



ISW Series Managed Industrial Ethernet Switch 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.

Text Conventions

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

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

Table 1: Notes and warnings






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

Table 2: Text

Convention	Description
screen displays	This typeface indicates command syntax, or represents information as it is displayed on the screen.
The words <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.
[]	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 articles, white papers, and case studies

Open Source Declarations

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

Training

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

Help and Support

If you require assistance, contact 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 customers to connect with one another, answer questions, and share ideas and feedback. This community is monitored by employees, but is not intended to replace specific guidance from GTAC.

Call GTAC

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

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

- Your service contract number, or serial numbers for all involved 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.

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

To send feedback, email us at .

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



ISW-Series Switch Overview

[8-port Switch Models](#) on page 11

[12-port Switch Models](#) on page 13

[28-port Switch Model](#) on page 16

Extreme Industrial Switches are a family of ruggedized Layer 2 switches designed to operate under harsh environments and extended temperature conditions. They provide continuous uptime, manageability, and operational efficiency. The Managed Ethernet Switch solutions provide full PoE+ power per PoE port, and are an excellent choice for industrial environments.

The full redundant ring technology available in Extreme Industrial Switches creates fault-tolerant networks with high availability. Managed Ethernet Switch solutions can automatically connect to a FabricConnect network through the Fabric Attach software-based feature, which enables the switches to be quickly mapped as endpoints within a virtualized Fabric Connect service.

Management

An RJ45 serial console port on the rear panel of the ISW-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. The ISW-24W-4X switch model includes an Ethernet management port that can be used to connect the system to an out of band management network for administration.

The ISW-4W-4WS-4X and ISW-24W-4X models also have a USB 2.0 Type A port on the front panel labeled USB. It can be used for a Bluetooth dongle or for attaching a removable memory module.

Cooling

All ISW-Series models operate without the need for active fans to provide system cooling.

Power Supplies

The ISW-Series switch is powered by two power supplies that connect to an AC power source and convert the AC current to DC current for the switch to use. The power supplies are redundant; two 240W power supplies do not provide 480W, they only provide 240W.

The power supplies must be installed by qualified personnel such as licensed electricians, in accordance with local electrical codes, and connected to a well fused power source. The power supplies operate without the need for internal cooling fans.

Operating Temperatures

ISW-Series switches support an operating temperature range from -40°C (-40°F) to 75°C (167°F).

8-port Switch Models

There are two 8-port switch models. The front panel of the ISW 4-10/100P, 2-10/100T, 2-SFP model switch includes:

- 4 10/100BaseTPoE+ ports
- 2 10/100BaseT ports
- 2 100FX/100Base-X SFP ports

The front panel of the ISW 4Gbp, 2GbT, 2-SFP model switch includes:

- 4 10/100/1000BaseTPoE+ ports
- 2 10/100/1000BaseT ports
- 2 100FX/100Base-X SFP ports

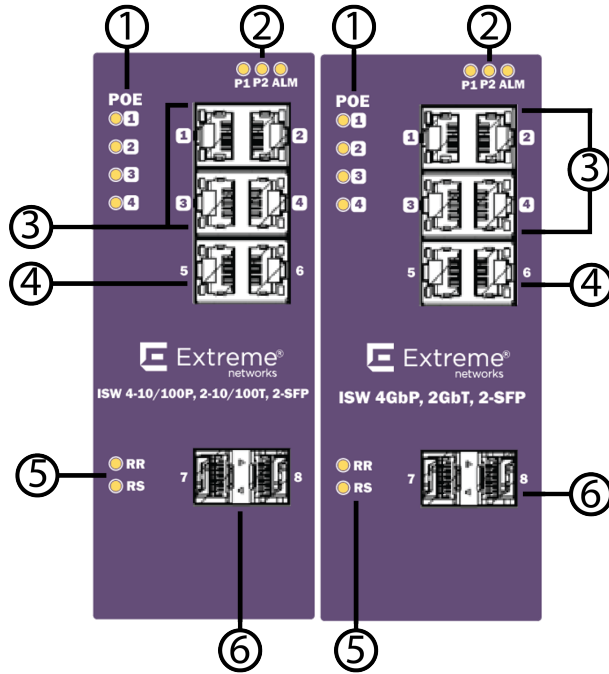


Figure 1: 8-Port PoE Series Front Panel

1 = PoE LEDs	2 = System status LEDs
3 = Gigabit Ethernet copper ports	4 = Gigabit Ethernet SFP ports
5 = Device info/status	6 = Gigabit Ethernet SFP ports

The top panel of both of the switch models include:

- Dual power input (6p terminal block)
- RJ45 serial console port
- Reset button
- Grounding lug

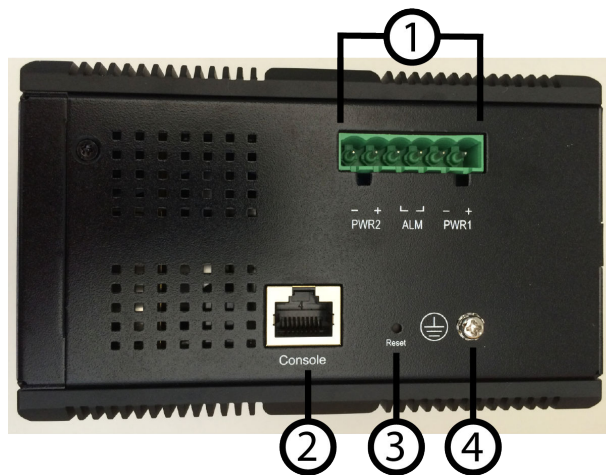


Figure 2: Top panel for both 8- port switches

1 = Dual power input (6p terminal block)	2 = RJ45 serial console port
3 = Reset	4 = Grounding lug



Note

Both models support DIN-rail or wall-mount options. They are not rack-mountable units.

12-port Switch Models

There are three 12-port switch models. The front panel of the ISW 8-10/100P, 4-SFP model switch includes:

- 8 10/100BaseT PoE+ ports
- 4 100 FX/1000Base-X SFP ports

The front panel of the ISW 8GbP, 4-SFP model switch includes:

- 8 10/100/1000BaseT PoE+ ports
- 4 100 FX/1000Base-X SFP ports

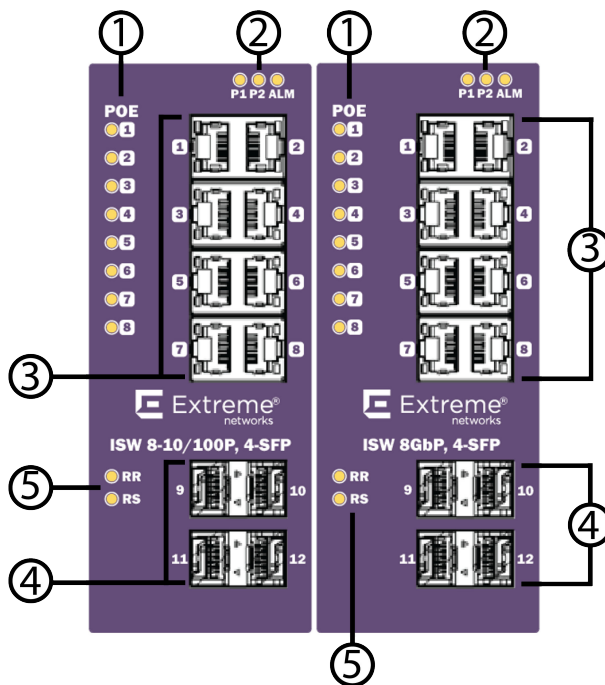


Figure 3: ISW 8-10/100P, 4-SFP and ISW 8GbP, 4-SFP models front panel

1 = PoE LEDs	2 = System status LEDs
3 = Gigabit Ethernet copper ports	4 = Gigabit Ethernet SFP ports
5 = Device info/status	

The top panel of the ISW 8-10/100P, 4-SFP and the ISW 8GbP, 4-SFP switch models include:

- Dual power input (6p terminal block)
- RJ45 serial console port
- Reset button
- Grounding lug

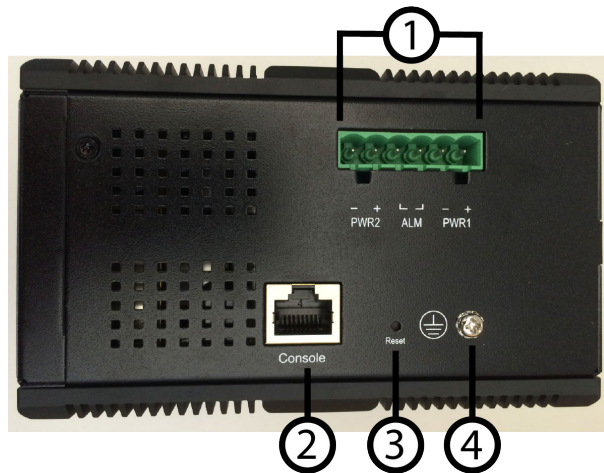


Figure 4: ISW 8-10/100P, 4-SFP and ISW 8GbP, 4-SFP models switches top panel

1 = Dual power input (6p terminal block)	2 = RJ45 serial console port
3 = Reset	4 = Grounding lug

The front panel of the ISW 8GbP, 4-SFP+ model switch includes:

- 4 x 10/100/1000BaseT 802.3bt (90W) ports
- 4 Combo Ports supporting either 10/100/1000BaseT 802.3bt (90W) **OR** 1000Base-X (SFP)
- 4 10G Base-X SFP+ports
- USB 2.0 Type A port

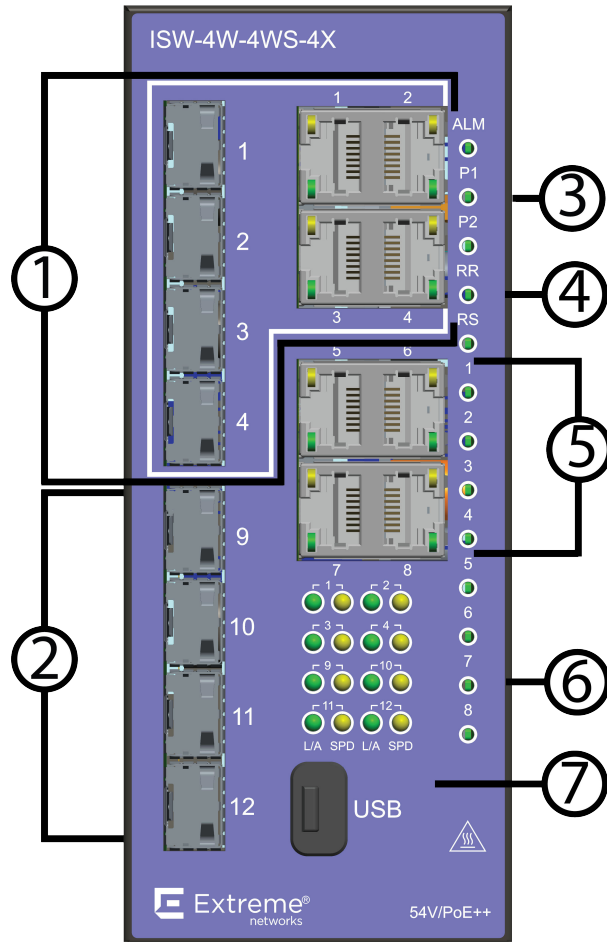


Figure 5: ISW 8GbP, 4-SFP+ model front panel

The top panel of the ISW 8GbP, 4-SFP+ switch model includes:

