

**TEG-S224TXA**  
**26-Port 10/100/1000Mbps**  
**Smart Copper Gigabit Switch**  
*with*  
*2×1000BASE-T + 24×10/100BASE-TX ports*

**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 or her 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.

## **VCCI Warning**

This is a product of VCCI Class A Compliance.

### **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 ( $T_{mra}$ ).

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).

P/N: 1907GSW72245000

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## ***ABOUT THIS GUIDE***

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Congratulations on your purchase of the 26-Port 10/100/1000Mbps Gigabit Ethernet Smart Switch. This device integrates 1000Mbps Gigabit Ethernet, 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 26-Port 10/100/1000Mbps Gigabit Ethernet Smart Switch.

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### **Terms/Usage**

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In this guide, the term “**Switch**” (first letter upper case) refers to your 26-Port 10/100/1000Mbps Gigabit Ethernet Smart Switch, and “**switch**” (first letter lower case) refers to other Ethernet switches.





## ***INTRODUCTION***

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

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.

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## Gigabit Ethernet Technology

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Gigabit Ethernet is an extension of IEEE 802.3 Ethernet utilizing the same packet structure, format, and support for CSMA/CD protocol, full duplex, flow control, and management objects, but with a tenfold increase in theoretical throughput over 100-Mbps Fast Ethernet and a hundredfold increase over 10-Mbps Ethernet. Since it is compatible with all 10-Mbps and 100-Mbps Ethernet environments, Gigabit Ethernet provides a straightforward upgrade without wasting a company's existing investment in hardware, software, and trained personnel.

The increased speed and extra bandwidth offered by Gigabit Ethernet are essential to coping with the network bottlenecks that frequently develop as computer busses get faster and more users using applications generate more traffic. 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.

Gigabit Ethernet supports video conferencing, complex imaging, and similar data-intensive applications. Likewise, since data transfers occur 10 times faster than 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.

The phenomenal bandwidth delivered by Gigabit Ethernet was the most cost-effective method to take advantage of today's rapidly improving switching and routing internetworking

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technologies. And with expected advances in silicon technology and digital signal processing Gigabit Ethernet will eventually operate over unshielded twisted-pair (UTP) cabling, outfitting your network with a powerful 1000-Mbps-capable backbone /server connection creating a flexible foundation for the next generation of network technology products.

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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.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized

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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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## VLAN (Virtual Local Area Network)

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A VLAN is a group of end-stations that are not constrained by their physical location and can communicate as if it's a common broadcast domain, a LAN. The primary use of VLANs is to reduce latency and need for routers, using faster switching instead. Other VLAN utility include the following:

### **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 for 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 eight VLANs.

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## Features

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- ?? 24×10/100BASE-TX Fast Ethernet ports
- ?? 2×1000BASE-T Gigabit Ethernet ports
- ?? Auto-MDIX media type detection for each port
- ?? Full/half duplex transfer mode for each 10/100Mbps Fast Ethernet ports
- ?? Full duplex transfer mode for each 1000Mbps Gigabit Ethernet ports
- ?? Wire speed reception and transmission
- ?? Store-and-Forward switching method
- ?? Supports up to 8K unicast addresses entities per device
- ?? Supports 512KB RAM for data buffering
- ?? Extensive front-panel diagnostic LEDs
- ?? IEEE 802.3x flow control for full-duplex
- ?? Back pressure flow control for half-duplex
- ?? Supports Port-based VLAN
- ?? Supports Port-based QoS
- ?? RS-232 DCE console port for setting up and managing the Switch via connection to a console terminal or PC using a terminal emulation program
- ?? Standard 19” Rack-mount size



## ***UNPACKING AND INSTALLATION***

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This chapter provides unpacking and installation information for the Switch. To avoid causing any damage to the Switch, we recommend that you read this chapter carefully before starting installation.

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### **Unpacking**

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

- ?? One 26-Port 10/100/1000Mbps Smart Copper Gigabit Switch
- ?? One AC power cord, suitable for your area's electrical power connections
- ?? One console cable (RS-232: 9 pin female to 9 pin female)
- ?? Four rubber feet for shock cushioning
- ?? Screws and two mounting brackets
- ?? This User's Guide

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 place the Switch may greatly affect its performance. When installing, take the following into your consideration:

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

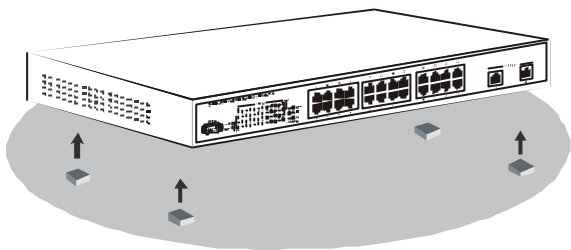
**Install the Switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.**

**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 cushions the Switch and protects the Switch case from scratching.**





**Figure 1. Attach the adhesive rubber pads to the bottom**

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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 equipments. Attach the mounting brackets to both sides of the Switch (one at each side), and secure them with the provided screws.

