TE100-S16V

16-Port 10/100Mbps

Fast Ethernet

Smart 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/her own expense.

VCCI Warning

This is a product of VCCI Class A Compliance.

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
　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。

UL Warning

a) Elevated Operating Ambient Temperature- If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

b) Reduced Air Flow- Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

c) Mechanical Loading- Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

d) Circuit Overloading- Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

e) Reliable Earthing- Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

TABLE OF CONTENTS

ABOUT THIS GUIDE

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

Purpose

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

Terms/Usage

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

INTRODUCTION

This chapter describes the features of the 16-Port 10/100Mbps Fast Ethernet Smart 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-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.

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 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.

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 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.

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.

VLAN (Virtual Local Area Network)

A VLAN is a group of end-stations that are not constrained by their physical location and can communicate as if a common

broadcast domain, a LAN. The primary utility of using VLAN is to reduce latency and need for routers, using faster switching instead. Other VLAN utility include:

Security

Security is increased with the reduction of opportunity in eavesdropping on a broadcast network because data will be switched to only those confidential users within the VLAN.

Cost Reduction

VLANs can be used to create multiple broadcast domains, thus eliminating the need of expensive routers.

Port-based (or port-group) VLAN is the common method of implementing a VLAN, and is the one supplied in the Switch. Each Switch port can belong from one to seventeen VLANs.

Features

- ✓ **16×10/100Mbps Auto-negotiation Ethernet ports**
- ✓ **All ports support auto-MDIX, so there is no need to use cross-over cables or an up-link port**
- ✓ **Full/half duplex transfer mode for each port**
- ✓ **Wire speed reception and transmission**
- ✓ **Store-and-Forward switching scheme capability to support rate adaptation and ensure data integrity**
- ✓ **Broadcast storm protection**
- ✓ **Up to 4K unicast addresses entries per device, self-learning, and table aging**
- ✓ **512KB RAM data buffer**
- ✓ **Supports IEEE 802.3x flow control for full-duplex mode ports**
- ✓ **Supports Back-pressure flow control for half-duplex mode ports**
- ✓ **Optional one port 100BASE-FX multimode Fiber module with SC type connector in the rear panel**
- ✓ **Supports Port-based VLAN and IEEE 802.1p QoS**
- ✓ **RS-232 DCE console port for setting up and manage the Switch via connection to a console terminal or PC using a terminal emulation program**
- ✓ **Standard 19" Rack-mount size**

UNPACKING AND INSTALLATION

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 Fast Ethernet Smart Switch**

- **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**

- **One console serial cable**

- **This User's Guide**

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

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** *Technical 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 around the Switch for ventilation.**

- **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 Switch and protect the Switch case from scratching.**

Rack Mounting

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 side panels (one on each side), and secure them with the provided screws.
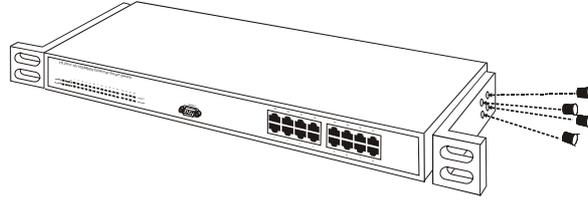
Figure 1. Installing the bracket with the provided screws

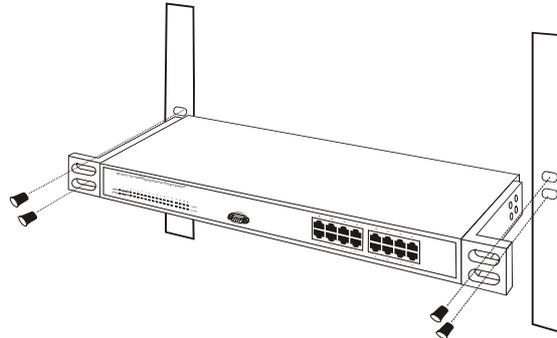Then, use screws provided with the equipment rack to mount the Switch on to the rack.

