



IFS ES2001-4P-4T User Manual



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Certification	  N4131
FCC compliance	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. You are cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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1. Introduction

1.1 Checklist

Check the contents of your package for following parts:

- ES2001-4P-4T
- User's manual CD x1
- Power cord x 1

If any of these pieces are missing or damaged, please contact your dealer immediately. If possible, retain the carton including the original packing material, to repack the product in case there is a need to return it to us for repair.

1.2 Features

- ◆ 8-Port 10/100Mbps Fast Ethernet ports
- ◆ 4-Port supports 48VDC power to PoE Powered device
- ◆ Hardware based 10/100Mbps auto-negotiation
- ◆ Flow control for full duplex operation and back pressure for half duplex operation
- ◆ Integrates address look-up engine, supports 1K absolute MAC addresses
- ◆ Automatic address learning and address aging
- ◆ Supports Auto MDI/MDI-X function
- ◆ LED indicators for easy network diagnostic
- ◆ Ethernet standards comply with IEEE 802.3 Ethernet, IEEE 802.3u Fast Ethernet, IEEE 802.3x Flow Control and IEEE 802.3af Power over Ethernet
- ◆ Optional Rack Ear Accessories Kit for 10-inch cabinet (RKE-10A) and 19-inch cabinet (RKE-10B)
- ◆ EMI standards comply with FCC, CE class A

1.3 Specification

Model	ES2001-4P-4T	
Hardware Specification		
Network Connector	8-Port RJ-45 for 10/100Base-TX	
PoE Inject Port	4-Port with PoE injector function, Port-1 to Port-4	
LED Display	One power, 1-4 port PoE in-use, LNK/ACT 5-8 port LNK/ACT	
Switch Architecture	Store and Forward switch architecture	
Switch Fabric	1.6Gbps	
MAC Address	1K MAC address table with Auto learning function	
Throughput	1.19Mbps	
Remote power feeding	End-point insert type and compatible with IEEE 802.3af Per port feeding power: 48V DC, 15.4W, 350mA (Maximum) (Pin 1, 2, 3, 6)	
Power	AC 100~240V, 50/60Hz,	
Power Consumption	Max. 65 watts / 221 BTU	
Dimension (W x D x H)	217 x 135 x 43 mm	
Weight	1.0 kg	
Power over Ethernet		
PoE Standard	IEEE 802.3af Power over Ethernet / PSE	
PoE Power Supply Type	End-Span	
PoE Power Output	Per Port 48V DC, 350mA . Max. 15.4 watts	
Power Pin Assignment	1/2(+), 3/6(-)	
Power Budget	55 watts	
Standard Conformance		
EMI Safety	FCC Class A, CE	
Operating environment	0~50 degree C, 10%~95%RH	
Storage environment	-40 ~70 degree C, 95% RH	
Operating Humidity	5% to 90% , relative humidity, non-condensing	
Storage Humidity	5% to 90% , relative humidity, non-condensing	
Standard Compliance	IEEE 802.3 IEEE 802.3u IEEE 802.3x IEEE 802.3af	Ethernet Fast Ethernet Flow Control Power over Ethernet

2. Hardware description

This product operates at two different running speeds – 10Mbps or 100Mbps. The switch automatically distinguishes the speed of incoming connection.

This section describes the hardware features of ES2001-4P-4T. For easier management and control of the Switch, familiarize yourself with its display indicators, and ports. Front panel illustrations in this chapter display the unit LED indicators. Before connecting any network device to the ES2001-4P-4T, please read this chapter carefully.

In the following section, the term “**Switch**” means the Switch device, i.e. ES2001-4P-4T; the term “**switch**” can be any third party switches

2.1 Product Description

The ES2001-4P-4T is equipped with unshielded twisted-pair (UTP) cable ports providing dedicated 10 or 100Mbps bandwidth. The ES2001-4P-4T supports MDI/ MDI-X for auto sensing the use of either CAT5 ‘patch’ or CAT5 ‘crossover’ cables on each of the 8 x 10/100Mbps ports. The Switch also provides PoE injection function on ports #1, 2, 3, 4, which is able to drive 4 x IEEE 802.3af compliant powered devices. Each 10/100Mbps port can supports up to 200Mbps of throughput in full-duplex mode, the ES2001-4P-4T also provides a simple, cost-effective, and highly reliable network connection for data as well as power. Furthermore, it is the ideal device for bridging among Ethernet, Fast Ethernet workgroups and networks.

With 4 PoE interfaces, the ES2001-4P-4T is ideal for small business and workgroups requiring to deploy the PoE for the wireless access points, IP-based surveillance camera or IP phones in any places easily, efficiently and cost effective.

The front panel of ES2001-4P-4T provides LEDs for easy recognition of the switch operation status and troubleshooting. These LED indicators display the power status for the system, LNK/ACT and speed for each 10/100M port. Also the PoE in use LED indicates for PoE ports (port#1 to port#4).

With data and power over Ethernet from one unit, the ES2001-4P-4T reduces the need for additional cables and eliminates the need for dedicated electrical outlets on the wall, ceiling or any unreachable place. The CAT5 cable carries both data and power lowering the installation costs, simplifying the installation effort and eliminating the need for electricians or extension cords.

2.2 Front Panel

The Front Panel of the ES2001-4P-4T PoE Ethernet Switch consists of 8x Auto-Sensing 10/100Mbps Ethernet RJ-45 Ports. The LED Indicators are also located on the front panel of the ES2001-4P-4T.

