5420 Series Hardware Installation Guide

Setup, Configuration, and Best Practices

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March 2025



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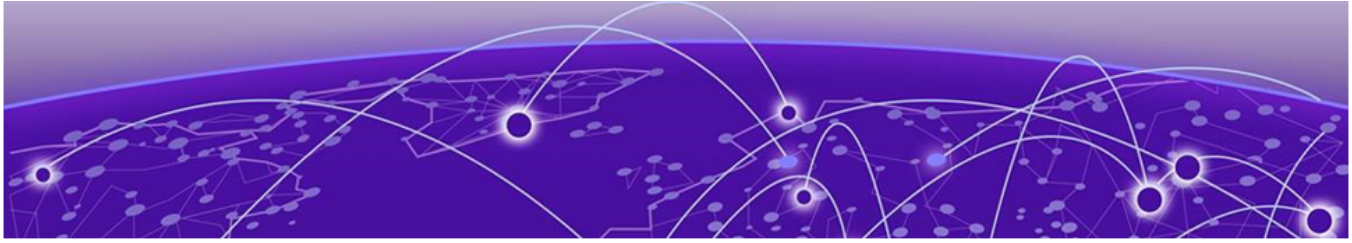


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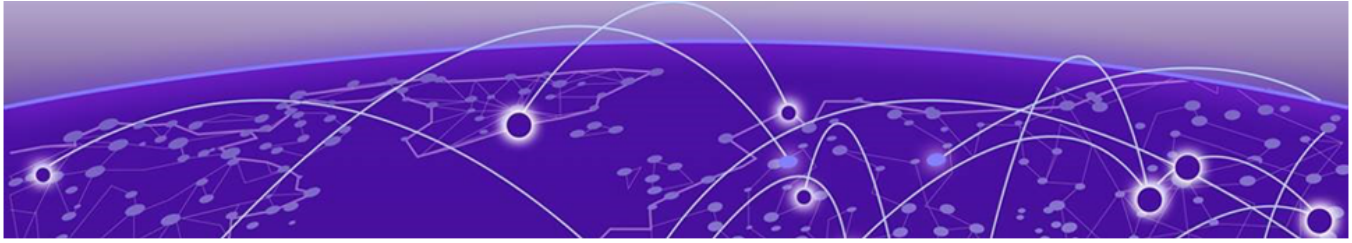
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Preface

This hardware installation guide for 5420 Series covers setting up switches, including site preparation, rack installation, power supply requirements, and cabling. It details switch models and features such as port configurations, cooling options, and power supplies. The guide includes management options via RJ45 and USB ports, secure boot procedures, and environmental requirements. It also provides instructions for building stacks, configuring switches, and monitoring device status. This document is intended for network administrators familiar with LANs, Ethernet, and SNMP.

Read the following topics to learn about:

- The meanings of text formats used in this document.
- Where you can find additional information and help.
- How to reach us with questions and comments.

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 *Switch Engine 32.1 User Guide* and the *Switch Engine 32.1 Command Reference Guide* for information about configuring Extreme Networks 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.

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 Extreme Networks 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
	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 is displayed 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.

Documentation and Training

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 articles, white papers, and case studies

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Extreme Networks offers product training courses, both online and in person, as well as specialized certifications. For details, visit the Extreme Networks Training page.

Help and Support

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

Extreme Portal

Search the GTAC (Global Technical Assistance Center) knowledge base; manage support cases and service contracts; download software; and obtain product licensing, training, and certifications.

The Hub

A forum for Extreme Networks customers to connect with one another, answer questions, and share ideas and feedback. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.

Call GTAC

For immediate support: (800) 998 2408 (toll-free in U.S. and Canada) or 1 (408) 579 2800. For the support phone number in your country, visit www.extremenetworks.com/support/contact.

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

- Your Extreme Networks service contract number, 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

Subscribe to Product Announcements

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

1. Go to The Hub.
2. In the list of categories, expand the **Product Announcements** list.
3. Select a product for which you would like to receive notifications.
4. Select **Subscribe**.
5. To select additional products, return to the **Product Announcements** list and repeat steps 3 and 4.

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

Send Feedback

The User Enablement team at Extreme Networks has made every effort to ensure that this document is accurate, complete, and easy to use. We strive to improve our

documentation to help you in your work, so we want to hear from you. We welcome all feedback, but we especially want to know about:

- Content errors, or confusing or conflicting information.
- Improvements that would help you find relevant information.
- Broken links or usability issues.

To send feedback, email us at documentation@extremenetworks.com .

Provide as much detail as possible including the publication title, topic heading, and page number (if applicable), along with your comments and suggestions for improvement.

New in this Guide

The following sections describe the recent documentation revisions for this guide. Use this information to locate the latest updates.

March 2025 Revisions

The following table lists the documentation updates for March, 2025.

Description	Section
Remove 25Gb speed from SFP+ MACsec capable uplink ports	5420F-8W-16P-4XE Switch Features on page 16 5420F-24P-4XE Switch Features on page 16 5420F-24S-4XE Switch Features on page 17 5420F-24T-4XE Switch Features on page 18 5420F-16MW-32P-4XE Switch Features on page 19 5420F-16W-32P-4XE Switch Features on page 20 5420F-48P-4XE Switch Features on page 21 5420F-48P-4XL Switch Features on page 21 5420F-48T-4XE Switch Features on page 22
Change 1 GB DDR4 ECC memory to 2 GB	CPU, Memory Specifications on page 97
Updates to power inlet and power cord specifications	150 W AC Power Supply on page 30 600 W AC PoE Power Supply on page 31 920 W AC PoE Power Supply on page 31 1200 W AC PoE Power Supply on page 32 2000 W AC PoE Power Supply on page 33

5420 Series Overview

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5420M-48T-4YE Switch Features on page 26
5420M-48W-4YE Switch Features on page 27

The ExtremeSwitching 5420 Series is a family of high-performance, feature-rich edge switches designed for the next-generation digital enterprise. The 5420 Series universal hardware provides end-to-end secure network segmentation, in addition to advanced policy capabilities, and offers a user-selectable choice of Extreme's flagship switch operating systems. The 5420 Series is a uniquely flexible platform that can be deployed across a range of edge and wiring-closet environments.

The 5420 Series consists of 14 models in the 5420M and the 5420F families. The 5420M models include field-replaceable power supplies and fans, and 4 x 1/10/25Gb built-in uplink ports. The 5420F models have a fixed power supply and one or more fixed fans, a second field-replaceable power supply, and 4 x 1/10Gb built-in uplink ports.

Both the 5420M and the 5420F families include 24 and 48-port 1 Gigabit models, as well as 1 / 2.5 Gigabit multi-rate models. Both also provide 30/60/90W PoE capabilities making them an ideal wired backend for wireless APs or in support of next-generation power Ethernet devices, such as digital signage, pan-tilt-zoom cameras, smart lighting, or point-of-sale terminals.

Management

An RJ45 serial console port on the switch enables you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to an out-of-band (OOB) 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 RJ45 serial console port is located on the front panel of the switch.

There is one Micro-B USB console port located on the front panel. If the Micro-B USB console port is connected, it is selected over the RJ45 serial console port. The Micro-B USB console port disconnects when the switch is rebooted. You can re-connect the port if needed. When the Micro-B USB console is active, any messages from the switch to the client terminal are echoed to both the USB console and the RJ45 serial console port; however, no user input is accepted from the RJ45 serial console port.



Note
Using a Micro-USB Type B to USB Type A cable, connect the Micro-USB Type B end to the switch, and the USB Type A end to a laptop or PC and complete the driver installation steps.

There are also two USB 2.0 Type A ports on the front panel labeled USB 1 and USB 2. They can host removable devices like flash drives.

Cooling

Switch cooling is provided by one replaceable fan module in 5420M switches, located on the rear panel of the switch, or two or three fixed fans in 5420F switches. Switch fans provide front-to-back airflow. Switch fans are not responsible for cooling the power supplies; power supplies have integrated cooling fans that operate independently of the switch fan.

A spare fan module (XN-FAN-000) with front-to-back airflow is available for 5420 Series switches.

Power Supplies

5420 Series switches use fixed and hot-swappable power supplies to provide enough power for the needs of the switch. 5420F models have 1 hot-swappable power supply and 1 fixed power supply. 5420M models have 2 hot-swappable power supplies. Power supply slots for hot-swappable power supplies are located in the rear of the switch.

Power supplies are ordered separately.

Stacking Ports

Each switch comes equipped with two stacking ports, also referred to as Universal Ethernet ports. The stacking ports are labeled U1 and U2 and are located on the front of the switch. When running Switch Engine, these ports can be used in either stacking mode or Ethernet mode. When in stacking mode, up to eight systems can be stacked

using qualified direct attach cables or optical transceivers. The U1 and U2 ports operate as stacking ports by default. Use the `disable stacking-support` command to set the U1 and U2 ports in Ethernet mode.

Fabric Engine does not support stacking, but the U1 and U2 ports can be used as Ethernet ports by Fabric Engine when Fabric Engine is in non-fabric mode. When used as Ethernet ports, the U1 and U2 ports can support data rates of either 10Gb using SFP+ optics or 20Gb using SFP-DD optics. 5420M switch models support two 10Gb channels on each SFP-DD port when the ports are used as Ethernet ports on Switch Engine 31.6 and later. 5420F switch models support one 10Gb channel on each SFP-DD port when the ports are used as Ethernet ports.

Stacking cables are ordered separately.

For information about optical modules, see the Extreme Optics website.

For information about stacking, see Build Stacks on page 49.

Secure Boot

Secure boot establishes a chain-of-trust relationship in the boot process. The chain-of-trust is established by cryptographic checks at each stage of the boot process to validate the integrity and authenticity of the next stage before it can execute. The current implementation validates boot images. It cannot be disabled after it has been programmed on the device. There is no command-line interface or commands to enable or disable secure boot. The status of the boot image verification can be monitored in the operating system.

For more information, see Secure Boot on page 28.

Operating Temperatures

All 5420 Series switch models support an operating range from 0°C to 50°C up to 3000 m (10,000 ft).

Temperature restrictions apply for some models at high altitudes.

Feature Licensing

The 5420 Series switches support Unified Licensing, so that you can use them with multiple operating systems. There are two methods of acquiring feature licenses: manual or through ExtremeCloud IQ™ (XIQ).

For Switch Engine licensing, see the *Feature License Requirements* for your version of the Switch Engine software.

For Fabric Engine licensing, see the Licensing chapter in the *Fabric Engine User Guide* for your version of the Fabric Engine operating system.

For XIQ licensing, see *ExtremeCloud IQ*.

5420F-8W-16P-4XE Switch Features

The front panel of the 5420F-8W-16P-4XE switch includes:

1 = 48 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = 16 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with Type 2 PoE+ (30W) ports
3 = Mode button
4 = USB Micro-B console port
5 = 10/100/1000BASE-T Out-of-band management port
6 = Serial console port (RJ-45)
7 = 2 x USB Type A port for management or external USB flash
8 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
9 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

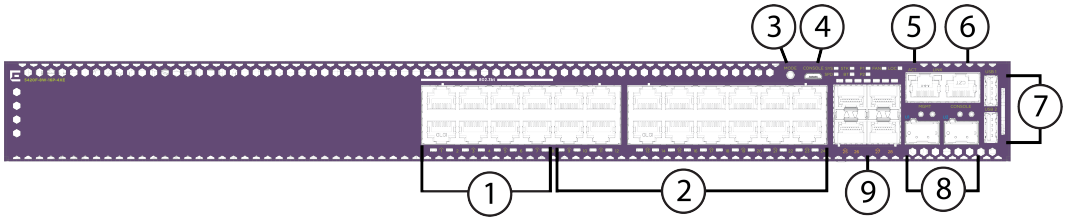


Figure 1: 5420F-8W-16P-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 2 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 2: 5420F-8W-16P-4XE Rear Panel

5420F-24P-4XE Switch Features

The front panel of the 5420F-24P-4XE switch includes:

1 = 24 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with 802.3at Type 2 PoE+ (30W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
8 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

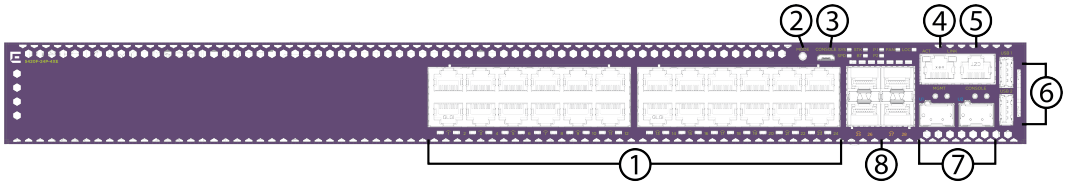


Figure 3: 5420F-24P-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 2 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 4: 5420F-24P-4XE Rear Panel

5420F-24S-4XE Switch Features

The front panel of the 5420F-24S-4XE switch includes:

1 = 24 x 100/1000BASE-X SFP MACsec capable ports (unpopulated)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)

6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
8 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

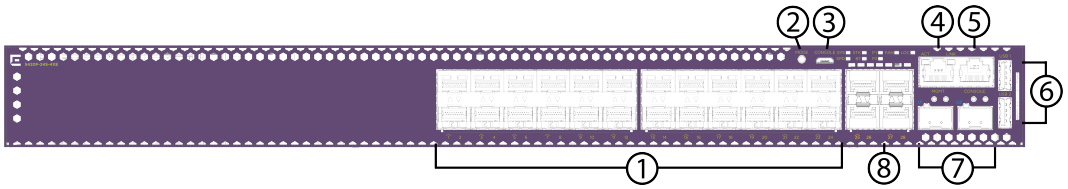


Figure 5: 5420F-24S-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 2 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 6: 5420F-24S-4XE Rear Panel

5420F-24T-4XE Switch Features

The front panel of the 5420F-24T-4XE switch includes:

1 = 24 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
8 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

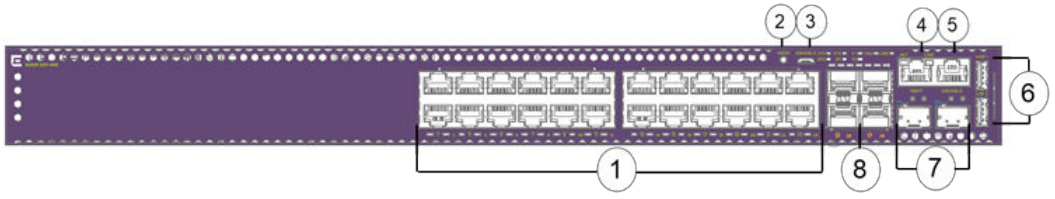


Figure 7: 5420F-24T-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 2 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 8: 5420F-24T-4XE Rear Panel

5420F-16MW-32P-4XE Switch Features

The front panel of the 5420F-16MW-32P-4XE switch includes:

1 = 16 x 100Mb/1Gb/2.5Gb MACsec capable ports with 802.3bt Type 4 PoE (90W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = 32 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with Type 2 PoE+ (30W)
3 = Mode button
4 = USB Micro-B console port
5 = 10/100/1000BASE-T Out-of-band management port
6 = Serial console port (RJ-45)
7 = 2 x USB Type A port for management or external USB flash
8 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
9 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

