ 115 V, 60 A @ 230 V
Power supply cord type	AC
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 651.
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

Table 281: Summit X450e-48t Power (continued)

Heat dissipation	94 W (321 BTU/hr)
Power consumption	94 W (321 BTU/hr)

Table 282: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 283: 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 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV L-L, 2kV L-G, Level 3, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (South Korea)

Table 284: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications)

Table 284: Telecom Standards (continued)

	ETSI EN 300 019 (Environmental for Telecommunications)

Table 285: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 286: 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
Operating conditions	Temperature range: 0°C to 40°C (32°F to 104°F) Humidity: 10% to 93% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks Random vibration: 3 to 500 Hz @ 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 @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 42 inches (<15 kg box)
Acoustic sound	Sound Power in accordance with EN 300 753 (10-1997) Sound power: 62 dBA per ISO 7779 Declared sound power: 6.4 belsA per ISO 7779 & ISO 9296 Bystander Sound Pressure in accordance with NEBS GR-63 Issue 2 Bystander sound pressure: 54 dBA right side @ 0.6 m

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 287: X450-G2 Unpackaged Dimensions

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	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 19.2 inches (43.2 cm)

Table 288: X450-G2 Unpackaged Weight

X450-G2-24t-GE4 X450-G2-24t-10GE4	13.71 lb (6.22 kg)
X450-G2-48t-GE4 X450-G2-48t-10GE4	14.22 lb (6.45 kg)
X450-G2-24p-GE4 X450-G2-24p-10GE4	13.93 lb (6.32 kg)
X450-G2-48p-GE4 X450-G2-48p-10GE4	14.51 lb (6.58 kg)

Table 289: X450-G2 Packaged Dimensions

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	Height: 6.70 inches (17.02 cm) Width: 22.85 inches (58.04 cm) Depth: 24.03 inches (60.96 cm)

Table 290: X450-G2 Packaged Weight

X450-G2-24t-GE4 X450-G2-24t-10GE4	20.72 lb (9.50 kg)
X450-G2-48t-GE4 X450-G2-48t-10GE4	21.23 lb (9.74 kg)
X450-G2-24p-GE4 X450-G2-24p-10GE4	20.94 lb (9.61 kg)
X450-G2-48p-GE4 X450-G2-48p-10GE4	21.52 lb (9.87 kg)

Table 291: 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 292: 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 293: 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 294: 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 295: 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 296: 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 297: 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 298: 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 299: 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 300: IEEE 802.3 Media Access Standards

Table 300: IEEE 802.3 Media Access Standards (continued)

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 301: 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)

Summit X460 Series Switches Technical Specifications

The Summit X460 series includes the following switches:

- Summit X460-24t switch
- Summit X460-48t switch
- Summit X460-24x switch
- Summit X460-48x switch

- Summit X460-24p switch
- Summit X460-48p switch

Note

For the technical specifications of power supplies for the Summit X460 series switches, see Summit 300 W Power Supplies Technical Specifications on page 631 and 750 W Power Supplies Technical Specifications on page 640.

Table 302: Physical Dimensions

Summit X460-24t switch Summit X460-48t switch Summit X460-24x switch Summit X460-48x switch Summit X460-24p switch Summit X460-48p switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 17.0 inches (43.2 cm)
SummitStack module SummitStack-V80 module XGM3SB-4sf option card	Height: 1.4 inches (3.55 cm) Width: 3.4 inches (8.6 cm) Depth: 4.9 inches (12.5 cm)
XGM3-2sf option card XGM3S-2sf option card XGM3S-2xsf option card	Height: 1.4 inches (3.55 cm) Width: 2.9 inches (7.4 cm) Depth: 4.9 inches (12.5 cm)
Summit X460 fan module	Height: 1.6 inches (4.15 cm) Width: 3.25 inches (8.26 cm) Depth: 4.9 inches (12.53 cm)

Table 303: Weight

Summit X460-24t switch	12.8 lb (5.81 kg)
Summit X460-48t switch	13.6 lb (6.15 kg)
Summit X460-24x switch	13.2 lb (6.01 kg)
Summit X460-48x switch	14.1 lb (6.4 kg)
Summit X460-24p switch	13.1 lb (5.94 kg)
Summit X460-48p switch	13.9 lb (6.3 kg) **Note:** Switch weights include installed fan module. They do not include installed VIM2 modules or power supplies
SummitStack module	0.42 lb (0.19 kg)
SummitStack-V80 module	0.53 lb (0.24 kg)
XGM3-2sf module	0.46 lb (0.21 kg)
XGM3S-2sf option card	0.5 lb (0.23 kg)
XGM3S-2xf option card	0.5 lb (0.23 kg)

Table 303: Weight (continued)

XGM3SB-4sf option card	0.5 lb (0.23 kg)
Summit X460 fan module	0.66 lb (0.30 kg)

Table 304: Packaged Dimensions

Summit X460-24t switch Summit X460-48t switch Summit X460-24x switch Summit X460-48x switch Summit X460-24p switch Summit X460-48p switch	Height: 6.5 inches (16.5 cm) Width: 23.4 inches (59.3 cm) Depth: 26.2 inches (66.5 cm)

Table 305: Packaged Weight

Summit X460-24t switch	23.6 lb (10.7 kg)
Summit X460-48t switch	24.3 lb (11.0 kg)
Summit X460-24x switch	24.0 lb (10.9 kg)
Summit X460-48x switch	24.9 lb (11.3 kg)
Summit X460-24p switch	23.8 lb (10.8 kg)
Summit X460-48p switch	24.6 lb (11.2 kg)
XGM3-2sf module	0.79 lb (0.36 kg)
XGM3S-2sf option card	1.0 lb (0.45 kg)
XGM3S-2xf option card	1.0 lb (0.45 kg)
XGM3SB-4sf option card	1.0 lb (0.45 kg)
SummitStack module	0.74 lb (0.34 kg)
SummitStack-V80 module	0.85 lb (0.39kg)
Summit X460 fan module	0.79 lb (0.36 kg)

Table 306: Fan

Minimum speed	2500 RPM
Maximum speed	15900 RPM
Acoustic sound	44 dB at low fan speed, 64 dB at high fan speed

Power: Summit X460-24t

Table 307: Summit X460-24t with No Installed Option Card or Stacking Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1 A
Input current	0.9 A @ 100 V~ (low-line) 0.45 A @ 240 V~ (high-line)

Table 307: Summit X460-24t with No Installed Option Card or Stacking Module (AC Power Supply) (continued)

Minimum power consumption	83 W
Minimum heat dissipation	284 BTU/hr
Maximum power consumption	103 W
Maximum heat dissipation	351 BTU/hr

Table 308: Summit X460-24t with No Option Card or Stacking Module (DC Power Supply)

Nominal input ratings	48 V⎓, 2 A
Input current	1.3 A @ 48 V⎓ (low-line) 1.15 A @ 60 V⎓ (high-line)
Minimum power consumption	67.8 W
Minimum heat dissipation	231 BTU/hr
Maximum power consumption	85 W
Maximum heat dissipation	290 BTU/hr

Power: Summit X460-24x

Table 309: Summit X460-24x with No Option Card or Stacking Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1 A
Input current	0.9 A @ 100 V~ (low-line) 0.45 A @ 240 V~ (high-line)
Minimum power consumption	89 W
Minimum heat dissipation	304 BTU/hr
Maximum power consumption	107 W
Maximum heat dissipation	365 BTU/hr

Table 310: Summit X460-24x with No Option Card or Stacking Module (DC Power Supply)

Nominal input ratings	48 V⎓, 1.75 A
Input current	1.5 A @ 48 V⎓ (low-line) 1.3 A @ 60 V⎓ (high-line)
Minimum power consumption	74 W
Minimum heat dissipation	253 BTU/hr
Maximum power consumption	93 W
Maximum heat dissipation	317 BTU/hr

Power: Summit X460-24p

Table 311: Summit X460-24p with No Option Card or Stacking Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.25 A (per power supply)
Input current	4.9 A @ 100 V~ (low-line) (per power supply) 2.0 A @ 240 V~ (high-line) (per power supply)
Minimum power consumption	481 W 962 W (power supply * 2 units)
Minimum heat dissipation	1,640 BTU/hr (per power supply) 3,280 BTU/hr (power supply * 2 units)
Maximum power consumption	493 W 986 W (power supply * 2 units)
Maximum heat dissipation	1,681 BTU/hr 3,362 BTU/hr

Power: Summit X460-48t

Table 312: Summit X460-48t with No Option Card or Stacking Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.25 A
Input current	1.1 A @ 100 V~ (low-line) 0.5 A @ 240 V~ (high-line)
Minimum power consumption	105 W
Minimum heat dissipation	359 BTU/hr
Maximum power consumption	129 W
Maximum heat dissipation	440 BTU/hr

Table 313: Summit X460-48t with No Option Card or Stacking Module (DC Power Supply)

Nominal input ratings	48 V⎓, 2 A
Input current	1.9 A @ 48 V⎓ (low-line) 1.6 A @ 60 V⎓ (high-line)
Minimum power consumption	107 W
Minimum heat dissipation	365 BTU/hr
Maximum power consumption	121 W
Maximum heat dissipation	413 BTU/hr

Power: Summit X460-48x

Table 314: Summit X460-48x with No Option Card or Stacking Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 1.25 A
Input current	1.1 A @ 100 V~ (low-line) 0.5 A @ 240 V~ (high-line)
Minimum power consumption	101 W
Minimum heat dissipation	345 BTU/hr
Maximum power consumption	119 W
Maximum heat dissipation	406 BTU/hr

Table 315: Summit X460-48x with No Installed Option Card or Stacking Module (DC Power Supply)

Nominal input ratings	48 V⎓, 2.25 A
Input current	2.1 A @ 48 V⎓ (low-line) 1.8 A @ 60 V⎓ (high-line)
Minimum power consumption	107 W
Minimum heat dissipation	365 BTU/hr
Maximum power consumption	121 W
Maximum heat dissipation	413 BTU/hr

Power: Summit X460-48p

Table 316: Summit X460-48p with No Option Card or Stacking Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 5.5 A (per power supply)
Input current	5.0 A @ 100 V~ (low-line) 2.1 A @ 240 V~ (high-line)
Minimum power consumption	493 W 966 W (power supply * 2 units)
Minimum heat dissipation	1,682 BTU/hr (per power supply) 3,364 BTU/hr (power supply * 2 units)

Table 316: Summit X460-48p with No Option Card or Stacking Module (AC Power Supply) (continued)

Maximum power consumption	505 W 1010 W (power supply * 2 units)
Maximum heat dissipation	1,722 BTU/hr 3,444 BTU/hr

Table 317: CPU, Memory

CPU/Memory
600 MHz CPU
512 MB memory
2.5 MB buffer, per chip

Table 318: Safety Standards

North American Safety of 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 Safety of ITE	EN 60950-1:2007 2nd Ed. EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 319: 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 EN 50121-4:2006 (Emission and immunity of the signaling and telecommunications apparatus)

Table 319: EMI/EMC Standards (continued)

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 EC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark KCC Mark, EMC Approval (Korea)

Table 320: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications) ETSI EN 300 019 (Environmental for Telecommunications)

Table 321: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 322: Environmental Data

Environmental standards	EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational EN/ETSI 300 753 (1997-10) - Acoustic Noise ASTM D3580 Random Vibration Unpackaged 1.5 G
Operating conditions	Temperature range: Summit X460-24t, X460-48t, X460-24x, and X460-48x 0° C to 45° C (32° F to 113° F) Summit X460-24p, X460-48p 0° C to 40° C (32° F to 104° F) Humidity: 10% to 95% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks 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

Table 322: Environmental Data (continued)

	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 323: 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 324: 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)

Table 324: X460-G2 Unpackaged Weight (With Blanks; No PSU or Fan Module) (continued)

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 325: 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 326: 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)

Table 326: X460-G2 Packaged Weight (No PSU or Fan Module) (continued)

X460-G2-24p-24hp-10GE4	20.50 lb (9.30 kg)
X460-G2-16mp-32p-10GE4	20.94 lb (9.50 kg)

Table 327: 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 328: 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

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 328: Fan and Acoustic Noise (continued)

Switch Model	Bystander Sound Pressure	Declared Sound Power (L_{WAd})
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
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

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 328: Fan and Acoustic Noise (continued)

Switch Model	Bystander Sound Pressure	Declared Sound Power (L_{WAd})
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
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.		

