LevelOne

FSW-0800FXC

FSW-0800FXT

FSW-1600FXC

FSW-1600FXT

8/16 Port 100Mbps Fast Ethernet Switch with

SC/ST Connector

User's Guide

Caution

Circuit devices are sensitive to static electricity, which can damage their delicate electronics. Dry weather conditions or walking across a carpeted floor may cause you to acquire a static electrical charge.

To protect your device, always:
- Touch the metal chassis of your computer to ground the static electrical charge before you pick up the circuit device.
- Pick up the device by holding it on the left and right edges only.

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A computing device pursuant to Subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment

European Community (CE) Electromagnetic Compatibility Directive

This equipment has been tested and found to comply with the protection requirements of European Emission Standard EN55022/EN60555-2 and the Generic European Immunity Standard EN50082-1 that calls up the following basic standards:
a)IEC801-2 Electrostatic Discharge
b)IEC801-3 RF Immunity
c)IEC801-4 Transient Burst

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Chapter 1
Introduction

Overview

The Levelone 8/16 Port Fiber Switch is a standard switch that meets all IEEE 802.3u/802.3x specifications. Fast Ethernet Switch is a cost-effective solution for easing your network congestion problem on existing shared-hub network by breaking up the collision domain and by multiplying the network performance. The overall network transmission speed is increased and the network efficiency is improved to accommodate high-bandwidth applications, such as imaging, multimedia, and CAD/CAM, etc.. Four models are available:

FSW-0800FXC	8 Port 100Mbps Fast Ethernet Switch with SC Connector
FSW-0800FXT	8 Port 100Mbps Fast Ethernet Switch with ST Connector
FSW-1600FXC	16 Port 100Mbps Fast Ethernet Switch with SC Connector
FSW-1600FXT	16 Port 100Mbps Fast Ethernet Switch with ST Connector

Models Description

Configuration	16 Fiber	8 Fiber
100FX Fiber Jack	16	8
10/100Mbps TP Jack	None	None

The available Fiber Transceiver(Jack) for switch:	
SC/ST multi-mode	Default
SC single-mode	optional

Checklist

Before you start installing the Fiber Switch, verify that the package contains the following items:

> 1 LevelOne 8/16 Port 10/100Mbps Fast Ethernet Switch
> Mounting Accessory (for 19" Rack Shelf)
> AC Power Cord
> This User's Manual

Please notify your sales representative immediately if any of the aforementioned items is missing or damaged.

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Chapter 2

Installing & Network Connection

Installation

Þ The fiber TX, RX cables must be paired at both ends.

Þ Repeat the above step, as needed, for each fiber port to be connected to a 100Base-FX device.

Þ The fiber port can be up-linked to an upper level hub's port.

Þ Verify that the voltage of AC power is correct and plug in AC power cord.

Note:
1. Both local and remote link devices (mode) must operate at the same transmission mode and speed
2. After the hub is powered off, wait at least 10 seconds before powering it on again

Network Parameter for 100Mbps Fiber

To help ensure a successful installation, you must observe the following cabling parameter. Violating these rules can render the LAN to work poorly.

100Base-FX fiber network connection

Full-duplex Switch via Fiber			
Multi-mode	Node to Node	:	2km
	Hub to Hub	:	2km
	Node to Hub	:	2km
Single-mode	Node to Node	:	15km
	Node to Hub	:	15km
	Hub to Hub	:	15km
Half-duplex Switch via Fiber			
Multi or single-mode	Node to Node	:	412m
	Node to Hub	:	412m
	Hub to Hub	:	412m
Half-duplex Class II Hub via Fiber			
Multi or single-mode	Node to Node	:	205m
	Node to Hub	:	100m
	Hub to Hub	:	5m

Chapter 3

Troubleshooting

Network troubleshooting requires patience and logic. Generally speaking, the cabling and workstation configurations are the likely first suspects; network hardware is usually last on the list. The nature of the hub design dictates that it is more likely for an entire hub to fail instead of just a single port.

