WATERS NETWORK SYSTEMS™

OPERATING MANUAL

PS-2126M-POE Switch

**Managed Switch with Twenty Four 10/100Base-TX PoE Ports
Plus Two Mini GBIC Slots for 1000Base-SX or LX Fiber Connectivity
Or
10/100/1000Base-TX Copper Connectivity**

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 Maximum throughput is 8.8Gbps
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 Web-based, SNMP (v1, v2c), CLI, or Telnet
 Port setting for duplex and speed
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 Port based and tagged VLANs (up to 256)
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 Broadcast storm suppression
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NETWORK STANDARDS:
 IEEE 802.3
 IEEE 802.3u
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 IEEE 802.3z
 IEEE 802.3x
 IEEE 802.1q
 IEEE 802.1p
 IEEE 802.1d/w
 IEEE 802.1x
 IEEE 802.3ad

EMI/SAFETY COMPLIANCE:
FCC Part 15 Class A & CE Mark Approval
PoE SPECIFICATIONS:
      Endpoint with 48VDC power through RJ45 pins 1, 2, 3 and 6
      PoE-PSE activity LED indicator
      185 watts of total power (up to 15.4 watts for 12 ports and up to 7.7 watts for 24 ports)
      Auto detect powered device and consumption levels
      Supports per port power consumption monitoring
      Smart feature for:
            PD on/off
            PD detection
            Power level
            PD status
            Power feeding priority
            Circuit protection to prevent power interference between ports
            Supports per port PoE state setting
NETWORK CABLE CONNECTORS:
RJ45 shielded female ports
      10/100Mbps: CAT5 UTP or better
      MM or SM with LC connectors
POWER SUPPLY:
Internal power supply
Input Voltage
      100 to 240 VAC, 50 to 60Hz
      210 watts maximum
Total power for PoE: 185 watts
OPERATING ENVIRONMENT
Ambient Temperature:
      32° to 122°F (0° to 50°C)
Ambient Humidity
      5% to 90%
MECHANICAL:
Enclosure:
      Rack mountable
Cooling Method: Fan cooled
PHYSICAL CHARACTERISTICS
Dimensions: 14.41 x 17.4 x 1.77 in
             366 x 442 x 45 mm
Weight:: 6.83lbs (3.1kg)
WARRANTY:
Limited Lifetime   Made in USA

2.0　Package Contents

Examine the shipping container for obvious damage prior to installing this product.　Notify the carrier of any damage that you believe occurred during shipment.　Ensure that the items listed below are included.　If an item is missing, please contact your supplier.

- PS-2126M-POE Ethernet switch chassis
- SFP Modules (optional)
- Mounting Accessory for (19" rack shelf)
- User's manual
- AC power cord
- RS-232 Cable

3.0　Introduction

The Waters' PS-2126M-POE switch is a managed Ethernet switch chassis with twenty four 10/100Base-TX PoE ports and two dual media slots.　The dual media slots can be used for either 10/100/1000Base-TX ports or 1000Base-SX or LX fiber.　The switch provides 26 usable ports.

The PS-2126M-POE meets all IEEE802.3/u/x/z specifications.　The switch can be managed through RS-232 serial port via direct connection or through an Ethernet port using CLI or Web-based management unit, associated with SNMP agent. With the SNMP agent, the network administrator can logon the switch to monitor, configure and control each port's activity through easy to use menu options.　The switch features comprehensive and useful functions such as QoS (Quality of Service), Spanning Tree, VLAN, Port Trunking, Bandwidth Control, Port Security, SNMP/RMON, IGMP Snooping capability via the intelligent software.　The switch is suitable for both metro-LAN and office applications.

For upgrading firmware, please refer to Section 5.27 for more details. The switch will not stop operating while upgrading firmware, however, upon completion, the switch must be rebooted.

3.1　Hardware Features

The PS-2126M switch provides the comprehensive features listed below for users to perform network administration functions efficiently and provide maximum network security.

- Conforms to IEEE 802.3, 802.3u, 802.3x, and 802.3ab and 802.3z
- 24 auto sensing 10/100 ports
- Two 10/100/1000Base-TX or 1000Mbps SFP Fiber module slots
- 26 usable ports
- Supports on-line pluggable fiber transceiver modules
- Supports 256KB packet buffer and 128KB control memory
- Maximum packet length up to 1536 bytes
- Full-duplex flow control (IEEE802.3x) and half duplex backpressure
- PoE functions:
  - 24 port IEEE802.3af PoE PSE
  - Endpoint with 48VDC power through RJ45 pins 1, 2, 3 and 6
  - Powered device PD auto detection and classification

- PoE – PSE status and activity LED indicator

3.2   Software Features

The following lists management highlights of the PS-2126M-POE switch:

- Provides the status of each port and allows for port configuration
- Supports per port traffic monitoring counters
- Supports a snapshot of the system information upon login
- Supports static trunk function
- Three user login; only first login administrator can configure the device. The rest of the users can only view the switch
- Maximum packet length can be up to 9208 bytes for jumbo frame application
- Supports DHCP broadcasting suppression
- Supports five types of QoS: MAC priority, 802.1p priority, IP, TOS Priority and DiffServ DSCP priority
- Supports port mirror function with ingress/egress traffic
- Supports rapid spanning tree
- Supports 802.1x port security
- SNMP access can be disabled to prevent illegal SNMP access
- Supports sending of trap events while monitoring events
- Supports default configuration which can be restored to overwrite the current configuration
- Built-in web-based management and CLI management providing a convenient user interface
- Supports network time synchronization and daylight saving
- Supports 120 event log records in the main memory and display on the local console
- Supports Ingress, non-unicast and Egress bandwidth rating management with a resolution of 1Mbps
- Trap event and alarm messages can be transferred via email and mobile phones
- Diagnostics available to inform network administrator of hardware status
- Supports external loopback test to check to see if the link is okay
- TFTP for firmware upgrade
- Supports remote boot through user interface and SNMP

3.3   Hardware Description

LED SET Mode: ACT/FDX/SPD

LEDSET Button:
LEDSET button is used to change the LED display mode

Fast Ethernet Port

Power Indication LED

PoE Port Status Indication LEDs

TP Port Status Indication LEDs

Fiber Port Status Indication LEDs

Gigabit Dual Media Port(25~26): SFP/TP

RESET Button:
RESET button is used to reset the management system.

Figure 3.1 - Front View of PS-2126M-POE
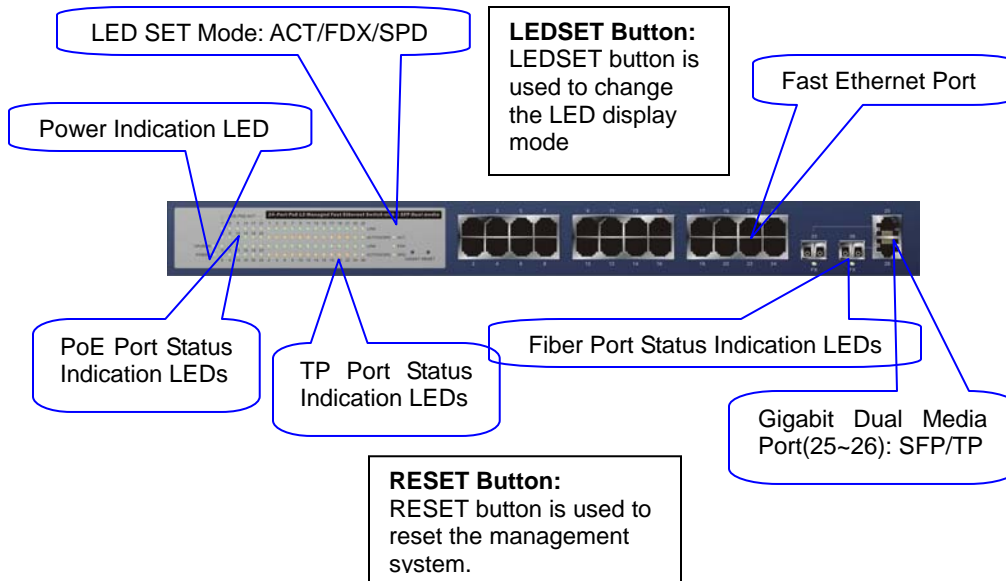
Figure 3.1 shows the front view of the PS-2126M-POE switch. The switch chassis has twenty four PoE 10/100Base-TX ports and two dual media slots. Those slots can be used as 10/100/1000Base-TX ports or with SFP modules for 1000Base-SX or LX fiber .

Figure 3.2 shows the rear view of the PS-2126-POE switch.

AC Line 100-240V 50/60 Hz

Figure 3.2 Rear Panel View

RS-232 DB-9 Connector

The following table provides the status and description of the LEDs.

LED	Color	Function
System LED		
CPURUN	Green	CPU is on and good
POWER	Green	AC power is on and good
ACT	Green	LEDSET set on active mode
FDX	Green	LEDSET set on full-duplex mode
SPD	Green	LEDSET set on speed mode
10/100Base-TX Ports 1 to 24 LED		
LINK	Green	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 traffic is present
		b. LEDSET set on FDX (full-duplex) mode:
		   Lit when full-duplex mode is active
		   Blinks when collisions occur
		c. LEDSET set on SPD (speed) mode:
		   Lit when 100Mbps speed is active
		   Off when 10Mbps speed is active

PoE-PSE ACT	Green	PoE Power is active
10/100/1000Mbps Gigabit TP/Fiber Port 25, 26 LED		
LINK	Green	Connection with remote device is good Off when cable connection is not good
FX	Green	Fiber port is active TP port is active

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

Table 3-1 - LEDs

3.4   Optional SFP Modules

The following lists the SFP modules that are available for this switch:

- SFP-1000SX-LC – multimode fiber transceiver with LC connector
- SFP-1000LX-LC-10 – singlemode (10km) fiber transceiver with LC connector
- SFP-1000LX-LC-30 – singlemode (30km) fiber transceiver with LC connector

3.5   Installation

Choose a surface for your switch that is clean, smooth and near a power outlet. Make sure that there is enough clearance around the switch to allow attachment of cables, power cord and air circulation.

1. Plug in the power cord into the switch.
2. Install the proper cable for network connection.
3. Plug the power cord into the power source.

3.6   Optional SFP Modules

The SFP modules are hot swappable, so you can plug or unplug the modules before and after the switch is turned on. If you are installing the optional SFP fiber transceivers, follow these guidelines:

1. Verify that the SFP module is the correct module and conforms to the chassis.
2. Slide the module along the slot.
3. Seat the module against the slot socket/connector.
4. Install the proper cable for network connection.

3.7   TP Port and Cable Installation

- Twisted pair 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, 5, 6, 7, 8 in Gigabit TP) and cross-over (Cable pin-outs for RJ-45 jack 1, 2, 3, 6 to 3, 6, 1, 2) can be used.

- Use CAT5 grade RJ45 TP cable to connect to a TP port of the switch to a network-aware device such as a workstation or a server.

- Repeat the above steps for each RJ45 port to be connected to a Gigabit 10/100/1000 TP device.

3.8   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. Power can be turned on even if there are no connections to the switch ports. Once the power is on, LEDs will light up and then go out except the power LED.

Once the self test is performed, the bootloader will load the firmware into the memory, which takes about 30 seconds. The switch will flash the LEDs once and automatically perform a self test.

3.9 Installing Chassis to a 19-inch Wiring Closet Rail

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
- Place the chassis into the 19-inch wiring closet rail. Secure the chassis with the screws.

3.10 Switch Topology

Theoretically, the switch partitions the collision domain for each port so you may link switches without limitations. However, network extension (cascading levels & overall diameter) must follow 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 layer 2 protocols such as 802.1d, 802.1q, and LACP.

The following table describes the cable and devices' bit-time delay (round trip):

1000Base-X TP, Fiber		100Base-TX TP		100Base-FX Fiber	
Round trip Delay: 4096		Round trip Delay: 512			
CAT5	11.12/m	CAT5	1.12/m	Fiber Cable:	1.0/m
Fiber	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 3-2

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). This will not be applied for full duplex operation. You may use the TP-Fiber module to extend the TP node distance over fiber optic and provide the long haul connection.

A hierarchical network with minimum levels of switching 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. It is recommended to connect the Server/Host to the Level 1 switch. This generally applies if no VLAN or other special requirements are applied.

Example 1: All switch ports are in the same local area network. All ports can access each other (See Figure 3.3).
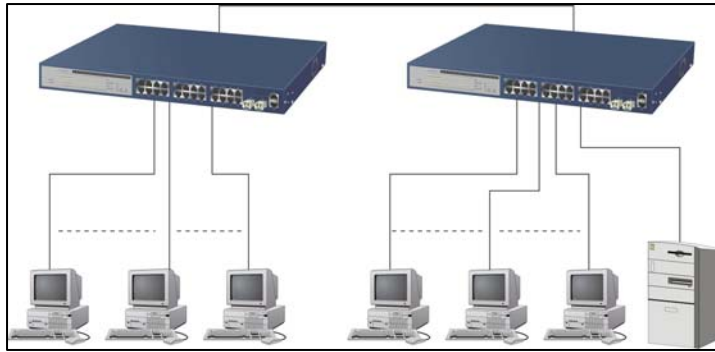
Figure 3.3 - No VLAN Configuration Diagram

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

In Example 2, the VLAN area is defined by the configured VLAN. The switch supports both port-based VLAN and tag-based VLAN. They are different in practical deployment, especially in physical locations. The following diagram shows how the VLAN works.

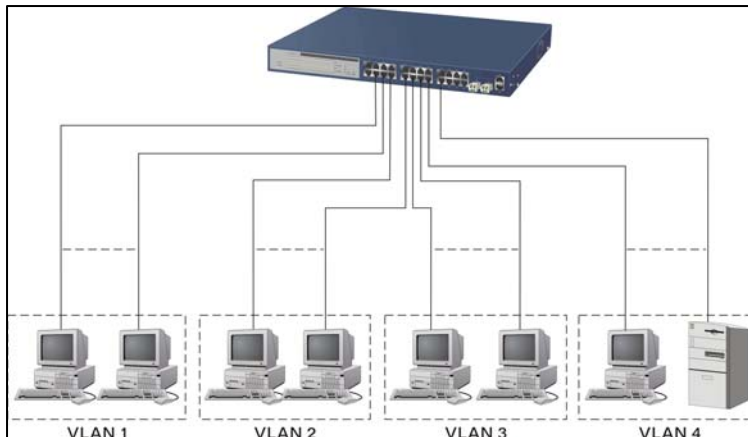Example 2a: Port-based VLAN (See Figure 3-4).

Figure 3.4 - Port-based VLAN Diagram

1. As a member of a VLAN, you cannot be a member of a VLAN in another switch.
2. As a member of a VLAN, you cannot access a member of another VLAN.
3. The switch manager has to assign different names for each VLAN group at one switch.

Case 2b: Port-based VLAN (See Figure 3-5).
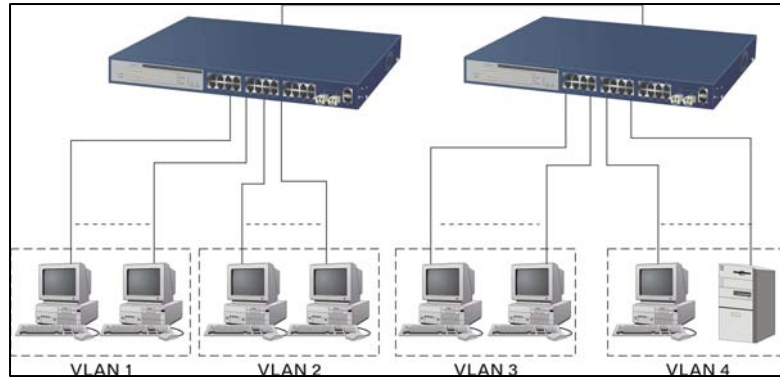
Figure 3.5 - Port-based VLAN Diagram

This is an example of how VLANs can be set up between two switches.

1. VLAN1 members cannot access VLAN2, VLAN3 and VLAN4 members.
2. VLAN2 members cannot access VLAN1 and VLAN3 members, but they can access VLAN4 members.
3. VLAN3 members cannot access VLAN1, VLAN2 and VLAN4.
4. VLAN4 members cannot access VLAN1 and VLAN3 members, but they can access VLAN2 members.

Example 3a: The same VLAN members can be at different switches with the same VID (See Figure 3-6).

Figure 3.6 – Attribute-based VLAN

4.0　Network Applications

There are three ways to access switch management functions:

1. RS-232 serial port connection (CLI)
2. Telnet
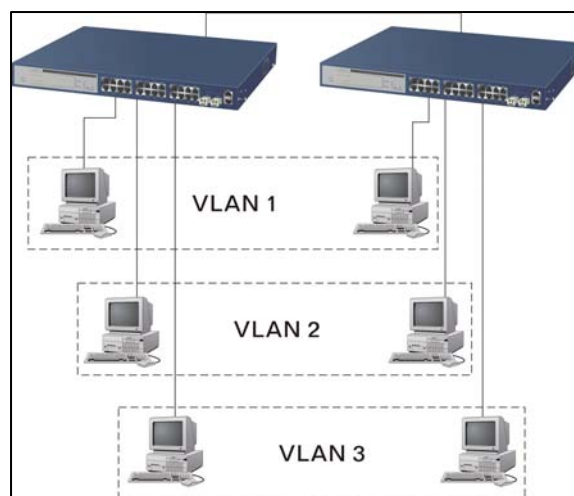3. Web

Note: Before accessing management functions through Telnet or the Web, you must modify the IP address, subnet mask, default gateway and DNS through the RS-232 connection.

4.1　Using the RS-232 Serial Port Connection

To configure the switch via the RS-232 serial port connection, follow these steps:

1. Connect the serial cable included with your switch to your workstation.
2. Connect the serial cable to console connector on the back of your switch.
3. Run the terminal emulator (Example: HyperTerminal) using the following settings.
   a. Baud rate (bits per second):　**57600**
   b. Data bits:　**8**
   c. Parity:　**N**
   d. Stop bits:　**1**
   e. Flow control:　**None**
4. When you complete the connection, press the **Enter** key.
5. Turn on the switch.
6. The default login is:
   a. Username = **admin**
   b. Password = **admin**

4.2　Configuring IP, Subnet Mask and Default Gateway

The default settings for your switch are listed in the following table:

Default Value	PS-2126M-POE
IP Address	192.168.1.1
Subnet	255.255.255.0
Default Gateway	192.168.1.254

Table 4-1

You may either change the IP address of the switch or change the IP address of your workstation. To change the IP address of the switch, via the console connection, you will have to use the CLI command listed below. A complete list of CLI commands is in Section 6.0 of this manual.

1. Once you have logged into the switch, you will see the following screen.

```
Managed Switch - FEPoEL2-SW26

Login: admin
Password:

FEPoEL2-SW26# █
```

Figure 4.1 – Login Screen

2. To set the IP Address of the switch, use the following commands:

Syntax:
set ip <ip> <mask> <gateway>
Description:
To set the system IP address, subnet mask and gateway.
Argument:
<ip> : ip address
<mask> : subnet mask
<gateway> : default gateway
Possible value:
<ip> : 192.168.1.2 or others
<mask> : 255.255.255.0 or others
<gateway> : 192.168.1.253 or others
Example:
FEPoEL2-SW26# set ip 192.168.1.2 255.255.255.0 192.168.1.253

Note: Once you have set the IP address of the switch, you must save the configuration. The CLI command is: **save start**. A detailed list of CLI commands can be found in Section 6.0.

4.3   Configuring the Switch via the Web

You can configure and monitor the switch through:
▪ CLI
▪ Web browser
▪ SNMP manager. The user interface for SNMP is not covered at this time.

Ethernet LAN
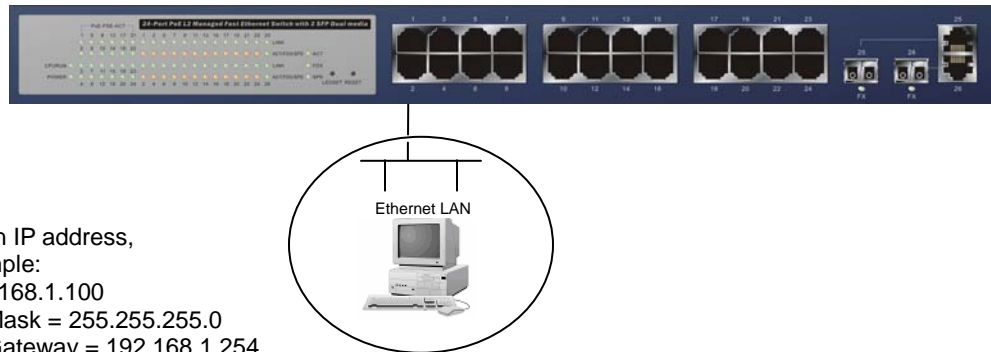
Assign an IP address,
For example:
IP = 192.168.1.100
Subnet Mask = 255.255.255.0
Default Gateway = 192.168.1.254

Figure 4.2 – Front Switch View

Before you are able to communicate with the switch, you must know the IP address of the switch. Once you know the IP address, follow these instructions:

1. Connect the switch with a UTP cable to your workstations.

    Note: If the workstation connects to the switch, you will have to setup the same subnet mask between them.

2. Access your web browser or use the console connection.

Note: If you make changes to the configuration, you must save the configuration before rebooting the switch.
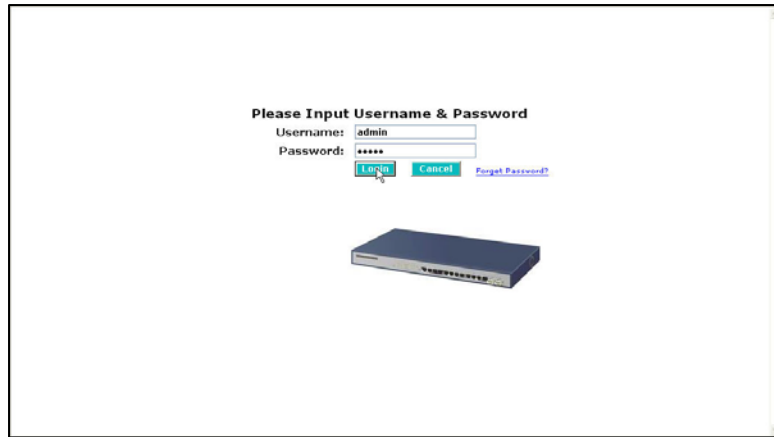
4.4   IP Address Assignment

Figure 4.3 - Login Screen via a Web browser

For IP address configuration, the following three parameters are required:
- IP address
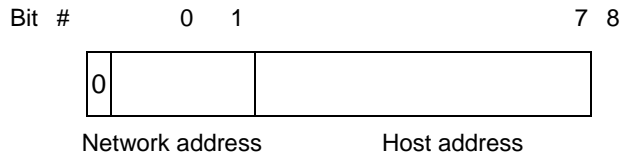- Subnet Mask
- Default Gateway and DNS.

IP Address:

The address of the network device is used for internetworking communication. IP addresses are split into predefined address classes or categories. This is referred to as "classful" addressing because the address is spilt into three predefined classes, groupings or categories. Each IP address comprises two parts: network identifier (address) and host identifier (address). The network identifier identifies the network on which the host resides, while the host identifier identifies the particular host on the given network. The host identifier must be unique in the same LAN.   Each class has its own network range between the network identifier and host identifier in the 32 bits address.   IP address is known as IPv4.

