

**4-Port 10/100Mbps +1/2 100FX Fiber Port**  
**Industrial Fast Ethernet Switch**

ISW-511 / ISW-621Series

User's Manual

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## **Revision**

PLANET 4-Port 10/100Mbps +1/2 100FX Fiber Port Industrial Fast Ethernet Switch User's Manual

For Models: ISW-511 / ISW-621 Series

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# **1. INTRODUCTION**

## **1.1 Package Contents**

Check the contents of your package for following parts:

- Industrial Fast Ethernet Switch x 1
- User's Manual x 1
- DIN Rail Kit x 1
- Wall Mount Kit x 1

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

## **1.2 How to Use This Manual**

This Industrial Fast Ethernet Switch User Manual is structured as follows:

### **Chapter 2 Installation**

The chapter explains the feature, functionality and the physical installation of the Industrial Fast Ethernet Switch.

### **Chapter 3 Application**

The chapter explains the Industrial Fast Ethernet Switch application.

### **Chapter 4 Switch operation**

The chapter explains the Industrial Fast Ethernet Switch transmit operation.

### **Chapter 5 Troubleshooting**

The chapter explains the troubleshooting of the Industrial Fast Ethernet Switch.

### **Appendix A**

This chapter contains cable information of the Industrial Fast Ethernet Switch.

## 1.3 Product Features

### Physical Port

Model Name	Ports		Fiber Optical Interface	
	Copper	Optical	Mode	Distance
ISW-511	4 x 10/100Base-TX	1 x 100Base-FX	Multi-mode	2km
ISW-511T			Single-mode	15km
ISW-511S15		2 x 100Base-FX		Multi-mode
ISW-511TS15			Single-mode	15km
ISW-621		2 x 100Base-FX		Multi-mode
ISW-621T			Single-mode	15km
ISW-621S15		2 x 100Base-FX		Multi-mode
ISW-621TS15			Single-mode	15km

### Layer 2 Features

- Complies with IEEE 802.3, IEEE 802.3u 10/100Base-TX, 100Base-FX
- Supports Auto-negotiation and 10/100Mbps half / full duplex mode for each copper port
- High performance store and forward architecture, broadcast storm control, runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
- Prevents packet loss with back pressure (Half-Duplex) and IEEE 802.3x PAUSE frame flow control (Full-Duplex)
- Backplane (Switching Fabric): ISW-511 Series: 1Gbps, ISW-621 Series: 1.2Gbps
- Integrated address look-up engine, support 2K absolute MAC addresses
- 1Mbit on-chip frame buffer on ISW-511 / ISW-621 Series
- Automatic address learning and address aging

- 
- CSMA/CD Protocol

### **Industrial Case / Installation**

- IP-30 Metal case / Protection
- DIN Rail and Wall Mount Design
- 12 to 48V DC, redundant power with polarity reverse protect function and connective removable terminal block for master and slave power
- -10 to 60 Degree C operation temperature on ISW-511 / ISW-511S15 / ISW-621 / ISW-621S15
- -40 to 75 Degree C operation temperature on ISW-511T / ISW-511TS15 / ISW-621T / ISW-621TS15



## 1.4 Product Specifications

Model		ISW-511	ISW-511S15
<b>Hardware Specification</b>			
Copper	Ports	4 x 10/100Base-TX, Auto-negotiation, Auto-MDI/MDI-X	
	Cable	10Base-T: 2-pair UTP Cat. 3, 4, 5 cable (100meters, max.) 100Base-TX: 2-pair UTP Cat. 5 cable (100meters, max.)	
Fiber Optical	Port	1 x 100Base-FX	
	Cable	50/125µm or 62.5/125µm fiber	9/125µm fiber
	Mode	Multi-mode	Single-mode
	Distance	2km	15km
Dimensions (W x D x H)		135mm x 97mm x 32mm	
Weight		436g	
Power Requirement		12~48 VDC, Redundant power with polarity reverse protection function	
Power Consumption / Dissipation		9.1 Watts / 31BTU	
Installation		DIN rail kit and wall mount ear	
<b>Switch Specification</b>			
Switch Processing Scheme		Store-and-Forward	
Address Table		2K entries	
Buffer		1Mbit	
Flow Control		Back pressure for half duplex, IEEE 802.3x Pause Frame for full duplex	
Switch Fabric		1Gbps	
Throughput (Packet Per Second)		0.74Mpps @ 64Bytes	
<b>Standards Conformance</b>			
Standards Compliance		IEEE 802.3 Ethernet, 10Base-T IEEE 802.3u Fast Ethernet, 100Base-TX, 100Base-FX IEEE 802.3x Full-duplex flow control	
Temperature		Operating: -10~60 Degree C Storage: -40~85 Degree C	
Humidity Operating		Operating: 5% to 90%, Storage: 5% to 90% (Non-condensing)	
Regulation Compliance		FCC Part 15 Class A, CE	

