# Extreme® networks

# 5520 Series Installation Guide

## Setup, Configuration, and Best Practices

# Table of Contents

# Abstract

This hardware installation guide for 5520 Series covers procedures for setting up the switches, including site preparation, rack installation, and power supply specifications. It details various models, describing port configurations, cooling systems, and power options. The guide outlines management interfaces, including RJ45 and USB ports, and discusses stack configuration, secure boot processes, and operating environment requirements. It also includes instructions for handling power supplies, fan modules, and versatile interface modules (VIMs). The document is intended for network administrators familiar with LANs, Ethernet, and SNMP protocols.

# Introduction to the 5520 Series Installation Guide

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

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

See the *Switch Engine User Guide* and the *Switch EngineCommand References* for your version of the *Switch Engine* operating system for information about configuring Extreme Networks switches.

> **Note**
> If the information in an installation note or release note shipped with your Extreme Networks equipment differs from the information in this guide, follow the installation or release note.

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 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. |

**Table 3: Command syntax (continued)**

| Convention | Description |
|---|---|
| [  ] | Syntax components displayed within square brackets are optional.<br>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 Product-Documentation@extremenetworks.com.

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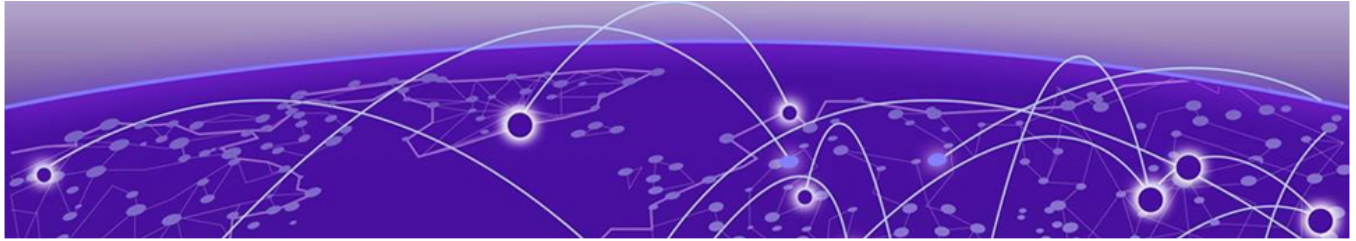
# New in this Guide

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

## August 2025

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

| Description | Section |
|---|---|
| Update for mixing AC and DC power supplies has been added. | Power Supplies for Use with Your Switch on page 35<br>Replace Power Supplies on page 100 |
| Update for the mixed speeds table entry for the 5520-VIM-4YE has been added. | Versatile Interface Modules for the 5520 Series Switches on page 49 |

# Overview

The 5520 Series is a family of high-performance aggregation switches. The 5520 Series universal hardware provides end-to-end secure network segmentation, in addition to advanced policy capabilities, and offers a user-selectable choice of Extreme's flagship switch operating systems.

The 5520 Series includes 24- and 48-port 1 Gigabit models, 1/2.5/5 Gigabit multi-rate models, as well as a 24-port 10 Gigabit model. The family also offers 30/60/90W PoE, and supports 10G and 25G modular uplinks for flexible linkage to other switches or devices over a range of media.

The 10/100/1000Base-T ports on the 5520-24W/12MW-36W/48T/48W models can operate in half-duplex mode when operating at 10Mbps or 100Mbps. Half-duplex is not supported on these ports when operating at 1Gbps.

## Universal Hardware

The switch comes with a dual-persona capability, allowing you to choose your Operating System (OS). Either the Switch Engine (EXOS) or Fabric Engine (VOSS) OS can be selected at switch start-up or changed at a later time. The switch assumes the features and capabilities of the OS that is selected. Switch OS selection can also be automated with ExtremeCloud IQ so that the desired OS can be automatically loaded at switch start-up, which facilitates remote OS enablement.

## Management

The switch supports connections using the RJ45 serial console port, the Ethernet management port, or the Micro-USB Type B port to view and manage the switch configuration. For more information on switch connection methods, see Manage Your

Switch. For switch connection details, see Connect to a Management Console on page 94.

After connecting to your switch, it can be flexibly configured and operated though the cloud, the network, or the command-line interface (CLI), either remotely or locally. You can access management functions on the switch using ExtremeCloud™ IQ or ExtremeCloud IQ Site Engine, or manually through a web-based GUI or generic command-line interface (CLI) client. For more information on switch configuration and operation methods, see Manage Your Switch.

> **Note**
> There are also two USB 2.0 Type A ports labeled USB 1 and USB 2. USB 1 is located on the front panel, while USB 2 is located on the rear panel. The USB ports can interface with USB storage devices.
>
> The first USB storage device inserted is mounted and can be used under the Switch Engine operating system as `/usr/local/ext`, or under the Fabric Engine operating system as `/usb`. A second inserted USB storage device is not used until the first one is removed.

## Instant Onboarding

Switch onboarding to the cloud is a hands-off operation using zero touch provisioning. Unpack the switch and connect it to the network. It automatically finds a connection to the cloud and is ready to be provisioned. The ExtremeCloud Companion mobile app makes onboarding even easier with on-site cloud set-up and switch troubleshooting capabilities.

## Cooling

Each switch is cooled by hot-swappable internal fan modules. Most 5520 Series models have fan modules that provide front-to back airflow. Models 5520-24T-BASE, 5520-24X-BASE, 5520-48T-BASE, and 5520-48SE-BASE require fan modules that provide back-to-front airflow. Models 5520-24T-ACDC, 5520-24X-ACDC, 5520-48T-ACDC, and 5520-48SE-ACDC support fan modules with either front-to-back airflow or back-to-front airflow. Switch fans are not responsible for cooling the power supplies; power supplies have integrated cooling fans that operate independently of the switch fan. Fan modules are ordered separately for models 5520-24T-BASE, 5520-24T-ACDC, 5520-24X- BASE, 5520-24X-ACDC, 5520-48T-BASE, 5520-48T-ACDC, 5520-48SE-BASE, and 5520-48SE-ACDC. Fan modules are included with other models.

For more information about the fan modules used in the switch, see Fan Modules for Use with Your Switch on page 33.

## Power Supplies

Most 5520 Series models use up to two hot-swappable internal AC power supplies to provide enough power for the needs of the switch. Power supplies have integrated cooling fans that operate independently of the switch fans for power supply cooling and are not responsible for cooling the switch. Models 5520-24T-ACDC, 5520-24X-ACDC,

5520-48T-ACDC, and 5520-48SE-ACDC support AC and DC power supplies. Power supplies are ordered separately.

For more information about the power supplies used in the switch, see Power Supplies for Use with Your Switch on page 35.

## Expansion Modules

The switch supports hardware accessories that expand the capabilities of the switch. Collectively, they are referred to as *expansion modules*. The following expansion modules are compatible with the switch:

### Versatile Interface Modules (VIMs)

A VIM is a plug-in expansion card used to add specific types of network ports and features. A VIM can be installed in the switch to provide dedicated high speed ports and flexible uplink capabilities with a single VIM slot.

### Virtual Port Extenders

A virtual port extender can be installed in the switch. Bridge port extenders (BPEs) receive packets from extended ports and forward packets toward the upstream controlling bridge (a Switch Engine-based switch) for L2/L3 processing. They do not fully process packets or make forwarding or filtering decisions.

For more information, see Expansion Modules for Use with Your Switch on page 41.

## Stacking Ports

Each switch comes equipped with two stacking ports, also referred to as Universal Ethernet ports. 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. Fabric Engine does not support stacking; the stacking ports can be used as Ethernet ports if Fabric Engine is in non-fabric mode.

> **Note**
> The 5520 Series can stack with themselves and with other switches. See Combine Switches from Different Series on page 65 for more information.

- Stacking cables are ordered separately.
- For more information about stacking ports, see Universal Ethernet Ports on page 30.
- For information about optical modules, see the Extreme Optics website.
- For more information about stacking, see Build Stacks on page 53.

## Instant Stack

Instant Stack simplifies cloud-based stack provisioning, enabling the entire switch stack to be set-up through a single push-button operation. Real-world stack information,

including each switch model and their stack order, is captured and replicated in the cloud. Once set up, the entire stack is then ready to be cloud-provisioned

> **Note**
> This feature is only supported on Switch Engine.

## Instant Port

Instant Port automates the adds, moves or changes across switch ports, which eliminates the need for manual port configuration. The switch automatically detects the connected device type and applies the correct port parameters. The result is significant time savings when adding or moving devices across the wired network. There is a simple cloud interface which allows Instant Port definitions of customer designated device types that can then be applied across a single switch, a stack, or even all switches in the network.

> **Note**
> This feature is only supported on Switch Engine.

## Instant Secure Port

Instant Secure Port utilizes ExtremeCloud Universal ZTNA for authentication and zero-trust policy enforcement across switch ports, while providing the same add, move, and change automation features of Instant Port. It simplifies switch security by using Universal ZTNA's cloud-based security capabilities, including Radius authentication, unified visibility and reporting, as well as policy enforced locally on switch ports. Instant Secure Port delivers a consistent and frictionless security experience for any user or device connecting through the switch.

> **Note**
>
> ExtremeCloud Universal ZTNA requires a separate license.
> This feature is only supported on Switch Engine.

## Secure Boot

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

For more information, see Secure Boot on page 31.

## Operating Temperatures

All 5520 Series switches using front-to-back airflow support an operating range from 0°C (32°F) to 50°C (122°F). All 5520 Series switches using back-to-front airflow support an operating range from 0°C (32°F) to 45°C (113°F).

Temperature restrictions apply for some models at high altitudes.

## Feature Licensing

5520 Series switches support Unified Licensing, so that you can use them with multiple operating systems. There are two methods of acquiring feature licenses: manual or through ExtremeCloud IQ$^{TM}$ (XIQ).

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

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

For XIQ licensing, see *ExtremeCloud IQ*.

## 5520-24T, 5520-24T-BASE, and 5520-24T-ACDC Switch Features

The front panel of the 5520-24T, 5520-24T-BASE, and 5520-24T-ACDC switch includes:

1 = 24 x 10/100/1000Mb full/half duplex MACsec capable ports

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

2 = USB Type-A port for management or external USB flash
3 = USB Micro-B console port
4 = 2 x QSFP28 Universal Ports/stacking ports (unpopulated)
5= VIM slot (unpopulated, covered)
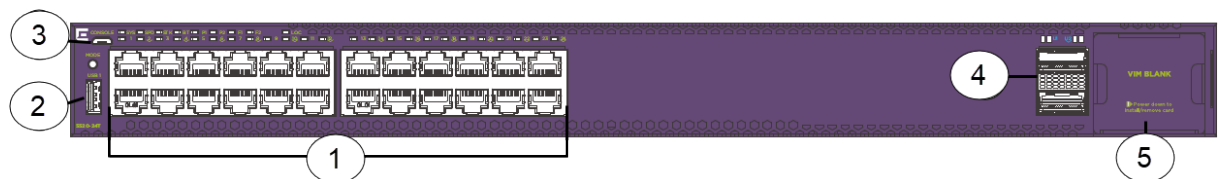


**Figure 1: 5520-24T, 5520-24T-BASE, and 5520-24T-ACDC Front Panel**

The rear panel of the switch includes:

> **Note**
> Power supplies and fans are not included with the 5520-24T-BASE and 5520-24T-ACDC models. They must be ordered separately. The 5520-24T-BASE and 5520-24T-ACDC models support fan modules and power supply units with either front-to-back or back-to-front airflow.

**1 =** 2 x Fan module slots (3 fan module slots for model 5520-24T-ACDC)

**2 =** Grounding lug

**3 =** Serial console port

**4 =** Out-of-band management port (RJ-45 )

**5 =** USB Type-A port for management or external USB flash

**6 =** Locator LED

**7 =** 2 x Power supply slots (unpopulated)
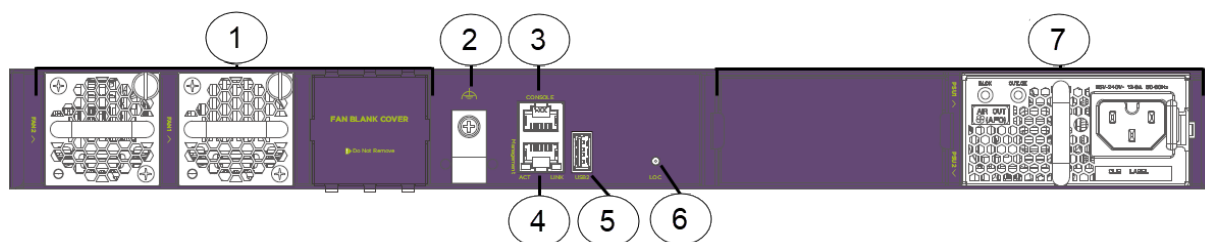


**Figure 2: 5520-24T, 5520-24T-BASE, and 5520-24T-ACDC Rear Panel**

## 5520-24W Switch Features

The front panel of the 5520-24W switch includes:

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

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

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

**3 =** USB Micro-B console port

**4 =** 2 x QSFP28 Universal Ports/stacking ports (unpopulated)

**5=** VIM slot (unpopulated, covered)
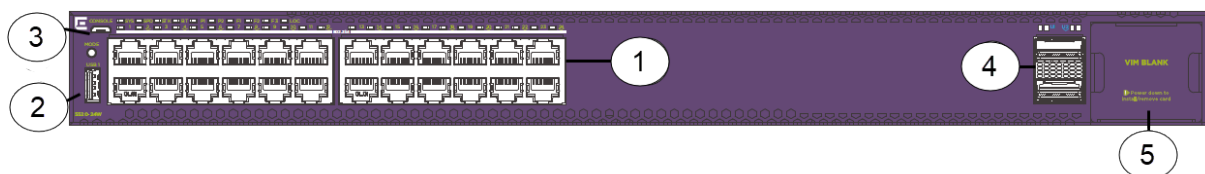


**Figure 3: 5520-24W Front Panel**

The rear panel of the switch includes:

**1 =** 3 x Fan module slots

**2 =** Grounding lug

**3 =** Serial console port

**4 =** Out-of-band management port (RJ-45 )

**5 =** USB Type-A port for management or external USB flash

**6 =** Locator LED

**7 =** 2 x Power supply slots (unpopulated)
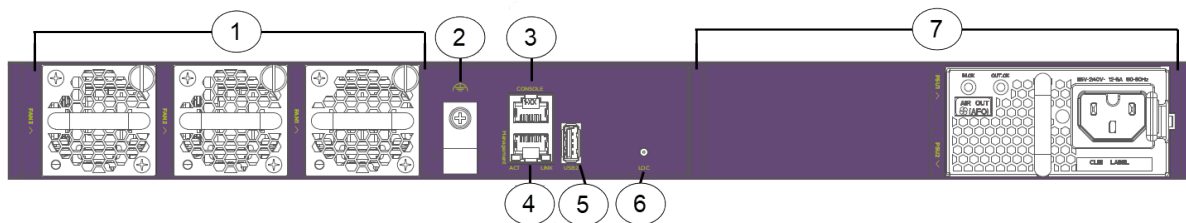
**Figure 4: 5520-24W Rear Panel**

## 5520-24X, 5520-24X-BASE, and 5520-24X-ACDC Switch Features

The front panel of the 5520-24X, 5520-24X-BASE, and 5520-24X-ACDC switch includes:

**1 =** 24 x 100Mb/1GB/10Gb SFP+ ports

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

**3 =** USB Micro-B console port

**4 =** 2 x QSFP28 Universal Ports/stacking ports (unpopulated)

**5=** VIM slot (unpopulated, covered)

> **Note**
>
> 5520-24X, 5520-24X-BASE, and 5520-24X-ACDC switches do not support 10G LRM and ZR optics.
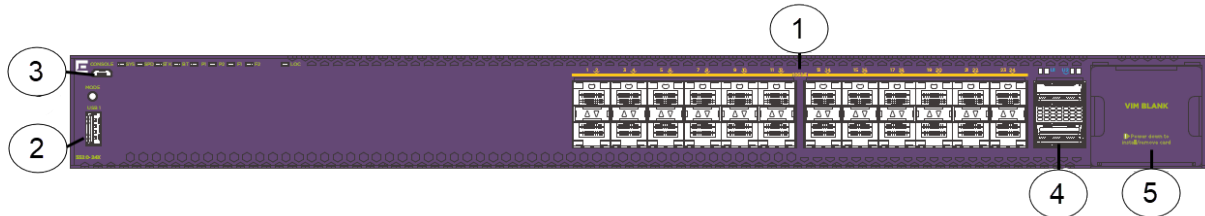


**Figure 5: 5520-24X, 5520-24X-BASE, and 5520-24X-ACDC Front Panel**

The rear panel of the switch includes:

> **Note**
>
> Power supplies and fans are not included with the 5520-24X-BASE and 5520-24X-ACDC models. They must be ordered separately. The 5520-24X-BASE and 5520-24X-ACDC models support fan modules and power supply units with either front-to-back or back-to-front airflow.

**1 =** 2 x Fan module slots (3 fan module slots for model 5520-24X-ACDC)

**2 =** Grounding lug

**3 =** Serial console port

**4 =** Out-of-band management port (RJ-45 )

**5 =** USB Type-A port for management or external USB flash

**6 =** Locator LED

**7 =** 2 x Power supply slots (unpopulated)
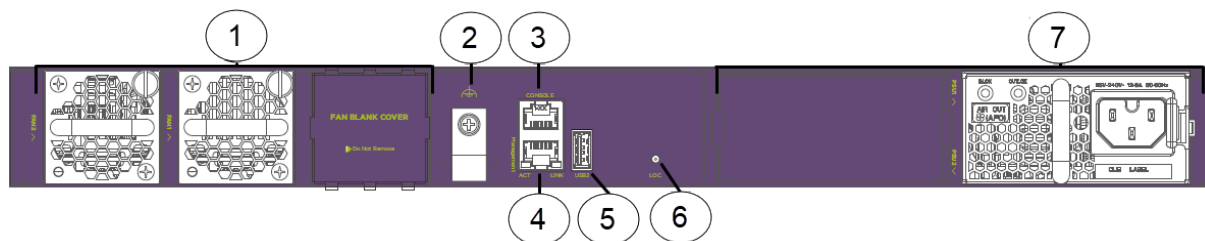
**Figure 6: 5520-24X, 5520-24X-BASE, and 5520-24X-ACDC Rear Panel**

## 5520-12MW-36W Switch Features

The front panel of the 5520-12MW-36W switch includes:

**1 =** 36 x 10/100/1000Mb full/half duplex MACsec capable ports with 802.3bt Type 4 PoE (90W)

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

**2 =** USB Type-A port for management or external USB flash
**3 =** USB Micro-B console port
**4 =** 2 x QSFP28 Universal Ports/stacking ports (unpopulated)
**5=** VIM slot (unpopulated, covered)
**6 =** 12 x 100Mb/1/2.5/5Gb multi-rate MACsec capable ports



**Figure 7: 5520-12MW-36W Front Panel**

The rear panel of the switch includes:

**1 =** 3 x Fan module slots
**2 =** Grounding lug
**3 =** Serial console port
**4 =** Out-of-band management port (RJ-45 )
**5 =** USB Type-A port for management or external USB flash
**6 =** Locator LED
**7 =** 2 x Power supply slots (unpopulated)
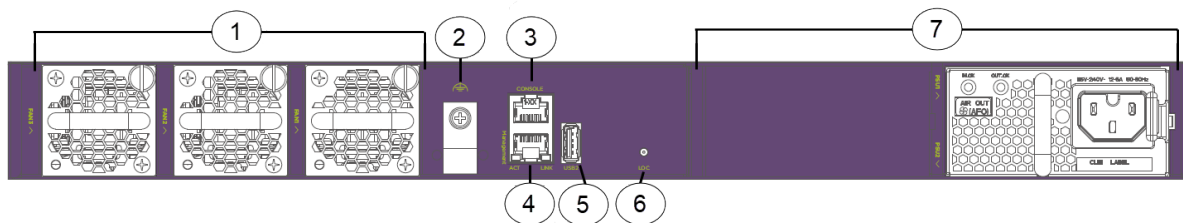
**Figure 8: 5520-12MW-36W Rear Panel**

# 5520-48T, 5520-48T-BASE, and 5520-48T-ACDC Switch Features

The front panel of the 5520-48T, 5520-48T-BASE, and 5520-48T-ACDC switch includes:

**1 =** 48 x 10/100/1000Mb full/half duplex MACsec capable ports

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

**2 =** USB Type-A port for management or external USB flash
**3 =** USB Micro-B console port
**4 =** 2 x QSFP28 Universal Ports/stacking ports (unpopulated)
**5=** VIM slot (unpopulated, covered)
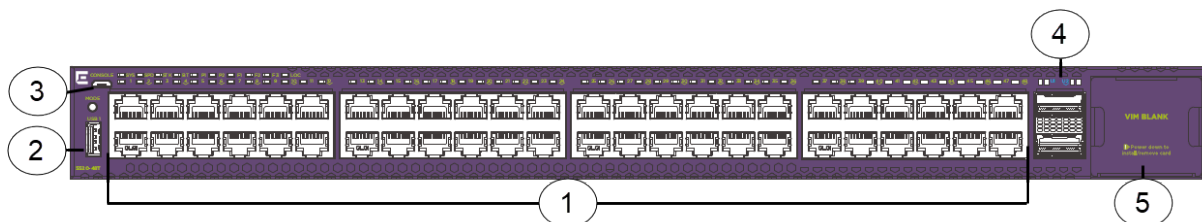


**Figure 9: 5520-48T, 5520-48T-BASE, and 5520-48T-ACDC Front Panel**

The rear panel of the switch includes:

> **Note**
> Power supplies and fans are not included with the 5520-48T-BASE and 5520-48T-ACDC models. They must be ordered separately. The 5520-48T-BASE and 5520-48T-ACDC models support fan modules and power supply units with either front-to-back or back-to-front airflow.

**1 =** 3 x Fan module slots
**2 =** Grounding lug
**3 =** Serial console port
**4 =** Out-of-band management port (RJ-45 )
**5 =** USB Type-A port for management or external USB flash
**6 =** Locator LED
**7 =** 2 x Power supply slots (unpopulated)
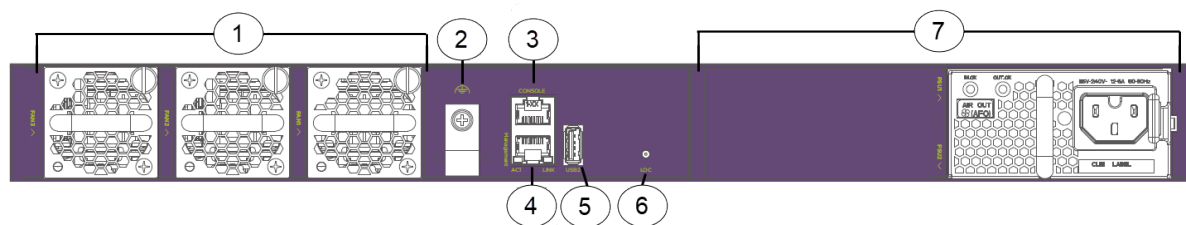
**Figure 10: 5520-48T, 5520-48T-BASE, and 5520-48T-ACDC Rear Panel**

## 5520-48W Switch Features

The front panel of the 5520-48W switch includes:

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

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

**2 =** USB Type-A port for management or external USB flash
**3 =** USB Micro-B console port
**4 =** 2 x QSFP28 Universal Ports/stacking ports (unpopulated)
**5=** VIM slot (unpopulated, covered)
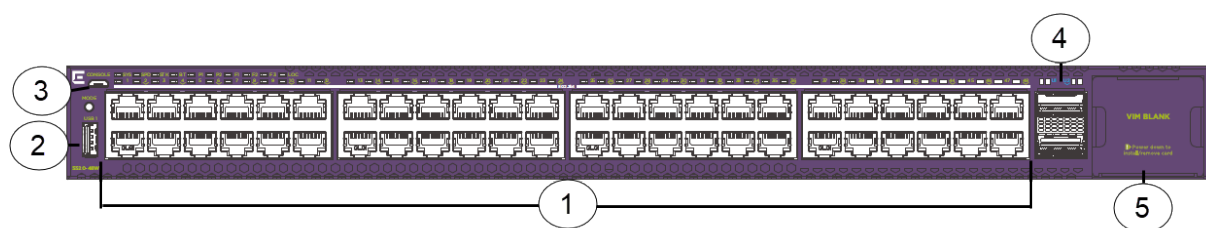


**Figure 11: 5520-48W Front Panel**

The rear panel of the switch includes:

**1 =** 3 x Fan module slots
**2 =** Grounding lug
**3 =** Serial console port
**4 =** Out-of-band management port (RJ-45 )
**5 =** USB Type-A port for management or external USB flash
**6 =** Locator LED
**7 =** 2 x Power supply slots (unpopulated)
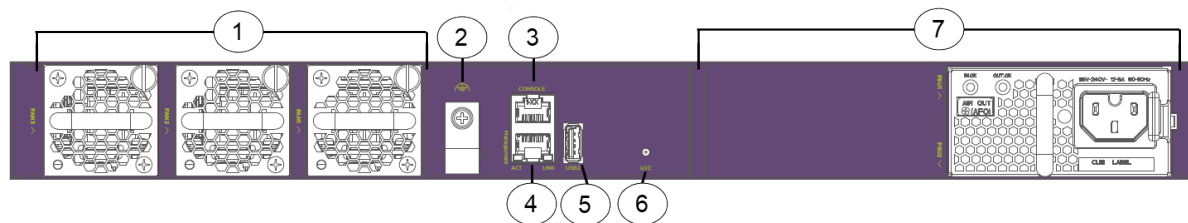
**Figure 12: 5520-48W Rear Panel**

# 5520-48SE, 5520-48SE-BASE, and 5520-48SE-ACDC Switch Features

The front panel of the 5520-48SE, 5520-48SE-BASE, and 5520-48SE-ACDC switch includes:

1 = 48 100/1000BASE-X MACsec capable SFP ports

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

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

3 = USB Micro-B console port

4 = 2 x QSFP28 Universal Ports/stacking ports (unpopulated)

5= VIM slot (unpopulated, covered)
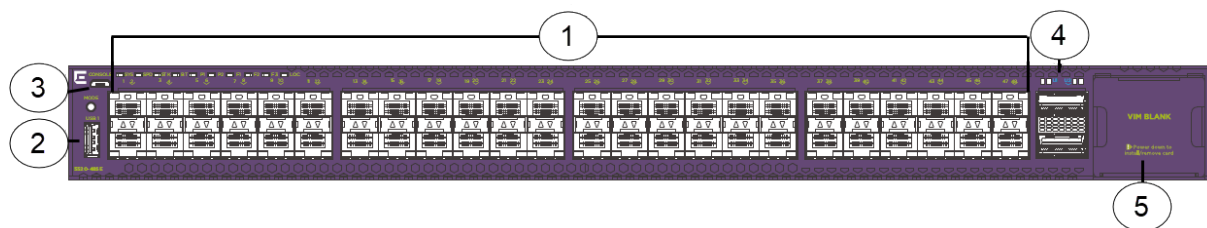


**Figure 13: 5520-48SE, 5520-48SE-BASE, and 5520-48SE-ACDC Front Panel**

The rear panel of the switch includes:

> **Note**
> Power supplies and fans are not included with the 5520-48SE-BASE and 5520-48SE-ACDC models. They must be ordered separately. The 5520-48SE-BASE and 5520-48SE-ACDC models support fan modules and power supply units with either front-to-back or back-to-front airflow.

1 = 3 x Fan module slots

2 = Grounding lug

3 = Serial console port

4 = Out-of-band management port (RJ-45 )

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

6 = Locator LED

7 = 2 x Power supply slots (unpopulated)
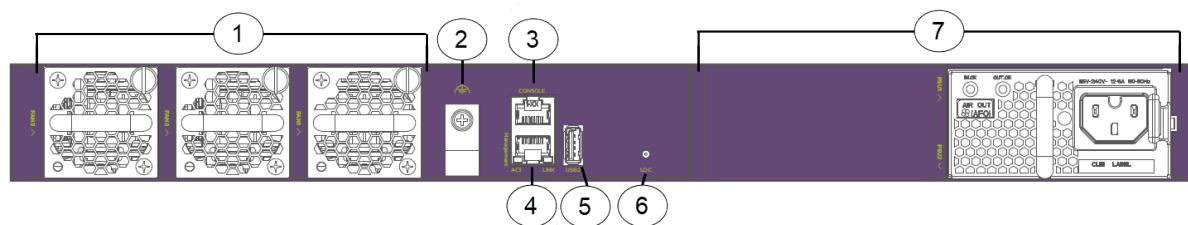
Figure 14: 5520-48SE, 5520-48SE-BASE, and 5520-48SE-ACDC Rear Panel

# Port Subdivisions

On some Extreme Networks switch models, you can configure QSFP28 ports either as single ports or as multiple, partitioned ports in Switch Engine, or channelized ports in Fabric Engine. In a partitioned or channelized port, with appropriate cabling, the original physical port can accommodate multiple data lanes at lower bandwidths. Ports are not partitioned by default.

The following options are available:

**Table 4: Port Partitioning**

| Device | Port Bandwidth | Port Partitions |
|---|---|---|
| 5520 (all models) QSFP28 | 100 Gb | One QSFP28 port with one of the following:<br>· Two 50 Gb ports (Switch Engine only)<br>· One 40 Gb port (default)<br>· Four 25 Gb ports<br>· Four 10 Gb ports<br><br>**Note:** These ports do not support 1x100Gb |

For information about configuring partitioned ports, see the *Switch Engine Command References* for your version of the Switch Engine operating system, or the *Fabric Engine Command References* for your version of the Fabric Engine operating system.

