

**RocketLinx ES8108  
RocketLinx ES8108F-S  
RocketLinx ES8108F-M**

**Industrial Ethernet Switch**

**User Guide**

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

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

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# Introduction

## Product Overview

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The RocketLinx ES8108/ES8108F is an 8-port Fast Ethernet switch that is equipped with a 2.0 Gbps Packet Switch engine designed to optimize packet forwarding and filtering to fulfill the needs of industrial communications applications. It provides packet forwarding ability to handle 64 to 1552 packet sizes in 2 priority queues that complies with Quality of Service (QoS) for the best data forwarding performance.

In addition, for the best network performance both broadcast storm filtering and flow control functions ensure data delivery without traffic congestion. To avoid interference as well as to extend your network coverage, RocketLinx ES8108F provides two models, which features two 100Mbps fiber ports with either Multi-Mode 2KM or Single-Mode 30KM transceivers to achieve stable long distance transmissions.

To perform in hazardous environments, the ES8108/ES8108F switches are equipped with two redundant power inputs, as well as a wide input voltage range to minimize power interruption. The switches also support a wide temperature operating range of -25°C through 70°C. For easy maintenance, ES8108/ES8108F has one alarm relay for the port link event and the power event to provide an alarm useful for service engineers. With their combination of industrial features, the RocketLinx ES8108/ES8108F switches deliver superior, reliable performance even in the most demanding environments.

RocketLinx ES8108/ES8108F requires no user setup and immediately starts operating as soon as you power it up.

## Features

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The RocketLinx ES8108/ES8108F family has the following features:

- **RocketLinx ES8108** has eight 10/100BASE-TX ports
- **RocketLinx ES8108F** has six 10/100BASE-TX ports and two 100BASE-FX (Multi-Mode or Single-Mode) ports
- Compact size with full power redundancy
- Supports Store-and-Forward switching architecture
- QoS for packet forwarding precedence
- Broadcast storm packet filtering
- Port and power event alarm
- IP31 aluminum alloy enclosure
- DIN rail or wall mount
- Dual power input 12 to 48VDC
- Compliance with IEEE Hi-Pot Testing
- Operating temperature -25° to 70°C

## Hardware Description

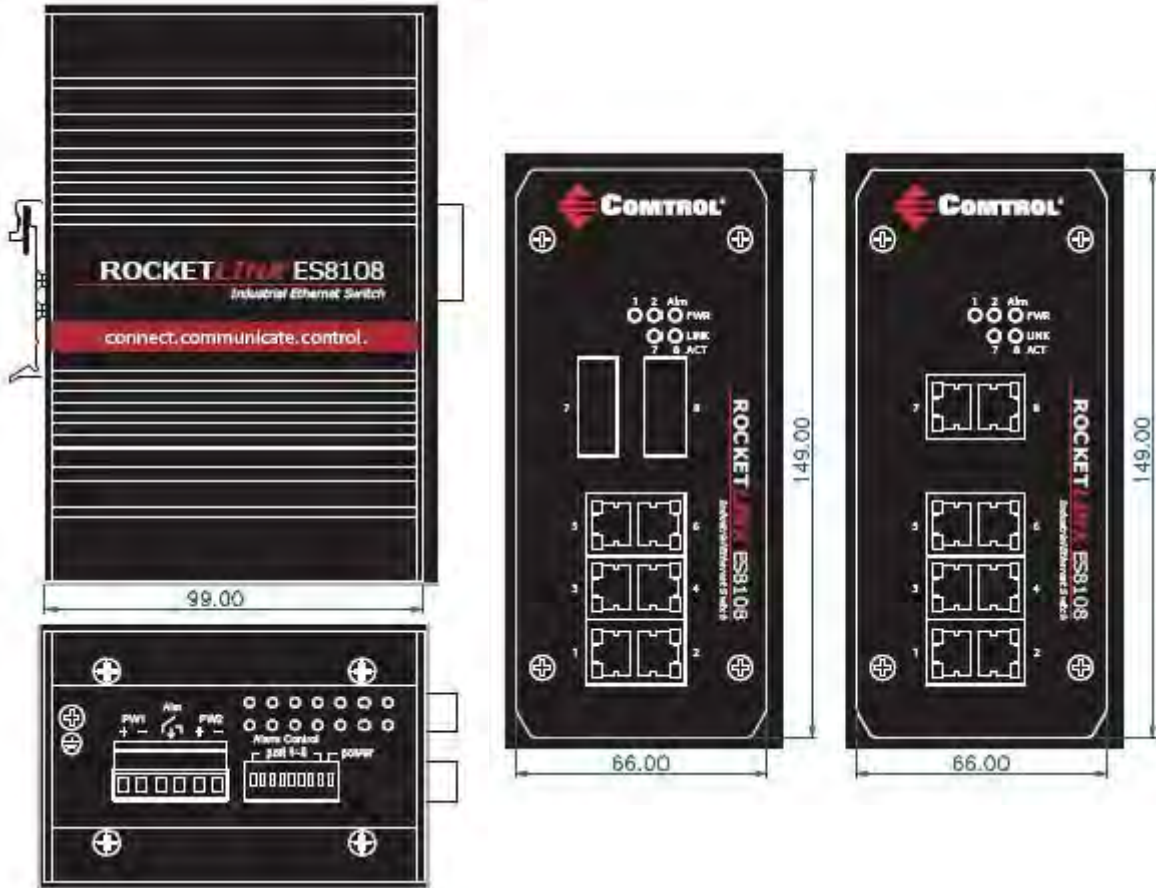
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This subsection discusses the following information:

- [Dimensions](#) on Page 6
- [Front Panel](#) on Page 7
- [Bottom View](#) on Page 7
- [LED Indicators](#) on Page 8

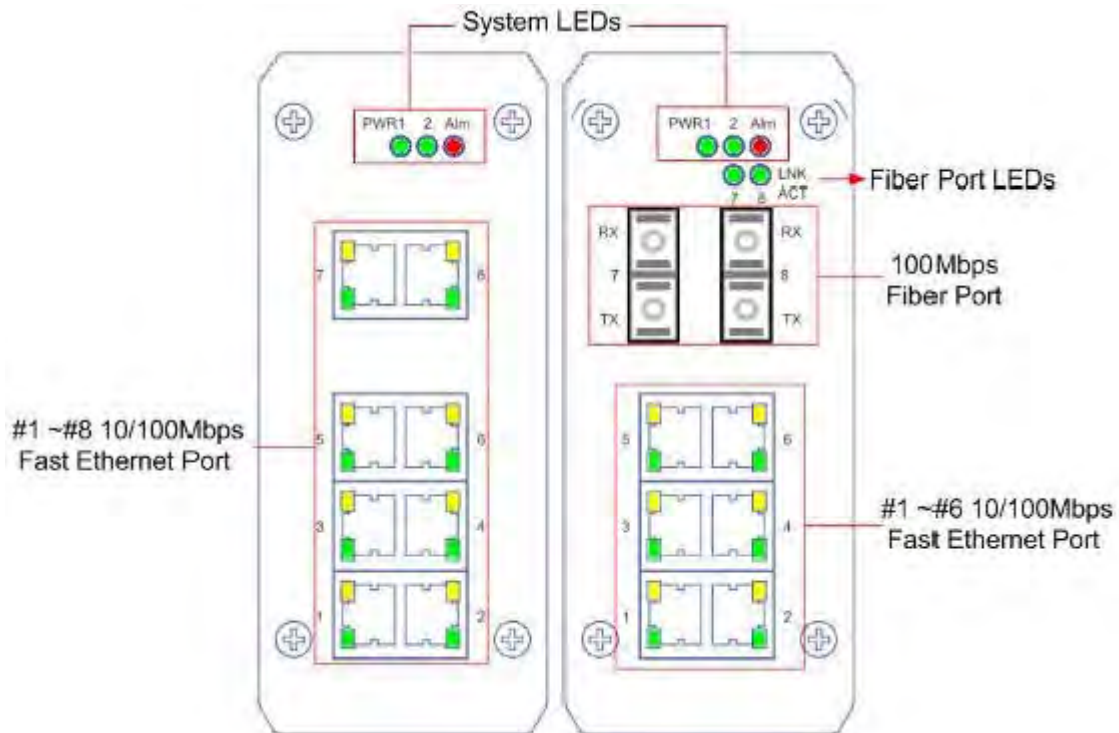
## Dimensions

The RocketLinx ES8108/ES8108F dimensions are 149 mm (H) x 66 mm (W) x 99 mm (D).