Figure 2. Mounting the Switch on to the rack

Connecting Network Cable

The Switch supports 10Mbps Ethernet or 100Mbps Fast Ethernet and it runs both in half and full duplex mode.

These ports are Auto-MDIX type port. The Switch can auto transform to MDI-II or MDI-X type, so you can make a connection using a standard or crossover cable.

AC Power

The Switch requires AC power supply of 100~240V AC, 50~60 Hz. The Switch does not come with a Power ON/OFF switch, so the Switch will automatically power on when it is connected to an electrical outlet. The switch's power supply will adjust to the local power source automatically and may be turned on without having any LAN segment cables connected.

IDENTIFYING EXTERNAL COMPONENTS

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

Front Panel
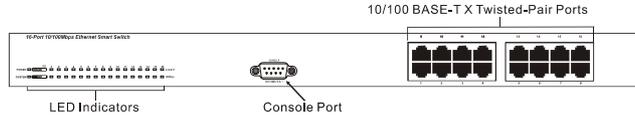
The figure below shows the front panels of the Switch.

Figure 3. Front panel of the 16-port 10/100Mbps Fast Ethernet Switch

LED Indicator

Comprehensive LED indicators display the status of the switch and the network (see the *LED Indicators* chapter below).

10/100BASE-T Twisted-Pair Ports

These ports support network speeds of either 10Mbps or 100Mbps, and can operate in half- and full- duplex transfer modes. These ports also support automatic MDI-II/MDI-X crossover detection function gives true "plug and play" capability.

Console Port

An RS-232 DCE console port is used to setup and manage the Switch via a connection to a console terminal or PC using a terminal emulation program (e.g. Windows HyperTerminal).
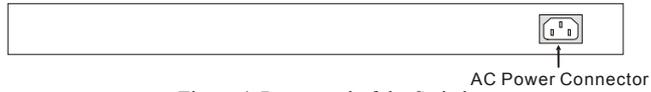
Rear Panel

AC Power Connector

Figure 4. Rear panel of the 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 into a power outlet. Supported input voltages range from 100~240V AC at 50~60Hz.

UNDERSTANDING LED INDICATORS

The front panel LEDs provides instant status feedback, and help monitor and troubleshoot.

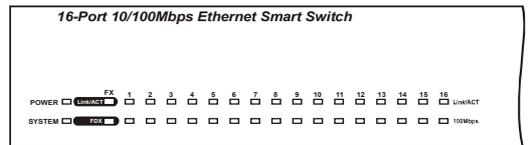Figure 5. LED indicators of the Switch

Power and System LEDs

POWER: Power Indicator

On	:	When the Power LED lights on, the Switch is receiving power.
Off	:	The LED is off when the Switch is not receiving power.

SYSTEM: Management Indicator

Blinking	:	When the CPU is working, the System LED is blinking.
On/Off	:	The CPU is not working and the Switch is defective.

Ports 1~16 Status LEDs

Link/ACT: Link/Activity

On	:	When the Link/ACT LED lights on, the respective port is successfully connected to an Ethernet network.
Blinking	:	When the Link/ACT LED is blinking, the port is transmitting or receiving data on the Ethernet network.
Off	:	No link.

100Mbps

On	:	When the 100Mbps LED lights on, the respective port is connected to a 100Mbps Fast Ethernet network.
Off	:	When the respective port is connected to a 10Mbps Ethernet network.

Fiber Module LEDs

FX Link/ACT: Link/Activity

On	:	When the fiber module is installed and connected to a Fast Ethernet network, the FX Link/ACT LED lights on.

Blinking	:	When the FX Link/ACT LED is blinking, the fiber module is transmitting/receiving data on the network.
Off	:	No link.

FDX: Full Duplex

On	:	When the FDX LED lights on, the fiber port is in full-duplex mode.
Off	:	When the LED light is off, the fiber port is in half-duplex mode.

CONFIGURATION

This Switch is a "smart" Switch. The programmable administration parameters allow the Switch to operate more effectively than unmanaged (dumb) switches. This chapter will describe how to configure the Switch.