32 bits

Network identifier	Host identifier
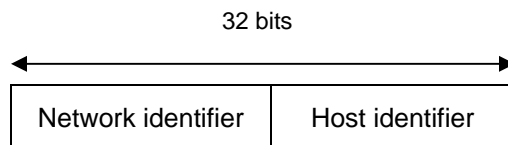
With "classful" addressing, the IP address is divided into three classes: class A, class B and class C. The rest of IP addresses are for multicast and broadcast. The bit length of the network prefix is the same as that of the subnet mask and is denoted as IP address/X, for example, 192.168.1.0/24. Each class has its address range described below.
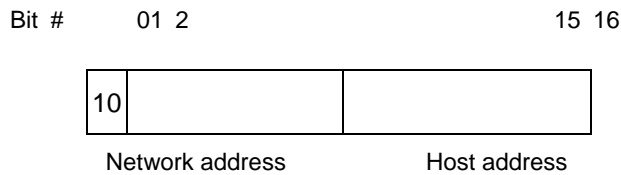
Class A:
Address is less than 126.255.255.255. There are a total of 126 networks can be defined because the address 0.0.0.0 is reserved for default route and 127.0.0.0/8 is reserved for loopback function.

Bit #   0   1   7 8

```
+---+----------------------------+
| 0 |                            |
+---+----------------------------+
```

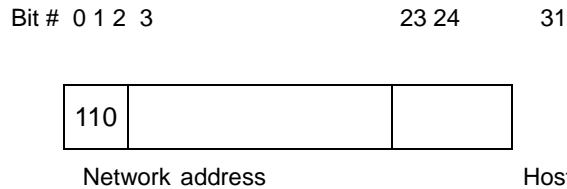Network address   Host address

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

```
+----+--------------------+------------------+
| 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

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 networks. This is referred to as Private IP address and listed 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

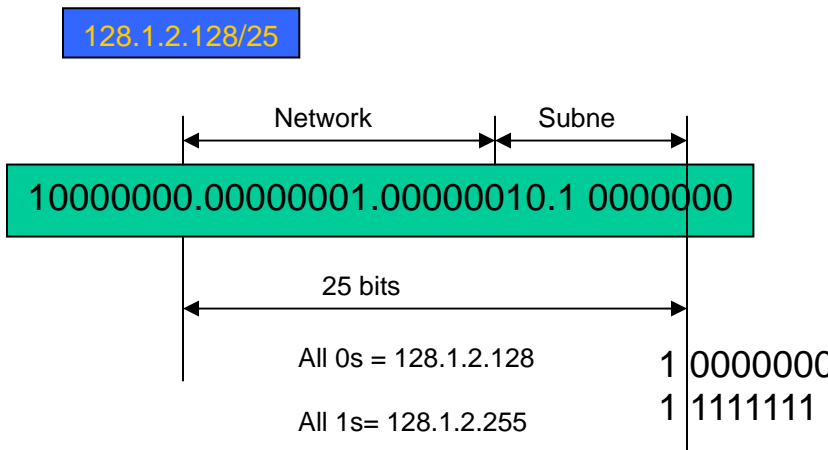Please refer to RFC 1597 and RFC 1466 for more information.

Subnet mask:

Subnet mask is 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 the IP address more efficiently and make it easier to manage IP

networks.

For a class B network, 128.1.2.3, the subnet mask 255.255.0.0 in default, in which the first two bytes are all 1s. This means more than 60 thousands of nodes in flat IP address will be at the same network. This is too large to manage practically. Now if we divide it into a smaller network by extending network prefix from 16 bits to, say 24 bits, its third byte is used 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 addresses are available in the sub-netted network. Two special addresses are reserved. They are the addresses with all zero's and all one's. For example, an IP address 128.1.2.128, what will the reserved IP address look like? All 0s mean the network itself, and all 1s mean IP broadcast.

128.1.2.128/25

```
        Network          Subne
   |←————————————→|←————————→|
   | 10000000.00000001.00000010.1 0000000 |
   |←————————————————————————→|
              25 bits

        All 0s = 128.1.2.128        1 0000000
        All 1s= 128.1.2.255         1 1111111
```

In this diagram, the subnet mask with 25-bit long, 255.255.255.128, contains 126 members in the sub-netted network. 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 4-2

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

With the subnet mask, a bigger network can be divided into smaller pieces. If you want to have more than two independent networks in a LAN, the network must be partitioned. The subnet mask must be applied.

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 packets, if the destination is not in the routing table, all 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, check the IP address of the network that will be

connected to the switch. Use the same network address and append your host address.
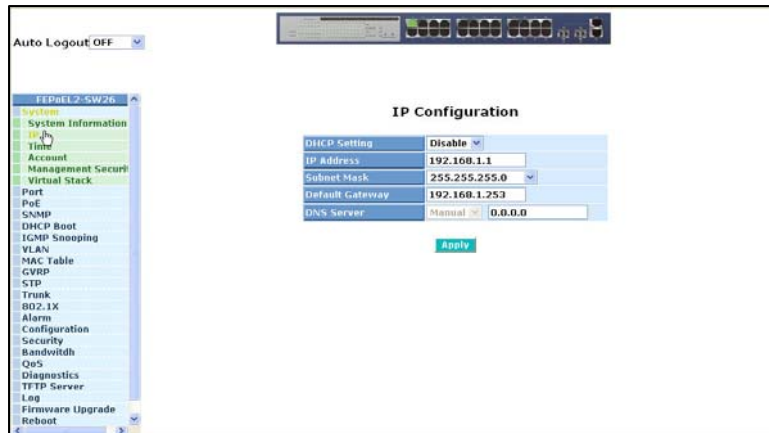

Figure 4.4 – IP Configuration

IP Address: For example, as shown in the Figure 4.4 **192.168.1.1**. An IP address in the range of **192.168.1.x** must be set on your PC.

Subnet Mask: For example, as show in Figure 4.4 **255.255.255.0**. Any subnet mask such as 255.255.255.x is allowable in this case.

DNS:

The Domain Name Server translates the human readable machine name to IP address. Every machine on the Internet has a unique IP address. A server generally has a static IP address. To connect to a server, the client needs to know the IP of the server. However, generally the name is used to connect to the server. Thus, the switch DNS client program (such as a browser) will ask the DNS to resolve the IP address of the named server.

5.0   Web Based Management

This section illustrates the configuration and management of the switch through a web interface. Management through the web interface allows you to easily access and monitor the switch through any port.

The default values of the managed 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 5-1

Once the switch has been configured via the switch's serial interface, you are ready to use the web management function. You must be connected to the switch via one of the Ethernet ports.

Access your web browser, and type in http://192.168.1.1 (or the assigned IP address) in the address field. The login screen will be displayed. (see Figure 5.1) requesting the username and password for login authentication. The default username and password are both **admin**.   Click on the **Login** button. The login process now is completed.

If you forget the password, click the link **Forget Password** in WebUI (See Figure 5.1) or input "Ctrl+Z" in from the CLI's login screen. The system will display a serial number. Write down this serial number and contact your vendor. The vendor will provide you with a temporary password. Use this new password as ID and Password to temporarily login. This new password is a limited use password and will only allow you log into the system one time. Therefore, modify your password one you login to the system.

The switch supports a simple user management function allowing only one administrator to configure the system at a time. If there are two or more users using administrator's identity, the switch will allow the one who logins first to configure the system. The rest of users, even with administrator's identity, can only monitor the system. Without administrator's identity, you can only monitor the system.

A maximum of three users are able to login simultaneously in the switch. To optimize the display effect, we recommend you use Microsoft IE 6.0 or above.
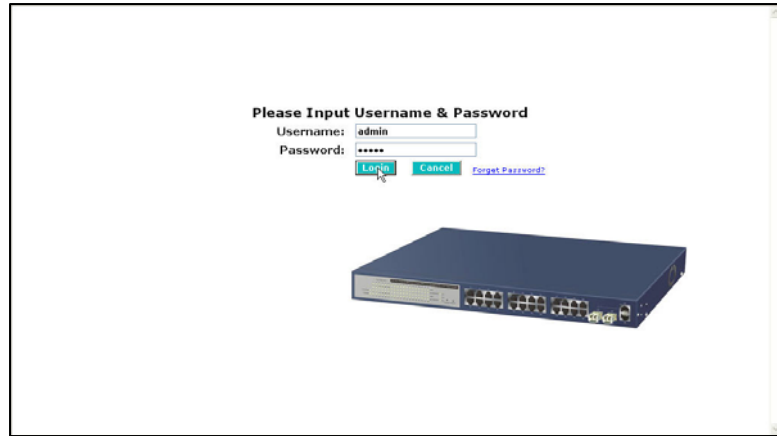
Figure 5.1 – Login Screen

5.1 Overview of Web Management

Once you have logged into the switch, the opening screen displays the **System Information**. On the left side of the screen, the function tree for all of the management functions is displayed. We will explore these functions in this chapter.

The following information is listed on the opening screen:
- Model
- System Description
- Location
- Contact
- Device Name
- System Up Time
- Current Time
- BIOS Version
- Firmware Version
- Hardware-Mechanical Version
- Serial Number
- Host IP Address
- Host MAC Address
- Device Port
- RAM Size
- Flash Size

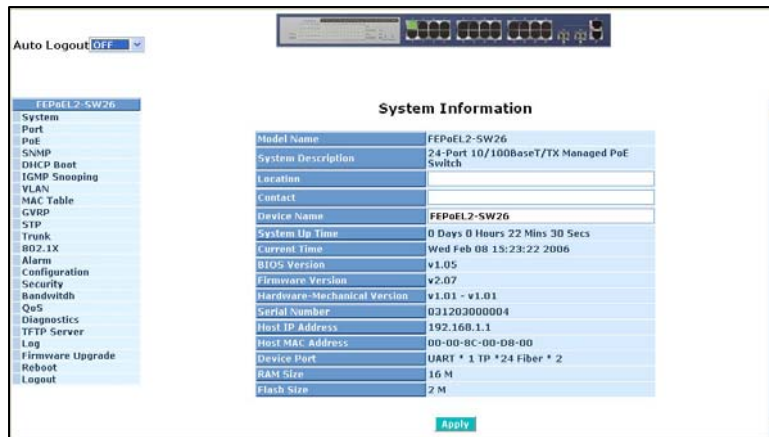Figure 5.2 displays the **System Information** screen.

Figure 5.2 – System Information

The top of the screen displays the front panel of the switch. The linked ports will be displayed in green and the ports that are not connected will be dark. The optional modules will display a cover plate if no module exists and will show a module if a module is present. The image of module depends on the installed module. If the module port is not connected, the port be dark and, if linked, green.

The front panel displayed at the top of the screen provides clicking functions that allow you to view information about the switch. This is a very convenient function for browsing the information for a single port. To view a single port, click on the port and an information window will be displayed. (See Figure 5.3)
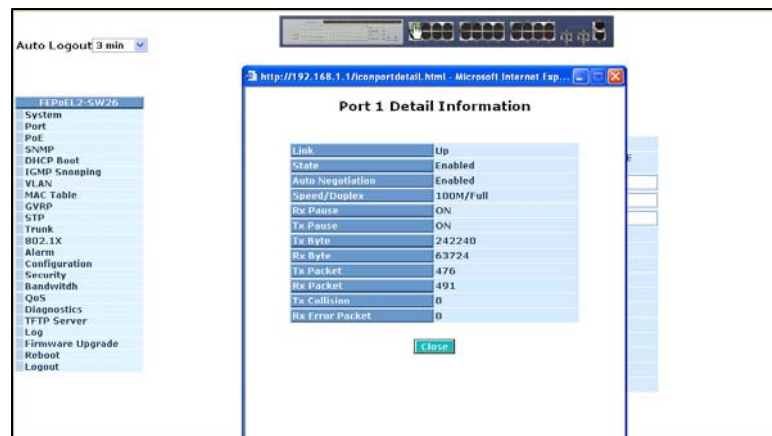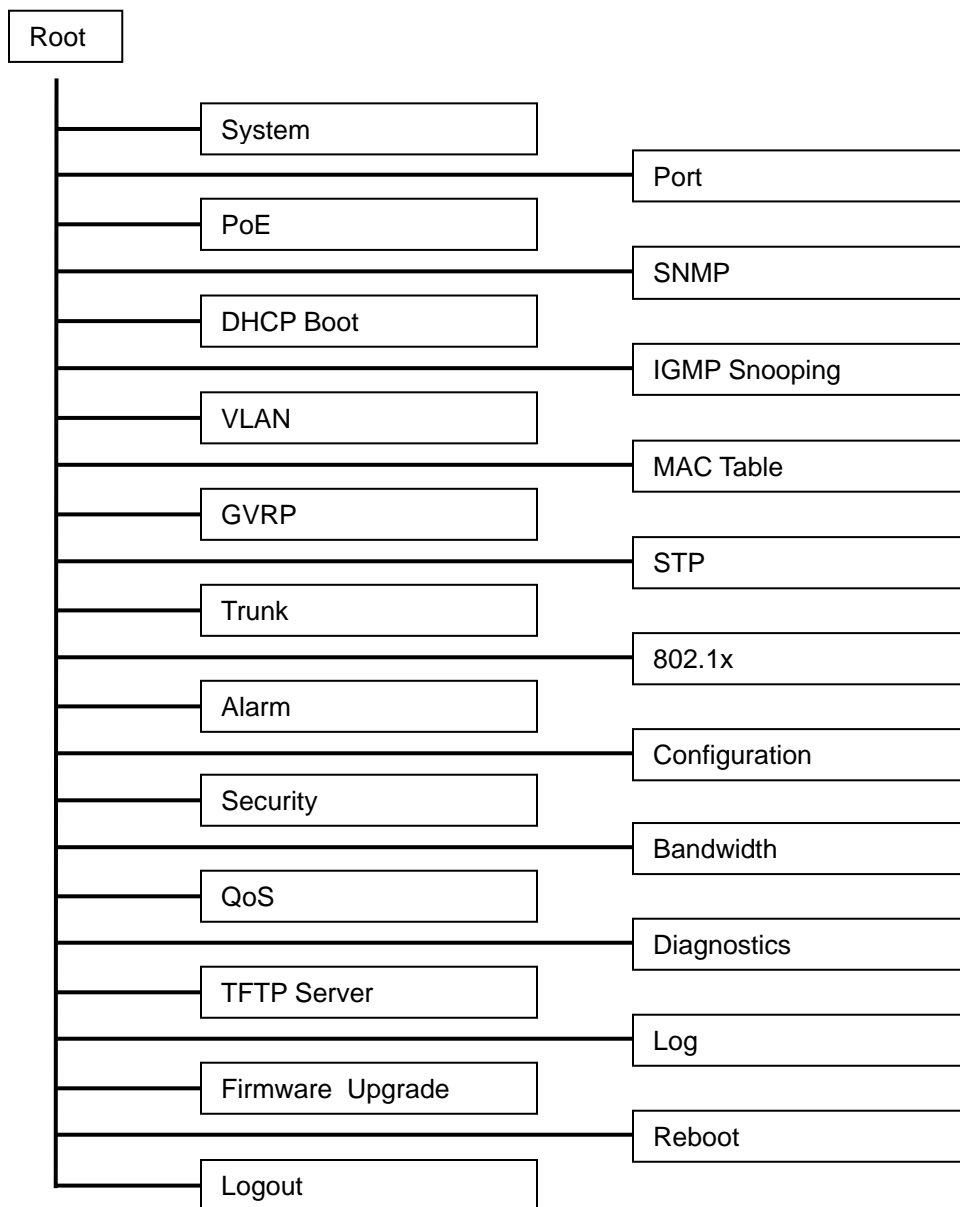

Figure 5.3 - Port Detail Information

Figure 5.3 shows basic information of the selected port. You will be able to view port status, traffic status and bandwidth rating for egress and ingress respectively.

On the left-top corner, there is a pull-down list for Auto Logout. For additional switch security, an auto-logout function is available to protect you from illegal users if you don't logout of the management functions when you are finished. The **Auto Logout** default is set to three minutes. You may change the time by using the pull down list for Auto Logout.   The system will automatically log out if there has been no activity during the time you choose. There is also an option for **OFF**. If OFF is selected, the management screen will remain on.

The left side of the screen displays the main menu tree for the web functions.   This a hierarchical menu. When you make a selection, a sub menu may be displayed with additional function in the sub menu.   The functions of each folder are described in this section.   The following list is the full function tree for web user interface.

