ECS4210-12P

12-Port Layer 2
Gigabit Ethernet Switch

Installation Guide

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Installation Guide

ECS4210-12P Gigabit Ethernet Switch

Layer 2 Gigabit Ethernet Switch,
with: 8 10/100/1000BASE-T (RJ-45) PoE Ports,
2 10/100/1000BASE-T (RJ-45) Uplink Ports,
2 Gigabit Uplink SFP Ports

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How to Use This Guide

This guide includes detailed information on the switch hardware, including network ports, power, cabling requirements, as well as plug-in modules and transceivers. This guide also provides general installation guidelines and recommended procedures. To deploy this switch effectively and ensure trouble-free operation it is recommended to first read the relevant sections in this guide so that you are familiar with all its hardware components.

Who Should Read This Guide?

This guide is for network administrators and support personnel that install, operate, and maintain network equipment. The guide assumes a basic working knowledge of LANs (Local Area Networks) and can be read by either those that are new to network equipment, or those with more experience.

How This Guide is Organized

The organization of this guide is based on the switch's main hardware components. Each chapter includes information about a specific component with relevant specifications and installation procedures. A switch overview section is also provided.

For Users New to Switches — If you are new to network switches, it is recommended that you first read all chapters in this guide before installing the switch.

For Experienced Users — If you are already familiar with installing and operating network switches, the Switch Description and Installation Overview chapters provide you with enough information to install the switch. Other chapters can be left for reference, when needed.

The guide includes these chapters:

- Chapter 1 - Switch Description—Includes a switch overview, key component identification and key technical specifications.
- Chapter 2 - Installation Overview—Includes details of the package contents and an outline of switch installation tasks.
- Chapter 3 - Switch Chassis—Includes switch chassis rack installaion, and system cooling requirements.
- Chapter 4 - Power and Grounding—Includes information on AC power requirements, switch grounding, and powering on the switch.

- Chapter 5 - Port Connections—Includes information on network interfaces, installing optional transceivers, and cabling specifications.
- Chapter 6 - Switch Management—Connecting to the switch for management, and information on the system status LEDs.
- Appendix A - Troubleshooting—Information for troubleshooting switch installation and operation.

Related Documentation

This guide focuses on switch hardware and installation, it does not cover software configuration of the switch. For specific information on how to operate and use the management functions of the switch, see the following guides:

Web Management Guide
CLI Reference Guide

For all safety information and regulatory statements, see the following documents:

Quick Start Guide
Safety and Regulatory Information

Conventions

The following conventions are used throughout this guide to show information:

Note: Emphasizes important information or calls your attention to related features or instructions.

Caution: Alerts you to a potential hazard that could cause loss of data, or damage the system or equipment.

Warning: Alerts you to a potential hazard that could cause personal injury.

Revision History

This section summarizes the changes in each revision of this guide.

March 2013 Revision

This is the first revision of this guide.

Contents

Figures

Tables

1 Switch Description

This chapter includes these sections:

Overview

Thank you for choosing the ECS4210-12P switch system. This switch is built with leading-edge technology to deliver reliable high-performance connectivity for your data network.

The ECS4210-12P is a Gigabit Ethernet Layer 2 switch with ten 10/100/1000BASE-T ports, and two Small Form Factor Pluggable (SFP) transceiver slots for fiber connectivity.

The switch also includes an SNMP-based management agent, which provides both in-band and out-of-band access for managing the switch. Further, the switch supports both web and CLI-based configuration.

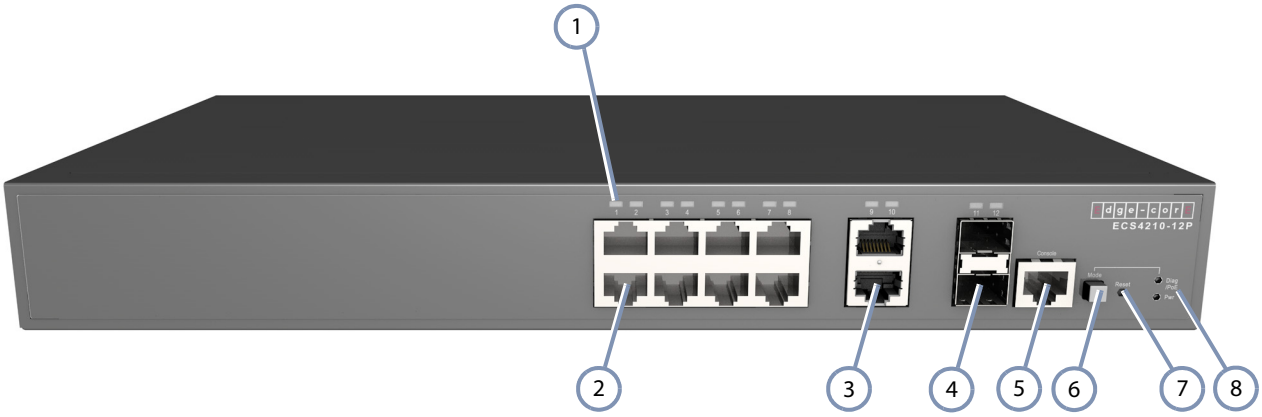
Power-over-Ethernet

Eight of the 10/100/1000 Mbps ports on the ECS4210-12P support both the IEEE 802.3af-2003 and IEEE 802.3at-2009 PoE standards that enable DC power to be supplied to attached devices using wires in the connecting Ethernet cable.

Key Hardware Components

The switch consists of several key hardware components. This manual describes each specific component, or related components, together with their installation requirements and procedures in each chapter. To understand each component in detail, refer to the relevant section.

Figure 1: Front Panel ECS4210-12P



1	Port LEDs	5	RJ-45 Console Port
2	1000BASE-T RJ-45 PoE Ports	6	PoE Button
3	1000BASE-T RJ-45 Uplink Ports	7	Reset Button
4	Gigabit SFP Slots	8	System LEDs

10/100/1000BASE-T RJ-45 Ports

The switch contains ten 10/100/1000BASE-T RJ-45 ports that support 10/100/1000BASE-T copper links to other devices. For more information, see "How to Connect to Twisted-Pair Copper Ports" on page 34.

Gigabit SFP Slots

The switch contains two Small Form Factor Pluggable (SFP) transceiver slots that operate up to 1 Gbps full duplex. For more information, see "How to Connect to SFP Fiber Optic Ports" on page 38.

PoE Button

Pressing the PoE button on the ECS4210-12P front panel changes the port LEDs to display PoE status. For more information, see "Understanding the System Status LEDs" on page 42.

Reset Button

Pressing the reset button on the right side front panel causes the switch to restart or restore factory default settings. For more information, see "How to Reset the Switch" on page 45.

System LEDs

For information on system status LED indicators, see "Understanding the System Status LEDs" on page 42.

Port LEDs

For information on port status LED indicators, see "Understanding the Port Status LEDs" on page 31.

Console Port

The RJ-45 connector on the front panel right side that is labeled "Console" provides an out-of-band serial connection to a terminal or a PC running terminal emulation software. The port can be used for performing switch monitoring and configuration. For more information, see "How to Connect to the Console Port" on page 43.

