4220 Series Cloud Managed Switches Hardware Installation Guide

Table of Contents

Preface

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.

Text Conventions

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

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

Table 1: Notes and warnings

Icon	Notice type	Alerts you to...
💡	Tip	Helpful tips and notices for using the product
📝	Note	Useful information or instructions
➡️	Important	Important features or instructions
⚠️	Caution	Risk of personal injury, system damage, or loss of data
⚠️	Warning	Risk of severe personal injury

Table 2: Text

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

Table 3: Command syntax

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

Documentation and Training

Find Extreme Networks product information at the following locations:

Current Product Documentation

Release Notes

Hardware and Software Compatibility for Extreme Networks products

Extreme Optics Compatibility

Other Resources such as articles, white papers, and case studies

Open Source Declarations

Some software files have been licensed under certain open source licenses. Information is available on the Open Source Declaration page.

Training

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

Help and Support

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

Extreme Portal

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

The Hub

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

Call GTAC

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

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

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

Subscribe to Product Announcements

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

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

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

Send Feedback

The User Enablement team at Extreme Networks has made every effort to ensure that this document is accurate, complete, and easy to use. We strive to improve our documentation to help you in your work, so we want to hear from you. We welcome all feedback, but we especially want to know about:

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

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

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

4220 Cloud Managed Switch Overview

The 4000 Series are ExtremeCloud IQ managed Layer 2 switches that are fully cloud managed. The 4000 Series maintains all the power and flexibility of a traditional enterprise access switch, while simplifying network operations. Visibility is centralized and actions are instantaneous. Zero-touch provisioning allows rapid deployment across sites, and machine learning tools help quickly isolate issues when troubleshooting. The 4000 Series also provides support for stacking and PoE.

> **Note**
> An ExtremeCloud IQ Pilot license is required for each 4000 Series switch.

The 4220 family includes 8, 12, 24, and 48-port models with gigabit and multi-gigabit (1/2.5/5Gb) access ports, up to 90W PoE, and 4 x SFP+ uplink/stack ports and is a highly flexible enterprise Layer 2 wired edge solution.

Management

An RJ45 serial console port on the switch enables you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to an out-of-band management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds. The RJ45 serial console port is located on the front panel of the switch.

There is one Micro-B USB console port located on the front panel. If the Micro-B USB console port is connected, it is selected over the RJ45 serial console port. The Micro-B USB console port disconnects when the switch is rebooted. You can re-connect the

port if needed. When the Micro-B USB console is active, there is no support for 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

You can manage 4000 Series switches using Bluetooth with mobile devices or laptops. Bluetooth is enabled by default. 4000 Series switches support the Extreme Networks Bluetooth 5.0 dongle (XN-USB-BT500-ADAPTER). 4220 Series switches do not have a Bluetooth LED that displays Bluetooth status.

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

Fixed internal switch fans in the 4220 Series provide left-to-right airflow for switch cooling. The internal fans are responsible for cooling the internal power supply.

Power Supplies

Each 4220 Series has a fixed internal AC power supply that provides enough power for the basic power needs of the switch. For switch models that support PoE, the internal power supply also provides a POE power budget beyond the basic switch needs. For power redundancy, switch models 4220-4MW-20P-4X and 4220-8MW-40P-4X support the addition of an external redundant power supply.

The external redundant power supply connection is located on the rear panel of the switch. The external redundant power supply can be rack-mounted. For more information about power supplies, see

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.

> **Note**
> 4220 Series 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 22.

Operating Temperatures

All 4220 Series switch models support an operating range from 0°C (32°F) to 50°C (122°F) up to 3000 m (10,000 ft).

> **Note**
> Models 4220-12P-4X, 4220-12T-4X, and 4220-4MW-8P-4X support silent mode operation at temperatures up to 35°C (95°F). Silent mode requires 1 RU of free space above the switch. Fans function normally if the temperature is between 35°C (95°F) and 50°C (122°F).

Feature Licensing

A base license for the 4220 Series is the only license supported in Switch Engine. For additional Switch Engine licensing information see the *Feature License Requirements* for your version of the Switch Engine software.

4220-12T-4X Switch Features

The front panel of the 4220-12T-4X switch includes:

1 = Mode button
2 = System LEDs
3 = USB Type-A port
4 = 10/100/1000BASE-T out-of-band management port
5 = 12 x 10/100/1000Base-T ports
7 = 4 x 1/10Gb SFP+ uplink/stacking ports
8 = USB Micro-B console port
9 = Serial console port (RJ-45)

Figure 1: 4220-12T-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input

Figure 2: 4220-12T-4X Rear View

> **Note**
> This model supports silent mode operation at temperatures up to 35°C (95°F). Silent mode requires 1 RU of free space above the switch. Fans function normally if the temperature is between 35°C (95°F) and 50°C (122°F).

4220-12P-4X Switch Features

The front panel of the 4220-12P-4X switch includes:

1 = Mode button
2 = System LEDs
3 = USB Type-A port
4 = 10/100/1000BASE-T out-of-band management port
5 = 12 x 10/100/1000Base-T 802.3at (30W) PoE ports
7 = 4 x 1/10Gb SFP+ uplink/stacking ports
8 = USB Micro-B console port
9 = Serial console port (RJ-45)

Figure 3: 4220-12P-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input
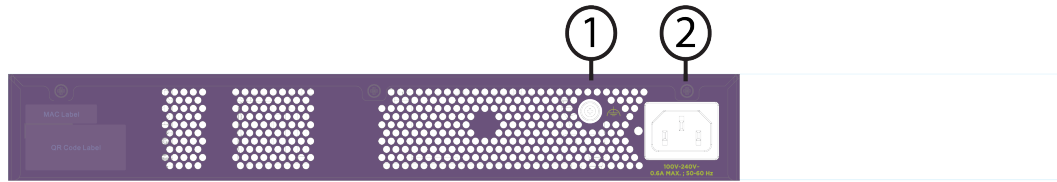
Figure 4: 4220-12P-4X Rear View

> 📝 **Note**
> This model supports silent mode operation at temperatures up to 35°C (95°F).
> Silent mode requires 1 RU of free space above the switch. Fans function
> normally if the temperature is between 35°C (95°F) and 50°C (122°F).

4220-24P-4X Switch Features

The front panel of the 4220-24P-4X switch includes:

1 = Mode button
2 = System LEDs
3 = USB Type-A port
4 = 10/100/1000BASE-T out-of-band management port
5 = 24 x 10/100/1000Base-T 802.3at (30W) PoE ports
7 = 4 x 1/10Gb SFP+ uplink/stacking ports
8 = USB Micro-B console port
9 = Serial console port (RJ-45)
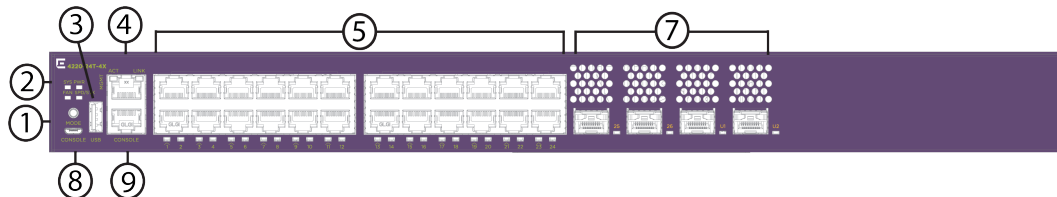
Figure 5: 4220-24P-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input
3 = Redundant power supply slot
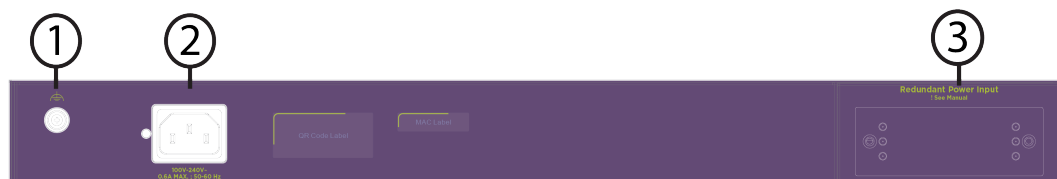
Figure 6: 4220-24P-4X Rear View

4220-24T-4X Switch Features

The front panel of the 4220-24T-4X switch includes:

1 = Mode button

2 = System LEDs

3 = USB Type-A port

4 = 10/100/1000BASE-T out-of-band management port

5 = 24 x 10/100/1000Base-T ports

7 = 4 x 1/10Gb SFP+ uplink/stacking ports

8 = USB Micro-B console port

9 = Serial console port (RJ-45)
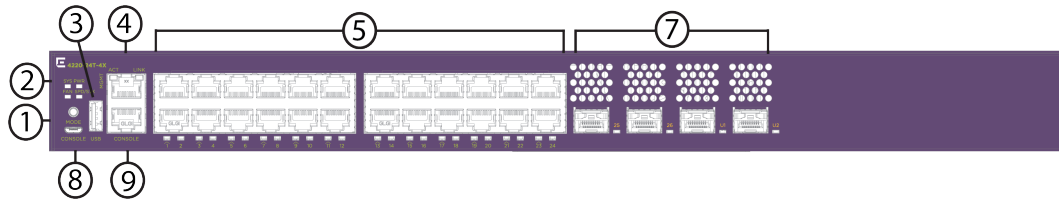
Figure 7: 4220-24T-4X Front View

The rear panel of the switch includes:

1 = Grounding lug

2 = Power supply power cord input
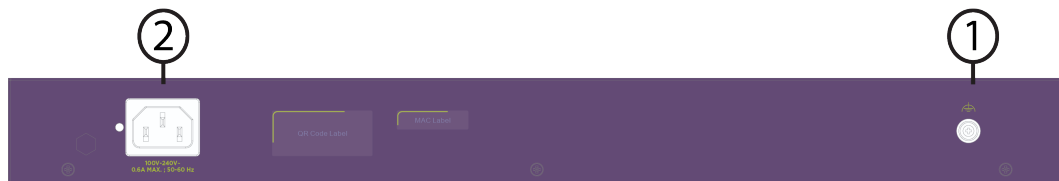
Figure 8: 4220-24T-4X Rear View

4220-48P-4X Switch Features

The front panel of the 4220-48P-4X switch includes:

1 = Mode button

2 = System LEDs

3 = USB Type-A port

4 = 10/100/1000BASE-T out-of-band management port

5 = 48 x 10/100/1000Base-T 802.3at (30W) PoE ports

7 = 4 x 1/10Gb SFP+ uplink/stacking ports

8 = USB Micro-B console port

9 = Serial console port (RJ-45)
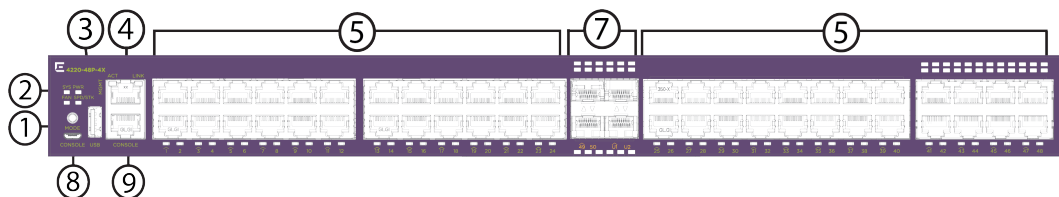
Figure 9: 4220-48P-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input
3 = Redundant power supply slot
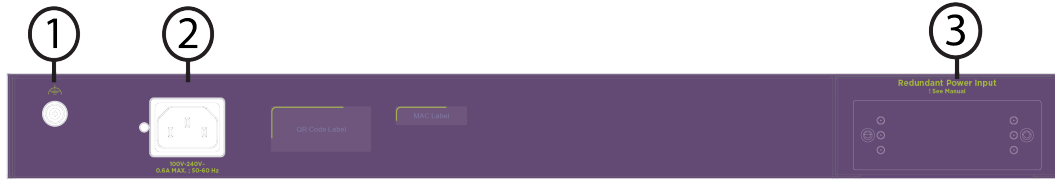
Figure 10: 4220-48P-4X Rear View

4220-48T-4X Switch Features

The front panel of the 4220-48T-4X switch includes:

1 = Mode button
2 = System LEDs
3 = USB Type-A port
4 = 10/100/1000BASE-T out-of-band management port
5 = 48 x 10/100/1000Base-T ports
7 = 4 x 1/10Gb SFP+ uplink/stacking ports
8 = USB Micro-B console port
9 = Serial console port (RJ-45)
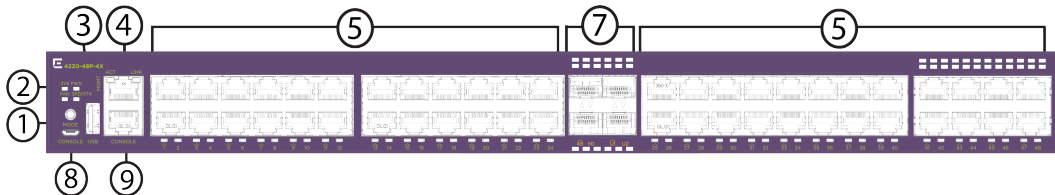
Figure 11: 4220-48T-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input
3 = Redundant power supply slot
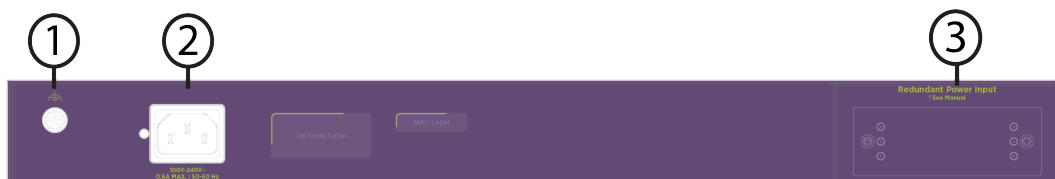
Figure 12: 4220-48T-4X Rear View

4220-4MW-20P-4X Switch Features

The front panel of the 4220-4MW-20P-4X switch includes:

1 = Mode button

2 = System LEDs

3 = USB Type-A port

4 = 10/100/1000BASE-T out-of-band management port

5 = 20 x 10/100/1000Base-T 802.3at (30W) PoE ports

6 = 4 x 1G/2.5G/5GBaseT 802.3bt (90W) PoE ports

7 = 4 x 1/10Gb SFP+ uplink/stacking ports

8 = USB Micro-B console port

9 = Serial console port (RJ-45)
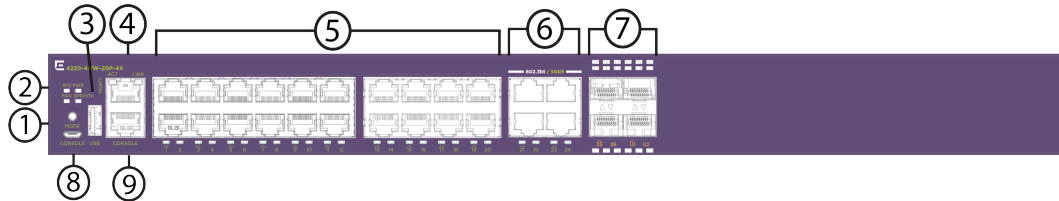
Figure 13: 4220-4MW-20P-4X Front View

The rear panel of the switch includes:

1 = Grounding lug

2 = Power supply power cord input

3 = Redundant power supply slot
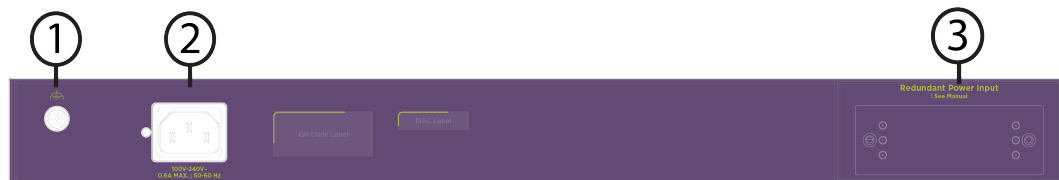
Figure 14: 4220-4MW-20P-4X Rear View

4220-4MW-8P-4X Switch Features

The front panel of the 4220-4MW-8P-4X switch includes:

1 = Mode button

2 = System LEDs

3 = USB Type-A port

4 = 10/100/1000BASE-T out-of-band management port

5 = 8 x 10/100/1000Base-T 802.3at (30W) PoE ports

6 = 4 x 1G/2.5G/5GBaseT 802.3bt (90W) PoE ports

7 = 4 x 1/10Gb SFP+ uplink/stacking ports

8 = USB Micro-B console port
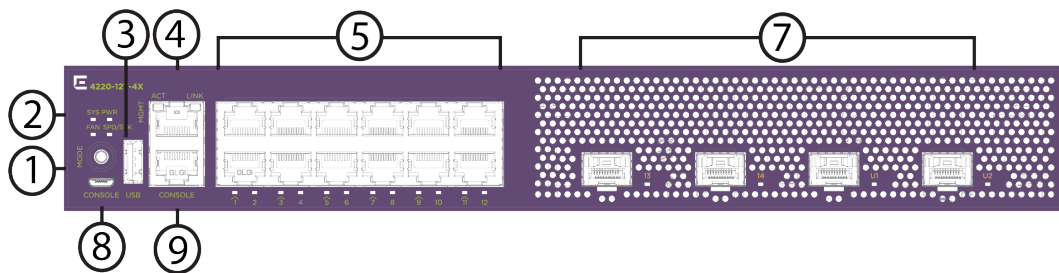
9 = Serial console port (RJ-45)
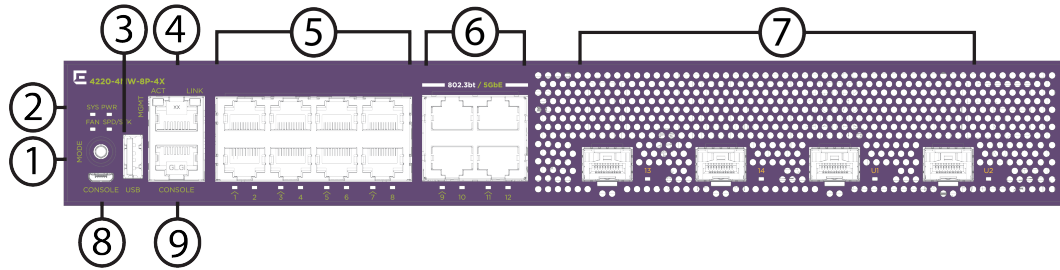
Figure 15: 4220-4MW-8P-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input
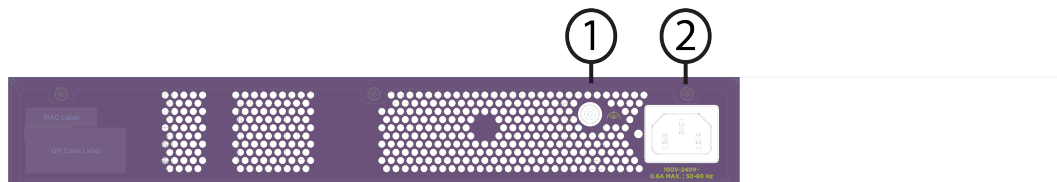
Figure 16: 4220-4MW-8P-4X Rear View
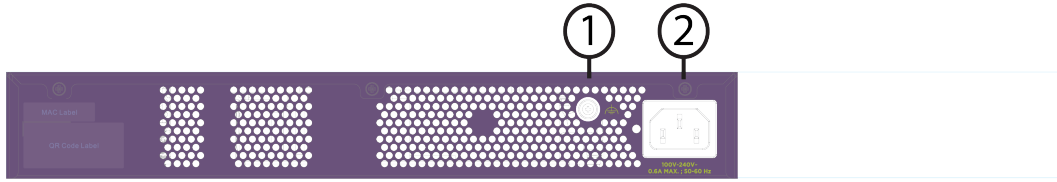
> **Note**
> This model supports silent mode operation at temperatures up to 35°C (95°F).
> Silent mode requires 1 RU of free space above the switch. Fans function
> normally if the temperature is between 35°C (95°F) and 50°C (122°F).

4220-8MW-40P-4X Switch Features

The front panel of the 4220-8MW-40P-4X switch includes:

1 = Mode button
2 = System LEDs
3 = USB Type-A port
4 = 10/100/1000BASE-T out-of-band management port
5 = 40 x 10/100/1000Base-T 802.3at (30W) PoE ports
6 = 8 x 1G/2.5G/5GBaseT 802.3bt (90W) PoE ports
7 = 4 x 1/10Gb SFP+ uplink/stacking ports
8 = USB Micro-B console port
9 = Serial console port (RJ-45)
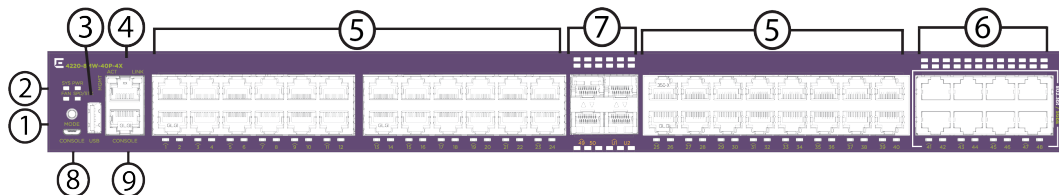
Figure 17: 4220-8MW-40P-4X Front View

The rear panel of the switch includes:

1 = Grounding lug
2 = Power supply power cord input
3 = Redundant power supply slot
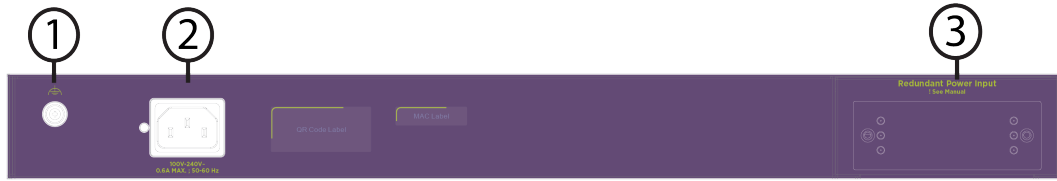
Figure 18: 4220-8MW-40P-4X Rear View

4220-8X Switch Features

The front panel of the 4220-8X switch includes:

1 = Mode button
2 = System LEDs
3 = USB Type-A port
4 = 10/100/1000BASE-T out-of-band management port
7 = 8 x 1/10Gb SFP+ uplink/stacking ports
8 = USB Micro-B console port
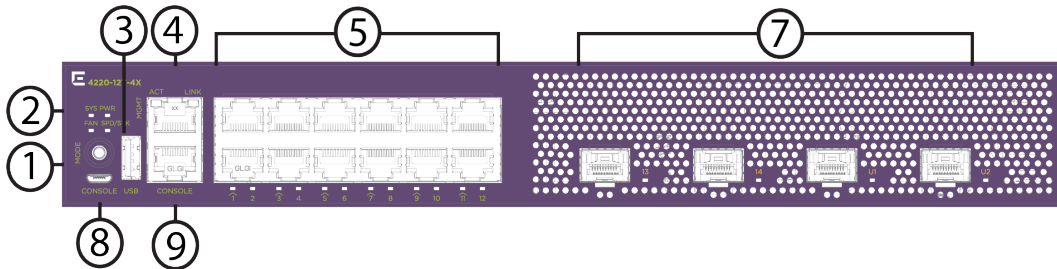**9 =** Serial console port (RJ-45)
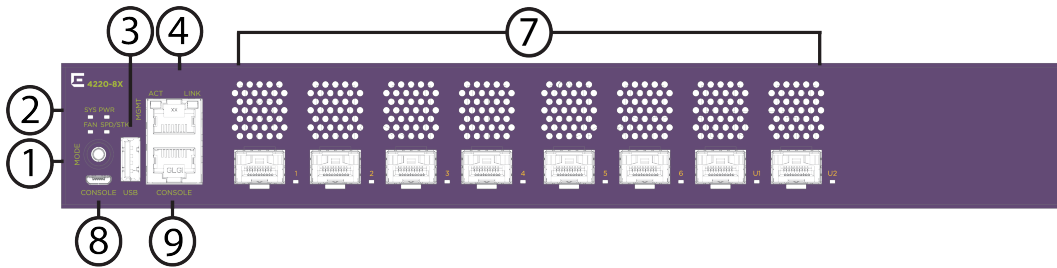
Figure 19: 4220-8X Front View

The rear panel of the switch includes:

**1 =** Grounding lug
2 = Power supply power cord input
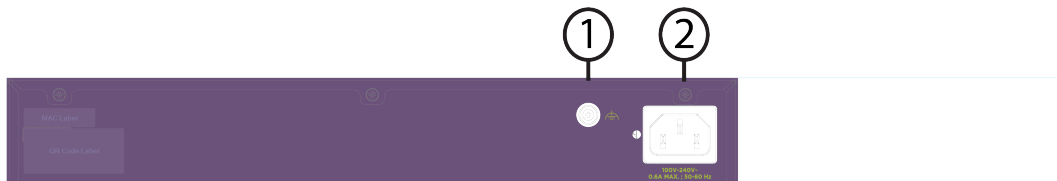
Figure 20: 4220-8X Rear View

Redundant Power Supplies for Use with Your Switch

The 4220 Series switch contains a fixed internal AC power supply that supplies the power needed for most switch operations. Switch models 4220-4MW-20P-4X and 4220-8MW-40P-4X provide the option to add an external redundant power supply (RPS) for power redundancy and a higher PoE budget. The following redundant power supplies are available:

- The 550 W external AC RPS (part no. RPS-550W) is only supported on model 4220-4MW-20P-4X.
- The 950 W external AC RPS (part no. RPS-950W) is only supported on model 4220-8MW-40P-4X.

