5320 Series Hardware Installation Guide

Setup, Configuration, and Best Practices

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Preface

This hardware installation guide provides detailed instructions for setting up 5320 Series switches. It covers a wide range of topics including site preparation, rack installation, power requirements, and cabling. The guide specifies various switch models and their respective features, such as port configurations, cooling mechanisms, and power supply options. Additionally, it includes guidelines on environmental and electrical standards compliance, safety precautions, and managing electrostatic discharge (ESD). The guide also details the use of various management ports and interfaces, including RJ45 and USB connections, for system configuration and monitoring. This document is intended for network administrators with basic knowledge of 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 Extreme 9920 Software Configuration Guide and the Extreme 9920 Software Command Reference for information about configuring Extreme Networks devices.

> **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 ExtremeSwitching switches or SLX routers, the product is referred to as *the switch* or *the router*.

Table 1: Notes and warnings

Icon	Notice type	Alerts you to...
	Tip	Helpful tips and notices for using the product
	Note	Useful information or instructions
	Important	Important features or instructions
	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 white papers, data sheets, and case studies

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

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 2826. For the support phone number in your country, visit: www.extremenetworks.com/support/contact

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

- Your Extreme Networks service contract number, 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 Information Development 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, do either of the following:

- Access the feedback form at https://www.extremenetworks.com/documentation-feedback/.
- Email us at documentation@extremenetworks.com.

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

ExtremeSwitching 5320 Series Overview

The ExtremeSwitching 5320 Series is a family of feature-rich edge switches designed for the next-generation digital enterprise. The 5320 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 5320 is a uniquely flexible platform that can be deployed across a range of edge and wiring-closet environments.

The 5320 Series includes fixed 16, 24- and 48-port 1 Gigabit models that are available in 30W PoE and non-PoE versions. The integrated 1Gb SFP uplinks can be upgraded to 10Gb. Two built-in SFP+ stacking ports on 5320 Series switches can be used for high-speed stacking when running Switch Engine (stacking is not supported when running Fabric Engine™). The family also includes 16-port PoE models available with either AC or DC power options, and extended temperature models that include an option to add an external 150W redundant AC power supply.

Management

An RJ45 serial console port on the switch enables you to connect a terminal and perform local management. An Ethernet management port on models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT in the 5320 Series can be used to connect the system to an out-of-band (OOB) management network for administration. The other models in the 5320 Series do not have a dedicated Ethernet port for OOB management. 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 is also a Type A USB 2.0 port labeled USB on the front panel that can host removable devices like flash drives.

Cooling

Switch cooling is provided by fixed internal fan modules with side-to-side (left to right) airflow. Switch fans are also responsible for cooling the power supplies; the power supplies do not have integrated cooling fans that operate independently of the switch fan. Fan-off operation at temperatures up to 35ºC is supported on 5320 16-port AC- and DC-powered models. The external redundant power supply for models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT has its own fan for cooling.

Power Supplies

Most 5320 Series switches have one fixed AC power supply unit that provides enough power for the needs of the switch. The 5320-16P-4XE-DC switch has one fixed DC power supply unit that provides enough power for the needs of the switch. Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT provide an option to add an external 150W redundant AC power supply. For more information regarding the redundant power supply, see the *Redundant Power Supply Quick Reference*.

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 10Gb using SFP+ optics.

> **Note**
> 5320-24T-4X-XT and 5320-24T-24S-4XE-XT switches can only be stacked with themselves.

Stacking cables are ordered separately.

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

For information about stacking, see Build Stacks on page 41.

Operating Temperatures

All 5320 Series switch models support an operating range from 0°C (32°F) to 50°C (122°F). The 5320-16P-4XE models, both AC and DC, and fan off, support an operating range from 0°C (32°F) to 35°C (95°F). Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT support an extended range from 0°C (32°F) to 60°C (140°F).

Temperature restrictions apply for some models at high altitudes.

Feature Licensing

> **Note**
> Fabric Engine does not support models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

The 5320 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*.

5320-48T-8XE Switch Features

The front panel of the switch includes:

1 = Serial console port (RJ-45)
2 = USB Type-A port for management or external USB flash
3 = USB Micro-B console port
4 = 48 x 10/100/1000BASE-T (autosensing) MACsec capable ports

> **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 6 x 1/10Gb SFP MACsec capable uplink ports
6 = 2 x 10Gb SFP+ Universal Ports/stacking ports (unpopulated)
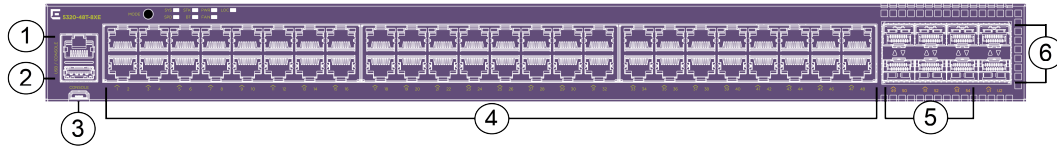
Figure 1: 5320-48T-8XE Front Panel

The rear panel of the switch includes:

- **1** = Grounding lug
- **2** = AC power inlet connector
- **3** = Cable tie mount for power cord management

Figure 2: 5320-48T-8XE Rear Panel

5320-48P-8XE Switch Features

The front panel of the switch includes:

- **1** = Serial console port (RJ-45)
- **2** = USB Type-A port for management or external USB flash
- **3** = USB Micro-B console port
- **4** = 48 x 10/100/1000BASE-T (autosensing) MACsec capable ports with 802.3at Type 2 PoE (30W)

> **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

- **5** = 6 x 1/10Gb SFP MACsec capable uplink ports
- **6** = 2 x 10Gb SFP+ Universal Ports/stacking ports (unpopulated)
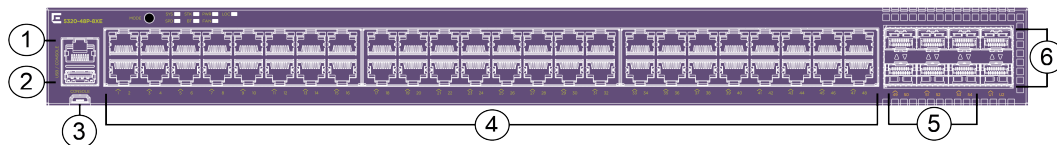
Figure 3: 5320-48P-8XE Front Panel

The rear panel of the switch includes:

- **1** = Grounding lug
- **2** = AC power inlet connector
- **3** = Cable tie mount for power cord management

Figure 4: 5320-48P-8XE Rear Panel

5320-24T-8XE Switch Features

The front panel of the switch includes:

1 = Serial console port (RJ-45)

2 = USB Type-A port for management or external USB flash

3 = USB Micro-B console port

4 = 24 x 10/100/1000BASE-T (autosensing) MACsec capable ports

> **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 6 x 1/10Gb SFP MACsec capable uplink ports

6 = 2 x 10Gb SFP+ Universal Ports/stacking ports (unpopulated)
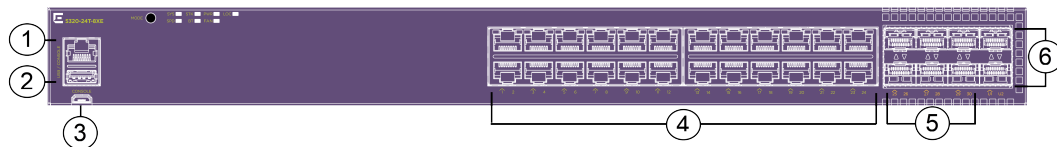
Figure 5: 5320-24T-8XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug

2 = AC power inlet connector

3 = Cable tie mount for power cord management

Figure 6: 5320-24T-8XE Rear Panel

5320-24P-8XE Switch Features

The front panel of the switch includes:

1 = Serial console port (RJ-45)

2 = USB Type-A port for management or external USB flash

3 = USB Micro-B console port

4 = 24 x 10/100/1000BASE-T (autosensing) MACsec capable ports with 802.3at Type 2 PoE (30W)

> **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 6 x 1/10Gb SFP MACsec capable uplink ports

6 = 2 x 10Gb SFP+ Universal Ports/stacking ports (unpopulated)
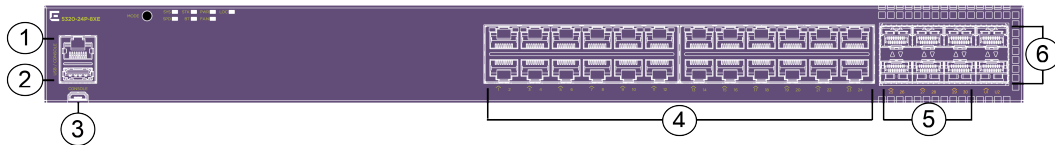
Figure 7: 5320-24P-8XE Front Panel

The rear panel of the switch includes:

1 = Grounding lug

2 = AC power inlet connector

3 = Cable tie mount for power cord management

Figure 8: 5320-24P-8XE Rear Panel

5320-16P-4XE Switch Features

The front panel of the switch includes:

1 = Serial console port (RJ-45)

2 = USB Type-A port for management or external USB flash

3 = USB Micro-B console port

4 = 16 x 10/100/1000BASE-T (autosensing) MACsec capable ports with 802.3at Type 2 PoE (30W)

> **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 2 x 1/10Gb SFP MACsec capable uplink ports

6 = 2 x 10Gb SFP+ Universal Ports/stacking ports (unpopulated)
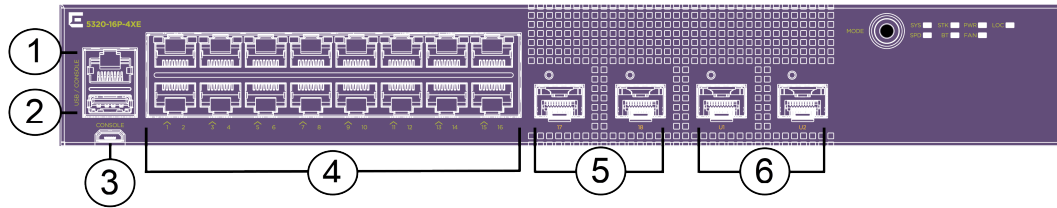
Figure 9: 5320-16P-4XE Front Panel

The rear panel of the switch includes:

1 = Kensington lock

2 = AC power inlet connector

3 = Grounding lug

4 = Cable tie mount for power cord management
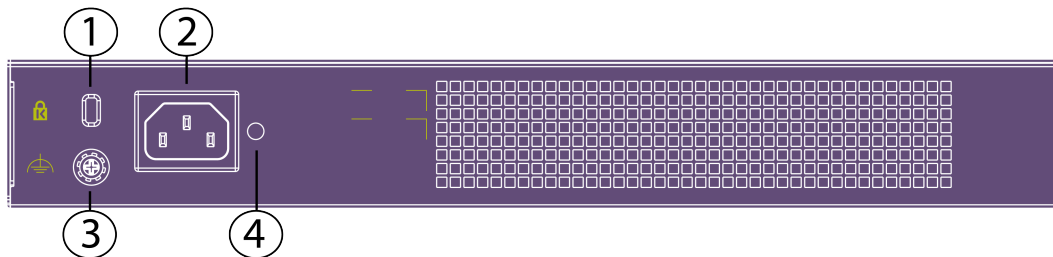
Figure 10: 5320-16P-4XE Rear Panel

5320-16P-4XE-DC Switch Features

The front panel of the switch includes:

1 = Serial console port (RJ-45)

2 = USB Type-A port for management or external USB flash

3 = USB Micro-B console port

4 = 16 x 10/100/1000BASE-T (autosensing) MACsec capable ports with 802.3at Type 2 PoE (30W)

> **Note**
>
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 2 x 1/10Gb SFP MACsec capable uplink ports

6 = 2 x 10Gb SFP+ Universal Ports/stacking ports (unpopulated)
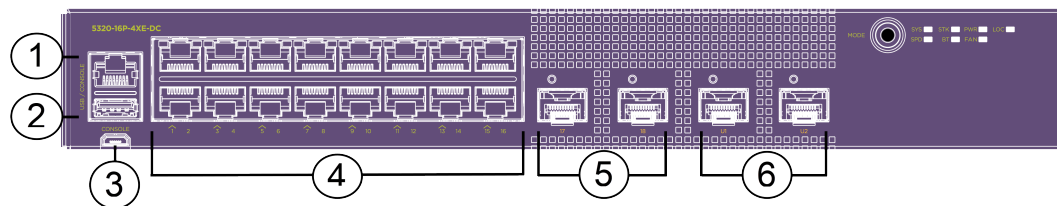
Figure 11: 5320-16P-4XE-DC Front Panel

The rear panel of the switch includes:

1 = Kensington lock

2 = DC power inlet connector

3 = Grounding lug

4 = Cable tie mount for power cord management
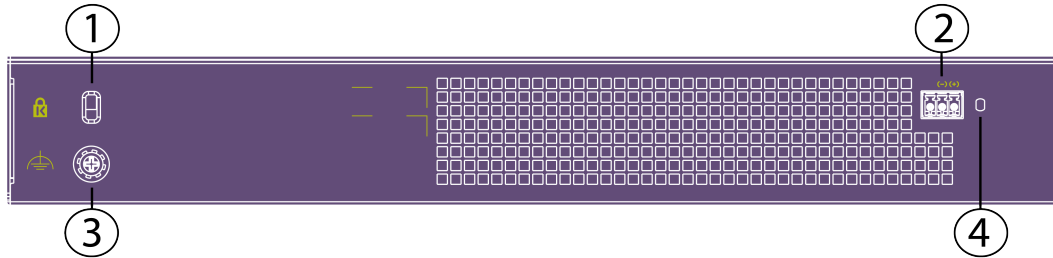
Figure 12: 5320-16P-4XE-DC Rear Panel

5320-24T-4X-XT Switch Features

The 5320-24T-4X-XT is one of two extended temperature models in the 5320 Series. The 5320-24T-4X-XT can function in extended temperatures up to 60°C (32°F), and provides the option to add an external 150W redundant AC power supply. The front panel of the switch includes:

1 = Mode button

2 = System LEDs

3 = 10/100/1000BASE-T out-of-band management port (RJ-45)

4 = 24 x 10/100/1000BASE-T (autosensing) full/half duplex ports (not MACsec capable)

> **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 4 x 1/10Gb SFP+ Universal ports/Stacking ports (unpopulated) (not MACsec capable)

7 = USB Micro-B console port

8 = USB Type-A port for management or external USB flash

9 = Serial console port (RJ-45)
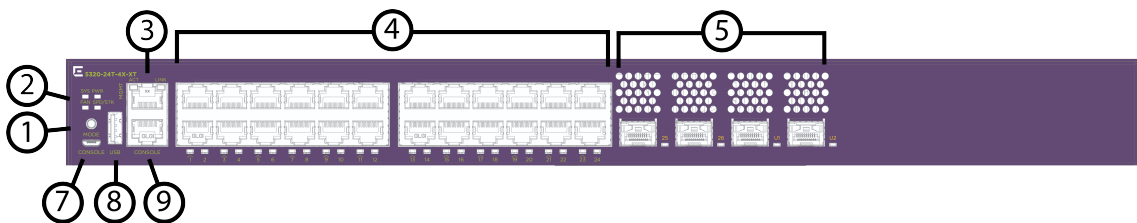
Figure 13: 5320-24T-4X-XT Front Panel

The rear panel of the switch includes:

1 = AC power inlet connector

2 = Redundant power inlet connector (behind cover)

3 = Grounding lug
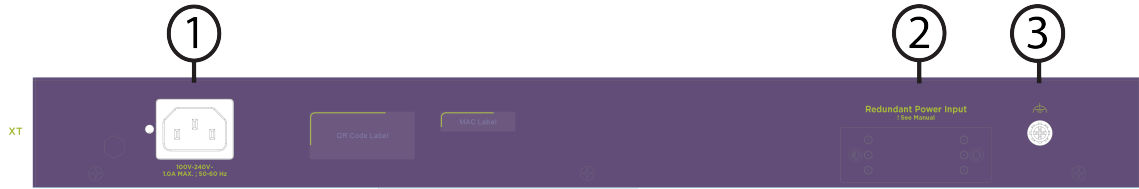
Figure 14: 5320-24T-4X-XT Rear Panel

5320-24T-24S-4XE-XT Switch Features

The 5320-24T-24S-4XE-XT is one of two extended temperature models in the 5320 Series. The 5320-24T-24S-4XE-XT can function in extended temperatures up to 60°C (32°F), and provides the option to add an external 150W redundant AC power supply. Industrial temperature optics are required when the system is operated at ambient temperatures of 50°C to 60°C (122°F to 140°F). The front panel of the switch includes:

1 = Mode button

2 = System LEDs

3 = 10/100/1000BASE-T out-of-band management port (RJ-45)

4 = 24 x 10/100/1000BASE-T (autosensing) full/half duplex MACsec capable ports

> 📝 **Note**
> The 10/100 ports support half duplex; the 1000 port supports full duplex. Half-duplex is not supported on these ports when operating at 1Gbps.

5 = 4 x 1/10Gb SFP+ MACsec capable Universal ports/Stacking ports (unpopulated)

6 = 24 x 100Mb/1G SFP ports

7 = USB Micro-B console port

8 = USB Type-A port for management or external USB flash

9 = Serial console port (RJ-45)
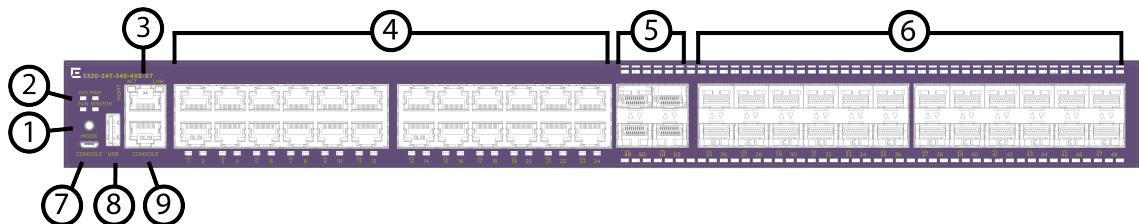
Figure 15: 5320-24T-24S-4XE-XT Front Panel

The rear panel of the switch includes:

1 = AC power inlet connector

2 = Redundant power inlet connector (behind cover)

3 = Grounding lug
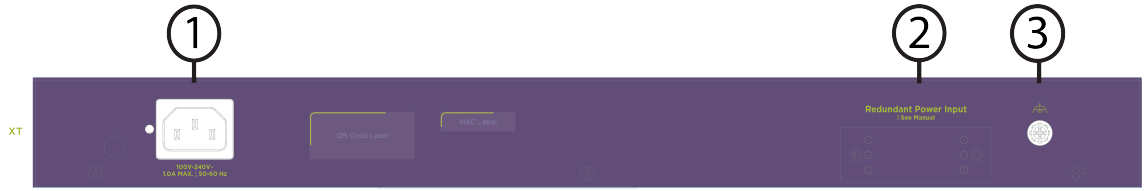
Figure 16: 5320-24T-24S-4XE-XT Rear Panel

Redundant Power Supplies for Use with Your Switch

The 5320 Series extended temperature (XT) switches contain a fixed internal AC power supply that supplies the power needed for most switch operations. XT switch models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT provide the option to add an external redundant power supply (RPS) for power redundancy. These models support a 150 W external AC RPS (part no. RPS-150W-XT).