Model		ISW-511T	ISW-511TS15
<b>Hardware Specification</b>			
Copper	Ports	4 x 10/100Base-TX, Auto-negotiation, Auto-MDI/MDI-X	
	Cable	10Base-T: 2-pair UTP Cat. 3, 4, 5 cable (100meters, max.) 100Base-TX: 2-pair UTP Cat. 5 cable (100meters, max.)	
Fiber Optical	Port	1 x 100Base-FX	
	Cable	50/125µm or 62.5/125µm fiber	9/125µm fiber
	Mode	Multi-mode	Single-mode
	Distance	2km	15km
Dimensions (W x D x H)		135mm x 97mm x 32mm	
Weight		436g	
Power Requirement		12~48 VDC, Redundant power with polarity reverse protection function	
Power Consumption / Dissipation		9.1 Watts / 31BTU	
Installation		DIN rail kit and wall mount ear	
<b>Switch Specification</b>			
Switch Processing Scheme		Store-and-Forward	
Address Table		2K entries	
Buffer		1Mbit	
Flow Control		Back pressure for half duplex, IEEE 802.3x Pause Frame for full duplex	
Switch Fabric		1Gbps	
Throughput (Packet Per Second)		0.74Mpps @ 64Bytes	
<b>Standards Conformance</b>			
Standards Compliance		IEEE 802.3 Ethernet, 10Base-T IEEE 802.3u Fast Ethernet, 100Base-TX, 100Base-FX IEEE 802.3x Full-duplex flow control	
Temperature		Operating: -40~75 Degree C Storage: -40~85 Degree C	
Humidity Operating		Operating: 5% to 90%, Storage: 5% to 90% (Non-condensing)	
Regulation Compliance		FCC Part 15 Class A, CE	

Model		ISW-621	ISW-621S15
<b>Hardware Specification</b>			
Copper	Ports	4 x 10/100Base-TX, Auto-negotiation, Auto-MDI/MDI-X	
	Cable	10Base-T: 2-pair UTP Cat. 3, 4, 5 cable (100meters, max.) 100Base-TX: 2-pair UTP Cat. 5 cable (100meters, max.)	
Fiber Optical	Port	2 x 100Base-FX	
	Cable	50/125µm or 62.5/125µm fiber	9/125µm fiber
	Mode	Multi-mode	Single-mode
	Distance	2km	15km
Dimensions (W x D x H)		135mm x 97mm x 32mm	
Weight		442g	
Power Requirement		12~48 VDC, Redundant power with polarity reverse protection function	
Power Consumption / Dissipation		11.6 Watts / 40BTU	
Installation		DIN rail kit and wall mount ear	
<b>Switch Specification</b>			
Switch Processing Scheme		Store-and-Forward	
Address Table		2K entries	
Buffer		1Mbit	
Flow Control		Back pressure for half duplex, IEEE 802.3x Pause Frame for full duplex	
Switch Fabric		1.2Gbps	
Throughput (Packet Per Second)		0.89Mpps @ 64Bytes	
<b>Standards Conformance</b>			
Standards Compliance		IEEE 802.3 Ethernet, 10Base-T IEEE 802.3u Fast Ethernet, 100Base-TX, 100Base-FX IEEE 802.3x Full-duplex flow control	
Temperature		Operating: -10~60 Degree C Storage: -40~85 Degree C	
Humidity Operating		Operating: 5% to 90%, Storage: 5% to 90% (Non-condensing)	
Regulation Compliance		FCC Part 15 Class A, CE	

