EES-1024AF

Intelligent Ethernet Switch

December 2002

User's Guide

ZyXEL

TOTAL INTERNET ACCESS SOLUTION

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(2) This device must accept any interference received, including interference that may cause undesired operations.

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♦ Firmware version information.

♦ Warranty information.

♦ Date you received your product.

♦ Brief description of the problem and the steps you took to solve it.

METHOD LOCATION	E-MAIL: SUPPORT SALES	TELEPHONE FAX	WEB SITE FTP SITE	REGULAR MAIL
WORLDWIDE	support@zyxel.com.tw sales@zyxel.com.tw	+886-3-578-3942 +886-3-578-2439	www.zyxel.com www.europe.zyxel.com ftp.europe.zyxel.com	ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu 300, Taiwan.
NORTH AMERICA	support@zyxel.com sales@zyxel.com	+1-714-632-0882 800-255-4101 +1-714-632-0858	www.zyxel.com ftp.zyxel.com	ZyXEL Communications Inc., 1650 Miraloma Avenue, Placentia, CA 92870, U.S.A.
SCANDINAVIA	support@zyxel.dk sales@zyxel.dk	+45-3955-0700 +45-3955-0707	www.zyxel.dk ftp.zyxel.dk	ZyXEL Communications A/S, Columbusvej 5, 2860 Soeborg, Denmark.
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Preface

Congratulations on your purchase of the EES Series of Intelligent Ethernet Switches.

This preface introduces you to the EES Series and discusses the organization and conventions of this User's Guide. It also provides information on other related documentation.

About The EES Series

The EES Intelligent Switch is designed to provide your network with Ethernet, Fast Ethernet, Gigabit Ethernet connectivity over twisted pair and fiber optic cabling. Two expansion slots on the front panel of the EES further add to the flexibility of your network systems. With its build-in Web Configurator, managing and configuring the EES becomes easier. From cabinet management to port-level control and monitoring, you can visually configure and manage your network via the web browser.

General Syntax Conventions

"Enter" means for you to type one or more characters and press the carriage return. "Select" or "Choose" means for you to select one from the predefined choices.

The SMT menu titles and labels are in **Bold Times** font. Predefined field choices are in **Bold Arial** font. Command and arrow keys are enclosed in square brackets. [ENTER] means the Enter, or carriage return key; [ESC] means the Escape key and [SPACE BAR] means the Space Bar.

For brevity's sake, we will use "e.g." as shorthand for "for instance", and "i.e." as shorthand for "that is" or "in other words" throughout this manual.

The EES-1024AF Intelligent Ethernet Switch will be referred to as the EES-1024AF, or simply as the switch in this manual.

Related Documentation

ZyXEL Web Site

The ZyXEL download library at www.zyxel.com contains additional support documentation and an online glossary of networking terms.

Part I:

Getting Ready

This part acquaints you with the features and applications of the EES-1024AF Intelligent Ethernet Switch, instructs you how to make the hardware connections, understand the front panel LEDs and introduces the SMT (System Management Terminal).

Chapter 1
Getting to Know the EES 1024

The EES-1024AF Intelligent Switch is designed to provide your network with Ethernet, Fast Ethernet, Gigabit Ethernet connectivity over twisted pair and fiber optic cabling. Two expansion slots on the front panel of the switch further add to the flexibility of your network systems.

The switch is a combination of 24 10/100M Ethernet RJ-45 ports and two optional module slots. The two optional modules can be 8-Port 10/100 auto-sensing Intelligent Switch Module, 2/4/8-Port 100 Base-FX Intelligent Fiber Module, Gigabit 1000Base-T Intelligent Switch Modules, and Gigabit 1000Base-SX/LX Intelligent Fiber Modules.

With its built-in web configurator, managing and configuring the switch becomes easier. From cabinet management to port-level control and monitoring, you can visually configure and manage your network via the web browser. Just click your mouse instead of typing cryptic command strings. In addition, the switch can also be managed via Telnet, the console port, or third-party SNMP management.

1.1 Features

- Conforms to IEEE 802.3, IEEE 802.3u, IEEE802.3z, IEEE 802.1d, IEEE 802.1q and IEEE 802.3x

- 24 auto-negotiating 10/100Mbps Ethernet RJ-45 ports

- 2 Expansion slots for optional module : 1-port Gigabit (SX/LX), 2/4-port 100Mbps Fiber (SC/ST/MT-RJ/VF-45), 8-port 100Mbps Fiber (MT-RJ/VF-45) 1-port Gigabit Copper, and 8-port 10/100 auto-sensing Switch modules

- Supports auto-sensing (auto MDI/MDIX crossover) for each 10/100Base-TX port

- One Console-connecting port for communication parameter configuration

- Supports full-duplex and half-duplex mode

- Store-and- forward switching architecture for abnormal packet filtering

- 4K-entry MAC address table

- LED-indicators for Power, ALM, 10/100M, LK/ACT, FD/ COL statuses

1.2 Intelligent Management Features

- Web Configurator

- Console and Telnet Configuration

- SNMP network management

- IEEE 802.1Q Tagging VLAN (4095 VLAN Group)

- IEEE 802.1d Spanning Tree Protocol (STP)

- Port Trunking supported

- IGMP and Sniffer (Port Mirroring) supported

- Port Priority - 802.1p & TOS (Type of Service) supported

- Static Address Table for manual address addition

- Broadcast Storm Filter function supported

- Firmware upgradeable through TFTP

1.3 Package Contents

Compare the contents of your EES-1024AF Intelligent Switch package with the standard checklist below. If any item is missing or damaged, please contact your local dealer for service.

- EES-1024AF Intelligent Ethernet Switch

- Power cord

- Four self-adhesive rubber feet

- This User's Guide

- Rack mount kit

- RS-232 cable

1.4 Management Methods

The switch supports the following management methods:

- Console and Telnet Management

- Web configurator

- SNMP Network Management

1.4.1   Console and Telnet Management

Managing the switch through the console port requires a direct connection between the computer and the switch using the RS-232 console port. You can also telnet into the switch from any computer on your network (provided you know the IP address of the switch and are in the same subnet).

1.4.2   Web Configurator

The switch comes with an embedded HTML web configurator residing in flash memory. It offers advanced management features and allows you to manage the switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer or Netscape Navigator. For more information, see *Chapter 6 Using the Web Configurator.*

1.4.3 SNMP Network Management

Simple Network Management Protocol is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. This switch supports SNMP agent functionality, which allows a manager station to manage and monitor the switch through the network.

An SNMP managed network consists of two main components: agents and a manager.

An agent is a management software module that resides in a managed device (the switch). An agent translates the local management information from the managed device into a form compatible with SNMP. The manager is the console through which network administrators perform network management functions. It executes applications that control and monitor managed devices.

The managed devices contain object variables/managed objects that define each piece of information to be collected about a device. Examples of variables include such as number of packets received, node port status etc. A Management Information Base (MIB) is a collection of managed objects. SNMP allows a manager and agents to communicate for the purpose of accessing these objects.

1.5 Network Applications

This section describes a few samples of network topology in which EES-1024AF Intelligent Switch (UTP/MT-RJ/VF-45, Intelligent) is used.

The switch provides versatile configuration options for the network. It is ideally suited as a workgroup or segment switch in a network; it has the flexibility to provide switched 10Mbps network link to the desktop or shared hubs, aggregate traffic from workgroup switches, or provide dedicated 100Mbps or 1000Mbps (Gigabit) to servers with bandwidth-intensive applications. Since all Fast Ethernet ports are auto-negotiate for operation at 100 Mbps the switch is perfect for use in an evolving network environment where demand for network speed is increasing.

1.5.1 Backbone Application

For small networks where rapid growth can be expected in the near future, the switch is an ideal solution supporting backbone connectivity.

The switch can be used as a standalone switch for a group of heavy traffic users. Switching is brought to the desktop either through a single end-station per switch port or through a multi-port switch.

A 1000 Mbps server is connected to the switch providing end stations high-speed accessibility to its applications. This configuration provides dedicated 100 Mbps connections to the network center, to the server, and up to 40 users (while 2 Optional 8-port module are installed).

When the network needs expansion, you can simply connect the switch to any IEEE 802.3 (Ethernet), IEEE 802.3u (Fast Ethernet) and 802.3z (Gigabit Ethernet) compliant switch utilizing the Auto MDI/MDIX function. The switch can also work side by side with a wide range of networking devices (e.g., firewall routers and printer servers) added to the network.
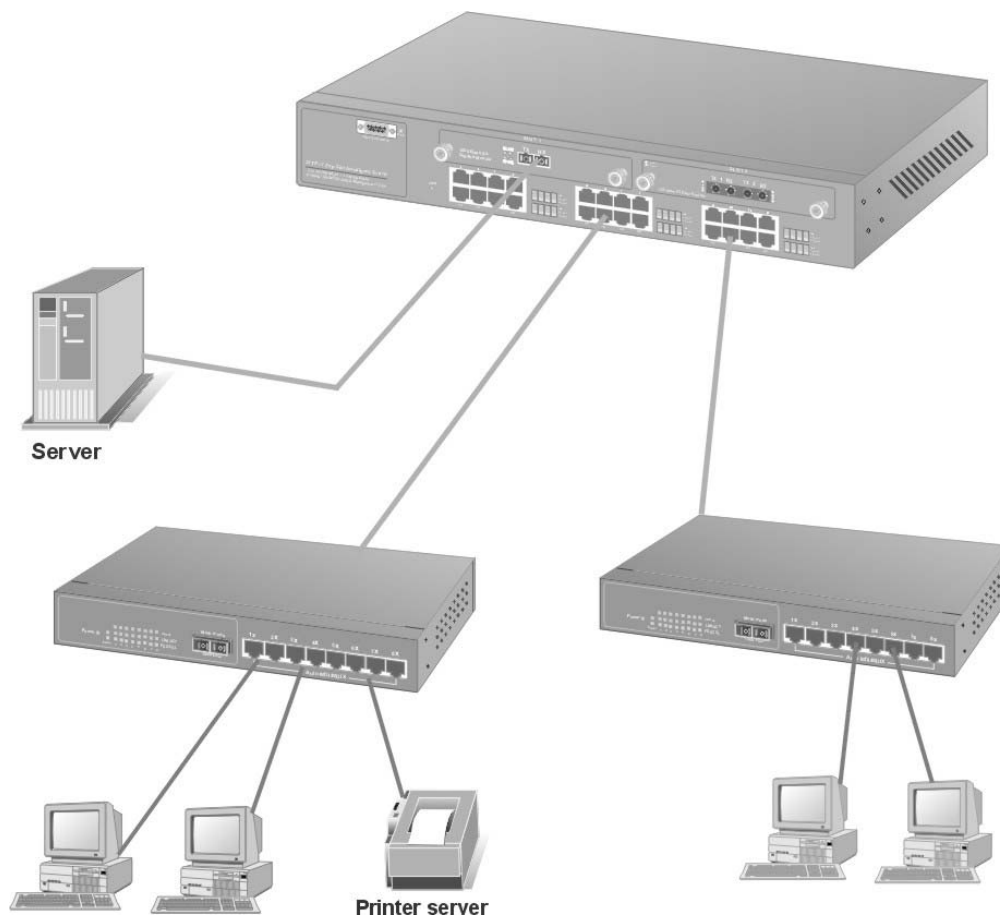
Figure 1-1 Backbone Application

1.5.2 Bridging Example

For enterprise networks where large data broadcasts are constantly processed, the switch is an ideal solution for department users to connect to the corporate backbone. Used as segment switch, the switch can alleviate user contention for bandwidth and eliminate server and network bottlenecks. All ports can connect to high-speed department servers that need high bandwidth. The switch provides parallel communications within its Gigabit port, which can run up to 2000 Mbps at full-duplex mode.

The switch makes key servers available to more users by allowing multiple conversations to occur concurrently, thereby significantly expanding overall network throughput. Moreover, the switch eases supervision and maintenance by allowing network manager centralize multiple servers at a single location.
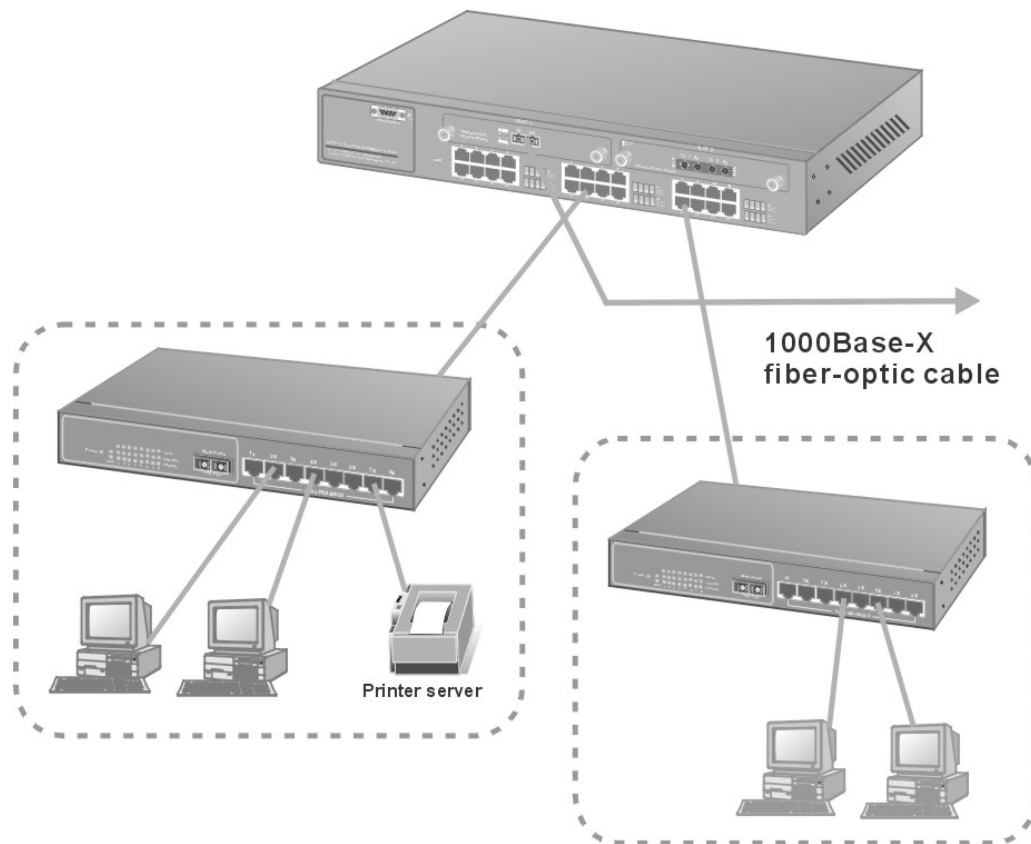
Figure 1-2 Bridging Application

Full-duplex mode operation only applies to point-to-point access (for example, when attaching the switch to a workstation, server, or another switch). When connecting to hubs, use a standard cascaded connection set for half-duplex operation.

1.5.3   High Performance Switched Workgroup

The switch is ideal for connecting two workgroups, supporting the throughput, for example, of 800Mbps. This application is useful for power groups that need high bandwidth.

The most common LAN implementations use a combination of standard switches, bridges and routers. The bridges and routers quickly become bottlenecks, reducing overall network throughput. Switching to higher-speed LANs such as FDDI or ATM is not a good choice for most people. However, such broadband equipment is still extremely expensive and difficult to maintain. Besides, you have to replace all existing Ethernet cable and adapter cards, restructure your network, and implement more expensive administration procedures.

The switch can provide the same bandwidth of FDDI and ATM at much lower costs. In addition, all current adapters and network devices can still be used. The switching cross-domain connection is better than bridge and router because the current LAN structure can be retained in which any node can freely communicate with any other node.
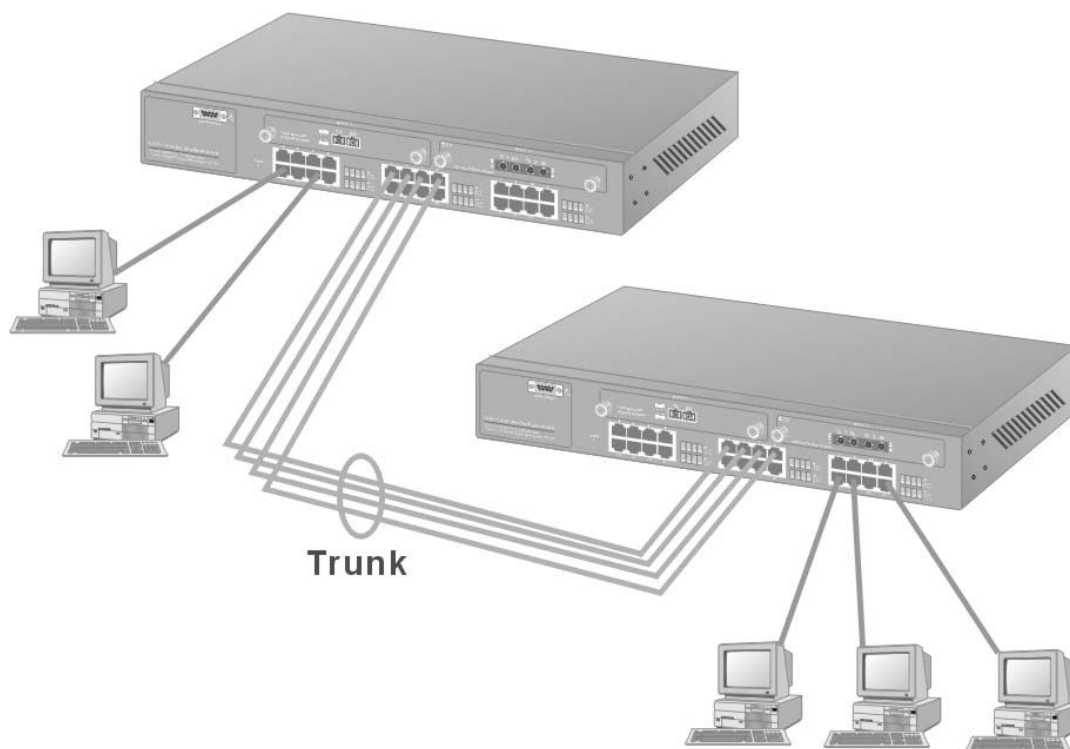
Figure 1-3 High Performance Switched Workgroup Application

1.5.4   IEEE 802.1Q VLAN Application

The switch supports up to 4095 tag-based IEEE 802.1Q-compatible virtual LAN (VLANs).

Tag-based VLAN Workgroup

You can group the switch ports into broadcast domains by assigning them to the same VLAN to increase network capacity and performance. With network segmentation, each switch port connects to a segment that is a single broadcast domain. Packets received in one VLAN can only be forwarded within that VLAN.

