ES-5224RS+
24 L2 Web Smart Rackmount Switch

User's Manual

24 Fast Ethernet + 2 Gigabit Web-Smart Switch User's Manual

Release 0.99

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Caution

Circuit devices are sensitive to static electricity, which can damage their delicate electronics. Dry weather conditions or walking across a carpeted floor may cause you to acquire a static electrical charge.

To protect your device, always:

• Touch the metal chassis of your computer to ground the static electrical charge before you pick up the circuit device.

• Pick up the device by holding it on the left and right edges only.

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A computing device pursuant to Subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

European Community (CE) Electromagnetic Compatibility Directive

This equipment has been tested and found to comply with the protection requirements of European Emission Standard EN55022/EN60555-2 and the Generic European Immunity Standard EN50082-1.

EMC:		
	EN55022(1988)/CISPR-22(1985)	class A
	EN60555-2(1995)	class A
	EN60555-3	
	IEC1000-4-2(1995)	4K V CD, 8KV, AD
	IEC1000-4-3(1995)	3V/m
	IEC1000-4-4(1995)	1KV – (power line), 0.5KV – (signal line)

About this user's manual

In this user's manual, it will not only tell you how to install and connect your network system but configure and monitor the Web-Smart Switch through the built-in Ethernet ports step-by-step. Many explanation in detail of hardware and software functions are shown as well as the examples of the operation for web-based interface.

Overview of this user's manual

- Chapter 1 "Introduction" describes the features of Web-Smart Switch
- Chapter 2 "Installation"
- Chapter 3 "Operation of Web-based Management"
- Chapter 4 "Maintenance"

1. Introduction

1-1. Overview of 24 Fast Ethernet + 2 Gigabit Web-Smart Switch

The Web-Smart Switch, implemented 24 10/100Mbps TP + 2 Gigabit dual media ports with SFP/GBIC, is a standard switch that meets all IEEE 802.3/u/x/z Gigabit, Fast Ethernet and Ethernet specifications. The switch can be managed through Ethernet port using Web-based management unit, associated with web-based management, the network administrator can logon the switch to monitor, configure and control each port's activity. In addition, the switch implements the QoS (Quality of Service), VLAN, Trunking. It is suitable for office application.

• **Model Description**

Model	Port 25, 26 Configurations
24 Port 10/100Base-TX + 2 Port Gigabit TP/SFP	Two types of media --- TP and SFP Fiber
24 Port 10/100Base-TX + 2 Port Gigabit TP/GBIC	Two types of media --- TP and GBIC Fiber

10/100/1000Mbps TP is a standard Ethernet port that meets all IEEE 802.3/u/x/z Gigabit, Fast Ethernet specifications. 1000Mbps SFP Fiber transceiver is a Gigabit Ethernet port that fully complies with all IEEE 802.3z and 1000Base-SX/LX standards.

1000Mbps Single Fiber WDM (BiDi) transceiver is designed with an optic Wavelength Division Multiplexing (WDM) technology that transports bi-directional full duplex signal over a single fiber simultaneously.

• **Key Features in the Device**

QoS:

The switch offers powerful QoS function. This function supports 802.1p, VLAN-tagged priority, can make precedence of 8 priorities and Port-based QoS service that we called VIP Port function in the switch.

VLAN:

Supports Port-based VLAN, IEEE802.1Q Tag VLAN. And supports 24 active VLANs and VLAN ID 1~4094.

Port Trunking:

Allows one or more links to be aggregated together to form a Link Aggregation Group by the static setting.

1-2. Checklist

Before you start installing the switch, verify that the package contains the following:

— A set of 24 10/100Mbps TP + 2 Gigabit dual media Ethernet switch
— Modules (optional)
— Mounting Accessory (for 19" Rack Shelf)
— This User's Manual in CD-ROM
— AC Power Cord

Please notify your sales representative immediately if any of the aforementioned items is missing or damaged.

1-3. Features

The Web-Smart Switch, a standalone off-the-shelf switch, provides the comprehensive features listed below for users to perform system network administration and efficiently and securely serve your network.

- **Hardware**

  • Supports 24-port 10/100M TP ports with Nway and auto MDIX function

  • In 24 Port 10/100Base-TX + 2 Port Gigabit TP/SFP switch, it supports 2 Gigabit dual media ports(TP/SFP) and 2 slots for removable SFP module supporting 1000M SFP fiber module

  • In 24 Port 10/100Base-TX + 2 Port Gigabit TP/GBIC switch, it supports 2 Gigabit dual media ports(TP/GBIC) and 2 slots for removable GBIC module supporting 1000M GBIC fiber module

  • Supports on-line pluggable fiber transceiver modules

  • Supports 256KB packet buffer and 128KB control memory

  • Full-duplex flow control (IEEE802.3x) and half-duplex backpressure

  • Extensive front-panel diagnostic LEDs; System: Power, CPURUN, ACT / FDX / SPD(LEDSET), 10/100Mbps TP Port1-24:LINK/ACT, FDX, SPD, 10/100/1000Mbps/Fiber port 25,26: LINK/ACT, FDX, SPD

- **Management**

  • Supports 802.1p, Port based QoS packet classified with four priority queues

  • Supports 802.1Q VLAN

  • Supports 802.1Q-based VLAN with 26 entries

  • Supports port-based VLAN

  • Isolated group support

  • MAC-based trunking with automatic link failover

- Supports programmable per-port storm control

- Per-port ingress/egress rate control with 64K/128K/256K (up to 100Mbps) resolution

- 8K MAC addresses with automatic learning and aging

- Programmable per-port flow control and backpressure

- Supports 802.1p Port Classification with four priority Queues

- Maximal packet length can be up to 1536 bytes

- Supports Ingress and Egress Bandwidth rating management

- Supports Broadcasting Suppression to avoid network suspended or crashed while a bunch of network device up after power lost and recover again

- Supports the trap event

- Supports default configuration

- Supports TFTP for firmware upgrade

- Supports on-line plug/unplug SFP/GBIC transceiver modules

- Supports concisely the status of port and easily port configuration

- Supports per port traffic monitoring counters

- Supports a snapshot of the system Information when you login

- Supports port mirror function

- Supports the static trunk function

- Supports user management and limits one user to login

- Supports Broadcasting Suppression to avoid network suspended or crashed

- Supports to send the trap event while monitored events happened

- Supports default configuration which can be restored to overwrite the current configuration which is working on via Web UI and Reset button of the switch

- Supports Quality of Service (QoS) used for vlan tag priority and has VIP port priority that is the same as port based QoS

- Built-in web-based management instead of using CLI interface, providing a more convenient GUI for the user

1-4. View of 24 Fast Ethernet + 2 Gigabit Web-Smart Switch

Fig. 1-1 Full View of 24 Fast Ethernet + 2 Gigabit Web-Smart Switch with SFP/GBIC Module

1-4-1. User Interfaces on the Front Panel (Button, LEDs and Plugs)

There are 24 TP Fast Ethernet ports and 2 slots for optional removable modules on the front panel of the switch. LED display area, locating on the front panel, contains a CPURUN, Power LED and 26 ports working status of the switch.
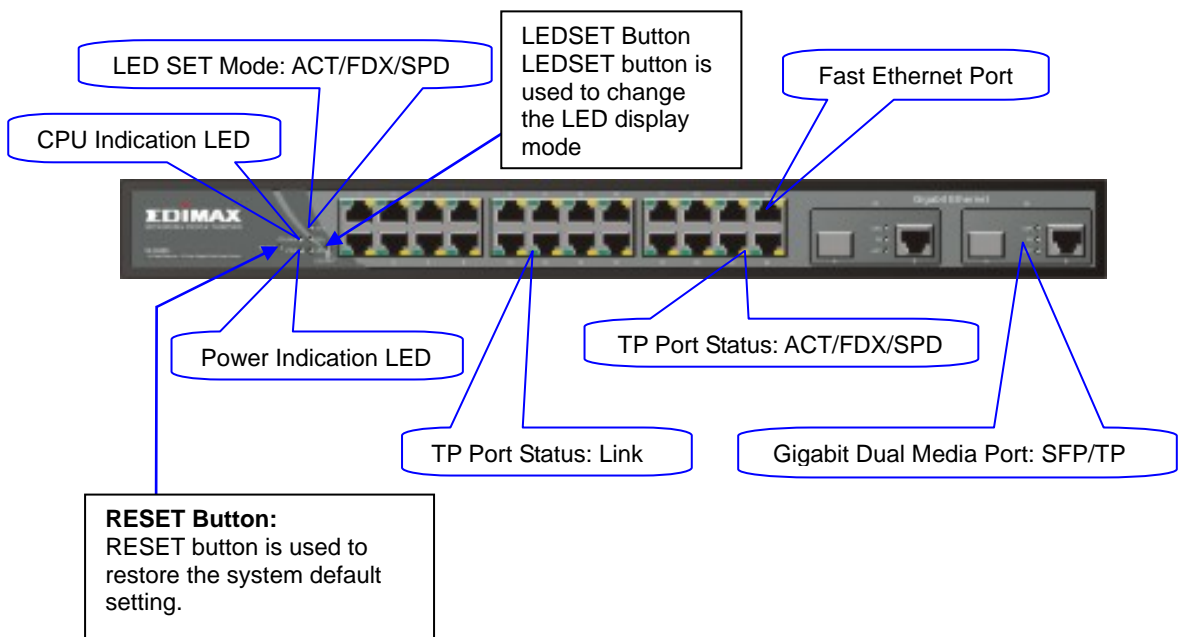

Fig. 1-2 Front View of 24 Fast Ethernet +2 Gigabit Web-Smart Switch with SFP Module

• **LED Indicators**

LED	Color	Function
System LED		
CPURUN	Green	Lit when CPU is on and good
POWER	Green	Lit when AC power is on and good
ACT	Green	Lit when LEDSET set on active mode
FDX	Green	Lit when LEDSET set on full-duplex mode
SPD	Green	Lit when LEDSET set on speed mode
10/100Mbps Ethernet TP Port 1 to 24 LED		
LNK	Green	Lit when connection with remote device is good Off when cable connection is not good

ACT/FDX/ SPD	Amber
	
	(TP Port 1 to 24 LED)
		a. LEDSET set on ACT (active) mode:
		     Blinks when any traffic is present
		b. LEDSET set on FDX (full-duplex) mode:
		     Lit when full-duplex mode is active
		     Blinks when any collision is present
		c. LEDSET set on SPD (speed) mode:
		     Lit when 100Mbps speed is active
		     Off when 10Mbps speed is active

10/100/1000Mbps Gigabit TP/Fiber Port 25, 26 LED		
LNK	Green	Lit when connection with remote device is good Off when cable connection is not good
FB	Green	Lit when Fiber port is active Off when TP port is active

ACT/FDX/ SPD	Green
	
	(Port 25, 26 LED)
		a. LEDSET set on ACT (active) mode:
		     Blinks when any traffic is present
		b. LEDSET set on FDX (full-duplex) mode:
		     Lit when full-duplex mode is active
		     Blinks when any collision is present
		c. LEDSET set on SPD (speed) mode:
		     Lit when 1000Mbps speed is active
		     Off when 10/100Mbps speed is active

Table1-1

1-4-2. User Interfaces on the Rear Panel

There is one AC power input socket for having the switch powered on or off.

AC Line 100-240V 50/60 Hz

Fig. 1-3 Rear View of 24 Fast Ethernet +2 Gigabit Web-Smart Switch

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1-5. View of the Optional Modules

In the switch, Port 25, 26 includes two types of media --- TP and SFP Fiber (LC, BiDi LC…); this port supports 10/100/1000Mbps TP or 1000Mbps SFP Fiber with auto-detected function. 1000Mbps SFP Fiber transceiver is used for high-speed connection expansion; the following are optional SFP types provided for the switch:

— 1000Mbps LC, MM, SFP Fiber transceiver (SFP.0LC.202)

— 1000Mbps LC, SM 10km, SFP Fiber transceiver (SFP.0LC.212.10)

— 1000Mbps LC, SM 30km, SFP Fiber transceiver (SFP.0LC.212.30)

— 1000Mbps LC, SM 50km, SFP Fiber transceiver (SFP.0LC.212.50)

— 1000Mbps BiDi LC, type 1, SM 20km, SFP Fiber WDM transceiver (SFP.0BL.621.201)

— 1000Mbps BiDi LC, type 2, SM 20km, SFP Fiber WDM transceiver (SFP.0BL.621.202)

— 1000Mbps LC, SM 10km, SFP Fiber transceiver with DDM (SFP.DLC.212.10)

Fig. 1-4 Front View of 1000Base-SX/LX LC, SFP Fiber Transceiver

Fig. 1-5 Front View of 1000Base-LX BiDi LC, SFP Fiber Transceiver

2. Installation

2-1. Starting Web-Smart Switch Up

This section will give users a quick start for:

- Hardware and Cable Installation
- Management Station Installation
- Software booting and configuration

2-1-1. Hardware and Cable Installation

At the beginning, please do first:

⇒ Wear a grounding device to avoid the damage from electrostatic discharge

• **Installing Optional SFP/GBIC Fiber Transceivers to the Web-Smart Switch**

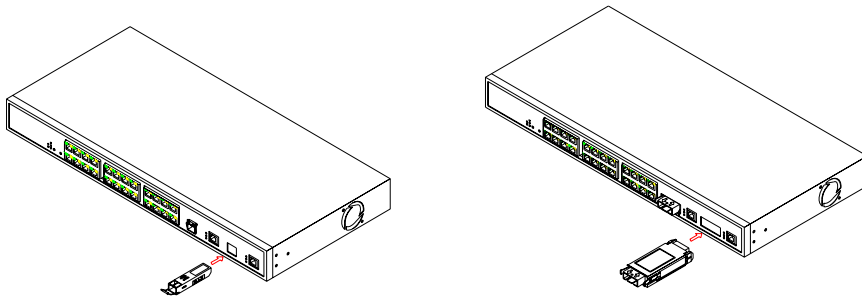Note: If you have no modules, please skip this section.

Fig. 2-1 Installation of Optional SFP/GBIC Fiber Transceiver

• **Connecting the SFP Module to the Chassis:**

The optional SFP modules are hot swappable, so you can plug or unplug it before or after powering on.

1. Verify that the SFP/GBIC module is the right model and conforms to the chassis

2. Slide the module along the slot. Also be sure that the module is properly seated against the slot socket/connector

3. Install the media cable for network connection

4. Repeat the above steps, as needed, for each module to be installed into slot(s)

5. Have the power ON after the above procedures are done

• **TP Port and Cable Installation**

⇒ In the switch, TP port supports MDI/MDI-X auto-crossover, so both types of cable, straight-through (Cable pin-outs for RJ-45 jack 1, 2, 3, 6 to 1, 2, 3, 6 in 10/100M TP; 1, 2, 3, 4, 5, 6, 7, 8 to 1, 2, 3, 4, 5, 6, 7, 8 in Gigabit TP) and crossed-over (Cable pin-outs for RJ-45 jack 1, 2, 3, 6 to 3, 6, 1, 2) can be used. It means you do not have to tell from them, just plug it.

⇒ Use Cat. 5 grade RJ-45 TP cable to connect to a TP port of the switch and the other end is connected to a network-aware device such as a workstation or a server.

⇒ Repeat the above steps, as needed, for each RJ-45 port to be connected to a Gigabit 10/100/1000 TP device.

Now, you can start having the switch in operation.

• **Power On**

      The switch supports 100-240 VAC, 50-60 Hz power supply. The power supply will automatically convert the local AC power source to DC power. It does not matter whether any connection plugged into the switch or not when power on, even modules as well. After the power is on, all LED indicators will light up immediately and then all off except the power LED still keeps on. This represents a reset of the system.

• **Firmware Loading**

      After resetting, the bootloader will load the firmware into the memory. It will take about 30 seconds, after that, the switch will flash all the LED once and automatically performs self-test and is in ready state.

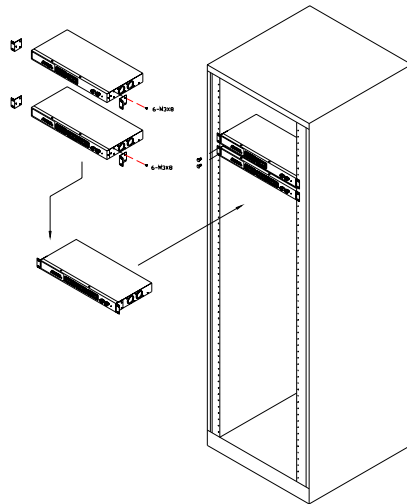## 2-1-2. Installing Chassis to a 19-Inch Wiring Closet Rail

Fig. 2-2

Caution: Allow a proper spacing and proper air ventilation for the cooling fan at both sides of the chassis.

