



Extreme 7720 Hardware Installation Guide

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Preface

Read the following topics to learn about:

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

Audience

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

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

See the [Switch Engine 32.4 User Guide](#) and the [Switch Engine 32.4 Command Reference Guide](#) for information about configuring Extreme Networks devices.



Note

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

Text Conventions

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

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

Table 1: Notes and warnings






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

Table 2: Text

Convention	Description
screen displays	This typeface indicates command syntax, or represents information as it is displayed on the screen.
The words <i>enter</i> and <i>type</i>	When you see the word <i>enter</i> 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 <i>type</i> .
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
<i>Words in italicized type</i>	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.
<i>italic text</i>	Italic text indicates variable content.

Table 3: Command syntax (continued)

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

Documentation and Training

Find Extreme Networks product information at the following locations:

[Current Product Documentation](#)

[Release Notes](#)

[Hardware and software compatibility](#) for Extreme Networks products

[Extreme Optics Compatibility](#)

[Other resources](#) such as white papers, data sheets, and case studies

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

Help and Support

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

Extreme Portal

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

The Hub

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

Call GTAC

For immediate support: (800) 998 2408 (toll-free in U.S. and Canada) or 1 (408) 579 2826. For the support phone number in your country, visit: www.extremenetworks.com/support/contact

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

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

Subscribe to Product Announcements

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

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

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

Send Feedback

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

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

To send feedback, do either of the following:

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

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



Extreme 7720 Series Overview

[Extreme 7720 Series Switch Features](#) on page 14

The Extreme 7720 Series is a purpose-built switch designed for high-performance aggregation and core applications. The 7720 Series provides end-to-end secure network segmentation and advanced policy capabilities. The 7720 Series is Universal Hardware, providing a user-selectable choice of Extreme's flagship switch operating systems.

The 7720 Series network hardware platform enables organizations to design networks that accommodate a variety of applications and east-west traffic patterns. With its high-density scale-out architecture, leading power efficiency, and airflow options, the 7720 Series platform delivers a cost-effective solution that optimizes power, cooling, and equipment room space, wherever your network operating center might be.

Management

An RJ45 serial console port on the front panel of the 4120 Series 7720 Series switch enables you to connect a terminal and perform local management. An Ethernet management port can be used to connect the system to an out-of-band management network for administration. Alternatively, you can use an Ethernet cable to connect this port directly to a laptop to view and locally manage the switch configuration. The Ethernet management port supports 10/100/1000 Mbps speeds.



Note

There is also a Type A USB 2.0 port that can host removable devices like flash drives.

Cooling

Hot-swappable fan modules that provide either front-to-back or back-to-front airflow for switch cooling are available for 7720 Series switches. The six fan slots on all models are located on the rear panel. Switch fans are not responsible for cooling the power supplies; power supplies have integrated cooling fans that operate independently of the switch fan. The direction of the airflow in the fans and power supplies must be the same.

Fans are ordered separately for base model 7720-32C. Fans are included with other models.

Power Supplies

Hot swappable 800 W AC or DC power supplies are available to power the switch. The power supplies have integrated cooling fans that operate independently of the switch fans. The fans provide either front-to-back or back-to-front airflow. The direction of the airflow in the power supplies and the switch fans must be the same. The two power supply slots on all models are located on the rear panel.

Power supplies are ordered separately for the base model 7720-32C. Power supplies are included with other models.

For more information about the power supplies used in the 7720 Series switches, see [Power Supplies for Use with Your Switch](#) on page 18.

Stacking

Each 4120 Series 7720 Series switch comes equipped with two 400GbE stacking ports, also referred to as Universal Ethernet ports. When running Switch Engine, up to eight systems can be stacked using qualified QSFP28 direct attach cables and optical transceivers located on the front panel of the switch. Stacking is not supported when running Fabric Engine. The stacking ports on 7720-32C models are ports 31 and 32



Note

The two stacking/SFP-DD ports are “Universal Ethernet” ports, labeled “U1” and “U2.” These ports can operate either as stacking ports with Switch Engine or as Ethernet ports with Switch Engine and with Fabric Engine in non-fabric mode. By default the stacking ports operate as Ethernet ports. Use the **enable stacking-support** command to set the stacking ports in stacking mode.

When running Fabric Engine, the stacking (or Universal Ethernet) 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.

Stacking cables are ordered separately.

For information about QSFP28 optical modules, see the [Extreme Optics](#) website.

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 17.

Operating Temperatures

The 7720 Series supports the following operating temperatures with front-to-back cooling:

- 0°C (32°F) to 50°C (122°F) at sea level
- 0°C (32°F) to 45°C (113°F) up to 1800 m (6000 ft)
- 0°C (32°F) to 40°C (104°F) above 1800 m (6000 ft), up to 3000m (10,000 ft)

The 7720 Series supports the following operating temperatures with back-to-front cooling:

- 0°C (32°F) to 45°C (113°F) at sea level
- 0°C (32°F) to 40°C (104°F) up to 1800 m (6000 ft)
- 0°C (32°F) to 35°C (95°F) above 1800 m (6000 ft), up to 3000m (10,000 ft)

Feature Licensing

The 7720 Series switches support Unified Licensing, so that you can use them with multiple operating systems. There are two methods of acquiring feature licenses: manual or through ExtremeCloud™ IQ (XIQ).

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

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

For XIQ licensing, see [ExtremeCloud IQ](#).

Extreme 7720 Series Switch Features

The Extreme 7720 Series switch includes the following models:

7720-32C

The 7720-32C base switch includes six empty fan module slots and two empty power supply module slots. Fan modules and power supply modules must be ordered separately.

7720-32C-AC-F

The 7720-32C-AC-F switch includes two AC power supply modules and six fan modules. Airflow for both the fan modules and the powers supply modules is front-to-back.

7720-32C-AC-R

The 7720-32C-AC-R switch includes two AC power supply modules and six fan modules. Airflow for both the fan modules and the powers supply modules is back-to-front.

The front panel of the switch includes:

- 32 40/100Gbps QSFP28 ports
- 1 RJ-45 serial console RJ-45 port
- 1 10/100/1000BASE-T out-of-band management port
- 1 Type A USB storage port

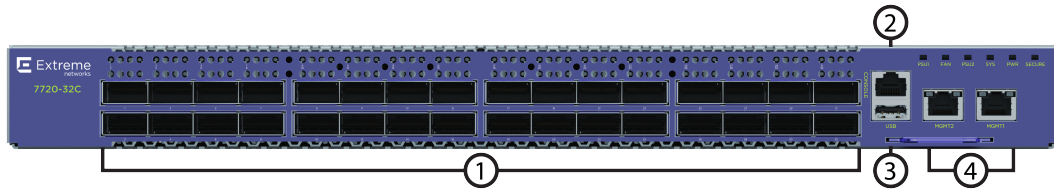


Figure 1: 7720-32C Switch Front Panel

1 = 40/100Gbps QSFP28 ports	3 = Type A USB storage port
2 = RJ-45 serial console port	4 = 10/100/1000BASE-T OOB management ports MGMT2 - CPU and BMC (secondary) MGMT1 - Direct to CPU (primary)

The rear panel of the switch includes:

- 6 fan module slots
- Grounding lug
- 2 power supply slots



Note

The color of the tab on the fan tray indicates the airflow direction:

- Red: front-to-back
- Blue: back-to-front

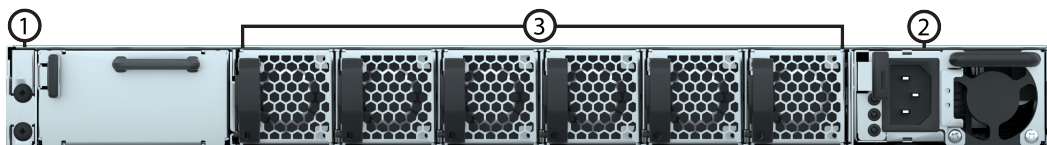


Figure 2: 7720-32C Switch Rear Panel

1 = Grounding point	2 = Power supply units/slots
3 = Fan modules	



Port Partitioning

On some ExtremeSwitching Universal switch models, you can configure QSFP28 ports either as single ports or as multiple, partitioned ports. In a partitioned port, with appropriate cabling, the original physical port can accommodate multiple data lanes at lower bandwidths.

The following partitioning options are available:

Table 4: QSFP28 Port Partitioning

Switch model	Port bandwidth	Port partitions
7720-32C	100 Gb or 40 Gb	Ports 1-27 and 29-32 with one of the following: <ul style="list-style-type: none">• One 100 Gb port (default)• One 40 Gb port• Two 50 Gb ports (Switch Engine only)• Four 25 Gb ports• Four 10 Gb ports• One 1 Gb port with the 10506 QSA adaptor (both Switch Engine and Fabric Engine) <p>Note: Port 28 cannot be partitioned and is 40/100G capable only.</p>

For information about configuring partitioned ports, see the [Switch Engine 32.4 Command Reference Guide](#).



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

Secure Boot Troubleshooting

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



Power Supplies for Use with Your Switch

Each switch runs with two replaceable 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. Supported power supply configurations include two 800 W AC power supply modules, two 800 W DC power supply modules, or one 800 W AC and one 800 W DC power supply module. Power supply modules have integrated cooling fans that operate independently of the switch fans, and are available with front-to-back or back-to-front airflow. The direction of the airflow in both power supply modules must be in the same direction, and must also be the in same direction of the airflow in the fan modules.

Power supplies are ordered separately for base model 7720-32C. Power supplies are included with other models.

Precautions Specific to Power Supply Modules



Warning

Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.



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 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.

800 W AC Power Supply

Two 800 W AC power supply options, with front-to-back or back-to-front airflow, are supported on the switch.

- 800W AC power supply - front-to-back airflow (part no. XN-ACPWR-800W-F)
- 800W AC power supply - back-to-front airflow (part no. XN-ACPWR-800W-R)

**Note**

AC power input cords are not provided with AC power supplies. You can order an appropriate cord from Extreme Networks or from your local supplier. The power cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 88.

For information on installing or replacing an AC power supply, see [Replace Internal Power Supplies](#) on page 67.

LEDs on the 800 W AC power supply provide information on the unit's operational status. See [800 W AC Power Supply LEDs](#) on page 79 for details.

800 W DC Power Supply

Two 800 W DC power supply options, with front-to-back or back-to-front airflow, are supported on the switch.

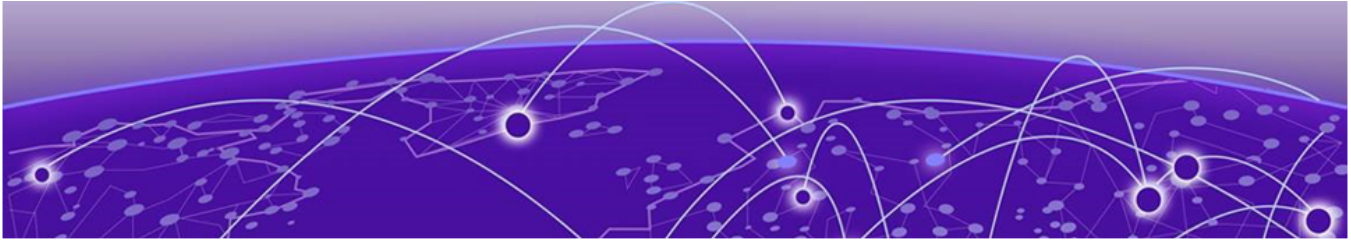
- 800W DC power supply - front-to-back airflow (part no. XN-DCPWR-800W-F)
- 800W DC power supply - back-to-front airflow (part no. XN-DCPWR-800W-R)

**Note**

DC power input cords are provided with DC power supplies.

For information on installing or replacing a DC power supply, see [Replace Internal Power Supplies](#) on page 67.

LEDs on the 800 W DC power supply provide information on the unit's operational status. See [800 W DC Power Supply LEDs](#) on page 79 for details.



Build Stacks

[Introduction to Stacking](#) on page 20

[Plan to Create Your Stack](#) on page 29

[Set up the Physical Stack](#) on page 33

A stack consists of a group of up to eight switches that are connected to form a ring. The stack offers the combined port capacity of the individual switches; it operates as if it were a single switch, making network administration easier.

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

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

Refer to the Stacking chapter in the [Switch Engine 32.4 User Guide](#) for information about configuring a stack, maintaining the stack configuration, and troubleshooting.

Introduction to Stacking

When stacking switches, the stack operates as if it were a single switch with a single IP address and a single point of authentication. One switch – called the primary switch – is responsible for running network protocols and managing the stack. The primary runs Switch Engine software and maintains all the software tables for all the switches in the stack.

All switches in the stack, including the primary switch, are called nodes. [Figure 3](#) 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.

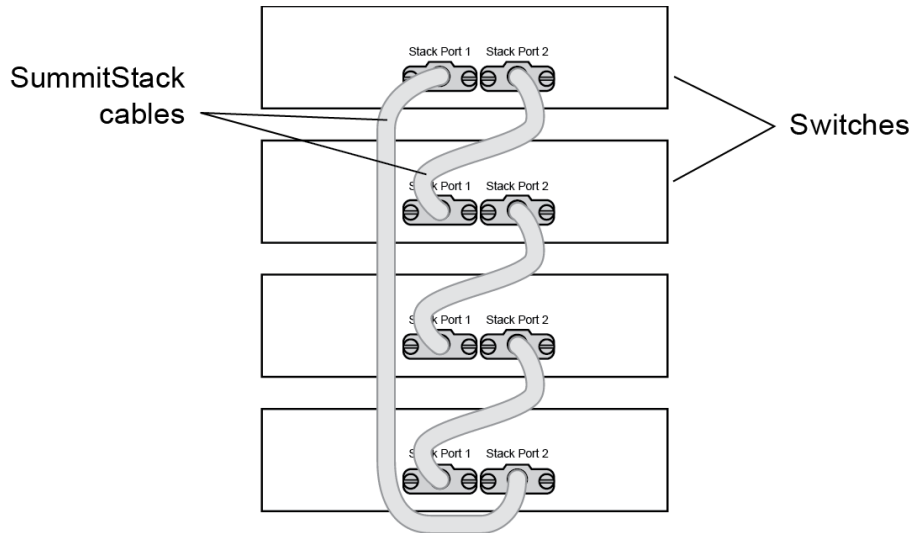


Figure 3: Switches Connected to Form a Stack

Using the SummitStack feature—part of the Switch Engine Edge license—a stack can combine switches from different series, provided that every switch in the stack:

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

See [Combine Switches from Different Series](#) on page 31 for information about which switch series can be combined to form a stack.

