

TEG-S28TX  
10-Port 10/100/1000Mbps  
NWay Gigabit  
Ethernet Switch

User's Guide

## **FCC Warning**

This equipment has been tested and found to comply with the limits for a Class B 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 B product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

## **VCCI Warning**

注意

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づく第一種情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

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## ***ABOUT THIS GUIDE***

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This user's guide tells you how to install your 10-port 10/100/1000Mbps Gigabit Ethernet Switch and how to connect it to your network.

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### **Terms**

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For simplicity, this documentation uses the terms “Switch” (first letter upper case) to refer to the 10-port 10/100/1000Mbps Gigabit Ethernet Switch, and “switch” (first letter lower case) to refer to all the Ethernet switches (including this 10-port 10/100/1000Mbps Gigabit Ethernet Switch).

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### **Overview of this User's Guide**

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- ? ? ***Introduction.*** Describes the Switch and its features.
  - ? ? ***Unpacking and Setup.*** 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.
  - ? ? ***Connecting the Switch.*** Tells how you can connect the Switch to your Ethernet network.
  - ? ? ***Technical Specifications.*** Lists the technical specifications of the 10-port 10/100/1000Mbps Gigabit Ethernet Switch.
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## ***INTRODUCTION***

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This section describes the features of the 10-port 10/100/1000Mbps Gigabit Ethernet Switch, as well as giving some background information about Gigabit Ethernet, Fast Ethernet and Switching technology.

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### **Gigabit Ethernet Technology**

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Gigabit Ethernet is an extension of IEEE 802.3 Ethernet, which utilizes the same packet structure, packet format, and supports CSMA/CD protocol, full duplex, flow control, and management objects. Performance wise, the theoretical throughput of the Gigabit Ethernet is ten times faster than the 100Mbps Fast Ethernet and 100 times faster than the 10Mbps Ethernet. Since it is compatible with all 10Mbps and 100Mbps Ethernet environments, Gigabit Ethernet provides a straightforward upgrade without wasting company's existing investment in hardware, software, and trained personnel.

The increased speed and extra bandwidth offered by Gigabit Ethernet are essential to cope with the network bottlenecks that caused by the traffics generated from faster computers and applications that require more bandwidth. Upgrading key components, such as your backbone and servers to Gigabit Ethernet can greatly improve network response times as well as significantly speed up the traffic between your subnets.

Fiber Gigabit Ethernet enables fast optical fiber connections to support video conferencing, complex imaging, and similar data-intensive applications. Likewise, since data transfers occur 10 times faster than

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Fast Ethernet, servers outfitted with Gigabit Ethernet NIC's are able to perform 10 times the number of operations in the same amount of time.

In addition, the phenomenal bandwidth delivered by Gigabit Ethernet is the most cost-effective method to take advantage of today and tomorrow's rapidly improving switching and routing internetworking technologies. With the fast growing advanced silicon technology and digital signal processing, Gigabit Ethernet is now operating over CAT5 unshielded twisted-pair (UTP) cabling, outfitting your network with a powerful 1000Mbps capable backbone/server connection creates a flexible foundation for the next generation of network technology products.

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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-TX (Fast Ethernet) provides a non-disruptive, smooth evolution from the 10BASE-T technology. The non-disruptive and smooth evolution 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 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 most of the 100Mbps Fast Ethernet products are 10/100Mbps dual-speed, they are compatible with 10Mbps Ethernet environments, which provides a straightforward

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upgrade and take advantage of the existing investment in hardware, software, and personnel training.

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## Switching Technology

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Another key development pushing the limits of Ethernet technology is in the field 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 (LAN). A switch increases capacity and decreases network loading by making it possible for a LAN to be divided into different *segments* which don't compete with each other for network transmission capacity, giving a decreased load on each.

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

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, the setup, and the maintenance required for the router, make it relatively impractical. Today's switches are an ideal solution to most kinds of LAN congestion problems.

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## Features

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The 10-port 10/100/1000Mbps Gigabit Ethernet Switch was designed for easy installation and high performance in an environment where traffic on the network and the number of users increase continuously.

Switch features include:

### *Ports*

- ? ? Two 10/100/1000Mbps NWay Auto-MDI Gigabit Ethernet port (port 9 and 10).
- ? ? Eight 10/100Mbps NWay Fast Ethernet ports (port 1 ~ 8).

### *Performance features*

- ? ? Store and forward switching scheme capability to support rate adaptation and protocol conversion.
- ? ? Full duplex to allow two communicating stations to transmit and receive at the same time.
- ? ? Wire-speed data forwarding rate for each port.
- ? ? Wire-speed data filtering rate for each port.
- ? ? 6K active MAC address entry table per device with automatic learning and aging.
- ? ? 256K bits packet buffer per device.
- ? ? Supports broadcast storm filtering.

## ***UNPACKING AND SETUP***

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This chapter provides unpacking and setup information for the Switch.