- Dual power input (6p terminal block)
- RJ45 serial console port
- Reset button
- Grounding lug

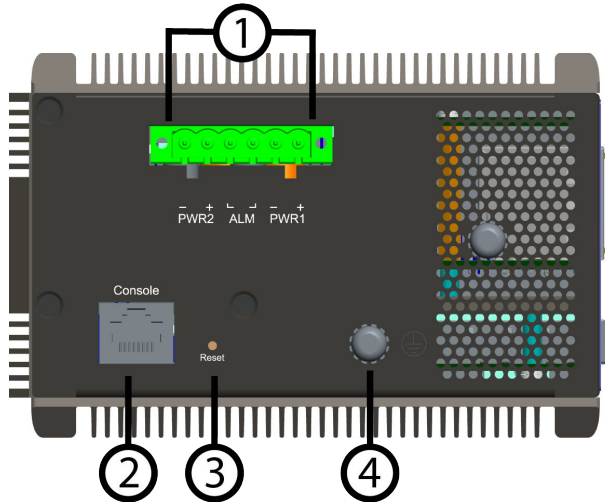


Figure 6: ISW 8GbP, 4-SFP+ model 12-Port PoE Series Rear Panel

1 = Dual power input (6p terminal block)	2 = RJ45 serial console port
3 = Reset	4 = Grounding lug



Note

All three models support DIN-rail or wall-mount options. They are not rack-mountable units.

28-port Switch Model

There is one 28-port switch model. The front panel of the ISW 24GbP, 4-SFP model switch includes:

- 24 10/100/1000Base-T 802.3bt (90W) ports
- 4 10GBase-X SFP+ ports
- 10/100/1000BASE-T OOB management port
- RJ-45 serial console port
- USB 2.0 Type A port



Note

This model does not support DIN-rail or wall-mount options. It is a 1RU rack-mountable unit.

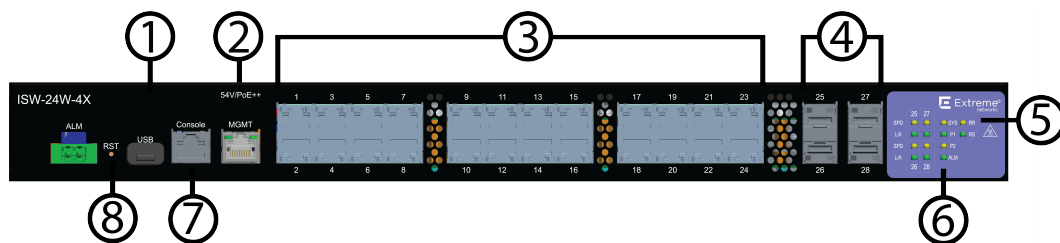


Figure 7: ISW 24GbP, 4-SFP model 28-Port PoE Series Front Panel

1 = USB Type A port	2 = 10/100/1000BASE-T OOB management port
3 = 10/100/1000Base-T PoE 802.3bt ports	4 = SFP+ ports (1/2.5/10G)
5 = Device info/status	6 = System status LEDs
7 = RJ-45 serial console port	8 = Reset

The rear panel of the ISW 24GbP, 4-SFP switch model includes:

- Dual power input (4p terminal block)
- Grounding lug



Figure 8: ISW 24GbP, 4-SFP model 28-Port PoE Series Rear Panel

1 = Dual power input (4p terminal block)	2 = Grounding lug
--	-------------------



Power Supplies for Use with Your Switch

The ISW-Series switches are powered by up to two external DC power supplies. The DC power input can be provided either by the DC power line available at the installation site or by using one of the supported AC input to DC output power supplies. Both power supplies must have the same power rating, such as 240W, for long term use. You can remove one power supply without interrupting the switch's operation. The ISW-Series switch can support an unmatched pair of power supplies for a short time while you are upgrading or downgrading.

Refer to [ISW Series Technical Specifications](#) on page 62 for the input ratings of the switches and the output ratings of the power supplies.

Power supplies are ordered separately.



Site Preparation

- [Plan Your Site](#) on page 19
- [Operating Environment Requirements](#) on page 20
- [Rack Specifications and Recommendations](#) on page 23
- [Evaluate and Meet Cable Requirements](#) on page 25
- [Meet Power Requirements](#) on page 31
- [Follow Applicable Industry Standards](#) on page 33

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 4](#) are authorities on electrical codes.

Table 4: 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 23 for more information.
- Use appropriate AC or DC power, power distribution, and grounding for your specific installation.

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

**Note**

Consult an electrical contractor for commercial building and wiring specifications.

Control the Temperature

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

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

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

- Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below the maximum operating temperature for the equipment..
- Install a reliable air conditioning and ventilation system.
- Keep the ventilation in the wiring closet running during non-business hours; otherwise, the equipment can overheat.
- Maintain a storage temperature between -40°C (-40°F) and 85°C (185°F).

[Table 5](#) summarizes the behavior of switches when they experience high operating temperatures.

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

Table 5: 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**

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.

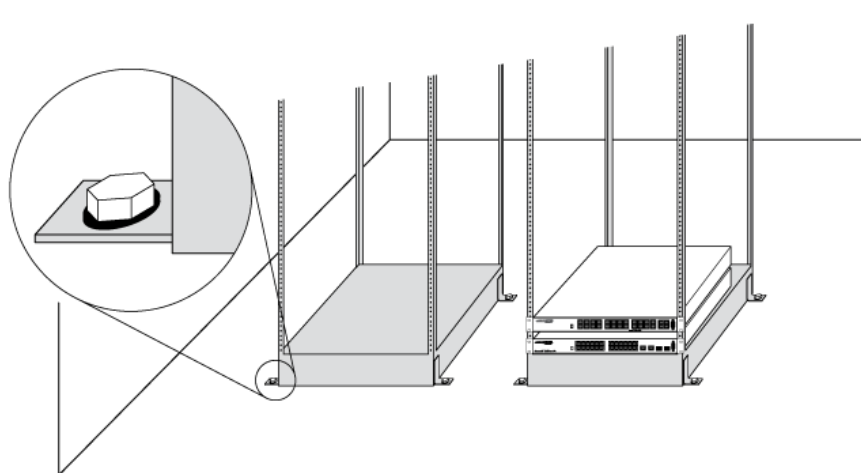


Figure 9: Properly Secured Rack

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 10](#) on page 27.
- 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.

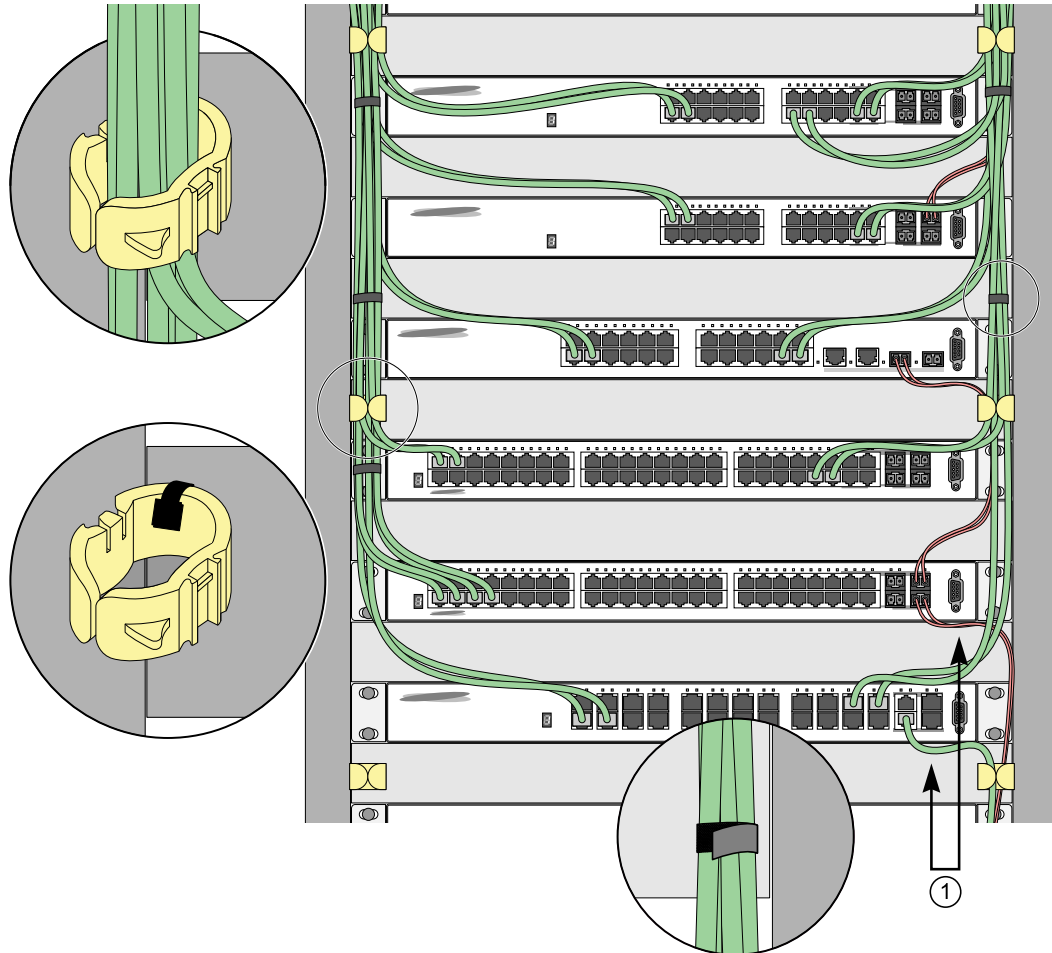


Figure 10: Properly Installed and Bundled Cable

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 11](#).



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.

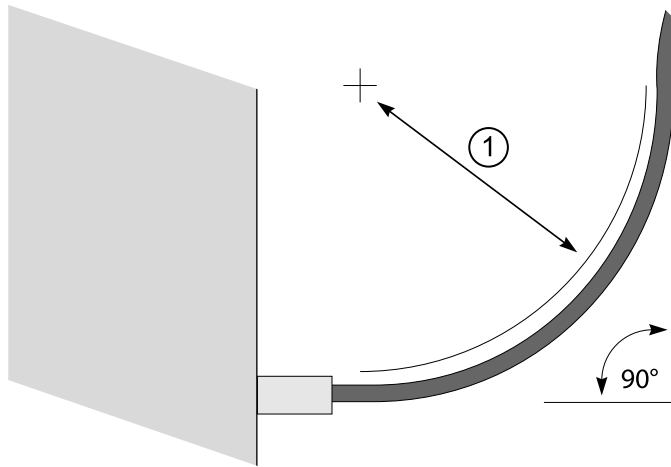


Figure 11: Bend Radius for Fiber Optic Cable

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

Cable Distances and Types

[Table 6](#) 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 6: 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 6: 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-LRM SFP+ (1310nm optical window)	62.5/125 µm multimode fiber	–	220

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 6: Cable Distances and Types (continued)

Standard	Media Type	MHz·km Rating	Maximum Distance (Meters)
10GBASE-ER SFP+ (1550nm optical window)	10/125 μ m single-mode fiber	–	40,000
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.