```
Root
 ├── System
 │        Port
 ├── PoE
 │        SNMP
 ├── DHCP Boot
 │        IGMP Snooping
 ├── VLAN
 │        MAC Table
 ├── GVRP
 │        STP
 ├── Trunk
 │        802.1x
 ├── Alarm
 │        Configuration
 ├── Security
 │        Bandwidth
 ├── QoS
 │        Diagnostics
 ├── TFTP Server
 │        Log
 ├── Firmware  Upgrade
 │        Reboot
 └── Logout
```

5.2 System Information

Function name:

System Information

Function description:

Displays the basic system information.

Parameter description:

Model name:

The model name of the device.

System description:

Describes the device. **24-Port 10/100Base-T/TX Managed PoE Switch**.

Location:

The location of the switch. User-defined.

Contact:

For the purpose of managing and maintaining the device, enter the contact person and phone to be used for help. You can configure this parameter through the device's user interface or SNMP.

Device name:

The name of the switch. User-defined. Default is GEPoEL2-SW12.

System up time:

The time accumulated since this switch was powered up. The format is day, hour, minute and second.

Current time:

Show the system time of the switch. The format: day of week, month, day, hours: minutes: seconds, year. For instance, Wed, Apr. 23, 12:10:10, 2004.

BIOS version:

The version of the BIOS.

Firmware version:

The firmware version.

Hardware-Mechanical version:

The version of Hardware and Mechanical. The figure before the hyphen is the version of electronic hardware; the one after the hyphen is the version of mechanical.

Serial number:

The serial number is assigned by the manufacturer.

Host IP address:

The IP address of the switch.

Host MAC address:

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

Device Port:

Displays the types and number of ports in the switch.

RAM size:

The size of the DRAM in this switch.

Flash size:

The size of the flash memory in this switch.

5.3   IP Configuration

IP configuration is one of the most important configurations in the switch. Without the proper setting, the network manager will not be able to manage or view the device. The switch supports both manual IP address setting and automatic IP address setting via DHCP server. When IP address is changed, you must reboot the switch so the setting takes effect and uses the new IP for management access.   The **IP Configuration Menu** is accessed from the **System Menu**. When you click on **System**, the submenu commands are displayed.   Click on **IP** to make changes to the IP setting.
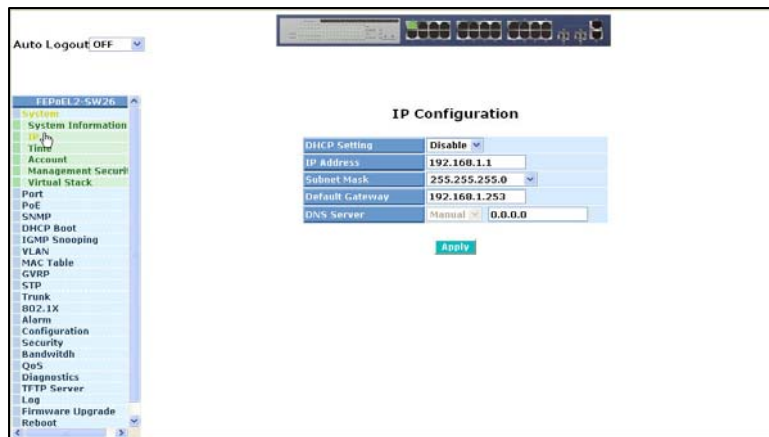

Figure 5.4 - IP Address Configuration

Function name:

IP Configuration

Function description:

Set IP address, subnet mask, default gateway and DNS for the switch.

Parameter description:

DHCP Setting:

DHCP is the abbreviation of Dynamic Host Configuration Protocol. DHCP is **disabled** by default. In this menu, you may **enable** or **disable** DHCP.

The switch supports DHCP client used to get an IP address automatically if you set this function "Enable".   When enabled, the switch will issue the request to the DHCP server to get an IP address. If the DHCP server is down or does not exist, the switch will issue the request and notify you that the IP address is being requested until the DHCP server is up. Before getting an IP address from DHCP server, the device will stop the booting process. If the field is set to "Disable", you will have to input the IP address manually. For more details about IP address and

DHCP, refer to **Section 4.4 - IP Address Assignment**.

Default: **Disabled**

IP address:

Users can configure the IP settings and enter new values if users set the DHCP function to "Disable". Click the **Apply** button to update.

When DHCP is disabled, Default: 192.168.1.1

If DHCP is enabled, this field is completed by the DHCP server and will not allow user manually set future IP addresses.

Subnet mask:

The purpose of the subnet mask is to get more network addresses. An IP device in a network must own its IP address, composed of Network address and Host address, otherwise communication with other devices cannot be made. The network classes A, B, and C are all too large to fit for almost all networks, so the subnet mask is introduced to solve this problem. Subnet mask uses some bits from host address and makes an IP address look at the Network address, Subnet mask number and host address. It is shown in the following figure. This reduces the total of IP numbers that a network is able to support by the power of 2.
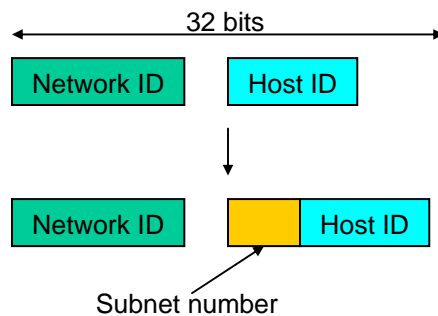
The subnet mask is used to set the subnet mask value, which should be the same value as that of the other devices resided in the same network it attaches.

Default 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

DNS:

The Domain Name Server is used to serve the translation between IP address and name address. The switch supports DNS client function to re-route the mnemonic name address to DNS server to get its associated IP address for accessing Internet. You can specify a DNS IP address for the switch. The switch can translate a mnemonic name address into an IP address.

There are two ways to specify the IP address of DNS. One is fixed mode, which manually specifies its IP address, the other is dynamic mode, which is assigned by DHCP server while DHCP is enabled. DNS can help you easily remember the mnemonic address name with the meaningful words in it. No assignment of DNS address is made by default.

Default: 0.0.0.0

5.4   Time Configuration

The switch provides a manual and automatic method to set the system time via NTP. Manual setting is simple. Input "Year", "Month", "Day", "Hour", "Minute" and "Second" within the valid value range indicated in each item. If you input an invalid value, for example, 61 in minute, the switch will clamp the figure to 59.

NTP is a well-known protocol used to synchronize the system time of the switch system time over a network. NTP, an internet draft standard formalized in RFC 1305, has been adopted on the system is version 3 protocol. The switch provides four built-in NTP server IP addresses residing in the Internet and an user-defined NTP server IP address. The time zone is Greenwich-centered which uses the expression form of GMT+/- xx hours.

Function name:

> Time

Function description:

> Set the system time by manual input or by synchronizing from Time servers. The function also supports daylight saving.

Parameter description:

> Current Time:
>
> > Show the current time of the system.
>
> Manual:
>
> > Use this function to adjust the time manually. Enter the valid figures in the fields of Year, Month, Day, Hour, Minute and Second respectively and click **Apply**. The time is adjusted. The valid figures for the parameter Year, Month, Day, Hour, Minute and Second are >=2000, 1-12, 1-31, 0-23, 0-59 and 0-59 respectively. If you input an incorrect number and click **Apply**, the device will reject the time adjustment request. There is no time zone setting in the Manual mode.
>
> > Default: Year = 2000,   Month = 1,   Day = 1
> >
> > > Hour = 0,   Minute = 0, Second = 0
>
> NTP:
>
> > NTP is Network Time Protocol and is used to synchronize the network time based Greenwich Mean Time (GMT). If used in the NTP mode and have selected a built-in NTP time server or manually specify an user-defined NTP server as well as Time Zone, the switch will synchronize the time shortly after clicking **Apply**. Though it synchronizes the time automatically, NTP does not update the time periodically without user's processing.
>
> > Time Zone is an offset time off GMT. To set, select the time zone first and then perform time synchronization via NTP. The switch will combine this time zone and updated NTP time to arrive at the local time. The switch supports configurable time zone from –12 to +13 step 1 hour.
>
> > Default Time zone: +8 Hrs.
>
> Daylight Saving:
>
> > Daylight saving is adopted in some countries. If set, it will adjust the time lag or advance in unit of hours, according to the starting date and the ending date. For example, if you set the day light saving to be one hour, when the time passes over the starting time, the system time will be increased one hour after one minute at the time since it passed over. And when the time passes

over the ending time, the system time will be decreased one hour after one minute at the time since it passed over.

The switch supports valid configurable day light saving time is –5 ~ +5 step one hour. The zero for this parameter means it need not have to adjust the current time, equivalent to in-act daylight saving. You don't have to set the starting/ending date as well. If you set daylight saving to non-zero, you have to set the starting/ending dates as well; otherwise, the daylight saving function will not be activated.

Default for Daylight Saving: 0.

The following parameters are configurable for the function Daylight Saving and described in detail.

Day Light Saving Start :

This is used to set for the beginning of day light saving time.

Month:

Range is 1 ~ 12.

Default: 1

Day:

Range is 1 ~ 31.

Default: 1

Hour:

Range is 0 ~ 23.

Default: 0

Day Light Saving End :

This is used for the ending of daylight saving time.

Month:

Range is 1 ~ 12.

Default: 1

Day:

Range is 1 ~ 31.

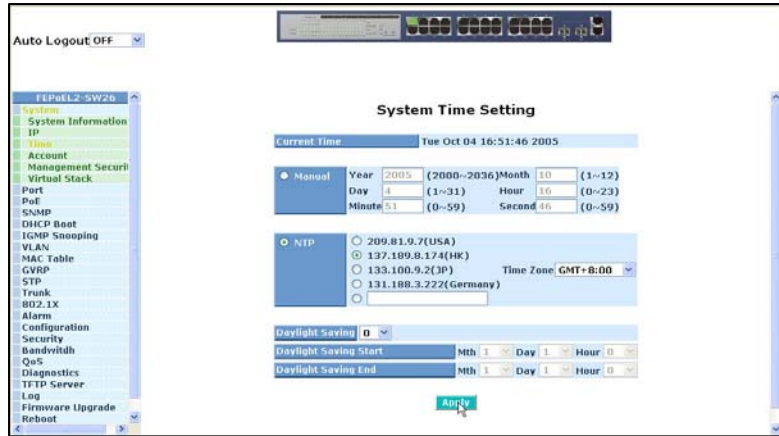Default: 1

Hour:

Range is 0 ~ 23.

Default: 0

Figure 5.5 – System Time Setting

5.5 Account Configuration

Only the administrator can create, modify or delete the username and password. The administrator can modify other guest identities' password without confirming the password. Guest-equivalent identity can modify his password only. Please note that you must confirm administrator/guest identity in the field of Authorization in advance before configuring the username and password. Only one administrator is allowed to exist and unable to be deleted. Up to four guest accounts can be created.

The default setting for user account is:
      Username: **admin**
      Password: **admin**

The default setting for guest user account is:
      Username: **guest**
      Password: **guest**

Figure 5.6 – Account Configuration

5.6   Management Policy

Through the management security configuration, the manager can perform the setup to control the switch and limit user to access the switch.

The following rules are provided for the management of the switch:

Rule 1:   If no lists exists, all connections are accepted.

Accept

_____

Rule 2:   If "accept lists" exists, all connections will be denied except the connection inside the accepting range.

| Accept | Deny | Accept | Deny | Accept |

_____

Rule 3:   If "deny lists" exists, all connections will be accepted except the connection inside the denying range.

| Deny | Accept | Deny | Accept | Deny |

_____

Rule 4:   If both "accept and deny" lists exist, all connections will be denied except the connection inside the accepting range.

| Accept | Deny | Deny | Deny | Accept |

_____

Rule 5:   If both "accept and deny" lists exist, all connections will be denied except the connection inside of accepting range and NOT inside the denying range at the same time.

Accept
Deny

Accept
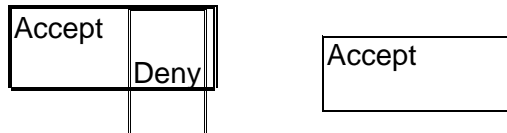
Deny| Acc | Deny | Acc | Deny

_____

Function name:

Management Security Configuration

Function description:

The switch provides a Management Security Configuration function. With this function, the manager can easily control the mode that the is used to connect to the switch. According to the mode, users can be classified into two types: Those who are able to connect to the switch (Accept) and those

who are unable to connect to the switch (Deny). Some restrictions also can be placed on the mode used to connect to the switch. For example, VLAN VID is able to be accepted or denied by the switch, the IP range of the user could be accepted or denied by the switch, a user port can be allowed or not allowed to connect with the switch, or the way the switch is controlled when connected by via HTTP, Telnet or SNMP.
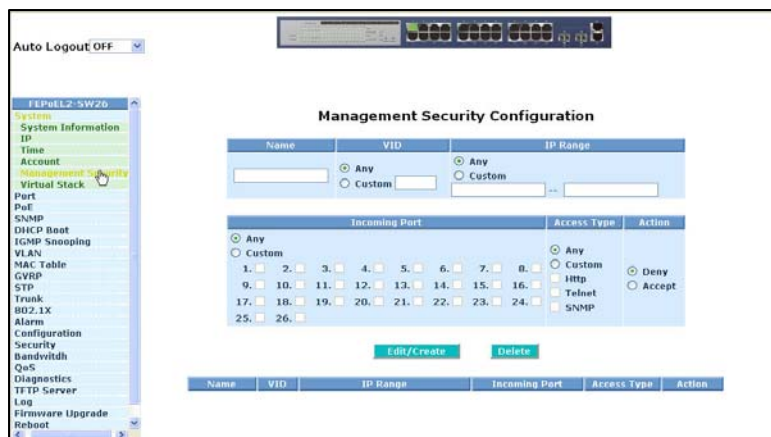

Figure 5.7 - Security

Parameter description:

Name:

A name is composed of any letter (A-Z, a-z) and digit (0-9) with maximal 8 characters.

VID:

The switch supports two options for managed valid VLAN VID, including "**Any**" and **Custom**. Default is **Any**. **Custom** allows you to supply the VID number. The valid VID range is 1~4094.

IP Range:

The switch supports two options for managed valid IP Range, including **Any** and **Custom**. The Default is **Any**.   **Custom** allows you to assign an effective IP range. The valid range is 0.0.0.0~255.255.255.255.

Incoming Port:

The switch supports two options for managed valid Port Range, including **Any** and **Custom**. The default is **Any**. **Custom** allows you to select the ports that should be used and the ports that should be restricted in the management security configuration.

Access Type:

The switch supports two options for managed valid Access Type, including **Any** and **Custom**. The default is **Any**.   **HTTP**, **Telnet** and **SNMP** If **Custom** has been chosen, **HTTP**, **Telnet** and **SNMP** can be used to access and managing the switch.

Action:

The switch supports options for managed valid Action Type, including **Deny** and **Accept**. The default is **Deny**. **Deny** restricts access switch management. **Accept** provides the authority to manage the switch.

Edit/Create:

A new entry of Management Security Configuration can be created after the initial parameters

as have been setup. Use the **Edit/Create** button.

Delete:

Removes the existed entry of Management Security Configuration from the management security table.

5.7   Virtual Stack

Function name:

Virtual Stack

Function description:

Virtual Stack Management (VSM) is the group management function. VSM configuration automatically groups switches in the same LAN. One switch among the group will be the master device, and the others will become the slave devices.

VSM offers a simple centralized management function. It is not necessary to remember the address of all devices, because the manager is capable of managing the network with the address of the Master device. VSM is only available in Web UI. While one switch become the Master, two rows of buttons for the group device will appear on the top of the Web UI. You can use these buttons to connect to the Web UI of the devices of the group without logging into these devices.

The top-left button is only for Master device (See Figure3-9). The background color of the button you press will be changed to represent that the device is under your management.

Note: It If you login via the console, the grouping will be removed temporarily.

The device of the group will be shown as station address (the last number of IP Address) + device name on the button (Ex: 196_FEPoEL2-SW26). If no corresponding device exists, " ---- " will be displayed.

Once the devices successfully join the group, they can be managed via the Master device and cannot be managed via telnet/console/web individually.

Up to 16 devices can be grouped for VSM, however, only one Master is allowed to exist in each group. For Master redundancy, you may configure more than two devices as Master device, however, the Master device with the smaller MAC value will be the Master. All of these 16 devices can become the Master device and back up with each other .
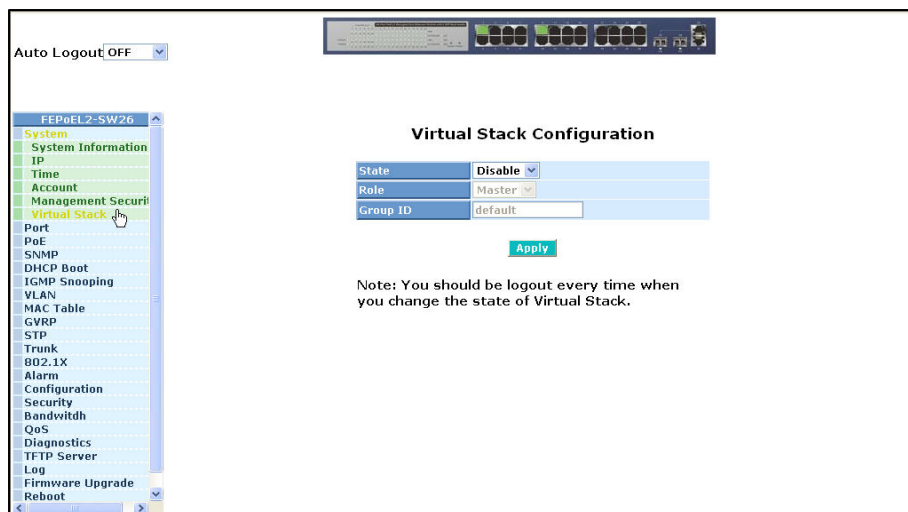
Virtual Stack is **disabled** by default.

Figure 5.8 – Virtual Stack

Parameter description:

State:

Used for the activation or de-activation of VSM.

Role:

The role that the switch would like to play in virtual stack. Two types of roles, including master and slave are offered. The default is **Master**.

Group ID:

It is the group identifier (GID) which signs for VSM. Valid letters are A-Z, a-z, 0-9, " - " and "_" characters. The maximum length is 15 characters.
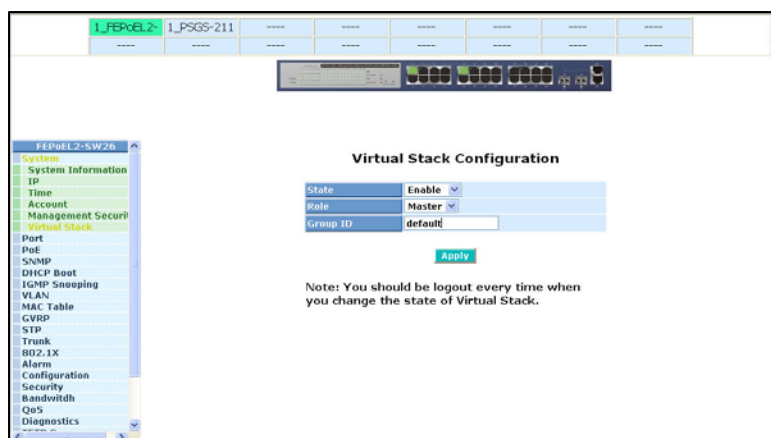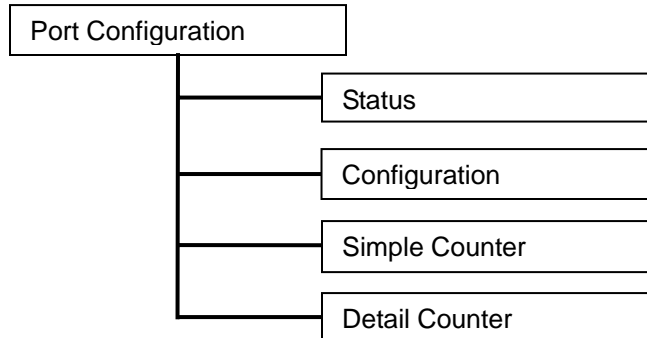

Figure 5.9 – Virtual Stack

5.8 Port Configuration

Port configuration includes the following functions:

5.8.1 Port Status

The port status function gathers the current status for all ports. The information is displayed by the order of port number, link status, port state, auto-negotiation status, speed/duplex and flow control. If a fiber module is installed in one or both of the slots, the current status for those ports will be displayed. See Figure 5.10.

Figure 5.10 – Port Status

Function name:

Port Status

Function Description:

Port status reports the current status of all ports in the switch. The screen will be automatically refreshed approximately every five seconds as port parameters change.

Parameter Description:

Port No:

Displays the port number. The number is 1 – 26. Ports 25 and 26 may be fiber SFP modules.

Media:

Shows the media type used in all ports. Ports 25 and 26 are optional SFP modules, which support fiber Gigabit Ethernet. Since the fiber port could be multimode or singlemode, the information will be based on the actual media installed in the switch with reference to connector, distance, fiber mode, etc. The module port information is displayed in Figure 5.11.

Link:

Displays an active or inactive port. If the link is connected to a working device, the link will show that is it **Up**; otherwise, it will show **Down**. This is determined by the hardware on both devices of the connection.

No default value.

State:

Displays the communication function of the port is **Enabled** or **Disabled**. When it is enabled, traffic can be transmitted and received via this port. When it is disabled, no traffic can be transferred through this port. Port State is configured by the user.

Default: **Enabled**.

Auto Negotiation:

Displays the exchange mode of Ethernet MAC. There are two modes supported in the switch. They are auto-negotiation mode **Enabled** and forced mode **Disabled**. When in **Enabled** mode, this function will be automatically negotiated by the hardware itself and exchange the capability of speed and duplex mode. The best communication mode will be used. When in **Disabled**" mode, both parties must have the same setting of speed and duplex, otherwise, there will be no link. In this case, the link result is **Down**.

Default: **Enabled**

Speed / Duplex Mode:

Displays the speed and duplex mode of all ports. There are three speeds 10Mbps, 100Mbps and 1000Mbps supported for TP media. Duplex mode is half duplex and full duplex. If the media is 1Gbps fiber, it is 1000Mbps only. The status of speed/duplex mode is determined by:

- Negotiation of both the local port and the link partner in **Auto Speed** mode

- User setting in **Force** mode. The local port has to be preset according to its capability.

Ports 1-24 are supported Fast Ethernet with TP media only, so the result will be displayed as 100M/Full or 100M/Half, 10M/Full and 10M/Half duplex.

Ports 25 and 26 are Gigabit ports. If the media is 1000Mbps with TP media, the combinations of 10/100M and Full/Half duplex, 1000Mbps full duplex will be displayed. If the media is 1000Mbps fiber, 1000M/Full duplex will be displayed.

Default: **None**, depends on the result of the negotiation.

Rx Pause:

RX pause determines the way that the port processes the PAUSE frame. If **on** is displayed, the port will apply the PAUSE frame; otherwise, the port will ignore the PAUSE frame.

Default: **None**

Tx Pause:

TX pause determines whether the port transmits the PAUSE frame or not. If **on** is displayed , the port will send the PAUSE frame; otherwise, the port will not send the PAUSE frame.