Console Port (RS-232 DCE)

The console configuration requires connecting a Workstation or a PC running a terminal emulation program (such as HyperTerminal, which comes with Microsoft Windows) to the RS-232 DCE console port of the Switch.

Below is the console port configuration:

- Baud rate: 9,600
- Data width: 8 bits
- Parity: none
- Stop bits: 1
- Flow control: None

Make sure the terminal or PC you are using to make this connection is configured to match these settings.

Configuring the Switch

The 16-Port 10/100Mbps Fast Ethernet Smart Switch has a menu-driven console interface. The Switch can be configured through the serial port. A network administrator can manage, control and monitor the Switch using the console program. This section indicates how to configure the Switch to enable its smart functions including:

Setup

The two options in the Setup screen are Port Configuration and VLAN. The functions of these two items are illustrated in the following sections.

System

The following options are available in the System screen; Factory Reset, Change Password, Confirm Password, Refresh Time, Login Timeout, and System Uptime.

File

You can upload or download the Switch's configuration settings by using Upload Configuration or Download Configuration in the File setting screen.

Statistics

In the Statistics menu screen, you can view each port's data transferring and receiving status.

<u>**Navigating The Console**</u>
After entering the configuration program, you will see available command keys at the bottom of each menu screen. Below are some common command keys.

[Tab]: Move from current field to the next available field.
↑ **and** ↓**:** Move cursor from field to field.
[Enter]: Execute selection

[Space Bar]: Change selection. Available when the field has multiple selections.

Login

Execute the terminal emulation program on the remote workstation, connect the serial cable, and turn on the Switch. The login screen will ask you to input a password to login.

*Password: **admin***   *(default password)*

Figure 10. Login

Move the cursor to highlight **Password**, input the default password **admin** and hit *Enter*, the cursor will then moves to **login**, hit Enter again to login.

Main Menu

After login the console, the main menu appears (see Figure 11). You can see the available console command keys in the lower portion of the screen. Move cursor to highlight a desired option by using *Up Arrow*, *Down Arrow,* and *Tab* keys, and then press *Enter* key to confirm. The four options in the Main Menu screen are **Setup**, **System**, **File**, and **Statistics**.

Figure 11. Main Menu

Configuring **Setup** Settings

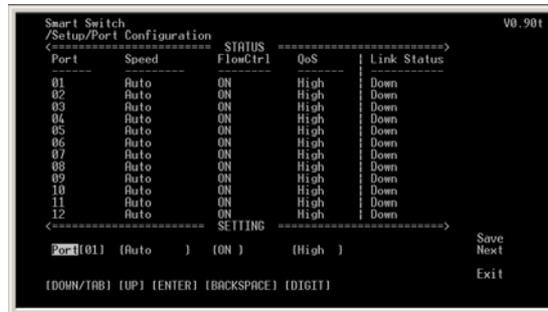There are **Port Configuration** and **VLAN** settings in Setup menu (see Figure 12).

Figure 12. Setup Menu

Port Configuration

In Port Configuration menu (Figure 13), you can configure each port's (port 17 is reserved for optional Fiber Port) Speed, Flow

Control, and QoS. **Link Status** is determined by the Switch and can't be changed. This screen displays Port 01 ~ 12 status, for port 13 ~ 17, please select **Next**.

After completing the setup, move cursor to **Save** and hit **Enter** to save the settings.

Figure 13. Port Configuration

(1) Speed

There are five speed modes— *Auto*, *100M Full*, *100M Half*, *10M Full*, and *10M Half*. To change the speed setting, highlight Port, enter the port number and hit **Enter**, and the cursor will move to the next field **Speed**. Hit *Space Bar* to select one of the speed options. Hit **Enter** to select the desired speed and the cursor will move to **Flow Control** option.

(2) Flow Control

This setting determines whether or not the Switch will be handling flow control. To change the flow control setting, select the Port number, highlight the **FlowCtrl** field, and hit **Space Bar**

to select **ON** or **OFF**. Set **FlowCtrl** to *ON* to avoid data transfer overflow.

