



ECS4510 Series  
28/52-Port Layer 2+  
Stackable GE Switch

Installation Guide

# Installation Guide

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## **ECS4510-28T Stackable GE Switch**

Layer 2+ Stackable Gigabit Ethernet Switch,  
with 24 10/100/1000BASE-T (RJ-45) Ports,  
2 10-Gigabit SFP+ Ports,  
and 1 10-Gigabit SFP+ Extender Module Slot

## **ECS4510-28P Stackable GE PoE Switch**

Layer 2+ Stackable Gigabit Ethernet Switch,  
with 24 10/100/1000BASE-T (RJ-45) PoE Ports,  
2 10-Gigabit SFP+ Ports,  
and 1 10-Gigabit SFP+ Extender Module Slot

## **ECS4510-28F Stackable GE Switch**

Layer 2+ Gigabit Ethernet Switch,  
with 22 100/1000BASE-X SFP Slots,  
2 Combination Gigabit (RJ-45/SFP) Ports,  
2 10-Gigabit SFP+ Ports,  
and 1 10-Gigabit SFP+ Extender Module Slot

## **ECS4510-28F-DC Stackable GE Switch**

Layer 2+ Gigabit Ethernet Switch,  
with 22 100/1000BASE-X SFP Slots,  
2 Combination Gigabit (RJ-45/SFP) Ports,  
2 10-Gigabit SFP+ Ports,  
and 1 10-Gigabit SFP+ Extender Module Slot

## **ECS4510-52T Stackable GE Switch**

Layer 2+ Gigabit Ethernet Switch,  
with 48 10/100/1000BASE-T (RJ-45) Ports,  
2 10-Gigabit SFP+ Ports,  
and 1 10-Gigabit SFP+ Extender Module Slot

## **ECS4510-52P Stackable GE PoE Switch**

Layer 2+ Gigabit Ethernet Switch,  
with 48 10/100/1000BASE-T (RJ-45) PoE Ports,  
2 10-Gigabit SFP+ Ports,  
and 1 10-Gigabit SFP+ Extender Module Slot

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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 installation, 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.

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

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

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

#### July 2015 Revision

This is the fourth revision of this guide. It includes the following change:

- ◆ Updated graphics for 52-port switches.

#### April 2015 Revision

This is the third revision of this guide. It includes the following change:

- ◆ Updated stacking information.
- ◆ Modified Diag LED states.

**March 2015 Revision**

This is the second revision of this guide. It includes the following change:

- ◆ Updated the part number information.

**September 2014 Revision Revision**

This is the first revision of this guide.

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# 1

## Switch Description

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This chapter includes these sections:

- ◆ [“Overview” on page 11](#)
- ◆ [“Key Technical Specifications” on page 15](#)

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### Overview

The ECS4510-28T, ECS4510-28P, ECS4510-52T, and ECS4510-52P are Gigabit Ethernet Layer 2+ stackable switches with 24/48 10/100/1000BASE-T ports, two 10-Gigabit (10G) Small Form Factor Pluggable Plus (SFP+) transceiver slots. The ECS4510-28F and ECS4510-28F-DC are Layer 2 + switches that provide 22 SFP 1G transceiver slots, two combination Gigabit RJ-45/SFP ports, and two 10G SFP+ slots. The ECS4510-28P and ECS4510-52P front-panel ports also support Power-over-Ethernet Plus (PoE+).

All switches also provide one rear-panel slot for a dual-port 10G hot-swappable expansion module.

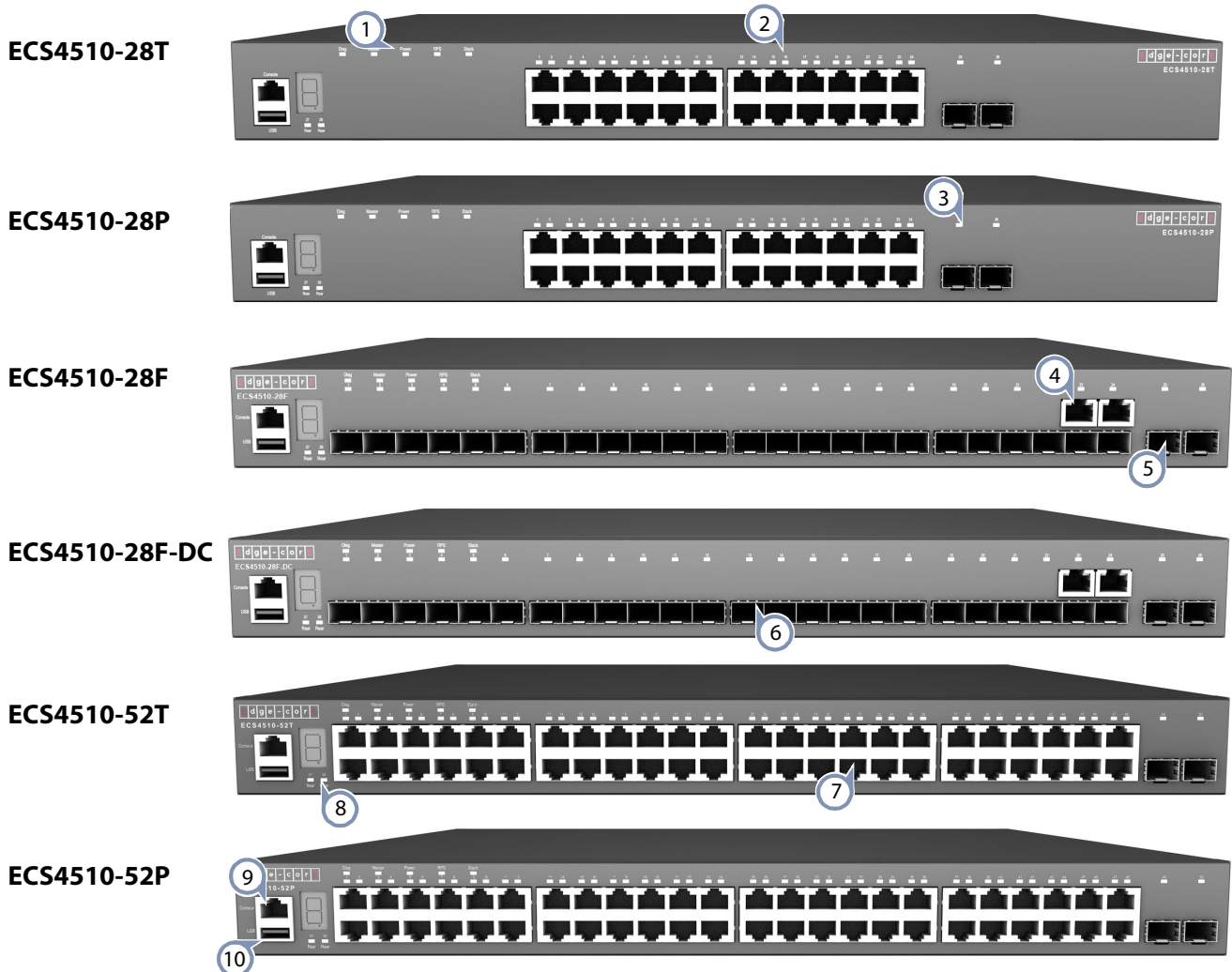
The switches include an SNMP-based management agent, which provides both in-band and out-of-band access for managing the switch. Further, the switches support both web and CLI-based configuration.

These switches include built-in stacking ports that enable units to be connected together through a 40 Gbps stack backplane. The switch stack can be managed from a master unit using a single IP address.