Model		ISW-621T	ISW-621TS15
<b>Hardware Specification</b>			
Copper	Ports	4 x 10/100Base-TX, Auto-negotiation, Auto-MDI/MDI-X	
	Cable	10Base-T : 2-pair UTP Cat. 3, 4, 5 cable (100meters, max.) 100Base-TX : 2-pair UTP Cat. 5 cable (100meters, max.)	
Fiber Optical	Port	2 x 100Base-FX	
	Cable	50/125µm or 62.5/125µm fiber	9/125µm fiber
	Mode	Multi-mode	Single-mode
	Distance	2km	15km
Dimensions (W x D x H)		135mm x 97mm x 32mm	
Weight		442g	
Power Requirement		12~48 VDC, Redundant power with polarity reverse protection function	
Power Consumption / Dissipation		11.6 Watts / 40BTU	
Installation		DIN rail kit and wall mount ear	
<b>Switch Specification</b>			
Switch Processing Scheme		Store-and-Forward	
Address Table		2K entries	
Buffer		1Mbit	
Flow Control		Back pressure for half duplex, IEEE 802.3x Pause Frame for full duplex	
Switch Fabric		1.2Gbps	
Throughput (Packet Per Second)		0.89Mpps @ 64Bytes	
<b>Standards Conformance</b>			
Standards Compliance		IEEE 802.3 Ethernet, 10Base-T IEEE 802.3u Fast Ethernet, 100Base-TX, 100Base-FX IEEE 802.3x Full-duplex flow control	
Temperature		Operating: -40~75 Degree C Storage: -40~85 Degree C	
Humidity Operating		Operating: 5% to 90%, Storage: 5% to 90% (Non-condensing)	
Regulation Compliance		FCC Part 15 Class A, CE	

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## **2. INSTALLATION**

This section describes the functionalities of the Industrial Fast Ethernet Switch's components and guides how to install it on the desktop. Basic knowledge of networking is assumed. Please read this chapter completely before continuing.

In the following section, the term "Industrial Fast Ethernet Switch" means the ISW-511 / ISW-621 series.

### **2.1 Product Description**

The PLANET ISW-511 / ISW-621 series is 4-Port 10/100Mbps + 1/2 100FX Fiber Port Industrial Fast Ethernet Switch with non-blocking wire-speed performance and new slim type with IP 30 metal shape for easily deployment in Heavy Industrial demanding environments.

With a 1/1.2Gbps internal switching fabric, the Industrial Fast Ethernet Switch can handle extremely large amounts of data in a secure topology linking to a backbone or high capacity servers.

The Industrial Fast Ethernet Switch has 2K MAC address table and offers wire-speed packets transfer performance without risk of packet loss. The stable throughput of the device makes it ideal for most Ethernet environments.

All RJ-45 copper interfaces support 10/100Mbps Auto-negotiation for optimal speed detection through RJ-45 Category 5, 4 or 3 cables. Support standard for Auto-MDI/MDI-X that can detect the type of connection to any Ethernet device without requiring special straight or crossover cables.

The flow control function allows Industrial Fast Ethernet Switch supported routers and servers to directly connect to this device for fast, reliable data transfer.

### 2.1.1 Switch Front Panel

Figure 2-1 & 2-2 & 2-3 & 2-4 shows a front panel of Industrial Fast Ethernet Switch.