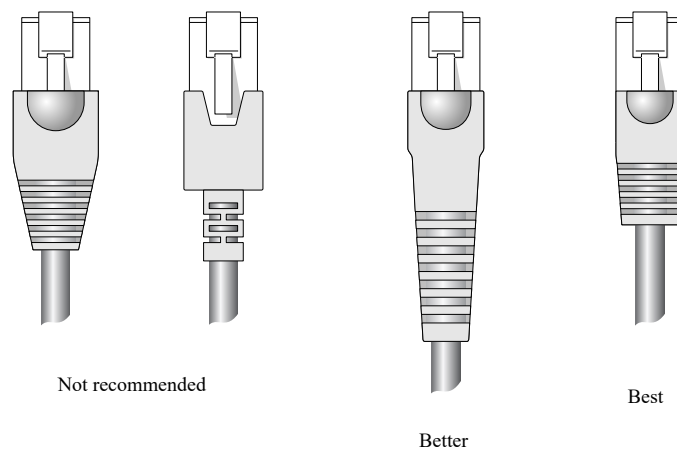
Use RJ45 Connector Jackets

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

**Figure 12: RJ45 Connector Jacket Types**

Prevent Radio Frequency Interference (RFI)

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

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

To prevent RF interference, avoid the following situations:

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

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

Meet Power Requirements

Observe the following requirements and precautions for powering your hardware.

Requirements for PoE Devices

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

Power Supply Requirements

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

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

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

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

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

Power Cord Requirements

Most Extreme Networks switches do not ship with power cords. See [Select Power Supply Cords](#) on page 76 for information on selecting and purchasing the correct AC power cords for use with specific Extreme Networks equipment.

UPS (Uninterruptible Power Supply) Requirements

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

A UPS traditionally can perform the following functions:

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

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

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

Select a UPS

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

- What are the amperage requirements?
- What is the longest potential time period that the UPS would be required to supply backup power?
- Where will the UPS be installed?
- What is the maximum transition time that the installation will allow? (See [Provide a Suitable UPS Transition Time](#) on page 33.)



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-ampere 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 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 Your Switch

[Safety Considerations for Installation](#) on page 34

[What You Will Need for the Installation](#) on page 35

[Mount the Switch](#) on page 35

[Connect Power Supplies, Alarm Relay, and Ground Connection](#) on page 37

[Turn on the Switch](#) on page 44

[Connect Network Interface Cables](#) on page 44

Before you attempt to install or remove an ISW-Series switch, read the precautions in [Safety Considerations for Installation](#) on page 34.

The installation process includes the following tasks:

1. Prepare to install the switch. See [What You Will Need for the Installation](#) on page 35.
2. Install the switch. See [Mount the Switch](#) on page 35.
3. Install one or two power supplies. See [Connect Power Supplies, Alarm Relay, and Ground Connection](#) on page 37.
4. Power up the switch. See [Turn on the Switch](#) on page 44.
5. Connect network interface cables. See [Connect Network Interface Cables](#) on page 44.
6. Perform initial network connection and configuration. See [Activate and Verify the Switch](#) on page 48.

Safety Considerations for Installation

Read the information in this chapter thoroughly before you attempt to install or remove an ISW-Series 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.

When a connector is removed during installation, testing, or servicing, or when an energized fiber is broken, a risk of ocular exposure to optical energy that can be potentially hazardous occurs, depending on the laser output power.

The primary hazards of exposure to laser radiation from an optical-fiber communication system are:

- Damage to the eye by accidental exposure to a beam emitted by a laser source.
- Damage to the eye from viewing a connector attached to a broken fiber or an energized fiber.

Do not cover vents that would restrict airflow.

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

**Note**

See [Safety and Regulatory Information](#) on page 71 for additional safety information and 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 19, and ensure that you have the appropriate people and tools on hand.

Installing ISW-Series 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 switch and 76 cm (30 in) behind the switch.

Check the *Quick Reference Guide* for your switch model to see what hardware is provided in the switch packaging.

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

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

Mount the Switch

Most ISW-Series switches can be DIN-rail mounted or wall-mounted. The ISW 24GbP, 4-SFP model switch can be rack-mounted in a two-post rack, but cannot be DIN-rail mounted or wall-mounted.

Mounting the ISW (DIN-Rail)

Mounting steps:

1. Screw the DIN-Rail bracket on with the bracket and screws in the accessory kit.
2. Hook the unit over the DIN rail.
3. Push the bottom of the unit towards the DIN Rail until it snaps into place.

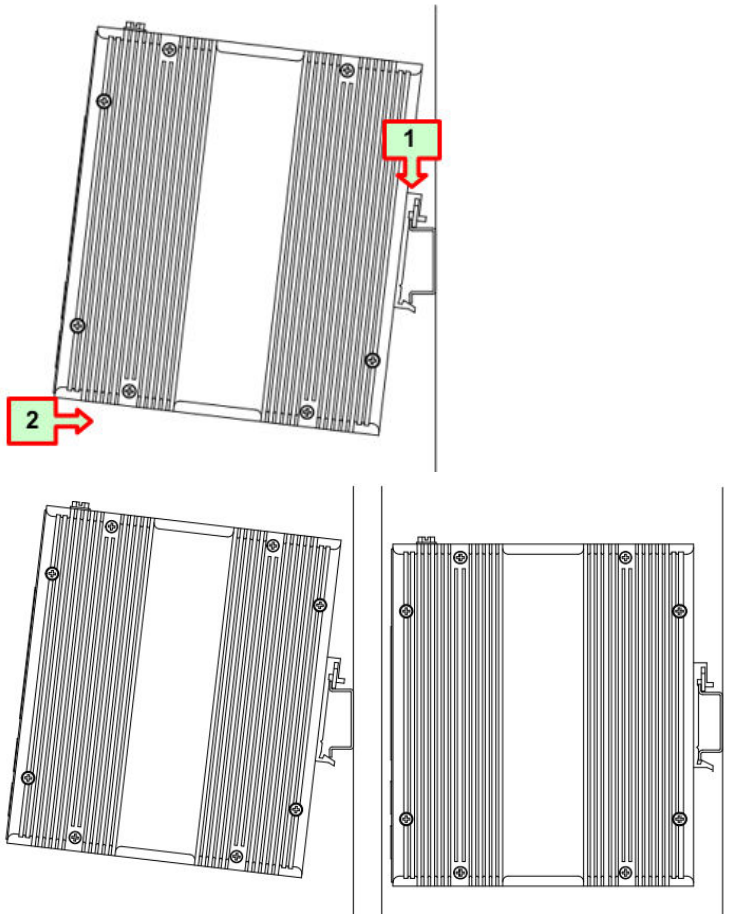
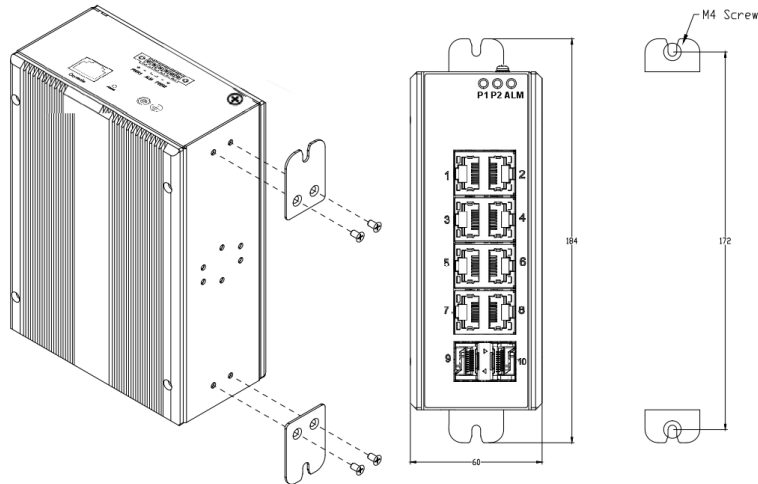


Figure 13: DIN-Rail Mounting

Mounting the ISW (Wall)

Attach the wall-mounting plates with the screws provided in the accessory kit.

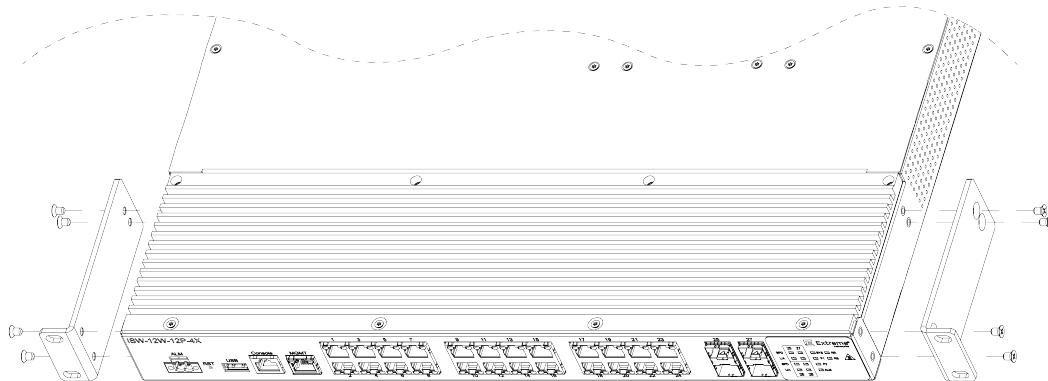


Mounting the ISW (Two-Post Rack)

This procedure uses the two-post mounting kit. The ISW 24GbP, 4-SFP switch can be installed in a standard two-post equipment rack. It does not support Din-rail or wall-mount options.

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

1. Attach a rack ear to one side of the switch, screwing it into the holes so that the flange (ear) is flush with the front of the switch.
2. Attach the other rack ear to the other side.



3. Attach the rack ears to the front rack posts, using the screws (rack post screws not provided).

Connect Power Supplies, Alarm Relay, and Ground Connection

Use the following sections to connect the power supplies, alarm relay, and ground connection.

Connect the Power Supplies to a Power Source

The power supplies connect to an AC power source and convert the AC current to DC current for the switch to use. The power supplies are redundant; two 240W power supplies do not provide 480W, they only provide 240W. The power supplies must be installed by qualified personnel such as licensed electricians, in accordance with local electrical codes, and connected to a well fused power source.

**Warning**

Electrical Hazard: Only qualified personnel should perform installation procedures and field wiring to AC primary voltage source

**Warning**

Electrical Hazard: Risk of electrical shock and energy hazard. All failures should be examined by a qualified technician. Do not remove the case of the power supply by yourself

**Warning**

Electrical Hazard: Risk of electric arcs and electric shock (danger to life). Connecting both the primary and the secondary sides together is not allowed.