⇒ Wear a grounding device for electrostatic discharge.
⇒ Screw the mounting accessory to the front side of the switch (See Fig. 2-2).
⇒ Place the Chassis into the 19-inch wiring closet rail and locate it at the proper position. Then, fix the Chassis by screwing it.

2-1-3. Cabling Requirements

To help ensure a successful installation and keep the network performance good, please take a care on the cabling requirement. Cables with worse specification will render the LAN to work poorly.

2-1-3-1. Cabling Requirements for TP Ports

⇒ For Fast Ethernet TP network connection
  — The grade of the cable must be Cat. 5 or Cat. 5e with a maximum length of 100 meters.
⇒ Gigabit Ethernet TP network connection
  — The grade of the cable must be Cat. 5 or Cat. 5e with a maximum length of 100 meters. Cat. 5e is recommended.

2-1-3-2. Cabling Requirements for 1000SX/LX SFP Module

It is more complex and comprehensive contrast to TP cabling in the fiber media. Basically, there are two categories of fiber, multi mode (MM) and single mode (SM). The later is categorized into several classes by the distance it supports. They are SX, LX, LHX, XD, and ZX. From the viewpoint of connector type, there mainly are LC and BIDI LC.

  — Gigabit Fiber with multi-mode LC SFP module

  — Gigabit Fiber with single-mode LC SFP module

  — Gigabit Fiber with BiDi LC 1310nm SFP module

  — Gigabit Fiber with BiDi LC 1550nm SFP module

The following table lists the types of fiber that we support and those else not listed here are available upon request.

	Multi-mode Fiber Cable and Modal Bandwidth			
	Multi-mode 62.5/125μm		Multi-mode 50/125μm	
IEEE 802.3z Gigabit Ethernet 1000SX 850nm	Modal Bandwidth	Distance	Modal Bandwidth	Distance
	160MHz-Km	220m	400MHz-Km	500m
	200MHz-Km	275m	500MHz-Km	550m
1000Base-LX/LHX/XD/ZX	SFP.0LC.212.10/30/50/70/B0 Km (or GBI.ZSC.212.10/30/50 Km)			
	Single-mode Fiber 9/125μm			
	Single-mode transceiver 1310nm 10Km			
	Single-mode transceiver 1550nm 30, 50, 70, 110Km			
1000Base-LX Single Fiber WDM Module	SFP.0BL.621.202 (or GBI.ZBS.621.202)	Single-Mode *20Km	TX(Transmit) 1310nm	
			RX(Receive) 1550nm	
	SFP.0BL.621.201 (or GBI.ZBS.621.201)	Single-Mode *20Km	TX(Transmit) 1550nm	
			RX(Receive) 1310nm	

Table2-1

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2-1-3-3. Switch Cascading in Topology

• **Takes the Delay Time into Account**

Theoretically, the switch partitions the collision domain for each port in switch cascading that you may up-link the switches unlimitedly. In practice, the network extension (cascading levels & overall diameter) must follow the constraint of the IEEE 802.3/802.3u/802.3z and other 802.1 series protocol specifications, in which the limitations are the timing requirement from physical signals defined by 802.3 series specification of Media Access Control (MAC) and PHY, and timer from some OSI layer 2 protocols such as 802.1d, 802.1q, LACP and so on.

The fiber, TP cables and devices' bit-time delay (round trip) are as follows:

1000Base-X TP, Fiber		100Base-TX TP	
Round trip Delay: 4096		Round trip Delay: 512	
Cat. 5 TP Wire:	11.12/m	Cat. 5 TP Wire:	1.12/m
Fiber Cable:	10.10/m	TP to fiber Converter: 56	
Bit Time unit: 1ns (1sec./1000 Mega bit)		Bit Time unit: 0.01μs (1sec./100 Mega bit)	

Table 2-2

Sum up all elements' bit-time delay and the overall bit-time delay of wires/devices must be within Round Trip Delay (bit times) in a half-duplex network segment (collision domain). For full-duplex operation, this will not be applied. You may use the TP-Fiber module to extend the TP node distance over fiber optic and provide the long haul connection.

— 1000SX Fiber module: Multi-mode up to 220/275/500/550m by fiber type option
— 1000LX Fiber module: Single-mode up to 10Km
— 1000LHX Fiber module: Single-mode up to 30Km
— 1000ZX Fiber module: Single-mode up to 50Km

• **Typical Network Topology in Deployment**

A hierarchical network with minimum levels of switch may reduce the timing delay between server and client station. Basically, with this approach, it will minimize the number of switches in any one path; will lower the possibility of network loop and will improve network efficiency. If more than two switches are connected in the same network, select one switch as Level 1 switch and connect all other switches to it at Level 2. Server/Host is recommended to connect to the Level 1 switch. This is general if no VLAN or other special requirements are applied.

Case1: All switch ports are in the same local area network. Every port can access each other (See Fig. 2-3).
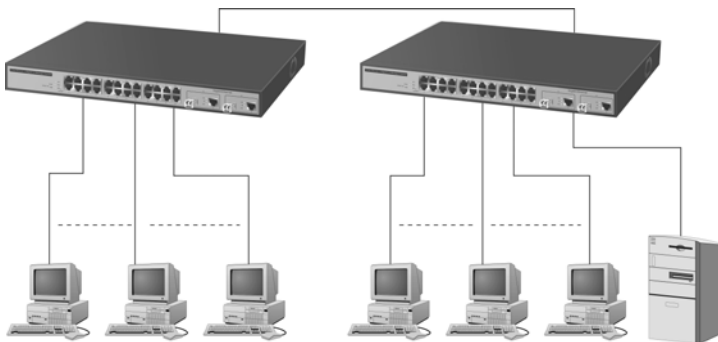

Fig. 2-3 No VLAN Configuration Diagram

If VLAN is enabled and configured, each node in the network that can communicate each other directly is bounded in the same VLAN area.

Here VLAN area is defined by what VLAN you are using. The switch supports both port-based VLAN and tag-based VLAN. They are different in practical deployment, especially in physical location. The following diagram shows how it works and what the difference they are.

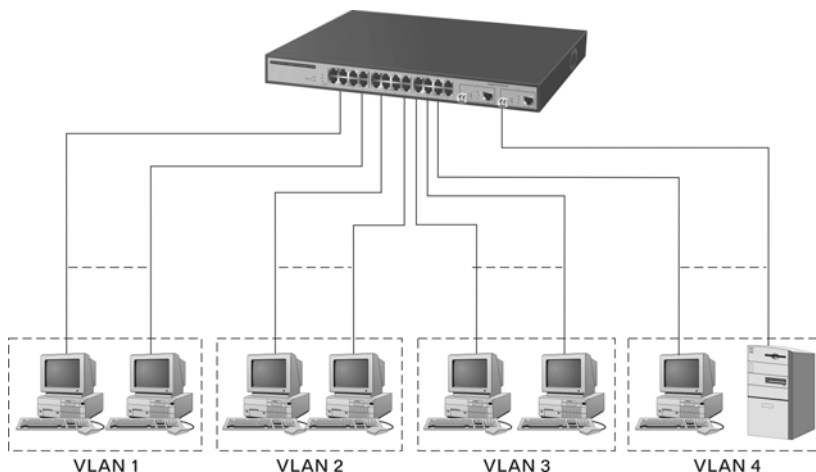Case2a: Port-based VLAN (See Fig.2-4).

Fig. 2-4 Port-based VLAN Diagram

1. The same VLAN members could not be in different switches.
2. Every VLAN members could not access VLAN members each other.
3. The switch manager has to assign different names for each VLAN groups at one switch.
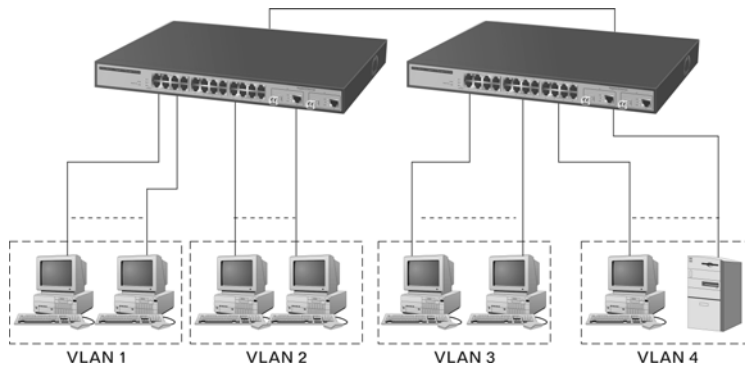
Case 2b: Port-based VLAN (See Fig.2-5).

Fig. 2-5 Port-based VLAN Diagram

1. VLAN1 members could not access VLAN2, VLAN3 and VLAN4 members.
2. VLAN2 members could not access VLAN1 and VLAN3 members, but they could access VLAN4 members.
3. VLAN3 members could not access VLAN1, VLAN2 and VLAN4.
4. VLAN4 members could not access VLAN1 and VLAN3 members, but they could access VLAN2 members.

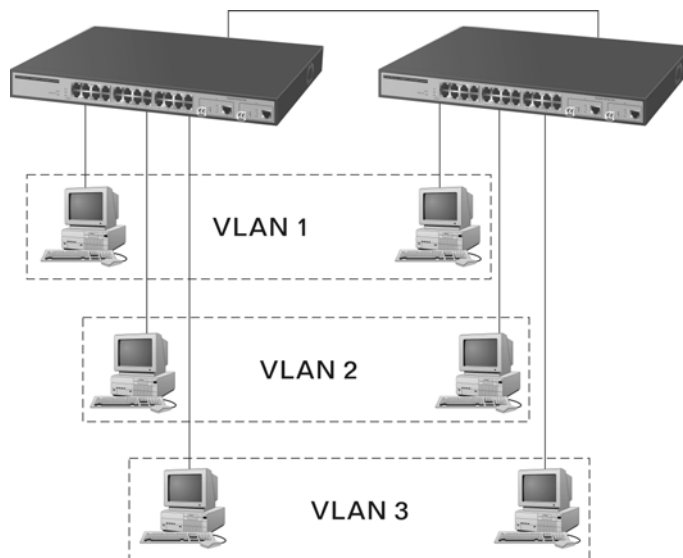Case3a: The same VLAN members can be at different switches with the same VID (See Fig. 2-6).

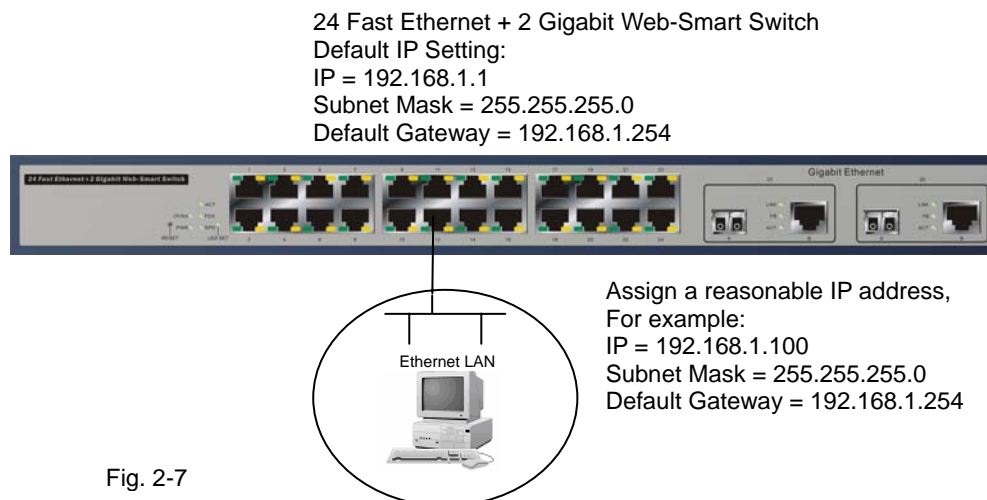Fig. 2-6 Attribute-based VLAN Diagram

2-1-4. Configuring the Management Agent of Web-Smart Switch

In the way of web, user is allowed to startup the switch management function. Users can use any one of them to monitor and configure the switch. You can touch them through the following procedures.

Section 2-1-4-1: Configuring Management Agent of Web-Smart Switch through Ethernet Port

2-1-4-1. Configuring Management Agent of Web-Smart Switch through Ethernet Port

There are two ways to configure and monitor the switch through the switch's Ethernet port. They are Web browser and SNMP manager. The user interface for the last one is NMS dependent and does not cover here. We just introduce the first type of management interface. Web-based UI for the switch is an interface in a highly friendly way.

24 Fast Ethernet + 2 Gigabit Web-Smart Switch
Default IP Setting:
IP = 192.168.1.1
Subnet Mask = 255.255.255.0
Default Gateway = 192.168.1.254

Assign a reasonable IP address,
For example:
IP = 192.168.1.100
Subnet Mask = 255.255.255.0
Default Gateway = 192.168.1.254

Ethernet LAN

Fig. 2-7

• **Managing Web-Smart Switch through Ethernet Port**

Before you communicate with the switch, you have to finish first the configuration of the IP address or to know the IP address of the switch. Then, follow the procedures listed below.

1. Set up a physical path between the configured the switch and a PC by a qualified UTP Cat. 5 cable with RJ-45 connector.

    Note: If PC directly connects to the switch, you have to setup the same subnet mask between them. But, subnet mask may be different for the PC in the remote site. Please refer to Fig. 2-7 about the Web-Smart Switch default IP address information.

2. Run web browser and follow the menu. Please refer to Chapter 4.

Fig. 2-8 the Login Screen for Web

2-1-5. IP Address Assignment

For IP address configuration, there are three parameters needed to be filled in. They are IP address, Subnet Mask, Default Gateway and DNS.

IP address:

The address of the network device in the network is used for internetworking communication. Its address structure looks is shown in the Fig. 2-9. It is "classful" because it is split into predefined address classes or categories.

Each class has its own network range between the network identifier and host identifier in the 32 bits address. Each IP address comprises two parts: network identifier (address) and host identifier (address). The former indicates the network where the addressed host resides, and the latter indicates the individual host in the network which the address of host refers to. And the host identifier must be unique in the same LAN. Here the term of IP address we used is version 4, known as IPv4.
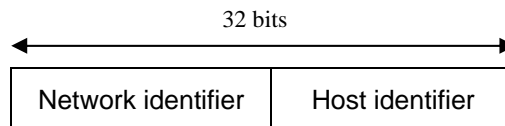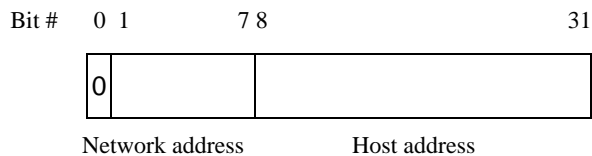

Fig. 2-9 IP address structure

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With the classful addressing, it divides IP address into three classes, class A, class B and class C. The rest of IP addresses are for multicast and broadcast. The bit length of the network prefix is the same as that of the subnet mask and is denoted as IP address/X, for example, 192.168.1.0/24. Each class has its address range described below.
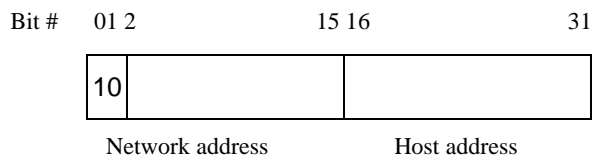
Class A:

Address is less than 126.255.255.255. There are a total of 126 networks can be defined because the address 0.0.0.0 is reserved for default route and 127.0.0.0/8 is reserved for loopback function.
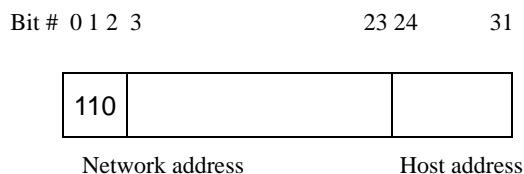
```
Bit #   0  1         7 8                        31
      +--+----------+---------------------------+
      |0 |          |                           |
      +--+----------+---------------------------+
      Network address       Host address
```

Class B:

IP address range between 128.0.0.0 and 191.255.255.255. Each class B network has a 16-bit network prefix followed 16-bit host address. There are 16,384 (2^{14})/16 networks able to be defined with a maximum of 65534 ($2^{16} - 2$) hosts per network.

```
Bit #   01 2              15 16                 31
      +--+--------------+---------------------+
      |10|              |                     |
      +--+--------------+---------------------+
        Network address       Host address
```

Class C:

IP address range between 192.0.0.0 and 223.255.255.255. Each class C network has a 24-bit network prefix followed 8-bit host address. There are 2,097,152 (2^{21})/24 networks able to be defined with a maximum of 254 ($2^8 - 2$) hosts per network.

```
Bit #  0 1 2  3                23 24      31
      +---+------------------+----------+
      |110|                  |          |
      +---+------------------+----------+
        Network address        Host address
```

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Class D and E:

Class D is a class with first 4 MSB (Most significance bit) set to 1-1-1-0 and is used for IP Multicast. See also RFC 1112. Class E is a class with first 4 MSB set to 1-1-1-1 and is used for IP broadcast.