The following topics introduce you to the basic principles of stacking and provide recommendations for creating stacks.

More information to answer your questions about stacking and help you plan your configuration is available on the [Extreme Networks GTAC Knowledge Base](#).

Build Basic Stacks

A stack can be created in either of two ways:

- In *native stacking*, switches are connected using either designated Ethernet data ports or dedicated stacking connectors.
- In *alternate stacking*, switches are connected using 10-Gbps Ethernet data ports that have been configured for stacking. These ports are located either on the switch itself or on option cards installed on either the front or the rear of the switch.



Note

Native stacking can be configured using Native-400 utilizing QSFP28 optics or Native-400-Alternative-Configuration using long range AOC optics.

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 33 and configure a vertical stack from the console on the switch at the top of the physical stack, the switches will be assigned slot numbers 1 through 8 from the top down.

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

Primary/Backup Switch Redundancy

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

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

SummitStack Topologies

[Figure 4](#) presents a graphical representation of a stack and some of the terms that describe stack conditions.

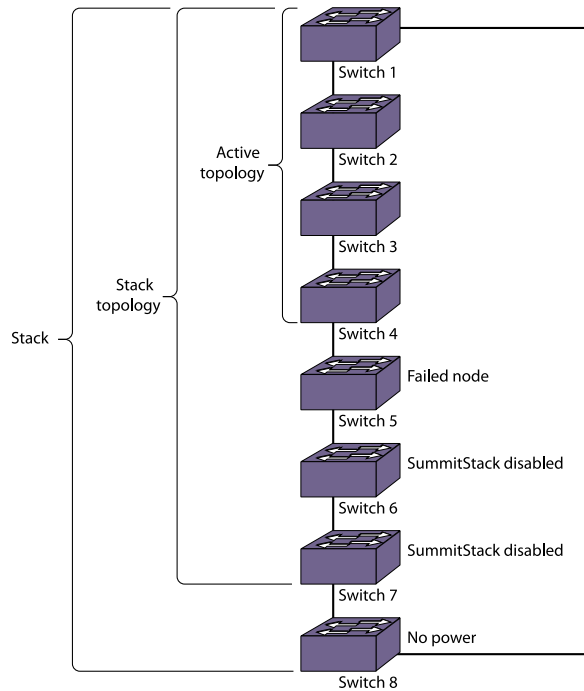


Figure 4: Example of a Stack, Showing the Active Topology and the Stack Topology

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 25.

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 5](#) represents a maximal ring topology of eight active nodes.

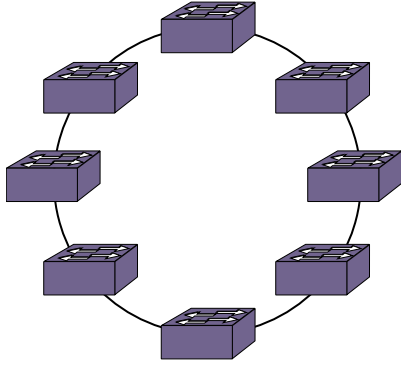


Figure 5: Graphical Representation of a Ring Topology

Figure 6 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.

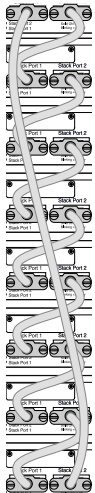


Figure 6: Switches Connected to Each Other in a Ring Topology

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 7](#), 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 7: Daisy Chain Topology

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

If you are using a daisy chain topology, the possibility of a dual primary condition increases. Before you create a daisy chain topology, read "Managing a Dual Primary Situation" in the [Switch Engine 32.4 User Guide](#).

SummitStack Terms

[Table 5](#) describes the terms used for the SummitStack feature. These terms are listed in the recommended reading sequence.

Table 5: List of Stacking Terms

Term	Description
Stackable switch	An Extreme Networks switch that provides two stacking ports and can participate in a stack.
Stacking port	A physical interface of a stackable switch that is used to allow the connection of a stacking link. Stacking ports are point-to-point links that are dedicated for the purpose of forming a stack.
Native stacking	A stacking configuration in which stack members are connected using either designated Ethernet data ports or dedicated stacking connectors.

Table 5: List of Stacking Terms (continued)

Term	Description
Alternate stacking	A stacking configuration in which stack members are connected using 10-Gbps Ethernet data ports that have been configured for stacking. These ports are located either on the switch itself or on option cards installed on the rear of the switch.
Stacking link	A cable that connects a stacking port of one stackable switch to a stacking port of another stackable switch, plus the stacking ports themselves.
Node	A switch that runs the Switch Engine operating system and is part of a stack. Synonymous with <i>stackable switch</i> .
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 <code>show stacking</code> command display are present in the stack topology.
Stack path	A data path that is formed over the stacking links for the purpose of determining the set of nodes that are present in the stack topology and their locations in the stack. Every node is always present in a stack path whether or not stacking is enabled on the node.
Control path	A data path that is formed over the stacking links that is dedicated to carrying control traffic, such as commands to program hardware or software image data for software upgrade. A node must join the control path to fully operate in the stack. A node that is disabled for stacking does not join the control path, but does communicate over the stack path.
Active node	A node that has joined the control path. The active node can forward the control path messages or can process them. It can also forward data traffic. Only an active node can appear as a card inserted into a slot when the <code>show slot {slot} {detail} detail</code> command is executed on the primary node of the stack.
Active topology	A contiguous set of active nodes in a stack topology plus the set of stacking links that connect them. When an active topology consists of more than one node, each node in the active topology is directly and physically connected to at least one other node in the active topology. Thus, the active topology is a set of physically contiguous active nodes within a stack topology.

Table 5: List of Stacking Terms (continued)

Term	Description
Candidate node	A node that is a potential member of an active topology, or an active node that is already a member of an active topology. A candidate node may or may not be an active mode – that is, it may or may not have joined the control path.
Node role	The role that each active node plays in the stack – either primary, backup, or standby.
Primary node	<p>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).</p> <p>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.</p>
Backup node	<p>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.</p> <p>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.</p>
Standby node	A node that is prepared to become a backup node in the event that the backup node becomes the primary node. When a backup node becomes a primary node, the new primary node synchronizes all of its databases to the new backup node. When a node operates in a standby role, most databases are not synchronized – except those few that directly relate to hardware programming.
Acquired node	<p>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.</p> <p>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.</p>
Data ports	The set of ports on a stackable switch that are available for connection to your data networks. Such ports can be members of a user-configured VLAN or trunk group. They can be used for Layer 2 and 3 forwarding of user data traffic, for mirroring, or other features you can configure. Data ports are different from stacking ports.

Table 5: List of Stacking Terms (continued)

Term	Description
Failover	The process of changing the backup node to the primary node when the original primary node has failed. When a primary node fails, if a backup node is present, and if that node has completed its initial synchronization with the primary node, then the backup node assumes the role of primary node. The standby nodes continue their operation and their data ports do not fail.
Hitless failover	A failover in which all data ports in the stack, except those of the failing primary node, continue normal operation when the primary node fails.
Node address	The unique MAC address that is factory-assigned to each node.
Node role election	The process that determines the role for each node. The election takes place during initial stack startup and elects one primary node and one backup node. An election also takes place after a primary node failover, when a new backup node is elected from the remaining standby nodes.
Node role election priority	A priority assigned to each node, to be used in node role election. The node with the highest node role election priority during a role election becomes the primary node. The node with the second highest node role election priority becomes the backup.
Operational node	A node that has achieved operational state as a card in a slot. The operational state can be displayed using the <code>show slot {slot} {detail} detail</code> 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 <code>show switch {detail}</code> command on the primary node.
Stack segment	A collection of nodes that form a stack topology. The term is useful when a stack is severed. Each severed portion of the stack is referred to as a stack segment.
Stack state	A state assigned by the stack to a node. You can display the stack state by entering the <code>show stacking</code> command.
Easy Setup	A procedure that automatically configures the essential stacking parameters on every node for initial stack deployment, and then automatically reboots the stack to put the parameters into effect. The choice to run Easy Setup is offered when you run the <code>enable stacking {node-address node-address}</code> command and the essential stacking parameters are unconfigured or inconsistent. It can also be invoked directly by running the <code>configure stacking easy-setup</code> command.

Plan to Create Your Stack

Use the information in the following topics to plan the physical makeup of your stack – switches, versatile interface modules (VIMs), and cables – and the stacking protocols you will use. Included are:

- Guidelines and other information for each switch model in your stack
- Considerations for combining different switch models in a stack
- Information about stacking cables

Enable and Disable the Stacking-Support Option

The stacking-support option is enabled by default for many switch and option card configurations. However, some configurations require you to enable the stacking-support option before a switch can participate in a stack.

- To enable stacking-support, issue the `enable stacking-support` command.
You must enable stacking-support individually for every switch in the stack that does not have stacking support enabled by default.
- To disable stacking support, configure the switch data ports to use the Ethernet protocol instead of the stacking protocol.

Use the `disable stacking-support` command.

Recommendations for Placing Switches for Stacked Operation

For best results in a SummitStack configuration, follow these recommendations for physically situating your equipment:

- Use the shortest possible stacking cables to connect the switches in the stack. This reduces the likelihood that the stacking cables might accidentally be damaged or disconnected. Stacking cables are available in lengths ranging from 0.3 meters to 100 meters.
- When possible, place all switches for the stack in the same rack or in adjacent racks. This facilitates using shorter stacking cables.
- The 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 23). Include only the nodes that you expect to be active in the stack.

Follow the recommendations in [Recommendations for Configuring Stacks](#) on page 30 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 33.

Recommendations for Configuring Stacks

When deploying a new stack, follow these recommendations for configuring the software:

- Plan to use the stack as if it were a single multi-slot switch. You need to decide the number and type of stackable switches in the stack and how the stack ports will be connected to the network.
- You can physically connect the stack to your networks before the nodes are configured. However, the default configuration on a switch in non-stacking mode assumes a default untagged VLAN that contains all switch ports. When first powered on, the switch acts as a Layer 2 switch, possibly resulting in network loops.
- Make sure all nodes support the SummitStack feature and are running the same Switch Engine software version. (See the [Switch Engine 32.4 Feature License Requirements](#).) To view the Switch Engine software version on a node, restart the node and run the command:

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

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

- If you intend to deploy new units that might be part of a stack in the future, turn on stacking mode during initial deployment to avoid the need for a future restart. The only disadvantages of stacking mode are the loss of QoS (quality of service) profile QP7 and the reservation of some of the packet buffer space for stacking control traffic.
- You can configure the stack by logging into the primary node or any of the other nodes.
- If the primary-capable stackable switches have different purchased license levels, you might need to configure license level restrictions on some nodes before those nodes can join the stack. See the [Switch Engine 32.4 User Guide](#) for more information about managing licenses.

- If the stack supports any feature pack license (such as MPLS or Direct Attach), that feature pack license must be installed on all primary-capable nodes to support that feature and to prevent traffic interruption if a failover event occurs.
- Most stacking specific configurations are effective only after a restart. However, most non-stacking configuration commands take effect immediately and require no restart.
- A basic stack configuration can be achieved by using the Easy Setup procedure, as described in the [Switch Engine 32.4 User Guide](#).
- If EAPS, Spanning Tree, or any Layer 2 redundancy protocol is not running on the network, make sure that your network connections do not form a network loop.

Follow the recommendations in [Recommendations for Placing Switches for Stacked Operation](#) on page 29 for physically situating your equipment.

Combine Switches from Different Series

7520 Series and 7720 Series switches can be stacked with themselves. They can also be stacked with each other using Native V400 stacking (SummitStack-V400), or Native-V400-Alternative-configuration (using the long range AOC optics). Both the 7520 Series and the 7720 Series have the same capability in terms of feature scalability and the speed, so either of them can be the primary switch or the backup 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 100 meters.



Note

For the most recent information about available cables, contact your Extreme Networks sales representative or refer to the [Extreme Optics](#) website.



Caution

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

Use the Extreme Stacking Tool

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

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

To use the Stacking Tool, follow these steps.

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



Note

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

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

Each switch model is represented by a rectangle, as shown in the example in the following figure. In this example, stacking ports are represented by ports 31 and 32 on the right side, which are the stacking ports for 7720-32C model.



Figure 8: 7720 Switch Shown in the Stacking Tool



Tip

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

3. Drag the rectangle to the first slot in the Stack column in the middle of the page. To the right of the Stack column, the tool displays statistics about available routes, supported software versions, and primary/backup recommendations.



Tip

If you don't 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 port 31 and 32 symbols to choose stacking methods – for example, SummitStack-V and SummitStack-V400.
 - To remove a switch from the stack, drag it away from the stacking column.

Whenever you add or remove a switch from the stack, the statistics and recommendations update automatically.

In addition to statistics and recommendations, colors in the display show whether the selected switch models and stacking methods are compatible.

Table 6: Colors in the Stacking Tool Display

Color	Meaning
Green	Compatible and preferred
Blue	Compatible
Yellow	Incompatible with the selected primary node
Red	Incompatible

Set up the Physical Stack

After you have installed the individual switches (see "Installing Your Switch"), follow these steps to create the physical stack.

1. Connect the switches that will form the stack.
See [Connect the Switches to Form the Stack Ring](#) on page 33.
2. Connect the switches to your management network.
See [Connect Your Stack to the Management Network](#) on page 36.

After setting up and connecting the switches, perform software configuration for the stack. See "Configuring a New Stack" in the [Switch Engine 32.4 User Guide](#).

Connect the Switches to Form the Stack Ring

After you have installed the individual switches, connect them together using the stacking cables.

The examples in this section show cable connections and the recommended order for connecting ports to facilitate the easy setup configuration.

In general, it is best to connect Stack Port 2 on one switch to Stack Port 1 on the switch with the next higher slot number. Although you can connect the switches in any order, connecting them as shown in these examples will produce better predictability and easier software configuration.

All connections between stack ports must be directly between switches. A stacking connection cannot pass through a third device, for example a Virtual Port Extender or an LRM/MACsec Adapter.

It is essential to create an unbroken data path through all the switches in the stack.

Examples of Valid Stacking Configurations

The examples in the following sections show various physical stacking arrangements: all switches in a single rack, switches in two adjacent racks, and switches at the tops of several racks in a row.

Example: Basic Stack with Four Switches

This example shows a stack of four switches in a single rack.

The slot numbers presume a console connection to the switch at the top of the physical stack.

Figure 9 shows cable connections for a 4-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.