**Power-over-Ethernet** All of the 10/100/1000 Mbps ports on the ECS4510-28P and ECS4510-52P support the IEEE 802.3at Power-over-Ethernet Plus (PoE+) standard that enables DC power to be supplied to attached devices using wires in the connecting Ethernet cable.

**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: Switch Front Panels



- |                                       |                              |
|---------------------------------------|------------------------------|
| 1 System LEDs                         | 6 100/1000BASE-X SFP Slots   |
| 2 1000BASE-T RJ-45 Port LEDs          | 7 1000BASE-T RJ-45 Ports     |
| 3 10G SFP+ Port LEDs                  | 8 Expansion Module Port LEDs |
| 4 Combination Gigabit RJ-45/SFP Ports | 9 RJ-45 Console Port         |
| 5 10G SFP+ Slots / Stacking Ports     | 10 USB Port                  |

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

The switch contains 24/48 RJ-45 ports that support 10/100/1000BASE-T copper links to other devices. The ports on the ECS4510-28P and ECS4510-52P also support PoE+ connections. For more information, see [“How to Connect to Twisted-Pair Copper Ports”](#) on page 40.

### 10G SFP+ Slots / Stacking Ports

The switch contains two 10G SFP+ transceiver slots that operate at 10 Gbps full duplex. For more information, see [“How to Connect to SFP/SFP+ Fiber Optic Ports” on page 45](#).

The SFP+ ports can also be used as stacking ports, providing a 40 Gbps stack backplane connection between switches. For more information, see [“Connecting Switches in a Stack” on page 47](#).

### Combination Gigabit RJ-45/SFP Ports

The ECS4510-28F switch contains two Gigabit combination ports. You can connect to either an RJ-45 port or an SFP transceiver (purchased separately).

- ◆ **SFP Slots** — The SFP transceiver slots operate at 100 Mbps or 1 Gbps full duplex. For more information, see [“How to Connect to SFP/SFP+ Fiber Optic Ports” on page 45](#).
- ◆ **1000BASE-T RJ-45 Ports** — The RJ-45 ports support 10/100/1000BASE-T copper links to other devices. For more information, see [“How to Connect to Twisted-Pair Copper Ports” on page 40](#).

### 100/1000BASE-X SFP Slots

The ECS4510-28F and ECS4510-28F-DC switches contain 22 1G SFP transceiver slots that operate at 100 Mbps or 1Gbps full duplex. For more information, see [“How to Connect to SFP/SFP+ Fiber Optic Ports” on page 45](#).

### System LEDs

For information on system status LED indicators, see [“Understanding the System Status LEDs” on page 50](#).

### Port LEDs

For information on port status LED indicators, see [“Understanding the Port Status LEDs” on page 38](#).

### USB Port

Reserved for future use.

### Console Port

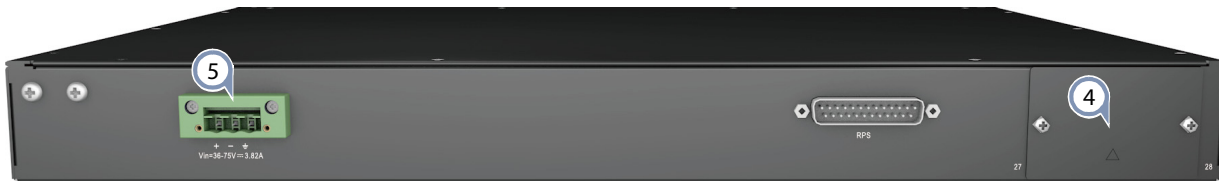
The RJ-45 connector on the front panel labeled “Console” provides an out-of-band serial connection to a terminal or a PC running terminal emulation software. The port can be used for performing switch monitoring and configuration. For more information, see [“How to Connect to the Console Port” on page 51](#).

Figure 2: Rear Panel

AC Models



DC Model



- ① Grounding Terminal
- ② RPS Connector
- ③ AC Power Socket
- ④ Expansion Module Slot
- ⑤ DC Power Socket (ECS4510-28F-DC only)

**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 32](#).

**RPS Connector**

The switch supports an optional Redundant Power Supply (RPS), that can supply power to the switch in the event the internal power supply fails. For more information, see [“DC Power Supply” on page 31](#).

**Expansion Module Slot**

The switch includes one slot on the rear panel for a hot-swappable dual-port 10GBASE module. For more information, see [“Optional Media Expansion Module” on page 28](#).

**AC Power Socket**

The switch requires a 100-240 VAC, 50-60 Hz 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 33](#).

**DC Power Socket**

The switch requires a 36 to 75 VDC, 3.82 A 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 DC Power” on page 34](#).

## Key Technical Specifications

The following table contains key system specifications for the switch.

**Table 1: Key Technical Specifications**

Item	Specification
Ports	ECS4510-28T/P: 24 1000BASE-T RJ-45 ports with Auto-negotiation ECS4510-52T/P: 48 1000BASE-T RJ-45 ports with Auto-negotiation ECS4510-28F/F-DC: 22 100/1000BASE-X SFP slots ECS4510-28F/F-DC: 2 Combination 1G RJ-45/SFP ports 2 10G SFP+ transceiver slots (for uplink or stacking) 1 expansion module slot (supporting dual-port 10G SFP+ module)
Network Interface	ECS4510-28T/P: Ports 1~24: RJ-45 connector, auto MDI/X Ports 25~26: 10G SFP+ transceivers Ports 27~28: Dual-port module supporting 10G SFP+ transceivers ECS4510-52T/P: Ports 1~48: RJ-45 connector, auto MDI/X Ports 49~50: 10G SFP+ transceivers Ports 51~52: Dual-port module supporting 10G SFP+ transceivers ECS4510-28F/F-DC: Ports 1~22: 1G SFP transceivers Ports 23~24: RJ-45 connector, auto MDI/X or 1G SFP transceivers Ports 25~26: 10G SFP+ transceivers Ports 27~28: Dual-port module supporting 10G SFP+ transceivers
Buffer Architecture	1.5 Mbytes
Aggregate Bandwidth	ECS4510-28T/P/F/F-DC: 128 Gbps ECS4510-52T/P: 176 Gbps
Switching Database	16K MAC address entries 1024 static MAC addresses 32 IP interfaces 1023 multicast groups
AC Input Power	ECS4510-28T: 100 to 240 V, 50-60 Hz, 1.5 A ECS4510-28P: 100 to 240 V, 50-60 Hz, 10 A ECS4510-28F: 100 to 240 V, 50-60 Hz, 2 A ECS4510-52T: 100 to 240 V, 50-60 Hz, 2 A ECS4510-52P: 100 to 127 V, 12 A ; 200 to 240 V , 6 A , 50-60 Hz
DC Input Power	ECS4510-28F-DC: 36 to 75 V, 3.82 A
Power Consumption*	ECS4510-28T: 35 W max. (with expansion module) ECS4510-28P: 515 W max. (with expansion module and PoE enabled) ECS4510-28P Max. PoE Load: 410 W ECS4510-28F/F-DC: 50 W max. (with expansion module) ECS4510-52T: 70 W max. (with expansion module) ECS4510-52P: 960 W max. (with expansion module and PoE enabled) The ECS4510-52P maximum power consumption is reduced to 780 W when the device is powered from a connected RPS.