For information on installing an external AC RPS, see Install an External Redundant Power Supply on page 71.

LEDs on the external redundant power supply provide information on the unit's operational status. See External Redundant Power Supply LEDs on page 93 for details.

Expansion Modules

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

Starting with Switch Engine 32.3, most 5320 Series models support the LRM/MACsec Adapter. Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT do not support the LRM/MACsec Adapter. The LRM/MACsec Adapter offers:

- Increased flexibility by supporting 10Gb Long Reach Multimode (LRM) connections. The adapter plugs into SFP+ ports that do not support LRM, effectively turning them into LRM-capable ports.
- Improved security through MACsec link encryption for connections leaving a building or campus.

LRM/MACsec Adapter

Deploy the LRM/MACsec Adapter by connecting both ports – using a dedicated SFP cable called the *host cable* – to SFP or SFP+ ports on a switch that does not natively support LRM and MACsec connections. The switch is referred to as the *host switch*.

> ⚠️ **Caution**
> Connect the adapter to the host switch using only the host cable that is provided for this purpose. The use of other cables can damage the equipment.

The LRM/MACsec Adapter can be physically mounted on a standard equipment rack. You can also purchase a bracket that attaches to the rack and holds up to five adapters together.

The LRM/MACsec Adapter receives power through its connection to the host switch's SFP port. Auxiliary power is supplied through a USB (micro-B) cable that connects the adapter to a power source that is capable of providing at least 0.5A of current. The auxiliary power cable is required for MACsec connections. It is optional for LRM-only connections.

To use the LRM/MACsec Adapter, you must have at least Switch Engine version 32.3 installed on the host switch to which the adapter is attached.

> **Note**
> LRM/MACsec Adapter initialization may take extended time - about 40-85 seconds per adapter plus 15-35 seconds per transceiver, depending on the platform type used with the adapter.
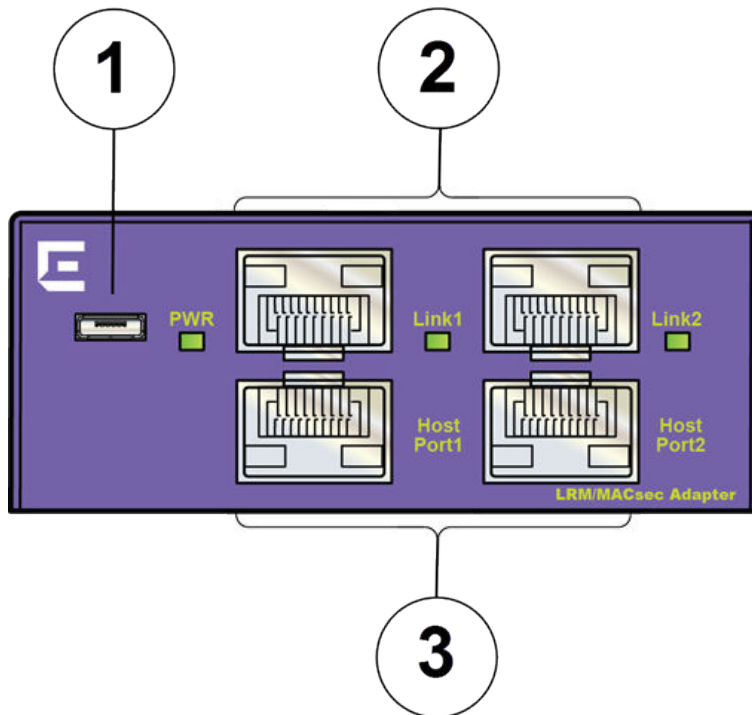
Figure 17: LRM/MACsec Adapter: Front Panel

1 = Auxiliary power connector	3 = SFP+ ports (connect to the host switch)
2 = SFP+ ports (connect to the network)	

Maximum Capacity for Using the LRM/MACsec Adapter

The following table details the maximum number of LRM/MACsec Adapters you can use. The maximum number varies according to:

- Whether you are running in LRM mode only, or in LRM plus MACsec mode.

- Whether you are using an auxiliary power (USB) cable to draw additional power beyond what is provided by the host switch.

Note

- The figures listed assume that, in every case, both adapter ports are connected to the host switch. The adapter will not operate properly if only one port is connected to the host switch.
- Unless noted otherwise, all switch models listed have SFP+ ports that can be configured for 10Gb. A 10G license upgrade is required for 10 Gb functionality, and to support an LRM/MACsec adapter with 10G-LRM optics..
- The LRM/MACsec Adapter is used only for its LRM capability with 5320 Series. MACsec is supported natively on the ports the LRM/MACsec adapter is connected to. MACsec is not supported on the stacking ports.

Table 4: Maximum Number of LRM/MACsec Adapters, by Switch Model and Connection Type

Switch Model	Mode: LRM Only		Mode: LRM and MACsec	
	Two ports no aux. power	Two ports 0.5A aux. power	Two ports aux. power[1]	One port One bypass aux. power[1]
5320-16P-4XE 5320-16p-4XE-DC	2	2	N/A	N/A
5320-24T-8XE 5320-24P-8XE	2	4	N/A	N/A
5320-48T-8XE 5320-48P-8XE	2[2]	4	N/A	N/A

[1]With 1W optics modules (SR, LR, LRM, 10 km bidirectional, AOC, DAC, and most 1 Gb optics), use 0.5A auxiliary power sources.

[2]On 5320 48-port systems, for each LRM/MACsec Adapter without auxiliary power two additional SFP+ ports must be unused, for example:

- 5320 48-port systems can support one LRM/MACsec Adapter without auxiliary power if two additional SFP+ ports are unused.
- 5320 48-port systems can support two LRM/MACsec Adapters without auxiliary power if four additional SFP+ ports are unused.

Limitations for Some Optical Devices

Temperature Limitations

In most circumstances, the LRM/MACsec Adapter can operate at temperatures up to 45°C (113°F). However, the maximum operating temperature is 40°C (104°F) when the adapter is used with any of the following optical transceivers:

- 10Gb ER SMF (part no. 10309)
- 10Gb ZR SMF (part no. 10310)
- 10Gb Tunable DWDM ZR (part no. 10325)
- 1000BASE-BX-U bidirectional SFP 120 km (part no. MGBIC-BX120-U)
- 1000BASE-BX-D bidirectional SFP 120 km (part no. MGBIC-BX120-D)

You can find a complete listing of cables and optical transceivers that are compatible with the LRM/MACsec Adapter in the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

LRM/MACsec Adapter LEDs

The LEDs on the front panel of the LRM/MACsec Adapter have the following meanings:

Table 5: LRM/MACsec Adapter LEDs

LED	Meaning
PWR	Green: Normal operation. The adapter is receiving power, either from the host switch or through the USB connector. Amber: The adapter is receiving insufficient power. Off: The adapter is not receiving power.
Link1	Steady green: The Link1 connection – from the host switch, through the adapter, to the network – is ready. Blinking green: Link1 is active. Off: Link1 is not ready.
Link2	Steady green: The Link2 connection – from the host switch, through the adapter, to the network – is ready. Blinking green: Link2 is active. Off: Link2 is not ready.

Site Preparation

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

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

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

> **Note**
> Before installing or removing any components of the system, and before carrying out any maintenance procedures, read the safety information in "Technical Specifications."

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."

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 6 are authorities on electrical codes.

Table 6: 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 31 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 7 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 7: 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.
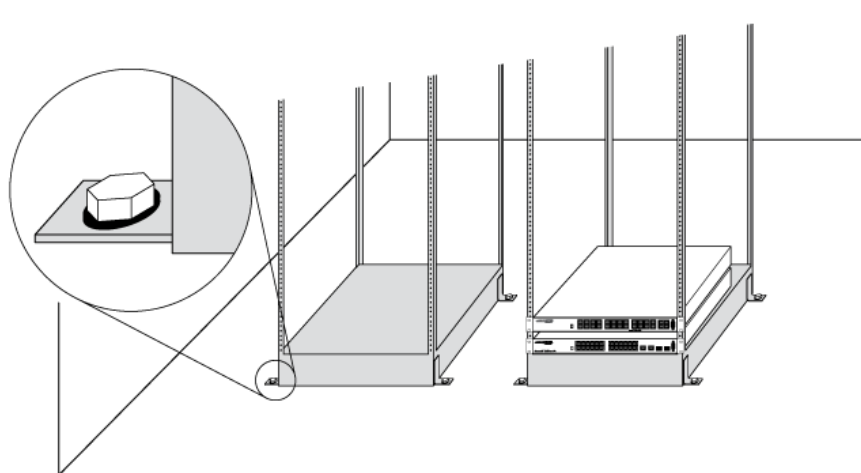
Figure 18: Properly Secured Rack

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 19 on page 35.
- 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.
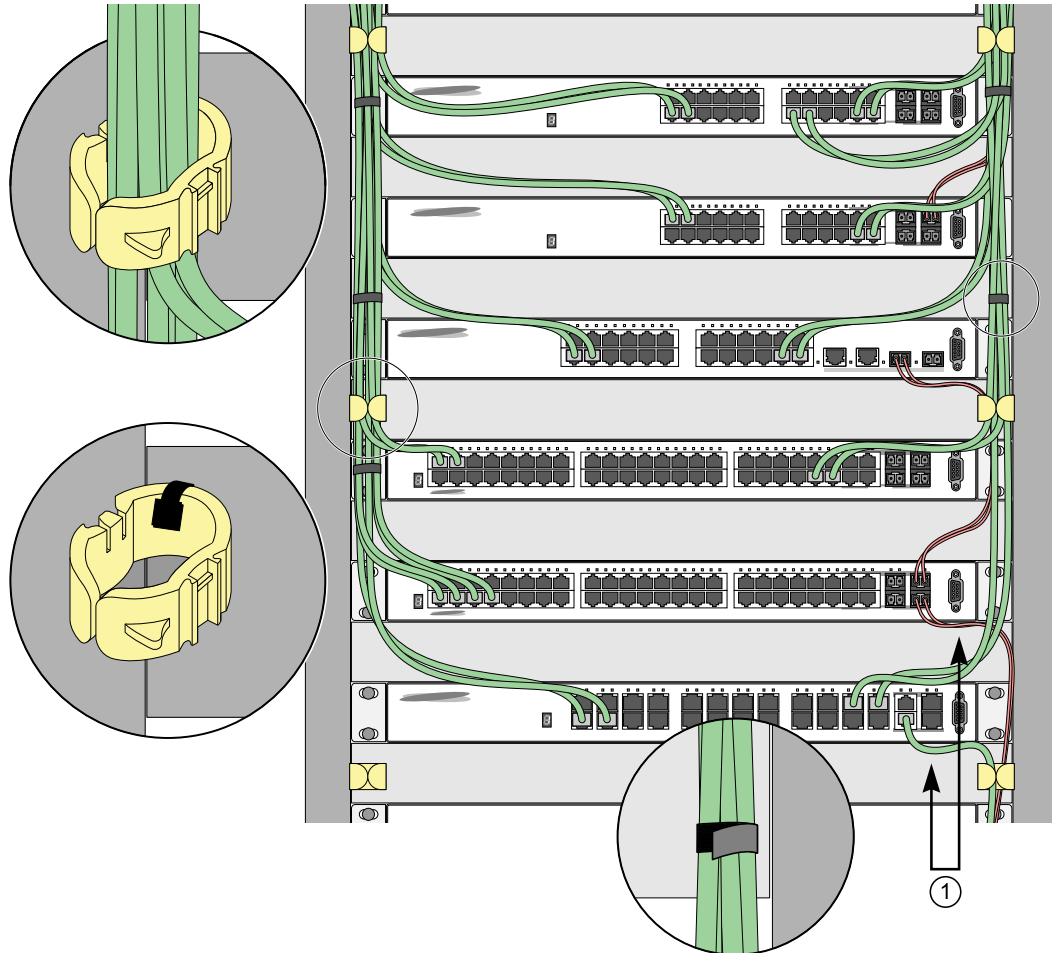
Figure 19: Properly Installed and Bundled Cable

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 20.

> **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.
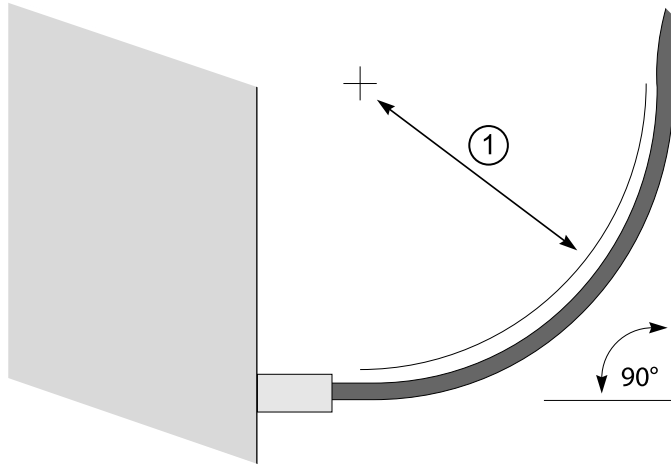
Figure 20: Bend Radius for Fiber Optic Cable

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 21 shows examples of recommended and non-recommended connector jacket types.
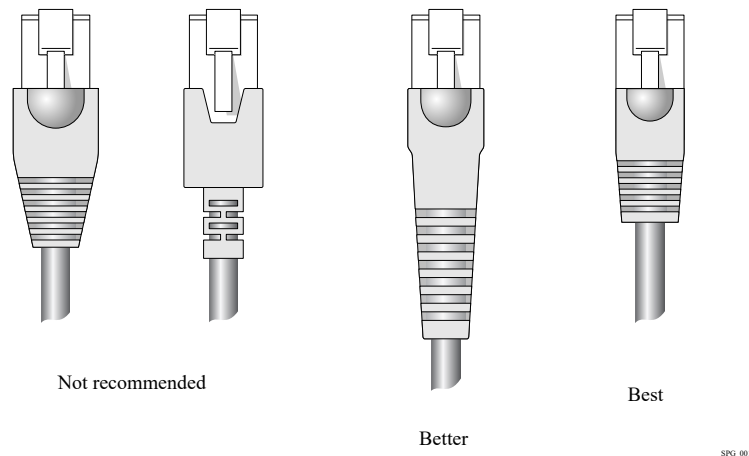
Figure 21: RJ45 Connector Jacket Types

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.

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 39.)

> **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

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 22 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.
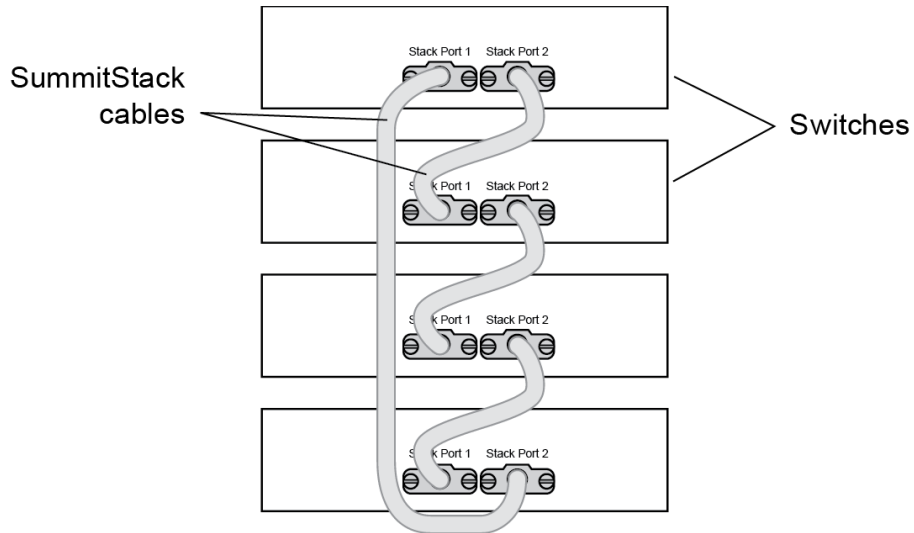
Figure 22: Switches Connected to Form a Stack

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 53 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 55 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.
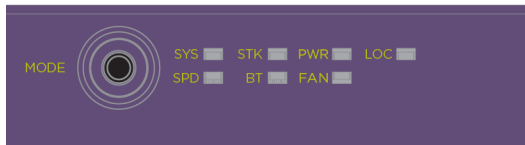
Figure 23: Mode Button with STK LED Example

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:

1. 5520 Series
2. 5420 Series
3. 5320 Series

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

Beginning with Switch Engine 31.6, 5320 Series switches can stack with 5520 Series switches by installing a 5520-VIM-4X VIM. The last two ports on the 5520-VIM-4X can be used as 10 GbE stack ports when Alternate stacking is selected. The two stack ports on the 5520-VIM-4X support both SFP+ direct attach and optical transceivers.

📝 **Note**
Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT can only be stacked with themselves using Native V40 stacking.

