

TE100-S16E
16-Port
10/100Mbps NWay
Ethernet Switch

User's Guide

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.

注意

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ABOUT THIS GUIDE

Congratulations on your purchase of the 16-port 10/100Mbps NWay Fast Ethernet Switch. This device integrates 100Mbps Fast Ethernet and 10Mbps Ethernet network in a highly flexible desktop package.

Purpose

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

Terms/Usage

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

Overview of this User's Guide

Chapter 1, *Introduction*. Describes the Switch and its features.

Chapter 2, *Unpacking and Setup*. Helps you get started with the basic installation of the Switch.

Chapter 3, *Identifying External Components*. Describes the front panel, rear panel and LED indicators of the Switch.

Chapter 4, *Connecting the Switch*. Shows you how to connect the Switch to your Ethernet network.

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

Appendix B, *RJ-45 Pin Specification*. Describes the RJ-45 receptacle/connector and the straight and crossover cable.

INTRODUCTION

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

Fast Ethernet Technology

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 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 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.

Switching Technology

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 and/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 100BASE-TX network's 205-meter network diameter limit. Switches support both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet. They are also ideal for bridging between the existing 10Mbps networks and the 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 router costs more, is difficult to setup, and maintenance intensive, all these make routers relatively impractical. Today switches are an ideal solution to most kinds of local area network congestion problems.

Features

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

The Switch with their small, desktop size was

specifically designed for small to middle workgroups. This Switch can be installed where space is limited; moreover, they provide 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 200Mbps high bandwidth (100Mbps full-duplex mode), any port can provide workstations with a congestion-free data pipe to access the server/workstation.

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 changing the Switch or reconfigure the network for migrating to Fast Ethernet.

The Switch combine dynamic memory allocation with store-and-forward switching scheme to ensure that the buffer is effectively allocated for each port, while

controlling the data flow between transmit and receive nodes to guarantee against all possible packet loss.

The Switch is an unmanaged 10/100Mbps Fast Ethernet Switch that offers solutions for increasing Ethernet workgroup bandwidth. The Switch's other key feature including the following:

- ~~///~~ Uplink/ MDI-II (media dependent interface) port for uplinking to another switch, hub or repeater.
- ~~///~~ Store and forward switching scheme. As the result of complete frame checking and error frame filtering, this scheme prevents error packages from transmitting among segments.
- ~~///~~ NWay Auto-negotiation for each port. This allows each port to auto-sense connection speed (10/100Mbps), which provides automatic and flexible connection for the network.
- ~~///~~ IEEE 802.3x flow control for full-duplex connections and Back Pressure flow control for half-duplex connections.
- ~~///~~ Data forwarding rate per port is at wire-speed (100Mbps).

- ~~///~~ Data filtering rate eliminates all error packets, runts, etc., per port at wire-speed for 100Mbps speed.
- ~~///~~ Up to 8K active MAC address entry table per port with self-learning and table-aging.
- ~~///~~ 512 Kbytes RAM buffers per device.
- ~~///~~ Broadcast storm protection.

UNPACKING AND SETUP

This chapter provides unpacking and setup information for the Switch.

Unpacking

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

One 16-port 10/100Mbps NWay Fast Ethernet Switch

One external power adapter

This User's Guide

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

Setup

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

- ✍* The installation surface must be able to support at least 1.5 Kg.
- ✍* The power outlet should be within 1.82 meters (6 feet) of the Switch.
- ✍* Visually inspect the DC power jack and make sure that it is secured to the power adapter.
- ✍* Make sure that there is proper heat dissipation from and adequate ventilation around the Switch.
- ✍* Do not place heavy objects on the Switch.

IDENTIFYING EXTERNAL COMPONENTS

This section identifies all the major external components of the Switch. Both the front and rear panels are shown below followed by a description of each panel's feature. The indicator panel is described in detail in the next chapter.

Front Panel

The figure below shows the front panel of the switch.