Table 329: 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 330: 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~, 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~ 200-240 V~ 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~ 200-240 V~ 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~ 200-240 V~ 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~ 200-240 V~ 50/60 Hz, 7.7A/3.7 A max per PS

Table 330: 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~ 200-240 V~ 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~ 200-240 V~ 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~ 200-240 V~ 50/60 Hz, 11.5A/5.5 A max per PS

Table 331: 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

Table 331: X460-G2 Power Consumption (continued)

Switch Model	Minimum Heat Dissipation	Minimum Power Consumption	Maximum Heat Dissipation	Maximum Power Consumption
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 332: 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

Table 332: X460-G2 PoE Power Budget (continued)

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 & 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 333: X460-G2 PoE Power Budget

PSU Configuration	X460-G2-24p-GE4 X460-G2-24p-10GE4	X460-G2-48p-GE4 X460-G2-48p-10GE4
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
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
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
2 PSUs of 1100 W	720 W 24 ports @ 30 W 24 ports @ 15.4 W	1440 W 48 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

Table 334: 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 335: 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 336: 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 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 337: Telecom Standards

	EN/ETSI 300 386:2008 (EMC Telecommunications) EN/ETSI 300 019 (Environmental for Telecommunications)

Table 337: Telecom Standards (continued)

	MEF9 and MEF14 certified for EPL, EVPL, and ELAN

Table 338: 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 339: 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 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)

Summit X480 Series Switches Technical Specifications

The Summit X480 series includes the following switches:

- Summit X480-24x switch
- Summit X480-48x switch

- Summit X480-48t switch

Table 340: Physical Dimensions

Summit X480-24x switch Summit X480-48x switch Summit X480-48t switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 19.0 inches (48.3 cm)
VIM2-SummitStack module VIM2-10G4X module VIM2-SummitStack128 module VIM2-SummitStack-V80 module VIM3-40G4X module	Height: 1.7 inches (4.3 cm) Width: 5.2 inches (13.2 cm) Depth: 9.9 inches (25.2 cm)
Summit X480 fan module	Height: 1.7 inches (4.3 cm) Width: 5.2 inches (13.2 cm) Depth: 9.9 inches (25.2 cm)

Table 341: Weight

Summit X480-24x switch	20.9 lb (9.5 kg)
Summit X480-48x switch	22.7 lb (10.3 kg)
Summit X480-48t switch	21.2 lb (9.6 kg)
Note: Switch weights include installed fan module. They do not include installed VIM2 modules or power supplies.	
VIM2-SummitStack module	2.03 lb (0.92 kg)
VIM2-10G4X module	2.76 lb (1.25 kg)
VIM3-40G4X module	2.40 lb (1.09 kg)
VIM2-SummitStack128 module	2.05 lb (0.93 kg)
VIM2-SummitStack-V80 module	1.48 lb (0.67 kg)
Summit X480 fan module	0.45 lb (0.99 kg)

Table 342: Packaged Dimensions

Summit X480-24x switch Summit X480-48x switch Summit X480-48t switch	Height: 6.5 inches (16.5 cm)
	Width: 23.4 inches (59.3 cm)
	Depth: 26.2 inches (66.5 cm)

Table 342: Packaged Dimensions (continued)

VIM2-SummitStack module VIM2-10G4X module VIM2-SummitStack128 module VIM2-SummitStack-V80 module	Height: 3.9 inches (10 cm)
	Width: 9.4 inches (24.0 cm)
	Depth: 15.4 inches (39 cm)

Table 343: Packaged Weight

Summit X480-24x switch	20.94 lb (9.5 kg)
Summit X480-48x switch	22.7 lb (10.3 kg)
Summit X480-48t switch	21.2 lb (9.6 kg)
VIM2-SummitStack module	2.0 lb (0.92 kg)
VIM2-10G4X module	2.75 lb (1.25 kg)
VIM3-40G4X module	3.46 lb (1.57 kg)
VIM2-SummitStack128 module	2.1 lb (0.93 kg)
VIM2-SummitStack-V80 module	2.2 lb (1 kg)
Summit X480 fan module	1.27 lb (0.58 kg)

Table 344: Fan Speed

Minimum speed	4500 RPM
Maximum speed	18000 RPM

Table 345: Acoustic Noise

	60 db at low fan speed, 66 db at high fan speed

Power: Summit X480-24x

Table 346: Summit X480-24x with No Installed VIM (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.0 A @ 100 V~ (low-line) 0.9 A @ 240 V~ (high-line)
Heat dissipation	195 W, 663 BTU/hr
Power consumption	195 W, 663 BTU/hr

Table 347: Summit X480-24x with VIM2-SummitStack Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.01 A @ 100 V~ (low-line) 0.88 A @ 240 V~ (high-line)
Heat dissipation	200 W, 680 BTU/hr
Power consumption	200 W, 680 BTU/hr

Table 348: Summit X480-24x with VIM2-10G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.4 A @ 100 V~ (low-line) 1.1 A @ 240 V~ (high-line)
Heat dissipation	241 W, 823 BTU/hr
Power consumption	241 W, 823 BTU/hr

Table 349: Summit X480-24x with VIM2-SummitStack128 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.08 A @ 100 V~ (low-line) 0.91 A @ 240 V~ (high-line)
Heat dissipation	206 W, 704 BTU/hr
Power consumption	206 W, 704 BTU/hr

Table 350: Summit X480-24x with VIM2-SummitStack-V80 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.09 A @ 100 V~ (low-line) 0.92 A @ 240 V~ (high-line)
Heat dissipation	207 W, 706 BTU/hr
Power consumption	207 W, 706 BTU/hr

Table 351: Summit X480-24x with VIM3-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.40 A @ 100 V~ (low-line) 0.95 A @ 240 V~ (high-line)
Heat dissipation	238 W, 812 BTU/hr
Power consumption	238 W, 812 BTU/hr

Table 352: Summit X480-24x with No Installed VIM (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	3.25 A @ 48 V⎓ (low-line) 2.6 A @ 60 V⎓ (high-line)
Heat dissipation	156 W, 532 BTU/hr
Power consumption	156 W, 532 BTU/hr

Table 353: Summit X480-24x with VIM2-SummitStack Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	3.4 A @ 48 V⎓ (low-line) 2.7 A @ 60 V⎓ (high-line)
Heat dissipation	161 W, 550 BTU/hr
Power consumption	161 W, 550 BTU/hr

Table 354: Summit X480-24x with VIM2-10G4X Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	5.7 A @ 48 V⎓ (low-line) 4.2 A @ 60 V⎓ (high-line)
Heat dissipation	246 W, 839 BTU/hr
Power consumption	246 W, 839 BTU/hr

Table 355: Summit X480-24x with VIM2-SummitStack128 Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	3.5 A @ 48 V⎓ (low-line) 2.8 A @ 60 V⎓ (high-line)
Heat dissipation	167 W, 569 BTU/hr
Power consumption	167 W, 569 BTU/hr

Table 356: Summit X480-24x with VIM2-SummitStack-V80 Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	3.6 A @ 48 V⎓ (low-line) 2.9 A @ 60 V⎓ (high-line)
Heat dissipation	168 W, 573 BTU/hr
Power consumption	169 W, 573 BTU/hr

Table 357: Summit X480-24x with VIM3-40G4X Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	6.4 A @ 48 V⎓ (low-line) 4.25A @ 60 V⎓ (high-line)
Heat dissipation	265 W, 904 BTU/hr
Power consumption	265 W, 904 BTU/hr

Power: Summit X480-48x

Table 358: Summit X480-48x with No Installed VIM (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	2.0 A @ 100 V~ (low-line) 0.9 A @ 240 V~ (high-line)
Heat dissipation	200 W, 675 BTU/hr
Power consumption	200 W, 675 BTU/hr

Table 359: Summit X480-48x with VIM2-SummitStack Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	2.01 A @ 100 V~ (low-line) 0.89 A @ 240 V~ (high-line)
Heat dissipation	203 W, 692 BTU/hr
Power consumption	203 W, 692 BTU/hr

Table 360: Summit X480-48x with VIM2-10G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	2.3 A @ 100 V~ (low-line) 1.0 A @ 240 V~ (high-line)
Heat dissipation	227 W, 774 BTU/hr
Power consumption	227 W, 774 BTU/hr

Table 361: Summit X480-48x with VIM2-SummitStack128 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	2.04 A @ 100 V~ (low-line) 0.89 A @ 240 V~ (high-line)
Heat dissipation	202 W, 688 BTU/hr
Power consumption	202 W, 688 BTU/hr

Table 362: Summit X480-48x with VIM2-SummitStack-V80 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	2.06 A @ 100 V~ (low-line) 0.91 A @ 240 V~ (high-line)
Heat dissipation	212 W, 723 BTU/hr
Power consumption	212 W, 723 BTU/hr

Table 363: Summit X480-48x with VIM3-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	2.6 A @ 100 V~ (low-line) 0.96 A @ 240 V~ (high-line)
Heat dissipation	255 W, 870 BTU/hr
Power consumption	255 W, 870 BTU/hr

Table 364: Summit X480-48x with No Installed VIM (DC Power Supply)

Nominal input ratings	48 V⎓, 8.0 A
Input current	3.3 A @ 48 V⎓ (low-line) 2.6 A @ 60 V⎓ (high-line)
Heat dissipation	158 W, 540 BTU/hr
Power consumption	158 W, 540 BTU/hr

Table 365: Summit X480-48x with VIM2-SummitStack Module (DC Power Supply)

Nominal input ratings	48 V⎓, 8.0 A
Input current	3.4 A @ 48 V⎓ (low-line) 2.7 A @ 60 V⎓ (high-line)
Heat dissipation	163 W, 556 BTU/hr
Power consumption	163 W, 556 BTU/hr

Table 366: Summit X480-48x with VIM2-10G4X Module (DC Power Supply)

Nominal input ratings	48 V⎓, 8.0 A
Input current	5.7 A @ 48 V⎓ (low-line) 4.4 A @ 60 V⎓ (high-line)
Heat dissipation	246 W, 839 BTU/hr
Power consumption	246 W, 839 BTU/hr