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 24 presents a graphical representation of a stack and some of the terms that describe stack conditions.
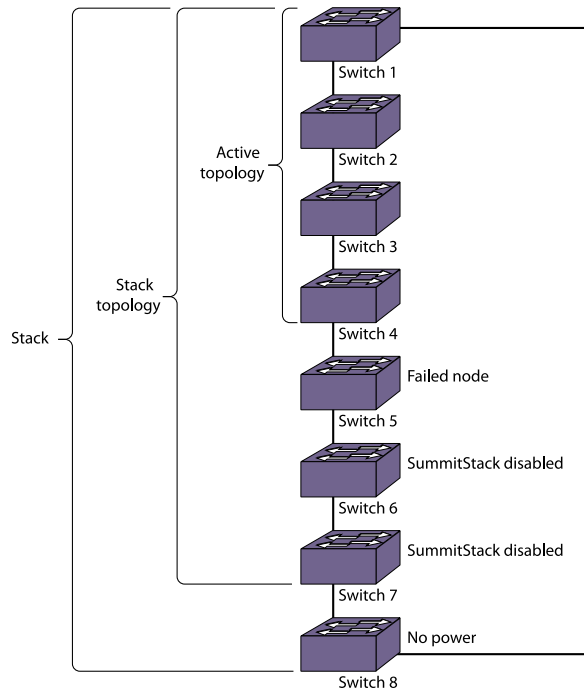
Figure 24: Example of a Stack, Showing the Active Topology and the Stack Topology

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 47.

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 25 represents a maximal ring topology of eight active nodes.
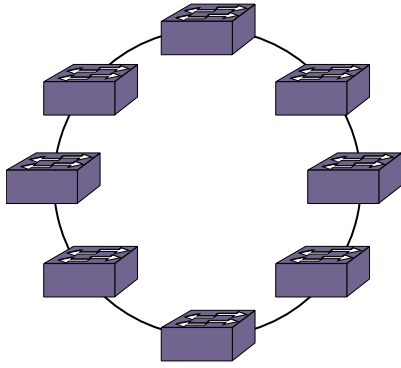
Figure 25: Graphical Representation of a Ring Topology

Figure 26 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.
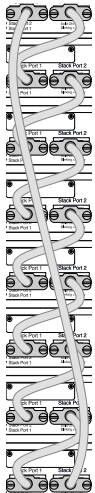
Figure 26: Switches Connected to Each Other in a Ring Topology

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 27, 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 27: 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 8 describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

Table 8: 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 8: 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 8: 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 8: 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 45). Include only the nodes that you expect to be active in the stack.

Follow the recommendations in Recommendations for Configuring Stacks on page 52 to configure the software for your stack.

The recommended procedures for installing and interconnecting a stack are found in Set up the Physical Stack on page 55.

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 51 for physically situating your equipment.

Combine Switches from Different Series

5320 Series switches can stack with themselves and 5420 Series switches using SummitStack-V40 stacking (10G link running at HG). 5320 Series can also be stacked with 5520 Series switches using Alternate stacking (10Gb link running at HG). The 5320 Series extended temperature (XT) switches, models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT, can only stack with themselves using SummitStack-V40 stacking.

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. In this example, stacking ports are represented by U1 and U2 on the right side.

Figure 28: 5320 Switch 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 9: 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 55.
2. Connect the switches to your management network.

   See Connect Your Stack to the Management Network on page 58.

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 29 shows cable connections for a 4-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.
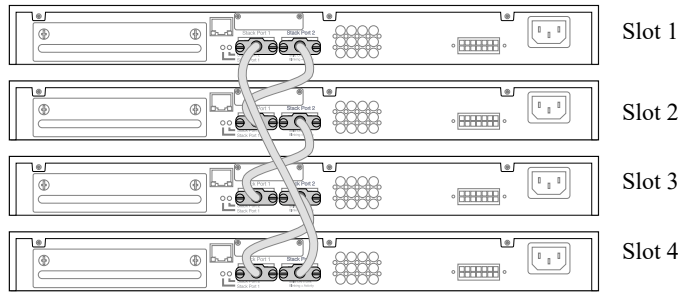
Slot 1

Slot 2

Slot 3

Slot 4

Figure 29: SummitStack Cable Connections Using Four Switches with Integrated SummitStack Ports

Table 10 lists the recommended order for connecting the stacking ports in this example.

Table 10: 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 30 shows cable connections for an 8-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

Figure 30: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

Table 11 lists the recommended order for connecting the stacking ports in this example.

Table 11: 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 31 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.

Rack A   Rack B   Rack C   Rack D   Rack E

Slot 1   Slot 2   Slot 5   Slot 3   Slot 4
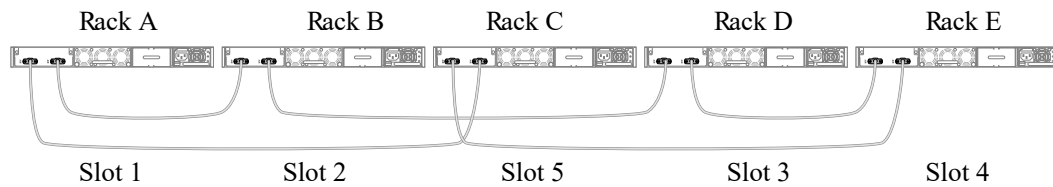
Figure 31: Top-of-Rack Stack Installation

Table 12 lists the recommended order for connecting the stacking ports in this example.

Table 12: 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 55, 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

Before you attempt to install or remove an Extreme Networks switch, read the precautions in Safety Considerations for Installation on page 59.

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 60.
2. Mount the switch, or install the switch in the rack.

   See Mount the Device on page 60.
3. Connect network interface cables.

   See Connect Network Interface Cables on page 77.
4. Install optional components: optical transceivers and cables.

   See the instructions in Install Optional Components on page 77.
5. Power up the switch.

   See Turn on the Switch on page 78.
6. Perform initial network connection and configuration.

   See Activate and Verify the Switch on page 81.

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 on page 110 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 27, 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.

You need the following additional tools and equipment. These are not provided with your switch:

- Screwdriver for securing the rack mounting screws.
- #2 Phillips magnetic screwdriver to attach bracket screws that are provided with the switch.
- ESD-preventive wrist strap for installing optional ports at the back of the switch.

Mount the Device

The 5320 Series provides multiple options for mounting or installing the switch.

Mount Options

You can mount or install the device in the following ways:

- All 5320 Series support mounting as a standalone unit on a flat surface, such as a table top. Use the rubber feet included with the device to secure the device on the surface. No other equipment is required for table installation.
- All 5320 Series support mounting in a standard two-post rack. Rack mounting ears are included with the device.
- Additionally, both the 5320-16P-4XE and 5320-16P-4XE-DC support wall-mounting and under-the-table mounting. Anchors and wood screws are included with the device.

Mount the Device on a Table

5320 Series switches provide four self-adhesive rubber pads for mounting on tables or other flat surfaces. The pads keep the switch from scratching the supporting surface and help ensure adequate airflow around the switches when they are mounted on top of one another. You can safely place up to four switches on top of one another.

⚠️ **Caution**
Do not place other equipment on top of table-mounted switches.

To mount a switch on a table - or any firm, flat surface - follow these steps.

1. Carefully separate the four rubber pads that are provided
2. Apply the pads to the underside of the switch by placing a pad at each corner, ensuring that all corners are aligned. Figure 32 shows the locations for attaching the rubber mounting feet on the switch.
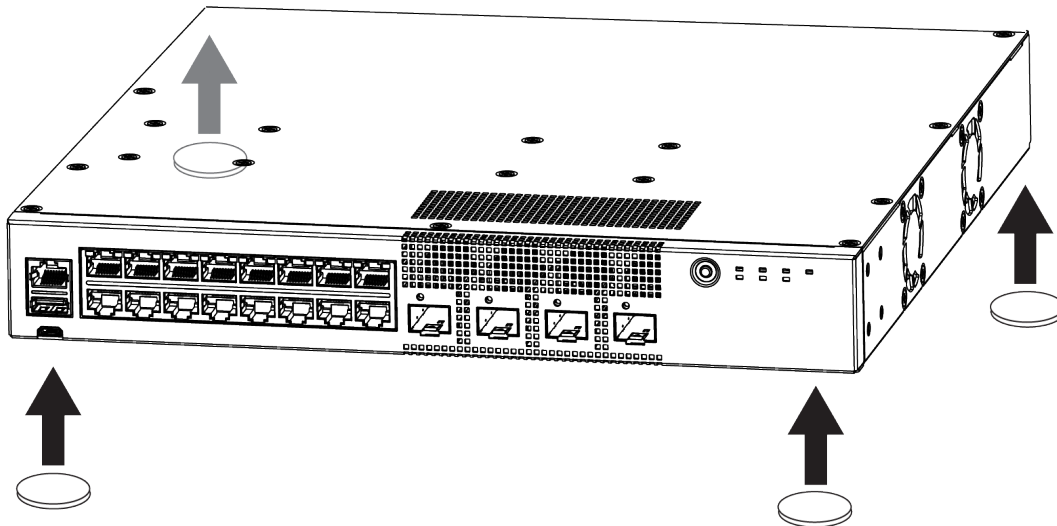
Figure 32: Table Mount: 5320 Series

Install the Device in a Rack

This procedure uses a two-post mounting kit, which accommodates rack posts 3 inches or 6 inches wide.

The two-post rack mount kit XN-2P-RMKIT-006 is required for models 5320- 48T-8XE, 5320-48P-8XE, 5320-24T-8XE, and 5320-24P-8XE. The two-post rack mount kit XN-2P-RMKIT-007 is available for models 5320-16P-4XE and 5320-16P-4XE-DC. The 1U two-post rack mount kit XN-2P-RMKIT-011 is also available for models 5320-16P-4XE and 5320-16P-4XE-DC. The two-post rack mount kit XN-2P-RMKIT-008 is required for models 5320-24T-24S-4XE-XT and 5320-24T-4X-XT. The two-post rack mount kits can also be installed in a four-post rack, using just the two front posts or the two back posts.

The rack mount kit contains an instruction sheet, along with the following components:

- Mounting ears (2 count)
- Mounting ear screws (8 count)

Rack mounting ears can support two configurations: flush- and mid-mount.

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

To attach a switch to a two-post rack, follow these steps.

1. Attach a mounting bracket to each side of the switch, using the screws provided. Align each mounting bracket so that the flange (ear) faces the front of the switch to flush-mount, or faces the rear of the switch to mid-mount.

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

   > **Note**
   > Do not block the air vent on the top of the unit. Leaving a space between units ensures adequate airflow.

   > **Note**
   > Do not overlap rack mounting ears when using the longer mounting ears. Leaving a space between units ensures adequate airflow.
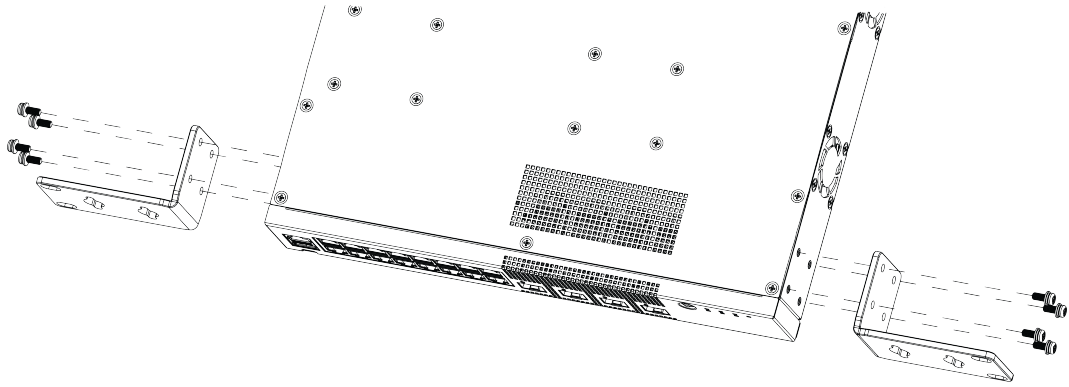
Figure 33: Flush-Mount: Attaching 1U mounting ears to 5320-16P models
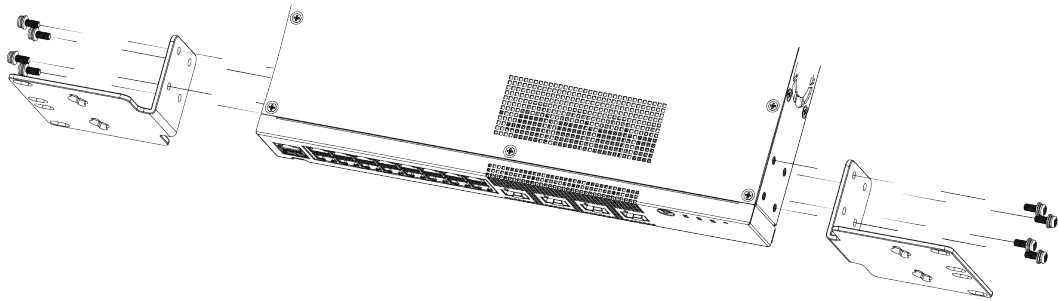
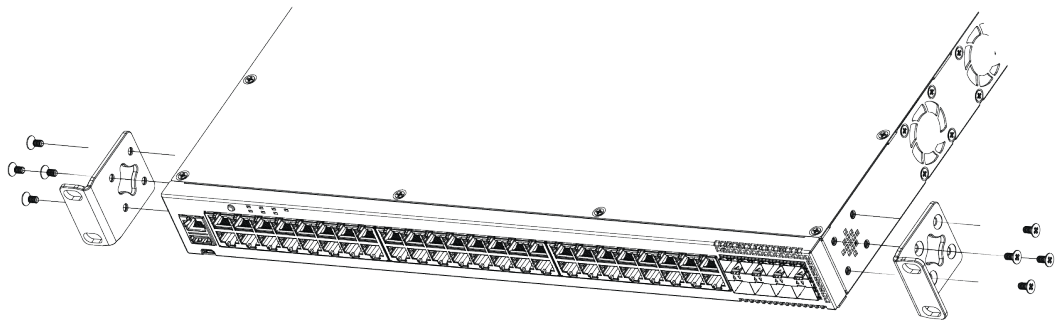**Figure 34: Flush-Mount: Attaching larger mounting ears to 5320-16P models**

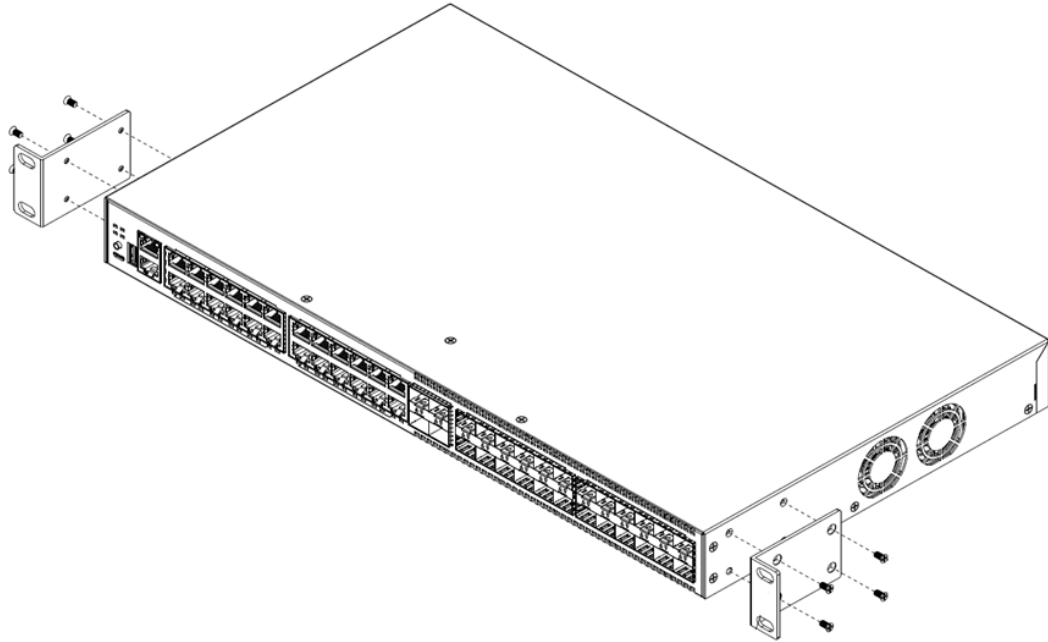**Figure 35: Flush-Mount: Attaching short mounting ears to models 5320-48P/T and 5320-24P/T**

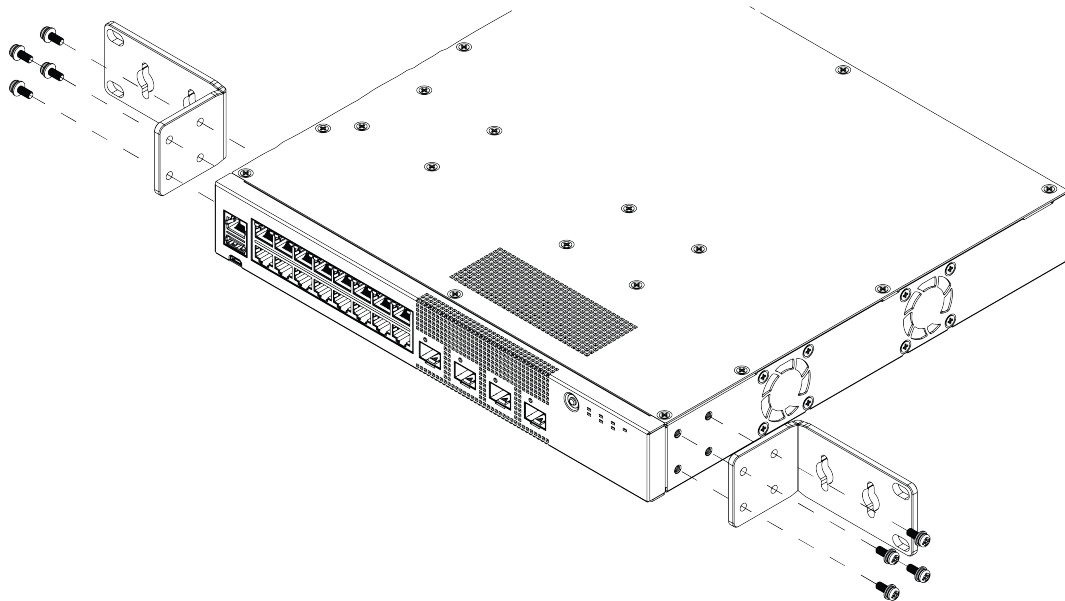**Figure 36: Flush-Mount: Attaching mounting ears to 5320-24T-4X-XT and 5320-24T-24S-4XE-XT models**