**Table 1: Key Technical Specifications (Continued)**

Item	Specification
Maximum Current	ECS4510-28T: 1.1 A @ 110 VAC (with expansion module) ECS4510-28P: 4.56 A @ 110 VAC (with expansion module and PoE enabled) ECS4510-28F: 0.51 A @ 100 VAC (with expansion module) ECS4510-52T: 0.58 A @ 110 VAC (with expansion module) ECS4510-52P: 7.92A @110 VAC (with expansion module and PoE enabled)
Weight	ECS4510-28T: 3.7 kg (8.16 lb) ECS4510-28P: 4.95 kg (10.91 lb) ECS4510-28F: 3.8 kg (8.38 lb) ECS4510-28F-DC: 3.8 kg (8.38 lb) ECS4510-52T: 4.8 kg (10.52 lb) ECS4510-52P: 6.58 kg (14.51 lb)
Size (W x D x H)	ECS4510-28T/P/F/F-DC: 44.0 x 31.5 x 4.4 cm (17.3 x 12.4 x 1.7 in.) ECS4510-52T/P: 44.0 x 39.1 x 4.4 cm (17.3 x 15.4 x 1.7 in.)
Temperature	Operating: 0° C to 45° C (32° F to 113° F) Storage: -40° C to 70° C (-40° F to 158° F)
Humidity	Operating: 10% to 90% (non-condensing)
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

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This chapter includes these sections:

- ◆ [“Package Contents” on page 17](#)
- ◆ [“Switch Installation Tasks” on page 18](#)

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### Package Contents

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

- ◆ ECS4510-28T, ECS4510-28P, ECS4510-28F, ECS4510-28F-DC, ECS4510-52T, or ECS4510-52P Switch
- ◆ AC Power Cord—either US, Continental Europe or UK
- ◆ DC connector plug (ECS4510-28F-DC only)
- ◆ Rack Mounting Kit — includes two brackets and eight screws
- ◆ Four adhesive foot pads
- ◆ Console cable — RJ-45 to DB-9
- ◆ Documentation — *Quick Start Guide* and *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 17.

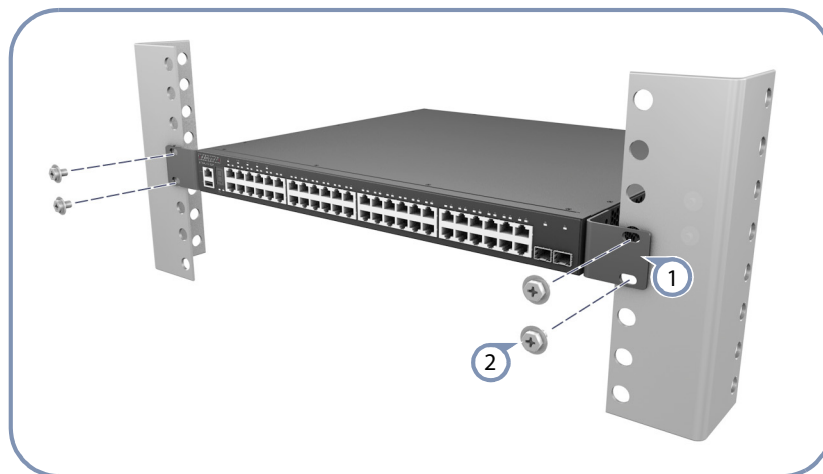
### Task 2 **Install the Chassis**

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

### Task 3 Ground the Switch and Power On

Connect a ground wire to the switch, and then use a AC power cable to connect the switch to a AC power source..

➔ Go to the chapter “Power and Grounding”.

Figure 4: Connecting AC Power



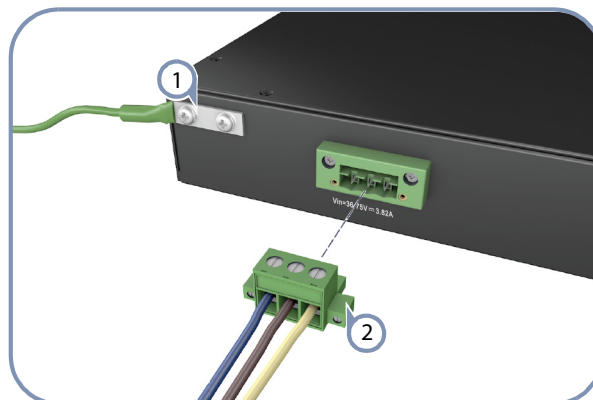
- 1 Connect a grounding wire to the grounding terminal..
- 2 Connect an external AC power source to the AC power socket of the switch using the supplied AC power cord.

### Connect DC Power

Connect a ground wire to the switch, and then use a DC power cable to connect the switch to a DC power source.

➔ Go to the chapter “Power and Grounding”.

Figure 5: Connecting DC Power



- 1 Connect a grounding wire to the grounding terminal..
- 2 Connect an external DC power source to the DC power socket of the switch using a DC power cable.

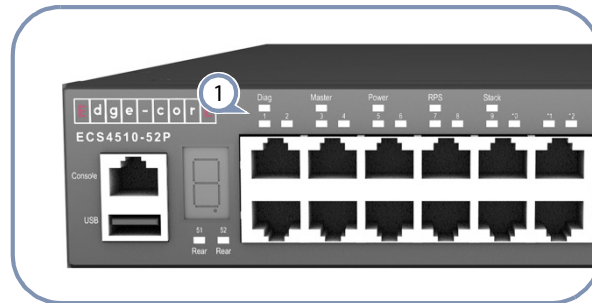
#### Task 4 Verify Switch Operation

Verify basic switch operation by checking the system LEDs.

When operating normally, the Power and Diag LEDs should both be on green. If either of these LEDs are on amber, see [“Diagnosing LED Indicators” on page 54](#).

➔ Go to the section [“Understanding the System Status LEDs” on page 50](#).

Figure 6: 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 51](#)

Figure 7: Console Port



- 1 Connect console cable to switch's Console port.
- 2 Connect console cable to PC's DB-9 COM port.

For information on initial switch configuration:

➔ *Refer to the CLI Reference Guide.*

## Task 6 Install Transceivers and Connect Cables

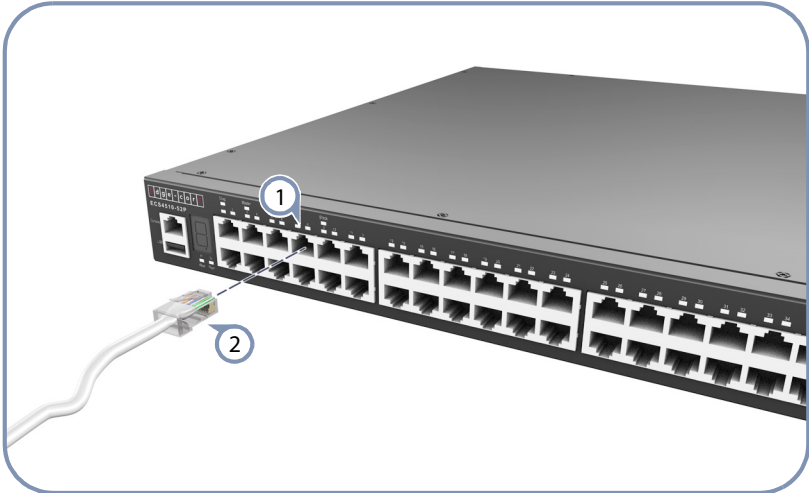
Install SFP/SFP+ transceivers and connect network cables to port interfaces:

- ◆ For RJ-45 ports, use 100-ohm Category 5, 5e or better twisted-pair cable for 1000BASE-T connections, Category 5 or better for 100BASE-TX connections, and Category 3 or better for 10BASE-T connections.
- ◆ First install SFP/SFP+ transceivers and then connect fiber optic cabling to the transceiver ports. The following transceivers are supported:
  - 1000BASE-SX (ET4201-SX)
  - 1000BASE-LX (ET4201-LX)
  - 1000BASE-ZX (ET4201-ZX)
  - 10GBASE-SR (ET5402-SR)
  - 10GBASE-LR (ET5402-LR)
  - 10GBASE-ER (ET5402-ER)

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

➔ Go to the chapter "[Port Connections](#)"

Figure 8: Making a Connection to an RJ-45 Port



- 1 10/100/1000BASE-T RJ-45 Port.
- 2 Twisted-pair Cable with RJ-45 Plug.