Table 367: Summit X480-48x with VIM2-SummitStack128 Module (DC Power Supply)

Nominal input ratings	48 V⎓, 8.0 A
Input current	3.4 A @ 48 V⎓ (low-line) 2.7 A @ 60 V⎓ (high-line)
Heat dissipation	165 W, 562 BTU/hr
Power consumption	165 W, 562 BTU/hr

Table 368: Summit X480-48x with VIM2-SummitStack-V80 Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	3.5 A @ 48 V⎓ (low-line) 2.8 A @ 60 V⎓ (high-line)
Heat dissipation	170 W, 580 BTU/hr
Power consumption	170 W, 580 BTU/hr

Table 369: Summit X480-48x with VIM3-40G4X Module (DC Power Supply)

Nominal input ratings	48 V⎓, 8.0 A
Input current	6.42 A @ 48 V⎓ (low-line) 4.3 A @ 60 V⎓ (high-line)
Heat dissipation	265 W, 904 BTU/hr
Power consumption	265 W, 904 BTU/hr

Power: Summit X480-48t

Table 370: Summit X480-48t with No Installed VIM (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.0 A
Input current	1.9 A @ 100 V~ (low-line) 0.8 A @ 240 V~ (high-line)
Heat dissipation	182 W, 622 BTU/hr
Power consumption	182 W, 622 BTU/hr

Table 371: Summit X480-48t with VIM2-SummitStack Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.0 A
Input current	1.89 A @ 100 V~ (low-line) 0.84 A @ 240 V~ (high-line)
Heat dissipation	187 W, 639 BTU/hr
Power consumption	187 W, 639 BTU/hr

Table 372: Summit X480-48t with VIM2-10G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.0 A
Input current	2.34 A @ 100 V~ (low-line) 1.0 A @ 240 V~ (high-line)
Heat dissipation	232 W, 793 BTU/hr
Power consumption	232 W, 793 BTU/hr

Table 373: Summit X480-48t with VIM2-SummitStack128 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.0 A
Input current	1.89 A @ 100 V~ (low-line) 0.84 A @ 240 V~ (high-line)
Heat dissipation	256 W, 871 BTU/hr
Power consumption	256 W, 871 BTU/hr

Table 374: Summit X480-48t with VIM2-SummitStack-V80 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.5 A
Input current	1.91 A @ 100 V~ (low-line) 0.86 A @ 240 V~ (high-line)
Heat dissipation	194 W, 662 BTU/hr
Power consumption	194 W, 662 BTU/hr

Table 375: Summit X480-48t with VIM3-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.0 A
Input current	2.40 A @ 100 V~ (low-line) 0.98 A @ 240 V~ (high-line)
Heat dissipation	240 W, 819 BTU/hr
Power consumption	240 W, 819 BTU/hr

Table 376: Summit X480-48t with No Installed VIM (DC Power Supply)

Nominal input ratings	48 V⎓, 7.0 A
Input current	3.1 A @ 48 V⎓ (low-line) 2.4 A @ 60 V⎓ (high-line)
Heat dissipation	148 W, 503 BTU/hr
Power consumption	148 W, 503 BTU/hr

Table 377: Summit X480-48t with VIM2-SummitStack Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.0 A
Input current	3.24 A @ 48 V⎓ (low-line) 2.5 A @ 60 V⎓ (high-line)
Heat dissipation	153 W, 520 BTU/hr
Power consumption	153 W, 520 BTU/hr

Table 378: Summit X480-48t with VIM2-10G4X Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.0 A
Input current	3.1 A @ 48 V⎓ (low-line) 2.4 A @ 60 V⎓ (high-line)
Heat dissipation	148 W, 503 BTU/hr
Power consumption	148 W, 503 BTU/hr

Table 379: Summit X480-48t with VIM2-SummitStack128 Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.0 A
Input current	3.2 A @ 48 V⎓ (low-line) 2.5 A @ 60 V⎓ (high-line)
Heat dissipation	153 W, 522 BTU/hr
Power consumption	153 W, 522 BTU/hr

Table 380: Summit X480-48t with VIM2-SummitStack-V80 Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.5 A
Input current	3.3 A @ 48 V⎓ (low-line) 2.6 A @ 60 V⎓ (high-line)
Heat dissipation	160 W, 546 BTU/hr
Power consumption	160 W, 546 BTU/hr

Table 381: Summit X480-48t with VIM3-40G4X Module (DC Power Supply)

Nominal input ratings	48 V⎓, 7.0 A
Input current	6.1 A @ 48 V⎓ (low-line) 4.0 A @ 60 V⎓ (high-line)

Table 381: Summit X480-48t with VIM3-40G4X Module (DC Power Supply) (continued)

Heat dissipation	250 W, 854 BTU/hr
Power consumption	250 W, 854 BTU/hr

Table 382: Safety Standards

North American Safety of ITE	UL 60950-1 1st Ed., Listed Device (US) CSA 22.2 #60950-1-03 1st 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 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 2006/95/EC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2006 + National Differences AS/NZX 60950-1 (Australia /New Zealand)

Table 383: 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 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 1995+A2:2005 (Flicker) ETSI EN 300 386 v1.3.3, 2005-04 (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) EC/EN 61000-4-2:2001 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A EC/EN 61000-4-3:2006 Radiated Immunity 10V/m, Criteria EC/EN 61000-4-4:2005 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 61000-4-6:2005 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A EC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) ACMA (C-Tick) (Australia Emissions) CCC Mark KCC Mark, EMC Approval (Korea)

Table 384: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications)

Table 384: Telecom Standards (continued)

	ETSI EN 300 019 (Environmental for Telecommunications)

Table 385: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 386: 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
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) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks 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)

Note

For the technical specifications of power supplies for the Summit X480 series switches, see Summit 450 W Power Supplies Technical Specifications on page 634.

Summit X650 Series Switches Technical Specifications

The Summit X650 series includes the following switches:

- Summit X650-24t switch

- Summit X650-24x switch

Table 387: Physical Dimensions

Summit X650-24t switch Summit X650-24x switch	Height: 1.73 inches (4.4 cm) Width: 17.35 inches (44.1 cm) Depth: 25.8 inches (65.5 cm)
VIM1-SummitStack module VIM1-10G8X module VIM1-SummitStack512 module VIM1-SummitStack256 module VIM3-40G4X module	Height: 1.7 inches (4.3 cm) Width: 5.2 inches (13.2 cm) Depth: 9.9 inches (25.2cm)

Table 388: Weight

Summit X650-24t switch	24.1 lb (11.6 kg)
Summit X650-24x switch	20.4 lb (10.1kg)
VIM1-SummitStack module	1.5 lb (0.66 kg)
VIM1-10G8X module	2.0 lb (0.9 kg)
VIM3-40G4X module	2.40 lb (1.09 kg)

Table 389: Packaged Dimensions

Summit X650-24t switch Summit X650-24x switch	Height: 10.4 inches (25.5 cm) Width: 23.3 inches (59.2 cm) Depth: 32.8 inches (83.4 cm)

Table 390: Packaged Weight

Summit X650-24t switch	35.5 lb (16.1 kg)
Summit X650-24x switch	32.2 lb (14.6 kg)
VIM3-40G4X module	3.46 lb (1.57 kg)

Table 391: Fan Speed

Minimum speed	4500 RPM
Maximum speed	18000 RPM

Table 392: Acoustic Noise

	61 db at low fan speed, 66 db at high fan speed

Power: Summit X650-24t (Manufacturing part number 800246-00)

Table 393: Summit X650-24t with VIM1-SummitStack Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	6.9 A @ 100 V~ (low-line) 2.9 A @ 240 V~ (high-line)
Heat dissipation	689 W, 2,351 BTU/hr
Power consumption	689 W, 2,351 BTU/hr

Table 394: Summit X650-24t with VIM1-10G8X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	7.8 A @ 100 V~ (low-line) 3.8 A @ 240 V~ (high-line)
Heat dissipation	780 W, 2,661 BTU/hr
Power consumption	780 W, 2,661 BTU/hr

Table 395: Summit X650-24t with VIM1-SummitStack512 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	8.0 A @ 100 V~ (low-line) 3.8 A @ 240 V~ (high-line)
Heat dissipation	798 W, 2,723 BTU/hr
Power consumption	798 W, 2,723 BTU/hr

Table 396: Summit X650-24t with VIM1-SummitStack256 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	2.9 A @ 100 V~ (low-line) 4.8 A @ 240 V~ (high-line)
Heat dissipation	285 W, 973 BTU/hr
Power consumption	285 W, 973 BTU/hr

Table 397: Summit X650-24t with VIM1-SummitStack Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	12.9 A @ 48 V⎓ (low-line) 10.6 A @ 60 V⎓ (high-line)
Heat dissipation	617 W, 2,105 BTU/hr
Power consumption	617 W, 2,105 BTU/hr

Table 398: Summit X650-24t with VIM1-10G8X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	14.6 A @ 48 V⎓ (low-line) 12.3 A @ 60 V⎓ (high-line)
Heat dissipation	701 W, 2,393 BTU/hr
Power consumption	701 W, 2,393 BTU/hr

Table 399: Summit X650-24t with VIM1-SummitStack512 Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	14.8 A @ 48 V⎓ (low-line) 12.5 A @ 60 V⎓ (high-line)
Heat dissipation	708 W, 2,416 BTU/hr
Power consumption	708 W, 2,416 BTU/hr

Table 400: Summit X650-24t with VIM1-SummitStack256 Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	xx A @ 48 V⎓ (low-line) xx A @ 60 V⎓ (high-line)
Heat dissipation	xx W, 2,416 BTU/hr
Power consumption	xx W, 2,416 BTU/hr

Power: Summit X650-24t (Manufacturing part number 800320-00)

Table 401: Summit X650-24t with VIM1-SummitStack Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	4.6 A @ 100 V~ (low-line) 1.6 A @ 240 V~ (high-line)
Heat dissipation	463 W, 1,580 BTU/hr
Power consumption	463 W, 1,580 BTU/hr

Table 402: Summit X650-24t with VIM1-10G8X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	5.5 A @ 100 V~ (low-line) 2.5 A @ 240 V~ (high-line)
Heat dissipation	552 W, 1,884 BTU/hr
Power consumption	552 W, 1,884 BTU/hr

Table 403: Summit X650-24t with VIM1-SummitStack512 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	5.7 A @ 100 V~ (low-line) 2.7 A @ 240 V~ (high-line)
Heat dissipation	565 W, 1,928 BTU/hr

Table 404: Summit X650-24t with VIM3-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	6.2 A @ 100 V~ (low-line) 2.6 A @ 240 V~ (high-line)
Heat dissipation	615 W, 2,099 BTU/hr
Power consumption	615 W, 2,099BTU/hr

Table 405: Summit X650-24t with VIM1-SummitStack256 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 8.0 A
Input current	xx A @ 100 V~ (low-line) xx A @ 240 V~ (high-line)
Heat dissipation	xx W, xx BTU/hr
Power consumption	xx W, xx BTU/hr