# Manage Your Switch

Each switch can be flexibly managed though the cloud, the network, or the command-line interface (CLI), either remotely or locally.

## Connect to Your Switch

You can use the following methods to connect to the switch.

**RJ45 serial console port**

Attach an RJ45 to DB9 adapter cable to the RJ45 serial console port on the switch to connect a terminal to manage the switch locally. The RJ45 serial console port is located on the rear panel of the switch.

**Ethernet management port**

Attach an Ethernet cable to the Ethernet management port to connect the system to an out-of-band management network to manage the switch. An Ethernet management port provides dedicated remote access to the switch using TCP/IP. The switch uses an Ethernet management port only for host operation, not for switching or routing.

Alternatively, attach an Ethernet cable directly to the Ethernet management port and a laptop to view and locally manage the switch configuration.

The Ethernet management port is located on the rear panel of the switch. It supports 10/100/1000 Mbps speeds.

**Micro-USB Type B port**

Attach the Micro-USB Type B end of a Micro-USB Type B to USB Type A cable to the Micro-USB Type B port on the switch, and the USB Type A end to a PC or laptop to view and locally manage the switch configuration. The Micro-USB Type B port is located on the front panel of the switch.

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

For switch connection details, see Connect to a Management Console on page 94.

# Configure and Operate Your Switch

The switch supports flexible configuration and operation through the following methods.

### ExtremeCloud IQ or ExtremeCloud IQ Site Engine

ExtremeCloud IQ is a cloud-based enterprise network management application. It provides centralized management, monitoring, and control of network devices from the cloud. It is entirely cloud-hosted, meaning it does not require on-premises infrastructure for management.

ExtremeCloud IQ - Site Engine is an on-premises solution that extends the capabilities of ExtremeCloud IQ to manage a broader range of devices and provides additional features for comprehensive network management. ExtremeCloud IQ - Site Engine provides end-to-end network management, task automation, real-time analytics, and service assurance.

For more information, see ExtremeCloud IQ.

### Web-based GUI or generic command-line interface (CLI)

The command line interface (CLI) is a powerful tool for managing and configuring switches and network settings. The CLI interface can be accessed through the web-based GUI, or through Telnet, Secure Shell (SSH2), or SNMP using an SNMP manager. The web server must be enabled in the operating system on the switch in order to use the web-based GUI.
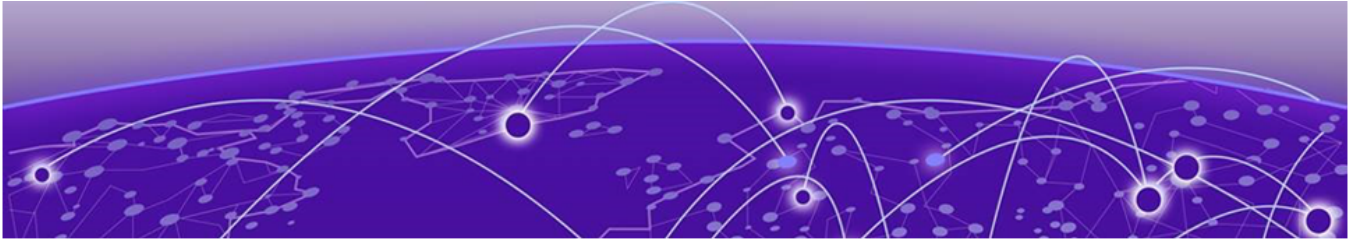
# Universal Ethernet Ports

The Universal Ethernet ports, or stacking ports, are located on the front panel of the switch and are labeled U1 and U2. These ports can be used with Switch Engine as stacking ports, or as Ethernet ports with Switch Engine and Fabric Engine in non-fabric mode (Fabric Engine does not support stacking).

The Universal Ethernet ports operate as stacking ports by default. Use the `disable stacking-support` command to set the U1 and U2 ports in Ethernet mode.

When used as Ethernet ports, the U1 and U2 ports can support data rates of 100Gb, 2 x 50Gb, 1 x 40Gb, 4 x 25Gb, or 4 x 10Gb using QSFP optics.

When running Fabric Engine, the stacking ports are reserved for use by advanced features on the switch by default. For more information, see the `advanced-feature-bandwidth-reservation` Boot Flag documentation in the *Fabric Engine User Guide* for your version of the Fabric Engine operating system.

For information on switch stacking, see

# Secure Boot

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

## Switch Engine

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

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

Trusted delivery can only be in one of two states:

- Boot Image Verified
- Boot Image Verification Failed

## Fabric Engine

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

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

            Default Version        : 2.2.1.3

            Alternate Version      : 2.2.1.3

            Boot Version Used      : Default

            Trusted Delivery Status : Boot Image Verified
```

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

- Boot Image Verified
- Boot Image Verification Failed

## Secure Boot Troubleshooting

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

# Fan Modules for Use with Your Switch

The 5520 Series switch is designed to operate with hot-swappable internal fan modules that provide the cooling needed for the switch to operate. The switch models can include up to two redundant, hot-swappable fan modules. The fan modules in the switch chassis can be removed and replaced without special tools. The switch can continue operating while a fan is being replaced (hot-swap)

Switch fans are not responsible for cooling the power supplies; power supplies have integrated cooling fans that operate independently of the switch fan. All installed fan modules must blow air in the same direction and must match the airflow direction of the installed power supplies. Fan module slots are located on the rear panel of the switch.

## Precautions Specific to Fan Modules

**Warning**
Be careful not to accidently insert your fingers into the fan tray while removing it from the chassis. The fan may still be spinning at a high speed.

**Caution**
Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

**Caution**
Ensure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I."

**Caution**
If you do not install a fan module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

## Fan Modules

Three fan module options, with front-to-back or back-to-front airflow, are supported on the switch.

- Part number 17115 provides front-to-back airflow for switch cooling.
- Part numbers X870-FANBF and 17116 provide back-to-front airflow for switch cooling.

Fan modules are ordered separately for models 5520-24T-BASE, 5520-24T-ACDC, 5520-24X- BASE, 5520-24X-ACDC, 5520-48T-BASE, 5520-48T-ACDC, 5520-48SE-BASE, and 5520-48SE-ACDC. Fan modules are included with other models.

For information on installing or replacing a fan module, see Replace Fan Modules on page 105.

LEDs on the front panel of the switch provide information on the unit's operational status. See Monitor the Switch on page 135 for details.

# Power Supplies for Use with Your Switch

The 5520 Series switch is designed to operate with hot-swappable internal power supply modules that provide all of the power needed for the switch to operate. You can remove one power supply module without interrupting the switch's operation (hot-swap). Installed power supplies can be AC, DC, or a combination of AC and DC for the 5520-24T-ACDC, 5520-24X-ACDC, 5520-48T-ACDC, and 5520-48SE-ACDC switches.

Power supplies have integrated cooling fans that operate independently of the switch fans for power supply cooling and are not responsible for cooling the switch. All installed power supplies must blow air in the same direction and must match the airflow direction of the installed fan modules. Power supply slots are located on the rear panel of the switch.

## Precautions Specific to Power Supply Modules

⚠️ **Warning**
Make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.

⚠️ **Warning**
If the installation requires a different power cord than the one supplied with the device, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.

⚠️ **Caution**
Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

⚠️ **Caution**
Ensure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I."

⚠️ **Caution**
If you do not install a fan module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

## 350 W AC Power Supplies

The 350 W AC power supplies (part numbers XN-ACPWR-350W-FB and 10953) provide front-to-back airflow and are compatible with 5520-24T, 5520-24T-BASE, 5520-24X, 5520-24X-BASE, 5520-48T, 5520-48T-BASE, 5520-48SE, and 5520-48SE-BASE switches.

The 350 W AC power supplies (part numbers XN-ACPWR-350W-BF and DPS350AB-42 A) provide back-to-front airflow and are compatible with 5520-24T-BASE, 5520-24X-BASE, 5520-48T-BASE, and 5520-48SE-BASE switches.

The 350 W AC power supply has a (C14) power inlet that requires a (C13) power cord.

📝 **Note**
AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

For information on installing or replacing a power supply, see Replace Power Supplies on page 100.

The 350 W AC power supply has the status LEDs listed in Table 5.

**Table 5: 350 W AC Power Supply LED Status Indications**

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

## 550 W AC and DC Power Supplies

The 550 W AC power supplies (part numbers XN-ACPWR-550W-FB which provide front-to-back airflow, and XN-ACPWR-550W-BF which provide back-to-front airflow) and the 550 W DC power supplies (part numbers XN-DCPWR-550W-FB which provide front-to-back airflow, and XN-DCPWR-550W-BF which provide back-to-front airflow) are

compatible with the 5520-24T-ACDC, 5520-24X-ACDC, 5520-48T-ACDC, and 5520-48SE-ACDC switches .

## 550 W AC Power Supplies

The 550 W AC power supply has a (C14) power inlet that requires a (C13) power cord.

> **Note**
> AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

For information on installing or replacing a power supply, see Replace Power Supplies on page 100.

The 550 W AC power supply has the status LEDs listed in 550 W AC and DC Power Supplies on page 36.

**Table 6: 550 W AC Power Supply LED Status Indications**

| LED | Description |
|-----|-------------|
| Green | Output on and OK |
| Blinking Green | Only 12 Vsb on or PSU in cold redundant state |
| Amber | AC cord unplugged or AC power lost with a second power supply in parallel still with AC input power and 12 Vsb must be connected together in parallel |
| Blinking amber | Power supply warning events where the power supply continues to operate high temp, high power, high current, or slow fan |
| Amber | Power supply critical event causing a shutdown; failure, OCP, OVP, or fan fail |

## 550 W DC Power Supplies

The 550 W DC power supply accepts the positronic plug PLAH03M400A1/AA-E1A.

For information on installing or replacing a power supply, see Replace Power Supplies on page 100.

The 550 W DC power supply has the status LEDs listed in 550 W AC and DC Power Supplies on page 36.

**Table 7: 550 W DC Power Supply LED Status Indications**

| LED | Description |
|-----|-------------|
| Green | Output on and OK |
| Off | No DC input power to all power supplies |

**Table 7: 550 W DC Power Supply LED Status Indications (continued)**

| LED | Description |
|-----|-------------|
| Blinking Green | DC input present; only 12 Vsb on (PSU off) or PSU in cold redundant state |
| Amber | DC input cord unplugged or DC input power lost with a second power supply in parallel still with DC input power |
| Blinking amber | Power supply warning events where the power supply continues to operate high temp, high power, high current, or slow fan |
| Amber | Power supply critical event causing a shutdown; failure, OCP, OVP, or fan fail |

## 715 W AC Power Supplies

The 715 W AC PSU-FB (part numbers XN-ACPWR-715W-FB and 10951) provide front-to-back airflow and are compatible with 5520-24W, 5520-12MW-36W, and 5520-48W switches.

The 715 W AC power supply has a (C16) power inlet that requires a (C15) power cord.

> **Note**
> AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

For information on installing or replacing a power supply, see Replace Power Supplies on page 100.

The 715 W AC power supply has the status LEDs listed in Table 8.

**Table 8: 715 W AC Power Supply LED Status Indications**

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

## 1100 W AC Power Supplies

The 1100 W AC PSU-FB (part numbers XN-ACPWR-1100W-FB and 10941) provide front-to-back airflow and are compatible with 5520-24W, 5520-12MW-36W, and 5520-48W switches.

The 1100 W AC power supply has a (C16) power inlet that requires a (C15) power cord.

> **Note**
> AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

For information on installing or replacing a power supply, see Replace Power Supplies on page 100.

The 1100 W AC power supply has the status LEDs listed in Table 9:

**Table 9: 1100 W AC Power Supply LED Status Indications**

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

## 2000 W AC Power Supply

The 2000 W AC PSU-FB (part numbers XN-ACPWR-2000W-FB and XN-ACPWR-2000W-F) provide front-to-back airflow and are compatible with 5520-24W, 5520-12MW-36W, and 5520-48W switches.

> **Note**
> In order to obtain 2000W output from this power supply, the PSU must be connected to a 200-240VAC source.

The 2000 W AC power supply has a (C16) power inlet that requires a (C15) power cord.

> **Note**
> AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

For information on installing or replacing a power supply, see Replace Power Supplies on page 100.

The 2000 W AC power supply has the status LEDs listed in Table 10:

**Table 10: 2000 W AC Power Supply LED Status Indications**

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

# Expansion Modules for Use with Your Switch

The switch supports hardware accessories that expand the capabilities of the switch. Collectively, they are referred to as *expansion modules*.

- You can install a versatile interface module (VIM) in the dedicated slot in the front panel of the switch. If no module is installed, the option slot is covered by a blank panel. The VIM provides dedicated 10/25/40G high speed ports.
- You can install a virtual port extender to receive packets from extended ports and forward packets toward the upstream controlling bridge for L2/L3 processing without fully processing packets or making forwarding or filtering decisions.

**Table 11: Compatibility of Expansion Modules**

| Module Type | Name | No. of Ports | Type of Ports |
|---|---|---|---|
| Bridge Port Extender | V300 Virtual Port Extender | up to 8 | 8 10/100/1000BASE-T ports and:<br>• 2 1000BASE-T 802.3bt Type 4 uplink ports for PoE model<br>• 2 10Gb SFP+ uplink ports for non- PoE models |
| Bridge Port Extender | V400 Virtual Port Extender | up to 48 | 48 10/100/1000BASE-T ports and:<br>• 2 10Gb SFP+ uplink ports for V400-24 port models<br>• 4 10Gb SFP+ uplink ports for V400-48 port models |

**Table 11: Compatibility of Expansion Modules (continued)**

| Module Type | Name | No. of Ports | Type of Ports |
|---|---|---|---|
| 5520-VIM | 5520-VIM-4X | 4 | 10GbE SFP+ optical ports |
| | 5520-VIM-4XE | 4 | 10GbE SFP+ MACsec capable optical ports |
| | 5520-VIM-4YE | 4 | 25GbE SFP28 MACsec capable optical ports |

# V300 Virtual Port Extender

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

The V300 Virtual Port Extender offers the following models:

- V300-8P-2X Model on page 42
- V300-8T-2X Model on page 43
- V300-8P-2T-W Model on page 44
- V300HT-8P-2X Model on page 45
- V300HT-8T-2X Model on page 46

In general, the V300 Virtual Port Extender offers the following features:

- Eight 10/100/1000BASE-T half/full duplex ports or 10/100/1000BASE-T half/full duplex PoE+ ports
- Two 10Gb SFP+ uplinks
- PoE+ power on some models
- Fixed internal power-supply (non-PoE models), fanless

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

## V300-8P-2X Model

The Virtual Port Extender V300-8P-2X model offers the following features:

- Eight 10/100/1000BASE-T half/full duplex PoE+ ports
- Two 10Gb SFP+ ports
- One USB port

- One console/management port
- One DC input port

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

> **1** = DC input
> **2** = 10/100/1000BASE-T PoE+ ports
> **3** = 10Gb SFP+ ports
> **4** = USB port
> **5** = Console/Management port

The V300-8P-2X model is shipped with one 40W AC PS FRU (Model XN-ACPWR-280W).
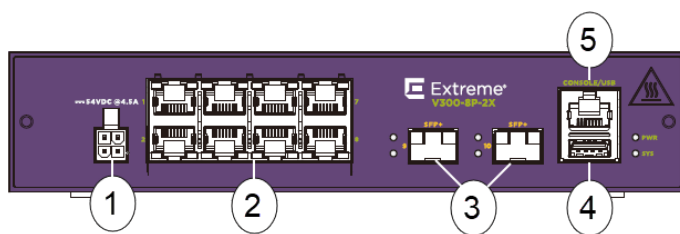


**Figure 15: V300-8P-2X Front Panel**



**Figure 16: V300 Virtual Port Extender Rear Panel**

## V300-8T-2X Model

The Virtual Port Extender V300-8T-2X model offers the following features:

- Eight 10/100/1000BASE-T half/full duplex ports
- Two 10Gb SFP+ ports
- One USB port
- One console/management port
- One DC input jack

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

The V300-8T-2X model is shipped with one 40W AC PS FRU (Model XN-ACPWR-40W).

> **1** = DC input
> **2** = 10/100/1000BASE-T ports

**3 =** 10Gb SFP+ ports
**4 =** USB port
**5 =** Console/Management port
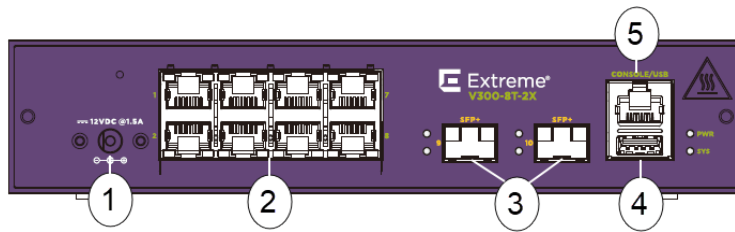