**Warning**

Do not install the unit in places with high moisture or near water.

**Warning**

The Frame Ground (FG) must be connected to PE (Protective Earth).

**Warning**

Before commencing any installation, maintenance, or modification work, disconnect your system from supply voltage. Make sure that inadvertent connection in circuit will be impossible!

**Warning**

Always enable good ventilation clearances: 5mm left and right, 40 mm above, and 20 mm below the unit in use to prevent it from overheating. Also a 10-15 cm clearance must be kept when the adjacent device is a heat source

**Warning**

The appropriate mounting orientation for the unit is vertical, the input terminals at the bottom and output on the top. Mounting orientations other than that, such as upside down, horizontal, or table-top mounting, is not allowed.

**Warning**

To reduce risk of accidental shock or burn, install PSU in a Restricted Access Location. A Restricted Access Location is a location for equipment where both of the following apply:

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

**Warning**

For continued protection against risk of fire, replace only with same type and rating of fuse.

Pour ne pas compromettre la protection contre les risques d'incendie, remplacer par un fusible de même type et de mêmes caractéristiques nominales.

Installing Instructions

1. Use copper wire only. The following table shows recommended wires.

	18	16	14	12	10
Rated Current of Equipment (Amp)	6A	6-10A	13-16A	16-25A	25-32A
Cross-section of Lead (mm ²)	.75	1.0	1.5	2.5	4

**Note**

- Current each wire carries should be de-rated to 80% of the current suggested above when using 5 or more wires connected to the unit.
 - The maximum allowable wire cross-sectional area for the terminal of the SDR-75 is 12AWG/2.5 mm².
2. Make sure that all strands of each stranded wire enter the terminal connection and the screw terminals are securely fixed to prevent poor contact.

If the power supply possesses multi-output terminals, make sure each contact is connected to wires to prevent too much current stress on a single contact.
 3. Use wires that can withstand temperatures of at least 80°C, such as UL1007.
 4. The recommended screwdriver is 4mm, slotted type. The recommended torque setting for terminals is shown in the table below.

Model	I/P	O/P
SDR-240 / 480	5 kgf-cm (4.4 lb-in)	8 kgf-cm (7 lb-in)

- The suggested fuse and maximum number of the SDR PSUs that can be connected to a circuit breaker at 230V are shown in the following table.

Model	Fuse	Circuit Breaker	
		C16	D16
SDR-240	T5A/L250V	4	8
SDR-480	T8A/L250V	4	4

- Verify that the power source circuit is de-energized.
- Connect the power source to the AC input terminals on the power supplies. See [Figure 14](#) for the AC input terminal location on the power supply.



Figure 14: Power Supply AC and DC inputs

1 = AC terminal input from power source	2 = DC terminal output to DC switch terminal input
---	--

- Continue to [Connect Power Supplies to the Switch](#).

Connect Power Supplies to the Switch

The following AC-DC power supplies (PSUs) are available for the ISW-Series switches:

240 W AC-DC PSU

Part number 16807 is compatible with all ISW-Series switch models.

480 W AC-DC PSU

Part number 16920 is compatible with all ISW-Series switch models.

The AC-DC power interface is a 6-pin terminal block with polarity signs on the top panel on most of the ISW-Series switches. The 6-pin terminal block contains an alarm contact in the middle of the terminal block. The power interface for the ISW 24GbP, 4-SFP model switch is a 4-pin terminal block with polarity signs on the rear panel.

Use the following steps to install the power supplies:

1. Verify that the power source circuit is de-energized.
2. Connect the DC output terminals on the power supply to the DC input terminals on the switch. Insert the positive and negative wires into V+ and V- contacts on the terminal block respectively and tighten the wire-clamp screws to prevent the wires from being loosened.

See [Figure 14](#) on page 40 for the location of the DC output terminals on the power supply. See the following illustrations for the location of the DC terminal inputs on the switch.

3. Energize the power source circuit.
4. When power is connected, verify that the switch's PWR LED turns green. If the PWR LED does not turn green, refer to [System Status LEDs](#) on page 51 for troubleshooting information.



Note

Connect the AC-DC power supply to a well-fused power source.

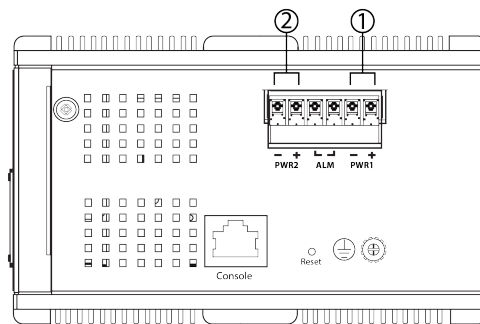


Figure 15: 6-pin Power Supply Terminal Block for the 8-port and 12-port Switches

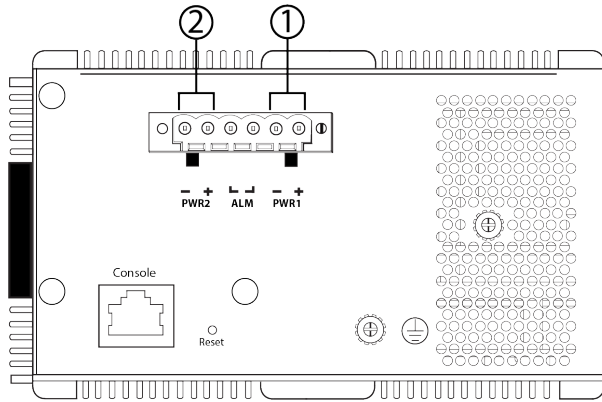


Figure 16: 6-pin Power Supply Terminal Block for the ISW 8GbP, 4-SFP+ Switch

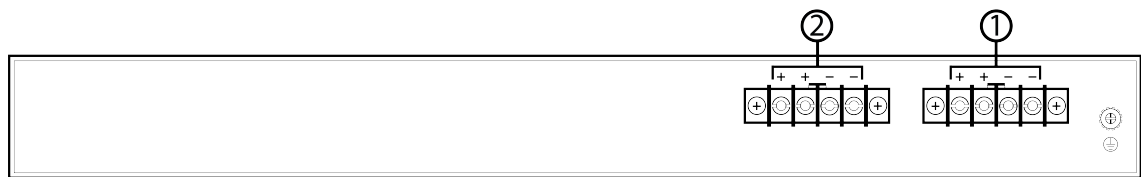


Figure 17: 4-pin Power Supply Terminal Block for the ISW 24GbP, 4-SFP Switch

1 = First power supply

2 = Second power supply

Mounting Instructions

1. Mount only as shown in the figure below, with input terminals down so that sufficient cooling is possible.

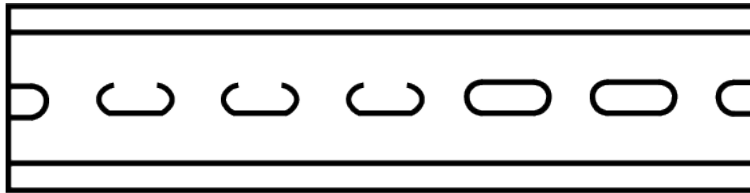


Figure 18: Rail Fastening Orientation

2. Tilt the unit slightly rearwards.
3. Fit the unit over top hat rail.
4. Slide it downward until it hits the stop and press against the bottom to lock it in place.
5. Shake the unit slightly to check the locking action.

Connect the Alarm Relay and Ground Connection

The alarm relay output contacts are in the middle of the DC terminal block connector as shown below.

The alarm relay out is “Normal Open,” and it closes when any predefined failure such as a power failure or an Ethernet link failure is detected.

The relay output with current carrying capacity of 0.5A @ 24 VDC.

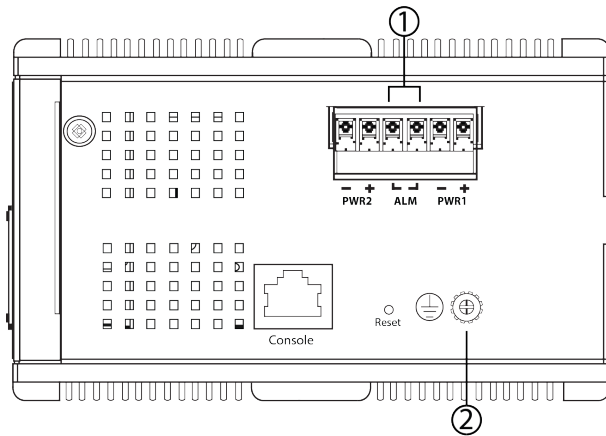


Figure 19: Alarm Relay and Ground Connectors for the 8-port and 12-port Switches

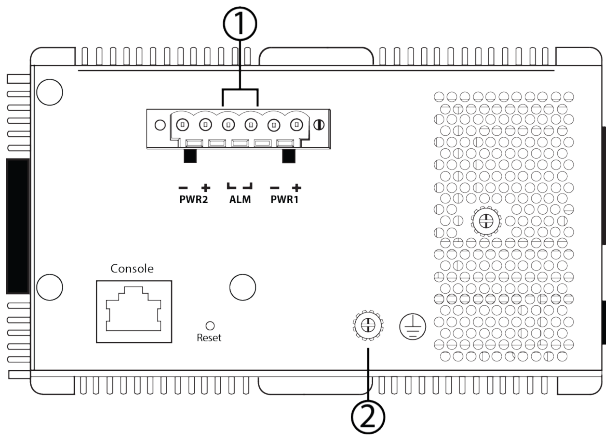


Figure 20: Alarm Relay and Ground Connectors for the ISW 8GbP, 4-SFP+ Switch

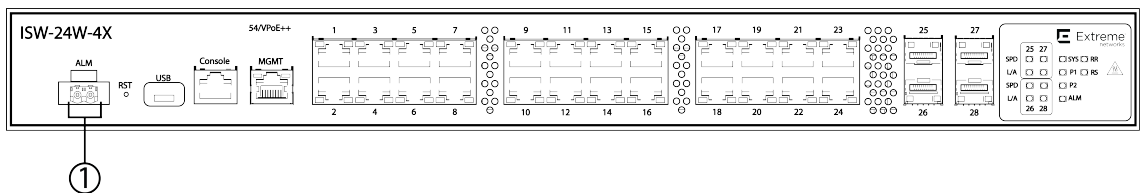


Figure 21: Alarm Relay for the ISW 24GbP, 4-SFP Switch

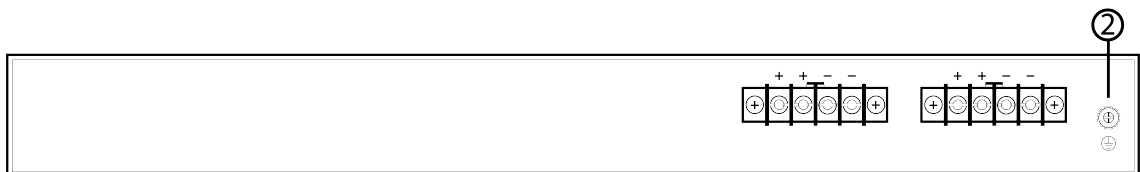



Figure 22: Ground Connector for the ISW 24GbP, 4-SFP Switch

1 = Alarm relay connection	2 = Earth ground connector
----------------------------	----------------------------

To connect the ground connection:

1. Locate the grounding point at the rear of the chassis, which is marked by the international symbol for earth ground.

2. Strip the insulation to expose 1/2 inch (12 mm) of bare wire at one end of the grounding wire.
3. Wrap the bare grounding wire around the provided M3 or M4 earth ground screw.
4. Use a straight-tip torque screwdriver to tighten the retaining screw to 20 in-lb (2.25 N m).
5. Connect the other end of the grounding wire to a known reliable earth ground point at your site.