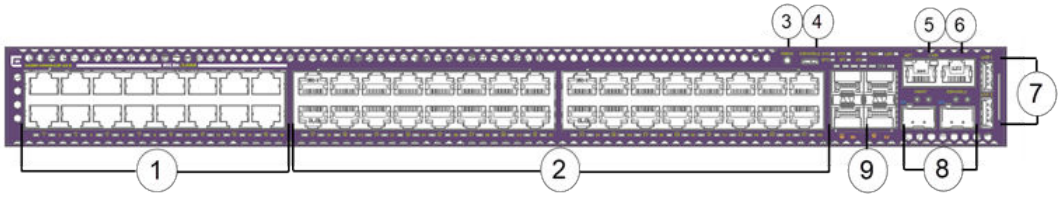


Figure 9: 5420F-16MW-32P-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 3 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 10: 5420F-16MW-32P-4XE Rear Panel

5420F-16W-32P-4XE Switch Features

The front panel of the 5420F-16W-32P-4XE switch includes:

1 = 16 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with 802.3bt Type 4 PoE (90W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = 32 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with Type 2 PoE+ (30W

3 = Mode button

4 = USB Micro-B console port

5 = 10/100/1000BASE-T Out-of-band management port

6 = Serial console port (RJ-45)

7 = 2 x USB Type A port for management or external USB flash

8 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)

9 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

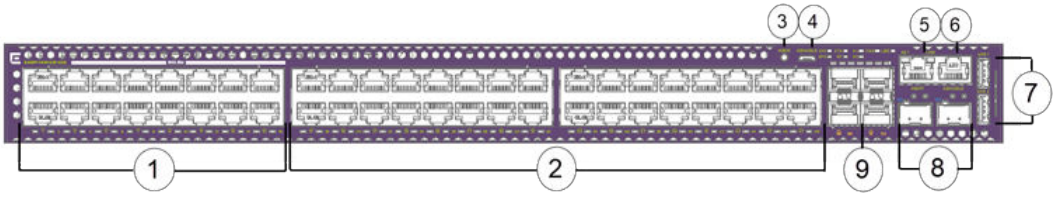


Figure 11: 5420F-16W-32P-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug

2 = 3 x Fixed fan modules

3 = AC power inlet connector

4 = Power supply slot (unpopulated)



Figure 12: 5420F-16W-32P-4XE Rear Panel

5420F-48P-4XE Switch Features

The front panel of the 5420F-48P-4XE switch includes:

1 = 48 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with Type 2 PoE+ (30W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
8 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

Note
If you are trying to activate a MACsec license on a **5420F-48P-4XE** switch with hardware revision AC, contact GTAC for the latest support information.

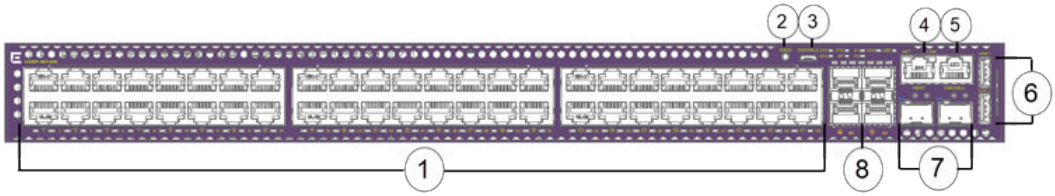


Figure 13: 5420F-48P-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 3 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 14: 5420F-48P-4XE Rear Panel

5420F-48P-4XL Switch Features

The front panel of the 5420F-48P-4XL switch includes:

1 = 48 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with Type 2 PoE+ (30W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
8 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

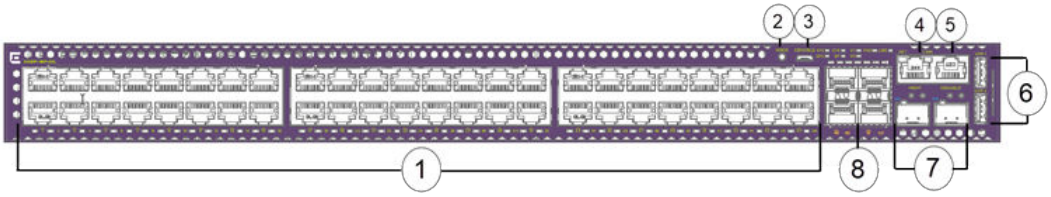


Figure 15: 5420F-48P-4XL Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 3 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slots (unpopulated)



Figure 16: 5420F-48P-4XL Rear Panel

5420F-48T-4XE Switch Features

The front panel of the 5420F-48T-4XE switch includes:

1 = 48 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)

6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)
8 = 4 x 1/10Gb SFP+ MACsec capable uplink ports (unpopulated)

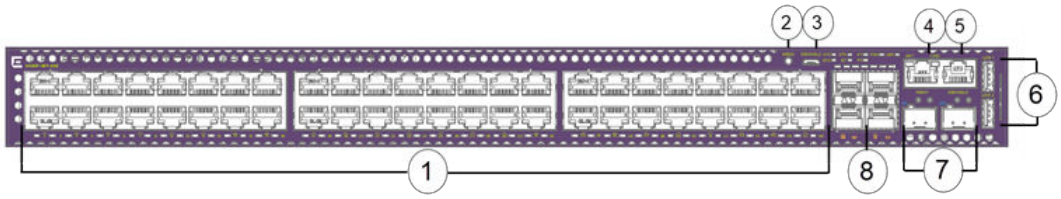


Figure 17: 5420F-48T-4XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = 2 x Fixed fan modules
3 = AC power inlet connector
4 = Power supply slot (unpopulated)



Figure 18: 5420F-48T-4XE Rear Panel

5420M-24T-4YE Switch Features

The front panel of the 5420M-24T-4YE switch includes:

1 = 24 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)

Note
These ports can operate either as stacking ports, or as 10G Ethernet ports with SFP+ optics using the **`disable stacking-support`** command.

8 = 4 x 1/10/25Gb SFP28 MACsec capable uplink ports (unpopulated)

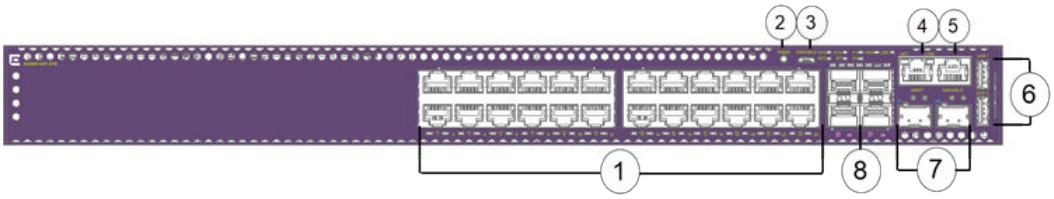


Figure 19: 5420M-24T-4YE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = Fan module
3 = 2 x Power supply slots (unpopulated)



Figure 20: 5420M-24T-4YE Rear Panel

5420M-24W-4YE Switch Features

The front panel of the 5420M-24W-4YE switch includes:

1 = 24 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with 802.3bt Type 4 PoE (90W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)

Note
These ports can operate either as stacking ports, or as 10G Ethernet ports with SFP+ optics using the **`disable stacking-support`** command.

8 = 4 x 1/10/25Gb SFP28 MACsec capable uplink ports (unpopulated)

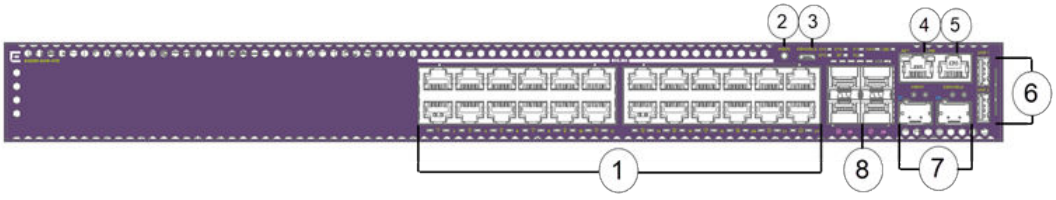


Figure 21: 5420M-24W-4YE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = Fan module
3 = 2 x Power supply slots (unpopulated)



Figure 22: 5420M-24W-4YE Rear Panel

5420M-16MW-32P-4YE Switch Features

The front panel of the 5420M-16MW-32P-4YE switch includes:

1 = 16 x 100Mb/1Gb/2.5Gb MACsec cabable ports with 802.3bt Type 4 PoE (90W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = 32 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with Type 2 PoE+ (30W)
3 = Mode button
4 = USB Micro-B console port
5 = 10/100/1000BASE-T Out-of-band management port
6 = Serial console port (RJ-45)
7 = 2 x USB Type A port for management or external USB flash
8 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)

Note
These ports can operate either as stacking ports, or as 10G Ethernet ports with SFP+ optics using the **`disable stacking-support`** command.

9 = 4 x 1/10/25Gb SFP28 MACsec capable uplink ports (unpopulated)

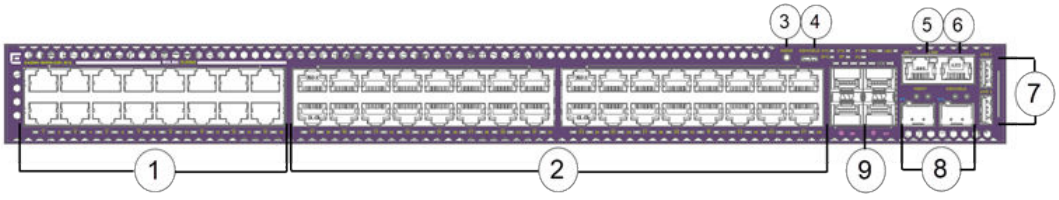


Figure 23: 5420M-16MW-32P-4YE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = Fan module
3 = 2 x Power supply slots (unpopulated)



Figure 24: 5420M-16MW-32P-4YE Rear Panel

5420M-48T-4YE Switch Features

The front panel of the 5420M-48T-4YE switch includes:

1 = 48 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)

Note
These ports can operate either as stacking ports, or as 10G Ethernet ports with SFP+ optics using the **`disable stacking-support`** command.

8 = 4 x 1/10/25Gb SFP28 MACsec capable uplink ports (unpopulated)

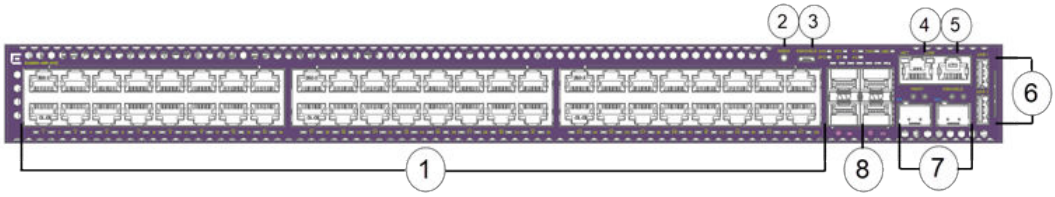


Figure 25: 5420M-48T-4YE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = Fan module
3 = 2 x Power supply slots (unpopulated)



Figure 26: 5420M-48T-4YE Rear Panel

5420M-48W-4YE Switch Features

The front panel of the 5420M-48W-4YE switch includes:

1 = 48 x 10/100/1000BASE-T full/half duplex (autosensing) MACsec capable ports with 802.3bt Type 4 PoE (90W)

Note
Half-duplex is not supported on these ports when operating at 1Gbps.

2 = Mode button
3 = USB Micro-B console port
4 = 10/100/1000BASE-T Out-of-band management port
5 = Serial console port (RJ-45)
6 = 2 x USB Type A port for management or external USB flash
7 = 2 x SFP-DD Universal ports/Stacking ports (unpopulated)

Note
These ports can operate either as stacking ports, or as 10G Ethernet ports with SFP+ optics using the **`disable stacking-support`** command.

8 = 4 x 1/10/25Gb SFP28 MACsec capable uplink ports (unpopulated)

Note
If you are trying to activate a MACsec license on a **5420M-48W-4YE** switch with hardware revision AC, contact GTAC for the latest support information.

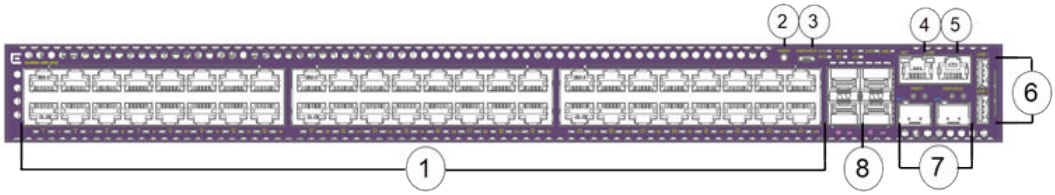


Figure 27: 5420M-48W-4YE Front Panel

The rear panel of the switch includes:

1 = Grounding lug
2 = Fan module
3 = 2 x Power supply slots (unpopulated)



Figure 28: 5420M-48W-4YE Rear Panel

Secure Boot

The status of the boot image verification can be monitored in the operating system.

Switch Engine

The Trusted Delivery field in the output of the `show switch` and `show system` commands in Switch Engine displays the status of the boot image verification. For example:

```
5520-24X-EXOS.2 # sh switch
SysName:          5520-24X-EXOS
SysLocation:
SysContact:       https://www.extremenetworks.com/support/
System MAC:       00:04:96:F2:F8:00
System Type:      5520-24X-EXOS
SysHealth check:  Enabled (Normal)
Recovery Mode:    All
System Watchdog:  Enabled
Trusted Delivery: Boot Image Verified
Current Time:     Mon Jul 27 19:35:03 2020
Timezone:         [Auto DST Disabled] GMT Offset: 0 minutes, name is UTC.
Boot Time:        Mon Jul 27 19:31:50 2020
```

Trusted delivery can only be in one of two states:

- Boot Image Verified
- Boot Image Verification Failed

Fabric Engine

The Trusted Delivery Status field in the `show sys-info` command in Fabric Engine displays the status of the boot image verification. For example:

```
       U-Boot Info :
-------------------------------------------------------------------------------------------
----------

                Default Version         : 2.2.1.3

                Alternate Version       : 2.2.1.3

                Boot Version Used       : Default

                Trusted Delivery Status : Boot Image Verified
```

Trusted delivery status can only be in one of two states:

- Boot Image Verified
- Boot Image Verification Failed

Secure Boot Troubleshooting

When there is a secure boot validation failure, the switch is booted to a recovery stage or halts. Contact GTAC for assistance with recovering the switch.

Power Supplies for Use with Your Switch

150 W AC Power Supply on page 30
600 W AC PoE Power Supply on page 31
920 W AC PoE Power Supply on page 31
1200 W AC PoE Power Supply on page 32
2000 W AC PoE Power Supply on page 33
Minimum Software Version for Power Supplies on 5420 Series Switches on page 34

5420F models have 1 hot-swappable PSU and 1 fixed PSU. 5420M models have 2 hot-swappable PSUs. You can remove one power supply without interrupting the switch's operation.