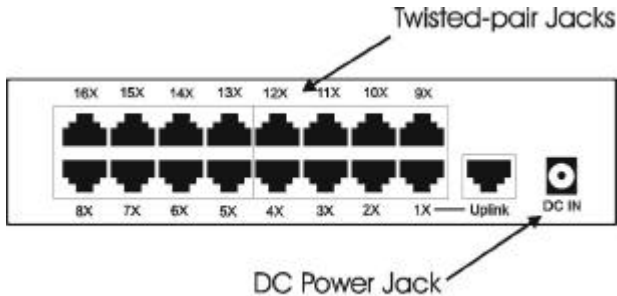


16-port 10/100Mbps NWay Fast Ethernet Switch Front Panel

LED Indicator Panel

Refer to the LED Indicator section for detailed information about each LED indicator on the Switch.

Rear Panel



16-port 10/100Mbps NWay Fast Ethernet Switch Rear Panel

DC Power Jack: Power is supplied through an external AC power adapter. Check the technical specification section for information about the AC power input voltage.

Since the switch does not include a power switch, plugging its power adapter into a power outlet will immediately power on the device.

MDI-X Jacks: Use these jacks to connect workstations to the Switch. These are **MDI-X** (Medium-Dependent Interface, Cross-wired) jacks; you can use ordinary straight-through twisted-pair cables to connect network computers and network

servers to the Switch. If you need to connect another device with an **MDI-X** jack, such as another hub or Ethernet switch, you should use a crossover cable, or make the connection using the **MDI-II** jack (described below). For more information about crossover connections.

Uplink Jack (MDI-II): Use this jack to connect other hub or switch to the Switch. This is MDI-II (Medium-dependent Interface, straight-wired) jack, which means you can connect the Switch to a device's MDI-X port using an ordinary straight-through cable.

LED Indicators

Power Indicator (PWR)

This indicator lights green when the Switch is receiving power. If there is no power to the Switch, this LED will remain off.

Full-duplex/Collision (FDX/COL)

This LED indicator lights green when the port is in full duplex (FDX) mode. The LED is OFF for half duplex (HDX) operations. If the LED is green and blinking, there is collision on that port.

Link/Activity (Link/ACT)

This indicator lights green when the port is connected to a 100Mbps Fast Ethernet device. The indicator blinks green when transmitting or receiving data at 100Mbps rate. This LED lights amber when the port is connected to a 10Mbps Ethernet device. The indicator blinks amber when transmitting or receiving data at 10Mbps.

CONNECTING THE SWITCH

This chapter describes how to connect the Switch to network.

PC to Switch

User can connect network PCs to the Switch's 1x~16x port via two-pair Category 5 UTP/STP straight cables.

After the connection is made, the PC's network adapter card's LED should light and indicate the fastest possible connection speed. If the adapter's LED indicator(s) are not light after a proper connection was made, check and make sure the LAN card, the cable, and the Switch are in working condition.

1. The Link/ACT LED indicator lights green for connecting to 100Mbps speed. The LED lights amber for connecting to 10Mbps speed.
 2. The FDX/COL LED indicator lights green for full-duplex connection. The LED remains off for half-duplex connection.
-

Hub to Switch

A hub (10 or 100BASE-TX) can be connected to the Switch via a two-pair Category 5 UTP/STP straight cable. The connection is accomplished from the hub's

uplink (MDI-II) port to any of the Switch's MDI-X ports (1X ~ 16X) or from the hub's MDI-X port to Switch's Uplink port (MDI-II).

A. 10BASE-T Hub

When connecting the Switch to a 10BASE-T hub, the Switch's port LED indicators should light up as the following:

FDX/COL LED indicator is *OFF*.

Link/ACT LED indicator is light amber.

B. 100BASE-TX Hub

When connecting the Switch to a 100BASE-TX hub, the Switch's port LED indicators should light up as the following:

FDX/COL LED indicator is *OFF*.

Link/ACT LED indicator is light green.

