

# **SOHOConnect Series**

**FSD-401ST / FSD-401SC**  
**5-port 10/100Mbps Ethernet Switch**

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**SOHOConnect Series**



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## **FCC Warning**

This device has been tested and found to comply with 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 user's manual, may cause interference in which case user will be required to correct the interference at his own expense.

## **CE Mark Warning**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## **Revision**

The information in this manual is subject to change without notice.  
User's manual for PLANET SOHOConnect Series Switch  
Model: **FSD-401ST/FSD-401SC**  
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## General Introduction

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### Checklist

Check the contents of your package for following parts:

- ◆ The Fast Ethernet Switch
- ◆ Power Supply
- ◆ Rubber foot
- ◆ User's Manual

If any of these pieces 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.

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### Introduction

The FSD-401ST/FSD-401SC, 5-port 10/100Mbps Ethernet Switch is designed to allow simultaneous transmission of multiple packets via an internal high-speed data channel including 100Base-FX fiber-optic. This means that it can partition a network more efficiently than bridges or routers in most environments.

In the following sections, the term “Switch” will represent Planet’s FSD-401, the both model, and “switch” for third part Ethernet switches. This Switch is a highly reliable network switch and is the ideal device for bridging Ethernet to Fast Ethernet workgroups or networks. Simple and cost-effective, the Switch complies to IEEE802.3u, IEEE802.3, 100Base-FX, 100Base-TX, and 10Base-T. Therefore, the Switch will be the fast being recognized as one of the most important building blocks for today networking technology.

Compact in size and designed for Plug and Play installation, the Switch allows the network administrator to simply connect the network and power cables and the switching/bridging functions begin automatically. No hardware or software configurations are required.

The front panel of the Switch provides LED indicators for easy recognition of the switch operation status and for troubleshooting. These LED indicators display the power status for the system and link, speed, full-duplex, and receive status for each port.

With 4-port Fast Ethernet Switching designed specifically for connecting workgroup devices and desktops, companies no longer have to invest in expensive and inflexible switches engineered primarily for backbone implementations. Instead, companies can deploy scaleable, affordable switches that increase the aggregate bandwidth of the network by boosting throughput to the workgroups

that need it most. The fifth port of the FSD-401 is a 100Base-FX fiber-optic ports that can help to implement the switched network up to 2 kilometers away to your central office.

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### **Features**

- ◆ 4-port 10/100base-TX Auto-Negotiation, 1-port 100Base-FX Ethernet Switching Hub
- ◆ Complies with the IEEE802.3 Ethernet and IEEE802.3u Fast Ethernet standard
- ◆ Features Store-and-Forward architectures with wire-speed filtering and forwarding rates
- ◆ Full/Half-Duplex capability on each TX/FX port, total bandwidth is up to 200Mbps/port
- ◆ Support up to 1K Uni-cast address, Layer 2 address resolution-Self Learning
- ◆ Broadcast storm control
- ◆ IEEE802.3x compliant full-duplex flow control
- ◆ Half-duplex flow control
- ◆ Runt and CRC Filtering eliminates erroneous packets to optimize the network bandwidth
- ◆ Provide internal power supply
- ◆ LED indicators for simple diagnostics and management
- ◆ Port#1 provides an extra port for MDI and MDI-X mode PC or hub uplink.
- ◆ Plug and Play



## Chapter 2

### Hardware Description

This section describes the hardware features of the Switch. 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 hub, read this chapter carefully.

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#### Front Panel

The unit front panel provides a simple interface monitoring the Switch. It includes a power indicator for each port. The only difference of the model is the fifth port of FSD-401. FSD-401ST is with two round ST type connection and FSD-401SC is with SC type connector.

Figure 1. Front Panel of FSD-401

### LED indicators

LED Function	Color	Description
Power (PWR)	Green	This indicator lights green when the hub is receiving power, otherwise, it is off.
Link/ Act	Green	This indicator green when the port is connected to a either 10Mbps Ethernet or 100Mbps Fast Ethernet station , If the station to which the hub is connected is powered off, or if there is a problem with the link, the LED will remain off. And the indicator blinking green when the data will be received to all other connected ports.
100	Green	This indicator green when the port is connected to a 100Mbps Fast Ethernet station. If the station to which the hub is connected is powered off, a 10Mbps Ethernet station, or if there is a problem with the link, the LED will remain off.
FDX/COL	Amber	Lit: Full duplex operation Unlit: Half duplex operation Blink: indicates data collisions on the respective Ethernet segment of this port. Whenever a collision is detected, the respective COL indicator will briefly blink

### DIP Switch

The fifth port of the Switch is with one Duplex Switch, it can set the port to runs in Half-Duplex or Full-Duplex, in default, it is set on Full-Duplex. Please check the following sections about the fiber-optic wiring.