VLAN allows the logical grouping of end stations, based not on physical location but on business policies such as job function or department. Members of a group can be dispersed throughout a facility - they do not have to be connected in close physical locations.

Hence, group members can coordinate their data communication requirements regardless of the actual working locations; and the logical network can extend to any point you want it to. Moreover, VLAN groups can be modified at any time to add, move or change users without any re-cabling.
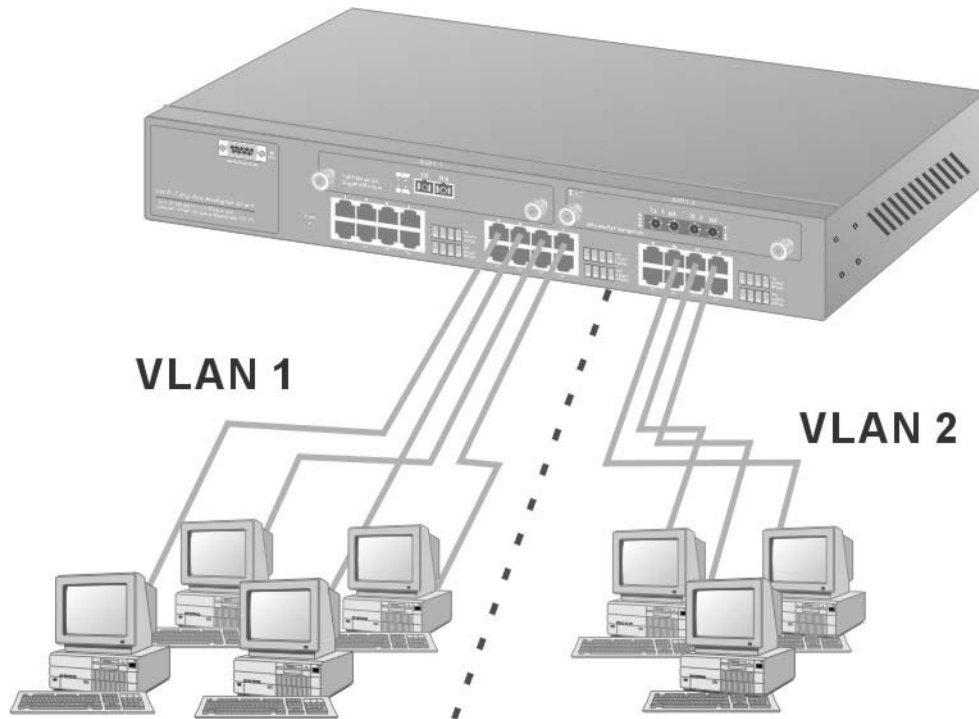
Figure 1-4 VLAN Workgroup Application

Shared Server

The switch's compliance to the IEEE802.1Q tagging VLAN standard allows ports to exist in multiple VLANs for shared resources, such as servers, printers, or Switch-to-Switch connections. It is also possible to have resources exist in multiple VLANs on one switch as shown in the following figure.
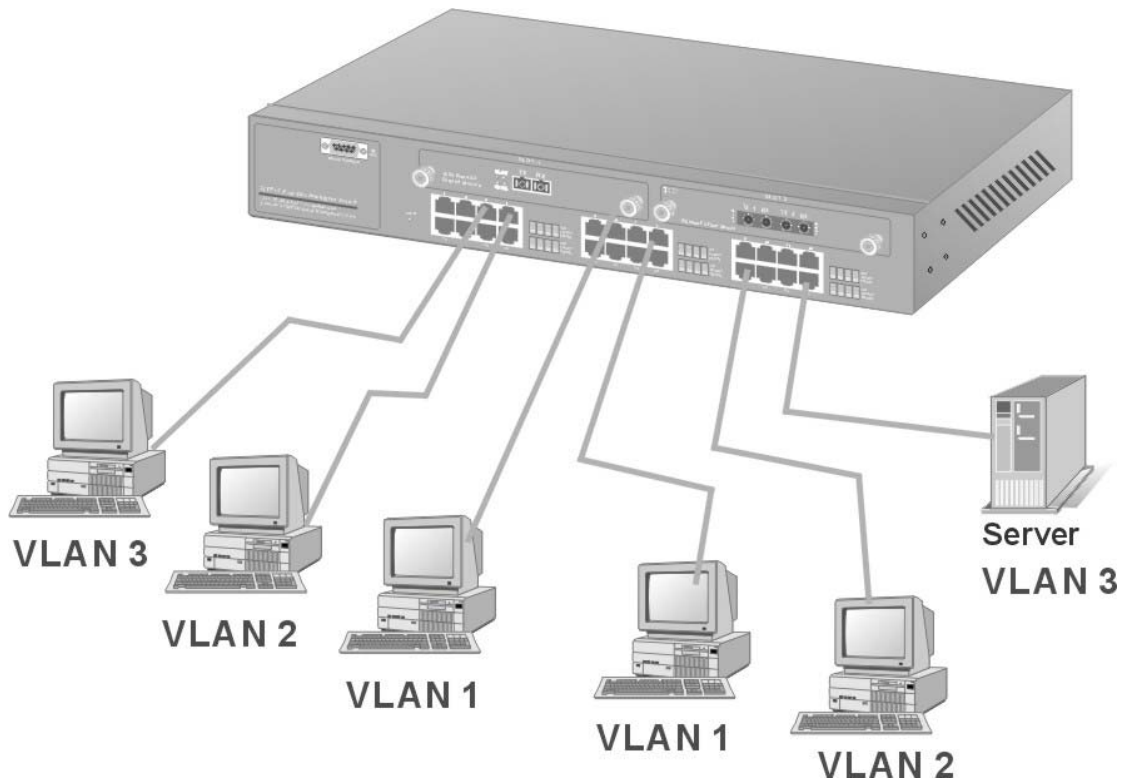
Figure 1-5 Shared Server

In this example, stations in different VLANs share resources. As a result, VLAN 1 and VLAN 2 can access VLAN 3 for printing. All VLAN port members of VLAN3 can see the broadcasts from ports configured in VLAN3.

Chapter 2
Hardware Connections

This section describes the hardware of the EES-1024AF Intelligent Switch, and gives a functional overview of the switch.

2.1 Hardware Description

2.1.1   The Front Panel

The front panel of the switch consists of 24 auto-sensing 10/100Mbps Ethernet RJ-45 ports, two optional expansion slots, and a Console port. The LED indicators are also located on the front panel of the switch.
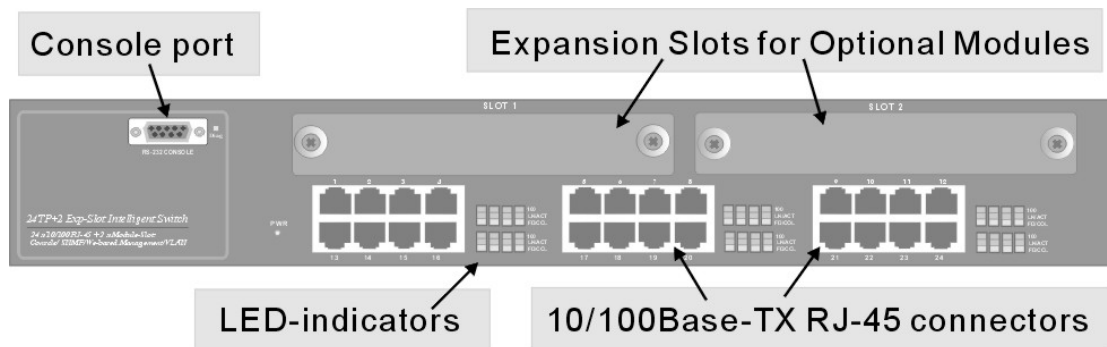
Figure 2-1 The Front Panel of switch

10/100Base-TX RJ-45 ports (Auto MDI/MDIX):

Your switch comes with 24 10/100Mbps auto-sensing ports for 10Base-T or 100Base-TX devices connections. With the auto MDI/MDIX feature, you can connect to another switch or workstation without changing to straight-through or crossover network cables.

Expansion Slots

The chassis of the switch contains two expansion slots. The optional modules come with the built-in CPU module. You can choose two of the following optional modules. For more information, see the *Optional Modules* chapter.

- 8-Port 10/100 auto-sensing Intelligent Switch Module

- 2/4-Port 100 Base-FX Intelligent Fiber Module

- Gigabit 1000Base-T Intelligent Switch Modules

- Gigabit 1000Base-SX/LX Intelligent Fiber Modules

Console Port

Console management can be done through the Console Port. It requires a direct connection between the switch and a computer via a RS-232 cable.

LED Indicators

All LED indicators are located on the front panel of the switch. They provide a real-time indication of system and operational status. The following table gives descriptions of the LED status and their meanings.
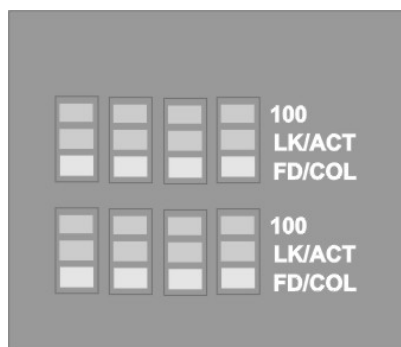
Figure 2-2 The LED

Table 2-1 The LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
PWR	Green	ON	The system is turned on.
		OFF	The system is off.
ALM	Red	ON	The system is functioning abnormally.
		OFF	The system is functioning normally.
100	Green	ON	The link to a 100 Mbps Ethernet network is up.
		OFF	No device attached or in 10Mbps mode.
LK/ACT	Green	ON	The port is connected with a device.
		Blinking	The port is receiving or transmitting data.
		Off	No device attached.
FD/COL	Yellow	ON	The port is operating in Full-duplex mode.
		Blinking	Packet collision occurred.
		OFF	No device attached or in half-duplex mode.

2.1.2   Rear Panel

The 3-pronged power plug and the On/off switch are located at the back of the switch. The ventilation fan is located on the side of the switch. The switch works with AC in the range 100-240V AC, 50-60Hz.

Figure 2-3 The Rear Panel of the switch

Power On

After all network cables are connected, plug the power cord into the power socket on the back panel and the other end into a power outlet. Turn the power on using the power Switch on the back panel. The switch uses a universal power supply that requires no additional adjustment. Check the front panel PWR LED to see if power is properly supplied.

Diagnostic Test

After the installation is completed and AC power is applied, the switch will automatically perform a diagnostic test. When the Power LED is on within 5 seconds, the Diagnostic status LEDs will soon flash red.

When the switch passes the self-test within 15 seconds, the Link /ACT LED turns on.

If the switch fails the self-test, the ALM LED will blink.

2.2 Mounting the EES-1024AF

The switch is suitable for use in an office environment where it can be rack-mounted in standard EIA 19-inch racks or standalone.

For proper ventilation, allow about at least 4 inches (10 cm) of clearance on the front and 3.4 inches (8 cm) on the back of the switch. This is especially important for enclosed rack installation.

2.2.1   Desktop Mounting

Step 1.   Make sure the switch is clean and dry.

Step 2.   Set the EES-1024AF on a smooth, level and sturdy flat space strong enough to support the weight of the EES-1024AF and the attached cables with a power outlet nearby.

Step 3.   Make sure there is enough clearance around the EES-1024AF to allow air circulation and the attachment of cables and the power cord.

Step 4.   Remove the adhesive backing from the supplied rubber feet.

Step 5.   Attach the rubber feet to each corner on the bottom of the EES-1024AF. These rubber feet help protect the EES-1024AF from shock or vibration and ensure space between devices when stacking.
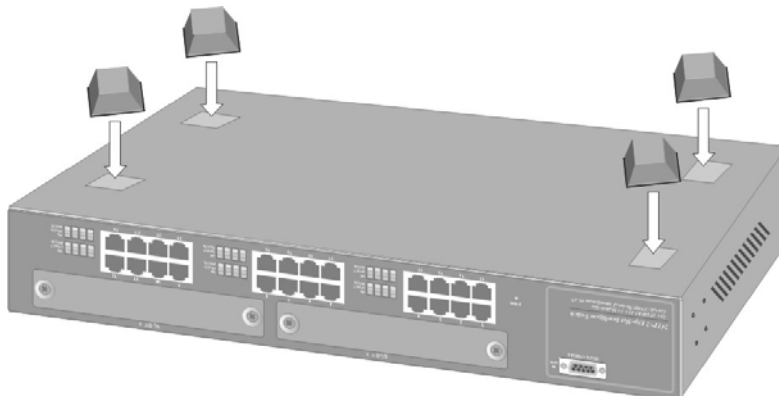
Figure 2-4 Attaching Rubber Feet to each corner on the bottom of the switch

Do not block the ventilation holes. Leave space between switches when stacking.

2.2.2   Rack-mounted Installation

The EES-1024AF can be mounted on a 19-inch rack or in a wiring closet with other equipment. Follow the steps below to mount your EES-1024AF on a 19-inch rack using the included rack-mounting kit.

Step 1.   Align one bracket with the holes on one side of the EES-1024AF and secure it with the bracket screws smaller than the rack-mouting screws. Similarly, attach the other brackets

Figure 2-5 Attach mounting brackets with screws

Step 2.   After attaching both mounting brackets, position the EES-1024AF in the rack by lining up the holes in the brackets with the appropriate holes on the rack. Secure the EES-1024AF to the rack with the rack-mounting screws.
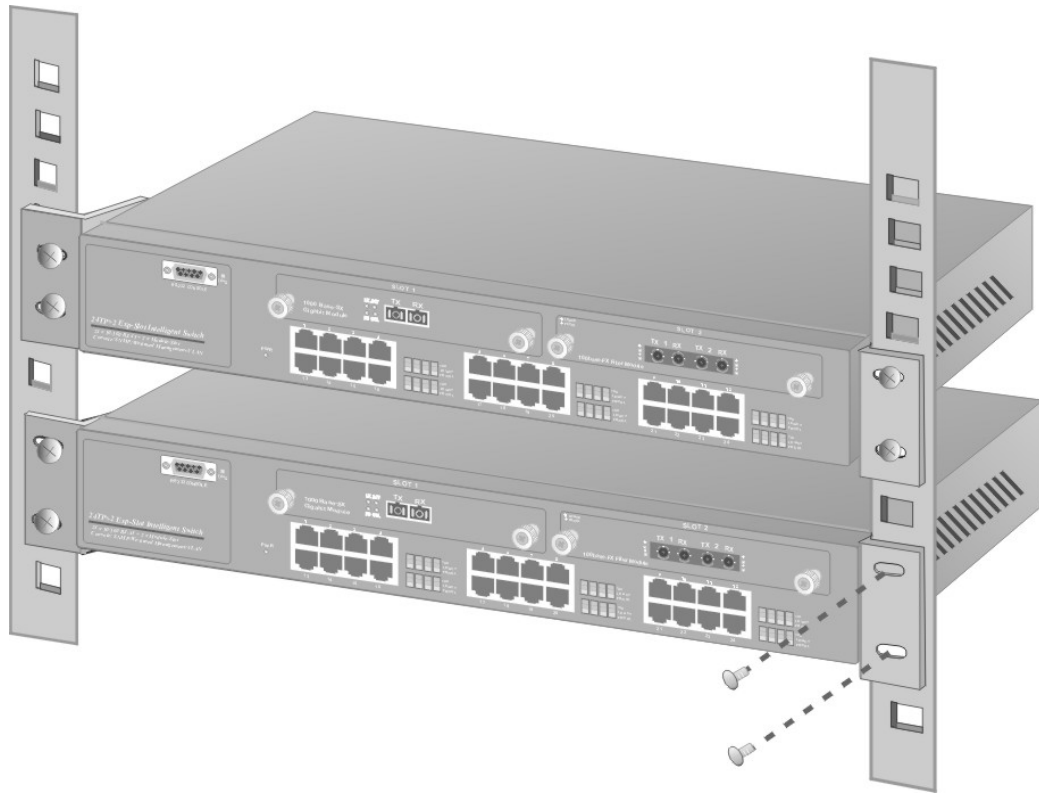
Figure 2-6 Mount the switch in an EIA standard 19-inch Rack

Chapter 3
Optional Modules

3.1 Introduction[1]

With the EES switch's two expansion slots, you can use optional modules that allow your EES switch to provide 10/100 Mbps and 1000 Mbps connections to other compatible network devices. The optional modules are designed to expand your network area.

You can choose from the following to optimize your network's performance while reducing cost and complexity

- 1-port Gigabit 1000Base-T Intelligent module
- 1-port Gigabit 1000Base-SX/LX Fiber Intelligent modules
- 8-port 10/100 auto-sensing Intelligent module
- 2-port/ 4-port 100Base-FX Fiber Intelligent modules

The following sections provide a brief description of each optional module.

3.2 EM1024A-8TP: 8-Port 10/100 auto-sensing Intelligent Switch Module
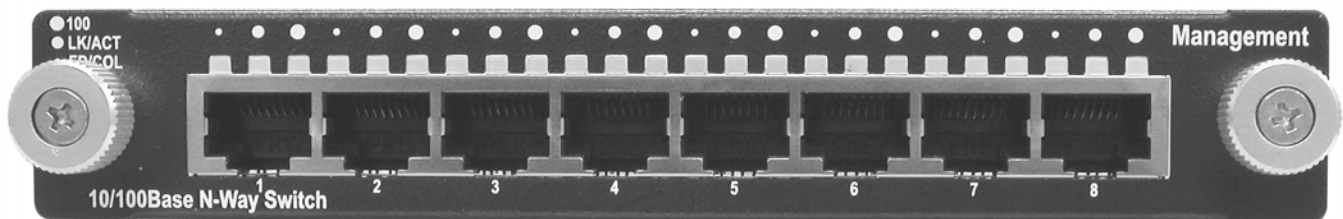
Figure 3-1 EM1024A-8TP Front Panel

Features

- Eight 10/100Mbps Ethernet switch ports
- Supports auto MDI/MDIX (auto-sensing) for all 10/100Base-TX ports
- Auto-negotiation support on all ports
- Back-Pressure-Base flow control on half-duplex ports
- Pause-Frame-Base flow control on full-duplex ports

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[1] The list of modules is correct at the time of writing. It is subjected to change without notice.

- Supports store-and-forward switching

- Supports non-blocking and full wire speed forwarding rate

- 4K-entry MAC address table

- 100M, LK/ACT, FD/COL LEDs

- Supports SNMP management

Front Panel LEDs

There are three types of LEDs for each RJ-45 port.

Table 3-1 EM1024A-8TP LED Description

LED	COLOR	STATUS	DESCRIPTION
100	Green	On	An Ethernet device is connected at 100 Mbps.
		Off	An Ethernet device is connected at 10Mbps.
LK/ACT	Green	On	The port is connected to an Ethernet device.
		Blinking	The port is transmitting or receiving data.
FD/COL	Yellow	On	The port is operating in full-duplex mode.
		Blinking	Packet collision occurred on this port.
		Off	The port is operating in half-duplex mode.