Power supplies are ordered separately.

150 W AC Power Supply

The 150 W AC power supply (models XN-ACPWR-150W and XN-ACPWR-150W-FB with front-to-back ventilation airflow) are compatible with 5420F-24T-4XE, 5420F-24S-4XE, 5420F-48T-4XE, 5420M-24T-4YE, and 5420M-48T-4YE switch models.

The 150 W AC power supply has a (C14) power inlet that requires a (C13) power cord.

The 150 W AC power supply has the status LEDs listed in the following table:

Table 4: 150 W AC Power Supply LED Status Indications

LED State	Description
Off	No AC input power connection
Green	Output ON and OK
Green/1Hz flashing	AC present/only 12VSB on (PSU off) or PSU in Smart ON state
Amber	AC cord unplugged or AC power lost; with a second PSU in parallel still with AC input power
Amber/1Hz flashing	PSU warning (high temp, high power, high current, slow fan)
Amber	PSU critcal event and shutdown (failure, OCP, OVP, Fan failure)

600 W AC PoE Power Supply

The 600W AC PoE power supply (models XN-ACPWR-600W and XN-ACPWR-600W-FB and with front-to-back ventilation airflow) are compatible with 5420F-24P-4XE and 5420F-8W-16P-4XE switch models.

The 600 W AC power supply has a (C14) power inlet that requires a (C13) power cord.

The 600 W AC PoE power supply has the status LEDs listed in the following table:

Table 5: XN-ACPWR-600W model 600 W AC PoE Power Supply LED Status Indications

DC_OK (left)	AC_OK (right)	Description
Green/1 Hz flashing	Green	AC present / only standby outputs on.
Green	Green	Power supply DC outputs on and OK.
Red	Green	Power supply failure. PSU shut down*.

*Power supply DC fail : OCP, OVP, OTP, fan.

Table 6: XN-ACPWR-600W-FB model 600 W AC Power Supply LED Status Indications

LED State	Description
Off	No AC input power connection
Green	Output ON and OK
Green/1Hz flashing	AC present/only 12VSB on (PSU off) or PSU in Smart ON state
Amber	AC cord unplugged or AC power lost; with a second PSU in parallel still with AC input power
Amber/1Hz flashing	PSU warning (high temp, high power, high current, slow fan)
Amber	PSU critcal event and shutdown (failure, OCP, OVP, Fan failure)

920 W AC PoE Power Supply

The 920 W AC PoE power supply (model XN-ACPWR-920W with front-to-back ventilation airflow) is compatible with 5420F-48P-4XE, 5420F-48P-4XL, 5420M-24W-4YE, 5420M-48W-4YE, and 5420M-16MW-32P-4YE switch models.

The 920 W AC power supply has a (C14) power inlet that requires a (C13) power cord.

The 920 W AC PoE power supply has the status LEDs listed in the following table:

Table 7: 920 W AC PoE Power Supply LED Status Indications

DC_OK (left)	AC_OK (right)	Description
Green/1 Hz flashing	Green	AC present / only standby outputs on.
Green	Green	Power supply DC outputs on and OK.
Red	Green	Power supply failure. PSU shut down*.

*Power supply DC fail : OCP, OVP, OTP, fan.

1200 W AC PoE Power Supply

The 1200 W AC PoE power supply model XN-ACPWR-1200W (with front-to-back ventilation airflow) is compatible with 5420F-16W-32P-4XE and 5420F-16MW-32P-4XE switch models. The 1200 W AC PoE power supply model XN-ACPWR-1200W-FB (with front-to-back ventilation airflow) is compatible with 5420F-48P-4XE, 5420F-48P-4XL, 5420F-16W-32P-4XE, 5420F-16MW-32P-4XE, 5420M-24W-4YE, 5420M-48W-4YE, and 5420M-16MW-32P-4YE.

The XN-ACPWR-1200W model 1200 W AC PoE power supply has a (C16) power inlet that requires a (C15) power cord.

The XN-ACPWR-1200W-FB model 1200 W AC PoE power supply has a (C14) power inlet that requires a (C13) power cord.

The 1200 W AC PoE power supply has the status LEDs listed in the following table:

Table 8: XN-ACPWR-1200W model 1200 W AC PoE Power Supply LED Status Indications

DC_OK (left)	AC_OK (right)	Description
Green/1 Hz flashing	Green	AC present / only standby outputs on.
Green	Green	Power supply DC outputs on and OK.
Red	Green	Power supply failure. PSU shut down*.

*Power supply DC fail : OCP, OVP, OTP, fan.

Table 9: XN-ACPWR-1200W-FB model 600 W AC Power Supply LED Status Indications

LED State	Description
Off	No AC input power connection
Green	Output ON and OK
Green/1Hz flashing	AC present/only 12VSB on (PSU off) or PSU in Smart ON state
Amber	AC cord unplugged or AC power lost; with a second PSU in parallel still with AC input power
Amber/1Hz flashing	PSU warning (high temp, high power, high current, slow fan)
Amber	PSU critcal event and shutdown (failure, OCP, OVP, Fan failure)

2000 W AC PoE Power Supply

The 2000 W AC PoE power supply (models XN-ACPWR-2000W and XN-ACPWR-2000W-FB-A with front-to-back ventilation airflow) are compatible with 5420M-48W-4YE and 5420M-16MW-32P-4YE switch models.

In order to obtain 2000W output from these power supplies, the PSU must be connected to a 200-240VAC source.

The XN-ACPWR-2000W model 2000 W AC PoE power supply has a (C16) power inlet that requires a (C15) power cord.

The XN-ACPWR-2000W-FB-A model 2000 W AC PoE power supply has a (C14) power inlet that requires a (C13) power cord.

The 2000 W AC PoE power supply has the status LEDs listed in the following table:

Table 10: XN-ACPWR-2000W model 2000 W AC PoE Power Supply LED Status Indications

DC_OK (left)	AC_OK (right)	Description
Green/1 Hz flashing	Green	AC present / only standby outputs on.
Green	Green	Power supply DC outputs on and OK.
Red	Green	Power supply failure. PSU shut down*.

*Power supply DC fail : OCP, OVP, UVP, OTP, fan.

Table 11: XN-ACPWR-2000W-FB-A model 2000 W AC Power Supply LED Status Indications

LED State	Description
Off	No AC input power connection
Green	Output ON and OK
Green/1Hz flashing	AC present/only 12VSB on (PSU off) or PSU in Smart ON state
Amber	AC cord unplugged or AC power lost; with a second PSU in parallel still with AC input power
Amber/1Hz flashing	PSU warning (high temp, high power, high current, slow fan)
Amber	PSU critcal event and shutdown (failure, OCP, OVP, Fan failure)

Minimum Software Version for Power Supplies on 5420 Series Switches

The following table contains the minimum software versions that are required on the 5420 Series switches for the listed power supply units.

Model Number	Switch Engine min SW Version	Fabric Engine min SW Version
XN-ACPWR-150W-FB	31.5.1.6	8.4.3.0
XN-ACPWR-600W-FB	31.5.1.6	8.4.3.0
XN-ACPWR-1200W-FB	32.4.1.10 and 31.7.2.28	8.10
XN-ACPWR-2000W-FB-A	31.5.1.6	8.4.3.0

Previous software versions do not support these power supply units. You must upgrade the 5420 Series switches to the listed minimum software version or later ***before installing*** these power supply units in the switch.

Site Preparation

Plan Your Site on page 35
Operating Environment Requirements on page 36
Rack Specifications and Recommendations on page 39
Evaluate and Meet Cable Requirements on page 41
Meet Power Requirements on page 45
Follow Applicable Industry Standards on page 47

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 the Technical Specifications on page 90 topic.

Plan 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 90.

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.

Meet 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 12 are authorities on electrical codes.

Table 12: 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

Set 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 39 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.

Control the Temperature

Extreme Networks equipment generates a significant amount of heat. It is essential that you provide a temperature-controlled environment for both performance and safety.

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

Observe these additional thermal recommendations for the location where you plan to install your equipment:

- Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below the maximum operating temperature for the equipment..
- 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 13 summarizes the behavior of Extreme Networks switches when they experience high operating temperatures.

Safeguards are built into all Extreme Networks switches and power supply units to minimize the risk of fire.

Table 13: Thermal Shutdown and Restart Behavior

Switch Model(s)	Behavior
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 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 by removing and then restoring all line power to the system. The internal sensor must still measure a system temperature that is lower than the maximum specified ambient temperature, so recovery might not be immediate.

Control 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 5% and 95% relative humidity (non-condensing) for short intervals.

Protect 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).

Ground 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.

Provide Adequate Space for the Rack

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

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

Warning
Extreme Networks switches do not have a switch for turning power to the unit on and off. For systems using an AC power supply, power to the switch is disconnected by removing the wall plug from the electrical outlet.

Be sure that cables and other equipment do not block the switch's air intake or outflow.

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.

Secure 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.

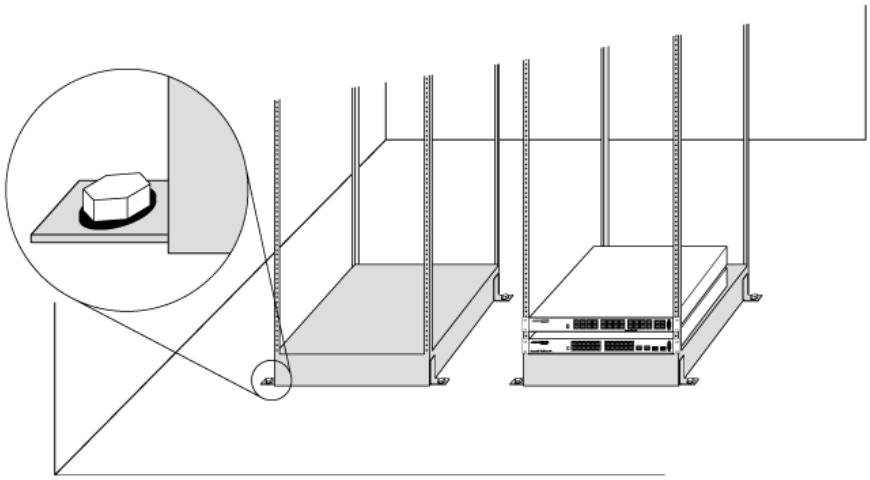


Figure 29: Properly Secured Rack

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

Evaluate and Meet 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.

Label Cables and Keep 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.

Install 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 30 on page 43.
- 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.

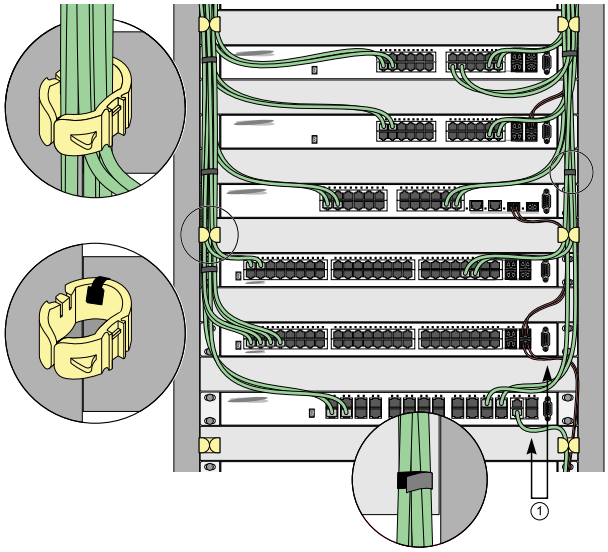


Figure 30: Properly Installed and Bundled Cable

1 = Ensure adequate slack and bend radius

Handle Fiber Optic Cable

Fiber optic cable must be handled carefully during installation.

Every cable has a minimum bend radius, 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 31.

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.

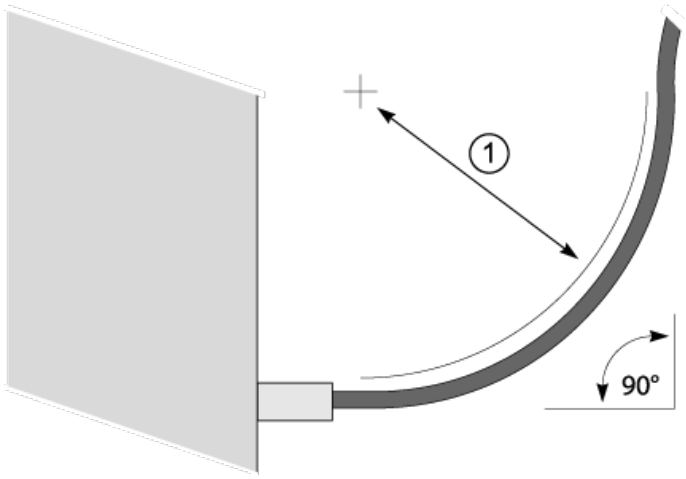


Figure 31: Bend Radius for Fiber Optic Cable
1 = Minimum 5 cm (2 in) radius in 90° bend

Cable Distances and Types

Refer to the Extreme Optics website for descriptions of optics and cables, as well as a complete list of supported cable lengths, and a list of the cable types that are compatible with your equipment.

Use 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 32 shows examples of recommended and non-recommended connector jacket types.

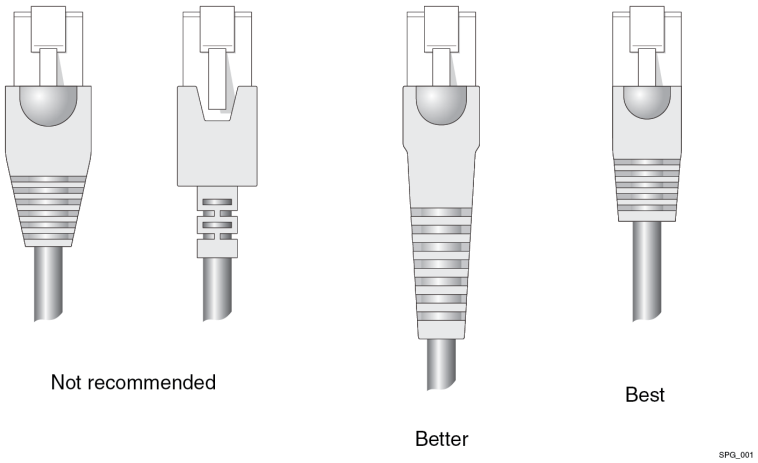


Figure 32: RJ45 Connector Jacket Types

Prevent 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.

Meet 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, the best practice is to plug your system into a surge suppressor.

For detailed power specifications for your equipment, see "Technical Specifications."

Power Cord Requirements

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 106.

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.

Select 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 Provide a Suitable UPS Transition Time on page 47.)

Note
Use a UPS that provides online protection.

Calculate 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.

Provide 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.)

Follow 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.

Build Stacks

Introduction to Stacking on page 49
Plan to Create Your Stack on page 59
Set up the Physical Stack on page 63

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; it operates as if it were a single switch, making network administration easier.

Stacking is facilitated by the SummitStack-V feature – part of the Switch Engine Basic License features.

This topic describes the supported configurations for stacking switches, the considerations for planning a stack, and the steps for setting up the hardware. Read this chapter before installing the switches that will make up the stack.

