



# **LevelOne**

**FSW-1610TX**

**FSW-2410TX**

**16/24-Port Fast Ethernet Switch**

## **User Manual**

**Version 1.1-0609**



## **FCC Warning**

This equipment has been tested and found to comply with the regulations 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 this user's guide, 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 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.



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## ***ABOUT THIS GUIDE***

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Congratulations on your purchase of **LevelOne FSW-1610/2410TX** 16/24-port 10/100Mbps Auto-negotiation Fast Ethernet Switch. This device integrates 100Mbps Fast Ethernet and 10Mbps Ethernet network capabilities in a highly flexible package.

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### **Purpose**

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This guide discusses how to install your 16/24-port 10/100Mbps Fast Ethernet Switch.

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### **Terms/Usage**

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In this guide, the term “**Switch**” (first letter upper case) refers to your 16/24-Port 10/100Mbps Fast Ethernet Switch, and “**switch**” (first letter lower case) refers to other Ethernet switches.

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### **Overview of this User’s Guide**

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***Introduction.*** Describes the Switch and its features.

***Unpacking and Installation.*** Helps you get started with the basic installation of the Switch.

***Identifying External Components.*** Describes the front panel, rear panel and LED indicators of the Switch.

***Technical Specifications.*** Lists the technical (general, physical and environmental, and performance) specifications of the Switch.

## ***INTRODUCTION***

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This chapter describes the features of the Switch and some background information about Ethernet/Fast Ethernet switching technology.

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### **Fast Ethernet Technology**

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The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, 100BASE-T (Fast Ethernet) provides a non-disruptive, smooth evolution from the current 10BASE-T technology. The non-disruptive and smooth evolution nature, and the dominating potential market base, virtually guarantee cost effective and high performance Fast Ethernet solutions in the years to come.

100Mbps Fast Ethernet is a new standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100Mbps Fast Ethernet is compatible with all other 10Mbps Ethernet environments, it provides a straightforward upgrade and takes advantage of the existing investment in hardware, software, and personnel training.

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## Switching Technology

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Another approach to pushing beyond the limits of Ethernet technology is the development of switching technology. A switch bridges Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by dividing a local area network into different *segments*, which don't compete with each other for network transmission capacity.

The switch acts as a high-speed selective bridge between the individual segments. The switch, without interfering with any other segments, automatically forwards traffic that needs to go from one segment to another. By doing this the total network capacity is multiplied, while still maintaining the same network cabling and adapter cards.

For Fast Ethernet networks, a switch is an effective way of eliminating problems of chaining hubs beyond the "two-repeater limit." A switch can be used to split parts of the network into different collision domains, making it possible to expand your Fast Ethernet network beyond the 205-meter network diameter limit for 100BASE-TX networks. Switches supporting both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet are also ideal for bridging between the existing 10Mbps networks and the new 100Mbps networks.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized by higher latencies. Routers have also been used to segment local area networks, but the cost of a router, the setup and maintenance required make routers relatively impractical. Today switches are an ideal

solution to most kinds of local area network congestion problems.

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## **Features**

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The Switch were designed for easy installation and high performance in an environment where traffic on the network and the number of user increase continuously.

The Switch with its rack size is specifically designed for middle to large workgroups. The Switch provides immediate access to a rapidly growing network through a wide range of user-reliable functions.

The Switch is ideal for deployment with multiple high-speed servers for shared bandwidth 10Mbps or 100Mbps workgroups. With the highest bandwidth 200Mbps (100Mbps full-duplex mode), any port can provide workstations with a congestion-free data pipe for simultaneous access to the server.

The Switch is expandable by cascading two or more switches together. As all ports support 200Mbps, the Switch can be cascaded from any port and to any number of switches.

The Switch is a perfect choice for site planning to upgrade to Fast Ethernet in the future. Ethernet workgroups can connect to the Switch now, and change adapters and hubs anytime later without needing to change the Switch or reconfigure the network.

The Switch combine dynamic memory allocation with store-and-forward switching to ensure that the buffer is effectively allocated for each port, while controlling the data flow between the transmit and receive nodes to guarantee against all possible packet loss.