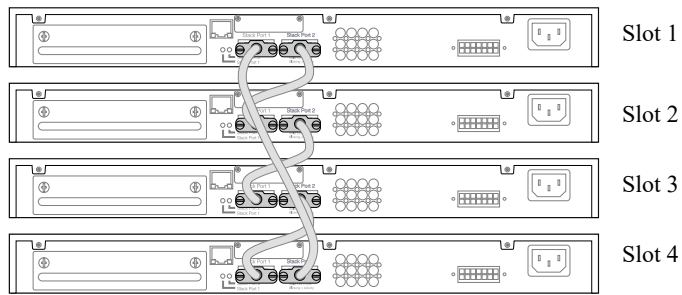


Figure 9: SummitStack Cable Connections Using Four Switches with Integrated SummitStack Ports

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

Table 7: 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 10 shows cable connections for an 8-node stack using SummitStack 40G cables to connect switches with integrated SummitStack ports.



Figure 10: SummitStack Cable Connections Using Eight Switches with Integrated SummitStack Ports

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

Table 8: 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 11 shows five switches installed at the tops of five adjacent racks. To accommodate the shortest possible cables, immediately adjacent switches are not always connected together. Port 2 on one switch is connected to Port 1 on the next connected switch. If the easy setup feature is used to configure the stack parameters, the assigned slot numbers will be as shown in the figure.

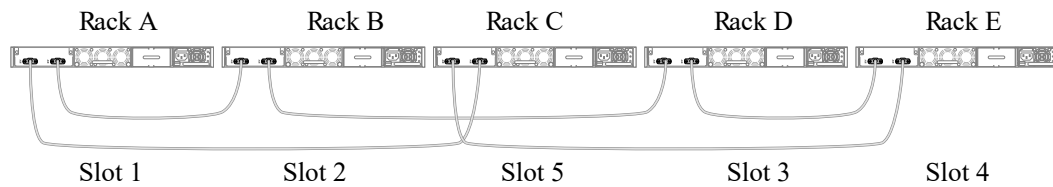


Figure 11: Top-of-Rack Stack Installation

Table 9 lists the recommended order for connecting the stacking ports in this example.

Table 9: 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 the Ethernet management port on the switch that will become the stack primary node. If you plan to configure redundancy, connect to the console ports of all switches in the stack that will be primary-capable.

If you followed the cabling examples in [Connect the Switches to Form the Stack Ring](#) on page 33, 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 the version of Switch Engine you are using, for instructions to perform the software configuration for your stack.



Site Preparation

[Plan Your Site](#) on page 37

[Operating Environment Requirements](#) on page 38

[Rack Specifications and Recommendations](#) on page 41

[Evaluate and Meet Cable Requirements](#) on page 43

[Meet Power Requirements](#) on page 49

[Follow Applicable Industry Standards](#) on page 51

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

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

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



Note

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

Plan Your Site

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

1. Meeting site requirements.

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

- Building and electrical code requirements
- Environmental, safety, and thermal requirements for the equipment you plan to install

- Equipment rack requirements
2. Evaluating and meeting cable requirements.

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

3. Meeting power requirements.

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

For power specifications of the switches, see the specific switch listings in "Technical Specifications."

Operating Environment Requirements

Verify that your site meets all environmental and safety requirements.

Virtually all areas of the United States are regulated by building codes and standards. During the early planning stages of installing or modifying your network, it is important that you develop a thorough understanding of the regulations that pertain to your location and industry.

Meet Building and Electrical Codes

Building and electrical codes vary depending on your location. Comply with all code specifications when planning your site and installing cable. This section lists resources for obtaining additional information.

For information about major building codes, consult the following organization:

International Code Council (ICC)
5203 Leesburg Pike
Falls Church, VA 22041 USA
www.iccsafe.org

The organizations listed in [Table 10](#) are authorities on electrical codes.

Table 10: Authorities on Electrical Codes

Organization	Address	Web Site URL
National Electrical Code (NEC) Classification (USA only) Recognized authority on safe electrical wiring. Federal, state, and local governments use NEC standards to establish their own laws, ordinances, and codes on wiring specifications. The NEC classification is published by the National Fire Protection Association (NFPA).	NFPA 1 Batterymarch Park Quincy, MA 02169 USA	www.nfpa.org/
Underwriters' Laboratory (UL) Independent research and testing laboratory. UL evaluates the performance and capability of electrical wiring and equipment to determine whether they meet certain safety standards when properly used. Acceptance is usually indicated by the words "UL Approved" or "UL Listed."	UL 333 Pfingsten Road Northbrook, IL 60062 USA	www.ul.com
National Electrical Manufacturing Association (NEMA) (USA only) Organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components.	NEMA 1300 N. 17th Street Rosslyn, VA 22209 USA	www.nema.org
Electronic Components Industry Association (ECIA) Trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry.	ECIA 111 Alderman Drive Suite 400 Alpharetta, GA 30005 USA	www.ecianow.org
Federal Communications Commission (FCC) (USA only) Commission that regulates all interstate and foreign electrical communication systems that originate in the United States according to the Communications Act of 1934. The FCC regulates all U.S. telephone and cable systems.	FCC 445 12th Street S.W. Washington, DC 20554 USA	www.fcc.gov

Set Up the Wiring Closet

Be aware of the following recommendations for your wiring closet:

- Make sure that your system is easily accessible for installation and service. See [Rack Specifications and Recommendations](#) on page 41 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 11](#) 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 11: Thermal Shutdown and Restart Behavior

Switch Model(s)	Behavior
All models	<p>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.</p> <p>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.</p>

Control the Humidity Level

To maximize equipment life, keep operating humidity between 50% and 70% relative humidity (non-condensing) during typical operation.

The equipment can operate between 5% and 95% relative humidity (non-condensing) for short intervals.

Protect Your System from ESD (Electrostatic Discharge)

Your system must be protected from static electricity or ESD. Take the following measures to ensure optimum system performance:

- Remove materials that can cause electrostatic generation (such as synthetic resins) from the wiring closet.
Check the appropriateness of floor mats and flooring.
- Connect metal chassis, conduit, and other metals to ground using dedicated grounding lines.
- Use electrostatically safe equipment.
If you are working with pluggable interface modules, wear an ESD-preventive wrist strap and connect the metal end to a grounded equipment rack or other source of ground.

Rack Specifications and Recommendations

Racks should conform to conventional standards.

In the United States, use EIA Standard RS-310C: Racks, Panels, and Associated Equipment. In countries other than the United States, use IEC Standard 297. In addition, verify that your rack meets the basic mechanical, space, and earthquake requirements that are described in this section.

Mechanical Recommendations for the Rack

Use equipment racks that meet the following mechanical recommendations:

- Use an open style, 19-inch rack to facilitate easy maintenance and to provide proper ventilation.
- Use a rack made of steel or aluminum.
- The rack should use the universal mounting rail hole pattern that is identified in IEC Standard 297.
- The rack should have designated earth grounding connections (typically on the base).
- The rack must meet earthquake safety requirements equal to that of the installed chassis.
- The mounting holes should be flush with the rails to accommodate the chassis.
- The rack should support approximately 270 kg (600 lb).

Ground the Rack

The rack must be properly grounded.

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground.

At a minimum, follow these guidelines to ground equipment racks to the earth ground:

- CAD weld appropriate wire terminals to building I-beams or earth ground rods.
- For a DC-powered switch, use a minimum 14 AWG stranded copper wire for grounding.

AC-powered switches do not need separate chassis grounding.

- Position the earth ground as close to the equipment rack as possible to maintain the shortest wiring distance possible.
- Use a ground impedance tester or micro-ohm meter to test the quality of earth ground connection at the chassis. This will ensure good grounding between the chassis, rack, and earth ground.



Note

Because building codes vary worldwide, consult an electrical contractor to ensure proper equipment grounding for your specific installation.

Provide Adequate Space for the Rack

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

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

**Warning**

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

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

Depending on other conditions in the equipment room, it may be possible to install the switches closer to each other; consult your Extreme Networks Customer Support representative for guidance.

Secure the Rack

The rack should be attached to the wiring closet floor with 9.5 mm (3/8 in) lag screws or equivalent hardware. The floor under the rack should be level within 5 mm (3/16 in). Use a floor-leveling cement compound if necessary or bolt the racks to the floor as shown.

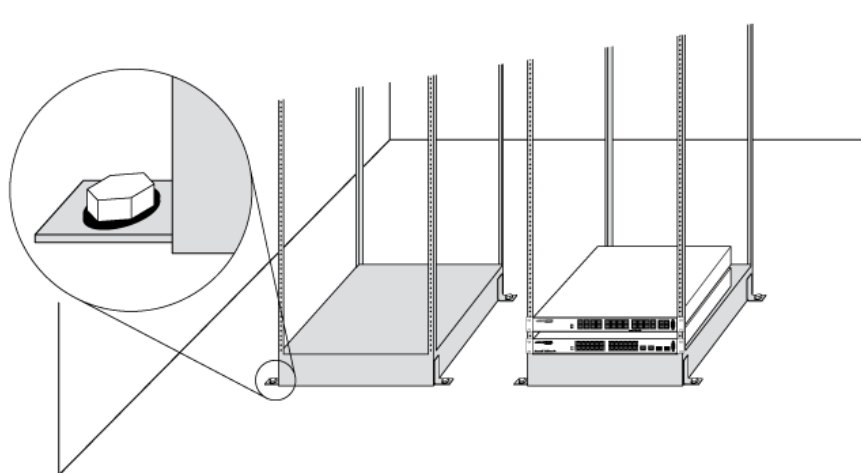


Figure 12: Properly Secured Rack

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 13](#) on page 45.
- 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.

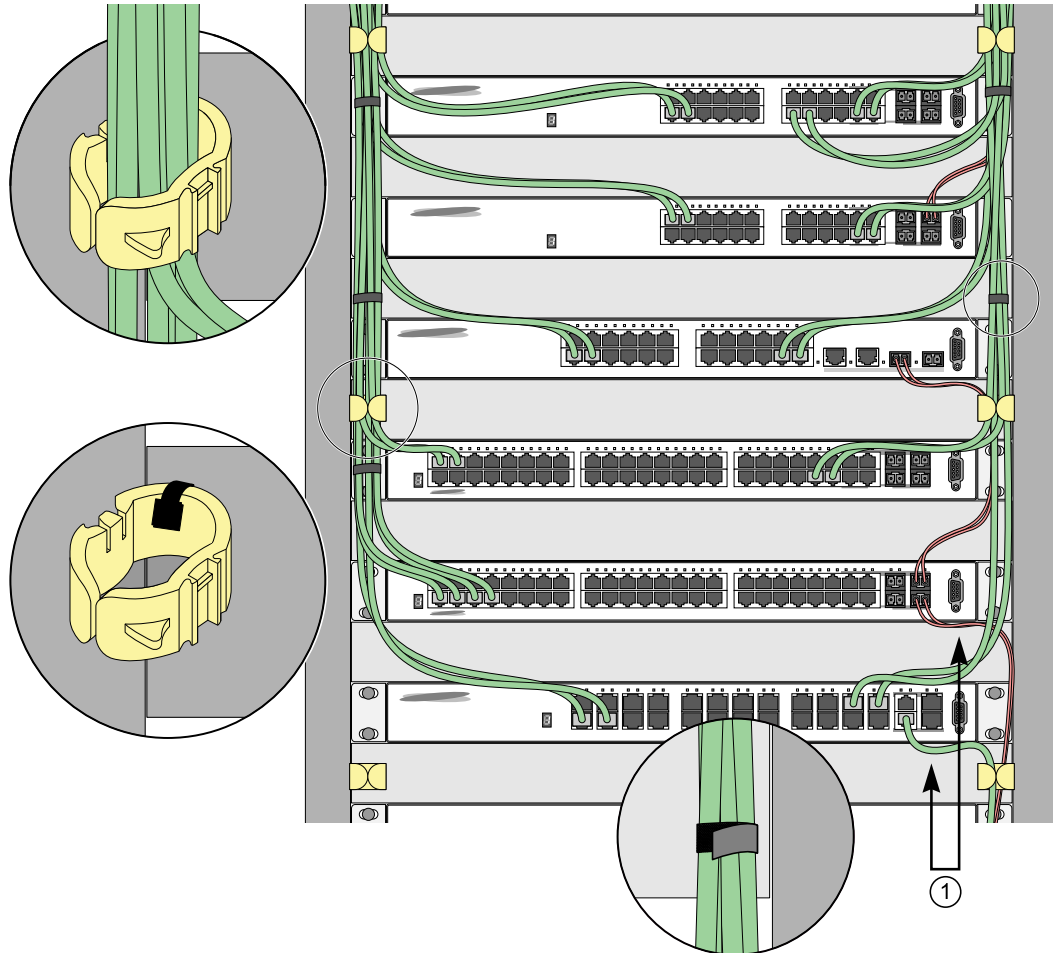


Figure 13: Properly Installed and Bundled Cable

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 14](#).



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.

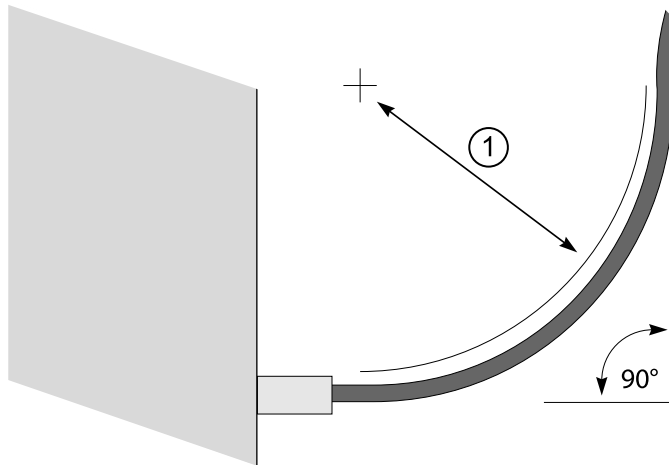


Figure 14: Bend Radius for Fiber Optic Cable

1 = Minimum 5 cm (2 in) radius in 90° bend

Cable Distances and Types

[Table 12](#) shows one example of cable media types and maximum distances that support reliable transmission in accordance with international standards (except where noted). 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.