Refer to the Stacking chapter in the *Switch Engine 32.1 User Guide* for information about configuring a stack, maintaining the stack configuration, and troubleshooting.

Introduction to Stacking

When stacking switches, 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 primary switch – is responsible for running network protocols and managing the stack. The primary runs Switch Engine software and maintains all the software tables for all the switches in the stack.

All switches in the stack, including the primary switch, are called nodes. Figure 33 shows four nodes in a stack, connected to each other by SummitStack cables.

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.

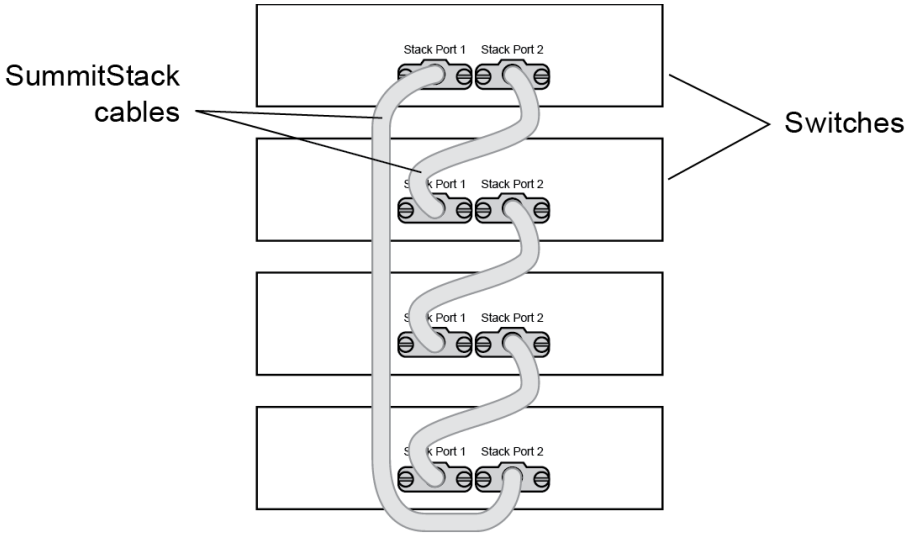


Figure 33: Switches Connected to Form a Stack

Using the SummitStack feature—part of the Switch Engine Edge/Base 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 Switch Engine.
- Includes support for stacking.

See Combine Switches from Different Series on page 61 for information about which switch series can be combined to form a stack.

The following topics 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.

Build 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 either the front or 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.

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 primary. 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 Connect the Switches to Form the Stack Ring on page 63 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.

The top half of the number blinks if the switch is the primary, 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.

The Mode button is used to cycle through three display modes for the port LEDs. After two presses of the Mode button, the port LEDs will enter the STK Display Mode, indicated by the STK LED. STK mode is used to indicate slot presence and slot number via the first eight port LEDs.

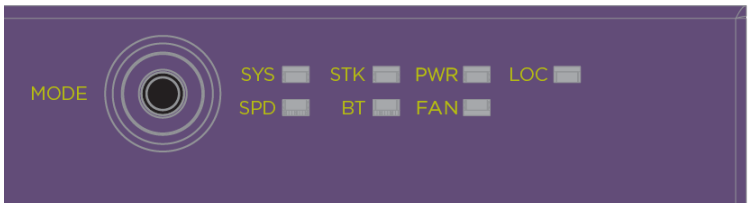


Figure 34: Mode Button with STK LED Example

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.

Primary/Backup Switch Redundancy

When your stack is operational, one switch is the primary 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 primary if the primary 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 primary and slot 2 as the backup. You can also configure additional switches as “primary-capable,” meaning they can become a stack primary in case the initial backup switch fails.

When assigning the primary and backup roles in mixed stacks, consider the feature scalability and the speed of each switch model. The easy setup configuration process selects primary and backup switches based on capability and speed. The following list shows the capabilities based on the ability to cross stack with other switch families. The most capable switches are shown at the top of each list:

- 5520 Series
- 5420 Series
- 5320 Series

5420 Series switches can be stacked with themselves, or with 5320 Series or 5520 Series switches using Alternate stacking. The 5320 Series can only act as a Standby node in a 5420 Series Primary configuration. The 5320 Series cannot act as a Backup node when the Primary node is a 5420 Series.

Beginning with Switch Engine 31.5, 5420 Series switches can be stacked with the 5520 Series switches using SummitStack-V80 and a special cable which converts QSFP+ to SFP-DD. The SummitStack-V80 configuration sets the speed of the QSFP+ stack ports to 20Gb.

When easy setup compares two switches that have the same capability, the lower slot number takes precedence.

Follow the same ranking hierarchy when you plan the physical placement of the switches in the stack.

SummitStack Topologies

Figure 35 presents a graphical representation of a stack and some of the terms that describe stack conditions.

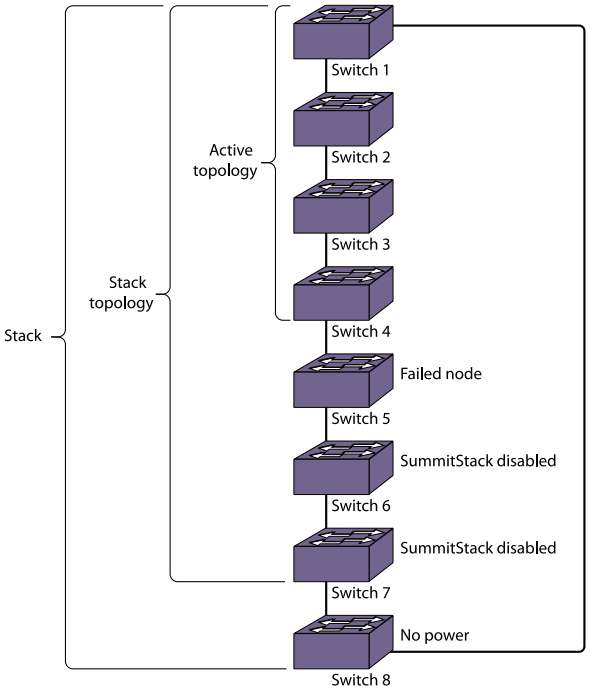


Figure 35: Example of a Stack, Showing the Active Topology and the Stack Topology

A stack is the collection of all switches, or nodes, that are cabled together to form one virtual switch using the Switch Engine 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.

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 55.

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 36 represents a maximal ring topology of eight active nodes.

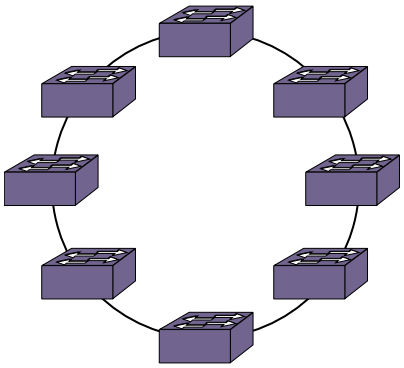


Figure 36: Graphical Representation of a Ring Topology

Figure 37 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.

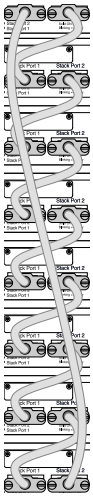


Figure 37: Switches Connected to Each Other in a Ring Topology

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 38, 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.

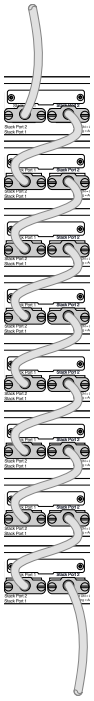


Figure 38: Daisy Chain Topology

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 *Switch Engine 32.1 User Guide*.

SummitStack Terms

Table 14 describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

Table 14: List of Stacking Terms

Term	Description
Stackable switch	An Extreme Networks 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.

Table 14: 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 Switch Engine 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 primary 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.

Table 14: List of Stacking Terms (continued)

Term	Description
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 primary, backup, or standby.
Primary node	The node that is elected as the primary node in the stack. The primary 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 primary node controls all of its own data ports as well as all data ports on the backup and standby nodes. To accomplish this, the primary 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 primary if the primary node fails. The primary node keeps the backup node's databases synchronized with its own databases in preparation for such an event. If and when the primary node fails, the backup node becomes the primary 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 primary node. When a backup node becomes a primary node, the new primary 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 primary node. This means that the primary 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 primary 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 primary node, and only when both the backup and standby nodes were already acquired by the same primary 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 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.

Table 14: List of Stacking Terms (continued)

Term	Description
Failover	The process of changing the backup node to the primary node when the original primary node has failed. When a primary node fails, if a backup node is present, and if that node has completed its initial synchronization with the primary node, then the backup node assumes the role of primary 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 primary node, continue normal operation when the primary node fails.
Node address	The unique MAC address that is factory-assigned to each node.
Node role election	The process that determines the role for each node. The election takes place during initial stack startup and elects one primary node and one backup node. An election also takes place after a primary node failover, when a new backup node is elected from the remaining standby nodes.
Node role election priority	A priority assigned to each node, to be used in node role election. The node with the highest node role election priority during a role election becomes the primary 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 primary 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

Enable and Disable 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.

- 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.
- When possible, place all switches for the stack in the same rack or in adjacent racks. This facilitates using shorter stacking cables.
- The primary switch, or node, is the switch 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 primary switch. If switches are installed in several adjacent racks, place the primary switch at one end of the row.
- Physically locate the intended primary and backup nodes adjacent to each other, and plan to connect these nodes to each other directly so that Switch Engine application synchronization traffic is localized to a single stack link.
- On the primary node, connect the Ethernet management port to your management network.

- To provide management access to the stack in case of a failure in the primary 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 53). Include only the nodes that you expect to be active in the stack.

Follow the recommendations in Recommendations for Configuring Stacks on page 60 to configure the software for your stack.

The recommended procedures for installing and interconnecting a stack are found in Set up the Physical Stack.

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 Switch Engine software version. (See the *Switch Engine 32.1 Feature License Requirements*.) To view the Switch Engine 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 primary node or any of the other nodes.
- If the primary-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 *Switch Engine 32.1 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 primary-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 *Switch Engine 32.1 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 59 for physically situating your equipment.

Combine Switches from Different Series

5420 Series switches can stack with themselves using SummitStack-V40 stacking (10G link running at HG). 5420 Series switches can also be stacked with 5320 Series or 5520 Series switches using Alternate stacking (10G link running at HG).

Select Stacking Cables

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.



Note
For the most recent information about available cables, contact your Extreme Networks sales representative or refer to the Extreme Optics website.



Caution
Use of non-recommended cables or optics could cause stack instability.

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.
- Statistics showing the routing options that are available with every stack combination.
- Recommendations about which switches should be the primary and backup nodes.
- Information about the supported versions of Switch Engine 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.ach switch model is represented by a rectangle, as shown in the example in the following figure. In this example, stacking ports are represented by U1 and U2 on the right side.



Figure 39: 5420 Switches Shown in the Stacking Tool

   Tip
   Select 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 primary/backup recommendations.

   Tip
   If you do not see statistics and other information, select 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, select the U1 and U2 symbols to choose stacking methods – for example, SummitStack-V and SummitStack-V80.
   - 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 15: Colors in the Stacking Tool Display

Color	Meaning
Green	Compatible and preferred
Blue	Compatible
Yellow	Incompatible with the selected primary 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 Connect the Switches to Form the Stack Ring on page 63.
2. Connect the switches to your management network. See Connect Your Stack to the Management Network on page 66.

After setting up and connecting the switches, perform software configuration for the stack. See "Configuring a New Stack" in the *Switch Engine 32.1 User Guide*.

Connect 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.

Examples of Valid Stacking Configurations

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 40 shows cable connections for a 4-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

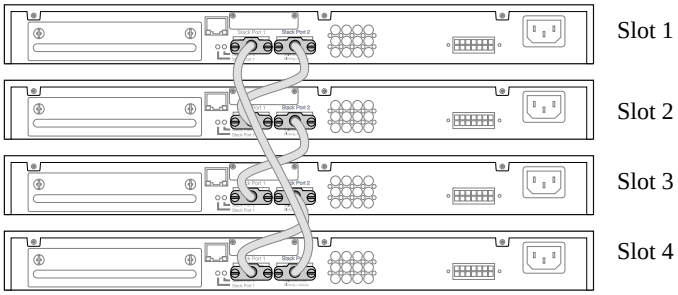


Figure 40: SummitStack Cable Connections Using Four Switches with Integrated SummitStack Ports

Table 16 lists the recommended order for connecting the stacking ports in this example.

Table 16: 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 41 shows cable connections for an 8-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.



Figure 41: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

Table 17 lists the recommended order for connecting the stacking ports in this example.

Table 17: Basic Stack with Eight Switches: Connections

Connect this slot and port . . .		. . . To this slot and port	
Slot 1	Stack Port 2	Slot 2	Stack Port 1
Slot 2	Stack Port 2	Slot 3	Stack Port 1
Slot 3	Stack Port 2	Slot 4	Stack Port 1
Slot 4	Stack Port 2	Slot 5	Stack Port 1
Slot 5	Stack Port 2	Slot 6	Stack Port 1
Slot 6	Stack Port 2	Slot 7	Stack Port 1
Slot 7	Stack Port 2	Slot 8	Stack Port 1
Slot 8	Stack Port 2	Slot 1	Stack Port 1

Example: Stacked Switches across Several Racks

Figure 42 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.

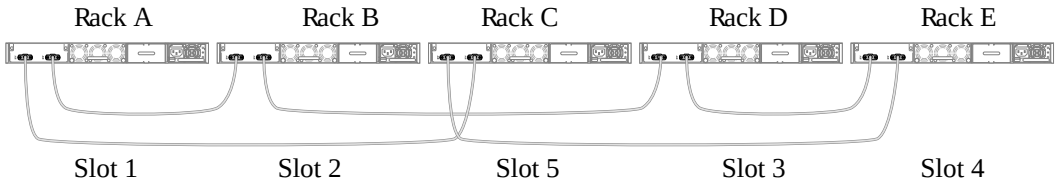


Figure 42: Top-of-Rack Stack Installation

Table 18 lists the recommended order for connecting the stacking ports in this example.

Table 18: 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

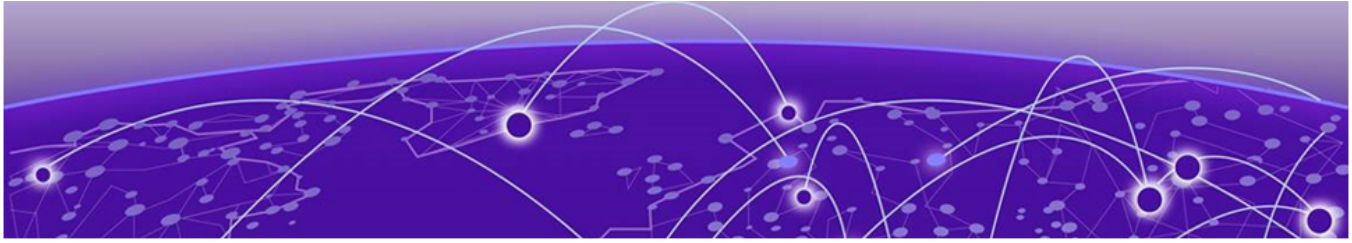
Connect Your Stack to the Management Network

Before you can configure Switch Engine for a new stack, your management console must be connected to at least one switch in the stack.