Figure 2: Rear Panel

1 Grounding Terminal

2 AC Power Socket

Cooling Fans and Vents

The switch must be installed in a properly cooled and ventilated environment. For more information, see "Switch Cooling Requirements" on page 23.

AC Power Socket

The switch requires an AC power source. For more information on the switch power input, how to connect it, and how to power-on the switch, see "How to Connect to AC Power" on page 27.

Grounding Terminal

The switch includes a grounding terminal that must be connected to a ground source that provides local earth potential. For more information , see "Grounding the Chassis" on page 26.

Key Technical Specifications

The following table contains key system specifications for the switch.

Table 1: Key Technical Specifications

Item	Specification
Ports	8 10/100/1000BASE-T RJ-45 PoE ports with Auto-negotiation 2 10/100/1000BASE-T RJ-45 ports with Auto-negotiation 2 Gigabit SFP transceiver slots
Network Interface	Ports 1-10: RJ-45 ◆ RJ-45 connector, auto MDI/X Ports 11~12: SFP ◆ Gigabit SFP transceivers
Buffer Architecture	4 Mbytes
Aggregate Bandwidth	24 Gbps
Switching Database	16K MAC address entries
LEDs	System: Pwr (power), Diag (diagnostic) Ports 1~12 Status (link, activity, speed)
AC Input Power	AC 100-240 V, 50-60 Hz, 2.1 A @ 100 VAC
Power Consumption*	189 W @ 100 VAC, 167 W @ 220 VAC
Weight	2.311 kg (5.09 lbs)
Size	(W x D x H): 28.0 x 22.0 x 4.4 cm (11.02 x 8.66 x 1.73 in)
Temperature	Operating: 0° C to 50° C (32° F to 122° F) Storage: -40° C to 70° C (-40° F to 158° F)
Humidity	Operating: 10% to 90% (non-condensing)
Out-of-Band Management	Front Panel RJ-45 console port
In-Band Management	SSH, Telnet, SNMP, or HTTP
Software Loading	HTTP, FTP/TFTP in-band
Forwarding Mode	Store-and-forward
Throughput	Wire speed
Flow Control	Full Duplex: IEEE 802.3x Half Duplex: Back pressure

* Maximum power consumption values are measured under a 100 percent loading test and should be used as estimates for planning purposes.

2 Installation Overview

This chapter includes these sections:

Package Contents

After unpacking the switch, check the contents to be sure you have received all the components.

- ECS4210-12P Switch
- AC Power Cord—either US, Continental Europe or UK
- Rack Mounting Kit containing two extension brackets and eight screws for attaching the brackets to the switch.
- 4 adhesive foot pads
- Console cable—RJ-45 to DB-9
- Quick Start Guide
- Regulatory and Safety Information
- Documentation CD—includes *Installation Guide, Web Management Guide* and *CLI Reference Guide*

Switch Installation Tasks

Follow these tasks to install the switch in your network. For full details on each task, go to the relevant chapter or section by clicking on the link.

Caution: Before installing your switch, first review all the safety statements and guidelines in the *Regulatory and Safety Information* document.

Task 1 Unpack Package and Check Contents

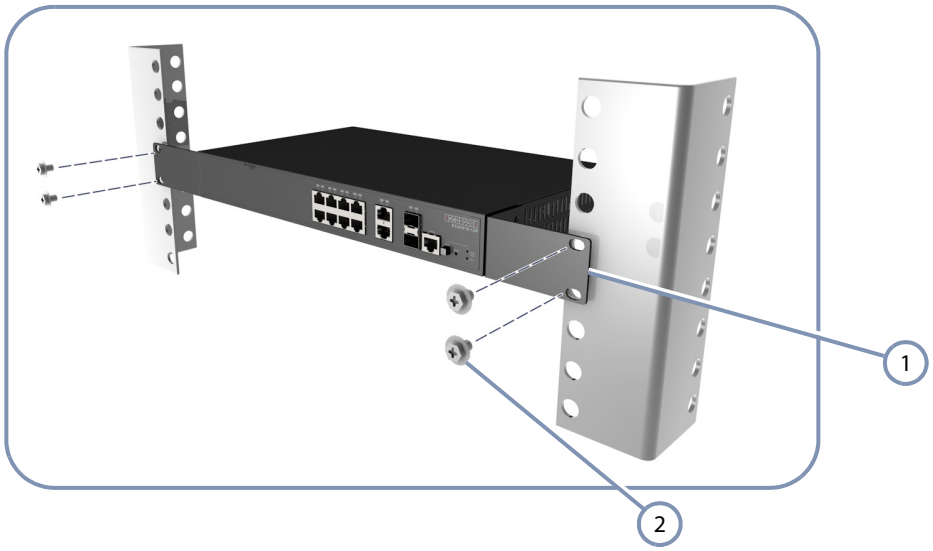
Unpack your switch and check the package contents to be sure you have received all the items. See "Package Contents" on page 14.

Task 2 Install the Chassis

The switch is designed to be installed in a standard 19-inch equipment rack. Plan your rack installation and install the switch chassis in the rack. Be sure to take into account switch cooling requirements.

Go to the chapter "Switch Chassis"

Figure 3: Installing the Switch in a Rack



1 Attach the extension brackets to the switch,

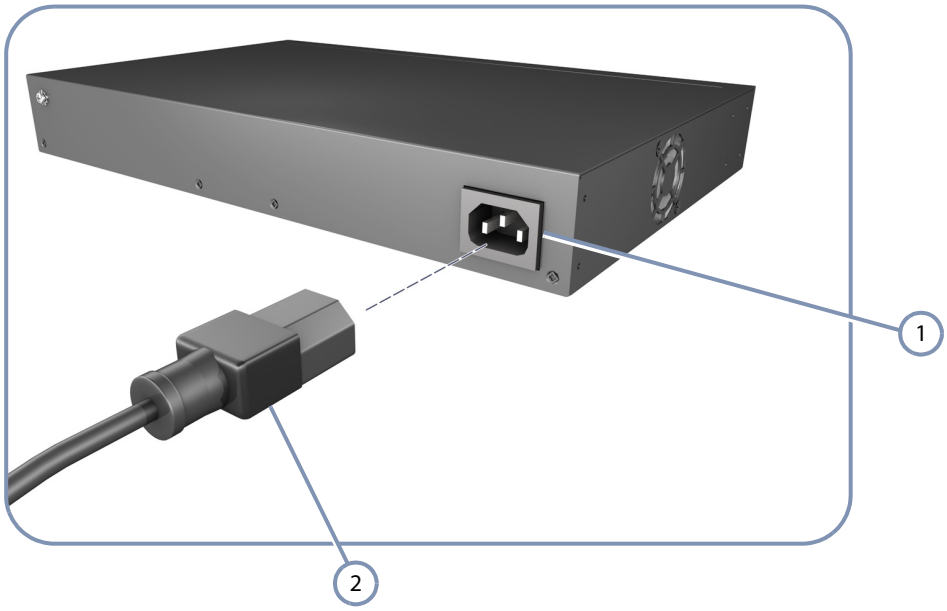
2 Use the rack mounting screws supplied with the rack to secure the switch in the rack.