**Figure 17: V300-8T-2X Front Panel**
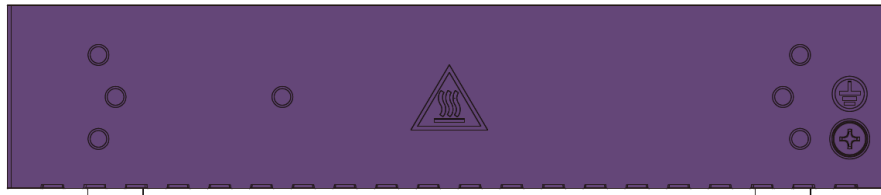


**Figure 18: V300 Virtual Port Extender Rear Panel**

## V300-8P-2T-W Model

The Virtual Port Extender V300-8P-2T-W model offers the following features:

- 8 10/100/1000BASE-T half duplex PoE+ ports
- 2 1000/BASE-T 802.3bt Type 4 ports
- PoE power
- Fanless

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

**1 =** 10/100/1000BASE-T PoE ports
**2 =** 1000/BASE-T 802.3bt PD up-link
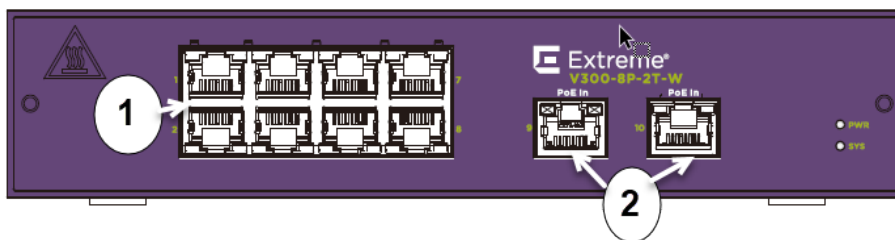


**Figure 19: V300-8P-2T-W Front Panel**
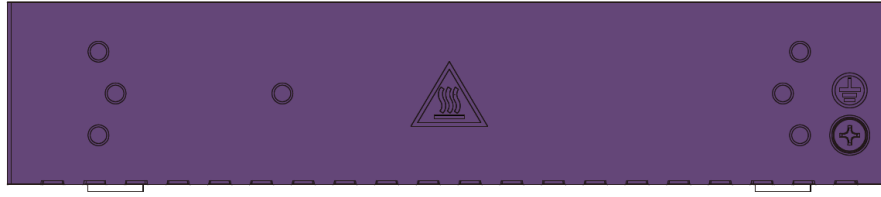
**Figure 20: V300-8P-2T-W Rear Panel**

## V300HT-8P-2X Model

The Virtual Port Extender V300HT-8P-2X model is a high-temperature model that offers the following features:

- Eight 10/100/1000BASE-T half/full duplex PoE+ ports
- Two 10Gb SFP+ ports
- One USB port
- One console/management port
- Two DC input ports

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

The V300HT-8P-2X model is compatible with the following power supplies: 40W AC PS FRU (Model XN-ACPWR-40W).

- Model XN-ACPWR-320W-HT - a 320W AC power supply high temperature
- Model 16807 - an IS AC-DC power supply with 240W output and DIN rail compatible

> **Important**
> The high temperature power supplies for the V300HT models require field wiring. Power supplies must be installed in accordance with local electrical codes by a licensed electrician.

> **Note**
> Power supplies for this model are sold separately.

**1 =** DC input
**2 =** 10/100/1000BASE-T PoE+ ports
**3 =** 10Gb SFP+ ports
**4 =** USB port
**5 =** Console/Management port
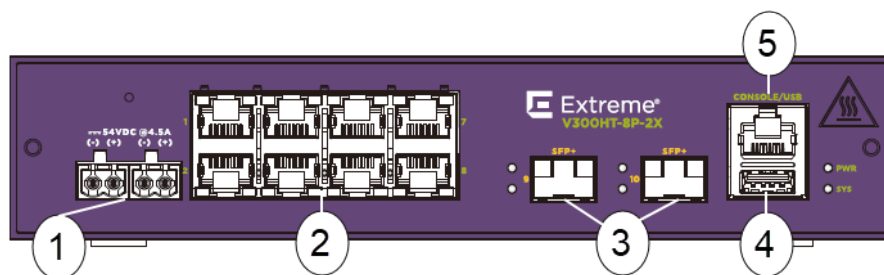
**Figure 21: V300HT-8P-2X Front Panel**



**Figure 22: V300 Virtual Port Extender Rear Panel**

## V300HT-8T-2X Model

The Virtual Port Extender V300HT-8T-2X model is a high-temperature model that offers the following features:

- Eight 10/100/1000BASE-T half/full duplex ports
- Two 10Gb SFP+ ports
- One USB port
- One console/management port
- Two DC input ports

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

The V300HT-8T-2X model is compatible with the following power supplies:

- Model XN-ACPWR-40W-HT - a 40W AC power supply high temperature
- Model XN-ACPWR-60W-HT-DIN - a 60W AC power supply high temperature DIN rail compatible

➡️ **Important**
The high temperature power supplies for the V300HT models require field wiring. Power supplies must be installed in accordance with local electrical codes by a licensed electrician.

📝 **Note**
Power supplies for this model are sold separately.

**1** = DC input
**2** = 10/100/1000BASE-T ports

**3 =** 10Gb SFP+ ports

**4 =** USB port

**5 =** Console/Management port
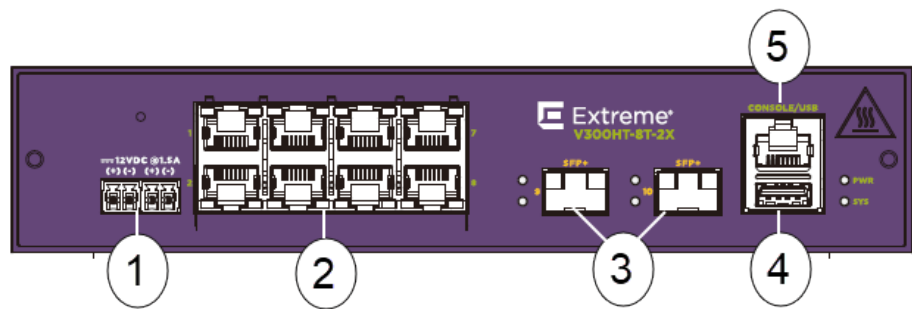


**Figure 23: V300HT-8T-2X Front Panel**
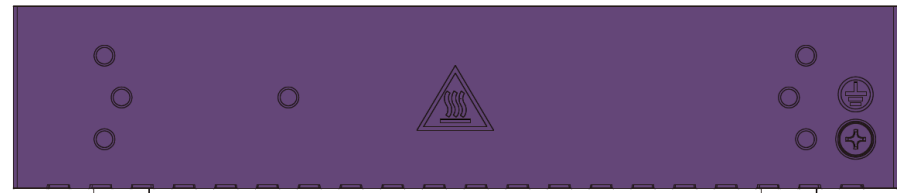


**Figure 24: V300 Virtual Port Extender Rear Panel**

## V300 Virtual Port Extender LEDs

The V300 Virtual Port Extender front panel LEDs observe the following behavior:

**Table 12: V300 Virtual Port Extender LEDs**

| Location | LED Indicative | Color | Status | Description |
|---|---|---|---|---|
| LED Per device | PWR LED (Top) | Green | Off | Power off |
| | | | Solid | Power on |
| | | Amber | Solid | External PSU 2 fail (For non-PD model) |
| | | | Flash | External PSU 1 fail (For non-PD model) |
| | System LED (Bottom) | Green | Off | System off |
| | | | Solid | System on and ready |
| | | | Flash | Booting |
| | | Amber | Flash | Fail (Controlled by MPP) |

**Table 12: V300 Virtual Port Extender LEDs (continued)**

| Location | LED Indicative | Color | Status | Description |
|---|---|---|---|---|
| LED Per RJ45 Port 1-8 (PSE) | Link/Act (left) | Green | Off | No Link |
| | | | Solid | Link is established |
| | | | Flash | Link activity |
| | PoE (right) | Amber | Off | No PD detected |
| | | | Solid | PD is detected |
| LED Per RJ45 Port 9-10 (PD) | Link/Act (left) | Green | Off | No link |
| | | | Solid | Link is established |
| | | | Flash | Link activity |
| | PoE (right) PoE model | Amber | Off | No PSE power is provided |
| | | | Solid | PSE power is supplied |

# V400 Virtual Port Extender

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

The V400 Virtual Port Extender offers the following features:
- 24 or 48 10/100/1000 Base-T ports that provide 10 Gbps copper connectivity.
- Two or four 1000/10G Base-X SFP+ ports that provide 10 Gbps high-density fiber connectivity.
- Serial console port.
- Front panel USB port.
- PoE+ power on some models.
- Fixed internal power-supply and fan modules.

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

For more information about configuring Switch Engine for use with this equipment, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.

**1** = 10/100/1000BASE-T ports

**2** = Console/Management port

**3** = 10Gb SFP+ ports

**4** = USB port
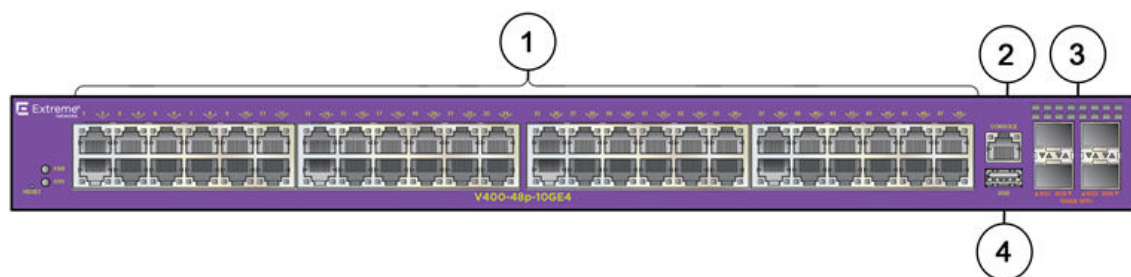
**Figure 25: V400 Virtual Port Extender Front Panel (48-port Model Shown)**

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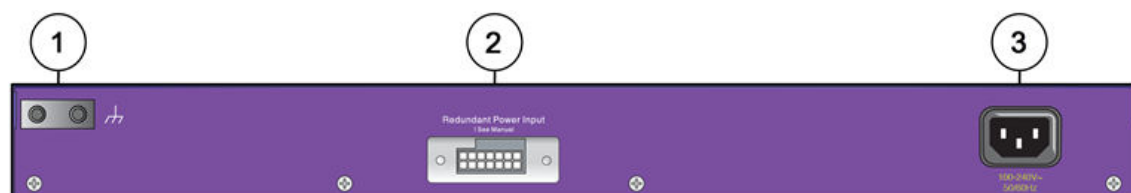


**Figure 26: V400 Virtual Port Extender Rear Panel**

# Versatile Interface Modules for the 5520 Series Switches

You can install a versatile interface module (VIM) in a dedicated slot in the front panel of the 5520 Series switch to provide 10/25G dedicated high speed ports. The front panel of every 5520 Series switch provides one slot to install the following:

- 5520-VIM-4X versatile interface module that provides four 10-GbE (SFP+) ports.
- 5520-VIM-4XE versatile interface module that provides four 10-GbE (SFP+) ports, LRM/MACsec capable.
- 5520-VIM-4YE versatile interface module that provides four 25-GbE (SFP28) MACsec capable ports.

The 5520-VIM ports are 1-4 on the 5520-VIM faceplate.

In Fabric Engine, the 5520-VIM slot number is 2.

5520-VIMs are ordered separately. Each VIM label can be found on the bottom side of the device, as seen in the following figure:

1 = 5520-VIM label
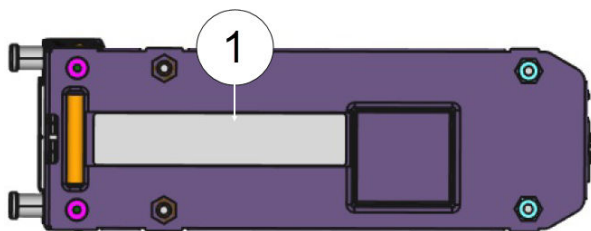
**Figure 27: 5520-VIM Label**

**Table 13: 5520-VIM Matrix**

|  | 5520-VIM-4X | 5520-VIM-4XE | 5520-VIM-4YE |
|---|---|---|---|
| Usable ports | 4 | 4 | 4 |
| Operational speeds | 1Gbps & 10Gbps | 1Gbps & 10Gbps | 10Gbps & 25Gbps |
| PHY present | No | Yes | Yes |
| 1000BASE-T & 10GBASE-T | 10GBASE-T only | Both | 10GBASE-T only |
| Mixed speeds | 1Gbps & 10Gbps | 1Gbps & 10Gbps | Mixed speeds not supported[1] |
| 1G Auto-negotiation | Disabled | Enabled |  |
| 10G Auto-negotiation | Disabled | Disabled | Disabled |
| 10G LRM & ZT optics | Not supported | Supported | Supported |
| 25G Auto-negotiation |  |  | Enabled for DAC Disabled for Fiber |
| FEC | Not supported | Not supported | Auto-FEC enabled for DAC and Fiber[2] |
| MACsec | Not supported | 128/256bit | 128/256bit |

[1] - In Fabric Engine, you must set `sys vim-speed` to 10G or 25G for 5520-VIM-4YE. The default is 25G. A reboot is not necessary after setting the speed. In Switch Engine, use the `configure ports partition` command with 4x25 or 4x10 on the first VIM port.

[2] - FEC is enabled by default only with `autonegotiation` set to ON.

See Versatile Interface Modules (VIM) Port LEDs on page 138 for VIM LED details.

## 5520-VIM-4X Versatile Interface Module

The 5520-VIM-4X versatile interface module provides four 10-GbE (SFP+) ports.

For information about the supported optical modules, refer to the most recent version of the Extreme Optics website.
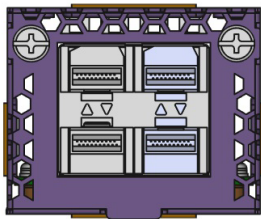
**Figure 28: 5520-VIM-4X Versatile Interface Module**

**Table 14: Port Numbers for Ports on the 5520-VIM-4X Module**

| 5520 Series 24-port models | 5520 Series 48-port models | Fabric Engine (all models) |
|---|---|---|
| 33-36 (Switch Engine) | 57-60 on 48-port models (Switch Engine) | VIM slot number=2 Interface names=2/1-2/4 |

## 5520-VIM-4XE Versatile Interface Module

The 5520-VIM-4XE versatile interface module provides four 10-GbE (SFP+) ports, MACsec capable.

For information about the supported optical modules, refer to the most recent version of the Extreme Optics website.
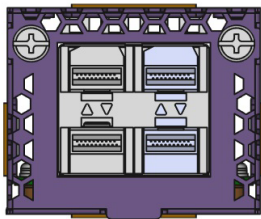


**Figure 29: 5520-VIM-4XE Versatile Interface Module**

**Table 15: Port Numbers for Ports on the 5520-VIM-4XE Module**

| 5520 Series 24-port models | 5520 Series 48-port models | Fabric Engine (all models) |
|---|---|---|
| 33-36 (Switch Engine) | 57-60 on 48-port models (Switch Engine) | VIM slot number=2 Interface names=2/1-2/4 |

## 5520-VIM-4YE Versatile Interface Module

The 5520-VIM-4YE versatile interface module provides four 25-GbE (SFP28) MACsec capable ports.

> **Note**
> In Fabric Engine, you must use the `sys vim-speed` command to set the speed to 10G or 25G for 5520-VIM-4YE. The default is 25G. A reboot is not necessary after setting the speed.
> In Switch Engine, use the `configure ports partition` command with 4x25 or 4x10.

For information about the supported optical modules, refer to the most recent version of the Extreme Optics website.
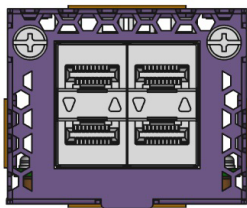


**Figure 30: 5520-VIM-4YE Versatile Interface Module**

**Table 16: Port Numbers for Ports on the 5520-VIM-4YE Module**

| 5520 Series 24-port models | 5520 Series 48-port models | Fabric Engine (all models) |
| --- | --- | --- |
| 33-36 (Switch Engine) | 57-60 on 48-port models (Switch Engine) | VIM slot number=2 Interface names=2/1-2/4 |

# 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 Native-V feature – part of the Switch Engine Basic License features.

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

Refer to the "Stacking" chapter in the *Switch Engine User Guide* for your version of the Switch Engine operating system 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 31 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.
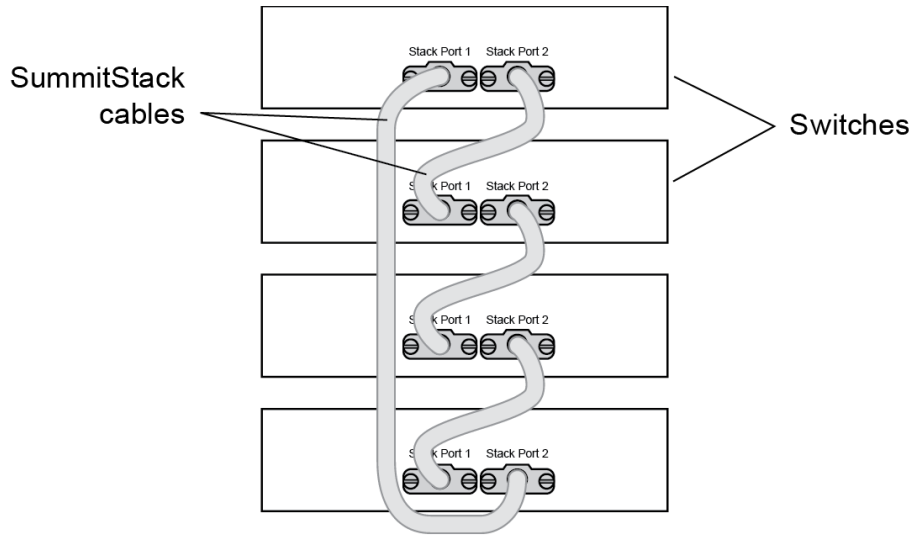
**Figure 31: Switches Connected to Form a Stack**
Using the SummitStack feature—part of the Switch Engine Edge/Base license—a stack can combine switches from different series, provided that every switch in the stack:

- Runs in the same partition (primary or secondary).
- Runs the same version of Switch Engine.
- Includes support for stacking.

See Combine Switches from Different Series on page 65 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* mode, switches are connected using either designated Ethernet data ports or dedicated stacking connectors.
- In *alternate stacking* mode, switches are connected using 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. Not all switches support alternate stacking mod.

The 5520 Series supports native stacking in Native-V160 stacking mode. The switch also supports Native-V200 stacking mode. The 5520 Series supports alternate stacking. See Combine Switches from Different Series on page 65 for more information about cross-stacking 5520 Series switches with other switches.

When planning and building your stack, be sure to follow port compatibility and cabling recommendations as described in this chapter.

*Slot Numbers in Stacks*

A switch stack can be thought of as a virtual chassis. Each switch (node) operates as if it were occupying a slot in a chassis and is controlled by the primary. The high-speed stacking links function like the backplane links of a chassis.

Each switch in the stack is assigned a "slot number" during the initial software configuration of the stack. Starting at the switch with the console connection, numbers are assigned in numerical order following the physical path of the connected stacking cables. For example, if you follow the cabling recommendations presented in Connect the Switches to Form the Stack Ring on page 68 and configure a vertical stack from the console on the switch at the top of the physical stack, the switches will be assigned slot numbers 1 through 8 from the top down.

The top half of the number blinks if the switch is the primary, and the bottom half blinks if it is the backup. If the LED is steadily lit, the switch is a standby. If the LED is off the switch is not configured as a member of a stack.

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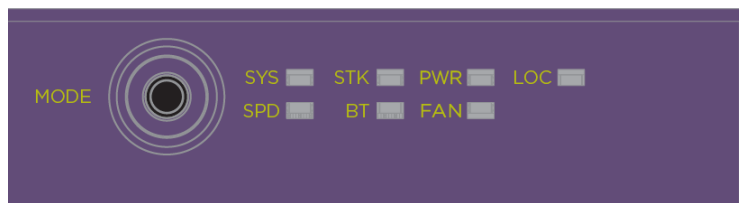


**Figure 32: Mode Button with STK LED Example**

The LED is steady green if the link is OK, blinking green if traffic is present, and off if no signal is present.

A quick way to verify that the cable connections match the software configuration is to check the stack number indicator on each switch. If the slot numbers do not line up in the order you arranged the switches, this might indicate that the stacking cable setup differs from what you intended when you configured the software. In this case, reconnect the cables in the correct order and perform the software configuration again.

*Primary/Backup Switch Redundancy*

When your stack is operational, one switch is the primary switch, responsible for running network protocols and managing the stack.

To provide recovery in case of a break in the stack connections, you can configure redundancy by designating a backup switch to take over as primary if the primary switch fails. When you perform the initial software configuration of the stack, the "easy setup" configuration option automatically configures redundancy, with slot 1 as the primary and slot 2 as the backup. You can also configure additional switches as "primary-capable," meaning they can become a stack primary in case the initial backup switch fails.

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

5520 Series switches can be stacked with themselves, or with 5320 Series or 5420 Series switches.

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

5520 Series switches can also be stacked with 5720 Series switches. When creating a mixed stack of 5520 Series and 5720 Series switches, the Primary and Backup nodes must be 5720 Series switches and they must be configured for the Native V200 stacking method.

1. 5720 Series
2. 5520 Series

When easy setup compares two switches that have the same capability, the lower slot number takes precedence. Follow the same ranking hierarchy when you plan the physical placement of the switches in the stack.

## SummitStack Topologies

Figure 33 presents a graphical representation of a stack and some of the terms that describe stack conditions.
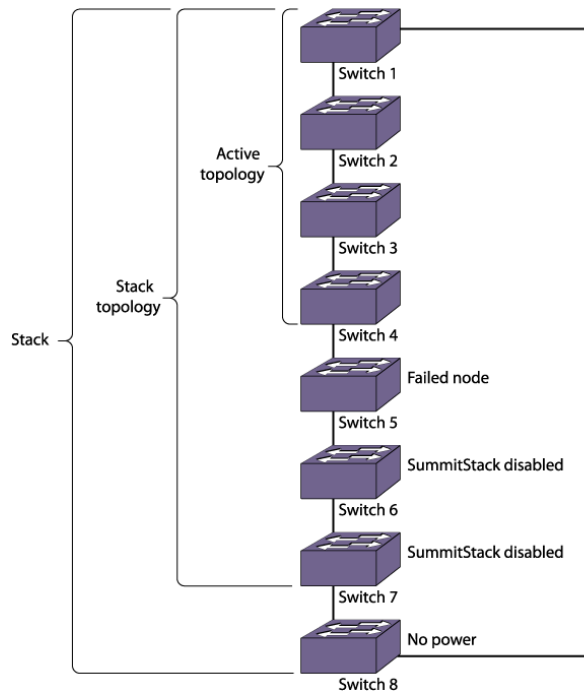
**Figure 33: Example of a Stack, Showing the Active Topology and the Stack Topology**

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 60.

*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 34 represents a maximal ring topology of eight active nodes.
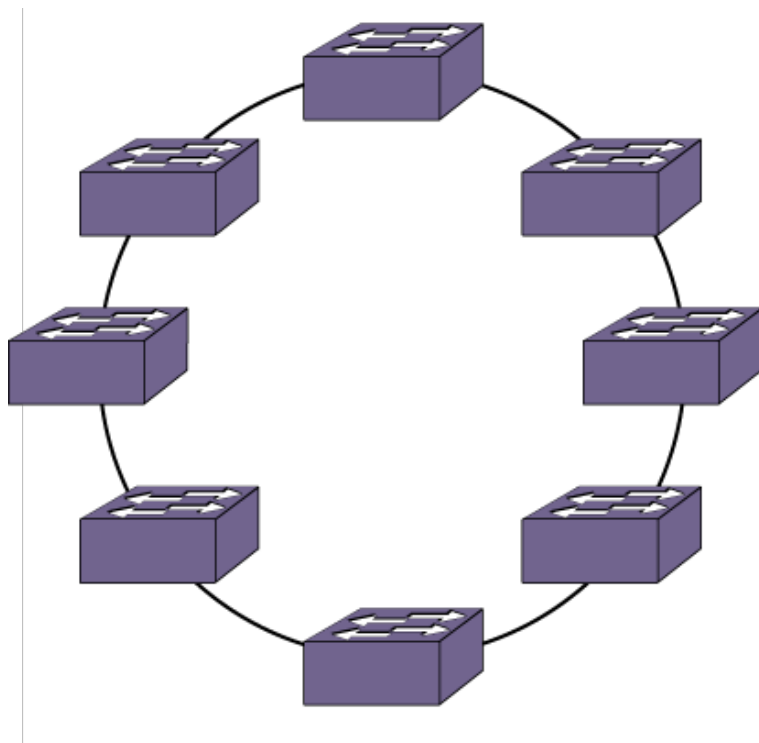
**Figure 34: Graphical Representation of a Ring Topology**

Figure 35 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.
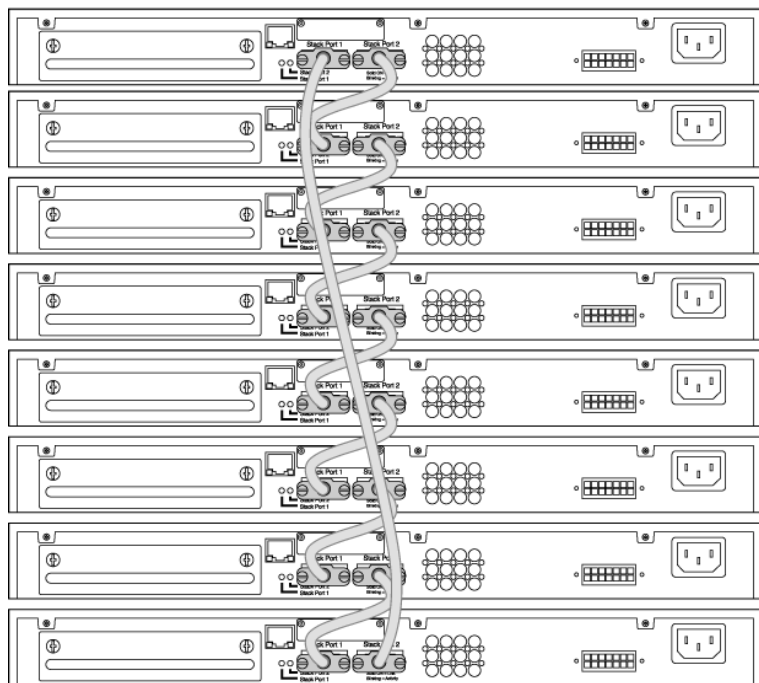


**Figure 35: Switches Connected to Each Other in a Ring Topology**

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 36, 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.
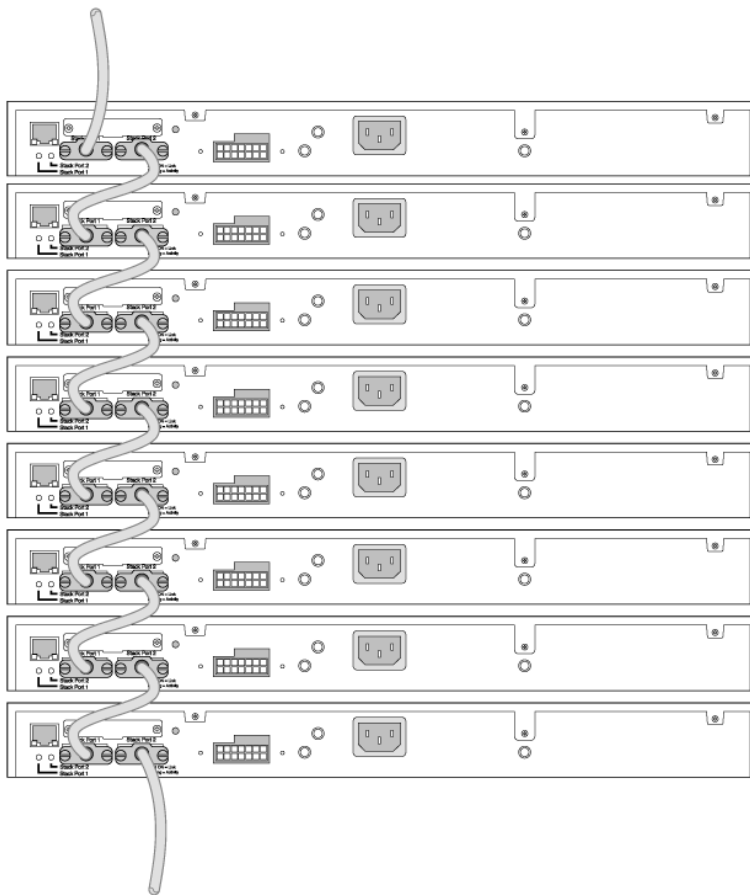


**Figure 36: Daisy Chain Topology**

You might need to use a daisy chain topology while adding a new node, removing a node, or joining two stacks.

If you are using a daisy chain topology, the possibility of a dual primary condition increases. Before you create a daisy chain topology, read "Managing a Dual Primary Situation" in the *Switch Engine User Guide* for your version of the Switch Engine operating system.

## SummitStack Terms

Table 17 describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

**Table 17: 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. |
| 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. |

**Table 17: List of Stacking Terms (continued)**

| Term | Description |
|---|---|
| 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. |
| 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).<br>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.<br>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. |

**Table 17: List of Stacking Terms (continued)**

| Term | Description |
|---|---|
| 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.<br>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. |
| Failover | The process of changing the backup node to the primary node when the original primary node has failed.<br>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. |

**Table 17: List of Stacking Terms (continued)**

| Term | Description |
|------|-------------|
| 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.<br>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. To disable stacking support, configure the switch data ports to use the Ethernet protocol instead of the stacking protocol. Use the following command:

```
disable stacking-support
```

To enable stacking-support, use the following command:

```
enable stacking-support
```

You must enable stacking-support individually for every switch in the stack that does not have stacking support enabled. The default stacking mode is Native-V160.

## 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 57). Include only the nodes that you expect to be active in the stack.

Follow the recommendations in Recommendations for Configuring Stacks on page 64 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 68.

## 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 *Licensing Guide* for your version of the Switch Engine operating system.) To view the Switch Engine software version on a node, restart the node and run the command:

```
show version {detail | process name | images {partition partition}
{slot slot_number} } .
```

If any node does not have the right version, install the correct version on that node. Use the same image partition on all nodes. After stacking is enabled, images can be upgraded from the stack only if the same image is selected on all nodes.

- If you intend to deploy new units that might be part of a stack in the future, turn on stacking mode during initial deployment to avoid the need for a future restart. The only disadvantages of stacking mode are the loss of QoS (quality of service) profile QP7 and the reservation of some of the packet buffer space for stacking control traffic.
- You can configure the stack by logging into the primary node or any of the other nodes.
- If the primary-capable stackable switches have different purchased license levels, you might need to configure license level restrictions on some nodes before those nodes can join the stack. See the *Switch Engine User Guide* for your version of the Switch Engine operating system for more information about managing licenses.
- If the stack supports any feature pack license (such as MPLS or Direct Attach), that feature pack license must be installed on all primary-capable nodes to support that feature and to prevent traffic interruption if a failover event occurs.
- Most stacking specific configurations are effective only after a restart. However, most non-stacking configuration commands take effect immediately and require no restart.
- A basic stack configuration can be achieved by using the Easy Setup procedure, as described in the *Switch Engine User Guide* for your version of the Switch Engine operating system.
- 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 64 for physically situating your equipment.

## Combine Switches from Different Series

5520 Series switches can stack with themselves and support data rates of 40Gbps on ports U1 and U2 using the Native-V160 stacking mode with QSFP+ cables. High-speed 200Gb stacking is available on 5520 Series starting with Switch Engine 31.6 while using Native-V200. The two QSFP ports on the 5520 Series each provide 50Gb in both directions, resulting in 4x50Gb, or 200Gb total.

The 5520 Series can also stack with 5320 Series, 5420 Series, and 5720 Series switches.

- When stacking with 5320 Series and 5420 Series switches (beginning with Switch Engine 31.6), the 5520 Series supports data rates of 10Gbps utilizing the 5520-VIM-4X installed on the 5520 Series. Either the Native-V40 stacking mode (10G link running at HG) with SFP+ cables can be used, or the Native-V stacking mode with SFP+ cables and alternate stacking ports (10G link running at HG) can be used.

Alternate stacking ports are 35 and 36 for models 5520-24T, 5520-24W, 5520-24X, 5520-24T-ACDC-BASE, and 5520-24X-ACDC-BASE. Alternate stacking ports are 59 and 60 for models 5520-48T, 5520-48W, 5520-12MW-36W, 5520-48SE, 5520-48T-ACDC-BASE, and 5520-48SE-ACDC-BASE.

- When stacking with 5420 Series switches (beginning with Switch Engine 31.5), the 5520 Series supports data rates of 20Gbps on ports U1 and U2 using the Native-V80 stacking mode with QSFP+ to SFP-DD cables.
- When stacking with 5720 Series switches, the 5520 Series supports data rates of 50Gbps on ports U1 and U2 using the Native-V200 stacking mode with QSFP28 cables.
- 5520 Series switches cannot stack with 5320 Series Extended Temperature switches and the 5320-16P-2MXT-2X switch.

## 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 40 kilometers.

> **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.

## Use the Extreme Stacking Tool

The Extreme Stacking Tool provides an easy way to plan your stack. As you select various switches and stacking modes, the tool shows you:

- What switch models can be stacked together and which cannot.
- Statistics showing the routing options that are available with every stack combination.
- Recommendations about which switches should be the primary and backup nodes.
- Information about the supported versions of Switch Engine for every combination.

To use the Stacking Tool, follow these steps.

1. Open the Stacking Tool (https://stackingtool.extremenetworks.com/StackingTool/) in a web browser.

> **Note**
> The Stacking Tool is also available in the Support Tools section of the Extreme Portal.

2. Find a switch model in the **Switches** column.

Each switch model is represented by a rectangle, as shown in the example in the following figure.ach switch model is represented by a rectangle, as shown in the

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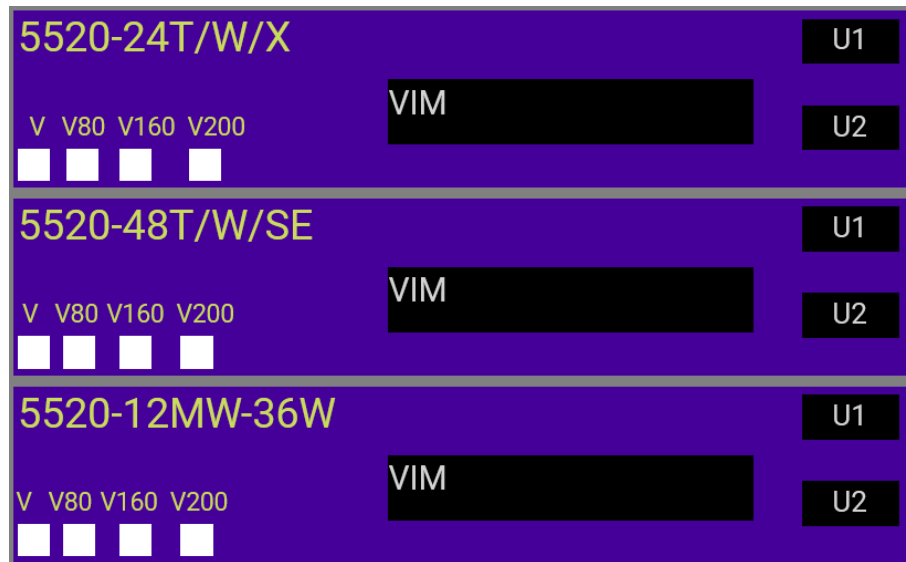


**Figure 37: 5520 Switches Shown in the Stacking Tool**

> 💡 **Tip**
> Select a rectangle to display more information about the switch model and the VIMs (if any) that it can use for stacking.

3. Drag the rectangle to the first slot in the Stack column in the middle of the page.

   To the right of the Stack column, the tool displays statistics about available routes, supported software versions, and primary/backup recommendations.

> 💡 **Tip**
> If you do not see statistics and other information, select the arrow (> symbol) to the immediate right of the Stack column.

4. Use the tool in any of the following ways:
   - Select other switches and drag them to the slots in the stacking column.
   - For any switch in the stack, select the U1 and U2 symbols to choose stacking modes – for example, Native-V and Native-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 switches and stacking modes are compatible.

**Table 18: 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 Install Your Switch on page 86), follow these steps to create the physical stack.

1. Connect the switches that will form the stack.See Connect the Switches to Form the Stack Ring on page 68.
2. Connect the switches to your management network. See Connect Your Stack to the Management Network on page 71.

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

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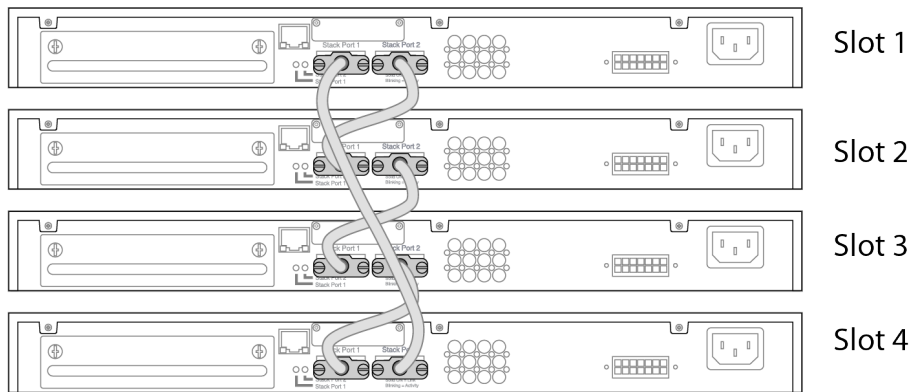


**Figure 38: SummitStack Cable Connections Using Four Switches with Integrated SummitStack Ports**

Table 19 lists the recommended order for connecting the stacking ports in this example.

**Table 19: 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 39 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 39: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports**

Table 20 lists the recommended order for connecting the stacking ports in this example.

**Table 20: Basic Stack with Eight Switches: Connections**

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

Example: Stacked Switches across Several Racks

Figure 40 shows five switches installed at the tops of five adjacent racks. To accommodate the shortest possible cables, immediately adjacent switches are not always connected together. Port 2 on one switch is connected to Port 1 on the next connected switch. If the easy setup feature is used to configure the stack parameters, the assigned slot numbers will be as shown in the figure.

Rack A          Rack B          Rack C              Rack D              Rack E

Slot 1          Slot 2          Slot 5              Slot 3              Slot 4
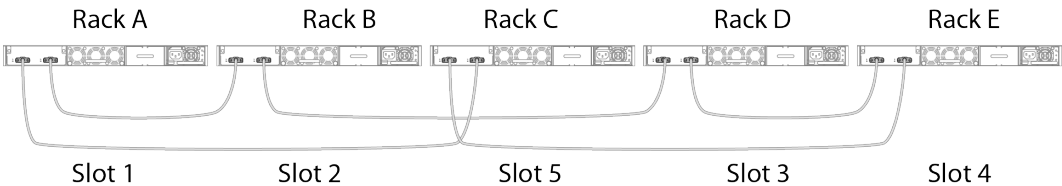
**Figure 40: Top-of-Rack Stack Installation**

Table 21 lists the recommended order for connecting the stacking ports in this example.

**Table 21: 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 68, 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 the Technical Specifications on page 139 topic.

## Plan Your Site

To install your equipment successfully, you should plan the site carefully. The site planning process has three major parts:

1. Meeting site requirements.

   The physical installation site must meet the following requirements for a safe and successful installation:

   • Building and electrical code requirements

   • Environmental, safety, and thermal requirements for the equipment you plan to install

   • Equipment rack requirements

2. Evaluating and meeting cable requirements.

   After examining your physical site and verifying that all environment requirements are met, evaluate and compare your existing cable plant with the requirements of the Extreme Networks equipment to determine if you need to install new cables.

3. Meeting power requirements.

   To run your equipment safely, you must meet the specific power requirements for each switch and external power supply unit installed in the system.

   For power specifications of the switches, see the specific switch listings in Technical Specifications on page 139.

## 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 22 are authorities on electrical codes.

**Table 22: Authorities on Electrical Codes**

| Organization | Address | Web Site URL |
|---|---|---|
| National Electrical Code (NEC) Classification (USA only)<br><br>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<br>1 Batterymarch Park<br>Quincy, MA 02169<br>USA | www.nfpa.org/ |
| Underwriters' Laboratory (UL)<br><br>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<br>333 Pfingsten Road<br>Northbrook, IL 60062<br>USA | www.ul.com |
| National Electrical Manufacturing Association (NEMA) (USA only)<br><br>Organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components. | NEMA<br>1300 N. 17th Street<br>Rosslyn, VA 22209<br>USA | www.nema.org |
| Electronic Components Industry Association (ECIA)<br><br>Trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry. | ECIA<br>111 Alderman Drive<br>Suite 400<br>Alpharetta, GA 30005<br>USA | www.ecianow.org |
| Federal Communications Commission (FCC) (USA only)<br><br>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<br>445 12th Street S.W.<br>Washington, DC 20554<br>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 76 for more information.
- Use appropriate AC or DC power, power distribution, and grounding for your specific installation.

- Use a vinyl floor covering in your wiring closet. (Concrete floors accumulate dust, and carpets can cause static electricity.)
- Prevent unauthorized access to wiring closets by providing door locks. Install the equipment in a secured, enclosed, and restricted access location, ensuring that only qualified service personnel have access to the equipment.
- Provide adequate overhead lighting for easy maintenance.
- Be sure that each wiring closet has a suitable ground. All equipment racks and equipment installed in the closet should be grounded.
- Be sure that all system environmental requirements are met, such as ambient temperature and humidity.

> **Note**
> Consult an electrical contractor for commercial building and wiring specifications.

## Control the Temperature

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

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

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

- Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below the maximum operating temperature for the equipment.
- Install a reliable air conditioning and ventilation system.
- Keep the ventilation in the wiring closet running during non-business hours; otherwise, the equipment can overheat.
- Maintain a storage temperature between -40°C (-40°F) and 70°C (158°F).

Table 23 summarizes the behavior of Extreme Networks switches when they experience high operating temperatures.

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

**Table 23: Thermal Shutdown and Restart Behavior**

| Switch Model(s) | Behavior |
|---|---|
| All switches | 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.<br>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 6 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.
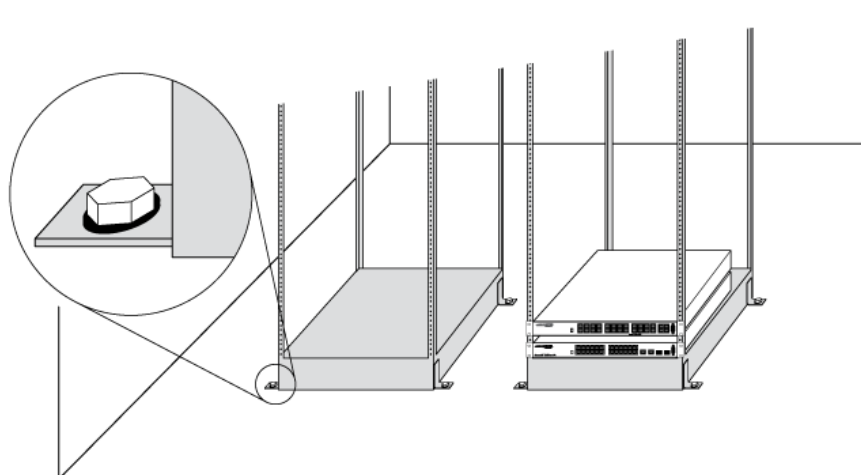


**Figure 41: Properly Secured Rack**

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 42 on page 80.
- 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.
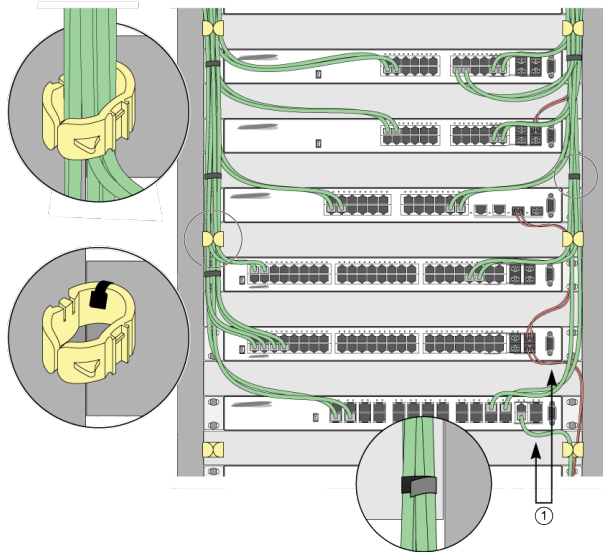


**Figure 42: Properly Installed and Bundled Cable**

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 43.

> **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.
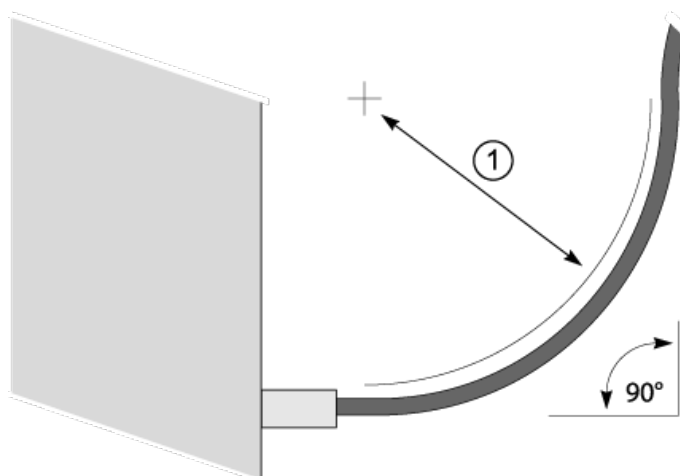
**Figure 43: Bend Radius for Fiber Optic Cable**
1 = Minimum 5 cm (2 in) radius in 90° bend

*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 44 shows examples of recommended and non-recommended connector jacket types.



Not recommended

Better

Best
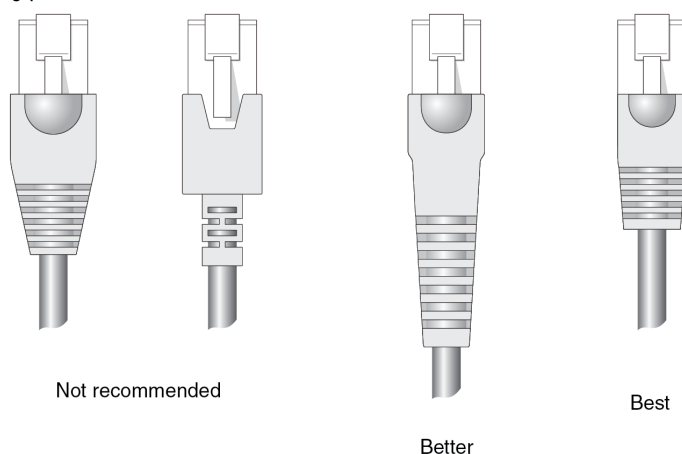
SPG_001

**Figure 44: RJ45 Connector Jacket Types**

## Prevent Radio Frequency Interference (RFI)

If you use UTP cabling in an installation, take precautions to avoid radio frequency (RF) interference.

RF interference can cause degradation of signal quality, and, in an Ethernet network environment, can cause excessive collisions, loss of link status, or other physical layer problems that can lead to poor performance or loss of communication.

To prevent RF interference, avoid the following situations:
- Attaching UTP cable to AC power cables
- Routing UTP cable near antennas, such as a ham radio antenna
- Routing UTP cable near equipment that could exhibit RF interference, such as ARC welding equipment
- Routing UTP cable near electrical motors that contain coils
- Routing UTP cable near air conditioner units
- Routing UTP cable near electrical transformers

In areas or applications where these situations cannot be avoided, use fiber optic cabling or shielded twisted pair cabling.

## Meet Power Requirements

Observe the following requirements and precautions for powering your hardware.

### Requirements for PoE Devices

When connecting PoE devices to a PoE switch, all connections between the PoE device and the switch must remain within the same building and use a low-voltage power distribution system per IEEE 802.3af.

### Power Supply Requirements

Follow these recommendations when you plan power supply connections for your equipment:
- Place the equipment in an area that accommodates the power consumption and component heat dissipation specifications.
- Be sure that your power supply meets the site DC power or AC power requirements of the network equipment.
- When you connect power to installed equipment, do not make this connection through an extension cord or power strip.
- If your switch includes more than one power supply, connect each power supply to a different, independent power source.

If a power source fails, it will affect only the switch power supply to which it is connected. If all switch power supplies are connected to a single power source, the entire switch is vulnerable to a power source failure.

- In regions that are susceptible to electrical storms, the best practice is to plug your system into a surge suppressor.

For detailed power specifications for your equipment, see Technical Specifications on page 139.

## Power Cord Requirements

Most Extreme Networks switches do not ship with power cords. Visit www.extremenetworks.com/product/powercords/ for information on selecting and purchasing the correct power cords for use with specific Extreme Networks equipment. The web page provides specifications for power cords in each country so that you can purchase cords locally.

AC power cords must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

## 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 84.)

> **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: or .

# Install Your Switch

Before you attempt to install or remove an Extreme Networks switch, read the precautions in Safety Considerations for Installation on page 87.

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 87.
2. Install the switch in the rack. See Attach the Switch to a Rack or Cabinet on page 88.
3. Install expansion modules. See Install Expansion Modules on page 91.
4. Install optional components: optical transceivers and cables. See the instructions in Install Optional Components on page 91.
5. Install one or two power supplies. See Install Internal Power Supplies on page 91.

> **Note**
> Be aware of whether the power supply you are installing is AC-powered or a DC-powered. The installation instructions are different depending upon what type of power is used.

6. Connect network interface cables. See Connect Network Interface Cables on page 92.
7. Power up the switch. See Turn on the Switch on page 92.
8. Perform initial network connection and configuration. See Activate and Verify the Switch on page 94.

## Safety Considerations for Installation

Read the information in this chapter thoroughly before you attempt to install or remove an Extreme Networks switch.

Ensure that proper ESD (electrostatic discharge) controls are in use before switch maintenance is performed. This includes but is not limited to wrist straps that are grounded to the switch housing and earth grounds.

> **Warning**
> Connect the chassis ground wire **before** you connect any power cables.
> Disconnect the ground wire **after** you disconnect all power cables.

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

Do not cover vents that would restrict airflow.

> **Note**
> See Safety and Regulatory Information for additional safety and regulatory information. See Technical Specifications on page 139 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 72, 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 to see what hardware is provided in the switch packaging. Most Extreme Networks switches come with the following hardware:

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

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

- Rack mounting screws: eight for a four-post installation; four for other installations. The size of the screws will vary based on the rack system you are using.
- Screwdriver for securing the rack mounting screws.
- #2 Phillips magnetic screwdriver to attach bracket screws that are provided with the switch.
- AC power cord. For switches with removable AC power supplies, a separate power cord is needed for each installed power supply. The cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.
- ESD-preventive wrist strap for installing optional ports at the back of the switch.

## Attach the Switch to a Rack or Cabinet

The 5520 Series switch can be attached to a standard 19-inch equipment rack in either of the following ways:

- Four-post rack, using the mounting kit provided (part number XN-4P-RMKIT-005).
- Two-post rack, using mounting brackets (part number XN-2PRMKIT-005) to attach the front or the middle of the switch to the posts (not provided). The two-post rack mounting kit can be ordered separately.

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

### Two-Post Rack Mount

You can attach the switch to a two-post rack in either of two configurations:
- Flush-mount
- Mid-mount

Use the following instructions to install the switch in a two-post rack.

1. Set a mounting bracket against the switch housing on one side of the switch.

   Set the flange (ear) flush with the front of the switch, facing the front, for a flush-mount.

   Set the flange (ear) toward the back of the switch, facing the rear, for a mid-mount.

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

   - Figure 45 shows a flush-mount configuration using a short mounting bracket.
   - Figure 46 shows a mid-mount configuration using a short mounting bracket.
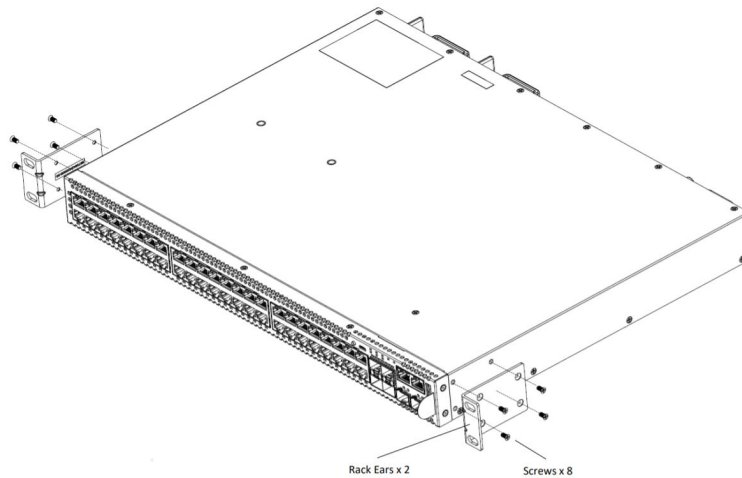
**Figure 45: Flush-Mount: Attaching Short Mounting Brackets**
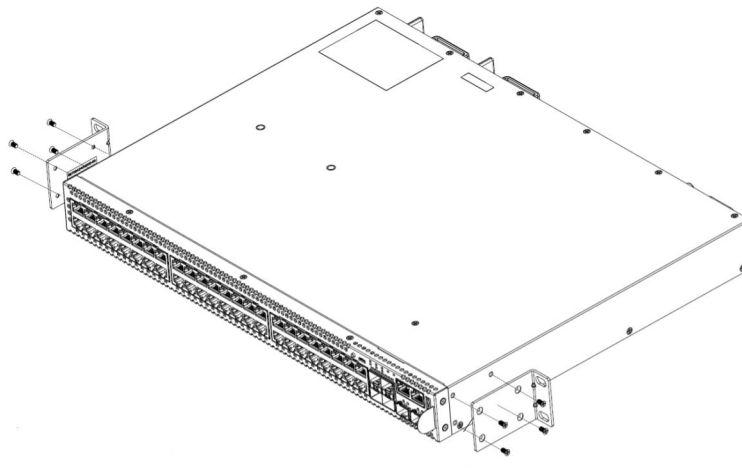


**Figure 46: Mid-Mount: Attaching Short Mounting Brackets**

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

   If you are using screws other than the screws that are provided, ensure that the threaded length of the screws is within 4 to 5 cm.

3. Repeat step 1 and step 2 to to attach the other bracket to the other side of the switch.

4. Secure the mounting bracket flanges to the rack, using screws that are appropriate for the rack. (Rack-mounting screws are not provided.)

5. Ground the switch if a grounding lug is present.

   a. At one end of the wire, strip the insulation to expose 1/2 inch (12 mm) of bare wire.

   b. Identify the grounding lug on the back of the switch.

   c. Insert the stripped wire into the grounding lug.

    d. Tighten the retaining screw with a straight-tip torque screwdriver to 20 in-lb (2.25 N m).

    e. Connect the other end of the wire to a known reliable earth ground point at your site.

After the switch is secured to the rack or cabinet, install optional components using the instructions in Install Optional Components on page 91.

Install one or two power supplies using the instructions in Install Internal Power Supplies on page 91.

## Four-Post Rack Mount

1. Attach the rack rails to both sides of the switch using the provided rack screws.
2. Attach the rack ears to the front rack posts, using the screws (rack post screws not provided).
3. Slide the rack rails into the rack ears on both sides, and adjust them to the appropriate rack depth.



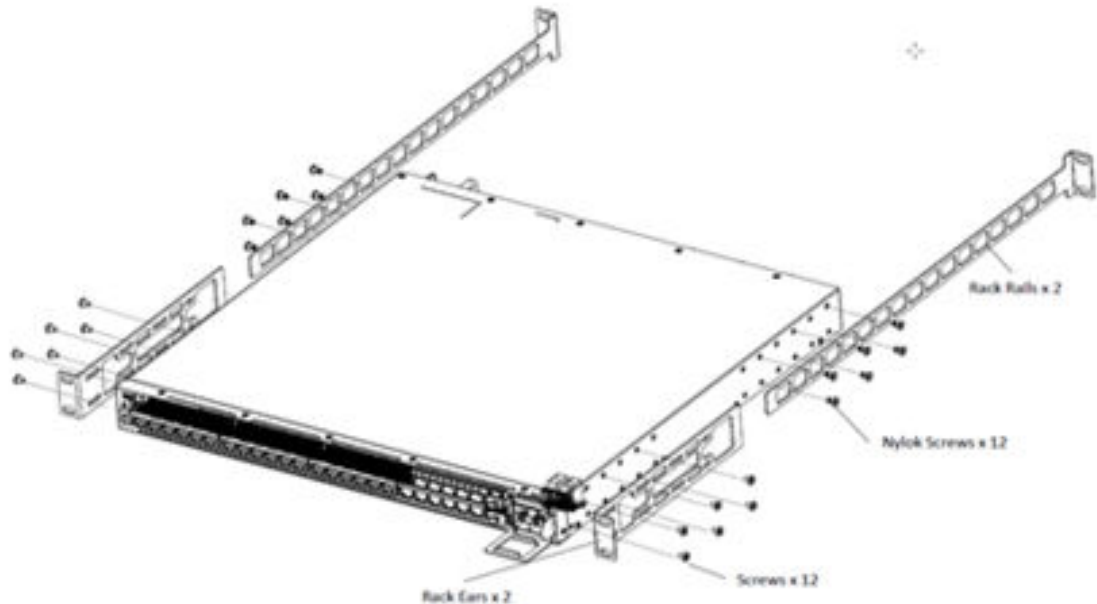**Figure 47: Attaching the Side Rails**

4. Attach the rack rails to the rear rack posts, using the screws (rack post screws not provided).
5. If a grounding lug is present, ground the switch.

    a. At one end of the wire, strip the insulation to expose 1/2 inch (12 mm) of bare wire.

    b. Identify the grounding lug on the back of the switch.

    c. Insert the stripped wire into the grounding lug.

d. Tighten the retaining screw with a straight-tip torque screwdriver to 20 in-lb (2.25 N m).

e. Connect the other end of the wire to a known reliable earth ground point at your site.

After the switch is secured to the rack or cabinet, install optional components using the instructions in Install Optional Components on page 91.

Install one or two power supplies using the instructions in Install Internal Power Supplies on page 91.

## Install Expansion Modules

The switch supports hardware accessories that expand the capabilities of the switch. Collectively, they are referred to as *expansion modules*. The 5520 Series supports versatile interface modules (VIMs) and virtual port extenders. For installation instructions, see Replace Expansion Modules on page 107.

## Install Optional Components

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

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