Table 12: Cable Distances and Types

Standard	Media Type	MHz·km Rating	Maximum Distance (Meters)
1000BASE-SX (850nm optical window)	50/125 μm multimode fiber	400	500
	50/125 μm multimode fiber	500	550
	62.5/125 μm multimode fiber	160	220
	62.5/125 μm multimode fiber	200	275

Table 12: Cable Distances and Types (continued)

Standard	Media Type	MHz·km Rating	Maximum Distance (Meters)
1000BASE-LX (1300nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	–	5,000
	10/125 µm single-mode fiber ¹	–	10,000
1000BASE-ZX (1550nm optical window)	10/125 µm single-mode fiber	–	80,000
100BASE-LX100 (1550nm optical window)	10/125 µm single-mode fiber	–	100,000
1000BASE-BX10 (1490nm optical window) (1310nm optical window)	10/125 µm single-mode fiber	–	10,000
1000BASE-LX70 (1550nm optical window)	10/125 µm single-mode fiber	–	70,000
10/100/1000BASE-T SFP	(1 Gbps link) Category 5 and higher UTP cable	–	100
	(100 Mbps link) Category 5 and higher UTP cable	–	150
	(10 Mbps link) Category 5 and higher UTP cable	–	250
10GBASE-T SFP+	(10 Gb links) Category 6A and higher UTP cable	–	30
10GBASE-SR SFP+ (850nm optical window)	62.5 µm multimode fiber	160	26
	62.5 µm multimode fiber (OM1)	200	33
	50 µm multimode fiber	400	66
	50 µm multimode fiber (OM2)	500	82
	50 µm multimode fiber (OM3)	2000	300
10GBASE-LR SFP+ (1310nm optical window)	10/125 µm single-mode fiber	–	10,000
10GBASE-ER SFP+ (1550nm optical window)	10/125 µm single-mode fiber	–	40,000

¹ Proprietary to Extreme Networks. Connections between two Extreme Networks 1000BASE-LX interfaces that use 10/125 µm single-mode fiber can use a maximum distance of 10,000 meters.

Table 12: Cable Distances and Types (continued)

Standard	Media Type	MHz·km Rating	Maximum Distance (Meters)
1000BASE-T	Category 5 and higher UTP cable	–	100
100BASE-TX	Category 5 and higher UTP cable	–	100
10BASE-T	Category 3 and higher UTP cable	–	100

Refer to the [Extreme Optics](#) website for details about direct-attach cables that are supported by this equipment.

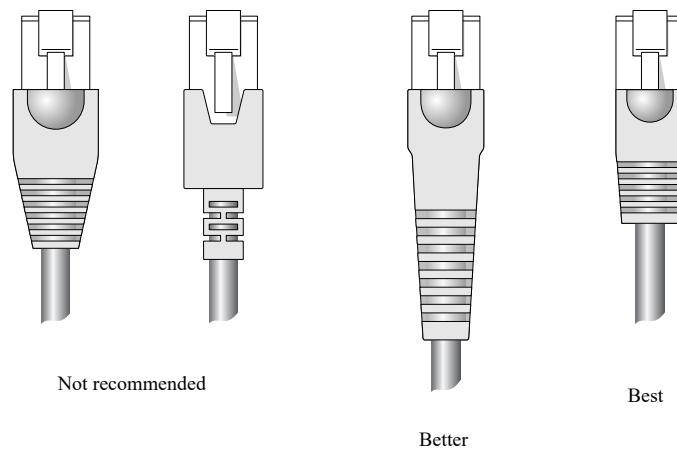
Use RJ45 Connector Jackets

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 15](#) shows examples of recommended and non-recommended connector jacket types.

**Figure 15: RJ45 Connector Jacket Types**

Prevent Radio Frequency Interference (RFI)

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

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

To prevent RF interference, avoid the following situations:

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

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

Meet Power Requirements

Observe the following requirements and precautions for powering your hardware.

Requirements for PoE Devices

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

Power Supply Requirements

Follow these recommendations when you plan power supply connections for your equipment:

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

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

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

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

Power Cord Requirements

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

UPS (Uninterruptible Power Supply) Requirements

A UPS (uninterruptible power supply) is a device that sits between a power supply (such as a wall outlet) and a device (such as a switch) to prevent outages, sags, surges, and bad harmonics from adversely affecting the performance of the device.

A UPS traditionally can perform the following functions:

- Absorb relatively small power surges.
- Smooth out noisy power sources.
- Continue to provide power to equipment during line sags.
- Provide power for a period of time after a blackout has occurred.

In addition, some UPS devices or UPS-plus-software combinations provide the following functions:

- Automatically shut down equipment during long power outages.
- Monitor and log power supply status.
- Display the voltage (current draw) of the equipment.
- Restart equipment after a long power outage.
- Display the voltage currently on the line.
- Provide alarms on certain error conditions.
- Provide short-circuit protection.

Select a UPS

To determine UPS requirements for your switch, answer these questions:

- What are the amperage requirements?
- What is the longest potential time period that the UPS would be required to supply backup power?
- Where will the UPS be installed?
- What is the maximum transition time that the installation will allow? (See [Provide a Suitable UPS Transition Time](#) on page 51.)

**Note**

Use a UPS that provides online protection.

Calculate Volt-Amperage Requirements

To determine the size of UPS that you need:

1. Locate the voltage and amperage requirements for each piece of equipment.

These numbers are usually found on a sticker on the back or bottom of your equipment.

2. Multiply the numbers together to get Volt-Amperes (VA):

$VA = \text{Volts} \times \text{Amperes}$

3. Add the VA from all the pieces of equipment together to find the total VA requirement.

To determine the minimum volt-amperage requirements for your UPS, add 30% to the total.

Provide a Suitable UPS Transition Time

UPS transition time is the time required for the UPS to change from providing AC power derived from the utility (or mains) supply to providing AC power derived from the battery backup. UPS transition time is sometimes called *UPS transfer time*.

UPS transition times vary between UPS models and implementations, but shorter transition times are preferred. For Extreme Networks stacking products, a UPS transition time of 20 milliseconds or less ensures optimum performance and minimizes service interruptions.

For high-availability and fault-tolerant installations in which the switches use redundant power supply units (PSUs), ensure that each PSU in a switch is connected to a different UPS and that each UPS is powered by an independent AC supply. This will prevent service interruptions when a power source is lost, or when a UPS unit fails. (Note that a single, appropriately sized UPS can power PSUs in multiple switches. The recommendation is simply that for any given switch, the two PSUs should be connected to different UPS units.)

Follow Applicable Industry Standards

Always follow applicable industry standards.

For more information, see the following ANSI/TIA/EIA standards:

- ANSI/TIA/EIA-568-A—the six subsystems of a structured cabling system
- ANSI/TIA/EIA-569-A—design considerations
- ANSI/TIA/EIA-606—cabling system administration
- ANSI/TIA/EIA-607—commercial building grounding and bonding requirements

You can access these standards at: www.ansi.org or www.tiaonline.org.



Install the Switch

- [Safety Considerations for Installation](#) on page 53
- [What You Will Need for the Installation](#) on page 53
- [Attach the Switch to a Rack or Cabinet](#) on page 54
- [Install Optional Components](#) on page 60
- [Install Internal Power Supplies](#) on page 60
- [Turn on the Switch](#) on page 61
- [Connect Network Interface Cables](#) on page 61

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

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

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

The installation process includes the following tasks:

1. Prepare to install the switch. See [What You Will Need for the Installation](#) on page 53.
2. Install the switch in the rack. See [Attach the Switch to a Rack or Cabinet](#) on page 54.
3. Install optional components: optical transceivers and cables. See the instructions in [Install Optional Components](#) on page 60.
4. If your switch does not come with an installed internal power supply, install one or two power supplies. See [Install Internal Power Supplies](#) on page 60.



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.

5. Power up the switch. See [Turn on the Switch](#) on page 61.
6. Connect network interface cables. See [Connect Network Interface Cables](#) on page 61.
7. Perform initial network connection and configuration. See [Activate and Verify the Switch](#) on page 62.

Safety Considerations for Installation

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

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



Warning

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

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

Do not cover vents that would restrict airflow.



Note

See [Safety Information](#) on page 91 for additional safety information.
See [Regulatory Information](#) on page 97 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 37, and ensure that you have the appropriate people and tools on hand.

Installing Extreme Networks switches is easiest when there are two people to maneuver the switch and attach mounting hardware.

Provide enough space in front of and behind the switch so that you can service it easily. Ensure that a minimum of 122 cm (48 in) in front of the rack and 76 cm (30 in) behind the rack.

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

Check the *Quick Reference Guide* for your switch model to see what hardware is provided in the switch packaging. MicroVSP switches do not come with rack-mounting brackets or screws.

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

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

Attach the Switch to a Rack or Cabinet

The 7720 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.
- Two-post rack, using mounting brackets (not provided) to attach the front or the middle of the switch to the posts.

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



Note

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

Four-Post Rack Mount

A four-post rack-mounting kit is included in the box with your switch. The kit contains an instruction sheet, along with the following components:

- Two mounting brackets, known as *inner member* in the instruction sheet. These pieces attach directly to both sides of the switch housing.
- Two slider assemblies, one for each side of the switch. Each slider assembly consists of an outer piece that is secured to the rack and a sliding rail to which you will attach the corresponding mounting bracket. These pieces are known on the instruction sheet as the *outer member* and *intermediate member*.
- Mounting ears - Black rack ears with a thumb screw in the middle (2 count)
- Black mounting ear screws (6 count)

To attach your switch to a four-post rack, follow these steps:

1. Separate the inner sliding rails from the outer rails by extending the rails and pulling on the disconnect latch. Note which direction the sliding rails slide from the outer rails for correct installation.

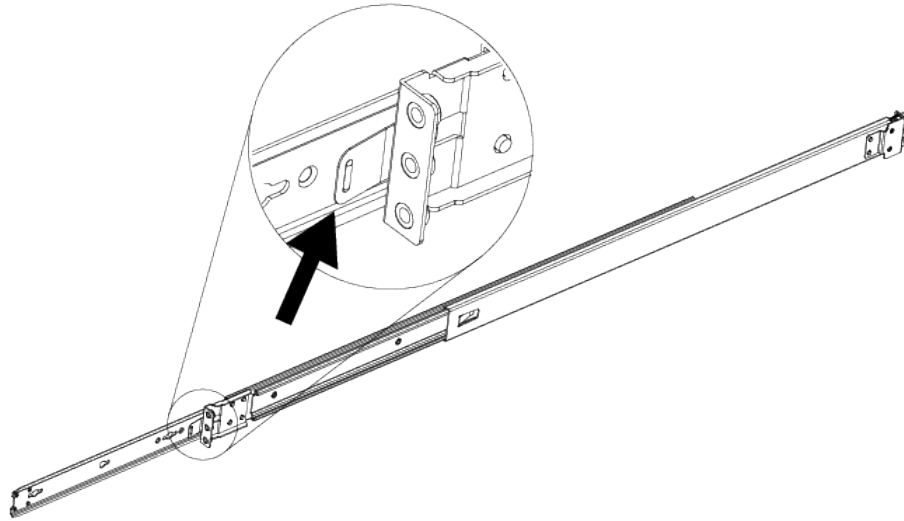


Figure 16: Separating the Inner Sliding Rails

2. Attach the outer rail (bracket) to the rack, securing it with the M5 screws.

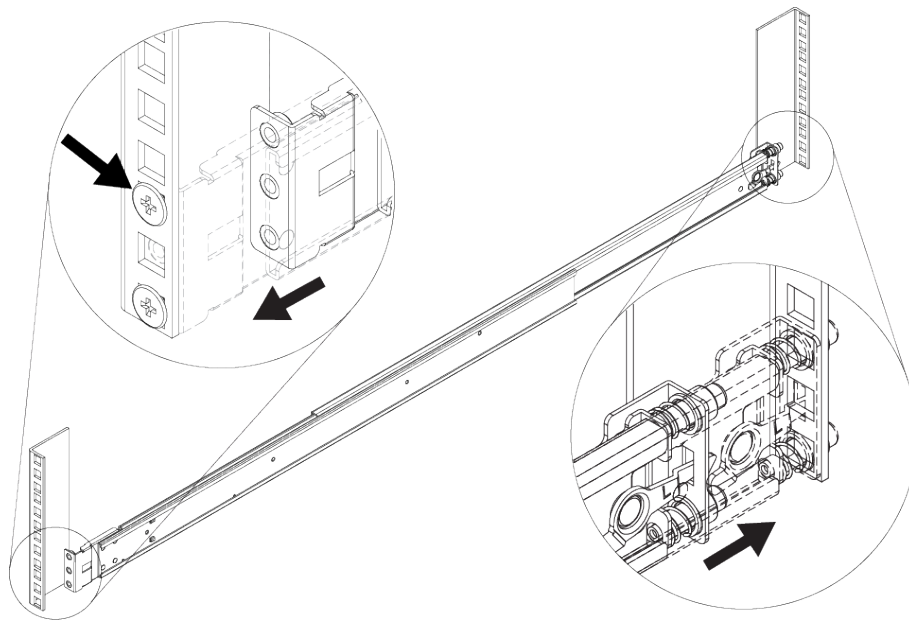


Figure 17: Attaching the Outer Rail

3. Attach an inner rail to the side of the device, using the M4 screws.
 - If you are using the 1U long rack ears (already attached to the inner rail): Ensure that the rack ear is flush with the either the front or the rear panel of the unit and continue to step 4 on page 57.

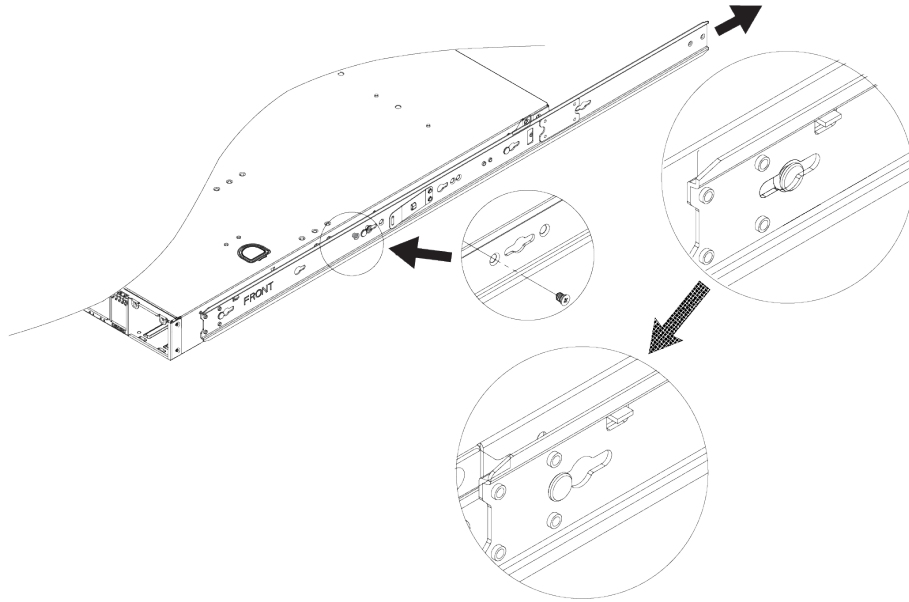


Figure 18: Front Installation: Attaching the Inner Rail

- If using the 1U or 2U short rack ears, attach one to the side of the device using the #6-32 screws, so that the rack ear is flush with either the front or the rear panel of the device.