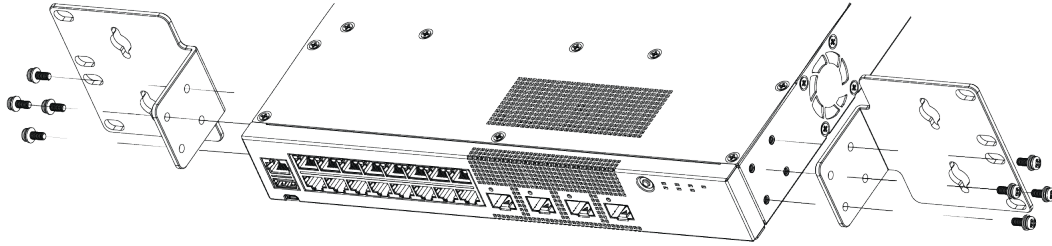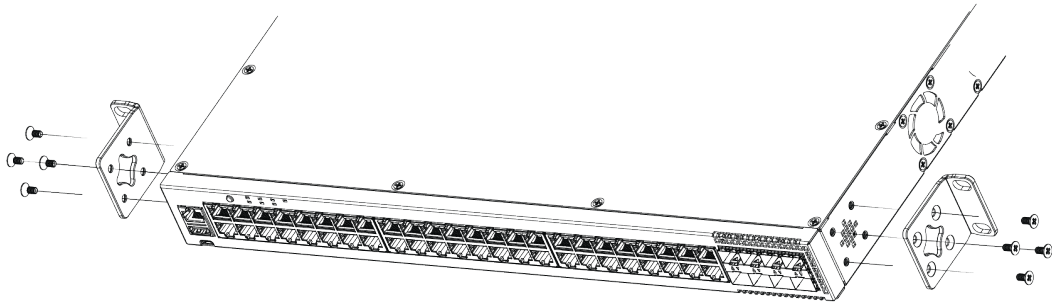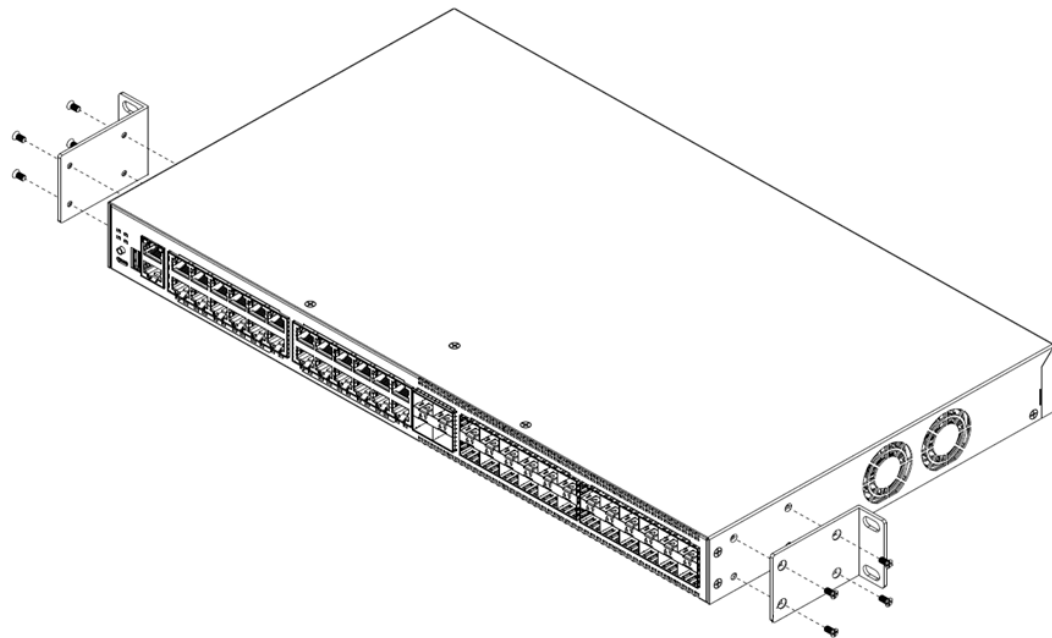**Figure 37: Mid-Mount: Attaching 1U mounting ears to 5320-16P models**

Figure 38: Mid-Mount: Attaching larger mounting ears to 5320-16P models

Figure 39: Mid-Mount: Attaching short mounting ears to models 5320-48P/T and 5320-24P/T

Figure 40: Mid-Mount: Attaching mounting ears to 5320-24T-4X-XT and 5320-24T-24S-4XE-XT models

2. With the mounting brackets attached, position the switch between the vertical rack rails of the 19-inch rack.

3. Fasten the switch securely to the rack rails using four customer-supplied rack screws. Ensure that the threaded length of the screws is within 4 to 5 cm.

Figure 41: Flush-Mount: Mounting in a Two- or Four-Post Rack for models 5320-16P-4XE and 5320-16P-4XE-DC
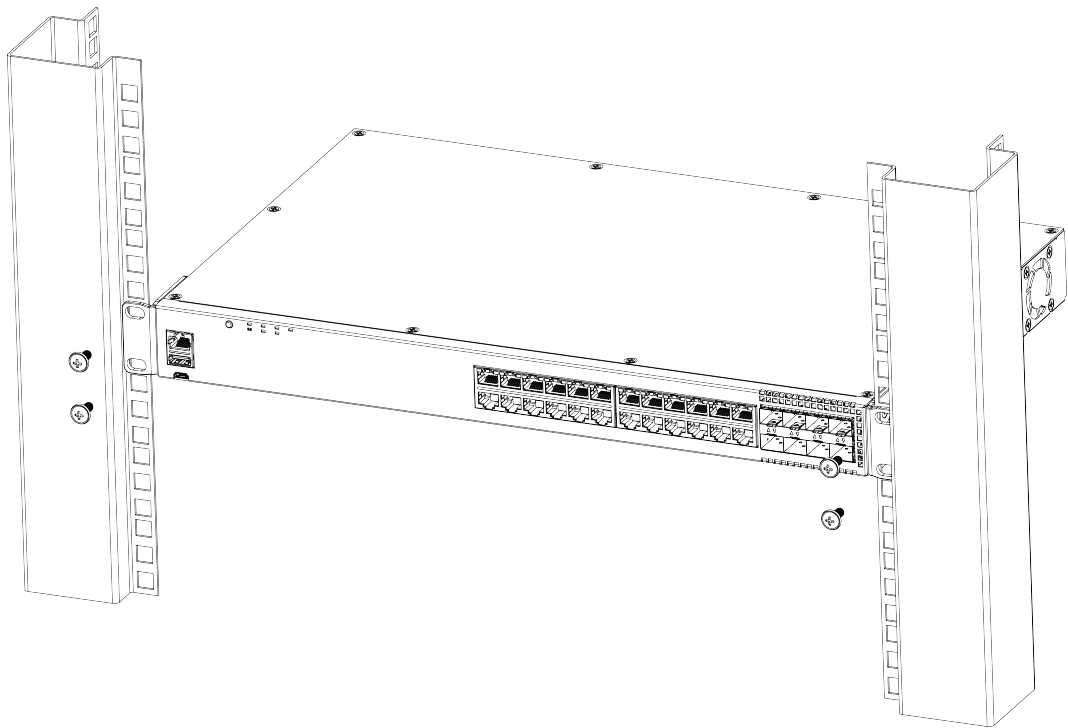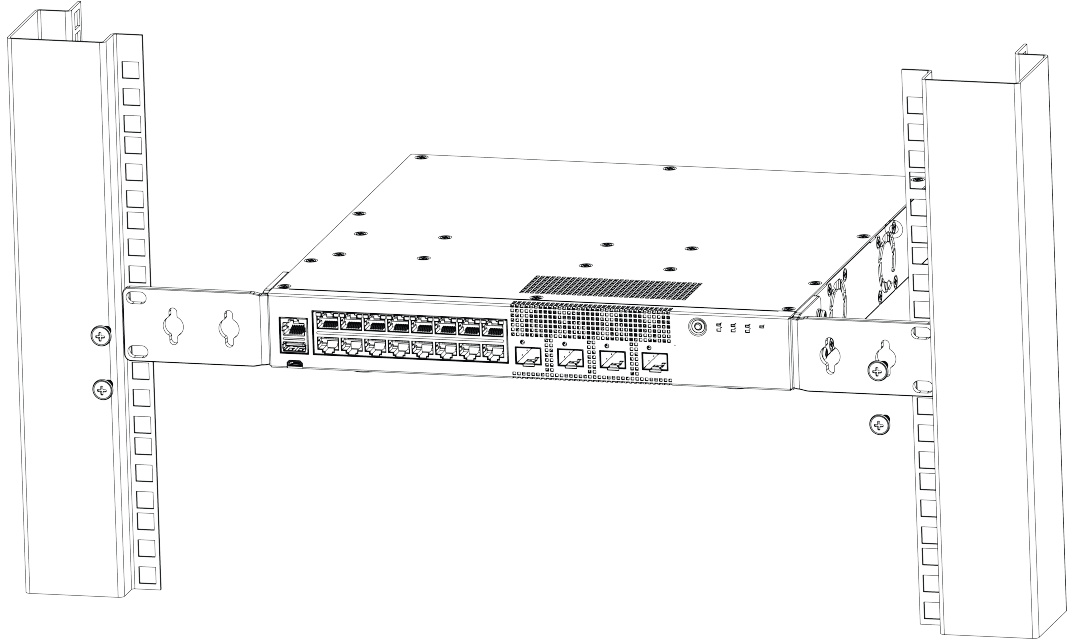
Figure 42: Flush-Mount: Mounting in a Two- or Four-Post Rack for models 5320-24T-8XE and 5320-24P-8XE
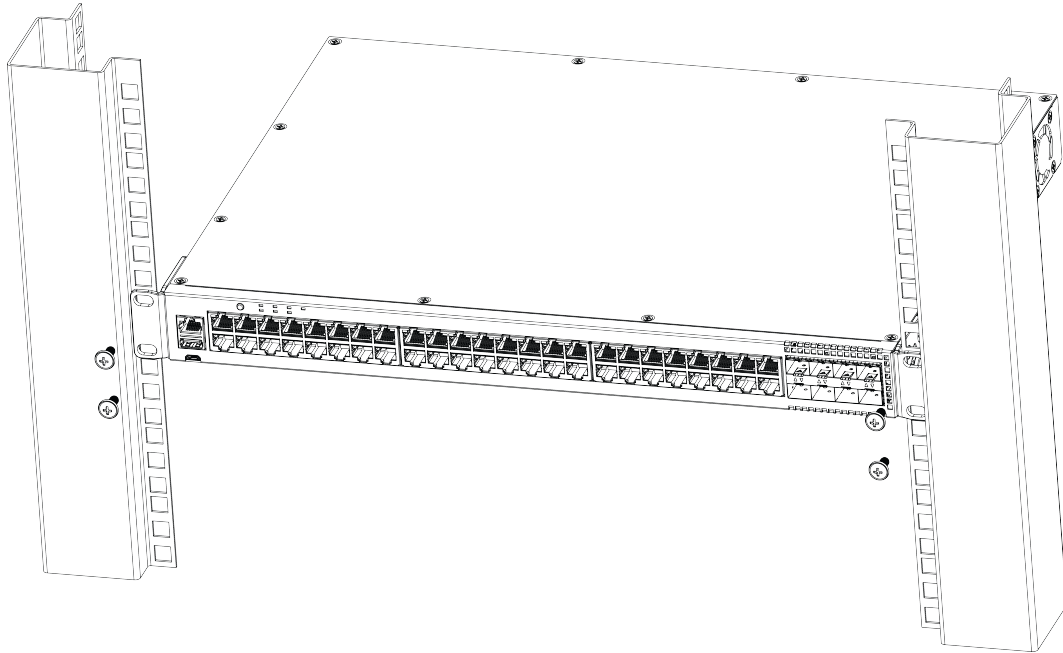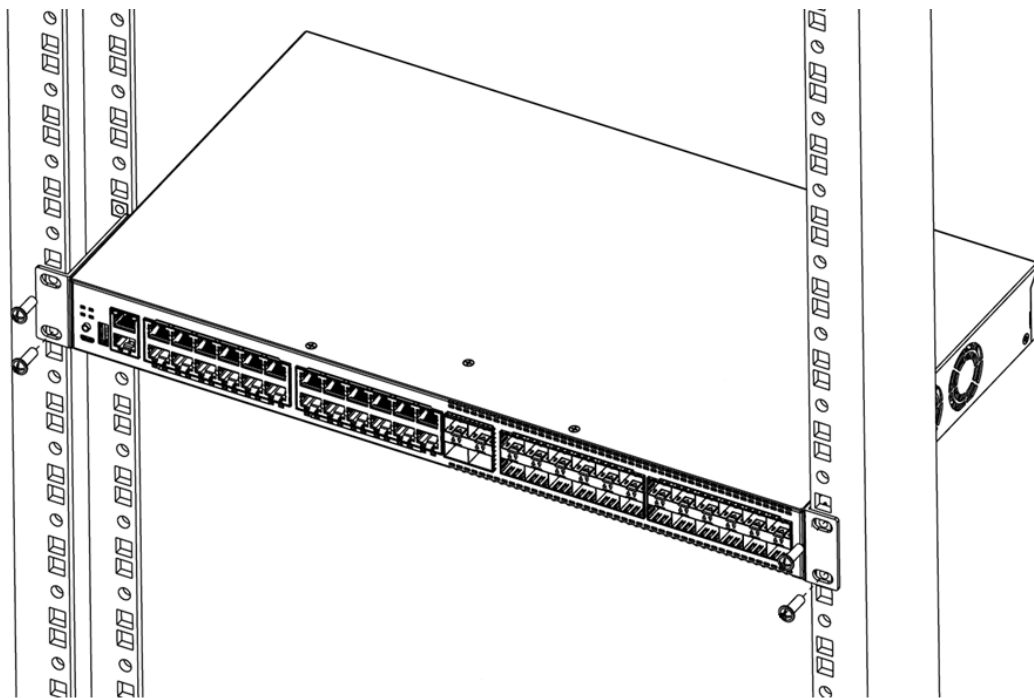
Figure 43: Flush-Mount: Mounting in a Two- or Four-Post Rack for models 5320-48T-8XE and 5320-48P-8XE

Figure 44: Flush-Mount: Mounting in a Two- or Four-Post Rack for models 5320-24T-24S-4XE-XT and 5320-24T-4X-XT
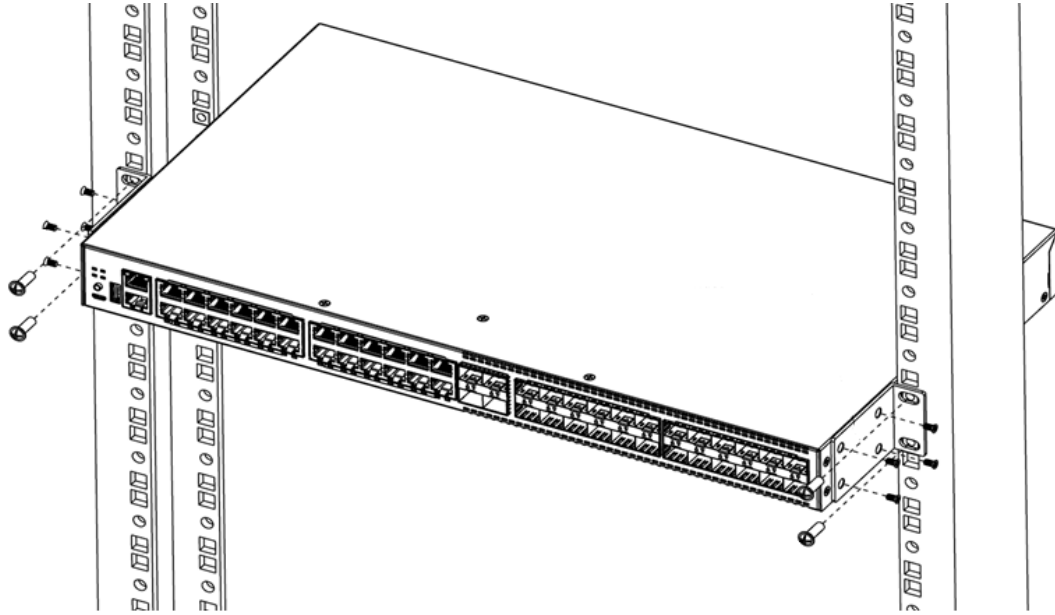
Figure 45: Mid-Mount: Mounting in a Two- or Four-Post Rack for models 5320-24T-24S-4XE-XT and 5320-24T-4X-XT

Mount the Device on a Wall (5320-16P models)

The 5320-16P switch models are constructed so that they can be mounted on a wall. Ensure that the wall is strong enough to support the weight of the switch and the attached cables.

> **Note**
> The front end of the switch must be facing down, and the power inlet must be facing up when mounting a switch to the wall.

To mount a switch to the wall, follow these steps.