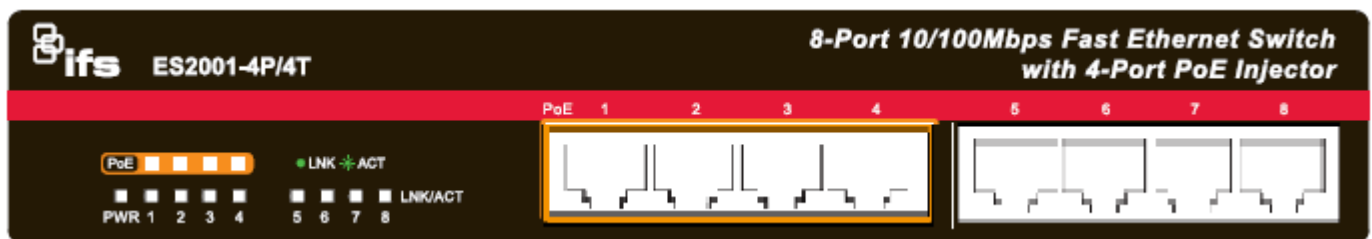


Figure 2-1 ES2001-4P-4T Switch front panel

2.2.1 LED indicators

■ System

LED	Color	Function
PWR	Green	Lights to indicate that the Switch has power.

■ Per 10/100Mbps port

LED	Color	Function
PoE In-use	Green	Lights to indicate the port is providing 48VDC in-line power. (1-4 ports)
LNK/ACT	Green	Lit: Indicates the link through that port is successfully established. Blinks to indicate that the Switch is actively sending or receiving data over that port.

2.3 Rear Panel

The rear panel of the ES2001-4P-4T has an AC inlet power socket, which accepts input power from 100 to 240VAC, 50-60Hz.

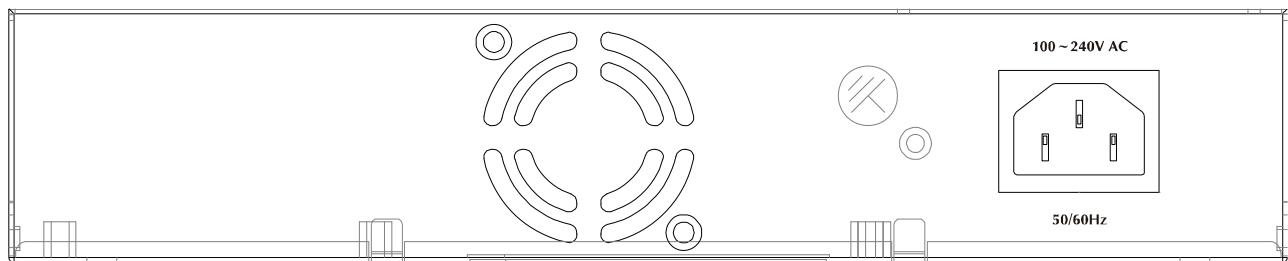


Figure 2-2 ES2001-4P-4T Switch rear panel

Power Notice:

The device is a power-required device, it means, it will not work till it is powered. If your network is system critical, please consider using UPS (Uninterrupted Power Supply) for your device to help prevent data loss or network downtime.

In some areas, installing a surge suppression device may also help to protect your ES2001-4P-4T from being damaged by unregulated surge or current to the ES2001-4P-4T or the power adapter.

2.4 Hardware Installation

2.4.1 Before start up

Before your installation, please refer to the following for your cabling:

100Base-TX

All 100Base-TX ports come with Auto-Negotiation capability. They automatically support 100Base-TX and 10Base-T networks. Users only need to plug a working network device into one of the 100Base-TX ports, and then turn on the ES2001-4P-4T. The port will automatically detect the appropriate speed (10Mbps, 20Mbps, 100Mbps or 200Mbps) after the negotiation with the connected device.

Cabling

Each 10/100Base-TX port uses RJ-45 sockets for connection of unshielded twisted-pair cable (UTP). The IEEE 802.3u Fast Ethernet standard requires Category 5 UTP for 100Mbps 100Base-TX. 10Base-T networks can use Cat.3, 4, or 5 UTP (see table below). Maximum distance is 100meters (328 feet).

Port Type	Cable Type	Connector
10Base-T	Cat 3, 4, 5, 2-pair	RJ-45
100Base-TX	Cat.5 UTP, 2-pair	RJ-45

Any Ethernet devices like hubs/ PCs can connect to the ES2001-4P-4T by using the appropriate cable. The eight-10/100Mbps ports are auto-MDI/MDI-X and can be used with 'straight-through' or 'crossover' cables.

2.5 Desktop Installation

To install the Switch on desktop, simply follow the next steps:

Step 1: Attach the rubber feet to the recessed areas on the bottom of the Switch, as shown in Figure 2-3.