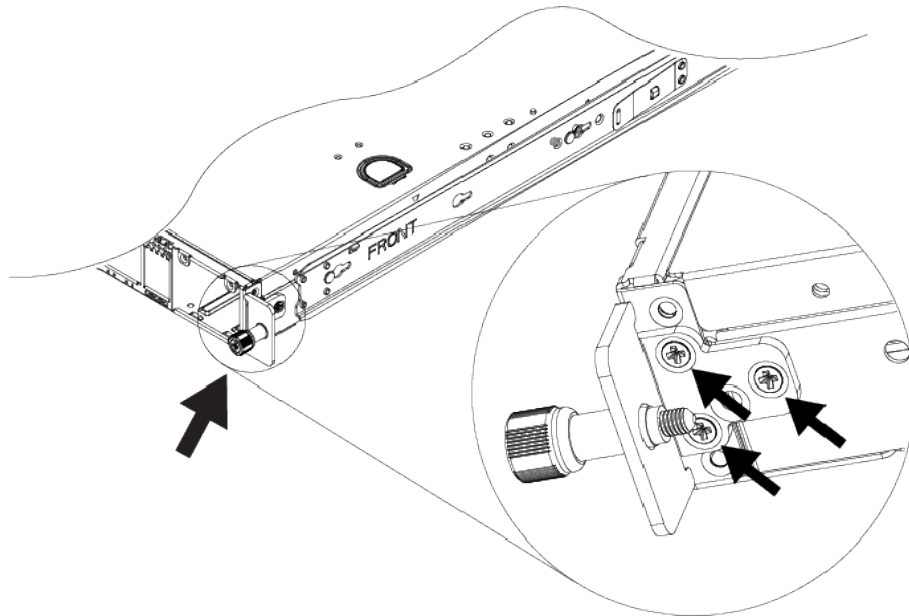


Figure 19: Front Installation: Attaching a Rack Ear

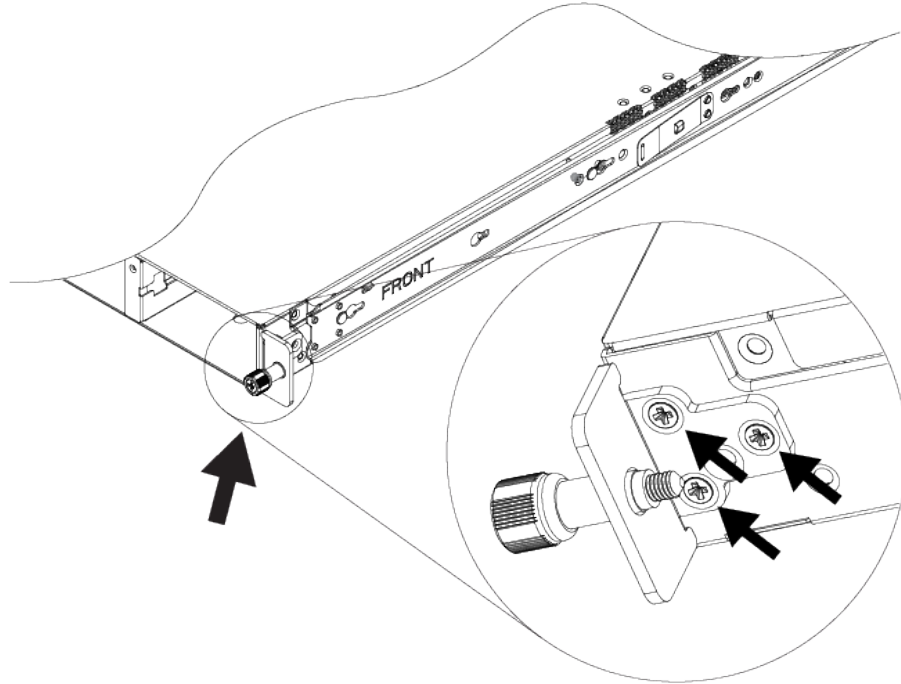


Figure 20: Rear Installation: Attaching a Rack Ear

4. Repeat steps 2 on page 55 and 3 for the other side of the device.
5. Insert the device into the rail kit. To install the device in the front of the rack, slide the device into the outer rails in the front of the rack.

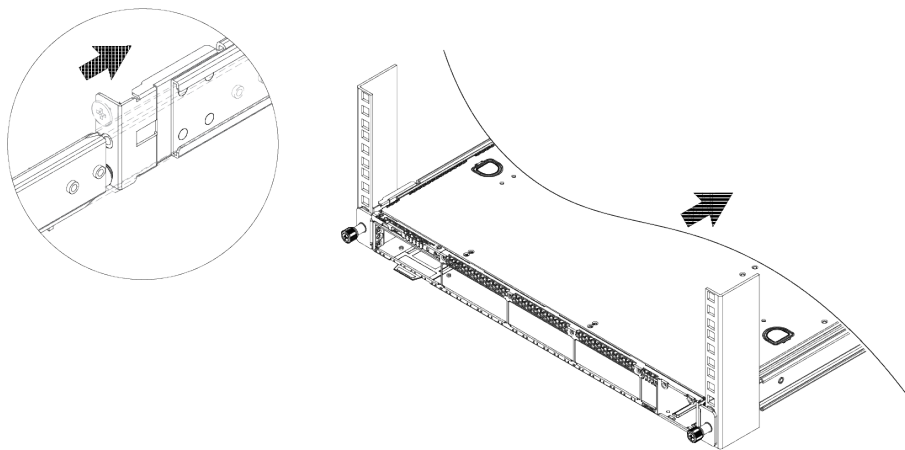


Figure 21: Front Installation: Inserting the Device

To install the device in the rear of the rack, slide the device into the outer rails in the rear of the rack.

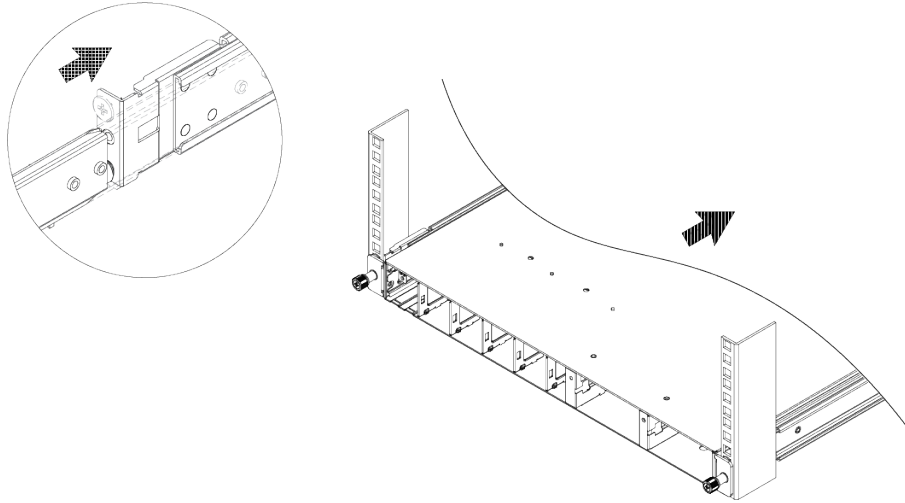


Figure 22: Rear Installation: Inserting the Device

Secure the device to the rack using the thumb screws on the mounting ears.

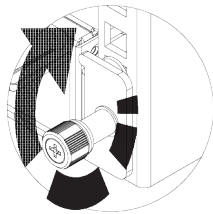


Figure 23: Secure the Device

Two-Post Rack Mount

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

- Front mount
- Mid-mount

The side of the switch has different sets of holes for attaching mounting brackets in either configuration.

Brackets for a two-post mount are not included in the box with the switch. However, they can be ordered separately using part number XN-2P-RKMT299.

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

1. On one side of the switch, attach one of the short mounting brackets to the device.
 - a. For a front mount, position the bracket over the holes so that the flange (ear) is even with the front of the device, as shown in the figure below:

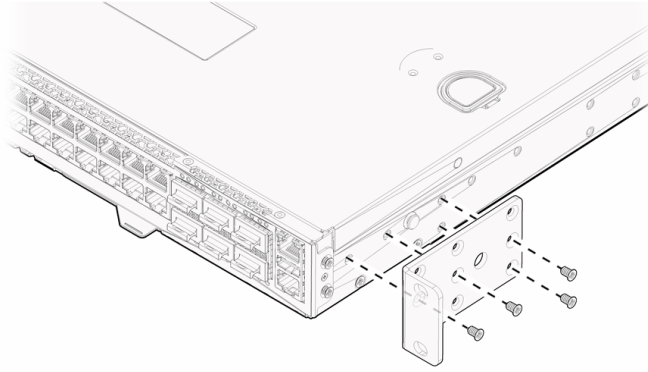


Figure 24: Attaching a Short Mounting Bracket (Ear): Front of Switch

- b. For a mid-mount, position the bracket so that the flange (ear) is positioned slightly more than halfway between the front and back of the device, as shown in figure below:

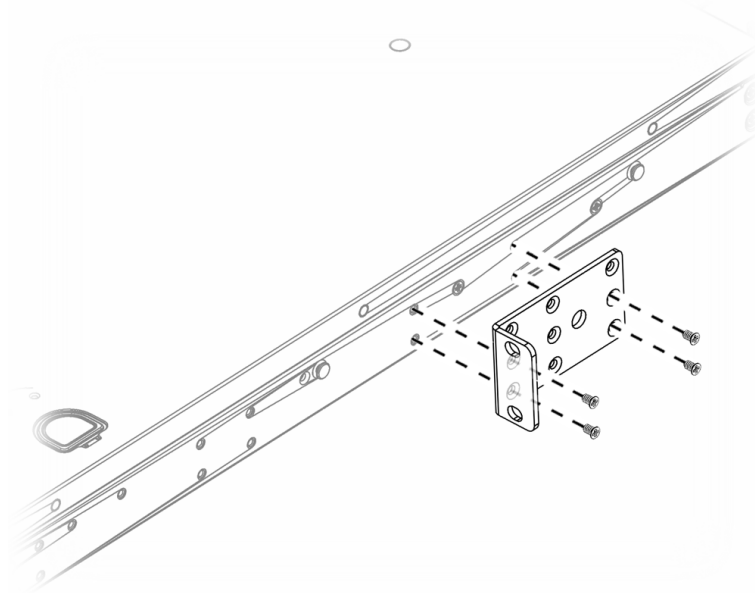


Figure 25: Attaching a Short Mounting Bracket (Ear): Middle of Switch

- c. Use four small mounting screws (provided) to attach the bracket to the device.
2. Attach the other short mounting bracket to the other side of the device, as you did in step 2.
3. Secure the brackets to the rack posts using rack-mounting screws that are appropriate for the rack (not provided).

If the switch comes with installed power supplies, skip to the topic: [Turn on the Switch](#) on page 61.

If the switch does not have an installed power supply, install one or two power supplies using the instructions in [Install Internal Power Supplies](#) on page 60.

Install Optional Components

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

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

For a list of the optical components supported with ExtremeSwitching devices, see the [Extreme Optics](#) website.

Pluggable Transceiver Modules

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

Optical Cables

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

Breakout cables

The copper breakout cables are terminated with optical connectors and are available in 1m, 3m, 5m, or greater lengths. No additional connectors or cabling are required when using the copper breakout. When using the fiber breakout cables, additional 10Gb optics are required.

For 7720 Series switches running either Fabric Engine or Switch Engine, interfaces 0/1 through 0/27 and 0/29 through 0/32 support up to 4 10GbE, 4 25GbE, 1 40GbE, or 1 100GbE ports each in breakout mode when using the appropriate optics. Interface 0/28 cannot be partitioned, but it supports 1 40GbE or 1 100GbE port. See the [Extreme Optics](#) website to determine the appropriate optics.

Install Internal Power Supplies

If your device does not come with an installed internal power supply, you can install one or two power supplies. All installed power supplies must have the same airflow direction (front-to-back or back-to-front) and must also match the airflow direction of the fan modules.

This switch supports 800 W AC or DC power supply units.

- If the power supply module has a **red** tab, the airflow is front-to-back.
- If the power supply module has a **blue** tab, the airflow is back-to-front.

The following internal power supplies (PSUs) are available for the switch:

800 W AC or DC PSU

Part numbers XN-ACPWR-800W-F and XN-DCPWR-550W-FB provide front-to-back airflow for cooling, and AC and DC power, respectively.

Part numbers XN-DCPWR-800W-F and XN-DCPWR-800W-R provide back-to-front airflow for cooling, and AC and DC power, respectively.

For installation instructions, see [Replace Internal Power Supplies](#) on page 67.

Turn on the Switch

An AC power cord is not included with the AC power supply. You can purchase AC power cords for use in the US and Canada from Extreme Networks or from your local supplier. The cord must meet the requirements listed in [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 88.

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

If the PSU LEDs do not turn green, refer to the [800 W AC Power Supply LEDs](#) on page 79 topic for your device for troubleshooting information.

Connect Network Interface Cables

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

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.



Activate and Verify the Switch

[Connect to a Management Console](#) on page 62

[Log in for the First Time on Switch Engine](#) on page 62

[Configure the Switch's IP Address for the Management VLAN](#) on page 64

[Change the Switch OS via the Bootloader Menu](#) on page 64

[Change the Switch OS via the Startup Menu](#) on page 65

[Log In for the First Time on Fabric Engine](#) on page 65

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

Connect to a Management Console

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

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

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

Log in for the First Time on Switch Engine

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

Switch Engine is the default operating system for the 7720 Series switch. If you want to run Fabric Engine, see [Change the Switch OS via the Bootloader Menu](#) on page 64 or [Change the Switch OS via the Startup Menu](#) on page 65.

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 62.

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

1. Use a terminal emulator such as PuTTY or TeraTerm to connect to the switch through the serial port connection.

You can also connect to the switch via telnet or SSH. Be sure that your serial connection is set properly:

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

For example:

```
login: admin
```

**Note**

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

When you have successfully logged on to the system, the command line prompt displays the system name (for example, `7720-32C-SwitchEngine#`) in its prompt. You are logged in with administrator privileges, which gives you access to all switch functions.

4. Respond to the screen prompts to configure the level of security you need.

**Note**

For more information about logging in to the switch and configuring switch management access, see the [Switch Engine 32.4 User Guide](#).