Connect your management console to a serial console port or the Ethernet management console 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 Connect the Switches to Form the Stack Ring on page 63, 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 *Switch Engine User's Guide* for your version of Switch Engine for instructions to perform the software configuration for your stack.



Install Your Switch

Safety Considerations for Installation on page 68
What You Will Need for the Installation on page 68
Attach the Switch to a Rack or Cabinet on page 69
Install Optional Components on page 70
Install Internal AC Power Supplies on page 71
Connect Network Interface Cables on page 71
Turn on the Switch on page 72

Before you attempt to install or remove an Extreme Networks switch, read the precautions in Safety Considerations for Installation on page 68.

Extreme Networks switches fit into standard 19-inch equipment racks. A two-post rack-mounting kit is provided with the switch.

The installation process includes the following tasks:

1. Prepare to install the switch.

   See What You Will Need for the Installation on page 68.
2. Install the switch in the rack.

   See Attach the Switch to a Rack or Cabinet on page 69.
3. Install optional components: optical transceivers and cables.

   See the instructions in Install Optional Components on page 70.
4. If your switch does not come with an installed internal power supply, install one or two power supplies.

   See Install Internal AC Power Supplies on page 71.
5. Connect network interface cables.

   See Connect Network Interface Cables on page 71.
6. Power up the switch.

   See Turn on the Switch on page 72.
7. Perform initial network connection and configuration.

   See Activate and Verify the Switch on page 74.

Safety Considerations for Installation

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 power cables.
Disconnect the ground wire **after** you disconnect all 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 for additional safety information regulatory compliance certifications.

What You Will Need for the Installation

Ensure that you have followed the guidance in Site Preparation on page 35, and ensure that you have the appropriate people and tools on hand.

Installing Extreme Networks switches is easiest when there are 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. Ensure that a minimum of 122 cm (48 in) in front of the rack and 76 cm (30 in) behind the rack.

If your switch has internal power supplies, make sure they have the same airflow direction as the fans in the switch.

Check the *Quick Reference Guide* for your switch model to see what hardware is provided in the switch packaging. Most Extreme Networks switches come with the following hardware:

- Two rack mounting brackets (ears) adaptable for either a front-mount or mid-mount installation.
- Two long mounting brackets (rails) or slider kits for mounting in a four-post installation.
- Screws for attaching mounting hardware to the switch housing.

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 size of the screws will vary based on the rack system you are using.
- Screwdriver for securing the rack mounting screws.
- #2 Phillips magnetic screwdriver to attach bracket screws that are provided with the switch.
- 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 106.
- ESD-preventive wrist strap for installing optional ports at the back of the switch.

Attach the Switch to a Rack or Cabinet

To attach a switch to a four-post rack or a cabinet, follow these steps.

Take care to load the rack so that it is not top-heavy. Start installing equipment at the bottom and work up.

1. On one side of the switch, set a mounting bracket against the switch housing.

   Set the flange even with the front panel of the switch – or, if you are mid-mounting the switch, set the flange toward the back of the switch.

   The following figures illustrate how to attach the brackets for two common mounting options.

   - Figure 43 shows a mid-mount configuration using a short mounting bracket.
   - Figure 44 shows a front-mount configuration using a short mounting bracket.

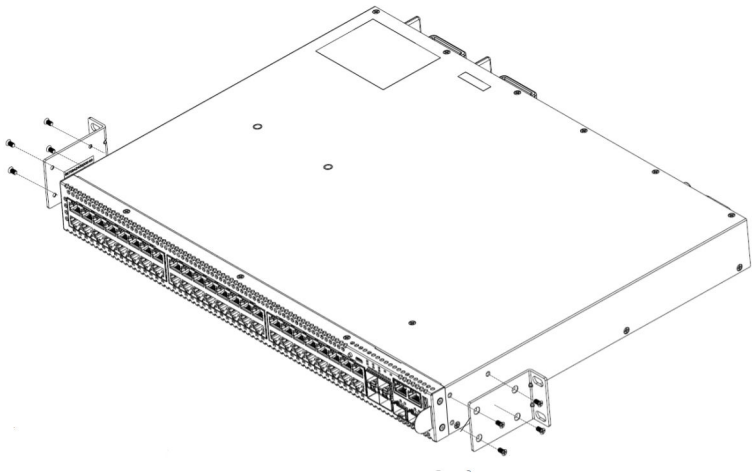


Figure 43: Mid-Mount: Attaching Short Mounting Brackets

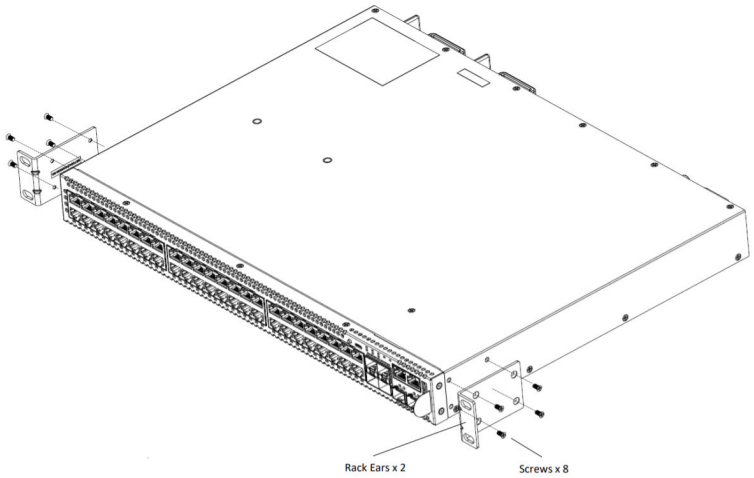


Figure 44: Front Mount: Attaching Short Mounting Brackets

2. Use the small bracket-mounting screws (provided) to secure the bracket to the switch housing.

   If using screws other than those provided, ensure that the threaded length of the screws is within 4 to 5 cm.
3. Repeat step 1 and step 2 to attach the other bracket to the other side of the switch.
4. Secure the mounting bracket flanges to the rack, using screws that are appropriate for the rack.

   (Rack-mounting screws are not provided.)
5. If a grounding lug is present, 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 lug on the back of the switch.
   c. Insert the stripped wire into the grounding lug.
   d. Tighten the retaining screw with a straight-tip torque screwdriver 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.

After the switch is secured to the rack or cabinet, install optional components using the instructions in Install Optional Components on page 70.

Then, install one or two power supplies using the instructions in Install Internal AC Power Supplies on page 71.

Install Optional Components

After the switch is secured to the rack, install optional components.

Extreme Networks switches support the use of pluggable transceivers and cables in the SFP, SFP+, SFP28, QSFP+, and QSFP28 formats.

For a list of the optical components supported with Extreme Networks devices, see the Extreme Optics website.

Pluggable Transceiver Modules

Extreme Networks offers several optical transceiver modules for transmitting and receiving data over optical fiber rather than through electrical wires.

Optical Cables

Direct-attach copper and fiber cables provide connections between populated SFP, SFP+, SFP28, QSFP+, and QSFP28 ports.

Install Internal AC Power Supplies

The following AC internal power supplies (PSUs) are available for 5420 Series switches:

150 W AC PSU

Part number XN-ACPWR-150W is compatible with 5420F-24T-4XE, 5420F-24S-4XE, 5420F-48T-4XE, 5420M-24T-4YE, and 5420M-48T-4YE switch models.

600 W AC PSU

Part number XN-ACPWR-600W is compatible with 540F-24P-4XE and 5420F-8W-16P-4XE switch models.

920 W AC PSU

Part number XN-ACPWR-920W is compatible with 5420F-48P-4XE, 5420F-48P-4XL, 5420M-24W-4YE, 5420M-48W-4YE, 5420M-16MW-32P-4YE switch models.

1200 W AC PSU

Part number XN-ACPWR-1200W is compatible with 5420F-16W-32P-4XE and 5420F-16MW-32P-4XE switch models.

2000 W AC PSU

Part number XN-ACPWR-2000W is compatible with 5420M-48W-4YE and 5420M-16MW-32P-4YE switch models.

For installation instructions, see Replace Internal AC Power Supplies on page 79.

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.

Turn on the Switch

Use the following instructions to turn on the switch

Connect AC Power

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 106.

To turn on the switch, connect one end of the power cord to the AC power input socket on the device and connect the other end to an AC power outlet.

Note
The switch does not have a power button, so connecting the power cable at both ends turns the switch on. The grounding connection in the power receptacle and in the power cord properly ground the power supply and extend that grounding to the switch.

Connect DC Power

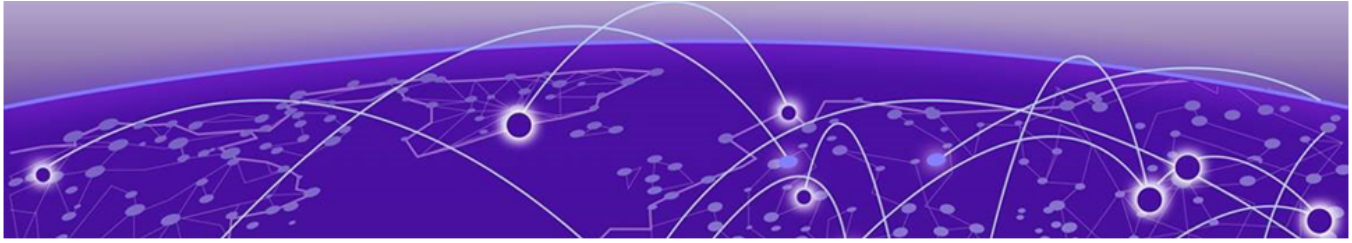
Use the following instructions to connect the device to a DC power source.

1. Verify that the DC circuit is de-energized.
2. Verify that the ground wire is connected to the grounding lug on the rear of the switch.

   The grounding lug is identified by the international symbol for earth ground: 
3. Verify that the DC power input cables are properly connected to the DC power supplies at the rear of the switch.
4. Energize the circuit.

When the PSU LED has turned green, follow the instructions in Activate and Verify the Switch on page 74.

If the PSU and RPS LEDs do not turn green, refer to Power Supplies for Use with Your Switch on page 30 for troubleshooting information.



Activate and Verify the Switch

Connect to a Management Console on page 74
Log In for the First Time on Switch Engine on page 74
Configure the Switch's IP Address for the Management VLAN on page 76
Change the Switch OS via the Bootloader Menu on page 76
Change the Switch OS via the Startup Menu on page 77
Log In for the First Time on Fabric Engine on page 77

Operating system selection and activation can be done via the following:

1. XIQ - automatically by pre-selecting the preferred switch OS
2. Bootloader menu - option to change the switch OS on initial activation only
3. Startup menu in Switch Engine CLI - post-Bootloader menu prompt

Refer to *Read Me First - Switch OS Selection for Universal Hardware* shipped with your switch, or visit https://www.extremenetworks.com/support/switch-os-selection/ for information on changing your switch OS after initial activation.

Otherwise, use the instructions in the following topics.

Connect to a Management Console

Connect each switch's serial console interface (an RJ45 jack) to a PC or terminal. The PC or terminal serves as the *management console*, used to monitor and configure the switch.

The default communication protocol settings for the serial console interface are:

- Baud rate: 115200
- Data bits: 8
- Stop bit: 1
- Parity: None

Log In for the First Time on Switch Engine

Onboard your switch with ExtremeCloud™. Log in or create your XIQ administrator account in order to select your switch operating system with XIQ at https://extremecloudiq.com

Switch Engine is the default operating system for the 5420 Series. If you want to run Fabric Engine, see Change the Switch OS via the Bootloader Menu on page 76 or Change the Switch OS via the Startup Menu on page 77.

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 Connect to a Management Console on page 74.

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. You can also connect to the switch via telnet or SSH.

   Be sure that your serial connection is set properly:
   - Baud rate: Baud rate: 115200
   - Data bits: 8
   - Stop bit: 1
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, `5420F-24T-4XE-SwitchEngine#`) 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 *Switch Engine 32.1 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 the Configure the Switch's IP Address for the Management VLAN on page 76.

Configure 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 *Switch Engine 32.1 User Guide*.

The configuration is saved to the configuration database of the switch.

Change the Switch OS via the Bootloader Menu

Onboard your switch with ExtremeCloud™. Log in or create your XIQ administrator account in order to select your switch operating system with XIQ at https://extremecloudiq.com.

Switch Engine is the default operating system for the Universal Hardware switch.

You can change the switch OS from the Bootloader menu on initial activation only by completing the following 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
   - Data bits: 8
   - Stop bit: 1
2. Once the switch is powered on, after seeing the "Boot Menu" screen, press the **[spacebar]** key within 30 seconds.
3. Use the **down-arrow** key to select `Change the switch OS to Fabric Engine`, then select **Enter**.

The switch installs Fabric Engine , then resets. Once the NOS is selected, the "Boot Menu" only waits for 3 seconds before continuing.

To change the switch OS if you take no action during the initial boot, see Change the Switch OS via the Startup Menu on page 77.

Change the Switch OS via the Startup Menu

Onboard your switch with ExtremeCloud™. Log in or create your XIQ administrator account in order to select your switch operating system with XIQ at https://extremecloudiq.com.

Switch Engine is the default operating system for the Universal Hardware switch. If you take no action during the initial bootup, you can change the switch OS from the Startup menu on initial activation only by completing the following steps:

1. Connect to the switch via telnet, SSH, or console with a baud rate of 115200.
2. At the login prompt, log in using the default user name `admin`.

   For example:

   ```
   login: admin
   ```

   Note
   For the initial password, simply press **[Enter]**.

3. The switch prompts you to choose which switch personality you want to use:

   ```
   This switch can alternatively run the Fabric Engine Network Operating System.
   If you answer yes, all data including configurations, logs and debugs will be
   cleared, except for the license activation status, Fabric Engine
    will be installed, and Switch Engine will be removed.
   Would you like to change the switch OS to Fabric Engine? [y/N/q]:
   ```

The switch installs Fabric Engine, then resets.

After resetting, your switch boots with Fabric Engine. See Log In for the First Time on Fabric Engine on page 77.

Log In for the First Time on Fabric Engine

Onboard your switch with ExtremeCloud™. Log in or create your XIQ administrator account in order to select your switch operating system with XIQ at https://extremecloudiq.com.

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: 115200
   - Data bits: 8
   - Stop bit: 1

2. Press **[Enter]** one or more times until you see the login prompt.
3. At the login prompt, log in using the default user name `rwa`.

For example:

```
login: rwa
```

When prompted for the password, enter `rwa`.

When you are logged in with the role-based authentical level of `rwa`, you can configure the login and password values for the other role-based authentication levels.

Remove and Replace Components

Replace Internal AC Power Supplies on page 79
Replace Fan Modules on page 84

Follow the procedures in this section to remove and replace internal AC power supplies and fan modules.

Replace Internal AC Power Supplies

This topic describes how to replace internal AC power supplies in a switch.