Turn on the Switch

Use the following instructions to turn on the device.

1. Verify that the AC circuit is de-energized.
2. Verify that the AC power input cables are properly connected to both the AC circuit and the AC terminal block on power supply.
3. Verify that the DC power input cables are properly connected from the power supply to the DC terminal block on the top or the rear of the switch.
4. Verify that the ground wire is connected to the grounding lug on the rear of the device. The grounding lug is identified by the international symbol for earth ground:



5. Energize the circuit.
6. When power is connected, verify that the PSU LED is green.

If the PSU LEDs do not turn green, refer to the [Monitor the Switch](#) on page 51 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

Use the Ethernet Interface with an RJ45 Connection

ISW-Series provides two types of electrical (RJ45) and optical (mini-GBIC) interfaces.

- To connect to a PC, use a straight-through or a cross-over Ethernet cable.

- To connect the copper port to an Ethernet device, use UTP (Unshielded Twisted Pair) or STP (Shielded Twisted Pair) Ethernet cables.



The pin assignment of RJ45 connector is shown in [Figure 23](#) and [Table 7](#).

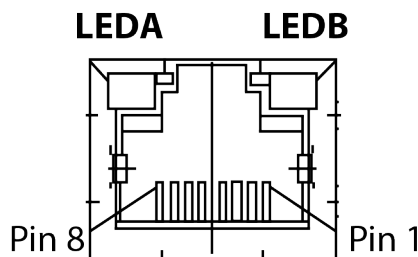


Figure 23: RJ45 Connector Pins

Table 7: RJ45 Connector Pin Assignment

Pin	Assignment	PoE Assignment
1, 2	T/Rx+, T/Rx-	Positive VPort
3, 6	T/Rx+, T/Rx-	Negative VPort
4, 5	T/Rx+, T/Rx-	X
7, 8	T/Rx+, T/Rx-	X

Use the Ethernet Interface with a Fiber Connection

For both 100/1000 Mbps fiber speed connections, the SFP slots are available. The SFP slot accepts the fiber transceivers that typically have an LC connector.

The fiber transceivers have options of multimode, single mode, long-haul, or special-application transceivers.

Prepare a proper SFP module and install it into the optical port. Then you can connect fiber optics cabling that uses LC connectors or SC connectors (with the use of an optional SC-to-LC adapter) to the fiber optics connector.

Refer to for the normal operational LED status.



Figure 24: Fiber optics cable with LC duplex connector



Figure 25: Connect the optical fiber to the SFP socket



Important

Never attempt to view optical connectors that might be emitting laser energy. Do not power up the laser product without connecting the laser to the optical fiber and putting the cover in position, as laser outputs will emit infrared laser light at this point.

Connect the Cables

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 the Management Console](#) on page 48

[Configure the Switch for Use](#) on page 50

After the ISW-Series switch is installed and powered on, use the instructions in the following topics to activate and verify your switch.

Connect to the Management Console

The console port on the top of the switch is used to establish a serial connection between the switch and a terminal emulator or a computer with terminal emulation software so that the switch can be managed locally.

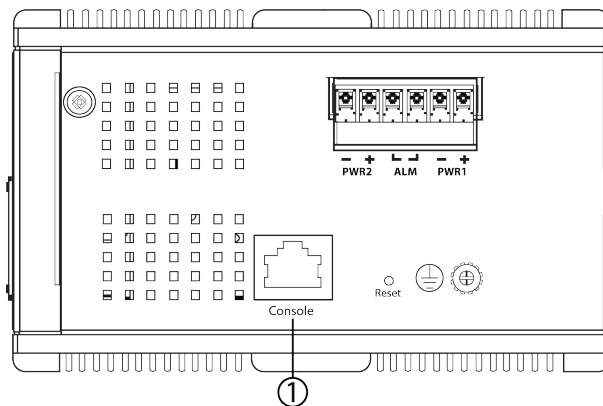


Figure 26: Console Port for the 8-port and 12-port Switches

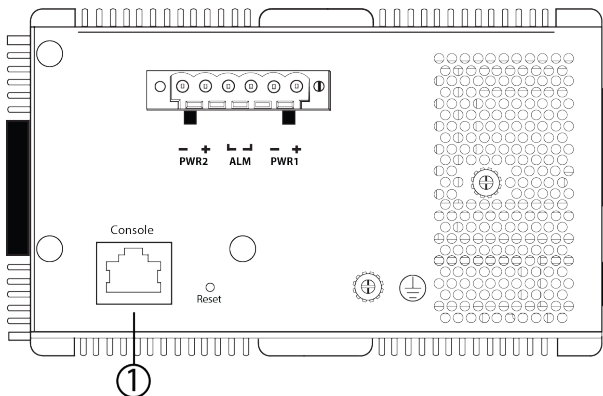


Figure 27: Console Port for the ISW 8GbP, 4-SFP+ Switch

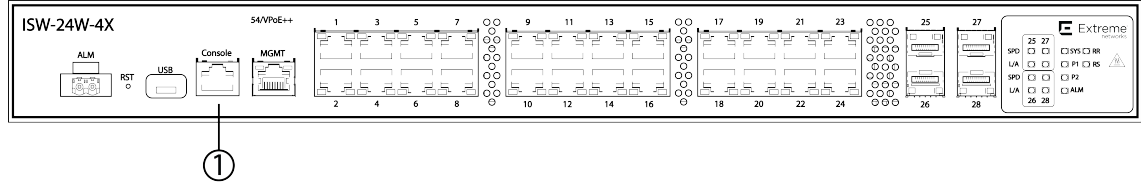


Figure 28: Console Port for the ISW 24Gbp, 4-SFP Switch

To establish a serial connection to the console port on the device, complete the following steps.

1. Verify that the device is powered on by verifying that all power LED indicators on the management and interface ports, power supply and fan modules display a steady green light.
2. Connect the RJ-45 serial cable provided with the device to the management Ethernet port of the device. Attach the supplied RJ45 (male) connector-to-RS232 DB9 (female) connector to the RJ-45 serial cable, then connect it to the PC COM port.



Important

Using a different cable than the one provided with the switch can cause bootup issues.

3. Access the device using a terminal emulator application (such as HyperTerminal in a Windows environment or Tip in a LINUX environment).



Note

Disable any serial communication programs running on the workstation (such as synchronization programs).

4. Open a terminal emulator application (such as HyperTerminal on a PC, or TERM, Tip, or Kermit in a LINUX environment), and configure the application as follows:

- In a Windows environment:
 - Baud rate: 11520
 - Data bits: 8
 - Stop Bit: 1
 - Parity: None
 - Flow control: None



Note

Flow control is not supported on the serial consoles when attached to remote terminal servers and must be disabled to ensure proper operation.

- In a LINUX environment, enter the following string at the prompt:

```
tip /dev/ttyb -115200
```

If ttyb is already in use, use ttya instead and enter the following string at the prompt:

```
tip /dev/ttya -115200
```

When the terminal emulator application stops reporting information, press **Enter**. You receive the following login prompt:

```
login:
```

- Follow the steps to log into the switch and initial configuration steps in [Configure the Switch for Use](#) on page 50.

Configure the Switch for Use

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

1. Connect to the ISW-Series Ethernet port (RJ45 Ethernet port) using factory default IP: 192.0.2.1.
2. Log in with default account and password (admin / [none])
3. Change the IP address with the following commands listed:

```
enable
configure terminal
interface vlan 1
ip address xxx.xxx.xxx.xxx xxx.xxx.xxx.xxx
exit
```

4. To log in to the web interface, enter your switch's IP address in a web browser.
5. Enter the account name and password.
6. Click **Sign in**.



Monitor the Switch

- [System Status LEDs on page 51](#)
- [Copper RJ45 Port LEDs on page 52](#)
- [SFP and SFP+ Port LEDs on page 53](#)
- [PoE LEDs on page 54](#)

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.

Callout	LED	Color/State	Meaning
1	P1	Off	PSU-1 does not have supply power.
		Solid Green	PSU-1 has power.
	P2	Off	PSU-2 does not have supply power.
		Solid Green	PSU-2 has power.
2	Alarm	Off	No alarm event has occurred.
		Solid Red	Alarm event has occurred.
4	System (SYS) ISW 24GbP, 4-SFP only	Off	System is not working or has no power.
		Solid Green	System is functioning normally.
		Flashing Green	System is booting, or database is saving or remote download is in-progress.
3	RR (Ring Role)	Off	Ring/Chain is secondary role.
		Solid Green	Ring or Chain enabled with Ring-Primary, Chain (Tail) or Balancing Chain (Central Block).
	RS (Ring Status)	Off	No ring fail detected.
		Solid Green	Ring fail happened and was detected.

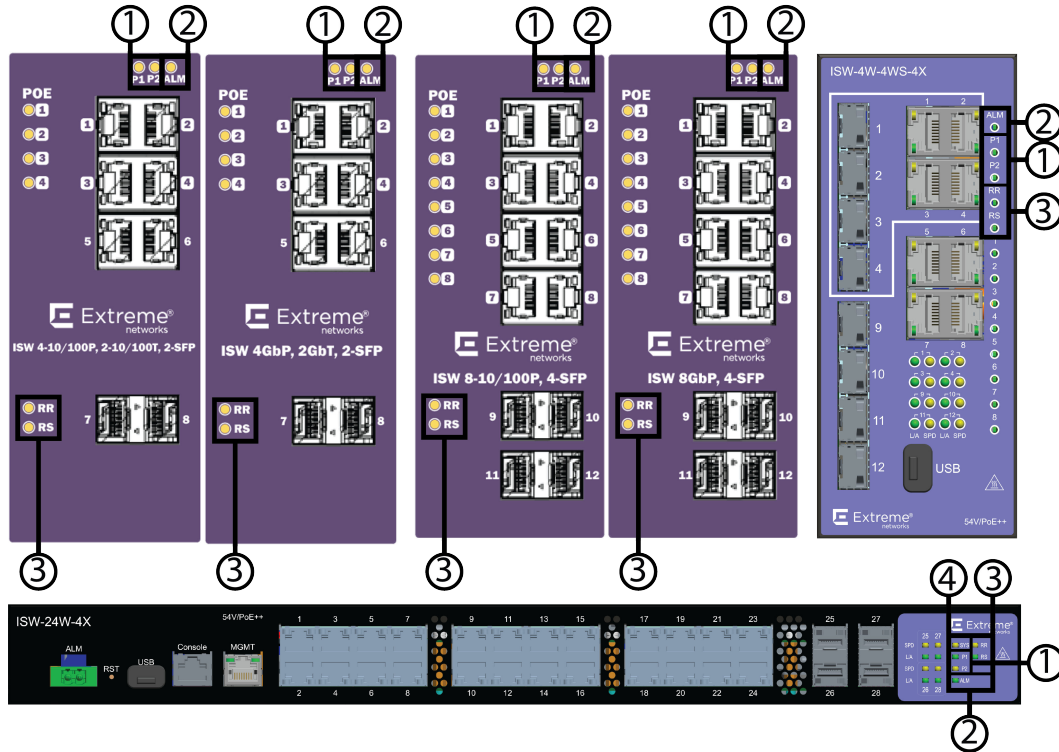


Figure 29: System Status LED locations

Copper RJ45 Port LEDs

There are two LEDs for each copper RJ45 port, located on either side of the port. The LEDs indicate link, activity, and speed. The following table describes the colors and the states for the LEDs.