# 3

## Switch Chassis

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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” on page 23](#)
- ◆ [“Switch Cooling Requirements” on page 24](#)
- ◆ [“How to Install the Switch in a Rack” on page 25](#)
- ◆ [“How to Install the Switch on a Shelf or Desktop” on page 27](#)
- ◆ [“Optional Media Expansion Module” on page 28](#)
- ◆ [“How to Install an Optional Media Expansion Module” on page 28](#)

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### 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 45 ° C (32 to 113 ° F) and its humidity within 5% to 95%, 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 31](#) or the external DC power requirements for the switch can be met as listed under [“How to Connect to DC Power” on page 34](#).

## 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 airflow at the front, back, and sides of the switch. If the airflow is insufficient, it may cause the switch to overheat and possibly fail.

The ECS4510-28P/F/F-DC and ECS4510-52T switches are equipped with three cooling fans and the ECS4510-52P with four. The following figure shows the cool air intake and the hot air exhaust airflow into and from the switch.

**Figure 9: Switch Cooling**



The ECS4510-28T uses a fanless cooling design. The following figure shows the convective airflow from the switch.

**Figure 10: Switch Cooling (ECS4510-28T)**





**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 airflow.
- ◆ When possible, do not completely fill the rack or cabinet with equipment, allow some unused space within the enclosure for better airflow.

---

## 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 24](#).
- ◆ **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 brackets to the device using the screws provided in the Rack Mounting Kit.

**Figure 11: Attaching the Brackets**

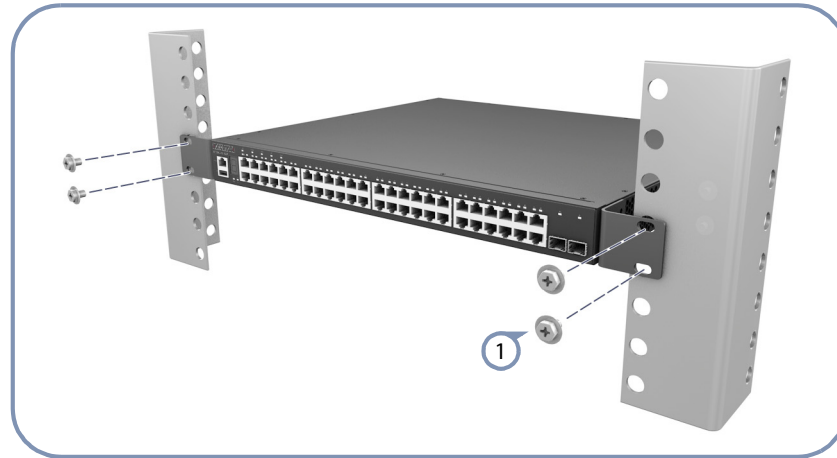


1 Bracket Screws

2 Rack Mounting Bracket

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 12: Installing the Switch in a Rack



① Rack Mount Screws

5. If installing a single switch only, go to [“Power and Grounding”](#) on page 30.
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 13: Attaching the Adhesive Feet



① 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 33.](#)
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.

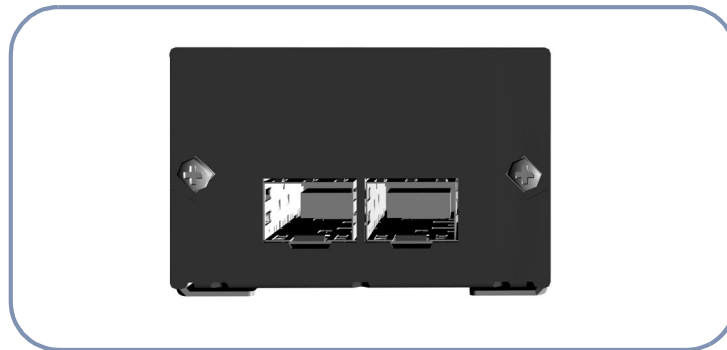
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## Optional Media Expansion Module

The switches support an optional hot-swappable, dual-port 10G SFP+ media expansion module that installs in the rear of the switch chassis.

The module's SFP+ slots support standard 10G SFP+ transceivers. The 10GBASE transceivers operate at 10 Gbps full duplex with support for flow control.

Figure 14: Dual-Port 10G SFP+ Module



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## How to Install an Optional Media Expansion Module

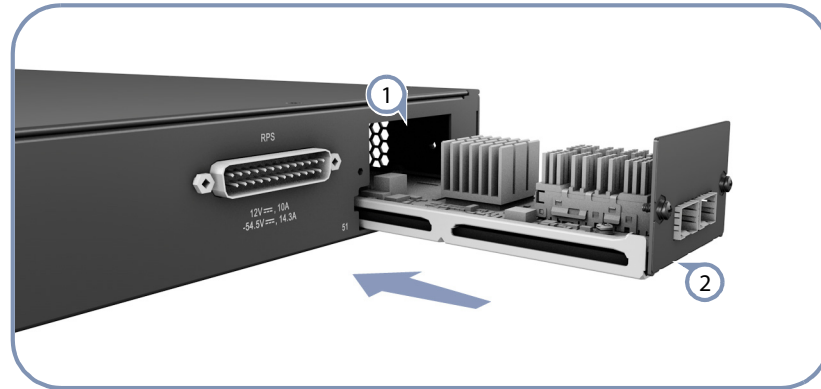


**Note:** The slide-in modules are hot-swappable, you do not need to power off the switch before installing or removing a module.

To install an optional module into the switch, do the following:

1. Remove the blank metal plate (or a previously installed module) from the appropriate slot by removing the two screws with a flat-head screwdriver.
2. Before opening the package that contains the module, touch the bag to the switch casing to discharge any potential static electricity. Also, it is recommended to use an ESD wrist strap during installation.
3. Remove the module from the anti-static shielded bag.

Figure 15: Installing an Optional Module



1 Module Slot

2 Media Expansion Module

4. Holding the module level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.
5. If you are sure the module is properly mated with the connector, tighten the retainer screws to secure the module in the slot.
6. The Module LED on the switch's front panel should turn green to confirm that the module is correctly installed and ready to use.

# 4

## Power and Grounding

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

This chapter includes this sections:

- ◆ “AC Power Supply” on page 30
- ◆ “DC Power Supply” on page 31
- ◆ “Optional Redundant Power Supply” on page 32
- ◆ “Grounding the Chassis” on page 32
- ◆ “How to Connect to AC Power” on page 33
- ◆ “How to Connect to DC Power” on page 34

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### AC 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 16: AC Power Supply Socket**



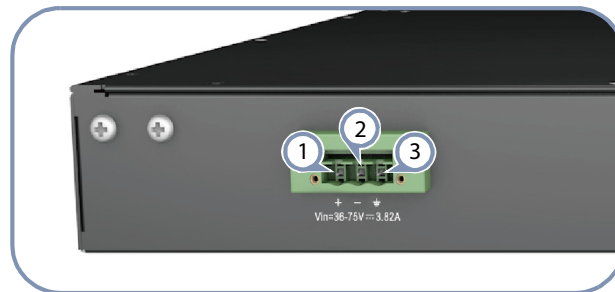
**Table 2: AC Power Supply Specifications**

Item	Description
AC Input	ECS4510-28T: 100 to 240 V, 50-60 Hz, 1.5 A ECS4510-28P: 100 to 240 V, 50-60 Hz, 10 A ECS4510-28F: 100 to 240 V, 50-60 Hz, 2 A ECS4510-52T: 100 to 240 V, 50-60 Hz, 2 A ECS4510-52P: 100 to 127 V, 12 A ; 200 to 240 V , 6 A , 50-60 Hz
Maximum Power Consumption	ECS4510-28T: 35 W max. (with expansion module) ECS4510-28P: 515 W max. (with expansion module and PoE enabled) ECS4510-28P Max. PoE Load: 410 W ECS4510-28F/ECS4510-28F-DC: 50 W max. (with expansion module) ECS4510-52T: 70 W max. (with expansion module) ECS4510-52P: 960 W max. (with expansion module and PoE enabled) The ECS4510-52P maximum power consumption is reduced to 780 W when the device is powered from a connected RPS.