Task 3 Connect AC Power to Power On

Connect the power cord to the AC socket on the switch and to a grounded, 3-pin, AC power source.

Go to the chapter "Power and Grounding"

Figure 4: Connecting AC Power



1. Connect an external AC power source to the AC power socket of the switch using the supplied AC power cord.
2. Supplied AC Power cord.

Task 4 Verify Switch Operation

Verify basic switch operation by checking the system LEDs.

When operating normally, the Pwr and Diag LED should both be on green. If either of these LEDs are on amber, see "Diagnosing LED Indicators" on page 46.

Go to the section "Understanding the System Status LEDs" on page 42

Figure 5: System LEDs

1 System Status LEDs.

Task 5 Make Initial Configuration Changes

At this point you may need to make a few basic switch configuration changes before connecting to the network. It is suggested to connect to the switch console port to perform this task.

The serial port's configuration requirements are as follows: 115200 bps, 8 characters, no parity, one stop bit, 8 data bits, and no flow control.

You can log in to the command-line interface (CLI) using default settings: User "admin" with the password "admin".

Go to "How to Connect to the Console Port" on page 43

Figure 6: Console Port

1 Console Port

For information on initial switch configuration:

Refer to the *CLI Reference Guide*.

Task 6 Install Transceivers and Connect Cables

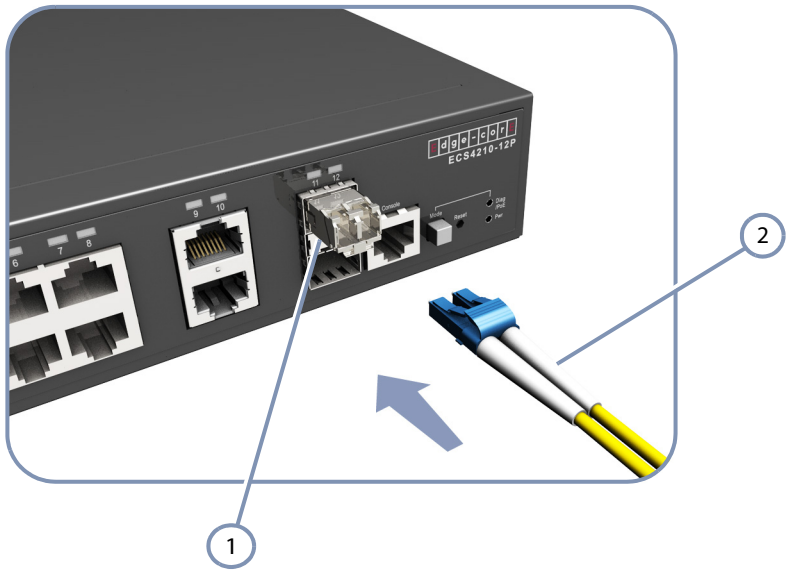
Install SFP transceivers and connect network cables to port interfaces:

- For RJ-45 ports, use 100-ohm category 3 or better Ethernet cable for 10BASE-T connections, use 100-ohm category 5 or better Ethernet cable for 100BASE-TX and 1000BASE-T connections.
- Install SFP transceivers and then connect fiber optic cabling to the transceiver ports.

As connections are made, check the port status LEDs to be sure the links are valid.

Go to the chapter "Port Connections"

Figure 7: Making a Connection to an SFP Port



1 Install SFP transceivers.

2 Connect fiber optic cabling to the ports.

3 Switch Chassis

The switch is designed to be installed in a standard 19-inch equipment rack.

Before continuing with switch installation, first review the general guidelines and switch cooling requirements in this chapter.

This chapter includes these sections:

General Installation Guidelines

Be sure to follow the guidelines below when choosing a location.

The installation location should:

- be able to maintain its temperature within 0 to 50 ° C (32 to 122 ° F) and its humidity within 10% to 90%, non-condensing.
- provide adequate space (approximately five centimeters or two inches) on all sides for proper air flow.
- be accessible for installing, cabling and maintaining the device.
- allow the status LEDs to be clearly visible.
- Make sure twisted-pair cable is always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios and transmitters.
- Make sure that the unit is connected to a separate grounded power outlet and is powered from an independent circuit breaker. As with any equipment, using a filter or surge suppressor is recommended. Verify that the external AC power requirements for the switch can be met as listed under "AC Power Supply Specifications" on page 25.

How to Install the Switch in a Rack

When rack mounting the switch, pay particular attention to the following factors:

- **Rack Types:** You can use any standard EIA 19-inch equipment rack with either two or four posts. The bracket hole pattern should be spaced 1U (1.75 in. or 4.45 cm) apart.
- **Rack Stability:** Whenever possible, secure the rack to the building ceiling or floor, particularly if you are located in a region where earthquakes are common.
- **Rack Planning:** When installing equipment in a rack, first plan how units can be best arranged. Try to always mount the heaviest equipment at the bottom of the rack.
- **Temperature:** Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range. See "Switch Cooling Requirements" on page 23.
- **Mechanical Loading:** Do not place any equipment on top of a rack-mounted unit.
- **Circuit Overloading:** Be sure that the supply circuit to the rack assembly is not overloaded.
- **Grounding:** Rack-mounted equipment should be properly grounded.

Rack-Mounting Items

Before you start to rack-mount the switch, be sure to have the following items available:

- Four mounting screws for each device you plan to install in a rack—these are not included. Be sure to use the rack mounting screws that are supplied with the rack.
- A screwdriver (Phillips or flathead, depending on the type of screws used).

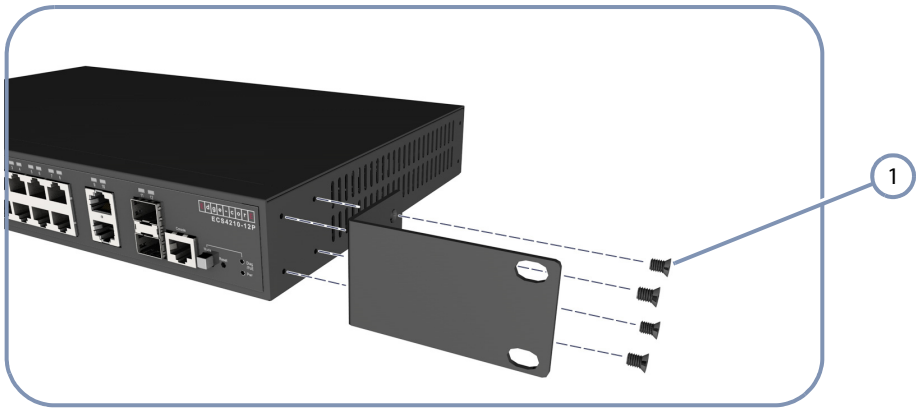
Rack-Mount Procedure

To rack mount the switch, follow these steps:

Caution: Installing the switch in a rack requires two people: One should position the switch in the rack, while the other secures it using the mounting screws.