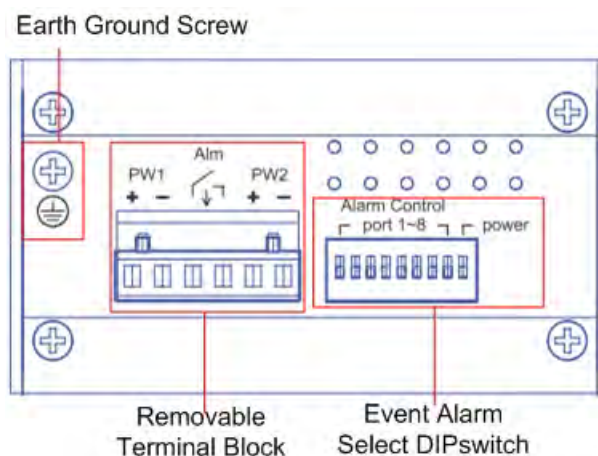
## Front Panel

The RocketLinx ES8108/ES8108F front panels are illustrated below.



## Bottom View

The bottom view of the RocketLinx ES8108/ES8108F consists of one 6-pin removable terminal block connector for two DC power inputs and an event alarm output. There is one 9-pin DIP switch on the bottom for alarm control of port or power event selection.



## LED Indicators

There are system diagnostic LEDs and Ethernet Port LEDs located on the front panel of the RocketLinx ES8108/ES8108F. The LED indicators provide administrators with real-time system status. The following table describes the function of each LED indicator. Refer to the figure in [Front Panel](#) on Page 7 for LED locations.

LED	Status	Description
PWR1	Green on	Power is on.
	Off	No power is being supplied.
PWR2	Green on	Power is on.
	Off	No power is being supplied.
Alm	Red on	Port link down or power failure event occurred.
	Off	No event.
Port 1- 8 (RocketLinx ES8108)	Link (Green on)	A network device is detected and linked up.
	Activity (Green blinks)	The port is transmitting or receiving packets from the connected device.
Port 1- 6 (RocketLinx ES8108F)	Speed (Yellow on/ 100Mbps)	A network device is detected and link established at 100Mbps.
	Speed (Yellow off)	A network device is detected and link established at 10Mbps.
Fiber port #7, #8 (RocketLinx ES8108F)	100Mbps Link (Green on)	The port is operating in full-duplex mode.
	100Mbps Activity (Green Blinks)	The port is transmitting or receiving packets from the connected device.

## Packet Forwarding Ability

The RocketLinx ES8108/ES8108F features a packet filtering function for broadcast packet control protection and Quality of Service (QoS). Both features can provide higher performance in a crowded network through traffic filtering and prioritization.

This subsection will introduce the principles of traffic control and forwarding precedence, including Broadcast control and Quality of Service.

### Broadcast Control

The RocketLinx ES8108/ES8108F begins to drop broadcast packets with DA (destination address) equal to FF:FF:FF:FF:FF:FF if the received broadcast packets are more than the threshold – 198 packets/ per second at 100Mbps or 19 packets / per second at 10Mbps link speed.

All ports are enabled with this function by default to provide better network performance and prevent congestion caused by the flooding of broadcast packets.