3.3 EM1024A-GTP: Gigabit 1000Base-T Intelligent Switch Module
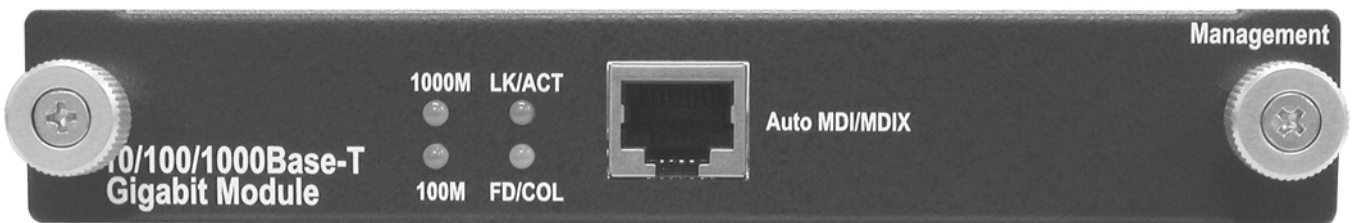
Figure 3-2 EM1024A-GTP Front Panel

Features

- Gigabit Media Independent Interface (GMII) compliant

- One 100/1000Mbps N-Way auto-negotiation switch port

- Standard auto-negotiation, duplex modes and flow control for MII and GMII PHY

- Supports full-duplex at 1000Mbps on GMII interface

- Supports auto MDI/MDIX (auto-sensing)

- 128Kb memory buffer sharing

- Supports store-and-forward switching

- Supports half-duplex and full-duplex modes at 10/100 Mbps on MII interface

- 1000M, 100M, LK/ACT and FD/COL LEDs

Front Panel LEDs

There are four LEDs for the RJ-45 port.

Table 3-2 EM1024A-GTP LED Description

LED	COLOR	STATUS	DESCRIPTION
1000M	Green	On	An Ethernet device is connected at 1000 Mbps.
		Off	An Ethernet device is connected at 10 Mbps or is not connected.
LK/ACT	Green	On	The port is connected to an Ethernet device.
		Blinking	The port is receiving or transmitting data.
		Off	No Ethernet device is connected to this port.
100M	Green	On	An Ethernet device is connected at 100 Mbps.
		Off	An Ethernet device is connected at 10 Mbps or is not connected.
FD/COL	Yellow	On	The port is operating in full-duplex mode.
		Blinking	Collisions occurred.
		Off	The port is operating in half-duplex mode.

3.4 100Base-FX Fiber Intelligent Module Series

3.4.1 EM1024A-2FX-SC: 2-Port 100Base-FX (Multi-mode) Intelligent Fiber Module
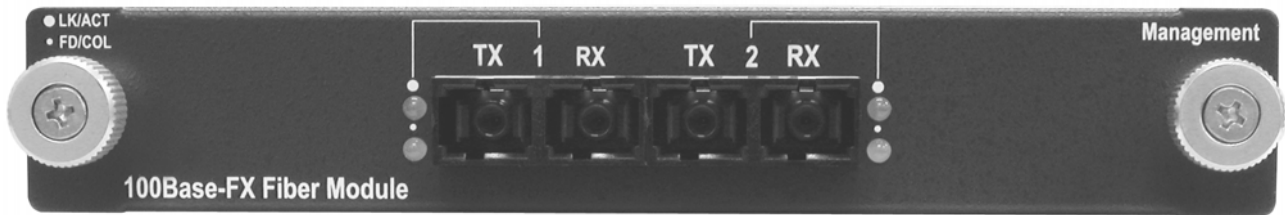
Figure 3-3 EM1024A-2FX-SC Front Panel

3.4.2   EM1024A-4FX-SC: 4-Port 100Base-FX (Multi-mode) Intelligent Fiber Module
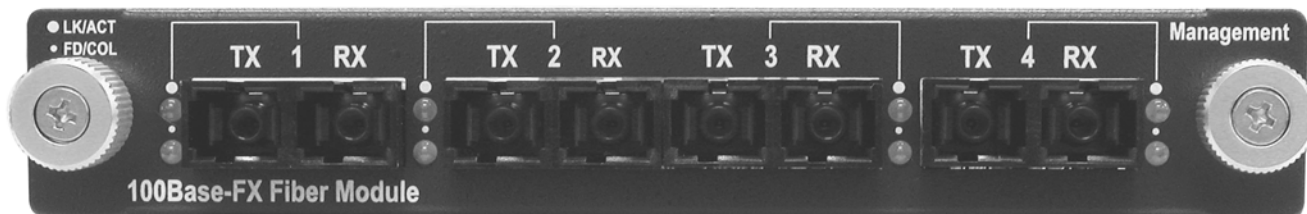
Figure 3-4 EM1024A-4FX-SC Front Panel

Features

- Two/Four 100Mbps fiber ports (SC connectors)

- 5MB memory buffer

- 12K-entry MAC address table

- Supports store-and-forward switching

- Supports half-duplex and full-duplex modes

- LK/ACT and FD/COL LEDs

- Supports connection distance of up to 2 kilometers via fiber optic cable.

- Supports SNMP management

3.4.3   EM1024A-2FX-SC-30: 2-Port 100Base-FX (Single-mode) Intelligent Fiber Module
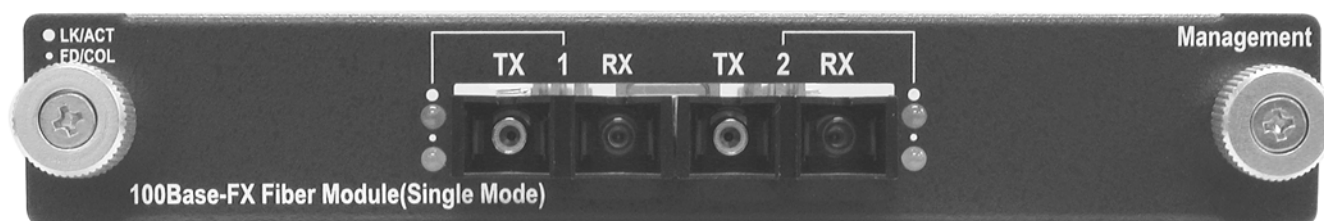
Figure 3-5 EM1024A-2FX-SC-30 Front Panel

3.4.4 EM1024A-4FX-SC-30: 4-Port 100Base-FX (Single-mode) Intelligent Fiber Module
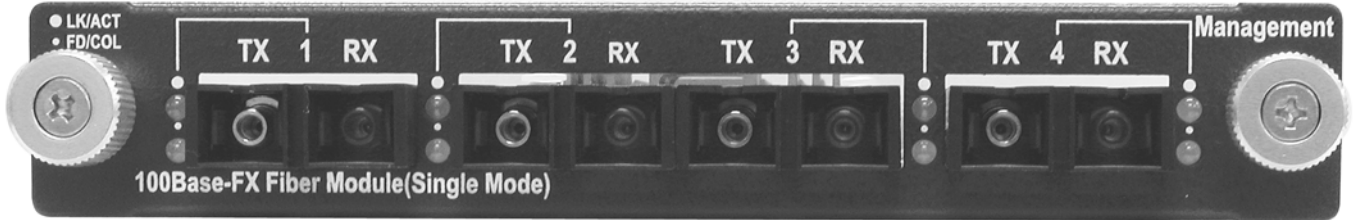
Figure 3-6 EM1024A-4FX-SC-30 Front Panel

Features

- Two/Four 100Mbps fiber ports (SC connectors)

- 5MB memory buffer

- 12K-entry MAC address table

- Supports store-and-forward packet filtering

- Supports half-duplex and full-duplex modes

- LK/ACT and FD/COL LEDs

- Supports connection distance of up to 30 kilometers via fiber optic cable.

- Supports SNMP management

Front Panel LEDs

There are two LED indicators for each fiber port.

Table 3-3 100Base-FX Fiber Module Series LED Description

| LED	COLOR	STATUS	DESCRIPTION
LK/ACT	Green	On	The port is connected to an Ethernet device.
		Blinking	The port is transmitting or receiving data.
		Off	The port is not connected to an Ethernet device.
FD/COL	Yellow	On	The port is operating in full-duplex mode.
		Blinking	Data packet collision occurred on this port.
		Off	The port is operating in half-duplex mode.

3.5 Gigabit 1000Base-X Intelligent Fiber Module Series

3.5.1   EM1024A-SX-SC: Gigabit 1000Base-SX Intelligent Module
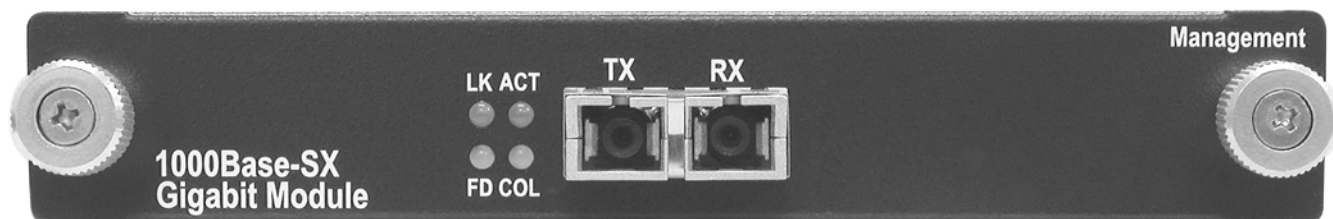
Figure 3-7 EM1024A-SX-SC Front Panel

Features

- One auto-negotiating 1000Mbps fiber port (SC connectors)

- 4K MAC address table

- Supports store-and-forward switching

- LK, ACT, FD and COL LEDs

- Supports connection distance of up to 220 meters (using 62.5/125um Multi-mode fiber) and up to 500 meters (using 50/125um Multi-mode fiber) via fiber optic cable.

- Supports SNMP management

3.5.2   EM1024A-LX-SC: Gigabit 1000Base-LX Intelligent Module
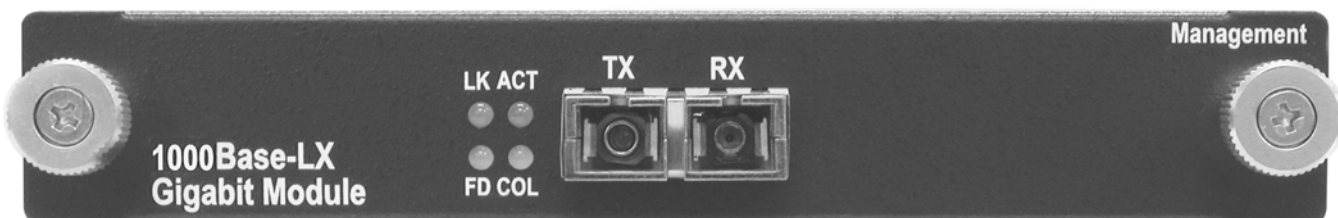
Figure 3-8 EM1024A-LX-SC: Front Panel

Features

- One auto-negotiating 1000Mbps fiber port (SC connectors)

- 4K MAC address table

- Supports store-and-forward switching

- LK, ACT, FD and COL LEDs

- Supports connection distance of up to 10 kilometers (using 9/125um Single-mode fiber) via fiber optic cable.

- Support SNMP management

Front Panel LEDs

There are four LED indicators for the fiber port.

Table 3-4 Gigabit 1000Base Intelligent Module Series LED Description

LED	COLOR	STATUS	DECRIPTION
LK	Green	On	The port is connected to an Ethernet device.
		Off	The port is not connected to an Ethernet device.
ACT	Green	Blinking	The port is transmitting or receiving data.
FD	Yellow	On	The port is operating in full-duplex mode.
		Off	The port is operating in half-duplex mode.
COL	Yellow	Blinking	Data packet collision occurred on this port.

3.6 Installing Optional Modules

You can install two optional modules separately to meet the needs of your network. The procedure for installing the optional modules is the same. Follow these steps to install the optional modules.

Step 1. Turn off your switch and unplug the power cord from the switch.

Step 2. Loosen the thumbscrews from the cover plate and remove the cover plate from the optional slot. Do not discard the cover plate. You can put the cover plate back on if you remove the new module.

Figure 3-9 Loosening the Screws and Removing the Cover Plate

Step 3. Ground yourself by wearing an anti-static wrist strap or touching any grounded or metal objects before you continue.

Step 4. Remove the optional module from its protective anti-static packaging. Avoid touching the onboard circuit components by holding it by the edge.

Step 5. Insert the optional module into an avaliable expansion slot on the switch. Press it firmly until the optional module snaps into place and secure it to the switch with the retaining screws.

Slide the optional module into the expansion slot until it snaps into place.
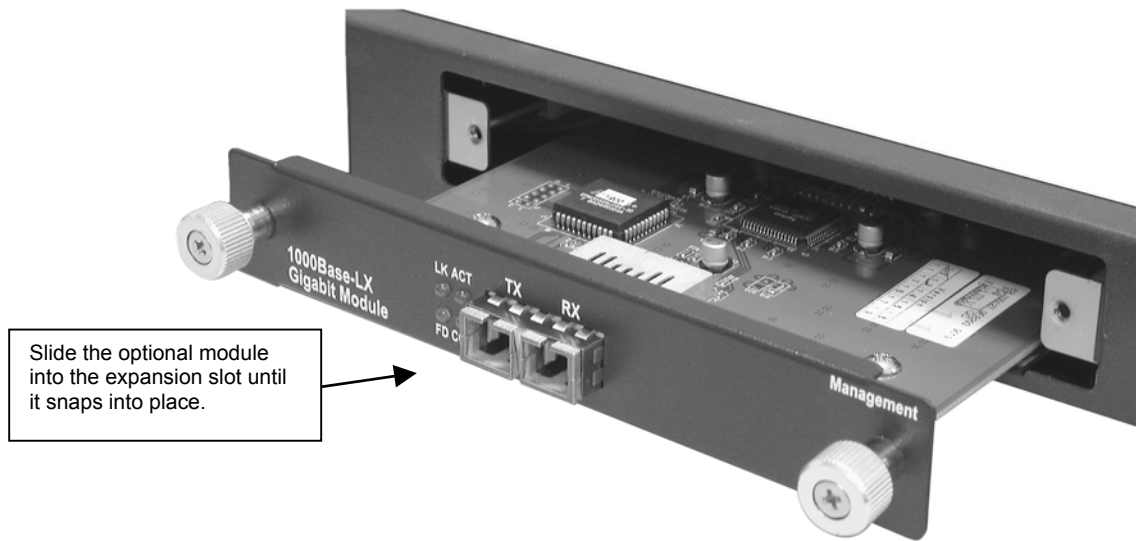
Figure 3-10 Inserting the optional module

Never force, bend or twist the optional modules into the expansion slots.

Step 6. Turn on the switch. The switch automatically detects the installed optional module. Connect any necessary network cables to the optional module and check the LEDs to verify that it is functioning properly.

Chapter 4
Introducing the SMT

This chapter introduces the basics of SMT.

4.1 Connecting to the Console Port

The Console configuration (out of band) allows you to set your switch to enable a user at a remote console terminal to communicate with the switch as if the console terminal were directly connected to it.

The Console port uses a male DB-9 connector to connect to a computer or terminal for monitoring and configuring the switch. Use the supplied RS-232 cable with a female DB-9 connector to connect a terminal or computer to the Console port.
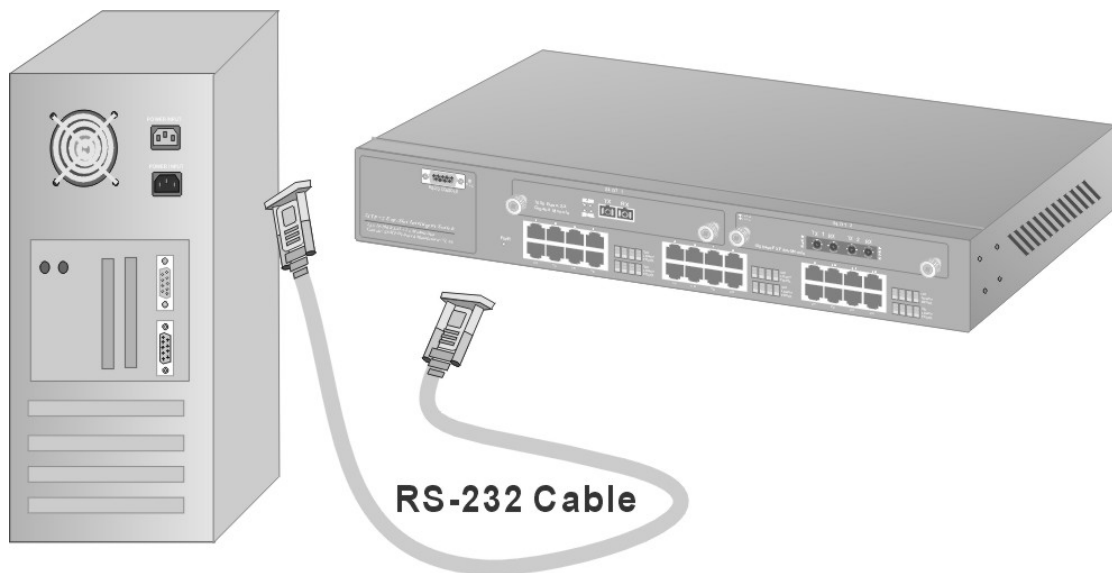
Figure 4-1 Connecting the Switch to a terminal via RS-232 cable

4.2 Establishing the Console Port Connection

After the switch is connected to a computer, turn on the computer and run a terminal emulation program (i.e. Hyper Terminal in Windows) and configure its communication parameters to match the following default characteristics of the console port.
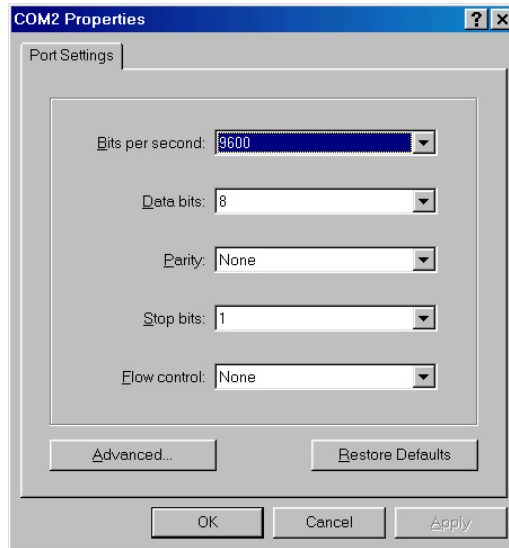
Figure 4-2 Parameter settings of communication parameters in Hyper Terminal

Table 4-1 Field Values for Hyper Terminal in Windows

FIELD	VALUE
Baud Rate	9600 bps
Data Bits	8
Parity	none
Stop Bit	1
Control flow	None

4.2.1   Initial Screen

At the prompt, type **go** and press [ENTER] to display the main screen as shown next.

```
Type 'go' to enter main menu: go
```
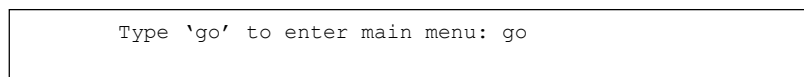
Figure 4-3 SMT - Initial Screen

4.2.2   Password Screen (optional)

If you enabled the console password login option, the following screen displays. To disable or enable this option, see *4.4.2 Enable Console Login*

```
Login: root
Password:
User root logged in
Type 'go' to enter main menu or 'exit' to logout: go
```
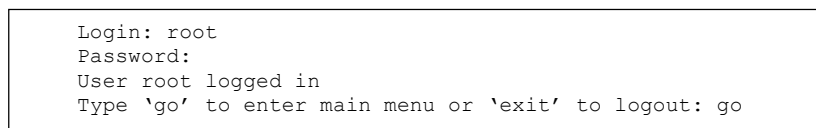
Figure 4-4 SMT - Login

4.3 Navigating the SMT Interface

The SMT (System Management Terminal) is the interface you use to manage your switch through the Console port or Telnet. Several operations that you should be familiar with before you attempt to modify the configuration are listed in the following table.