1. Using the two holes in each short mounting ear, mark the places on the wall to mount the switch. Each mounting ear has two mounting holes, so be sure to make four marks. Be sure to position the marks so that the switch is level when it is mounted.
2. Drill a hole at each mark.
3. Insert a provided anchor into each hole. Gently tap each anchor with a hammer, if necessary, to ensure that it is inserted tightly.
4. Using rack mount screws, attach a wall-mounting ear to the left side of the switch, at the front end. Figure 47 on page 69 shows the attachment of the screws.
5. Repeat step 4 for the right side of the switch.
6. Mount the switch on the wall by screwing a provided wood screw through each hole in the wall-mounting ears into the anchors. Ensure that all screws are securely fastened and that the switch is firmly attached to the wall.
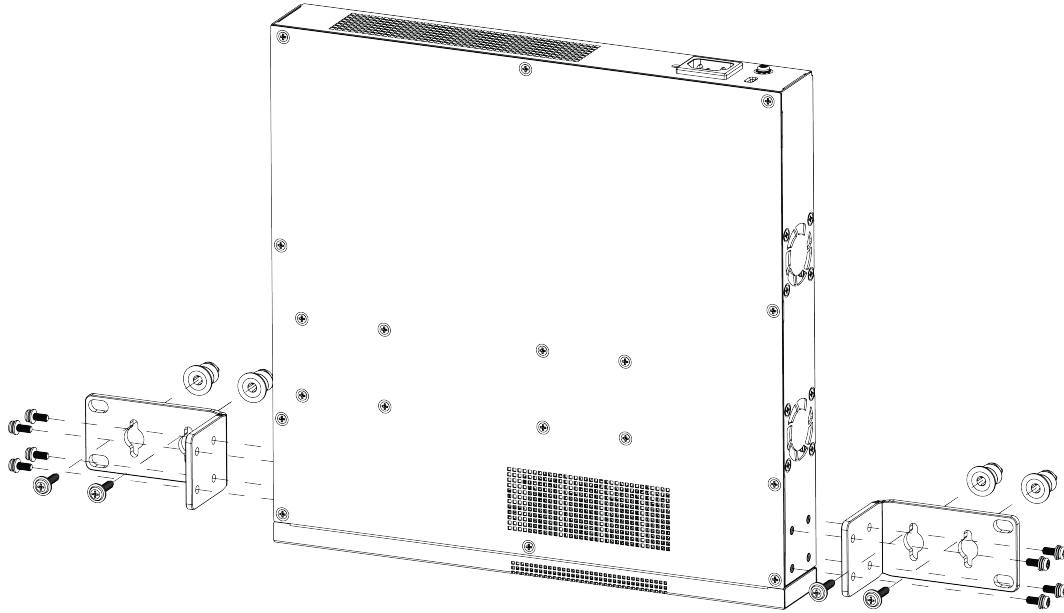
Figure 46: Wall-Mount: Attaching 1U mounting ears to 5320-16P models
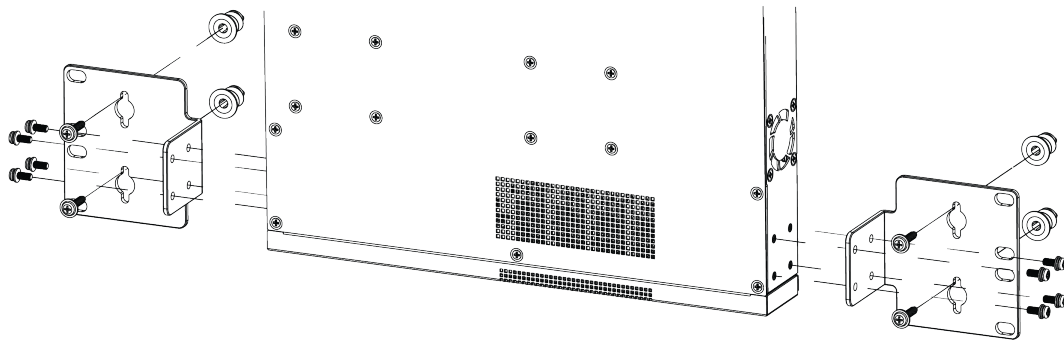
Figure 47: Wall-Mount: Attaching larger mounting ears to 5320-16P models

There is a "cleaner" method of attaching the mounting ears to the switch so that they are tucked under the switch instead of pointing away from the switch. Figure 49 illustrates attaching the mounting ears so that they are underneath the switch.
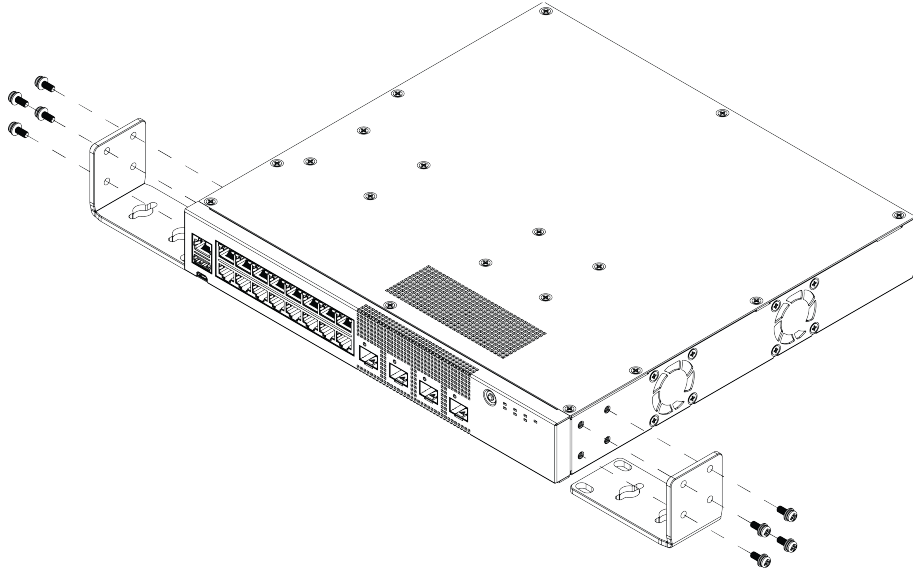
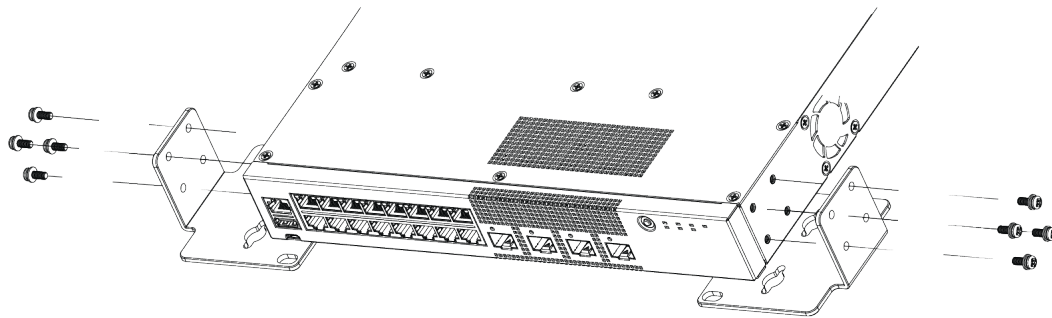**Figure 48: Alternate method of attaching 1U mounting ears**

Figure 49: Alternate method of attaching larger mounting ears

Mount the 5320-16P models Under a Table

The 5320-16P switch models are constructed so that they can be mounted under a table. Ensure that the table is strong enough to support the weight of the switch and the attached cables.

To mount a switch under the table, follow these steps.

1. Using the two holes in each short mounting ear, mark the places under the table to mount the switch. Each mounting ear has two mounting holes, so be sure to make four marks.
2. Drill a hole at each mark.
3. Insert a provided anchor into each hole, if an anchor is needed. Gently tap each anchor with a hammer, if necessary, to ensure that it is inserted tightly.
4. Using rack mount screws, attach a mounting ear to the left side of the switch, at the front end. Figure 51 on page 71 shows the attachment of the screws.

5. Repeat step 4 for the right side of the switch.
6. Mount the switch under the table by screwing a provided wood screw through each hole in the mounting ears into the anchors. Ensure that all screws are securely fastened and that the switch is firmly attached to under the table.
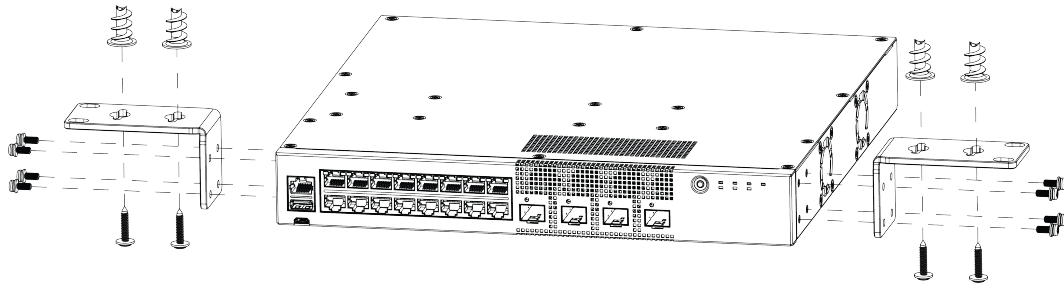

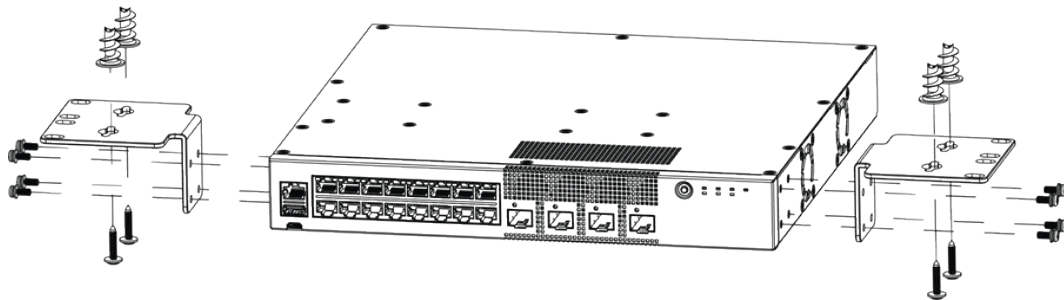**Figure 50: Under the Table Mount: Attaching 1U mounting ears to 5320-16P models**

Figure 51: Under the Table Mount: Attaching larger mounting ears to 5320-16P models

There is a "cleaner" method of attaching the mounting ears to the switch so that they are tucked under the switch instead of pointing away from the switch. Figure 49 on page 70 illustrates attaching the mounting ears so that they are underneath the switch.

Install an External Redundant Power Supply

The RPS-150W-XT redundant power supply (RPS) can be installed on a flat surface or in a 19-inch rack.

Install the RPS on a Flat Surface

Four self-adhesive rubber pads are provided for installing flat surfaces, like a table. The pads keep the RPS from scratching the supporting surface and help ensure adequate airflow around the RPS.

To install an RPS on a table - or any firm, flat surface - follow these steps.

1. Carefully separate the four rubber pads that are provided
2. Apply the pads to the underside of the RPS by placing a pad at each corner, ensuring that all corners are aligned. Figure 52 shows the locations for attaching the rubber mounting feet on the switch.
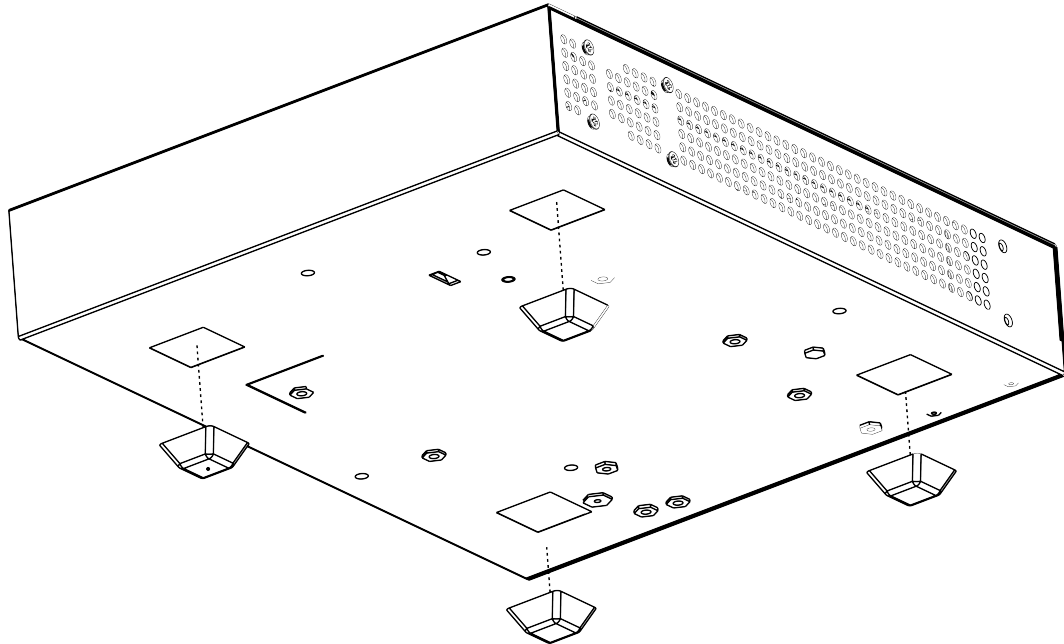
Figure 52: Table Mount: Attaching Rubber Feet

Install the RPS in a Rack

The RPS can be installed in a four-post rack, using just the two front posts or two back posts, or a two-post rack. The rack-mount kit XN-2P-RMKIT-003 is ordered separately. The following procedure uses the two-post mounting kit, which accommodates rack posts 3 inches or 6 inches wide. Rack ears can support both flush- and mid-mounting. To install the RPS you need:

- Two rack mount brackets and mounting screws (rack mount kit) shipped with the RPS.
- Four customer-supplied screws to attach the RPS to a standard 19-inch rack.

To install the RPS in a rack:

1. Attach a mounting bracket to each side of the RPS, using the screws provided. Align each mounting bracket so that the flange (ear) faces the front of the RPS to flush-mount, or faces the rear of the RPS to mid-mount.
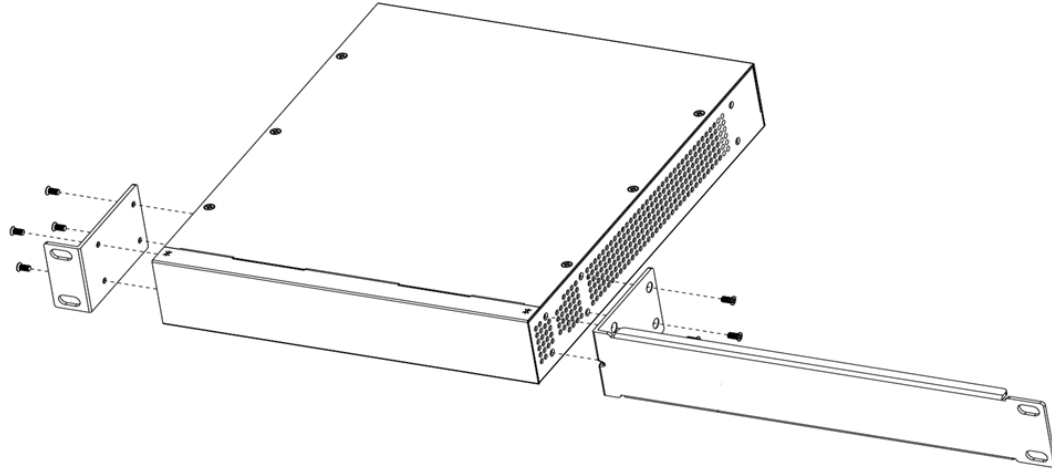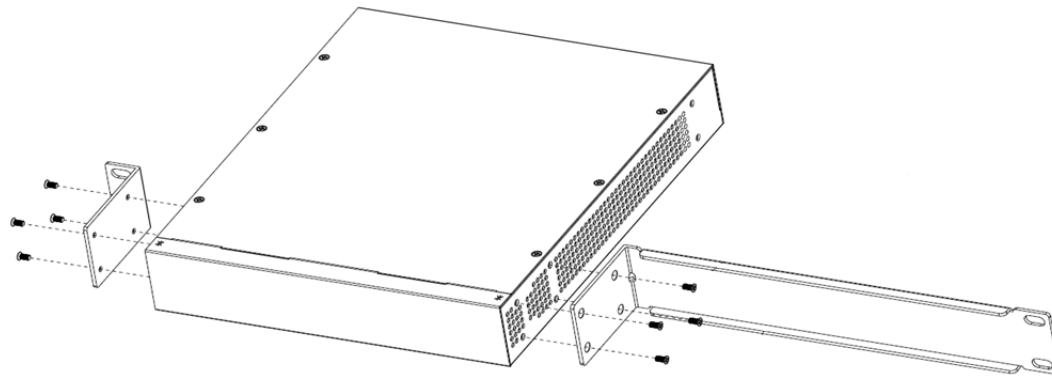
Figure 53: Flush-Mount: Attaching mounting ears

Figure 54: Mid-Mount: Attaching mounting ears

2. With the mounting brackets attached, position the RPS between the vertical rack rails of the 19-inch rack.
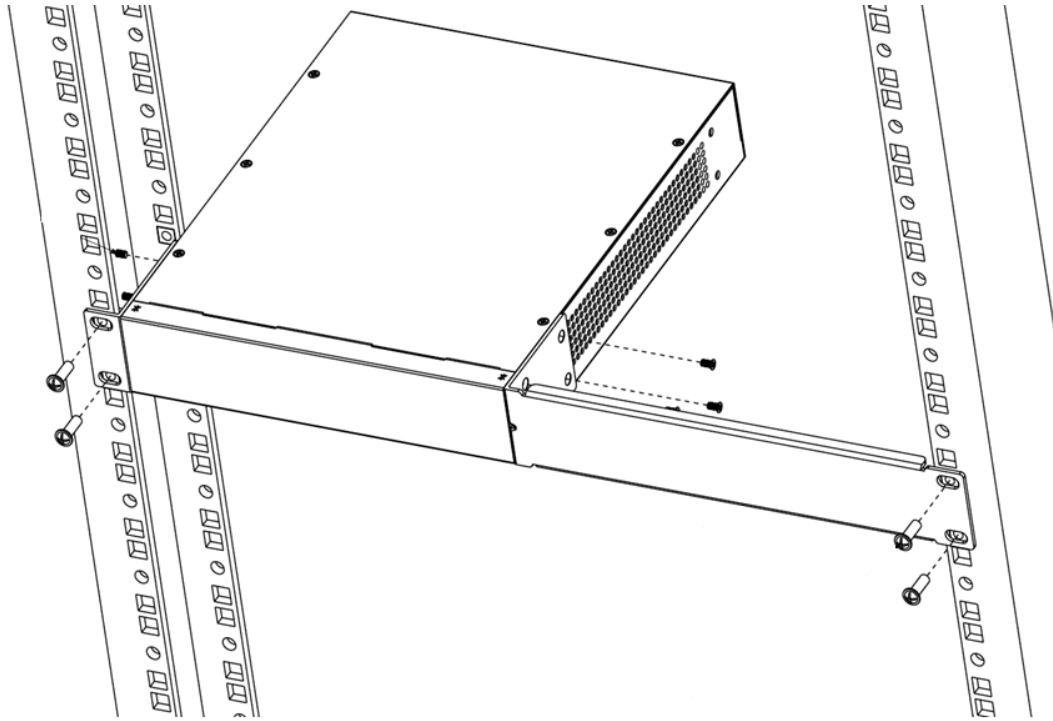3. Fasten the RPS securely to the rack rails using four customer-supplied rack screws.