### Quality of Service

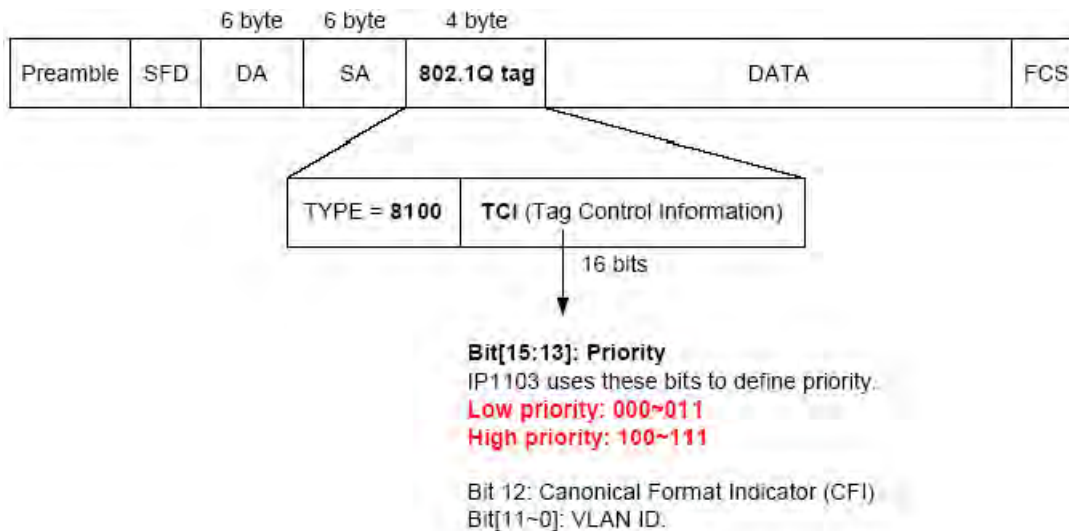
The RocketLinx ES8108/ES8108F supports the frame type priority function, where high priority packets will be queued to a high priority queue to share more bandwidth. The ratio of bandwidth of the high priority to the low priority queue is 8:1. After 8 high priority packets are processed, then 1 low priority packet is processed.

Both the RocketLinx ES8108 and RocketLinx ES8108F can examine the specific bits of VLAN Tag and TCP/IP TOS of IPv4 and IPv6.



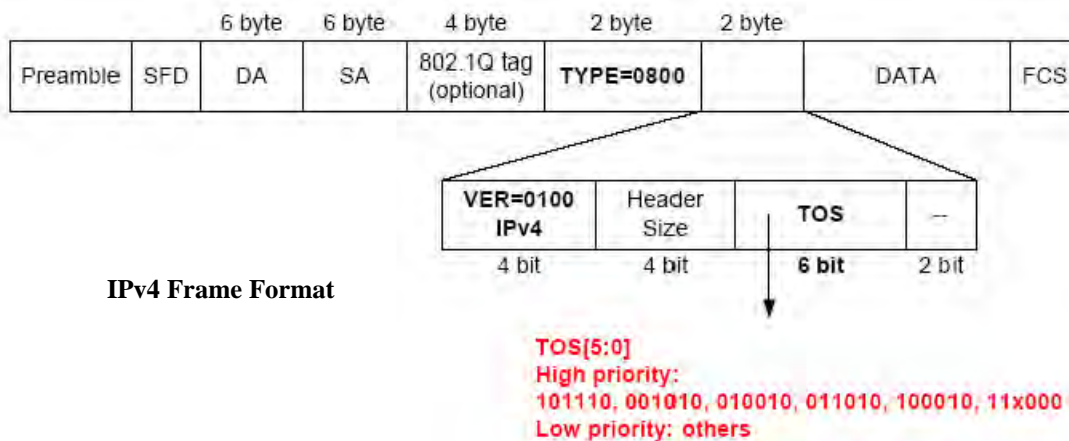
## IEEE 802.1Q tag based CoS

The RocketLinx ES8108/ES8108F checks the 3 bits of the priority field carried by a VLAN tag and maps it to the corresponding priority. A packet with a priority field ranging from 0 to 3 will be treated as a low priority packet, and will be stored in a low priority queue. A packet with a priority field ranging from 4 to 7 will be treated as a high priority packet, and will be stored in the high priority queue.