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

### Pluggable Transceiver Modules

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

### Optical Cables

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

## Install Internal Power Supplies

If your switch does not come with an installed power supply, you can install one or two power supplies. All installed power supplies must blow air in the same direction and must match the airflow direction of the installed fan modules.

• Power supplies with a **red** tab provide front-to-back airflow.
• Power supplies with a **blue** tab provide back-to-front airflow.

For installation instructions, see Replace Power Supplies on page 100.

## Connect Network Interface Cables

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

| Cable Type | Maximum Distance |
|------------|------------------|
| CAT5E | 55 meters |
| CAT6 | 55 meters |
| CAT6A | 100 meters |

Working carefully, one port at a time, do the following:

1. Verify that you have identified the correct cable for the port.
2. Use an alcohol wipe or other appropriate cleaning agent to clean the cable connectors; make sure they are free of dust, oil, and other contaminants.
3. If you are using optical fiber cable, align the transmit (Tx) and receive (Rx) connectors with the correct corresponding connectors on the switch or the I/O module.
4. Press the cable connectors into their mating connectors on the switch or I/O module until the cable connector is firmly seated.
5. Repeat the preceding steps for the remaining cables on this or other switches or I/O modules.
6. Dress and secure the cable bundle to provide appropriate strain relief and protection against bends and kinks.

## Turn on the Switch

Use the following instructions to turn on the switch

> **Note**
> The switch does not have a power button, so connecting the power cable at both ends turns the switch on.

## Connect AC Power

An AC power cord is not included with the AC power supply. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed in Power Cord Requirements for AC-Powered Switches and AC Power Supplies on page 166.

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

> **Note**
> The grounding connection in the power receptacle and in the power cord properly ground the power supply and extend that grounding to the switch.

If the power supply LEDs do not turn green, refer to System Status LEDs on page 135 for troubleshooting information.

When the power supply LED has turned green, follow the instructions in Activate and Verify the Switch on page 94.

## Connect DC Power

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

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

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

If the power supply LEDs do not turn green, refer to System Status LEDs on page 135 for troubleshooting information.

When the power supply LED has turned green, follow the instructions in Activate and Verify the Switch on page 94.

# Activate and Verify the Switch

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

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

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

Otherwise, use the instructions in the following topics 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

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

Switch Engine is the default operating system. If you want to run Fabric Engine, see Change the Switch OS via the Bootloader Menu on page 96 or Change the Switch OS via the Startup Menu on page 97.

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 94.

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

1. Use a terminal emulator such as PuTTY or TeraTerm, connect to the switch using the serial port connection. You can also connect to the switch via telnet or SSH.

   Be sure that your serial connection is set properly:
   - Baud rate: Baud rate: 115200
   - Data bits: 8
   - Stop bit: 1
2. At the management console, press **[Enter]** one or more times until you see the login prompt.
3. At the login prompt, log in using the default user name `admin`.

   For example:

   ```
   login: admin
   ```

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

   When you have successfully logged on to the system, the command line prompt displays the system name (for example, `5520-24T-SwitchEngine#`) in its prompt. You are logged in with administrator privileges, which gives you access to all switch functions.
4. Respond to the screen prompts to configure the level of security you need.

   > **Note**
   > For more information about logging in to the switch and configuring switch management access, see the *Switch Engine User Guide* for your version of the Switch Engine operating system.
5. Enter `show version`.

   The switch serial number is displayed, as highlighted in the following example. Make a note of this number for future reference.
   ```
   Transit.3 # show version
   Switch : 800444-00-05 0723G-01234 Rev 5.0 BootROM:
   ```

Configure the switch's IP address for the management virtual LAN (VLAN) by following the steps in the Configure the Switch's IP Address for the Management VLAN on page 96.

## Configure the Switch's IP Address for the Management VLAN

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

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

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

1. Assign a name, IP address, and default subnetwork mask for the VLAN as shown in the following example:

   ```
   configure vlan vlan_name ipaddress nn.nn.nn.nn 255.255.255.0
   ```

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

   > **Note**
   > For more information about saving configuration changes, see the _Switch Engine User Guide_ for your version of the Switch Engine operating system.

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

## Change the Switch OS via the Bootloader Menu

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

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

1. Using a terminal emulator such as PuTTY or TeraTerm, connect to the switch using the serial port connection.

   Be sure that your serial connection is set properly:
   - Baud rate: Baud rate: 115200
   - Data bits: 8
   - Stop bit: 1
2. Once the switch is powered on, after seeing the "Boot Menu" screen, press the **[spacebar]** key within 30 seconds.
3. Use the **down-arrow** key to select `Change the switch OS to Fabric Engine`, then select **Enter**.

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

## Change the Switch OS via the Startup Menu

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

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

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

    For example:

    ```
    login: admin
    ```

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

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

    The switch installs Fabric Engine, then resets.

    After resetting, your switch boots with Fabric Engine. See Log In for the First Time on Fabric Engine on page 97.

## Log In for the First Time on Fabric Engine

Onboard your switch with ExtremeCloud^TM. Log in or create your XIQ administrator account in order to select your switch operating system with XIQ at 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 94.

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

1.  Using a terminal emulator such as PuTTY or TeraTerm, connect to the switch using the serial port connection.

    Be sure that your serial connection is set properly:
    *   Baud rate: 115200
    *   Data bits: 8

- Stop bit: 1

2. Press **[Enter]** one or more times until you see the login prompt.

3. At the login prompt, log in using the default user name `rwa`.

   For example:

   ```
   login: rwa
   ```

   When prompted for the password, enter `rwa`.

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

# Remove and Replace Components

Use the information in the following topics to remove or replace components.

## Remove a Switch from a Rack

These procedures assume that you have attached the switch to the rack as described in Attach the Switch to a Rack or Cabinet on page 88.

> **Note**
> Read all of the information in this chapter thoroughly before attempting to remove a switch from a rack.

## Remove a Switch from a Four-Post Rack

Use the following instructions to remove a switch from a four-post rack.

1. Disconnect the device from its power source or sources.
2. Remove all cables and transceivers.
3. To remove a device from a four-post rack, do the following:

    a. Unsecure the device from the rack by unscrewing the thumb screws on the mounting ears.
    b. Fully extend the device on the rails and push the disconnect latch to release the device.
    c. Carefully slide the device out of the slider assembly and place it on a flat surface.

       You can leave the slider assemblies in place. If you want to remove them, continue with the next step.
    d. On one of the slider assemblies, remove the outer rail (bracket) from the rack by removing the M5 screws.
    e. Repeat step 3.d to remove the second slider assembly.

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

## Remove a Switch from a Two-Post Rack

Use the following instructions to remove a switch from a two-post rack.

1. Disconnect the device from its power source or sources, then disconnect the ground, if there is a ground.
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.

# Replace Power Supplies

For switches with replaceable power supplies, refer to the following information to replace the power supplies. The switches have two power supply slots. In a switch with a redundant power configuration, you can replace one power supply without powering down the switch ("hot swapping"). Most 5520 Series switches support up to two AC power supplies, but the 5520-24T-ACDC, 5520-24X-ACDC, 5520-48T-ACDC, and 5520-48SE-ACDC switches support AC, DC, or a combination of AC and DC power supplies. Power supply slots are located on the rear panel of the switch.

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

Images in this topic might show switches that are not identical to the ones you are using. However, the procedure for replacing a power supply is the same for all Extreme Networks switches.

📝 **Note**
Read all of the information in this chapter thoroughly before attempting to replace a power supply.

## Power Supply Airflow Direction Requirements

All installed power supplies must blow air in the same direction and must match the airflow direction of the installed fan modules.

- A power supply with a **red** tab provides front-to-back airflow for power supply cooling. All 5520 Series switches are available with front-to-back airflow.
- A power supply with a **blue** tab provides back-to-front airflow for power supply cooling. 5520-24T-BASE, 5520-24T-ACDC, 5520-24X-BASE, 5520-24X-ACDC,

5520-48T-BASE, 5520-48T-ACDC, 5520-48SE-BASE, and 5520-48SE-ACDC switches are available with back-to-front or front-to-back airflow.

## Replace a Power Supply

5520 Series switches support the following power supplies:

- The 350 W AC power supplies (part numbers XN-ACPWR-350W-FB and 10953) provide front-to-back airflow and are compatible with 5520-24T, 5520-24T-BASE, 5520-24X, 5520-24X-BASE, 5520-48T, 5520-48T-BASE, 5520-48SE, and 5520-48SE-BASE switches.

  The 350 W AC power supplies (part numbers XN-ACPWR-350W-BF and DPS350AB-42 A) provide back-to-front airflow and are compatible with 5520-24T-BASE, 5520-24X-BASE, 5520-48T-BASE, and 5520-48SE-BASE switches.

- The 550 W AC power supplies (part numbers XN-ACPWR-550W-FB which provide front-to-back airflow, and XN-ACPWR-550W-BF which provide back-to-front airflow) and the 550 W DC power supplies (part numbers XN-DCPWR-550W-FB which provide front-to-back airflow, and XN-DCPWR-550W-BF which provide back-to-front airflow) are compatible with the 5520-24T-ACDC, 5520-24X-ACDC, 5520-48T-ACDC, and 5520-48SE-ACDC switches .

- The 715 W AC PSU-FB (part numbers XN-ACPWR-715W-FB and 10951) provide front-to-back airflow and are compatible with 5520-24W, 5520-12MW-36W, and 5520-48W switches.

- The 1100 W AC PSU-FB (part numbers XN-ACPWR-1100W-FB and 10941) provide front-to-back airflow and are compatible with 5520-24W, 5520-12MW-36W, and 5520-48W switches.

- The 2000 W AC PSU-FB (part numbers XN-ACPWR-2000W-FB and XN-ACPWR-2000W-F) provide front-to-back airflow and are compatible with 5520-24W, 5520-12MW-36W, and 5520-48W switches.

*Pre-Installation Requirements*

You need the following tools and materials to replace a power supply:

- Thermal protective gloves
- AC power cord, if you are not re-using the cord from the removed power supply

*Remove a Power Supply*

⚠️ **Caution**
Disconnect the AC power cord from the wall outlet and from the power supply before removing an AC power supply. Ensure that the DC circuit is de-energized before removing a DC power supply.

Use the following instructions to remove a power supply.

1.  Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.

> ⚠️ **Caution**
> Power supplies can become very hot during operation. Wear thermal protective gloves when you remove a power supply from an operating switch.

2.  Note the orientation and the airflow direction of the installed power supply, and the location of the latching tab on the power supply.
3.  Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors.
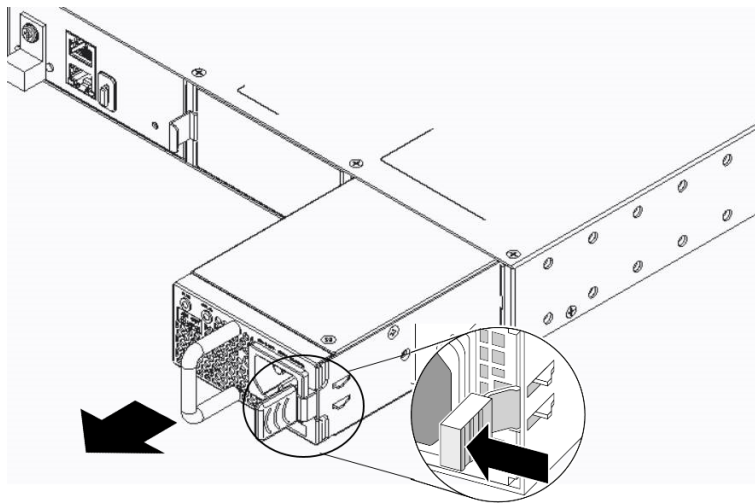


**Figure 48: Remove a Power Supply**

> 📝 **Note**
> If you are not installing a replacement power supply, install a cover over the unoccupied power supply bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

*Replace or Install a Power Supply*

Use the following instructions to replace or install a power supply.

1.  Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
2.  If necessary, remove a blank panel from the back of the switch.
3.  Ensure that the orientation of the power supply is correct, and that the new power supply's airflow direction (front-to-back or back-to-front) is compatible with the installed fan modules and any other installed power supplies.
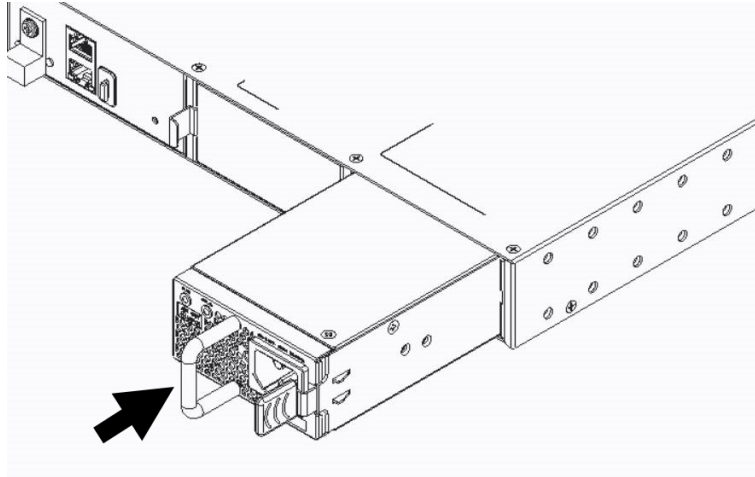4.  Carefully slide the power supply all the way into the power supply slot.

**Figure 49: Install a Power Supply**

5. Push the power supply in until the latch snaps into place.

   Do not slam the power supply into the switch.

   > **Note**
   > Be sure to install a cover over any unoccupied power supply slots. Unoccupied power supply slots must always be covered to maintain proper system ventilation and EMI levels.

To install or replace a second power supply repeat this procedure.

After installing a power supply, connect the power cord to the power supply.

- If the power supply was an AC power supply, connect it to a grounded AC power outlet.

  > **Warning**
  > Always make sure that the source outlet is properly grounded before plugging the AC power cord into the AC power supply.

- If the power supply was a DC power supply, use the provided 2 meter DC power input cable for the DC power supply to ground the power supply and connect the power supply to the power source.

  > **Warning**
  > Connect the chassis ground wire before you connect any power cables.

*Connect a DC Power Supply to the Source Voltage*

The DC power connection at your facility must be made by a qualified electrician, following these instructions.

> **Warning**
> Always make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cables on the DC power supply

> ⚠️ **Caution**
> Provide proper connection and strain relief on the DC power cables in accordance with all local and national electrical codes.

1. Verify that the DC circuit is de-energized.
2. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
3. Position the DC power cable connector so that the wide, flat side is closest to the fan, as shown in #unique_124/unique_124_Connect_42_FIG_MYK_D4L_NZB. The DC power cable connector can only connect to the power supply one way.
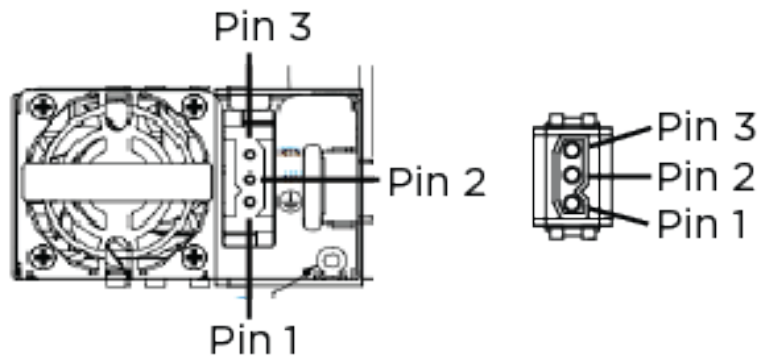
**Figure 50: Connecting the DC Power Cord**

4. Tighten the two thumb screws to secure the DC power connector in place.
5. The installation electrician connects the other end of the power cord to the building power system.

> ⚠️ **Warning**
> Before installing, be sure to connect the chassis ground wire before you connect any power cables.

> ⚠️ **Warning**
> Before removing, be sure to disconnect the ground wire after you disconnect all power cables

   a. Connect the ring terminal of the yellow and green ground wire to a known reliable earth ground point at your site.
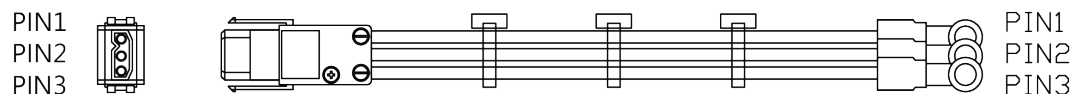
**Figure 51: DC Power Cable**

Use the following for building the wire harness:

| Cable Connector | Wire Color | |
| --- | --- | --- |
| Pin 1 | Yellow/Green | GRD |
| Pin 2 | Black | -48V |
| Pin 3 | Red | RTN |

   b. Connect the ring terminal of the red RTN power cable to the positive terminal of the DC power source, and connect the ring terminal of the black -48V power cable to the negative terminal of the DC power source.
6. Repeat these steps for each power supply.

Leave the ESD strap permanently connected to the rack, so that the strap is always available when you need to handle ESD-sensitive components.

## Replace Fan Modules

For switches with replaceable fan modules, refer to the following information to replace the fan modules. You can replace fan modules as needed while the switch is operating ("hot swapping"). Fan module slots are located on the rear panel of the switch.

Do not operate a chassis for more than a few minutes with a missing fan module. To ensure internal chassis air pressure is maintained and to avoid loss of traffic due to modules overheating and shutting down, leave a failed fan module installed until you have a replacement.

Images in this topic might show switches that are not identical to the ones you are using. However, the procedure for replacing a fan module is the same for all Extreme Networks switches.

> **Note**
> Read all of the information in this chapter thoroughly before attempting to replace a fan module.

### Fan Airflow Direction Requirements

All installed fan modules must blow air in the same direction and must match the airflow direction of the installed power supplies. Before you begin, have the replacement fan module on hand so that you can complete the replacement promptly. The switch can overheat if left without adequate cooling for an extended time.

- A fan labeled **Air Out** provides front-to-back airflow for switch cooling. All 5520 Series switches are available with front-to-back airflow.
- A fan labeled **Air In** provides back-to-front airflow for switch cooling. 5520-24T-BASE, 5520-24T-ACDC, 5520-24X-BASE, 5520-24X-ACDC, 5520-48T-BASE, 5520-48T-ACDC, 5520-48SE-BASE, and 5520-48SE-ACDC switches are available with back-to-front or front-to-back airflow.

## Replace a Fan Module

Use the following instructions to remove and replace a fan module in the switch.

*Pre-Installation Requirements*

You need a 1/4-inch flat-blade screwdriver to replace a fan module.

> ⚠️ **Caution**
> Be sure to finish the replacement procedure promptly. The switch could overheat if left without cooling for an extended period.

*Remove a Fan Module*

Use the following instructions to remove a fan module.

1. Completely loosen the captive retaining screws on the fan module.

   On most switch models, the fan module has two retaining screws at the bottom corners of the module, as shown in Figure 52.

   On some switch models, the fan module has a single retaining screw at the top right corner of the module.
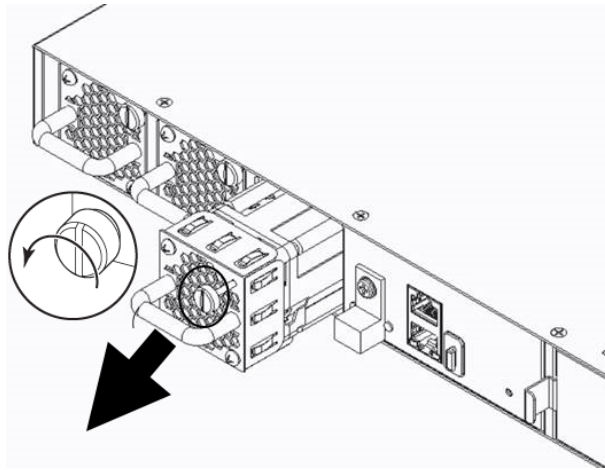2. Slide the fan module out of the switch and set it aside.



**Figure 52: Removing a Fan Module**

*Replace or Install a Fan Module*

Use the following instructions to install a fan module.

1. Verify that the airflow direction on the fan module matches that of the installed power supplies and any installed fan modules.

   Fan modules labeled **Air Out** provide front-to-back airflow.

   Fan modules labeled **Air In** provide back-to-front airflow.
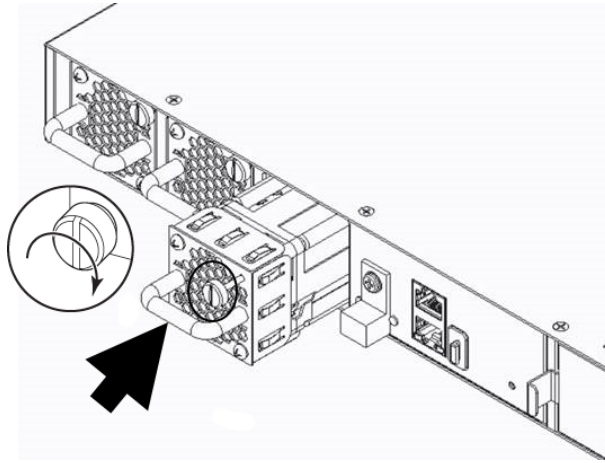2. Carefully slide the replacement fan module into the switch.

**Figure 53: Installing a Fan Module**

3. Align and fully tighten the captive retaining screws.

# Replace Expansion Modules

The switch supports hardware accessories that expand the capabilities of the switch. Collectively, they are referred to as *expansion modules*. The 5520 Series supports versatile interface modules (VIMs) and virtual port extenders.

> **Note**
> Read the information in this chapter thoroughly before trying install or remove an expansion module.

## Replace Versatile Interface Modules

5520 Series switches support the following versatile interface modules (VIMs):

- ◦ 5520-VIM-4X versatile interface module that provides four 10-GbE (SFP+) ports.
  ◦ 5520-VIM-4XE versatile interface module that provides four 10-GbE (SFP+) ports, LRM/MACsec capable.
  ◦ 5520-VIM-4YE versatile interface module that provides four 25-GbE (SFP28) MACsec capable ports.

You need the following tools and materials to install a VIM module:

- ESD-preventive wrist strap
- Phillips head screwdriver

*Remove a VIM module*

Use the following instructions to remove a VIM module.

1. Attach the ESD wrist strap to your wrist and connect the metal end to an appropriate ground point on the rack.
2. Ensure that the switch is completely powered down.

3. Remove the screws that secure the VIM module in the VIM slot using the Phillips head screwdriver.
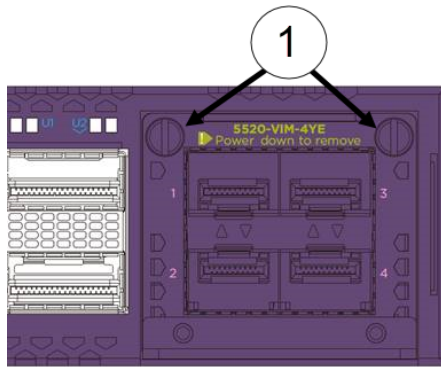


**Figure 54: VIM Module Inserted in Slot**

>      1 = VIM module retaining screw locations

4. Slide the VIM module out of the VIM slot and set it aside.

*Replace a VIM module*

Use the following instructions to replace a VIM module.

1. Attach the ESD wrist strap to your wrist and connect the metal end to an appropriate ground point on the rack.
2. Ensure that the switch is completely powered down.
3. Remove the VIM cover (if necessary) by removing the screws that hold the cover plate over VIM slot, using the Phillips head screwdriver.
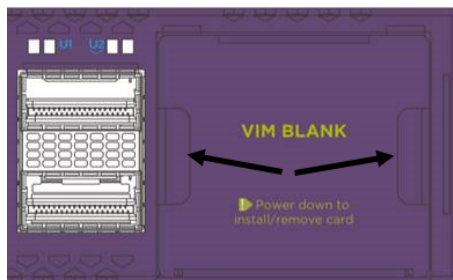


**Figure 55: Removing a slot Cover Plate (VIM slot cover shown)**

>      1 = VIM module retaining screw locations

4. Remove the new VIM module from its anti-static packaging.
5. Install the VIM module in the switch:

    a. Carefully slide the VIM module into the switch.
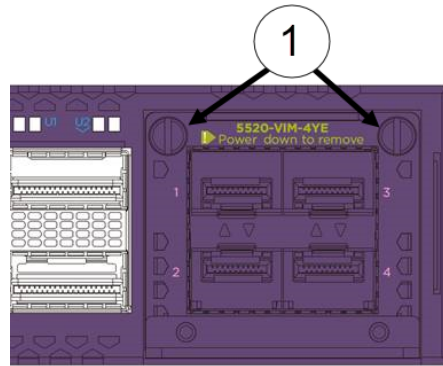    b. Insert and tighten the retaining screws you previously removed, using the Phillips head screwdriver.

**Figure 56: VIM Module Inserted in Slot**

1 = VIM module retaining screw locations

## Replace Virtual Port Extenders

5520 Series switches support the following virtual port extenders:

- V300 Virtual Port Extender
  - V300-8P-2T-W (PoE)
  - V300-8P-2X (non-PoE)
  - V300-8T-2X (non-PoE)
  - V300HT-8P-2X (non-PoE)
  - V300HT-8T-2X (non-PoE)
- V400 Virtual Port Extender
- Half-Duplex to Full-Duplex Converter (HDX/FDX Converter)

*Remove a Virtual Port Extender*