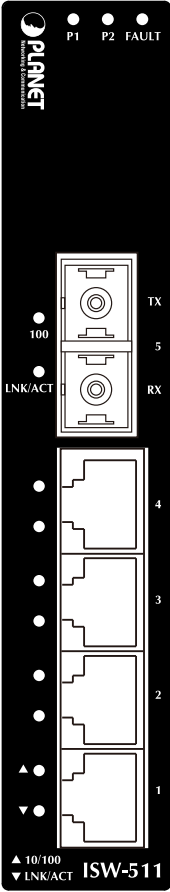


Figure 2-1 ISW-511 / ISW-511S15 front panel

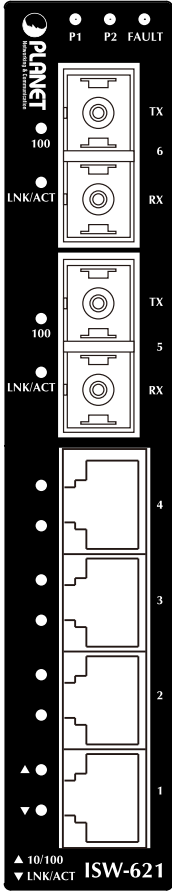


Figure 2-2 ISW-621 / ISW-621S15 front panel

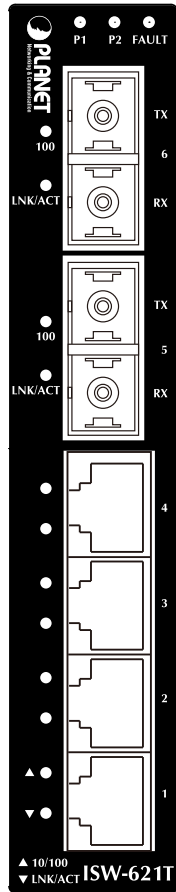
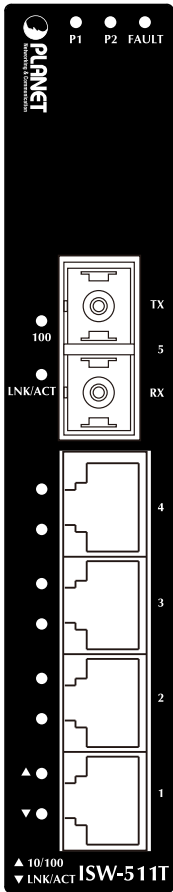


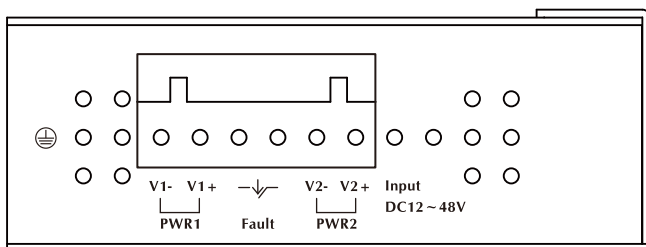
Figure 2-3 ISW-511T / ISW-511TS15 front panel    Figure 2-4 ISW-621T / ISW-621TS15 front panel

## 2.1.2 LED Indicators

LED	Color	Function	
P1	Green	Lit: indicate the power 1 has power.	
P2	Green	Lit: indicate the power 2 has power.	
FAULT	Green	Lit: indicate the either power 1 or power 2 has no power.	
100	Green	Fiber Optical	Lit: indicate the Fiber port is successfully connecting to the network at 100Mbps.
10/100	Green	Copper	Lit: indicate the Switch is successfully connecting to the network at 100Mbps. Off: indicate that the Switch is successfully connecting to the network at 10Mbps.
LNK/ACT	Green	Fiber Optical	Lit: indicate the link through that port is successfully established.
		Copper	Blink: indicate that the Switch is actively sending or receiving data over that port.

## 2.1.3 Switch Upper Panel

The upper panel of the Industrial Fast Ethernet Switch consist one terminal block connector within two DC power inputs. Figure 2-5 shows the upper panel of the Industrial Fast Ethernet Switch.



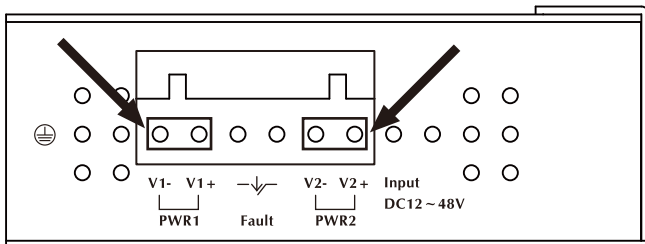
**Figure 2-5** Industrial Fast Ethernet Switch upper Panel.