Table 406: Summit X650-24t with VIM1-SummitStack Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	8.7 A @ 48 V⎓ (low-line) 7.1 A @ 60 V⎓ (high-line)
Heat dissipation	418 W, 1,426 BTU/hr
Power consumption	418 W, 1,426 BTU/hr

Table 407: Summit X650-24t with VIM1-10G8X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	10.4 A @ 48 V⎓ (low-line) 8.8 A @ 60 V⎓ (high-line)
Heat dissipation	500 W, 1,706 BTU/hr
Power consumption	500 W, 1,706 BTU/hr

Table 408: Summit X650-24t with VIM1-SummitStack512 Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	10.4 A @ 48 V⎓ (low-line) 8.8 A @ 60 V⎓ (high-line)
Heat dissipation	501 W, 1,709 BTU/hr
Power consumption	501 W, 1,709 BTU/hr

Table 409: Summit X650-24t with VIM3-40G4X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	12.7 A @ 48 V⎓ (low-line) 9.95 A @ 60 V⎓ (high-line)
Heat dissipation	612 W, 2088 BTU/hr
Power consumption	612 W, 2088 BTU/hr

Table 410: Summit X650-24t with VIM1-SummitStack256 Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 24 A
Input current	xx A @ 48 V⎓ (low-line) xx A @ 60 V⎓ (high-line)
Heat dissipation	xx W, xx BTU/hr
Power consumption	xx W, xx BTU/hr

Power: Summit X650-24x (all manufacturing part numbers)

Table 411: Summit X650-24x with VIM1-SummitStack Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.75 A
Input current	2.9 A @ 100 V~ (low-line) 1.2 A @ 240 V~ (high-line)
Heat dissipation	291 W, 992 BTU/hr
Power consumption	291 W, 992 BTU/hr

Table 412: Summit X650-24x with VIM1-10G8X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.75 A
Input current	3.7 A @ 100 V~ (low-line) 1.5 A @ 240 V~ (high-line)
Heat dissipation	371 W, 1,402 BTU/hr
Power consumption	371 W, 1,402 BTU/hr

Table 413: Summit X650-24x with VIM1-SummitStack512 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.75 A
Input current	3.8 A @ 100 V~ (low-line) 1.6 A @ 240 V~ (high-line)
Heat dissipation	383 W, 1,307 BTU/hr
Power consumption	383 W, 1,307 BTU/hr

Table 414: Summit X650-24x with VIM1-SummitStack256 Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.75 A
Input current	2.9 A @ 100 V~ (low-line) 4.8 A @ 240 V~ (high-line)
Heat dissipation	285 W, 973 BTU/hr
Power consumption	285 W, 973 BTU/hr

Table 415: Summit X650-24x with VIM3-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.75 A
Input current	3.8 A @ 100 V~ (low-line) 1.6 A @ 240 V~ (high-line)
Heat dissipation	385 W, 1,314 BTU/hr
Power consumption	385 W, 1,314 BTU/hr

Table 416: Summit X650-24x with VIM1-SummitStack Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 9 A
Input current	5.9 A @ 48 V⎓ (low-line) 4.8 A @ 60 V⎓ (high-line)
Heat dissipation	287 W, 979 BTU/hr
Power consumption	287 W, 979 BTU/hr

Table 417: Summit X650-24x with VIM1-10G8X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 9 A
Input current	7.5 A @ 48 V⎓ (low-line) 6.1 A @ 60 V⎓ (high-line)
Heat dissipation	364 W, 1,242 BTU/hr
Power consumption	364 W, 1,242 BTU/hr

Table 418: Summit X650-24x with VIM1-SummitStack512 Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 9 A
Input current	7.7 A @ 48 V⎓ (low-line) 6.2 A @ 60 V⎓ (high-line)
Heat dissipation	372 W, 1,269 BTU/hr
Power consumption	372 W, 1,269 BTU/hr

Table 419: Summit X650-24x with VIM3-40G4X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 9 A
Input current	7.9 A @ 48 V⎓ (low-line) 6.3 A @ 60 V⎓ (high-line)
Heat dissipation	385 W, 1,314 BTU/hr
Power consumption	385 W, 1,314 BTU/hr

Table 420: Summit X650-24x with VIM1-SummitStack256 Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 9 A
Input current	xx A @ 48 V⎓ (low-line) xx A @ 60 V⎓ (high-line)

Table 420: Summit X650-24x with VIM1-SummitStack256 Module (DC Power Supply) (continued)

Heat dissipation	xx W, xx BTU/hr
Power consumption	xx W, xx BTU/hr

Table 421: Safety Standards

North American Safety of ITE	UL 60950-1:2003 1st Ed., Listed Device (US) CSA 22.2#60950-1-03 1st Ed.(Canada) Complies with FCC 21CFR 1040.10 (US Laser Safety) CDRH Letter of Approval (US FDA Approval) IEEE 802.3af 6-2003 Environment A for PoE Applications
European Safety of ITE	EN 60950-1:2001+A11 EN 60825-1+A2:2001 (Lasers Safety) TUV-R GS Mark by German Notified Body 73/23/EEC Low Voltage Directive
International Safety of ITE	CB Report & Certificate per IEC 60950-1:2001 Country Deviations AS/NZX 60950-1 (Australia /New Zealand)

Table 422: 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 55022:1998 Class A EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2,3 (Harmonics & Flicker) ETSI EN 300 386:2001 (EMC Telecommunications) 89/336/EEC EMC Directive
International EMC certifications	CISPR 22:1997 Class A (International Emissions) CISPR 24:1997 Class A (International Immunity) IEC/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A IEC/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A IEC/EN 61000-4-4 Transient Burst, 1kV, Criteria A IEC/EN 61000-4-5 Surge, 2kV L-L, 2kV L-G, Level 3, Criteria A IEC/EN 61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
Country-specific	VCCI Class A (Japan Emissions) AS/NZS 3548 ACA (Australia Emissions) CNS 13438:1997 Class A (BSMI-Taiwan) MIC Mark, EMC Approval (South Korea)

Table 423: Telecom Standards

	ETSI EN 300 386:2001 (EMC Telecommunications)

Table 423: Telecom Standards (continued)

	ETSI EN 300 019 (Environmental for Telecommunications)

Table 424: IEEE 802.3 Media Access Standards

	IEEE 802.3ab 1000BASE-T

Table 425: 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
Operating conditions	Temperature range: 0° C to 40° C (32° F to 104° F) Humidity: 10% to 93% relative humidity, non-condensing Altitude: 0 to 3,000 meters (9,850 feet) Shock (half sine): 30 m/s^2 (3 G), 11 ms, 60 shocks Random vibration: 3 to 500 Hz @ 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 @ velocity 5 mm/s, 62 to 500 Hz @ 0.2 G Packaged random vibration: 5 to 20 Hz @ 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz 14 drops minimum on sides & corners @ 42 inches (<15 kg box)

Note

For the technical specifications of power supplies for the Summit X650 series switches, see Summit 850 W Power Supplies Technical Specifications on page 641.

Summit X670 Series Switches Technical Specifications

The Summit X670 series includes the following switches:

- Summit X670-48x switch (17103, 17103C, 17104)
- Summit X670V-48x switch (17101, 17102)
- Summit X670V-48t switch (17201, 17202, 17203, 17204, 17205, 17206)

Note

The 17103C Teradyne X670-48x-FB-AC consists of one (17103) X670-48x 48 10GBASE-X SFP+ with three front-to-back airflow fan modules and two (10925) 550W AC Power Supplies with front-to-back airflow.

Note

For the technical specifications of power supplies for the Summit X670 series switches, see Summit 450 W Power Supplies Technical Specifications on page 634 and Summit 550 W Power Supplies Technical Specifications on page 636.

Table 426: Physical Dimensions

Summit X670-48x switch Summit X670V-48x switch Summit X670V-48t switch	Height: 1.73 inches (4.4 cm) Width: 17.4 inches (44.1 cm) Depth: 19.25 inches (48.9 cm)
VIM4-40G4X module	Height: 1.6 inches (4.1 cm) Width: 4.1 inches (10.3 cm) Depth: 6.5 inches (16.6 cm)
Summit X670 fan module	Height: 1.65 inches (4.2 cm) Width: 1.65 inches (4.2 cm) Depth: 3.98 inches (10.1 cm)

Table 427: Weight

Summit X670-48x switch	16.0 lb (7.3 kg)
Summit X670V-48x switch Summit X670V-48t switch	15.3 lb (7.0 kg)
Note: Switch weights include installed fan module. They do not include installed VIM4 modules or power supplies.	
VIM4-40G4X module	0.99 lb (0.45 kg)
Summit X670 fan module	0.36 lb (0.16 kg)

Table 428: Packaged Dimensions

Summit X670-48x switch Summit X670V-48x switch Summit X670V-48t switch	Height: 6.5 inches (16.5 cm)
	Width: 23.4 inches (59.3 cm)
	Depth: 26.2 inches (66.5 cm)
VVIM4-40G4X module	Height: 3.9 inches (10 cm)
	Width: 9.4 inches (24.0 cm)
	Depth: 15.4 inches (39 cm)

Table 429: Packaged Weight

Summit X670-48x switch	22.7 lb (10.3 kg)
Summit X670V-48x switch Summit X670V-48t switch	21.2 lb (9.6 kg)
VIM4-40G4X module	2.75 lb (1.25 kg)
Summit X670 fan module	1.27 lb (0.58 kg)

Table 430: Fan Speed

Minimum speed	4500 RPM
Maximum speed	18000 RPM

Power: Summit X670-48x

Table 431: Summit X670-48x (AC Power Supply)

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

Table 432: Summit X670-48x (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 5.0 A
Input current	4.25 A @ 48 V⎓ (low-line) 3.35 A @ 60 V⎓ (high-line)
Heat dissipation	210 W, 717 BTU/hr
Power consumption	210 W, 717 BTU/hr

Power: Summit X670V-48x

Table 433: Summit X670V-48x with No Installed VIM (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.75 A
Input current	3.0 A @ 100 V~ (low-line) 1.2 A @ 240 V~ (high-line)
Heat dissipation	300 W, 1,024 BTU/hr
Power consumption	300 W, 1,024 BTU/hr

Table 434: Summit X670V-48x with VIM4-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 3.75 A
Input current	3.4 A @ 100 V~ (low-line) 1.4 A @ 240 V~ (high-line)
Heat dissipation	340 W, 1,161 BTU/hr
Power consumption	340 W, 1,161 BTU/hr

Table 435: Summit X670V-48x with No Installed VIM (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 7.5 A
Input current	5.7 A @ 48 V⎓ (low-line) 4.6 A @ 60 V⎓ (high-line)
Heat dissipation	280 W, 956 BTU/hr
Power consumption	280 W, 956 BTU/hr

Table 436: Summit X670V-48x with VIM4-40G4X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 7.5 A
Input current	6.85 A @ 48 V⎓ (low-line) 5.45 A @ 60 V⎓ (high-line)
Heat dissipation	330 W, 1,126 BTU/hr
Power consumption	330 W, 1,126 BTU/hr

Power: Summit X670V-48t

Table 437: Summit X670V-48t with No Installed VIM (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	3.3 A @ 100 V~ (low-line) 1.41 A @ 240 V~ (high-line)
Heat dissipation	323 W, 1,102 BTU/hr
Power consumption	323 W, 1,102 BTU/hr