## DC Power Supply

The ECS4510-28F-DC requires power from an external DC power circuit that can provide 36 to 75 VDC. A DC terminal is located on the rear panel of the switch. The terminal is for connecting the DC power circuit.

**Figure 17: DC Terminal**



- ① VDC Power Pin
- ③ Chassis Ground Pin
- ② VDC Return Pin

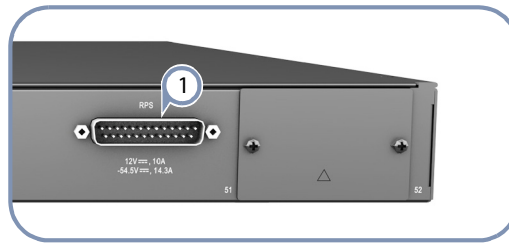
**Table 3: DC Power Supply Specifications**

Item	Description
DC Input	36 to 75 VDC 3.82 A
Maximum Power Consumption	42 W max. (without expansion module)

## Optional Redundant Power Supply

The ECS4510-52P switch supports an optional redundant power supply (RPS) connection. The connector labeled “RPS” on the switch rear panel is for the optional RPS.

**Figure 18: Redundant Power Supply Connector**



① RPS Connector

**Table 4: RPS Specifications**

Item	Description
Input Power	100-240 VAC, 50-60 Hz, 12 A
Output Power	12 VDC, 10.5 A -54.5 VDC, 14.3 A

## Grounding the Chassis

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

**Figure 19: 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 dual-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.

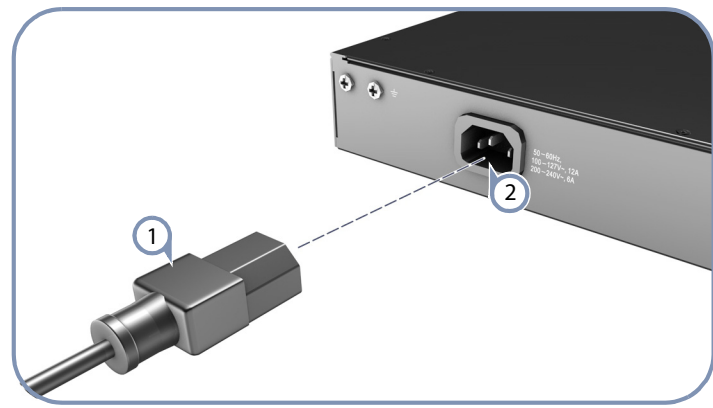
## How to Connect to AC Power

To supply AC power to the switch, first verify that the external AC power supply can provide power that meets the specifications in [Table 2](#).

To connect the switch to a power source:

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

**Figure 20: 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.

---

## How to Connect to DC Power

When using DC power, an external DC power supply circuit must be connected to the DC power connector.



**Warning:** Before wiring the DC plug or connecting power to the switch, ensure that power to the feed lines is turned off at the supply circuit breaker or disconnected from the power bus.



**Note:** 1+1 redundancy is a system where a switch power supply is backed up by another switch power supply in a load-sharing mode. If one power supply fails, the other power supply takes over the full load of the switch.

**Note:** To provide adequate circuit protection between the DC power supply and the switch, all intermediate wiring and circuitry should be rated to carry a load at least two times the maximum rating for this switch, as described in [Table 2, "AC Power Supply Specifications," on page 31](#).

**Note:** The wiring between the DC power supply and the switch must be stranded copper wire within the range of 10 to 18 AWG.

**Note:** Wiring for the power input terminals on the switch are described below. Wiring of the DC power supply terminals depends on the equipment in use at the local site, but should be wired in such a way as to meet the input requirements shown in [Figure 21 on page 35](#). The wiring should also be color coded according to local standards to ensure that the input power and ground lines can be easily distinguished.

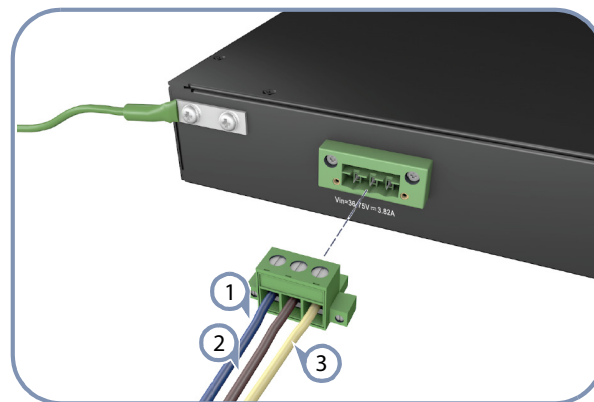
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To connect the switch to a power source:

1. Verify that the external DC power supply can provide 36 to 75 VDC, 3.82 A maximum.
2. Prepare two wires for the DC power source. Use 10 to 18 AWG stranded copper wire. Make sure these wires are not plugged into the power source.
3. Use a wire stripper to carefully strip about a half an inch of the outer insulation off the end of each wire, exposing the copper core.
4. Twist the copper wire strands together to form a tight braid. If possible, solder the exposed braid of wire together for better conductivity.
5. Connect the external power feed and power ground/return lines to the DC plug (provided with the switch) as shown in [Figure 21](#). The brown wire connects to the "-" pin, and the blue wire to the "+" pin. Use a small flat-tip screwdriver to loosen the screws on the power plug and open the wire clamps.

Insert the wire leads into the openings shown in [Figure 21](#). Each lead inserted in the power plug must match the lead attached to the power source. Use the label on the DC power connection block to identify the appropriate power input and return or ground lines.

**Figure 21: DC Plug Connections**



- ① VDC (blue wire)
- ② VDC Return (brown wire)
- ③ Chassis Ground (yellow-green wire)



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**Warning:** If the power leads are plugged into the wrong holes, the power supply will not work properly and may damage the switch.

---

6. Push each wire about half an inch into the opening on the plug, and tighten down the clamp screw securely. You should not be able to pull on the wire and dislodge it.
7. Insert the power plug in the power receptacle on the rear panel.
8. At the power source, turn on the power for the feed lines or power bus.
9. Check the the Power LED indicator as the switch is powered on. If the Power LED is not on, recheck the power supply and power cable connections at the supply source.