According to IANA (Internet Assigned Numbers Authority), there are three specific IP address blocks reserved and able to be used for extending internal network. We call it Private IP address and list below:

|	
Class A	10.0.0.0 --- 10.255.255.255
Class B	172.16.0.0 --- 172.31.255.255
Class C	192.168.0.0 --- 192.168.255.255

Please refer to RFC 1597 and RFC 1466 for more information.

Subnet mask:

It means the sub-division of a class-based network or a CIDR block. The subnet is used to determine how to split an IP address to the network prefix and the host address in bitwise basis. It is designed to utilize IP address more efficiently and ease to manage IP network.

For a class B network, 128.1.2.3, it may have a subnet mask 255.255.0.0 in default, in which the first two bytes is with all 1s. This means more than 60 thousands of nodes in flat IP address will be at the same network. It's too large to manage practically. Now if we divide it into smaller network by extending network prefix from 16 bits to, say 24 bits, that's using its third byte to subnet this class B network. Now it has a subnet mask 255.255.255.0, in which each bit of the first three bytes is 1. It's now clear that the first two bytes is used to identify the class B network, the third byte is used to identify the subnet within this class B network and, of course, the last byte is the host number.

Not all IP address is available in the sub-netted network. Two special addresses are reserved. They are the addresses with all zero's and all one's host number. For example, an IP address 128.1.2.128, what IP address reserved will be looked like? All 0s mean the network itself, and all 1s mean IP broadcast.
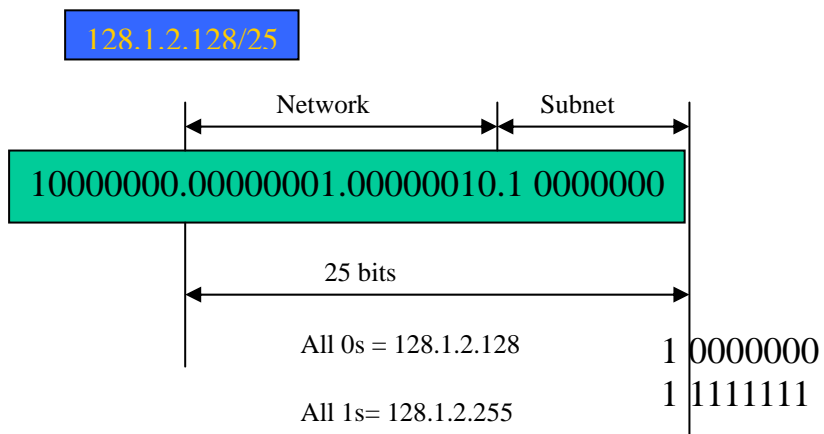
In this diagram, you can see the subnet mask with 25-bit long, 255.255.255.128, contains 126 members in the sub-netted network. Another is that the length of network prefix equals the number of the bit with 1s in that subnet mask. With this, you can easily count the number of IP addresses matched. The following table shows the result.

Prefix Length	No. of IP matched	No. of Addressable IP
/32	1	-
/31	2	-
/30	4	2
/29	8	6
/28	16	14
/27	32	30
/26	64	62
/25	128	126
/24	256	254
/23	512	510
/22	1024	1022
/21	2048	2046
/20	4096	4094
/19	8192	8190
/18	16384	16382
/17	32768	32766
/16	65536	65534

Table 2-3

According to the scheme above, a subnet mask 255.255.255.0 will partition a network with the class C. It means there will have a maximum of 254 effective nodes existed in this sub-netted network and is considered a physical network in an autonomous network. So it owns a network IP address which may looks like 168.1.2.0.

With the subnet mask, a bigger network can be cut into small pieces of network. If we want to have more than two independent networks in a worknet, a partition to the network must be performed. In this case, subnet mask must be applied.

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For different network applications, the subnet mask may look like 255.255.255.240. This means it is a small network accommodating a maximum of 15 nodes in the network.

Default gateway:

For the routed packet, if the destination is not in the routing table, all the traffic is put into the device with the designated IP address, known as default router. Basically, it is a routing policy. The gateway setting is used for Trap Events Host only in the switch.

For assigning an IP address to the switch, you just have to check what the IP address of the network will be connected with the switch. Use the same network address and append your host address to it.
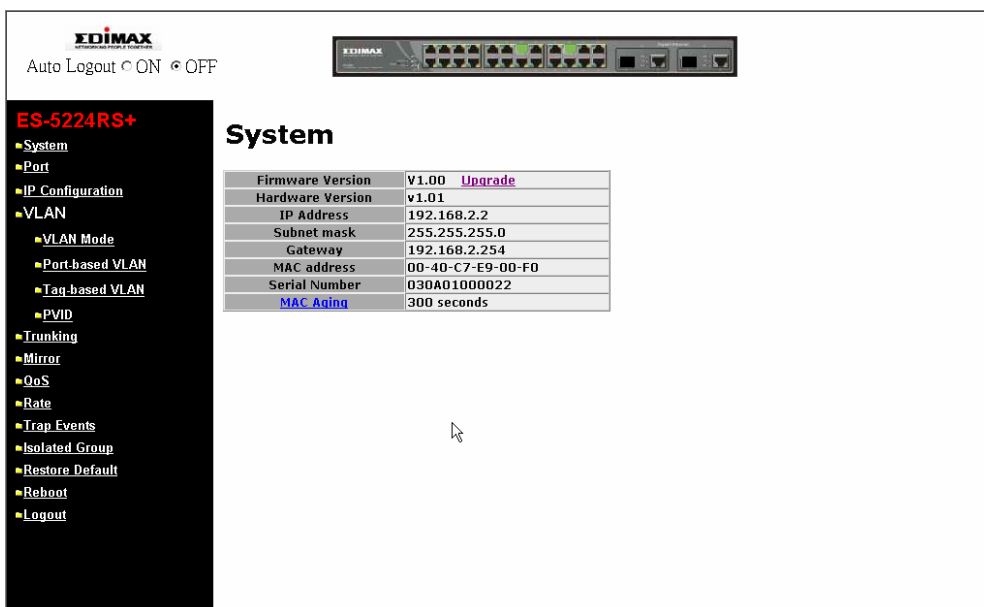

Fig. 2-10

First, IP Address: as shown in the Fig. 2-10, enter "192.168.1.1", for instance. For sure, an IP address such as 192.168.1.x must be set on your PC.

Second, Subnet Mask: as shown in the Fig. 2-10, enter "255.255.255.0". Any subnet mask such as 255.255.255.x is allowable in this case.

2-2. Typical Applications

Web-Smart Switch implements 24 Fast Ethernet TP ports with auto MDIX + 2 Gigabit dual media ports with SFP/GBIC for removable module supported comprehensive fiber types of connection, including LC, BiDi LC for SFP and LC/SC, BiDi LC/SC for GBIC. For more details on the specification of Web-Smart Switch, please refer to Appendix A.

The switch is suitable for the following applications.
— Central Site/Remote site application is used in carrier or ISP (See Fig. 2-11)
— Peer-to-peer application is used in two remote offices (See Fig. 2-12)
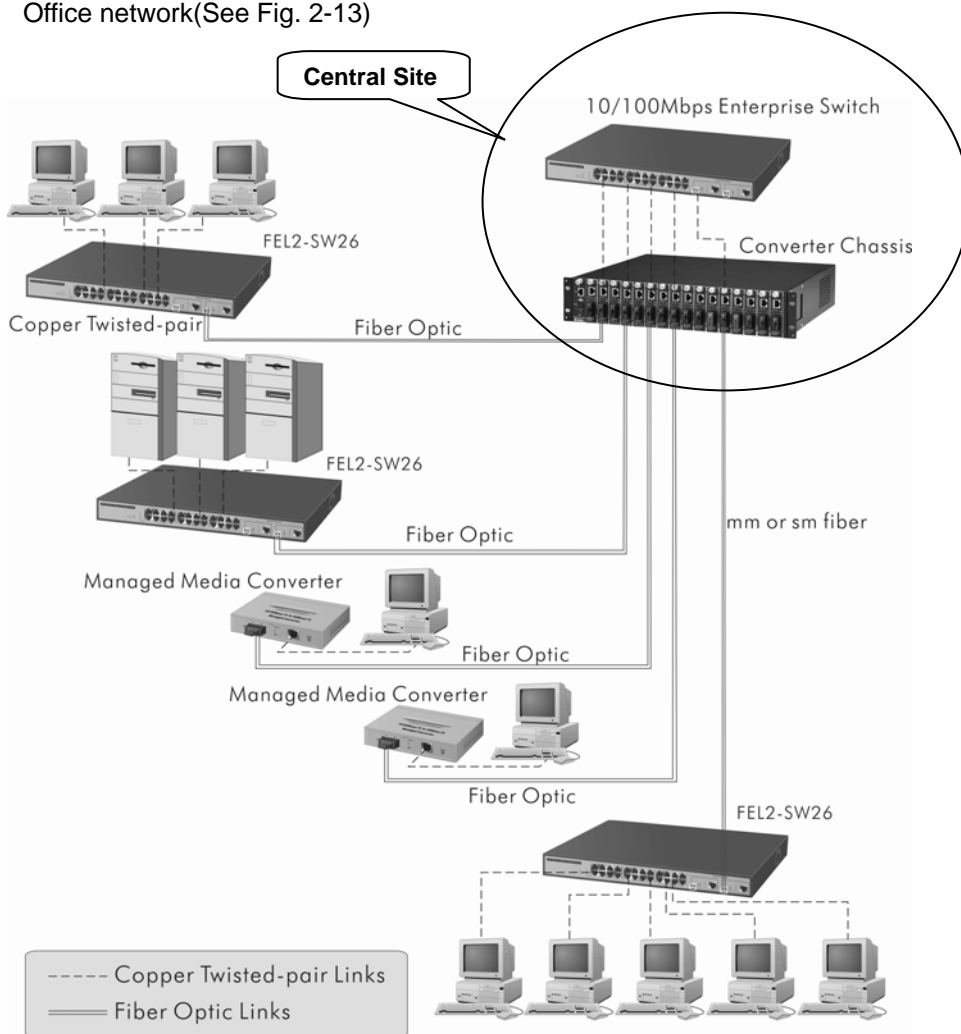— Office network(See Fig. 2-13)

Fig. 2-11 Network Connection between Remote Site and Central Site

Fig. 2-11 is a system wide basic reference connection diagram. This diagram demonstrates how the switch connects with other network devices and hosts.
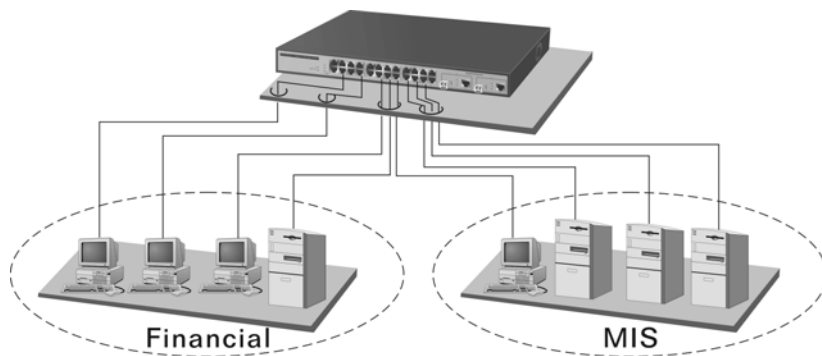
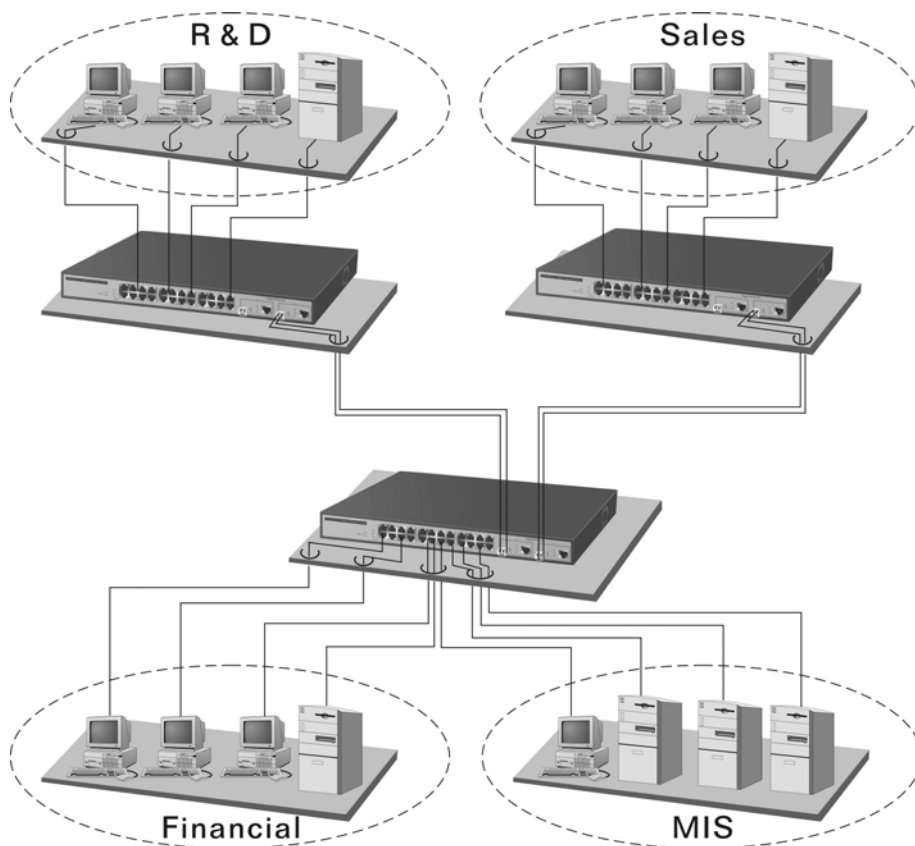Fig. 2-12 Peer-to-peer Network Connection

Fig. 2-13 Office Network Connection

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3. Operation of Web-based Management

      This chapter instructs you how to configure and manage the switch through the web user interface it supports, to access and manage 24 10/100Mbps TP Port and 2 Gigabit TP/SFP or TP/GBIC Fiber dual media port. The switch provides 24 fixed Fast Ethernet TP ports and two optional Gigabit dual media ports supporting either fiber or TP media. With this facility, you can easily access and monitor through any one port of the switch all the status of the switch, including MIBs status, each port activity, multicast traffic, and so on.

      The default values of Web-Smart Switch are listed in the table below:

IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.254
Username	admin
Password	admin

Table 3-1

      After the switch has been finished configuration, you can browse it by using the IP address you set up. For instance, type http://192.168.1.1 in the address row in a browser, it will show the following screen (see Fig.3-1) and ask you inputting password in order to login and access authentication. The default password is "admin". For the first time to use, please enter the default password, then click the **<Login>** button. The login process now is completed.

      In the switch, it supports a simple user management function allowing only one administrator to configure the system at the same time.

      To optimize the display effect, we recommend you use Microsoft IE 6.0 above, Netscape V7.1 above or FireFox V1.00 above and have the resolution 1024x768. The switch supported neutral web browser interface.