Table 438: Summit X670V-48t with VIM4-40G4X Module (AC Power Supply)

Nominal input ratings	100 to 240 V~, 50/60 Hz, 4.0 A
Input current	3.5 A @ 100 V~ (low-line) 1.52 A @ 230 V~ (high-line)
Heat dissipation	350 W, 1,194 BTU/hr
Power consumption	350 W, 1,194 BTU/hr

Table 439: Summit X670V-48t with No Installed VIM (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 7.5 A
Input current	8.4 A @ 40 V⎓ (low-line) 5.4 A @ 60 V⎓ (high-line)
Heat dissipation	336 W, 1147 BTU/hr
Power consumption	336 W, 1147 BTU/hr

Table 440: Summit X670V-48t with VIM4-40G4X Module (DC Power Supply)

Nominal input ratings	48 to 60 V⎓, 8.0 A
Input current	9.13 A @ 48 V⎓ (low-line) 5.88 A @ 60 V⎓ (high-line)

Table 440: Summit X670V-48t with VIM4-40G4X Module (DC Power Supply) (continued)

Heat dissipation	365W, 1,245 BTU/hr
Power consumption	365 W, 1,245 BTU/hr

Table 441: CPU, Memory

1 GHz CPU
1 GB memory
9 MB buffer, per chip

Table 442: 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 443: 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 443: 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 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 444: 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 445: 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 446: 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

Table 446: 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 X670V-48x: 56.6 dB(A) min

Summit X670-G2 Series Switches Technical Specifications

The Summit X670-G2 series includes the following switches:

- X670-G2-48x-4q
- X670-G2-72x

Table 447: 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 448: X670-G2 Unpackaged Weight

X670-G2-48x-4q	14.7 lb (6.7 kg)
X670-G2-72x	15.42 lb (7.0 kg)

Table 449: 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 450: X670-G2 Packaged Weight

X670-G2-48x-4q	20.1 lb (9.1 kg)
X670-G2-72x	20.7 lb (9.4 kg)

Table 451: 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
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

12 Bystander Sound pressure is presented for comparison to other products measured using Bystander Sound Pressure.

13 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 452: 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

Table 453: 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 454: CPU, Memory

CPU/Memory
1 GHz 64-bit CPU
2 GB DDR3 ECC SDRA memory
4 GB eMMC Flash Memory
12 MB buffer, per chip

Standards and Environmental Data

Table 455: 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 456: 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 457: 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 458: IEEE 802.3 Media Access Standards

Table 458: IEEE 802.3 Media Access Standards (continued)

IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X IEEE 802.3ae 10GBASE-X IEEE 802.3ba 40GBASE-X

Table 459: 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)

Summit X770 Series Switches Technical Specifications

The Summit X770 series includes the following switch:

- Summit X770-32q switch

Table 460: 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 461: Weight

Summit X770-32q switch	18.0 lb (8.2 kg)
Summit X770 fan module	0.36 lb (0.16 kg)

[14] Switch weights include installed fan module. They do not include power supplies.

Table 461: Weight (continued)

550 W AC PSU	2.75 lb (1.2 kg)
550 W DC PSU	2.50 lb (1.1 kg)

Table 462: 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 463: Packaged Weight

Summit X770-32q switch	23.2 lb (10.5 kg)
Summit X770 fan module	0.50 lb (0.20 kg)

Table 464: Fan Speed

Minimum speed	4500 RPM
Maximum speed	18000 RPM

Power: Summit X770-32q

Table 465: 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

Table 466: Summit X770-32q: Power for Each of the Two Installed DC Power Supplies

Nominal input ratings	48 to 60 V⎓, 5.0 A
Input current	4.25 A @ 48 V⎓ (low-line) 3.35 A @ 60 V⎓ (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 467: 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 467: 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 468: CPU, Memory

1GHz CPU
1GB memory
12 MB packet buffer, per chip

Standards and Environmental Data

Table 469: 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 470: 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 470: 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 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 471: 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 472: 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 473: 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

Table 473: 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

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 474: 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 475: Power Specifications

AC input frequency range	50 to 60 Hz
AC input voltage range	100-240 VAC

Table 475: Power Specifications (continued)

Output Voltage	12VDC
Output Current	1.0 A min., 8.5 A or 13.0 A max.

Table 476: 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 477: 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 478: 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

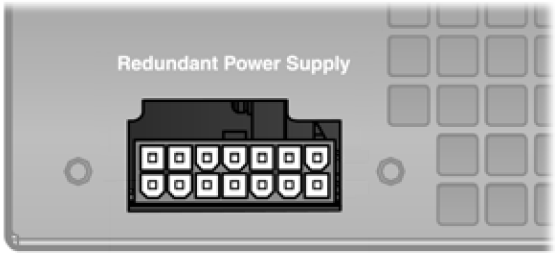


Figure 452: STK-RPS-150PS Connector Pin Locations

Table 479: STK-RPS-150PS Connector Pin Functions

Pin	Function	Pin	Function
1	- 50 V return	8	Ground
2	- 50 VDC	9	No connection

Table 479: STK-RPS-150PS Connector Pin Functions (continued)

Pin	Function	Pin	Function
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

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).

These power supplies are for use with the Summit X460-G2 series, Summit X460-24t, Summit X460-24x, Summit X460-48t, and Summit X460-48x switches.

Summit 300 W AC Power Supply (Model 10930A and 10943)

Table 480: 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 481: Power Specifications

Voltage input range	85 to 264 V~
Nominal input ratings	100 to 240 V~, 50 to 60 Hz, 5 A
Nominal input current at full loads	4.2 A @ 90 V~ (low-line) 1.7 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	30 A
Output	12 V⎓, 25 A max, 300 Watts 3.3 V⎓, 3.03 A max, 10 Watts
Power supply input socket	IEC 320 C14

Table 481: Power Specifications (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 651.
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 482: 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 483: 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 484: Power Specifications

Nominal Input	–40 to –72 V, 9 A
DC Voltage Input Range	18V to -72V⎓
Maximum Input Amperages	9 A @ 40 V⎓ 7.5 A @ 48 V⎓ 5 A @ 72 V⎓
Inrush Current	82 A at 72 V⎓ peak
Minimum wire size	14 AWG (1.5 mm^2) copper stranded

Table 484: Power Specifications (continued)

DC Output	12 V⎓, 25 A/3.3 V⎓, 3.0 A
DC Output Power (W)	300 W

Table 485: 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 350 W Power Supplies Technical Specifications

The following Summit 350 W power supplies are available for use in X460-G2 series PoE switches:

- Summit 350 W AC power supply: front-to-back airflow (part nos. XN-ACPWR-350W-FB and 10953)
- Summit 350 W AC power supply: back-to-front airflow (part no. 10954)

Models XN-ACPWR-350W-FB and 10953 (front-to-back airflow) are also compatible with the ExtremeSwitching X465-24S, X465-24XE, and X465-48T switch models.

Summit 350 W AC Power Supply (XN-ACPWR-350W-FB, 10953, 10954)

Table 486: 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 487: 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 350 W load
Maximum inrush current	45A at Max 264 VAC at 25C with cold start
Output	54 V, 13.2 A max, 350 W
Power supply input socket and cord	IEC/EN 60320-1/C16 AC input receptacles

Table 487: Power Specifications (continued)

Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651
Efficiency	Minimum efficiency: 88% at maximum power output

Table 488: 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)

Summit 450 W Power Supplies Technical Specifications

The following two power supplies are available for use in the Summit X480 series switches and in Summit X670 series switches that have front-to-back ventilation airflow.

- Summit 450 W AC power supply
- Summit 450 W DC power supply

Summit 450 W AC Power Supplies

The following tables list the specifications of the AC power supplies for use with the Summit X480-24x, X480-48x, Summit X480-48t, Summit X670-48x, and Summit X670V-48x switches:

Table 489: Physical Specifications

Dimensions	Height: 1.5 inches (3.8 cm) Width: 3.1 inches (7.8 cm) Depth: 13.3 inches (33.8 cm)
Weight	3.64 lb (1.65 kg)

Table 490: Power Specifications

Voltage input range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50 to 60 Hz, 8 A
Nominal input current at full loads	12 A @ 90 V~ (low-line) 5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	15 A
Output	12 V⎓, 37 A max, 450 Watts 3.3 V⎓, 3 A max, 9.9 Watts Maximum continuous DC output shall not exceed 450 Watts.
Power supply input socket	IEC 320 C14

Table 490: Power Specifications (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 651.
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	84% typical at full load, high line

Table 491: 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)

Summit 450 W DC Power Supplies

The following tables list the specifications of the DC power supplies for use with the Summit X480-24x, X480-48x, and Summit X480-48t:

Table 492: Physical Specifications

Dimensions	Height: 1.5 inches (3.8 cm) Width: 3.1 inches (7.8 cm) Depth: 13.3 inches (33.8 cm)
Weight	3.22 lb (1.46 kg)

Table 493: Power Specifications

Nominal Input	–48 to –60 V⎓, 24 A
DC Voltage Input Range	–40 to –75 V⎓
Maximum Input Amperages	13.5 A @ 40 V⎓ 11.2 A @ 48 V⎓ 7.5 A @ 72 V⎓
Inrush Current	10 A peak
Inrush Energy	1.5 A^2S
Minimum wire size	14 AWG (1.5 mm^2) copper stranded

Table 493: Power Specifications (continued)

DC Output	12 V⎓, 36.7 A/3.3 V⎓, 3.0 A
DC Output Power (W)	450 W

Table 494: 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)

Summit 550 W Power Supplies Technical Specifications

The following power supplies are available for use in X670-G2 and X770 series switches:

The following power supplies are available for use in X670, 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 495: 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 496: AC Power Specifications (Models 10925 and 10927)

Voltage input range	90 to 264 V ~
Nominal input ratings	100 to 240 V ~, 50 to 60 Hz, 8 A
Nominal input current at full loads	8 A @ 90 V ~ (low-line), 4 A @ 230 V ~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	15 A at 25°C (77°F)
Output	12 V ⎓, 45 A max, 540 Watts, 3 V ⎓, 3 A max, 10 Watts Maximum continuous DC output shall not exceed 550 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 651.

Table 496: AC Power Specifications (Models 10925 and 10927) (continued)

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 ~ with full load 88% at 220 V ~ with full load

Table 497: DC Power Specifications (Models 10926 and 10928)

Nominal Input	–40 V to –60 V, 18 A
DC Voltage Input Range	–36 to –75 V ⎓
Maximum Input Amperages	18 A @ 36 V ⎓, 13.5 A @ 48 V ⎓ 8.5 A @ 75 V ⎓
Inrush Current	25 A peak
Inrush Energy	0.625 A^2S
Minimum wire size	14 AWG (1.5 mm^2) copper stranded
DC Output	12 V ⎓, 45 A/3.3 V ⎓, 3.0 A
DC Output Power (W)	550 W

Table 498: 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: 0.0001g2/Hz 350 to 500 Hz -6dB/Octave, 500 Hz 0.000052 Hz
Acceleration	0.21.0 gRMS (Typical Level) Duration: 20 min per axis

Summit 550 W Power Supplies for X670-G2 Switches

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

- 550 W AC PSU-FB (Model DS550HE-3)—AC power supply with front-to-back ventilation airflow
- 550 W DC PSU-FB (Model DS550DC-3)—DC power supply with front-to-back ventilation airflow
- 550 W AC PSU-BF (Model DS550HE-3-002)—AC power supply with back-to-front ventilation airflow
- 550 W DC PSU-BF (Model DS550DC-3-003)—DC power supply with back-to-front ventilation airflow

Specifications for 550 W Power Supplies for the X670-G2

The following tables list the specifications for the 550 W AC PSU-FB (Model 10925) and 550 W AC PSU-BF (Model 10927) AC power supplies for use in X670 and X770 series switches.