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## Rear Panel

### Power Inlet

The rear panel of the Switch indicates a 100~240VAC Power inlet for the Switch

Figure 2. Rear Panel of FSD-401

### Power Notice:

1. The device is a power-required device, it means, it will not work till it is powered. If your networks should active all the time, please consider use an UPS (Uninterrupted Power Supply) for your device. It will prevent you from network data loss or network downtime.
2. In some area, installing a surge suppression device may also help to protect your hub from being damaged by unregulated surge or current to the Switch or the power adapter.

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## Hardware Installation

1. Place the Switch on a smooth surface
2. Connect the power cord to the switch and with the other end to the power.
3. Connect hub or PC to one port of the Switch using Category 3/4/5 UTP/STP cabling.
4. Connect another hub or PC to the other port of Switch by following the same process as described in Step 3.
5. Connect the multi-mode fiber cable (62.5/125µm or 50/125µm) with correct connector (either ST or SC) from the Switch to your 100Bas-FX Ethernet device (with TX/RX crossed)
6. Set the duplex mode of the Switch and the fiber device. Power on

the Switch and all the devices connect to the Switch.

**Notice:**

**1. Cable distance for the Switch**

The UTP cable distance between the Switch and hub/PC should not exceed 100 meters. The fiber-optic cable should not exceed 412 meters in Half-duplex mode and 2 kilometers for Full-duplex mode.

**2. Make sure the wiring is correct**

It can be used Category 3/4/5 cable in 10Mbps operation. To reliably operate your network at 100Mbps, you must use an Unshielded Twisted-Pair (UTP) Category 5 cable, or better Data Grade cabling. While a Category-3 or -4 cable may initially seem to work, it will soon cause data loss.

The fiber-optic cable should be a multi-mode fiber cable with 62.5/125µm or 50/125µm in specification. You can find the information from the printing of the cable. If you are not familiar with it, please consult your local dealer for the information.

All kinds of hub/PC can connect to Switch by using straight-through wires. The Switch provides one additional RJ-45 connector that is converted from port 1, labeled "Uplink" port. Either port 1 or Uplink port can be used at one time.

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## **Configuration**

### **100Mbps Server to 10/100Mbps Hub**

Plug one end of the Category 5 UTP Cable into any one port of the Switch, and the other end of this cable into the RJ-45 of Fast Ethernet Adapter in the server. The cable length between these 2 connecting points should not exceed 100 meters.

Plug one end of the Category 3/5 UTP Cable into “Uplink” port of the Switch, and the other end of this cable into any port of the 10/100Mbps Ethernet hub. The cable length between these 2 connecting points should not exceed 100 meters.

Figure 3. 100Mbps File server to Hubs Connection

### **Connect to 10/100Mbps Hub**

Plug one end of the Category 5 UTP Cable into one port of the Switch, and the other end of this cable into “Uplink” port of the 100Mbps Fast Ethernet Hub. The cable length between these 2 connecting points should not exceed 100 meters.

Plug one end of the Category 3 UTP Cable into one port of the Switch, and the other end of this cable into “Uplink” port of the 10Mbps Ethernet Hub. The cable length between these 2 connecting points should not exceed 100 meters.

### **Connect to 100Base-FX Switch/Device**

Plug the pair the fiber-cable to the Switch’s port 5, secure the fiber-optic connector. Connect the other end to the fiber-optic port of the

device like repeater hub, switch or workstations. Be noted for the duplex mode. For Hub, only Half-Duplex mode can be selected, at the mean time, the cable distance cannot exceed 412 meters. For Switch or end-node, the maximum distance cannot exceed 2 kilometers. The pair of the connectors must be crossed, i.e. TX/RX port of the Switch should connect to RX/TX port of the device in other end.

Figure 5. Fast Ethernet fiber-optic connection

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## **Switch Operation**

### **Address Table**

The 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. The information comes from the learning process of Ethernet Switch.

### **Learning**

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

### **Forwarding & Filtering**

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

The 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 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, when this packet will be filtered. Thereby increasing the network throughput and availability

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

Store-and-Forward is one type of packet-forwarding techniques. A Store-and-Forward Ethernet Switch 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 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. A Ethernet Switch 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 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 Switch performs "Store-and-forward" therefore, no error packets occur. More reliably, it reduces the re-transmission rate. No packet loss will occur.