For information on installing an external AC RPS, see Install an External Redundant Power Supply on page 62.

LEDs on the external redundant power supply provide information on the unit's operational status. See External Redundant Power Supply LEDs on page 78 for details.

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 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 21 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.
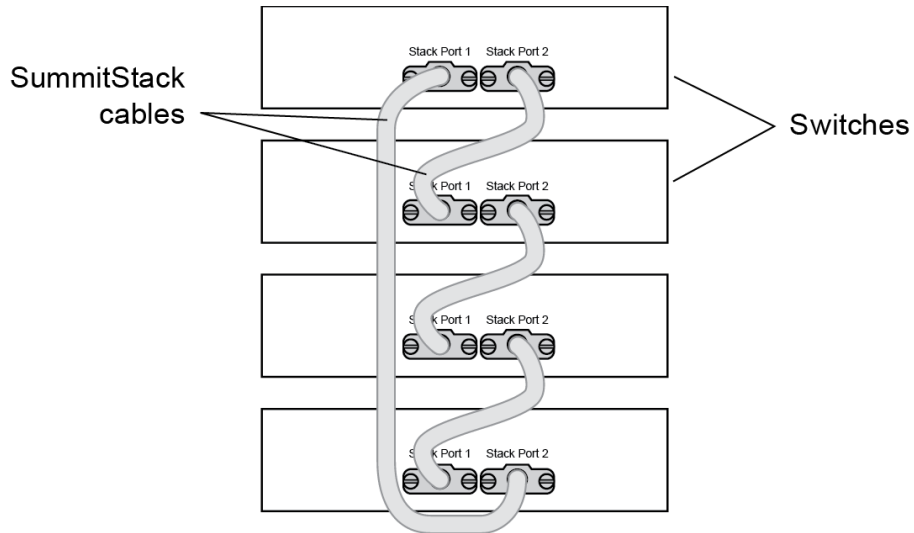
Figure 21: Switches Connected to Form a Stack

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 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.

> **Note**
> 4220 Series does not support alternate stacking.

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 Figure 21 on page 23 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.

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.

> **Note**
> 4220 Series switches 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.

SummitStack Topologies

Figure 22 presents a graphical representation of a stack and some of the terms that describe stack conditions.
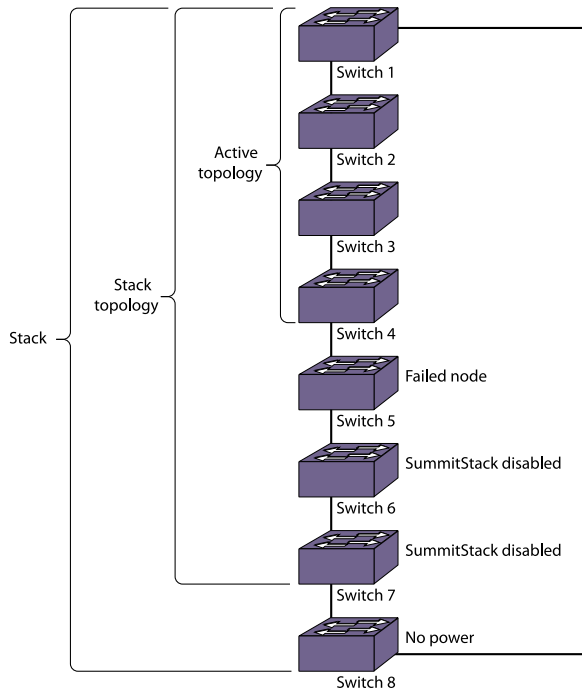
Figure 22: Example of a Stack, Showing the Active Topology and the Stack Topology

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 27.

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 23 represents a maximal ring topology of eight active nodes.
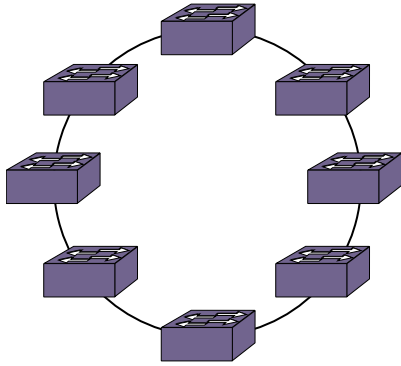
Figure 23: Graphical Representation of a Ring Topology

Figure 24 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.
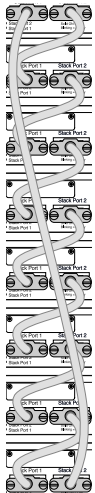
Figure 24: Switches Connected to Each Other in a Ring Topology

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 25, 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 25: 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 .

SummitStack Terms

Table 4 describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

Table 4: 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 4: 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 4: 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 4: 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 25). Include only the nodes that you expect to be active in the stack.

Follow the recommendations in Recommendations for Configuring Stacks on page 32 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 34.

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 .) 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 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 .
- 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 31 for physically situating your equipment.

Combine Switches from Different Series

4220 Series switches can only stack with themselves using Native 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 26: 4220 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 5: 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
2. Connect the switches to your management network.

    See

After setting up and connecting the switches, perform software configuration for the stack. See "Configuring a New Stack" in the .

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 27 shows cable connections for a 4-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.
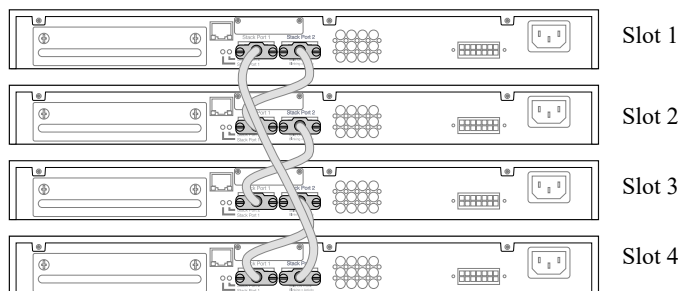
Figure 27: SummitStack Cable Connections Using Four Switches with Integrated SummitStack Ports

Table 6 lists the recommended order for connecting the stacking ports in this example.

Table 6: 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 28 shows cable connections for an 8-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

Slot 1
Slot 2
Slot 3
Slot 4
Slot 5
Slot 6
Slot 7
Slot 8

Figure 28: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

Table 7 lists the recommended order for connecting the stacking ports in this example.

Table 7: Basic Stack with Eight Switches: Connections

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

Table 7: Basic Stack with Eight Switches: Connections (continued)

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

Example: Stacked Switches across Several Racks

Figure 29 shows five switches installed at the tops of five adjacent racks. To accommodate the shortest possible cables, immediately adjacent switches are not always connected together. Port 2 on one switch is connected to Port 1 on the next connected switch. If the easy setup feature is used to configure the stack parameters, the assigned slot numbers will be as shown in the figure.
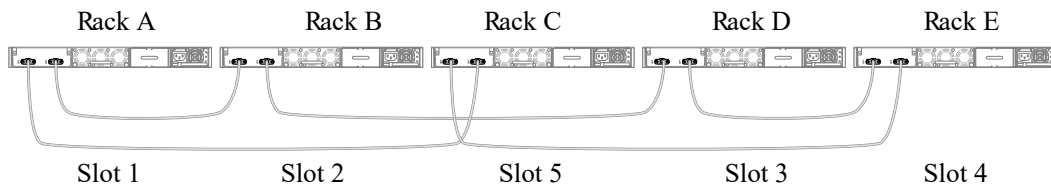
Figure 29: Top-of-Rack Stack Installation

Table 8 lists the recommended order for connecting the stacking ports in this example.

Table 8: 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 35, 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.

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 9 are authorities on electrical codes.

Table 9: 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 of 1934. The FCC regulates all U.S. telephone and cable systems.	FCC 445 12th Street S.W. Washington, DC 20554 USA	www.fcc.gov

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 43 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 85°C (185°F).

Table 10 summarizes the behavior of ExtremeSwitching 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 10: 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.
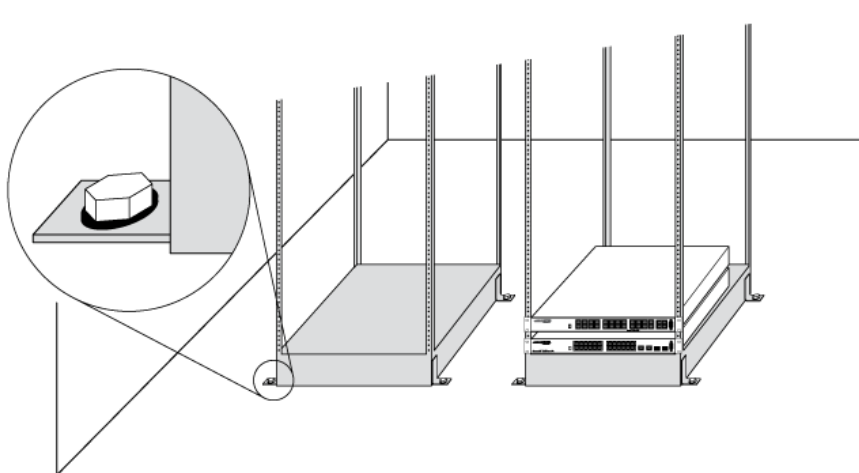

Figure 30: Properly Secured Rack

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 31 on page 47.
- 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.
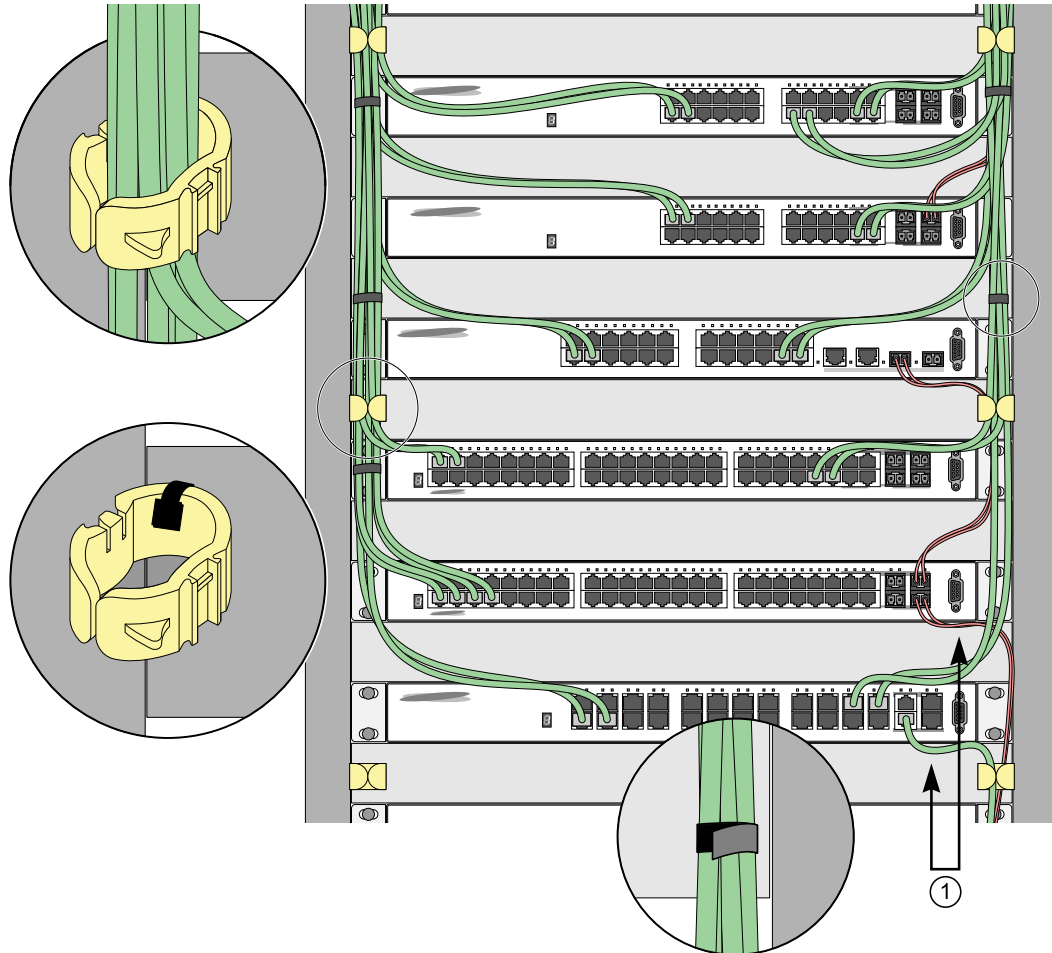- Keep all ports and connectors free of dust.

Figure 31: 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 32.