Table 4-2 Navigating the SMT

OPERATION	KEYSTROKE	DESCRIPTION
Move down to another menu	[ENTER]	To move forward to a submenu, type in the number or alphabet of the desired submenu and press [ENTER].
Move up to a previous menu	Type **q** or **Q**, then press [ENTER]	To move back to the previous menu, type **q** or **Q** and press [ENTER].
Entering information	[ENTER]	Type in the number or alphabet of the desired field, type in the appropriate information and press [ENTER].
Save your configuration	[ENTER]	Save your configuration by pressing [ENTER] at the message "Press ENTER to confirm or ESC to cancel". Saving the data on the screen will take you, in most cases to the previous menu.
Exit the SMT	Type **q** or **Q**, then press [ENTER]	Type **q** or **Q** at the main menu prompt and press [ENTER] to exit the SMT interface.

4.3.1   The Main Menu

After you log in, the SMT displays the **Main Menu**.

```
[Main]

1. Device Settings
2. Ports Settings
3. Address Table
4. Spanning Tree Protocol
5. Broadcast Storm Filter
6. IGMP
V. VLAN Mode (2 modes)
C. VLAN for CPU (2 VLANs)
I. Secure IP for Telnet and HTTP
S. Save Current Settings
D. Factory Default Settings & Reboot System
R. Reboot System
Q. Quit

Select one function (1-6, V, C, I, S, D, R, Q):
```

Figure 4-5 SMT- Main Menu

Table 4-3 SMT Main Menu Summary

#	MENU TITLE	DESCRIPTION
1	Device Settings	Use this menu to enter administrative information.
2	Port Settings	Use this menu to set the port settings for each port.
3	Address Table	Use this menu to display address information of each port.

Table 4-3 SMT Main Menu Summary

#	MENU TITLE	DESCRIPTION
4	Spanning Tree Protocol	Use this menu to enable or disable the Spanning Tree Protocol and show the port status.
5	Broadcast Storm Filter	Use this menu to enable or disable the Broadcast Storm filters.
6	IGMP	Use this menu to enable or disable the IGMP.
V	VLAN Mode (2 modes)	Use this menu to set the VLAN modes.
C	VLAN for CPU (2 VLANs	Use this menu to set VLAN ID for managed CPU.
I	Secure IP for Telnet and HTTP	Use this menu to enable or disable secure IP for Telnet or HTTP and specify the secure IP address(es).
S	Save Current Settings	Select this option to save your current custom settings.
D	Factory Default Settings and Reboot System	Select this option to reset the switch to factory default settings and reboot the system. This will erase all your custom settings.
R	Reboot System	This option reboots the system and makes all new settings take effect.
Q	Quit	To exit the SMT menu, you must type 'q' or 'Q'.

The SMT is not case sensitive; therefore you can type either "q" or "Q" at the prompt to exit.

4.4 Device Settings

4.4.1   Changing Your System Password

It is important to change the system password or login name by doing the following:

Step 1.   Enter 1 from the main menu. This will bring up **Device Setting** as shown.

```
[Main] [Device Settings]

0.1 Version (RO):        1.01.1, Mar. 20, 2002
0.2 MAC Address (RO):    00-00-1c-f3-0c-02
0.3 System Up Time (RO): 0 days 0 hours 3 minutes 59
seconds
1. System Name:          EES 1024AF
2. System Location:      2
3. System Contact:       Someone
4. IP Address:           192.168.1.1
5. Subnet Mask:          255.255.255.0
6. Default Gateway:      192.168.1.10
7. Change User/Password: root/root
8. Console Login Enabled: Yes
Q. Quit

Note: please save settings and reboot system
so that your device settings will take effect

Select one function (1-8, Q): 7
```

Figure 4-6 SMT - Device Settings

Step 2.   Enter 7 to select the **Change User/Password** option.

Step 3.   Type in the new username and enter the new password twice.

The SMT will return to the **Device Settings** screen. You should see your new user name and the password will be shown as "********".

4.4.2   Enable Console Login

ZyXEL strongly recommend that you enable the console login feature for security.

Step 1.   In the **Device Settings** menu, Enter 8 to select the **Console Login Enabled** option.

Step 2.   Enter "y" at the "Input Yes or No (Y, N):" prompt.

4.4.3   Assigning IP Address

Once you have logged into the switch, you need to assign an IP address to the Ethernet Interfaces of the switch so that you can connect to and manage the switch using a web browser. Follow the steps to assign an IP address to your switch:

Step 1.   In the **Device Settigns** menu, enter 4 to select **IP Address.**

Step 2.   Enter a unique IP address for the switch, and then press [ENTER]. (Default IP address is **192.168.1.1**)

Step 3.   Enter 5 to select **Subnet Mask**, and enter the subnet mask (IP Net mask) address. (Default subnet Mask is **255.255.255.0**)

Step 4.   Enter 6 to Select **Default Gateway**, and enter the IP address of the default gateway if you are sending packets to another IP network. (Default Gateway is **192.168.16. 254**)

The gateway address is the router that can forward packets to the other IP networks.

Return to the main menu to execute **S** (**Save Current Settings**) and **R** (**Reboot System**) to make your new settings take effect.

4.5 Save and Reboot

Once you have make new changes using the SMT you have to save the new settings and reboot your switch.

4.5.1   Save Current Settings

You must save the new settings to the switch before rebooting. Follow the steps to save the current settings.

Step 1.   Enter "s" from the SMT main menu.

Step 2.   Enter "y" at the prompt to continue saving and press [ENTER]. Once you save the current settings to the switch, you will not be able to get back the old settings. Enter "n" to cancel.

Step 3.   Wait for a moment. The SMT will return to the main menu after the saving the current settings.

```
[Main] [Save Current Settings]

Are you sure? (Y, N): y

save current settings...
done...
```

Figure 4-7 SMT – Save Current Settings

4.5.2   Reboot Your EES-1024AF

Follow the steps to reboot the switch. Rebooting will make all new settings take effect.

Step 1.   Enter "r" from the SMT main menu.

Step 2.   Enter "y'" at the prompt to continue the reboot process. Otherwise enter "n" to return to the main menu.

Step 3.   Wait for about 30 seconds before the SMT prompts you to log in again.

```
[Main] [Reboot System]

Are you sure? (Y, N): y

 reboot system.

24-port 10/100Base-TX + 2 expansion modules switch is
starting...
```

Figure 4-8 SMT - Reboot System

4.6 Resetting the EES-1024AF

You can reset the switch to the factory default values. All your custom configurations will be lost except the IP address of the switch.

Step 1.   Enter "d" from the main menu.

Step 2.   Enter "y" to continue the reset process. Otherwise enter "n" to returnt to the main menu.

Step 3.   Wait for a moment while the switch reboots and prompts you to log in again.

Part II:

Getting Started

This part shows you how to configure the basic setup using the SMT menus and introduces you to the Web Configurator.

Chapter 5
General Setup Using the SMT

This chapter shows you basic configuration using the SMT.

5.1 Ethernet Port Settings

Ethernet port connections can be in half-duplex or full-duplex mode. The Ethernet port must use the same speed or duplex mode setting as the peer Ethernet port in order to connect.

Enter 2 from the main menu, and then type in the port number to bring up the **Port Settings** menu for the specified port.

```
      [Main] [Ports Settings]
      module: 0, port: 1

      0.1 Link (RO):        Up
      0.2 Speed/Duplex (RO): 100/Full
      1. Port Enabled:      Enabled
      2. Speed/Duplex:      Auto
      3. Flow Control:      Enabled
      4. Back Pressure:     Enabled
      5. VLAN Tagged:       No
      6. Default VLAN ID:   1
      7. Note:
      Q. Quit

      Select one function (1-7, Q):
```

Figure 5-1 SMT - Port Settings

At the prompt, type the corresponding numerical numbers to configure. The **Port Settings** fields are explained in the table below.

Table 5-1 Port Settings Fields

#	FIELD	DESCRIPTION	EXAMPLE
0.1	Link	This read-only field indicates the connection status of the port.	Up
0.2	Speed/Duplex	This read-only field shows the actual speed and the duplex mode of the port.	100/FULL
1	Port Enabled	Select this option to enable or disable the port.	Enabled
2	Speed/Duplex	Set the port speed and duplex mode with this option. The switch will auto detect the speed and duplex mode of the attached device if you select **Auto**; otherwise check the settings of the device attached to this port and select from the following: **100/Full**, **100/Half**, **10/Full**, and **10/Half**.	**Auto**
3	Flow Control	When this option is enabled, the switch sends a PAUSE message to the device to pause the transmission when the buffer in the switch is full. This works only for devices in full-duplex mode.	**Enable**
4	Back Pressure	When this option is enabled, the switch sends a Back Pressure message to the device to pause the transmission when the buffer in the switch is full. This works only for devices in half-duplex mode.	**Enable**

Table 5-1 Port Settings Fields

#	FIELD	DESCRIPTION	EXAMPLE
5	VLAN Tagged	The VLAN ID will be tagged to the transmitted packets through the port.	**No**
6	Default VLAN ID	Select this option to set the default VLAN ID. You can select from 1 to 4095.	**1**
7	Note	This option allows you to enter additional information for the port. This will not affect the current configuration. Maximum 16 characters.	
When you have completed this menu, type "q" and press [ENTER] at the prompt go back to the **Port Settings** main menu. You can type "q" at any time to cancel.			

5.2 View Your Port Information

You can view the MAC address and the VLAN ID of a specific port in **Address Table**. Follow the steps to view all your port information.

Step 1. Enter 3 from the main menu the to bring up the **Address Table** menu.

Step 2. Enter 1 and press [ENTER] to display information on all ports currently connected to the switch.

```
[Main] [Address Table]

1. All
2. Module
3. Module Port
Q. Quit

Select one function (1-3, Q): 1

==============================================================

[Main] [Address Table] [All]
Module Port MAC-Address        VLAN
------ ---- ----------------   ----
0      1    00-50-ba-ad-4f-81  1
==============================================================
```

Figure 5-2 SMT - Address Table (All)

You can also select options 1 and 2 to display port information on a specific module.

5.3 Spanning Tree Protocol (STP)

Enable or disable the spanning tree protocol by following the steps.

Step 1. Enter 4 from the main menu to display the **Spanning Tree Protocol** page.

Step 2. Enter 1 to enable or 2 to disable the spanning tree protocol.

Step 3. Once the spanning tree protocol is enabled, you can enter 3 at the prompt the view port status for each port.

```
[Main] [Spanning Tree Protocol]
Current state: Enabled

1. Enable
2. Disable
3. Show Port State
Q. Quit

Select one function (1-3, Q): 3
============================================================

[Main] [Spanning Tree Protocol] [Show Port State]

Module Port State
------ ---- ------------
0      1    Listening
0      2    Not connected
0      3    Not connected
Press 'ENTER' key to continue...
```

Figure 5-3 SMT - Spanning Tree Protocol with Port Status

5.4 Broadcast Storm Filter

Follow the steps to enable or disable the broadcast storm filter.

Step 1. Enter 5 from the main menu to bring up the **Broadcast Storm Filter** page.

Step 2. Enter 1 to enable or 2 to diable the filter at the prompt.

```
[Main] [Broadcast Storm Filter]
Current state: Enabled

1. Enable
2. Disable
Q. Quit

Select one function (1-2, Q): 1
```

Figure 5-4 SMT - Broadcast Storm Filter

5.5 Internet Group Management Protocol (IGMP)

Follow the steps to enable or disable the IGMP

Step 1. Enter 6 from the main menu to open **IGMP** page.

Step 2. Enter 1 to enable or 2 to disable the IGMP.

```
[Main] [IGMP]
Current state: Enabled

1. Enable
2. Disable
Q. Quit

Select one function (1-2, Q):
```

Figure 5-5 SMT - IGMP

5.6 Setting the VLAN Mode

Follow the steps to set the VLAN mode.

Step 1. Enter "v" from the main menu to open the **VLAN Mode** page.

Step 2. Enter one of the two modes at the prompt.

```
[Main] [VLAN Mode]
Current mode: 1

1. VLAN is valid for all packets
2. VLAN is valid for broadcast and multicast packets, not for
   unicast packets.
   For SmartBits test, this mode will get better throughput.
Q. Quit

Select one function (1-2, Q):
```

Figure 5-6 SMT - VLAN Mode

5.7 Setting the VLAN for CPU

To set the VLAN for CPU enter "c" from the main menu to open the **VLAN for CPU** page.

```
[Main] [VLAN for CPU]

1. Current first VLAN for CPU: VLAN ID 1
2. Current second VLAN for CPU: None
Q. Quit

Select one function (1-2, Q): 1
```

Figure 5-7 SMT - VLAN for CPU

Table 5-2 Fields in VLAN for CPU options

#	FIELD	DESCRIPTION	EXAMPLE
1	Current first VLAN for CPU	Select this option and enter the VLAN ID for the first CPU. You can choose from ID 1 to 4095.	1
2	Current second VLAN for CPU	Select this option and enter the VLAN ID for the second CPU. You can choose from ID 1 to 4095.	None
Press "q" to exit this menu.			

5.8 Configure Secure IP Addresses

When the secure IP for Telnet or HTTP is enabled, only those IP address(es) specified in this screen will be able to Telnet to the switch or login using the Web Configurator. You can specify up to 4 IP addresses. If either secure IP feature is enabled without specifying an IP address, no device will be able to log into the switch using that login method.

Enabling the secure IP feature will not affect console port login.

ZyXEL recommend that you enable the Secure IP for HTTP **option if the switch is on the public network.**

Enter "i" from the main menu to bring up the **Secure IP** screen.

Figure 5-8 SMT – Secure IP

```
[Main] [Secure IP]

1. Secure IP for Telnet:  Enabled
2. Secure IP for HTTP:    Enabled
3. Secure IP 1:           192.168.1.10
4. Secure IP 2:
5. Secure IP 3:
6. Secure IP 4:
Q. Quit

Note: We suggest that you enable the HTTP
option if the management CPU
uses an Internet real IP

Select one function (1-6, Q):
```

Table 5-3 Fields in Secure IP

#	FIELD	DESCRIPTION	EXAMPLE
1	Secure IP for Telnet	Select this option and enable or disable the secure IP for Telnet sessions.	Enabled
2	Secure IP for HTTP	Select this option and enable or disable the secure IP for HTTP sessions.	Enabled
3 .. 6	Secure IP 1 .. 4	Select these options to specify secure IP address(es)	192.168.1.10
Press "q" to exit this menu.			

5.9 General Setup Complete

The SMT allows you to configure basic settings of the switch. Use the embedded Web Configurator to configure advanced settings as described next.

Chapter 6
Using the Web Configurator

This section introduces the configuration and functions of the Web Configurator.

6.1 Introduction

The embedded Web Configurator offers advanced management features and allows you to manage the switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer or Navigator.

The Web Configurator supports Internet Explorer 4.0 and Netscape Communicator 4.x and later versions. It is based on Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

By default, Internet Explorer 4.0 does not allow Java Applets to open sockets. The user has to explicitly modify the browser setting to enable Java Applets to use network ports. See *Appendix A Microsoft Internet Explorer Setup*. You don't need to change any configuration if you use Netscape browser. However, Netscape browser doesn't support TFTP firmware upgrade.

6.2 System Login

Disconnect the Console port connection before launching the Web Configurator.

Step 1. Start Internet Explorer or Netscape Communicator web browser.

Step 2. Type http:// and the IP address of the switch (for example, the default is 192.168.1.1) in the Location or Address field. Press **Enter**.

Figure 6-1 Web Configurator - Login

Step 3. The **Password** screen appears. Type user name and password. The default is **root** for both.

Step 4. Click **Ok**. The **Home** page of the Web Configurator displays.

6.3 Navigating the Web Configurator

6.3.1   Task Bar

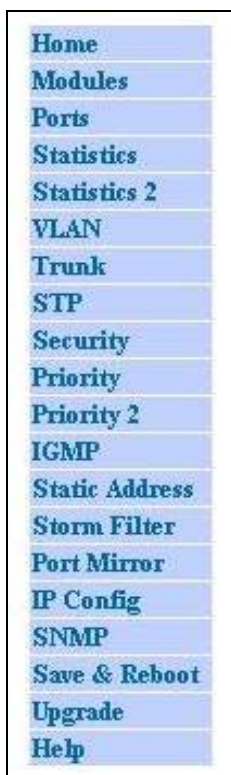The task bar displays at the left of all web pages provides a consistent way to access all program functions.

Figure 6-2 Web Configurator - Navigation Bar

6.3.2   The Web Configurator Front Panel Display

The Web Configurator displays the front panel of your switch at the top of every web page. The front panel shows the modules installed in the switch and the link status of all ports. The link status information is updated each time the Web Configurator polls the switch. The colors of the LED indicate the operating status of the port.