Caution
Power supplies that support PoE cannot be installed in switches that do not support PoE. The switch operating system prevents PoE power contribution from a power supply that is not listed for use with that particular switch model.

Replacing a 150 W AC Power Supply

The 150 W AC PSU (Model XN-ACPWR-150W with front-to-back ventilation airflow) is compatible with 5420F-24T-4XE, 5420F-24S-4XE, 5420F-48T-4XE, 5420M-24T-4YE, and 5420M-48T-4YE switch models.

5420F models have 1 hot-swappable PSU and 1 fixed PSU. 5420M models have 2 hot-swappable PSUs. In a switch with a redundant power configuration, you can replace one AC power supply without powering down the switch.

Caution
A 150 W AC power supply cannot be installed and used in a switch that supports PoE.

You need the following tools and materials to replace a 150 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 150 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 45.

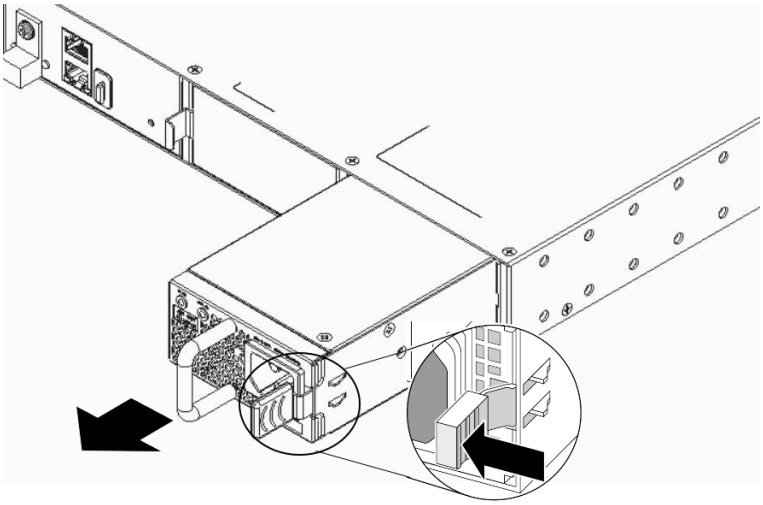


Figure 45: Removing an 150 W AC Power Supply

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 46.

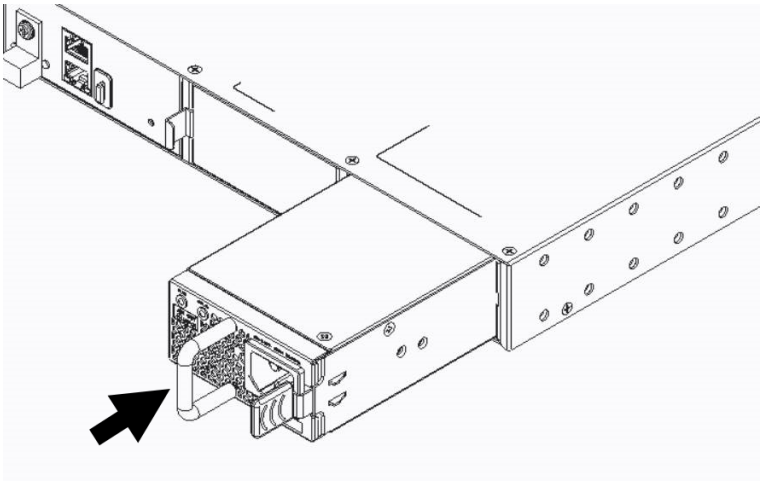


Figure 46: Installing an 150 W AC Power Supply

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 600 W, 920 W, 1200 W, or 2000 W AC PoE Power Supply

The 600W AC PoE PS (Model XN-ACPWR-600W with front-to-back ventilation airflow) is compatible with 5420F-24P-4XE and 5420F-8W-16P-4XE switch models.

The 920 W AC PoE PSU (Model XN-ACPWR-920W with front-to-back ventilation airflow) is compatible with 5420F-48P-4XE, 5420F-48P-4XL, 5420M-24W-4YE, 5420M-48W-4YE, and 5420M-16MW-32P-4YE switch models.

The 1200W AC PoE PS (Model XN-ACPWR-1200W with front-to-back ventilation airflow) is compatible with 5420F-16W-32P-4XE and 5420F-16MW-32P-4XE switch models.

The XN-ACPWR-2000W (Model XN-ACPWR-2000W with front-to-back ventilation airflow) is compatible with 5420M-48W-4YE and 5420M-16MW-32P-4YE switch models.

5420F models have 1 hot-swappable PSU and 1 fixed PSU. 5420M models have 2 hot-swappable PSUs. In a switch with a redundant power configuration, you can replace one AC power supply without powering down the switch.

Caution
The 600 W, 920 W, 1200 W, and 2000 W AC power supplies that support PoE cannot be installed and used in a switch that does not support PoE.

Note
The switch operating system prevents PoE power contribution from a power supply that is not listed for use with that particular switch model.

You need the following tools and materials to replace a 600 W, 920 W, 1200 W, or 2000 W AC PoE 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 600 W, 920 W, 1200 W, or 2000 W AC PoE 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 Replacing a 600 W, 920 W, 1200 W, or 2000 W AC PoE Power Supply on page 81.

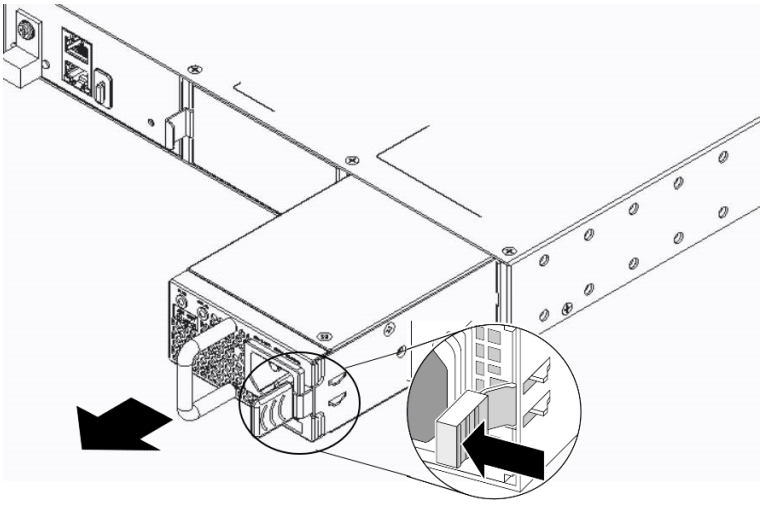


Figure 47: Removing a 600 W, 920 W, 1200 W, or 2000 W AC Power Supply

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.

See Replacing a 600 W, 920 W, 1200 W, or 2000 W AC PoE Power Supply on page 81.

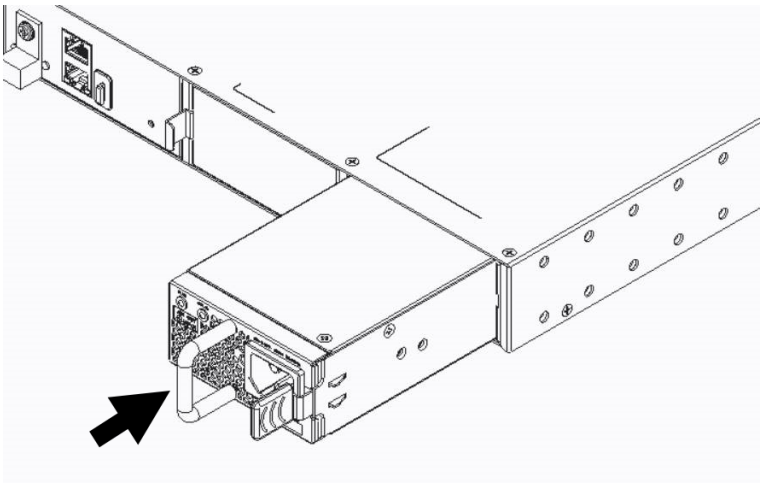


Figure 48: Installing a 600 W, 920 W, 1200 W, or 2000 W AC Power Supply

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.

Replace Fan Modules

For switches with replaceable fan modules, refer to the following information to replace the fan modules.

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

5420 Series 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.

Replace 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 Replace a Fan Module on page 84.

   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.

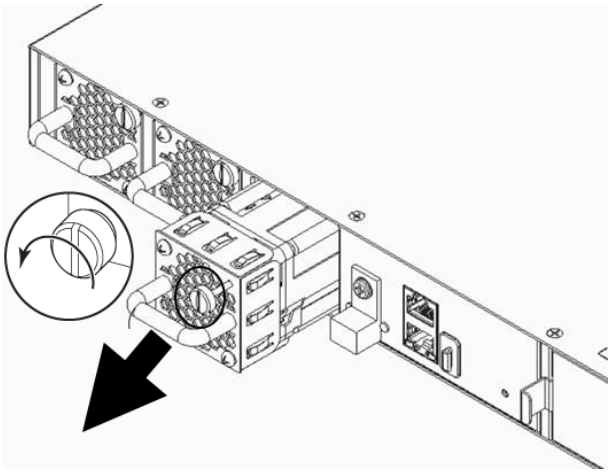


Figure 49: Removing a Fan Module

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.

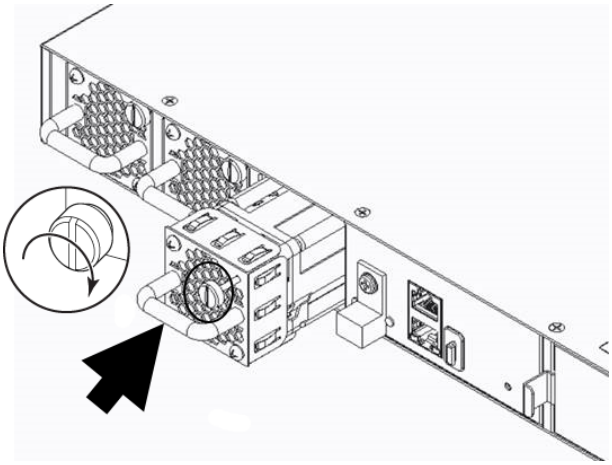


Figure 50: Installing a Fan Module

5. Align and fully tighten the captive retaining screws.

Monitor the Device

5420 Series Switch LEDs on page 86

The following topics help you track the status of the device as it is running.

5420 Series Switch LEDs

ExtremeSwitching 5420 Series front panel port LEDs, as described in the following table:

Table 19: 5420 Series Port LEDs

LED	Color/State	Port State
SYStem status LED (Legacy MGMT function) **Note:** The system status LED is solid green to indicate normal operation when the switch is running Fabric Engine.	Green flash slowly	POST Passed, normal operation, blinks on standalone switch, stack primary, and backup nodes in a stack; off for standby nodes in a stack
	Green blinking	POST in progress
	Amber blinking	POST failed or overheat
PSU status LEDs P1/P2	Green	Power On
	Off	Power off and no power attached
	Amber Blinking	Power supply failures
Speed status (SPD), Stacking status (STK)	SPD solid green	Speed mode
	STK solid green	Stacking mode
	All off	Normal mode
Fan status for 5420F	Green	Normal operation
	Amber Blinking	Fan failure
Fan module status for 5420M	Green	Normal operation
	Amber Blinking	Fan module failure
	Off	Fan module not present

Table 19: 5420 Series Port LEDs (continued)

LED	Color/State	Port State
Bluetooth Status LED (BT)	Green Blinking	Bluetooth pairing in progress
	Green	Bluetooth connected
	Off	Bluetooth not connected
Locator LED (LOC)	Blue Blinking	Locator function

The following figure shows the two alternate mode LEDs for 5420 Series switches: SPD and STK. The Mode button is used to cycle through three display modes for the port LEDs. In the default mode, SPD and STK are off. SPD and STK display modes expire after 30 seconds, at which time the port LEDs revert to the default SYS mode. Pressing and holding the the Mode button initiates Bluetooth pairing.

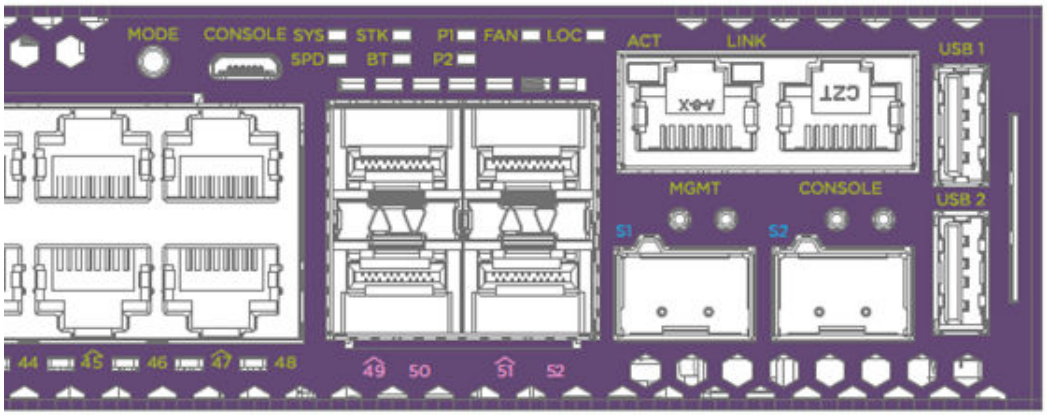


Figure 51: 5420 Series Mode and System Status LEDs

Note
Front-panel PoE ports use Amber to indicate PoE states.

Port LEDs in Default (SYS) Mode

In the default SYS mode, SPD is OFF, and the port status displays behavior for link, traffic, and PoE as described in the following table:

Table 20: Port LEDs in SYS Mode (default)

Color/State	Meaning
Green	Link is OK; port is not powered
Amber	Link is OK; port is powered; no traffic
Green blinking	Link is OK and transmitting packets; port is not powered
Amber blinking	Link is OK and transmitting packets; port is powered

Table 20: Port LEDs in SYS Mode (default) (continued)

Color/State	Meaning
Amber slow blinking	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

Port LEDs in SPD Mode

The port LEDs enter the SPD display mode when the Mode button is pressed one time, indicated by the SPD LED. SPD mode is used to help determine the operational speed of a port.

There are two LEDs per SFP-DD port on 5420 models. When an SFP-DD port is used for Ethernet and stacking is disabled, each SFP-DD port can be used as either a single SFP+ port or two SFP+ ports if an SFP-DD transceiver is used on 5420M models. When the SFP-DD port is used for as a single SFP+ port, the first LED represents link and traffic, while the second LED is not operational. When the SFP-dd port is used as two SFP+ ports, the first LED represents link and traffic for the first port, and the second LED represents link and traffic for the second port. 5420F models are limited to one 10Gbps port per SFP-DD port in Ethernet mode with stacking disabled. The second SFP+ port is not available and the second LED is not operational.

In stack mode, each SFP-DD port can be used as one 20Gbps SFP+ port, or one 10Gbps SFP+ port, depending on the stack speed and optic used. The first LED represents the link state and traffic of the stack port with solid or blinking green. The second SFP+ port is not available and the second LED is not operational.