> **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.
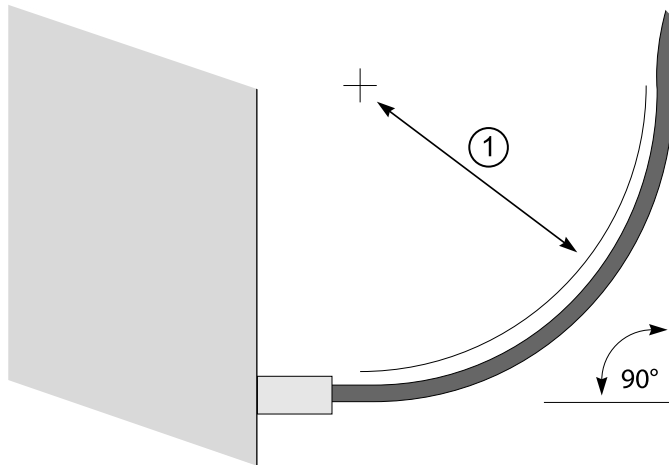
Figure 32: Bend Radius for Fiber Optic Cable

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.

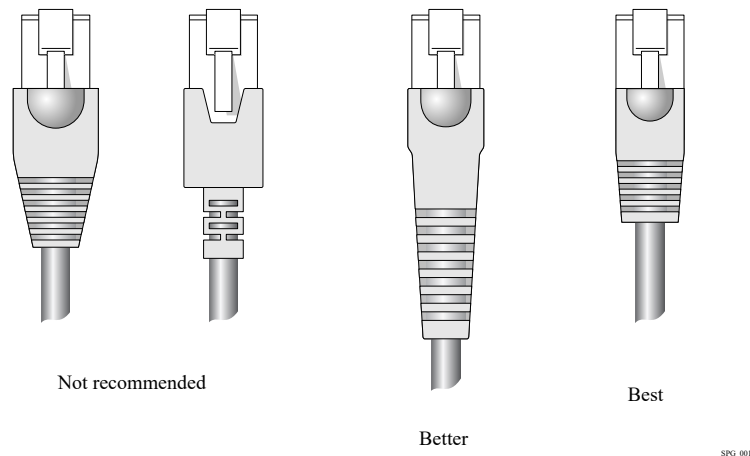Figure 33 shows examples of recommended and non-recommended connector jacket types.

Figure 33: 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 either IEEE 802.3at., IEEE 802.3bt., or 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 Extreme Networks switches do not ship with power cords. See Select Power Supply Cords on page 91 for information on selecting and purchasing the correct AC power cords for use with specific Extreme Networks equipment.

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 51.)

> **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.

Install the Switch

Before you attempt to install or remove an Extreme Networks switch, read the precautions in Safety Considerations for Installation on page 53.

Extreme Networks switches fit into standard 19-inch equipment racks.

A four-post rack-mounting kit is provided with the switch. A two-post kit can be ordered separately.

The installation process includes the following tasks:

1. Prepare to install the switch. See What You Will Need for the Installation on page 54.
2. Install the switch in the rack. See Install the Switch on page 53.
3. Install optional components: optical transceivers and cables. See the instructions in Install Optional Components on page 66.
4. Power up the switch. See Turn on the Switch on page 67 .
5. Connect network interface cables. See Connect Network Interface Cables on page 67 .
6. Perform initial network connection and configuration. See Activate and Verify the Switch on page 68.

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 DC power cables.
> Disconnect the ground wire **after** you disconnect all DC power cables.

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

Do not cover vents that would restrict airflow.

> **Note**
> See Safety Information on page 87 for additional safety information.
> See Regulatory Information on page 94 for additional information regarding regulatory compliance certifications.

What You Will Need for the Installation

Ensure that you have followed the guidance in Site Preparation on page 39, 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. MicroVSP switches do not come with rack-mounting brackets or screws.

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.

Attach the Switch to a Rack or Cabinet

4220 Series provides multiple options for mounting or installing the switch.

Mount Options

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

- All 4220 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 4220 Series support mounting in a standard two-post rack or four-post rack. Rack mounting ears are included with the device.
- Additionally, the 4220-8X, 4220-4MW-8P-4X, 4220-12P-4X, and the 4220-48T-4X models support wall-mounting and under-the-table mounting. Anchors and wood screws are included with the device.

Mount the Device on a Table

4220 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 34 shows the locations for attaching the rubber mounting feet on the switch.
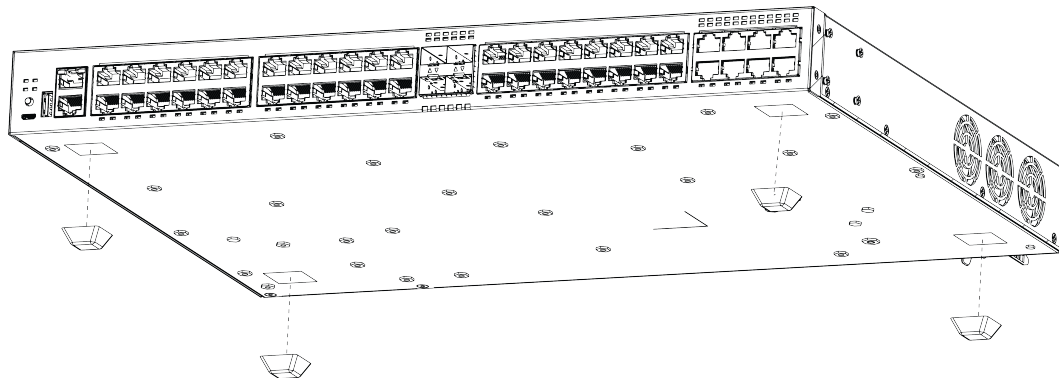

Figure 34: Table Mount: 4220 Series

> 📝 **Note**
> Models 4220-12P-4X, 4220-12T-4X, and 4220-4MW-8P-4X support silent mode operation at temperatures up to 35°C (95°F). Silent mode requires 1 RU of free space above the switch. Stacked switches do not have 1 RU of free space between them, and might not run in silent mode. Fans function normally if the temperature is between 35°C (95°F) and 50°C (122°F).

Install the Device in a Rack

The 4220 Series can be installed in a four-post rack, using just the two front posts or two back posts. 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-008 is required for models 4220-24T-4X, 4220-24P-4X, 4220-4MW-20P-4X, 4220-8MW-40P-4X, 4220-48P-4X, and 4220-48T-4X.

The two-post rack mount kit XN-2P-RMKIT-009 is required for models 4220-8X, 4220-12P-4X, 4220-12T-4X, and 4220-4MW-8P-4X.

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 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.
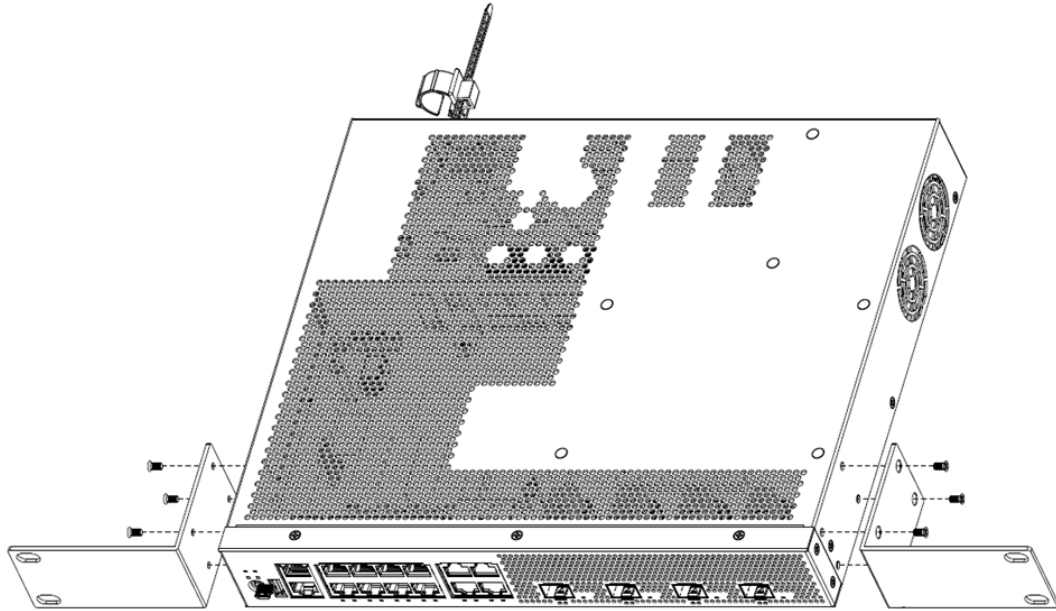
Figure 35: Flush-Mount: Attaching mounting ears to models 4220-8X, 4220-4MW-8P-4X, 4220-12P-4X, and 4220-12T-4X
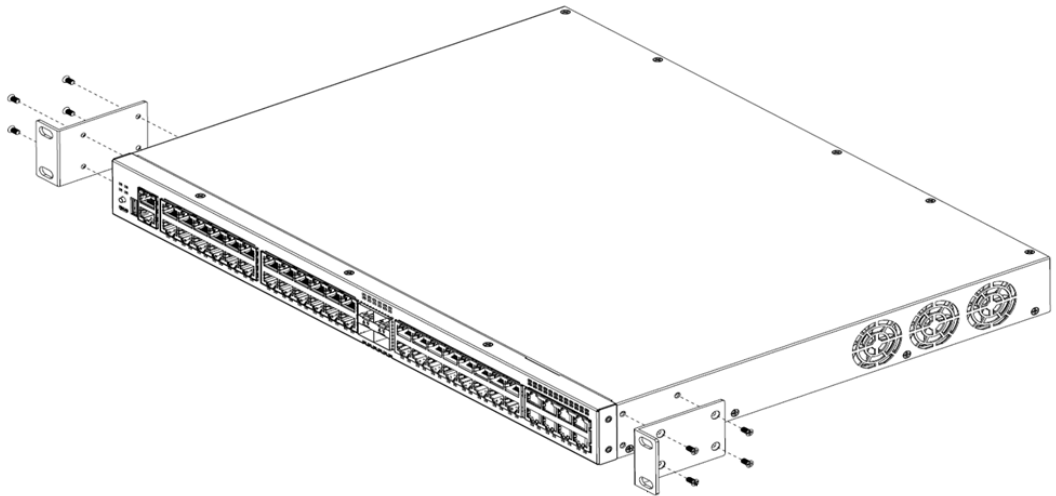

Figure 36: Flush-Mount: Attaching mounting ears to models 4220-4MW-20P-4X, 4220-8MW-40P-4X, 4220-48P-4X, 4220-48T-4X, 4220-24P-4X, and 4220-24T-4X
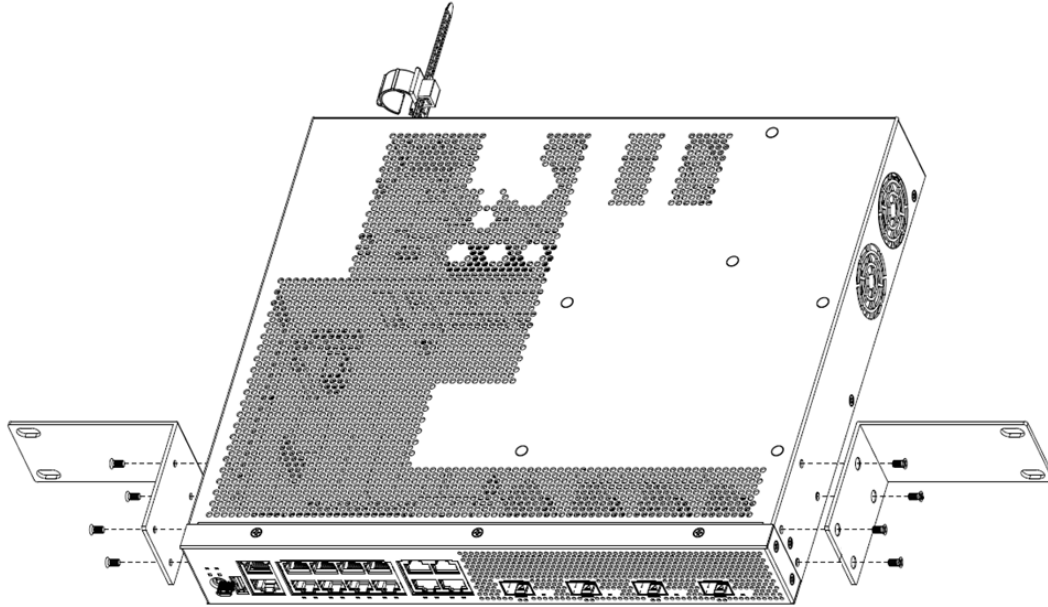
Figure 37: Mid-Mount: Attaching mounting ears to models 4220-8X, 4220-4MW-8P-4X, 4220-12P-4X, and 4220-12T-4X
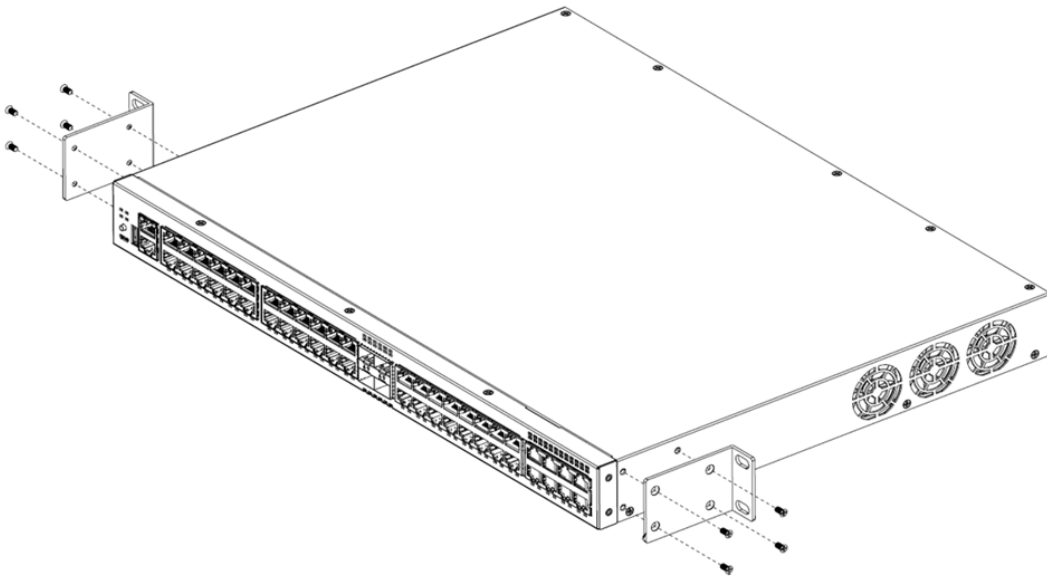

Figure 38: Mid-Mount: Attaching mounting ears to models 4220-4MW-20P-4X, 4220-8MW-40P-4X, 4220-48P-4X, 4220-48T-4X, 4220-24P-4X, and 4220-24T-4X

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.