Table 6-1 Web Configurator - Front Panel LED Color Descriptions

COLOR	LINK STATUS
Orange	The port is operating at 10 Mbps.
Green	The port is operating at 100 Mbps.
Yellow	The port is operating at 1000 Mbps.
White	The port is disabled by the Spanning Tree Protocol.
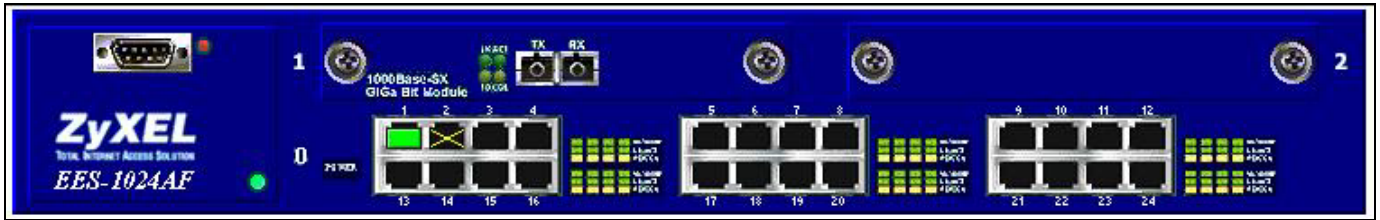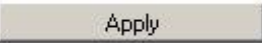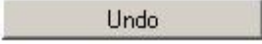
Figure 6-3 Web Configurator - Front Panel

A yellow "X" indicates a port is disabled. To view port information, click on the ports to open the **Ports** page. See *7.1 Port Management* for information on configuring the ports.

6.3.3   Commonly Used Buttons

The table describes the actions related to the buttons display at the bottom of the web pages.

Table 6-2 Commonly Used Buttons

BUTTON	FUNCTION
Apply	Click this button to apply your new settings to the current runny configuration. The new configuration will not take effect until you save and reboot your switch. See *8.1Save and Reboot.*
Undo	Click this button to clear the information you have just entered. The procedure works only if you have not yet click **Apply** before you click **Undo**.

6.4 Viewing Basic System Information

The **Home** page displays when you first access the Web Configurator.
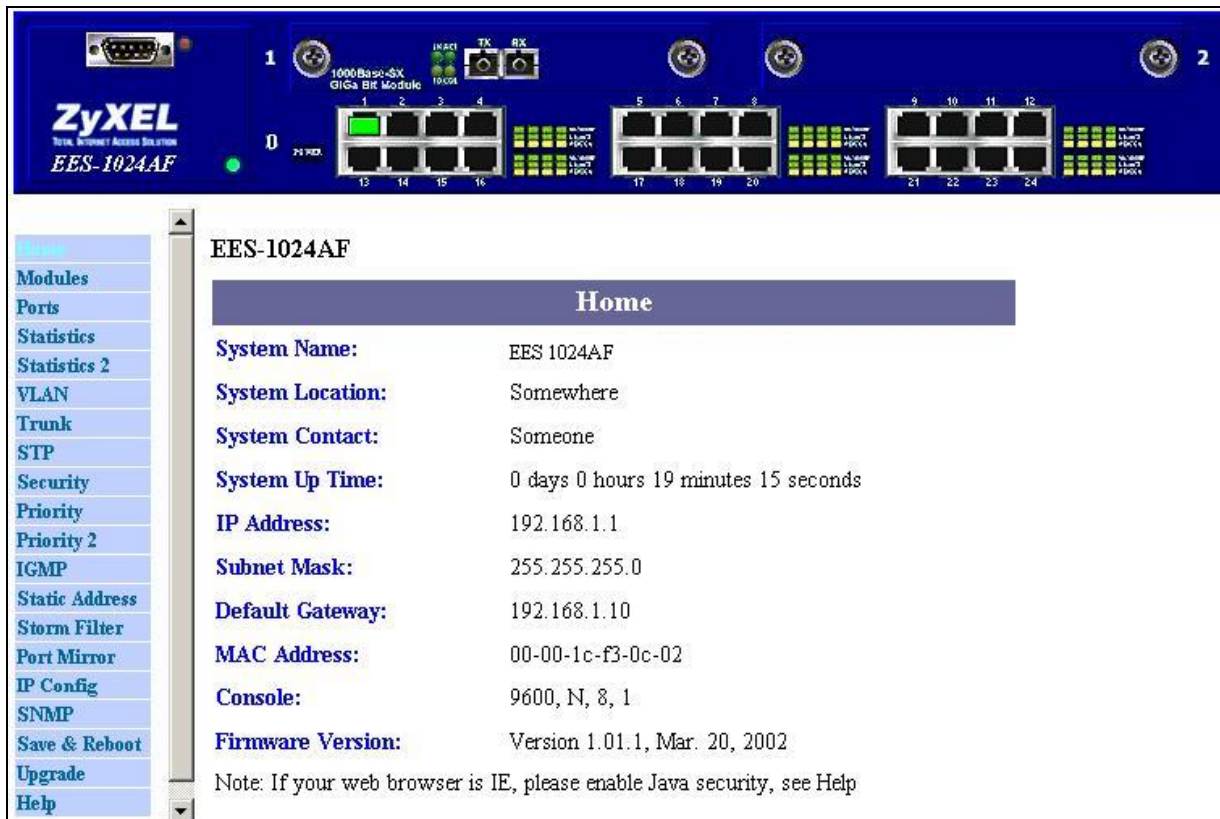
Figure 6-4 Web Configurator - Home

Table 6-3 Home Page Field Description

FIELD	DESCRIPTION	EXAMPLE
System Name	Displays the descriptive name for identification purposes.	EES 1024AF
System Location	The physical location of the switch.	somewhere
System Contact	The name of the person in charge of this switch.	someone
Note: You can change the above three fields in the **SNMP** page.		
System Up Time	Indicates the time since the managed unit was re-initialized.	
IP Address	The IP Address of the managed unit.	**192.168.1.1**
Subnet Mask	The subnet mask of the managed unit.	
Default Gateway	The default outgoing gateway of the managed unit.	
Note: You can change the IP Address, Subnet Mask and Default Gateway field in the **IP Config** page.		
Console	Shows the RS 232 console settings of the switch: the speed, parity, data bits and the stop bit.	**9600**, **N**, **8**, **1**
MAC Address	A read-only field showing the MAC address of the switch.	00-00-1c-f3-0c-02
Firmware Version	The firmware version of the management unit. You can upgrade to the new firmware on-line when the new version is released.	Version 1.01.1, Mar. 20, 2002

6.5 Modules

Modules page shows the modules that have been installed into the switch. There are fixed 24x 10/100 Base-TX ports in Module 0, and another 2 slot (module 1 and module 2) used for expansion. In the following example, 1-port Gigabit 1000Base-SX Fiber Module is installed into the switch.
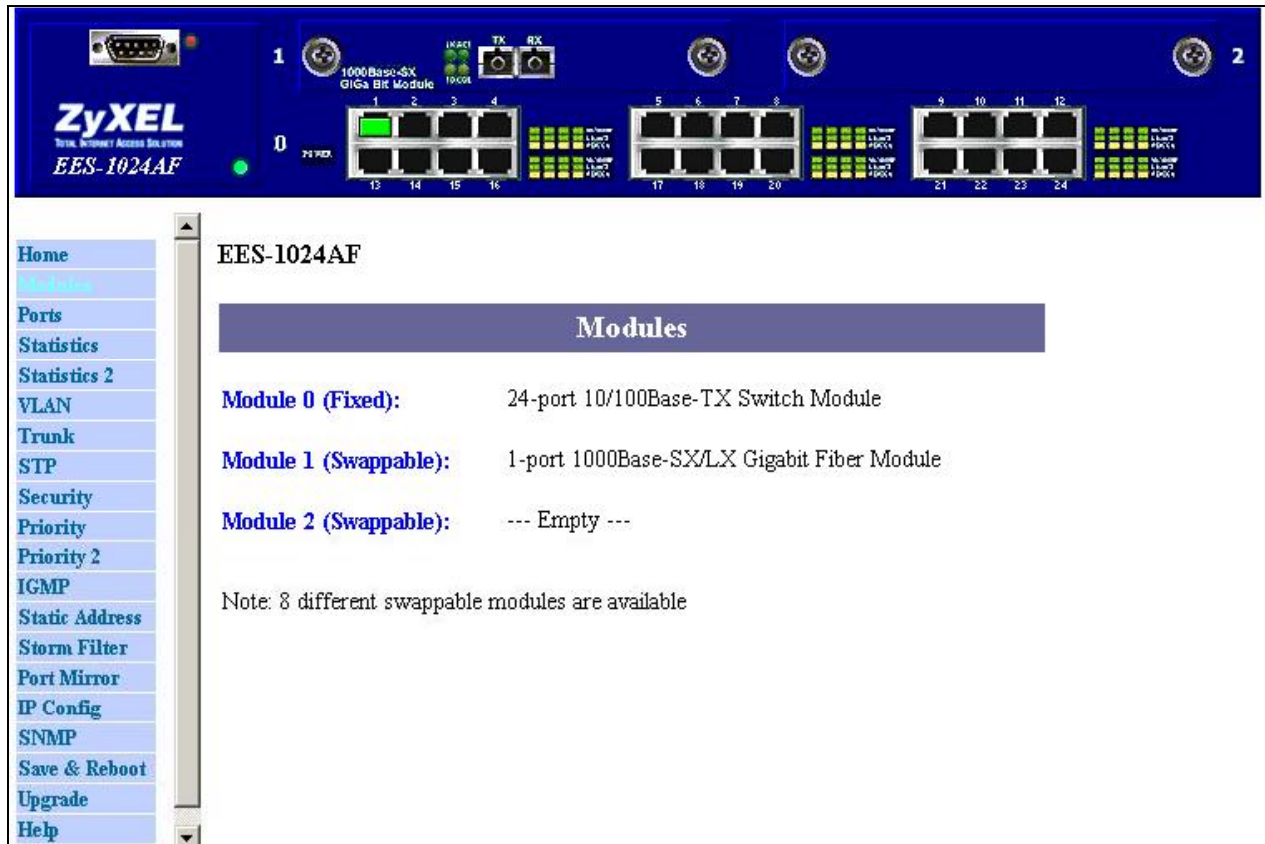

Figure 6-5 Web Configurator - Modules

Any two of the following modules can be installed to the switch. See the *Optional Modules* chapter for more information.

- 8-port auto-sensing 10/100Base-TX Switch Module
- 2-port 100Base-FX (SC/ST) Fiber Module
- 4-port 100Base-FX (SC/ST) Fiber Module
- 2-port 100Base-FX (MT-RJ/VF-45) Fiber Module
- 4-port 100Base-FX (MT-RJ/VF-45) Fiber Module
- 1-port Gigabit 1000Base-F (SX/LX) Fiber Module
- 1-port Gigabit 1000Base-T Switch Module

Part III:

Advanced Applications and Management

This part shows you how to use the advanced features of the Web Configurator.

Chapter 7
Advanced Web Management

7.1 Port Management

Inside the **Ports** page, you can enable or disable, configure speed and duplex, and assign VLAN ID to each port. The **Port Management** table shows the port status of all ports. You can also change some properties of all ports in this table.

Figure 7-1 Web Configurator – Ports

Table 7-1 Port Management Field Description

FIELDS	DESCRIPTION
Module	This value shows the module number (0, 1 or 2).
Port Number	This shows the number of the port in the module.
Enabled	Select this option to enable a specific port.
Link	Indicates whether a node links to that port is up or not
Speed/Duplex	Set the transmission speed and the duplex mode in this field. The switch will automatically detect the speed and the duplex mode of the attached device if you select **Auto**; otherwise check the settings of the device attached to the specific port and configure the same speed here. Select **Auto**, **100/Full**, **100/Half**, **10/Full** or **10/Half** from the pull-down list.

Table 7-1 Port Management Field Description

FIELDS	DESCRIPTION
Flow Control	When this option is selected, the switch sends a PAUSE message to the device to pause the transmission when the buffer in the switch is full. This works only for devices in **Full** duplex mode.
Back Pressure	When this option is selected, the switch sends a Back Pressure message to the device to pause the transmission when the buffer in the switch is full. This works only for devices in **Half** duplex mode.
VLAN Tagged	Select this option to tag the VLAN ID to the packets transmitted through the specified port.
Default VLAN ID	If a packet is received without the VLAN tagged, then the Default VLAN ID is used to classify this packet to that VLAN.
Note	Memorial note for this port, max length is 16 characters

IF you want to set multiple VLANs, we suggest that you set Default VLAN ID for each port first then set VLAN in the VLAN window.

7.2 Port Statistics

The **Statistics** page displays the detailed information about each port. You can compare and evaluate throughput or other port parameters. All screen data is updated automatically and you can also update the data manually.
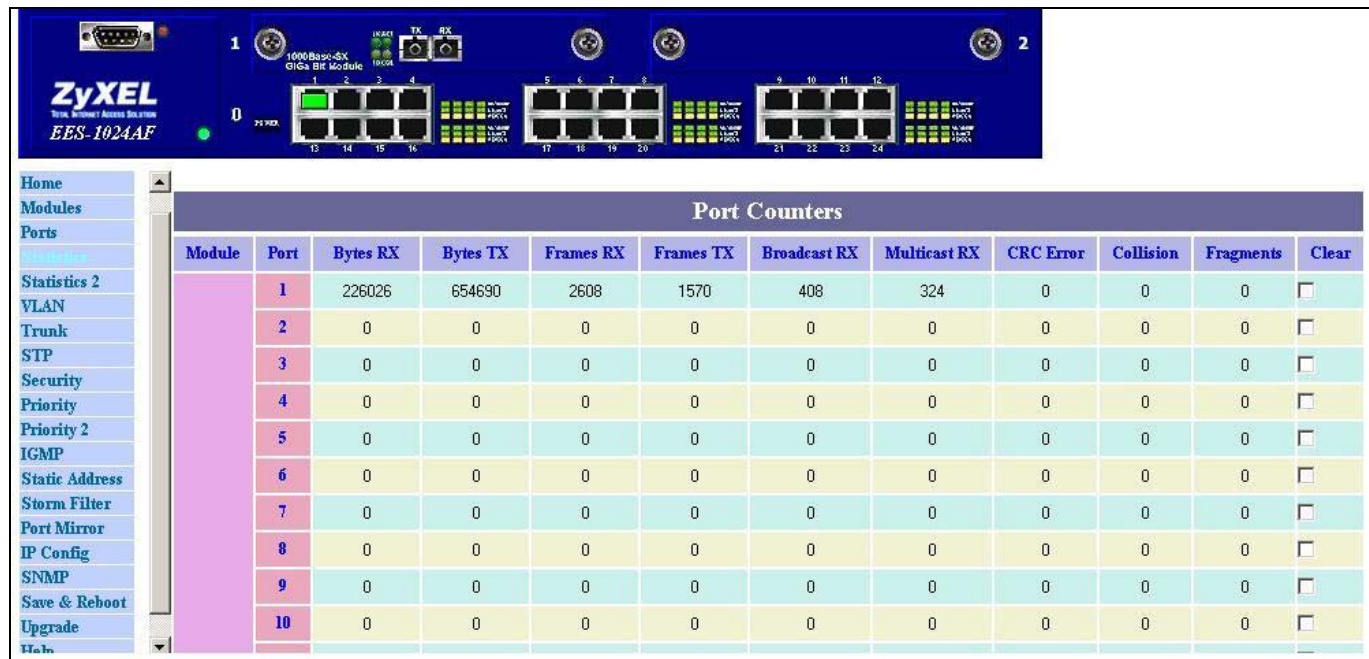
Figure 7-2 Web Configurator - Statistics

The **Port Counters** table shows 18 counters for each port in each module.

Table 7-2 The Statistics Field Description

FIELD	DESCRIPTION
Bytes RX	The total bytes received from that port
Bytes TX	The total bytes sent from that port
Frames RX	The total packets receives from that port (of all sizes)
Broadcast RX	The total broadcast packets received from that port
Multicast RX	The total multicast packets received from that port
CRC Error	The total packets received containing CRC errors from that port.
Collision	The total number of collisions that occurred during reception and transmission
Fragments	This counter is incremented once for every received packet which meet all the following conditions: 1. Packet data length is less than 64 bytes or packet without SFD and is less than 64 bytes in length. 2. Collision event has not been detected. 3. Late collision event has not been detected. 4. Packet has invalid CRC.
64 Bytes	This counter is incremented once for every received and transmitted packet with size of 64 bytes.
65-127 Bytes	This counter is incremented once for every received and transmitted packet with size of 65 to 127 bytes.
128-255 Bytes	This counter is incremented once for every received and transmitted packet with size of 128 to 255 bytes.
256-511 Bytes	This counter is incremented once for every received and transmitted packet with size of 256 to 511 bytes.
512-1023 Bytes	This counter is incremented once for every received and transmitted packet with size of 512 to 1023 bytes.
1024-1536 Bytes	This counter is incremented once for every received and transmitted packet with size of 1024 to 1536 bytes.
Oversize	This counter is incremented once for every received packet with meets all the following conditions. 1. Packet data length is greater than 1536. 2. Packet has valid CRC.
Undersize	This counter is incremented once for every received packet with meets all the following conditions. 1. Packet data length is less than 64. 2. Collision event has not been detected. 3. Late collision event has not been detected. 4. Packet has valid CRC.
Jabber	This counter is incremented once for every received packet with meets all the following conditions. 1. Packet data length is greater than 1536. 2. Packet has invalid CRC.

You can clear 18 counters of some ports by selecting the corresponding **Clear** check boxes and then clicking **Clear**. To clear all counters of all ports, click **Select All** and then **Clear**.

7.3 VLAN (Virtual LAN)

A VLAN (Virtual LAN) is a group of switching ports designated by the switch as belonging to the same broadcast domain. This feature allows the workgroup to be defined on the basis of their logical location instead of their physical location, and this does not require recalling.

If a broadcast packet is received from a port, it will forward this broadcast packet only to those ports belonging to the same VLAN. VLAN classification of every packet is done in the following way: If the packet is tagged with non-zero VLAN-id field then this is used as the VLAN id. Otherwise the default VLAN id of the input port is used. You can assign a single switch port to two or more VLANs. The factory default VLAN is that all ports belong to the same VLAN group 1. VLAN also enable you to configure tag-based VLANs to help isolate broadcast traffic and increase security. Creating VLANs increases network flexibility by allowing you to reassign devices to accommodate network moves, additions, and changes, eliminating the need to change physical cabling.