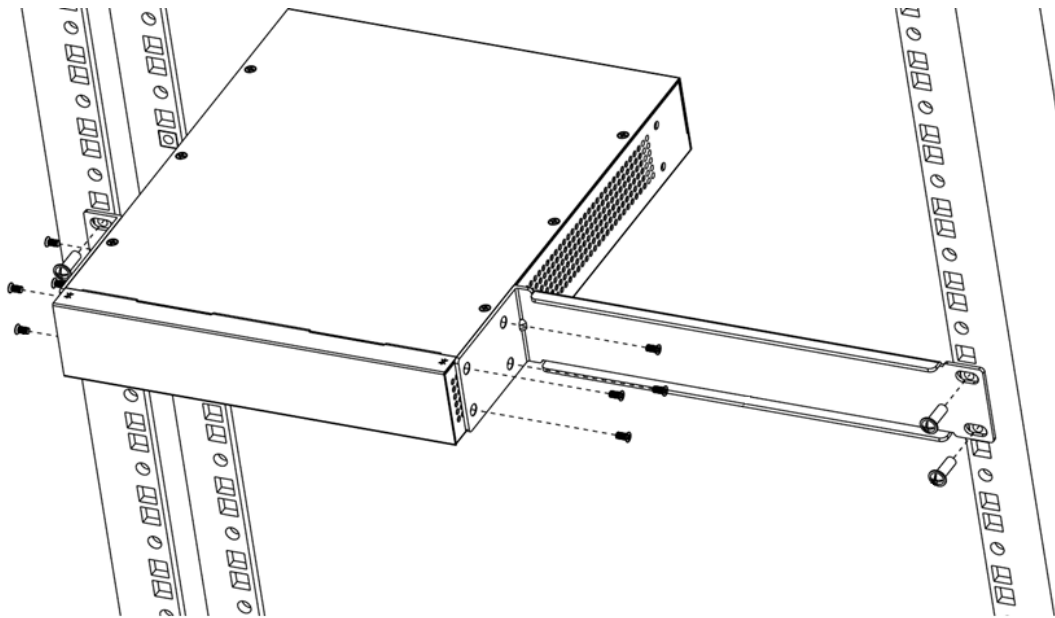**Figure 55: Flush-Mount: Mounting in a Two- or Four-Post Rack**

Figure 56: Mid-Mount: Mounting in a Two- or Four-Post Rack

Dual Rack Mount the RPS

Two RPS-150W-XT models can be dual rack mounted in a two-post rack using the dual rack-mount kit 16572, which is ordered separately. To install:

1. Attach two short brackets to the outer sides of the two devices using four M3 screws per bracket.
2. Attach two additional short brackets to the inner side of the right device using two M3 screws per bracket.
3. Attach the final long bracket to the inner side of the left device using four M3 screws.
4. Slip the short connecting brackets on the device on the right into both ends of the long connecting bracket on the device on the left.
5. Attach the connecting brackets to each other using the four remaining chassis screws. The devices can be installed in the rack as a single unit.
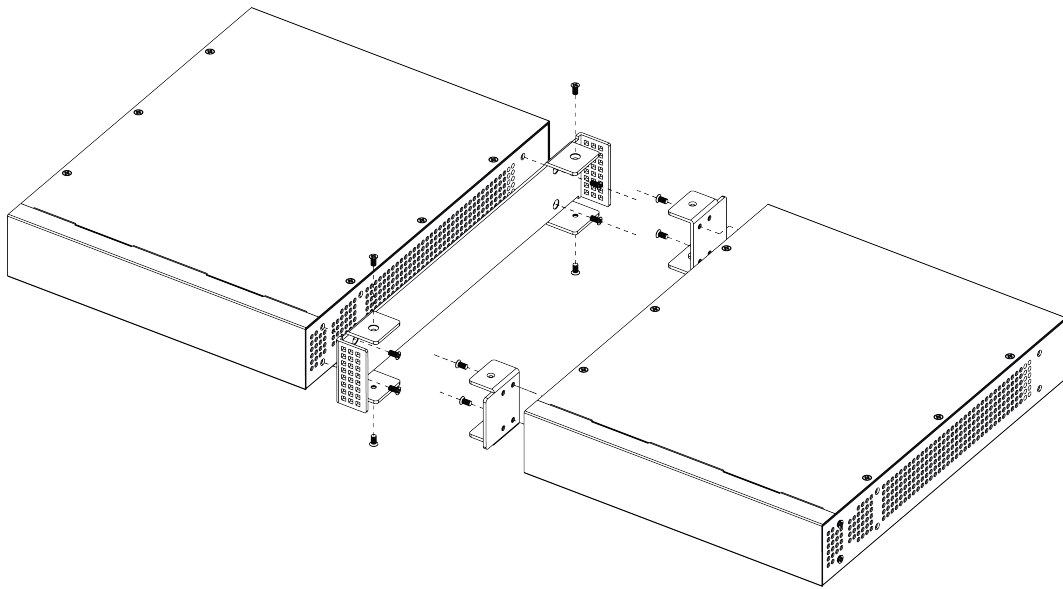

Figure 57: Dual Rack Mount: Connecting the Devices

6. Attach the switches to the rack using rack-mounting hardware (not provided).
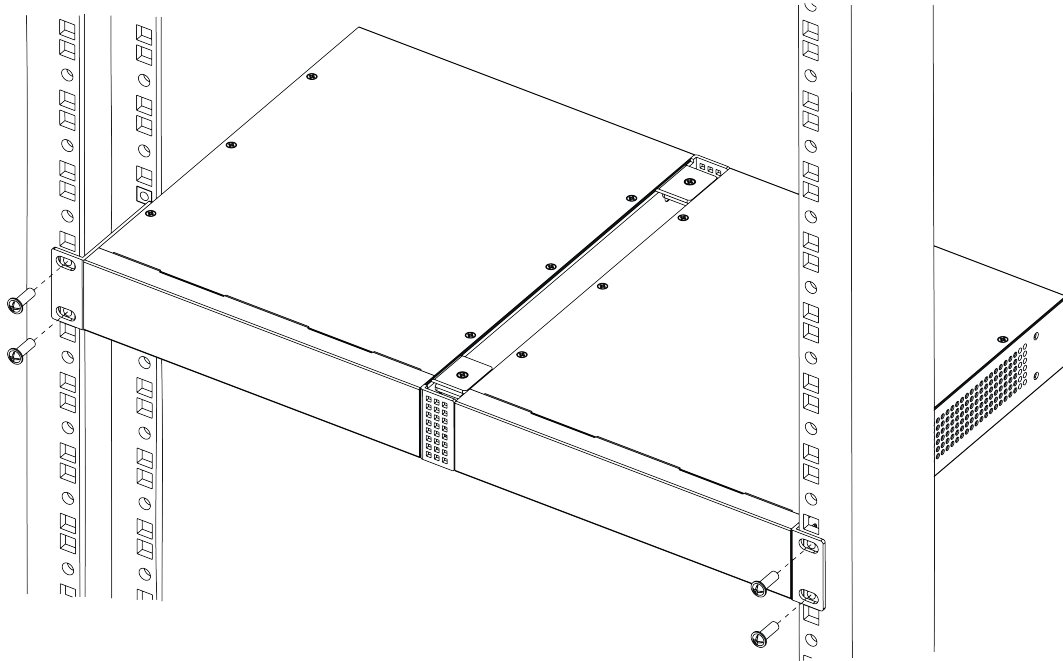
Figure 58: Dual Rack Mount: Mounting the Connected Devices

Connect the RPS Cable and the AC Power Cord

➡️ **Important**
Connections must be made in a specific order when attaching an RPS to a powered system.

To connect the RPS:

1. Connect the RPS cable between the switch and the RPS **before** connecting the AC power cord. The RPS cable is connected from the Redundant Power Output on the rear panel of the RPS to the Redundant Power Input on rear panel of the switch.
2. Connect the AC power cord to the AC input power connector on the RPS, then plug the AC power cord into the main AC power outlet.

Figure 59: RPS cable and AC Power Cord Connection
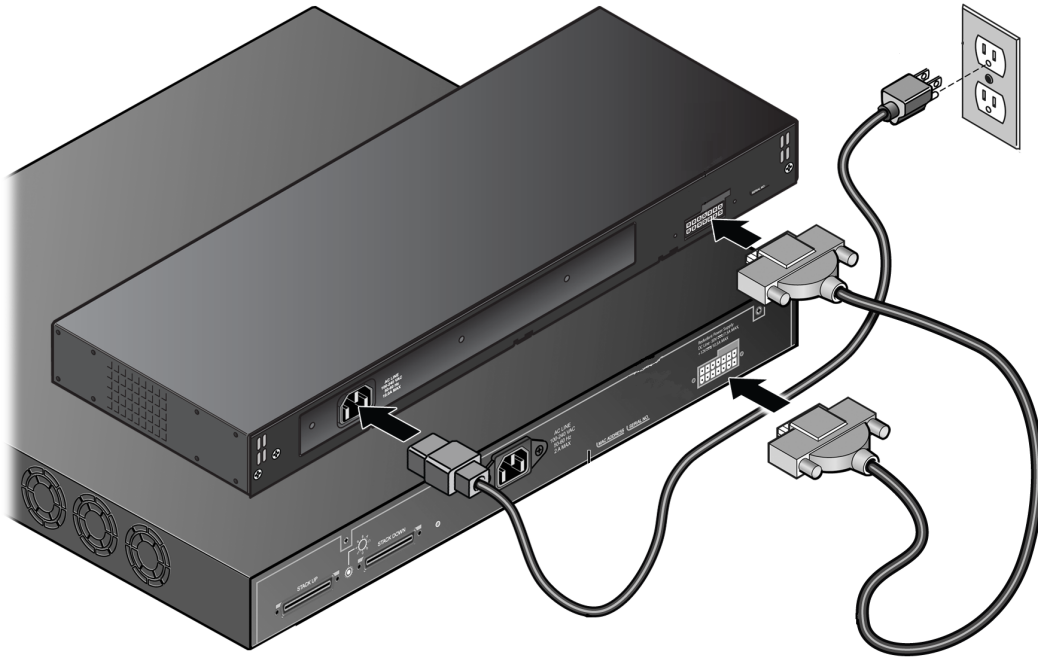
The AC power LED on the rear of the RPS turns green to indicate a successful connection and that the RPS is operating properly.

Connect Network Interface Cables

Use the appropriate type of cable to connect the ports of your switch to another switch or router. 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.

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.

Install Optional Components

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

ExtremeSwitching 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 ExtremeSwitching 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.

Turn on the Switch

Most 5320 Series switches have one fixed AC power supply unit. The 5320-16P-4XE switch has one fixed DC power supply unit. Be aware of whether the power supply you are connecting is AC-powered or DC-powered. The connection instructions are different depending upon what type of power is used. Follow the instructions in the following sections to connect the appropriate power supply to the switch and turn it on.

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 107.

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. 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

DC power and grounding cables are not included with the power supply. You can purchase #16 AWG copper DC power cables and ground wire for use in the US and Canada from Extreme Networks or from your local supplier.

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

1. Strip 0.25 inch (6.35 mm) of insulation from one end of each cable wire. Three cable wires are needed: two power input cables and one ground cable.
2. Verify that the DC circuit is de-energized.

3. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
4. Insert a screwdriver into all three slots on the top of the terminal connector and loosen the screws enough to accommodate a stripped power input cable.
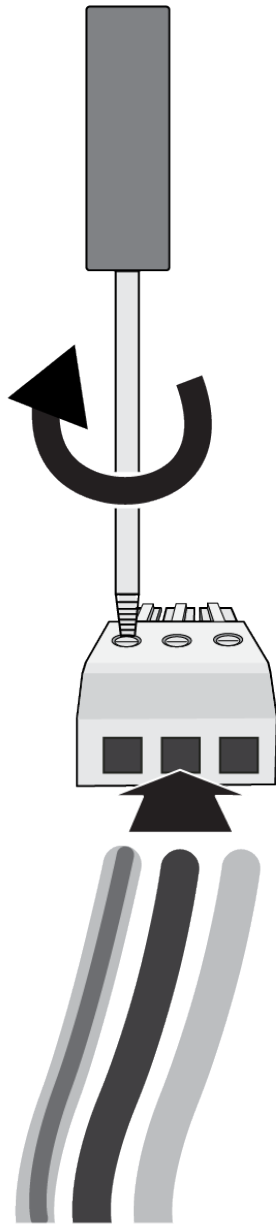5. Insert the cable wires into the terminal connector.

Figure 60: Inserting the cable wires into the DC terminal connector

a. Slide the end of the ground wire into the ground terminal (labeled **GND** on the left side of the connector.
b. Tighten the screw on the top of the ground terminal connector to 2.2 in-lb (0.25 N m).

c. Slide the end of the **negative** wire (–48 V) into the **negative** terminal (labeled **–**, in the middle of the terminal connector).

d. Tighten the screw on the top of the ground terminal connector to 2.2 in-lb (0.25 N m).

e. Slide the end of the **positive** wire (–48 V RTN) into the **positive** terminal (labeled **+**, on the right side of the terminal connector).

f. Tighten the screw on the top of the ground terminal connector to 2.2 in-lb (0.25 N m).

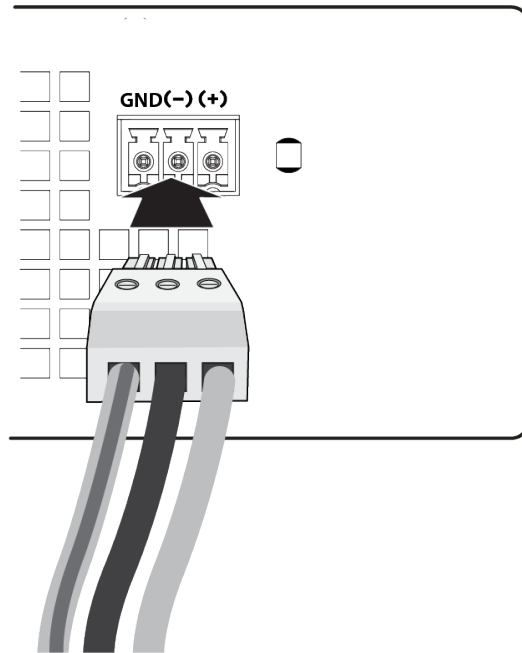6. Insert the connector into the slot on the power supply.

Figure 61: Inserting the DC terminal connector into the slot on the power supply

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

8. Energize the circuit. When power is connected, verify that the PWR LED is green.

When the PWR LED has turned green, follow the instructions in Activate and Verify the Switch on page 81.

If the PWR LED does not turn green, refer to 5320 Series Switch LEDs on page 89 for troubleshooting information.

Activate and Verify the Switch

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, follow the instructions in these topics:

- Connect to a Management Console on page 81
- Log in for the First Time on Switch Engine on page 82
- Configure a VLAN and a Virtual Router to Use a Front Panel Port for Local Management on page 83
- Change the Switch OS via the Bootloader Menu on page 84
- Change the Switch OS via the Startup Menu on page 84
- Log In for the First Time on Fabric Engine on page 85

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 5320 Series. If you want to run Fabric Engine, see Change the Switch OS via the Bootloader Menu on page 84 or Change the Switch OS via the Startup Menu on page 84.

> **Note**
> Fabric Engine does not support models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

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 81.