### **Auto-Negotiation**

The STP ports on the 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 100Base-TX port in either Half- or Full-Duplex mode.

<b>If attached device is:</b>	<b>100Base-TX port will set to:</b>
• 10Mbps, no auto-negotiation	10Mbps
• 10Mbps, with auto-negotiation	10/20Mbps (10Base-T/Full-Duplex)

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• 100Mbps, no auto-negotiation	100Mbps
• 100Mbps, with auto-negotiation	100/200Mbps (100Base-TX/Full-Duplex)

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## Chapter 3

# Troubleshooting

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

### **The Link LED is not Lit**

Solution:

Make sure the switch configuration is consistent with the connecting device

Check the cable connections.

### **Performance is bad**

Solution:

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

### **Some stations can not talk to other stations located on the other port**

Solution:

The address table may contain older information than of the address table of that node. Please power down to refresh the address

information.

## Appendix A

### Specifications:

<b>General (Ethernet)</b>	
Standards:	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100 Base-TX/FX Fast Ethernet IEEE 802.3 MAC layer frame size: 64 - 1518 Bytes
Protocol:	CSMA/CD
Data Transfer Rate:	Ethernet:                      Fast Ethernet: 10Mbps (half duplex)      100Mbps (half duplex) 20Mbps (full duplex)      200Mbps (full duplex)
Topology:	Star
<b>General (Cabling)</b>	
Network Cables:	10Base-T: 2-pair UTP Cat. 3,4,5 (100 m, maximum) EIA/TIA- 568 100-ohm STP (100 m, maximum) 100Base-TX: 2-pair UTP Cat. 5 (100 m, maximum) EIA/TIA-568 100-ohm STP (100 m, maximum) 100Base-FX: 1-pair Multi-mode optic fiber 62.5/125i m, 50/125i m max. 2 kilometers
Number of Ports:	4 - STP ports 1-ST/SC fiber-optic (1300nm wavelength)
Media Interface Exchange:	Cascade RJ-45 shared with port#1
<b>Hardware Physical /Environmental Specification</b>	
DC inputs	100~240VAC, 50~60Hz
Power Consumption	15 watts maximum
LED Indication	System : Power Port: 3 LED Indicators per port (LINK/ACT, 100, FDX/ COL)
Operating Temperature	0 ~ 50 degree C
Storage Temperature	-20 ~ 70 degree C
Humidity	10% ~ 90% non-condensing
Dimensions	187 x 120 x 35 mm

<b>General (Ethernet)</b>	
EMI	FCC Class A, CE Mark Class A
<b>Performance</b>	
Transmission Method	Store-and-forward
Filtering Address Table	1 K entries / device
Packet Filtering/Forwarding Rate	148,800pps per port (for 100Mbps) 14,880pps per port (for 10Mbps)
MAC Address Learning	Automatic update / Max age: fixed

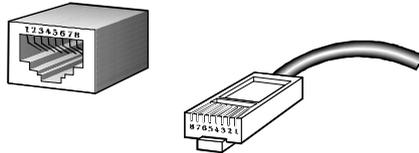
### RJ-45 Pin Specification

When connecting your FSD-401 10/100Mbps Ethernet Switch to another switch, a bridge or a hub, a modified crossover cable is necessary. Please review these products for matching cable pin assignment.

The following diagram and tables show the standard RJ-45 receptacle/connector and their pin assignments for the switch-to-network adapter card connection, and the straight / crossover cable for the Switch-to-switch/hub/bridge connection.

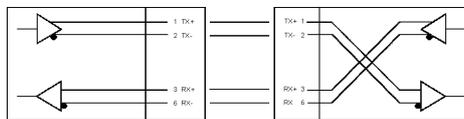
RJ-45 Connector pin assignment	
Contact	Media Direct Interface Signal
1	TX + (transmit)
2	TX - (transmit)
3	Rx + (receive)
4	Not used
5	Not used
6	Rx - (receive)
7	Not used
8	Not used

The standard cable, RJ-45 pin assignment

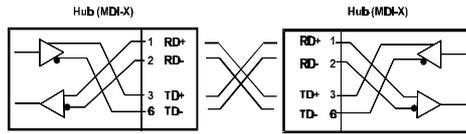


The standard RJ-45 receptacle/connector

The following shows straight cable and crossover cable connection:



Straight cable for Switch (uplink MDI-II port) to switch/Hub or other devices connection



**Crossover cable for Switch (MDI-X port) to switch/hub or other network devices (MDI-X port) connection**