1. Attach the extension brackets to the device using the screws provided in the Rack Mounting Kit.

Figure 8: Attaching the Extension Brackets



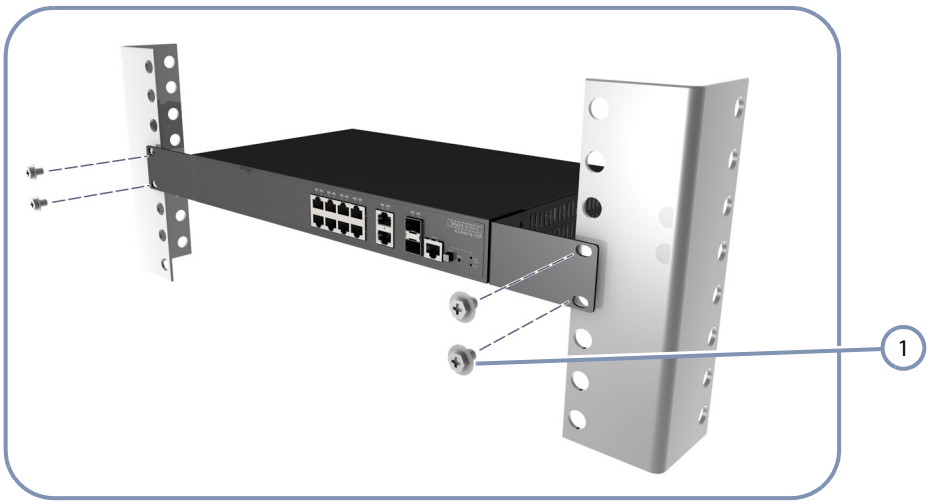
1 Use the screws provided in the Rack Mounting Kit.

2. Following your rack plan, mark the holes in the rack where the switch will be installed.

3. One person should lift the switch into the rack so that it is aligned with the marked holes.

4. The second person should secure the switch in the rack, using four rack-mounting screws (not provided).

Figure 9: Installing the Switch in a Rack



1 Use the rack mounting screws supplied with the rack.

5. If installing a single switch only, go to "Power and Grounding" on page 25.

6. If installing multiple switches, repeat steps 1 to 4 to mount the switches following your rack plan.

How to Install the Switch on a Shelf or Desktop.

The switch can be installed on any flat surface such as a desktop or shelf. To mount the switch on a flat surface, follow these steps:

1. Attach the four adhesive feet to the bottom of the first switch.

Figure 10: Attaching the Adhesive Feet

2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper airflow.

3. If installing a single switch only, go to "How to Connect to AC Power" on page 27.

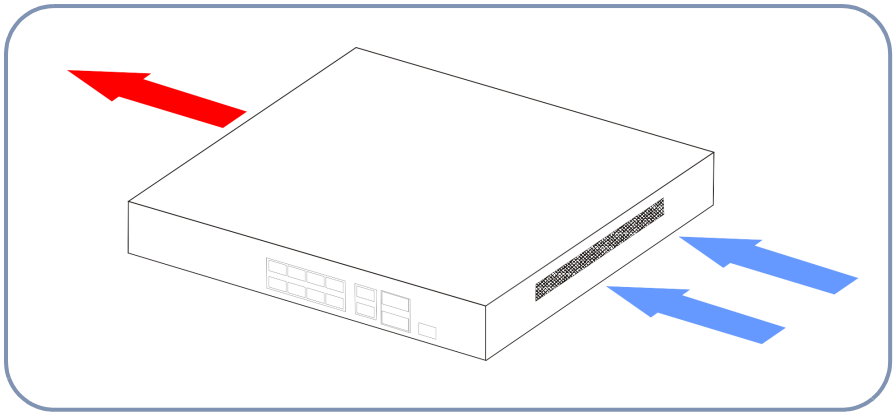
4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order.

Switch Cooling Requirements

Wherever the switch is located, be sure to pay close attention to switch cooling requirements. The location should be well ventilated and provide unrestricted air flow at the front, back, and sides of the switch. If the air flow is insufficient, it may cause the switch to overheat and possibly fail.

The ECS4210-12P is equipped with 3 cooling fans. The following figure shows the cool air intake and the hot air exhaust airflow into and from the ECS4210-12P switch.

Figure 11: ECS4210-12P Switch Cooling



Rack Cooling

When mounting the switch in an enclosed rack or cabinet, be sure to check the following guidelines to prevent overheating:

- Make sure that enough cool air can flow into the enclosure for the equipment it contains.
- Check that the rack or cabinet allows the hot air to exit the enclosure (normally from the top) without circulating back into equipment.
- If the enclosure has sides or doors with ventilation holes, make sure they are not blocked by cables or other obstructions.
- Route cables within the rack or cabinet to maximize the air flow.
- When possible, do not completely fill the rack or cabinet with equipment, allow some unused space within the enclosure for better air flow.

4 Power and Grounding

This chapter focuses on how to connect AC power to the switch, grounding the chassis, and how to power-on the switch.

This chapter includes these sections:

Switch Power Supply

The switch requires power from an external AC power supply that can meet the required specification described in Table 2. A standard AC power socket is located on the rear panel of the switch. The power socket is for the AC power cord.

Figure 12: AC Power Supply Socket

Table 2: AC Power Supply Specifications

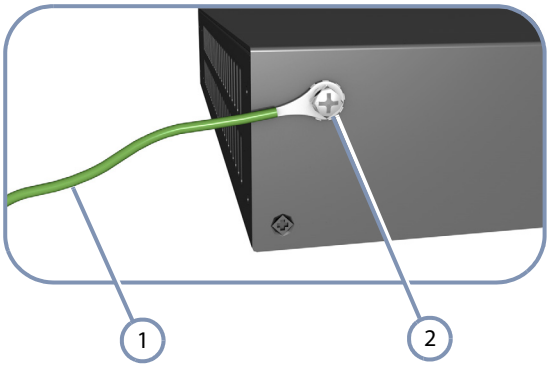
Item	Description
AC Input	100-240 VAC, 50-60 Hz, 2.1 A
Power Supply	100-240 VAC, 50-60 Hz, auto-sensing
Maximum Power Consumption*	189 W @ 100 VAC, 167 W @ 220 VAC

* Maximum power consumption values are measured under a 100 percent loading test and should be used as estimates for planning purposes.

Grounding the Chassis

The rear panel of the switch chassis includes a single hole grounding terminal. It must be connected to ground to ensure proper operation and to meet electromagnetic interference (EMI) and safety requirements.

Figure 13: Grounding Terminal



1 Grounding Wire

2 Grounding Terminal

Before powering on the switch, ground the switch to earth as described below.

1. Ensure that the rack on which the switch is to be mounted is properly grounded and in compliance with ETSI ETS 300 253.
2. Ensure that there is a good electrical connection to the grounding point on the rack (no paint or isolating surface treatment).
3. Disconnect all power cables to the switch.
4. The switch chassis is connected internally to 0 V. This circuit is connected to the single-hole grounding terminal on the rear panel of the switch (left of the AC power socket). The surface area around this terminal is not painted in order to provide for a good connection. Attach a 6 AWG stranded copper wire to the grounding terminal on the switch.
5. Then attach the grounding wire to the ground point on the rack.