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The Switch is an unmanaged 10/100 Fast Ethernet Switch that offers solutions in accelerating small Ethernet workgroup bandwidth. Other key features are:

- ✓ **16/24-Port 10/100BASE Ethernet Switch with RJ-45 connectors**
- ✓ **Support Auto-negotiation for speed and duplex modes for each port**
- ✓ **Supports Auto-MDI/MDI-X for each port**
- ✓ **Wire speed reception and transmission**
- ✓ **Store-and-Forward switching method**
- ✓ **Integrated address Look-Up Engine, supports 8K absolute MAC addresses**
- ✓ **Supports 1.25Mbits RAM for data buffering**
- ✓ **Front-panel diagnostic LEDs**
- ✓ **IEEE 802.3x flow control for full-duplex**
- ✓ **Back pressure flow control for half-duplex**
- ✓ **Standard 19” Rack-mountable size**

## ***UNPACKING AND INSTALLATION***

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This chapter provides unpacking and setup information for FSW-1610/2410TX.

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### **Unpacking**

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Open the shipping cartons of the Switch and carefully unpacks its contents. The carton should contain the following items:

- ✓ **One FSW-1610/2410TX**
- ✓ **One AC power cord, suitable for your area's electrical power connections**
- ✓ **Four rubber feet to be used for shock cushioning**
- ✓ **Screws and two mounting brackets**
- ✓ **This User Manual**

If any item is found missing or damaged, please contact your local reseller for replacement.

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### **Installation**

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The site where you install the Switch stack may greatly affect its performance. When installing, consider the following pointers:

Install the Switch in a fairly cool and dry place. See *Specifications* for the acceptable temperature and humidity operating ranges.

Install the Switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.

Leave at least 10cm of space at the front and rear of the hub for ventilation.

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Install the Switch on a sturdy, level surface that can support its weight, or in an EIA standard-size equipment rack. For information on rack installation, see the next section, *Rack Mounting*.

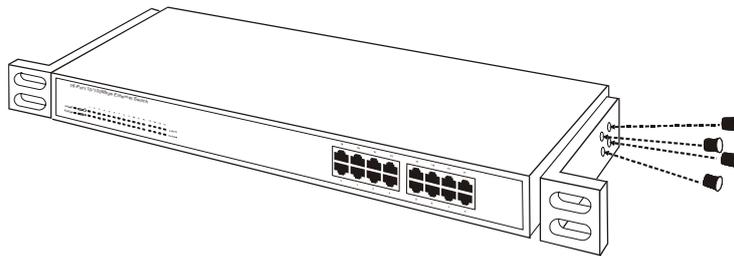
When installing the Switch on a level surface, attach the rubber feet to the bottom of each device. The rubber feet cushion the hub and protect the hub case from scratching.

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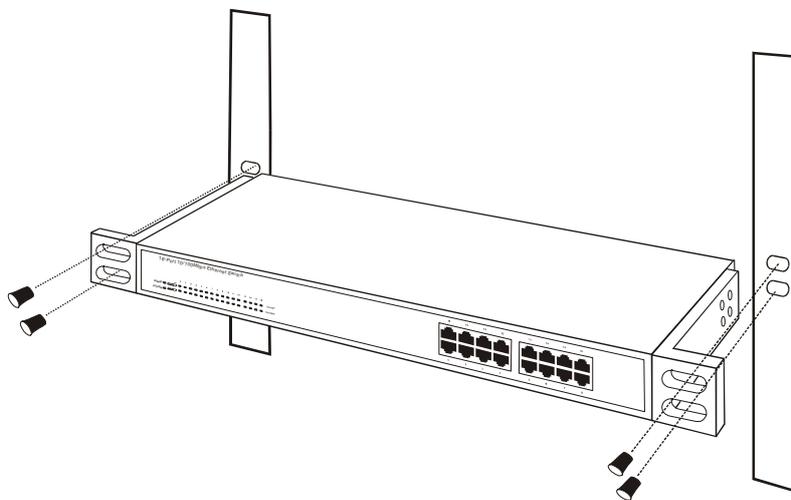
## **Rack Mounting**

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The switch can be mounted in an EIA standard-size, 19-inch rack, which can be placed in a wiring closet with other equipment. Attach the mounting brackets at the switch's front panel (one on each side), and secure them with the provided screws.



Then, use screws provided with the equipment rack to mount each switch in the rack.