5. Enter `show version`.

The switch serial number is displayed, as highlighted in the following example. Make a note of this number for future reference.

```
7720-32C-SwitchEngine.1 # show ver
Switch : 801131-00-01 AR032207Q-40019 Rev 01 BootROM: N/A IMG: 32.1.0.359
```

**Note**

Software upgrade is required.

Configure the switch's IP address for the management virtual LAN (VLAN) by following the steps in [Configure the Switch's IP Address for the Management VLAN](#) on page 64.

Configure the Switch's IP Address for the Management VLAN

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



Note

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

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

1. Assign a name, IP address, and default subnetwork mask for the VLAN as shown in the following example. `configure vlan vlan_name ipaddress nn.nn.nn.nn 255.255.255.0`

Your changes take effect immediately.

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



Note

For more information about saving configuration changes, see the [Switch Engine 32.4 User Guide](#).

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

Change the Switch OS via the Bootloader Menu

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

Switch Engine is the default operating system for the Universal Hardware switch. You can change the switch OS from the Bootloader menu on initial activation only by completing the following steps:

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

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

To change the switch OS if you take no action during the initial boot, see [Change the Switch OS via the Startup Menu](#) on page 65.

Change the Switch OS via the Startup Menu

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

Switch Engine is the default operating system for the 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 will boot with Fabric Engine. See [Log In for the First Time on Fabric Engine](#) on page 65 for more information.

Log In for the First Time on Fabric Engine

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

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

1. Use a terminal emulator such as PuTTY or TeraTerm to connect to the switch through the serial port connection.

You can also connect to the switch via telnet or SSH. Be sure that your serial connection is set properly:

- Baud rate: 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 authentication level of `rwa`, you can configure the login and password values for the other role-based authentication levels.



Remove and Replace Components

[Replace Internal Power Supplies](#) on page 67

[Replace Fan Modules](#) on page 73

[Remove the Device from the Rack](#) on page 74

You can replace internal power supplies and fan modules, as needed, while the device is operating ("hot swapping").

For each device, ensure that all installed power supplies and fan modules have the same the airflow direction: either front-to-back or back-to-front.

Follow the procedures in this section to remove and replace power supplies and fan modules, and to remove a device from a rack.

Replace Internal Power Supplies

You can replace internal power supplies as needed while the switch is operating ("hot swapping").

All installed power supplies must have the same airflow direction (front-to-back or back-to-front) and must also match the airflow direction of the fan modules.

- If the power supply module has a **red** tab, the airflow is front-to-back.
- If the power supply module has a **blue** tab, the airflow is back-to-front.

To replace one or both AC internal power supplies in the switch, follow the steps in [Replace an 800 W Internal AC Power Supply](#) on page 67.

To replace one or both DC internal power supplies in the switch, follow the steps in [Replace an 800 W Internal DC Power Supply](#) on page 70.

Replace an 800 W Internal AC Power Supply

The switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one power supply without powering

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

**Warning**

Be sure to disconnect all power cables before you disconnect the chassis ground wire.

**Warning**

Make sure that the AC power supply circuit is not overloaded. Use proper over-current protection, such as a circuit-breaker, to prevent over-current conditions.

Replace an 800 W AC Power Supply

1. Disconnect the AC power cord from the wall outlet and from the power supply.
2. If necessary, remove a blank panel from the back of the switch.
3. Note the orientation of the installed power supply, and the location of the latching tab at the right of the unit.
4. Verify that the new power supply's airflow direction (front-to-back or back-to-front) is compatible with the other installed power supply (if any) and with the installed fan modules.
5. Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors. See [Figure 26](#).

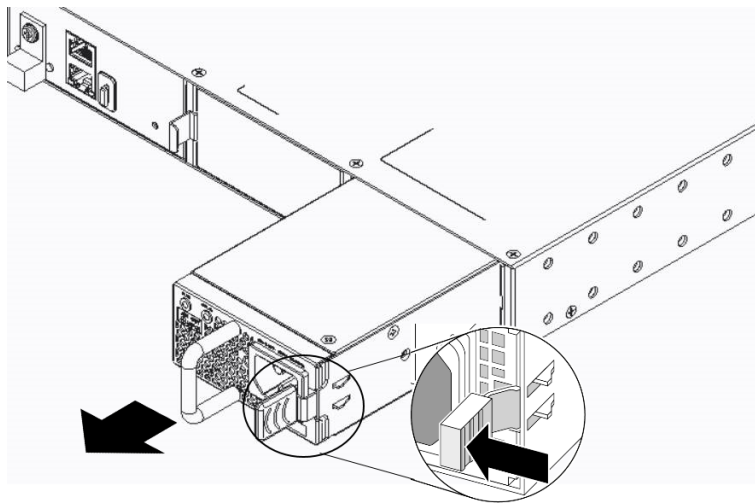


Figure 26: Removing a 800 W AC Power Supply

6. Carefully slide the power supply all the way into the power supply bay (see [Figure 27](#)).

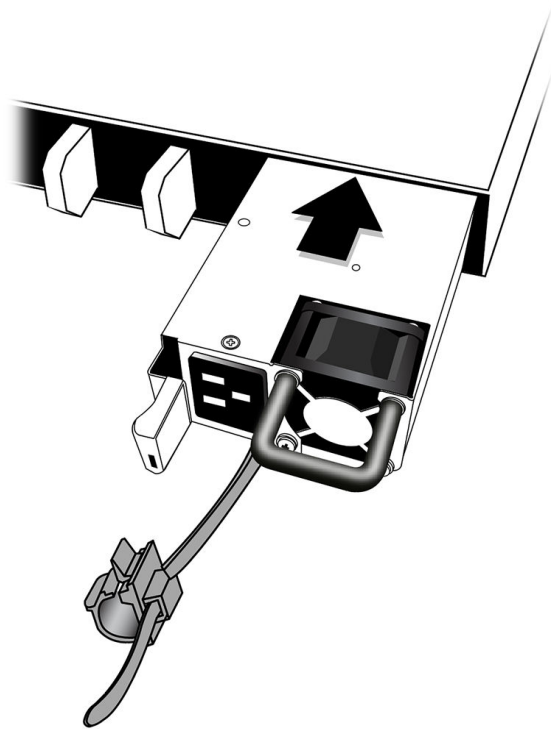


Figure 27: Installing an 800 W AC Power Supply

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

Do not slam the power supply into the switch.



Note

If power supplies are not installed in both power supply bays, be sure to install a cover over the unoccupied bay. Unoccupied bays must always be covered to maintain proper system ventilation and EMI levels.

8. Connect the power cord to the power supply and 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.

9. If the power supply is equipped with a power cord retainer, use the retainer to secure the power cord to the power supply.

Replace an 800 W Internal DC Power Supply

The switches have two bays for hot-swappable power supplies. In a switch with a redundant power configuration, you can replace one power supply without powering down the switch.



Note

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



Caution

Make sure that the DC power supply circuit is not overloaded. Use proper overcurrent protection, such as a circuit breaker, to prevent overcurrent conditions. You can use up to a 30-Amp breaker.

Replace an 800 W DC Power Supply



Warning

Be sure to disconnect all power cables before you disconnect the chassis ground wire.

To replace an 800 W DC power supply, follow these steps:

1. Attach an ESD-preventive wrist strap to your bare wrist and connect the metal end to an appropriate ground point on the rack.
2. Note the orientation of the installed power supply, and the location of the latching tab at the right of the unit.
3. Push the latching tab toward the power supply handle and pull outward on the handle to disengage the power supply internal connectors, as shown in [Figure 28](#).

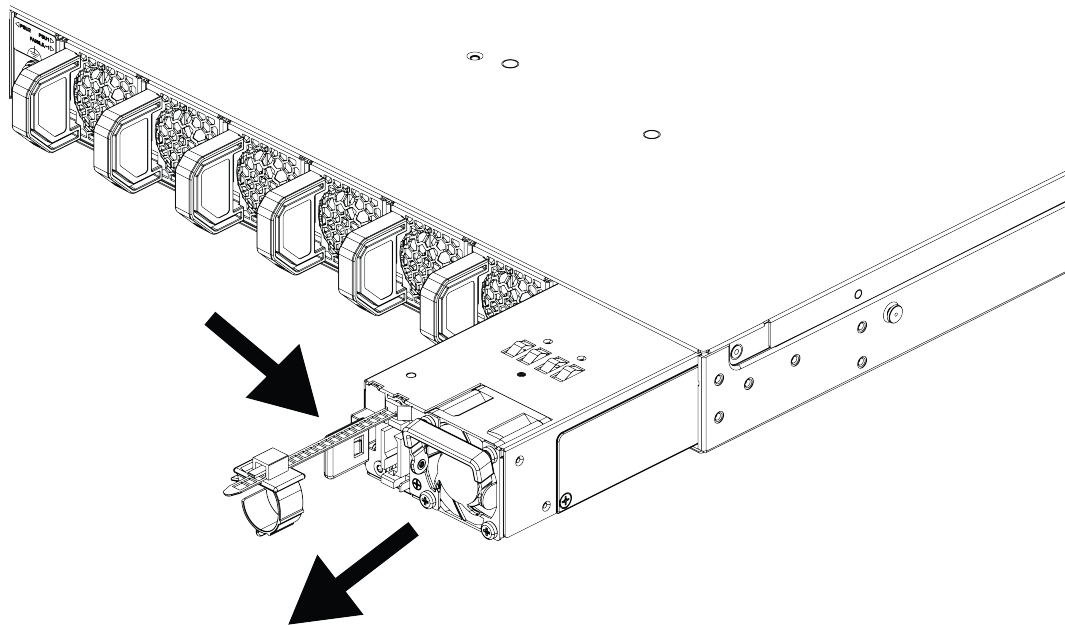


Figure 28: Remove an 800 W DC Power Supply

- Carefully slide the power supply the rest of the way out of the switch, as shown in [Figure 28](#).

**Caution**

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

**Note**

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

- Verify that the replacement power supply is oriented the same way as the unit you removed, and has the same airflow direction.
- Carefully slide the power supply all the way into the power supply bay until the latch snaps into place, as shown in [Figure 29](#).

**Caution**

Do not slam the power supply into the switch.

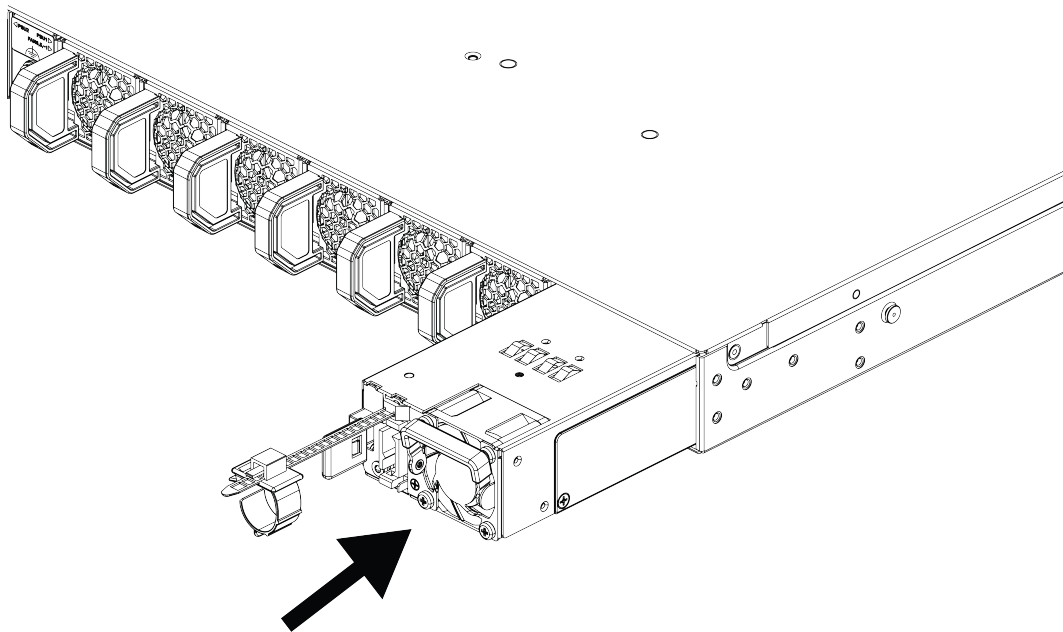


Figure 29: Replace an 800 W DC Power Supply

- To install a second power supply, repeat the procedure.

When you are finished, 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.

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 [Figure 30](#). The DC power cable connector can only connect to the power supply one way.

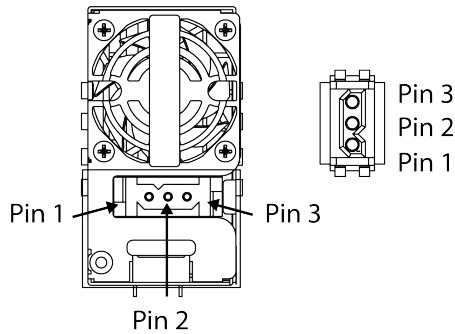


Figure 30: Connecting the DC Power Cord

4. 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.

- a. Connect the ring terminal of the yellow and green ground wire to a known reliable earth ground point at your site.

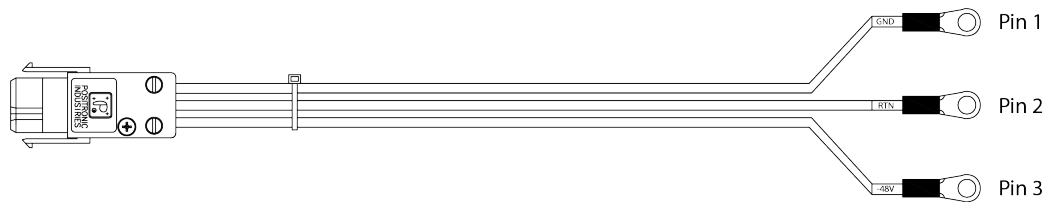


Figure 31: DC Power Cable

Use the following for the building wire harness:

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

- 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.
5. 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

You can replace fan modules as needed while the switch is operating ("hot swapping").

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

- If the fan module has a **red** tab, the airflow is front-to-back. Use a fan module labeled **Air Out**.
- If the fan module has a **blue** tab, the airflow is back-to-front. Use a fan module labeled **Air In**.



Note

The operating-system software cannot display the airflow direction.

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.

To replace the fan module in a switch, do the following.

1. Gently pull the tab (labeled **Air Out** or **Air In**) on the end of the fan module.

The fan module is held in place by spring clips. As you pull, the clips will disengage and the fan will stop.