Caution: The earth connection must not be removed unless all supply connections have been disconnected.

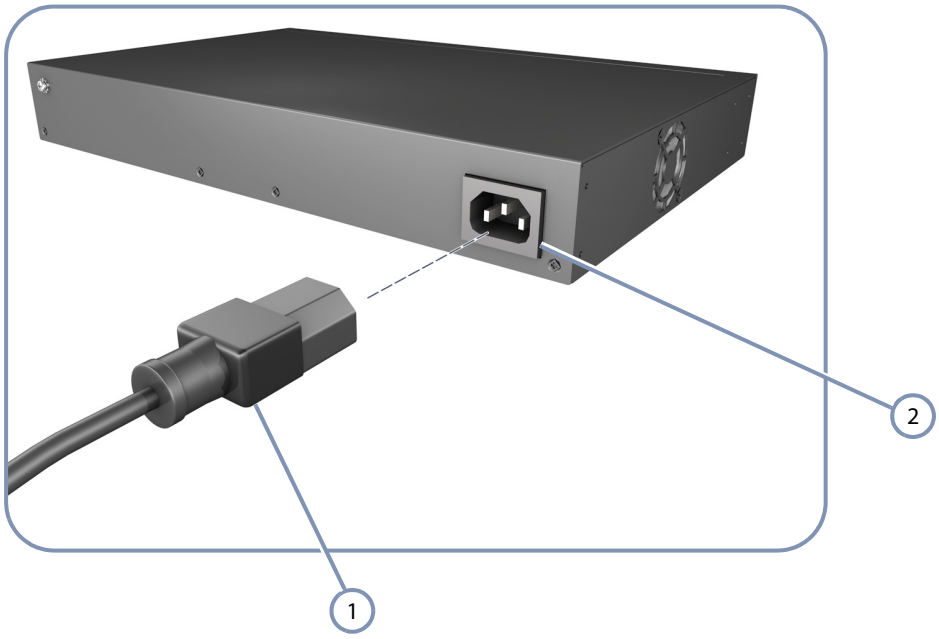
How to Connect to AC Power

To supply AC power to the switch, first verify that the external AC power supply can provide 100 to 240 VAC, 50-60 Hz, 2.1 A minimum.

To connect the switch to a power source:

1. Plug the power cord into a grounded, 3-pin, AC power source.

Figure 14: AC Power Cord and Power Socket



1 AC Power Cord

2 AC Power Socket

2. Insert the plug on the other end of the power cord directly into the AC input socket on the back of the switch.

Note: If your country's AC power outlet standards do not match the power plug of the included AC power cord, you will need to change the AC power cord. You must use a cord set that has been approved for the socket type in your country.

3. Check the LED indicators on the switch front panel as the unit is powered on to verify that power is being received. If not, recheck the power cord connections at the AC supply source and back panel power input connector.

5 Port Connections

This chapter focuses on making connections to switch network interfaces, including how to install optional transceivers, and details on network cable specifications.

The switch features ten 10/100/1000BASE-T RJ-45 ports and two Gigabit SFP transceiver slots. The sections that follow describe these interfaces.

This chapter includes these sections:

Cable Labeling and Connection Records

When planning a network installation, it is essential to label the opposing ends of cables and to record where each cable is connected. Doing so will enable you to easily locate inter-connected devices, isolate faults and change your topology without need for unnecessary time consumption.

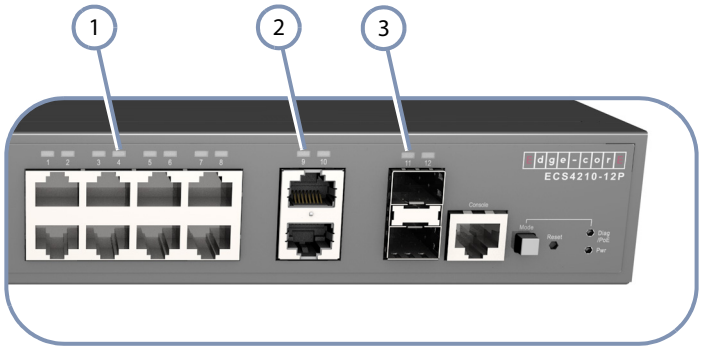
To best manage the physical implementations of your network, follow these guidelines:

- Clearly label the opposing ends of each cable.
- Using your building's floor plans, draw a map of the location of all network-connected equipment. For each piece of equipment, identify the devices to which it is connected.
- Note the length of each cable and the maximum cable length supported by the switch ports.
- For ease of understanding, use a location-based key when assigning prefixes to your cable labeling.
- Use sequential numbers for cables that originate from the same equipment.
- Differentiate between racks by naming accordingly.
- Label each separate piece of equipment.
- Display a copy of your equipment map, including meanings of all abbreviations at each equipment rack.

Understanding the Port Status LEDs

The switch includes LED indicators for each port to indicate link status and network activity. The port LEDs are shown below and described in the following table.

Figure 15: Port Status LEDs



1 Port 1-8 Link/Activity LEDs

2 Port 11-12 Link/Activity LEDs

3 Port 9-10 Link/Activity LEDs

Table 3: Port Status LEDs

LED	Condition	Status
1000BASE-T RJ-45 PoE Ports 1-8		
Link/Activity	On/Blinking Amber	Port has a valid 10/100 Mbps link. Blinking indicates traffic on the port.
	On/Blinking Green	Port has a valid 1000 Mbps link. Blinking indicates traffic on the port.
	Off	The link is down.
PoE Status[a]	On Amber	A PoE device is connected and using less than or equal to 15.4 W of power supplied from the switch.
	On Green	A PoE device is connected and using greater than 15.4 W of power supplied from the switch.
	Off	No PoE device is connected.
1000BASE-T RJ-45 Ports 9-10		
Link/Activity	On/Blinking Amber	Port has a valid 10/100 Mbps link. Blinking indicates traffic on the port.
	On/Blinking Green	Port has a valid 1000 Mbps link. Blinking indicates traffic on the port.
	Off	The link is down.