      In Fig. 3-2, for example, left section is the whole function tree with web user interface and we will travel it through this chapter.
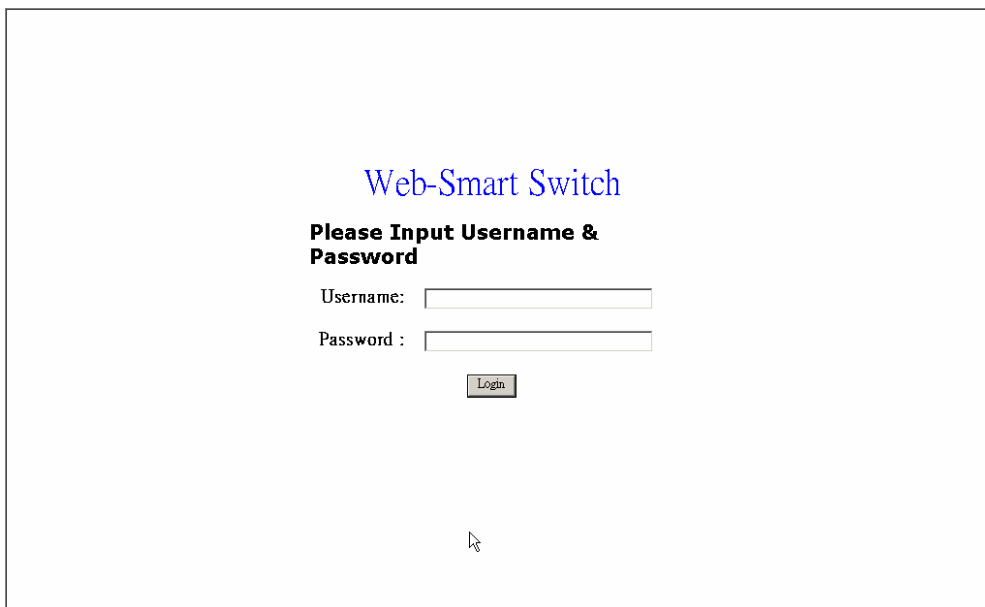
Fig. 3-1

3-1. Web Management Home Overview

After you login, Web-Smart Switch shows you the system information as Fig. 3-2. This page is default and tells you the basic information of the system, including "Firmware Version", "Hardware Version", "IP Address", "Subnet Mask", "Gateway", "Mac Address", "Serial Number" and "MAC Aging". With this information, you will know the software version used, MAC address, etc., this is helpful while configuring.
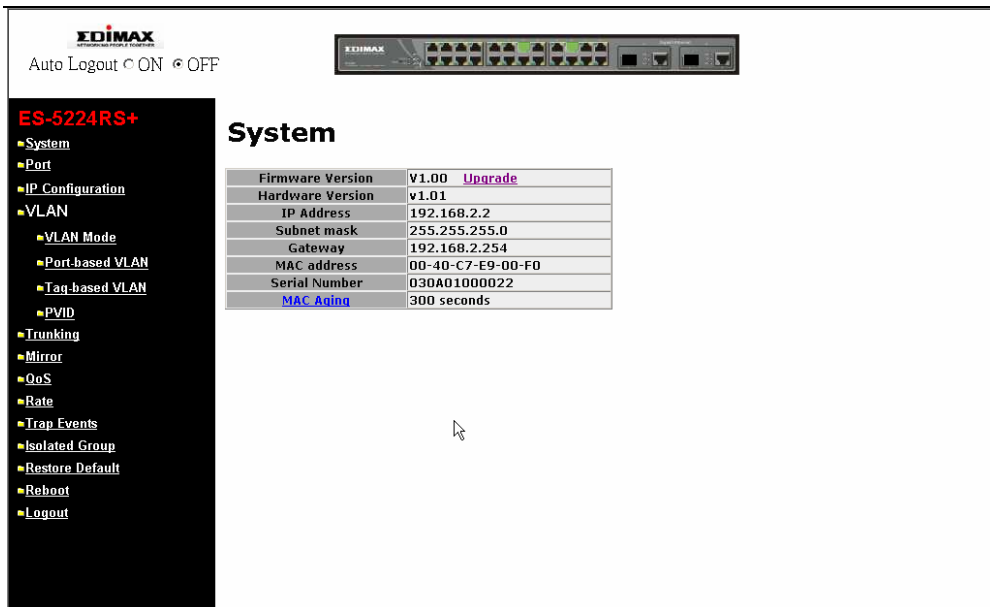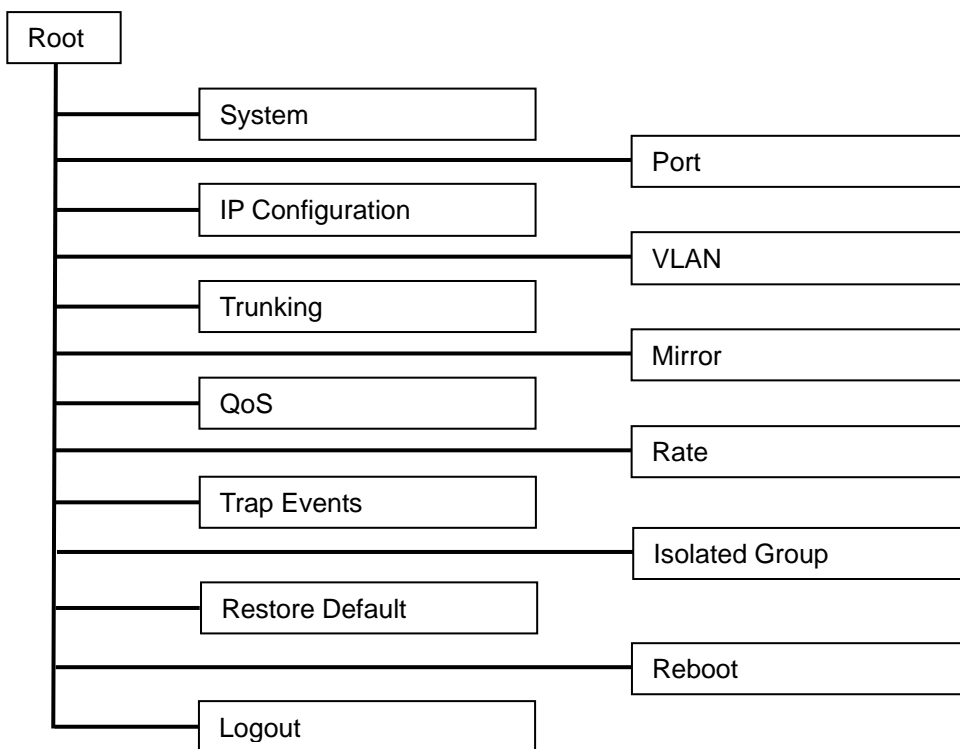
Fig. 3-2

• **The Information of Page Layout**

— On the top side, it shows both the front panel of Web-Smart Switch. In the front panel, the linked ports will display green; as to the ports, which are link off, they will be dark. For the optional modules, the slot will show only a cover plate if no module exists and will show a module if a module is present. The image of module depends on the one you inserted. The same, if disconnected, the port will show just dark, if linked, green.

— On the left-top corner, there are two radians for Auto Logout. For the sake of security, we provide auto-logout function to protect you from illegal user as you are leaving. If you click ON radian, the system will be logged out automatically when no action on the device 3 minutes later. If OFF is chosen, the screen will keep as it is. Default is ON.

— On the left side, the main menu tree for web is listed in the page. All functions can be divided into thirteen parts, including "System", "Port", "IP Configuration", "VLAN", "Trunking", "Mirror", "QoS", "Rate", "Trap Events", "Isolated Group", "Restore Default", "Reboot" and "Logout". The functions of each folder are described in its corresponded section respectively. The following list is the main function tree for web user interface.

—

```
┌────────┐
│ Root   │
└───┬────┘
    │        ┌───────────────────┐
    ├────────│ System            │
    │        └───────────────────┘
    │                              ┌───────────────────┐
    │──────────────────────────────│ Port              │
    │        ┌───────────────────┐ └───────────────────┘
    ├────────│ IP Configuration  │
    │        └───────────────────┘
    │                              ┌───────────────────┐
    │──────────────────────────────│ VLAN              │
    │        ┌───────────────────┐ └───────────────────┘
    ├────────│ Trunking          │
    │        └───────────────────┘
    │                              ┌───────────────────┐
    │──────────────────────────────│ Mirror            │
    │        ┌───────────────────┐ └───────────────────┘
    ├────────│ QoS               │
    │        └───────────────────┘
    │                              ┌───────────────────┐
    │──────────────────────────────│ Rate              │
    │        ┌───────────────────┐ └───────────────────┘
    ├────────│ Trap Events       │
    │        └───────────────────┘
    │                              ┌───────────────────┐
    │──────────────────────────────│ Isolated Group    │
    │        ┌───────────────────┐ └───────────────────┘
    ├────────│ Restore Default   │
    │        └───────────────────┘
    │                              ┌───────────────────┐
    │──────────────────────────────│ Reboot            │
    │        ┌───────────────────┐ └───────────────────┘
    └────────│ Logout            │
             └───────────────────┘
```

3-2. System

System function is used to display the current settings of the switch. In addition, the user also can do upgrade and set up MAC Aging time respectively.
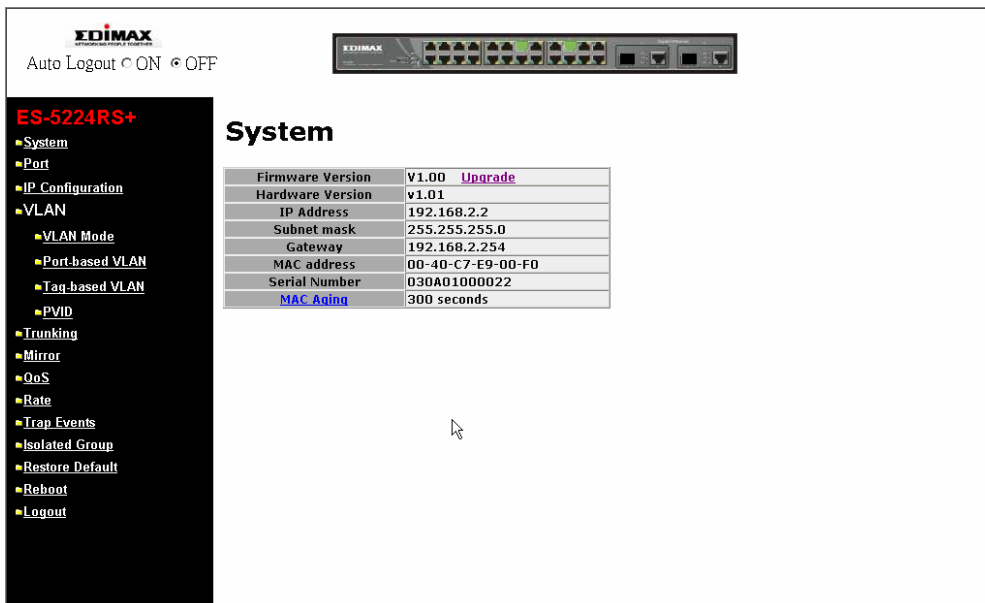

Fig. 3-3

Function name:

System

Function Description:

Display the basic information of this switch.

Parameter Description:

Firmware Version:

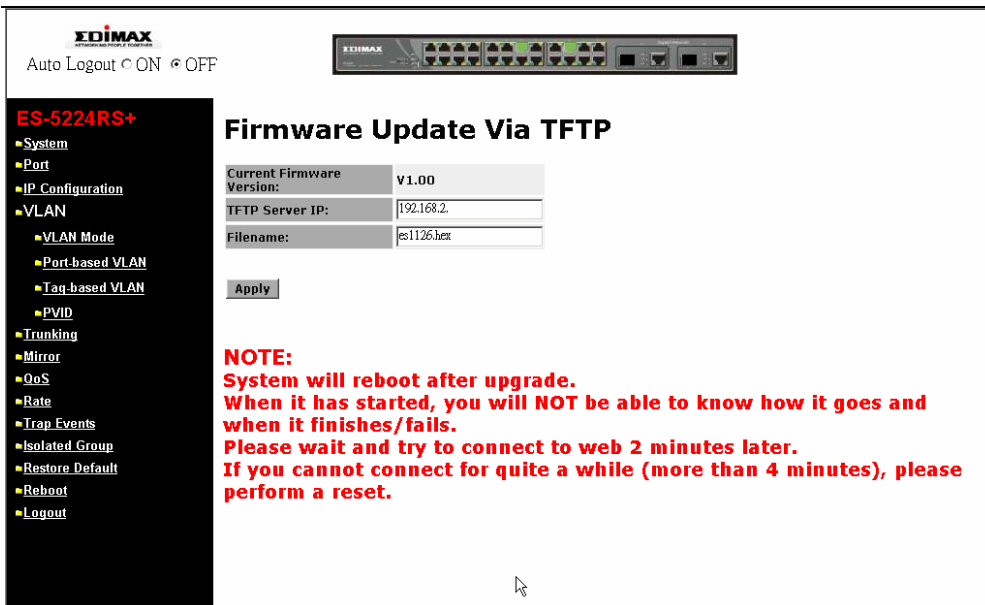To show the firmware version of this switch. For upgrading, please click the "**Upgrade**" in hyperlink.

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Fig. 3-4

Hardware Version:

  To show the hardware version of this switch.

IP Address:

  To show the IP address of this switch.

Subnet Mask:

  To show the subnet mask of this switch.

Gateway:

  To show the default gateway of this switch.

MAC Address:

  To show the Ethernet MAC address of this switch.

Serial Number:

  The serial number is assigned by the manufacturer.

MAC Aging:

  To enable or disable the MAC Aging function and change MAC Aging time.

  Default: 300 seconds.
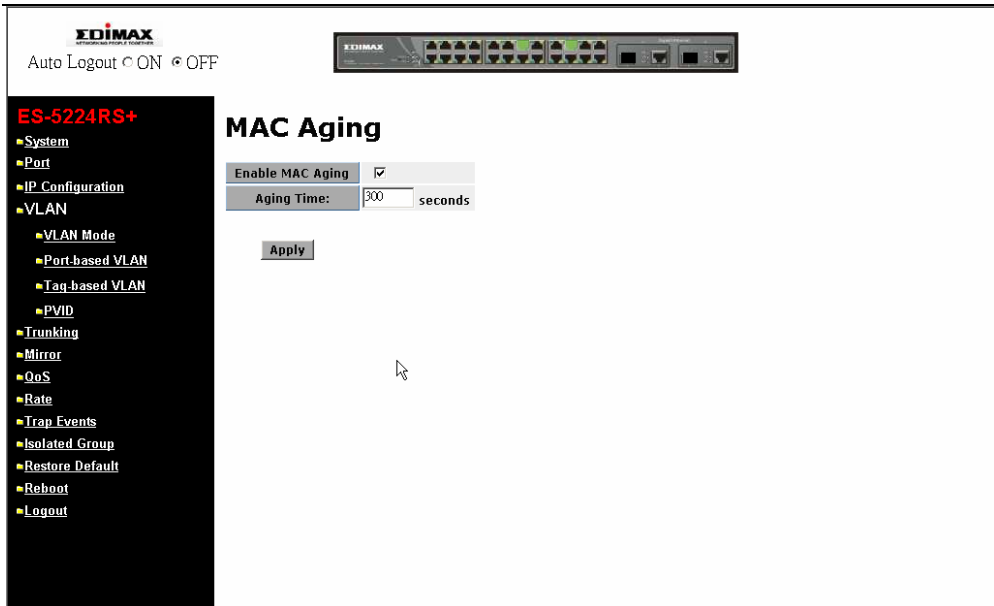
Fig. 3-5
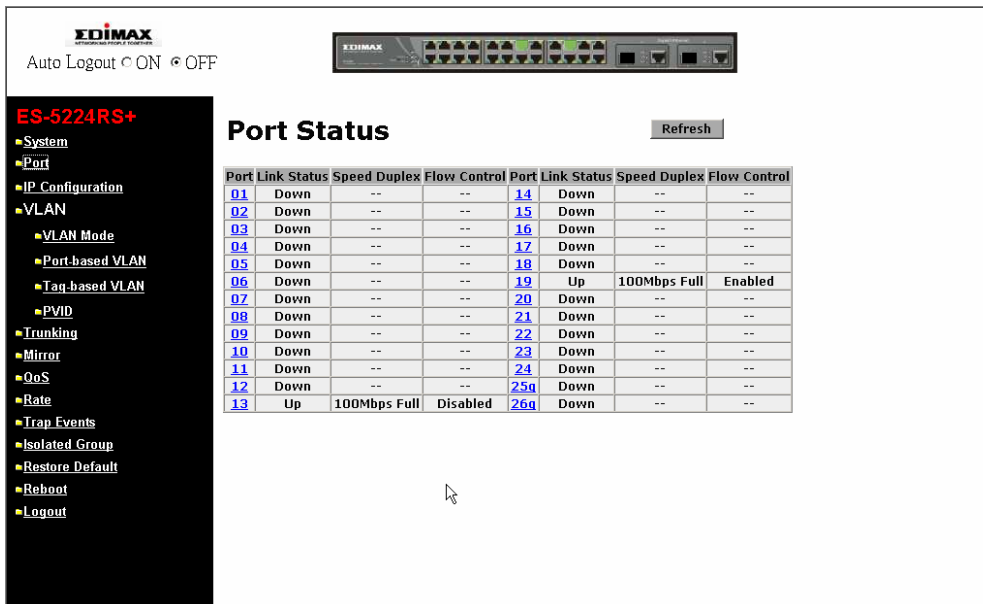
3-3. Port

Function name:

TP/Fiber Ports Status

Function description:

TP/Fiber Ports Status function is applied to display the latest updated status of all ports in this switch. Or click the Port ID directly to configure it (See Fig.3-7). In this function, you can view the following setting including, link status, speed duplex and flow control. All of them are described in detail below.