Cabling Problems

Improper Cabling is the primary cause of most non-workstation problems on Ethernet network, particularly for 100 Base-FX networks. It must be emphasized that genuine twisted-pair cable and fiber optic cable be used to avoid many types of cabling problems

- Wiring is definitely the problem if the Link LED does not light when the fiber plug from a workstation is inserted into the port jack. Either correct the break in the wire or replace the wire before proceeding
- Multi or single-mode fiber cable should match the switch's fiber transceiver.
- If a workstation (workstation A) does not work and other 100Base-X ports on the hub are functioning, remove a fiber plug from a functioning port with a functioning workstation (workstation B) and insert it into the suspect port. If workstation B still works, the problem is in workstation A or in the wiring. However, if workstation B does not work, then the hub may have a defective port. Even if you suspect a defective port on the hub, continue testing. Improperly wired workstations may appear to be functional, especially if they are located near the hub. Sometimes, a port connected to an improperly wired workstation can function marginally while another port may not work at all
- Once you have established that the hub is working properly, check all wiring between the hub and the malfunctioning workstation. Ensure that the transmit and receive wires have not been crossed; the two transmit wires should be paired together as should the two receive wires
- Use a continuity checker to ensure that wires do not have breaks. By shorting together the two wires of a pair at one end, you can use the continuity checker at the other end. Also, check that there are no shorts between wires

16 Port Fiber Switch
Technical Specifications

Standards Compliance : IEEE802.3u and 802.3x 100Base-FX

Transmission Mode : Full or Half duplex

Transmission Speed : 100Mbps

Packet forwarding/filtering Rate:
148,800 packets / sec full wire rate on 100Mbps forwarding and filtering

MAC Address and Self-learning: up to 12K

Buffer Memory : 1024KB for 16 ports

Flow control : IEEE802.3x compliant for full-duplex
Back pressure flow control for half-duplex

Network Interface :
16ST.M : Sixteen ST multi-mode fiber ports

16SC.M : Sixteen SC multi-mode fiber ports

16SC.S : Sixteen SC single-mode fiber ports

Cable and Maximum length:

FX(Fiber)	50/125, 62.5/125 or 100/140 m multi-mode, up to 2Km
	8.3/125, 8.7/125, 9/125 or 10/125 m single-mode, up to 15Km

Selectable Duplex Mode Switch: Per fiber port FDX/HDX DIP switch

Diagnostic LED:
System LED : Power
Per Port LED : Link/Act, 100Mbps, FDX/Col

Power Requirement : AC Line

Voltage : 100 240 V
Frequency : 50 60 Hz
Consumption : 65W Max.

Ambient Temperature : 0° to 50°C

Humidity : 5% to 90%

Dimensions : 44(H) 440(W) 200(D) mm

Complies with FCC Part 15 Class A & CE Mark Approval

8 Port Fiber Switch
Technical Specifications

Standards Compliance : IEEE802.3u and 802.3x 100Base-FX
Transmission Mode : Full or Half duplex
Transmission Speed : 100Mbps
Packet forwarding/filtering Rate:
   148,800 packets / sec full wire rate on 100Mbps forwarding and filtering
MAC Address and Self-learning: up to 12K
Buffer Memory : 1024KB for 8 ports
Flow control : IEEE802.3x compliant for full-duplex
   Back pressure flow control for half-duplex
Network Interface :
   8ST.M : Eight ST multi-mode fiber ports
   8SC.M : Eight SC multi-mode fiber ports
   8SC.S : Eight SC single-mode fiber ports

Cable and Maximum length:

FX(Fiber)	50/125, 62.5/125 or 100/140 m multi-mode, up to 2Km
	8.3/125, 8.7/125, 9/125 or 10/125 m single-mode, up to 15Km

Selectable Duplex Mode Switch: Per fiber port FDX/HDX DIP switch
Diagnostic LED:
   System LED : Power
   Per Port LED : Link/Act, 100Mbps, FDX/Col
Power Requirement : AC Line
   Voltage : 100 240 V
   Frequency : 50 60 Hz
   Consumption : 43W Max.