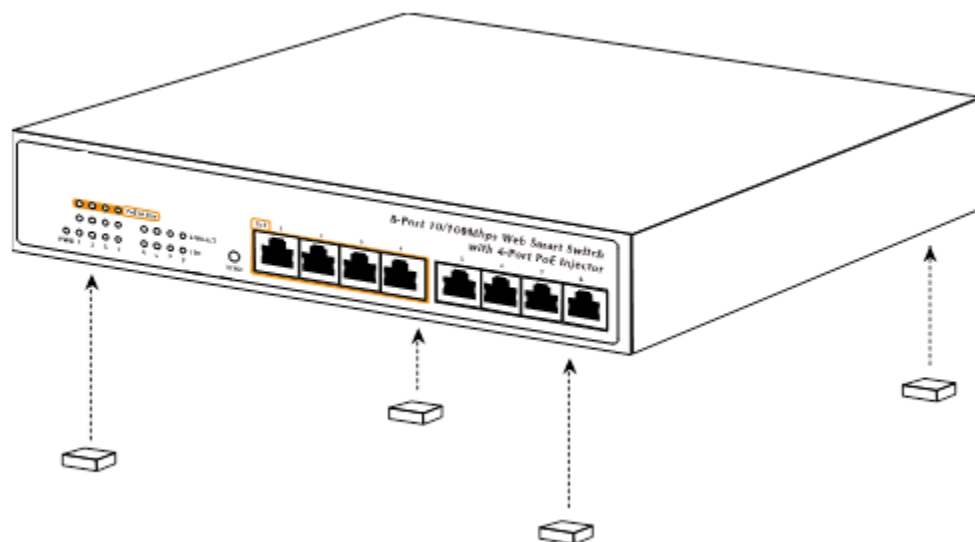


Figure 2-3 Attaching the rubber feet to the Fast Ethernet Switch

Step 2: Place the Switch on desktop near an AC power source.

Step 3: Keep enough ventilation space between the Switch and the surrounding objects.



Note

When choosing a location, please keep in mind the environmental restrictions discussed in Chapter 1, Section 4, in Specification.

Step 4: Connect your Switch to 802.3af compatible Power Devices (PD) and other network devices.

- A. Connect one end of a standard network cable to the 10/100 RJ-45 ports on the front of the Switch.
- B. Connect the other end of the cable to the network devices such as printer servers, workstations or routers...etc.



Note

Connection to the Switch requires UTP Category 5 network cabling with RJ-45 tips. For more information, please see the Cabling Specification in Appendix A.

Step 5: Supply power to the Switch.

- A. Connect one end of the power cable to the Switch.
- B. Connect the power plug of the power cable to a standard wall outlet.

When the Switch receives power, the Power LED should remain solid Green.

2.6 Rack Mounting

To install the Switch in a 10-inch standard rack, follow the instructions described below.

Step 1: Place your Fast Ethernet Switch on a hard flat surface, with the front panel positioned towards your front side.

Step 2: Attach a rack-mount bracket to each side of the Switch with supplied screws attached to the package.

Figure 2-4 shows how to attach brackets to one side of the Switch.



Figure 2-4 Attaching the brackets to the Switch.



You must use the screws supplied with the mounting brackets. Damage caused to the parts by using incorrect screws would invalidate the warranty.

Step 3: Secure the brackets tightly.

Step 4: Follow the same steps to attach the second bracket to the opposite side.

Step 5: After the brackets are attached to the Switch, use suitable screws to securely attach the brackets to the rack, as shown in Figure 2-5.

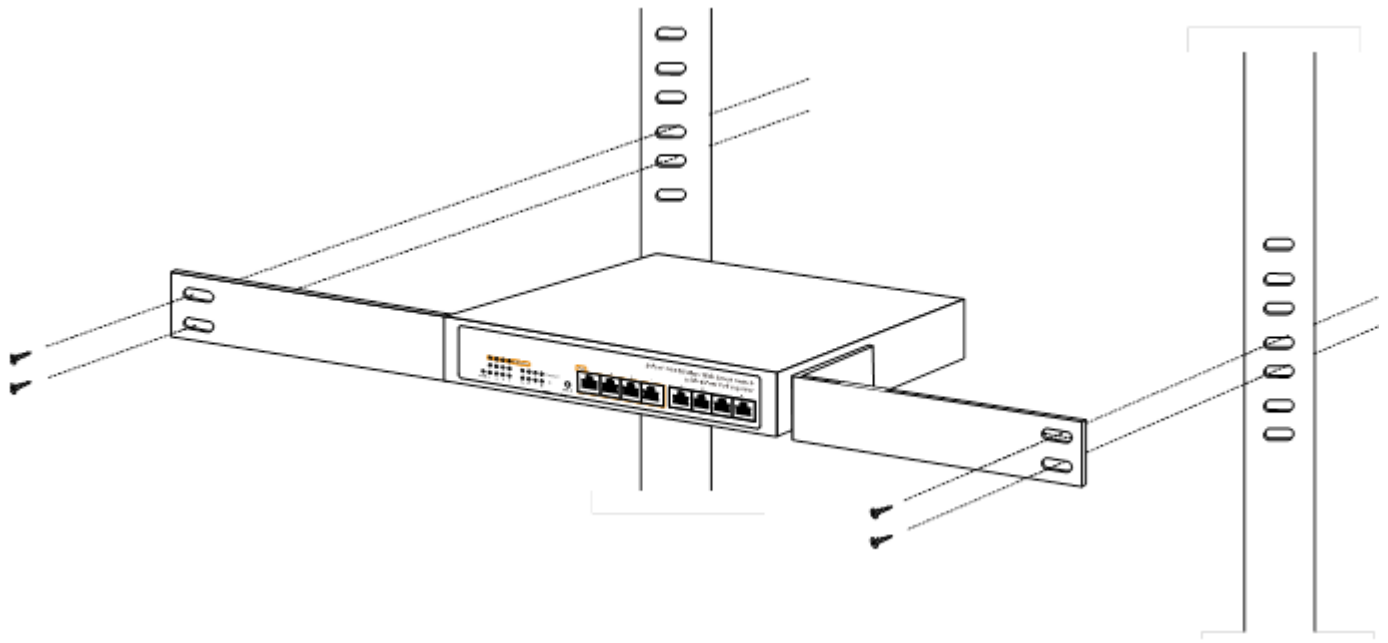


Figure 2-5 Mounting the Switch in a Rack

Step 6: Proceeds with the steps 4 and steps 5 of **session 2.5 Desktop Installation** to connect the network cabling and supply power to your Switch.