Table 499: 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	AC model 3.64 lb (1.65 kg) DC model 2.58 lb (1/17 kg)

Table 500: DC Model Power Specifications

Nominal input	-48 to -60 VDC, 24 A
DC Voltage input range	-35 to -75 V
Inrush Current	21 A peak
Maximum wire size	14 AWG (1.5 mm2 copper stranded).
DC Output	12 V, 45 A/3.3V, 3A
DC Output Power (W)	550 W

Table 501: 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: 0.0001g2/Hz 350 to 500 Hz -6dB/Octave, 500 Hz 0.000052 Hz
Acceleration	0.21.0 gRMS (Typical Level) Duration: 20 min per axis

Summit DC Power Supplies for X670 and X770 Series Switches

The following tables list the specifications for the 550 W DC PSU-FB (Model 10926) and 550 W DC PSU-BF (Model 10928) power supplies for use with the Summit X670 and Summit X770 series switches.

Dimensions	Height: 1.5 inches (3.8 cm) Width: 3.1 inches (7.8 cm) Depth: 13.3 inches (33.8 cm)
Weight	3.22 lb (1.46 kg)

Table 502: Power Specifications

Nominal Input	–40 V to –60 V, 18 A
DC Voltage Input Range	–36 to –75 V ⎓
Maximum Input Amperages	18 A @ 36 V ⎓13.5 A @ 48 V ⎓ 8.5 A @ 75 V ⎓
Inrush Current	25 A peak
Inrush Energy	0.625 A^2S
Minimum wire size	14 AWG (1.5 mm^2) copper stranded
DC Output	12 V ⎓, 45 A/3.3 V ⎓, 3.0 A
DC Output Power (W)	550 W

Table 503: 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: 0.0001g2/Hz 350 to 500 Hz -6dB/Octave, 500 Hz 0.000052 Hz
Acceleration	0.21.0 gRMS (Typical Level) Duration: 20 min per axis

Summit 715 W Power Supplies Technical Specifications

The following Summit 715 W power supplies are available for use in Summit X460-G2 series switches.

- Summit 715 W AC power supply: front-to-back airflow (part nos. XN-ACPWR-715W-FB and 10951)
- Summit 715 W AC power supply: back-to-front airflow (part no. 10952)

Models XN-ACPWR-715W-FB and 10951 (front-to-back airflow) are also compatible with the Summit X450-G2 and ExtremeSwitching X465-24W/48P/48W/24MU/24MU-24W and X465i-48W PoE switch models.

Table 504: 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 505: 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 715 W load
Maximum inrush current	45A at Max 264 VAC at 25C with cold start
Output	54 V, 13.2 A max, 715 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 651
Efficiency	Minimum efficiency: 88% at maximum power output

Table 506: 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)

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 (part no. 10931) is available for use with Summit X460 series PoE switches. It is compatible with the EPS-C2 power supply.

The Summit 750 W AC power supply is also used in the EPS-C2 external power system.

Table 507: 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 508: Power Specifications

Voltage input range	85 to 264 V ~
Nominal input ratings	100 to 240 V ~ , 50 to 60 Hz, 10 A
Nominal input current at full loads	10 A at 90 V ~ (low-line) 3.7 A at 230 V ~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	35 A
Output	12 V ⎓, 25 A max, 300 Watts 55 V ⎓, 8.18 A max, 450 Watts 3.3 V ⎓, 3.03 A max, 10 Watts
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651.
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 509: 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)

Summit 850 W Power Supplies Technical Specifications

The Summit X650 power supplies can be used in the Summit X650-24t switch and the Summit X650-24x switch.

Two Summit X650 power supplies are available:

- Summit X650 AC power supply

- Summit X650 DC power supply

For use with the Summit X650-24t and X650-24x switches

Weight	3.04 lb (1.38 kg)
Voltage input range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50 to 60 Hz, 10 A
Nominal input current at full loads	12 A @ 90 V~ (low-line) 5 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	100 A
Output	12 V⎓, 70 A max, 840 Watts 3.3 V⎓, 6 A max, 19.8 Watts Maximum continuous DC output shall not exceed 850 Watts.
Power supply cord type	AC
Power supply input socket	IEC 320 C14
Power cord input plug	IEC 320 C13
Power cord wall plug	
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	80% with 60% to 100% load

For use with the Summit X650-24t and X650-24x switches

Table 510: Summit 850 W DC Power Supply (Model 10915)

Weight	2.95 lb (1.34 kg)
Nominal Input	–48 to –60 V⎓
DC Voltage Input Range	–39 to –72 V⎓
Maximum Input Amperages	26 A @ 40 V⎓ 22 A @ 48 V⎓ 15 A @ 72 V⎓
Minimum wire size	12 AWG (3.3 mm^2) copper stranded
DC Output	12 V⎓, 70 A/3.3 V⎓, 6 A
DC Output Power (W)	850 W
Operating temperature	0°C to 40°C (normal operation) Short-term operation is permitted at –5°C to 0°C and 40°C to 50°C, for no more than 96 consecutive hours and a total of not more than 15 days in 1 year.
Storage temperature	-40°C to 85°C

Table 510: Summit 850 W DC Power Supply (Model 10915) (continued)

Operating humidity	20% to 95% relative humidity, non-condensing
Operational shock	30 m/s^2 (3 G)

Summit 1100 W Power Supplies Technical Specifications

AC Power Supplies

The following Summit 1100 W AC power supplies are available for use in Summit X460-G2 series switches.

- Summit 1100 W AC power supply: front-to-back airflow (part nos. XN-ACPWR-1100W-FB and 10941)
- Summit 1100 W AC power supply: back-to-front airflow (part no. 10942)

Models XN-ACPWR-1100W-FB and 10941 (front-to-back airflow) are also compatible with the X450-G2 and ExtremeSwitching X465-24W/48P/48W/24MU/24MU-24W and X465i-48W PoE switch models.

See Summit 1100 W AC Power Supplies (XN-ACPWR-1100W-FB, 10941, 10942) on page 643 for details.

DC Power Supplies

The following Summit 1100 W DC power supplies are available for use in ExtremeSwitching X690 and X870 series switches.

- Summit 1100 W DC power supply: front-to-back airflow (part no. 10962)
- Summit 1100 W DC power supply: back-to-front airflow (part no. 10963)

See Summit 1100 W DC Power Supplies (10962, 10963) on page 644 for details.

Summit 1100 W AC Power Supplies (XN-ACPWR-1100W-FB, 10941, 10942)

Table 511: 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 512: Power Specifications

Voltage input range	100-127/200-240~ 47 to 63Hz
Nominal input ratings	12.5 A max at 115VAC and 6 A max at 230VAC at full 1100 W load
Maximum inrush current	45A at Max 264 VAC at 25C with cold start
Output	54 V, 20 A max, 1100 W
Power supply input socket and cord	IEC/EN 60320-1/C16 AC input receptacles

Table 512: Power Specifications (continued)

Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651.
Efficiency	Minimum efficiency: 88% at maximum power output.

Table 513: 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)

Summit 1100 W DC Power Supplies (10962, 10963)

Table 514: 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 515: Power Specifications

Nominal input	-48 to -60 VDC, 24 A
DC Voltage input range	-35 to -75 V
Inrush Current	21 A peak
Maximum wire size	14 AWG (1.5 mm2 copper stranded).
DC Output	12 V, 45 A/3.3V, 3A
DC Output Power (W)	1100 W

Table 516: 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)

Summit External Power Supplies Technical Specifications

The following external power supplies are available for use with Summit X150, X250e, X450, X450a, and X450e series switches:

- EPS-LD external power supply
- EPS-160 external power module (used with EPS-T chassis)
- EPS-500 external power supply
- EPS-600LS external power module (used with EPS-C chassis)
- EPS-150DC external power supply (used with EPS-T2 chassis)

For use with the Summit X450a-24t and X450e-24p switches

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50 to 60 Hz, 10 A
Input Current	6 A at 100 V~, 2.5 A at 240 V~
Line frequency range	47 to 63 Hz
Maximum inrush current	30 A at 115 V~, 60 A at 230 V~
Output	-50 V⎓, 7.5 A max, 375 Watts 12 V⎓, 7.5 A max, 90 Watts
Power supply cord type	AC
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 651.
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	>75% at 100% load
Heat dissipation, Watts, BTU/hr	123 W, 419.7 BTU/hr
Power consumption, Watts, BTU/hr	588 W, 2006.3 BTU/hr
Ambient operating temperature	0°C to 40°C (32°F to 104°F)

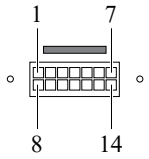
For use with the Summit X150-24t, X150-48t, X250e-24t, X250e-24x, X250e-48t, X450-24t, and X450-24x switches

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 250 V, 4 to 2 A, 47 to 63 Hz
Line frequency range	47 to 63 Hz
Input current	2 A at 100 V 1 A at 240 V
Line frequency	50 to 60 Hz

Maximum inrush current	30 A at 115 V~, 50 A at 230 V~
Output	12 V⎓, 11 A 5 V⎓, 1.5 A
Power supply cord type	AC
Power supply input socket	IEC 320 C14
Power supply input plug	IEC 320 C13
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 651.
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	80% at 100% load
Heat dissipation, Watts/BTU	38.5 W, 131.4 BTU/hr
Power consumption, Watts, BTU/hr	178 W, 607.4 BTU/hr
Ambient operating temperature	0°C to 40°C (32°F to 104°F)

The following figure shows the wire-to-pin connections for the connector on the rear panel of the EPS-160 power supply.