Hub without Uplink (MDI-II) port

If a hub is not equipped with an uplink (MDI-II) port, the connection can be made using either straight cable

or crossover cable.

A. Using straight cable

When using straight cable, the connection can be made from the uplink (MDI-II) port of the Switch to any port of the Hub.

B. Using crossover cable

When using crossover cable, the connection can be made from any port of the Switch to any port of the Hub.

Switch to Switch (or other Ethernet device)

The Switch can be connected to another switch or other Ethernet device (routers, bridges, etc.) via a two-pair Category 5 UTP/STP straight or crossover cable.

A. Using straight cable

When using straight cable, this is done from the uplink (MDI-II) port of the Switch (Switch A) to any of the MDI-X port of the other switch (switch B) or other device.

B. Using crossover cable

When using crossover cable, the connection is made from any MDI-X port of the Switch (Switch A) to any of

the MDI-X port of the other switch (switch B) or other device.

1. The Link/ACT LED indicator lights green for connecting to 100Mbps speed. The LED lights amber for connecting to 10Mbps speed.
2. The FDX/COL LED indicator lights green for full-duplex connection. The LED remains off for half-duplex connection.

Port Speed & Duplex Mode

After plugging the cable to a specific port, the system uses auto-negotiation to determine the transmission mode:

If the attached device does not support auto-negotiation or has auto-negotiation disabled, an auto-sensing process is initiated to select the proper connection speed and the duplex-mode is set to **half-duplex**.

TECHNICAL SPECIFICATIONS

General	
Standards	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100 Base-TX Fast Ethernet ANSI/IEEE Std 802.3 NWay auto-negotiation
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 (100 m), EIA/TIA-568 100-ohm STP (100 m) 100BASE-TX: 2-pair UTP Cat. 5 (100 m), EIA/TIA-568 100-ohm STP (100 m)
Number of Ports	16 (10/100Mbps NWay MDI-X ports)
Uplink Port	1 (MDI-II port, shared with port 1)

Physical and Environmental

DC inputs	DC5V/5A
Power Consumption	25 watts. (max.)
Temperature	Operating: -10? ~ 50? C, Storage: -10? ~ 70? C
Humidity	Operating: 10% ~ 90%, Storage: 5% ~ 90%
Dimensions	184 x 124 x 44 mm (W x H x D)
EMI:	FCC Class A, CE Mark A, VCCI-A

Performance

Transmission Method:	Store-and-forward
RAM Buffer:	512Kbytes 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

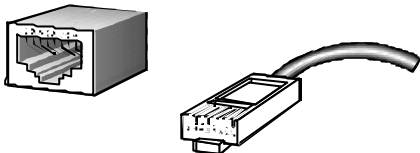
RJ-45 PIN SPECIFICATION

When connecting your 16-port 10/100Mbps NWay Fast Ethernet Switch to another switch, bridge, hub, or Ethernet device, a crossover cable maybe required. Please check the product's User's Guide for correct RJ-45 cable pin assignment.

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

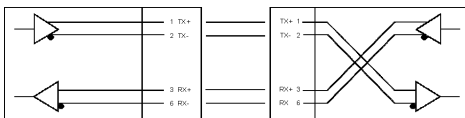
RJ-45 Connector pin assignment	
Contact	Media Direct Interface Signal
1	TX + (transmit)
2	TX - (transmit)
3	Rx + (receive)
4	Not used
5	Not used
6	Rx - (receive)
7	Not used
8	Not used

The standard cable and RJ-45 plug pin assignment

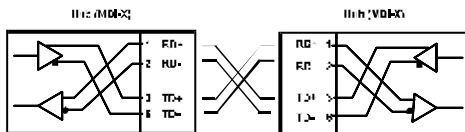


The standard RJ-45 receptacle/connector

The following shows straight cable and crossover cable connection:



Straight cable for Switch (uplink MDI-II port) to switch/hub or Ethernet device connection



Crossover cable for Switch (MDI-X port) to switch/hub or Ethernet device (MDI-X port) connection