## 2.1.4 Wiring the Power Inputs

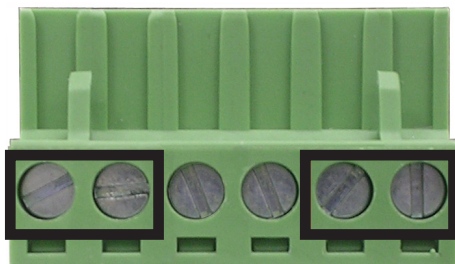
The 6-contact terminal block connector on the top panel of Industrial Fast Ethernet Switch is used for two DC redundant powers input. Please follow the steps below to insert the power wire.

1. Insert positive / negative DC power wires into the contacts 1 and 2 for POWER 1, or 5 and 6 for POWER 2.



V1- V1 +      V2 - V2 +

2. Tighten the wire-clamp screws for preventing the wires from loosing.
- 3.



1      2      3      4      5      6  
Power 1      Fault      Power 2  
-      +      -      +



Note

The wire gauge for the terminal block should be in the range between 12 ~ 24 AWG.

## 2.1.5 Wiring the Fault Alarm Contact

The fault alarm contacts are in the middle of the terminal block connector as the picture shows below. Inserting the wires, the Industrial Fast Ethernet Switch will detect the fault status of the power failure, or port link failure (available for managed model) and then forms an open circuit. The following illustration shows an application example for wiring the fault alarm contacts.

1      2      3      4      5      6

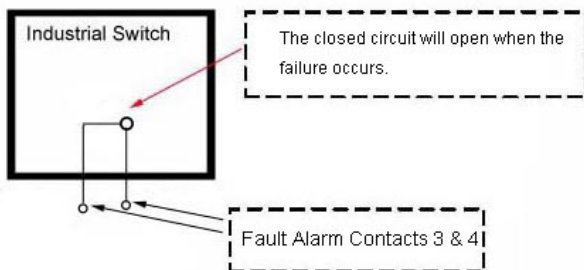


Insert the wires into the fault alarm contacts



Note

1. The wire gauge for the terminal block should be in the range between 12 ~ 24 AWG.
2. Alarm relay circuit accepts up to 30V, max. 3A currents.



## 2.2 Mounting Installation

This section describes how to install the Industrial Fast Ethernet Switch and make connections to it. Please read the following topics and perform the procedures in the order being presented.

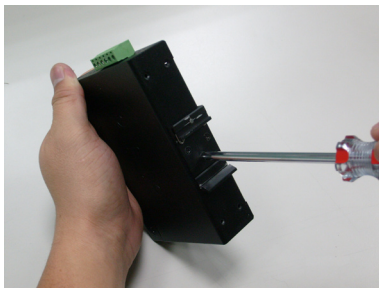


Note

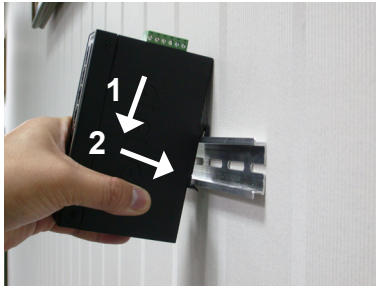
In the installation steps below, this Manual use IGS-801 (PLANET 8 Port Industrial Gigabit Switch) as the example. However, the steps for PLANET Industrial Switch & Industrial Media Converter are similar.

### 2.2.1 Install DIN-Rail Mounting

The DIN-Rail is screwed on the Industrial Fast Ethernet Switch when out of factory. When need to replace the wall mount application with DIN-Rail application on Industrial Fast Ethernet Switch , please refer to following figures to screw the DIN-Rail on the Industrial Fast Ethernet Switch. To hang the Industrial Fast Ethernet Switch, follow the below steps:



**Step 1:** screw the DIN-Rail on the Industrial Fast Ethernet Switch.



**Step 2:** Lightly press the button of DIN-Rail into the track.



**Step 3:** Check the DIN-Rail is tightly on the track.

**Step 4:** Please refer to following procedures to remove the Industrial Fast Ethernet Switch from the track.



**Step 5:** Lightly press the button of DIN-Rail for remove it from the track.

---

## 2.2.2 Wall Mount Plate Mounting

To install the Industrial Fast Ethernet Switch on the wall, please follows the instructions described below.