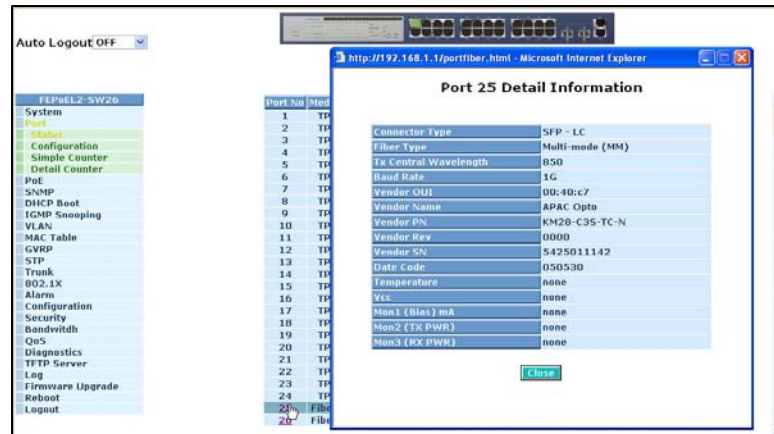
Default: **None**

Figure 5.11 – Port Detail Information

Parameter description of Port 25 and Port 26:

Connector Type:

Displays the connector type. (Ex. UTP, SC, ST, or LC)

Fiber Type:

Displays the fiber type (multimode or singlemode)

Tx Central Wavelength:

Displays the fiber optical transmitting central wavelength, (850nm, 1310nm, 1550nm, etc.).

Baud Rate:

Displays the maximum baud rate of the fiber module supported. (Ex. 10M, 100M or 1000M)

Vendor OUI:

Displays the Manufacturer's OUI code which is assigned by IEEE.

Vendor Name:

Displays the company name of the module manufacturer.

Vendor P/N:

Displays the product name of the module manufacturer.

Vendor Rev (Revision):

Displays the module revision.

Vendor SN (Serial Number):

Displays the serial number assigned by the manufacturer.

Date Code:

Displays the date this module was made.

Temperature:

Displays the current temperature of module.

Vcc:

Displays the working DC voltage of module.

Mon1(Bias) mA:

Displays the Bias of the module.

Mon2(TX PWR):
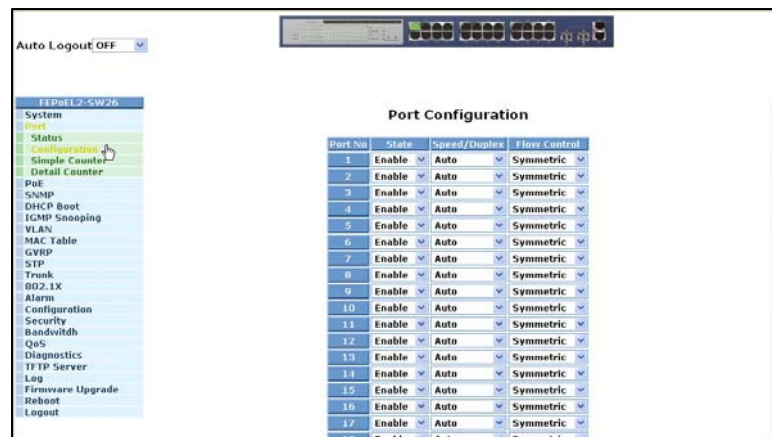
Show the transmit power of module.

Mon3(RX PWR):

Show the receiver power of module.

5.8.2   Port Configuration

Port Configuration is used to modify the setting by port. This function allows set and reset the functions described below.

Figure 5.12 – Port Configuration

Function name:

Port Configuration

Function description:

Used to set the operation mode of each port. The switch supports three parameters for each port:

- State

- Speed/Duplex
- Flow control.

Parameter description:

State:

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 transmitted through this port. Port State is configurable by the user. If you set a port's state to **Disable**, then that port cannot pass traffic, even though **Link** is displayed.

Default: **Enable**.

Speed/Duplex:

Set the speed and duplex mode for the port. 10/100Mbps is available for ports 1-24, and 1000Mbps is available for ports 25 and 26. If the media is 1Gbps fiber, it will always be 1000Mbps and the duplex mode can only be full. If the media is TP, the speed/duplex mode is comprised of speeds of 10/100/1000Mbps and the duplex mode is either full or half duplex. The following table summarizes the function the media:

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

Table 5.2

In auto-negotiation mode, there is no default value. In forced mode, the default value depends on the setting.

Flow Control:

There are two modes to choose in flow control, including **Symmetric** and **Asymmetric**. If flow control is set to **Symmetric**, both parties can send the PAUSE frame to the transmitting device(s) in case the receiving port is too busy to handle the packets. When set to **Asymmetric**, ?????.

Default: **Symmetric**.

5.8.3   Simple Counter

The function of the **Simple Counter** is to collect information and provide counting about the traffic of the port, whether the packet is good or bad.

In Figure 5.13, the screen shows all ports' counter information at the same time. Each data field is 20-digits. If the counting overflows, the counter will be reset and restart counting. The data is updated based on the time interval defined by the user. The valid range is three to ten seconds. The refresh interval is used to set the update frequency. Default update time is three seconds.

Figure 5.13 – Simple Counter

Function name:

Simple Counter

Function description:

Displays the summary counting of each port's traffic, including Tx Byte, Rx Byte, Tx Packet, Rx Packet, Tx Collision and Rx Error Packet.

Parameters description:

Tx Byte:

Total transmitted bytes.

Rx Byte:

Total received bytes.

Tx Packet:

The counting number of the packets transmitted.

Rx Packet:

The counting number of the packet received.

Tx Collision:

Number of collisions transmitting frames experienced.

Rx Error Packet:

Number of bad packets received.

5.8.4 Detail Counter

The function of the **Detail Counter** is to collect information and provide the counting for the traffic of the port, whether the packet is good or bad.

In Figure 5.14, the counter is displayed one port at a time. To see another port's counter, pull down the Select list. The figures for the port you have chosen will be displayed.

Each data field is 20-digits. If the counting overflows, the counter will be reset and counting will be restarted. The data is updated based on the time interval defined by the user. The valid range is three to ten seconds. The refresh interval is used to set the update frequency. Default update time is three seconds.
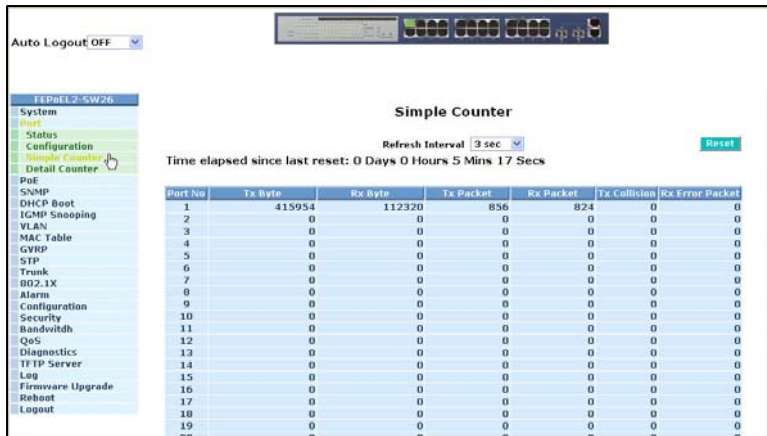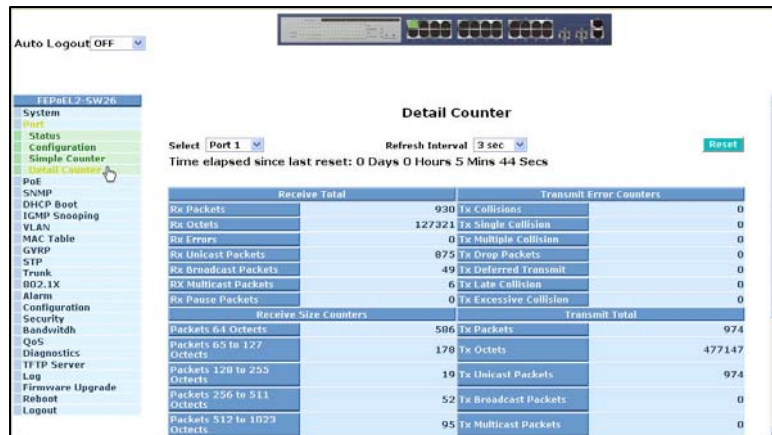

Figure 5.14 – Detail Counter

Function name:

Detail Counter

Function description:

Displays the detailed counting number of each port's traffic. In Figure 5.14, the window shows all counter information for one port at a time.

Parameter description:

Rx Packets:

The counting number of the packets received.

RX Octets:

Total received bytes.

Rx High Priority Packets:

Number of Rx packets classified as high priority.

Rx Low Priority Packets:

Number of Rx packets classified as low priority.

Rx Broadcast:

Shows the counting number of the received broadcast packet.

Rx Multicast:

Shows the counting number of the received multicast packet.

Tx Packets:

The counting number of the packet transmitted.

TX Octets:

Total transmitted bytes.

Tx High Priority Packets:

Number of Tx packets classified as high priority.

Tx Low Priority Packets:

Number of Tx packets classified as low priority.

Tx Broadcast:

Shows the counting number of the transmitted broadcast packet.

Tx Multicast:

Shows the counting number of the transmitted multicast packet.

Rx 64 Bytes:

Number of 64-byte frames in good and bad packets received.

Rx 65-127 Bytes:

Number of 65 ~ 126-byte frames in good and bad packets received.

Rx 128-255 Bytes:

Number of 127 ~ 255-byte frames in good and bad packets received.

Rx 256-511 Bytes:

Number of 256 ~ 511-byte frames in good and bad packets received.

Rx 512-1023 Bytes:

Number of 512 ~ 1023-byte frames in good and bad packets received.

Rx 1024-Bytes:

Number of 1024-max_length-byte frames in good and bad packets received.

Tx 64 Bytes:

Number of 64-byte frames in good and bad packets transmitted.

Tx 65-127 Bytes:

Number of 65 ~ 126-byte frames in good and bad packets transmitted.

Tx 128-255 Bytes:

Number of 127 ~ 255-byte frames in good and bad packets transmitted.

Tx 256-511 Bytes:

Number of 256 ~ 511-byte frames in good and bad packets transmitted.

Tx 512-1023 Bytes:

Number of 512 ~ 1023-byte frames in good and bad packets transmitted.

Tx 1024-Bytes:

Number of 1024-max_length-byte frames in good and bad packets transmitted.

Rx CRC/Alignment:

Number of alignment errors and CRC error packets received.

Rx Undersize:

Number of short frames (<64 Bytes) with valid CRC.

Rx Oversize:

Number of long frames (according to max_length register) with valid CRC.

Rx Fragments:

Number of short frames (< 64 bytes) with invalid CRC.

Rx Jabber:

Number of long frames(according to max_length register) with invalid CRC.

Rx Drops:

Frames dropped due to the lack of receiving buffer.

Rx Errors:

Number of the error packets received.

Tx Collisions:

Number of collisions transmitting frames experienced.

Tx Drops:

Number of frames dropped due to excessive collision, late collision, or frame aging.

Tx FIFO Drops:

Number of frames dropped due to the lack of transmitting buffer.

5.9 PoE Function

Function name:

PoE Status

Function description:

Displays information for PoE
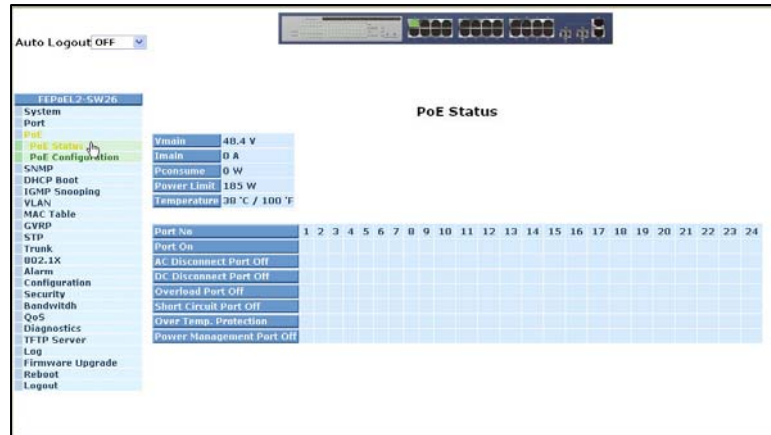
Figure 5.15 – PoE Status

Parameter description:

Vmain:

The volt is supplied by the PoE.

Imain:

The sum of the current supplied by every port.

Pconsume:

The sum of the power supplied by every port.

Power Limit:

The maximal power supplied by the switch (Read Only).

Temperature:

The temperature of the chip for PoE.

Port No:

Port number.

Port On:

Shows whether the port is supplying the power to the PD or not.

AC Disconnect Port Off:

Port is turned off due to the AC Disconnect function.

DC Disconnect Port Off:

Port is turned off due to the DC Disconnect function.

Overload Port Off:

The switch will stop supplying PoE power to the port if the attached PD exceeds the class setting.

Short Circuit Port Off:

The switch will stop supplying power to the port if it detects a short circuit in the PD linked to the port.

Over Temp. Protection:

The port of the switch will be disabled due to fast transient rise in temperature to 240°C or slow rise in temperature to 200°C.

Power Management Port Off:

If total power required by all PDs linked to the switch exceed the power limit, the switch will stop supplying power to this port after determining the priority.

Function name:

PoE Configuration

Function description:

You can configure settings for PoE in the PoE Port Management function.

The switch complies with IEEE 802.3af protocol and is capable of detecting automatically whether the device linked to the port on the switch is PD (Powered Device) or not. The switch also manages the power supplement based on the Class of the PD. It will stop supplying power once the power required by the PD exceeds the Class, Short Circuit or if **over temperature** occurs. (see Over Temperature Protection above.)

Figure 5.16 – PoE Configuration

Parameter description:

Status:

Status would be either **Normal** or **Active**. **Normal** means the port is ready to link and supply the power to the PD at any time. **Active** means the port is read to supply the power.

State:

Enable means the power supplied to the PD is legal while the port linked to the PD; **Disable** means the port does not own the PoE function.

Priority:

Three options are offered for the user to choose, including **Normal**, **Low** and **High**. Default is **Normal**. The switch will stop supplying the power to the port based on the order of the priority Low→Normal→High in case total power required by all PDs linked to the switch exceeds the power limit. If the ports have the same priority, the switch will cease the power supplement from the port with the highest port ID (12→1).

Power(W):

The power is consumed by the port.

Current(mA):

The current is supplied to the PD by the port.

Class:

The Class of the PD linked to the port of the switch.

5.10   SNMP Configuration

Any Network Management System (NMS) running the Simple Network Management Protocol (SNMP) can manage devices equipped with the SNMP agent, provided that the Management Information Base (MIB) is installed correctly on the managed devices. SNMP is a protocol that is used to govern the transfer of information between SNMP manager and agent. This protocol traverses the Object Identity (OID) of the management Information Base (MIB), described in the form of SMI syntax.

SNMP is passive except for the issuing the trap information. The switch supports a function to turn on or off the SNMP agent. If you set the field SNMP to **Enable**, the SNMP agent will be launched. All supported MIB OIDs, including RMON MIB, can be accessed via SNMP manager. If SNMP is set to **Disable**, the SNMP agent will not be activated. The related Community Name, Trap Host IP Address, Trap and all MIB counters will be ignored.

Function name:

SNMP Configuration

Function description:

This function is used to configure SNMP settings, community name, trap host and public traps as well as the throttle of SNMP. A SNMP manager must pass authentication by identifying both community names, then it can access the MIB information of the target device. So, both parties must have the same community name. Once the setting has been completed, click **Apply** and the setting will take effect.

Parameters description:

SNMP:

The term SNMP is used for the activation or de-activation of SNMP. Default is **Enable**.

Get/Set/Trap Community:

Community name is used as the password for authenticating if the requesting network management unit belongs to the same community group. If they don't have the same community name, they don't belong to the same group. Hence, the requesting network management unit cannot access a device with a different community name via SNMP protocol; If they both have the same community name, they can talk each other.

Community name is user-definable with a maximum length of 15 characters and is case sensitive. No blank spaces are permitted in the community name string. Any printable character is allowed.

The community name for each function works independently. Each function has its own community name. The community name for GET only works for the GET function and can't be applied to other function such as SET and Trap.

Default SNMP function: **Enable**

Default community name for GET: **Public**

Default community name for SET: **Private**

Default community name for Trap: **Public**

Default Set function: **Enable**

Default trap host IP address: **0.0.0.0**

Default port number: **162**

Trap:

There are six supported trap hosts. Each has its own community name and IP address and is user-definable. To create a trap host means to create a trap manager by assigning an IP address to the host the trap message. In other words, the trap host is a network management unit with SNMP manager receiving the trap message from a switch with SNMP agent issuing the trap message. Six trap hosts can prevent the important trap message from being lost.

For each public trap, the switch supports the trap event Cold Start, Warm Start, Link Down, Link Up and Authentication Failure Trap. They can be enabled or disabled individually. When enabled, the corresponded trap will actively send a trap message to the trap host when a trap occurs. If all public traps are disabled, no public trap message will be sent. The Enterprise (no. 6) trap is classified as private trap, which is listed in the Trap Alarm Configuration function folder.

Default for all public traps: **Enable**.
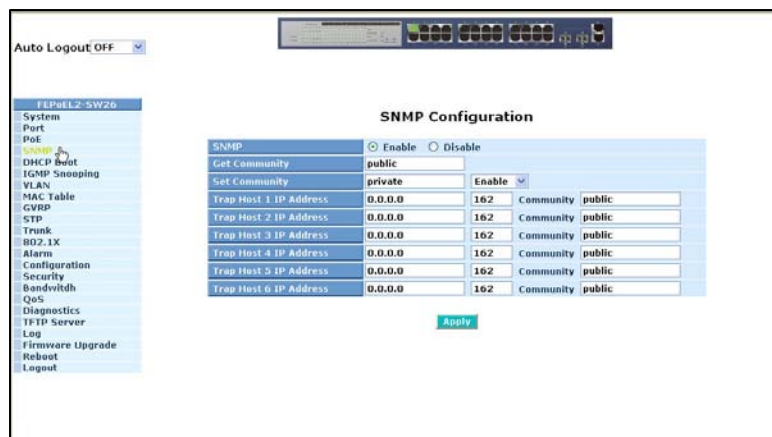
Figure 5.17 - Community and trap host setting

5.11   DHCP Boot

The DHCP Boot function is used to spread the request broadcast packet into a bigger time frame to prevent the traffic congestion due to broadcast packets from many network devices which may seek its NMS, boot server, DHCP server and predefined connections in case the whole building or block loses power. When this happens, the switch has to be rebooted. Switches or other network devices on the LAN will try their best to find the server to return to their services or try to set up the predefined links. Many broadcast packets will be issued.

The switch supports a random delay time for DHCP and boot delay for each device. This suppresses the broadcast storm while all devices are booting at the same time. The maximum user-defined delay time is 30 seconds. If DHCP Broadcasting Suppression function is enabled, the delay time is set randomly, ranging from 0 to 30 seconds. The exact delay time is computed by the switch itself. The default is **Disable**.
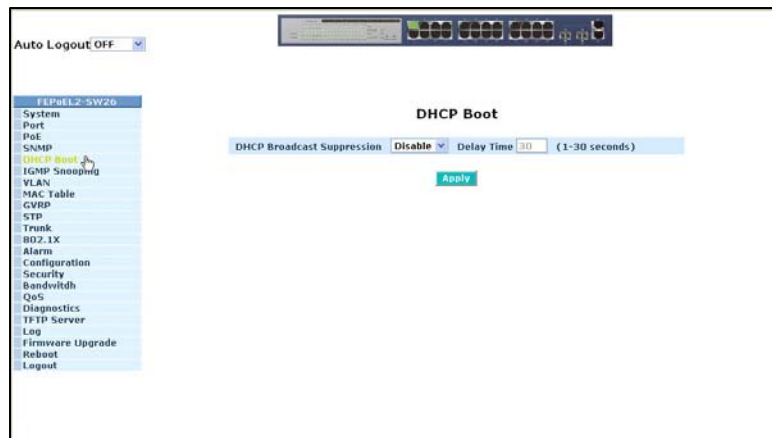
Figure 5.18 - DHCP

5.12   IGMP Snooping

IGMP snooping is used to establish the multicast groups to forward multicast packets to member ports. IGMP snooping avoids wasting the bandwidth while IP multicast packets are running over the network. A switch that does not support IGMP snooping cannot tell a multicast packet from broadcast packet, so it treats them as broadcast packets. Without IGMP snooping, the multicast packet forwarding function is no different from broadcast packets.

A switch with IGMP snooping supports the functions of query, report and leave. A type of packet exchanged between IP multicast router/switch and IP multicast host can update the information of the multicast table when a member (port) joins or leaves an IP multicast destination address. With this function, once a switch receives an IP multicast packet, it will forward the packet to the members who had joined a specified IP multicast group.

Figure 5.19 – IGMP Status

Function name:

IGMP Snooping

Function description:

IGMP is used to snoop the status of IP multicast groups and display its associated information in both tagged VLAN and non-tagged VLAN networks. Enabling IGMP with either passive or active mode, you can monitor the IGMP snooping information, which contains the multicast member list with the multicast groups, VID and member port.

Parameter description:

IGMP snooping mode selection:

The switch supports three kinds of IGMP Snooping status, including **passive**, **active** and **disable**.

Disable:

Use the **disable** mode to disable IGMP Snooping function.

Default: **Disable**

Active:

In the **active** mode, IGMP snooping will periodically issue the Membership Query message to all attached hosts and gather the membership report message to update the database of the multicast table. This also reduces the unnecessary multicast traffic.

Passive:

In **passive** snooping mode, IGMP snooping will not periodically poll the hosts in the groups. The switch will send a Membership Query message to all hosts only when it has received a Membership Query message from a router.

IP Address:

Shows all multicast groups IP addresses that are registered on this device.

VLAN ID:

Shows VLAN ID for each multicast group.

Member Port:

Shows member ports that join each multicast group.

Function name:

Allowed Group

Function description:

The Allowed Group function provides set up by IGMP Snooping to the IP multicast table based on the user's specific conditions. IGMP reports packets that meet the items that have been defined.
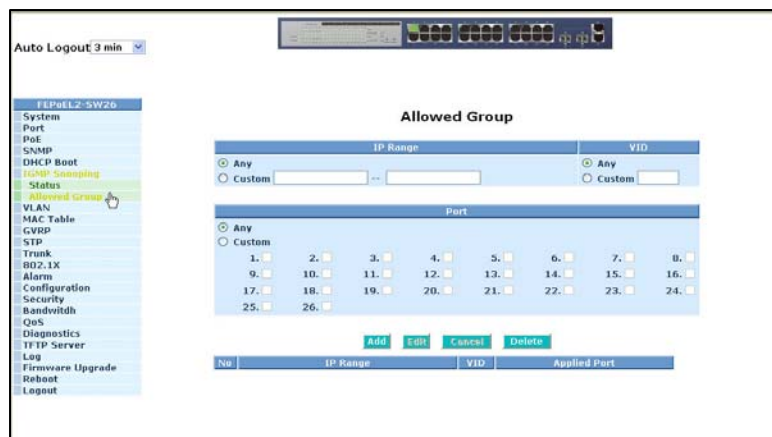

Figure 5.20 – Allowed Group

Parameter description:

IP Range:

The switch supports two options for managing a valid IP range: **Any** and **Custom**. The default is **Any**. If **Custom** had been chosen, you can assign the effective IP range. The valid range is 224.0.0.0~239.255.255.255.

VID:

>   The switch supports two options for managing a valid VLAN VID: **Any** and **Custom**. The default is **Any**. **Custom** allows you to fill in VID number. The valid VID range is 1~4094.

Port:

>   The switch supports two options for managing a valid port range: **Any** and **Custom**. The default is **Any**. If Custom is used, you may select the ports to be included in the allowed group.

Add:

>   Use **add** to create a new entry for allowed group configuration once you have set the parameters listed above.

Edit:

>   The existed entry also can be modified by using the **Edit** button.

Delete:

>   Use **delete** to remove the existed entry of allowed group configuration from the allowed group.

5.13   VLANs

The switch supports Tag-based VLAN (802.1q) and Port-based VLANs. 256 active VLANs are supported and VLAN ID can range from 1~4094. VLAN configuration is used to partition your LAN into small segments based on your LAN requirements. By properly configuring VLANs, you can improve security and increase performance.

5.13.1   VLAN Mode

Function name:

>   VLAN Mode Setting

Function description:

>   The VLAN Mode Selection function includes two modes: Port-based and Tag- based. Choose a mode by using the drop-down list and selecting an item. Click **Apply** and the settings will take effect immediately.

Parameter description:

>   VLAN Mode:

>>   Tag-based:

>>>   Tag-based VLAN identifies its member by VID. Tag-based VLANs are different from port-based VLANs. If there are additional rules in ingress filtering list or egress filtering list, the packet will be screened with filtering criteria to determine if it can be forwarded. The switch supports 802.1q.

>>>   Each tag-based VLAN must be assigned a VLAN name and VLAN ID. Valid VLAN ID is 1-4094. You may create total up to 256 Tag VLAN groups.

>>   Port-based:

>>>   Port-based VLAN is defined by port. Any packet coming in or out 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 Ports 1, 2, 3 & 4, and if you are connected to Port 1, you can communicate with Port 2-4. If you are connected to Port 5, you cannot communicate with those ports. Each port-based VLAN must be assigned a group name. This switch can support a maximum of 26 port-based VLAN groups.

Symmetric VLAN:

This is an Ingress Rule. This rule forwards only packets with VIDs matching this port's configured VID. For example, if port 1 receives a tagged packet with VID=100 (VLAN named=VLAN100), and if the Symmetric-VLAN function is enabled, the switch will determine if port 1 is a member of VLAN100. If it is, the received packet is forwarded; otherwise, the received packet is dropped.

Note: If Symmetric VLAN is enabled and port 1, for example, receives an untagged packet, the switch will apply the PVID of port 1 to tag this packet. The packet will then will be forwarded. But if the PVID of port 1 is not 100, the packet will be dropped.

SVL:

If SVL is enabled, all VLANs use the same filtering database storing the membership information of the VLAN to learn or look up the membership information of the VLAN. If SVL is disabled, the learning mode is IVL. In this mode, VLANs use different filtering database storing the membership information of the VLAN to learn or look up the information of a VLAN member.

Double Tag:

Double-tag mode belongs to the tag-based mode, however, it would treat all frames as untagged ones, which means that the tag with PVID will be added into all packets. Then, these packets will be forwarded as Tag-based VLANs. So, the incoming packets with tag will become the double-tag ones.

.
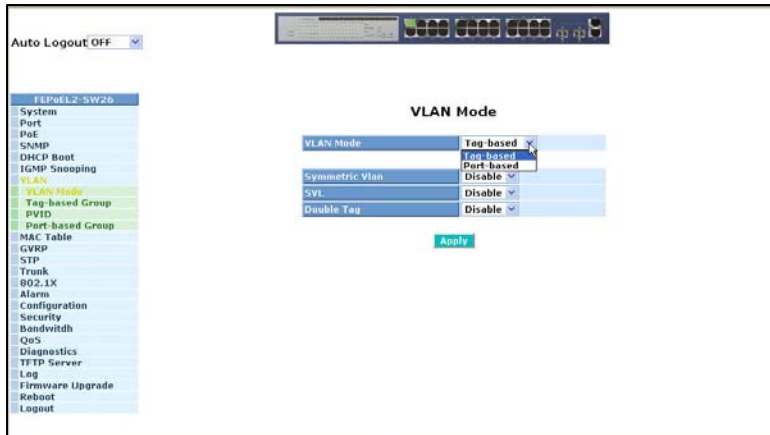
Figure 5.21 – VLAN Mode

5.13.2   Tag-based Group

Function name:

Tag-based Group Configuration

Function description:

Displays tag-based VLAN groups. Use this option to create, edit and delete a tag-based VLAN groups. Add a new VLAN group by inputting a new VLAN name and VLAN ID.

Parameter description:

VLAN Name:

Valid letters are A-Z, a-z, 0-9, " - " and "_" characters. The maximum length is 15 characters.

VID:

VLAN identifier. Each tag-based VLAN group has a unique VID used in tag-based and Double-tag mode.

Member:

Used to enable or disable a member port. **Enable** means the port is a member of the VLAN. Select the check box (☑) beside **Port X** to enable it.
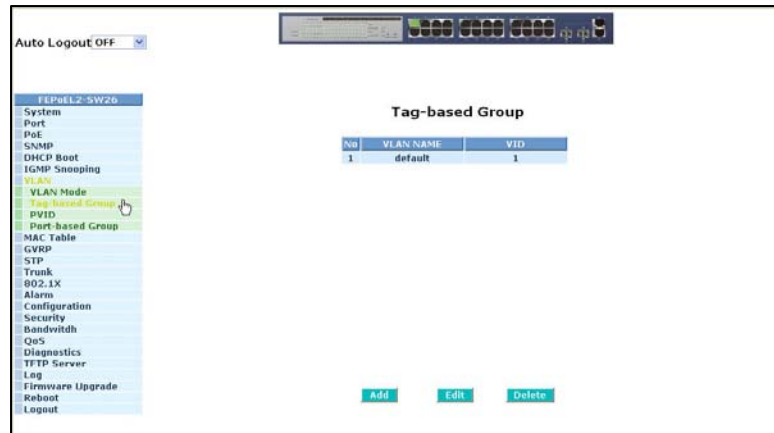
Figure 5.22 – Tag-based Group

Add Group:

Input the VLAN name and VID. Choose the member by clicking the check box beside the port number to create a new tag-based VLAN. The parameter of untag stands for an egress rule for the port. If you select the check box beside the port number, packets with this VID outgoing from this port will be untagged. Select Apply to save the setting.

Figure 5.23 – Tag-based VLAN

Delete Group:

Press **Delete** to remove the selected group entry from the tag-based group table.
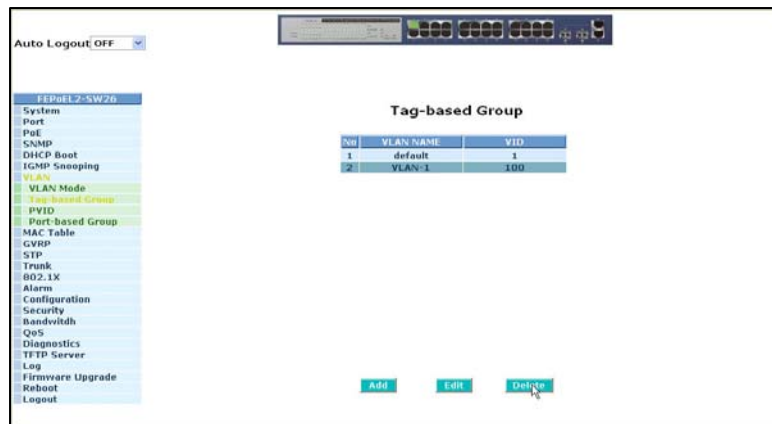
Figure 5.24 – Tag-based Group

Edit a group:

Select a group entry and select **Edit.** This allows you to modify the group's description, member and untagged settings.
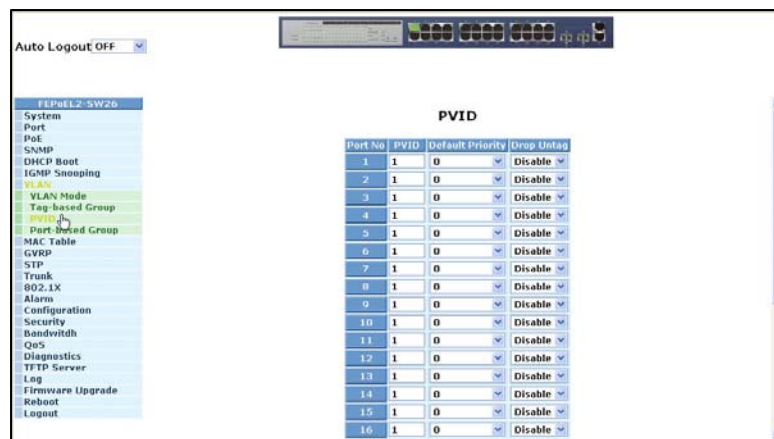
5.13.3   PVID

Function name:

PVID

Function description:

In the PVID Setting, you can input a range of VID numbers (1 to 4094) to each port. You can choose ingress filtering rule 2 to each port. The Ingress Filtering Rule 2 is **drop untagged frames**. If Rule 2 is enabled, the port will discard all Untagged-frames.

Figure 5.25 – PVID Settings

Parameter description:

Port 1-26:

Port number.

PVID:

The PVID range is 1-4094. Before setting the 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.

Default Priority:

It is based on 802.1p QoS and affects untagged packets. When the packets enter the switch, priority precedence will be applied according to your default priority setting and mapping to 802.1p priority setting in the QoS function. For example, if you set default priority for port 2 with 2 and transmit untagged packets to port 2, these packets will own priority 2 precedence based on your default 802.1p priority mapping setting in the QoS function and will be sent to Queue 1.

Drop Untag:

Drop untagged frame. You can configure a port to accept all frames (Tagged and Untagged) or just receive tagged frames. 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, and the rest packets will be discarded.

5.13.4   Port-Based Group

Function name:

Port-based Group Configuration

Function description:

Displays the information for the existing port-based VLAN groups. Use this function to create, edit and delete a port-based VLAN group. Add a new VLAN group by inputting a new VLAN name.

Parameter description:

VLAN Name:

Valid letters are A-Z, a-z, 0-9, " - " and "_" characters. The maximal length is 15 characters.

Member:

Used to enable or disable a member port. **Enable** means the port is a member of the VLAN. Select the check box (☑) beside the port x to enable it.
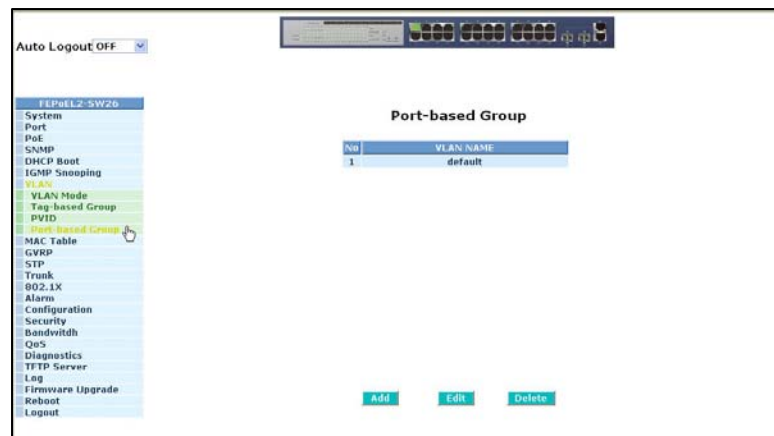
Figure 5.26 – Port-based Group

Add Group:

Create a new port-based VLAN. Input the VLAN name and choose the group member by selecting the check box beside the port number. Select **Apply** for the setting to take effect.
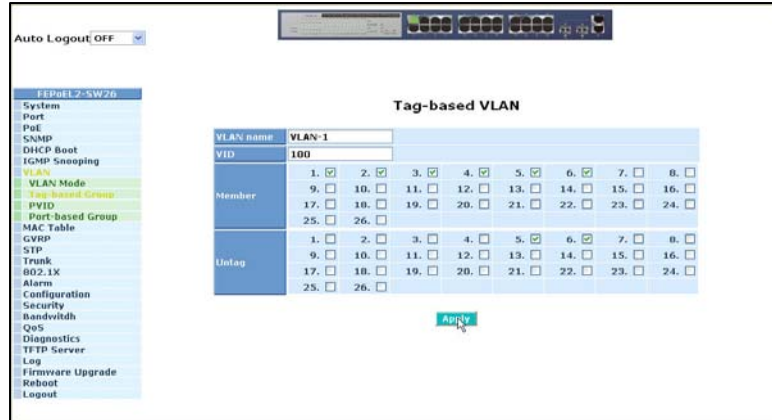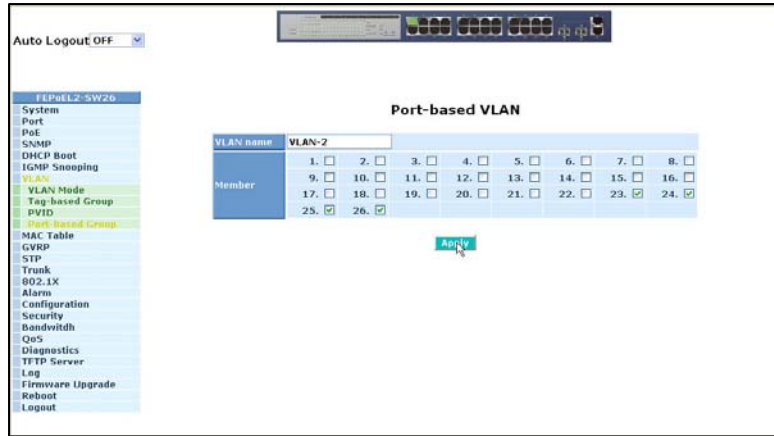
Figure 5.27 – Port-based VLAN

Delete Group:

Use **Delete** to remove the selected group entry from the port-based group table.
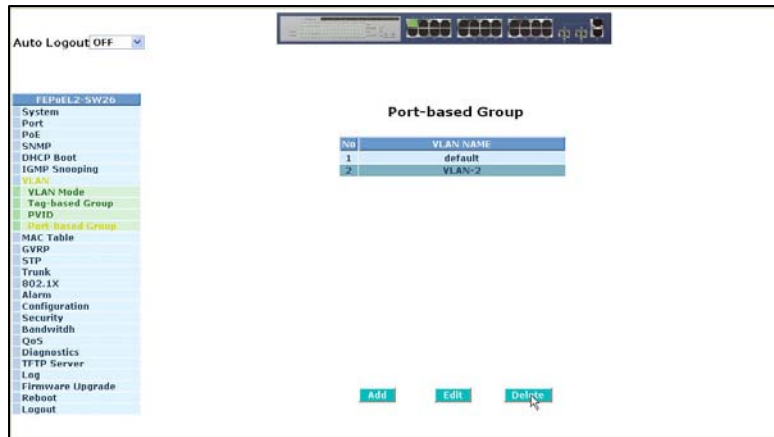
Figure 5.28 – Port-based Group

Edit a group:

To edit a group entry, use **Edit**. This allows you to modify a group's description and member set.

5.14 MAC Table

MAC Table Configuration gathers many functions, including MAC Table Information, MAC Table Maintenance, Static Forward, Static Filter and MAC Alias, which cannot be categorized to some function type. They are described below.

Function name:

MAC Table Information

Function Description:

Displays the static or dynamic learning MAC entry and the state for the selected port.

Parameter description:

Port:

Select the port.

Search:

Set up the MAC entry.

The default is ??-??-??-??-??-??

MAC:

Displays the MAC address of the entry selected from the searched MAC entries table.

Alias:

Set up the Alias for the selected MAC entry.

Set Alias:

Save the Alias of MAC entry you set up.

Search:

Find the entry that meets your setup.

Previous Page:

Move to the previous page.

Next Page:

Move to the next page.

Alias:

The Alias of the searched entry.

MAC Address:

The MAC address of the searched entry.

Port:

The port that exists in the searched MAC Entry.

VID:

VLAN Group that MAC Entry exists.

State:

Displays the method for this MAC entry. It may show "Dynamic MAC" or "Static MAC".
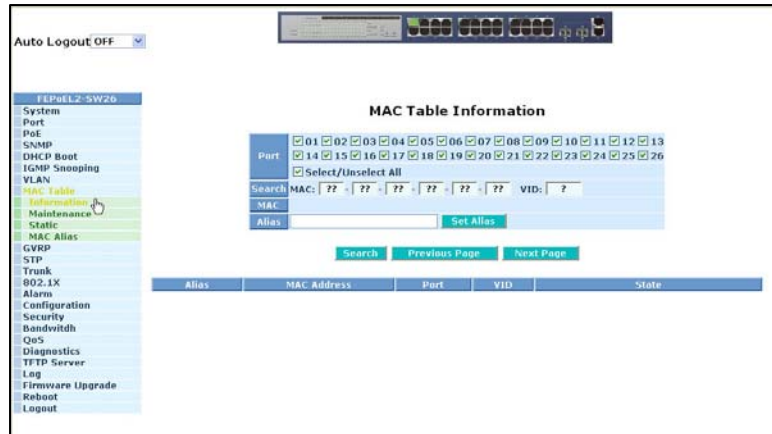
Figure 5.29 – MAC Table Information

Function Name:

MAC Table Maintenance

Function Description:

This function allows the user to set up the processing mechanism of the MAC Table. An idle MAC address exceeding MAC address age-out time will be removed from the MAC Table. The range of age-out time is 10-1000000 seconds, and the setup of this time will have no effect on static MAC addresses.

Parameter description:

Aging Time:

Deletes a MAC address which is idling for a period of time from the MAC Table, which will not affect static MAC address. Range of MAC address aging time is 10-1000000 seconds. The default aging time is 300 seconds.

Learning Limit:

Set up the maximum amount of MAC addresses that each port can learn. Valid value of learning limit for ports 1~24 ranges from 0-8191. For ports 25 and port 26, only the fixed value **8192** is assigned to these two ports and you cannot configure this value.
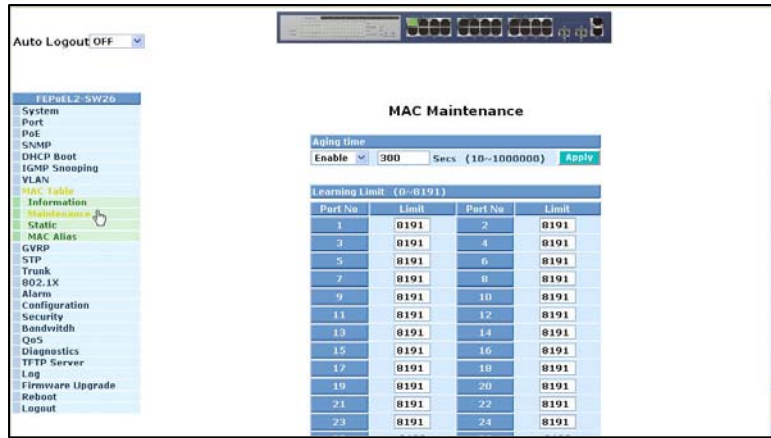
Figure 5.30 – MAC Maintenance

Function Name:

Function Name:

Static Setting

Function Description:

The static function is used to configure MAC's real attributes inside of the switch. The three attributes that can be configured are: static, static with destination drop and static with source drop.

If **static** is chosen, assign a MAC address to a specific port. All traffic from this MAC address will be forwarded to this port.

If **static with destination drop** is chosen, the packet will be dropped if its DA is equal to the value you have set. This setting is global, so, it may affect all ports' transmission of the packets.

If **static with source drop** is chosen, the packet will be dropped if its SA is equal to the value you set. This setting is global so, it may affect all ports' transmission of the packets.

Figure 5.31 – Static MAC Settings

Parameter description:

MAC:

Six-byte Ethernet hardware address and usually expressed by hex and separated by hyphens. For example,

00 – 40 - C7 - D6 – 00 - 01

VID:

VLAN identifier. This will be filled only when tagged VLAN is used. Valid range is 1 ~ 4094.

Queue (Priority):

Set the priority(0~3) for the MAC.

Forwarding Rule(Drop Policy):

Static:

A MAC address is assigned to a specific port. Traffic from this MAC address will be forwarded to this port.

Static with Destination Drop:

If the DA of the incoming packets meets the value you set, these packets will be dropped.

Static with Source Drop:

If the SA of the incoming packets meets the value you set, these packets will be dropped.

Port :

Select the port number to set in the switch (ports 1 ~26).

Function name:

MAC Alias

Function description:

MAC Alias function is used to assign MAC address an English name. This will help identify which MAC address belongs to a user in the illegal access report. At the initial time, all pairs of the existing alias name and MAC address are shown.

There are three MAC alias functions in this function folder, including MAC Alias Add, MAC Alias Edit and MAC Alias Delete. Use **Create/Edit** to add/modify a new or an existing alias name for a specified MAC address, or mark an existing entry for deletion. Alias name must be composed of A-Z, a-z and 0-9 only and has a maximal length of 15 characters.

Function name:

MAC Alias Create/Edit or Delete

Function description:

In the MAC Alias function, MAC Alias Add/Edit function is used to let you add or modify an association between MAC address and an English name. Select **Create/Edit** to add a new record with name.

Select the MAC Alias Delete function to remove an alias name from a MAC address. You can select an existing MAC address or alias name for removal.
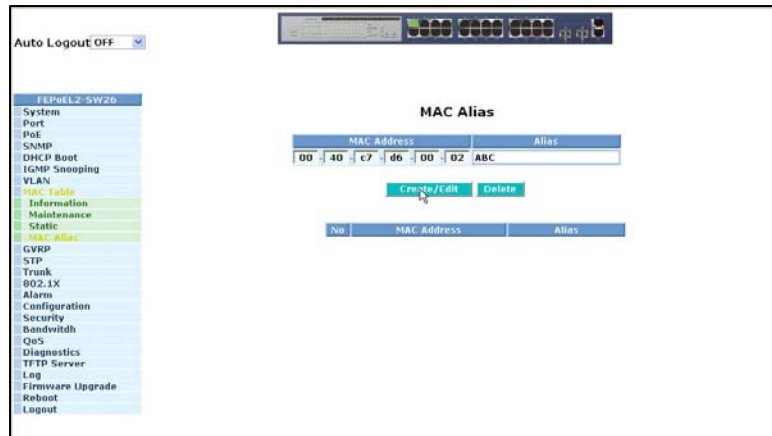
Figure 5.32 – MAC Alias
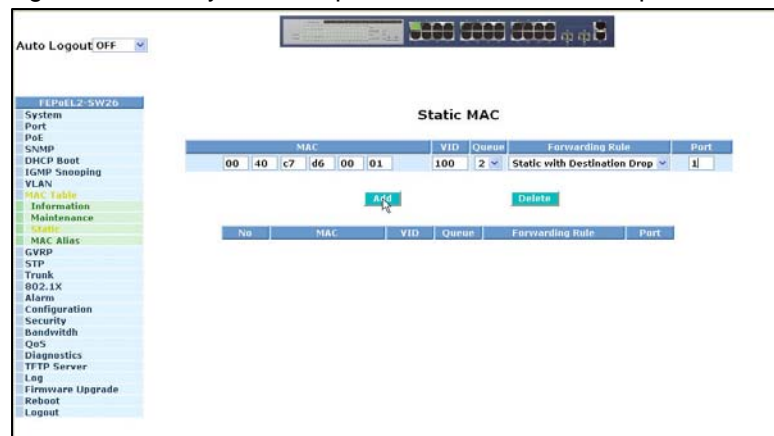
Parameter description:

MAC Address:

Six-byte Ethernet hardware address and usually expressed by hex and separated by hyphens. For example,

00 – 40 - C7 - D6 – 00 - 01

Alias:

Assigned MAC alias name.

Note: If there are too many learned MAC addresses, it is recommended to input the MAC address and alias name directly.

5.15   GVRP Configuration

GVRP is an application based on the Generic Attribute Registration Protocol (GARP), mainly used to automatically and dynamically maintain the group membership information of the VLANs. GVRP provides the VLAN registration service through a GARP application. The GARP Information Declaration (GID) is used to maintain the ports associated with their attribute database and GARP Information Propagation (GIP) to communicate among switches and end stations. With GID information and GIP, GVRP state machine maintain the contents of Dynamic VLAN Registration Entries for each VLAN and propagate these information to other GVRP-aware devices to setup and update their knowledge database, the set of VLANs associated with currently active members, and through which ports these members can be reached.
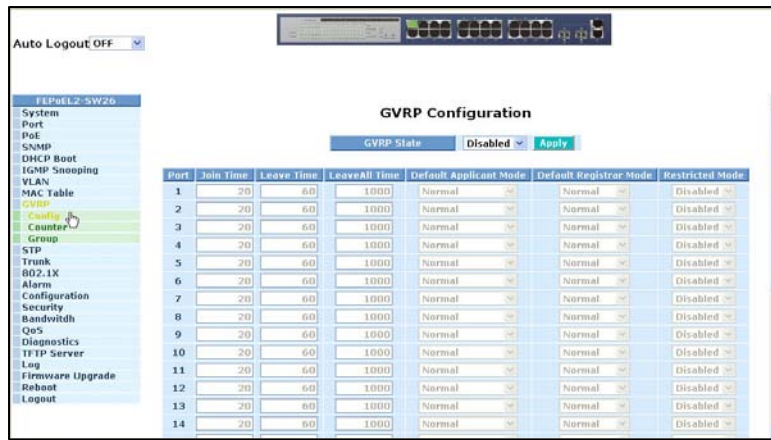
Figure 5.33 – GVRP Configuration

GVRP cannot be enabled unless the VLAN mode is set to Tag based.

The following three functions are supported with GVRP:

Function name:

GVRP Config

Function description:

The function of GVRP Config is used to configure each port's GVRP operation mode. There are seven parameters to be configured which are described below.

Parameter description:

GVRP State Setting:

This function allows you to enable or disable the GVRP function. Use the drop down list and select the **Downward** arrow key to choose **Enable** or **Disable**. Select **Apply** and the function will take effect immediately.

Join Time:

Used to declare the Join Time in unit of centisecond. Valid time range: 20 –100 centisecond, Default: 20 centisecond.

Leave Time:

Used to declare the Leave Time in unit of centisecond. Valid time range: 60 –300 centisecond, Default: 60 centisecond.

Leave All Time:

A registered device will be de-registered at the end of this time period. If someone still issues a new join, then a registration will be kept in the switch. Valid range: 1000-5000 unit time, Default: 1000 unit time.

Default Applicant Mode:

There are two modes that indicate the type of participant: normal participant and non-participant.

Normal:

In the **normal participant** mode, the switch participates normally in GARP protocol exchanges. The default setting is **Normal**.

Non-Participant:

In the **non-participant** mode, the switch does not send or reply any GARP messages. The switch listens for messages and reacts for the received GVRP BPDU.

Default Registrar Mode:

There are three types of parameters for **registrar** mode: registrar administrative control value, normal registrar, fixed registrar and forbidden registrar.

Normal:

The Registrar responds normally to incoming GARP messages. The default setting is Normal.

Fixed:

The Registrar ignores all GARP messages, and all members remain in the registered (IN) state.

Forbidden:

The Registrar ignores all GARP messages, and all members remain in the unregistered (EMPTY) state.

Restricted Mode:

This function is used to restrict dynamic VLAN be created when this port received GVRP PDU. There are two modes: disable and enable.

Disabled:

In this mode, the switch dynamic VLAN will be created when this port received GVRP PDU. The default setting is Normal.

Enabled:

In this mode, the switch does not create dynamic VLAN when this port received GVRP PDU. Except received dynamic VLAN message of the GVRP PDU is an existed static VLAN in the switch. This port will be added into the static VLAN members dynamically.

Function name:

GVRP Counter

Function description:

GVRP counters are divided into Received and Transmitted categories which allows you monitor the GVRP actions. They are GARP packets.
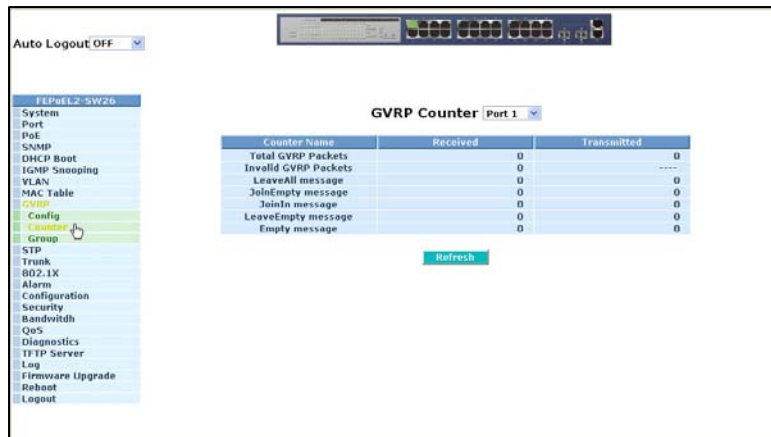
Figure 5.34 – GVRP Counter

Parameter description:

Received:

Total GVRP Packets:

Total GVRP BPDU received by the GVRP application.

Invalid GVRP Packets:

Number of invalid GARP BPDU received by the GARP application.

LeaveAll Message Packets:

Number of GARP BPDU with Leave All message received by the GARP application.

JoinEmpty Message Packets:

Number of GARP BPDU with Join Empty message received by the GARP application.

JoinIn Message Packets:

Number of GARP BPDU with Join In message received by the GARP application.

LeaveEmpty Message Packets:

Number of GARP BPDU with Leave Empty message received by the GARP application.

Empty Message Packets:

Number of GARP BPDU with Empty message received by the GARP application.

Transmitted:

Total GVRP Packets:

Total GARP BPDU transmitted by the GVRP application.

Invalid GVRP Packets:

Number of invalid GARP BPDU transmitted by the GVRP   application.

LeaveAll Message Packets:

Number of GARP BPDU with Leave All message transmitted by the GARP application.

JoinEmpty Message Packets:

Number of GARP BPDU with Join Empty message transmitted by the GARP application.

JoinIn Message Packets:

Number of GARP BPDU with Join In message transmitted by the GARP application.

LeaveEmpty Message Packets:

Number of GARP BPDU with Leave Empty message transmitted by the GARP application.

Empty Message Packets:

Number of GARP BPDU with Empty message transmitted by the GARP application.

Function name:

GVRP Group Information

Function description:

To show the dynamic group member and their information.

Parameter description:

Current Dynamic Group Number :

The number of GVRP groups that are currently created.

VID:

VLAN identifier. When a GVRP group is created, each dynamic VLAN group owns its VID. Valid range is 1 ~ 4094.

Member Port:

Those are the members belonging to the same dynamic VLAN group.

Edit Administrative Control:

When you create a GVRP group, use the Administrative Control function to change the Applicant Mode and Registrar Mode of a GVRP group member.

Refresh:

Refresh function allows you to see current GVRP group status.

Figure 5.35 – GVRP VLAN Group Information

5.16   Spanning Tree Configuration (STP) Configuration

The Spanning Tree Protocol (STP) is a standardized method (IEEE 802.1D) used to avoid loops in switched networks. When STP is enabled, only one path is active between any two nodes on the network at a time. Once Spanning Tree Protocol has been enabled, advanced functions can be configured. It is recommend that STP is enabled to ensure a single active path on the network.

5.16.1   STP Status

Function name:

STP Status

Function description:

Spanning Tree Status displays the current status of 12 parameters. The 12 parameters are described below:

Parameter description:

STP State:

Displays the current STP Enabled / Disabled status. Default is "Disabled".

Bridge ID:

Displays the switch's bridge ID which is the MAC address of this switch.

Bridge Priority:

Displays the switch's current bridge priority setting. Default is 32768.

Designated Root:

Displays the root bridge ID of this network segment. If this switch is a root bridge, the "Designated Root" will show this switch's bridge ID.

Designated Priority:

Displays the current root bridge priority.

Root Port:

Displays port number connected to root bridge with the lowest path cost.

Root Path Cost:

Displays the path cost between the root port and the designated port of the root bridge.

Current Max. Age:

Displays the current root bridge maximum age time. Maximum age time is used to monitor STP topology. When a bridge does not receive a hello message from root bridge until the maximum age time is counted down to 0, the bridge will treat the root bridge as malfunctioned and issue a Topology Change Notification (TCN) BPDU to all other bridges.

All bridges in the LAN will re-learn and determine the root bridge. Maximum Age time is assigned by root bridge in unit of seconds. Default is 20 seconds.

Current Forward Delay:

Displays the current root bridge forward delay time. The value of Forward Delay time is set by root. The Forward Delay time is defined as the time spent from Listening state moved to Learning state or from Learning state moved to Forwarding state of a port in bridge.

Hello Time:

Displays the current hello time of the root bridge. Hello time is a time interval specified by root bridge. It is used to request all other bridges periodically sending hello message to the bridge attached to its designated port.

STP Topology Change Count:

STP Topology Change Count expresses the time spent in a unit of seconds since the beginning of the Spanning Tree Topology Change to the end of the STP convergence. Once the STP change is converged, the Topology Change count will be reset to 0. The figures showing in the screen may not be the exact time it spent but very close to, because the time is eclipsing.

Time Since Last Topology Change:

Time Since Last Topology Change is the accumulated time in unit of seconds the STP has been since the last STP Topology Change was made. When Topology Change is initiated again, the counter will be reset to 0 and resume counting once the STP topology change is completed.
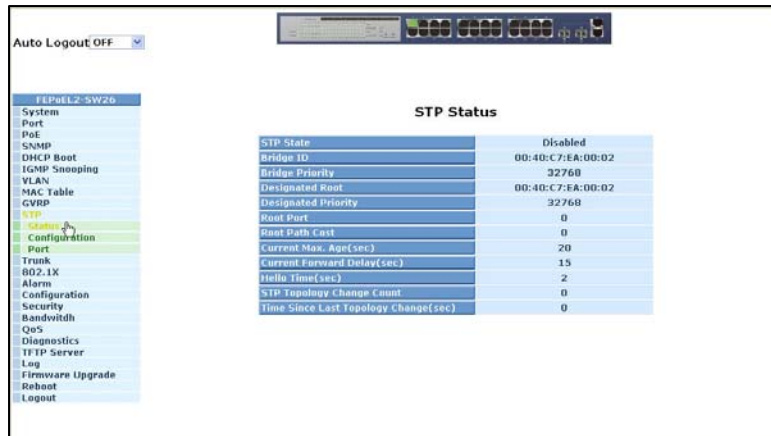
Figure 5.36 – STP Status

5.16.2 STP Configuration

STP includes Rapid Spanning Tree Protocol (RSTP). STP has six parameters to be configured. These parameters are described below.

Function name:

STP Configuration

Function description:

Set the following Spanning Tree parameters to control STP function (enable/disable). Select mode RSTP/STP and affect STP state machine behavior to send BPDU in the switch. The default setting of STP is **Disable**.

Parameter description:

Spanning Tree Protocol:

Set 802.1W Rapid STP function Enable / Disable. Default is "Disable"

Bridge Priority:

The lower the number for bridge priority, the higher the priority it will have. Usually, the bridge with the highest bridge priority is the root. If you want this switch to be the root bridge, set the value lower than that of the bridge in the LAN. The valid value is 0 ~ 61440. The default is 32768.

Hello Time:

Hello Time is used to determine the periodic time to send normal BPDU from designated ports among bridges. It decides how long a bridge should notify other bridges to say that it is up and connected. If the switch is the root bridge of the LAN, for example, all other bridges will use the hello time assigned by this switch to communicate with each other. The valid value is 1 ~ 10 in unit of second.

Default is 2 seconds.

Max. Age:

When the switch is the root bridge, the whole LAN will apply the number set by the switch as their maximum age time. When a bridge received a BPDU originating from the root bridge and if the message age conveyed in the BPDU exceeds the Max. Age of the root bridge, the bridge

will treat the root bridge as malfunctioning and issue a Topology Change Notification (TCN) BPDU to all other bridges. All bridges in the LAN will re-calculate to determine who the root bridge is. The valid value of Max. Age is 6 ~ 40 seconds. Default is 20 seconds.

Forward Delay:

You can set the root bridge forward delay time. This figure is set by the root bridge only. The forward delay time is defined as the time spent from Listening state moved to Learning state and also from Learning state moved to Forwarding state of a port in bridge. The forward delay time contains two states, Listening state to Learning state and Learning state to Forwarding state. It assumes that forward delay time is 15 seconds, then total forward delay time will be 30 seconds.

The valid value is 4 ~ 30 seconds, default is 15 seconds.

Force Version:

Two options are offered for the STP algorithm. One is RSTP and the other is STP. If STP is chosen, RSTP will run as a legacy STP. The switch supports RSTP (802.1w) which is backward compatible with STP (802.1d).
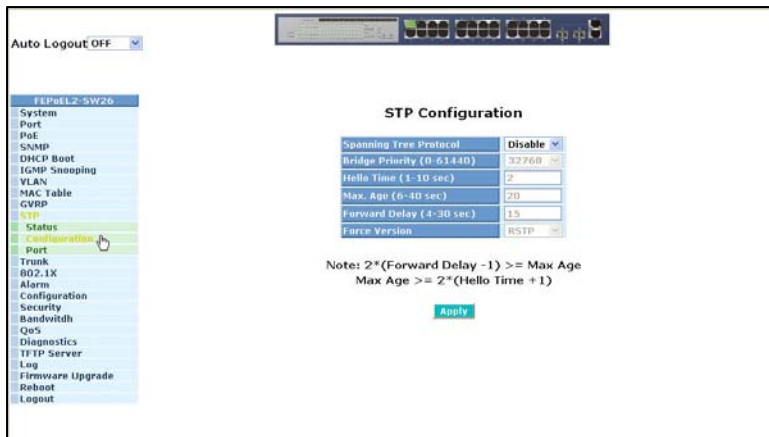
Figure 5.37 – STP Configuration

5.16.3   STP Port Configuration

Function name:

STP Port Setting

Function description:

In the STP Port Setting, one item selection and five parameters are available for setup. You can disable and enable each port. You can set "Path Cost" and "Priority" for each port and set "Admin Edge Port" and "Admin Point To Point".

Parameter description:

Port Status:

Displays the current state of a port for viewing only. There are three possible states. (according to 802.1w specification)

- ▪ DISCARDING state indicates that this port can neither forward packets nor contribute

learning knowledge.

- LEARNING state indicates this port can now contribute its learning knowledge but cannot forward packets.

- FORWARDING state indicates this port can both contribute its learning knowledge and forward packets normally.

Note: Three other states (Disable state, BLOCKING state and LISTENING state) defined in the 802.1d specification are now represented as DISCARDING state.

Path Cost Status:

The contribution value of the path through this port to Root Bridge. STP algorithm determines a best path to Root Bridge by calculating the sum of path cost contributed by all ports on this path. A port with a smaller path cost value would become the Root Port.

Configured Path Cost:

The range is 0 – 200,000,000. If the path cost is set to zero, the STP will get the recommended value resulted from auto-negotiation of the link accordingly and display this value in the field of Path Cost Status. Otherwise, the value set by the administrator set up will be displayed.

802.1w RSTP recommended value: (Valid range: 1 – 200,000,000)

> 10 Mbps: 2,000,000
>
> 100 Mbps: 200,000
>
> 1 Gbps: 20,000
>
> Default: 0

Priority:

Port Priority and Port Number are combined to form the Port ID. Port IDs are often compared in order to determine which port of a bridge would become the Root Port. The range is 0 – 240.

Default is 128.

Admin Edge Port:

If you select **Yes**, this port will be an edge port. An Edge Port is a port connected to a device that knows nothing about STP or RSTP. Usually, the connected device is an end station. Edge Ports will immediately transit to forwarding state and skip the listening and learning state because the edge ports cannot create bridging loops in the network. This will expedite the convergence. When the link on the edge port toggles, the STP topology keeps unchanged. Unlike the designate port or root port though, an edge port will transit to a normal spanning-tree port immediately if it receives a BPDU.

Default: No

Admin Point To Point:

A port is a point-to-point link, from RSTP's view, if it is in full-duplex mode. It is a shared link if it is in half-duplex mode. RSTP fast convergence can only happen on point-to-point links and on edge ports. This can expedite the convergence because this will have the port fast transited to forwarding state.

There are three parameters, Auto, True and False, used to configure the type of the point-to-

point link. If the parameter is configured to Auto, RSTP will use the duplex mode resulting from the auto-negotiation. If it goes into half-duplex, the port will not transit to Forwarding state. If it is set as True, the port is treated as point-to-point link by RSTP and unconditionally transited to Forwarding state. If it is set to False, fast transition to Forwarding state will not occur on this port.

Default: **Auto**

M Check:

Migration Check. Forces the port sending out an RSTP BPDU instead of a legacy STP BPDU at the next transmission. The only benefit of this operation is to make the port quickly get back to act as an RSTP port. Select **M Check** to send a RSTP BPDU from the port you specified.

Figure 5.38 – STP Port Configuration

5.17   Trunking Configuration

The Port Trunking Configuration is used to configure the settings of Link Aggregation. More than one port can be bundled with the same speed, full duplex and the same MAC to be a single logical port. The logical port aggregates the bandwidth of these ports. This means you can apply your current Ethernet equipment 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.

The switch supports two types of port trunking methods:

LACP:

Ports using Link Aggregation Control Protocol (according to IEEE 802.3ad specification) as their trunking method can choose their unique LACP GroupID (1~3) to form a logic "trunked port". The benefit of using LACP is that a port makes an agreement with its peer port before it becomes a ready member of a "trunk group" (also called aggregator). LACP is safer than the other trunking method - static trunk.

The switch LACP does not support the followings:

— Link Aggregation across switches

— Aggregation with non-IEEE 802.3 MAC link

— Operating in half-duplex mode

— Aggregate the ports with different data rates

Static Trunk:

Ports using Static Trunk as their trunk method can choose their unique Static Group ID (also 1~3, this Static group ID can be the same with another LACP group ID) to form a logic "trunked port". The benefit of using Static Trunk method is that a port can immediately become a member of a trunk group without handshaking with its peer port. This is a disadvantage because the peer ports of the static trunk group may not know that they should be aggregate together to form a "logic trunked port". Using Static Trunk on both end of a link is strongly recommended. Low speed links will stay in "not ready" state when using static trunk to aggregate with high speed links.

The switch supports a maximum of three trunk groups for LACP and additional three trunk groups for Static Trunk. In the system capability view, only three "real trunked" groups are supported. An LACP trunk group with more than one ready member-ports is a "real trunked" group. An LACP trunk group with only one or less than one ready member-ports is not a "real trunked" group. Any Static trunk group is a "real trunked" group.

Per Trunking Group supports a maximum of four ready member-ports. Please note that some decisions will automatically be made by the system while you are configuring your trunking ports. Trunk setting rules are listed below:

▪ Maximum of three groups are allowed
▪ The members of each group cannot exceed more than four ports
▪ Group 1 and 2 cannot exist in ports 25 and 26
▪ Group 3 cannot exist in ports 1~24

Function name:

Port Setting/Status

Function description:

Port setting/status is used to configure the trunk setting for the ports.

Parameter description:

Method:

This determines the method a port uses to aggregate with other ports.

None: (default)

A port does not aggregate with other ports.

LACP:

A port uses LACP as its trunk method to aggregate with other ports also using LACP.

Static:

A port uses Static Trunk as its trunk method to aggregate with other ports also using Static Trunk.

Group:

Ports choosing the same trunking method other than "None" must be assigned a unique Group number (i.e. Group ID, valid value is from 1 to eight) so they can aggregate with each other.

Active LACP:

This field is only available when a port's trunking method is LACP.

Active:

An Active LACP port begins to send LACPDU to its link partner as soon as the LACP protocol entity takes control of this port.

Passive:

A Passive LACP port will not actively send LACPDU out until it receives an LACPDU from its link partner.

Aggtr:

Aggtr is an abbreviation of "aggregator". Every port is also an aggregator, and its own aggregator ID is the same as its own port number. An aggregator is a representative of a trunking group. Ports with same Group ID and using same trunking method will have the opportunity to aggregate to a particular aggregator port. This aggregator port is usually the port with the smallest port number within the trunking group.

Status:

This field represents the trunking status of a port which uses a trunking method other than "None". It also represents the management link status of a port which uses the "None" trunking method. "---" means "not ready"

Figure 5.39 – Trunk Port Setting/Status

Function name:

Aggregator View

Function description:

To display the current port trunking information from the aggregator point of view.

Parameter description:

Aggregator:

Displays the aggregator ID (from 1 to 26) of every port. Every port is also an aggregator, and its own aggregator ID is the same as its own port number.

Method:
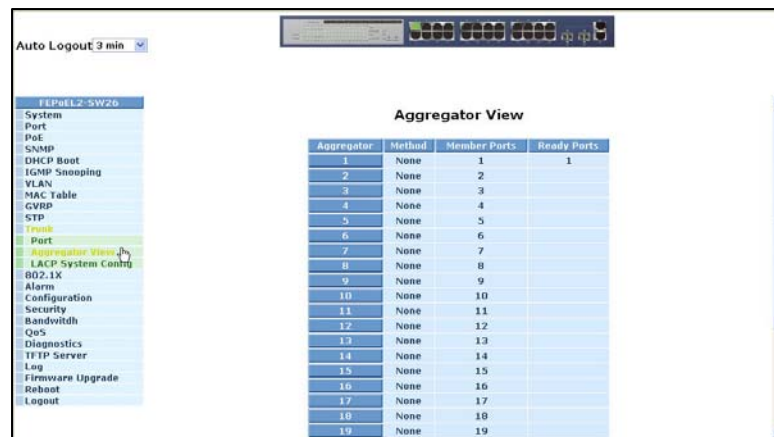
Displays the method a port uses to aggregate with other ports.

Member Ports:

Displays all member ports of an aggregator (port).

Ready Ports:

Displays only the ready member ports within an aggregator (port).

Figure 5.41 – Aggregator View

Function name:

LACP Detail (LACP Aggregator Detailed Information)

Function description:

Displays the detailed information of the LACP trunking group.

Parameter description:

Actor:

The switch you are using to view LACP.

Partner:

The peer system from the aggregator's view.

System Priority:

Displays the System Priority of a system ID.

MAC Address:

    Displays the MAC Address of a system ID.

Port:
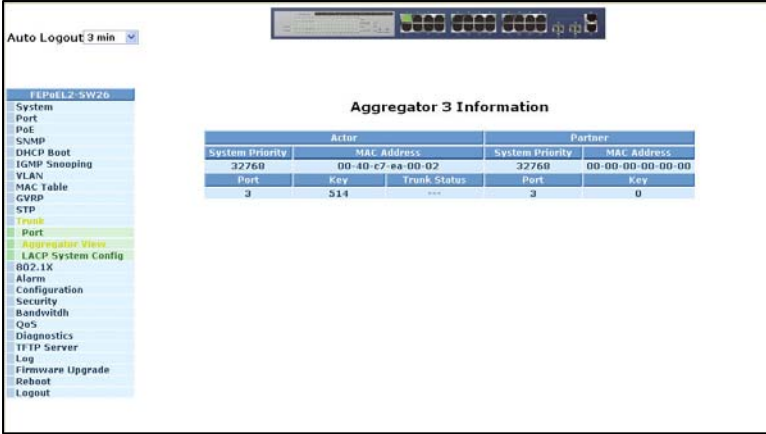
    Displays the port number of an LACP port ID.

Key:

    Displays the key value of the aggregator. The key value is determined by the LACP protocol entity and can't be set through management.

Trunk Status:

    Displays the trunk status of a single member port."---" means "not ready"

Figure 5.42 – Aggregator 3 Information

Function name:

    LACP System Configuration

Function description:

    Used to set the priority of the LACP system ID. LACP will only aggregate together the ports whose peer link partners are all on a single system. Each system supports LACP will be assigned a globally unique System Identifier for this purpose. A system ID is a 64-bit field comprising a 48-bit MAC Address and 16-bit priority value.

Parameter description:

    System Priority:

    The System Priority can be set by the user. Its range is from 1 to 65535. Default: 32768

    Hash Method:

    DA+SA, DA and SA are three **hash methods** offered for the Link Aggregation of the switch. Packets will decide the path to transmit according to the mode of hash that has been chosen.

    Default: DA and SA
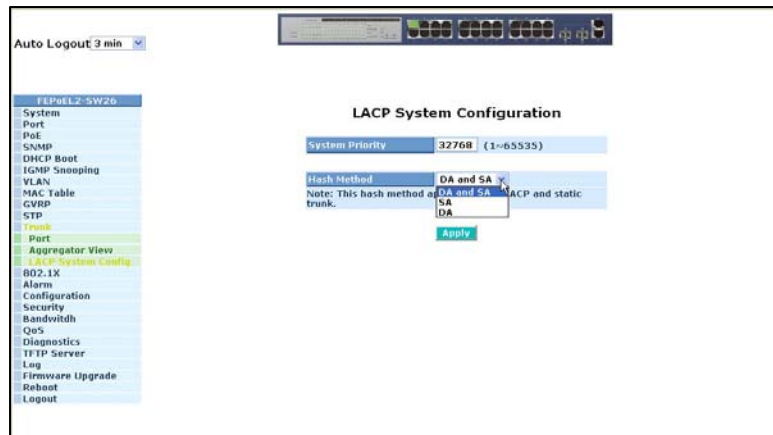
Figure 5.42 – LACP System Configuration

5.18 802.1X Configuration

802.1X port-based network access control provides a method to restrict users to access network resources via authenticating user's information. This restricts users from gaining access to the network resources through a 802.1X-enabled port without authentication. To access the network through a port under 802.1X control, you must first input your account name for authentication and wait to gain authorization before sending or receiving any packets from a 802.1X-enabled port.

Before the devices or workstations can access the network resources through the ports under 802.1X control, the devices or workstations must send an authentication request to the authenticator. The authenticator passes the request to the authentication server to authenticate and verify, and the server informs the authenticator to grant the request for authorization for the ports.

According to IEEE 802.1X, there are three components are implemented:
▪ Supplicant
▪ Authenticator
▪ Authentication server shown in Figure 5.43.

Supplicant:
▪ An entity authenticated by an authenticator. Used to communicate with the Authenticator PAE (Port Access Entity) by exchanging the authentication message when the Authenticator PAE performs a request.

Authenticator:
▪ An entity facilitates the authentication of the supplicant entity. It controls the state of the port, authorized or unauthorized, according to the result of authentication message exchanged between it and a supplicant PAE. The authenticator may request the supplicant to re-authenticate itself at a configured time period. Once re-authenticating has begun, the

controlled port remains in the authorized state until re-authentication fails.
- A port acting as an authenticator is thought to be two logical ports, a controlled port and an uncontrolled port. A controlled port can only pass packets when the authenticator PAE is authorized. Otherwise, an uncontrolled port will unconditionally pass the packets with PAE group MAC address, which has the value of 01-80-c2-00-00-03 and will not be forwarded by MAC bridge, at any time.

Authentication server:
- A device provides authentication service, through EAP, to an authenticator by using authentication credentials supplied by the supplicant to determine if the supplicant is authorized to access the network resource.
- The overview of operation flow for the Figure 5.53 is quite simple. When Supplicant PAE issues a request to Authenticator PAE, Authenticator and Supplicant exchanges authentication message. Then, Authenticator passes the request to RADIUS server to verify. Finally, RADIUS server replies if the request is granted or denied.
- During the authentication process, the message packets, encapsulated by Extensible Authentication Protocol over LAN (EAPOL), are exchanged between an authenticator PAE and a supplicant PAE. The Authenticator exchanges the message to authentication server using EAP encapsulation. Before successfully authenticating, the supplicant can only touch the authenticator to perform authentication message exchange or access the network from the uncontrolled port.
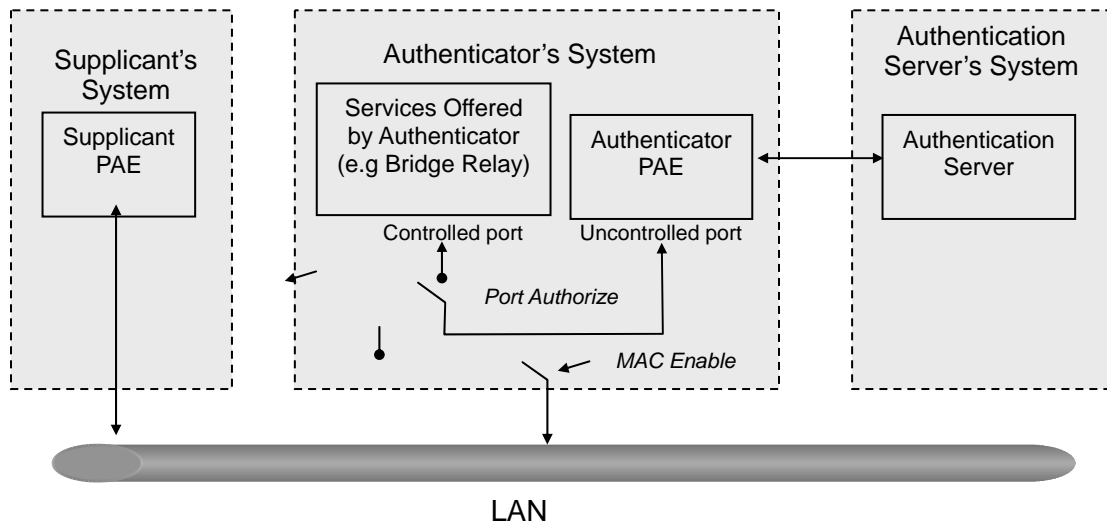
Figure 5.43 - Authentication

Figure 5.44 represents a typical configuration; a single supplicant, an authenticator and an authentication server. B and C are in the internal network, D is the Authentication server running RADIUS, switch at the central location which acts as Authenticator connecting to PC A. A is a PC outside the controlled port, running Supplicant PAE. In this case, PC A wants to access the services on device B and C. It first must exchange the authentication message with the authenticator on the port it connected via EAPOL packet. The authenticator transfers the

supplicant's credentials to Authentication server for verification. If successful, the authentication server will notify the authenticator. PC A is then allowed to access B and C via the switch. If there are two switches directly connected together instead of a single one, the link ports connecting the two switches may have to perform two port roles: authenticator and supplicant, because the traffic is bi-directional.

Authentication server

Figure 5.44

C

Authenticator

B
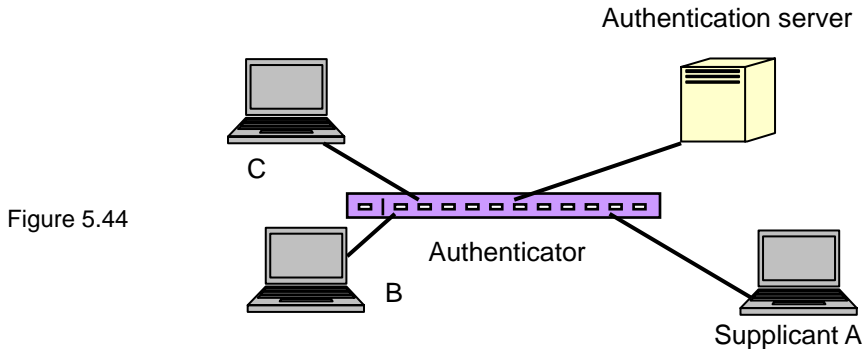
Supplicant A

Figure 5.45 illustrates the procedure of 802.1X authentication. There are steps for the login based on 802.1X port access control management. The protocol used in the right side is EAPOL and the left side is EAP.

1. At the initial stage, supplicant A is unauthenticated so the port acting as an authenticator is in unauthorized state. Access is blocked in this stage.
2. Either authenticator or supplicant can initiate the message exchange. If supplicant initiates the process, it sends EAPOL-start packet to the authenticator PAE and authenticator will immediately respond EAP-Request/Identity packet.
3. The authenticator periodically sends EAP-Request/Identity to the supplicant to request the identity it wants to be authenticated.
4. If the authenticator doesn't send EAP-Request/Identity, the supplicant will initiate EAPOL-beginning the process by sending it to the authenticator.
5. The Supplicant replies an EAP-Response/Identity to the authenticator. The authenticator will embed the user ID into Radius-Access-Request command and send it to the authentication server for identity confirmation.
6. After receiving the Radius-Access-Request, the authentication server sends Radius-Access-Challenge to the supplicant asking for inputting user password via the authenticator PAE.
7. The supplicant will convert the user password into the credential information, perhaps, in MD5 format and replies an EAP-Response with this credential information as well as the specified authentication algorithm (MD5 or OTP) to Authentication server via the authenticator PAE. As per the value of the type field in message PDU, the authentication server knows which algorithm should be applied to authenticate the credential information, EAP-MD5 (Message Digest 5) or EAP-OTP (One Time Password) or other algorithm.