Ambient Temperature : 0° to 50°C
Humidity : 5% to 90%
Dimensions : 44(H) 440(W) 200(D) mm
Complies with FCC Part 15 Class A & CE Mark Approval

Workstation Problems

Most non-cabling problems result from improper configuration of the network interface card (NIC) and its corresponding driver. The following points will be helpful:

- Like other add-on cards in the workstation or server, NIC must have unique memory address, I/O address, and interrupt. The settings on a particular card must not conflict with the settings on any other card in the same station. Please refer the User's manual of the NIC, computers, and Networking operating systems to determine the proper configuration
- The selection of half or full duplex, the speed of 10 or 100Mbps for the NIC setting must match the mode and speed setting of the corresponding port of the Hub. For NWay Auto-Negotiation setting, both link partners will auto-adjust to the highest allowable speed and mode operation

Other Problems

Other specific problems may be diagnosed by using the LEDs, as below.

Power LED is off when the AC Power switch is ON:
- Defective power supply unit or fuse
- Incorrect AC voltage
- Defective Hub

Link/Act LED is off at any Fiber:
- Faulty node or wiring connection
  For fiber -   the "TX", "RX" cables should be paired at both ends
   No Link signal is received from the remote node/site

100Base-X Port at irregular traffic:
- Abnormal or invalid transmission status(mode / speed) between local and remote link partners, i.e., full-duplex port is connecting to a half-duplex port, or 10Mbps port is connecting to a 100Mbps device

Hub Diagnostic Test

— The switch hub performs self-diagnostic test at major hub modules upon power on, LED indicators will go to normal status if no problem occurred
— To reset or restart the hub, power off the hub and wait for 10 seconds, then power on it again

For connection to Router, Bridge, or regular 100Base-X Hub, please refer to the device's Technical Manual for respective bit-time delay.

Switch Hub Cascading and Long-Haul Connection

Theoretically, the switch hub breaks up the collision domain in hub cascading that you may up-link the hubs unlimitedly. In practice, the network extension (cascading levels & overall diameter) is limited by the timing requirement--time-out specification--of your application software and network operating system.

A hierarchical network with minimum levels of hub may reduce the timing delay between server and client station. If more than two hubs are connected in the same room, select one hub as Level 1 hub and connect all other hubs to it at Level 2. Server/Host is recommended to connect to the Level 1 hub. By following this approach, it will minimize the number of hubs in any one path and will improve network efficiency. (See Fig. 2-1)

The fiber switch(single mode transceiver) with single mode fiber can provide the long haul connection up to 15km per segment, you may extend the distance by cascading the switch and meet the timing requirement of your application software. Sum up all elements' bit-time delay and the overall bit-time delay of wires/devices must be within 512 bit in a 100Base-X network segment (collision domain). The fiber cables and devices' bit-time delay(round trip) is as below:

100Base-TX		100Base-FX	
DTE DTE:	100	DTE DTE:	100
Class II Hub:	92	Class II Hub:	92
Cat. 5 TP Wire:	1.112/m	Fiber Cable:	1.0/m
DTE FX to DTE TX :100			
100Base-TX to 100Base-FX Converter: 56			