   The following figures illustrate how to attach the switch to the rack for two common mounting options.
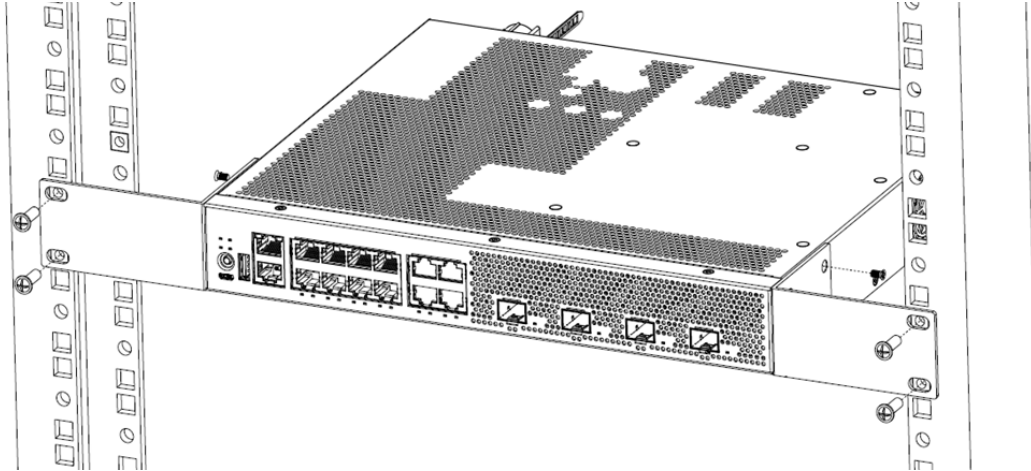
Figure 39: Flush-Mount: Mounting in a Two- or Four-Post Rack for models 4220-8X, 4220-4MW-8P-4X, 4220-12P-4X, and 4220-12T-4X
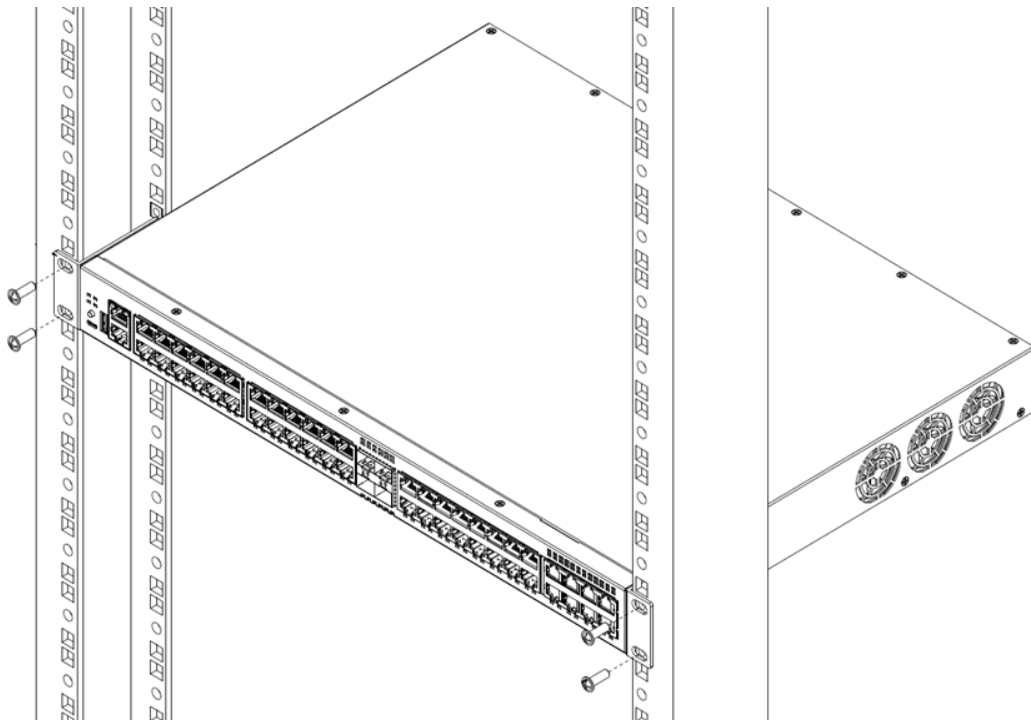
Figure 40: Flush-Mount: Mounting in a Two- or Four-Post Rack for models 4220-4MW-20P-4X, 4220-8MW-40P-4X, 4220-48P-4X, 4220-48T-4X, 4220-24P-4X, and 4220-24T-4X
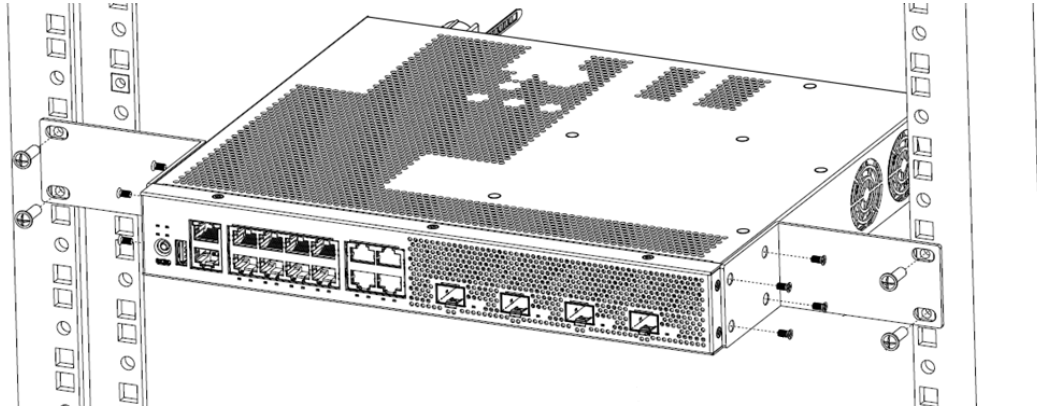
Figure 41: Mid-Mount: Mounting in a Two- or Four-Post Rack for models 4220-8X, 4220-4MW-8P-4X, 4220-12P-4X, and 4220-12T-4X
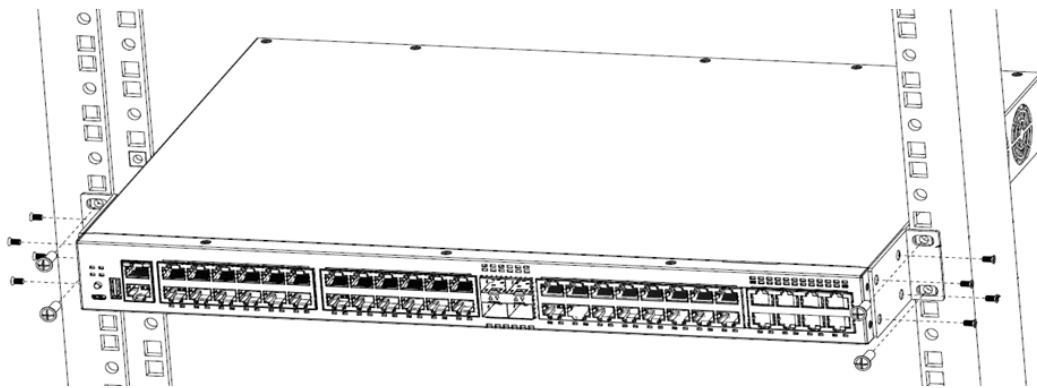

Figure 42: Mid-Mount: Mounting in a Two- or Four-Post Rack for models 4220-4MW-20P-4X, 4220-8MW-40P-4X, 4220-48P-4X, 4220-48T-4X, 4220-24P-4X, and 4220-24T-4X

Mount the Device on a Wall

The 4220-8X, 4220-12P-4X, 4220-12T-4X, and 4220-4MW-8P-4X switch models are constructed so that they can be mounted on a wall, and require wall mount kit 908775-10. Ensure that the wall is strong enough to support the weight of the switch and the attached cables.

> **Note**
> Orientation for wall mounting is limited. 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. Use the two holes in each short mounting ear to 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 the holes and attach the brackets using four wood screws and four anchors that are included in the accessory kit, which can be ordered separately.

3. Using rack mount screws, attach a wall-mounting ear to the left side of the switch, at the front end. Figure 43 shows the attachment of the screws.
4. Repeat step 3 for the right side of the switch.
5. 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.
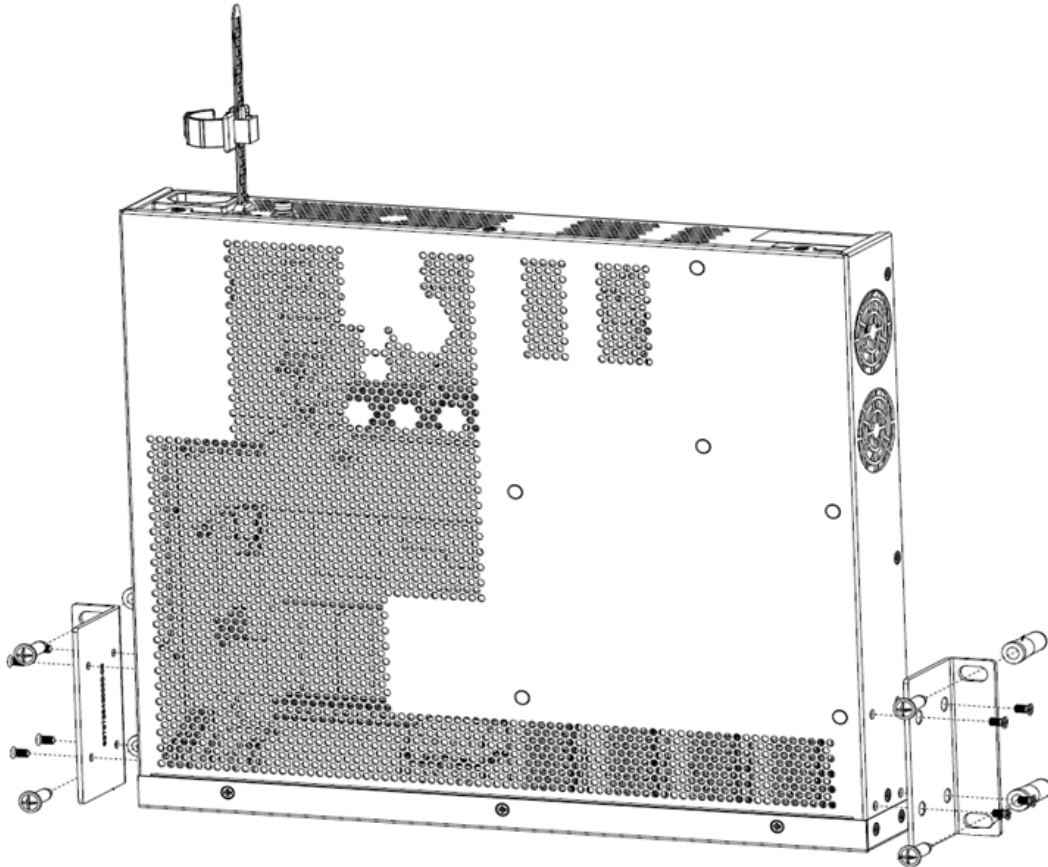

Figure 43: Wall-Mount: Attaching to a wall for models 4220-8X, 4220-4MW-8P-4X, 4220-12P-4X, 4220-12T-4X

Mount the Device Under a Table

The 4220-8X, 4220-12P-4X, 4220-12T-4X, and 4220-4MW-8P-4X switch models are constructed so that they can be mounted under a table, and require wall mount kit 908775-10. Ensure that the table is strong enough to support the weight of the switch and the attached cables.