LED	Color/State	Models	
Link/Activity	Off	All models	No link.
	Solid Green		Link is up but no traffic is detected.
	Flashing Green		Link is up and traffic is detected.

LED	Color/State	Models	
Speed	Off	ISW 4Gbp, 2GbT, 2-SFP ISW 4-10/100P, 2-10/100T, 2-SFP ISW 8-10/100P, 4-SFP ISW 8Gbp, 4-SFP	No link or a 10 Mbps connection is detected.
	Off	ISW 8Gbp, 4-SFP+ ISW 24Gbp, 4-SFP	No link.
	Solid Amber	ISW 4Gbp, 2GbT, 2-SFP ISW 4-10/100P, 2-10/100T, 2-SFP ISW 8-10/100P, 4-SFP ISW 8Gbp, 4-SFP	A 100 Mbps or a 1000 Mbps connection is detected
		ISW 8Gbp, 4-SFP+ ISW 24Gbp, 4-SFP	A 1/2.5/10Gbps connection is detected.

SFP and SFP+ Port LEDs

The SFP ports include two LEDs on models ISW 4Gbp, 2GbT, 2-SFP, ISW 4-10/100P, 2-10/100T, 2-SFP, ISW 8-10/100P, 4-SFP, and ISW 8Gbp, 4-SFP. The following table describes the colors and the states for the LEDs.

SFP Port LED	Color/State	Meaning
Link/Activity	Off	No link.
	Solid Green	Link is up but no traffic is detected.
	Flashing Green	Link is up and traffic is detected.
Speed	Off	No link or a SFP port speed 100Mbps connection is detected.
	Solid Amber	A 1000Mbps connection is detected. ISW 8Gbp, 4-SFP+: A 1/2.5/10Gbps connection is detected.

The SFP+ ports include two LEDs. On the ISW 8Gbp, 4-SFP+ switch model, the LED on the left is for link/activity and the LED on the right is for speed. On the ISW 24Gbp,

4-SFP switch model, the LED on top is speed and the LED on the bottom is for link/activity. The following table describes the colors and the states for the LEDs.

SFP+ Port LEDs		
Link/Activity	Off	No link
	Solid green	Link is up but no traffic is detected.
	Flashing green	Link is up and traffic is detected.
Speed	Off	No link or a 100Mbps connection is detected.
	Solid amber	A 1/2.5/10Gbps connection is detected.

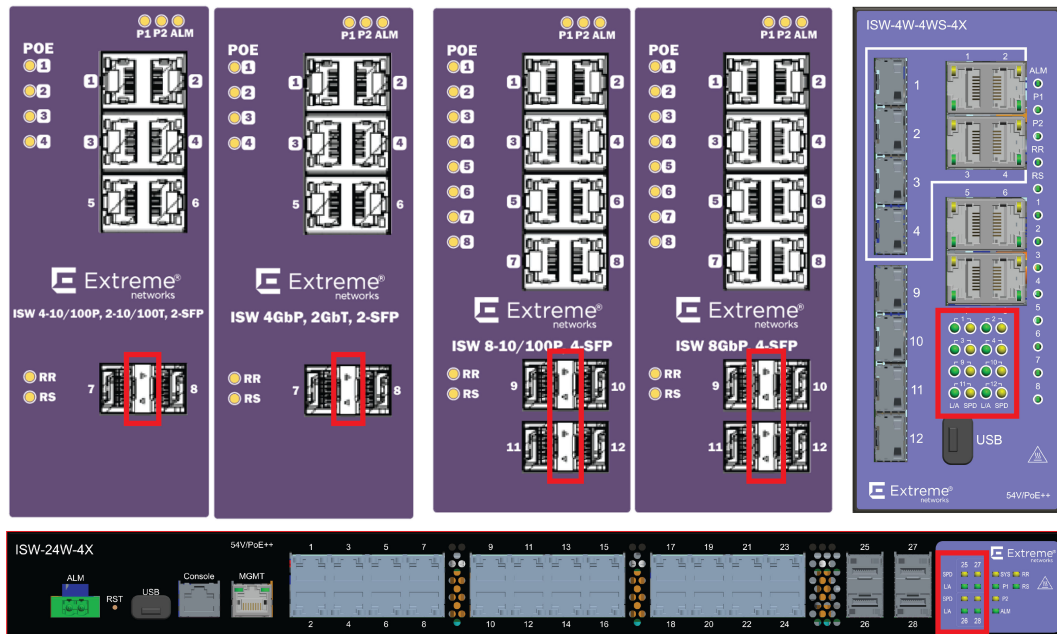


Figure 30: SFP and SFP+ LED Locations

PoE LEDs

The PoE LEDs are located on the front of the switch. There are four LEDs for models ISW 4GbP, 2GbT, 2-SFP and ISW 4-10/100P, 2-10/100T, 2-SFP; eight LEDs for models ISW

8GbP, 4-SFP+, ISW 8-10/100P, 4-SFP, and ISW 8GbP, 4-SFP; and 24 LEDs on model ISW 24GbP, 4-SFP. The following tables describe the colors and the states for the LEDs.

Table 8: 8-Port PoE LEDs

Color/State	Meaning
Off	No PoE power output.
Solid Green	PoE port is connected to PoE PD device, using the 802.3bt standard/PoH.
Solid Amber	PoE port is connected to PoE PD device, using the 802.3af/at standard.
Solid Red	No PoE power delivered due to PoE PD detection failure, short-circuit, overloading, or over temperature.
Flashing Red	No PoE power delivered due to power management (blinking per 2 second).

Table 9: 24-Port PoE LEDs

Color/State	Meaning
Off	No PoE power output.
Solid Amber	PoE port is connected to PoE PD device. (802.3af/at/bt or PoH)
Flashing Amber	No PoE power delivered due to PoE PD detection failure, short-circuit, overloading, over temperature or power management.

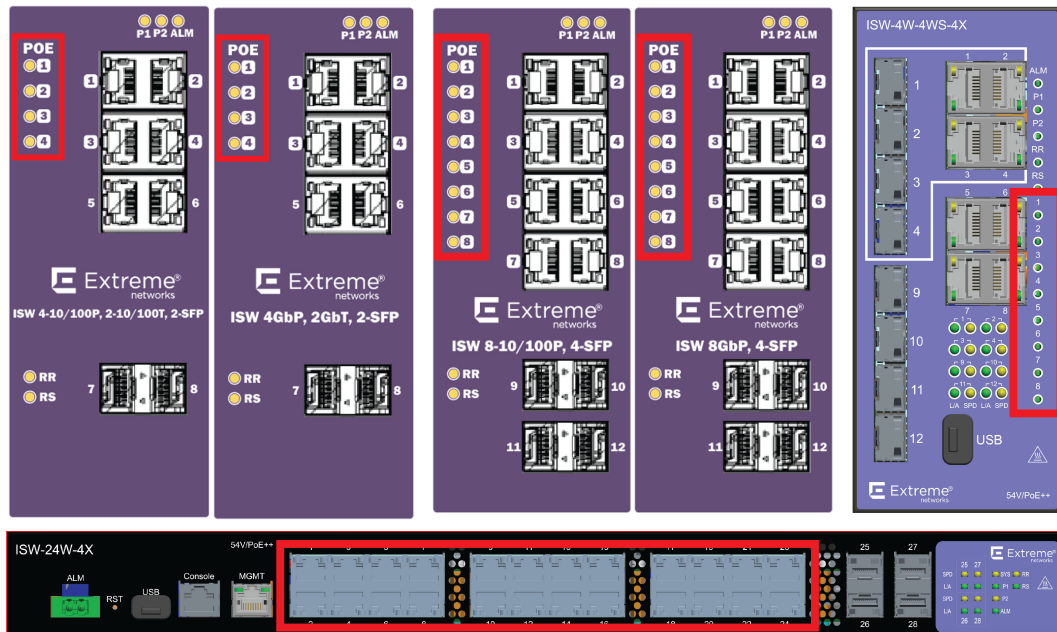


Figure 31: PoE LED Locations

Reset, Upgrade or Downgrade Software

[System Reset](#) on page 56

[Reset Configuration Defaults via CLI Command](#) on page 57

[Reset Configuration Defaults via Web UI](#) on page 58

[Upgrade and Downgrade Software](#) on page 59

Use the following topics to reset the switch without removing power, reset configuration defaults using the command line or the Web UI, and upgrade or downgrade the software.

System Reset

The **Reset** button is provided to reboot the system without the need to remove power. Under normal circumstances, you will not have to use it. However, on rare occasions, the ISW-Series might not respond and you may need to push the **Reset** button.