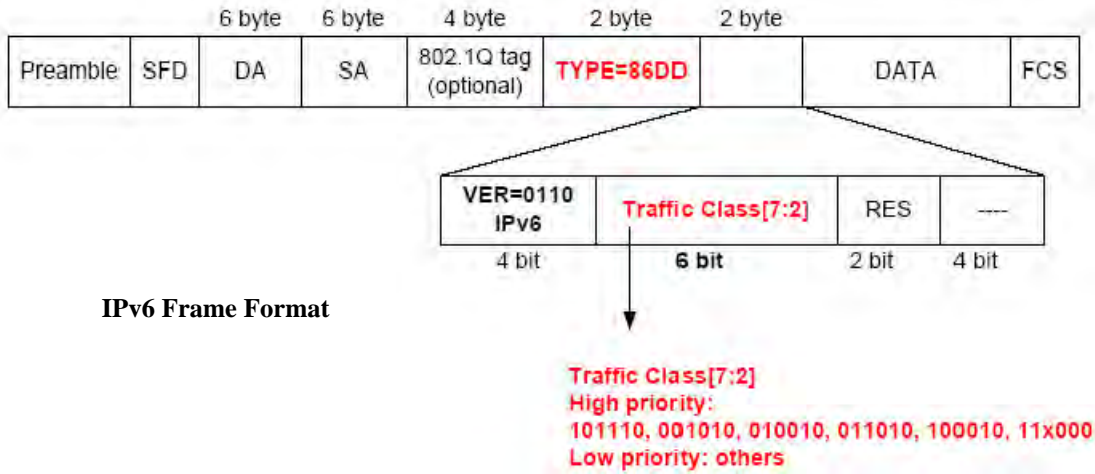
## IEEE 802.1Q Type of Service for IPv4 /IPv6 packet

The RocketLinx ES8108/ES8108F also provides the IP layer CoS (Class of Service) function by recognizing the priority octet and mapping it to the corresponding priority. For an IPv4 packet, it is embedded in the TOS (Type of Service) Octet.



IPv4 Frame Format

For an IPv6 data packet, the Traffic Class Octet is used to differentiate the Class of Service. When this function is enabled, the RocketLinx ES8108/ES8108F will automatically recognize the IP version and capture either the TOS field (IPv4) or Traffic Class field (IPv6) and distribute the packet into the High or Low Queue.



# Hardware Installation

You can use the following subsections to install the RocketLinx ES8108/ES8108F:

- [Connecting the Power and Ground](#)
- [Wiring the Relay Output](#) on Page 12
- [Enabling the Event Alarm](#) on Page 12
- [Mounting the RocketLinx ES8108/ES8108F](#) on Page 13
- [Connecting the Ethernet Ports](#) on Page 13
- [Connecting the Fiber Port \(RocketLinx ES8108F\)](#) on Page 14

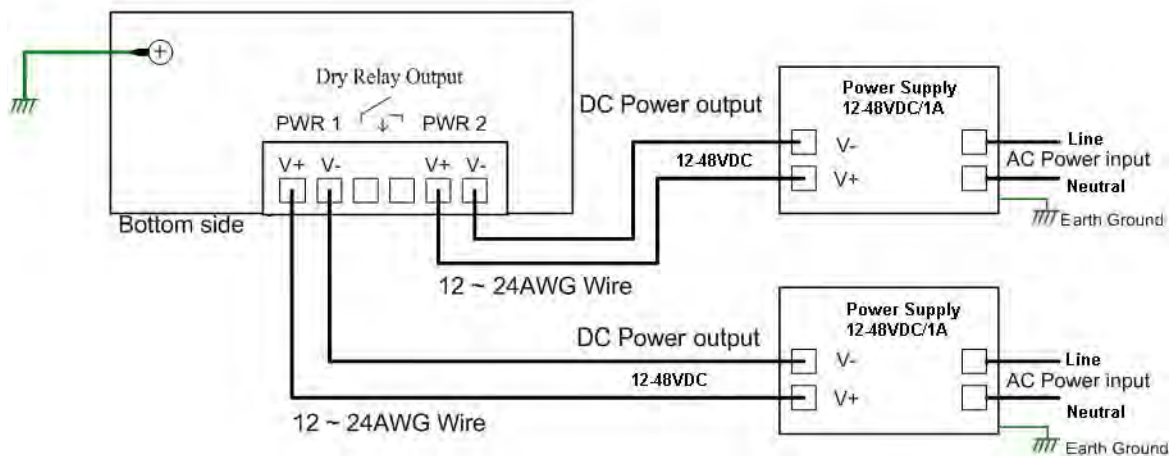
## Connecting the Power and Ground

Use the following procedure to connect the power and the ground.