Fig. 3-6

Parameter description:

Port:

Display the port number. The number is 1 – 26. Both port 25 and 26 are optional modules.

Link Status:

Show that if the link on the port is active or not. If the link is connected to a working-well device, the Link Status will show the current link speed and duplex. If the connection is broken, it will show "Down". This is determined by the hardware on both devices of the connection.

In port 25 and 26, it will show "Copper" when TP media is adopted, and it will show "Fiber" if Fiber media is adopted. Otherwise, it will show "Down" if the connection is broken.

No default value.

Speed Duplex:

Display the speed and duplex of all port. There are three speeds 10Mbps, 100Mbps and 1000Mbps supported for TP media, and the duplex supported is half duplex and full duplex. If the media is 1Gbps fiber, it is 1000Mbps supported only. The status of speed/duplex mode is determined by 1) the negotiation of both local port and link partner in "Enable" mode or 2) user setting in "Disable" mode. The local port has to be preset its capability.

Flow Control:

Show each port's flow control status.

There are two types of flow control in Ethernet, Backpressure for half-duplex operation and Pause flow control (IEEE802.3x) for full-duplex operation. The switch supports both of them. Default: Enabled
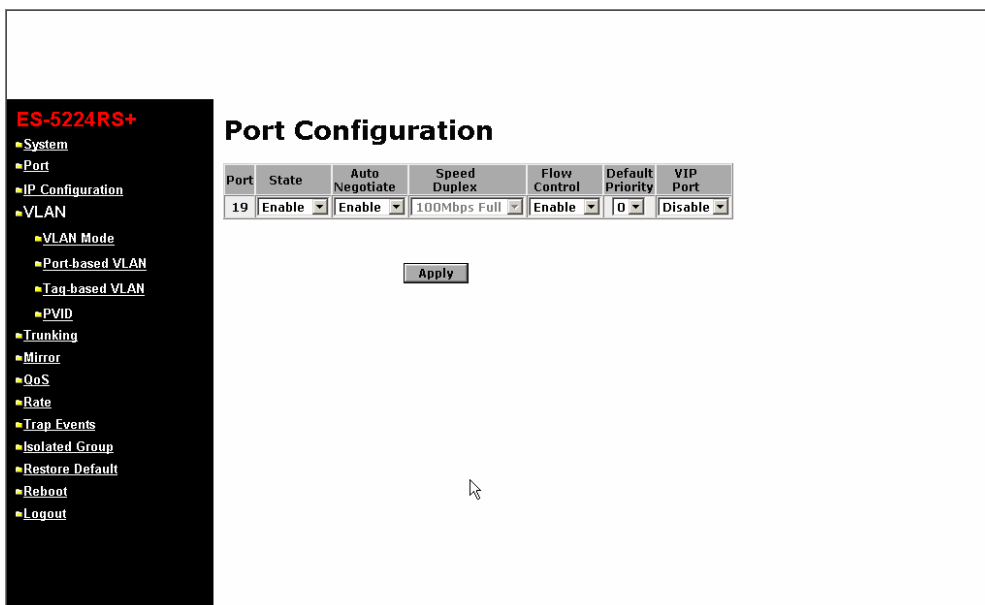

Fig. 3-7

Parameter description for Port Configuration:

State:

Show if the communication capability of the port is Enabled or Disabled. When enabled, traffic can be transmitted and received via this port. When disabled, the port is blocked and no traffic can be transferred through this port. Admin function is configurable by the user. There are only two states "Enable" and "Disable" able to choose. If you set a port's state "Disable", then that port is prohibited to pass any traffic, even it looks Link up.

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Default is Enable.

Auto Negotiate:

Only "Enable" and "Disable" two states can be chosen. "Enable" means the port adopted the auto-negotiation algorithm to exchange the capability with the linked partner and adjusted its speed, duplex and flow control. When enabled, the speed, duplex mode and flow control mode may change. "Disable" means the forced mode is adopted. When disabled, if you want to set up a connection successfully, you must have both port configuration of local port and linked partner be the same. If their configuration is different, the link will not be set up successfully. In the switch, the 1Gbps fiber module, it supports auto and forced modes.

Default: Auto Negotiation is enabled.

Notice: When you are in Disable mode, you must handle it carefully because this may cause the connection failed.

Speed Duplex:

Set the speed and duplex of the port. In speed, 10/100Mbps baud rate is available for Fast Ethernet, Gigabit module in port 25, 26. If the media is 1Gbps fiber, it is always 1000Mbps and the duplex is full only. If the media is TP, the Speed/Duplex is comprised of the combination of speed mode, 10/100/1000Mbps, and duplex mode, full duplex and half duplex. The following table summarized the function the media supports.

Media type	NWay	Speed	Duplex
100M TP	ON/OFF	10/100M	Full/Half
1000M TP	ON/OFF	10/100/1000M	Full for all, Half for 10/100
1000M Fiber	ON/OFF	1000M	Full

In Auto-negotiation mode, no default value. In Forced mode, default value depends on your setting.

Flow Control:

There are two modes to choose in flow control, including Enable and Disable. If flow control is set Enable, both parties can send PAUSE frame to the transmitting device(s) if the receiving port is too busy to handle. When it is set Disable, there will be no flow control in the port. It drops the packet if too much to handle.

Default: Enable

Default Priority:

Default Priority is used for untagged packets hold QoS priority. It provide 8 priorities (0~7) in each port. When untagged packets enter one port of the switch, they will have the precedence you set default priority in that port. For instance, as you choose port 2 with default priority 2 and the untagged frames get into the port 2 of the switch, they will possess priority 2 QoS precedence. Then priority 2 packets must check the setting of QoS function. In default, the priority 2 is in Queue 1. Finally, the packets will obey the Scheduling Method, Weighted Round Robin or Strict Priority, to reach QoS effect. Nevertheless, you want Default Priority to act on, please enable tag–based VLAN in advance.

VIP Port:

VIP Port is particularly used for the "Strict Priority" method of QoS Setting Scheduling. Please note that you should apply "Strict Priority" Scheduling Method before the usage of VIP Port.

The function of VIP Port is to offer the highest priority of QoS to the port you set up. As to the other ports with disabled VIP Port whose priority cannot be higher than those with enabled VIP Port. For example, if port 2, 3 and 4(Port 2's VIP Port is enabled) transmit untagged packets to port 1 at the speed of 100MB and result in the traffic congestion, then the packets that port 1 had received will be only from port 2. Due to the priorities of packets coming from port 3, 4 are lower than the ones of VIP port - port 2, so the packets will form port 3, 4 will be dropped. Furthermore, this VIP Port capability also cooperates with 802.1p QoS similarly.

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3-4. IP Configuration

IP configuration is one of the most important configurations in the switch. Without the proper setting, network manager will not be able to manage or view the device. The switch supports manual IP address setting. When IP address is changed, you must reboot the switch to have the setting taken effect and use the new IP to browse for web management.

Function name:

IP Configuration

Function description:

Set IP address, subnet mask, default gateway, system name, password and auto logout timer for the switch.

Parameter description:

IP Address:

Users can configure the IP settings and fill in new values. Then, click **<Apply>** button to update.

Default: 192.168.1.1

Subnet Mask:

Subnet mask is made for the purpose to get more network address because any IP device in a network must own its IP address, composed of Network address and Host address, otherwise can't communicate with other devices each other. But unfortunately, the network classes A, B, and C are all too large to fit for almost all networks, hence, subnet mask is introduced to solve this problem. Subnet mask uses some bits from host address and makes an IP address looked Network address, Subnet mask number and host address. It is shown in the following figure. This reduces the total IP number of a network able to support, by the amount of 2 power of the bit number of subnet number (2^(bit number of subnet number)).
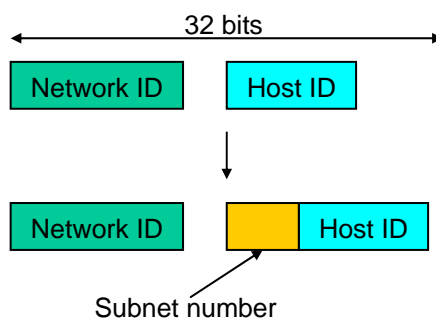
Subnet mask is used to set the subnet mask value, which should be the same value as that of the other devices resided in the same network it attaches.

For more information, please also see the Section 2-1-5 "IP Address Assignment" in this manual.

Default: 255.255.255.0

Gateway:

Set an IP address for a gateway to handle those packets that do not meet the routing rules predefined in the device. If a packet does not meet the criteria for other pre-defined path, it must be forwarded to a default router on a default path. This means any packet with undefined IP address in the routing table will be sent to this device unconditionally.

Default: 192.168.1.254

MAC Address:

It is the Ethernet MAC address of the management agent in this switch.

Password:

Set a password for this switch. Up to 16 characters are allowed in this parameter. Any alphanumeric character is acceptable.
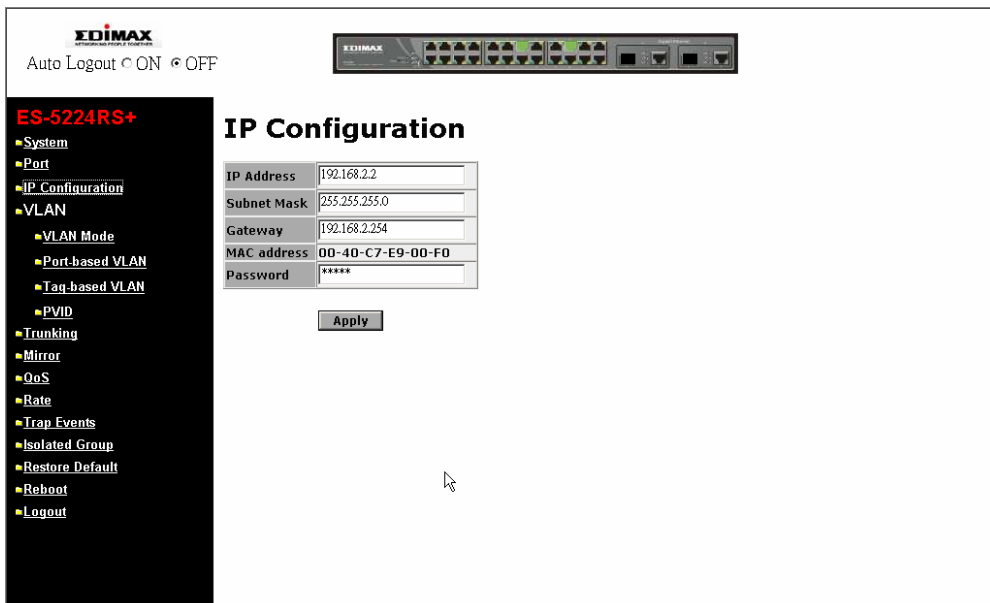
Default: admin

Fig. 3-8

3-5. VLAN

The switch supports Port-based VLAN and Tag-based VLAN (802.1q). Support 26 active VLANs and VLAN ID 1~4094. VLAN configuration is used to partition your LAN into small ones as your demand. Properly configuring it, you can gain not only improving security and increasing performance but greatly reducing VLAN management.
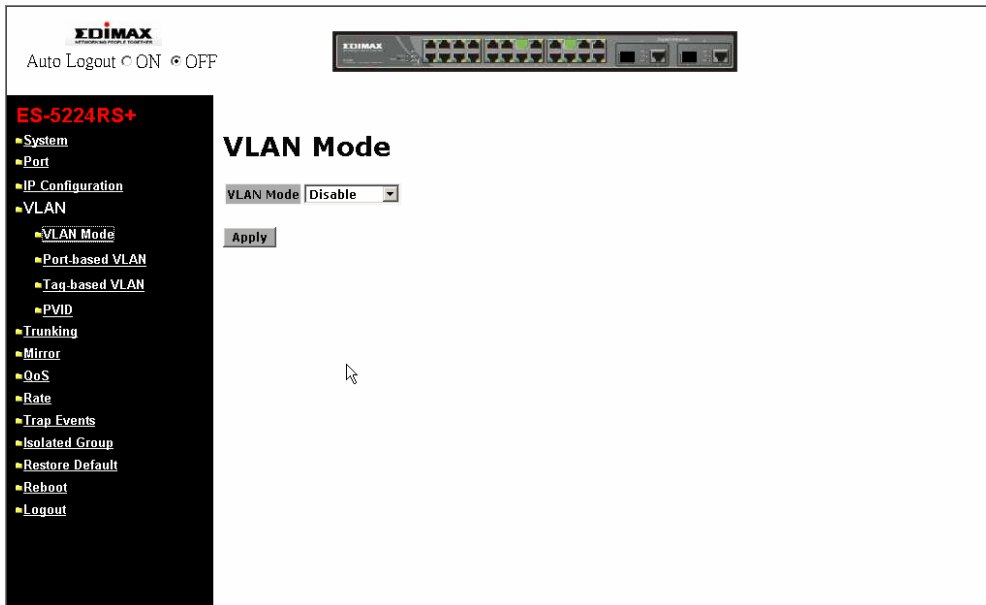

Fig. 3-9

Function name:

VLAN Mode Setting

Function description:

The VLAN Mode Selection function includes four modes: Port-based, Tag-based or Disable, you can choose one of them by pulling down list and pressing the **<Downward>** arrow key. Then, click **<Apply>** button, the settings will take affect immediately.

Parameter description:

VLAN Mode:

Disable:

Stop VLAN function on the switch. In this mode, no VLAN is applied to the switch. This is the default setting.

Port-based:

Port-based VLAN is defined by port. Any packet coming in or outgoing from any one port of a port-based VLAN will be accepted. No filtering criterion applies in port-based VLAN. The only criterion is the physical port you connect to. For example, for a port-based VLAN named PVLAN-1 contains port members Port 1&2&3&4. If you are on the port 1, you can communicate with port 2&3&4. If you

are on the port 5, then you cannot talk to them. Each port-based VLAN you built up must be assigned a group name. This switch can support up to maximal 26 port-based VLAN groups.

Tag-based:

Tag-based VLAN identifies its member by VID. This is quite different from port-based VLAN. If there are any more rules in ingress filtering list or egress filtering list, the packet will be screened with more filtering criteria to determine if it can be forwarded. The switch supports supplement of 802.1q. For more details, please see the section VLAN in Chapter 3.

Each tag-based VLAN you built up must be assigned VLAN name and VLAN ID. Valid VLAN ID is 1-4094. User can create total up to 26 Tag VLAN groups.

Function name:

Port-based VLAN

Function description:

It shows the existed information of VLAN Groups List and maintains them, i.e. modify and delete one of them.

If you are in port-based VLAN, it will just show the ID, Description and Member of the existed port-based VLAN group. You can easily create and delete a VLAN group by pressing **<Add Group>** and **<Delete Group>** function buttons, or click the Group ID directly to edit it.

Parameter description:

Metro Mode:

The Metro Mode is a quick configuration VLAN environment method on Port-based VLAN. It will create 24 or 25 Port-based VLAN groups.

Port 25 vs. Port 1~26:

Except Port 25, each port of the switch cannot transmit packets with each other. Each port groups a VLAN with Port 25, thus, total 25 groups consisting of 2 members are formed.

Port 26 vs. Port 1~26:

Except Port 26, each port of the switch cannot transmit packets with each other. Each port groups a VLAN with Port 26, thus, total 25 groups consisting of 2 members are formed.

Port 25&26 vs. Port 1~24:

Except Port 25 and Port 26, each port of the switch cannot transmit packets with each other. Each port groups a VLAN with Port 25 and Port 26, thus, total 24 groups consisting of 3 members are formed.

ID (Group ID):

When you want to edit a VLAN group, you must select the Group ID field. Then, you will enter Tag Base VLAN Group Setting or Port Base VLAN Group Setting page, which depends on your VLAN mode selection.

Description:

The description defined by administrator is associated with a VLAN group.