Use the following instructions to remove a virtual port extender.

1. Disconnect the port extender from its power source and, if applicable, from its redundant power supply.
2. Support the port extender while you remove the rack-mounting screws that hold the front mounting brackets in place against the rack posts.
3. Carefully slide the port extender out of the rack.
4. Place the port extender on a secure, flat surface. Optionally, remove the mounting brackets from the sides.
5. Optionally, install a new virtual port extender.

*Remove a Half-Duplex to Full-Duplex Converter*

Use the following instructions to remove a Half-Duplex to Full-Duplex converter

1. Disconnect the half-duplex ports (HD1 - HD4) from your half-duplex devices.
2. Disconnect the full-duplex ports (FD1 - FD4) from the switch.
3. Disconnect the converter from its power adapter.
   a. Disconnect the power adapter from its AC power source.

     b.  Disconnect the DC power cable from the power adapter and from the DC input socket on the side of the converter.

     c.  Remove the grounding wire from the converter.

4.  If the converter is attached to a 3-slot modular shelf, loosen the cable ties and remove it from the shelf.

5.  Optionally, install a new converter.

*Install a V300 Virtual Port Extender*

The following installation instructions are applicable to the V300-8P-2T-W (PoE) model. The V300-8P-2X, V300-8T-2X, V300HT-8P-2X, and V300HT-8T-2X models will be referred to as non-PoE models from this point on.

You need the following tools and materials to install a V300 Virtual Port Extender:

- ESD-preventive wrist strap
- M3.5 or M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

The V300 Virtual Port Extender comes with two mounting brackets and screws for attaching them. Mount the equipment in a standard equipment rack, in either a front-mount or mid-mount configuration, in the same way you would mount a switch.

To install a V300 Virtual Port Extender, follow these steps:

1.  Attach the mounting brackets to the sides of the port extender using four screws (included) for each bracket.
2.  Align the holes in the brackets with the rack post holes.
3.  Secure the port extender to each post with rack-mounting screws (not provided).
4.  Connect an AC power cord to the AC power input socket on the port extender and to an AC power outlet.
5.  When power is connected, verify that the SYS LED on the port extender turns green.

     If the SYS LED does not turn green, verify that the power source is on and the connection was made properly.
6.  Optionally, connect the port extender to a redundant power source, depending on the model.

The following mounting kits are available for non-PoE V300 models:

**Table 24: V300 Mounting Kits**

| Kit part number | Description |
|---|---|
| XN-2P-RMTKIT-1CS-001 | Single rack mount kit |
| XN-2P-RMTKIT-2CS-001 | Dual rack mount kit |
| XN-DIN-MT-001 | DIN Rail mount kit |
| XN-MTKIT-CS-001 | Replacement surface mount kit |
| XN-PS-MT-001 | PSU mount kit |

For additional installation options, including non-PoE V300 Mounting Kit installation, see the following topics:

### Install a V300 Virtual Port Extender on a Wall

The following tools and materials are required to install a V300 Virtual Port Extender to a wall:

- ESD-preventive wrist strap
- M3.5 #2 Phillips screwdriver (magnetic screwdriver recommended)
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended) for non-PoE models

> **Note**
> The mounting surface, item, and hardware must be able to support the extender in all environmental conditions. The mounting surface must also be flat.

Typical installation for the V300-8P-2T-W model include wall or table installations, in addition to VESA mounting.

There are several orientations for installation on a wall. To install the V300-8P-2T-W model on a wall:

1. Attach the short brackets to both sides of the extender

   The orientation for wall mounting should be front panel facing down.

   Two short brackets attached to the extender by 4 wood screws and 4 anchors, provided in the accessory kit.
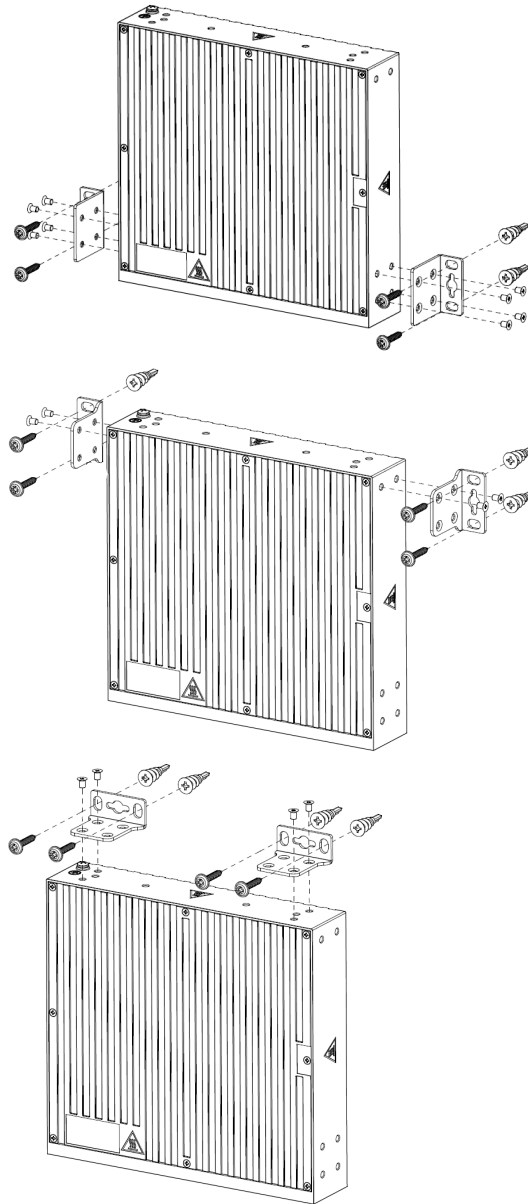
**Figure 57: V300-8P-2T-W Wall Mounting**

2. Use the optional short bracket as a template and mark the holes to be used. Extreme recommends using 2 holes per short rack ear.

3. For non-PoE models, after attaching the short brackets, attach the PSUs to the PSU mounting brackets using two cable ties.
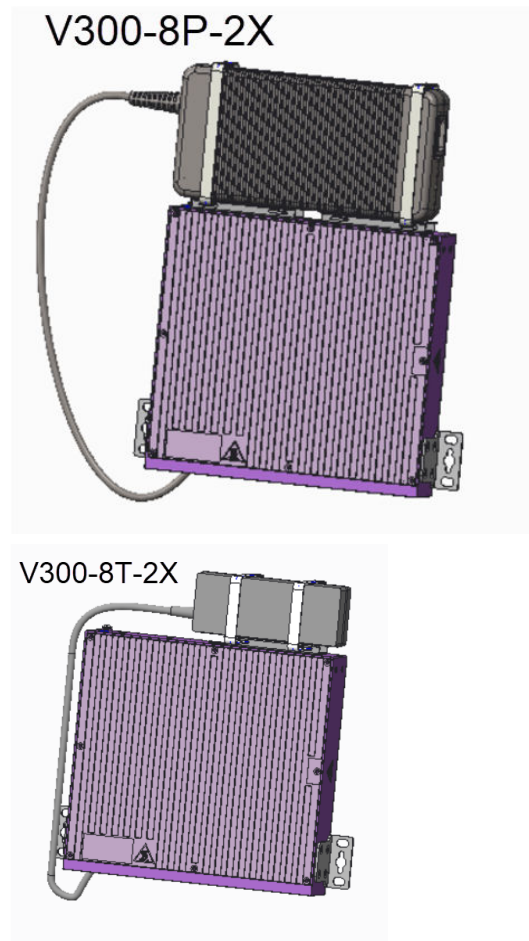


**Figure 58: V300-8P/8T-2X Wall Mount with PSU**
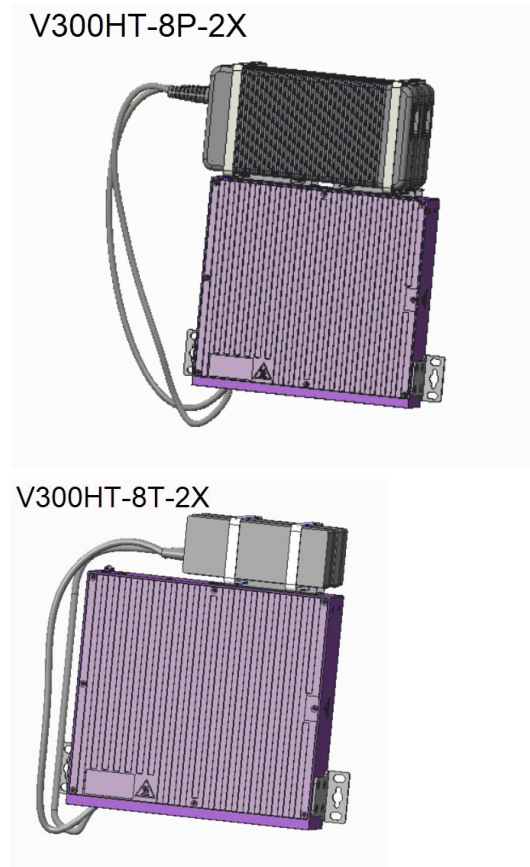
V300HT-8P-2X

V300HT-8T-2X

**Figure 59: V300HT-8P/8T-2X Wall Mount with PSU**

4. Drill the holes and attach the bracket using the provided woodscrews and anchors.
5. Connect the LAN/Ethernet cables to the extender.
6. When power is connected, verify that the SYS LED on the port extender turns green.

### Install a V300 Virtual Port Extender Under or on a Table Surface

The following tools and materials are required to install a V300 Virtual Port Extender under a table:

- ESD-preventive wrist strap
- M3.5 #2 Phillips screwdriver (magnetic screwdriver recommended) for PoE model
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended) for non-PoE models

Typical installation for the V300-8P-2T-W model include wall or table installations, in addition to VESA mounting.

For table surface or other flat surface installation, attach the rubber feet to the underside of the virtual port extender, then place the device to the table or flat surface:
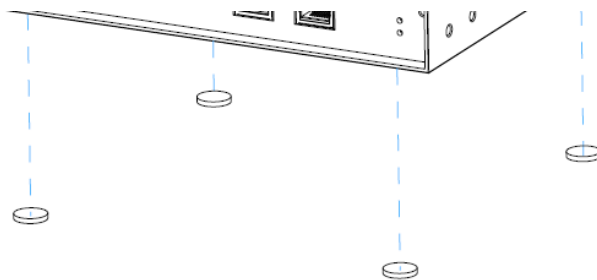
**Figure 60: Table Surface Mounting**

There are several orientations for installation under a table. To install a V300-8P-2T-W model under a table:

1.  Attach the short mounting brackets (included in kit) to the sides of the port extender using four screws (included) for each bracket.
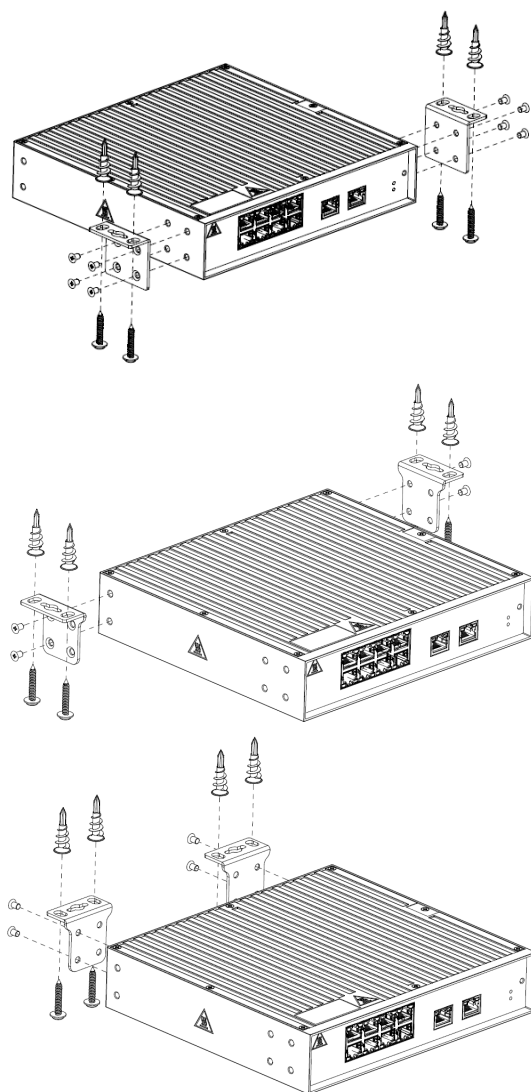


**Figure 61: Under Table Mounting**

2. For non-PoE models, after attaching short brackets and PSU bracket to the V300, attach the PSU(s) to the PSU mounting bracket using two cable ties:
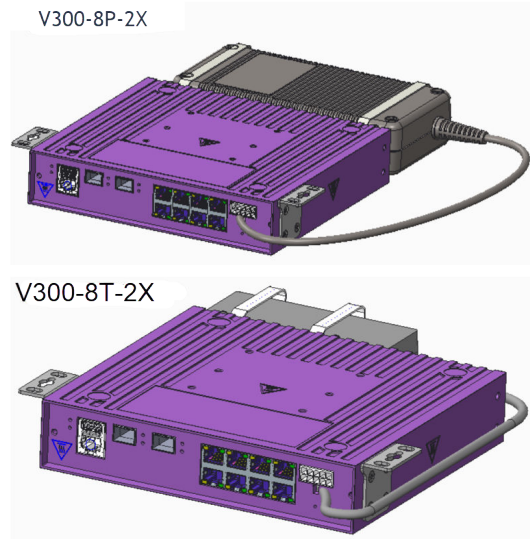


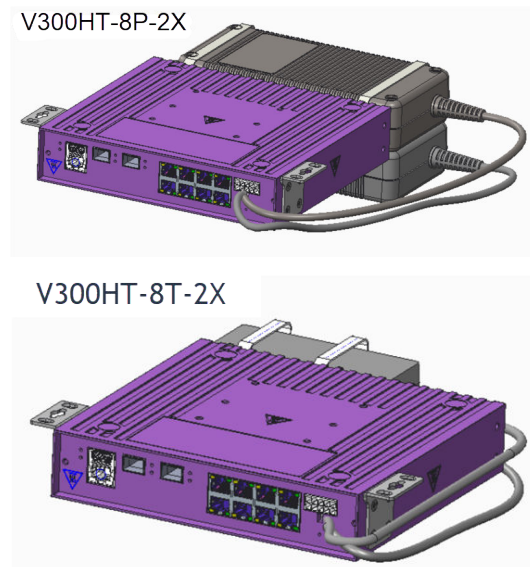**Figure 62: V300-8P/8T-2X Under Table Mounting with PSU**



**Figure 63: V300HT-8P/8T-2X Under Table Mounting with PSU**

3. Secure the port extender to the underside of the table using the provided 4 wood screws and 4 anchors.
4. When power is connected, verify that the SYS LED on the port extender turns green.

## Install a V300 Virtual Port Extender in a VESA Mount

The following tools and materials are required to install a V300 Virtual Port Extender with a VESA mount:

- ESD-preventive wrist strap

- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

The VESA mount comes with 4 screws and should be used when mounting the V300 Virtual Port Extender to a VESA mount for 75mm x 75mm or 35mm x 75mm mounting dimensions. To install a V300 Virtual Port Extender in a VESA Mount:

1. Attach the VESA mount to the underside of the port extender using four screws (included):
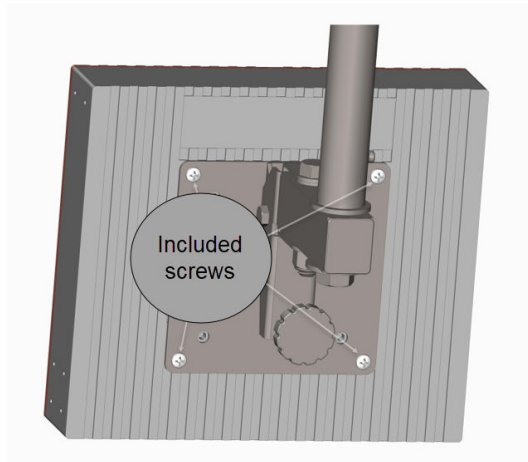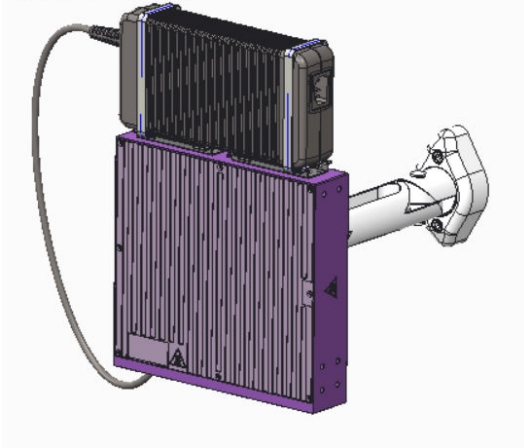


**Figure 64: VESA Mounting**

2. For non-PoE models, after attaching the PSU bracket to the V300, attach the PSU(s) to the PSU mounting brackets using two cable ties:
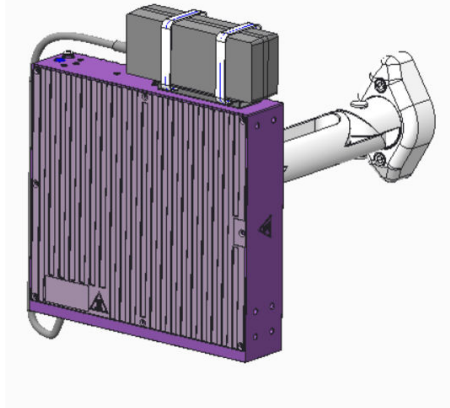
V300-8P-2X

V300-8T-2X

**Figure 65: V300-8P/8T-2X VESA Mounting with PSU**

3. Connect the LAN/Ethernet cables to the extender.
4. When power is connected, verify that the SYS LED on the port extender turns green.

### Install a V300 in a Single Rack Mount

The following tools and materials are required to install a non-PoE V300 Virtual Port Extender to a single rack mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)
- XN-2P-RMTKIT-1CS-001 - Single rack mount kit

1. Remove all contents of the single rack mount kit (XN-2P-RMTKIT-1CS-001).
2. Attach the short and long ear brackets to the V300 using the screws provided.
3. Secure the bracket flanges to the rack using the customer-provided screws appropriate for the rack you are using.

4. After attaching the PSU bracket to the V300, attach the PSU to the PSU mounting brackets using two or four cable ties:
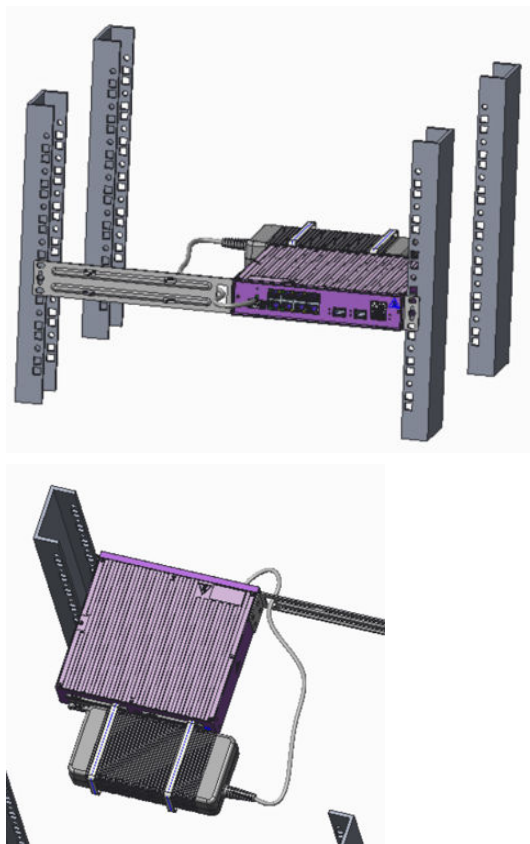


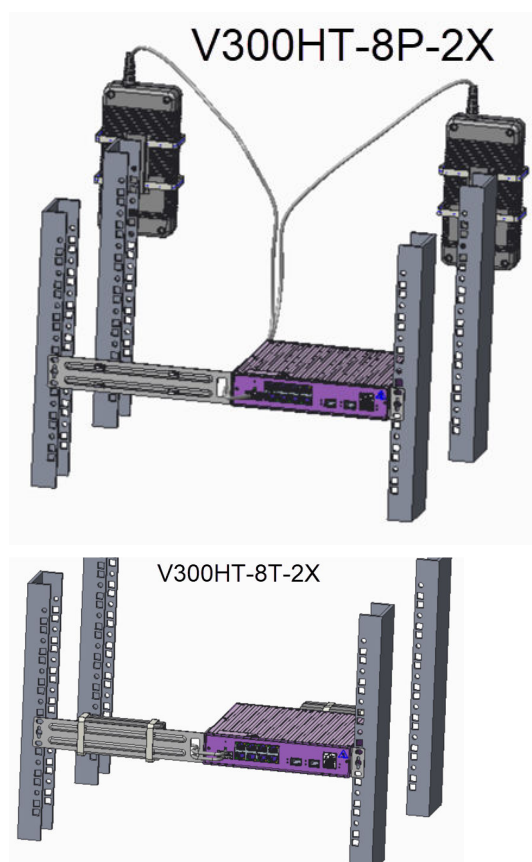**Figure 66: V300-8P-2X Single Rack Mounting with PSU**

**Figure 67: V300HT-8P/8T-2X Single Rack Mounting with PSUs**

5. For a more secure attachment, attach the two PSU mounting brackets to the rack using customer-provided screws:
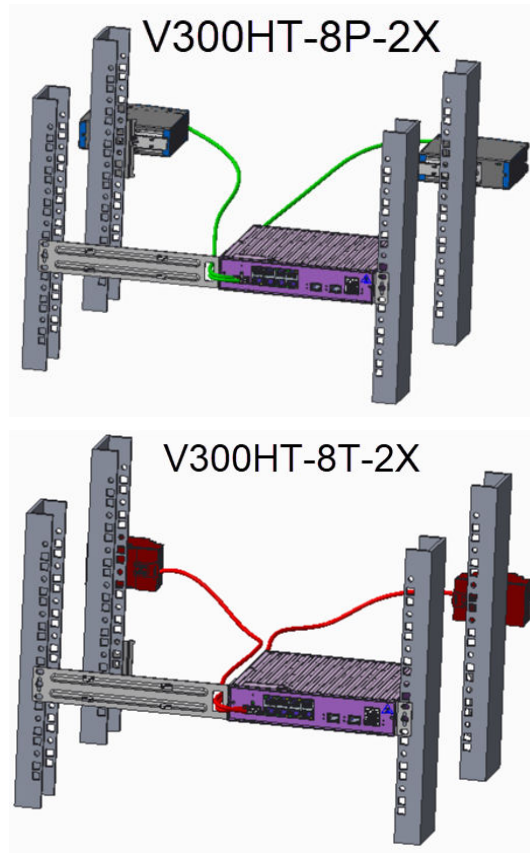


**Figure 68: V300HT-8P/8T-2X Single Rack Mounting with DIN Rail and PSUs**

6. Alternatively, the PSU can be mounted to the long rack ear using cable ties.

### Install a V300 in a Dual Rack Mount

The following tools and materials are required to install a non-PoE V300 Virtual Port Extender to a dual rack mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)
- XN-2P-RMTKIT-2CS-001 - Dual rack mount kit

1. Remove all contents of the dual rack mount kit (XN-2P-RMTKIT-2CS-001).
2. Attach one short ear bracket to the outer side of each V300 using the screws provided.
3. Attach the joint brackets to the inward side of each V300 (one with tapped screw holes facing forward, one facing rearward, using the screws provided).
4. Attach the two joint brackets together using the screws provided.

5. After attaching the PSU bracket to the V300 using the provided screws, attach the PSU to the PSU mounting brackets using two, four, or eight cable ties:
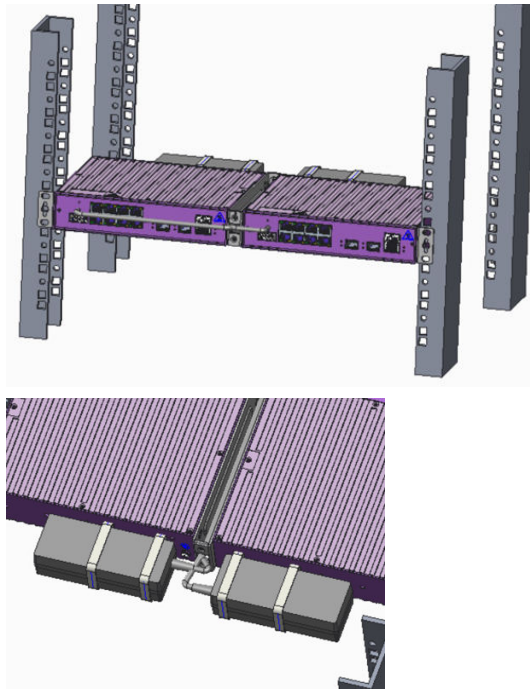


**Figure 69: V300-8T-2X Dual Rack Mounting with PSU**
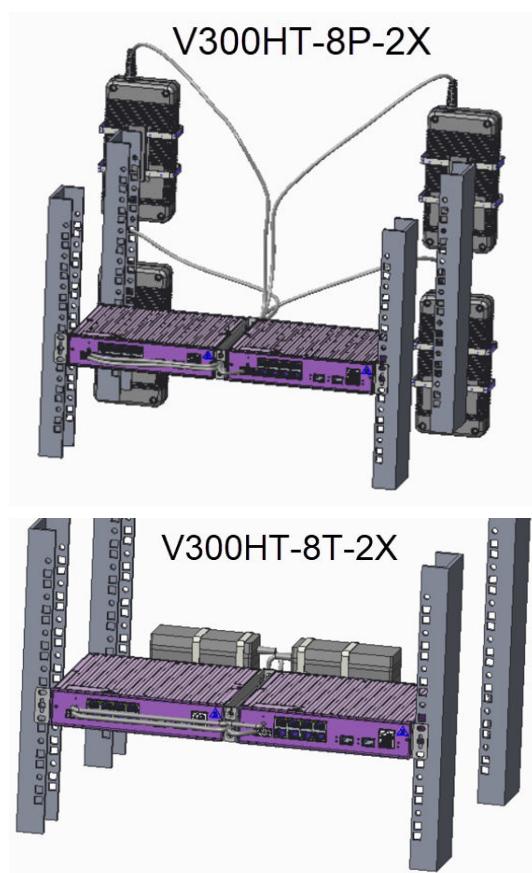
**Figure 70: V300HT-8P/8T Dual Rack Mounting with PSUs**

6. For a more secure attachment, attach the PSU mounting brackets to the rack using customer-provided screws:
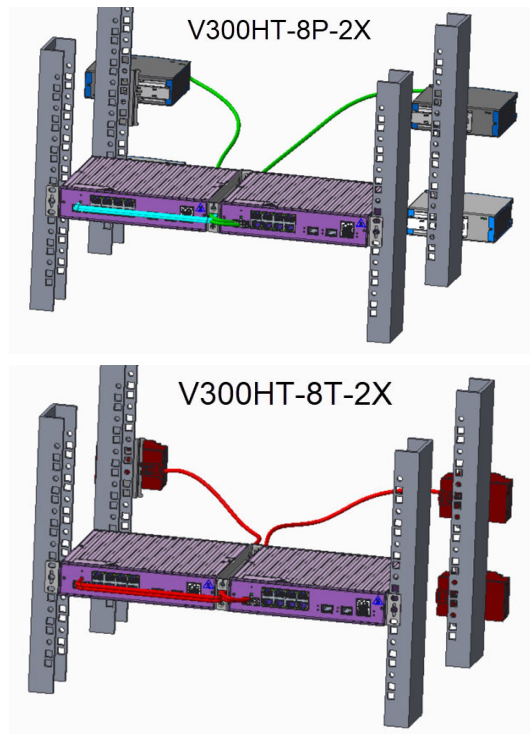


**Figure 71: V300HT-8P/8T Dual Rack Mounting with DIN Rail and PSUs**

### Install a V300 in a DIN Rail Mount

The following tools and materials are required to install a non-PoE V300 Virtual Port Extender to a DIN Rail mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)
- XN-DIN-MT-001 - DIN Rail mount kit

For PSU XN-ACPWR-320W-HT or XN-ACPWR-40W-HT:

1. Remove all contents of the DIN Rail mount kit (XN-DIN-MT-001).
2. Attach the port extender to the DIN Rail using one DIN bracket and the screws provided.

3. Attach the PSUs to the DIN bracket using cable ties, and then attach the bracket to the DIN Rail:



**Figure 72: V300HT-8P-2X DIN Rail Mount with dual XN-ACPWR-320W-HT PSUs**

4. For PSU 16807, attach the port extender to the DIN Rail using one DIN bracket and the screws provided.

5. Attach the PSUs directly to the DIN rail:
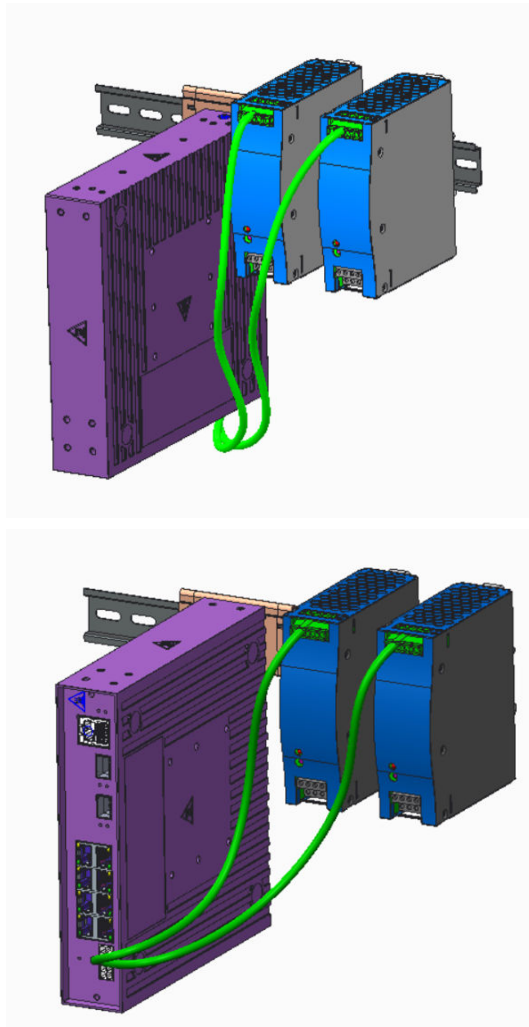


**Figure 73: V300HT-8P-2X DIN Rail Mount with dual 16807 PSUs**

6. For XN-ACPWR-60W-HT-DIN, attach the port extender to the DIN Rail using one DIN bracket and the screws provided.

7.  Attach the PSUs directly to the DIN rail:
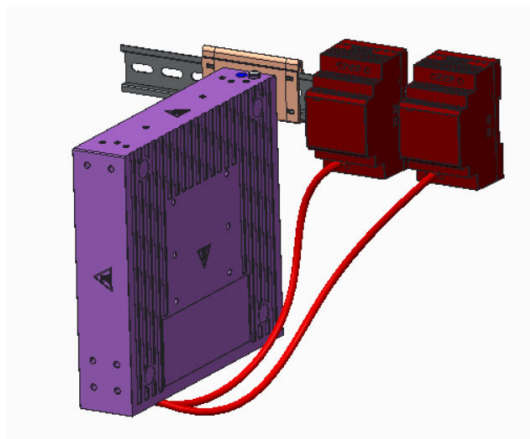


**Figure 74: V300HT-8T-2X DIN Rail Mount with dual XN-ACPWR-60W-HT-DIN PSUs**

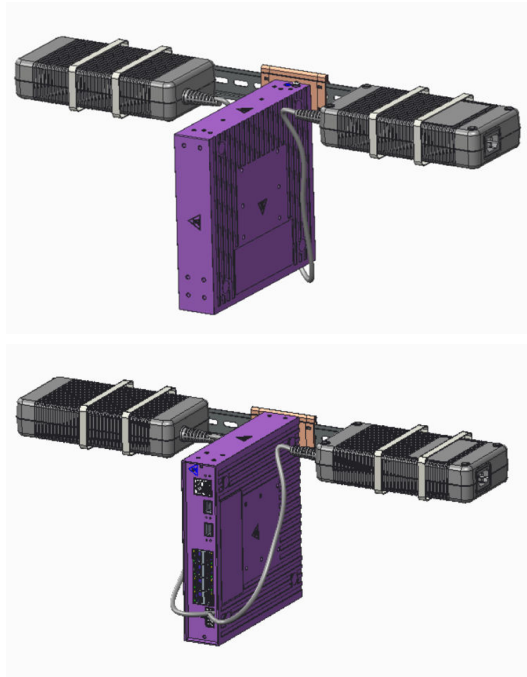Install a V300-8P-2T-W Model in a Single or Dual Rack Mount

You need the following tools and materials to install a V300-8P-2T-W model to a rack mount:

·   ESD-preventive wrist strap

·   M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

Typical installation for the V300-8P-2T-W model include wall or table installations, in addition to VESA mounting. In order to rack-mount this model, an accessory mounting kit is required.

To install the V300-8P-2T-W model in a single or dual rack mount kit:

1.  Remove all contents of the single rack mount kit (XN-1S-RKMT-V300) or dual rack mount kit (XN-2S-RKMT-V300).

2.  Attach the short mounting brackets (included) to the sides of the port extender using the four screws (included) for each bracket.
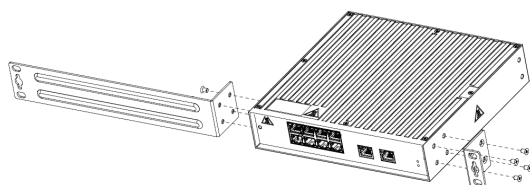


**Figure 75: Single Rack Mounting**
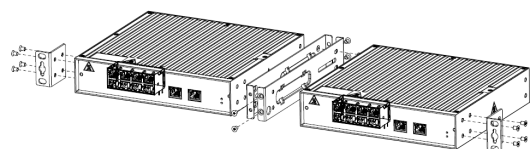


**Figure 76: Dual Rack Mounting**

3.  Align the holes in the brackets with the rack post holes.
4.  Secure the port extender to each post with rack-mounting screws (not provided).
5.  Connect the LAN/Ethernet cables to the extender.
6.  When power is connected, verify that the SYS LED on the port extender turns green.

### Install a V300-8P-2T-W Model in a DIN Rail Mount

You need the following tools and materials to install a V300 Virtual Port Extender to a DIN Rail mount:

- ESD-preventive wrist strap
- M4 #2 Phillips screwdriver (magnetic screwdriver recommended)

There are two DIN Rail mounting options. To install a V300-8P-2T-W model in a DIN Rail Mount:

1.  Remove all contents of the DIN Rail Mount Kit (XN-DIN-MT-V300).
2.  For option 1, attach the DIN mounting bracket to the rear of the port extender using the two screws (included) for each bracket:
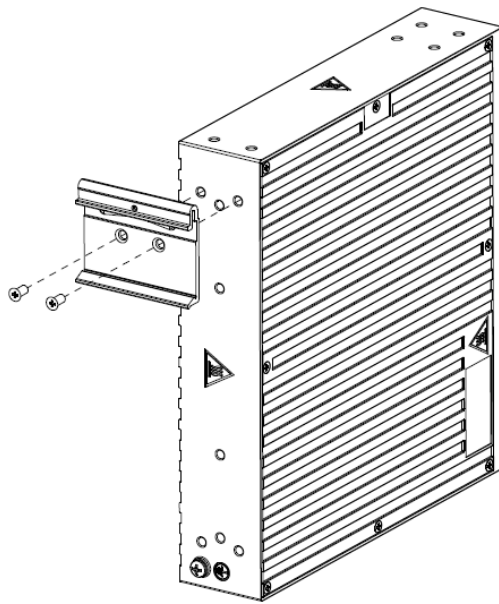


**Figure 77: DIN Rail Mounting Option 1: Attach the Bracket**

3. Align the DIN bracket with the DIN rail and attach the port extender:

**Figure 78: DIN Rail Mounting Option 1: Secure the Port Extender**

4. For option 2, attach the DIN mounting bracket to the side panel of the port extender:

Front
panel
facing
down

**Figure 79: Din Rail Mounting Option 2: Attach the Bracket**

5. Align the DIN bracket with the DIN rail and attach the port extender:

Front
panel
facing
down
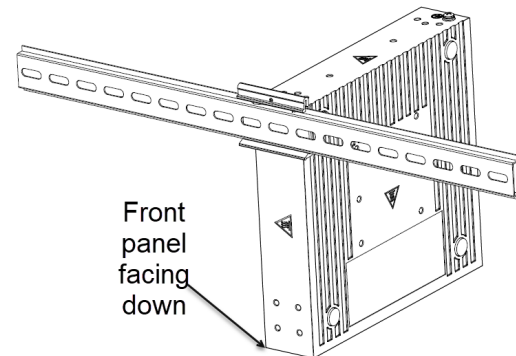
**Figure 80: DIN Rail Mounting Option 2: Secure the Port Extender**

6.  When power is connected, verify that the SYS LED on the port extender turns green.

### Connect the V300 Virtual Port Extender to Power

V300-8P-2W and V300-8T-2W models run on AC power with included power supply unit(s).

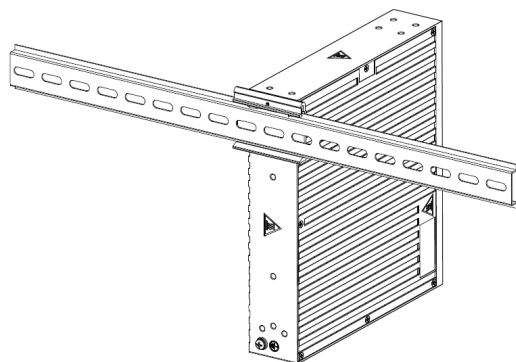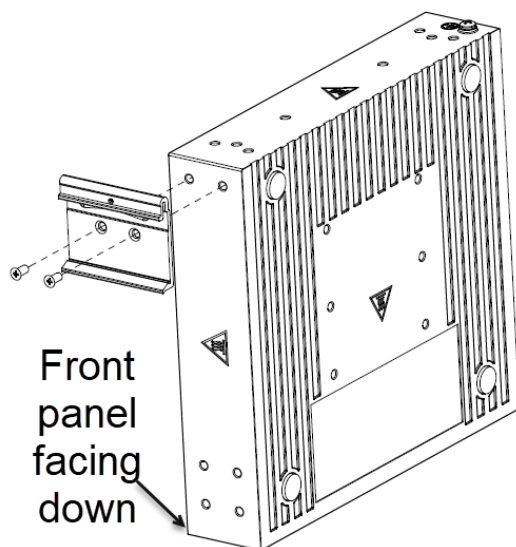V300HT-8P-2W and V300HT-8T-2W models can run on redundant power supplies (RPS). HT model power supplies are sold separately.

See the following topics to connect non-PoE V300 models to power:

### Connect the V300 to a Primary Power Source

> **Note**
> Installing the system as described in this guide meets the protective earth grounding requirements of the National Electrical Code (NEC) UL 60950 and IEC 60950 standards. However, in some cases, it may be necessary to use an alternative grounding method. In these cases, a 14 AWG wire can be connected between the grounding lug on the chassis and a nearby building ground point.

To attach the V300 switch to a power source, do the following:

1.  Connect the PSU to the V300 with the integrated power cable.
2.  Connect the AC power cord to the AC power input socket on the power supply and plug the other end into an AC power outlet.

    To attach the V300HT model to a primary power source, do the following:
3.  Connect the PSU to the included screw terminal connector (use adequate AWG wire for DIN PSUs).
4.  Plug the screw terminal connector into the port extender DC input (PSU1 recommended).
5.  Connect the:

    *   AC power cord to the AC power input socket on the PSU and plug the other end into an AC power outlet for non-DIN PSUs; or
    *   PSU to an AC power source using the instructions included with the PSU for DIN PSUs.

When power is connected, verify that the PWR LED on the switch turns green. If the PWR LED does not turn green, verify that the power source is powered on and the connection was made properly.

**Connect the V300 to a Redundant Power Source**

> **Note**
> Installing the system as described in this guide meets the protective earth grounding requirements of the National Electrical Code (NEC) UL 60950 and IEC 60950 standards. However, in some cases, it may be necessary to use an alternative grounding method. In these cases, a 14 AWG wire can be connected between the grounding lug on the chassis and a nearby building ground point.

To attach the V300 switch to a redundant power source (HT models only), do the following:

1. Connect the RPS to the included screw terminal connector (use adequate AWG wire for DIN PSUs).
2. Plug the screw terminal connector into the port extender DC input (PSU2 recommended).
3. Connect the:
   - AC power cord to the AC power input socket on the PSU and plug the other end into an AC power outlet for non-DIN PSUs; or
   - PSU to an AC power source using the instructions included with the PSU for DIN PSUs.

When power is connected, verify that the PWR LED on the switch turns green. If the PWR LED does not turn green, verify that the power source is powered on and the connection was made properly.

*Install a V400 Virtual Port Extender*

You need the following tools and materials to install a V400 Virtual Port Extender:

- ESD-preventive wrist strap
- #1 Phillips screwdriver (for clock module) or flat-bladed screwdriver (for all other VIM modules)

Your V400 Virtual Port Extender comes with two mounting brackets and screws for attaching them. Mount the equipment in a standard equipment rack, in either a front or mid-mount configuration, in the same way you would mount a switch.

To install a V400 Virtual Port Extender, follow these steps:

1. Attach the mounting brackets to the sides of the port extender using four screws (included) for each bracket.
2. Align the holes in the brackets with the rack post holes.
3. Secure the port extender to each post with rack-mounting screws (not provided).
4. Connect an AC power cord to the AC power input socket on the port extender and to an AC power outlet.
5. When power is connected, verify that the SYS LED on the port extender turns green.

   If the SYS LED does not turn green, verify that the power source is powered on and the connection was made properly.

*Install a Half-Duplex to Full-Duplex Converter*

The following options are available for installing the Half-Duplex to Full-Duplex Converter:

1. On a shelf that is mounted in an equipment rack. (The shelf can accommodate up to three converters.)

   See Install Half-Duplex to Full-Duplex Converters in a 3-Slot Modular Shelf on page 132.

2. On a flat surface.

   See Mount a Half-Duplex to Full-Duplex Converter on a Flat Surface on page 132.

3. On a wall.

   See Mount a Half-Duplex to Full-Duplex Converter on a Wall on page 133.

## Install Half-Duplex to Full-Duplex Converters in a 3-Slot Modular Shelf

Refer to Install a Half-Duplex to Full-Duplex Converter on page 132 for installation options for the Half-Duplex to Full-Duplex Converter.

Before installing the converter in the 3-slot modular shelf (part no. STK-RPS-1005CH3), mount the shelf in the rack. Follow the steps in the 3-Slot Modular Shelf Quick Reference Guide.

To install up to three Half-Duplex to Full-Duplex Converter units in the 3-slot modular shelf, follow these steps:

1. Attach the four rubber feet (included) to the bottom of the converter, one at each corner.
2. Set the converter on the shelf.
3. Connect the converter to its power adapter, following the instructions in Connect a Half-Duplex to Full-Duplex Converter to its Power Adapter on page 133.
4. Secure the converter to the shelf using cable ties (included with the shelf).

   Pass the ties through the holes in the shelf and secure them firmly around the converter.
5. Connect the full-duplex ports (FD1 - FD4) to the switch.
6. Connect the half-duplex ports (HD1 - HD4) to your half-duplex devices.
7. Install one or two additional Half-Duplex to Full-Duplex Converter units in the shelf, as described in steps Install Half-Duplex to Full-Duplex Converters in a 3-Slot Modular Shelf on page 132 through Install Half-Duplex to Full-Duplex Converters in a 3-Slot Modular Shelf on page 132.

## Mount a Half-Duplex to Full-Duplex Converter on a Flat Surface

Refer to Install a Half-Duplex to Full-Duplex Converter on page 132 for installation options for the Half-Duplex to Full-Duplex Converter.

To install a Half-Duplex to Full-Duplex Converter unit on a flat surface, follow these steps:

1. Attach the four rubber feet (included) to the bottom of the converter, one at each corner.
2. Set the converter on a flat, stable surface.
3. Connect the converter to its power adapter, following the instructions in Connect a Half-Duplex to Full-Duplex Converter to its Power Adapter on page 133.
4. Connect the full-duplex ports (FD1 - FD4) to the switch.
5. Connect the half-duplex ports (HD1 - HD4) to your half-duplex devices.

### Mount a Half-Duplex to Full-Duplex Converter on a Wall

Refer to Install a Half-Duplex to Full-Duplex Converter on page 132 for installation options for the Half-Duplex to Full-Duplex Converter.

To mount a Half-Duplex to Full-Duplex Converter unit on a wall, follow these steps:

1. Drill two holes in the wall, each 4 mm (0.16 in.) in diameter.

   The holes should be 10.5 cm (4.13 in.) apart so that they correspond to the locations of the holes in the bottom of the converter.
2. Insert an anchor bolt (not provided) into each hole in the wall.
3. Place a screw (not provided) into each anchor bolt and tighten so that the screw head protrudes slightly from the wall.
4. Place the converter onto the screws and gently lower it so that it locks into place.
5. Connect the converter to its power adapter, following the instructions in Connect a Half-Duplex to Full-Duplex Converter to its Power Adapter on page 133.
6. Connect the full-duplex ports (FD1 - FD4) to the switch.
7. Connect the half-duplex ports (HD1 - HD4) to your half-duplex devices.

### Connect a Half-Duplex to Full-Duplex Converter to its Power Adapter

Before connecting the Half-Duplex to Full-Duplex Converter to power, install it using one of the options described in Install a Half-Duplex to Full-Duplex Converter on page 132.

The Half-Duplex to Full-Duplex Converter operates on DC power, which it receives from its power adapter.

Connection points to the power adapter are located on the sides of the converter, as shown in Connect a Half-Duplex to Full-Duplex Converter to its Power Adapter on page 133.

**1** = Kensington lock point
**2** = Grounding point
**3** = DC power connector
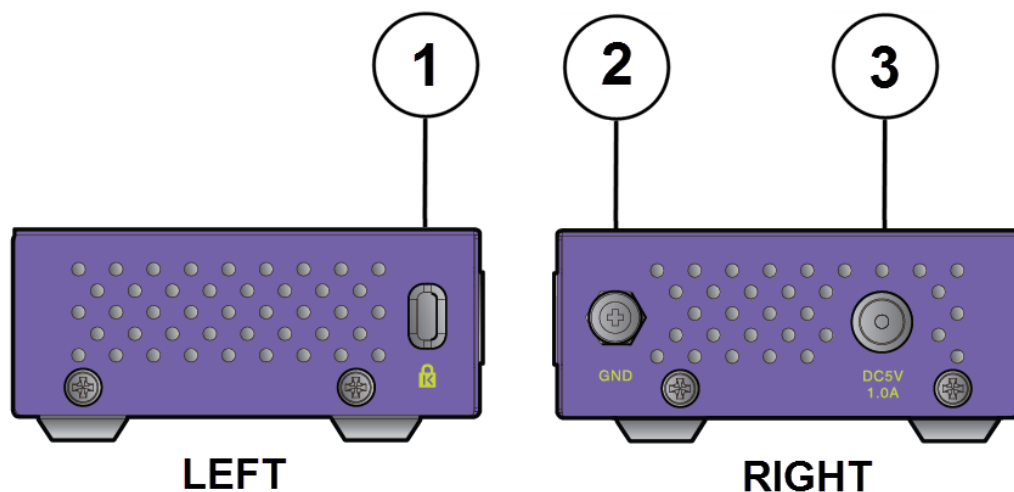
**Figure 81: Half-Duplex to Full-Duplex Converter: Side Panels**

To connect your Half-Duplex to Full-Duplex Converter to power, follow these steps:

1. Attach a grounding wire to the grounding point on the side of the converter.
2. Connect a DC power cable to the DC input socket on the same side of the converter.
3. Connect the other end of the DC power cable to the power adapter.
4. Connect the power adapter to an AC power source.
5. When power is connected, verify that the converter's power LED turns green.

   If the power LED does not turn on, recheck the connections from the connector to the power source.

# Monitor the Switch

The following topics help you monitor the status of the switch as it is running.

## System Status LEDs

System status LEDs are located on the front of the switch. The following table describes the colors and the states for the LEDs.

| LED | Color/State | Port State |
|---|---|---|
| SYStem status LED<br>(Legacy MGMT function)<br><br>**Note:** The system status LED is solid green to indicate normal operation when the switch is running Fabric Engine. | Green flash slowly | POST Passed,<br>normal operation, blinks on standalone switch, stack master, and backup nodes in a stack;<br>off for standby nodes in a stack |