(3) QoS

Quality of Service (QoS) is a networking term that specifies a guaranteed throughput level. When data packets with QoS priority information pass through QoS supported device, these packets will be handled with priority. Without certain level of QoS, multimedia applications such as Streaming Video and Network Conference can be sluggish or stopped due to network congestions.

This Switch supports IEEE 802.1p QoS Tagging and Port-Based QoS. It exams each packet for IEEE 802.1p priority tag, if the tag value is higher than 3, the packet has high priority; otherwise, the packet has low priority. If the packet has no priority tag, it will handle the packet according to the priority code (high or low) of the port.

Note: IEEE 802.1p Priority Tag supersedes the Port-Based Priority setting. For example, if Port 1 is set to low priority, but the packet coming in this port has high priority tag, the Switch will consider the packet as high priority packet.

The default settings for all ports' QoS are ***High***. To change the Port-Based QoS setting, select the Port number, highlight the QoS field, and hit **Space Bar** to select High or Low.

QoS Example: The computers connect to Switch's Port 1 ~ 5 do Video Conferencing regularly. To ensure video/voice streaming quality between these 5 Users, you can set Port 1 ~ 5 QoS to **High** and set the rest of the ports' QoS to low.

(4) Link Status

Link Status displays each port's link status. If the port's connection is valid, it will show the connection speed (10 or 100) and duplex mode (half or full). The status displays **Down** if the port is not connected.

VLAN (Virtual Local Area Network)

In VLAN settings, you can group a number of ports into individual "virtual" network. Port(s) not in the same VLAN will not be able to communicate with each other. There are 17 VLAN groups available. To setup VLAN, enter the VLAN group number and you will see [vvvvvvvvvv:vvvvvvv]. Each v (or -) represents a port; starting from left to right, the port number is 1~17, with : after port 10 and port 20. Use [Tab] and [Backspace] keys to locate the desired port and then hit [Space Bar] to select "V" to add the port to the VLAN group or select "-" to delete the port from the group. In default, all ports belong to VLAN 1 (see Figure 14).
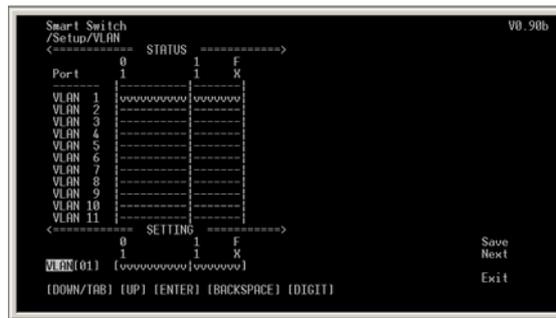

Figure 14. VLAN Configuration

For example, there are five computers (PC1~PC5) connected to the Switch's port 1~5. The 5 PCs are divided into two VLAN groups, VLAN1 (PC1 ~ PC4) and VLAN2 (PC2 ~ PC5). In this setup, PC1 could not communicate with PC5, because they are not in the same VLAN group.

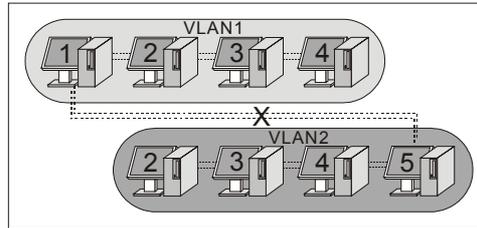
Figure 15. There is no connection between PC1 (VLAN 1) and PC5 (VLAN 2)

Using VLAN feature, you can group the computers on the Switch into many independent small networks. For example, in Figure 16, the Switch has been divided into four VLAN groups. Each VLAN group is independent and there is no communication between the VLAN groups.
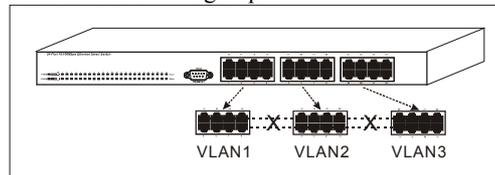

Figure 16. Dividing the Switch into two smaller switches

Note: Configuring VLAN can be very confusing. If your VLAN settings do not perform the way they should, you can reset the Switch back to its default state by going to "System" menu and select "Factory Reset".