Table 517: Pinouts for the Redundant Power Supply Connector

Connector	Pin Number	Wire Label	Pin Number	Wire Label
	1	NC	8	RS+
	2	GND	9	GND
	3	GND	10	INT PG
	4	GND	11	EXT_CON
	5	GND	12	EXT_PG
	6	+12 V	13	+5 V
	7	+12 V	14	+12 V

For use with the Summit X150-24p, X250e-24p, X450a-24t, X450a-24x, X450a-48t, and X450e-24p switches

Operational voltage range	90 to 264 V~
Nominal input ratings	100 to 240 V~, 50 to 60 Hz, 10 A
Nominal input current	5.75 A @ 115 V~ (low-line) 2.80 A @ 230 V~ (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	30 A @ 115 V, 60 A @ 220 V~

Output	-50 V⎓, 7.5 A max, 375 Watts 12 V⎓, 10.5 A max, 126 Watts Maximum continuous DC output shall not exceed 500 Watts.
Power supply cord type	AC
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 651.
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	>70% @ 100% load
Heat dissipation, Watts, BTU/hr	158 W, 539.1 BTU/hr
Power consumption, Watts, BTU/hr	659 W, 2248.6 BTU/hr
Ambient operating temperature	0°C to 40°C (32°F to 104°F)

For use with the Summit X450e-48p and X250e-48p switches

Must be installed in the EPS-C chassis (Model 10912)

Operational voltage range	90 to 264 V〜
Nominal input ratings	100-250 V〜, 50/60 Hz, 10 A
Nominal input current	7 A @ 115 V〜 (low-line) 3.5 A @ 230 V〜 (high-line)
Line frequency range	47 to 63 Hz
Maximum inrush current	17 A @ 115 V/60 Hz, maximum load
Output power	600 W
Power supply cord type	AC
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 651.
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	85% nominal
Heat dissipation, Watts, BTU/hr	219 W, 747.3 BTU/hr
Power consumption, Watts, BTU/hr	801 W, 2733.1 BTU/hr
Ambient operating temperature	0°C to 40°C (32°F to 104°F)
Output Ratings for EPS-C chassis with 1, 2, or 3 installed EPS-600LS units	
One EPS-600-LS unit	582 W output: –48 V/9 A (432 W), 12 V/12.5 A

Two EPS-600-LS units	1116 W output: –48 V/18 A (864 W), 12 V/21 A
Three EPS-600-LS units	1260 W output: –48 V/21 A (1008 W), 12 V/21 A

For use with the Summit X450a-24tDC and Summit X450a-24xDC switches

Operational voltage range	–36 to –72 V⎓
Nominal input ratings	–36 to –72 V⎓, 6 A maximum
Input current	5.5 A @ –36 V⎓ (low-line) 2.6 A @ –72 V⎓ (high-line)
Line frequency range	47 to 63 Hz
Inrush current	20 A @ 48 V, 40 A @ 72 V⎓
Input wire harness	Extreme part number 250088-00
Power supply input socket	TYCO PN 206061-1
Power cord input plug	TYCO PN 206060-1
Power cord wall plug	None provided
Power supply cord gauge	14 AWG (2.0 mm^2)
Input wire harness	Extreme part number250088-00
Efficiency	> 75% at 100% load
Heat dissipation, Watts, BTU/hr	45 W, 153.5 BTU/hr
Power consumption, Watts, BTU/hr	195 W, 665.4 BTU/hr
Ambient operating temperature	0°C to 40°C
Storage and transportation temperature	–40°C to 70°C

The following figure provides the wire-to-pin connection specifications for the DC wiring harness shipped with the EPS-150DC power supply. Figure 296 on page 366 shows the connector.

Table 518: Wire-to-Pin Connection Specifications

Pin Number	Wire Color	Circuit Connection
1	Green/yellow	Chassis ground
2	Red	Return
3	Black	-48 V
4	unused	

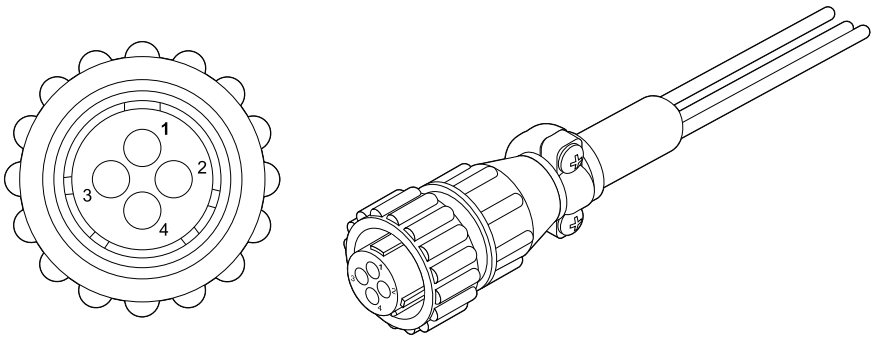


Figure 453: Three-wire Wiring Harness

EPS-C2 Redundant Power Supply Technical Specifications

The following tables list the specifications for the EPS-C2 redundant power supply unit (model 10936).

Table 519: 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 520: Other Specifications

Allowable PSU	Summit 750W PoE AC PSU
Power cord input plug/socket	IEC 320 C13/C14
Power cord gauge	Min 18AWG

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 521: 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 522: Power Specifications

AC input frequency	50/60 Hz (range 47-63 Hz)
AC input voltage	100-240 V~ (range 90-264 V~)

Table 522: Power Specifications (continued)

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 523: 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 454 and Table 524 on page 650 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.

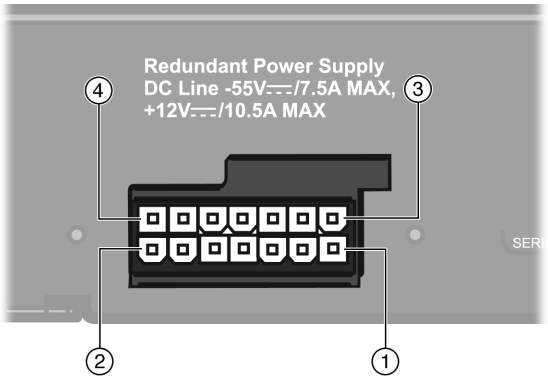


Figure 454: RPS-500p Connector Pin Locations

Table 524: 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

Table 524: RPS-500p Connector Pins (continued)

Pin	Function	Pin	Function
5	12 VDC output	12	Status 2
6	12 VDC output	13	Power good
7	Ground	14	Ground

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-C15 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 14.76 feet (4.5 m) long, the wire size must be 15 AWG (2 mm^2) minimum wire length up to 4.9 feet (1.5 m).

  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 525 describes the pinouts for a DB-9 console plug connector.

Table 525: 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 455 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

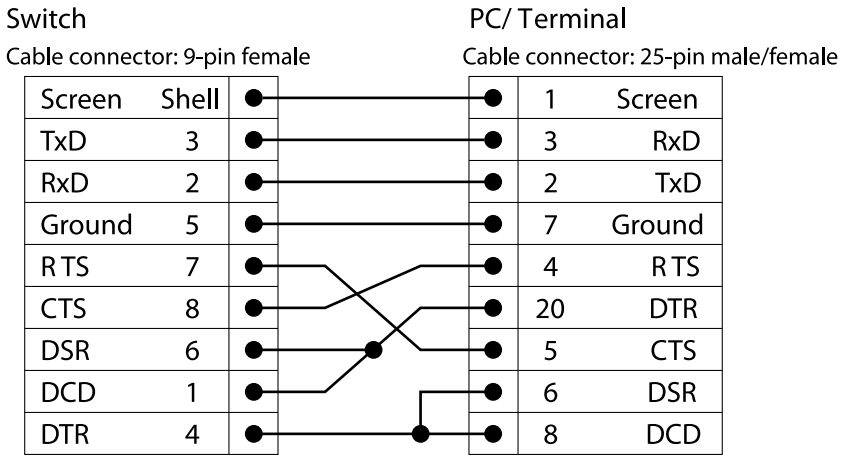


Figure 455: Null-Modem Cable Pinouts

Figure 456 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

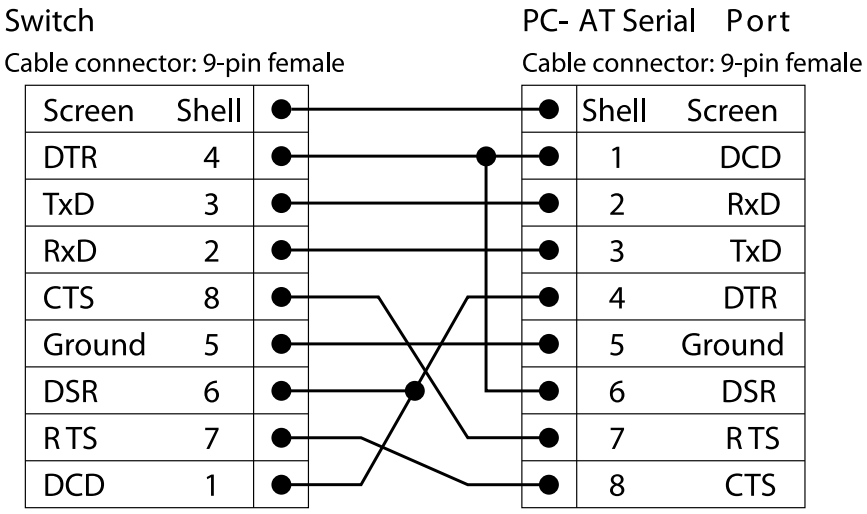


Figure 456: PC-AT Serial Null-modem Cable Pinouts

Table 526 shows the pinouts for the RJ45 console port on the ExtremeSwitching switches.

Table 526: 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	—

Table 526: RJ45 Console Port on Switch (continued)

Function	Pin Number	Direction
RXD (receive data)	6	In
DSR (data set ready)	7	In
RTS (request to send)	8	Out

Table 527 shows the pinouts for an RJ45-to-DB-9 adapter.

Table 527: 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

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

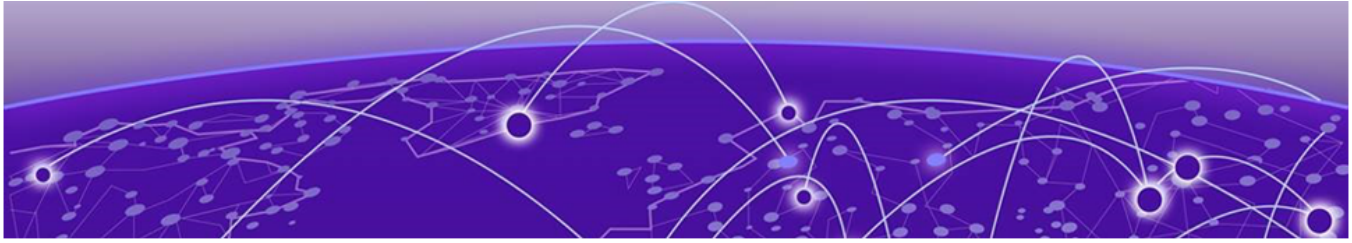
This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

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.



Glossary

ad hoc mode

An 802.11 networking framework in which devices or stations communicate directly with each other, without the use of an AP.

ARP

Address Resolution Protocol is part of the TCP/IP suite used to dynamically associate a device's physical address (MAC address) with its logical address (IP address). The system broadcasts an ARP request, containing the IP address, and the device with that IP address sends back its MAC address so that traffic can be transmitted.

ATM

Asynchronous Transmission Mode is a start/stop transmission in which each character is preceded by a start signal and followed by one or more stop signals. A variable time interval can exist between characters. ATM is the preferred technology for the transfer of images.

BSS

Basic Service Set is a wireless topology consisting of one access point connected to a wired network and a set of wireless devices. Also called an infrastructure network. See also *IBSS (Independent Basic Service Set)*.

Chalet

Chalet is a web-based user interface for setting up and viewing information about a switch, removing the need to enter common commands individually in the CLI.

CHAP

Challenge-Handshake Authentication Protocol is one of the two main authentication protocols used to verify a user's name and password for PPP Internet connections. CHAP is more secure because it performs a three-way handshake during the initial link establishment between the home and remote machines. It can also repeat the authentication anytime after the link has been established.