Member:

This is used to enable or disable if a port is a member of the new added VLAN, "Enable" means it is a member of the VLAN. Just tick the check box (☑) beside the port x to enable it.
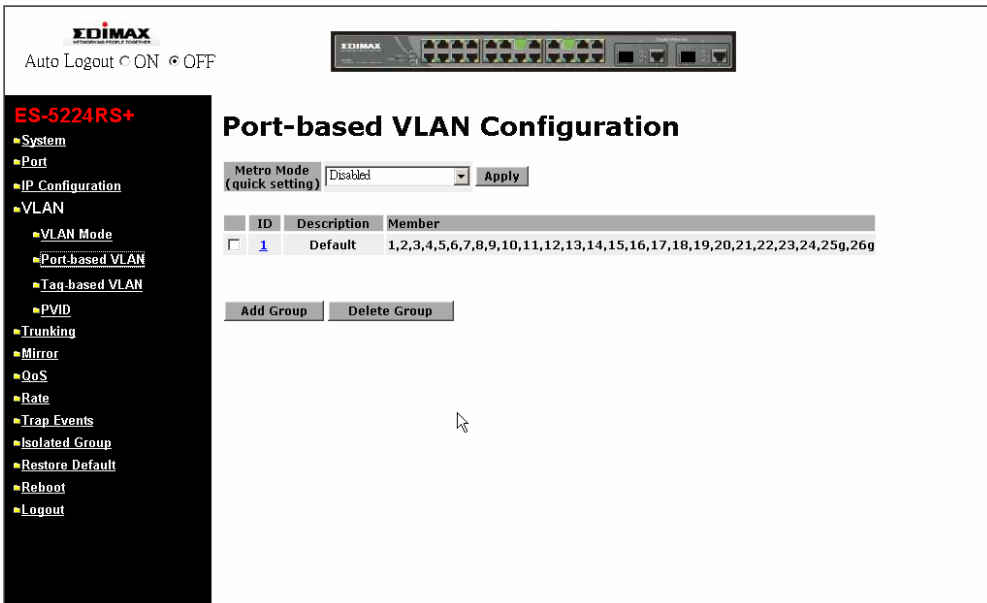
Fig. 3-10

Add Group for Port-based VLAN:

Create a new port-based VLAN. Fill in the name in the field of Description and choose the port by ticking the check box beside the port No. in Member field. Then, press the **<Apply>** button to have the setting taken effect.
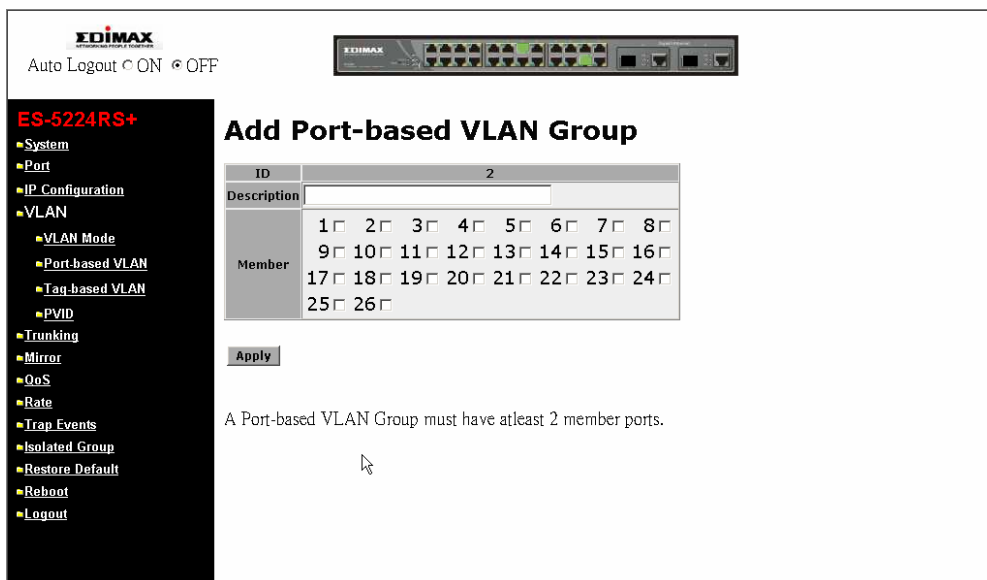

Fig. 3-11

Delete Group for Port-based VLAN:

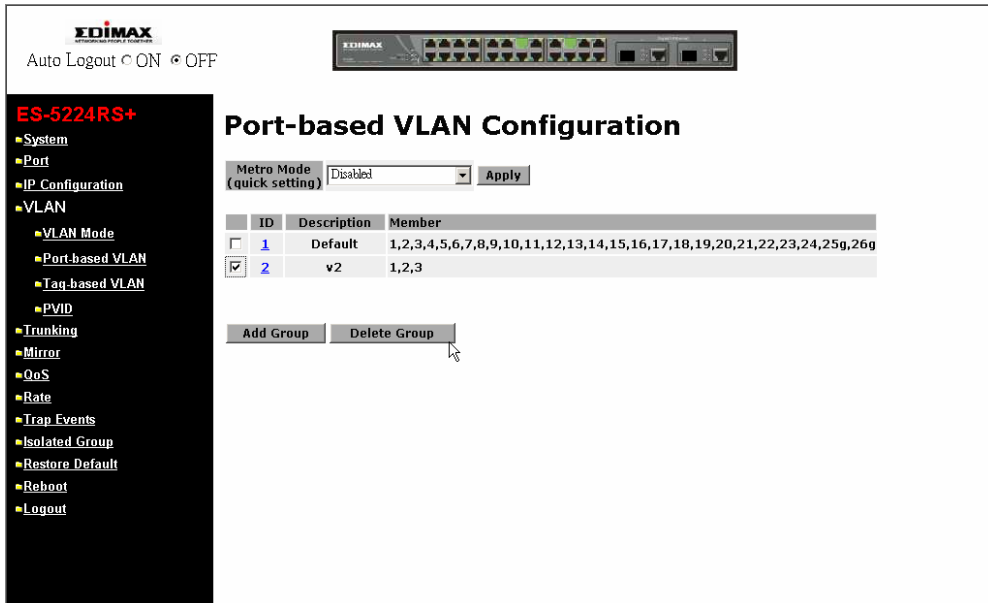Just tick the check box (☑) beside the ID, then press the **<Delete Group>** button to delete the group.

Fig. 3-12

Function name:

Tag-based VLAN

Function description:

It shows the existed information of VLAN Groups List and maintains them, i.e. modify and delete one of them. User also can add a new VLAN group by inputting a new VLAN name and VLAN ID.

If you are in tag-based VLAN, it will show the VID and Member of the existed tag-based VLAN group. You can easily create and delete a VLAN group by selecting **<Create New VLAN>** in VLAN ID list and pressing **<Remove This VLAN>** function buttons respectively.
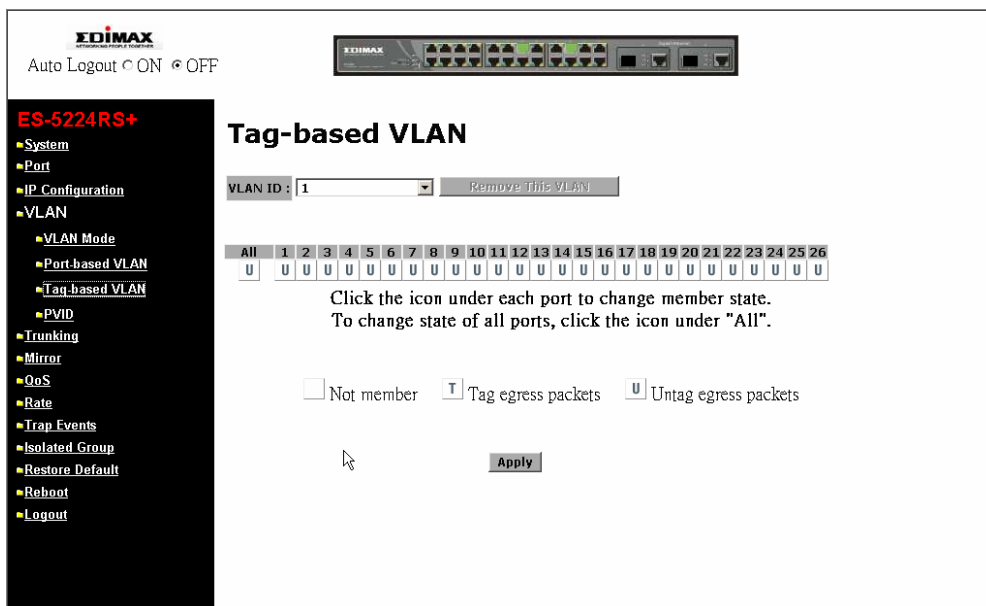
Fig. 3-13

Parameter description:

VID(VLAN ID):

VLAN identifier. Each tag-based VLAN group has a unique VID. It appears only in tag-based mode.

Member:

This is used to enable or disable if a port is a member of the new added VLAN. "T" and "U" represents that they are members belonging to this VLAN. "T" means frames with this VID outgoing from this port will be tagged, "U" means frames with this VID outgoing from this port will not be tagged instead. Click the icon under each port to change the member state. If you would like to set up all ports at a time, user is also allowed to click the icon under "All" to simplify the procedure of configuration.

Add Group for Tag-based VLAN:

Create a new Tag-based VLAN. Fill in the value of VLAN ID in the field of New VLAN ID and choose the member state of each port by ticking the icon under the port No.. Then, press the **<Create>** button to have the setting taken effect.
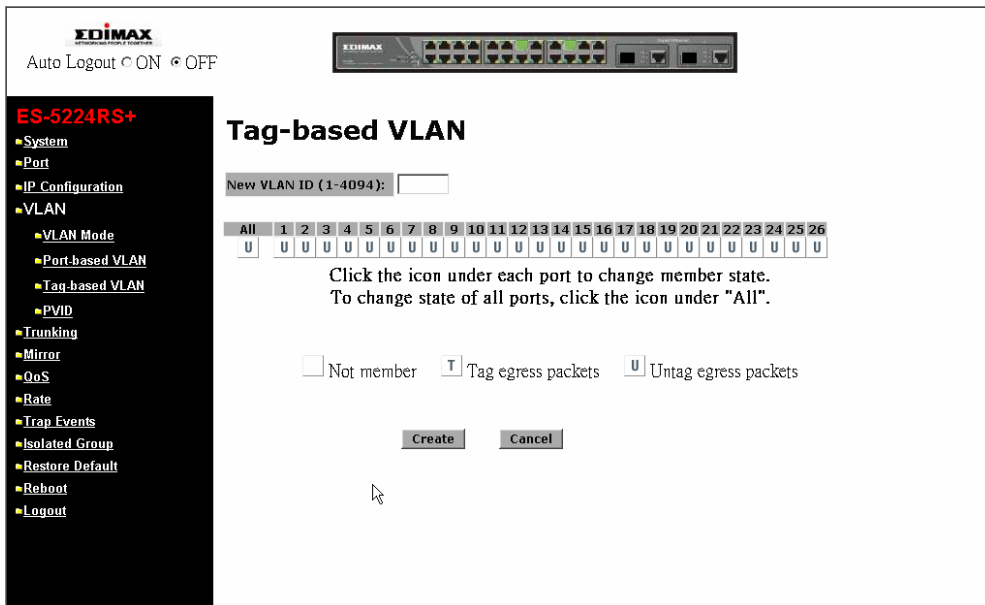

Fig. 3-14

Delete Tag-based VLAN Group:

Just choose the existing VLAN in VLAN ID list, then press the **<Remove This VLAN>** button to delete the group.
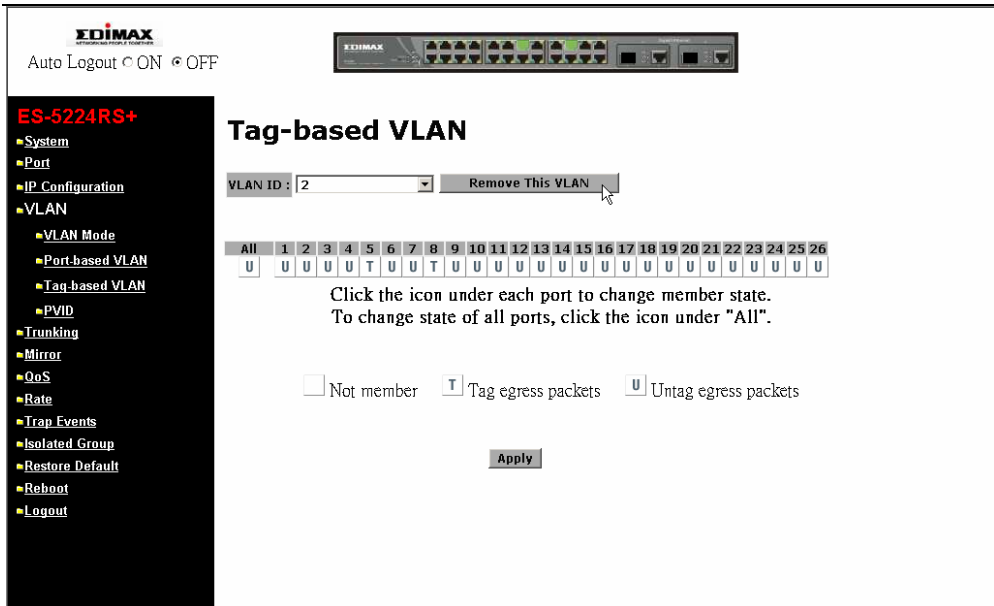
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Fig. 3-15

Function name:

PVID

Function description:

In VLAN Port VID Setting, user can input VID number to each port. The range of VID number is from 1 to 4094. User also can choose ingress filtering rules to each port. There are two ingress filtering rules which can be applied to the switch.
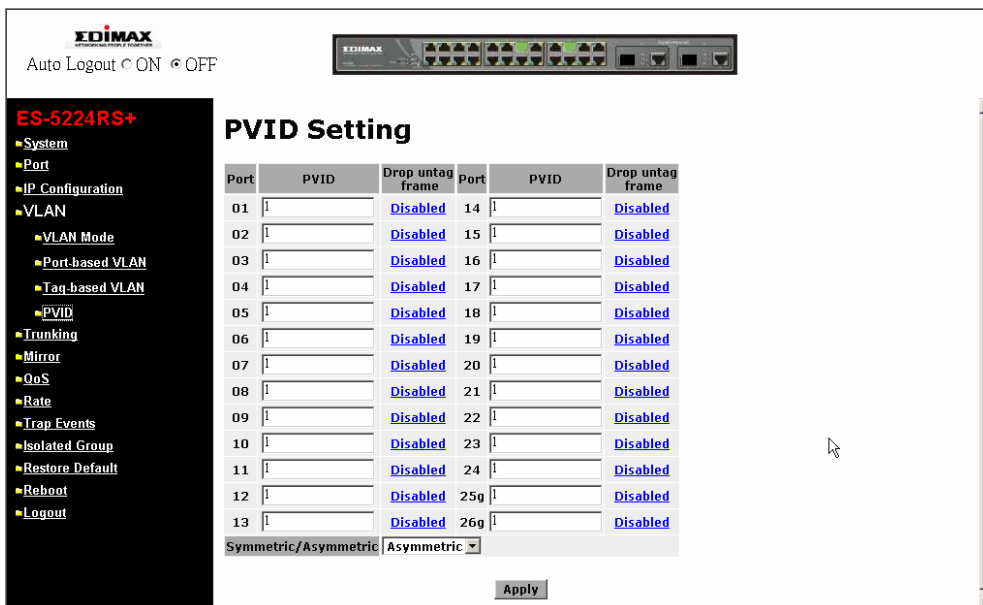

Fig. 3-16

Parameter description:

Port 1-26:

Port number.

PVID:

This PVID range will be 1-4094. Before you set a number x as PVID, you have to create a Tag-based VLAN with VID x. For example, if port x receives an untagged packet, the switch will apply the PVID (assume as VID y) of port x to tag this packet, the packet then will be forwarded as the tagged packet with VID y.

Symmetric/Asymmetric:

Forward only packets with VID matching this port's configured VID. You can choose "Symmetric" as a way for all ports to filter unwanted traffic. In Symmetric Mode, a given port checks if the given port is a member of the VLAN on which the received packet belongs to, to determine forward it or not. For example, if port 1 receives a tagged packet with VID=100 (VLAN name=VLAN100), and if "Symmetric/Asymmetric" is Symmetric, the

switch will check if port 1 is a member of VLAN100. If yes, the received packet is forwarded; otherwise, the received packet is dropped.

Drop Untag Frame:

Drop untagged frame. You can configure a given port to accept all frames (Tagged and Untagged) or just receive tagged frame. If the former is the case, then the packets with tagged or untagged will be processed. If the later is the case, only the packets carrying VLAN tag will be processed, the rest packets will be discarded.

3-6. Trunking

Trunking configuration is used to configure the settings of Link Aggregation. You can bundle more than one port with the same speed, full duplex and the same MAC to be a single logical port, thus the logical port aggregates the bandwidth of these ports. This means you can apply your current Ethernet equipments to build the bandwidth aggregation. For example, if there are three Fast Ethernet ports aggregated in a logical port, then this logical port has bandwidth three times as high as a single Fast Ethernet port has.