| | Green blinking | POST in progress |
| | Amber blinking | POST failed or overheat |
| PSU status LEDs P1/P2 | Green | Power On |
| | Off | Power off and no power attached |
| | Amber blinking | Power supply failures |
| Fan status LEDS (F1, F2 and F3) | Green | Normal operation |
| | Amber blinking | Fan failure |
| | Amber | Fan absent |
| Bluetooth Status LED (BT) | Green blinking | Bluetooth pairing in progress |
| | Green | Bluetooth connected |
| Locator LED (LOC) | Blue blinking | Locator function |

The following figure shows the two alternate mode LEDs for 5520 Series switches: SPD and STK. The Mode button is used to cycle through three display modes for the port LEDs. In the default mode, SPD and STK are off. SPD and STK display modes expire after 30 seconds, at which time the port LEDs revert to the default SYS mode.
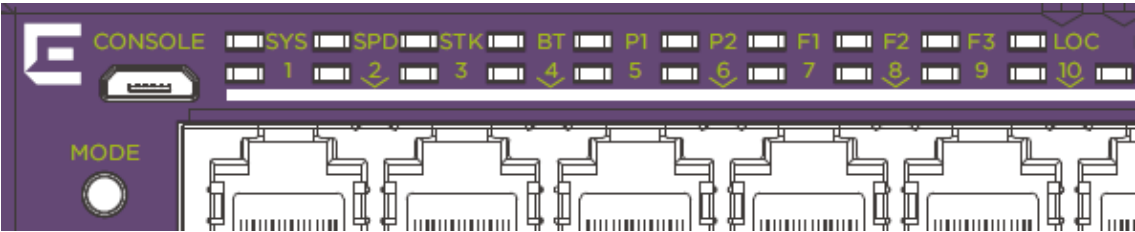


**Figure 82: 5520 Series Mode and System Status LEDs**

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

## Port LEDs in Default (SYS) Mode

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

**Table 25: Port LEDs in SYS Mode (default)**

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

## Port LEDs in SPD Mode

After one press of the Mode button, the port LEDs enter the SPD (speed) Display Mode, indicated by the SPD LED. SPD mode is used to help determine the operational speed of a port.

There are two LEDs per QSFP28 port on 5520 models. In stack mode, the first LED represents the link state and traffic of the stack port with solid or blinking green. When a QSFP28 port is used for Ethernet and partitioned to 4x10 or 4x25, one LED is shared for two ports. The first LED indicates state for the first two ports and the second LED indicates state for the second two ports. The LED is on or blinking green to indicate link and traffic when any of the 2 ports are up. It is off when both ports are down. In partitioned 2x50, each LED represents link and traffic for one 50G port. In aggregate

1x40 mode, the first LED indicates the port state and traffic and the second LED is off. Color and blink patterns indicate speeds, as referenced by the following table:

**Table 26: Port LEDs in SPD Mode**

| Color/State | Speed |
|---|---|
| Slow blinking green | 10Mbps |
| Fast blinking green | 100Mbps |
| Solid green | 1000Mbps |
| Slow blinking amber | 2.5Gbps |
| Fast blinking green | 5Gbps |
| Slow blinking green | 10Gbps |
| Fast blinking green | 25Gbps |
| Fast blinking green | 40Gbps |
| Fast blinking green | 50Gbps |

## Port LEDs in STK Mode

After two presses of the Mode button, the port LEDs enter the STK Display Mode, indicated by the STK LED. STK mode is used to indicate slot presence and slot number via the first eight port LED, as referenced by the following table:

**Table 27: Port LEDs in STK Mode**

| Color/State | Speed |
|---|---|
| Green | Slot corresponding to the port number of the LED is present |
| Blinking green | This slot has slot number corresponding to the port number of the blinking LED |

**Table 28: Management Port LEDs**

| Right side LED | | State |
|---|---|---|
| Link | Green | Link up |
| | Off | No link up or port disable |
| Left side LED | | State |
| Act | Blinking green | Packet transmitting or receiving |
| | Off | No packet transmitting or receiving |

## Locator LED

The blue LED labeled LOC on the front panel is the locator LED, which is controlled by using the CLI commands
```
[enable | disable] led locator.
```

# Versatile Interface Modules (VIM) Port LEDs

There are two supported modes for ExtremeSwitching 5520-VIM port LEDs:

- SYS - default, use normal port LED behavior for link, traffic, and PoE
- SPD – use the port LEDs to indicate operational speed

## 5520-VIM Port LEDs in Default (SYS) Mode

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

**Table 29: 5520-VIM Port LEDs in SYS Mode (default)**

| Color/State | Meaning |
|---|---|
| Solid green | Link is OK; port is not powered |
| Blinking green | Link is OK and transmitting packets; port is not powered |
| Slow blinking green | Port is admin disabled |
| Off | Port is not powered, has no link |

## 5520-VIM Port LEDs in SPD Mode

SPD mode is used to help determine the operational speed of a port. Color and blink pattern indicate speeds, as referenced by the following table:

**Table 30: 5520-VIM Port LEDs in SPD Mode**

| Color/State | Speed |
|---|---|
| Slow blinking green | 10Gbps |
| Solid green | 1Gbps |
| Fast blinking green | 25Gbps |

# Technical Specifications

This following topics contain technical specifications for the hardware products described in this document.

# 5520 Series Technical Specifications

## External Interfaces

| Switch Model | Interfaces |
| --- | --- |
| 5520-24T | • 24 x 10/100/1000BASE-T ports<br>  ◦ Full / Half-Duplex (autosensing)<br>  ◦ MACsec-capable<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |
| 5520-24W | • 24 x 10/100/1000BASE-T 802.3bt (90W) ports<br>  ◦ Full / Half-Duplex (autosensing)<br>  ◦ MACsec-capable<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |
| 5520-48T | • 48 x 10/100/1000BASE-T ports<br>  ◦ Full / Half-Duplex (autosensing)<br>  ◦ MACsec-capable<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |
| 5520-48W | • 48 x 10/100/1000BASE-T 802.3bt (90W) ports<br>  ◦ Full / Half-Duplex (autosensing)<br>  ◦ MACsec-capable<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |

| Switch Model | Interfaces |
|---|---|
| 5520-12MW-36W | • 12 x 100M/1/2.5/5GBASE-T 802.3bt (90W) PoE ports<br>• 36 x 10/100/1000BASE-T 802.3bt (90W) PoE ports<br>  ◦ Full-Duplex<br>  ◦ MACsec-capable<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |
| 5520-48SE | • 48 x 100/1000BASE-X (SFP) ports (unpopulated)<br>  ◦ MACsec-capable<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |
| 5520-24X | • 24 x 100M/1G/10GBASE-X (SFP+) ports** (unpopulated)<br>• 2 x Stacking/QSFP28 ports* (unpopulated)<br>• 1 x Serial console port (RJ-45)<br>• 1 x 10/100/1000BASE-T out-of-band management port<br>• 2 x USB A ports for management or external USB flash<br>• 1 x USB Micro-B console port<br>• 1 x VIM slot |
| 5520-24T-ACDC | • 24 x 10/100/1000BASE-T FDX/HDX MACsec capable ports<br>• 2 stacking/QSFP28 ports<br>• 1 unpopulated VIM slot<br>• 3 unpopulated modular fan slots<br>• 2 unpopulated modular PSU slots<br>• AC or DC PSU capable |
| 5520-48T-ACDC | • 48 x 10/100/1000BASE-T FDX/HDX MACsec capable ports<br>• 2 stacking/QSFP28 ports<br>• 1 unpopulated VIM slot<br>• 3 unpopulated modular fan slots<br>• 2 unpopulated modular PSU slots<br>• AC or DC PSU capable |

| Switch Model | Interfaces |
|---|---|
| 5520-24X-ACDC | • 24 x 100M/1Gb/10Gb SFP+ ports** (unpopulated)<br>• 2 stacking/QSFP28 ports (unpopulated)<br>• 1 unpopulated VIM slot<br>• 3 unpopulated modular fan slots<br>• 2 unpopulated modular PSU slots<br>• AC or DC PSU capable |
| 5520-48SE-ACDC | • 48 x 100/1000BASE-X SFP MACsec capable ports (unpopulated)<br>• 2 stacking/QSFP28 ports (unpopulated)<br>• 1 unpopulated VIM slot<br>• 3 unpopulated modular fan slots<br>• 2 unpopulated modular PSU slots<br>• AC or DC PSU capable |
| 5520-VIM-4X | • 4 x 1/10GBASE-X SFP+ ports (unpopulated) |
| 5520-VIM-4XE | • 4 x 1/10GBASE-X SFP+ ports (unpopulated)<br>  ◦ LRM-capable<br>  ◦ MACsec-capable |
| 5520-VIM-4YE | • 4 x 10/25GBASE-X SFP28 ports (unpopulated)<br>  ◦ MACsec-capable |

* Notes on use of the 2 x Stacking/QSFP28 ports

1. With Switch Engine, the 2 x QSFP28 ports can be used for stacking or as Ethernet uplink ports (when not stacking); stacking data rate is 40Gb or 50Gb per port.
2. With Fabric Engine, the 2 x QSFP28 ports can be used as Ethernet uplink ports if in non-Fabric mode or if no VIM is present as of the VOSS 8.4.2 release.
3. Ethernet uplink QSFP28 data rate options per port, with channelization: 4 x 10Gb SFP+, 4 x 25Gb SFP28, 1 x 40Gb QSFP+ (supported with Switch Engine and Fabric Engine); 2 x 50Gb (Switch Engine only)

** 100M on 5520-24x and 5520-24x-ACDC access ports supported with Switch Engine and with Fabric Engine. Refer to the Extreme Optics Compatibility Tool.

## Weights and Dimensions

### Switches

| Switch Model | Weight* | Physical Dimensions | |
|---|---|---|---|
| | | Chassis Only | With PSU |
| 5520-24T | 5.54 kg (12.21 lb.) | Height: 44 mm (1.73 in.)<br>Width: 441 mm (17.36 in.)<br>Depth: 442 mm (17.42 in.) | Height: 44 mm (1.73 in.)<br>Width: 441 mm (17.36 in.)<br>Depth: 449 mm (17.68 in.) |
| 5520-24W | 6.25 kg (13.78 lb.) | | |

| Switch Model | Weight* | Physical Dimensions | |
|---|---|---|---|
| | | Chassis Only | With PSU |
| 5520-48T | 5.76 kg (12.70 lb.) | | |
| 5520-48W | 6.06 kg (13.36 lb.) | | |
| 5520-12MW-36W | 6.33 kg (13.96 lb.) | | |
| 5520-48SE | 5.70 kg (12.57 lb.) | | |
| 5520-24X | 6.25 kg (13.78 lb.) | | |
| 5520-24T-ACDC | 5.15 kg (11.35 lb.) | Height: 43 mm (1.71 in.) Width: 431 mm (16.98 in.) Depth: 442 mm (17.42 in.) | Not applicable |
| 5520-48T-ACDC | 5.95 kg (13.12 lb.) | | |
| 5520-24X-ACDC | 5.68 kg (12.52 lb.) | | |
| 5520-48SE-ACDC | 5.91 kg (13.03 lb.) | | |

* Switch weights include fans but no PSUs

## VIM Modules

| Model | Weight | Physical Dimensions |
|---|---|---|
| 5520-VIM-4X | 0.17 kg (0.37 lb.) | Height: 40.8 mm (1.61 in.) Width: 48.8 mm (1.92 in.) Depth: 146.3 mm (5.76 in.) |
| 5520-VIM-4XE | 0.20 kg (0.44 lb.) | |
| 5520-VIM-4YE | 0.21 kg (0.46 lb.) | |

## Power Supplies

| Model | Weight* | Physical Dimensions |
|---|---|---|
| 10953 (350W AC) | 1.08 kg (2.38 lb.) | Height: 82.5 mm (3.25 in.) Width: 40 mm (1.57 in.) Depth: 287 mm (11.30 in.) |
| 10951 (715W AC) | 1.16 kg (2.56 lb.) | |
| 10941 (1100W AC) | 1.16 kg (2.56 lb.) | |
| XN-ACPWR-2000W-F (2000W AC) | 1.16 kg (2.56 lb.) | Height: 75 mm (2.95 in.) Width: 40 mm (1.57 in.) Depth: 292 mm (11.50 in.) |
| XN-ACPWR-550W-FB | 0.81 kg (1.79 lb.) | Height: 40 mm (1.58 in.) Width: 73.7 mm (2.90 in.) Depth: 185.2 mm (7.29 in.) |
| XN-ACPWR-550W-BF | 0.81 kg (1.79 lb.) | |
| XN-DCPWR-550W-FB | 0.81 kg (1.79 lb.) | |
| XN-DCPWR-550W-BF | 0.81 kg (1.79 lb.) | |

# Acoustic Noise and Fan Speed

## Fan & Acoustic Noise

| Switch Model | Acoustic Information | |
|---|---|---|
| 5520-24T | Typical: Single 350W AC PSU, no VIM<br>Maximum: Dual 350W AC PSU, 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 39.6 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>77.5 dB(A), 50˚C (122˚F) (Maximum) | 5.1 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>8.46 B, 50˚C (122˚F) (Maximum) |
| 5520-24W | Typical: Single 715W AC PSU, no VIM<br>Maximum: Dual 1100W AC PSU, 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 50.4 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>67.1 dB(A), 25˚C (77˚F) (Maximum)<br>78.9 dB(A), 50˚C (122˚F) (Maximum) | 6 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>7.61 B, 25˚C (77˚F) (Maximum)<br>8.6 B, 50˚C (122˚F) (Maximum) |
| 5520-48T | Typical: Single 350W AC PSU, no VIM<br>Maximum: Dual 350W AC PSU, 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 39.0 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>79.0 dB(A), 50˚C (122˚F) (Maximum) | 4.9 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>8.52 B, 50˚C (122˚F) (Maximum) |
| 5520-48W | Typical: Single 1100W AC PSU, no VIM<br>Maximum: Dual 2000W AC PSU (240VAC), 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 64.3 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>69.1 dB(A), 25˚C (77˚F) (Maximum)<br>79.4 dB(A), 50˚C (122˚F) (Maximum) | 7.24 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>7.65 B, 25˚C (77˚F) (Maximum)<br>8.6 B, 50˚C (122˚F) (Maximum) |

| Switch Model | Acoustic Information | |
|---|---|---|
| 5520-12MW-36W | Typical: Single 1100W AC PSU, no VIM<br>Maximum: Dual 2000W AC PSU (240VAC), 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 62.7 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>69.2 dB(A), 25˚C (77˚F) (Maximum)<br>78.8 dB(A), 50˚C (122˚F) (Maximum) | 7.25 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>7.64 B, 25˚C (77˚F) (Maximum)<br>8.6 B, 50˚C (122˚F) (Maximum) |
| 5520-48SE | Typical: Single 350W AC PSU, no VIM<br>Maximum: Dual 350W AC PSU, 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 41.4 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>77.9 dB(A), 50˚C (122˚F) (Maximum) | 5.14 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>8.53 B, 50˚C (122˚F) (Maximum) |
| 5520-24X | Typical: Single 350W AC PSU, no VIM<br>Maximum: Dual 350W AC PSU, 5520-VIM-4YE | |
| | Bystander Sound Pressure | Sound Power |
| | 40.6 dB(A),0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>76.9 dB(A), 50˚C (122˚F) (Maximum) | 5.05 B, 0˚C to 35˚C (32˚F to 95˚F) (Typical)<br>8.52 B, 50˚C (122˚F) (Maximum) |

| Switch Model | Acoustic Information | |
|---|---|---|
| 5520-24T-ACDC | Typical: F2B Airflow; Single 550W AC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.6 dB(A), 0˚C to 40˚C (Typical)<br>76.5 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.94 B, 0˚C to 40˚C (Typical)<br>8.60 B, 50˚C (Maximum) |
| | Typical: F2B Airflow; Single 550W DC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.2 dB(A), 0˚C to 40˚C (Typical)<br>77.0 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.89 B, 0˚C to 40˚C (Typical)<br>8.56 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W AC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.46dB(A), 0˚C to 40˚C (Typical)<br>76.6 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.99 B, 0˚C to 40˚C (Typical)<br>8.61 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W DC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>39.8 dB(A), 0˚C to 40˚C (Typical)<br>79.0 dB(A), 50˚C (Maximum) | Sound Power<br><br>5.03 B, 0˚C to 40˚C (Typical)<br>8.69 B, 50˚C (Maximum) |

| Switch Model | Acoustic Information | |
|---|---|---|
| 5520-48T-ACDC | Typical:F2B Airflow; Single 550W AC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.2 dB(A), 0˚C to 40˚C (Typical)<br>76.4 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.91 B, 0˚C to 40˚C (Typical)<br>8.58 B, 50˚C (Maximum) |
| | Typical: F2B Airflow; Single 550W DC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.1 dB(A), 0˚C to 40˚C (Typical)<br>77.1 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.88 B, 0˚C to 40˚C (Typical)<br>8.55 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W AC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.5 dB(A), 0˚C to 40˚C (Typical)<br>76.7 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.94 B, 0˚C to 40˚C (Typical)<br>8.54 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W DC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>39.6 dB(A), 0˚C to 40˚C (Typical)<br>79.0 dB(A), 50˚C (Maximum) | Sound Power<br><br>5.00 B, 0˚C to 40˚C (Typical)<br>8.70 B, 50˚C (Maximum) |

| Switch Model | Acoustic Information | |
|---|---|---|
| 5520-48SE-ACDC | Typical: F2B Airflow; Single 550W AC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>39.0 dB(A), 0˚C to 40˚C (Typical)<br>76.6 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.98 B, 0˚C to 40˚C (Typical)<br>8.65 B, 50˚C (Maximum) |
| | Typical: F2B Airflow; Single 550W DC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.7 dB(A), 0˚C to 40˚C (Typical)<br>77.2 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.96 B, 0˚C to 40˚C (Typical)<br>8.64 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W AC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.9 dB(A), 0˚C to 40˚C (Typical)<br>77.4 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.95 B, 0˚C to 40˚C (Typical)<br>8.65 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W DC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>40.2 dB(A), 0˚C to 40˚C (Typical)<br>79.5 dB(A), 50˚C (Maximum) | Sound Power<br><br>5.04 B, 0˚C to 40˚C (Typical)<br>8.75 B, 50˚C (Maximum) |

| Switch Model | Acoustic Information | |
|---|---|---|
| 5520-24X-ACDC | Typical: F2B Airflow; Single 550W AC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.1 dB(A), 0˚C to 40˚C (Typical)<br>75.8 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.90 B, 0˚C to 40˚C (Typical)<br>8.59 B, 50˚C (Maximum) |
| | Typical: F2B Airflow; Single 550W DC PSU, no VIM<br>Maximum: F2B Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.0 dB(A), 0˚C to 40˚C (Typical)<br>76.6 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.88 B, 0˚C to 40˚C (Typical)<br>8.53 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W AC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W AC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>38.3 dB(A), 0˚C to 40˚C (Typical)<br>77.3 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.94 B, 0˚C to 40˚C (Typical)<br>8.64 B, 50˚C (Maximum) |
| | Typical: B2F Airflow; Single 550W DC PSU, no VIM<br>Maximum: B2F Airflow; Dual 550W DC PSU, with 5520-VIM-4YE | |
| | Bystander Sound Pressure<br><br>40.1 dB(A), 0˚C to 40˚C (Typical)<br>79.3 dB(A), 50˚C (Maximum) | Sound Power<br><br>4.94 B, 0˚C to 40˚C (Typical)<br>8.73 B, 50˚C (Maximum) |

**Table 31: 5520 Fan Speed and Power Consumption**

| Fan Speed | Fan Module RPM (typical) | | Power |
|---|---|---|---|
| | Inlet Fan | Outlet Fan | Typical |
| Full (100%) | 21000 | 19000 | 12V*1.7A = 20.4W per module* |
| Low (20%) | 4200 | 3800 | 2W (per module) |

* Some units are equipped with (2) fan module, while others are equipped with 3. Total fan power is equal to the number of installed fan modules multiplied by the fan power for each module.

### Fan Speed and Temperature Variation

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

## Memory

| Memory |
| --- |
| 2 GB DDR4 ECC memory |
| 2 GB SLC NAND Flash Memory |
| 8MB packet buffer per chip |

## Mean Time Between Failures

**Table 32: 5520 MTBF (front-to-back airflow)**

| Ambient Temp = 25°C | 5520-24T | 5520-24W | 5520-24X | 5520-12MW-36W | 5520-48T | 5520-48W | 5520-48SE |
| --- | --- | --- | --- | --- | --- | --- | --- |
| System base (all boards, modules excluded) | 545,928 | 480,404 | 633,004 | 392,662 | 506,767 | 417,304 | 531,218 |
| Complete system - A (system base+full fans+1 PSU) | | | | | | | |
| One 2000W PSU | | 185,080 | | 174,532 | | 179,138 | |
| One 1100W PSU | | 212,906 | | 199,067 | | 205,081 | |
| One 715W PSU | | 218,879 | | 204,272 | | 210,617 | |
| One 350W PSU | 270,711 | | 193,198 | | 236,070 | | 169,687 |
| Complete system - B (system base+ full fans+2 PSUs) | | | | | | | |
| Two 2000W PSU | | 123,936 | | 119,115 | | 121,243 | |
| Two 1100W PSU | | 150,232 | | 143,607 | | 146,293 | |

**Table 32: 5520 MTBF (front-to-back airflow) (continued)**

| Ambient Temp = 25°C | 5520-24T | 5520-24W | 5520-24X | 5520-12MW-36W | 5520-48T | 5520-48W | 5520-48SE |
|---|---|---|---|---|---|---|---|
| Two 715W PSU | | 156,248 | | 148,663 | | 151,992 | |
| Two 350W PSU | 184,380 | | 193,198 | | 167,627 | | 169,687 |

> **Note**
> 5520-24X and 5520-24T models have 2 fan slots; All other models have 3.

**Table 33: 5520 MTBF (back-to-front airflow)**

| Ambient Temp = 25°C | 5520-48T-BASE | 5520-24T-BASE | 5520-24X-BASE | 5520-48SE-BASE |
|---|---|---|---|---|
| System base (without PSU and fans) | 506,767 | 545,928 | 633,004 | 531,218 |
| (system base+3 fans+1 PSU) | | | | |
| One 350W PSU | 334,974 | | | 343,304 |
| (system base+3 fans+2 PSUs) | | | | |
| Two 350W PSU | 353,898 | | | 363,209 |
| (system base+2 fans+1 PSU) | | | | |
| One 350W PSU | | 409,290 | 455,433 | |
| (system base+2 fans+2 PSUs) | | | | |
| Two 350W PSU | | 437,901 | 491,140 | |

**Table 34: 5520 MTBF (AC and DC power supplies)**

| Ambient Temp = 25°C | 5520-48T-ACDC | 5520-24T-ACDC | 5520-24X-ACDC | 5520-48SE-ACDC |
|---|---|---|---|---|
| System base (without PSU and fans) | 634,091 | 697,627 | 717,424 | 618,066 |
| (system base+3 f-b fans+1 PSU) | | | | |
| One 550W AC PSU | 317,110 | 331,806 | 335,188 | 313,314 |
| One 550W DC PSU | 303,810 | 317,273 | 320,363 | 300,323 |
| (system base+3 b-f fans+1 PSU) | | | | |

**Table 34: 5520 MTBF (AC and DC power supplies) (continued)**

| Ambient Temp = 25°C | 5520-48T-ACDC | 5520-24T-ACDC | 5520-24X-ACDC | 5520-48SE-ACDC |
|---|---|---|---|---|
| One 550W AC PSU | 297,612 | 310,520 | 313,480 | 294,266 |
| One 550W DC PSU | 317,057 | 331,749 | 335,128 | 313,262 |
| (system base+3 f-b fans+2 PSUs) | | | | |
| Two 550W AC PSUs | 355,926 | 374,545 | 378,860 | 351,150 |
| Two 550W DC PSUs | 344,636 | 362,064 | 366,094 | 340,156 |
| (system base+3 b-f fans+2 PSUs) | | | | |
| Two 550W AC PSUs | 339,289 | 356,168 | 360,067 | 334,947 |
| Two 550W DC PSUs | 355,877 | 374,492 | 378,805 | 351,103 |

**Table 35: 5520 MTBF (AC and DC power supplies cont.)**

| Ambient Temp = 50°C | 5520-48T-ACDC | 5520-24T-ACDC | 5520-24X-ACDC | 5520-48SE-ACDC |
|---|---|---|---|---|
| System base (without PSU and fans) | 251,134 | | 286,740 | |

## Power Specifications

| | 10953 | 10951 | 10941 | XN-ACPWR-2000-F* |
|---|---|---|---|---|
| Voltage Input Range (Nominal) | 100VAC-127VAC/ 200VAC-240VAC | 100VAC-127VAC/ 200VAC-240VAC | 100VAC-127VAC/ 200VAC-240VAC | 100VAC-127VAC/ 200VAC-240VAC |
| Line Frequency Range | 50Hz to 60Hz | 50Hz to 60Hz | 50Hz to 60Hz | 50Hz to 60Hz |
| Power Supply Input Socket | IEC/EN 60320 C14 | IEC/EN 60320 C16 | IEC/EN 60320 C16 | IEC/EN 60320 C16 |
| Power Cord Input Plug | IEC/EN 60320 C13 | IEC/EN 60320 C15 | IEC/EN 60320 C15 | IEC/EN 60320 C15 |
| Operating Temperature | 0°C to 55°C (32°F to 131°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 55°C (32°F to 131°F) Normal Operation |

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

## Power Supply Specifications (cont.)

| | XN-ACPWR-350W-FB | XN-ACPWR-350W-BF | XN-ACPWR-715W-FB | XN-ACPWR-1100W-FB | XN-ACPWR-2000W-FB* |
|---|---|---|---|---|---|
| Voltage Input Range (Nominal) | 100VAC-240VAC | 100VAC-240VAC | 100VAC-240VAC | 100VAC-240VAC | 100VAC-240VAC |
| Line Frequency Range | 50Hz to 60Hz | 50Hz to 60Hz | 50Hz to 60Hz | 50Hz to 60Hz | 50Hz to 60Hz |
| Power Supply Input Socket | IEC/EN 60320 C14 | IEC/EN 60320 C14 | IEC/EN 60320 C16 | IEC/EN 60320 C16 | IEC/EN 60320 C16 |
| Power Cord Input Plug | IEC/EN 60320 C13 | IEC/EN 60320 C13 | IEC/EN 60320 C15 | IEC/EN 60320 C15 | IEC/EN 60320 C15 |
| Operating Temperature | 0°C to 55°C (32°F to 131°F) Normal Operation | 0°C to 55°C (32°F to 131°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation |

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

## Power Supply Specifications (cont.)

| | XN-ACPWR-550W-FB | XN-ACPWR-550W-BF | XN-DCPWR-550W-FB | XN-DCPWR-550W-BF |
|---|---|---|---|---|
| Voltage Input Range (Nominal) | 100VAC-240VAC | 100VAC-240VAC | -48VDC (-36VDC to -72VDC) | -48VDC (-36VDC to -72VDC) |
| Line Frequency Range | 50Hz to 60Hz | 50Hz to 60Hz | N/A | N/A |
| Power Supply Input Socket | IEC 320 - C14 | IEC 320 - C14 | POSITRONIC PN# PLAH03M400A1/AA-E1A | POSITRONIC PN# PLAH03M400A1/AA-E1A |

| | XN-ACPWR-550W-FB | XN-ACPWR-550W-BF | XN-DCPWR-550W-FB | XN-DCPWR-550W-BF |
|---|---|---|---|---|
| Power Cord Input Plug | IEC 320 - C13 | IEC 320 - C13 | POSITRONIC PN# PLAH03M400A1/ AA-E1A | POSITRONIC PN# PLAH03M400A1/ AA-E1A |