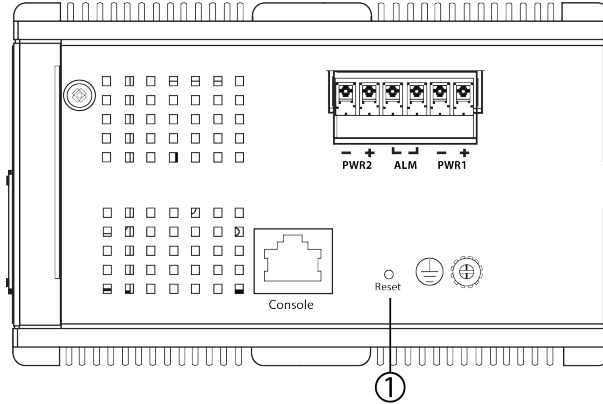


Figure 32: Reset Button for the 8-port and 12-port Switches

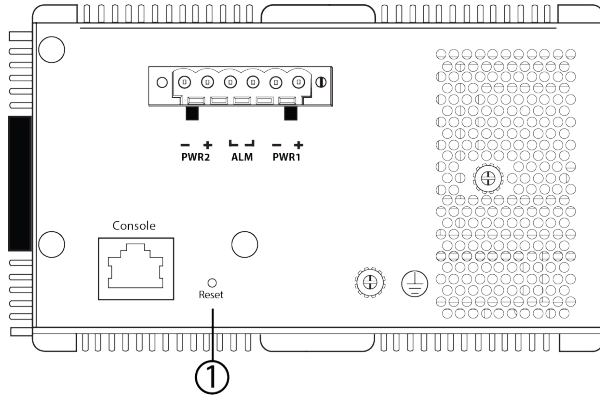


Figure 33: Reset Button for the ISW 8Gbp, 4-SFP+ Switch

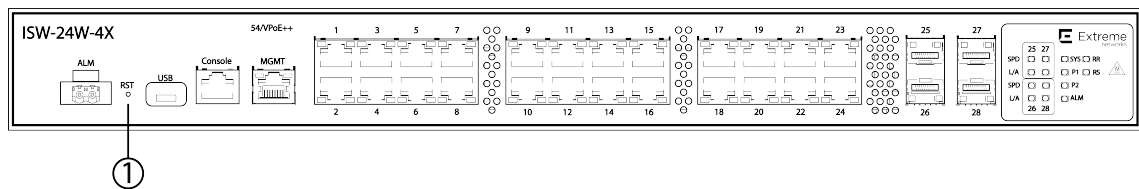


Figure 34: Reset Button for the ISW 24Gbp, 4-SFP Switch

Reset Configuration Defaults via CLI Command

If you want to reset the configuration to default, but keep management IP settings, do the following:

1. Execute the command: `reload defaults keep-ip`
2. Check interface and IP address, and confirm only management IP setting is kept.
3. Execute the command: `copy running-config startup-config`

```
COM1:115200baud - Tera Term VT
File Edit Setup Control Window Help
# reload defaults keep-ip
% Reloading defaults, attempting to keep VLAN 1 IP address. Please stand by.
% If need reboot must wait for 3-5 seconds.
#
# show int vlan 1
VLAN1
  LINK: 00-11-22-dd-0c-01 Mtu:1500 <UP BROADCAST RUNNING MULTICAST>
  IPv6: fe80:2::211:22ff:fedd:c01/64 <ANYCAST TENTATIVE AUTOCONF>
  IPv4: 192.168.0.1/24 192.168.0.255
# show int vlan 200
% VLAN interface 200 does not exist.
#
# show vlan
VLAN Name                Interfaces
-----
1    default                Gi 1/1-14
#
# show int vlan 1
VLAN1
  LINK: 00-11-22-dd-0c-01 Mtu:1500 <UP BROADCAST RUNNING MULTICAST>
  IPv6: fe80:2::211:22ff:fedd:c01/64 <ANYCAST TENTATIVE AUTOCONF>
  IPv4: 192.168.0.1/24 192.168.0.255
#
# copy running-config startup-config
```

If you want to reset all configurations to the default:

4. Execute the command: reload defaults
5. Check interface VLAN and IP address, and confirm they all change to default settings.
6. Execute the command: copy running-config startup-config

```
# reload defaults
% Reloading defaults. Please stand by.
% If need reboot must wait for 3~5 seconds.
# show int vlan 1
VLAN1
  LINK: 00-11-22-dd-0c-01 Mtu:1500 <UP BROADCAST RUNNING MULTICAST>
  IPv4: 192.0.2.1/24 192.0.2.255
  IPv6: fe80:2::211:22ff:fedd:c01/64 <ANYCAST TENTATIVE AUTOCONF>
# show vlan
VLAN Name                Interfaces
-----
1    default                Gi 1/1-14

# copy running-config startup-config
Building configuration...
% Saving 1357 bytes to flash:startup-config
% If need reboot must wait for 3~5 seconds.
#
```

Reset Configuration Defaults via Web UI

If you want to reset the configuration to default, but keep management IP settings, do the following:

1. Go to **Maintenance > Factory Default** and click **Yes**.

Factory Defaults

Are you sure you want to reset the configuration to
Factory Defaults?

2. Go to **Maintenance > Configuration > Save startup-config** and click **Save Configuration**.

Save Running Configuration to startup-config

Please note: The generation of the configuration file may be time consuming, depending on the amount of non-default configuration.

If you want to reset all configurations to the default:

3. Go to **Maintenance > Configuration > Activate**.
4. Select **default-config** and then click **Activate Configuration**.

Activate Configuration

Select configuration file to activate. The previous configuration will be completely replaced, potentially leading to loss of management connectivity.

Please note: The activated configuration file will not be saved to startup-config automatically.

File Name

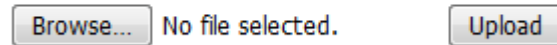
- default-config
 startup-config

5. Change PC's IP address belong to 192.0.2.X networks.
6. Change web's IP be 192.0.2.1 (default IP) to login DUT's Web UI.
7. Go to **Maintenance > Configuration > Save startup config** and then click **Save Configuration**.

Upgrade and Downgrade Software

1. From the web UI, go to **Maintenance > > Software > > Upload** page.
2. Select the software file, and click **Upload**.

Software Upload



3. After beginning the upload process, do not cold/warm start device. Instead, wait for auto-reboot, and then the upgrade can complete.



Important Deployment Considerations

Consider the following items before deploying ISW-Series switches.

Generation deployment considerations

- Industrial grade SFPs, with maximum temperatures of up to 85°C, are required for extended temperature operations.
- ISW-Series switches are fan-less. In order to achieve the rated operating temperature, the switches require an airflow of 40 to 100-LFM.

ISW-4W-4WS-4X deployment considerations

- SFPs are the primary component at risk for exceeding their thermal limits. SFPs will maintain operation in a safe environment through the reduction of PoE power in the system.
- When the system enters operational restriction mode due to thermal limits, the PoE power is reduced from 360W total to 180W total. The highest numbered ports drop PoE in decreasing order until the PoE power is at or under 180W.
- In the event the reduction to 180W of PoE power is insufficient, ALL PoE power delivery is turned off.
- If the system continues to overheat, the SFP TX/RX is turned off until the system cools down below 65°C (ambient).

ISW-24W-4X deployment considerations

- System operational specifications as provided are for when the unit is racked and maintains 2-RU of separation above and below the unit, using 5-RU of total rack space.
- When the unit is racked and maintains only 1-RU of separation above and below the unit, using 3-RU of total rack space, the thermal operational range is reduced.
- When the unit is racked and does not provide any separation from adjacent racked equipment, using 1-RU of total rack space, the thermal operational range is extremely limited.
- The system can support 720W of total PoE power. However, that is limited to distribution at a maximum of 240W for each set of 8 ports (1-8, 9-16, 17-24).
- SFPs are the primary component at risk for exceeding their thermal limits. SFPs will maintain operation in a safe environment through the reduction of PoE power in the system.

- When the system enters operational restriction mode due to thermal limits, all the right-most 8-ports (ports 17-24) drop PoE power.
- When the system uses the SDR-960W PSU, it can achieve 720W of PoE power if the ambient temperature is under 60°C. Dual PSUs are required to operate at 720W of PoE if the temperature is over 60°C.



ISW Series Technical Specifications

- [Power Options](#) on page 64
- [Weights and Physical Measurements](#) on page 65
- [Performance & Scale](#) on page 67
- [CPU, Memory](#) on page 67
- [Console Connector Pinouts](#) on page 67
- [Standards](#) on page 68

This topic lists technical specifications for the ISW-Series switches.

External Interfaces

Part Number	Product Description	Interfaces
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	4 x 10/100BASE-T PoE+ ports 802.3at (30W) ports 2 x 10/100BASE-T ports • Full / Half Duplex (autosensing) 2 x 100/1000BASE-X SFP uplink ports 1 x serial console Port (RJ45) Dual DC power input DIN rail mount
16802	ISW 8-10/100P, 4-SFP	8 x 10/100BASE-T PoE+ ports 802.3at (30W) ports 4 x 100/1000BASE-X SFP uplink ports 1 x serial console port (RJ45) Dual DC power input DIN rail mount
16803	ISW 4Gbp, 2GbT, 2-SFP	2 x 10/100/1000BASE-T ports • Full / Half Duplex (autosensing) 4 x 10/100/1000BASE-T PoE+ ports 802.3at (30W) ports 2 x 100/1000BASE-X SFP uplink ports 1 x serial console Port (RJ45) Dual DC power input DIN rail mount

Part Number	Product Description	Interfaces
16804	ISW 8 GbP, 4-SFP	8 x 10/100/1000BASE-T PoE+ ports 802.3at (30W) ports 4 x 100/1000BASE-X SFP uplink ports 1 x Serial Console Port (RJ45) Dual DC power input DIN rail mount
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	4 x 10/100/1000BASE-T Hi PoE+ ports 802.3bt (90W) ports 4 x 10/100/1000BASE-T Hi PoE+ ports 802.3bt (90W) ports shared with 4 x 100/1000BASE-X SFP ports 4 x 100/1000/10GBASE-X SFP+ uplink ports 1 x serial console port (RJ45) 1 x USB 2.0 Dual DC power input DIN rail mount
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	24 x 10/100/1000BASE-T Hi PoE+ ports 802.3bt (90W) 4 x 1000/10GBASE-X SFP+ uplink ports 1 x Serial Console Port (RJ45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB 2.0 Dual DC power input Rack mount

Technical Specifications

Specifications	16801, 16802, 16803, 16804	ISW-4W-4WS-4X	ISW-24W-4X
Operating Temperature	-40°C to +75°C	-40°C to +75°C	-40°C to +75°C
Mounting	DIN Rail, Wall Mount	DIN Rail, Wall Mount	Rack Mount*
Power Supply	Dual DC Input**, External PSU	Dual DC Input**, External PSU	Dual DC Input**, External PSU
Rated Input	12-56VDC (46-56V for IEEE 802.3af/at)	46-57VDC, max. 7.5A (52-57V for IEEE 802.3bt)	46-57VDC, max. 15A (52-57V for IEEE 802.3bt)
Qualified PSUs***	240W (16807) 480W (16920)	240W (16807) 480W (16920) 960W (ISW-AC-DC-PS-960W)	240W (16807) 480W (16920) 960W (ISW-AC-DC-PS-960W)
Fans	Fanless	Fanless	Fanless

* Refer to [Install Your Switch](#) on page 34 for required space clearances for installing rack mounted switch

** Dual DC input offers power supply redundancy only and cannot be used for additive PoE power

*** ISW switches can also be powered by direct DC input available at deployment site, which match the rated input of the switches

Power Options

Power Supply Technical Specifications

Specifications	16807	16920	ISW-AC-DC-PS-960W
Operating Temperature	-25°C to +70°C	-25°C to +70°C	-30°C to +70°C
Mounting	DIN Rail	DIN Rail	DIN Rail
Rated Power	240W	480W	960W
Rated Input	100-240VAC, 50/60Hz, 2.6A	100-240VAC, 50/60Hz, 5A	200-240VAC, 50/60Hz, 6A
Rated Output	48VDC, 5A	48VDC, 10A	48 to 55Vdc (Voltage Adjustable), 20A
Derating	> 60°C de-rate power by 2.5%/°C	> 55 °C de-rate power by 1.33%/°C (100VAC) > 60 °C de-rate power by 2%/°C (230VAC)	> 50°C de-rate power by 2%/°C
Derated power @ 70°C	180W	384W	576

* Same type PSUs must be used for redundancy

Note: It is recommended that the power supply output voltage be adjusted to 54V for best PoE performance.