8. If user ID and password is correct, the authentication server will send a Radius-Access-Accept to the authenticator. If not correct, the authentication server will send a Radius-Access-Reject.
9. When the authenticator PAE receives a Radius-Access-Accept, it will send an EAP-Success to the supplicant. At this time, the supplicant is authorized and the port is connected to the supplicant and is under 802.1X control in the authorized state. The supplicant and other devices connected to this port can access the network. If the authenticator receives a Radius-Access-Reject, it will send an EAP-Failure to the supplicant. This means the supplicant has failed to authenticate. The port connected is in the unauthorized state, the

supplicant and the devices connected to this port won't be allowed to access the network.
10. When the supplicant issues an EAP-Logoff message to Authentication server, the active port being used is set to unauthorized.
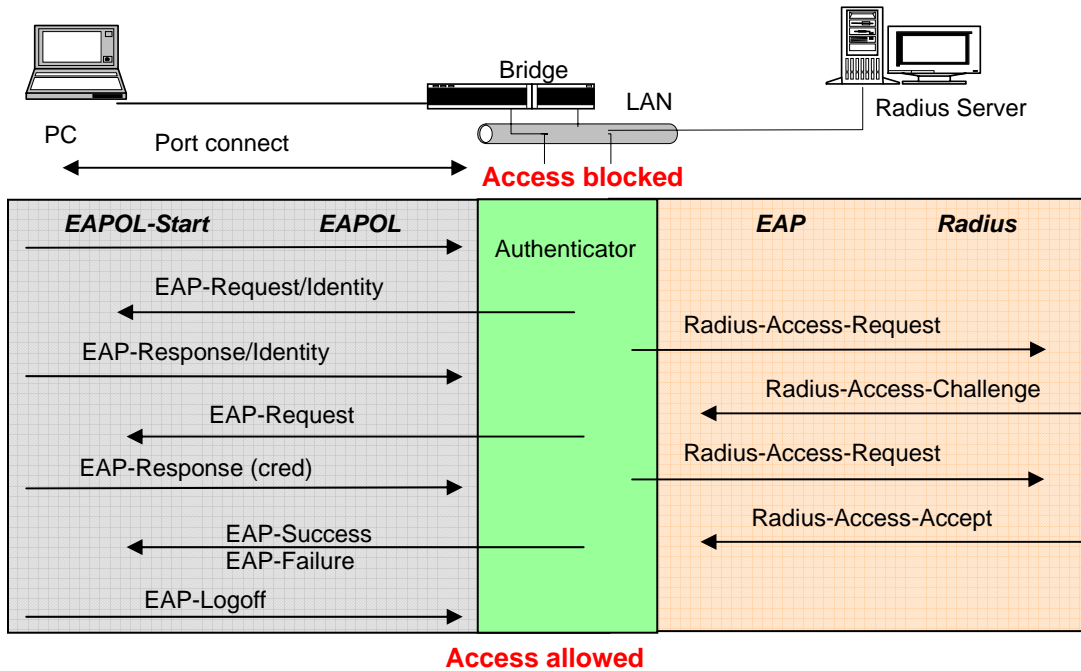
Figure 5.45 -802.1x Authentication

The type of authentication supported in the switch is multihost 802.1x. In this mode, once a supplicant is authorized, the devices connected to this port can access the network resources.

802.1X Port-based Network Access Control function supported by the switch is complex. Support, by basic multihost mode, can distinguish the device's MAC address and its VID. The following table summarizes the combination of the authentication status and the port status versus the status of port mode, set in 802.1X Port mode, port control state, set in 802.1X port setting. Entry Authorized means MAC entry is authorized.

Port Mode	Port Control	Authentication	Port Status
Disable	Don't Care	Don't Care	Port Uncontrolled
Multihost	Auto	Successful	Port Authorized
Multihost	Auto	Failure	Port Unauthorized
Multihost	ForceUnauthorized	Don't Care	Port Unauthorized
Multihost	ForceAuthorized	Don't Care	Port Authorized

Table 5-3

Function name:

802.1X State Setting

Function description:

This function is used to configure the global parameters for RADIUS authentication in 802.1X port security application.

Parameter description:

Radius Server:

RADIUS server IP address for authentication.

Default: 192.168.1.1

Port Number:

The port number to communicate with RADIUS server for the authentication service. The valid value ranges 1-65535.

Default port number is 1812.

Secret Key:

The secret key between authentication server and authenticator. It is a string with the length 1 – 31 characters. The character string may contain upper case, lower case and 0-9 without spaces.

Default: Radius
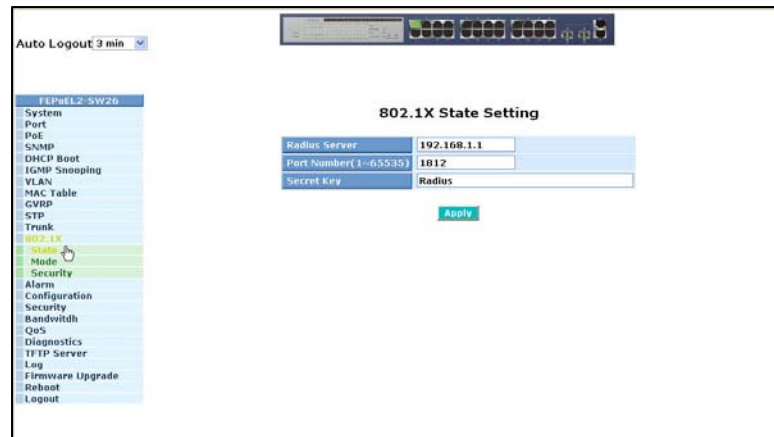
Figure 5.46 – 802.1X Setting

Function name:

802.1X Mode Setting

Function description:

Set the operation mode of 802.1X for each port. In this device, multihost operation mode is supported.

Parameter description:

Port Number:

Indicate which port is selected to configure the 802.1X operation mode.

802.1X Mode:

802.1X operation mode. There are two options, including Disable and Multihost mode. Default is Disable.

- ■ Disable

The chosen port acts as a plain port, which means 802.1X port access control does not work on the port.

- ■ 802.1X with multihost

In multihost mode, the devices connected to this port can access the network, once a supplicant is authorized.
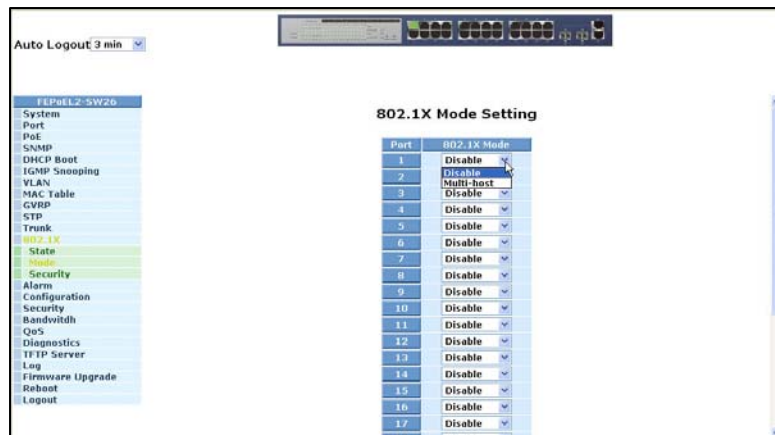
Figure 5.47 – 802.1x Setting

Function name:

Port Security Management

Function description:

Displays each port status. In multihost mode, the port number and its status, authorized or unauthorized are displayed.

Parameter description:

Disable Mode:

If Disable mode is selected for a port, in the function 802.1X Port Mode Configuration, the port is in the uncontrolled port state and does not apply the 802.1X authenticator. Any node attached to this port can access the network without the admittance of 802.1X authenticator. The Port Status will display the following screen.

Port Number:

The port number to be chosen to show its 802.1X Port Status. The valid number is Port 1 – 26.

Port Status:

The current 802.1X status of the port. In Disable mode, this field is Disabled.

802.1X with Multihost mode:

Select 802.1X with Multihost mode for a port.   With the function 802.1X Port Mode Configuration, devices can access the network through this port once the authenticator is authorized. The Port Status will display the following screen. If the port is granted to access the network, the port status is authorized, otherwise, unauthorized.

Figure 5.48 – Port Security Management

Function name:

Parameter Setting

Function description:

This function is used to configure the parameters for each port in 802.1X port security application. Refer to the following parameters description for details.

Parameter description:

Port:

The port number to be selected for configuring its associated 802.1X parameters which are Port control, reAuthMax, txPeriod, Quiet Period, reAuthEnabled, reAuthPeriod, max. Request, suppTimeout, serverTimeout and Controlled direction.

Port Control:

This is used to set the operation mode for authorization. There are three types of operation mode supported, ForceUnauthorized, ForceAuthorized, Auto.

- ForceUnauthorized:

  The controlled port remains in the unauthorized state.

- ForceAuthorized:

  The controlled port remains in the authorized state.

- Auto:

  The controlled port is set to be in authorized state or unauthorized state depends on the result of the authentication exchange between the authentication server and the supplicant.

Default: **Auto**

reAuthMax (1-10):

The number of authentication attempts that is permitted before the port becomes unauthorized.

Default: **2**

txPeriod (1-65535 s):

A time period to transmitted EAPOL PDU between the authenticator and the supplicant.

Default: **30**

Quiet Period (0-65535 s):

A period of time during in which access the supplicant will not be attempted.

Default: **60 seconds**

reAuthEnabled:

Choose whether regular authentication will take place in this port.

Default: **ON**

reAuthPeriod (1-65535 s):

A non-zero number seconds between the periodic re-authentication of the supplicant.

Default: **3600**

max. Request (1-10):

The maximum of number times that the authenticator will retransmit an EAP Request to the supplicant before it times out the authentication session. The valid range: 1 – 10.

Default: **2 times**

suppTimeout (1-65535 s):

A timeout condition in the exchange between the authenticator and the supplicant. The valid range: 1 –65535.

Default: **30 seconds**

serverTimeout (1-65535):

A timeout condition in the exchange between the authenticator and the authentication server. The valid range: 1 –65535.

Default: **30 seconds**
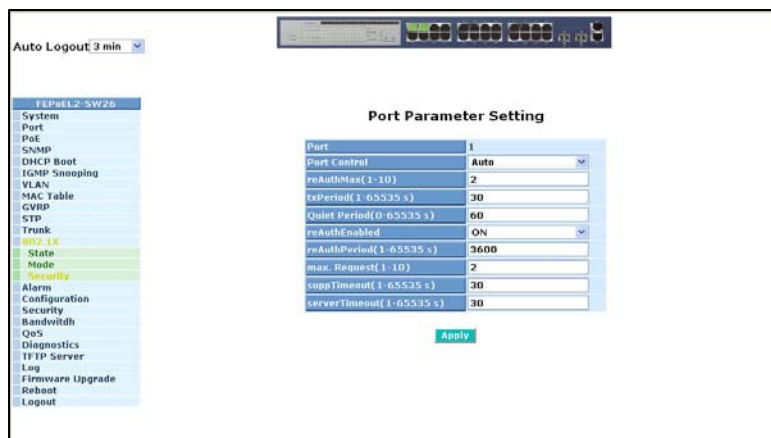
Figure 5.49 – Port Parameter Setting

5.19   Alarm Configuration
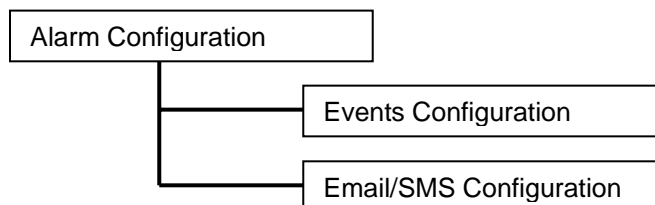
Function name:

Events Configuration

Function description:

The Trap Events Configuration function is used to enable the switch to send out trap information while pre-defined trap events occur. The switch provides 22 different trap events. The trap information can be sent out in three ways, including email, mobile phone SMS (short message system) and trap. The message will be sent if you check (☑) the trap event individually on the web page shown below.

Parameter description:

Trap: Cold Start, Warm Start, Link Down, Link Up, Authentication Failure, User login, User logout

STP: STP Topology Changed, STP Disabled, STP Enabled

LACP: LACP Disabled, LACP Enabled, LACP Member Added, LACP Port Failure

GVRP: GVRP Disabled, GVRP Enabled

VLAN: Port-based VLAN Enabled, Tag-based VLAN Enabled

Module Swap: Module Inserted, Module Removed, Dual Media Swapped

PoE: PoE Failure
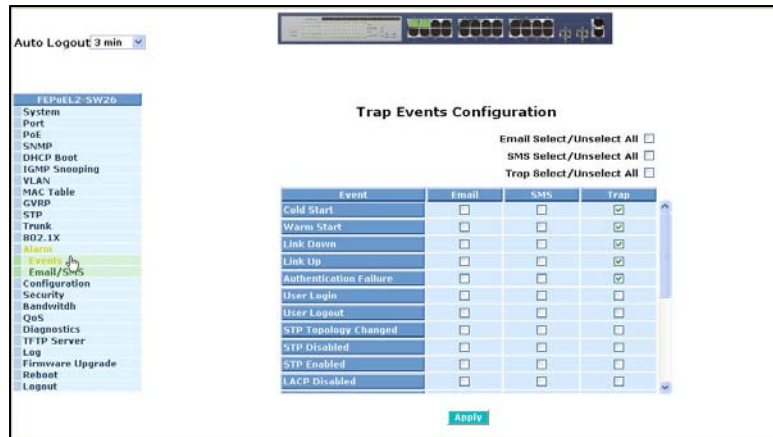
Figure 5.50 – Trap Events Configuration

Function name:

Email/SMS Configuration

Function description:

Alarm configuration is used to configure the recipients of the alarm message via email or SMS, or both. The method is dependent on the settings. An email address or a mobile phone number has to be set in the alarm configuration (See Figure 5.2). If set properly, you can read the trap information from your email or mobile phone. This function provides up to six email addresses and up to six mobile phone numbers. The 22 trap events will be sent out to SNMP Manager when trap event occurs. Once trap events have been selected, enter your desired email addresses and mobile phone numbers. Select **Apply** to complete the alarm configuration. The alarm settings will take effect in a few seconds.

Note: SMS may not work in your mobile phone system. It is customized for different systems.

Parameter description:

Email:

Mail Server: IP address of the server transferring your email.

Username: Username on the mail server.

Password: Password on the mail server.

Email Address 1 – 6: Additional email addresses that would like to receive the alarm message.
SMS:
SMS Server: IP address of the server transferring your SMS.

Username: Username in ISP.

Password: Password in ISP.

Mobile Phone 1-6: Additional mobile phone numbers that would like to receive the alarm message.
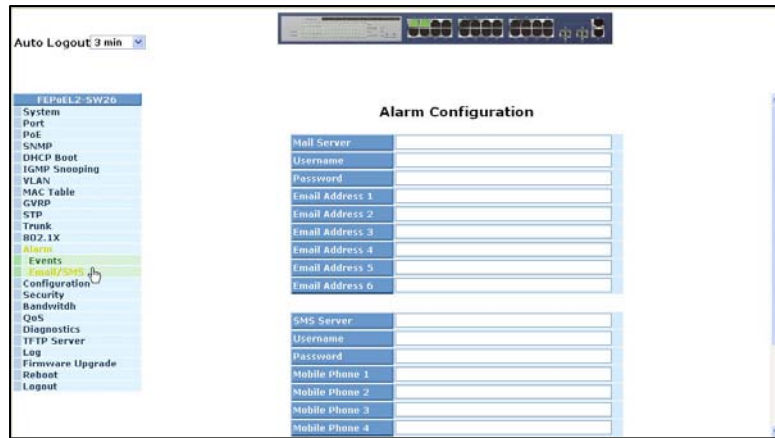
Figure 5.51 – Alarm Configuration

5.20   Configuration

The switch supports three copies of configurations, including the default configuration, working configuration and user configuration for your configuration management. The three copies are described below:

Default Configuration:
- The default configuration is the factory setting and cannot be altered. The following lists two restore default functions provided if it becomes necessary to restore the default settings for the switch:
  - o   Restore Default Configuration – defaults to the IP address 192.168.1.1
  - o   Restore Default Configuration without changing current IP address – the IP address will remain the same.

Working Configuration:
- The working configuration is the current configuration and can be changed any time. The configurations you are using are saved into this configuration file. This is updated each time you click on **Apply**.

User Configuration:
- User configuration is the specified file for backup purposes and can be updated while confirming the configuration. You can retrieve this configuration by performing Restore User Configuration.

Note: If you make changes to the configuration, you must save the configuration before rebooting the switch.
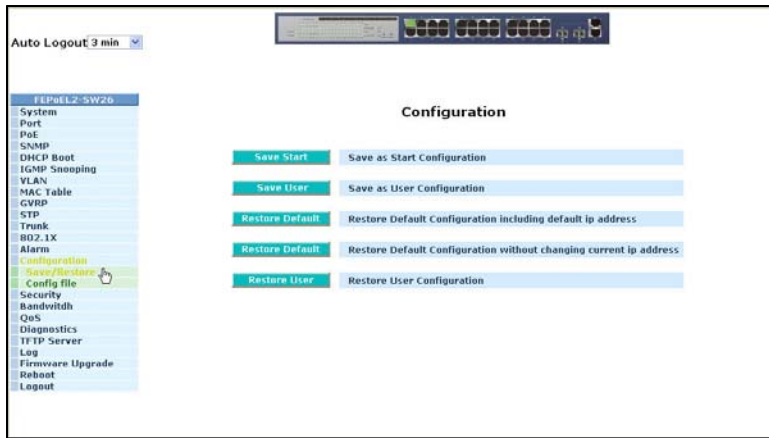
Figure 5.52 - Configuration

5.20.1   Configuration File

Function name:

Save As Start Configuration

Function description:

Save the current configuration as a start configuration file in flash memory.
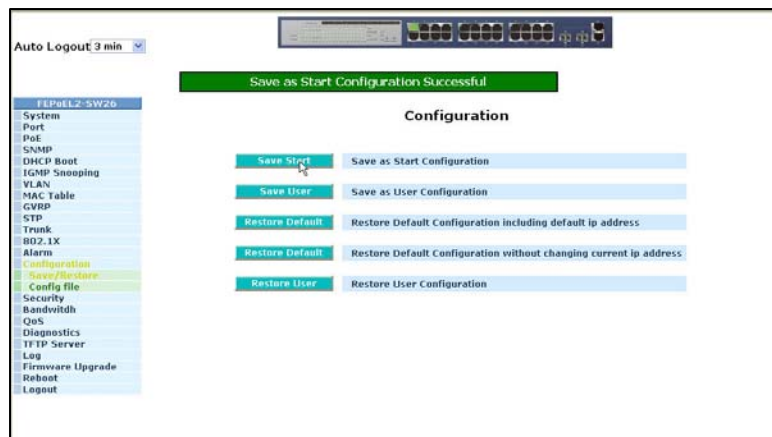
Figure 5.53 – Configuration – Save Start

Function name:

>   Save As User Configuration

Function description:

>   Save the current configuration as a user configuration file in flash memory.
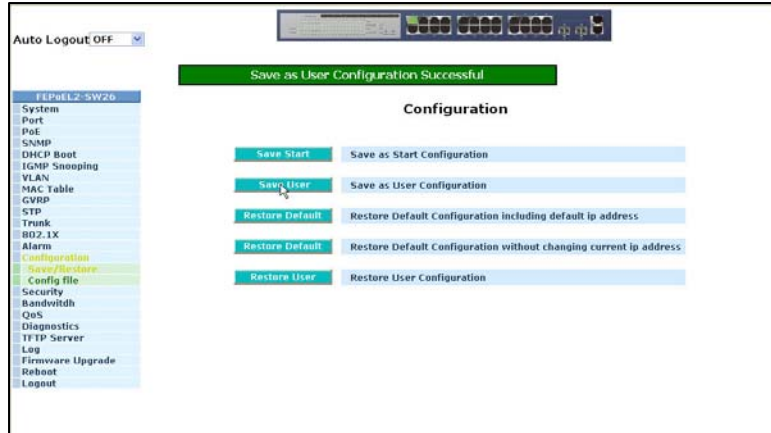
Figure 5.54 – Configuration – Save User

5.20.2   Restore Default Configuration

Function name:

>   Restore Default Configuration (includes default IP address)

Function description:

>   Restore Default Configuration function can retrieve the factory setting to replace the start configuration. If the factory settings are restored, the IP address of the switch will be restored to 192.168.1.1.

Figure 5.55 – Restore User Configuration

Function name:

Restore Default Configuration (excludes current IP address)

Function description:

Restore Default Configuration function can retrieve the factory setting to replace the start configuration. However, by using this restore, the switch's current IP address will not be changed and will NOT be restored to 192.168.1.1.

Figure 5.56 – Restore Default Configuration Message

Function name:

Restore User Configuration

Function description:

Restore User Configuration function retrieves the previous confirmed working configuration stored in the flash memory to update start configuration. When restoring the configuration, the system's start configuration is updated and will be changed its system settings after rebooting the system.
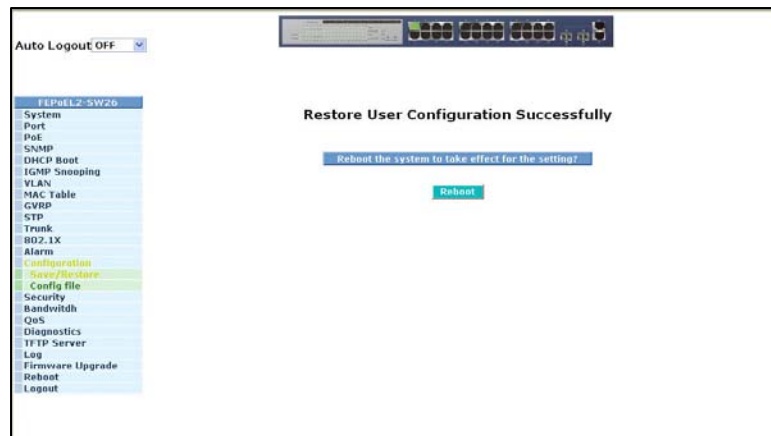
Figure 5.57 – Restore User Configuration Message

5.20.3   Configuration File

Function name:

Config File

Function description:

Use this function to back up or reload the configuration files of Save As Start or Save As User via TFTP.

Parameter description:

Export File Path:

Export Start:

Export Save As Start's configuration file stored in flash.

Export User-Conf:

Export Save As User's configuration file stored in flash.

Import File Path:

Import Start:

Import Save As Start's configuration file stored in flash.

Import User-Conf:

Import Save As User's configuration file stored in flash.
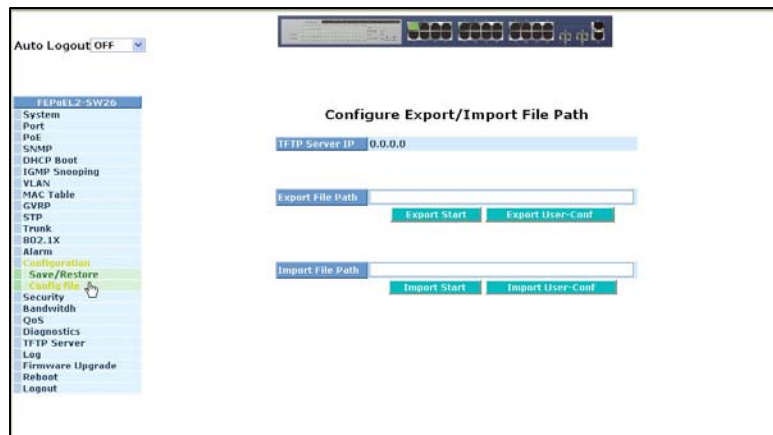
Figure 5.58 – Configure Export/Import Path

5.21   Security

Function name:

Mirror Configuration

Function description:

Mirror Configuration is used to monitor network traffic. For example, if Port A and Port B are used as the Monitoring Port and Monitored Port respectively, the traffic received by Port B will be copied to Port A for monitoring.

Parameter description:

Mode:

Used for the activation or de-activation of the Port Mirror function. Port Mirroring is disabled by default.

Monitoring Port:

Used to set up the port for monitoring. The valid ports can be Ports 1~26.   The default is Port 1.

Monitored Ingress Port:

Set up the port to be monitored. Only packets set up will be monitored. Click the check box (☑) beside the port x. The valid ports are Ports 1~26.

Monitored Egress Port:

Set up the port for being monitored. Only packets set up will be monitored. Click the check box (☑) beside the port x. The valid ports are Port 1~26.
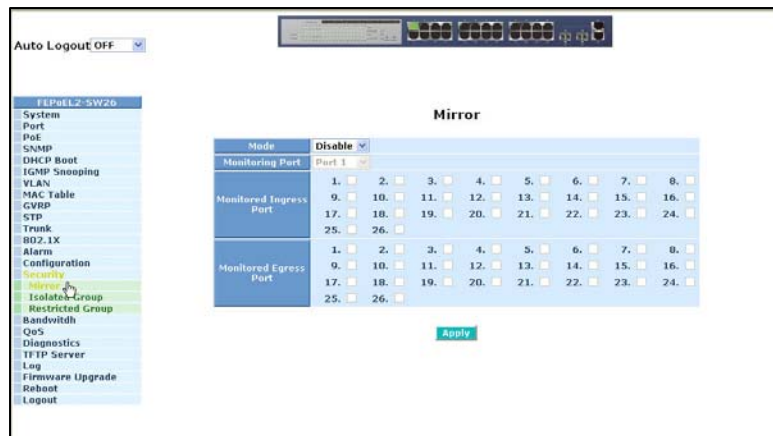
Figure 5.59 – Port Mirroring

Function name:

Isolated Group

Function description:

The Isolated Group function allows the port to be independent of other ports in the Isolated group. Communication is forbidden between these ports. However, the ports of the Isolated group are still able to communicate with the ports of the non-Isolated group. This feature makes it helpful for the

network administrator to immediately find a port that is causing the occurrence of looping problems in the network.

Parameter description:

Mode:

Used for the activation or de-activation of Isolated Group function. The default is disabled.

Isolated Group:

Choose any port to be the member of this group. Just click the check box (☑) beside the port x. The valid ports are Port 1~26. In this group, all of these member ports cannot forward packets to each other. Thus, the switch will not be capable of forwarding any packets in case all ports become the members of the Isolated group.
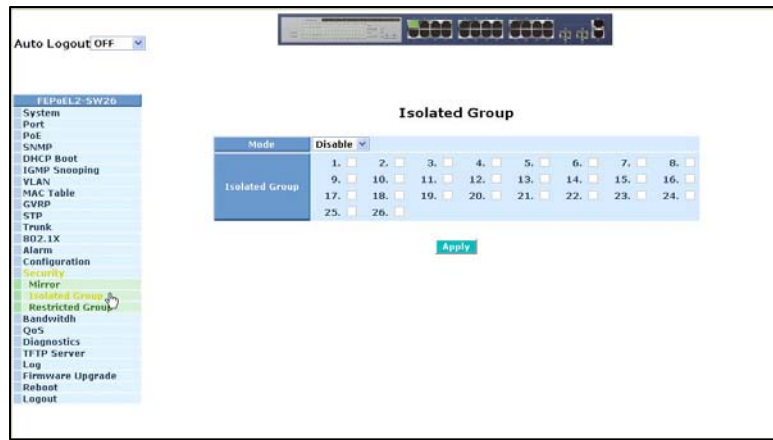
Figure 5.60 – Isolated Group

Function name:

Restricted Group

Function description:

The function of the Restricted Group is to decide the direction of transmitting packets for the specific port. The packets received by the port with the "Ingress" mode of the Restricted Group will be sent to the ports with the "Egress" mode of the Restricted Group.

Parameter description:

Mode:

Used for the activation or de-activation of the Restricted Group function. The default is disabled.

Ingress:

Select the ports that the Restricted Group should be set into "Ingress" mode. Just click the check box (☑) beside the port x. The valid ports are Port 1~26.

Egress:

Select the ports that the Restricted Group should be set into "Egress" mode. Just click the check box (☑) beside the port x. The valid ports are Port 1~26.
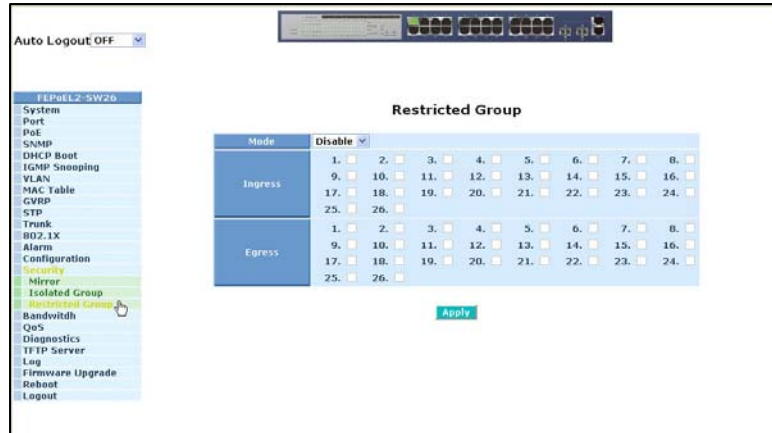
Figure 5.61 – Restricted Group

5.22   Bandwidth Management

Function name:

Ingress Bandwidth Setting

Function description:

The Ingress Bandwidth Setting function is used to set the limit of Ingress bandwidth for each port.

Parameter description:

Port No.:

Choose the desired port for the Ingress Bandwidth Setting. The valid range for the ports is 1~26.

Rate:

Set the limit of Ingress bandwidth for the chosen port. Incoming traffic will be discarded if the rate exceeds the value you set in the Data Rate field. Pause frames are also generated if flow control is enabled. The format of the packets is limited to unicast, broadcast and multicast. The valid value of Ports 1~24 ranges from 66~102400 and for Ports 25~26, the range is from 66~1024000 with the minimum unit of 1. The default value of Port 1~24 is 102400 and Port 25~26 is 1024000.

Function name:

Egress Bandwidth Setting

Function description:

The Egress Bandwidth Setting function is used to set the limit of Egress bandwidth for each port.

Parameter description:

Port No.:

Choose the desired port for the Egress Bandwidth Setting. The valid range for the ports is 1~26.

Rate:

Set the limit of Egress bandwidth for the chosen port.   Packet transmission will be delayed if the rate exceeds the value you set in the Data Rate field. Traffic may be lost if the egress buffers run full. The format of the packets is limited to unicast, broadcast and multicast. Valid value of Ports 1~24 ranges from 66~102400 and for Ports 25~26 ranges from 66~1024000 with the minimum unit of 1. The default value of Port 1~24 is 102400 and Port 25~26 is 1024000.
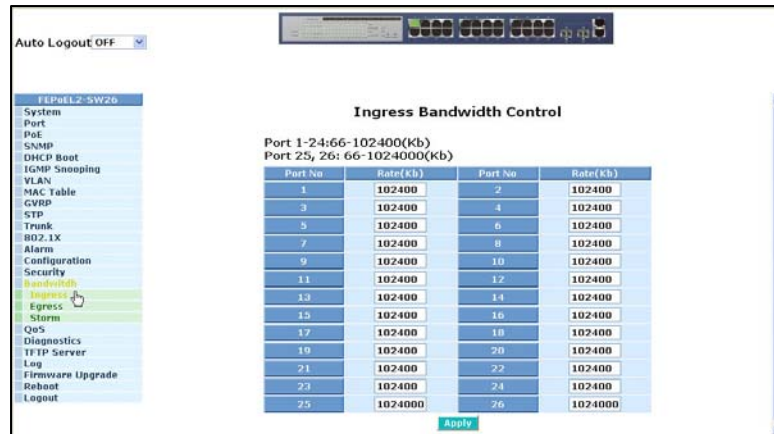
Figure 5.62 – Egress Bandwidth Control

Function name:

Storm Setting

Function description:

The Bandwidth Management function is used to set up the limit of Ingress and Egress bandwidth for each port.

Parameter description:

Storm Type:

Disable:

Disables bandwidth storm control.

Broadcast Storm Control:

Enables bandwidth storm control for broadcast packets.

Multicast Storm Control:

Enables bandwidth storm control for multicast packets.

Unknown Unicast Storm Control:

Enables the function of bandwidth storm control for unknown unicast packets. These packets are the MAC addresses that have not completed the learning process.

Broadcast, Multicast, Unknown Unicast Storm Control:

Enables the function of bandwidth storm control for all packets in transmission.

Storm Rate :

Sets up the limit of bandwidth for storm type you choose. Valid value of the storm rate ranges from 1-100 with the minimum unit of 1. Only integers are acceptable. The default is 100.

Figure 5.63 – Bandwidth Storm Control

5.23   Quality of Service (QoS) Configuration

The switch supports the following five types of QoS:
- MAC Priority – MAC priority ports act by using the destination address of MAC in packets.
- 802.1p Priority – VLAN tagged priority fields are affected by the 802.1p priority setting.
- IP TOS Priority – IP TOS priority affects the TOS fields of the IP header. It uses an 8-bit service type field that specifies how the datagram should be handled. The field can be divided into six subfields as follows:
    o PRECEDENCE (3 bits)
    o D-Type (Delay priority, 1 bit)
    o T-Type (Throughput priority, 1 bit)
    o R-type (Reliability Priority, 1 bit)
    o M-Type (Monetary Cost Priority, 1bit)
    o UNUSED (1bit)
- DiffServ DSCP Priority – Acts on the DSCP field of the IP Header. The differentiated services interpretation says the first six bits comprise a codepoint, which is sometimes abbreviated DSCP and the last two bits are left unused.
- Port   Based Priority "VIP Port" - All packets set as VIP Ports will have the   highest transmitting priority.