> **Note**
> Models 4220-12P-4X, 4220-12T-4X, and 4220-4MW-8P-4X support silent mode operation at temperatures up to 35°C (95°F). Silent mode requires 1 RU of free space above the switch. Fans function normally if the temperature is between 35°C (95°F) and 50°C (122°F).

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 44 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.
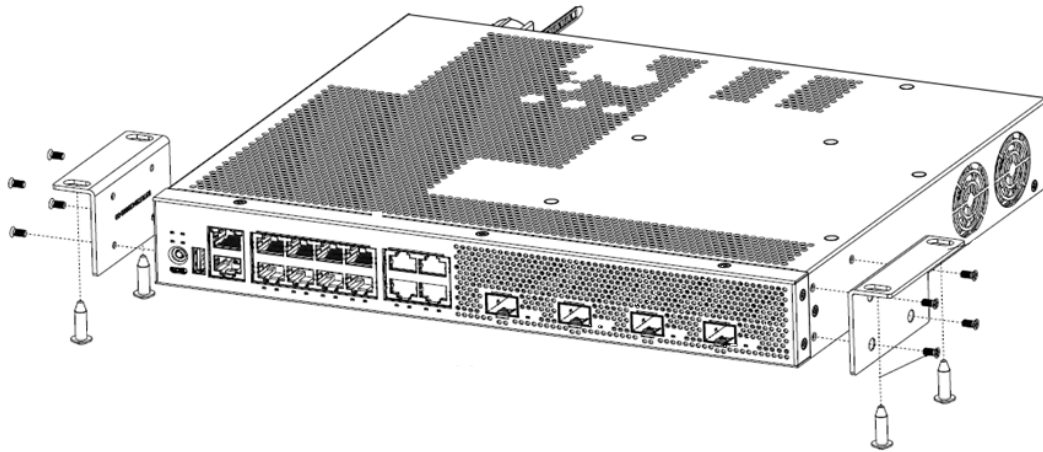

Figure 44: Under the Table Mount: Attaching a switch under a table

Install an External Redundant Power Supply

The RPS-550W and the RPS-950W redundant power supplies (RPS) can be installed on a flat surface, or in a 19-inch rack using the included two-post rack mount kit (XN-2P-RMKIT-002).

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. shows the locations for attaching the rubber mounting feet on the switch.

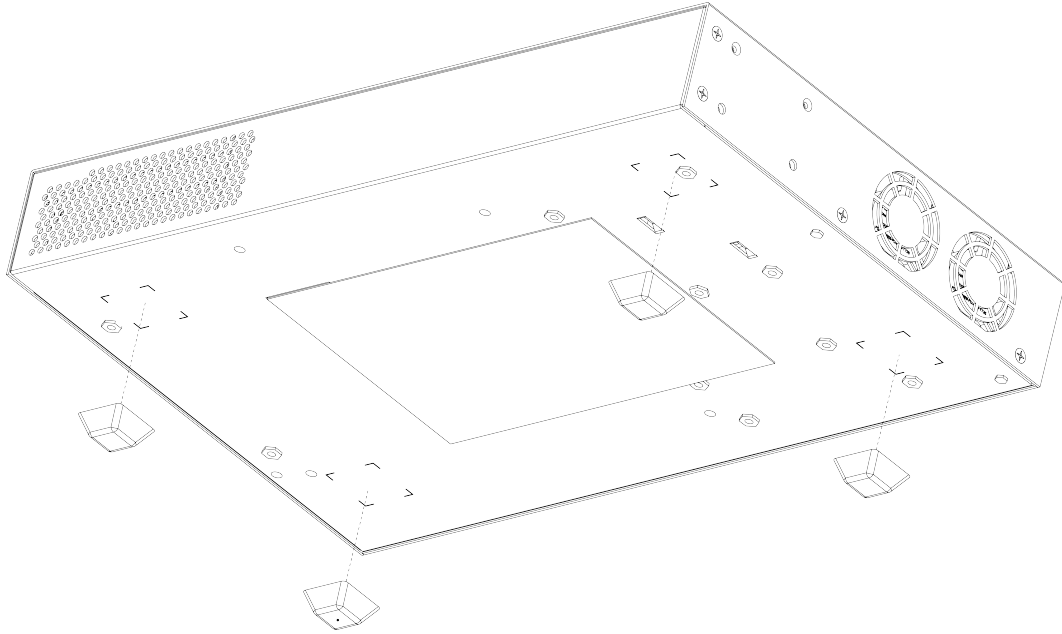**Figure 45: Table Mount: Attaching Rubber Feet**

Figure 46: Table Mount

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. This procedure uses a 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.
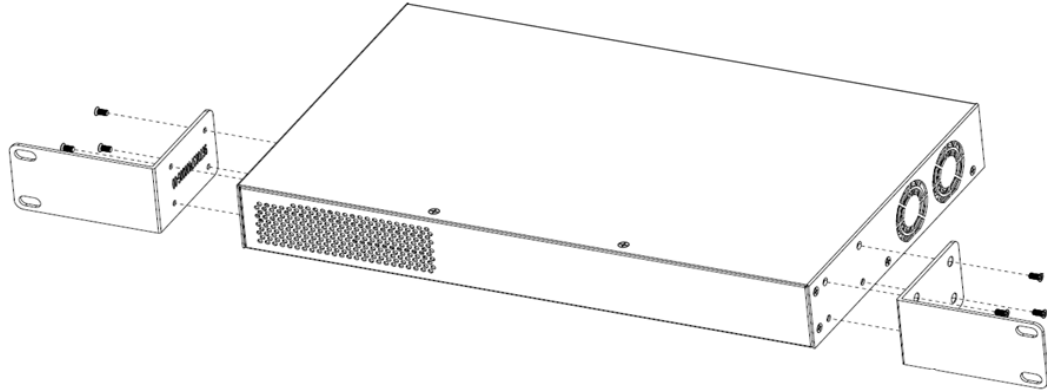
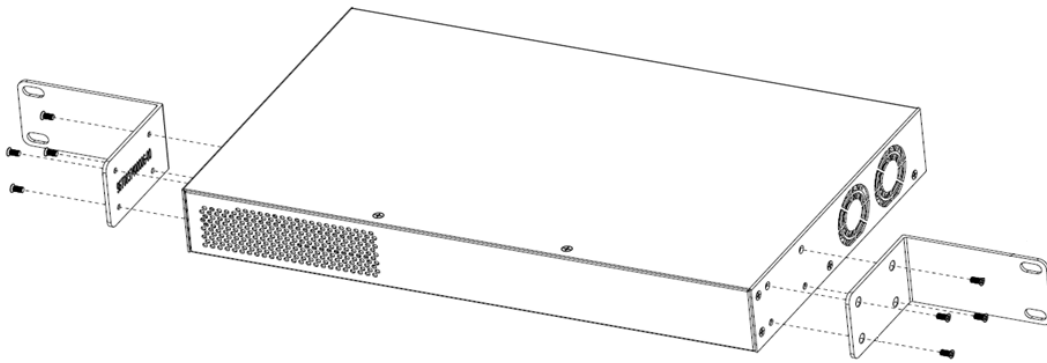**Figure 47: Flush-Mount: Attaching mounting ears**

Figure 48: Mid-Mount: Attaching mounting ears

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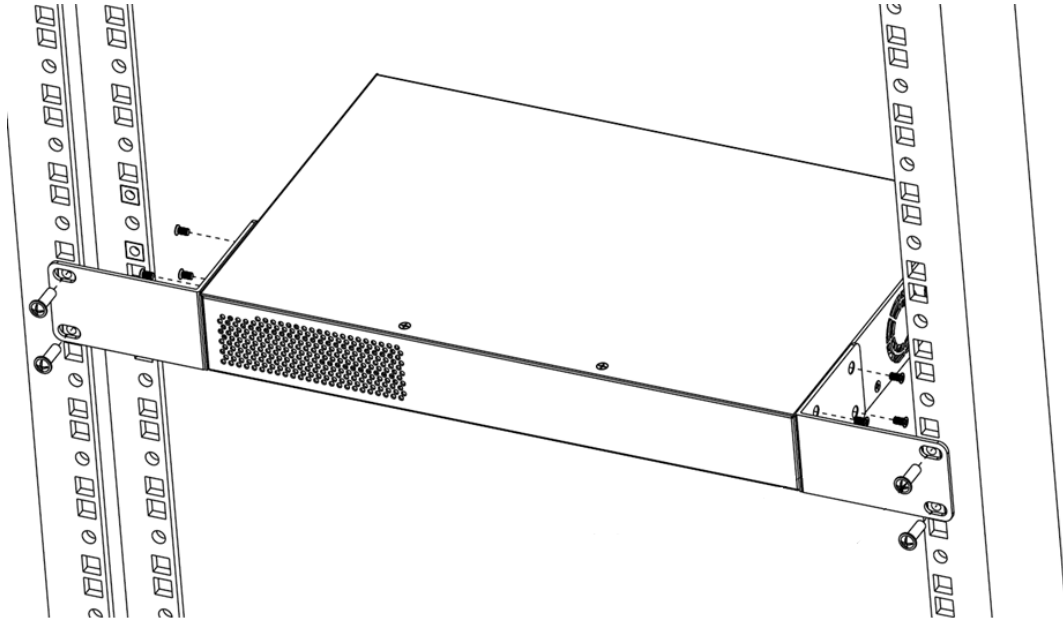3. Fasten the RPS securely to the rack rails using four customer-supplied rack screws.

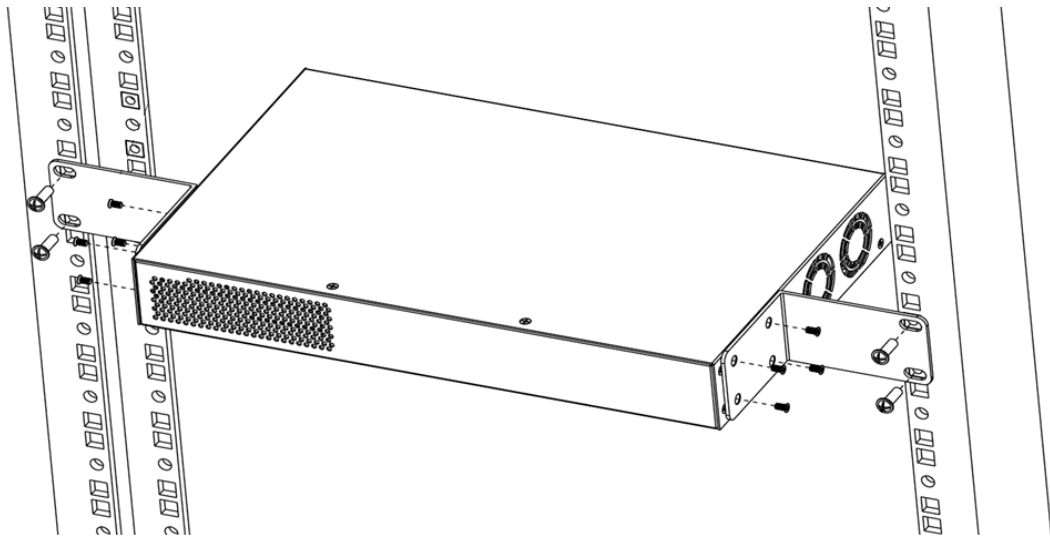**Figure 49: Flush-Mount: Mounting in a Two- or Four-Post Rack**

Figure 50: Mid-Mount: Mounting in a Two- or Four-Post Rack

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.

The supplied one meter RPS cable (part no. RPS-CBL-1M) is required for use with the RPS-550W and RPS-950W external redundant power supplies.