Table 3: Port Status LEDs (Continued)

LED	Condition	Status
Gigabit SFP Ports 11-12		
Link/Activity	On/Blinking Amber	Port has a valid 100 Mbps link. Blinking indicates traffic on the port.
	On/Blinking Green	Port has a valid 1000 Mbps link. Blinking indicates traffic on the port.
	Off	The link is down.

a. PoE button is pressed; Ports 1-8 only

How to Install an SFP Transceiver

The switch provides slots for optional SFP transceivers. The supported transceiver types are listed below:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LH
- 1000BASE-T

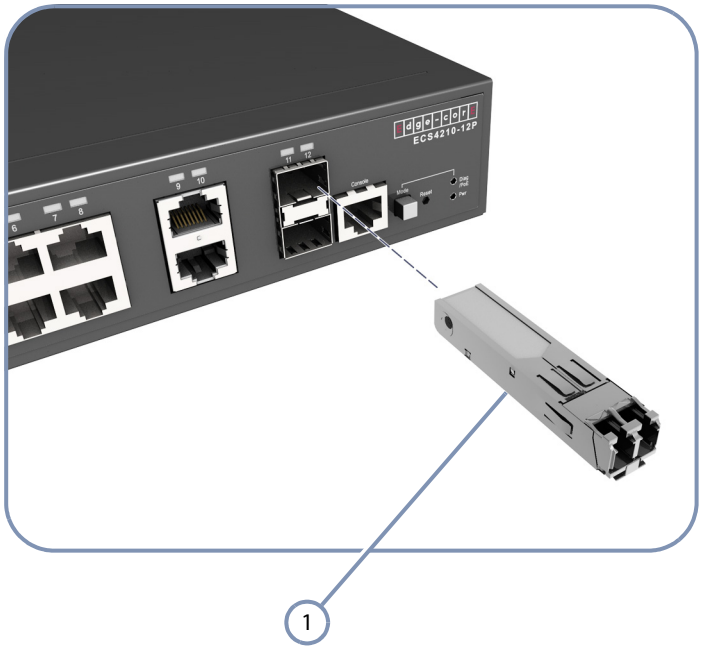
Note: SFP transceivers are hot-swappable. The switch does not need to be powered off before installing or removing a transceiver.

Note: SFP transceivers are not provided in the switch package.

To install an SFP transceiver, do the following:

1. Consider network and cabling requirements to select an appropriate transceiver type that is also compatible with the switch transceiver support.
2. If the SFP slot is covered with a rubber protective cap, remove the cap and keep it for later replacement.
3. Insert the transceiver with the optical connector facing outward and the slot connector facing down. Note that SFP transceivers are keyed so they can only be installed in the correct orientation.
4. Slide the transceiver into the slot until it clicks into place. If you do not immediately connect a cable to the port, use a rubber protective cap to keep the transceiver optics clean.

Figure 16: Inserting an SFP Transceiver into a Slot



1 SFP Transceiver

Note: To remove a transceiver: First disconnect the network cable, then pull the tab to remove the transceiver from the slot.

How to Connect to Twisted-Pair Copper Ports

The RJ-45 ports on the switch support automatic MDI/MDI-X pinout configuration, which enables you to use standard straight-through twisted-pair cables to connect to any other network device (PCs, servers, switches, routers, or hubs).

The connection requires an unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable with RJ-45 connectors at both ends.

Table 4: Maximum Twisted-Pair Copper Cable Lengths

Cable Type	Maximum Cable Length	Connector
1000BASE-T		
Category 5, 5e, or 6 100-ohm UTP or STP	100 m (328 ft)	RJ-45
100BASE-TX		
Category 5 or better 100-ohm UTP or STP	100 m (328 ft)	RJ-45
10BASE-T		
Category 3 or better 100-ohm UTP	100 m (328 ft)	RJ-45

Copper Cabling Guidelines

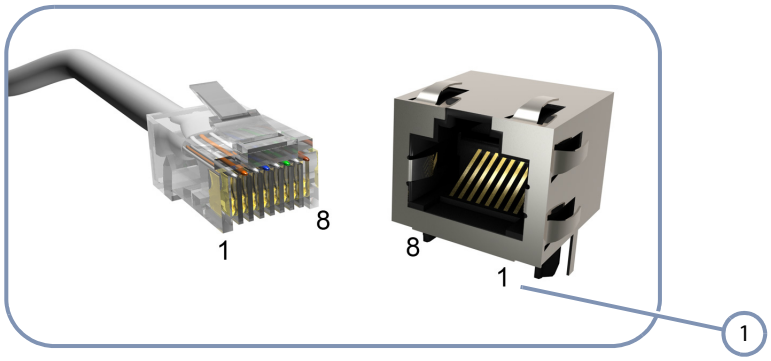
To ensure proper operation when installing the switch into a network, make sure that the current cables are suitable for 10BASE-T, 100BASE-TX, or 1000BASE-T operation. Check the following criteria against the current installation of your network:

- Cable type: Unshielded twisted pair (UTP) or shielded twisted pair (STP) cables with RJ-45 connectors; Category 5, 5e or better cable for 1000BASE-T connections, Category 5 or better for 100BASE-TX connections, and Category 3 or better for 10BASE-T connections.
- Protection from radio frequency interference emissions
- Electrical surge suppression
- Separation of electrical wires (switch related or other) and electromagnetic fields from data based network wiring
- Safe connections with no damaged cables, connectors or shields

10/100BASE-TX Pin Assignments

All 100BASE-TX RJ-45 ports support automatic MDI/MDI-X operation, so you can use straight-through or crossover cables for all network connections to PCs, switches, or hubs. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3, and 6 at the other end of the cable.

Figure 17: RJ-45 Connector



1 RJ-45 Pin Numbers

Table 5: 10/100BASE-TX MDI and MDI-X Port Pinouts

Pin	MDI Signal Name[a]	MDI-X Signal Name
1	Transmit Data plus (TD+) -52V power (Negative V_{port})	Receive Data plus (RD+) GND (Positive V_{port})
2	Transmit Data minus (TD-) -52V power (Negative V_{port})	Receive Data minus (RD-) GND (Positive V_{port})
3	Receive Data plus (RD+) GND (Positive V_{port})	Transmit Data plus (TD+) -52V power (Negative V_{port})
4	-52V power (Negative V_{port})	GND (Positive V_{port})
5	-52V power (Negative V_{port})	GND (Positive V_{port})
6	Receive Data minus (RD-) GND (Positive V_{port})	Transmit Data minus (TD-) -52V power (Negative V_{port})
7	GND (Positive V_{port})	-52V power (Negative V_{port})
8	GND (Positive V_{port})	-52V power (Negative V_{port})

a. The "+" and "-" signs represent the polarity of the wires that make up each wire pair.

1000BASE-T Assignments

All 1000BASE-T ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs, servers, or switches.

The table below shows the 1000BASE-T MDI and MDI-X port pinouts. These ports require that all four pairs of wires be connected. Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive.

Table 6: 1000BASE-T MDI and MDI-X Port Pinouts

Pin	MDI Signal Name	MDI-X Signal Name
1	Bi-directional Pair A Plus (BI_DA+) -52V power (Negative V_{port})	Bi-directional Pair B Plus (BI_DB+) GND (Positive V_{port})
2	Bi-directional Pair A Minus (BI_DA-) -52V power (Negative V_{port})	Bi-directional Pair B Minus (BI_DB-) GND (Positive V_{port})

Table 6: 1000BASE-T MDI and MDI-X Port Pinouts (Continued)

Pin	MDI Signal Name	MDI-X Signal Name
3	Bi-directional Pair B Plus (BI_DB+) GND (Positive V_{port})	Bi-directional Pair A Plus (BI_DA+) -52V power (Negative V_{port})
4	Bi-directional Pair C Plus (BI_DC+) -52V power (Negative V_{port})	Bi-directional Pair D Plus (BI_DD+) GND (Positive V_{port})
5	Bi-directional Pair C Minus (BI_DC-) -52V power (Negative V_{port})	Bi-directional Pair D Minus (BI_DD-) GND (Positive V_{port})
6	Bi-directional Pair B Minus (BI_DB-) GND (Positive V_{port})	Bi-directional Pair A Minus (BI_DA-) -52V power (Negative V_{port})
7	Bi-directional Pair D Plus (BI_DD+) GND (Positive V_{port})	Bi-directional Pair C Plus (BI_DC+) -52V power (Negative V_{port})
8	Bi-directional Pair D Minus (BI_DD-) GND (Positive V_{port})	Bi-directional Pair C Minus (BI_DC-) -52V power (Negative V_{port})

1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, Category 5e (enhanced Category 5) or Category 6 cable should be used. The Category 5e and 6 specifications include test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3-2008 standards.