1. Insert the positive and negative wires (12-24AWG) into V+ and V- contacts.
2. Tighten the wire-clamp screws to prevent the wires from coming loose.

**Note:** Power should be disconnected from the power supply before connecting it to the switch. Otherwise, your screwdriver blade can inadvertently short your terminal connections to the grounded enclosure.

- PWR1 and PWR2 support power redundancy and reverse polarity protection.
- If both power inputs are connected, the RocketLinx ES8108/ES8108F is powered from the highest connected voltage.
- The RocketLinx ES8108/ES8108F will emit an alarm if the ES8108/ES8108F is no longer receiving power.
- Positive and negative power system inputs are both accepted but PWR1 and PWR2 must apply the same mode.



**Note:** Do not connect to AC line - Neutral.

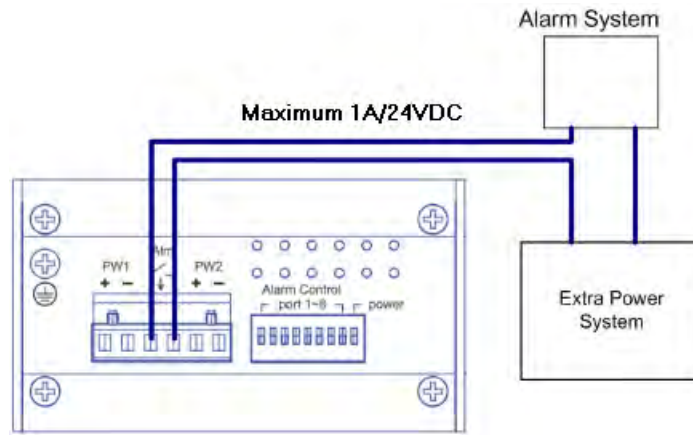
3. Connect a ground wire between the chassis and earth ground using 12-24AWG wire to ensure that the RocketLinx ES8108/ES8108F is not damaged by noise or electrical shock.
  - a. Loosen the earth ground screw (displayed in the previous illustration).
  - b. Tighten the screw after the earth ground wire is connected.

## Wiring the Relay Output

The RocketLinx ES8108/ES8108F have a built-in alarm-relay for port link and power events notifications. The relay contacts are normally open and remain open when there is no failure event. The relay contacts will close when there is a failure event to notify.

The failure events are selectable and enabled using the DIP switch on the ES8108/ES8108F. The relay contacts of RocketLinx ES8108/ES8108F are rated for a maximum of 1A at 24VDC.

Wiring the alarm relay output is the same as wiring power inputs in [Connecting the Power and Ground](#).



1. Insert positive and negative wires into V+ and V-.
2. Tighten the wire-clamp screws to prevent the wires from coming loose.

## Enabling the Event Alarm

You can use this subsection to configure and enable the event alarm to alert maintenance engineers once a system event has occurred. The RocketLinx ES8108/ES8108F is equipped with one dry relay output for port link failure or power failure.

On the bottom of the ES8108/ES8108F, there is one 9-pin DIP switch for alarm control. If you connect the alarm ([Wiring the Relay Output](#) on Page 12) and set the DIP switch of the intended Alarm to *ON*, the relay output forms a short circuit if an alarm occurs.

Use this table to set the DIP switch for the relay output alarm.



Pin	Status	Description
1-8	On	Enables the port link down alarm for the corresponding port.
	Off	Disables the port link down alarm on the corresponding port.
P9	On	Enables the power failure alarm.
	Off	Disables the power failure alarm.

## Mounting the RocketLinx ES8108/ES8108F

You can mount the RocketLinx ES8108/ES8108F on a DIN rail or mounted to the wall. The DIN rail clip is already attached to the RocketLinx ES8108/ES8108F when packaged.