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.
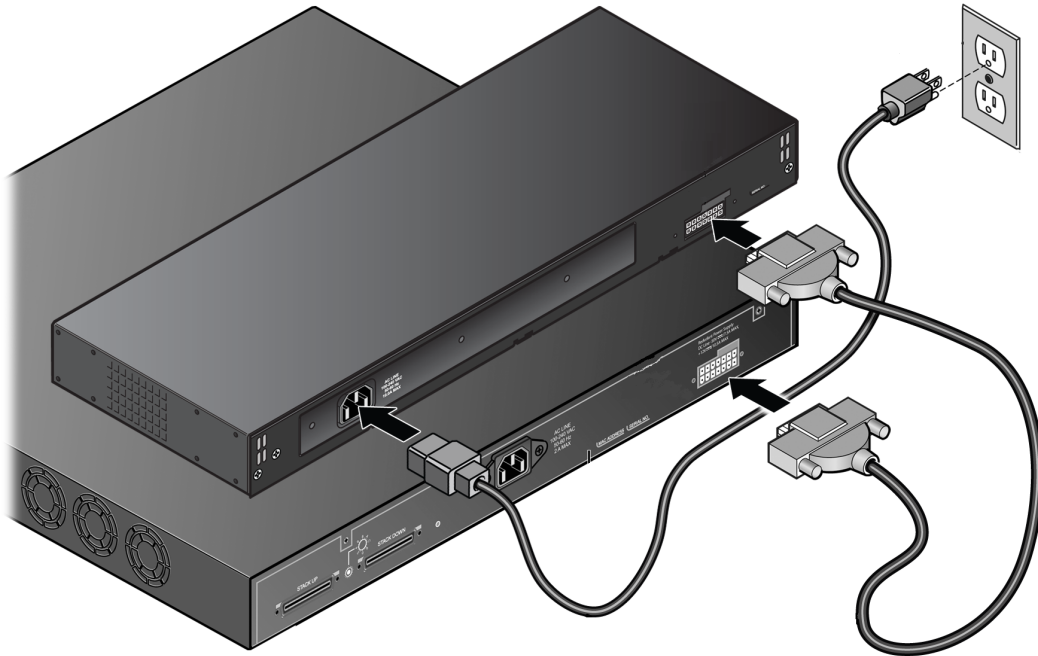

Figure 51: RPS cable and AC Power Cord Connection

The AC power LED on the rear of the RPS turns green to indicate a successful connection and that the RPS is operating properly.

If the PWR LED does not turn green, refer to External Redundant Power Supply LEDs on page 78 for troubleshooting information.

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+, 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+, SFP28, QSFP+, and QSFP28 ports.

Turn on the Switch

An AC power cord is not included with the AC power supply. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 90.

For devices that are connected to AC power, connect the power cord to the AC power input socket on the device (or power supply) and to an AC power outlet.

If the PSU LEDs do not turn green, refer to the External Redundant Power Supply LEDs on page 78 topic or the topic for your device for troubleshooting information.

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.

Activate and Verify the Switch

After you have installed the switch and connected network cables, complete these tasks to configure the software on the switch and prepare it for use.

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

The 4220 Series is designed for easy-to-use cloud management. 4220 Series switches can be managed by either of the native cloud management options ExtremeCloud™ IQ or ExtremeCloud™ IQ Site Engine, avoiding the need for complex on-switch provisioning through a direct console interface. Onboarding to the cloud is a hands-off operation using zero-touch provisioning. Connect the switch to the network and the switch automatically finds its connection to the cloud and is ready to be provisioned.

> **Note**
> An ExtremeCloud IQ Pilot License is required for each 4220 Series switch.

Use the following steps to log into the switch.

1. The initial login prompt displays as follows:
   ```
   (Pending-AAA) login:
   ```

   The failsafe account is available at this time, but the normal AAA login security is not available yet.

2. Wait for the following message to display:

```
Authentication Service (AAA) on the master node is now available for login.
```

The normal AAA login security is available at this time.

3. Press **[Enter]**.

Whether or not you press **[Enter]**, after you see the logon prompt, you can perform a normal logon.

You can perform a normal logon after you see the logon prompt regardless of whether or not you pressed **[Enter]**. The following prompt displays:

```
login
```

After you have successfully logged on, the following information about successful and unsuccessful logons displays:

```
There have been 26 successful logins since last reboot and 0 failed logins since last
successful login
Last Successful Login was on: Thu Apr 23 17:16:08 2020
```

Manual Setup

This section describes how to manually onboard the switch and finish the switch configuration.

Onboard your switch with ExtremeCloud™. Log in or create your XIQ administrator account https://extremecloudiq.com

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 68.

To perform the initial login and complete initial configuration tasks, follow these steps.

1. Use a terminal emulator such as PuTTY or TeraTerm to connect to the switch through 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, `4220-12P-4X-SwitchEngine =`). You are logged in to the CLI and have limited access to 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 .

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.

```
(Software Upgrade Required) 4220-48P-4X-SwitchEngine.1 = show version
Switch           : 801146-00-03 PA062335G-00005 Rev 03 BootROM: 3.5.0.10   IMG:
32.7.0.527

Image    : Extreme Networks Switch Engine version 32.7.0.527 by release-manager
           on Mon 04 Mar 2024 04:42:03 PM UTC
BootROM : Default 3.5.0.10  Alternate 3.5.0.10
Diagnostics : 0.0.3.2
Certified Version : EXOS Linux 5.10.177, Extreme Networks FIPS Object Module 2.0.16a
Build Tools Version : exos-arm64-sdk-3.1.19.1.0
```

> **Note**
> Software upgrade is required.

Configure the switch's IP address for the management virtual LAN (VLAN) by following the steps in .

Configure the Switch's IP Address for the Management VLAN

You can configure the switch's IP address for the management virtual LAN (VLAN).

> **Note**
> The management port is part of the `mgmt` VLAN. This VLAN membership cannot be changed.

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

If the switch has no saved configuration, a startup provisioning script asks the user about management connectivity and security:

```
By default, Auto-Provisioning uses DHCP on all Ethernet ports as this
switch attempts to connect to an Extreme Networks management product.
Instead of using DHCP, do you want to 'disable auto-provision' and
```

```
configure a static IP address, default gateway and DNS server now?
[y/N/q]:
```

From the CLI "=" prompt, you can enter `run provisioning` to run the provisioning script.

Or you can use the `vlan` CLI command to assign a name, IP address, and default subnetwork mask for the VLAN.

1. Assign a name, IP address, and default subnetwork mask for the VLAN as shown in the following example. `configure vlan` *vlan_name* `ipaddress` *nn.nn.nn.nn* `255.255.255.0`
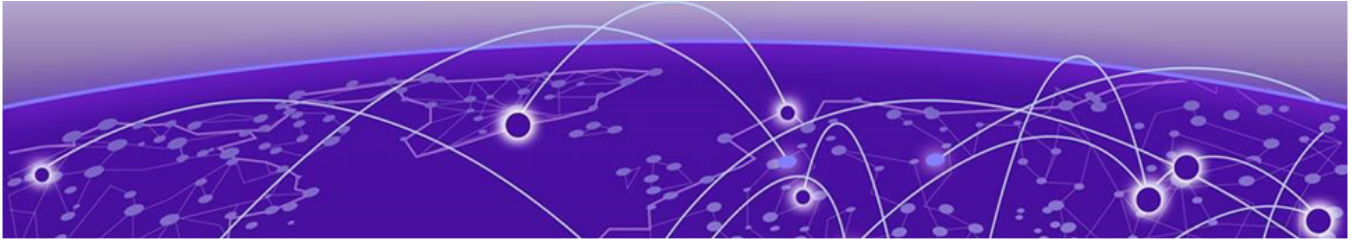
   Your changes take effect immediately.
2. Enter `save` to save your configuration changes so that they will be in effect after the next system reboot.

   > **Note**
   > For more information about saving configuration changes, see the .

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

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 72.

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.
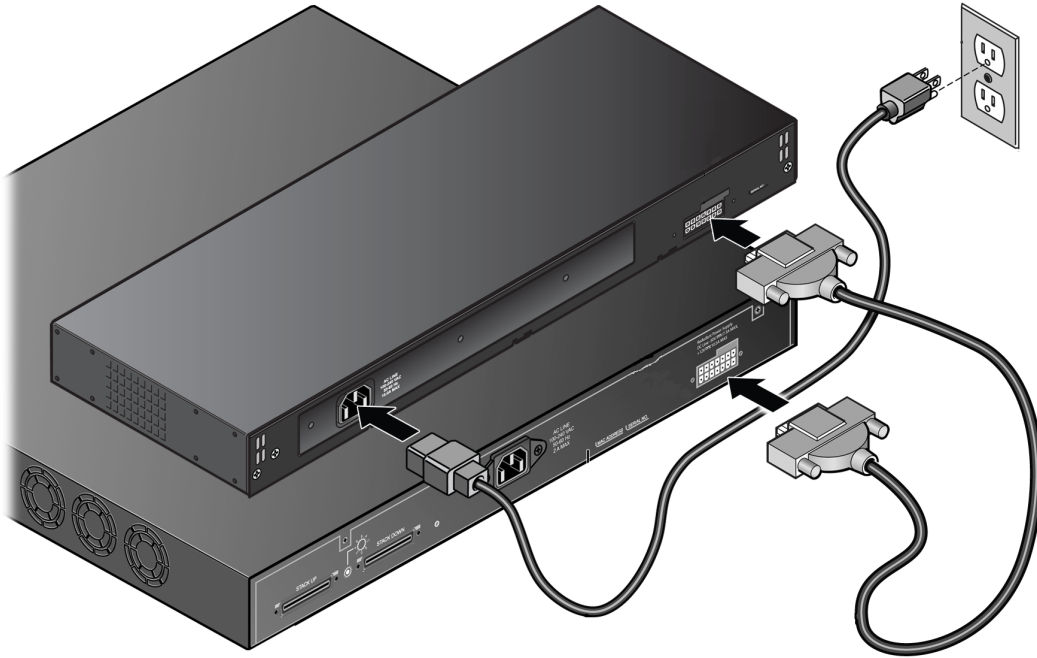

Figure 52: RPS cable and AC Power Cord Connection

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.

4220 Series Switch LEDs

System status LEDs are located on the front of the switch. The following figure shows the status LEDs for 4220 Series switches:
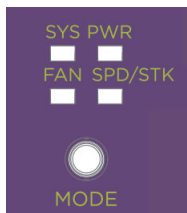
Figure 53: 4220 Series Mode and System Status LEDs

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.

Table 11: 4220 Series System LEDs

Label	Function	Color/State	Port State
SYS	System status LED (Legacy MGMT function)	Slow Blinking Green	POST Passed, normal operation. Blinks on a standalone switch, and on primary and backup nodes in a stack. Off for standby nodes in a stack.
		Blinking Green	POST in progress.
		Blinking Amber	POST failed or overheat.
		Off	No power or low power mode.
PWR	Power status LED for models with no RPS support.	Green	Power on, normal.
		Off	Power off, no power supply attached.
		Blinking Amber	Power supply failure.
	Power status LED for models with RPS support.	See Table 12 on page 76	
FAN	Fan status LEDS	Solid Green	Normal operation.
		Blinking Amber	Fan failure.
		Off	No power.
SPD/STK	Speed status LED Stacking status LED	Off (state 1)	System (SYS) mode (default)
		Amber Solid (state 2)	Speed (SPD) mode (single press of mode button)
		Green Solid (State 3)	Stacking (STK) mode (second press of the mode button)

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.

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.

Table 12: Power LEDs

Internal PSU State (indicated by a dash)	RPS State (indicated by two dots)	LED Pattern	Indication
On	Off	Green dash/off	Internal PSU OK, RPS not present.
On	On	Green dash/ Green dots	Both PSUs OK.
On	Fault	Green dash/ Amber dots	Internal PSU OK, RPS present but failed or powered down.
Fault	Not present	Amber dash/off	Internal PSU failed (54VPG is low), RPS not present. **Only valid for PoE systems.**
Fault or Off	On	Amber dash/ Green dots	Internal PSU failed or powered down, RPS is good.
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.**

Port LEDs in Default (SYS) Mode

In the default SYS mode, SPD and STK are OFF. Port status displays behavior for link, traffic, and PoE as described in the following table:

Color/State	Meaning
Solid Green	Link is OK; port is not powered.
Solid Amber	Link is OK; port is powered; no traffic.
Blinking Green	Link is OK and transmitting packets; port is not powered.
Blinking Amber	Link is active and transmitting packets; port is powered.
Slow Blinking Amber	No link, or disabled port; port is powered.
Alternating Amber and Green	Port has a power fault.
Off	Port is not powered, has no link, or is disabled.

Port LEDs in SPD Mode

SPD mode helps to determine the operational speed of a port.

Color/State	Speed
Slow Blinking Green	10Mbps
Fast Blinking Green	100Mbps
Solid Green	1000Mbps
Slow Blinking Amber	2.5Gbps
Fast Blinking Amber	5Gbps
Slow Blinking Green	10Gbps

Port LEDs in STK Mode

STK mode indicates slot presence and slot number through the first eight port LEDs. Pressing the Mode button for 5 seconds when in STK mode initiates InstStack auto-stacking.

Port 1-8 Color/State	Stacking Indication
Steady green	Slot corresponding to the port number of the LED is present.
Blinking green	This slot has the slot number corresponding to the port number of the blinking LED.

Management Port LEDs

100/1000Base-T RJ-45 Management port on the front panel includes two LEDs located on each side of the RJ-45 port. The LED on the right side is labeled Link (for link status) and the LED on the left side is labeled Act (for port activity). The following table describes the meaning of the colors and states for the LEDs.