 The switch supports up to 4095 tag-based 802.1Q-compatible virtual LANs (VLANs).
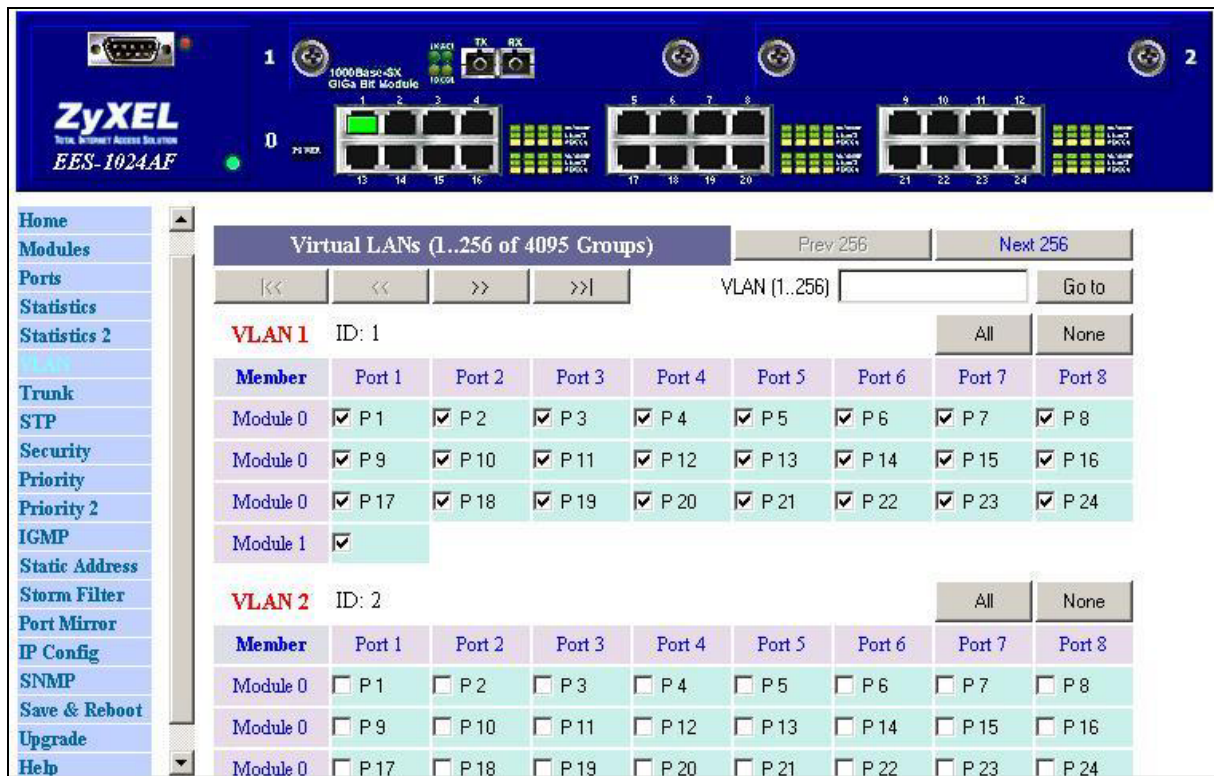
Figure 7-3 Web Configurator - VLAN

In the VLAN management window, you will see 2 VLANs in the page. To select a certain VLAN, you can do the following:

Table 7-3 VLAN Page Button Description

BUTTON	DESCRIPTION
Prev 256	Click this button to display the previous 256 VLANs.
Next 256	Click this button to display the next 256 VLANs.

>>	Click this button to display the next two VLANs
<<	Click this button to display the previous two VLANs
>>|	Click this button to display the last two VLANs
|<<	Click this button to display the first two VLANs

Enter the VLAN index in the **VLAN** field then click **Go to**. You can add, edit and remove port members of each VLAN and then click **Apply** once to configure the desired VLANs you want.

If you want to set multiple VLANs, we recommend that you set Default VLAN ID **for each port first in** Ports **page.**

7.4 Trunk

Port trunking is the ability to group several 10/100Base-TX or 100Base-FX ports to increase the bandwidth between this switch and another compatible switch. This is an inexpensive way to increase bandwidth. We define port trunking as the ability to group sets of ports (up to 8) within the same module into a single logical link. The port trunk acts as a single link between switches. Multiple trunks may be implemented in this switch, but only one trunk can be created within a module.
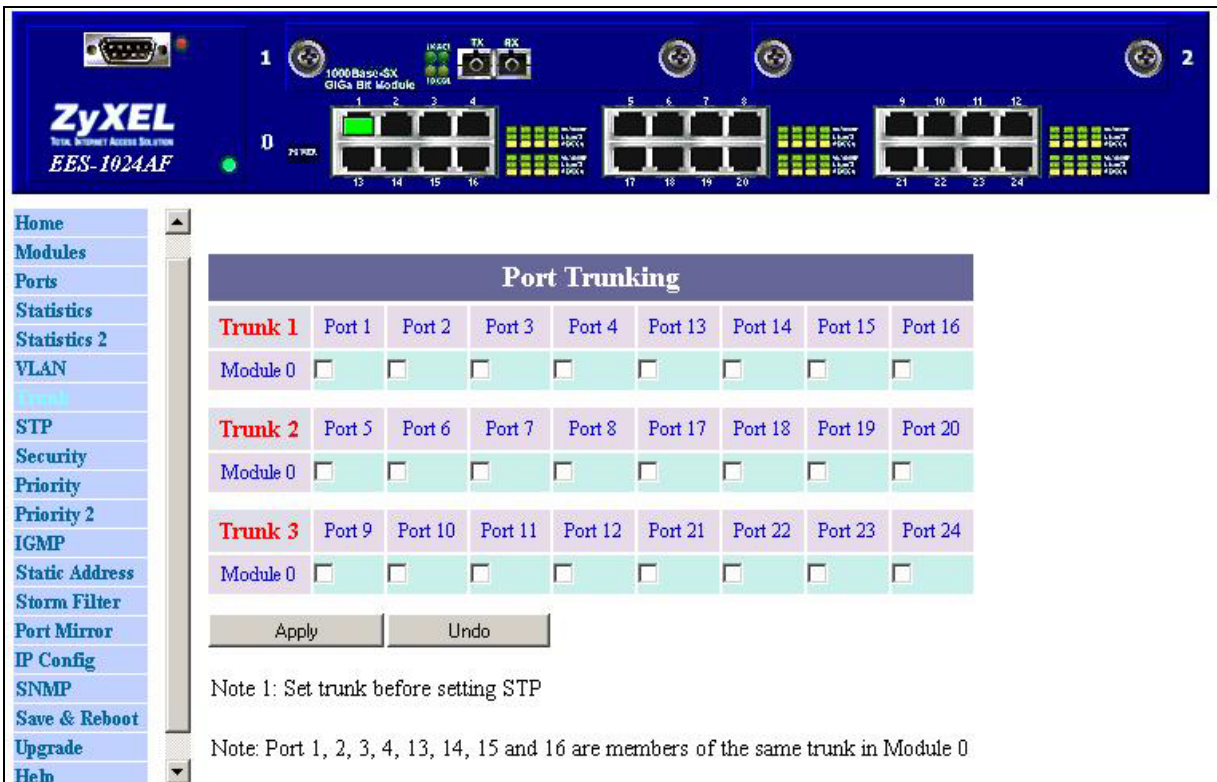
Figure 7-4 Web Configurator - Trunk

You can add, edit and remove port members of each trunk by clicking the selection box under each port and then click **Apply**.

Make sure trunking ports are in the same VLAN group.

7.5 STP (Spanning Tree Protocol)

Spanning tree is a link management protocol that provides path redundancy while preventing undesirable loops in the network. For Layer 2 Ethernet network to function properly, only one active path must exist between two stations.

The spanning-tree algorithm calculates the best loop-free path throughout a switched network. STP forces redundant data paths into a standby (blocked) state. If a network segment in the spanning tree fails and a redundant path exists, the spanning-tree algorithm recalculates the spanning tree topology and activates the standby path.

Figure 7-5 Web Configurator - STP

Select **Enable Spanning Tree Protocol** to enable this feature.

Table 7-4 STP Fields Descriptions

FIELD	DESCRIPTION
The **Current Spanning Tree Root** describes the unique root switch information for the instance of spanning tree.	
MAC Address	The MAC address of the root switch.
Root Max Age	The amount of time (in seconds) the protocol information received on a port is stored by the root switch.
Root Hello Time	The time interval (in seconds) the root switch sends Hello messages to other switches.
Root Forward Delay	The amount of time (in seconds) a port will remain in the listening or learning states before entering the forwarding state.
Root Path Cost	The path cost to the root switch from this switch.
Root Port	The port providing the best path from the switch to the root switch.
The **Spanning Tree Bridge Configuration** describes this switch information in the spanning tree.	
Priority	The priority of the switch, default is 32768. The lower the numeric value you assign , the higher priority for this switch.
Max Age	The amount of time (in seconds) protocol information received on a port is stored by the root switch, the default value is 20
Hello Time	How often the root switch broadcasts Hello message to other switches, the default value is 2
Forward Delay	The amount of time a port will remain in the listening and learning states before entering the forwarding state, the default value is 15
The **Port Configuration** describes those ports information in this switch in the spanning tree.	
Module	Shows the module number of the specific port.
Port	Shows the port number.
Trunked	Indicates the port is trunked or not.
Priority	The port priority. The smaller this value, the higher priority this port has.
State	This state of this port. Each port on a switch using STP exists in one of the following five states: Listening, Learning, Forwarding, Blocking or Disabled
Path Cost	The cost of transmission through this port. The smaller this value, the higher cost this port has. 4 for Gigabit Ethernet and 10 for Fast Ethernet and FDDI
Root Cost	The cost of transmission to the root switch.

When you enable the spanning tree protocol, because all ports in the switch will listen and learn, you may lose communication to the switch you are managing. Wait about 2 times forward delay (i.e. 2*15 seconds) before you get the communication again.

7.6 Port Security

When a computer accesses a port on the switch, the MAC address of that computer is entered in the MAC address table of that port. Port Security allows you to restrict the number of MAC addresses residing in a port. For example, if a dummy extension hub is attached to a port on the switch, you can set up the port to allow only two users to access. Use the port security window to set the parameters.

Step 1. Specify a number from one to 127 in the **Max Allowed MAC Address Count Per Port** field to set the maximum MAC address for all ports.

Figure 7-6 Web Configurator – Port Security

To restrict the number of MAC address of a port, you must do the following:

Step 2. Select **Enable** for that port. If the **Enable** checkbox is not selected, there is no MAC address count restriction for that port.

Step 3. Type the number in the **Max Allowed MAC Address Count** field for each individual port. This number should be smaller than **Max Allowed MAC Address Count Per Port**.

Step 4. Click **Apply**.

Step 5. **Used Count** field tells you how many MAC address are residing in the corresponding port now.

A trunked port is not allowed to enable the port security option.

7.7 Port Priority – 802.1p

There are two priority queues (high and low) on each port. Each port arbitrates between two transmit queues (high and low priority). The arbitration uses weighted round-robin between the high and low priority queues, and you can adjust this weight.

7.7.1 Programmable Mapping of 802.1p to Internal Priority

The received packets with 802.1q tag are assigned priority according to a flexible (fixed for the old 48310 and 48320 module) and programmable mapping of the 802.1p user-priority tag (3 bits, value from 0 to 7) to the internal priority queue. The default is to assign a packet to high priority queue when the 802.1p user-priority tag is 4 to 7, and to low priority queue when the 802.1p user-priority tag is 0 to 3. Check the corresponding mapping checkbox to assign a high priority or uncheck that to assign a low priority.

Figure 7-7 Web Configurator - Port Priority (802.1)

7.8 Port Priority - Type of Service

Each port can parse the header of an incoming IPv4 header and identify the Type-Of-Service byte (TOS field). This is extremely important with the deployment of Microsoft Windows 2000 and the emerging DiffServ standard, which marks Voice-Over-IP and other real-time traffic using this field. This feature provides Layer 3 QoS.

If this function of a port is enabled, then the most significant 6 bits of the TOS (these 6 bits are also known as the DiffServ Code Point "DSCP" field, value from 0 to 63) are used to assign a priority to the packet received from this

port. Please check the corresponding mapping checkbox to assign a high priority or uncheck that to assign a low priority. The old 48310 and 48320 modules do not support this function.
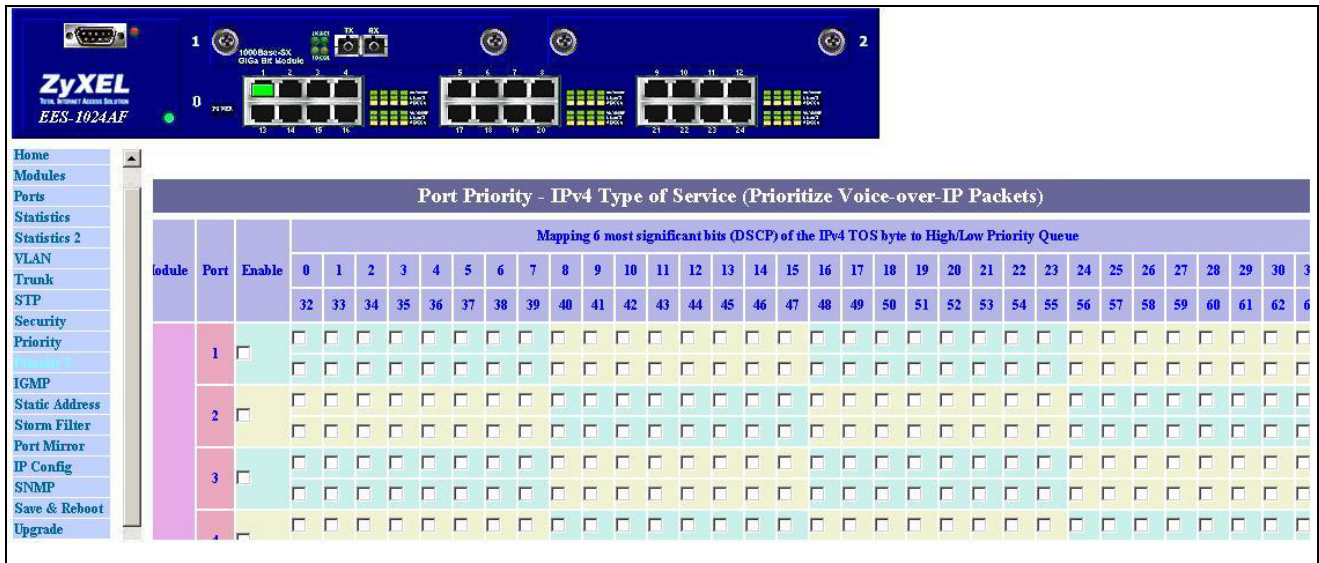
Figure 7-8 Web Configurator - Port Priority (IPv4 Type of Service)

7.9 IGMP (IP Multicast)

Multicasting is used to support real-time applications such as video conferencing or streaming audio. IGMP (Internet Group Management Protocol) allow you to query for any attached hosts who want to receive a specific multicast service. The switch looks up the IP Multicast Group used for this service and adds any port which received a similar request to that group. It then propagates the service request on to any neighboring multicast switch to ensure that it will continue to receive the multicast service.

If you want your switch to support multimedia and IP multicast, enable this option (default is enabled). When this option is enabled, this switch only directs the multicast data packets to the ports where needed, saving bandwidth. If **Forward with high priority** is enabled, then the IP multicast traffic will have a higher priority than other traffic.
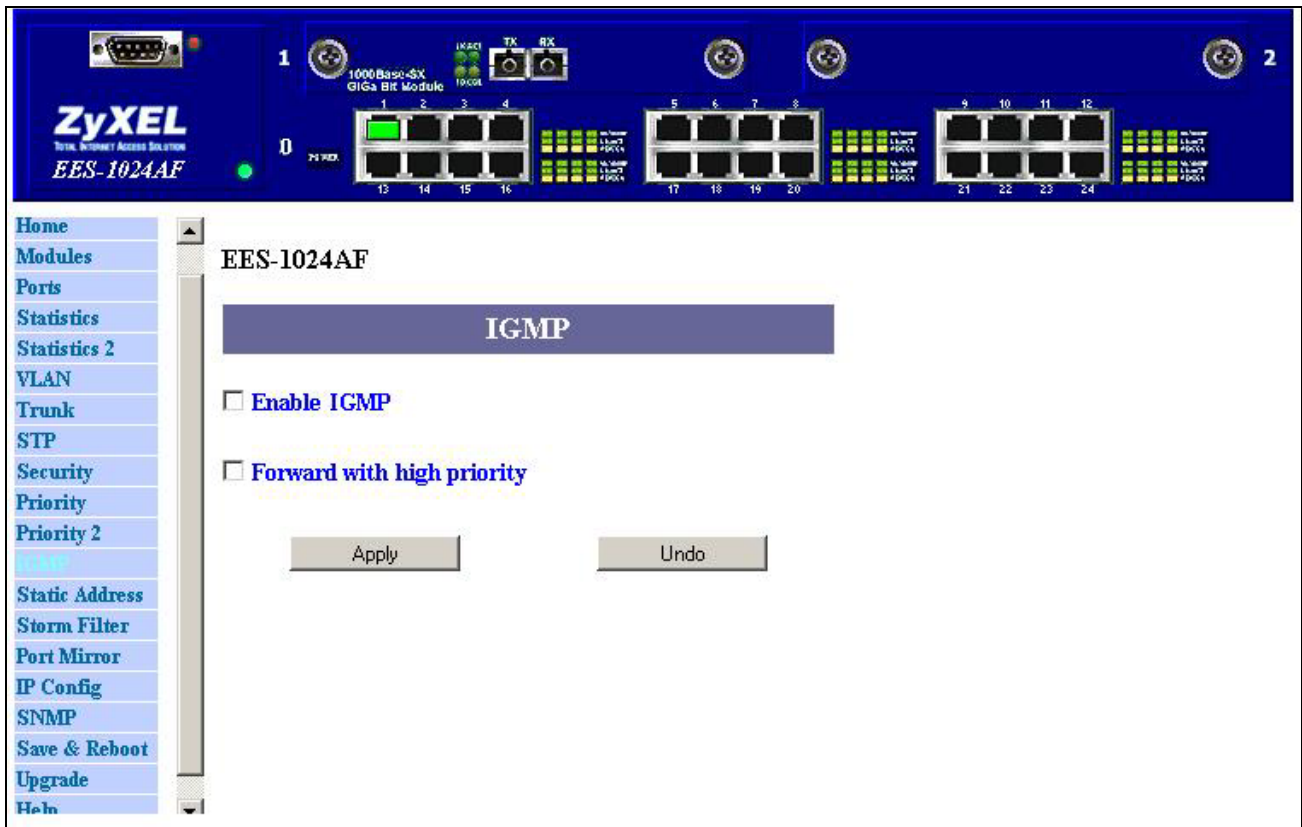
Figure 7-9 Web Configurator - IGMP

7.10 Static Address

You can lock a certain MAC address (associated with a host,) to a certain port. Once the MAC address is locked to a specific port, this MAC address will not receive any packets if it is moved to another port. Static addresses are manually entered into the **Static Address Table**.

Step 1. Enter the MAC address in the **MAC Address** field (ex. 00-00-00-00-00-01) and VLAN ID (default is 1).

Step 2. Select the **Module** and **Port** you want to associate with this entry with from the **Port** drop-down box.