2.7 Product Application

2.7.1 Connecting end node or switch

1. Place the ES2001-4P-4T on a smooth surface or fasten the mounting brackets purchased separately with the provided screws in a standard 19" rack.
2. Connect the power cord to the power inlet socket of ES2001-4P-4T and the other end into the local power source outlet. When the Switch receives power, the Power LED should remain solid Green.
3. Connect other switch or PC to one port of the ES2001-4P-4T using Category 3/4/5 UTP/STP cabling.
4. Connect another switch or PC to the other port of ES2001-4P-4T by following the same process as described in Step 3.

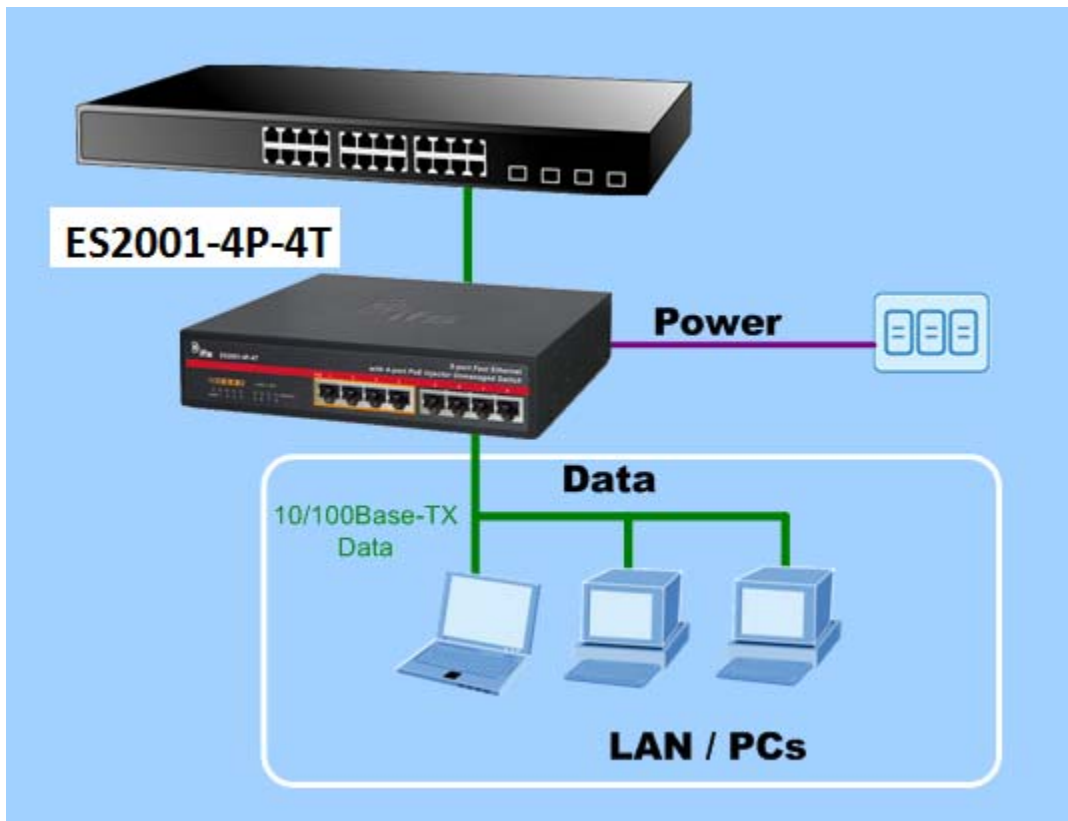


Figure 2-6 End node or Switch connection



Note

Cable distance for Switch

The cable distance between the ES2001-4P-4T and PC should not exceed 100 meter for UTP/STP cable.