2. Slide the fan module out of the switch and set it aside.
3. Verify that the airflow direction on the replacement fan module matches that of the installed fan modules.

Fans with front-to-back airflow have red tabs and are labeled **Air Out**.

Fans with back-to-front airflow have blue tabs and are labeled **Air In**.

4. Carefully slide the replacement fan module into the switch.

Push until the fan module snaps into place. The fan will automatically start to operate.

Remove the Device from the Rack

These procedures assume that you have attached the device to the rack as described in one of the following topics:

- [Remove the Switch from a Four-Post Rack](#)
- [Remove the Switch from a Two-Post Rack](#) on page 75

Remove the Switch from a Four-Post Rack

To remove or reposition a device after you have mounted it in a rack, follow these steps.

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. Push the disconnect latch to release the device after it is fully extended.

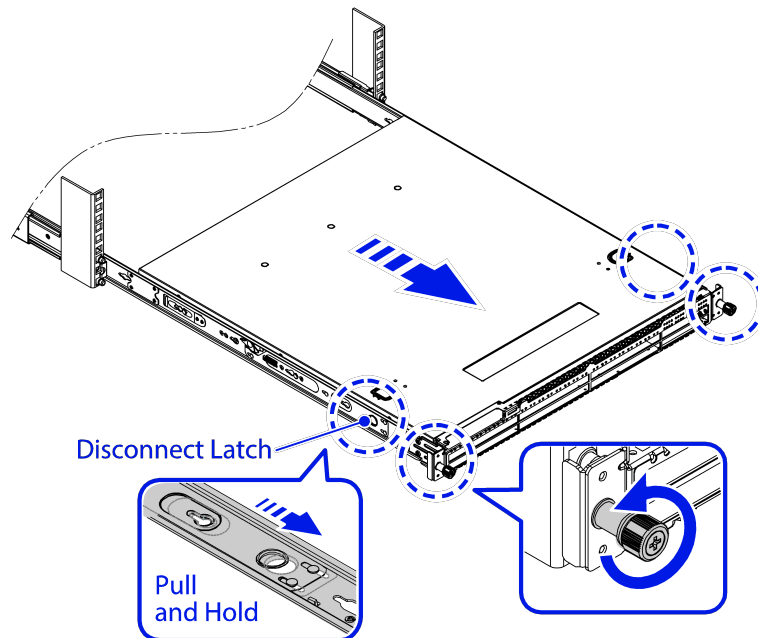


Figure 32: Disconnect latch for removal

- b. Disengage the retainers that are connecting the mounting brackets with the sliding rails on both sides.
- 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, push the rear clamp until it separates from the rear rack post.

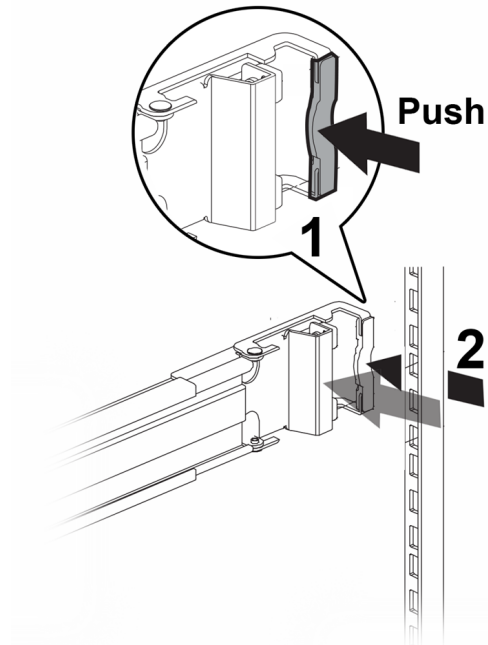


Figure 33: Removing the Slider Assembly: Rear Rack Post

- e. Release the tab that holds the front of the slider assembly to the front rack post, and pull the pegs out.

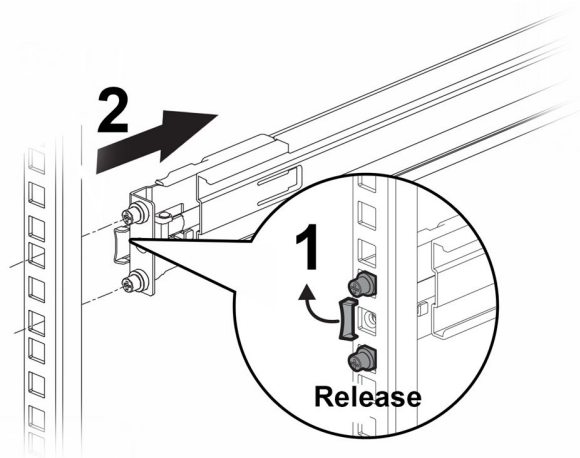


Figure 34: Removing the Slider Assembly: Front Rack Post

- f. Repeat step 3.d and step 3.e to remove the second slider assembly.

Remove the Switch from a Two-Post Rack

To remove a device from a two-post rack, do the following:

1. Unscrew the mounting brackets from the rack while carefully supporting the weight of the device.
2. 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.



Monitor the Switch

- [System Status LEDs on page 77](#)
- [RJ-45 Management Port LEDs on page 78](#)
- [QSFP28 Port LEDs on page 78](#)
- [800 W AC Power Supply LEDs on page 79](#)
- [800 W DC Power Supply LEDs on page 79](#)

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.

Label or Type	Color/State	Meaning
PSU1, PSU2 (Power Supplies)	Steady green	PSU is installed and providing power
	Steady amber	PSU is installed but input power is disconnected or unit fault detected
	Off	PSU is not installed
FAN	Steady green	All fans operating normally
	Steady amber	A fan has been removed or fault detected
	Off	No power to fan modules
SYS (System)	Steady green	System loaded properly and is ready
	Steady amber	Either the PSU or fan or both are faulty, not present, or the system has not loaded properly
	Off	CPU power is off
PWR (Power)	Steady green	Normal operation
	Blinking green	System in reset
	Off	Unit not operational

Label or Type	Color/State	Meaning
SECURE	Steady blue	Authentication complete
	Very slow blinking blue (0.25Hz)	Bypass authentication (debug only)
	Fast blinking blue (4Hz)	Authentication failed
	Slow blinking blue (1Hz)	Authenticating or updating images
	Off	Authentication begin or fault

RJ-45 Management Port LEDs

The 10/100/1000Base-T RJ-45 Management port includes two LEDs that are both amber and green. The LEDs are located on each side of the RJ-45 port. The LED on the right side is labeled Speed and the LED on the left side is labeled Link/Activity. The following table describes the meaning of the colors and states for the LEDs.

Table 13: 10/100/1000Base-T RJ-45 Management Port LEDs

LED	Color/State	Description
Speed	Off	The port is operating at 10 Mbps.
	Green	The port is operating at 100 Mbps.
	Amber	The port is operating at 1000 Mbps.
Link/Activity	Green	The port has established a link. There is no data activity.
	Blinking green	The port has established a link and there is data activity.
	Off	The port has not established a link.

QSFP28 Port LEDs

Each QSFP28 port has four green LEDs. The following table describes the states for the LEDs.

Table 14: Front Panel System LEDs

Label or Type	Color/State	Meaning
PSU1, PSU2 (Power Supplies)	Steady green	PSU is installed and providing power
	Steady amber	PSU is installed but input power is disconnected or unit fault detected
	Off	PSU is not installed

Table 14: Front Panel System LEDs (continued)

Label or Type	Color/State	Meaning
FAN	Steady green	All fans operating normally
	Steady amber	A fan has been removed or fault detected
	Off	No power to fan modules
SYS (System)	Steady green	System loaded properly and is ready
	Steady amber	Either the PSU or fan or both are faulty, not present, or the system has not loaded properly
	Off	CPU power is off
PWR (Power)	Steady green	Normal operation
	Blinking green	System in reset
	Off	Unit not operational
SECURE	Steady blue	Authentication complete
	Very slow blinking blue (0.25Hz)	Bypass authentication (debug only)
	Fast blinking blue (4Hz)	Authentication failed
	Slow blinking blue (1Hz)	Authenticating or updating images
	Off	Authentication begin or fault

800 W AC Power Supply LEDs

The following table describes the meanings of the LEDs on the 800 W AC power supplies (part number XN-ACPWR-800W-F or XN-ACPWR-800W-R).

The LEDs are located on the end of the power supply unit, arranged vertically to the left of the power cord receptacle.

Table 15: 800 W AC Power Supply LED Status Indications

Label and Color	Description	State	Meaning
! Amber	Fault Indicator	On (Solid)	PSU fault
		Off	No PSU fault
AC (Green)	AC input Good	On	AC input OK
		Off	AC input fail

800 W DC Power Supply LEDs

The following table describes the meanings of the LEDs on the 800 W DC power supplies (part number XN-DCPWR-800W-F or XN-DCPWR-800W-R).

The LEDs are located on the end of the power supply unit, arranged vertically to the left of the power cord receptacle.

Table 16: 800 W DC Power Supply LED Status Indications

Label and Color	Description	State	Meaning
! Amber	Fault Indicator	On (Solid)	PSU fault
		Off	No PSU fault
OUT OK (Green)	DC output Good	On (solid)	DC output OK
		Off or Blinking	DC output fail
IN OK (Green)	DC input Good "IN OK"	On	DC input OK
		Off	DC input fail



Technical Specifications

- [7720 Series Technical Specifications](#) on page 81
- [Acoustic Noise and Fan Speed](#) on page 83
- [CPU, Memory Specifications](#) on page 84
- [Mean Time Between Failures](#) on page 84
- [Power Specifications](#) on page 84
- [Environmental](#) on page 85
- [Standards](#) on page 86
- [EMI/EMC Standards](#) on page 87
- [Power Cord Requirements for AC-Powered Switches and AC Power Supplies](#) on page 88
- [Console Connector Pinouts](#) on page 88

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

7720 Series Technical Specifications

External Interfaces

Ports	32 x QSFP+QSFP28 40Gb/100Gb ports 124 x 10G/25G ports using break-out cables 1 x Serial console port RJ-45 2 x 10/100/1000BASE-T out-of-band management port (only the first port is used for out-of-band management) USB Type A storage port
Power Supplies	Modular 800W AC power supply (up to 2 PSUs) Modular 800W DC power supply (up to 2 PSUs) Front-Back and Back-Front airflow options
Fan Tray	6 fan modules, support one fan redundancy Front-Back and Back-Front airflow options
Dimensions	17.3in W/22.44in D/1.7in H (44.0cm/57.0cm/4.3cm)
Weight	16.3 lb (7.4 kg) no PSU/19.9 lb (9.0 kg) with two PSUs

Performance	Line rate 6.4 Tbps Switching Capacity (3.2 Tbps ingress, 3.2 Tbps egress) Forwarding Rate: 2000 Mpps Typical Latency: 800 ns
CPU/Memory	8-core Processor 16GB DDR4 ECC memory 128GB SSD memory
Packet Buffers	32MB
Operating Conditions	Environmental Operating Temperature Front-to-back: 0°C (32°F) to 50°C (124°F) at sea level 0°C (32°F) to 45°C (113°F) up to 1800 m (6000ft) 0°C (32°F) to 40°C (104°F), up to 3000m (10000 ft) Back-to-front: 0°C (32°F) to 45°C (113°F) at sea level 0°C (32°F) to 40°C (104°F) up to 1800 m (6000ft) 0°C (32°F) to 35°C (95°F) up to 3000m (10000 ft)

Weights and Dimensions of Accessories

Model	Weight	Dimensions
XN-FAN-001-F: Fan unit, front-to-back or XN-FAN-001-R: Fan Unit back-to-front	0.14 kg (0.31 lb)	Height: 4.0 cm (1.57 in) Width: 4.0 cm (1.57 in) Length: 13.4 cm (5.28 in)
XN-4P-RKMT298 - Four-post rack mount kit (included with switch)	2.63 kg (5.8 lb)	Height: 2.1 cm (0.83 in) Width: 4.4 cm (1.73 in) Length: 63.0 cm - 90.0 cm (24.80 in - 35.43 in)
XN-2P-RKMT299 - Two-post rack mount kit (ordered separately)	2.8 kg (6.17 lb)	Height: 4.44 cm (1.75 in) Width: 2.0 cm (0.79 in) Length: 67.93 cm - 93.24 cm (26.76 in - 36.73 in)

Acoustic Noise and Fan Speed

Acoustic Noise

The following table includes acoustic specifications of the Extreme 7720 Series switches.

Switch Model	Bystander Sound Pressure (at 27°C)	Declared Sound Power (at 27°C)
7720-32C (AC/DC PSU with front-to-back airflow)	45 dB(A)	6.9 bels
7720-32C (AC/DC PSU with back-to-front airflow)	52 dB(A)	7.3 bels

Fan Tray and Speed Variation

Fan speeds are adjusted based on calculations of the temperatures on all sensors. Due to one fan being located behind the other, air pushed from one fan can cause the other fan in the module to run at a higher speed. One fan can run at medium speed while the other can spin at high speed if one is close to the temperature boundary.

Table 17: Fan Tray and Speed Variation

Description	Operation Status	Operation Speed	Airflow Direction
Tray 1 Fan 1	up	high speed	Unknown*
Tray 1 Fan 2	up	medium speed	Unknown*
Tray 2 Fan 1	up	high speed	Unknown*
Tray 2 Fan 2	up	medium speed	Unknown*
Tray 3 Fan 1	up	high speed	Unknown*
Tray 3 Fan 2	up	medium speed	Unknown*
Tray 4 Fan 1	up	high speed	Unknown*
Tray 4 Fan 2	up	medium speed	Unknown*
Tray 5 Fan 1	up	high speed	Unknown*
Tray 5 Fan 2	up	medium speed	Unknown*
Tray 6 Fan 1	up	high speed	Unknown*
Tray 6 Fan 2	up	medium speed	Unknown*

* - The color of the tab on the fan tray indicates the airflow direction:

- Red = Front-to-Back
- Blue = Back-to-Front

CPU, Memory Specifications

The following table includes CPU and memory specifications for the Extreme 7720 Series switches.

2.2 GHz CPU
16 GB memory, 128 GB SSD
4GB eMMC Flash Memory
32MB buffer for ASIC

Mean Time Between Failures

The following table includes mean time between failures (MTBF) information for the Extreme 7720 Series switches.