Color and blink pattern indicate speeds, as referenced by the following table:

Table 21: Port LEDs in SPD Mode

Color/State	Speed
Green	10Mbps
Green blinking	100Mbps
Amber	1000Mbps
Amber slow blinking	2.5Gbps
Green slow blinking	10Gbps
Green fast blinking	25Gbps
Green fast blinking	40/50Gbps

Port LEDs in STK Mode

The port LEDs enter the STK display mode after the Mode button is pressed twice, indicated by the STK LED. STK mode is used to indicate slot presence and slot number via the first eight port LED, as referenced by the following table:

Table 22: Port LEDs in STK Mode

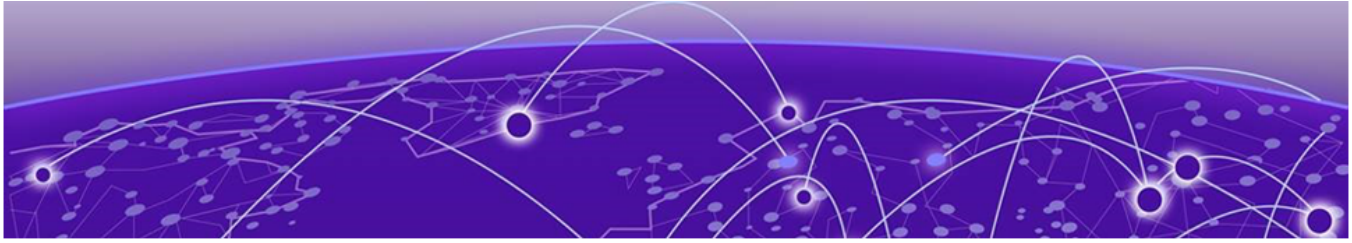
Color/State	Speed
Green	The slot corresponding to the port number of the LED is present.
Green blinking	This slot has a slot number corresponding to the port number of the blinking LED.

Management Port LEDs

The management port uses two LEDs to indicate port activity and link status, as referenced by the following table:

Table 23: Management Port LEDs

Right side LED		State
Link	Green	Link up
	Off	No link up or port disabled
Left side LED		**State**
Act	Green blinking	Packet transmitting or receiving
	Off	No packet transmitting or receiving



Technical Specifications

5420 Series Technical Specifications on page 91
Acoustic Noise and Fan Speed on page 96
CPU, Memory Specifications on page 97
Mean Time Between Failures on page 98
Power Specifications on page 100
Environmental on page 104
Standards on page 104
Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 106
Console Connector Pinouts on page 106

This section lists technical specifications for the hardware products described in this document.

5420 Series Technical Specifications

External Interfaces

Switch Model	Interfaces
5420F-24T-4XE	24 x 10/100/1000BASE-T ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-24P-4XE	24 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-24S-4XE	24 x 100/1000BASE-X (SFP) ports (unpopulated) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

Switch Model	Interfaces
5420F-48T-4XE	48 x 10/100/1000BASE-T ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-48P-4XE	48 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-48P-4XL	48 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable • LRM-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

Switch Model	Interfaces
5420F-8W-16P-4XE	8 x 10/100/1000BASE-T 802.3bt (90W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 16 x 10/100/1000BASE-T 802.3at (30W) ports • Full/Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-16W-32P-4XE	16 x 10/100/1000BASE-T 802.3bt (90W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 32 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420F-16MW-32P-4XE	16 x 100M/1G/2.5GBASE-T 802.3bt (90W) ports • MACsec-capable 32 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports(unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

Switch Model	Interfaces
5420M-24T-4YE	24 x 10/100/1000BASE-T ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-24W-4YE	24 x 10/100/1000BASE-T 802.3bt (90W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-48T-4YE	48 x 10/100/1000BASE-T ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

Switch Model	Interfaces
5420M-48W-4YE	48 x 10/100/1000BASE-T 802.3bt (90W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port
5420M-16MW-32P-4YE	16 x 100M/1G/2.5GBASE-T 802.3bt (90W) ports • MACsec-capable 32 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex(autosensing) • MACsec-capable 4 x 1/10/25Gb SFP28 uplink ports (unpopulated) • MACsec-capable 2 x Stacking/SFP-DD ports* (unpopulated) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 2 x USB A ports for management or external USB flash 1 x USB Micro-B console port

* Notes on use of the 2 x Stacking/SFP-DD ports

1. With Switch Engine, the 2 x SFP-DD ports can used either for stacking or as Ethernet uplink ports (when not stacking).
2. With Fabric Engine, the 2 x SFP-DD ports can be used as Ethernet uplinks when in non-Fabric mode.
3. SFP-DD ports support either 10Gb or 20Gb data rates with the use of appropriate transceivers/cables.
4. When used as uplinks, 5420M models support up to 2 x 10Gb channels on each SFP-DD port
5. When used as uplinks, 5420F models support a single 10Gb channel on each SFP-DD port.

Switch Model	Weight*	Physical Dimensions
5420F-24T-4XE	4.10 kg (9.03 lb.)	Height: 43.2 mm (1.7 in.) Width: 442.0 mm (17.4 in.) Depth: 287.02 mm (11.3 in.)
5420F-24P-4XE	4.64 kg (10.23 lb.)	
5420F-24S-4XE	4.12 kg (9.08 lb.)	
5420F-8W-16P-4XE	4.64 kg (10.23 lb.)	
5420F-48T-4XE	4.64 kg (10.23 lb.)	

Switch Model	Weight*	Physical Dimensions
5420F-48P-4XE	5.28 kg (11.64 lb.)	Height: 43.2 mm (1.7 in.) Width: 442.0 mm (17.4 in.) Depth: 330.20 mm (13.0 in.)
5420F-48P-4XL	5.28 kg (11.64 lb.)	
5420F-16W-32P-4XE	5.36 kg (11.82 lb.)	
5420F-16MW-32P-4XE	5.30 kg (11.68 lb.)	
5420M-24T-4YE	4.18 kg (9.22 lb.)	
5420M-24W-4YE	4.40 kg (9.70 lb.)	
5420M-48T-4YE	4.39 kg (9.68 lb.)	
5420M-48W-4YE	4.73 kg (10.43 lb.)	
5420M-16MW-32P-4YE	5.30 kg (11.68 lb.)	

* Measured weight includes fan (XN-FAN-000) and PSU cover(s), but does not include optional power supply unit(s).

Acoustic Noise and Fan Speed

	Bystander Sound Pressure – dB(A)*		Declared Sound Power – Bels*	
Switch Model	1 PSU	2 PSUs	1 PSU	2 PSUs
5420F-24T-4XE	35.50	36.20	4.83	4.93
5420F-24P-4XE	39.60	39.90	5.16	5.24
5420F-24S-4XE	39.70	39.60	5.21	5.22
5420F-48T-4XE	35.30	34.90	4.78	4.77
5420F-48P-4XE	41.30	42.00	5.42	5.48
5420F-48P-4XL	44.00	42.60	5.67	5.57
5420F-8W-16P-4XE	42.30	43.20	5.52	5.63
5420F-16W-32P-4XE	44.30	54.10	5.72	6.62
5420F-16MW-32P-4XE	45.30	54.40	5.77	6.64
5420M-24T-4YE	33.50	33.00	4.59	4.65
5420M-24W-4YE	33.00	42.80	5.02	5.51
5420M-48T-4YE	33.40	33.00	4.56	4.59
5420M-48W-4YE**	52.70	59.80	6.42	6.97
5420M-16MW-32P-4YE**	51.70	50.50	6.30	6.25

* Noise measurements are based on operational tests conducted at 25°C (77°F) in compliance with ISO 7779

** 5420M-48W-4YE and 5420M-16MW-32P-4YE results using 2000 W PSUs (XN-ACPWR-2000W)

Fan Speed

The speed of the fan increases only when the temperature of the device increases. Fan speed is not dependent on any fan failures.

Model	Internal PSU Fan		Internal System Fan	Fan Module
	4020 17000 RPM Fan	4028 16000 RPM Fan	4028 16000 RPM Fan	4028 16000 RPM Fan
5420F-24T-4XE	1	N/A	1	N/A
5420F-24P-4XE	1	N/A	1	N/A
5420F-8W-16P-4XE	1	N/A	1	N/A
5420F-48P-4XE	2	N/A	1	N/A
5420F-16W-32P-4XE	N/A	2	1	N/A
5420F-48T-4XE	1	N/A	1	N/A
5420F-16MW-32P-4XE	N/A	2	1	N/A
5420F-24S-4XE	1	N/A	1	N/A
5420F-48P-4XL	2	N/A	1	N/A
5420M-24W-4YE			N/A	1
5420M-24T-4YE	N/A		N/A	1
5420M-48W-4YE	N/A		N/A	1
5420M-48T-4YE	N/A		N/A	1
5420M-16MW-32P-4YE	N/A		N/A	1

CPU, Memory Specifications

CPU/Memory
1-core, 1.7GHz x86 ARM CPU (Cortex A72)
2 GB DDR4 ECC memory
1 GB SLC NAND Flash Memory
4 MB packet buffer per chip

Mean Time Between Failures

Table 24: 5420M family MTBF

Model	MTBF at 25°C
48W-4YE without PSU	547,531
48W-4YE with 1 CRPS 920W PSU	219,609
48W-4YE with 2 CRPS 920W PSUs	274,975
48W-4YE with 1 CRPS 2000W PSU	288,273
48W-4YE with 1 CRPS 920W and 1 CRPS 2000W PSU	304,604
48W-4YE with 2 CRPS 2000W PSUs	342,300
48T-4YE without PSU	818,774
48T-4YE with 1 CRPS 150W PSU	337,509
48T-4YE with 2 CRPS 150W PSUs	419,750
24W-4YE without PSU	652,991
24W-4YE with 1 CRPS 920W PSU	236,680
24W-4YE with 2 CRPS 920W PSUs	301,563
24T-4YE without PSU	842,727
24T-4YE with 1 CRPS 150W PSU	341,393
24T-4YE with 2 CRPS 150W PSUs	425,775
16MW-32P-4YE without PSU	576,512
16MW-32P-4YE with 1 CRPS 920W PSU	224,128
16MW-32P-4YE with 2 CRPS 920W PSUs	281,986
16MW-32P-4YE with 1 CRPS 2000W PSU	296,110
16MW-32P-4YE with 1 CRPS 920W and 1 CRPS 2000W PSU	313,368
16MW-32P-4YE with 2 CRPS 2000W PSUs	353,406

Table 25: 5420F family MTBF

Model	MTBF at 25°C
48P-4XE without PSU	406,882
48P-4XE with 1 OFPS 860W PSU	270,052
48P-4XE with 1 OFPS 860W and 1 CRPS 920W PSU	264,420
48P-4XL without PSU	414,751
48P-4XL with 1 OFPS 860W PSU	273,496
48P-4XL with 1 OFPS 860W and 1 CRPS 920W PSU	267,721

Table 25: 5420F family MTBF (continued)

Model	MTBF at 25°C
48T-4XE without PSU	623,178
48T-4XE with 1 OFPS 120W PSU	541,636
48T-4XE with 1 OFPS 120W and 1 CRPS 150W PSU	441,361
16MW-32P-4XE without PSU	377,035
16MW-32P-4XE with 1 OFPS 1200W PSU	219,064
16MW-32P-4XE with 1 OFPS 1200W and 1 CRPS 1200W PSU	263,301
16W-32P-4XE without PSU	383,424
16W-32P-4XE with 1 OFPS 1200W PSU	221,205
16W-32P-4XE with 2 CRPS 1200W PSUs	266,401
8W-16P-4XE without PSU	541,183
8W-16P-4XE with 1 OFPS 660W PSU	271,147
8W-16P-4XE with 1 OFPS 660W and 1 CRPS 600W PSU	326,619
24P-4XE without PSU	548,157
24P-4XE with 1 OFPS 660W PSU	272,887
24P-4XE with 1 OFPS 660W and 1 CRPS 600W PSU	329,146
24S-4XE without PSU	590,144
24S-4XE with 1 OFPS 150W PSU	291,032
24S-4XE with 1 OFPS 150W and 1 CRPS 150W PSU	350,197
24T-4XE without PSU	637,131
24T-4XE with 1 OFPS 120W PSU	552,146
24T-4XE with 1 OFPS 120W and 1 CRPS 150W PSU	448,314

Power Specifications

Power Supply Options

	XN-ACPWR-150W XN-ACPWR-150W-FB	XN-ACPWR-600W XN-ACPWR-600W-FB	XN-ACPWR-920W	XN-ACPWR-1200W* XN-ACPWR-1200W-FB	XN-ACPWR-2000W** XN-ACPWR-2000-FB-A
Voltage Input Range (Nominal)	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC
Line Frequency Range	47Hz to 63Hz	47Hz to 63Hz	47Hz to 63Hz	47Hz to 63Hz	47Hz to 63Hz
Power Supply Input Socket	IEC/EN60320 C14	IEC/EN60320 C14	IEC/EN60320 C14	IEC/EN60320 C16 IEC/EN 60320 C14 (for -FB)	IEC/EN60320 C16 IEC/EN 60320 C14 (for -FB-A)
Power Cord Input Plug	IEC/EN60320 C13	IEC/EN60320 C13	IEC/EN60320 C13	IEC/EN60320 C15 IEC/EN 60320 C13 (for -FB)	IEC/EN60320 C15 IEC/EN 60320 C13 (for -FB-A)
Operating Temperature	0°C to 50°C (32°F to 122°F) Normal Operation	0°C to 50°C (32°F to 122°F) Normal Operation	0°C to 50°C (32°F to 122°F) Normal Operation	0°C to 50°C (32°F to 122°F) Normal Operation	0°C to 45°C (32°F to 113°F)***

* 200-240VAC is required to achieve full 1200W output. If run at 100-120 VAC, output is limited to 860W

** 200-240 VAC is required to achieve full 2000W output. If run at 100-120 VAC, output is limited to 1100W

*** At sea-level, 0°C to 40°C (32°F to 104°F) at1500 m; 0°C to 35°C (32°F to 95°F) at3000 m

5420F Internal Fixed and Secondary Power Supply Options

Model	Internal Fixed Power Supply Unit (PSU)*	Secondary Power Supply Unit (PSU)**
5420F-24T-4XE	120W AC PSU	XN-ACPWR-150W or XN-ACPWR-150W-FB
5420F-24P-4XE	660W AC PSU	XN-ACPWR-600W or XN-ACPWR-600W-FB

Model	Internal Fixed Power Supply Unit (PSU)*	Secondary Power Supply Unit (PSU)**
5420F-24S-4XE	150W AC PSU	XN-ACPWR-150W or XN-ACPWR-150W-FB
5420F-48T-4XE	120W AC PSU	XN-ACPWR-150W or XN-ACPWR-150W-FB
5420F-48P-4XE	860W AC PSU	XN-ACPWR-920W or XN-ACPWR-1200W-FB
5420F-48P-4XL	860W AC PSU	XN-ACPWR-920W or XN-ACPWR-1200W-FB
5420F-8W-16P-4XE	660W AC PSU	XN-ACPWR-600W or XN-ACPWR-600W-FB
5420F-16W-32P-4XE	1200W AC PSU	XN-ACPWR-1200W or XN-ACPWR-1200W-FB
5420F-16MW-32P-4XE	1200W AC PSU	XN-ACPWR-1200W or XN-ACPWR-1200W-FB

* Internal Fixed PSU is non-orderable and comes pre-installed with each 5420F model

** Secondary PSU provides power redundancy in 5420F non-PoE models and enables maximum PoE Power Budget in 5420F PoE models (see table below). Model/PSU combinations other than those listed above are blocked physically or in software.