# ***IDENTIFYING EXTERNAL COMPONENTS***

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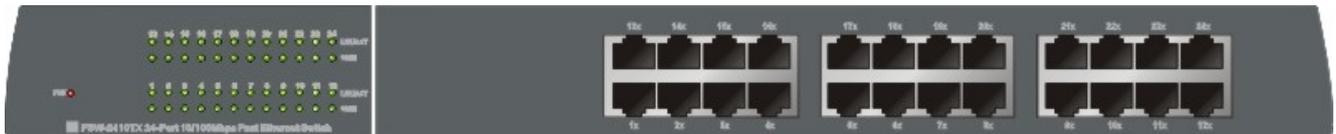
This section identifies all the major external components of FSW-1610/2410TX.

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## **Front Panel**

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The figure below shows the front panels of the switch.



**FSW-2410TX 24-port 10/100Mbps Fast Ethernet Switch**

## **LED Indicator Panel**

Refer to the detailed information about each of the switch's LED indicators.

### **◆ Power (PWR)**

This indicator lights green when the switch is receiving power, otherwise, it is off.

### **◆ Link / Activity ( green )**

This indicator light green when the port is connected to a Fast Ethernet or Ethernet station, if the indicator blinking green will be transmission or received data .

### **◆ 100Mbps ( green )**

This LED indicator light green when the port is connected to a 100Mbps Fast Ethernet station. Otherwise, the LED is off when the port is connected to 10Mbps Ethernet station.

## Twisted-Pair Ports

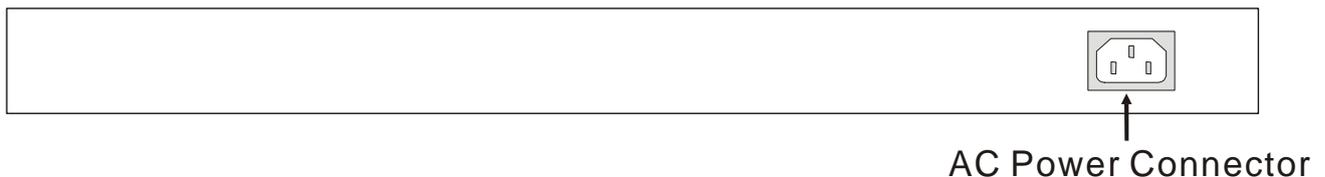
These ports supports automatic MDI/MDIX crossover detection function gives true 'plug and play' capability without the need of confusing crossover cables or crossover ports.

With the Auto-MDI function, you just need to plug-in the network cable to the hub directly and no need to care if the end node is NIC (Network Interface Card) or switches and hubs.

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## Rear Panel

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## AC Power Connector

This is a three-pronged connector that supports the power cord. Plug in the female connector of the provided power cord into this connector, and the male into a power outlet. Supported input voltages range from 100-240 AC at 50-60Hz. Technical Specification.

# TECHNICAL SPECIFICATION

<b>General</b>	
Standards	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100BASE-TX Fast Ethernet
Protocol	CSMA/CD
Data Transfer Rate	Ethernet: 10Mbps (half duplex), 20Mbps (full-duplex) Fast Ethernet: 100Mbps (half duplex), 200Mbps (full- duplex)
Topology	Star
Network Cables	10BASE-T: 2-pair UTP Cat. 3,4,5, EIA/TIA- 568 100-ohm STP 100BASE-TX: 2-pair UTP Cat. 5, EIA/TIA-568 100-ohm STP
Number of Ports	16/24 x 10/100Mbps Auto-MDI ports
<b>Physical and Environmental</b>	
AC inputs	100 to 240 VAC, 50 or 60 Hz internal universal power supply
Power Consumption	FSW-1610TX      6 watts. (max.) FSW-2410TX      6.4 watts. (max.)
Temperature	Operating: 0° ~ 40° C, Storage: -10° ~ 70° C
Humidity	Operating: 10% ~ 90%, Storage: 5% ~ 90%
Dimensions	440 x 140 x 44 mm (W x H x D)
EMI	FCC Class A, CE Mark Class A
<b>Performance</b>	
Transmits Method	Store-and-forward
RAM Buffer	1.25Mbits per device
Filtering Address Table	8K entries per device
Packet Filtering/Forwarding Rate	10Mbps Ethernet: 14,880/pps 100Mbps Fast Ethernet: 148,800/pps
MAC Address Learning	Automatic update