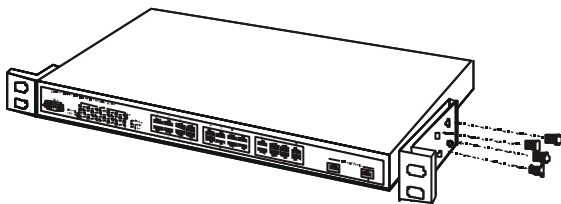


Figure 2. Combine the Switch with the provided screws  
Then, use screws provided with the equipment rack to mount the

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Switch to the rack.

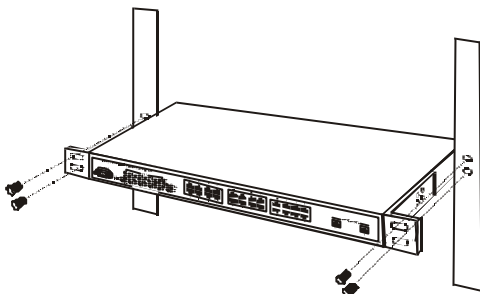


Figure 3. Installing the Switch on an equipment rack

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## Connecting Network Cable

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The Switch supports 24 10/100Mbps Fast Ethernet ports and 2 10/100/1000Mbps Gigabit Ethernet ports. It runs full/half duplex transfer mode for 10/100Mbps speed and full duplex transfer mode for 1000Mbps speed.

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

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## AC Power

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The Switch can be used with AC power supply 100~240V AC, 50~60 Hz. The power switch is located at the rear of the unit adjacent to the AC power connector and the system fan. 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.



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## ***IDENTIFYING EXTERNAL COMPONENTS***

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This chapter identifies all the major external components of the Switch. Both the front and rear panels are shown below, with a description of each panel features.

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### **Front Panel**

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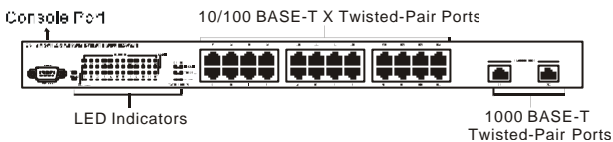


Figure 4. The front panel of the Switch

### **LED Indicators**

Refer to the next chapter *Understanding LED Indicators* for detailed information on the meaning of each LED indicator.

### **10/100BASE-TX Twisted-Pair Ports (Port1~24)**

These ports support network speeds of either 10Mbps or 100Mbps, and can operate in half- or full- duplex transfer modes. These ports also support Auto-MDIX crossover detection function, providing true “plug and play” capability.

### **1000BASE-T Twisted Pair Ports (Port 25~26)**

The Switch is equipped with two Gigabit twisted pair ports.

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These ports auto negotiate between 10/100/1000Mbps and support auto-MDIX type detection function. These two ports operate only in full duplex mode.

### Console Port

An RS-232 DCE console port is set up and manages the Switch via a connection to a console terminal or PC using a terminal emulation program.

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## Rear Panel

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**Figure 5. The 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.

### Power Switch

Use the power switch beside this power connector to turn on or turn off the power of the Switch.

## ***UNDERSTANDING LED INDICATORS***

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The front panel LEDs provides instant status feedback, and, helps monitor and troubleshoot when needed.

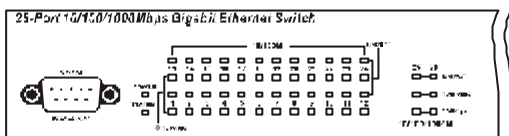


Figure 6. LED indicators of the Switch

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### Device LED

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#### **POWER**

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**

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

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## Ports 1~24 Status LEDs

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### LINK/ACT

On	:	When the LED lights on, the respective port is connected to the 10/100Mbps Ethernet network.
Blinking	:	When the LED is blinking, the port is transmitting or receiving data on the 10/100Mbps Ethernet network.
Off	:	No link.