Make sure the wiring is correct

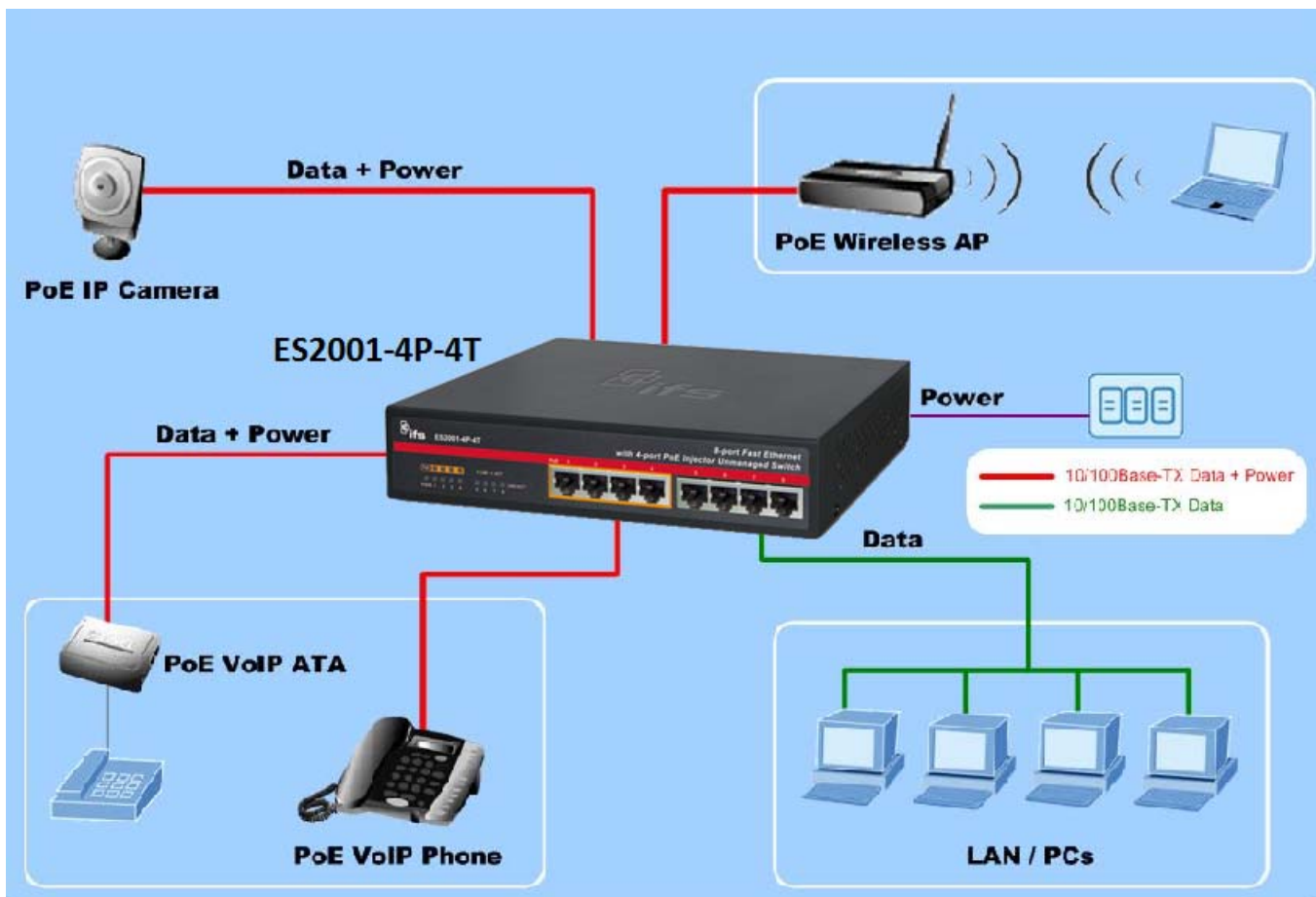
It Category 3/4/5 cable can be used in 10 Mbps operation. To reliably operate your network at 100Mbps, you must use an Unshielded Twisted-Pair (UTP) Category 5 cable, or better Data Grade cabling. Use of CAT3 or CAT4 cables with 100Mbps may cause data loss.

2.7.2 Typical Uses:

Providing up to 4 PoE, in-line power interfaces, the Switch can easily build a power central-controlled IP phone system, IP camera system, AP group for the enterprise. For instance, 4 camera / AP can be easily installed around the corner in the company for surveillance demands or build a wireless roaming environment in the offices.





Without the power-socket limitation, the switch makes the installation of cameras or WLAN AP more easily and efficiently.

Figure 2-7 Department / workgroup PoE Switch connection



2.8 Examples of Power over Ethernet Powered Device

The below devices are typical examples of PoE powered devices. The power ratings (in watts) are given as a guideline only. Please refer to the instructions of the powered device for accurate information.

 <p>3~5 watts</p>	<p>Voice over IP phones Enterprise can install POE VoIP Phone, ATA and other Ethernet/non-Ethernet end-devices to the central where UPS is installed for un-interrupt power system and power control system.</p>
 <p>6~12 watts</p>	<p>Wireless LAN Access Points Museum, Sightseeing, Airport, Hotel, Campus, Factory, Warehouse can install the Access Point any where with no hesitation</p>
 <p>10~12 watts</p>	<p>IP Surveillance Enterprise, Museum, Campus, Hospital, Bank, can install IP Camera without limits of install location – no need electrician to install AC sockets.</p>
 <p>3~12 watts</p>	<p>PoE Splitter PoE Splitter split the PoE 48V DC over the Ethernet cable into 5/9/12V DC power output. It frees the device deployment from restrictions due to power outlet locations, which eliminate the costs for additional AC wiring and reduces the installation time.</p>

3. Switch Operation

3.1 Address Table

The Switch is implemented with an address table. This address table is composed of many entries. Each entry is used to store the address information of some node in network, including MAC address, port no, etc. This information comes from the learning process of Ethernet Switch.

3.2 Learning

When one packet comes in from any port, the Switch will record the source address, port no. And the other related information in address table. This information will be used to decide either forwarding or filtering for future packets.

3.3 Forwarding & Filtering

When one packet comes from some port of the Ethernet Switching, it will also check the destination address besides the source address learning. The Ethernet Switching will lookup the address-table for the destination address. If not found, this packet will be forwarded to all the other ports except the port which this packet comes in. And these ports will transmit this packet to the network it connected. If found, and the destination address is located at different port from this packet comes in, the Ethernet Switching will forward this packet to the port where this destination address is located according to the information from address table. But, if the destination address is located at the same port with this packet comes in, then this packet will be filtered. Thereby increasing the network throughput and availability.