Step 3. Click **Add** and then the **Apply** button.

Remove the entry from current static address table to unlock a MAC address from the select port; this MAC address is free again. Click **Remove All** to delete all entries from the **Static Address Table**.
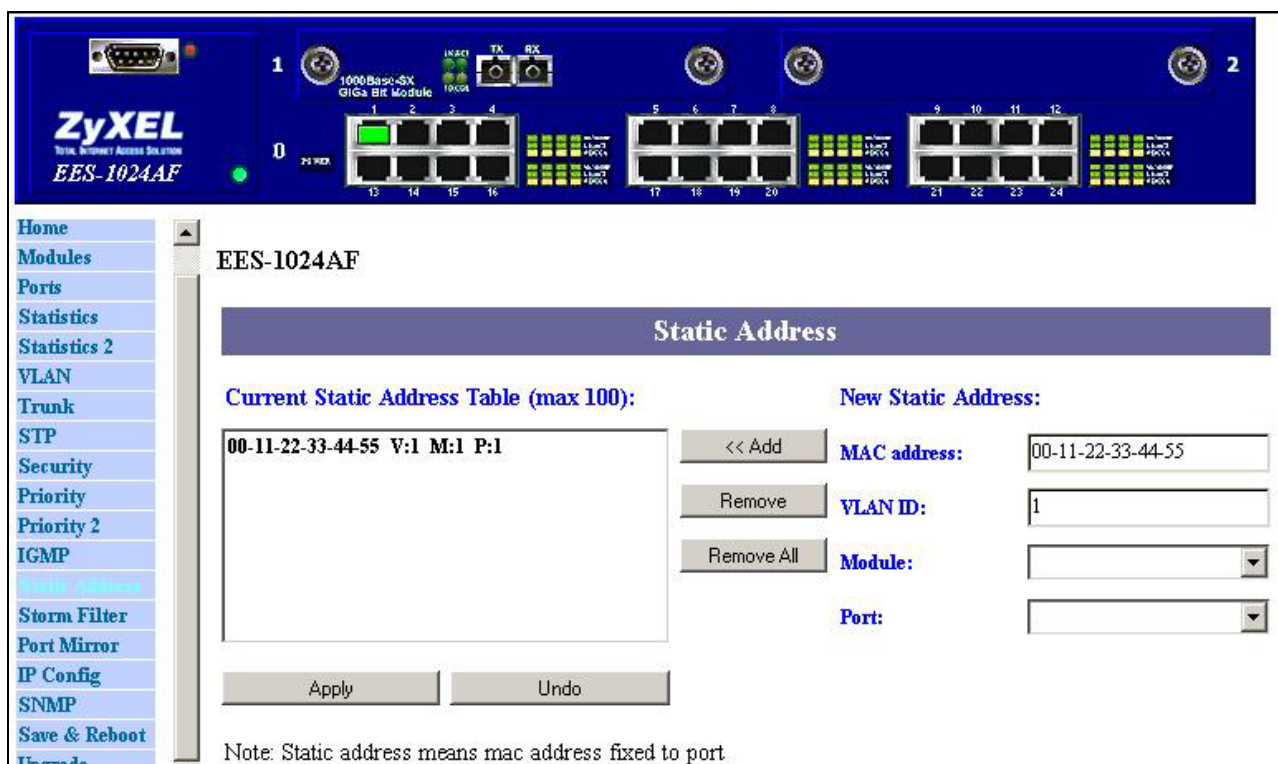
Figure 7-10 Web Configurator - Static Address

7.11 Broadcast Storm Filter

Storm filter avoids flooded data packets. This feature prevents the bursts of broadcast traffic. Excessive broadcast packets (Broadcast Storms) can be filtered out by enabling the **Broadcast Storm Filtering** option. When this option is enabled, if more than 3000 packets per second broadcast packets were sent to a port for 5 seconds, the port will not receive any broadcast packets until less than 3000 packets per second broadcast packets were received for 5 seconds. If a broadcast storm happens to a port, you will see a red **BS** text appearing in the corresponding (module, port) cell. A "—" indicates no broadcast storm.
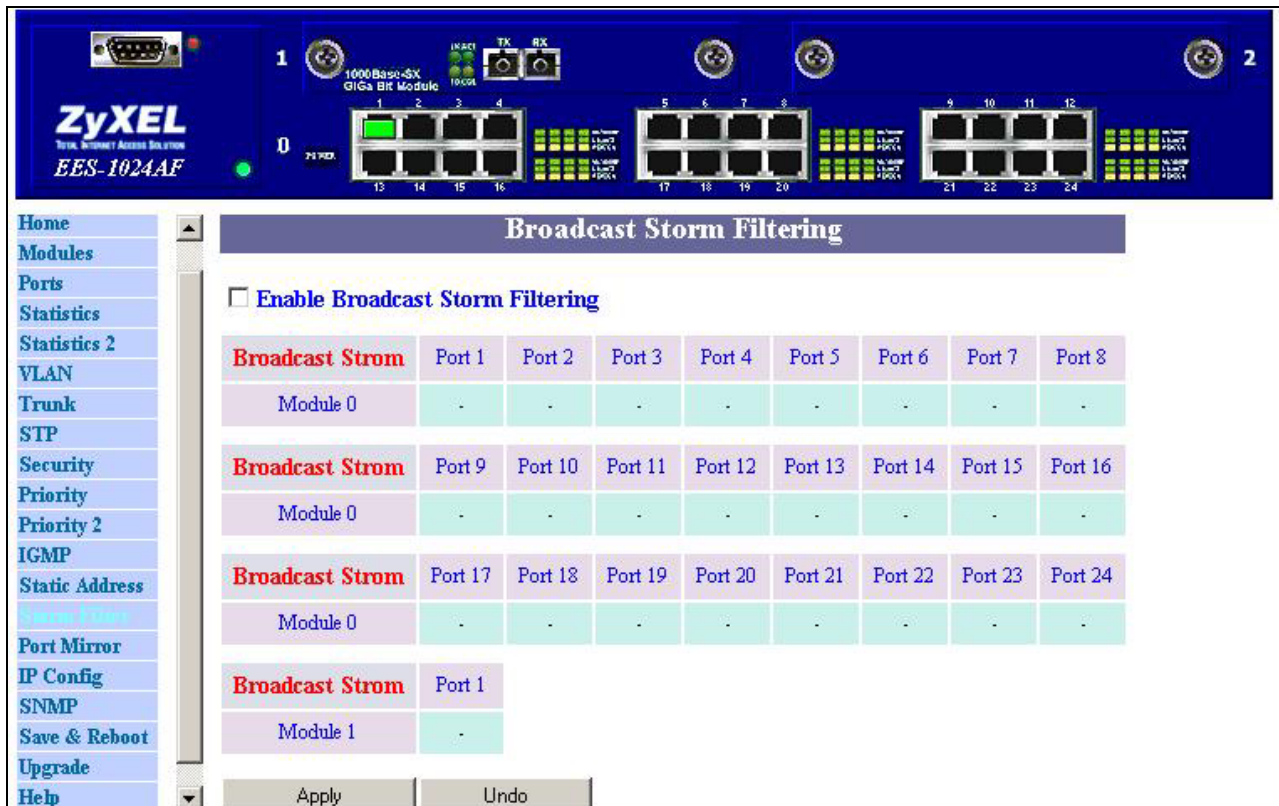
Figure 7-11 Web Configurator -Broadcast Storm Filter

7.12 Port Mirror (Sniffer)

Port Mirror (Sniffer) mirrors traffic (all frames) from a specific resource port to a target port. This helps tracking down network errors or erroneous packet transfers without interrupting the flow of data across the network. If you want to monitor all received and transmitted packets of a specific port, follow the steps below:

Step 1. Select the monitored port from the **Mirror Source Port** drop-down list in the corresponding **Mirror Source Module**. Only one port can be monitored in one module at the same time.

Step 2. Select the corresponding target module port in **Mirror Target Module** and **Mirror Target Port** drop-down lists.

Step 3. Select **Enable** for the corrosponding ports and then click **Apply**.
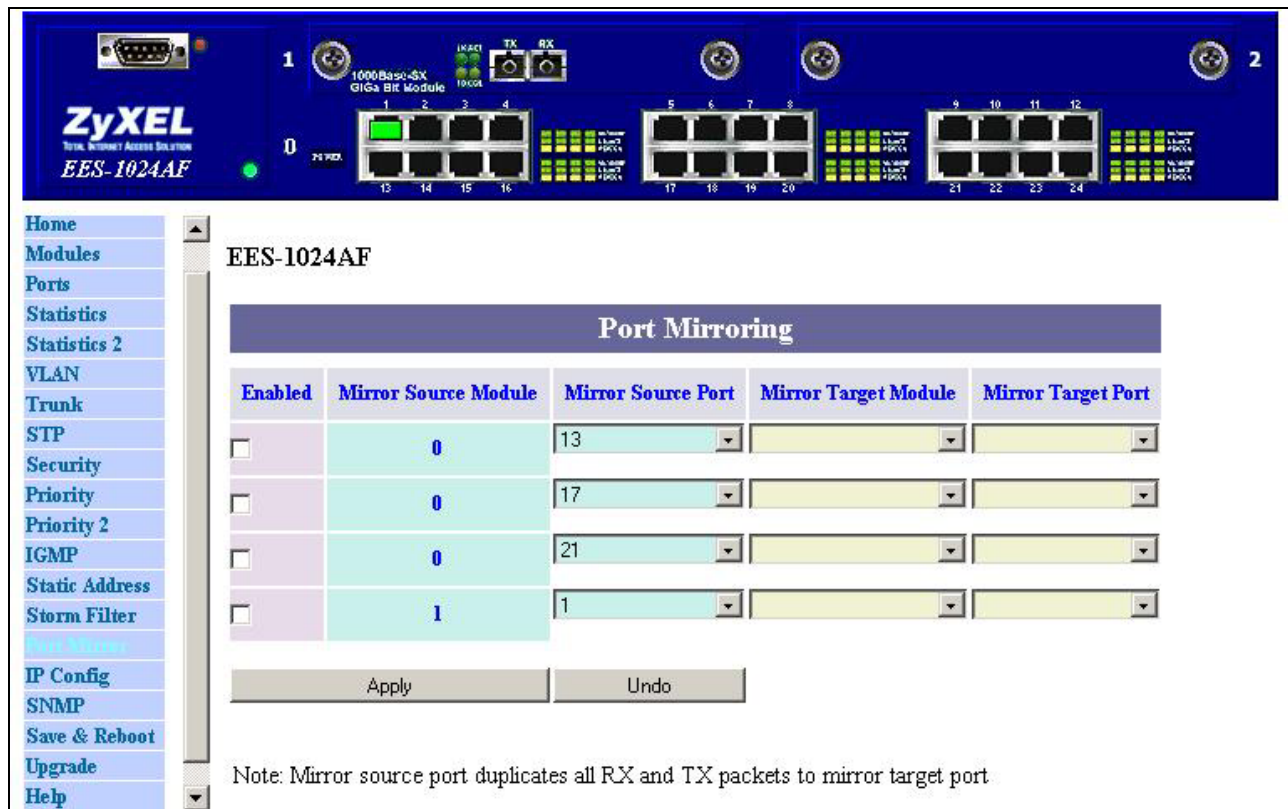
Figure 7-12 Web Configurator - Port Mirroring

7.13 IP Config

You can change the IP address, subnet mask and default gateway of the managed node. You can also modify the fields from the RS232 console. Enter the IP address, subnet mask and default gateway in the corresponding fields. Follow the steps below if you want to change the user name or password for the managed node.

Step 1.   Select **Change Password**.

Step 2.   Enter the user name in the **Username** field.

Step 3.   Enter the same password in the **Password** and **Confirm Password** fields.

Step 4.   Click **Apply**.

Reboot the switch to make your settings take effect if you have changed one of the IP address, subnet mask or default gateway.
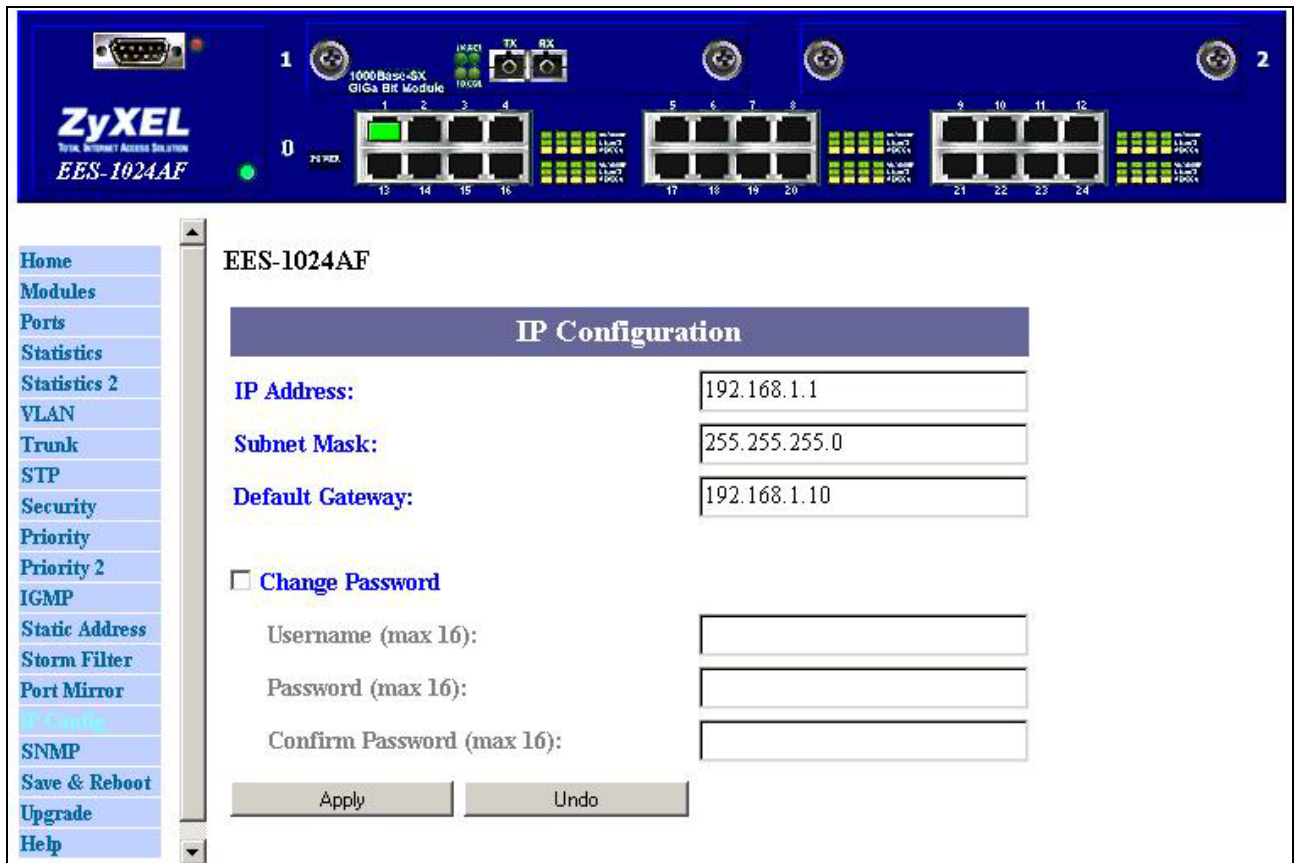
Figure 7-13 Web Configurator - IP Config

7.14 SNMP

You can manage the switch using a third-party SNMP (Simple Network Management Protocol) agent. The community strings control the access rights to the SNMP agent.

Type the system name, system location and system contact in the corresponding fields. See the section on *Home* for descriptions of these fields.

You can submit community strings on **Get Request Community***,* and **Set Request Community** to authorize management access. For security you should change them to prevent unauthorized access.

Get Request Community (Read-only access right) means that member of community can view the information but can not make changes to the configuration.

Set Request Community (Read/Write access right) allow the member of the community to view and make change to the configuration.

To set the **Get Request Community** and **Set Request Community** names, type the desired text string in the corresponding fields. The default value for both fields is **public**. You must set these two parameters correctly to perform Get request from the management unit and Set request to the management unit.

Figure 7-14 Web Configurator - SNMP

Chapter 8
Configuration and Firmware Maintenance

This chapter shows you how to save, reboot, reset and upgrade new firmware to the switch using the Web Configurator.

8.1 Save and Reboot

8.1.1   Save

You can save current settings by selecting **Current Settings** then clicking **Apply** next to the checkbox. You should reboot the system so that your current settings will take effect.

8.1.2   Reboot

If you want to reboot the switch, select **Reboot System** then click **Apply** next to the checkbox. Wait for about 30 seconds before you continue to use the Web Configurator.

8.2 Reset to Factory Default Settings

If you want to use the factory default settings, select **Factory Default Settings** then click **Apply** next to the checkbox. You should reboot the system so that the factory default settings will take effect.