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### **Unpacking**

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

- ? ? One 10-port 10/100/1000Mbps Gigabit Ethernet Switch
- ? ? Four rubber feet with adhesive backing
- ? ? One AC power cord
- ? ? This User's Guide

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

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### **Setup**

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The setup of the Switch can be performed using the following steps:

- ? ? The surface must support at least 5 kg.
  - ? ? The power outlet should be within 1.82 meters (6 feet) of the device.
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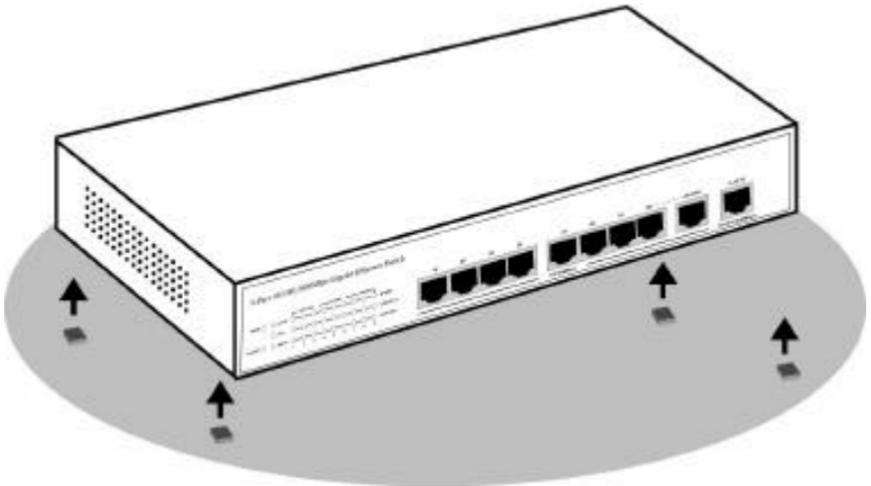
- ? ? Visually inspect the power cord and see that it is secured fully to the AC power connector.
- ? ? Make sure that there is adequate room for ventilation around the Switch and do not place heavy object on the Switch.

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## Desktop or Shelf Installation

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When installing the Switch on a desktop or shelf, the rubber feet included with the device must be first attached. Attach these cushioning feet on the bottom at each corner of the device. Allow enough ventilation space between the device and the objects around it.



**Figure 2-1. Gigabit Ethernet Switch installed on a Desktop or Shelf**

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## Rack Installation (optional)

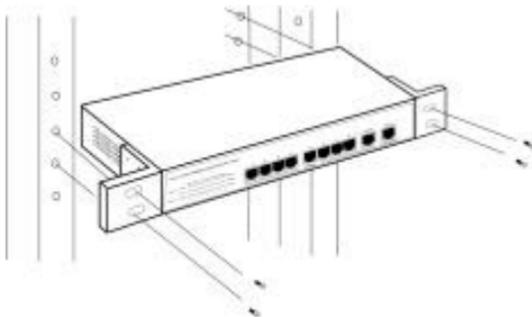
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The 10-port 10/100/1000Mbps Gigabit Ethernet Switch can be mounted in an EIA standard size, 19-inch rack, which can be placed in a wiring closet with other equipment. To install, attach the mounting brackets on the switch's front panel (one on each side) and secure them with the screws provided.



**Figure 2- 2A. Attaching the mounting brackets to the Switch**

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



**Figure 2-2B. Installing the Switch in an equipment rack**

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## **Connecting Network Cable**

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The Gigabit Ethernet Switch supports two 10/100/1000Mbps Gigabit Ethernet ports and eight 10/100Mbps Fast Ethernet ports. Port 1 to port 8 supports 10Mbps Ethernet or 100Mbps Fast Ethernet. Port 9 and port 10 are Gigabit Ethernet ports and they support 10Mbps, 100Mbps and 1000Mbps. All ports support half duplex or full duplex.

All ports are Auto-MDI type port, they auto-senses the incoming connection type and switches between MDI-II and MDI-X. You can make the connection using either a straight-through or crossover cable.

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## **Power on**

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The 10-port 10/100/1000Mbps Gigabit Ethernet Switch can be used with AC power sources 100 - 240 VAC, 50 - 60 Hz. The Switch's power supply will adjust to the local power source automatically and may be turned on without having any or all LAN segment cables connected.

## ***IDENTIFYING EXTERNAL COMPONENTS***

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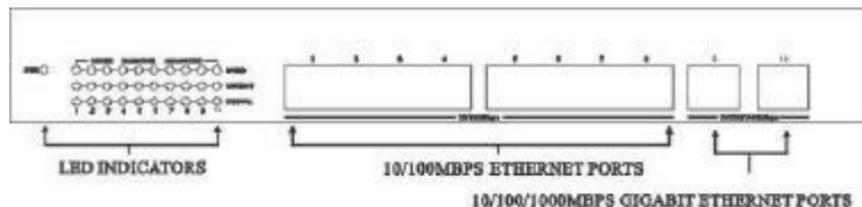
This chapter describes the front panel, rear panel and LED indicators of the Switch

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### **Front Panel**

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The front panel of the Switch consists of 8 10/100Mbps Ethernet ports, 2 10/100/1000Mbps Gigabit Ethernet port, and LED indicators.