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, `5320-24T-8XE-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 : 801106-00-02 TB032146K-H0021 Rev 02 BootROM: 3.4.2.8
   ```

Configure the switch's IP address for the management virtual LAN (VLAN) by following the steps in Configure a VLAN and a Virtual Router to Use a Front Panel Port for Local Management on page 83.

Configure a VLAN and a Virtual Router to Use a Front Panel Port for Local Management

Most of the 5320 Series models do not have a dedicated Ethernet port for out-of-band (OOB) management. Instead, you can create and configure a VLAN and a virtual router in order to use a front panel port for local switch management.

> **Note**
> Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT have a dedicated Ethernet port for out-of-band (OOB) management.

Log in to the management console, connect to the device, and follow these steps.

1. Create a user virtual router (VR) using the following command:

   For models 5320-48T-8XE and 5320-48P-8XE, use the following command:
   ```
   create vr vr-name
   ```
   For all other models, use the following command:
   ```
   create vr vr-name local-only
   ```
   ```
   create vr VR-mymgmt
   ```

2. Create a VLAN and connect the virtual router using the following command:
   ```
   create vlan vlan-name vr vr-name
   ```
   ```
   create vlan myvlan vr VR-mymgmt
   ```

3. Remove the port to use as the management port from the default virtual router (vr-default) using the following command:
   ```
   configure vr vr-default delete port port-number
   ```
   ```
   configure vr vr-default delete port 12
   ```

4. Add the port to use as the management port to the virtual router using the following command:
   ```
   configure vr vr-name add port port-number
   ```
   ```
   configure vr vr-mymgmt add port 12
   ```

5. Add the port to use as the management port to the VLAN using the following command:
   ```
   configure vlan-name add port port-number
   ```
   ```
   configure myvlan add port 12
   ```

6. Configure the IP address and subnet mask length using the following command:
   ```
   configure vlan-name ipaddress ipaddress/subnet-mask
   ```
   ```
   configure myvlan ipaddress 10.69.8.100/24
   ```

7. Configure the default gateway (you must specify VR-Mgmt for the management port and VLAN mgmt) using the following command:

   `configure` *`vlan-name`* `iproute add default` *`ipaddress`* `vr` *`vr-name`*

   `configure iproute add default 10.69.8.1 vr vr-mymgmt`

8. Enter `save` to save your configuration changes so that they will be in effect after the next system reboot

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

Change the Switch OS via the Bootloader Menu

> **Note**
> Fabric Engine does not support models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

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 5320 Series. 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 "5320 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 will install Fabric Engine, then reset. Once the NOS is selected, the "5320 Boot Menu" will only wait 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

> **Note**
> Fabric Engine does not support models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

Onboard your switch with Switch Engine™. 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 5320 Series. 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 will install Fabric Engine, then reset.

   After resetting, your switch will boot with Fabric Engine. See Log In for the First Time on Fabric Engine on page 85 for more information.

Log In for the First Time on Fabric Engine

> **Note**
> Fabric Engine does not support models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

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

Follow the procedures in this section to remove and replace external redundant power supplies and to remove a device from a rack.

Remove a Device from a Two-Post Rack

Use the following instructions to remove a device, like a switch or a redundant power supply (RPS), from a two-post rack.

1. Disconnect the device from its power source or sources, then disconnect the ground.

   Important
   Connections must be removed in a specific order when detaching an RPS from a powered system. See Disconnect the RPS Cable and the AC Power Cord on page 87.

2. Remove all cables and transceivers.
3. Unscrew the mounting brackets from the rack while carefully supporting the weight of the device.
4. Tilt the device so that the brackets are clear of the rack posts, and carefully lift it out of the rack.

   If the device cannot be tilted (because other equipment is mounted directly above and below), remove one or two mounting brackets from the device and then slide the device out.

   If you plan to use the device again later, store it with the mounting brackets attached.

Disconnect the RPS Cable and the AC Power Cord

Important
Connections must be removed in a specific order when detaching an RPS from a powered system.

To disconnect the RPS:

1. Disconnect the AC power cord from the AC input power connector on the rear of the RPS **before** disconnecting the RPS cable.

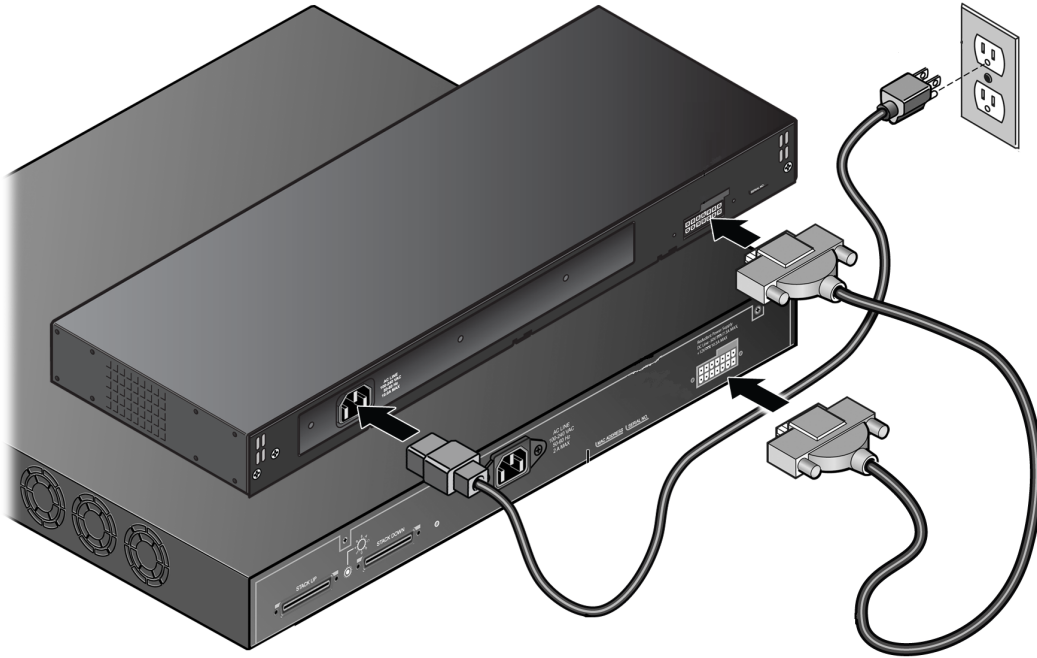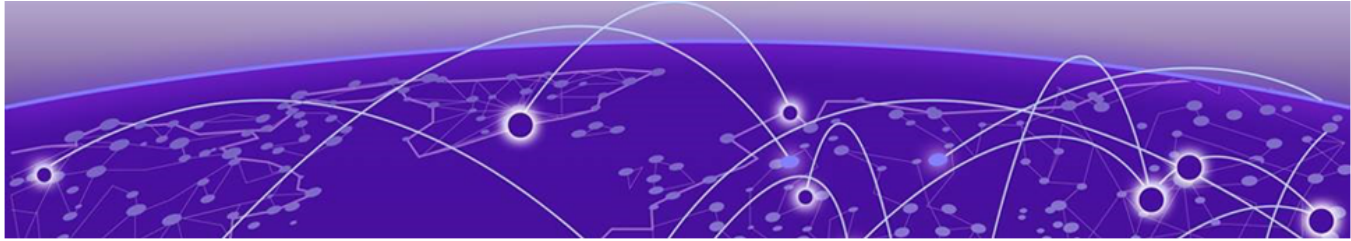2. Disconnect the RPS cable from the rear panel of the RPS and the rear panel of the switch.

Figure 62: RPS cable and AC Power Cord Connection

The AC power LED on the rear of the RPS turns off to indicate that the power to the RPS has been disconnected.

Monitor the Switch

The following topics help you monitor the status of the switch while it is operating.

5320 Series Switch LEDs

ExtremeSwitching 5320 Series front panel port LEDs, for all models except 5320-24T-4X-XT and 5320-24T-24S-4XE-XT, as described in the following table:

Table 13: 5320 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 LED PWR	Green	Power On
	Off	Power off and no power attached
	Amber blinking	Power supply failure
Fan status LED	Green	Normal operation
	Amber blinking	Fan failure
	Off	Fan or power off
Bluetooth Status LED (BT)	Green blinking	Bluetooth pairing in progress
	Green	Bluetooth connected
	Off	Bluetooth not connected
Speed Mode LED (SPD)	Green	Port LEDs indicate rate

Table 13: 5320 Series Port LEDs (continued)

LED	Color/State	Port State
Stack Mode LED (STK)	Green	Port LEDS indicate stack position
Locator LED (LOC)	Blue blinking	Locator function

Port LEDs can display in three different modes: SYS (the default mode), SPD (speed) and STK (stacking). The Mode button cycles through the three display modes. In the default SYS mode, SPD and STK are off. The port LEDs enter SPD display mode, indicated by the SPD LED, after pressing the Mode button one time. SPD mode helps to determine the operational speed of a port. The port LEDs enter the STK display mode, indicated by the STK LED, after pressing the Mode button a second time. STK mode is used to indicate slot presence and slot number through the first eight port LEDs. SPD and STK display modes expire after 30 seconds, and the display mode reverts back to the default SYS mode. A long press of the Mode button when in any mode other than STK mode initiates Bluetooth pairing. Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT do not support Bluetooth pairing.

The following figure shows the two alternate mode LEDs for 5320 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 Mode button initiates Bluetooth pairing.
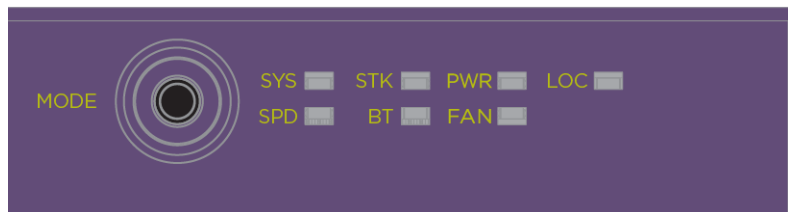
Figure 63: 5320 Series Mode Button and LEDs

The Mode button also supports the instant stacking feature. To instantly stack switches, first ensure that the SPD/STK LED is on STK by pressing the Mode button until the LED is green. Press and hold the Mode button for at least five seconds, then release the Mode button after five seconds. The front panel port LEDs on the primary node flash in an alternating pattern followed by a delayed reboot of all of the switches. The LEDs flash for approximately 15 seconds prior to the reboot. After the reboot completes, the switches are stacked.

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

The mode button and LEDs are located on the upper left side of the front panel on the 5320-48P/T and 5320-24P/T models. The mode button and LEDs are located on the upper right side of the front panel on the 5320-16P model.

5320-24T-4X-XT and 5320-24T-24S-4XE-XT front panel LEDs

ExtremeSwitching 5320 Series front panel port LEDs, for models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT, as described in the following table:

Table 14: System LEDs

Label	Function	Color/State	Port State
SYS	System status LED (Legacy MGMT function)	Green	POST Passed, normal operation.
		Green blinking	POST in progress
		Amber blinking	POST failed or overheat
		Off	No power.
PWR	Power status LED	See Power LED on page 92.	
FAN	Fan status LEDS	Green	Normal operation
		Amber blinking	Fan failure
		Off	No power.
SPD/STK	Speed status LED Stacking status LED	Off (state 1)	System mode (Normal)
		Amber (state 2)	Speed mode
		Green (State 3)	Stacking mode
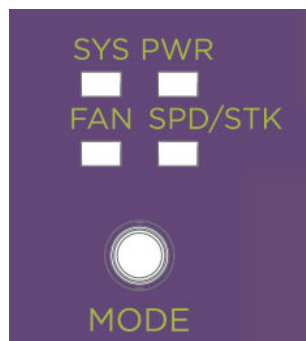
Figure 64: 5320-24T-4X-XT and 5320-24T-24S-4XE-XT Mode and System Status LEDs

Port LEDs in Default (SYS) Mode

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

> **Note**
> PoE is not supported on models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

Color/State	Meaning
Green	Link is OK
Amber	Link is OK; no traffic
Green blinking	Link is OK and transmitting packets

Color/State	Meaning
Amber blinking	Link is OK and transmitting packets
Alternating amber and green	Port has a power fault
Off	Port 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 the first time, indicated by the SPD LED. SPD mode is used to help determine the operational speed of a port.

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

> **Note**
> Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT do not support 2.5 Gbps, 5 Gbps, and 25 Gbps speeds.

Color/State	Speed
Green	10Mbps
Green blinking	100Mbps
Amber	1000Mbps
Amber slow blinking	2.5Gbps
Amber fast blinking	5Gbps
Green slow blinking	10Gbps
Green fast blinking	25Gbps

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:

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.

Power LED

The power LED can indicate the status of both the internal power supply and a connected external redundant power supply (RPS), for models that support connecting an RPS. The power LED first indicates the status of the internal power supply for one second, displaying either nothing (off), a green dash, or an amber dash. The power LED

then indicates the state of the external RPS for one second, displaying either nothing (off), two green dots, or two amber dots. The cycle repeats the two second interval continuously.

> **Note**
> PoE is not supported on models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT.

State Number	Internal PSU State (dash)	RPS State (two dots)	LED Pattern	Notes
1	On	Off	Green dash/off	Internal PSU OK, RPS Not present.
2	On	On	Green dash/ Green dots	Both PSUs OK.
3	On	Fault	Green dash/ Amber dots	Internal PSU OK, RPS PRESENT, but failed or powered down.
4	Fault	Not present	Amber dash/off	Internal PSU FAILed, RPS not present. **Only valid for PoE systems.**
5	Fault or Off	On	Amber dash/ Green dots	Internal PSU FAILed or powered down, RPS is good.
6	Fault or Off	Fault or Off	Amber dash/ Amber dots	Internal PSU FAILed or powered down, RPS FAILED or powered down. **Only valid for PoE systems.**

External Redundant Power Supply LEDs

The Power LED is located on the rear panel of the RPS. The following table presents the LED status and recommended actions if the LED is off.

Color	Status	Recommended Action
Green	AC input to RPS is within specifications.	None.
Off	AC input power to RPS is out of specification.	1. Check AC power cord connection to the RPS. 2. Check AC power at the power outlet. 3. Swap power cord for a known good one. If the problem persists, contact Extreme Networks for support.

Technical Specifications

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

Extreme 5320 Series Technical Specifications

External Interfaces

Switch Model	Interfaces
5320-16P-4XE	16 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable 1 x Serial console port (RJ-45) 1 x USB A port 1 x USB Micro-B console port
5320-16P-4XE-DC	16 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex (autosensing) • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable 1 x Serial console port (RJ-45) 1 x USB A port 1 x USB Micro-B console port
5320-24T-8XE	24 x 10/100/1000BASE-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 8 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable • 100Mb operation supported on last 4 uplink ports 1 x Serial console port (RJ-45) 1 x USB A port 1 x USB Micro-B console port
5320-24P-8XE	24 x 10/100/1000BASE-T 802.3at (30W) ports • Full / Half-Duplex (autosensing) • MACsec-capable 8 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable • 100Mb operation supported on last 4 uplink ports 1 x Serial console port (RJ-45) 1 x USB A port 1 x USB Micro-B console port

Switch Model	Interfaces
5320-48T-8XE	48 x 10/100/1000BASE-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 8 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable • 100Mb operation supported on last 4 uplink ports 1 x Serial console port (RJ-45) 1 x USB A port 1 x USB Micro-B console port
5320-48P-8XE	48 x 10/100/1000BASE-T 802.3at (30W) ports • Full/Half-Duplex (autosensing) • MACsec-capable 8 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable • 100Mb operation supported on last 4 uplink ports 1 x Serial console port (RJ-45) 1 x USB A port 1 x USB Micro-B console port
5320-24T-4X-XT	24 x 10/100/1000BASE-T ports • Full/Half-Duplex (autosensing) 4 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB A port 1 x USB Micro-B console port 0°C to 60°C operating temperature range
5320-24T-24S-4XE-XT	24 x 10/100/1000BASE-T ports • Full/Half-Duplex (autosensing) • MACsec-capable 24 x 100Mb/1Gb SFP uplink ports • MACsec-capable 4 x 1/10Gb SFP+ uplink ports (includes 2 x Stacking ports) • MACsec-capable 1 x Serial console port (RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB A port 1 x USB Micro-B console port 0°C to 60°C operating temperature range

Weights and Dimensions

Switch Model	Weight	Physical Dimensions
5320-16P-4XE	3.0 kg (6.6 lb.)	Height: 43.2 mm (1.7 in.) Width: 309.9 mm (12.2 in.) Depth: 299.7 mm (11.8 in.)
5320-16P-4XE-DC	3.0 kg (6.6 lb.)	
5320-24T-8XE	3.7 kg (8.2 lb.)	Height: 43.2 mm (1.7 in.) Width: 439.4 mm (17.3 in.) Depth: 279.4 mm (11.0 in.)
5320-24P-8XE	4.0 kg (8.8 lb.)	
5320-48T-8XE	4.2 kg (9.3 lb.)	Height: 43.2 mm (1.7 in.) Width: 439.4 mm (17.3 in.) Depth: 279.4 mm (11.0 in.)
5320-48P-8XE	5.0 kg (11.0 lb.)	Height: 43.2 mm (1.7 in.) Width: 439.4 mm (17.3 in.) Depth: 330.20 mm (13.0 in.)
5320-24T-4X-XT	3.2 kg (7 lb.)	Height: 43 mm (1.7 in.) Width: 441 mm (17.3 in.) Depth: 254 mm (10.0 in.)
5320-24T-24S-4XE-XT	4.0 kg (8.8 lb.)	Height: 43 mm (1.7 in.) Width: 441 mm (17.3 in.) Depth: 254 mm (10.0 in.)

Weights and Dimensions of Rack Mount Kits

Rack Mount Kits	Weight	Physical Dimensions
XN-2P-RMKIT-006 (for models 5320-48T-8XE, 5320-48P-8XE, 5320-24T-8XE, and 5320-24P-8XE)	0.2 kg (0.44 lb.)	Height: 20.3 mm (0.8 in) Width: 43.2 mm (1.7 in) Depth: 50.8 mm (2 in)
XN-2P-RMKIT-007 (for models 5320-16P-4XE and 5320-16P-4XE-DC)	0.52 kg (1.15 lb.)	Height: 50.8 mm (2 in) Width: 85.6 mm (3.4 in) Depth: 88.1 mm (3.5 in)
XN-2P-RMKIT-011 (for models 5320-16P-4XE and 5320-16P-4XE-DC.)	0.16 kg (0.35 lb.)	Height: 43.4 mm (1.7 in) Width: 50.8 mm (2 in) Depth: 85.6 mm (3.4 in)

Acoustic Noise and Fan Speed

Switch Model	Bystander Sound Pressure (dB(A))	Declared Sound Power (Bels)
5320-16P-4XE	All ports link up with full traffic, 8 PoE ports	
	Fan off 0°C to 35°C (32°F to 95°F) 19.8 (35°C to 40°C)	Fan off 0°C to 35°C (32°F to 95°F) 2.94 (35°C to 40°C)
5320-16P-4XE-DC	All ports link up with full traffic, 8 PoE ports	
	Fan off 0°C to 35°C (32°F to 95°F) 19.0 (35°C to 40°C)	Fan off 0°C to 35°C (32°F to 95°F) 2.91 (35°C to 40°C)
5320-24T-8XE	All ports link up with full traffic, 0°C to 35°C (32°F to 95°F)	
	19.5	2.86
5320-24P-8XE	All ports link up with full traffic, 12 PoE ports, 0°C to 35°C (32°F to 95°F)	
	20.3	2.86
5320-48T-8XE	All ports link up with full traffic	
	20.8	2.90
5320-48P-8XE	All ports link up with full traffic, 50% PoE budget load, 0°C to 35°C (32°F to 95°F)	
	20.9	2.87