**Step 1:** Remove the DIN-Rail from the Industrial Fast Ethernet Switch; loose the screws to remove the DIN-Rail.

**Step 2:** Place the wall mount plate on the rear panel of the Industrial Fast Ethernet Switch.



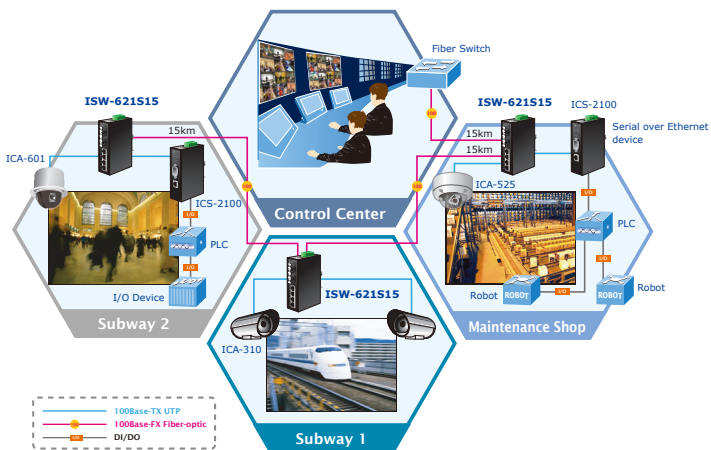
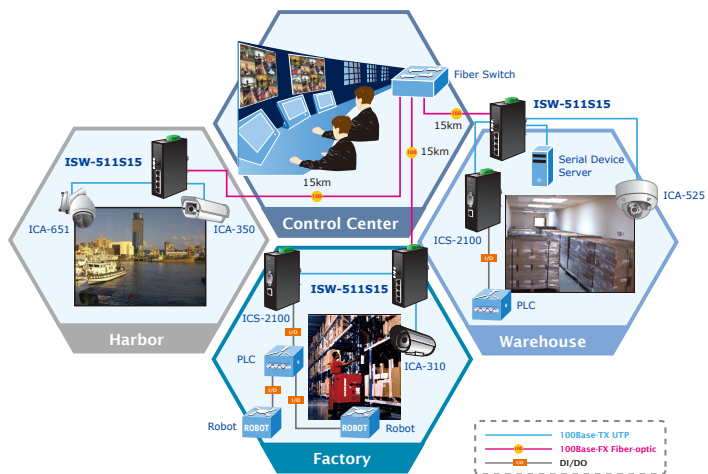
**Step 3:** Use the screws to screw the wall mount plate on the Industrial Fast Ethernet Switch.

**Step 4:** Use the hook holes at the corners of the wall mount plate to hang the Industrial Fast Ethernet Switch on the wall.

**Step 5:** To remove the wall mount plate, reverse steps above.

### 3. APPLICATION

In this paragraph, we will describe how to install Industrial Fast Ethernet Switch and the installation points for the attention.



## Installation Steps

- Step 1:** Unpack the Industrial Fast Ethernet Switch.
- Step 2:** Check the DIN-Rail is screwed on the Industrial Fast Ethernet Switch. (Please refer to DIN-Rail Mounting section for DIN-Rail installation. If the DIN-Rail is not screwed on the Industrial Fast Ethernet Switch.). If you want to wall mount the Industrial Fast Ethernet Switch, then please refer to Wall Mount Plate Mounting section for wall mount plate installation.
- Step 3:** To hang the Industrial Fast Ethernet Switch on the DIN-Rail track or wall, please refer to the Mounting Installation section.
- Step 4:** Power on the Industrial Fast Ethernet Switch. (Please refer to the Wiring the Power Inputs section for power input) The power LED on the Industrial Fast Ethernet Switch will light up. Please refer to the LED Indicators section for meaning of LED lights.
- Step 5:** Prepare the twisted-pair, straight through Category 5 cable for Ethernet connection.
- Step 6:** Insert one side of Category 5 cables into the Industrial Fast Ethernet Switch Ethernet port (RJ-45 port) and another side of category 5 cables to the network devices' Ethernet port (RJ-45 port), ex: Switch, PC or Server. The UTP port (RJ-45) LED on the Industrial Fast Ethernet Switch will light up when the cable connected with the network device. Please refer to the LED Indicators section for LED light meaning.



Note

Be sure the connected network devices support MDI/MDI-X. If it does not support then use the crossover category 5 Cable.