Switch Model	Mean Time Between Failures
7720-32C-AC-F	428,807 hrs @ 25°C
7720-32C-AC-R	476,814 hrs @ 25°C

Power Specifications

Power Supply Specifications

	800W AC PSU XN-ACPWR-800W-F/R	800WDC PSU XN-DCPWR-800W-F/R
Dimensions	3.15 in W x 1.57 in H x 8.11 in D (8.0 cm x 4.0 cm x 20.6 cm)	3.15 in W x 1.57 in H x 8.11 in D (8.0 cm x 4.0 cm x 20.6 cm)
Weight	1.79 lb (0.81kg)	1.85 lb (0.85kg)
Voltage Input Range	100VAC-140 VAC/200VAC-240 VAC	-48VDC to -60VDC
Line Frequency Range	50Hz– 60Hz	N/A
PSU Input Socket	IEC320 C14	Terminal Block
PSU Output Cord	IEC320 C13	N/A
Operating Conditions	0°C–55°C operation	0°C–55°C operation

Power Consumption

The following table includes power consumption information for the 7720 Series switches.

Operating Mode	Test Conditions				Power Consumption		
	Fan Duty	Traffic Load	Port Status	Packet Length (Bytes)	Dual Power: PSU1	Dual Power: PSU2	Single Power: PSU1
Empty mode	85%	NA	Down	NA	152.6 W	145.5 W	285.9 W
Standby mode	85%	NA	Up	NA	157.6 W	151.5 W	297.2 W
Typical mode	85%	70%	Up	1,518	165 W	159.8 W	313.6 W
Stress mode	100%	100%	Up	256	207.8 W	204.5 W	406.0 W

Power and Heat Dissipation

The following table includes power and heat dissipation information for the Extreme 7720 switches.

Switch Model	Minimum Heat Dissipation (BTU/hr) (Idle, no ports linked)	Minimum Power Consumption (Watts) (Idle, no ports linked)	Maximum Heat Dissipation (BTU/hr) (Fans high, all ports 100% traffic)	Maximum Power Consumption (Watts) (Fans high, all ports 100% traffic)
7720-32C-AC(F/R)	972 BTU/hr	285W	1340 BTU/hr	393W
7720-32C-DC(F/R)	975 BTU/hr	286W	1381 BTU/hr	405W

Environmental

Environmental Specifications

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

Environmental Compliance

- EU RoHS - 2011/65/EU
- EU WEEE - 2012/19/EU

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

Environmental Operating Conditions

Temp: 0°C to 50°C (32°F to 122°F)
Humidity: 10% to 95% relative humidity, non-condensing
Altitude: 0 to 3,000 meters (9,850 feet)
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: 10% 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 62368-1
UL/CuL62368-1 Listed
CAN/CSA-C22.2 No 60950-1-07 Incl. AM1 (2011) and AM2 (2014)
CAN/CSA C22.2 No. 62368-1:19
Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)
CDRH Letter of Approval (US FDA Approval)

European ITE

EN 60950-1 2nd Edition
EN62368-1
EN 60825-1 Class 1 (Lasers Safety)
2014/35/EU Low Voltage Directive

International ITE

CB Report & Certificate per IEC 60950-1
CB Report & Certificate IEC 62368-1

AS/NZS 62368.1:2022 (Australia/New Zealand)

EMI/EMC Standards

North American EMC for ITE

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

European EMC Standards

EN 55032 Class A
EN 55035
EN 55011
EN 61000-3-2,2014 (Harmonics)
EN 61000-3-3 2013 (Flicker)
EN 61000-6-2
EN 61000-6-4
EN 300 386 (EMC Telecommunications) 2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions) AS/NZSCISPR32
CISPR24 Class A (International Immunity)
IEC 61000-4-2/EN 61000-4-2 Electrostatic Discharge, 8 kV Contact, 15 kV Air, Criteria B
IEC 61000-4-3/EN 61000-4-3 Radiated Immunity 10V/m, Criteria A
IEC 61000-4-4/EN 61000-4-4 Transient Burst, 2 kV, Criteria B
IEC 61000-4-5/EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B
IEC61000-4-6 Conducted Immunity, 0.15-80MHz, 10V/rms, 80%AM (1kHz), Criteria A
IEC/EN61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

VCCI Class A (Japan Emissions)
ACMA RCM (Australia Emissions)
CQC Mark (China)
KCC Mark, EMC Approval (Korea)
BSMI (Taiwan)
Anatel (Brazil)
NoM (Mexico)
EAC (Russia, Belarus, Kazakhstan)
NRCS (South Africa)
TEC (India)

IEEE 802.3 Media Access Standards

- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ae 10GBASE-X
- IEEE 802.3 10GBASE-T (up to 100m using Cat6a cabling or better)
- IEEE 802.3by-2016 25Gb/s Operation
- IEEE 802.3ba/802.3bm 40 GBASE-X and 100 GBASE-X

Power Cord Requirements for AC-Powered Switches and AC Power Supplies

An AC power cord is not included with the AC power supply.

Power cords used with AC-powered switches or AC power supplies must meet the following requirements:

- The power cord must be agency-certified for the country of use.
- The power cord must have an IEC320-C13 connector for connection to the switch or power supply.
- The power cord must have an appropriately rated and approved wall plug applicable to the country of installation.
- For cords up to 6 feet (2 m) long, the wire size must be 18 AWG (.75 mm²) minimum; over 6 feet, the minimum wire size is 16 AWG (1.0 mm²).

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

Console Connector Pinouts

Table 18 describes the pinouts for a DB-9 console plug connector.

Table 18: 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 35 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

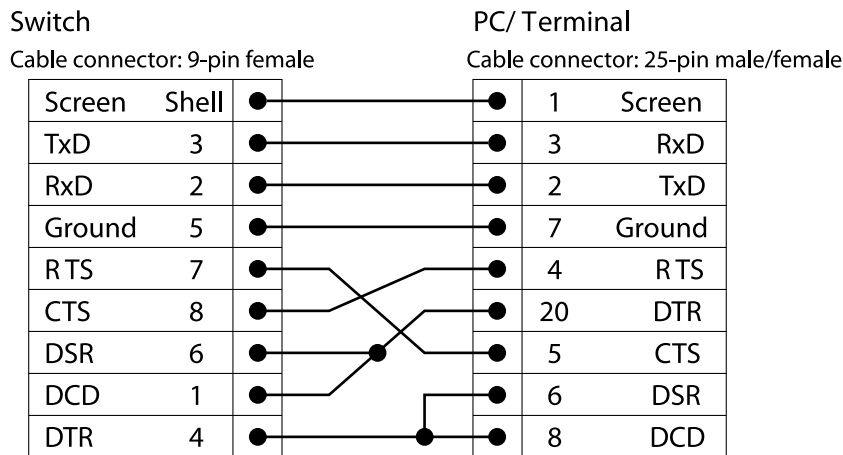


Figure 35: Null-Modem Cable Pinouts

Figure 36 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

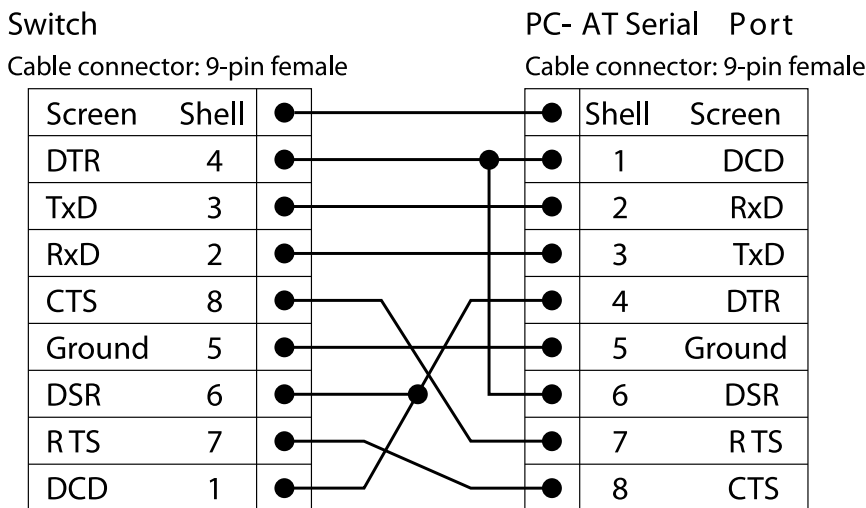


Figure 36: PC-AT Serial Null-modem Cable Pinouts

Table 19 shows the pinouts for the RJ45 console port on the Extreme Networks switches.

Table 19: 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	—

Table 19: RJ45 Console Port on Switch (continued)

Function	Pin Number	Direction
GND (ground)	5	—
RXD (receive data)	6	In
DSR (data set ready)	7	In
CTS (clear to send)	8	In

Table 20 shows the pinouts for an RJ45-to-DB-9 adapter.

Table 20: 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 Information

[Considerations Before Installing](#) on page 91

[General Safety Precautions](#) on page 92

[Maintenance Safety](#) on page 93

[Fiber Optic Ports and Optical Safety](#) on page 93

[Cable Routing for LAN Systems](#) on page 94

[Install Power Supply Units and Connect Power](#) on page 94

[Select Power Supply Cords](#) on page 95

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[Battery Warning - Taiwan](#) on page 96



Warning

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

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

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

Considerations Before Installing

Consider the following items before you install equipment.

- For equipment designed to operate in a typical Telco environment that is environmentally controlled, choose a site that has the following characteristics:
 - Temperature-controlled and humidity-controlled, such that the maximum ambient room temperature shall not exceed 45°C (113°F).
 - Clean and free from airborne materials that can conduct electricity.
 - Well ventilated and away from sources of heat including direct sunlight.

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

General Safety Precautions

Follow these guidelines:

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

Maintenance Safety

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

- Use only authorized accessories or components approved for use with this system. Failure to follow these instructions may damage the equipment or violate required safety and 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.

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

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

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

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



Caution

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



Warning

The Ethernet ports of the equipment and its sub-assemblies are suitable only for intra-building connections (within the same building) or for connections to unexposed wiring or cabling. (See the conditions listed above.) The Ethernet ports of this equipment or its sub-assemblies must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. Ethernet interfaces are designed for use only as intra-building interfaces (described as Type 2 or Type 4 ports in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP wiring. The addition of Primary Protectors is not sufficient protection to connect these interfaces metallically to OSP wiring. This warning does not apply to T1/E1 ports because T1/E1 ports have built-in isolation and surge protection that allows them to be connected to OSP wiring.

Install Power Supply Units and Connect Power

For the ratings and power input requirements of each power supply unit, see "Technical Specifications" or the data sheet for the power supply at www.extremenetworks.com.



Warning

Be sure to satisfy the requirements listed in this section when you install Extreme Networks power supplies or connect power.

When you install any power supply:

- Do not use excessive force when you insert a power supply into the bay.
- Do not attempt to open the power supply enclosure for any reason; the power supply does not contain user-serviceable parts. In the event of failure, return the defective power supply to Extreme Networks for repair or replacement.
- Do not put your hand into an open power supply bay when a power supply is not present.
- Before you work on equipment that is connected to power lines, remove all jewelry, including watches. Metal objects heat up when they are connected to power and ground and can cause serious burns or weld the metal object to the terminals.
- An electrical arc can occur when you connect or disconnect the power with power applied. This could cause an explosion in hazardous area installations. Be sure that power is removed from the device.
- When you install or replace equipment, always make the ground connection first and disconnect the ground connection last.

When you install DC power supplies or connect DC power:

- Extreme Networks DC power supplies do not have switches for turning the unit on and off. Make sure that the DC circuit is de-energized before connecting or disconnecting the DC power cord at the DC input power socket.
- Connect the system or power supply only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-based safety standards.



Note

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



Warning

Extreme Networks power supplies do not have switches for turning the unit on and off. Disconnect all power cords to remove power from the device. Make sure that these connections are easily accessible.

Extreme Networks alimentations n'ont pas de contact pour mettre l'appareil sous et hors tension. Débranchez tous les cordons d'alimentation pour couper l'alimentation de l'appareil. Assurez-vous que ces connexions sont facilement accessibles.

Select Power Supply Cords

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

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

**Note**

This equipment is not intended to be directly powered by power distribution systems where phase-phase voltages exceed 240 VAC (2P+PE), such as those used in Norway, France, and other countries. For these applications it is recommended that a transformer be used to step down the voltage to < 240 VAC from phase-phase, or that you make a connection to a (P+N+PE) power distribution where voltages do not exceed 240 VAC.

All installations should confirm that the product is reliably grounded according to the country's local electrical codes.

Battery Notice



Warning: This product contains a battery used to maintain product information. If the battery should need replacement it must be replaced by Service Personnel. Please contact Technical Support for assistance.

Risk of explosion if battery is replaced by an incorrect type. Dispose of expended battery in accordance with local disposal regulations.



Attention: Ce produit renferme une pile servant à conserver les renseignements sur le produit. Le cas échéant, faites remplacer la pile par le personnel du service de réparation. Veuillez communiquer avec l'assistance technique pour du soutien.

Il y a risque d'explosion si la pile est remplacée par un type de pile incorrect. Éliminez les piles usées en conformité aux règlements locaux d'élimination des piles.

Battery Warning - Taiwan

警告

如果更換不正確之電池型式會有爆炸的風險，
請依製造商說明書處理用過之電池。



Regulatory Information

[CE statement](#) on page 97

[EMC Warnings](#) on page 98

[China and Taiwan: Restriction of Hazardous Substances \(ROHS\)](#) on page 98

[BSMI statement \(Taiwan\)](#) on page 98

[Canadian requirements](#) on page 98

[China CCC statement](#) on page 99

[Australia \(RCM\)](#) on page 99

[Federal Communications Commission \(FCC\) Notice](#) on page 99

[Germany statement](#) on page 100

[KCC statement \(Republic of Korea\)](#) on page 100

[Japan \(VCCI Class A\)](#) on page 100

[Japan power cord](#) on page 101

CE statement



Important

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

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

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU
- EN 55032/EN 55024 (European Immunity Requirements)
 - EN61000-3-2/IEC61000-3-2 (European and Japanese Harmonics Spec)
 - EN61000-3-3

EMC Warnings

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。

China and Taiwan: Restriction of Hazardous Substances (ROHS)

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

BSMI statement (Taiwan)

警告:為避免電磁干擾,本產品不應安裝或用於住宅環境。

Canadian requirements

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

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

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



Note

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

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

Germany statement

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

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

KCC statement (Republic of Korea)

이 기기는 업무용 환경에서 사용할 목적으로 적
합성평가를 받은 기기로서 가정용 환경에서 사
용하는 경우 전파간섭의 우려가 있습니다.

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

Japan (VCCI Class A)



Warning

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

Japan power cord



注意 - 添付の電源コードを他の装置や用途に使用しない

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

English translation of above statement

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



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