Power-over-Ethernet

The ECS4210-12P switch supports both IEEE 802.3af and IEEE 802.3at-2009 PoE standards that enable DC power to be supplied from eight of the switch's RJ-45 copper ports (ports 1-8) to connected devices by utilizing certain pairs of the connecting Ethernet cable.

The total PoE power delivered by all ports cannot exceed the 150 W power budget. This means that up to 4 ports can supply a maximum 30 W of power simultaneously to connected devices, or all 8 ports can supply up to 16.7 W simultaneously.

Any PoE-compliant device attached to a port can directly draw power from the switch over the Ethernet cable without requiring its own separate power source. This capability gives network administrators centralized power control for devices such as IP phones and wireless access points, which translates into greater network availability.

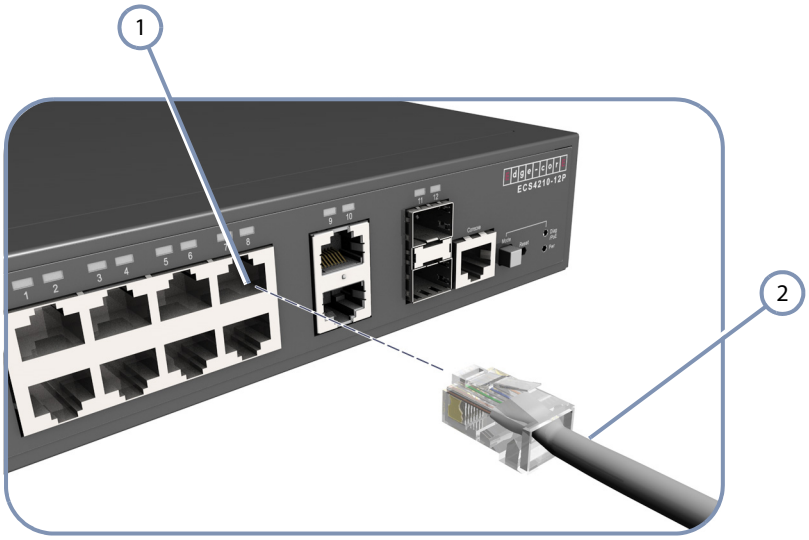
For each attached PoE-compliant device, the switch automatically senses the load and dynamically supplies the required power. The switch delivers power to a device using the wire pairs in UTP or STP cable.

Connection Procedure

Follow these steps to connect cables to 1000BASE-T RJ-45 twisted-pair copper ports.

1. Attach one end of a twisted-pair cable segment to the device's RJ-45 connector.

Figure 18: Making Twisted-Pair Connections



1 1000BASE-T RJ-45 Port

2 Category 5,5e or 6 Cable

2. Attach the other end to an available port on the switch.

   Make sure each twisted pair cable does not exceed 100 meters (328 ft) in length.

3. As each connection is made, the Link LED (on the switch) corresponding to each port will turn on green to indicate that the connection is valid.

How to Connect to SFP Fiber Optic Ports

The switch provides four slots for SFP-compliant fiber-optic transceivers.

Note that all 1000BASE fiber optic ports operate at 1 Gbps full duplex.

Table 7: Maximum Gigabit Ethernet Fiber Cable Lengths

Cable Type	Fiber Bandwidth	Maximum Cable Length	Connector
1000BASE-SX			
62.5/125 micron multimode	160 MHz/km	2-220 m (7-722 ft)	LC
	200 MHz/km	2-275 m (7-902 ft)	LC
50/125 micron multimode	400 MHz/km	2-500 m (7-1641 ft)	LC
	500 MHz/km	2-550 m (7-1805 ft)	LC
1000BASE-LX			
9/125 micron single-mode	N/A	2 m - 10 km (7 ft - 6.2 miles)	LC
1000BASE-LH			
9/125 micron single-mode	N/A	2 m - 80 km (7 ft - 50 miles)	LC

Note: The length of fiber optic cable for a single switched link should not exceed the relevant standards specified in this section. However, power budget constraints should also be considered when calculating the maximum fiber optic cable length for a particular link.

Note: Maximum distances may vary for different SFP vendors.

Connection Procedure

Follow these steps to connect cables to SFP transceiver ports.

Warning: This switch uses lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on.

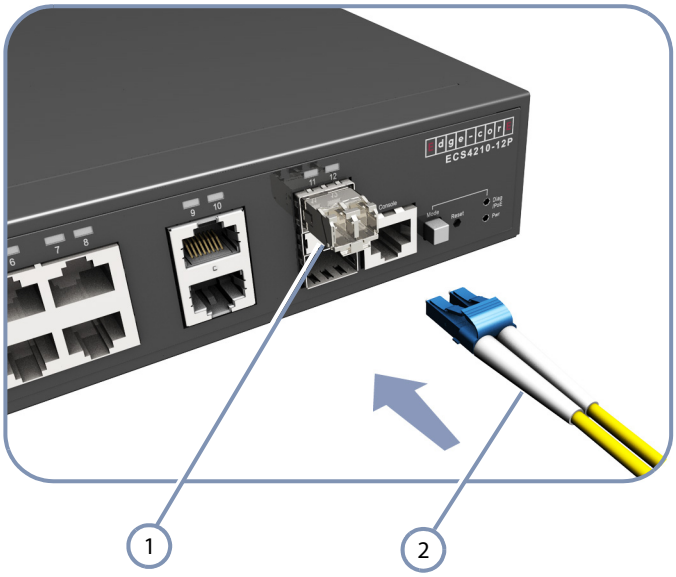
Warning: When selecting a fiber SFP device, considering safety, please make sure that it can function at a temperature that is not less than the recommended maximum operational temperature of the product. You must also use an approved Laser Class 1 SFP transceiver.

1. Remove and keep the fiber port's rubber plug. When not connected to a fiber cable, the rubber plug should be replaced to protect the optics.

2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

3. Connect one end of the cable to the SFP port on the switch and the other end to the SFP port on the other device. Since SFP connectors are keyed, the cable can be attached in only one orientation.

Figure 19: Making a Connection to an SFP Port



1 SFP Transceiver Port

2 SFP Fiber Optic Cable

4. As a connection is made, check the Link LED on the switch to be sure that the connection is valid.

Note: Be sure to secure cables properly and route them away from the switch without exceeding the minimum bending radius for fiber cables (typically a few inches). Use cable ties to bunder cables together and secure coiled loops of excess cable. Do not let cables hang free supporting their own weight or pull in any way that puts stress on the connectors.