3.4 Store-and-Forward

Store-and-Forward is one type of packet-forwarding techniques. A Store-and Forward Ethernet Switching stores the incoming frame in an internal buffer, do the complete error checking before transmission. Therefore, no error packets occurrence, it is the best choice when a network needs efficiency and stability.

The Ethernet Switch scans the destination address from the packet-header, searches the routing table provided for the incoming port and forwards the packet, only if required. The fast forwarding makes the switch attractive for connecting servers directly to the network, thereby increasing throughput and availability. However, the switch is most commonly used to segment existing hubs, which nearly always improves overall performance. An Ethernet Switching can be easily configured in any Ethernet network environment to significantly boost bandwidth using conventional cabling and adapters.

Due to the learning function of the Ethernet switching, the source address and corresponding port number of each incoming and outgoing packet are stored in a routing table. This information is subsequently used to filter packets whose destination address is on the same segment as the source address. This confines network traffic to its own respective domain, and reduces the overall load on the network.

The Switch performs "Store and forward" therefore, no error packets occur. More reliably, it reduces the re-transmission rate. No packet loss will occur.

3.5 Auto-Negotiation

The STP ports on the ES2001-4P-4T switch have built-in "Auto-negotiation". This technology automatically sets the best possible bandwidth when a connection is established with another network device (usually at Power On or Reset).

Detecting the modes does this and speeds at the second of both devices are connected and capable of, both 10Base-T and 100Base-TX devices can connect with the port in either Half- or Full-duplex mode.

4. Power OVER Ethernet Overview

What is PoE?

Based on the global standard IEEE 802.3af, PoE is a technology for wired Ethernet, the most widely installed local area network technology adopted today. PoE allows the electrical power necessary for the operation of each end-device to be carried by data cables rather than by separate power cords. New network applications, such as IP Cameras, VoIP Phones, and Wireless Networking, can help enterprises improve productivity. It minimizes wires that must be used to install the network for offering lower cost, and less power failures.

IEEE 802.3af also called Data Terminal equipment (DTE) power via Media dependent interface (MDI) is an international standard to define the transmission for power over Ethernet. The 802.3af is delivering 48V power over RJ-45 wiring. Besides 802.3af also define two types of source equipment: Mid-Span and End-Span.

■ Mid-Span

Mid-Span device is placed between legacy switch and the powered device. Mid-Span is tap the unused wire pairs 4/5 and 7/8 to carry power, the other four is for data transmit.

■ End-Span

End-Span device is direct connecting with power device. End-Span could also tap the wire 1/2 and 3/6.

PoE System Architecture

The specification of PoE typically requires two devices: the **Powered Source Equipment (PSE)** and the **Powered Device (PD)**. The PSE is either an End-Span or a Mid-Span, while the PD is a PoE-enabled terminal, such as IP Phones, Wireless LAN, etc. Power can be delivered over data pairs or spare pairs of standard CAT-5 cabling.

How Power is Transferred Through the Cable

A standard CAT5 Ethernet cable has four twisted pairs, but only two of these are used for 10BASE-T and 100BASE-T. The specification allows two options for using these cables for power, shown in Figure 2 and Figure 3:

The spare pairs are used. Figure 2 shows the pair on pins 4 and 5 connected together and forming the positive supply, and the pair on pins 7 and 8 connected and forming the negative supply. (In fact, a late change to the spec allows either polarity to be used).

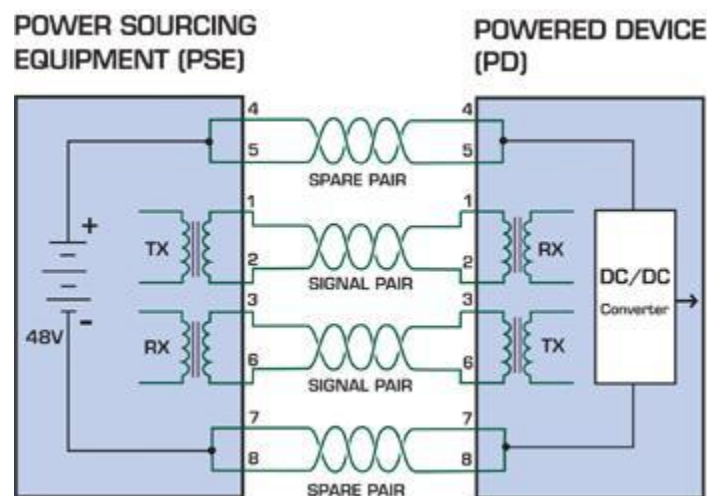


Figure 1 - Power Supplied over the Spare Pins

The data pairs are used. Since Ethernet pairs are transformer coupled at each end, it is possible to apply DC power to the center tap of the isolation transformer without upsetting the data transfer. In this mode of operation the pair on pins 3 and 6 and the pair on pins 1 and 2 can be of either polarity.