5320-24T-4X-XT	All ports link up with full traffic, 0°C to 25°C (32°F to 77°F)	
	55.8	5.6
5320-24T-24S-4XE-X	All ports link up with full traffic, 0°C to 25°C (32°F to 77°F)	
	29.8	3.0

Fan Speed

Table 15: 5320 Fan Speed

Model	Fan Speed	Fan RPM (typical)
5320-48T-8XE	Maximum (58%)	10500
	Low (10%)	650
5320-48P-8XE	Maximum (53%)	9500
	Low (15%)	1625
5320-24T-8XE	Maximum (58%)	10500
	Low (10%)	650

Table 15: 5320 Fan Speed (continued)

Model	Fan Speed	Fan RPM (typical)
5320-24P-8XE	Maximum (56%)	10000
	Low (15%)	1625
5320-16P-4XE	Maximum (53%)	9500
	Low (0 or 15%)	0 (fan-off), <35C 1625, >35C
5320-16P-4XE-DC	Maximum (53%)	9500
	Low (0 or 15%)	0 (fan-off), <35C 1625, >35C
5320-24T-4X-XT	Maximum (100%) @ 60C	17000
	Low (10%)	1800
5320-24T-24S-4XE-XT	Maximum (100%) @ 60C	17000
	Low (10%)	1800

Redundant Power Supply (RPS) Model	Bystander Sound Pressure (dB(A))	Declared Sound Power (Bels)
RPS-150W-XT	65	7.59

Memory

The following table includes memory specifications for the 5320 Series switches.

Specifications
1 GB DDR4 ECC memory 2 GB DDR4 ECC memory (for models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT)
1 GB SLC NAND Flash Memory
8 MB SPI flash
4 MB Packet buffer (for models 5320-48T-8XE, 5320-48P-8XE, and 5320-24T-24S-4XE-XT
2 MB Packet buffer (for models 5320-16P-4XE, 5320-16P-4XE-DC, 5320-24T-8XE, and 5320-24P-8XE)
1.5 MB Packet buffer (for model 5320-24T-4X-XT)

Mean Time Between Failure (MBTF)

Model	Current Type / Watts	PSU Details	MTBF at 25°C	MTBF at 50°C
5320-48P-8XE	AC 950W	L-R, 4x internal fans	826,592	346,564
5320-48T-8XE	AC 90W	L-R, 2x internal fans	1,236,931	556,964
5320-24P-8XE	AC 550W	L-R, 3x internal fans	1,196,258	491,595
5320-24T-8XE	AC 90W	L-R, 2x internal fans	1,292,504	541,031
5320-16P-4XE	AC 250W	L-R, 2x internal fans, fan-less below 35°C	788,963	260,187
5320-16P-4XE-DC	DC	L-R, 2x internal fans, fan-less below 35°C	1,265,083	491,249
5320-24T-4X-XT	AC 65W	L-R, 1x internal fans	368,717	87,125 @60°C
5320-24T-24S-4XE-XT	AC 150W	L-R, 2x internal fans	570,373	144,943 @60°C

Power Specifications

Power Supply Specifications

65 W AC Power Supply

The 65 W AC power supply is a fixed internal unit for model 5320-24T-4X-XT.

Voltage input range	90-132/198-264∿ 47 to 63Hz
Nominal input ratings	1.5A max at 100VAC and 1.0A max at 240VAC at Full 65 W load
Maximum inrush current	60A at Max 230VAC / 50Hz at 25C
Output	12V @65W
Power supply input socket and cord	IEC/EN 60320-1/C14 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 107
Efficiency	Minimum 88% at maximum power output

90 W AC Power Supply

The 90 W AC power supply is a fixed internal unit for models 5320-24T-8XE and 5320-48T-8XE.

Voltage input range	90-132/198-264∼ 47 to 63Hz
Nominal input ratings	1.2A max at 115VAC and 0.6A max at 230VAC at Full 90W load
Maximum inrush current	130A at Max 230VAC / 50Hz at 25C
Output	12V, 7.5A max, 90W
Power supply input socket and cord	IEC/EN 60320-1/C14 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 107
Efficiency	Minimum efficiency: 85% at maximum power output 115VAC

150 W AC Power Supply

The 150 W AC power supply is a fixed internal unit for model 5320-24T-24S-4XE-XT.

Voltage input range	90-132/198-264∼ 47 to 63Hz
Nominal input ratings	1.8A max at 115Vrms
Maximum inrush current	120A at Max 230VAC / 50Hz at 25C
Output	12V, 12.5A @150W
Power supply input socket and cord	IEC/EN 60320-1/C14 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 107
Efficiency	Minimum 87% at maximum power output

250 W AC Power Supply

The 250 W AC power supply is a fixed internal unit for model 5320-16P-4XE.

Voltage input range	90-132/198-264∼ 47 to 63Hz
Nominal input ratings	3.8A max at 90VAC at Full 250W load
Maximum inrush current	60A at Max 230VAC / 50Hz at 25C
Output	12V, 4.58A max, 54V, 3.61A max, 250W
Power supply input socket and cord	IEC/EN 60320-1/C14 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 107
Efficiency	Minimum efficiency: 90% at maximum power output 115VAC

550 W AC Power Supply

The 550 W AC power supply is a fixed internal unit for model 5320-24P-8XE.

Voltage input range	90-132/180-264～ 47 to 63Hz
Nominal input ratings	8.5A max at 90VAC at Full 550 W load
Maximum inrush current	30A at Max 115VAC / 60Hz at 40C
Output	12V, 12.5A max, 54V, 7.4A max 550 W
Power supply input socket and cord	IEC/EN 60320-1/C14 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 107
Efficiency	Minimum efficiency: 87% at maximum power output 115VAC

950 W AC Power Supply

The 950 W AC power supply is a fixed internal unit for model 5320-48P-8XE.

Voltage input range	90-132/180-264～ 47 to 63Hz
Nominal input ratings	15A max at 90VAC and 7.5A max at 180VAC at Full 950 W load
Maximum inrush current	60A at Max 230VAC / 50Hz at 25C
Output	12V, 14.1A max, 55V, 14.2A max, 950 W
Power supply input socket and cord	IEC/EN 60320-1/C14 AC input receptacles
Power cord wall plug	Refer to Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 107
Efficiency	Minimum efficiency: 87% at maximum power output 115VAC

DC Power Supply

The DC power supply is a fixed internal unit for model 5320-16P-4XE-DC.

Table 16: Power Specifications

Voltage input range	36 - 72V, 9.8 A max
Nominal input	48Vdc
DC output	12V/120W, 54V/200W

150 W Redundant Power Supply

The 150 W redundant power supply can be used with models 5320-24T-4X-XT and
5320-24T-24S-4XE-XT.

Table 17: Power Specifications

AC Input	100 - 240Vac, 50-60 Hz, 1.8A max. per PSU
DC Output	12Vdc, 12.5A max. total 150 W max.

Minimum/Maximum Power Consumption and Heat Dissipation

Switch Model	Minimum Power Consumption (W)	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)*	Maximum Heat Dissipation (BTU/hr)**
5320-16P-4XE	17	57	246	208
5320-16P-4XE-DC	20	67	260	256
5320-24T-8XE	18	60	50	171
5320-24P-8XE	21	70	480	375
5320-48T-8XE	25	85	64	217
5320-48P-8XE	30	104	924	629
5320-24T-4X-XT	14	35	49	119
5320-24T-24S-4XE-XT	25	96	87	328

Max PoE Power Budget

Switch Model	PoE Budget
5320-16P-4XE	185W
5320-16P-4XE-DC	185W
5320-24P-8XE	370W
5320-48P-8XE	740W

LRM/MACsec Adapter Technical Specifications

The LRM/MACsec Adapter (part no. 10965) can be attached to switch ports that are not LRM or MACsec capable, using a cable that is specifically designed for this purpose.

> **Note**
>
> Models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT do not support the LRM/MACsec Adapter.

Table 18: LRM/MACsec Adapter Packaged Dimensions

Height	3.00 cm (1.18 in)
Width	7.60 cm (2.99 in)
Length	12.35 cm (4.86 in)
Weight	300 g (0.66 lb)

LRM/MACsec Adapter Environmental Data and Standards

Table 19: Environmental Data

Operating temperature	0°C to 40°C (32°F to 104°F) when used with the following optics modules: · Tunable DWDM SFP+ (part no. 10325) · ER SFP+ (part no. 10309) · ZR SFP+ (part no. 10310) · Bidirectional 120 km SFP (part nos. MGBIC-BX120-U and MGBIC-BX120-D) 0°C to 45°C (32°F to 113°F) when used with all other supported optics modules
Storage and transportation temperature	-40°C to 70°C (-40°F to 158°F)
Humidity	10% to 95% relative humidity, non-condensing
Altitude	0 to 3,000 meters (9,850 feet)

Table 20: Safety Standards

North American Safety of ITE	UL 62368-1:2014, Listed Device (US) UL 60950-1 2nd Ed., A2:2014, Listed Device (US) CAN/CSA 22.2 #62368-1-14:2014 Canada)
European Safety of ITE	EN 62368-1:2014 EN 60950-1:2006+A11+A1+A12+A2 IEC 62368-1:2014 IEC 60950-1:2005 2nd+A1:2009+A2:2013 2014/35/EU Low Voltage Directive

Five-Slot Bracket

Table 21: Five-Slot Bracket for LRM/MACsec Adapter: Specifications

Part no.	10966
Height	4.32 cm (1.70 in)
Width	48.26 cm (19.00 in)
Length	5.00 cm (1.97 in)
Weight	487 g (1.07 lb)

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); models 5320-24T-4X-XT and 5320-24T-24S-4XE-XT: 0°C to 60°C (32°F to 140°F)

Humidity: 10% to 95% relative humidity, non-condensing

Altitude: 0 to 3,000 meters (9,850 feet)

Operational Shock (half sine) 300 m/s2 (30 G), 11 ms, 3 axes, 6 shocks/axis

Operational Random vibration: 3 to 500 Hz at 1.5 G rms

Accelerations: 3 Hz @ +10dB/Octave PSD, 10 Hz @ 0.006 PSD, 500 Hz @ 0.006 PSD

Packaging and Storage Specifications

Temp: -40°C to 70°C (-40°F to 158°F)

Humidity: 10% to 95% relative humidity, non-condensing

Packaged Shock (half sine): 3 axes, 100 shocks each axis (+/-), 180 m/s2 (18 G)

Packaged Vibration: 5 Hz to 20 Hz @ .01 g2/Hz (PSD), 20 to 500 Hz @-3 dB/Octave (PSD)

Packaged Random Vibration: 5 Hz to 62 Hz, 5mm/s velocity, 62 Hz to 500 Hz, 2.0 m/s2, 5 sweeps of each axis (15 total), Sweep Rate = 1 Octave/min

Packaged Drop: Height at 42 inches for product <10 kg, 13 drops including 6 surfaces, 3 edges and 4 corners

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 3V/m, Criteria A

IEC 61000-4-4/EN 61000-4-4 Transient Burst, 2 kV, Criteria B

IEC 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 802.3at PoE

IEEE 802.3ae 10GBASE-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.
- The power cord must have an appropriately rated and approved wall plug applicable to the country of installation.
- For cords up to 6 feet (2 m) long, the wire size must be 18 AWG (.75 mm^2) minimum; over 6 feet, the minimum wire size is 16 AWG (1.0 mm^2).

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

Console Connector Pinouts

Table 22 describes the pinouts for a DB-9 console plug connector.

Table 22: 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

Table 22: Pinouts for the DB-9 Console Connector (continued)

Function	Pin Number	Direction
GND (ground)	5	-
DSR (data set ready)	6	In
RTS (request to send)	7	Out
CTS (clear to send)	8	In

Figure 65 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.
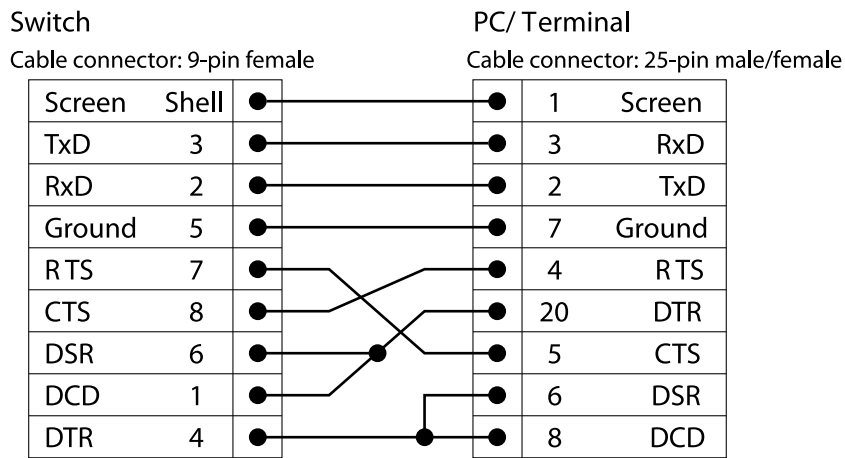
Figure 65: Null-Modem Cable Pinouts

Figure 66 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.
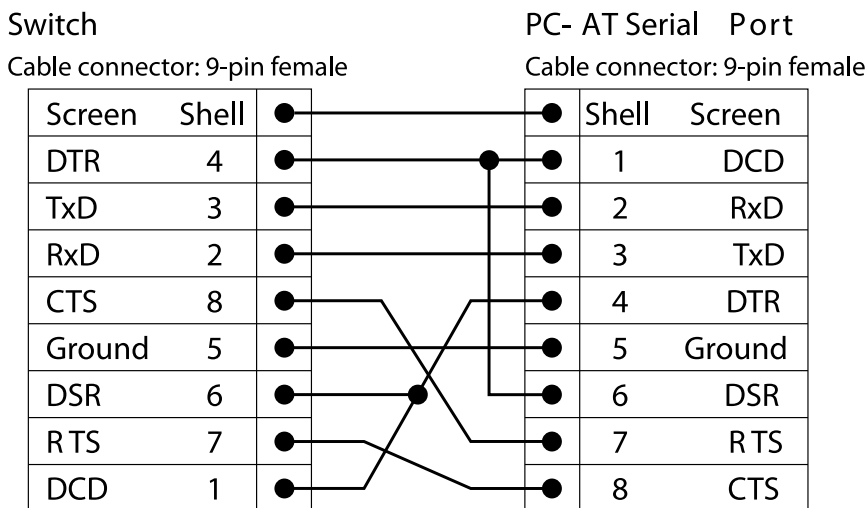
Figure 66: PC-AT Serial Null-modem Cable Pinouts

Table 23 shows the pinouts for the RJ45 console port on the ExtremeSwitching switches.

Table 23: 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 24 shows the pinouts for an RJ45-to-DB-9 adapter.

Table 24: 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

> ⚠️ **Warning**
> Read the following safety information thoroughly before installing Extreme Networks products. Failure to follow this safety information can lead to personal injury or damage to the equipment.

Only trained and qualified service personnel (as defined in IEC 60950-1 and AS/NZS 3260) should install, replace, or perform service to Extreme Networks switches and their components. Qualified personnel have read all related installation manuals, have the technical training and experience necessary to be aware of the hazards to which they are exposed in performing a task, and are aware of measures to minimize the danger to themselves or other persons.

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

Considerations Before Installing

Consider the following items before you install equipment.

- For equipment designed to operate in a typical Telco environment that is environmentally controlled, choose a site that has the following characteristics:
  - Temperature-controlled and humidity-controlled, such that the maximum ambient room temperature shall not exceed 50°C (122°F).
  - Clean and free from airborne materials that can conduct electricity.
  - Well ventilated and away from sources of heat including direct sunlight.
  - Away from sources of vibration or physical shock.
  - Isolated from strong electromagnetic fields produced by electrical devices.
- For equipment designed to be installed in environments that are not environmentally controlled, such as outdoor enclosures, see the product data sheet or for environmental conditions, temperature, and humidity.
- Establish at least 3 inches clearance on all sides for effective ventilation. Do not obstruct the air intake vent on the front, side, or rear ventilation grills. Locate the system away from heat sources.
- Make sure that your equipment is placed in an area that accommodates the power consumption and component heat dissipation specifications.
- Make sure that your power supplies meet the site DC power or AC power requirements of all the network equipment.
- Racks for Extreme Networks equipment must be permanently attached to the floor. Failure to stabilize the rack can cause the rack to tip over when the equipment is removed for servicing.
- Do not operate the system unless all modules, faceplates, front covers, and rear covers are in place. Blank faceplates and cover panels are required for the following functions:
  - Preventing exposure to hazardous voltages and currents inside the equipment
  - Containing electromagnetic interference (EMI) that might disrupt other equipment
  - Directing the flow of cooling air through the equipment
- Ultimate disposal of this product should be handled according to all national laws and regulations.

General Safety Precautions

Follow these guidelines:

- Do not try to lift objects that you think are too heavy for you.
- When you install equipment in a rack, load heavier devices in the lower half of the rack first to avoid making the rack top-heavy.
- Use only tools and equipment that are in perfect condition. Do not use equipment with visible damage.
- Route cables in a manner that prevents possible damage to the cables and avoids causing accidents, such as tripping.

- Do not place a monitor or other objects on top of the equipment. The chassis cover is not designed to support weight.
- To reduce the risk of fire, use only #26 AWG or larger telecommunications line cord. Use only copper conductors.
- Do not work on the system or connect or disconnect cables during periods of lightning activity.
- This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor.

Maintenance Safety

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

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

Fiber Optic Ports and Optical Safety

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

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

> **Warning**
>
> Laser optic modules become very hot after prolonged use. Take care when removing a laser optic module from the module or option card. If the laser optic module is too hot to touch, disengage the laser optic module and allow it to cool before removing it completely.
>
> When working with laser optic modules, always take the precautions listed below to avoid exposure to hazardous radiation.

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

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

Extreme Networks pluggable optical modules and direct-attach cables meet the following regulatory requirements:

- Class 1 or Class 1M Laser Product
- EN60825-1:2007 2nd Ed. or later, European standard
- FCC 21 CFR Chapter 1, Subchapter J in accordance with FDA & CDRH requirements
- Application of CE Mark in accordance with 2014/30/EU EMC Directive and the 2014/35/EU Low Voltage Directives
- UL and/or CSA registered component for North America
- 47 CFR Part 15, Class A when installed into Extreme products

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

LAN systems are designed for intra-building installations; that is, cable runs between devices must be in the same building as the connected units, except under the conditions listed in the next paragraph.

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

- Cable runs between buildings are less than 140 feet long.
- Cable runs between buildings are directly buried.

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

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

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

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

A power cord is not included in the product box.

You can purchase a power cord for your product and for your specific country from your local Extreme Networks Channel Account Manager or Sales Manager, or you can purchase a cord from your local supplier. Requirements for the power cord are listed in the Technical Specifications for your product.

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

> **Note**
> This equipment is not intended to be directly powered by power distribution systems where phase-phase voltages exceed 240 VAC (2P+PE), such as those used in Norway, France, and other countries. For these applications, 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情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

Korea EMC Statement

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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