Configuring **System** Setting

The **System** configuration menu screen (see Figure 17) indicates the following options:

Factory Reset: Restore all settings back to factory default.

Change Password: To change the login password (maximum 20 digits / letters).
Confirm Password: To confirm the new password.
Refresh Time: To set the automatic status refreshing time. You can select Disabled, 1 sec., 5 sec., 10 sec., 15 sec., or 20 sec. (by pressing the [**Space bar**]).

Login Timeout: Set the console idle time-out to automatically logout the configuration console. The selections are Disabled, 1 min., 2 min., 3 min., 4 min., and 5 min.

System Uptime: Indicates how long the Switch has been powered ON.

Figure 17. System Setting

Configuring **File** Setting

You can upload (save) or download (restore) Switch's
configuration file in the **File** menu screen (Figure 18).

Figure 18. File installation

Upload Configuration: Select this for saving the current
configuration to a file at a desired location (e.g. floppy disk or
hard drive).

● Move cursor to "Upload Configuration" and hit "Enter".

- At "Are you sure?", hit "space bar" once to show "Yes" and then hit "Enter".
- On Hyper Terminal's Menu Bar, click on "Transfer" and select "Receive File…".
- Input the path where you would like to save the file to (or click on "Browse" to select the location), click on the drop down arrow and select "Xmodem" as transfer protocol, click on "Receive", enter the desired file name, and then click "OK".
- After saving the file, the cursor will move to "Exit", hit "Enter" to go back to "File" menu.

Download Configuration: Select this for loading the previously saved configuration back to the Switch.
- Move cursor to "Download Configuration" and hit "Enter".
- At "Are you sure?", hit "space bar" once to show "Yes" and then hit "Enter".
- On Hyper Terminal's Menu Bar, click on "Transfer" and select "Send File…".
- Input the path and file name of the configuration file (or click on "Browse" to select file from the location), click on the drop down arrow and select "Xmodem" as transfer protocol, and click on "Send".
- After loading the configuration file, the cursor will move to "Exit", hit "Enter" to go back to "File" menu.

Statistics Menu

The Statistics screen displays all ports' transferring (Tx) and receiving (Rx) summaries (figure 19).

Figure 19. Statistics

Statistics Detail

Highlight **Port** and enter port number to view the detail statistics of this port (see Figure 20).

Figure 20. Statistics Detail

TECHNICAL SPECIFICATIONS

General	
Standards	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100 BASE-TX, 100BASE-FX 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 Media	10BASET: 2-pair UTP/STP Cat. 3, 4, 5; up to 100m 100BASE-TX: 2-pair UTP/STP Cat. 5; up to 100m Fiber module: 50/125 or 62.5/125μm multimode fiber with SC connector
Number of Ports	16 × 10/100Mbps Auto-MDIX STP ports 1 × expansion slot for 100BASE-FX fiber module

Physical and Environmental	
AC inputs:	100~240V AC, 50/60 Hz internal universal power supply
Power Consumption:	12 watts. (max.)

Temperature:	Operating: 0°~40°C, Storage: -10°~70°C
Humidity:	Operating: 10%~90% RH, Storage: 5%~90% RH
Dimensions:	440 x140 x 44 mm (W x H x D)
Weight:	2.1kg
Emissions:	FCC Class A, CE Mark Class A, VCCI Class A
Safety:	UL (1950), CB(IEC60950)
Per ormance	
Transmits Method:	Store-and-forward
RAM Buffer:	512K bytes per device
Filtering Address Table:	4K entries per device
Packet Filtering/Forwarding Rate:	10Mbps Ethernet: 14,880 pps 100Mbps Fast Ethernet: 148,800 pps
MAC Address Learning:	Automatic update