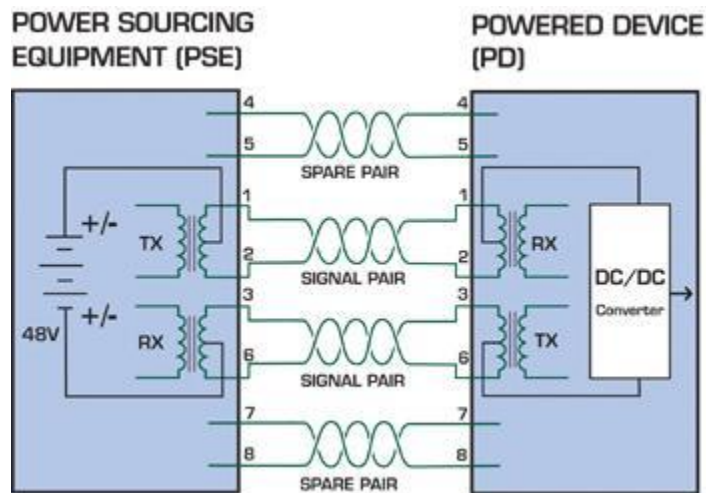


Figure 2 - Power Supplied over the Data Pins

When to install PoE?

Consider the following scenarios:

- You're planning to install the latest VoIP Phone system to minimize cabling building costs when your company moves into new offices next month.
- The company staff has been clamoring for a wireless access point in the picnic area behind the building so they can work on their laptops through lunch, but the cost of electrical power to the outside is not affordable.
- Management asks for IP Surveillance Cameras and business access systems throughout the facility, but they would rather avoid another electrician's payment.

References:

IEEE Std 802.3af-2003 (Amendment to IEEE Std 802.3-2002, including IEEE Std 802.3ae-2002), 2003 Page(s):0_1-121
 White Paper on Power over Ethernet (IEEE 802.3af)

5. The PoE Provision Process

While adding PoE support to networked devices is relatively painless, it should be realized that power cannot simply be transferred over existing CAT-5 cables. Without proper preparation, doing so may result in damage to devices that are not designed to support provision of power over their network interfaces.

The PSE is the manager of the PoE process. In the beginning, only small voltage level is induced on the port's output, till a valid PD is detected during the Detection period. The PSE may choose to perform classification, to estimate the amount of power to be consumed by this PD. After a time-controlled start-up, the PSE begins supplying the 48 VDC level to the PD, till it is physically or electrically disconnected. Upon disconnection, voltage and power shut down.

Since the PSE is responsible for the PoE process timing, it is the one generating the probing signals prior to operating the PD and monitoring the various scenarios that may occur during operation.

All probing is done using voltage induction and current measurement in return.

Stages of powering up a PoE link

Stage	Action	Volts specified per 802.3af	Volts managed by chipset
Detection	Measure whether powered device has the correct signature resistance of 15–33 K Ω	2.7-10.0	1.8–10.0
Classification	Measure which power level class the resistor indicates	14.5-20.5	12.5–25.0
Startup	Where the powered device will startup	>42	>38
Normal operation	Supply power to device	36-57	25.0–60.0

5.1 Line Detection

Before power is applied, safety dictates that it must first be ensured that a valid PD is connected to the PSE's output. This process is referred to as "line detection", and involves the PSE seeking a specific, 25 K Ω signature resistor. Detection of this signature indicates that a valid PD is connected, and that provision of power to the device may commence.

The signature resistor lies in the PD's PoE front-end, isolated from the rest of the PD's circuitries till detection is certified.

5.2 Classification

Once a PD is detected, the PSE may optionally perform classification, to determine the maximal power a PD is to consume. The PSE induces 15.5-20.5 VDC, limited to 100 mA, for a period of 10 to 75 ms responded by a certain current consumption by the PD, indicating its power class.

The PD is assigned to one of 5 classes: 0 (default class) indicates that full 15.4 watts should be provided, 1-3 indicate various required power levels and 4 is reserved for future use. PDs that do not support classification are assigned to class 0. Special care must be employed in the definition of class thresholds, as classification may be affected by cable losses.

Classifying a PD according to its power consumption may assist a PoE system in optimizing its power distribution. Such a system typically suffers from lack of power resources, so that efficient power management based on classification results may reduce total system costs.

5.3 Start-up

Once line detection and optional classification stages are completed, the PSE must switch from low voltage to its full voltage capacity (44-57 Volts) over a minimal amount of time (above 15 microseconds).

A gradual startup is required, as a sudden rise in voltage (reaching high frequencies) would introduce noise on the data lines.

Once provision of power is initiated, it is common for inrush current to be experienced at the PSE port, due to the PD's input capacitance. A PD must be designed to cease inrush current consumption (of over 350 mA) within 50 ms of power provision startup.

5.4 Operation

During normal operation, the PSE provides 44-57 VDC, able to support a minimum of 15.4 watts power.

Power Overloads

The IEEE 802.3af standard defines handling of overload conditions. In the event of an overload (a PD drawing a higher power level than the allowed 12.95 Watts), or an outright short circuit caused by a failure in cabling or in the PD, the PSE must shut down power within 50 to 75 milliseconds, while limiting current drain during this period to protect the cabling infrastructure.

Immediate voltage drop is avoided to prevent shutdown due to random fluctuations.

5.5 Power Disconnection Scenarios

The IEEE 802.3af standard requires that devices powered over Ethernet be disconnected safely (i.e. power needs be shut down within a short period of time following disconnection of a PD from an active port).

When a PD is disconnected, there is a danger that it will be replaced by a non-PoE-ready device while power is still on. Imagine disconnecting a powered IP phone utilizing 48 VDC, then inadvertently plugging the powered Ethernet cable into a non-PoE notebook computer. What's sure to follow is not a pretty picture.

The standard defines two means of disconnection, DC Disconnect and AC Disconnect, both of which provide the same functionality - the PSE shuts down power to a disconnected port within 300 to 400ms. The upper boundary is a physical human limit for disconnecting one PD and reconnecting another.