- Step 7:** Insert fiber cable from the ISW-511/621 series to the fiber network. TX, RX must be paired at both ends. The optical port LED on the Industrial Fast Ethernet Switch will light up when the cable connected with the network device. Please refer to the LED Indicators section for LED light meaning.
- Step 8:** When all connections are all set and LED lights all show in normal, the installation is complete.

---

## **4. SWITCH OPERATION**

### **4.1 Address Table**

The Industrial Fast Ethernet Switch is implemented with an address table. This address table 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 Industrial Fast Ethernet Switch.

### **4.2 Learning**

When one packet comes in from any port. The Industrial Fast Ethernet 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.

### **4.3 Forwarding & Filtering**

When one packet comes from some port of the Industrial Fast Ethernet Switch, it will also check the destination address besides the source address learning. The Industrial Fast Ethernet Switch 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 Industrial Fast Ethernet Switch 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.

### **4.4 Store-and-Forward**

Store-and-Forward is one type of packet-forwarding techniques. A Store-and-Forward Industrial Switch stores the incoming frame in an internal buffer, do the complete error checking before transmission.



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Therefore, no error packets occurrence, it is the best choice when a network needs efficiency and stability.

The Industrial Fast 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 Industrial Fast Ethernet Switch, 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 respective domain, reducing the overall load on the network.

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

## 4.5 Auto-negotiation

The STP ports on the Industrial Fast Ethernet 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). This is done by detect the modes and speeds at the second of both device is connected and capable of, both 10Base-T and 100Base-TX devices can connect with the port in either Half- or Full-Duplex mode.

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## 5. TROUBLESHOOTING

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

### **The per port LED is not lit**

Solution:

Check the cable connection of the Industrial Fast Ethernet Switch.

### **Performance is bad**

Solution:

Check the speed duplex mode of the partner device. The Industrial Fast Ethernet Switch is run at Auto-negotiation mode and if the partner is set to half duplex, then the performance will be poor.

### **Per port 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 Industrial Fast Ethernet Switch doesn't connect to the network**

Solution:

Check per port LED on the Industrial Fast Ethernet Switch. Try another port on the Industrial Fast Ethernet 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 the Industrial Fast Ethernet Switch doesn't connect to the network**

Solution:

Check per port LED on the Industrial Fast Ethernet Switch. Try another port on the Industrial Fast Ethernet 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.

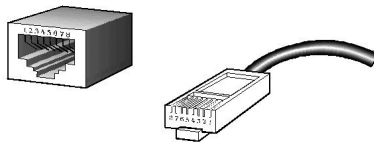
## APPENDIX A: NETWORKING CONNECTION

### A.1 Switch's RJ-45 Pin Assignments

10/100Mbps, 10/100Base-TX

RJ-45 Connector pin assignment		
Contact	MDI Media Dependant Interface	MDI-X Media Dependant Interface -Cross
1	Tx + (transmit)	Rx + (receive)
2	Tx - (transmit)	Rx - (receive)
3	Rx + (receive)	Tx + (transmit)
4, 5	Not used	
6	Rx - (receive)	Tx - (transmit)
7, 8	Not used	

### A.2 RJ-45 cable Pin Assignments



The standard RJ-45 receptacle/connector

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:

### Straight Cable



SIDE 1

#### SIDE 1

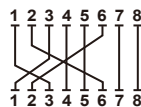
1 = White/Orange  
2 = Orange  
3 = White/Green  
4 = Blue  
5 = White/Blue  
6 = Green  
7 = White/Brown  
8 = Brown

#### SIDE 2

1 = White/Orange  
2 = Orange  
3 = White/Green  
4 = Blue  
5 = White/Blue  
6 = Green  
7 = White/Brown  
8 = Brown

---

### Cross Over Cable



SIDE 1

#### SIDE 1

1 = White/Orange  
2 = Orange  
3 = White/Green  
4 = Blue  
5 = White/Blue  
6 = Green  
7 = White/Brown  
8 = Brown

#### SIDE 2

1 = White/Green  
2 = Green  
3 = White/Orange  
4 = Blue  
5 = White/Blue  
6 = Orange  
7 = White/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.

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