# 5

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## Port Connections

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

This chapter includes these sections:

- ◆ [“Cable Labeling and Connection Records” on page 38](#)
- ◆ [“Understanding the Port Status LEDs” on page 38](#)
- ◆ [“How to Install an SFP/SFP+ Transceiver” on page 39](#)
- ◆ [“How to Connect to Twisted-Pair Copper Ports” on page 40](#)
- ◆ [“How to Connect to SFP/SFP+ Fiber Optic Ports” on page 45](#)
- ◆ [“Making 10 Gbps DAC Connections” on page 47](#)
- ◆ [“Connecting Switches in a Stack” on page 47](#)

## 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.

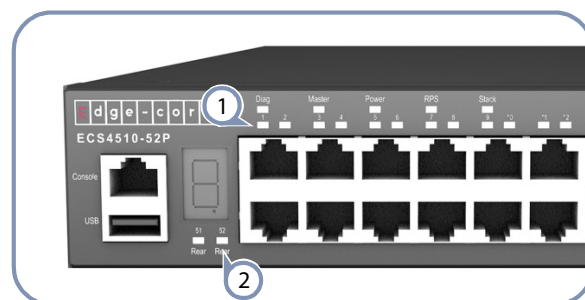
To best manage the physical implementations of your network, follow these guidelines:

- ◆ 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 22: Port Status LEDs



1 Port 1-50 Link/Activity LEDs

2 Port 51-52 Link/Activity LEDs

**Table 5: Port Status LEDs**

LED	Condition	Status
<b>1000BASE-T RJ-45 Ports 1-24/48</b>		
Link/Activity	On/Blinking Green	Port has a valid link. Blinking indicates activity.
	On/Blinking Amber	Port has a valid link and is supplying PoE power. Blinking indicates activity. (ECS4510-52P only)
	Off	The link is down.

## How to Install an SFP/SFP+ Transceiver

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

- ◆ 1000BASE-SX (ET4201-SX)
- ◆ 1000BASE-LX (ET4201-LX)
- ◆ 1000BASE-ZX (ET4201-ZX)
- ◆ 10GBASE-SR (ET5402-SR)
- ◆ 10GBASE-LR (ET5402-LR)
- ◆ 10GBASE-ER (ET5402-ER)



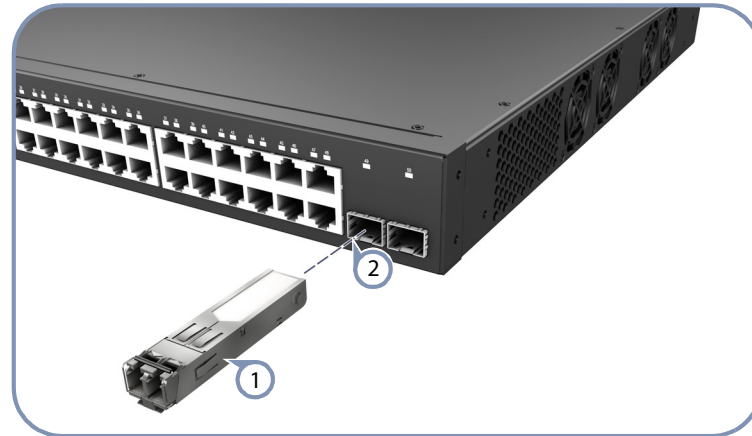
**Note:** SFP/SFP+ transceivers are hot-swappable. The switch does not need to be powered off before installing or removing a transceiver.

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

To install an SFP/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/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/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 23: Inserting an SFP/SFP+ Transceiver into a Slot



① SFP+ Transceiver

② SFP+ Slot



**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 6: Maximum Twisted-Pair Copper Cable Lengths**

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

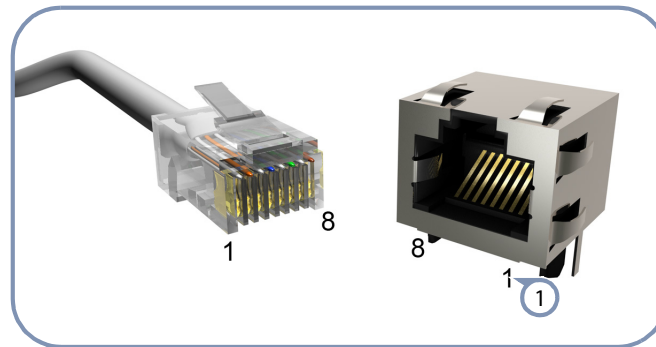


**Copper Cabling Guidelines** To ensure proper operation when installing the switch into a network, make sure that the current cables are suitable for 10BASE-T, 100BASE-TX, or 1000BASE-T operation. Check the following criteria against the current installation of your network:

- ◆ 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 24: RJ-45 Connector**



① RJ-45 Pin Numbers

**Table 7: 10/100BASE-TX MDI and MDI-X Port Pinouts**

Pin	MDI Signal Name <sup>a</sup>	MDI-X Signal Name
1	Transmit Data plus (TD+) -54.5V power (Negative $V_{port}$ )	Receive Data plus (RD+) GND (Positive $V_{port}$ )
2	Transmit Data minus (TD-) -54.5V 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+) -54.5V power (Negative $V_{port}$ )

**Table 7: 10/100BASE-TX MDI and MDI-X Port Pinouts (Continued)**

Pin	MDI Signal Name <sup>a</sup>	MDI-X Signal Name
4	-54.5V power (Negative V <sub>port</sub> )	GND (Positive V <sub>port</sub> )
5	-54.5V power (Negative V <sub>port</sub> )	GND (Positive V <sub>port</sub> )
6	Receive Data minus (RD-) GND (Positive V <sub>port</sub> )	Transmit Data minus (TD-) -54.5V power (Negative V <sub>port</sub> )
7	GND (Positive V <sub>port</sub> )	-54.5V power (Negative V <sub>port</sub> )
8	GND (Positive V <sub>port</sub> )	-54.5V power (Negative V <sub>port</sub> )

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 8: 1000BASE-T MDI and MDI-X Port Pinouts**

Pin	MDI Signal Name	MDI-X Signal Name
1	Bi-directional Pair A Plus (BI_DA+) -54.5V power (Negative V <sub>port</sub> )	Bi-directional Pair B Plus (BI_DB+) GND (Positive V <sub>port</sub> )
2	Bi-directional Pair A Minus (BI_DA-) -54.5V power (Negative V <sub>port</sub> )	Bi-directional Pair B Minus (BI_DB-) GND (Positive V <sub>port</sub> )
3	Bi-directional Pair B Plus (BI_DB+) GND (Positive V <sub>port</sub> )	Bi-directional Pair A Plus (BI_DA+) -54.5V power (Negative V <sub>port</sub> )
4	Bi-directional Pair C Plus (BI_DC+) -54.5V power (Negative V <sub>port</sub> )	Bi-directional Pair D Plus (BI_DD+) GND (Positive V <sub>port</sub> )
5	Bi-directional Pair C Minus (BI_DC-) -54.5V power (Negative V <sub>port</sub> )	Bi-directional Pair D Minus (BI_DD-) GND (Positive V <sub>port</sub> )
6	Bi-directional Pair B Minus (BI_DB-) GND (Positive V <sub>port</sub> )	Bi-directional Pair A Minus (BI_DA-) -54.5V power (Negative V <sub>port</sub> )
7	Bi-directional Pair D Plus (BI_DD+) GND (Positive V <sub>port</sub> )	Bi-directional Pair C Plus (BI_DC+) -54.5V power (Negative V <sub>port</sub> )
8	Bi-directional Pair D Minus (BI_DD-) GND (Positive V <sub>port</sub> )	Bi-directional Pair C Minus (BI_DC-) -54.5V power (Negative V <sub>port</sub> )

### 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 ECS4510-28P and ECS4510-52P switches support both IEEE 802.3af and IEEE 802.3at-2009 PoE standards that enable DC power to be supplied from the switch's RJ-45 copper ports to connected devices by utilizing certain pairs of the connecting Ethernet cable.