Power Consumption

Part Number	Product Description	Minimum Power Consumption (W)*	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)**	Maximum Heat Dissipation (BTU/hr)
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	15	51	142	75
16802	ISW 8-10/100P, 4-SFP	15	51	265	86
16803	ISW 4GbP, 2GbT, 2-SFP	15	51	142	75
16804	ISW 8GbP, 4-SFP	15	51	265	86

Part Number	Product Description	Minimum Power Consumption (W)*	Minimum Heat Dissipation (BTU/hr)	Maximum Power Consumption (W)**	Maximum Heat Dissipation (BTU/hr)
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	31	106	397***	127
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	40	136	777***	195

* Without PoE PD loading

** Includes PoE load on all ports

*** Includes the power consumption by SFP/SFP+ optics at 1.5W per port

PoE Budget*

Part Number	Product Description	PoE Budget with 240W PSU	PoE Budget with 480W PSU	PoE Budget with 960W PSU
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	120W	120W	not supported
16802	ISW 8-10/100P, 4-SFP	177W	240W	not supported
16803	ISW 4GbP, 2GbT, 2-SFP	120W	120W	not supported
16804	ISW 8GbP, 4-SFP	177W	240W	not supported
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	161W	353W	360W
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	152W	344W	720W**

* The table shows PoE budgets on a per PSU basis assuming 20% derating.

** Max PoE load of 240W per group of 8 ports. Refer to the Hardware Installation Guide for more details.

Weights and Physical Measurements

Physical Measurements

Part Number	Product Description	Dimensions (WxHxD) millimeters (mm)	Dimensions (WxHxD) inches (in.)
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
16802	ISW 8-10/100P, 4-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
16803	ISW 4GbP, 2GbT, 2-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0

Part Number	Product Description	Dimensions (WxHxD) millimeters (mm)	Dimensions (WxHxD) inches (in.)
16804	ISW 8 GbP, 4-SFP	77 x 154 x 128	3.0 x 6.0 x 5.0
ISW-4W-4WS-4X	ISW-12 802.3bt 4 GbP 4 Combo 4 SFP+	86 x 164 x 132	3.39 x 6.46 x 5.20
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	440 x 43.5 x 381	17.34 x 1.71 x 15.01
16807	ISAC-DS PS 240W	63 x 125.2 x 113.5	2.48 x 4.92 x 4.46
16920	ISAC-DS PS 480W	85.5 x 125.2 x 128.5	3.36 x 4.93 x 5.06
ISW-AC-DC-PS-960W	ISW AC-DC PS 960W DIN Rail	110 x 125.2 x 150	4.33 x 4.93 x 5.91

Weights

Part Number	Product Description	Weight (kg)	Weight (oz)
16801	ISW 4-10/100P, 2-10/100T, 2-SFP	1.38	48.68
16802	ISW 8-10/100P, 4-SFP	1.44	50.79
16803	ISW 4GbP, 2GbT, 2-SFP	1.38	48.68
16804	ISW 8GbP, 4-SFP	1.44	50.79
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+	1.9	67.02
ISW-24W-4X	ISW-28 802.3bt 24GbP 4 SFP+ 1RU	5.7	201.06

Performance & Scale

Part Number	Product Description	Port Counts							Aggregate Bandwidth	Forwarding Rate	
		10/100 Base-T	10/100 Base-T PoE+	10/100/1000 Base-T	10/100/1000 Base-T PoE+	10/100/1000 Base-T (802.3bt Hi-PoE)	1000 Base-X SFP	10GB Base-X SFP+			
16801	ISW4-10/100P, 2-10/100T, 2-SFP	2	4					2		5.2Gbps	3.87Mpps
16802	ISW 8-10/100P, 4-SFP		8					4		9.6Gbps	7.14Mpps
16803	ISW 4GbP, 2GbT, 2-SFP			2	4			2		16Gbps	11.90Mpps
16804	ISW8 GbP, 4-SFP				8			4		24 Gbs	17.85Mpps
ISW-4W-4WS-4X	ISW-12 802.3bt 4GbP 4 Combo 4 SFP+						4+[4]	[or 4]	4	96Gbps	71.4Mpps
ISW-24W-4X	ISW-28 802.3bt 24 GbP4 SFP+ 1RU						24		4	128Gbs	95.2Mpps

CPU, Memory

Specifications	16801, 16802, 16803, 16804	ISW-4W-4WS-4X	ISW-24W-4X
CPU	Microchip	Microchip	Marvell AC5X
DRAM	128MB	512MB	4GB
Flash	16MB	64MB	128MB
Packet Buffer	512KB	4MB	3MB

Console Connector Pinouts

The pin assignment of the DB-9 console plug connector is shown in [Figure 35](#). The DB-9 console plug connector is for models ISW 4-10/100P, 2-10/100T, 2-SFP, ISW 4GbP, 2GbT, 2-SFP, ISW 8-10/100P, 4-SFP, and ISW 8GbP, 4-SFP.

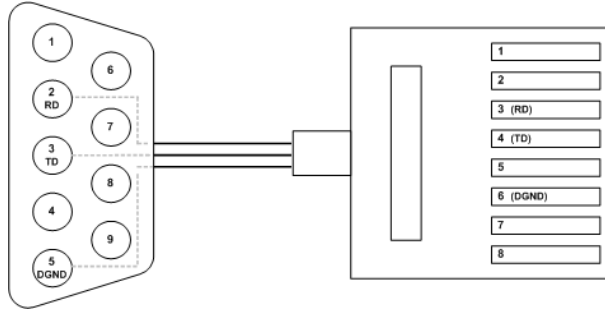


Figure 35: Console Cable Pin Assignment

Table 10 shows the pinouts for an RJ45 system console for models ISW 8Gbp, 4-SFP+ and ISW 24Gbp, 4-SFP.

Table 10: Pinouts for an RJ45 System Console

Signal	Pin Number	Direction
TXD (transmit data)	3	Out
GND (ground)	4	-
GND (ground)	5	-
RXD (receive data)	6	In

Standards

North American ITE

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

European ITE

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

International ITE

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

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 300 386 (EMC Telecommunications)
2014/30/EU EMC Directive

International EMC Certifications

CISPR 32, Class A (International Emissions)
AS/NZS CISPR32
CISPR 24 Class A (International Immunity)
IEC 61000-4-2 / EN 61000-4-2 Electrostatic Discharge, 6kV Contact (part# 16801-16804), 8kV Contact (ISW-4W-4WS-4X and ISW-24W-4X), 8kV Air (part# 16801-16804), 15kV Air (ISW-4W-4WS-4X and ISW-24W-4X) , Criteria B
IEC 61000-4-3 /EN 61000-4-3 Radiated Immunity 10V/m, Criteria A
IEC 61000-4-4 / EN 61000-4-4 Transient Burst, 1 kV (part# 16801-16804), Criteria B
IEC 61000-4-5 /EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria B
IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/rms, 80%AM (1kHz), Criteria A
IEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country-Specific

ACMA RCM (Australia Emissions)
KCC Mark, EMC Approval (Korea)
BSMI (Taiwan)
Anatel (Brazil)
EAC (Russia, Belarus, Kazakhstan)

RoHS and WEEE

RoHS (Pb free) and WEEE compliant

MTBF

>25 years

Environmental Specifications

Operating Temperature Range

-40°C to +75°C (cold startup at -40°C)

Storage Temperature Range

-40°C to +85°C

Humidity

5% to 95% relative humidity, non-condensing

Vibration, Shock and Freefall Certifications

IEC 60068-2-6 (Vibration)

IEC 60068-2-27 (Shock)

IEC 60068-2-32 (Freefall)

Transportation

NEMA TS 2-2016

Railway

EN50121-1-2017

EN50121-4-2016



Safety and Regulatory Information

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[Maintenance Safety](#) on page 73

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[Federal Communications Commission \(FCC\) Notice](#) on page 77



Warning

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

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

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

Considerations Before Installing

Consider the following items before you install equipment.

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

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

General Safety Precautions

Follow these guidelines:

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

Maintenance Safety

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

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

Fiber Optic Ports and Optical Safety

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

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



Warning

Laser optic modules become very hot after prolonged use. Take care when removing a laser optic module from the module or option card. If the laser optic module is too hot to touch, disengage the laser optic module and allow it to cool before removing it completely.

When working with laser optic modules, always take the precautions listed below to avoid exposure to hazardous radiation.

- Never look at the transmit LED/laser through a magnifying device while the transmit LED is powered on.
- Never look directly at a fiber port on the switch or at the ends of a fiber cable when they are powered on.

- Invisible laser radiation can occur when the connectors are open. Avoid direct eye exposure to the beam when optical connections are unplugged.
- Never alter, modify, or change an optical device in any way other than suggested in this document.

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

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

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

Cable Routing for LAN Systems

Extreme Networks equipment meets the requirements for LAN system equipment.

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

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

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



Caution

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

**Warning**

The Ethernet ports of the equipment and its sub-assemblies are suitable only for intra-building connections (within the same building) or for connections to unexposed wiring or cabling. (See the conditions listed above.) The Ethernet ports of this equipment or its sub-assemblies must not be metalically 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 metalically 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, consult an electrical contractor to ensure proper equipment grounding and power distribution for your specific installation and country.

**Warning**

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

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

Select Power Supply Cords

A power cord is not included in the product box.

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

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

**Note**

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

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

Battery Notice



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

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



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

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

Federal Communications Commission (FCC) Notice

Federal Communications Commission (FCC) Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Note

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



Warning

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

Industry Canada Notice CAN ICES-3 (A)/NMB-3(A)

This digital apparatus does not exceed the class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Product Safety

This product complies with the following international safety standards:

- UL 60950-1 2nd edition, A2:2014
- CAN/CSA-C22.2 No.60950-1-07 2nd Ed. 2014-10
- IEC 60950-1:2005 2nd+A1:2009+A2:2013
- EN 60950-1:2006+A11+A1+A12+A2
- 2014/35/EU (2006/95/EC will invalid by 20 April 2016)

Electromagnetic Compatibility (EMC)

This product complies with the following:

FCC 47 CFR Part 15 Subpart B Class A (US), ICES-003 (Canada)
 EN 55022 (ITE Emissions), EN 55024 (ITE Immunity)
 2014/30/EU (EMC Directive), EN 50121-1: 2017, EN 50121-4: 2016, EN 55011(ISM)
 EN 61000-6-2 (Ind. Immunity), EN61000-6-4 Ind. Emissions)
 EN 61000-3-2: 2014, EN 61000-3-3: 2013
 RCM (Australia), MSIP KCC (Korea), BSMI (Taiwan)

Korea EMC Statement (KCC)

이 기기는 업무용(A급) 전자파적합기기로서 판매자
 또는 사용자는 이 점을 주의하시기 바라며, 가정
 외의 지역에서 사용하는 것을 목적으로 합니다.

BSMI EMC Statement - Taiwan

This is a Class A product. In a domestic environemnt this product may cause radio interference in which case the user may be required to take adequate measurers.

警告使用者：
 此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻
 擾動，在此種情況下，使用者會被要求採取某些適當的對策。



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