DC Disconnect

DC Disconnect detection involves measurement of current. Naturally, a disconnected PD stops consuming current, which can be inspected by the PSE. The PSE must therefore disconnect power within 300 to 400 ms from the current flow stop. The lower time boundary is important to prevent shutdown due to random fluctuations.

AC Disconnect

This method is based on the fact that when a valid PD is connected to a port, the AC impedance measured on its terminals is significantly lower than in the case of an open port (disconnected PD).

AC Disconnect detection involves the induction of low AC signal in addition to the 48 VDC operating voltage. The returned AC signal amplitude is monitored by the PSE at the port terminals. During normal operation, the PD's relatively low impedance lowers the returned AC signal while a sudden disconnection of this PD will cause a surge to the full AC signal level and will indicate PD disconnection.

6. Troubleshooting

This chapter contains information to help you solve problems. If the Switch is not functioning properly, make sure the Ethernet Switch was set up according to instructions in this manual.

The Link LED is not lit

Solution:

Check the cable connection and remove duplex mode of the Switch.

Performance is bad

Solution:

Check the full duplex status of the Switch. If the Ethernet Switch is set to full duplex and the partner is set to half duplex, then the performance will be poor.

100Base-TX port link LED is lit, but the traffic is irregular

Solution:

Check that the attached device is not set to dedicate full duplex. Some devices use a physical or software switch to change duplex modes. Auto-negotiation may not recognize this type of full-duplex setting.

Why the Switch doesn't connect to the network

Solution:

Check the LNK/ACT LED on the switch Try another port on the Switch Make sure the cable is installed properly Make sure the cable is the right type Turn off the power. After a while, turn on power again.

Why I connect my PoE device to ES2001-4P-4T and it cannot power on?

Solution:

1. Please check the cable type of the connection from FSD-804(port 1 to port 4) to the other end. The cable should be an 8-wire UTP, Category 5 or above, EIA568 cable within 100 meters. A cable with only 4-wire, short loop or over 100 meters, all will affect the power supply.
2. Please check and assure the device that fully complied with IEEE 802.3af standard.

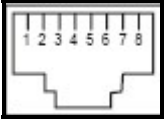
What is the power output of each IEEE 802.af PoE port?

Solution:

Each PoE port supports **48VDC, 350mA, max 15.4 watts** power output. Detect and inject by the standard of IEEE 802.3af.

Appendix A Networking Connection

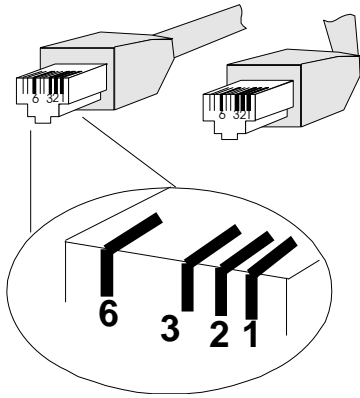
A.1 DATA OUT PoE Switch RJ-45 Port Pin Assignments (Port 1 to Port-4)

	PIN NO	RJ-45 SIGNAL ASSIGNMENT
	1	<ul style="list-style-type: none"> • Output Transmit Data + • Power +
	2	<ul style="list-style-type: none"> • Output Transmit Data – • Power +
	3	<ul style="list-style-type: none"> • Receive Data + • Power -
	4	-
	5	-
	6	<ul style="list-style-type: none"> • Receive Data – • Power -
	7	-
	8	-

A.2 Switch's RJ-45 Pin Assignments (Port-5 to Port-8)

Contact	MDI	MDI-X
1	1 (TX +)	3
2	2 (TX -)	6
3	3 (RX +)	1
6	6 (RX -)	2
4, 5, 7, 8	Not used	Not used

A.3 RJ-45 cable pin assignment



There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight cable and crossover cable connection:

<u>Straight Cable</u>		<u>SIDE 1</u>	<u>SIDE2</u>							
1	2	3	4	5	6	7	8	<u>SIDE 1</u>	1 = White / Orange	1 = White / Orange
2	3	4	5	6	7	8	2 = Orange		2 = Orange	
3	4	5	6	7	8			<u>SIDE 2</u>	3 = White / Green	3 = White / Green
4	5	6	7	8			4 = Blue		4 = Blue	
5	6	7	8					5 = White / Blue	5 = White / Blue	
6	7	8						6 = Green	6 = Green	
7	8							7 = White / Brown	7 = White / Brown	
8								8 = Brown	8 = Brown	
<u>Straight Cable</u>		<u>SIDE 1</u>	<u>SIDE2</u>							
1	2	3	4	5	6	7	8	<u>SIDE 1</u>	1 = White / Orange	1 = White / Orange
2	3	4	5	6	7	8	2 = Orange		2 = Green	
3	4	5	6	7	8			<u>SIDE 2</u>	3 = White / Green	3 = White / Orange
4	5	6	7	8			4 = Blue		4 = Blue	
5	6	7	8					5 = White / Blue	5 = White / Blue	
6	7	8						6 = Green	6 = Orange	
7	8							7 = White / Brown	7 = White / Brown	
8								8 = Brown	8 = Brown	

Figure A-1: Straight-Through and Crossover Cable

Please make sure your connected cables are with same pin assignment and color as above picture before deploying the cables into your network.

Contacting Technical Support

Contact technical support if you encounter any difficulties during this installation. Please make sure you have the requested diagnostic or log files ready before you contact us by phone or go to www.interlogix.com/customer-support.

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