Function name:

Trunking Setting

Function description:

Display the current setup of Aggregation Trunking. With this function, user is allowed to add a new trunking group or modify the members of an existed trunking group.

Note:

Check the following to avoid errors in configuration:

When configuring the link aggregation function, you should check that whether the aggregated ports are in full-duplex mode as well as their speed is the same or not. The aggregated ports are in the same VLAN group.
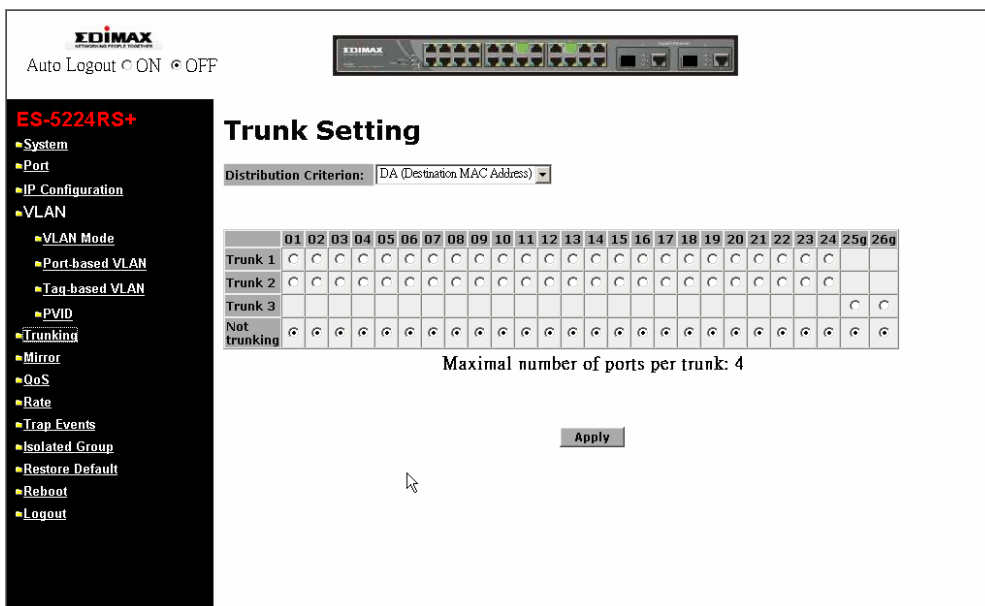

Fig. 3-17

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Parameter description:

Trunk 1~2:

Valid range is Port 1~24. In Trunk 1 or Trunk 2, user can group these ports together. And up to 4 ports can be selected for each trunk group.

Trunk 3:

Valid range is Port 25~26. In Trunk 3, only these two Gigabit ports are allowed to become a member of this trunk group.

Not trunking:

Set up the ports that do not join any aggregation trunking group.

3-7. Mirror

Function name:

Mirror Configuration

Function description:

Mirror Configuration is to monitor the traffic of the network. For example, we assume that Port A and Port B are "Mirror To" Port and "Mirror" Port respectively, thus, the traffic passed by Port B will be copied to Port A for monitoring.

Note:

When configuring the mirror function, you should avoid setting a port to be a sniffer port and aggregated port at the same time. It will cause something wrong.

Parameter description:

Enable Mirror:

Used for the activation or de-activation of Port Mirror function. Default is disable.

Monitored Port:

Set up the ports for being monitored. Valid port is Port 1~26 and more than one port is allowed to be chosen at one time.

Monitoring Port:

Set up the port for monitoring. Valid port is Port 1~26.

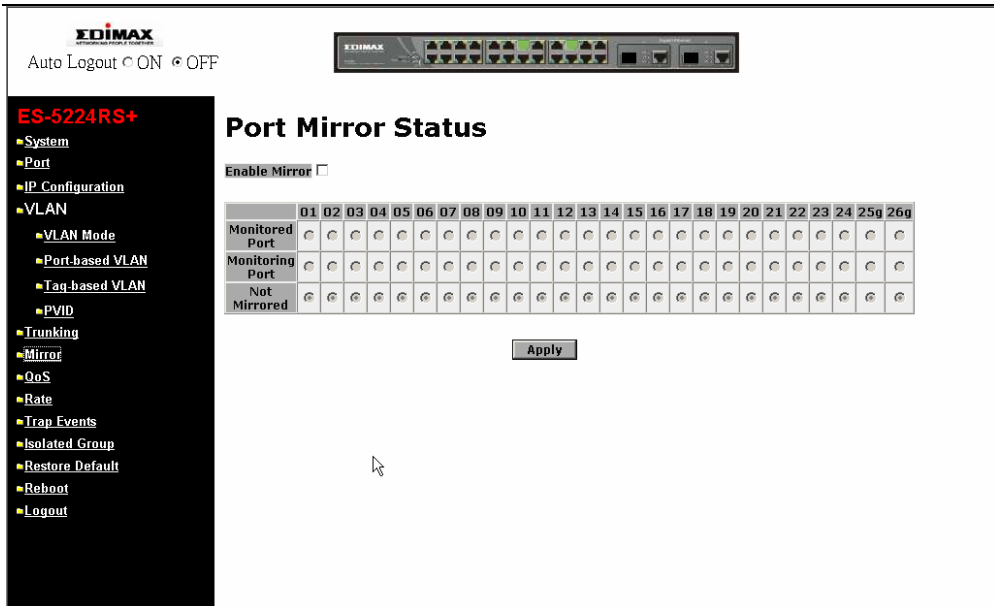Not Mirrored:

Choose the ports that will not be mirrored.

Fig. 3-18

3-8. QoS

Function name:

QoS Setting

Function description:

The switch offers powerful QoS function. This function supports 802.1p (Influence the packets with tag or not and when the packets have no tag, the packets will be added tag according to your Default Priority of Port Configuration for tagged priority field), VLAN-tagged priority, can make precedence of 8 priorities and Port-based (VIP port) QoS service. In VLAN-tagged mode, there are 3 bits belonging to this priority in the vlan tagged field. According to these 3 bits, we could arrange 8 traffic priority (0~7) and randomly place them into one of 4 Queues that the switch offers. However, These 4 Queues have different QoS order according to your setting of QoS Scheduling Method. At present, the switch supports 2 kinds of QoS Scheduling Method; the one is Weighted Round Robin, the other is Strict Priority. If we had chosen "Weighted Round Robin" as our Scheduling Method, each Queue will achieve QoS effect based on its different ratio of bandwidth in Weight. About VIP Port, when some ports belong to VIP Port, the packets enter VIP port and they will run in Queue 3 Priority followed by your assigning Weight. But while you choose Strict Priority Scheduling Method and assign some ports as VIP Port, VIP port will own the highest priority and get the largest bandwidth regardless of Queue Priority when the congestion of the network happens.

Parameter description:

Scheduling Method:

Two scheduling methods are offered for QoS, one is Weighted Round Robin, and the other is Strict Priority. The former will decide the bandwidth that each Queue will occupy based on the ratio of Weight; the latter will decide which port owns the highest priority in transmission according to if the VIP port is enabled or not. Default scheduling method is Weighted Round Robin.

Priority:

8 kinds of priorities, including 0, 1, 2, 3, 4, 5, 6 and 7.

Queue 0 (Low):

Any priority can be placed into Queue 0. Default priorities are 0 and 1. Press **<Apply>** button to have the setting taken effect after completing the setting.

Queue 1:

Any priority can be placed into Queue 1. Default priorities are 2 and 3. Press **<Apply>** button to have the setting taken effect after completing the setting.

Queue 2:

> Any priority can be placed into Queue 2. Default priorities are 4 and 5. Press **<Apply>** button to have the setting taken effect after completing the setting.

Queue 3 (High):

> Any priority can be placed into Queue 3. Default priorities are 6 and 7. Press **<Apply>** button to have the setting taken effect after completing the setting.

Weight:

> Distribute the ratio of bandwidth that each Queue may occupy. Valid range is 1~55. Default values of Weight for Queue 0, 1, 2, 3 are 1, 2, 4, 8 respectively. Press **<Apply>** button to have the setting taken effect after completing the setting.
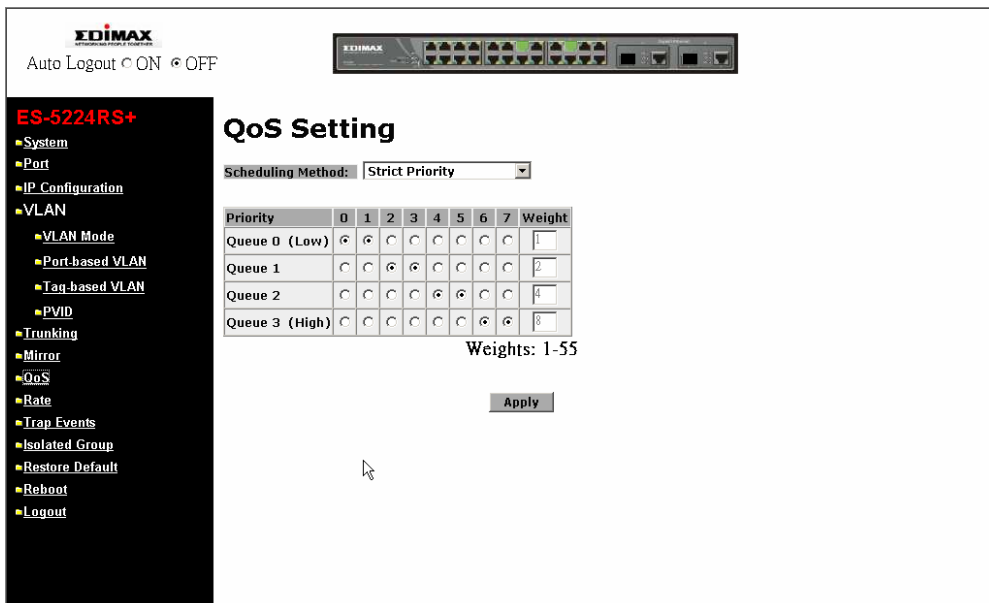

Fig. 3-19

3-9. Rate

Function name:

Rate

Function description:

Rate limit and storm control function is used to set up the limit of Ingress and Egress bandwidth for each port.
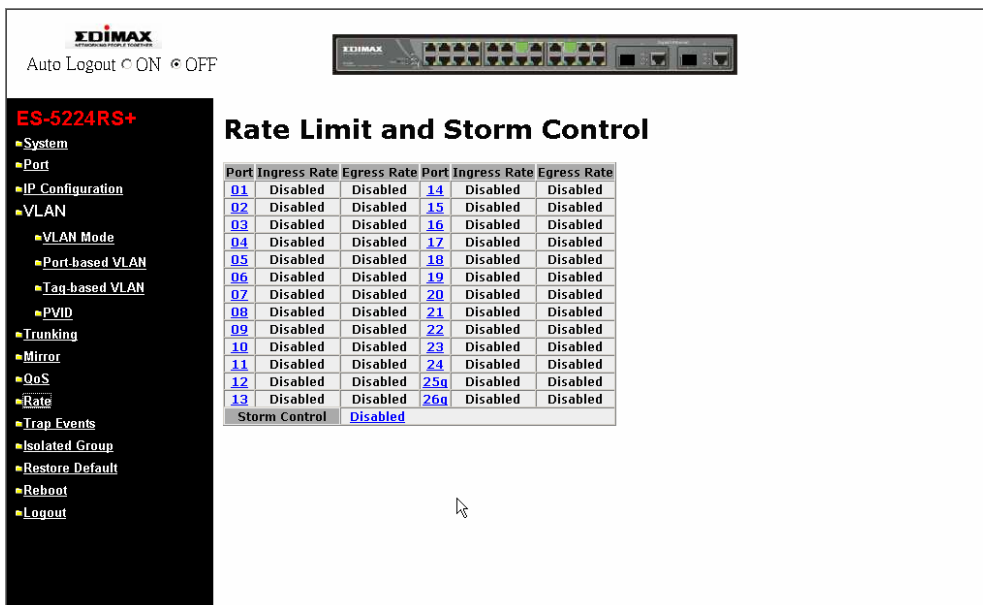

Fig. 3-20

Parameter description:

Ingress Rate:

Set up the limit of Ingress bandwidth for the port you choose. Incoming traffic will be discarded if the rate exceeds the value you set up in Data Rate field. Pause frames are also generated if flow control is enabled. Valid range is 64Kbps~80Mbps.

Egress Rate:

Set up the limit of Egress bandwidth for the port you choose. Incoming traffic will be discarded if the rate exceeds the value you set up in Data Rate field. Pause frames are also generated if flow control is enabled. Valid range is 64Kbps~100Mbps.

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Storm Control:

Pull down the list of the storm control type to control the flow of broadcast or unknown unicast packets. Incoming traffic will be discarded if the rate exceeds the value you set up in Storm Control Rate field. Valid range is 4% ~ 96%.
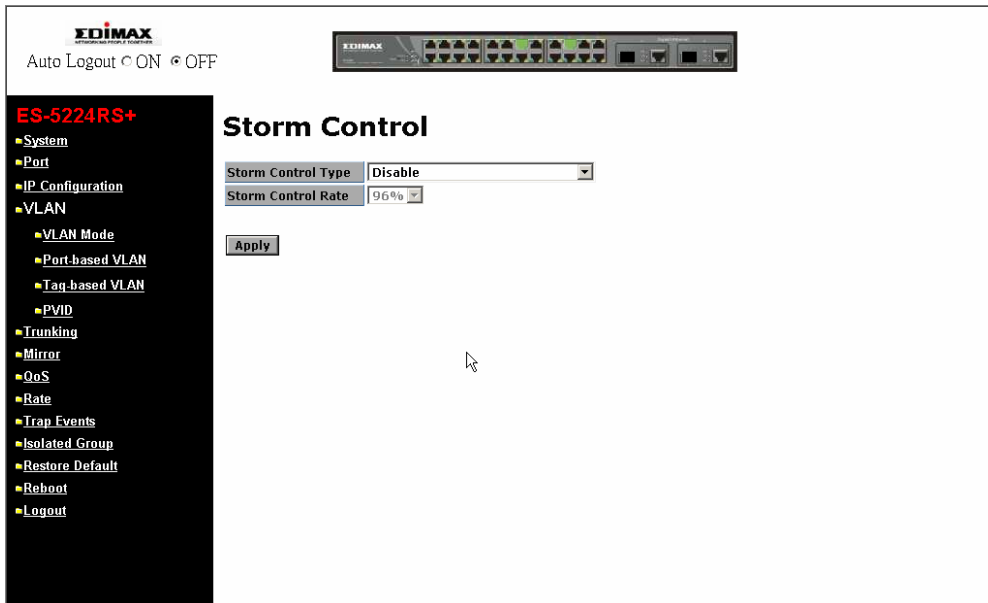

Fig. 3-21

3-10. Trap Events

Function name:

Trap Events

Function description:

The Trap Events Configuration function is used to enable the Advanced Smart Ethernet Switch to send out the trap information while pre-defined trap events occurred.

Switch management offers 5 different trap events and 2 host to users .The message will be sent while users tick (☑) the trap event individually on the web page shown as below. Except Warm Boot and Cold Boot, other trap events offer the counter function to help the user see the times that the trap event had happened.

Parameter description:

These trap functions are as they describe. The traps the switch supports are listed below.

Boot: Warm Boot, Cold Boot

Login: Illegal Login

Link: Link Up, Link Down

Fig. 3-22

3-11. Isolated Group

Function name:

Isolated Group

Function description:

Isolated Group function can let the port be independent of other ports in the protected group, and the communication is also forbidden between these ports. But, the ports of the protected group are still able to communicate with the ports of the non-protected group. With this design, it will be helpful to the administrator to immediately find and solve the port that results in the occurrence of looping problems in the network.

Parameter description:

Protected Group:

User can choose any port to be the member of this group. In this group, all of these member ports cannot forward packets with each other. Thus, the switch will not be capable of forwarding any packets in case its all ports become the members of the protected group.