CLI

Command Line Interface. The CLI provides an environment to issue commands to monitor and manage switches and wireless appliances.

Data Center Connect

DCC, formerly known as DCM (Data Center Manager), is a data center fabric management and automation tool that improves the efficiency of managing a large virtual and physical network. DCC provides an integrated view of the server, storage, and networking operations, removing the need to use multiple tools and management systems. DCC automates VM assignment, allocates appropriate network resources, and applies individual policies to various data objects in the switching fabric

(reducing VM sprawl). Learn more about DCC at http://www.extremenetworks.com/product/data-center-connect/.

DoS attack

Denial of Service attacks occur when a critical network or computing resource is overwhelmed so that legitimate requests for service cannot succeed. In its simplest form, a DoS attack is indistinguishable from normal heavy traffic. ExtremeXOS software has configurable parameters that allow you to defeat DoS attacks.

DSSS

Direct-Sequence Spread Spectrum is a transmission technology used in Local Area Wireless Network (LAWN) transmissions where a data signal at the sending station is combined with a higher data rate bit sequence, or chipping code, that divides the user data according to a spreading ratio. The chipping code is a redundant bit pattern for each bit that is transmitted, which increases the signal's resistance to interference. If one or more bits in the pattern are damaged during transmission, the original data can be recovered due to the redundancy of the transmission. (Compare with *FHSS (Frequency-Hopping Spread Spectrum)*.)

EAP-TLS/EAP-TTLS

EAP-TLS Extensible Authentication Protocol - Transport Layer Security. A general protocol for authentication that also supports multiple authentication methods, such as token cards, Kerberos, one-time passwords, certificates, public key authentication and smart cards.

IEEE 802.1x specifies how EAP should be encapsulated in LAN frames.
In wireless communications using EAP, a user requests connection to a WLAN through an access point, which then requests the identity of the user and transmits that identity to an authentication server such as RADIUS The server asks the access point for proof of identity, which the access point gets from the user and then sends back to the server to complete the authentication.

EAP-TLS provides for certificate-based and mutual authentication of the client and the network. It relies on client-side and server-side certificates to perform authentication and can be used to dynamically generate user-based and session-based WEP keys.

EAP-TTLS (Tunneled Transport Layer Security) is an extension of EAP-TLS to provide certificate-based, mutual authentication of the client and network through an encrypted tunnel, as well as to generate dynamic, per-user, per-session WEP keys. Unlike EAP-TLS, EAP-TTLS requires only server-side certificates.
(See also *PEAP (Protected Extensible Authentication Protocol)*.)

EAPS

Extreme Automatic Protection Switching is an Extreme Networks-proprietary version of the Ethernet Automatic Protection Switching protocol that prevents looping Layer 2 of the network. This feature is discussed in RFC 3619.

ESRP

Extreme Standby Router Protocol is an Extreme Networks-proprietary protocol that provides redundant Layer 2 and routing services to users.

Extreme Application Analytics

EAA, formerly Purview™, is a network powered application analytics and optimization solution that captures and analyzes context-based application traffic to deliver meaningful intelligence about applications, users, locations, and devices. EAA provides data to show how applications are being used. This can be used to better understand customer behavior on the network, identify the level of user engagement, and assure business application delivery to optimize the user experience. The software also provides visibility into network and application performance allowing IT to pinpoint and resolve performance issues in the infrastructure whether they are caused by the network, application, or server. Learn more about EAA at http://www.extremenetworks.com/product/extremeanalytics/.

Extreme Management Center

Extreme Management Center (Management Center), formerly Netsight™, is a web-based control interface that provides centralized visibility into your network. Management Center reaches beyond ports, VLANs, and SSIDs and provides detailed control of individual users, applications, and protocols. When coupled with wireless and Identity & Access Management products, Management Center becomes the central location for monitoring and managing all the components in the infrastructure. Learn more about Management Center at http://www.extremenetworks.com/product/management-center/.

ExtremeCloud

ExtremeCloud is a cloud-based network management Software as a Service (SaaS) tool. ExtremeCloud allows you to manage users, wired and wireless devices, and applications on corporate and guest networks. You can control the user experience with smarter edges – including managing QoS, call admission control, secure access policies, rate limiting, multicast, filtering, and traffic forwarding, all from an intuitive web interface. Learn more about ExtremeCloud at http://www.extremenetworks.com/product/extremecloud/.

ExtremeCloud Appliance

The ExtremeCloud Appliance, the newest addition to the Smart OmniEdge portfolio, is a next generation orchestration application offering all the mobility services required for modern unified access deployments. The ExtremeCloud Appliance extends the simplified workflows of the ExtremeCloud public cloud application to on-prem/private cloud deployments.

The ExtremeCloud Appliance includes comprehensive critical network services for wireless and wired connectivity, wireless device secure onboarding, distributed and centralized data paths, role-based access control through the Application Layer, integrated location services, and IoT device onboarding through a single platform.

Built on architecture with the latest technology, the embedded operating system supports application containers that enable future expansion of value added applications for the unified access edge. Learn more about ExtremeCloud Appliance at https://www.extremenetworks.com/product/extremecloud-appliance/.

ExtremeControl

ExtremeControl, formerly Extreme Access Control™ (EAC), is a set of management software tools that use information gathered by a hardware engine to control policy to all devices on the network. The software allows you to automate and secure access for all devices on the network from a central dashboard, making it easier to roll out security and identity policies across the wired and wireless network. Learn more about ExtremeControl at https://www.extremenetworks.com/product/extremecontrol/.

ExtremeSwitching

ExtremeSwitching is the family of products comprising different switch types: Modular (X8 and 8000 series [formerly BlackDiamond] and S and K series switches); Stackable (X-series and A, B, C, and 7100 series switches); Standalone (SSA, X430, and D, 200, 800, and ISW series); and Mobile Backhaul (E4G). Learn more about ExtremeSwitching at http://www.extremenetworks.com/products/switching-routing/.

ExtremeWireless

ExtremeWireless products and solutions offer high-density WiFi access, connecting your organization with employees, partners, and customers everywhere they go. The family of wireless products and solutions includes APs, wireless appliances, and software. Learn more about ExtremeWireless at http://www.extremenetworks.com/products/wireless/.

ExtremeXOS

ExtremeXOS, a modular switch operating system, is designed from the ground up to meet the needs of large cloud and private data centers, service providers, converged enterprise edge networks, and everything in between. Based on a resilient architecture and protocols, ExtremeXOS supports network virtualization and standards-based SDN capabilities like VXLAN gateway, OpenFlow, and OpenStack Cloud orchestration. ExtremeXOS also supports comprehensive role-based policy. Learn more about ExtremeXOS at http://www.extremenetworks.com/product/extremexos-network-operating-system/.

FHSS

Frequency-Hopping Spread Spectrum is a transmission technology used in Local Area Wireless Network (LAWN) transmissions where the data signal is modulated with a narrowband carrier signal that 'hops' in a random but predictable sequence from frequency to frequency as a function of time over a wide band of frequencies. This technique reduces interference. If synchronized properly, a single logical channel is maintained. (Compare with *DSSS (Direct-Sequence Spread Spectrum)*.)

IBSS

An IBSS is the 802.11 term for an ad hoc network. See *ad hoc mode*.

MIC

Message Integrity Check (or Code), also called 'Michael', is part of WPA and TKIP. The MIC is an additional 8-byte code inserted before the standard 4-byte ICV appended in by standard WEP to the 802.11 message. This greatly increases the difficulty in carrying out forgery attacks.
Both integrity check mechanisms are calculated by the receiver and compared against the values sent by the sender in the frame. If the values match, there is assurance that the message has not been tampered with.

netmask

A netmask is a string of 0s and 1s that mask, or screen out, the network part of an IP address, so that only the host computer part of the address remains. A frequently-used netmask is 255.255.255.0, used for a Class C subnet (one with up to 255 host computers). The ".0" in the netmask allows the specific host computer address to be visible.

OSPF

An interior gateway routing protocol for TCP/IP networks, Open Shortest Path First uses a link state routing algorithm that calculates routes for packets based on a number of factors, including least hops, speed of transmission lines, and congestion delays. You can also configure certain cost metrics for the

algorithm. This protocol is more efficient and scalable than vector-distance routing protocols. OSPF features include least-cost routing, ECMP routing, and load balancing. Although OSPF requires CPU power and memory space, it results in smaller, less frequent router table updates throughout the network. This protocol is more efficient and scalable than vector-distance routing protocols.

PEAP

Protected Extensible Authentication Protocol is an IETF draft standard to authenticate wireless LAN clients without requiring them to have certificates. In PEAP authentication, first the user authenticates the authentication server, then the authentication server authenticates the user. If the first phase is successful, the user is then authenticated over the SSL tunnel created in phase one using EAP-Generic Token Card (EAP-GTC) or Microsoft Challenged Handshake Protocol Version 2 (MSCHAP V2). (See also *EAP-TLS/EAP-TTLS*.)

RIP

This IGP vector-distance routing protocol is part of the TCP/IP suite and maintains tables of all known destinations and the number of hops required to reach each. Using Routing Information Protocol, routers periodically exchange entire routing tables. RIP is suitable for use only as an IGP.

SSL

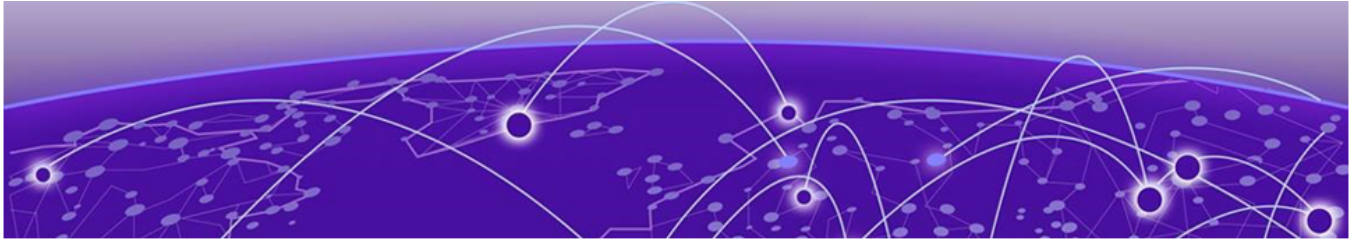
Secure Socket Layer is a protocol for transmitting private documents using the Internet. SSL works by using a public key to encrypt data that is transferred over the SSL connection. SSL uses the public-and-private key encryption system, which includes the use of a digital certificate. SSL is used for other applications than SSH, for example, OpenFlow.

syslog

A protocol used for the transmission of event notification messages across networks, originally developed on the University of California Berkeley Software Distribution (BSD) TCP/IP system implementations, and now embedded in many other operating systems and networked devices. A device generates a messages, a relay receives and forwards the messages, and a collector (a syslog server) receives the messages without relaying them.
syslog uses the UDP as its underlying transport layer mechanism. The UDP port that has been assigned to syslog is 514. (RFC 3164)

VLAN

The term VLAN is used to refer to a collection of devices that communicate as if they are on the same physical LAN. Any set of ports (including all ports on the switch) is considered a VLAN. LAN segments are not restricted by the hardware that physically connects them. The segments are defined by flexible user groups you create with the CLI.



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