Level 1

Long Haul Intra-hub connection

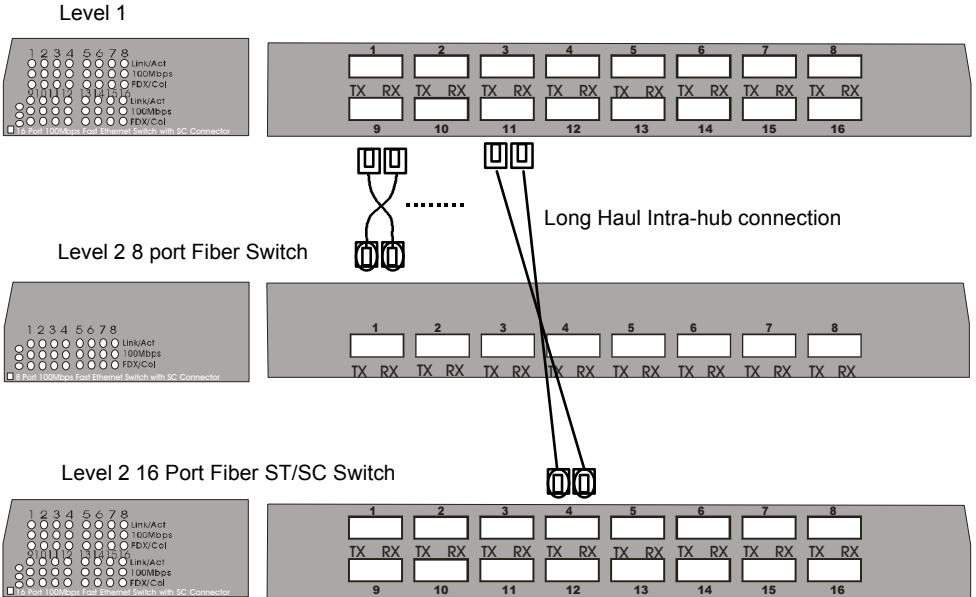Level 2 8 port Fiber Switch

Level 2 16 Port Fiber ST/SC Switch

Fig. 2-1 Multiple Hubs Cascading and Long-Haul Connection

Fiber Port Full/Half-duplex DIP Switch Setup

Every fiber port is FDX/HDX selectable by DIP switches, the default setting is FDX. You may force each fiber port into either **FDX** or **HDX.** Two typical modes between local and remote fiber devices are:

Local Fiber Port	Remote Fiber Port
Full-duplex	Full-duplex
Half-duplex	Half-duplex

(Default)
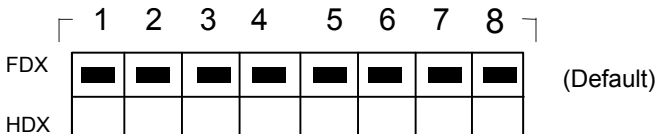
Note:

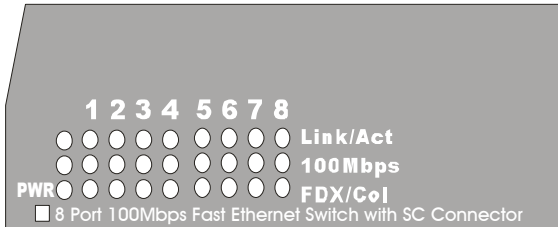The dark block denotes the switch position that each bit should be set to respectively.

To alter the duplex mode, power down the hub and select the DIP switch

mode setting. Then, power on to restart the new configuration and status.

LED Indicators

The status and descriptions of LED indicators are listed as below:

LED	Color	Function
System LED		
PWR	Green	Lit when AC power is on and good
Per Port LED		
Link/Act	Green	Lit when connection with remote device is good Blinks when any traffic is present
100Mbps	Green	Lit when 100Mbps speed is active
FDX/Col	Amber	Lit when full-duplex mode is active Blinks when any collision signal is present

Table 2-1 LED indicators description and status

The 8/16 port switch LED indicators are the same as Table 2-1 except the port capacity and associated LED indicators.
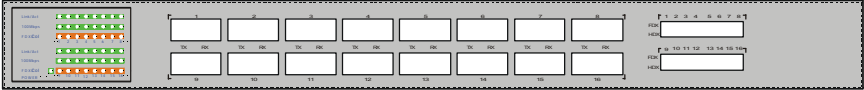
Front Panel

Fig. 1-1 Front view of 16 Port ST/SC Fiber Switch

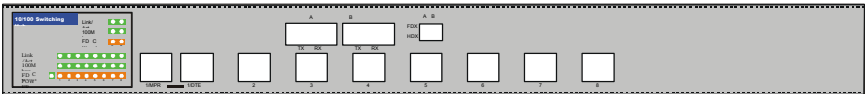Fig. 1-2 Front view of 8 Port ST/SC Fiber Switch

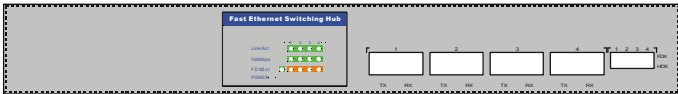Fig. 1-3 Front view of 8 TP with 2 Fiber ST/SC Switch

Fig. 1-4 Front view of 4 Port Fiber ST/SC Switch

Fig. 1-5 Front view of 4 Port Fiber MT-RJ Switch