**Figure 3-1. Front panel of the 10-port 10/100Mbps Gigabit Ethernet Switch**

- ? ? Two 10/100/1000Mbps Gigabit Ethernet ports (port 9 and 10).
- ? ? Eight 10/100Mbps Fast Ethernet ports (port 1 ~ 8).
- ? ? Comprehensive LED indicators that display the conditions of the Switch and status of the network. A description of these LED indicators follows (see *LED Indicators*).

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## Rear Panel

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The rear panel of the Switch consists of an AC power connector. The following shows the rear panel of the Switch.



**Figure 3-2. Rear panel of the 10-port 10/100/1000Mbps Gigabit Ethernet Switch**

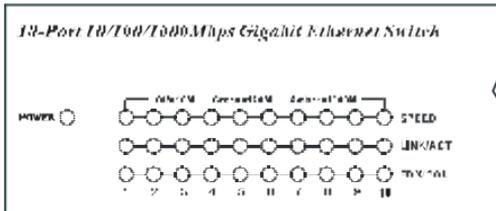
- ? ? **AC Power Connector** This is a three-pronged connector that supports the power cord. Plug in the female connector of the provided power cord into this connector, and the male connector into a power outlet. Supported input voltages range from 100 ~ 240 VAC at 50 ~ 60 Hz.
- ? ? **On/Off Switch** This is the power on/off switch. After the power cord is connected, push “ - ” to power on the Switch and push “ o ” to power it off.

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## LED Indicators

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The LED indicators of the Switch include Power, SPEED, LINK/ACT and FDX/COL. The following shows the LED indicators for the Switch along with an explanation of each indicator.



**Figure 3-4. The 10-port 10/100/1000Mbps Gigabit Ethernet Switch LED indicators**

- ? ? **POWER** After turning on the power, the Power indicator on the front panel should light to indicate the Switch is receiving power.
- ? ? **SPEED** The indicator lights amber when the port is connected to 1000Mbps Gigabit Ethernet station, and the indicator lights green when the port is connected to 100Mbps Fast Ethernet station. This indicator remains off when the port is connected to a 10Mbps Ethernet station.
- ? ? **LINK/ACT** This indicator light green when this port is connected to a device successfully. This indicator blinks green when the port is transmitting or received data on the network.
- ? ? **FDX/COL** This LED indicator lights green when a respective port is in full duplex (FDX) mode. It blinks green when collisions are occurring on the respective port.

## ***TECHNICAL SPECIFICATIONS***

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<b>General</b>	
Standards:	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100BASE-TX Fast Ethernet IEEE 802.3ab 1000BASE-T Gigabit Ethernet ANSI/IEEE 802.3 Auto-negotiation IEEE 802.3x Full duplex Flow Control
Protocol:	CSMA/CD
Data Transfer Rate:	Ethernet: 10Mbps (half-duplex), 20Mbps (full-duplex) Fast Ethernet: 100Mbps (half-duplex), 200Mbps (full-duplex) Gigabit Ethernet: 1000 Mbps (half-duplex), 2000 Mbps (full-duplex)
Topology	Star
Network Cables:	Ethernet: 2-pair UTP Cat. 3/4/5, EIA/TIA- 568 STP Fast Ethernet: 2-pair UTP Cat. 5, EIA/TIA-568 STP Gigabit Ethernet: 4-pair UTP Cat. 5, EIA/TIA-568 STP
Number of Ports:	2 x 10/100/1000Mbps NWay Gigabit Ethernet Auto-MDI port 8 x 10/100Mbps NWay Fast Ethernet Auto-MDI port

<b>Physical and Environmental</b>	
AC inputs:	100 – 240 VAC, 50/60 Hz
Power Consumption:	30 watts maximum
Operating Temperature:	0 ~ 50 degrees Celsius
Storage Temperature:	-10 ~ 70 degree Celsius
Humidity:	10% ~ 90% RH, non-condensing
Dimensions:	280 mm x 180 mm x 44 mm
EMI:	FCC Class A, CE Mark Class A, VCCI-A
Safety:	UL (UL 1950), TUV/GS (EN60950)
<b>Performance</b>	
Transmission Method:	Store-and-forward
RAM Buffer:	256K bits per device
Filtering Address Table:	6K MAC address per device
Packet Filtering / Forwarding Rate:	Ethernet: 14880pps Fast Ethernet: 148800pps Gigabit Ethernet: 1488000pps

## Physical and Environmental

MAC Address  
Learning:

Self-learning, Auto-aging