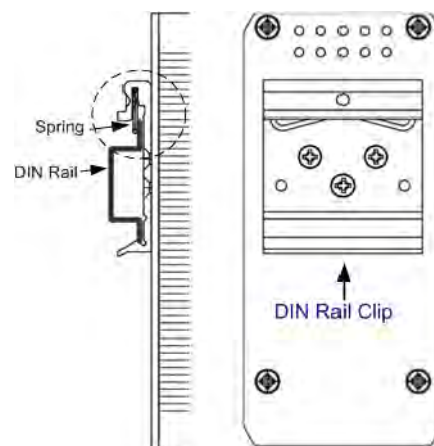
**Note:** *The RocketLinx ES8108/ES8108F will disperse heat through the metal case during PoE port operation. The RocketLinx ES8108/ES8108F should be installed and mounted onto a panel which provides good heat dispersion.*

You can use this procedure to mount the ES8108/ES8108F on a DIN rail.

1. Insert the upper end of DIN rail clip into the back of DIN rail track from its upper side.
2. Lightly push the bottom of DIN rail clip into the track.
3. Ensure the DIN rail clip is tightly attached on the track.
4. To remove the RocketLinx ES8108/ES8108F from the track, reverse the steps above.

To mount the ES8108/ES8108F on the wall:

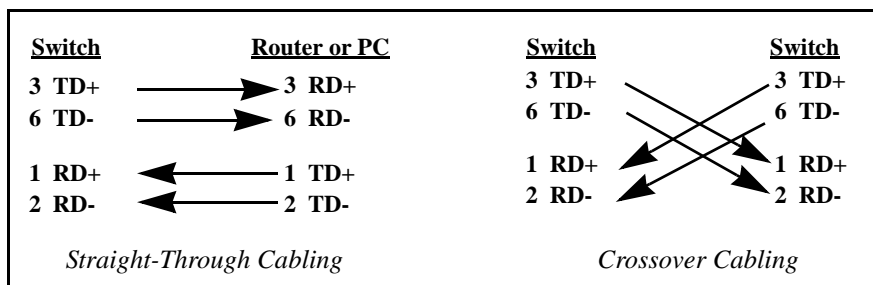
1. Snap the DIN rail plate into the track.
2. Attach the ES8108/ES8108F to the wall using the mounting screws.



## Connecting the Ethernet Ports

You can use the following information to connect standard Ethernet cables between the RocketLinx ES8108/ES8108F 10/100BASE-TX Ethernet ports and the network nodes. The Fast Ethernet ports support 10BASE-T and 100BASE-TX, full- or half-duplex modes.

All the Fast Ethernet ports automatically detect the signal from the connected devices to negotiate the link speed and duplex mode. Auto MDI/MDIX allows you to connect another switch, hub, or workstation without changing straight-through or crossover cables. Crossover cables cross-connect the transmit lines at each end to the received lines at the opposite end.



The Ethernet cables use Pins 1, 2, 3, and 6 of an 8-pin RJ45 connector. The signals of these pins are converted by the automatic MDIX function, as shown in the following table.

Pin	MDIX Signals	MDI Signals
1	RD+	TD+
2	RD-	TD-
3	TD+	RD+
6	TD-	RD-

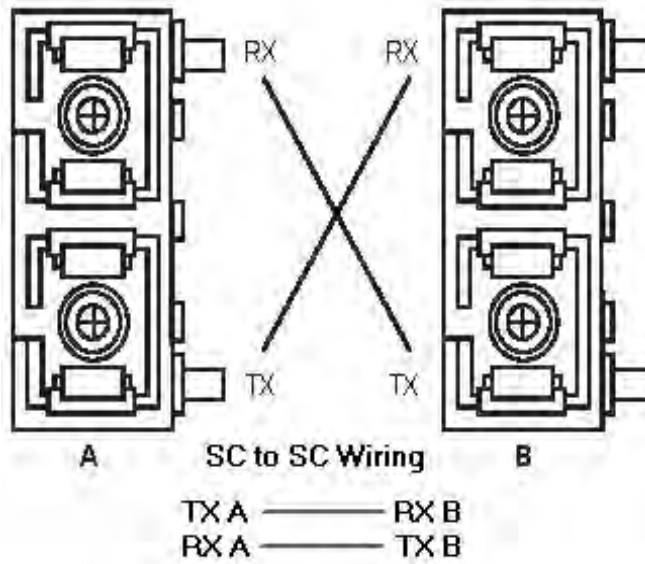
Connect one side of an Ethernet cable into any switch port and connect the other side to your attached device. The **LINK/ACT** LED is lit when the cable is correctly connected. Always make sure that the cables between the switches and attached devices (for example, switch, hub, or workstation) are less than 100 meters (328 feet).