### 100Mbps

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

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## Port 25 & Port 26 Status LEDs

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### LINK/ACT

On	:	When the LED lights on, the respective port is connected to a 10/100/1000Mbps Ethernet network.
Blinking	:	When the LED is blinking, the respective port is transferring or receiving data on a 10/100/1000Mbps Ethernet network.
Off	:	No link.



**1000Mbps**

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

**100Mbps**

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



## ***CONFIGURING THE SWITCH***

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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.

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### **Configuration via Serial Port**

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The Switch is accessible using a terminal or terminal emulator attached to the RS-232 serial port on the Switch.

***The console port is set at the factory for following configuration:***

<i>☞☞</i>	Baud rate:	9,600
<i>☞☞</i>	Data width:	8 bits
<i>☞☞</i>	Parity:	none
<i>☞☞</i>	Stop bits:	1
<i>☞☞</i>	Flow control:	None

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

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## Setting the Switch

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The 26-Port 10/100/1000Mbps Gigabit Ethernet Smart Switch has a menu-driven console interface for smart switch configuration. The Switch can be configured through the serial port. A network administrator can manage and control the Switch from the console program. This section indicates how to configure the Switch to enable its smart functions.

### **Setup**

There are two items, Port Configuration and VLAN, shown in the Setup screen. Each function of these two items will be illustrated in the following sections.

### **System**

In the System screen, Factory Reset, Load Previous Setting, and System Uptime, can be viewed and changed. System Uptime can't be altered and governed by the Switch.

### **File**

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

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## Main Menu

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The main menu appears, as shown in Figure 7. You can see the available console command keys in the lower portion of the screen. Move cursor to highlight a desired option by using **Tab** key and then press **Enter** key to confirm. There are five options: **Setup**, **System**, **File**, **Save and Exit Setup** and **Exit Without Saving**.

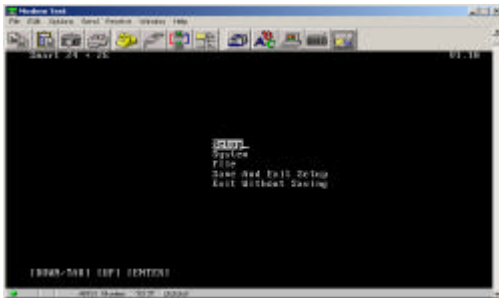


Figure 7. Main Menu

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## Configuring Setup Setting

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There are **Port Configuration** and **VLAN** settings in Setup menu, shown as Figure 8.

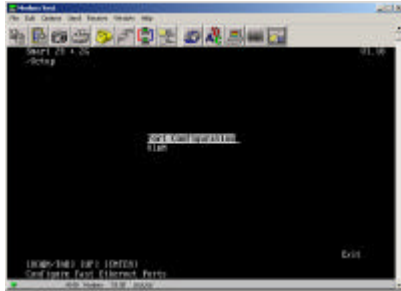


Figure 8. Setup

### Port Configuration

In the Port Configuration menu, you can configure each port's Speed, Flow Control, and QoS (port 1 ~ port 26) (see Figure 9). This screen displays Port 01 ~ 12 status; for port 13 ~ 26, use the [DOWN/TAB] key to select Next.

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

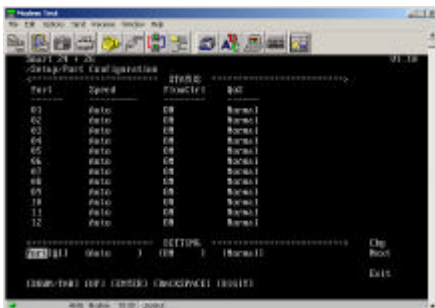


Figure 9. Port Configuration

### (1) Speed

The speed for all parts can only work at Auto Mode.

### (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, OFF, ALL ON, or ALL 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 Port-Based QoS. It exams each packet according to the priority code (high or normal) of the port.

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

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 Normal.

### VLAN Setting

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. 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. By default, all ports belong to VLAN 1. The default setting of VLAN is shown as Figure 10.

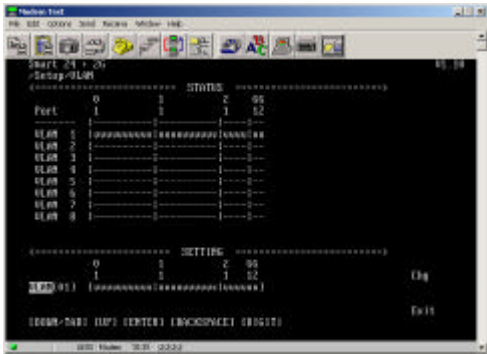


Figure 10. VLAN Configuration

For example, there are five computers (PC1~PC5) connected to the Switch’s port 1~5. They had been divided into two VLAN groups: VLAN1 (PC1~PC4) and VLAN2 (PC2~PC5). There is no way to connect PC1 and PC5 shown as Figure 11. If PC1 has to connect to PC5, it should joint PC1 and PC5 in the same VLAN.