For the ECS4510-28P, the total PoE power delivered by all ports cannot exceed the maximum power budget of 410 W. This means that up to 13 ports can supply a maximum 30 W of power simultaneously to connected devices (802.3at), or up to 24 ports can supply up to 15.4 W (802.3af).

For the ECS4510-52P, the total PoE power delivered by all ports cannot exceed the maximum power budget of 780 W when power is provided from the RPS. This means that up to 26 ports can supply a maximum 30 W of power simultaneously to connected devices (802.3at), or up to 48 ports can supply up to 15.4 W (802.3af).

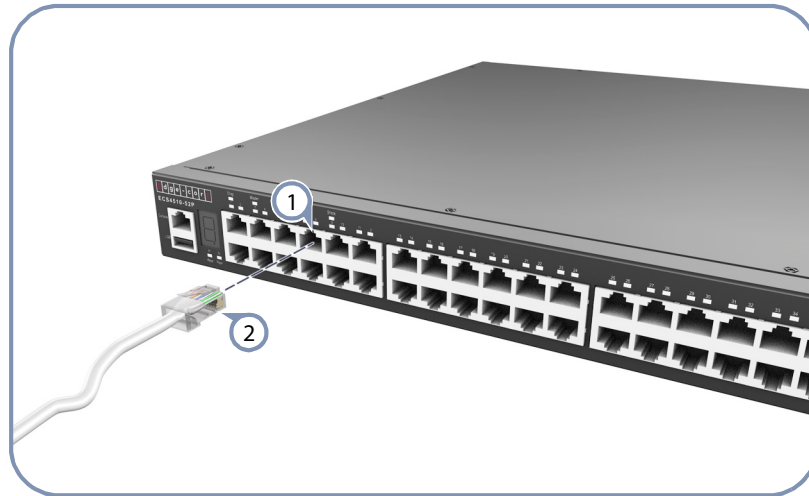
Any PoE-compliant device attached to a port can directly draw power from the switch over the Ethernet cable without requiring its own separate power source. This capability gives network administrators centralized power control for devices such as IP phones and wireless access points, which translates 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 25: 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/SFP+ Fiber Optic Ports

The switch provides slots for SFP+ or SFP-compliant fiber-optic transceivers. Note that all 10G SFP+ fiber optic ports operate at 10 Gbps full duplex. All 1000BASE fiber optic ports operate at 1 Gbps full duplex.

**Table 9: Maximum 10 Gigabit Ethernet Fiber Cable Lengths**

Fiber Size	Fiber Bandwidth	Maximum Cable Length	Connector
<b>10GBASE-SR</b>			
62.5/125 micron multimode	160 MHz/km	2-26 m (7-85 ft.)	LC
62.5/125 micron multimode	200 MHz/km	2-33 m (7-108 ft.)	LC
50/125 micron multimode	400 MHz/km	2-66 m (7-216 ft.)	LC
50/125 micron multimode	500 MHz/km	2-82 m (7-269 ft.)	LC
50/125 micron multimode	2000 MHz/km	2-300 m (7-984 ft.)	LC
<b>10GBASE-LR</b>			
9/125 micron single-mode	N/A	2 m - 10 km (7 ft - 6.2 miles)	LC
<b>10GBASE-ER</b>			
9/125 micron single-mode	N/A	2 m - 40 km (7 ft - 24.8 miles)	LC

**Table 10: Maximum Gigabit Ethernet Fiber Cable Lengths**

Cable Type	Fiber Bandwidth	Maximum Cable Length	Connector
<b>1000BASE-SX</b>			
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
<b>1000BASE-LX</b>			
9/125 micron single-mode	N/A	2 m - 10 km (7 ft - 6.2 miles)	LC
<b>1000BASE-ZX</b>			
9/125 micron single-mode	N/A	2 m - 70 km (7 ft - 43.5 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/SFP+ vendors.

**Connection Procedure** Follow these steps to connect cables to SFP/SFP+ transceiver ports.

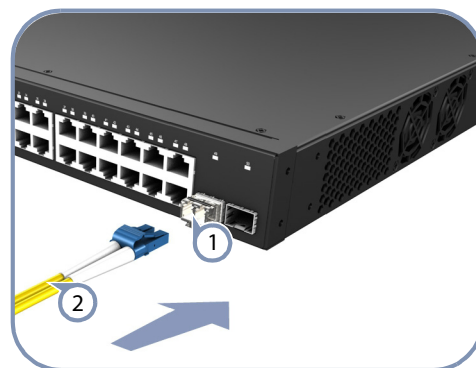


**Warning:** This switch uses lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on.

**Warning:** When selecting a fiber SFP/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/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/SFP+ port on the switch and the other end to the SFP/SFP+ port on the other device. Since SFP/SFP+ connectors are keyed, the cable can be attached in only one orientation.

**Figure 26: Making a Connection to an SFP+ Port**



① SFP+ Transceiver Port

② 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 bundle 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.

---

## Making 10 Gbps DAC Connections

Direct Attach Cable (DAC) is a method of connecting two SFP+ interfaces without using optics and fiber cable. A fixed length of twinax copper cable is terminated at each end with physically-compliant SFP+ transceivers that do not include all their normal electronic and optical components. The result is a low cost, low-latency, 10G Ethernet solution for short distances, ideal for connections within a rack or for stacking switches.

A 10G DAC connection is also known as twinax copper or 10GBASE-CR. DAC copper cables are available in pre-terminated lengths up to 7 m (22.9 ft).

1. Plug the SFP+ transceiver connector on one end of a twinax copper cable segment into an SFP+ slot on the link device.
2. Plug the other end of the twinax cable into an SFP+ slot on the switch.
3. Check that the Link LED on the switch turns on green to indicate that the connection is valid.



**Note:** When using DAC connections in a switch stack, be sure to follow the procedure see [“Connecting Switches in a Stack” on page 47](#).

---

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## Connecting Switches in a Stack

The 10G SFP+ ports on the switch front panel can be used as stacking ports to provide a 40 Gbps stack backplane connection. Any 24-port or 48-port switches can be connected together using SFP+ transceivers and cables. One unit in the stack acts as the Master for configuration tasks, all of the other units function in Slave mode, but can automatically take over management of the stack if the Master unit fails.

[Figure 27 on page 48](#) shows how the stack cables are connected between switches in a stack. Each stacking connection is a 10 Gbps full-duplex link using Direct Attach Cable (DAC) or other SFP+ transceivers and cables. The switch supports a line- and ring-topology stacking configuration, or can be used stand alone. To ensure minimal disruption in case a unit or stack cable fails, it is recommended to always use a ring-topology.

In line-topology stacking there is a single stack cable connection between each switch that carries two-way communications across the stack. In ring-topology stacking, an extra cable is connected between the top and bottom switches forming a “ring” or “closed-loop.” The closed-loop cable provides a redundant path for the stack link, so if one link fails, stack communications can still be maintained.

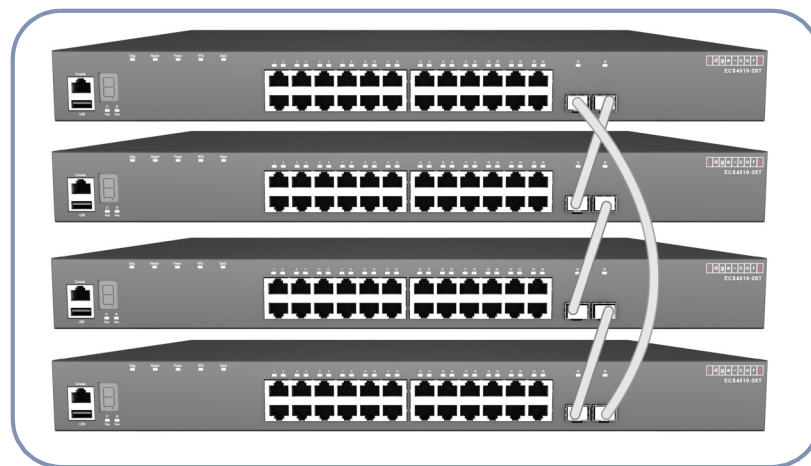
Figure 27 illustrates a ring-topology stacking configuration.