The wiring cable types and maximum cable length are as follows.

- 10BASE-T: 2-pair UTP/STP Category 3, 4, 5 cable, EIA/TIA-568 100-ohm (100 meters)
- 100BASE-TX: 2-pair UTP/STP Category 5 cable, EIA/TIA-568 100-ohm (100 meters)

## Connecting the Fiber Port (RocketLinx ES8108F)

Connect the fiber port on the RocketLinx ES8108F to another fiber Ethernet device using the following information.



This is a Class 1 Laser/LED product.  
Do not stare into the Laser/LED beam.

A wrong connection will cause the fiber port not to work properly.

The fiber connector is a standard connector or square connector (SC).

Mode	Cable Type	Wavelength	Transmit Power (min.)	Transmit Power (max.)	Receive Sensitivity (max.)	Receive Sensitivity (min.)	Min. Launch Power –Max. Receive Sensitivity	Distance (km)
Multi	50/125um 62.5/125um	1310nm	-20dBm	-14dBm	-31dBm	0dBm	11dBm	2km Note (below)
Single	8-10/125um	1310nm	-15dBm	-8dBm	-34dBm	-8dBm	19dBm	30km

**Note:** In the IEEE standard, it suggests the available transmission distance is 2KM for 62.5/125um fiber optical cable in 1310nm wave length. Actually, the attenuation of Multi-Mode 62.5/125um optical fiber cable is 1.5dBm/km and the maximum link distance can up to 4 to 5km.

IEEE organization recommends maximum optical fiber cable distances as defined in the following table.

<b>Standard</b>	<b>Data Rate (Mbps)</b>	<b>Cable Type</b>	<b>IEEE Standard Distance</b>
10BASE-FL	10	850nm, 50/125um or 62.5/125um Multi-Mode optical fiber cable	2km
100BASE-FX	100	1310nm, 50/125um or 62.5/125um Multi-Mode optical fiber cable	2km
100BASE-SX	100	850nm, 50/125um or 62.5/125um Multi-Mode optical fiber cable	300m
1000BASE-SX	1000	850nm, 50/125um Multi-mode optical fiber cable 850nm, 62.5/125um Multi-Mode optical fiber cable	550m 220m
1000BASE-LX	1000	1310nm, 50/125um or 62.5/125um Multi-mode optical fiber cable 1310nm, 9/125um Single-Mode optical fiber cable	550m 5km
1000BASE-LH	1000	1550nm,9/125um Single-Mode optical fiber cable	70km





# Troubleshooting and Technical Support

## Troubleshooting

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If you are having problems, you may want to check the following:

- Make sure you are using the correct DC power supplies (12 to 48VDC). Do not use power supplies with DC output over 48VDC.
- Select Ethernet cables with specifications suitable for your applications to set up your systems.

Ethernet cables are categorized into unshielded twisted-pair (UTP) and shielded twisted-pair (STP) cables.

Category 3, 4, 5, and 6 Ethernet cables are suitable for systems with 10 Mbps transmission speed.

For systems with 100 Mbps transmission speed, Category 5 and 6 Ethernet cables are the only suitable specifications for this environment.

You also need to make sure that the distance between any two nodes does not exceed 100 meters (328 feet).

- If the **Power** LEDs go off when the power cord is plugged in, a power failure might have occurred. Check the power output connection to see if there is any error at the power source. If you still cannot solve the problem, contact Control Technical Support for assistance.

## Control Support

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You can use one of the following methods to contact Control.

Contact Method	Web Address or Phone Number
Support	<a href="http://www.comtrol.com/pub/en/support">http://www.comtrol.com/pub/en/support</a>
Downloads	<a href="ftp://ftp.comtrol.com/html/ES8108.htm">ftp://ftp.comtrol.com/html/ES8108.htm</a>
Web Site	<a href="http://www.comtrol.com">http://www.comtrol.com</a>
Phone	763.494.4100



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