Not Protected:

The default setting. The port will be set to "Not Protected" while the network runs normally. "Not Protected" port will be allowed to do packets forwarding between other ports and to communicate with the ports of the protected group.
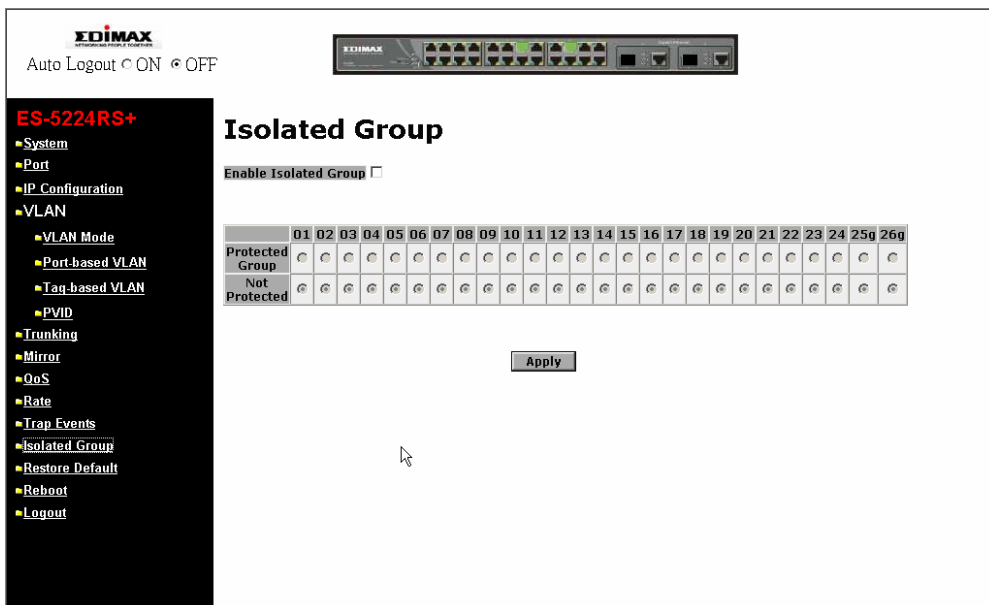
Fig. 3-23

3-12. Restore Default

Function name:

Restore Default

Function description:

Restore Default Configuration function can retrieve default setting to replace the working configuration. Except the IP address setting, all configurations will be restored the value to the factory default when you run the "Restore Default" function in the web UI. If you would like to restore all configurations including the IP address setting to the factory default, please press the "RESET" button on the front panel.

Note for "RESET" button:

You must press the "RESET" button over 3 seconds to restore the factory default setting.
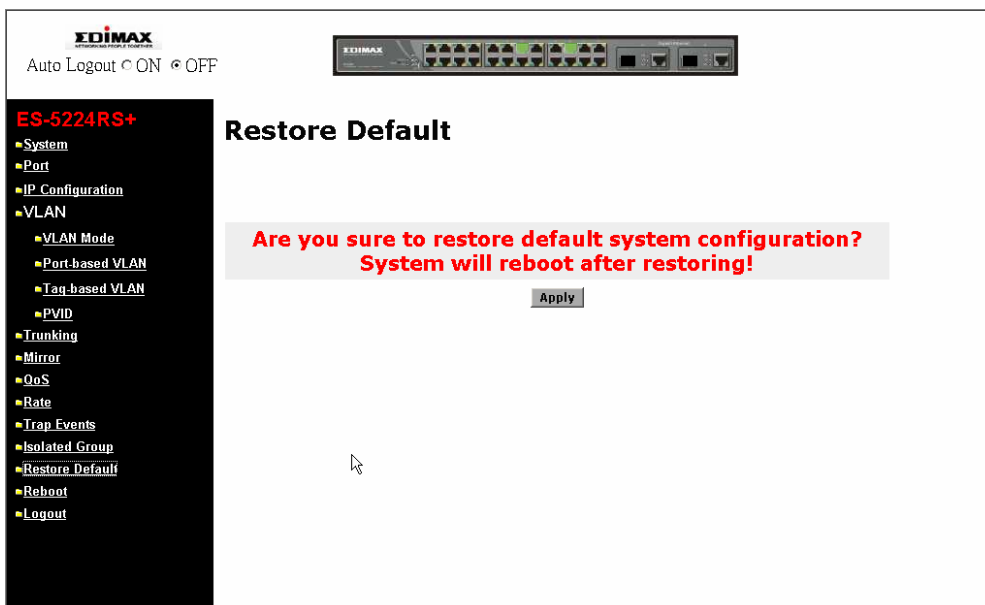
Fig. 3-24

3-13. Reboot

We offer you many ways to reboot the switch, including power up, hardware reset and software reset. You can press the RESET button in the front panel to reset the switch and to retrieve default setting. After upgrading software, then you must reboot to have the new configuration taken effect. Here we are discussing is software reset for the "reboot" in the main menu.

Function name:

Reboot

Function description:

Reboot the switch. Reboot takes the same effect as the RESET button on the front panel of the switch. Press **<Apply>** button to confirm warm restart function, and it will take around forty-five (45) seconds to complete the system boot.
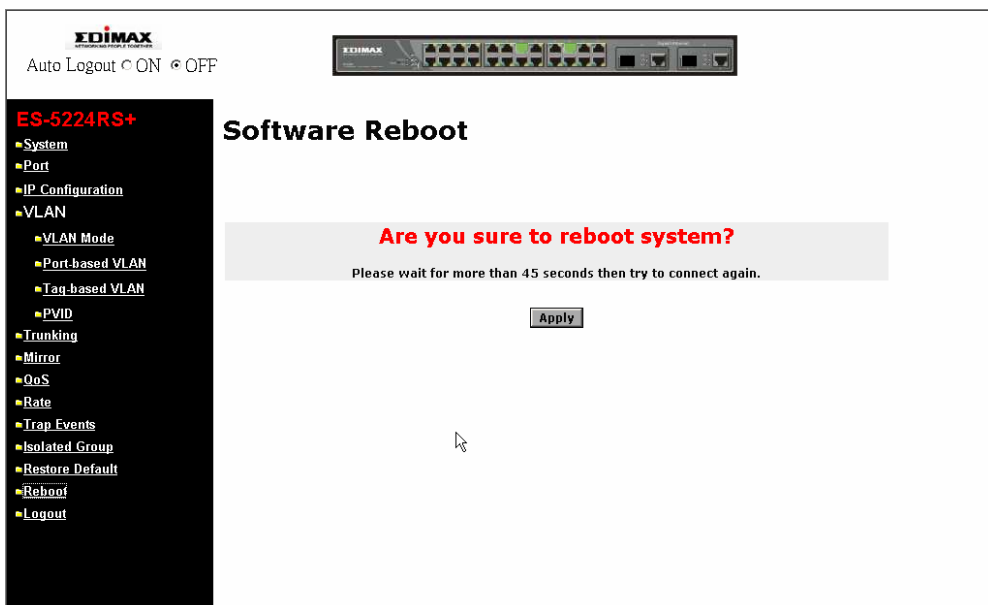
Fig. 3-25

3-14. Logout

Besides the auto logout function as we mentioned above in the section of system configuration, the switch also allows the user to logout manually by performing the Logout function.

Function name:

Logout

Function description:

The switch allows you to logout the system to prevent other users from the system without the permission. If you do not logout and exit the browser, the switch will automatically have you logout. Besides this manually logout and implicit logout, you can set up the parameter of Auto Logout Timer in system configuration function to explicitly ON/OFF this logout function.

Parameter description:

Auto/Manual Logout:

If no action and no key is stroke as well in any function screen more than the minutes you set up in Auto Logout Timer, the switch will have you logout automatically. Or click the logout function to exit the system manually.

Fig. 3-26

4. Maintenance

4-1. Resolving No Link Condition

The possible causes for a no link LED status are as follows:
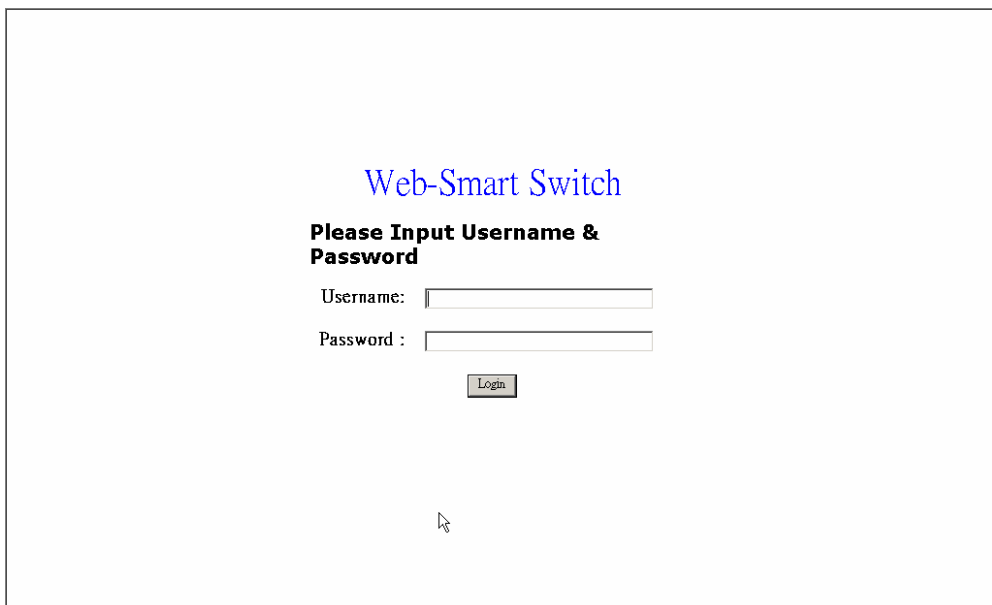- The attached device is not powered on
- The cable may not be the correct type or is faulty
- The installed building premise cable is faulty
- The port may be faulty

4-2. Q&A

1. Computer A can connect to Computer B, but cannot connect to Computer C through the Web-Smart Switch.
   - ✓ The network device of Computer C may fail to work. Please check the link/act status of Computer C on the LED indicator. Try another network device on this connection.
   - ✓ The network configuration of Computer C may be something wrong. Please verify the network configuration on Computer C.

2. The uplink connection function fails to work.
   - ✓ The connection ports on another must be connection ports. Please check if connection ports are used on that Web-Smart Switch.
   - ✓ Please check the uplink setup of the Web-Smart Switch to verify the uplink function is enabled.

3. The console interface cannot appear on the console port connection.
   - ✓ Web-Smart Switch has no console port, so you cannot use console interface to connect with Web-Smart Switch.

4. How to configure the Web-Smart Switch.
   - ✓ User can use IE browser program in window series of computer to control the web smart functions in Web-Smart Switch. First, choose any port in Web-Smart Switch. Then, use IE and type default IP address, 192.168.1.1, to connect to the switch with RJ45 network line. Finally, the login screen will appear at once.

Appendix A
Technical Specifications

Features

- The switch included 24-Port 10/100Mbps TP and 2-Port Gigabit Dual Media TP/SFP or TP/GBIC.

- Supports 24-port 10/100M TP ports with Nway and auto MDIX function.

- 24 Port 10/100Base-TX + 2 Port Gigabit TP/SFP switch supports 2 Gigabit dual media ports(TP/SFP) and 2 slots for removable SFP module supporting 1000M SFP fiber module.

- 24 Port 10/100Base-TX + 2 Port Gigabit TP/GBIC switch supports 2 Gigabit dual media ports(TP/GBIC) and 2 slots for removable GBIC module supporting 1000M GBIC fiber module.

- Supports on-line plug/unplug SFP/GBIC transceiver modules.
- Meets all IEEE 802.3/u/x/z Gigabit and Fast Ethernet specifications.
- Web-Smart management.
- Supports 802.1p, Port based QoS packet and can be classified with four priority queues.
- Supports 802.1Q-based VLAN with 26 entries.
- Protected port support.
- MAC-based trunking with automatic link fail-over.
- Support programmable per-port storm control.
- Per-port ingress/egress rate control with 64K/128K/256K (up to 100Mbps) resolution.
- 8K MAC addresses with automatic learning and aging.
- Programmable per-port flow control and back-pressure.
- Maximal packet length can be up to 1536 bytes
- Supports Ingress and Egress Bandwidth rating management.
- Supports per port status for monitoring.
- Supports per port media configuration.
- Supports Port-based and 802.1Q Tag-based VLAN.
- Supports Link Aggregation (Port Trunk).
- Supports 802.1p Port Classification with four priority Queues.
- Supports Port Mirror for sniffer.
- Supports Broadcasting Suppression.
- Supports Trap Host and Events Configuration.
- Supports IP Configuration: IP Address, Subnet mask, Gateway.
- Supports Trap Host IP.
- Supports System Events: Warm Boot, Cold Boot, Illegal login.
- Supports TP and Fiber Port Events: link up, Link down.
- Supports Trap Events Counters.
- Supports TFTP for firmware upgrade.

- Supports SW and HW Restore Factory Setting.
- Supports Software Reboot.
- Supports failover for redundant link.
- Non-blocking store-and-forward shared-memory Web-Smart switched.
- Supports auto-negotiation for configuring speed, duplex mode.
- Supports 802.3x flow control for full-duplex ports.
- Supports collision-based and carrier-based backpressure for half-duplex ports.
- Any ports can be in disable mode, force mode or auto-polling mode.
- Supports Head of Line (HOL) blocking prevention.
- Supports broadcast storm filtering.
- Web-based management provides the ability to completely manage the switch from any web browser.
- Auto-aging with programmable inter-age time.
- Supports 802.1p Class of Service with 4-level priority queuing.
- Supports port trunking with flexible load distribution and failover function.
- Supports port sniffer function
- Supports port-based VLAN, 802.1Q tag-based VLAN.
- Efficient self-learning and address recognition mechanism enables forwarding rate at wire speed.

Hardware Specifications

- **Standard Compliance:** IEEE802.3ab / 802.3z / 802.3u / 802.3x
  802.3z and 802.3ab compliant Gigabit Ethernet ports

- **Network Interface of Option transceiver:**

Configuration	Mode	Connector	Port
SFP.0LC.202	1000FDX	*LC M-M	2(Option)
SFP.0LC.212.XX	1000FDX	*LC S-M	2(Option)
SFP.0BL.621.20X	1000FDX	*BiDi-LC S-M	2(Option)
GBI.ZSC.202	1000FDX	*SC M-M	2(Option)
GBI.ZSC.212.XX	1000FDX	*SC S-M	2(Option)
GBI.ZSC.621.20X	1000FDX	*BiDi-SC S-M	2(Option)

* : Default module

- **Transmission Mode:** 10/100Mbps support full or half duplex
  1000Mbps support full duplex only

- **Transmission Speed:** 10/100/1000Mbps for TP
  1000Mbps for Fiber

- **Full Forwarding/Filtering Packet Rate:** PPS (packets per second)

Forwarding Rate	Speed
1,488,000PPS	1000Mbps
148,800PPS	100Mbps
14,880PPS	10Mbps

- **MAC Address and Self-learning:** 8K address table entries,
  26 VLAN table entries,

- **Buffer Memory:** Embedded 256KB packet buffers and 128KB control memory.

- **Flow Control:** IEEE802.3x compliant for full duplex
  Backpressure flow control for half duplex

- **Cable and Maximum Length:**

TP	Cat. 5 UTP cable, up to 100m
1000Base-SX SC M-M	Up to 220/275/500/550m, which depends on Multi-Mode Fiber type
1000Base-LX SC S-M	Single-Mode Fiber, up to10/30/50Km
1000Base-FX WDM SC S-M	Single Fiber, BiDi 20Km

▪ **Diagnostic LED:**

 System LED :   Power
                 CPURUN
                 ACT (LEDSET)
                 FDX (LEDSET)
                 SPD (LEDSET)

 Per Port LED:
  10/100M TP Port 1 to 24   : LINK/ACT, FDX, SPD
  1000M Fiber/TP Port 25,26 : LINK/ACT, FDX, SPD

▪ **Power Requirement** **:** AC Line

 Voltage   : 100~240 V
 Frequency   : 50~60 Hz
 Consumption   : 15W
▪ **Ambient Temperature** **:** 0° to 40°C
▪ **Humidity**   **:** 5% to 90%
▪ **Dimensions**   **:** 44(H) × 442(W) × 209(D) mm
▪ **Comply with FCC Part 15 Class A & CE Mark Approval**

User Manual

Management Software Specifications

System Configuration	Auto-negotiation support on 10/100Base-TX ports, Web browser or console interface can set transmission speed (10/100Mbps) and operation mode (Full/Half duplex) on each port, enable/disable any port, set VLAN group, set Trunk Connection.
VLAN Function	Port-Base / 802.1Q-Tagged, allowed up to 26 active VLANs in one switch.
Trunk Function	Ports trunk connections allowed
Bandwidth Control	Supports by-port Egress/Ingress rate control
Quality of Service (QoS)	Referred as Class of Service (CoS) by the IEEE 802.1P standard Four queues per port
Network Management	Web browser support based on HTTP Server

Note: Any specification is subject to change without notice.

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