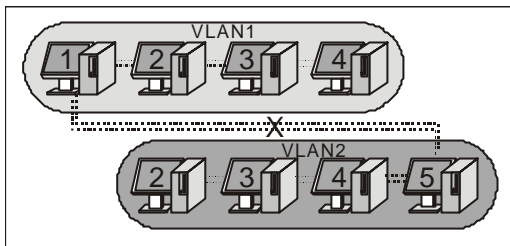


Figure 11: Dividing the Switch into two smaller switches

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”.

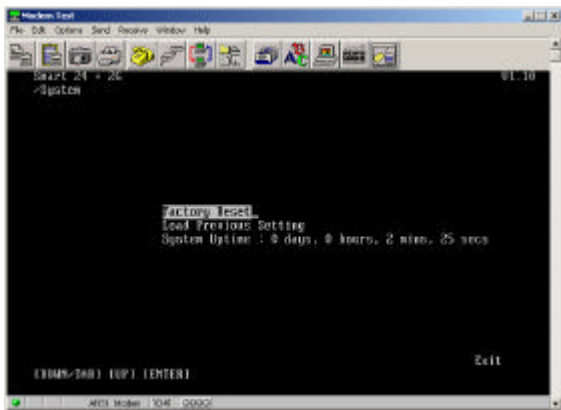
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## Configuring System Setting

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The System configuration menu screen (shown in Figure 12) indicates the following information:

- ?? **Factory Reset:** Restore all settings back to factory default.
- ?? **Load Previous Setting:** To reload the previous setting that has not been saved.
- ?? **System Uptime:** Indicates how long the Switch has been powered ON.



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Figure 12. System Setting

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## Configuring File Setting

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The File Configuration Menu screen (shown in Figure 13) indicates the following information:

**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.

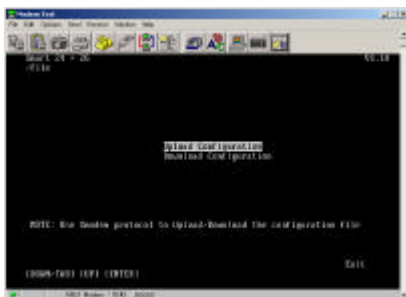


Figure 13. File installation



## ***TECHNICAL SPECIFICATIONS***

<b>General</b>	
Standards	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100 BASE-TX Fast Ethernet IEEE 802.3ab 1000BASE-T Gigabit Ethernet
Protocol	CSMA/CD
Data Transfer Rate	Ethernet: 10Mbps (half duplex), 20Mbps (full duplex) Fast Ethernet: 100Mbps (half duplex), 200Mbps (full duplex) Gigabit Ethernet: 2000Mbps (full duplex)
Topology	Star
Network Cables	10BASE-T: 2-pair UTP/STP Cat. 3,4,5; up to 100m 100BASE-TX: 2-pair UTP/STP Cat. 5; up to 100m 1000BASE-T: 4-pair UTP/STP Cat. 5; up to 100m (Cat. 5e is recommended)
Number of Ports	24 × 10/100BASE-TX Auto-MDIX STP ports 2 × 1000BASE-T Auto-MDIX STP ports

<b>Physical and Environmental</b>	
AC inputs:	100-240V AC, 50/60 Hz internal universal power supply
Power Consumption:	20 watts. (max.)
Temperature:	Operating: 0?~40?C (32?~104?F), Storage: -10?~70?C (14?~158?F)
Humidity:	Operating: 10%~90%, Storage: 5%~90%
Dimensions:	440 × 200× 44 mm (17.32 x 78.7 x 1.73) (W × H × D)
Emissions:	CE Mark Class A, FCC Class A, VCCI Class A
Safety:	cUL(1950), CB(IEC60950)
<b>Performance</b>	
Transmits Method:	Store-and-forward
RAM Buffer:	512K bytes per device
Filtering Address Table:	8K entries per device
Packet Filtering/Forwarding Rate:	10Mbps Ethernet: 14,880/pps 100Mbps Fast Ethernet: 148,800/pps 1000Mbps Gigabit Ethernet: 1488,000/pps
MAC Address Learning:	Automatic update