6 Switch Management

The switch include a management agent that allows you to configure or monitor the switch using its embedded management software. To manage the switch, you can make a direct connection to the console port (out-of-band), or you can manage it through a network connection (in-band) using Telnet, Secure Shell (SSH), a web browser, or SNMP-based network management software.

For a detailed description of the switch's software features, refer to the *Web Management Guide* and *CLI Reference Guide*.

This chapter includes these sections:

Understanding the System Status LEDs

The switch includes a display panel of key system LED indicators. The LEDs, which are located on the front panel, are shown below and described in the following table.

Figure 20: System Status LEDs

1 System Status LEDs

Table 8: System Status LEDs

LED	Condition	Status
Pwr	On Green	Internal power operating normally.
	Off	No AC power is connected or the internal power supply has failed.
Diag (Diagnostic)	On Green	The system diagnostic test has completed successfully.
	On Amber	System diagnostic in progress.
	Blinking Amber	The system self-diagnostic test has detected a fault.
	Blinking Amber and Green	The switch system is booting up.
PoE Status [a]	On Amber	Port LEDs display the individual port's PoE status.
	Amber Blinking	The PoE device power draw on the switch has reached at least 95 percent of the maximum switch power output capacity.
	Off	Port LEDs display the individual port's link and activity status

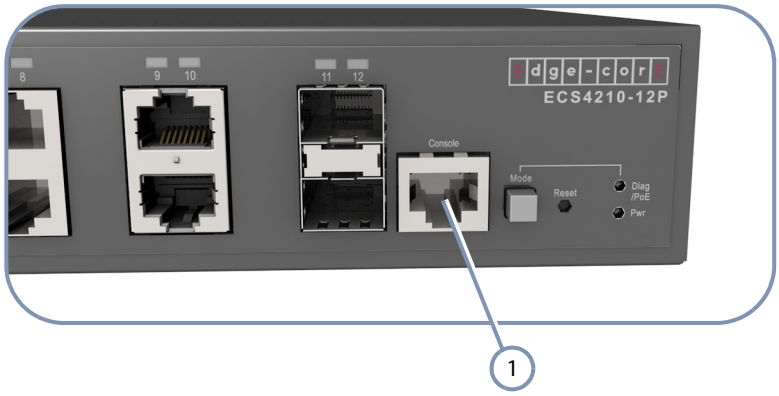
a. Diag LED with PoE button pressed

How to Connect to the Console Port

The RJ-45 Console port on the front panel of the switch is used to connect a console device to the switch for out-of-band console configuration. The console device can be a PC or workstation running a VT-100 terminal emulator, or a VT-100 terminal. A console cable is supplied with the switch for connecting to a PC's RS-232 serial DB-9 DTE (COM) port.

Note: To connect to notebooks or other PCs that do not have a DB-9 COM port, use a USB-to-male DB-9 adapter cable (not included with the switch).

Figure 21: Console Port



1 Console Port

The following table describes the pin assignments used in the console cable.

Table 9: Console Cable Wiring

Switch's RJ-45 Console Port	Null Modem	PC's 9-Pin DTE Port
6 RXD (receive data)	<----------	3 TXD (transmit data)
3 TXD (transmit data)	---------->	2 RXD (receive data)
4,5 SGND (signal ground)	----------	5 SGND (signal ground)

No other pins are used.

The serial port's default settings are as follows:

- Default Baud rate—115200 bps
- Character Size—8 Characters
- Parity—None

- Stop bit—One
- Data bits—8
- Flow control—None

Figure 22: Console Port Connection

Follow these steps to connect to the Console port:

1. Connect one end of the included RJ-45 to DB-9 serial cable to a DB-9 COM port connector on a management PC.
2. Plug in the RJ-45 end of the serial cable to the Console port on the switch.
3. Configure the PC's COM port required settings using VT-100 terminal emulator software (such as HyperTerminal) running on the management PC. The switch's default console port settings are:
    - 115200 bps, 8 data bits, 1-stop bit and no parity
4. Log in to the command-line interface (CLI) using one of the default user login settings:
    - User — admin
    - Password — admin

or

- User — guest
- Password — guest

Note that the guest default user login will only allow a user to view switch parameter data.

For a detailed description of connecting to the console and using the switch's command line interface (CLI), refer to the *CLI Reference Guide*.

How to Reset the Switch

The Reset button located on the front right side panel of the switch can be used to restart the device and set the configuration back to either the currently saved configuration or the factory default settings.

Reset to the Saved Configuration File

Press the Reset button for less than 5 seconds to restart the system software using the current saved configuration file settings. Any unsaved changes in the curerntly running configuration will be lost and the only the saved settings in the startup configuration file will be used when the switch reboots.

Reset to Factory Default Settings

Press the Reset button for more than 5 seconds to restart the system software using the factory default settings. Any unsaved changes in the currently running configuration will be lost. The saved startup configuration file will still be available to select within the switch user interface, if needed.

Caution: Pressing the reset button will lose any unsaved changes in the running switch configuration.

Figure 23: Reset Button

1 Reset Button

A Troubleshooting

Diagnosing LED Indicators

Table 10: Troubleshooting Chart

Symptom	Action
Pwr LED is Off	◆ Check connections between the switch, the power cord, and the AC power outlet. ◆ Check the AC power outlet is supplying 110-240 VAC. ◆ Contact your dealer for assistance.
Diag LED is blinking Amber	◆ Power cycle the switch to try and clear the condition. ◆ If the condition does not clear, contact your dealer for assistance.
Diag LED is blinking Amber with PoE button pressed.	◆ Turn off or unplug PoE devices until the condition clears. ◆ If the condition does not clear, contact your dealer for assistance.
Link/Act LED is Off	◆ Verify that the switch and attached device are powered on. ◆ Check the cable connectors are firmly plugged into both the switch and corresponding device. ◆ If the switch is installed in a rack, check the connections to the punch-down block and patch panel. ◆ Verify that the proper cable type is used and its length does not exceed specified limits. ◆ Check the attached device and cable connections for possible defects. Replace the defective cable if necessary.

System Self-Diagnostic Test Failure

If the Diag LED indicates a failure of the system power-on-self-test (POST), you can use a console connection to view the POST results. The POST results may indicate a failed component or help troubleshoot the problem. For more information on connecting to the console port and using the CLI, refer to the *CLI Reference Guide*.

Note a POST failure normally indicates a serious hardware fault that cannot be rectified or worked around. If you encounter a POST failure, you should contact your dealer for assistance.

Power and Cooling Problems

If a power indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply. However, if the switch shuts down after operating for a continuous period, check for loose power connections, power losses or surges at the power outlet. If you still cannot isolate the problem, the internal power supply may be defective.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

In-Band Access

You can access the management agent in the switch through a connection to any port using Telnet, a web browser, or other network management software tools. However, you must first configure the switch with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, check to see if you have a valid network connection. Then verify that you entered the correct IP address. Also, be sure the switch port has not been disabled. If it has not been disabled, then check the network cabling that connects your remote location to the switch.

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