Note
Refer to the Hardware Installation Guide for minimum software versions needed on the switch for supported power supply units.

5420F PoE Power Budget

Model	PoE Budget with Single Internal Fixed PSU	PoE Budget with Recommended Secondary PSU
5420F-24P-4XE	380W	720W
5420F-48P-4XE	740W	1440W
5420F-48P-4XL	740W	1440W
5420F-8W-16P-4XE	480W	960W
5420F-16W-32P-4XE	872W*/960W**	1437W*/1874W**
5420F-16MW-32P-4XE	860W*/960W**	1425W*/1862W**

* @ 100-120 VAC

** @ 200-240 VAC

5420M Primary and Secondary Power Supply Options

Model	Primary Power Supply Unit (PSU)*	Secondary Power Supply Unit (PSU)*
5420M-24T-4YE	XN-ACPWR-150W or XN-ACPWR-150W-FB	XN-ACPWR-150W or XN-ACPWR-150W-FB
5420M-24W-4YE	XN-ACPWR-920W or XN-ACPWR-1200W-FB	XN-ACPWR-920W or XN-ACPWR-1200W-FB
5420M-48T-4YE	XN-ACPWR-150W or XN-ACPWR-150W-FB	XN-ACPWR-150W or XN-ACPWR-150W-FB
5420M-48W-4YE	XN-ACPWR-920W, XN-ACPWR-2000W, or XN-ACPWR-1200W-FB	XN-ACPWR-920W, XN-ACPWR-2000W, or XN-ACPWR-1200W-FB, XN-ACPWR-2000W-FB-A
5420M-16MW-32P-4YE	XN-ACPWR-920W, XN-ACPWR-2000W, or XN-ACPWR-1200W-FB	XN-ACPWR-920W, XN-ACPWR-2000W, or XN-ACPWR-1200W-FB, XN-ACPWR-2000W-FB-A

Primary PSU is required; Secondary PSU provides power redundancy and enables maximum PoE Budget in 5420M PoE models (see table below). Model/PSU combinations other than those listed above are blocked physically or in software.

Note
Refer to the Hardware Installation Guide for minimum software versions needed on the switch for supported power supply units.

5420M PoE Power Budget

Model	Power Supply	PoE Budget with Single Primary PSU	PoE Budget with Optional Secondary PSU
5420M-24W-4YE	XN-ACPWR-920W XN-ACPWR-1200W-FB	720W	1440W
5420M-48W-4YE	XN-ACPWR-920W XN-ACPWR-1200W-FB	804W	1558W
	XN-ACPWR-2000W XN-ACPWR-2000W-FB- A	884W*/1440W**	1704W*/2880W**
5420M-16MW-32P-4YE	XN-ACPWR-920W XN-ACPWR-1200W-FB	787W	1541W
	XN-ACPWR-2000W XN-ACPWR-2000W-FB- A	884W*/1440W**	1687W*/2400W**

* @ 100-120 VAC

** @ 200-240 VAC

Minimum/Maximum Power Consumption and Heat Dissipation

Table 26: 5420F Switches

Switch Model	Minimum Power Consumption (W)	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)*	Maximum Heat Dissipation (BTU/hr)**
5420F-24T-4XE	24	81	62	211
5420F-24P-4XE	37	127	833	387
5420F-24S-4XE	35	119	114	388
5420F-48T-4XE	31	106	75	255
5420F-48P-4XE	48	164	1674	663
5420F-48P-4XL	49	168	1657	604
5420F-8W-16P-4XE	37	127	1092	452
5420F-16W-32P-4XE	46	156	2150	785
5420F-16MW-32P-4XE	50	172	2152	790

* Includes maximum PoE load (W) through the switch

**Does not include PoE load heat dissipated through external electronic load

Table 27: 5420M Switches

Switch Model	Minimum Power Consumption (W)	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)*	Maximum Heat Dissipation (BTU/hr)**
5420M-24T-4YE	28	95	57	194
5420M-24W-4YE	43	148	1601	551
5420M-48T-4YE	34	117	68	232
5420M-48W-4YE	72	245	3090	716
5420M-16MW-32P-4YE	69	234	2564	560

* Includes maximum PoE load (W) through the switch

**Does not include PoE load heat dissipated through external electronic load

Environmental

Environmental Specifications

EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage
EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation
EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational
EN/ETSI 300 753 (1997-10) - Acoustic Noise
ASTM D3580 Random Vibration Unpackaged 1.5 G

Environmental Compliance

EU RoHS - 2011/65/EU
EU WEEE - 2012/19/EU
EU REACH – Regulation (EC) No 1907/2006 Reporting
China RoHS - SJ/T 11363-2006
Taiwan RoHS - CNS 15663(2013.7)

Environmental Operating Conditions

Temp: 0°C to 50°C (32°F to 122°F)
Humidity: 5% to 95% relative humidity, non-condensing
Altitude: 0 to 3,000 meters (9,850 feet)
Shock (half sine) 30m/s2 (3G), 11ms, 60 shocks
Random vibration: 3 to 500 Hz at 1.5 G rms

Packaging and Storage Specifications

Temp: -40°C to 70°C (-40°F to 158°F)
Humidity: 5% to 95% relative humidity, non-condensing
Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks
Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G
Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz
Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Standards

North American ITE

UL 60950-1
UL/CuL 62368-1 Listed
CSA 22.2 No. 60950-1 2nd edition 2014 (Canada)
Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)
CDRH Letter of Approval (US FDA Approval)

European ITE

EN 60950-1 2nd Edition
EN 62368-1
EN 60825-1 Class 1 (Lasers Safety)
2014/35/EU Low Voltage Directive

International ITE

CB Report and Certificate per IEC 60950-1
CB Report and Certificate IEC 62368-1
AS/NZS 60950-1 (Australia/New Zealand)

North American EMC for ITE

FCC CFR 47 Part 15 Class A (USA)
ICES-003 Class A (Canada)

European EMC Standards

EN 55032 Class A
EN 55024
EN 61000-3-2,2014 (Harmonics)
EN 61000-3-3 2013 (Flicker)
EN 300 386 (EMC Telecommunications)
2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions)
AS/NZS CISPR32
CISPR 24 Class A (International Immunity)
IEC 61000-4-2/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria B
IEC 61000-4-3/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A
IEC 61000-4-4/EN 61000-4-4 Transient Burst, 2 kV, Criteria B
EC 61000-4-5/EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B
IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 3V/rms, 80%AM (1kHz), Criteria A
IEC/EN 61000-4-11 Power Dips and Interruptions, >30%, 25 periods, Criteria C

Country Specific

VCCI Class A (Japan Emissions)
ACMA RCM (Australia Emissions)
CCC Mark (China)
KCC Mark, EMC Approval (Korea)
BSMI (Taiwan)

Anatel (Brazil)
NoM (Mexico)
EAC (Russia, Belarus, Kazakhstan)
NRCS (South Africa)

IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T
IEEE 802.3bz 2.5G/5GBASE-T
IEEE 802.3bt Type4 PoE
IEEE 802.3ae 10GBASE-X
IEEE 802.3aq 10GBASE-LRM
IEEE 802.3by 25GBASE-X
IEEE 802.3az Energy Efficient Ethernet

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 appropriate AC connector for connection to the switch or power supply. See the power supply documentation for the appropriate power cord.
- 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 (4.5m) long, the wire size must be 15 AWG (2 mm^2) minimum wire length up to 4.92ft (1.5m).

For details about obtaining AC power cords for use in your country, refer to http://www.extremenetworks.com/product/powercords/.

Console Connector Pinouts

Table 28 describes the pinouts for a DB-9 console plug connector.

Table 28: 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	-

Table 28: Pinouts for the DB-9 Console Connector (continued)

Function	Pin Number	Direction
DSR (data set ready)	6	In
RTS (request to send)	7	Out
CTS (clear to send)	8	In

Figure 52 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

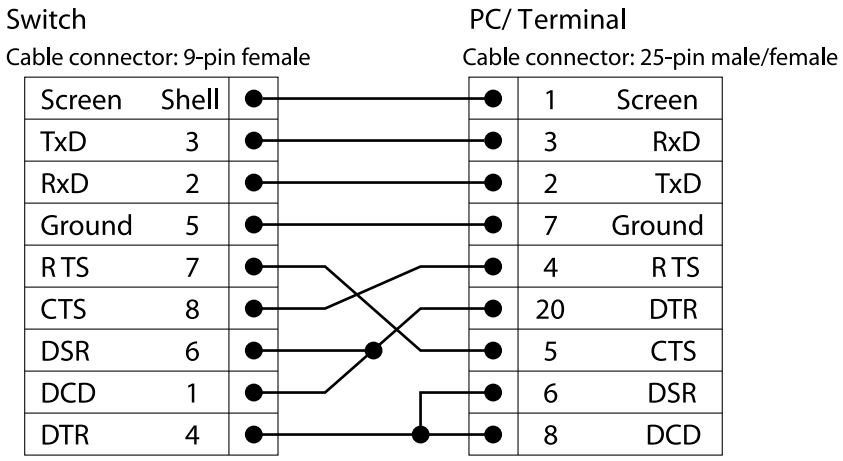


Figure 52: Null-Modem Cable Pinouts

Figure 53 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

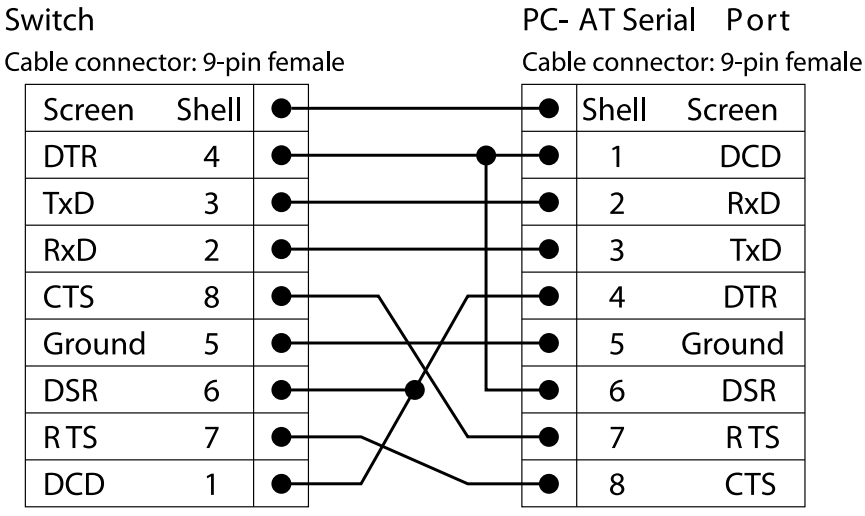


Figure 53: PC-AT Serial Null-modem Cable Pinouts

Table 29 shows the pinouts for the RJ45 console port on the ExtremeSwitching switches.

Table 29: RJ45 Console Port on Switch

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

Table 30 shows the pinouts for an RJ45-to-DB-9 adapter.

Table 30: 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

Safety and Regulatory Information

Considerations Before Installing on page 109
General Safety Precautions on page 110
Maintenance Safety on page 111
Cable Routing for LAN Systems on page 111
Fiber Optic Ports and Optical Safety on page 112
Install Power Supply Units and Connect Power on page 113
Select Power Supply Cords on page 114
Battery Notice on page 114
Battery Warning - Taiwan on page 115
EMC Warnings on page 115
Japan (VCCI Class A) on page 115
Korea EMC Statement on page 116

Warning
Read the following safety information thoroughly before installing Extreme Networks

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

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

Considerations Before Installing

Consider the following items before you install equipment.

- For equipment designed to operate in a typical Telco environment that is environmentally controlled, choose a site that has the following characteristics:
  - Temperature-controlled and humidity-controlled, such that the maximum ambient room temperature shall not exceed 50°C (122°F).
  - Clean and free from airborne materials that can conduct electricity.
  - Well ventilated and away from sources of heat including direct sunlight.

  - Away from sources of vibration or physical shock.
  - Isolated from strong electromagnetic fields produced by electrical devices.
- For equipment designed to be installed in environments that are not environmentally controlled, such as outdoor enclosures, see the product data sheet or for environmental conditions, temperature, and humidity.
- Establish at least 3 inches clearance on all sides for effective ventilation. Do not obstruct the air intake vent on the front, side, or rear ventilation grills. Locate the system away from heat sources.
- Make sure that your equipment is placed in an area that accommodates the power consumption and component heat dissipation specifications.
- Make sure that your power supplies meet the site DC power or AC power requirements of all the network equipment.
- Racks for Extreme Networks equipment must be permanently attached to the floor. Failure to stabilize the rack can cause the rack to tip over when the equipment is removed for servicing.
- Do not operate the system unless all modules, faceplates, front covers, and rear covers are in place. Blank faceplates and cover panels are required for the following functions:
  - Preventing exposure to hazardous voltages and currents inside the equipment
  - Containing electromagnetic interference (EMI) that might disrupt other equipment
  - Directing the flow of cooling air through the equipment
- Ultimate disposal of this product should be handled according to all national laws and regulations.

General Safety Precautions

Follow these guidelines:

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

Maintenance Safety

When you perform maintenance procedures on Extreme Networks equipment, follow these recommendations:

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

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.

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

Install Power Supply Units and Connect Power

For the ratings and power input requirements of each power supply unit, see "Technical Specifications" 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 DC power supplies or connect DC power:

- 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.

- 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.

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.

Select Power Supply Cords

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:為避免電磁干擾,本產品不應安裝
或使用於住宅環境。

China CQC Warning

警告:在居住环境中，运行此设备可能
会造成无线电干扰。

Japan (VCCI Class A)



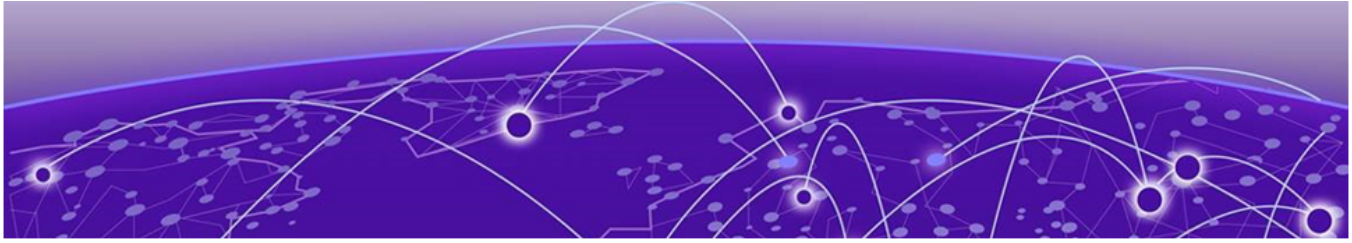
Warning

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機器です。この装置を住宅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.



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