When the stack is initially powered on, the Master unit is designated as unit 1 for a ring topology. For a line topology, the stack is simply numbered from top to bottom, with the first unit in the stack designated as unit 1. This unit identification number appears on the Stack Unit ID LCD on the front panel of the switch. For more information on stack configuration, refer to the *CLI Reference Guide* and *Web Management Guide*.

To connect switches in a stack, perform the following steps:

1. Plug one end of a stack cable in the right port of the top unit.
2. Plug the other end of a stack cable into the left port of the next unit.
3. Repeat steps 1 and 2 for each unit in the stack. Form a simple chain starting at the right port on the top unit and ending at the left port on the bottom unit.
4. (Optional) To form a wrap-around topology, plug one end of a stack cable into the right port on the bottom unit and the other end into the left port on the top unit.

Figure 27: Making Stack Connections



5. To complete the stack configuration, you must use the switch CLI or web interface to enable stacking on the SFP+ ports for each switch in the stack (refer to the *CLI Reference Guide* and *Web Management Guide*). You can also select the stack Master in the stack.
6. Reboot each switch in the stack to start stack operation.



# 6

---

## Switch Management

The switch includes 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*.

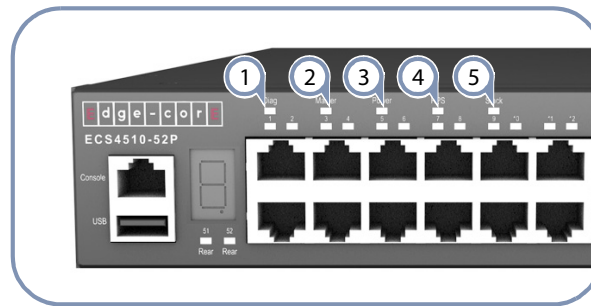
This chapter includes these sections:

- ◆ ["Understanding the System Status LEDs" on page 50](#)
- ◆ ["How to Connect to the Console Port" on page 51](#)

## 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 28: System Status LEDs



- ① Diag LED
- ② Master LED
- ③ Power LED
- ④ RPS LED
- ⑤ Stack LED

Table 11: System Status LEDs

LED	Condition	Status
Power	On Green	Internal power operating normally.
	On Amber	Internal power supply has a fault.
	Off	Power off.
Diag (Diagnostic)	On Green	The system diagnostic test has completed successfully.
	Blinking Green	The system diagnostic test is in progress.
	On Amber	The system diagnostic test has detected a fault.
	Blinking Amber	The system has detected that a cooling fan has failed.
RPS (Redundant Power Supply)	On Green	Redundant power supply is receiving power.
	On Amber	Redundant power supply present, but has a fault.
	Off	No redundant power supply is present.
Stack	On Green	The SFP+ ports are operating in stacking mode.
	Off	The SFP+ ports are in uplink mode or there is no link.
Master	On Green	The switch is the Master unit in the stack.
	On Amber	The switch is operating as a Slave unit in the stack.
	Off	The switch is operating in stand-alone mode.

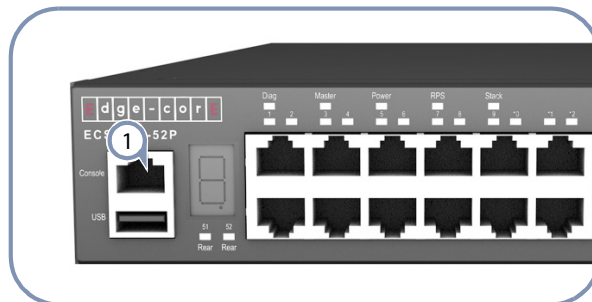
## How to Connect to the Console Port

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 29: Console Port



1 Console Port

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

Table 12: 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:

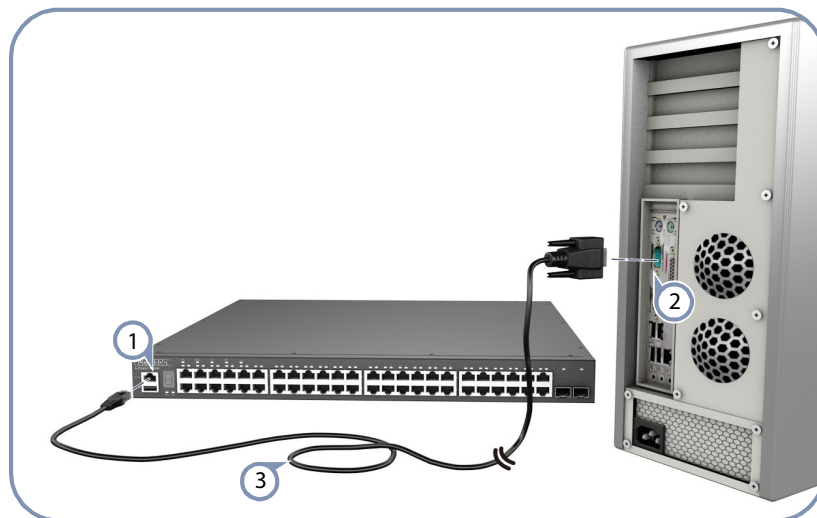
- ◆ Default Baud rate—115200 bps
- ◆ Character Size—8 Characters
- ◆ Parity—None
- ◆ Stop bit—One
- ◆ Data bits—8

- ◆ Flow control—None

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 the management PC.
2. Plug in the RJ-45 end of the serial cable to the Console port on the switch.

**Figure 30: Console Port Connection**



- ① Switch's RJ-45 Console Port
- ② PC's DB-9 COM Port
- ③ Console Cable

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*.



# Troubleshooting

## Diagnosing LED Indicators

Table 13: Troubleshooting Chart

Symptom	Action
Power LED is Off	<ul style="list-style-type: none"><li>◆ Check connections between the switch, the power cord, and the AC power outlet.</li><li>◆ Check the AC power outlet is supplying 110-240 VAC.</li><li>◆ Contact your dealer for assistance.</li></ul>
Diag LED is on Amber	<ul style="list-style-type: none"><li>◆ Power cycle the switch to try and clear the condition.</li><li>◆ If the condition does not clear, contact your dealer for assistance.</li></ul>
Diag LED is Blinking Amber	<ul style="list-style-type: none"><li>◆ Power cycle the switch to try and clear the fan failure.</li><li>◆ If the condition does not clear, replace the switch and contact your dealer for assistance.</li></ul>
RPS LED is on Amber	<ul style="list-style-type: none"><li>◆ Replace the RPS unit connected to the switch.</li><li>◆ If the condition does not clear, contact your dealer for assistance.</li></ul>
Link/Act LED is Off	<ul style="list-style-type: none"><li>◆ Verify that the switch and attached device are powered on.</li><li>◆ Check the cable connectors are firmly plugged into the switch and corresponding device.</li><li>◆ If the switch is installed in a rack, check the connections to the punch-down block and patch panel.</li><li>◆ Verify that the proper cable type is used and its length does not exceed specified limits.</li><li>◆ Check the attached device and cable connections for possible defects. Replace the defective cable if necessary.</li></ul>

## 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 that 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.

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## 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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