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

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.
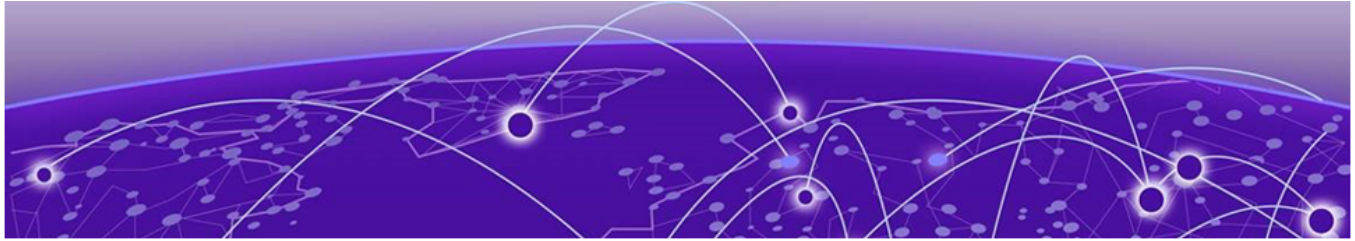
4220 Technical Specifications

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

External Interfaces

Switch Model	Interfaces
4220-12T-4X	• 12 x 10/100/1000Base-T ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A port • 1 x USB Micro-B console port
4220-12P-4X	• 12 x 10/100/1000Base-T 802.3at (30W) PoE ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port
4220-24T-4X	• 24 x 10/100/1000Base-T ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port

Switch Model	Interfaces
4220-24P-4X	• 24 x 10/100/1000Base-T 802.3at (30W) PoE ports • 4 x 1/10Gb uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port
4220-48T-4X	• 48 x 10/100/1000Base-T ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port
4220-48P-4X	• 48 x 10/100/1000Base-T 802.3at (30W) PoE ports • 4 x 1/10Gb uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port
4220-4MW-8P-4X	• 4 x 1G/2.5G/5GBaseT 802.3bt (90W) PoE ports • 8 x 10/100/1000Base-T 802.3at (30W) PoE ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port
4220-4MW-20P-4X	• 4 x 1G/2.5G/5GBaseT 802.3bt (90W) PoE ports • 20 x 10/100/1000Base-T 802.3at (30W) PoE ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port

Switch Model	Interfaces
4220-8MW-40P-4X	• 8 x 1G/2.5G/5GBaseT 802.3bt (90W) PoE ports • 40 x 10/100/1000Base-T 802.3at (30W) PoE ports • 4 x 1/10Gb SFP+ uplink/stacking ports (unpopulated) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x Serial console port (RJ-45) • 1 x USB A ports • 1 x USB Micro-B console port
4220-8X	• 8 x 1/10Gb SFP+ ports (unpopulated) • 1 x Serial console port (RJ-45) • 1 x 10/100/1000BASE-T out-of-band management port • 1 x USB A ports • 1 x USB Micro-B console port

Weights and Dimensions

Table 13: 4220 Systems

Part Number	Weight	Physical Dimensions
4220-12T-4X	5.5 lb / 2.5 kg	12.0 in W / 1.7 in H / 10.3 in D 305 mm / 44 mm / 261 mm
4220-12P-4X	6.8 lb / 3.1 kg	
4220-24T-4X	7.0 lb / 3.1 kg	17.36 in W / 1.7 in H / 10.0 in D 441 mm / 43 mm / 254 mm
4220-24P-4X	9.6 lb / 4.4 kg	17.4 in W / 1.7 in H / 13.0 in D 441 mm / 44 mm / 330 mm
4220-48T-4X	10.0 lb / 4.5 kg	
4220-48P-4X	11.2 lb / 5.1 kg	
4220-4MW-8P-4X	7.1 lb / 3.2 kg	12.0 in W / 1.7 in H / 10.3 in D 305 mm / 44 mm / 261 mm
4220-4MW-20P-4X	10.6 lb / 4.8 kg	17.4 in W / 1.7 in H / 13.0 in D 441 mm / 44 mm / 330 mm

Table 13: 4220 Systems (continued)

Part Number	Weight	Physical Dimensions
4220-8MW-40P-4X	11.9 lb / 5.4 kg	
4220-8X	5.2 lb / 2.4 kg	12.0 in W / 1.7 in H / 10.3 in D 305 mm / 44 mm / 261 mm

Table 14: 4220 Redundant Power Supplies

Part Number	Weight	Physical Dimensions
RPS-550W	5.0 lb / 2.3 kg	12.6 in W / 1.7 in H / 7.9 in D 320 mm / 43 mm / 200 mm
RPS-950W	5.4 lb / 2.4 kg	

Table 15: 4220 Console Cables and Bluetooth Adapter

Part Number	Weight	Physical Dimensions
RPS-CBL-1M	1.3 lb / 0.6 kg	39.4 in W / 0.9 in H / 3.1 in D 1000 mm / 24 mm / 80 mm
RPS-CBL-1M-2x7	1.0 lb / 0.5 kg	39.4 in W / 0.9 in H / 2.4 in D 1000 mm / 23 mm / 62 mm

Acoustics

Memory

The following table includes memory specifications for the 4220 Series switches.

Specifications
2 GB DDR4 ECC memory
1 GB SLC NAND flash memory
8 MB of SPI NOR flash memory

Mean Time Between Failures (MTBF)

Model	SR-332-Issue 3 MTBF kHRs	Achieved Value (HRs)
4220-12T-4X	> 350 @ 25°C	797,257
4220-12P-4X	> 350 @ 25°C	504,047
4220-24T-4X	> 350 @ 25°C	765,828
4220-24P-4X	> 350 @ 25°C	649,524
4220-48T-4X	> 350 @ 25°C	538,051
4220-48P-4X	> 350 @ 25°C	402,506

Model	SR-332-Issue 3 MTBF kHRs	Achieved Value (HRs)
4220-4MW-8P-4X	> 350 @ 25°C	402,506
4220-4MW-20P-4X	> 350 @ 25°C	358,402
4220-8MW-40P-4X	> 350 @ 25°C	343,085
4220-8X	> 350 @ 25°C	570,373

Power Specifications

Internal Fixed and Optional External Redundant Power Supply

Switch Model	Internal Fixed PSU - Max Power	Secondary PSU
4220-12T-4X	65W	–
4220-12P-4X	370W	–
4220-24T-4X	65W	–
4220-24P-4X	370W	–
4220-48T-4X	150W	–
4220-48P-4X	550W	–
4220-4MW-8P-4X	370W	–
4220-4MW-20P-4X	550W	RPS-550W
4220-8MW-40P-4X	950W	RPS-950W
4220-8X	65W	–

Max PoE Power Budget

Switch Model	PoE Budget
4220-12P-4X	124W
4220-24P-4X	195W
4220-48P-4X	370W
4220-4MW-8P-4X	240W
4220-4MW-20P-4X	370W
4220-8MW-40P-4X	740W

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)**
4220-12T-4X	12	41	26	89
4220-12P-4X	17	58	166	142
4220-24T-4X	15	50	31	104
4220-24P-4X	20	68	252	195
4220-48T-4X	28	96	52	177
4220-48P-4X	30	103	470	340
4220-4MW-8P-4X	19	64	304	219
4220-4MW-20P-4X	22	73	458	300
4220-8MW-40P-4X	35	118	899	542
4220-8X	11	38	30	103

Environmental

Environmental Specifications

EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage

EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation

EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational

EN/ETSI 300 753 (1997-10) - Acoustic Noise

ASTM D3580 Random Vibration Unpackaged 1.5 G

Environmental Compliance

EU RoHS - 2011/65/EU

EU WEEE - 2012/19/EU

EU REACH – Regulation (EC) No 1907/2006 Reporting

China RoHS - SJ/T 11363-2006

Taiwan RoHS - CNS 15663(2013.7)

Environmental Operating Conditions

Temp: 0°C to 50°C (32°F to 122°F)

Humidity: 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 EMC for ITE

FCC CFR 47 part 15 Class A (USA)

ICES-003 Class A (Canada)

European EMC Standards

EN 55032 Class A

EN 55035

EN 61000-3-2 (Harmonics)

EN 61000-3-3 (Flicker)

EN 300 386 (EMC Telecommunications)

2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions)

AS/NZS CISPR32

IEC 61000-4-2 / EN 61000-4-2: Electrostatic Discharge, 8kV Contact, 15kV 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 / EN 61000-4-6 Conducted Immunity, 0.15-80 MHz, 3Vrms, 80%AM (1kHz), Criteria A

IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

VCCI Class A (Japan Emissions)

ACMA RCM (Australia Emissions)

CQC Mark (China)

KCC Mark, EMC Approval (Korea)

BSMI (Taiwan)

Anatel (Brazil)

NoM (Mexico)

EAC (Russia, Belarus, Kazakhstan)

NRCS (South Africa)

TEC (India)

IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T

IEEE 802.3bz 2.5G/5GBASE-T

IEEE 802.3at PoE

IEEE 802.3bt Type 4 PoE

IEEE 802.3ae 10GBASE-R

IEEE 802.3by 25GBASE-R

IEEE 802.3bm/bj 100GBASE-R

IEEE 802.3az Energy Efficient Ethernet

Regulatory and Safety

North American ITE

60950-1

UL/cUL 62368-1

CAN/CSA 22.2 No. 60950-1 (Canada)

CAN/CSA 22.2 No. 62368-1

Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)

CDRH Letter of Approval (US FDA Approval)

European ITE

EN 62368-1

EN 60825-1 Class 1 (Lasers Safety)

2014/35/ EU Low Voltage Directive

International ITE

CB Report & Certificate per IEC 60950-1

CB Report & Certificate IEC 62368-1

AS/NZS 60950-1 (Australia /New Zealand)

Safety 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 45°C (113°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 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.

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

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

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

- Cable runs between buildings are less than 140 feet long.
- Cable runs between buildings are directly buried.
- Cable runs between buildings are in an underground conduit, where a continuous metallic cable shield or a continuous metallic conduit containing the cable is bonded to each building grounding electrode system.

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

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

This warning does not apply to T1/E1 ports because T1/E1 ports have built-in isolation and surge protection that allows them to be connected to OSP wiring.

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/.

Select Power Supply Cords

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

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

> **Note**
> This equipment is not intended to be directly powered by power distribution systems where phase-phase voltages exceed 240 VAC (2P+PE), such as those used in Norway, France, and other countries. For these applications it is recommended that a transformer be used to step down the voltage to < 240 VAC from phase-phase, or that you make a connection to a (P+N+PE) power distribution where voltages do not exceed 240 VAC.
> All installations should confirm that the product is reliably grounded according to the country's local electrical codes.

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

> **Warning**
> Extreme Networks power supplies do not have switches for turning the unit on and off. Disconnect all power cords to remove power from the device. Make sure that these connections are easily accessible.
>
> Extreme Networks alimentations n'ont pas de contact pour mettre l'appareil sous et hors tension. Débranchez tous les cordons d'alimentation pour couper l'alimentation de l'appareil. Assurez-vous que ces connexions sont facilement accessibles.

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。

Regulatory Information

CE statement

> **Important**
> This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures.

The standards compliance label on this device contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU
- EN 55032/EN 55024 (European Immunity Requirements)
  - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
  - EN61000-3-3

EMC Warnings

China CQC Warning

<div align="center">

警告:在居住环境中，运行此设备可能
会造成无线电干扰。

</div>

China and Taiwan: Restriction of Hazardous Substances (ROHS)

For more information, see https://www.extremenetworks.com/company/legal/restriction-of-hazardous-substances/.

BSMI statement (Taiwan)

<div align="center">

警告:為避免電磁干擾,本產品不應安裝
或使用於住宅環境。

</div>

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

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

Australia (RCM)

Warning

This equipment is compliant with Class B of CISPR 32. In a residential environment, this equipment may cause radio interference.

Federal Communications Commission (FCC) Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this

device must accept any interference received, including interference that may cause undesired operation.

> **Note**
>
> This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment uses, generates, and can radiate radio frequency energy and if not installed in accordance with the operator's manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

WARNING: Changes or modifications made to this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Germany statement

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 70.0 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70.0 dB(A) gemäss EN ISO 7779.

KCC statement (Republic of Korea)

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

Class A device (Broadcasting Communication Device for Office Use): This device obtained EMC registration for office use (Class A), and may be used in places other than home. Sellers and/or users need to take note of this.

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

Japan power cord

注意 - 添付の電源コードを他の装置や用途に使用しない
添付の電源コードは本装置に接続し、使用することを目的として設計され、その安全性が確認されているものです。決して他の装置や用途に使用しないでください。火災や感電の原因となる恐れがあります。

English translation of above statement

ATTENTION: Never use the power cord packed with your equipment for other products.

Index

Numerics

A

B

C

D