| Operating Temperature | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation | 0°C to 50°C (32°F to 122°F) Normal Operation |

## PoE Power Budget

| Switch Model | 1 x 715W | 2x 715W | 1 x 1100W | 2 x 1100W | 1 x 2000W @ 100-120VAC | 1 x 2000W @ 200-240VAC | 2 x 2000W @ 100-120VAC | 2 x 2000W @ 200-240VAC |
|---|---|---|---|---|---|---|---|---|
| 5520-24W | 494W | 1079W | 879W | 1781W | 879W | 1779W | 1869W | 2160W |
| 5520-48W | 483W | 1068W | 868W | 1770W | 868W | 1768W | 1858W | 3568W |
| 5520-12MW-36W | 464W | 1049W | 849W | 1751W | 849W | 1749W | 1839W | 3549W |

Note: It is recommended that primary and secondary power supply units (PSUs) be of the same type to support optimal PoE operation.

## 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)** |
|---|---|---|---|---|
| 5520-24T | 52 | 176 | 142 | 483 |
| 5520-24W | 54 | 182 | 2480 | 1092 |
| 5520-48T | 60 | 205 | 171 | 584 |
| 5520-48W | 59 | 203 | 4100 | 1817 |
| 5520-12MW-36W | 66 | 224 | 4095 | 1862 |
| 5520-48SE | 61 | 209 | 255 | 872 |
| 5520-24X | 48 | 165 | 171 | 585 |
| 5520-24T-ACDC | 41 | 140 | 135 | 459 |
| 5520-48T-ACDC | 46 | 156 | 141 | 481 |
| 5520-24X-ACDC | 39 | 132 | 169 | 575 |
| 5520-48SE-ACDC | 45 | 154 | 223 | 760 |

* Includes maximum PoE load (W) through the switch

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

# V300 Virtual Port Extender Specifications

The following V300 Virtual Port Extender models are available:

- V300-8P-2X
- V300-8T-2X
- V300-8P-2T-W
- V300HT-8P-2X
- V300HT-8T-2X

**Table 36: V300 Unpackaged Dimensions**

| | |
|---|---|
| V300-8P-2X<br>V300-8T-2X<br>V300HT-8P-2X<br>V300HT-8T-2X | Height:1.73 in (4.4 cm)<br>Width: 7.76 in (19.71 cm)<br>Length: 212 in (538.48 cm) |
| V300-8P-2T-W | Height: 1.73 in (4.4 cm)<br>Width: 8.26 in (21 cm)<br>Length: 7.48 in (19 cm) |

**Table 37: V300 Unpackaged Weight**

| | |
|---|---|
| V300-8P-2X<br>V300-8T-2X<br>V300HT-8P-2X<br>V300HT-8T-2X | 3.31 lb (1.5 kg) |
| V300-8P-2T-W | 3.22 lb (1.46 kg) |

**Table 38: V300 Packaged Dimensions**

| | |
|---|---|
| V300-8P-2X | Height: 3.07 in (7.79 cm)<br>Width: 11.52 in (29.26 cm)<br>Length: 19.98 in (50.74 cm) |
| V300-8T-2X | Height: 3.07 in (7.79 cm)<br>Width: 10.15 in (25.78 cm)<br>Length: 17.61 in (44.72 cm) |

**Table 38: V300 Packaged Dimensions (continued)**

| V300-8P-2T-W | Height: 3.08 in (7.82 cm)<br>Width: 10.85 in (27.56 cm)<br>Length: 11.52 in (29.26 cm) |
|---|---|
| V300HT-8P-2X<br>V300HT-8T-2X | Height: 3.07 in (7.79 cm)<br>Width: 10.15 in (25.78 cm)<br>Length: 14.46 in (36.72 cm) |

**Table 39: V300 Packaged Weight**

| V300-8P-2X<br>with 280W PSU | 7.94 (3.6 kg) |
|---|---|
| V300-8T-2X<br>with 40W PSU | 5.73 lb (2.6 kg) |
| V300-8P-2T-W | 4.1 lb (1.86 kg) |
| V300HT-8P-2X<br>V300HT-8T-2X | 3.97 (1.8kg) |

## Power Specifications

> **Note**
> When you use a redundant power supply (RPS), only redundant power – not additive power – is supported. Thus, the PoE ports load does not increase when an RPS is added.

**Table 40: V300 Power Options**

| V300-8P-2X | DC Input: 54VDC, 4.5A max |
|---|---|
| V300-8T-2X | DC Input: 12VDC, 1.5A max |
| V300-8P-2T-W | The PoE PSE Budget is dynamically determined by the 802.3bt Type 4 PD input power applied to its uplinks as follows:<br>• 2 x 90W = PoE ports load to 105W<br>• 1 x 90W = PoE ports load to 50W<br>• 2 x 60W = PoE ports load to 75W<br>• 1 x 60W = PoE ports load to 30W<br>• 2 x 30W = PoE ports load to 30W<br>• 1 x 30W = PoE ports load to 0W |
| V300HT-8P-2X | DC Input: 54VDC, 4.5A max |
| V300HT-8T-2X | DC Input: 12VDC, 1.5A max |

**Table 41: Power Specifications**

| | Minimum[1] Heat Dissipation (BTU/hr) | Minimum[1] Power Consumption (Watts) | Maximum[1] Heat Dissipation (BTU/hr) | Maximum[1] Power Consumption (Watts) |
|---|---|---|---|---|
| V300-8P-2X | 25.9 | 7.6W | 118.2 | 214.6W |
| V300-8T-2X | 11.6 | 3.3W | 23.8 | 7.0W |
| V300-8P-2T-W | 24.57 | 7.2W | 82.1 | 129.1W |
| V300HT-8P-2X | 25.8 | 7.6W | 113.7 | 213.3W |
| V300HT-8T-2X | 16.6 | 4.9W | 7.4 | 25.2W |

[1] Minimum is defined as idle, with no ports linked. Maximum is defined as fans high, all ports 100% traffic.

## Standards and Environmental Data

**Table 42: Safety Standards**

| North American Safety of ITE | UL 60950-1 2nd Ed., A2:2014, Listed Device (US) |
|---|---|
| | CSA 22.2 #60950-1-07 2nd Ed., 2014-10 Canada) |
| | Complies with FCC 21CFR 1040.10 (US Laser Safety) |
| | CDRH Letter of Approval (US FDA Approval) |
| European Safety of ITE | EN 60950-1:2006 +A11+A1+A12+A2 |
| | EN 60825-1:2007 (Lasers Safety) |
| | IEC 60950-1:2005 2nd+A1:2009+A2:2013 |
| | 2014/35/EU Low Voltage Directive |
| International Safety of ITE | CB Report & Certificate per IEC 60950-1:2005 2nd Ed. + National Differences |
| | AS/NZX 60950-1 (Australia /New Zealand) |

**Table 43: Environmental Data**

| Operating conditions | Temperature: 0°C to 60°C (32°F to 140°F) for V300 8P-2T-W and V300-8P/8T-2X models |
|---|---|
| | Temperature: -40°C to 70°C (-40°F to 158°F) for V300HT-8P/8T-2X models |
| | Storage and transportation temperature: -40°C to 70°C (-40°F to 158°F) |
| | Humidity: 5% to 95% relative humidity, non-condensing |
| | Altitude: 0 to 3,000 meters (9,850 feet) |

# V400 Virtual Port Extender Technical Specifications

The following V400 Virtual Port Extender models are available:

- V400-24t-10GE2 (part no. 18101)
- V400-24p-10GE2 (part no. 18102)
- V400-48t-10GE4 (part no. 18103)
- V400-48p-10GE4 (part no. 18104)

**Table 44: V400 Unpackaged Dimensions**

| | |
|---|---|
| V400-24t-10GE2 | Height: 1.70 in (4.32 cm)<br>Width: 9.97 in (25.3 cm)<br>Length: 17.34 in (44.0 cm) |
| V400-24p-10GE2 | Height: 1.70 in (4.32 cm)<br>Width: 9.97 in (25.3 cm)<br>Length: 17.34 in (44.0 cm) |
| V400-48t-10GE4 | Height: 1.70 in (4.32 cm)<br>Width: 9.97 in (25.3 cm)<br>Length: 17.34 in (44.0 cm) |
| V400-48p-10GE4 | Height: 1.70 in (4.32 cm)<br>Width: 15.25 in (38.7 cm)<br>Length: 17.34 in (44.0 cm) |

**Table 45: V400 Unpackaged Weight**

| | |
|---|---|
| V400-24t-10GE2 | 6.62 lb (3.00 kg) |
| V400-24p-10GE2 | 9.08 lb (4.12 kg) |
| V400-48t-10GE4 | 7.14 lb (3.26 kg) |
| V400-48p-10GE4 | 14.06 lb (6.38 kg) |

**Table 46: V400 Packaged Dimensions**

| | |
|---|---|
| V400-24t-10GE2 | Height: 4.49 in (11.4 cm)<br>Width: 14.66 in (37.2 cm)<br>Length: 22.02 in (55.9 cm) |
| V400-24p-10GE2 | Height: 4.49 in (11.4 cm)<br>Width: 14.66 in (37.2 cm)<br>Length: 22.02 in (55.9 cm) |

**Table 46: V400 Packaged Dimensions (continued)**

| V400-48t-10GE4 | Height: 4.49 in (11.4 cm)<br>Width: 14.66 in (37.2 cm)<br>Length: 22.02 in (55.9 cm) |
|---|---|
| V400-48p-10GE4 | Height: 4.49 in (11.4 cm)<br>Width: 19.86 in (50.4 cm)<br>Length: 22.02 in (55.9 cm) |

**Table 47: V400 Packaged Weight**

| V400-24t-10GE2 | 9.00 lb (4.08 kg) |
|---|---|
| V400-24p-10GE2 | 11.44 lb (5.19 kg) |
| V400-48t-10GE4 | 9.69 lb (4.39 kg) |
| V400-48p-10GE4 | 16.56 lb (7.50 kg) |

## Power Specifications

> **Note**
> When you use a redundant power supply (RPS), only redundant power – not additive power – is supported. Thus, the PoE ports load does not increase when an RPS is added.

**Table 48: V400 Power Options**

| V400-24t-10GE2 | AC Input: 100-240 VAC, 50/60 Hz, 0.6 A max |
|---|---|
| V400-24p-10GE2 | AC Input: 100-240 VAC, 50/60 Hz, 2.2 A max<br>DC RPS input: 54 VDC, 18.52 A max<br>• PoE ports load to 382 W for AC input only.<br>• PoE ports load to 720 W for DC input only.<br>• PoE ports load to 720 W for AC+DC input. |
| V400-48t-10GE4 | AC Input: 100-240 VAC, 50/60 Hz, 1.0 A max |
| V400-48p-10GE4 | AC Input: 100-240 VAC, 50/60 Hz, 12.0 - 6.0 A max<br>DC RPS input: 54 VDC, 18.52 A max<br>• PoE ports load to 740 W for AC input only.<br>• PoE ports load to 900 W for DC input only.<br>• PoE ports load to 1440 W for AC+DC input. |

**Table 49: Power Specifications**

|  | Minimum[2] Heat Dissipation (BTU/hr) | Minimum[2] Power Consumption (Watts) | Maximum[2] Heat Dissipation (BTU/hr) | Maximum Power Consumption (Watts) |
|---|---|---|---|---|
| V400-24t-10GE2 | 36.1 | 10.6 | 75.2 | 22.1 |
| V400-24p-10GE2 | 109.8 | 32.2 | 336.8 | 478.7 |
| V400-48t-10GE4 | 66.0 | 19.3 | 134.8 | 39.5 |
| V400-48p-10GE4 | 168.9 | 49.5 | 583.2 | 910.9 |
| VX-RPS-1000 | 141.3 | 41.4 | 3152.8 | 924 |

[2] Minimum is defined as idle, with no ports linked. Maximum is defined as fans high, all ports 100% traffic.

## Fan and Acoustic Sound

**Table 50: Fan and Acoustic Sound**

|  | Bystander Sound Pressure[3] in dB(A) | Declared Sound Power ($L_{WAd}$)[3] in bels |
|---|---|---|
| V400-24t-10GE2 | 41.6 (Duty 30%) / 59.4 (max.) | 4.4 (Duty 30%) / 6.2 (max.) |
| V400-24p-10GE2 | 47.5 (Duty 30%) / 64.0 (max.) | 5.0 (Duty 30%) / 6.7 (max.) |
| V400-48t-10GE4 | 43.4 (Duty 30%) / 61.1 (max.) | 4.6 (Duty 30%) / 6.4 (max.) |
| V400-48p-10GE4 | 48.5 (Duty 30%) / 65.5 (max.) | 5.1 (Duty 30%) / 6.8 (max.) |

[3] At 25°C and 50% PoE load where applicable

## Standards and Environmental Data

**Table 51: Safety Standards**

| North American Safety of ITE | UL 60950-1 2nd Ed., A2:2014, Listed Device (US) |
|---|---|
| | CSA 22.2 #60950-1-07 2nd Ed., 2014-10 Canada) |
| | Complies with FCC 21CFR 1040.10 (US Laser Safety) |
| | CDRH Letter of Approval (US FDA Approval) |
| European Safety of ITE | EN 60950-1:2006 +A11+A1+A12+A2 |
| | EN 60825-1:2007 (Lasers Safety) |
| | IEC 60950-1:2005 2nd+A1:2009+A2:2013 |
| | 2014/35/EU Low Voltage Directive |
| International Safety of ITE | CB Report & Certificate per IEC 60950-1:2005 2nd Ed. + National Differences |
| | AS/NZX 60950-1 (Australia /New Zealand) |

**Table 52: V400 Environmental Data**

| Operating conditions | Temperature: 0°C to 50°C (32°F to 122°F) for non-PoE models Temperature: 0°C to 45°C (32°F to 113°F) for PoE models |
|---|---|
| | Storage and transportation temperature: -40°C to 70°C (-40°F to 158°F) |
| | Humidity: 5% to 95% relative humidity, non-condensing |
| | Altitude: 0 to 3,000 meters (9,850 feet) |

# Half-Duplex to Full-Duplex Converter Technical Specifications

The Half-Duplex to Full-Duplex Converter can be attached to switch ports to enable communication over half-duplex connections with older Ethernet devices.

Order the converter using one of the following part numbers:

- 10958: HDX to FDX Converter, Rest of World
- 10959: HDX to FDX Converter: North America

Other specifications:

- 8.8 Gbps switching capacity
- 4 priority queues
- 192Kb packet buffer

**Table 53: Half-Duplex to Full-Duplex Converter Packaged Dimensions**

| Height | 2.69 cm (1.06 in) |
|---|---|
| Width | 12.9 cm (5.08 in) |
| Depth | 6.91 cm (2.72 in) |
| Weight | 200 g (0.44 lb) |

## Half-Duplex to Full-Duplex Converter Power Specifications

**Table 54: Rest of the World External Power Pack (10958-CEE 7/1)**

| | |
|---|---|
| Voltage input range | 200-240 VAC |
| Line frequency range | 50 to 60 Hz |
| Operating temperature | 0°C to 40°C (32°F to 104°F) normal operation |

**Table 55: North American External Power Pack (10959-NEMA 1-15P)**

| | |
|---|---|
| Voltage input range | 100-120 VAC |
| Line frequency range | 50 to 60 Hz |
| Operating temperature | 0°C to 40°C (32°F to 104°F) normal operation |

## Half-Duplex to Full-Duplex Converter Environmental Data and Standards

**Table 56: Environmental Data**

| | |
|---|---|
| Environmental conditions | Operating temperature: 0°C to 40°C (32°F to 104°F)<br>Storage temperature: -40°C to 70°C (-40°F to 158°F) |
| | Humidity: 10% to 95% relative humidity, non-condensing |
| | Altitude: 0 to 2,000 meters (6,562 feet) |
| | Packaged shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks |
| | Packaged vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G |
| | Packaged random vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/ oct. from 20 to 200 Hz |
| | Packaged drop height: 14 drops minimum on sides and corners at 42 inches (<15 kg box) |

**Table 57: Safety Standards**

| | |
|---|---|
| North American ITE | UL 60950-1 2nd Ed., Listed Device (U.S.) |
| | CSA 22.2 #60950-1-03 2nd Ed. (Canada) |
| | Complies with FCC 21CFR 1040.10 (U.S. Laser Safety) |
| European/International ITE | EN 60950-1:2007 2nd Ed. |
| | CB Report & Certificate per IEC 60950-1 2nd Ed. + National Differences |
| | AS/NZS 60950-1 (Australia /New Zealand) |
| EMI/EMC Standards | FCC CFR 47 part 15 Class A (USA) |
| | ICES-003 Class A (Canada) |
| | EN 55022: Class A |
| | EN 55024:A2 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11 |
| | EN 61000-3-2,8 (Harmonics) |
| | EN 61000-3-3 (Flicker) |
| | 2014/30/EU EMC Directive |

**Table 57: Safety Standards (continued)**

| International EMC Certifications | CISPR 22: Ed 5.2, Class A (International Emissions) |
|---|---|
| | CISPR 24:A2: Class A (International Immunity) |
| | IEC 61000-4-2: EN 61000-4-2:2009 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A |
| | IEC 61000-4-3: EN 61000-4-3:2006+A1:2008 Radiated Immunity 10V/m, Criteria A |
| | IEC 61000-4-4: am1 ed.2./EN 61000-4-4:2004/A1:2010 Transient Burst, 1 kV, Criteria A |
| | IEC 61000-4-5: EN 61000-4-5:2006 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A |
| | IEC 61000-4-6: EN 61000-4-6:2009 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A |
| | IEC/EN 61000-4-11: Power Dips & Interruptions, >30%, 25 periods, Criteria C |
| IEEE 802.3 Media Access Standards | IEEE 802.3ab 1000BASE-T |
| | IEEE 802.3az EEE |
| Environmental specifications | EN/ETSI 300 019-2-1 v2.1.2 - Class 1.2 Storage |
| | EN/ETSI 300 019-2-2 v2.1.2 - Class 2.3 Transportation |
| | EN/ETSI 300 019-2-3 v2.1.2 - Class 3.1e Operational |
| | ASTM D3580 Random Vibration Unpackaged 1.5 G |

# 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) for Front-Back cooling

Temp: 0°C to 45°C (32°F to 113°F) for Back-Front cooling (5520-24T, 5520-24x, 5520-48T, 5520-48SE)

Humidity: 5% to 95% relative humidity, non-condensing

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

Shock (half sine): 98m/s2 (10G), 11ms, 18 shocks

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

## Packaging and Storage Specifications

Temp: -40°C to 70°C (-40°F to 158°F)

Humidity: 5% to 95% relative humidity, non-condensing

Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks

Packaged Vibration: 5Hz to 62Hz at velocity 5 mm/s, 62Hz to 500Hz at 0.2 G

Packaged Random Vibration: 5Hz to 20Hz at 1.0 ASD w/–3 dB/oct. from 20Hz to 200Hz

Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

# Standards

## North American ITE

UL 60950-1

UL/CuL 62368-1 Listed

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

CDRH Letter of Approval (US FDA Approval)

CAN/CSA 22.2 No. 60950-1

## European ITE

EN 60950-1, EN 62368-1

EN 60825-1 Class 1 (Lasers Safety)

2014/35/EU Low Voltage Directive

## International ITE

CB Report and Certificate per IEC 60950-1

IEC 62368-1

## IEEE 802.3 Media Access Standards

IEEE 802.3ab 1000BASE-T

IEEE 802.3bz 2.5G/5GBASE-T

IEEE 802.3bt Type4 PoE

IEEE 802.3ae 10GBASE-X

IEEE 802.3aq 10GBASE-LRM

IEEE 802.3by 25GBASE-X

IEEE 802.3ba/802.3bm 40GBASE-X and 100GBASE-X

IEEE 802.3az Energy Efficient Ethernet

# EMI/EMC Standards

## North American EMC for ITE

FCC CFR 47 Part 15 Class A (USA)

CB Report and Certificate IEC 62368-1

RoHS Directive 2011/65/EU

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

## European EMC Standards

EN 55035

EN 55032 Class A

EN 55024

EN 55011

EN 61000-3-2,2014 (Harmonics)

EN 61000-3-3 2013 (Flicker)

EN 300 386 (EMC Telecommunications)

2014/30/EU EMC Directive

## International EMC Certifications

CISPR 32, Class A (International Emissions)

AS/NZS CISPR32

CISPR 24 Class A (International Immunity)

IEC 61000-4-2/EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria B

IEC 61000-4-3 /EN 61000-4-3 Radiated Immunity 10V/m, Criteria A

IEC 61000-4-4/EN 61000-4-4 Transient Burst, 1 kV, Criteria AB

IEC 61000-4-5 /EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B

IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A

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

## Country Specific

VCCI Class A (Japan Emissions)

ACMA RCM (Australia Emissions)

CCC Mark (China)

KCC Mark, EMC Approval (Korea)

EAC Mark (Custom Union)

NRCS Mark (South Africa)

BSMI Mark (Taiwan)

Anatel (Brazil)

NoM (Mexico)

## Power Cord Requirements for AC-Powered Switches and AC Power Supplies

An AC power cord is not included with the AC power supply.

Power cords used with AC-powered switches or AC power supplies must meet the following requirements:

- The power cord must be agency-certified for the country of use.
- The power cord must have an appropriate AC connector for connection to the switch or power supply. See the power supply documentation for the appropriate power cord.
- The power cord must have an appropriately rated and approved wall plug applicable to the country of installation.
- For cords up to 14.76 feet (4.5m) long, the wire size must be 15 AWG (2 mm$^2$ ) minimum wire length up to 4.92ft (1.5m).

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

## Console Connector Pinouts

Table 58 describes the pinouts for a DB-9 console plug connector.

**Table 58: Pinouts for the DB-9 Console Connector**

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

Figure 83 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.
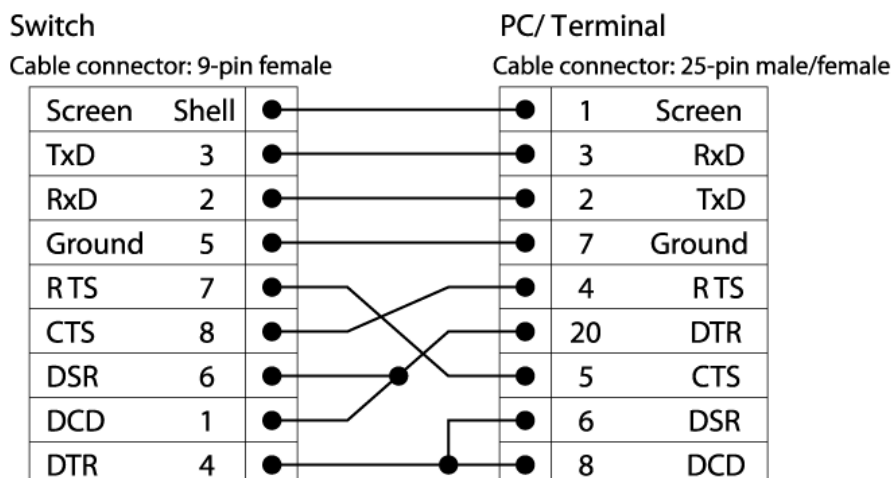
**Figure 83: Null-Modem Cable Pinouts**

Figure 84 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.
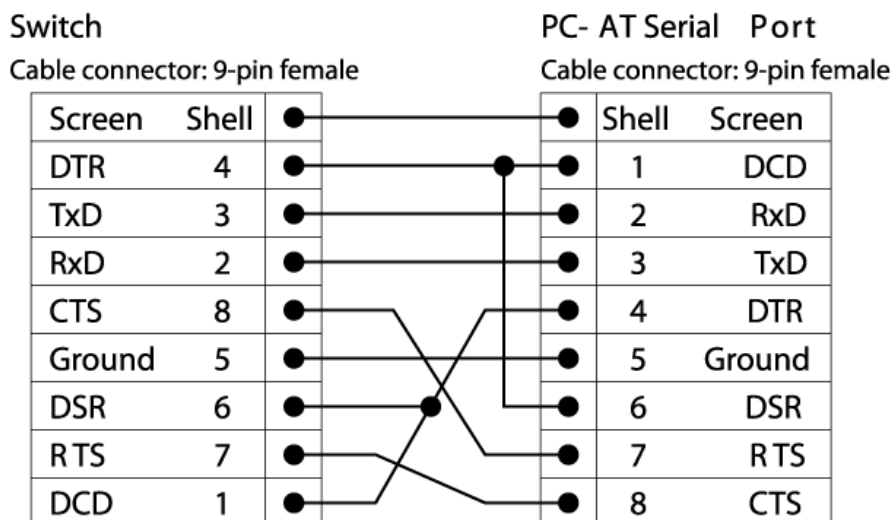


**Figure 84: PC-AT Serial Null-modem Cable Pinouts**

Table 59 shows the pinouts for the RJ45 console port on the ExtremeSwitching switches.

**Table 59: RJ45 Console Port on Switch**

| Function | Pin Number | Direction |
|---|---|---|
| RTS (request to send) | 1 | Out |
| DTR (data carrier detect) | 2 | Out |
| TXD (transmit data) | 3 | Out |
| GND (ground) | 4 | — |
| GND (ground) | 5 | — |
| RXD (receive data) | 6 | In |

**Table 59: RJ45 Console Port on Switch (continued)**

| Function | Pin Number | Direction |
|---|---|---|
| DSR (data set ready) | 7 | In |
| CTS (clear to send) | 8 | In |

Table 60 shows the pinouts for an RJ45-to-DB-9 adapter.

**Table 60: Pinouts for an RJ45 to DB-9 Adapter**

| Signal | RJ45 Pin | DB-9 Pin |
|---|---|---|
| CTS (clear to send) | 1 | 8 |
| DTR (data carrier detect) | 2 | 6 |
| TXD (transmit data) | 3 | 2 |
| GND (ground) | 4 | 5 |
| GND (ground) | 5 | 5 |
| RXD (receive data) | 6 | 3 |
| DSR (data set ready) | 7 | 4 |
| RTS (request to send) | 8 | 7 |

# Safety and Regulatory Information

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

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

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

## Considerations Before Installing

Consider the following items before you install equipment.

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

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

## General Safety Precautions

Follow these guidelines:

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

## Maintenance Safety

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

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

## Fiber Optic Ports and Optical Safety

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

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

**Warning**

Laser optic modules become very hot after prolonged use. Take care when removing a laser optic module from the module or option card. If the laser optic module is too hot to touch, disengage the laser optic module and allow it to cool before removing it completely.

When working with laser optic modules, always take the precautions listed below to avoid exposure to hazardous radiation.

- Never look at the transmit LED/laser through a magnifying device while the transmit LED is powered on.
- Never look directly at a fiber port on the switch or at the ends of a fiber cable when they are powered on.

- Invisible laser radiation can occur when the connectors are open. Avoid direct eye exposure to the beam when optical connections are unplugged.
- Never alter, modify, or change an optical device in any way other than suggested in this document.

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

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

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

## Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

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

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

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

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

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

## Install Power Supply Units and Connect Power

For the ratings and power input requirements of each power supply unit, see Technical Specifications on page 139 or the data sheet for the power supply at www.extremenetworks.com.

> ⚠️ **Warning**
>
> Be sure to satisfy the requirements listed in this section when you install Extreme Networks power supplies or connect power.

When you install any power supply:

- Do not use excessive force when you insert a power supply into the bay.
- Do not attempt to open the power supply enclosure for any reason; the power supply does not contain user-serviceable parts. In the event of failure, return the defective power supply to Extreme Networks for repair or replacement.
- Do not put your hand into an open power supply bay when a power supply is not present.
- Before you work on equipment that is connected to power lines, remove all jewelry, including watches. Metal objects heat up when they are connected to power and ground and can cause serious burns or weld the metal object to the terminals.
- An electrical arc can occur when you connect or disconnect the power with power applied. This could cause an explosion in hazardous area installations. Be sure that power is removed from the device.
- When you install or replace equipment, always make the ground connection first and disconnect the ground connection last.

When you install DC power supplies or connect DC power:

- Extreme Networks DC power supplies do not have switches for turning the unit on and off. Make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cord at the DC input power socket.

- Connect the system or power supply only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-based safety standards.

> **Note**
> Because building codes vary worldwide, consult an electrical contractor to ensure proper equipment grounding and power distribution for your specific installation and country.

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

## Select Power Supply Cords

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

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

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

## EMC Warnings

## Taiwan BSMI Warning

警告:為避免電磁干擾,本產品不應安裝
或使用於住宅環境。

## China CQC Warning

警告:在居住环境中，运行此设备可能
会造成无线电干扰。

## 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。

## Japan (VCCI Class A)

**Warning**

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

この装置は、クラスA機器です。この装置を住宅環境で使用すると
電波妨害を引き起こすことがあります。この場合には使用者が適切な
対策を講ずるよう要求されることがあります。　　　　VCCI-A

## Korea EMC Statement

이 기기는 업무용 환경에서 사용할 목적으로 적
합성평가를 받은 기기로서 가정용 환경에서 사
용하는 경우 전파간섭의 우려가 있습니다.

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