Resetting to factory default settings erases your custom configuration.
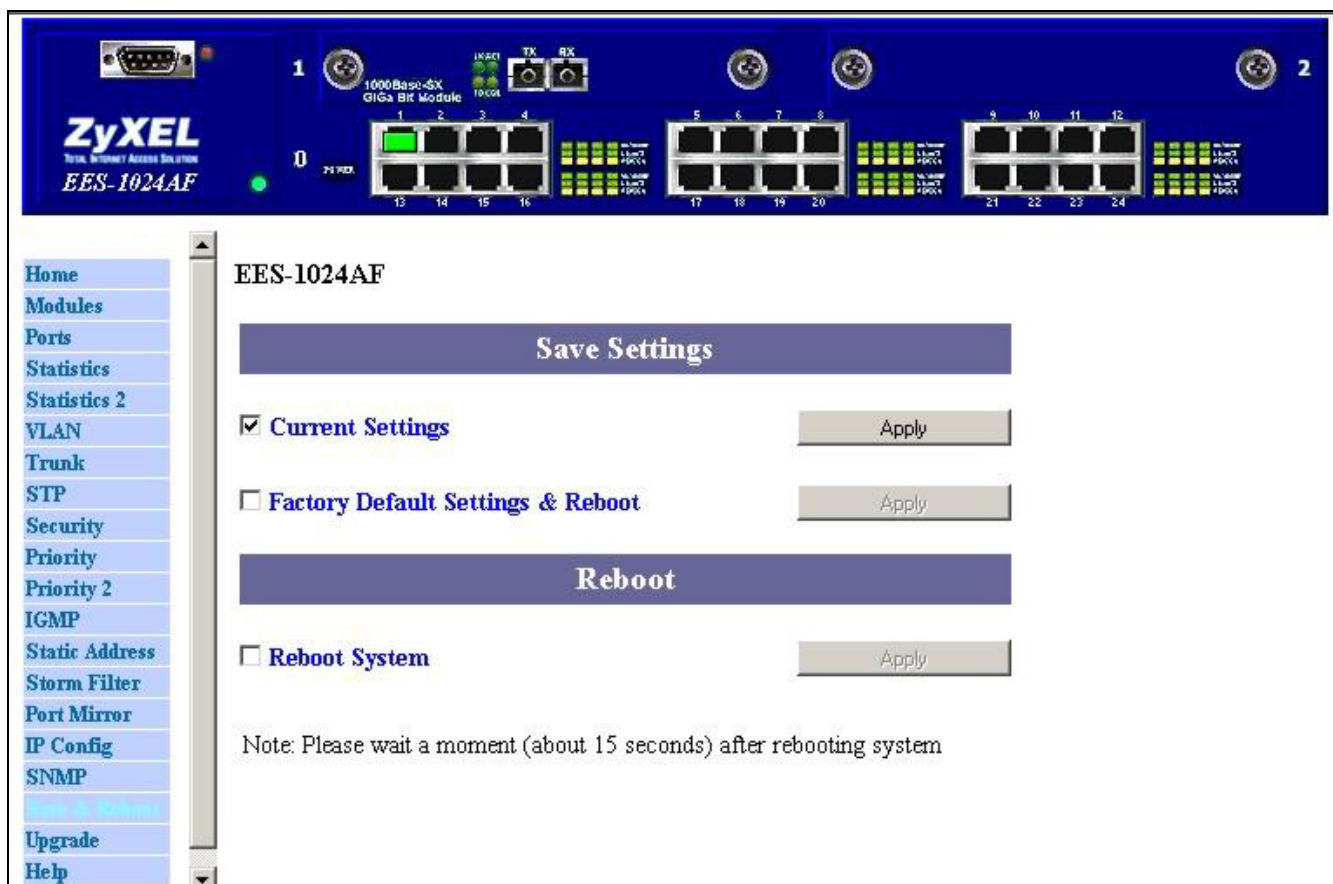
Figure 8-1 Web Configurator - Save & Reboot

8.3 Upgrade

Follow the steps below to upgrade the firmware of the managed unit using the Web Configurator.

Step 1. Download the latest firmware from ZyXEL website (http://www.zyxel.com).

Step 2. Enter the password in the **Password** field.

Step 3. Enter the file downloaded in the **File Path** edit box. Or click **Browse** to select the file.

Step 4. Click **Upgrade**.

After you have successfully upgraded to the new firmware, reboot the system so that the new firmware will take effect.
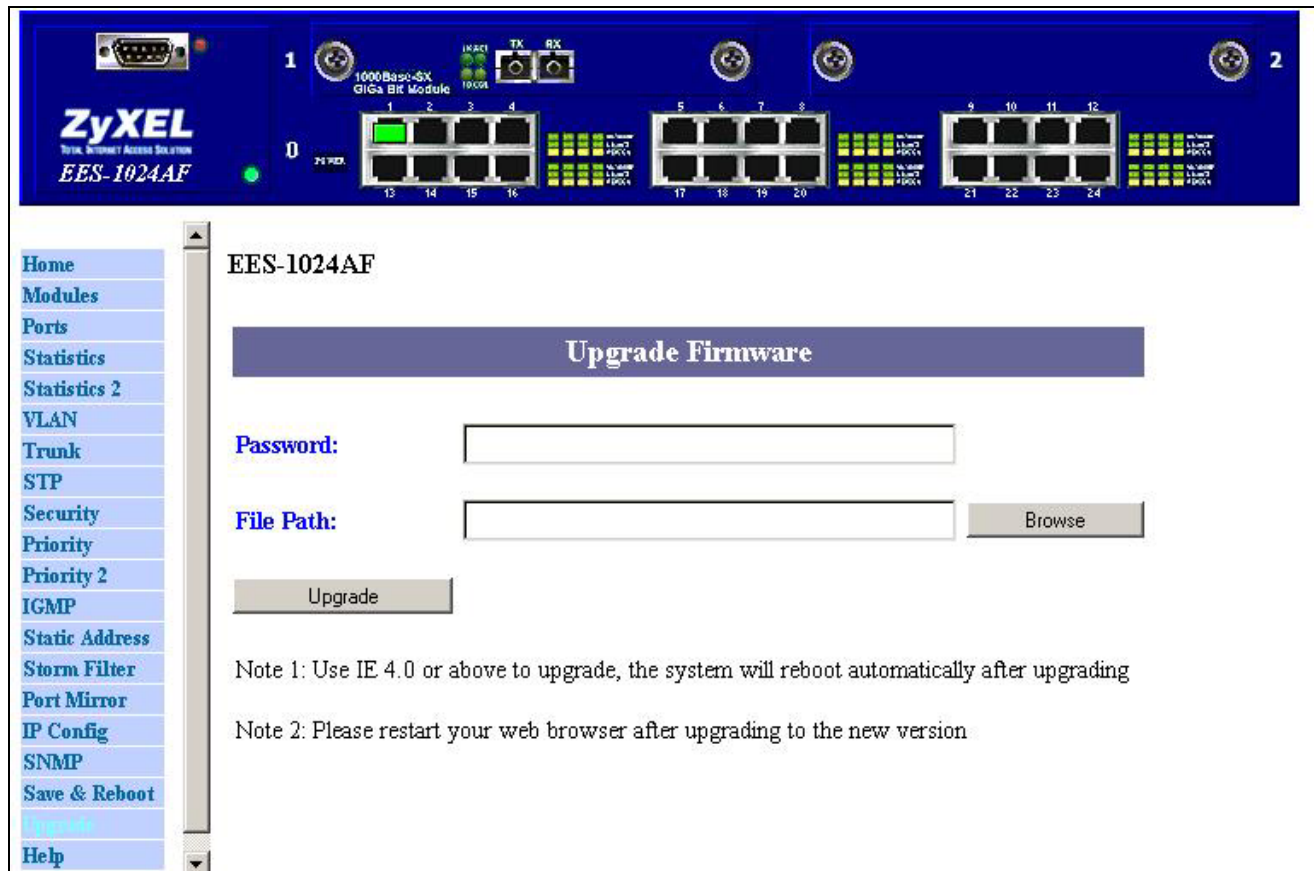
Figure 8-2 Web Configurator - Upgrade

Do NOT shut down the switch if you can't upgrade your new firmware successfully. Try the upgrade process again. Contact local customer support if any problem occurred.

Part IV:

Additional Information

This part contains the troubleshooting, the appendices and the index.

Chapter 9
Troubleshooting

9.1 Console Port

I cannot access the switch using the Console Port.

Table 9-1 Troubleshooting Console Port

STEPS	CORRECTIVE ACTION	
1	Check to see if the switch is connected to your computer using the RS-232 cable.	
2	Check to see if the communications program is configured correctly. Set the communication parameter as stated here.	Emulation: auto detect
		Baud Rate: 9600 bps
		No Parity, 8 data bits, 1 stop bit
		Flow Control: None

9.2 Telnet

I cannot telnet into the switch.

Table 9-2 Troubleshooting Telnet

STEPS	CORRECTIVE ACTION
1	Make sure you are using the right IP address of the switch. Check the IP address of the switch.
2	Ping the switch from your computer. If you cannot ping the switch, check the IP addresses in the switch and your computer. Make sure that both IP addresses are in the same subnet.
3	If these steps fail to correct the problem, contact the distributor.

9.3 Web Configurator

I cannot access the Web Configurator

Table 9-3 Troubleshooting Web Configurator

STEPS	CORRECTIVE ACTION
1	Make sure you are using the right IP address of the switch. Check the IP address of the switch.
2	Make sure your login name or password is correct if you have changed them. The default login and password is **root**.
2	Make sure there is not an SMT or Telnet session running.
3	Ping the switch from your computer. If you cannot ping the switch, check the IP addresses in the switch and your computer. Make sure that both IP addresses are in the same subnet.

The Web Configurator does not show properly in Internet Explorer.

Table 9-4 Troubleshooting Internet Explorer

STEPS	CORRECTIVE ACTION
1	Make sure you are using Internet Explorer 4.0 or Netscape Communicator 4.x and later versions.
2	Make sure the Java applet feature is turned on. See the appendix on *Windows Internet Explorer Setup* to configure your Internet Explorer. If you have Netscape web browser installed, use it instead.

Appendix A
Microsoft Internet Explorer 5.0 Setup

This appendix shows you how to enable Java applet security option in Internet Explorer 5.

If the pages of the web configurator does not display properly in Internet Explorer, follow the steps below to enable the Java applet security option.

Step 5. From Internet Explorer, click **Tools** and then **Internet Options** .
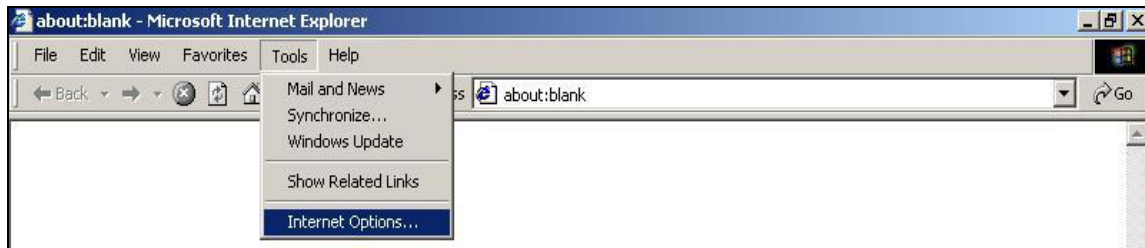
Diagram 1 Internet Explorer 5.0

Step 6. Select the **Security** tab in the **Internet Options** window. Then click **Trusted Sites**.

Diagram 2 IE5.0- Internet Options

Step 7. Click **Sites** and type the IP address of the switch with the prefix "**https://**". For example, https://190.168.1.1. Click **Add** and then **OK** to retrun to the **Internet Options** window.

Diagram 3 IE5.0- Add Trusted Site IP Address

Step 8. In the **Internet Options** window, click **Custom Level**.

Step 9. Scroll down to the **Microsoft VM** option. Under **Java Permissions** select **Custom**. Then click the **Java Custom Settings** button that displays.
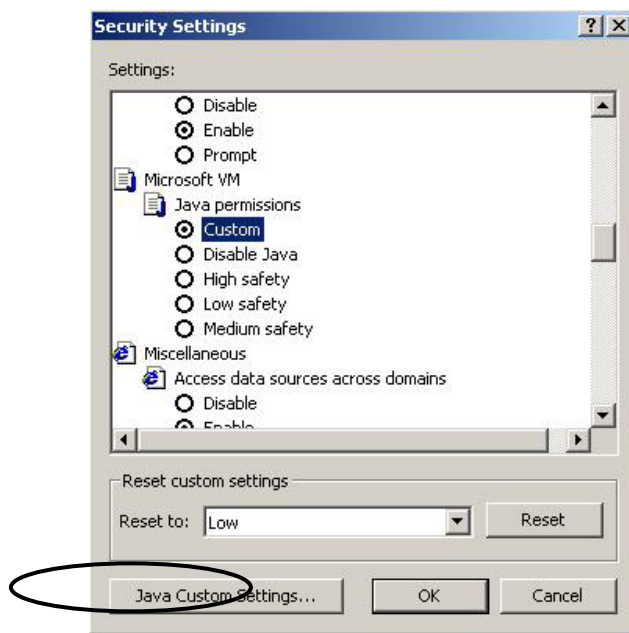
Diagram 4 IE5.0 – Security Settings

Step 10. Click the **Edit Permission** tab in the **Trusted Sites** window that displays.

Step 11. Select **Enable** under the **Run Unsigned Content** option. Then click **OK**.
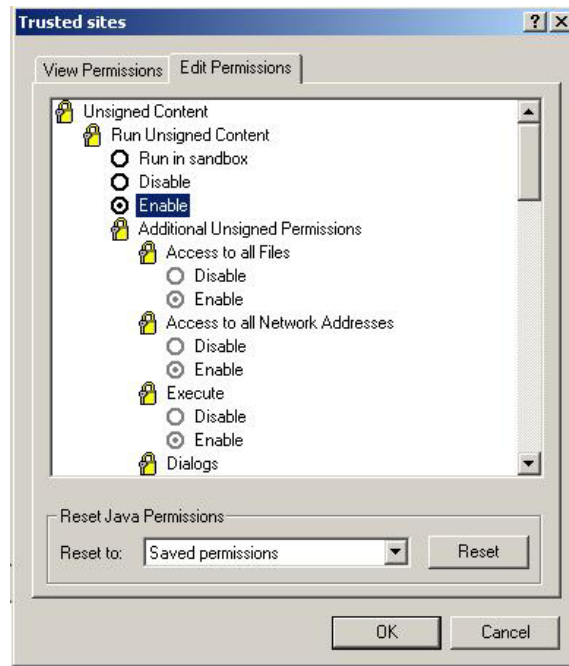
Diagram 5 IE5.0 – Edit Permissions

Step 12. Click **Yes** to change the security settings then click **OK** to close all settings windows.
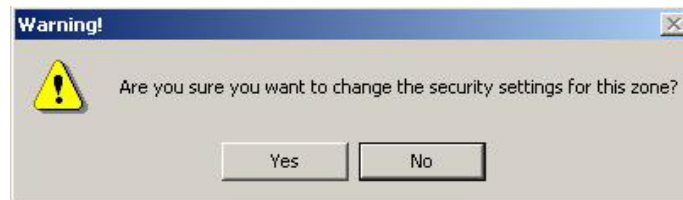
Diagram 6 IE5.0 – Internet Security Change Verification

Appendix B
Product Specifications

This section provides the specifications of EES-1024AF Intelligent Switch and optional modules.

Diagram 7 General Product Specifications

Standards	• IEEE802.3 10BASE-T Ethernet (twisted-pair copper) • IEEE802.3u 100BASE-TX Fast Ethernet (twisted-pair copper) • IEEE802.3z Gigabit SX/LX • ANSI/IEEE802.3 Auto-negotiation • IEEE802.3x Flow Control • IEEE802.1p Priority Queues • IEEE802.1Q VLAN • IEEE802.1d Spanning Tree
Protocol	CSMA/CD
Interface	• 24 10/100BASE-T Ethernet port • Two expansion slots. Modules support for 10/100/100BaseT, 100FX, Gigabit SX/LX • One RS-232C console port
Data Transfer Rate	• Ethernet: 10Mbps(half duplex) 20Mbps (full duplex) • Fast Ethernet: 100Mbps (half duplex) 200Mbps(full duplex) • Gigabit Ethernet: 2000Mbps(full duplex) (*) * Available on optional Gigabit Module
Network Cables	• 10BASE-T: 2-pair UTP Cat.3, 4, 5 (100 m) EIA/TIA-586 100-ohm STP (100 m) • 100BASE-TX, 1000BASE-T: UTP Cat.5 (100 m max.) EIA/TIA-568 100-ohm STP (100 m max.) • 100BASE-FX: 50/125-micron multi-mode fiber-optics and 62.5/125-micron multi-mode fiber-optics. Max distance up to 2km or longer (up to 60km), refer the label on the module • 1000BASE-SX: 50/125-micron multi-mode fiber-optics (500 m max.) 62.5/125-micron multi-mode fiber-optics (220 m max.) • 1000BASE-LX: 9/125-micron single-mode fiber-optics (10 km max.)

Diagram 7 General Product Specifications

Full/Half Duplex	• Full/half duplex for 10/100Mbps speeds • Full duplex only for Gigabit speed
Media Interface Exchange	All ports MDI-II/MDI-X auto-adjustment

Diagram 8 Performance and Management Specifications

Back plane	12Gbps
Packet Forwarding Rate	14880PPS for 10BASE-T 148800PPS for 100BASE-TX/FX 1488000PPS for Gigabit Fiber/Copper
Switching Method	Store-and-forward
MAC Address Table	4K entries per main switch
Data Buffer	• Main switch: 4KByte (excluding optional modules) • 8 ports 100BASE-TX Module: 256KByte • 2/4/8 ports Fiber Module: 4MByte • Gigabit Module: 128KByte
VLAN	• IEEE 802.1Q tag-based VLAN, 4095 Max
IEEE 802.1p Priority Queues	2 queues
Port Trunking	IEEE802.3ad port trunking 3 groups, each group up to 8 ports
Port Security	• Static MAC address filtering • MAC address number limitation
Multicasting	Support IGMP snooping
Broadcast Storm	Support broadcast storm control
Port Mirroring	All ports support port mirroring
Management	• Telnet • WEB-Based management • SNMP, SNMP Trap
Management Security	• User ID/Password for Telnet and WEB management authentication • Up to 4 security accounts
MIBs	• MIB-II (RFC 1213) • Bridge MIBs (RFC 1493)

Diagram 8 Performance and Management Specifications

	• VLAN MIBs (RFC 2674)(Future Upgrade) • ZyXEL Private MIB
Console Port	DB-9 RS-232

Diagram 9 Physical and Environmental Specifications

Ventilation	Main switch: 2 DC fans
Weight	Main switch: 4.3Kg Optional module: 220 ~ 280g
LED	• Main switch: 10/100Mbps, Link/Active, Full-duplex/Collision • 100FX Fiber module (2/4/8 ports): Link/Active, Full-duplex/Collision • Gigabit Module: Link, Active, Full-duplex, Collision
Dimensions	• Main switch: 441(W) x 226(D) x 66.5(H) mm (17.3(W) x 8.9(D) x 2.6(H) inches), 19-inch rack-mount width, 1.5 U height • Optional Switch Modules:178(W) x 152(D) x 25(H) (7(W)x 6(D)x 1(H) inches)
Power Supply	• 100 - 240VAC 50/60Hz internal universal power supply
Power Consumption	• Main switch: 33W max. • Max 50W with modules
Operating Temperature	0ºC ~45ºC (32ºF to 113ºF)
Operational Humidity	10% to 90% (Non-condensing)
EMI	• FCC Class A • CE
Safety	• UL, cUL

Diagram 10 Optional Modules Specifications

10/100BaseT module		
EM1024A-8TP	8 x 10/100 RJ-45, with Auto MDI/MDI-X	100m
100FX module		
EM1024A-2FX-SC	2 x 100FX(SC, multi-mode)	2km
EM1024A-2FX-SC-30	2 x 100FX(SC, single-mode)	30km
EM1024A-4FX-SC	4 x 100FX(SC, multi-mode)	2km
EM1024A-4FX-SC-30	4 x 100FX(SC, single-mode)	30km
Gigabit module		
EM1024A-SX-SC	1000Base-SX(SC, multi-mode) Module	Depends on fiber type
EM1024A-LX-SC	1000Base-LX(SC, single-mode) Module	10km
EM1024A-GTP	1000Base-T, UTP/STP RJ-45 Module	100m on CAT5e

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