```
 0      1      2      3      4      5      6      7
                            T bit   R bit   M bit
 Precedence          D bit      T O S              MBZ
```

Precedence = Vorrangssteuerung   MBZ = Must Be Zero
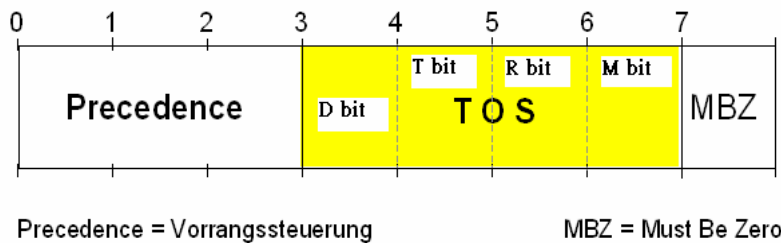
High Priority Packet streams will experience less delay into the switch. For handing different priority packets, each egress port has up to four queues. Each QoS is influenced by two scheduling schemes, WRR (Weighted Round Robin) and Strict Priority. Once the priority mapping is set to the queue, WRR scheduling will distribute the bandwidth according to the weight you set for four queues (queue 0 to queue 3). Strict Priority is used for the VIP Port of QoS.   If some ports are designated as the VIP Port, these ports will own the highest transmitting priority in egress queue of the switch.

The QoS functions mentioned above can be enabled at the same time. But, the following precedence will determine whether they work:

1. Enable both VIP and TOS
       Choose priorities of VIP and TOS.
2. Enable both VIP and DSCP
       Choose priorities of VIP and DSCP.
3. Enable both TOS and DSCP
       Choose "DSCP".
4. Enable both VIP and DSCP
       Choose priorities of VIP and DSCP.
5. Enable both 802.1p and TOS
       Choose "TOS".
6. Enable both 802.1p and DSCP
       Choose "DSCP".
7. Enable both 802.1p and DSCP and TOS
       Choose "DSCP".
8. Enable both 802.1p and DSCP and TOS and VIP
       Choose priorities of VIP and DSCP.
   ** VIP/DSCP > TOS > 802.1p (Final result)

Function name:

QoS Global Setting

Function description:

In order to use the QoS functions, the QoS mode must be enables in advance. Then, you can use MAC Priority, 802.1p Priority, IP TOS Priority, DiffServ DSCP Priority, or VIP Port functions. In this function, you can Enable the QoS Mode. Choose any of the Priority Controls, such as 802.1p, TOS, DSCP. You can also select a Scheduling Method of WRR (Weighted Round Robin) or Strict Priority. Once those have been set, you can arrange Weight values for queue 0 to queue 3.

Parameter description:

QoS Mode:

You must Enable the QoS Mode in order for the QoS function to become effective. The default is Disabled.

Priority Control:

Click the check box (☑) for 802.1P, TOS, or DSCP Qos. Click Apply.

Scheduling Method:

There are two Scheduling Methods, WRR and Strict Priority. The default is WRR. Once the Scheduling Method is chosen, click Apply.

Weight (1~55):

Set the weight values of Queue 0 to Queue 3. The range of Weight can be set from 1~55. The default weight of Queue 0 is 1, the weight of Queue 1 is 2, the weight of Queue 2 is 4, and the weight of Queue 3 is 8.
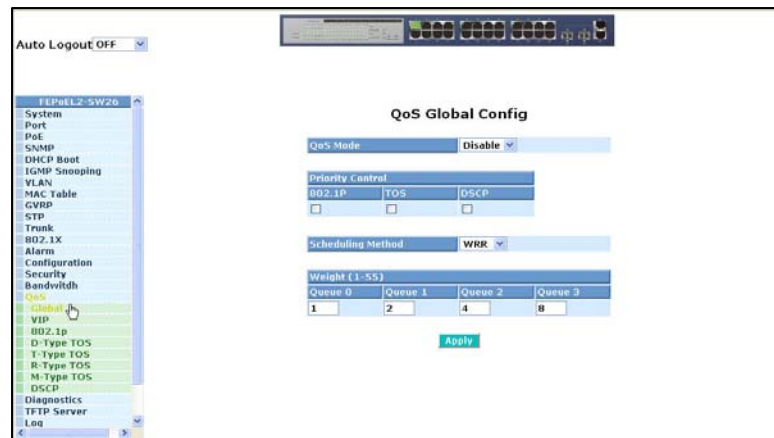
Figure 5.64 – QoS Global Configuration

Function name:

VIP Port Setting

Function description:

When a port is set as a VIP Port, the packets entering this port will have the highest transmitting priority. For example, if you choose port 2 as a VIP Port, simultaneously transmit packets from port 2 and port 3 to port 1 at speed of 100MB and congestions occur. The packets for port 3 will be dropped because the packets from port 2 has the highest precedence. In order for this function to take affect, the Scheduling Method of Strict Priority must be chosen.

Parameter description:

VIP Port:

Click the check box (☑) to select any port (port 1~26) as the VIP Port. Click **<Apply>**.
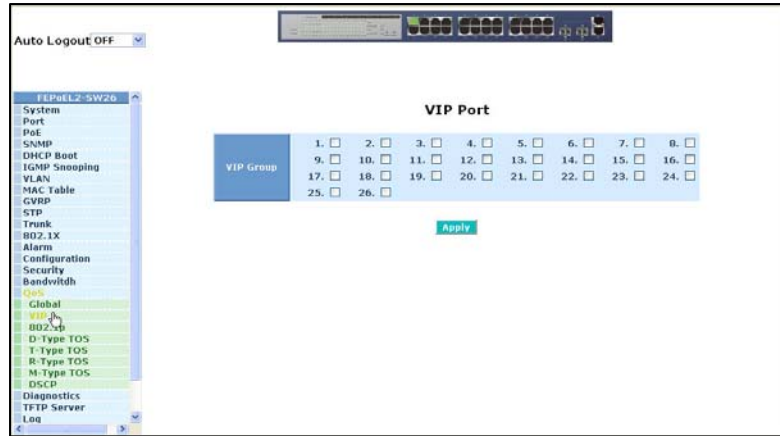
Figure 5.65 – VIP Port

Function name:

802.1p Setting

Function description:

This function will affect the priority of VLAN tag. Based on priority of the VLAN tag, 0~8 priorities can map up to four queues of the switch (queue 0~3) and possess different bandwidth distribution according to your weight setting.

Parameter description:

802.1p Priority Mapping:

Each Priority can select Queue 0 ~ Queue 3. In Default, Priority 0 is mapping to Queue 0, Priority 1 is mapping to Queue 0, Priority 2 is mapping to Queue 1, Priority 3 is mapping to Queue 1, Priority 4 is mapping to Queue 2, Priority 5 is mapping to Queue 2, Priority 6 is mapping to Queue 3, and Priority 0 is mapping to Queue 3.
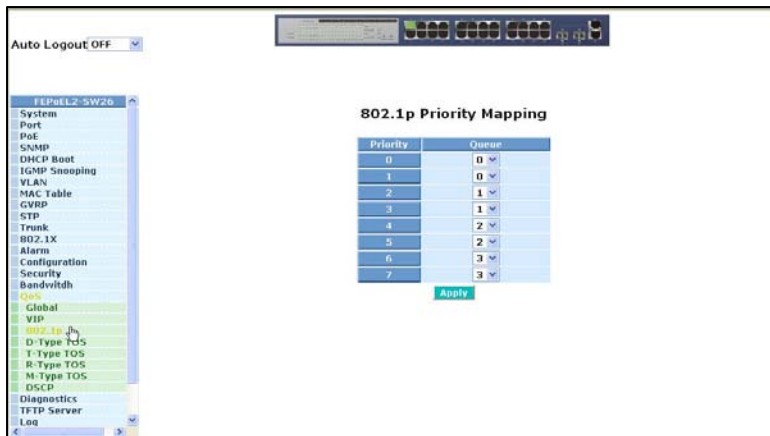
Figure 5.66 – Priority Mapping

Function name:

D-Type TOS

Function description:

IP TOS Priority affects the TOS fields of the IP header. It has an 8-bit SERVICE TYPE field that specifies how the datagram should be handled. The field could be divided into the following six subfields: PRECEDENCE (3 bits), D-Type (Delay Priority, 1 bit), T-Type (Throughput Priority, 1bit), R-Type (Reliability Priority, 1bit), M-Type (Monetary Cost Priority, 1bit), and UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. TOS Delay Priority Mapping works while D-TYPE in TOS field of IP header of the packets received by the switch is configured.
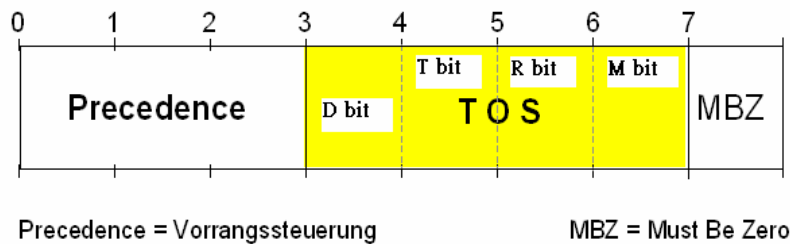
Parameter description:

TOS Delay Priority Mapping:

Each Priority can select Queue 0 ~ Queue 3. By Default, Priority 0 is mapped to Queue 0, Priority 1 is mapped to Queue 0, Priority 2 is mapped to Queue 1, Priority 3 is mapped to Queue 1, Priority 4 is mapped to Queue 2, Priority 5 is mapped to Queue 2, Priority 6 is mapped to Queue 3, and Priority 0 is mapped to Queue 3.
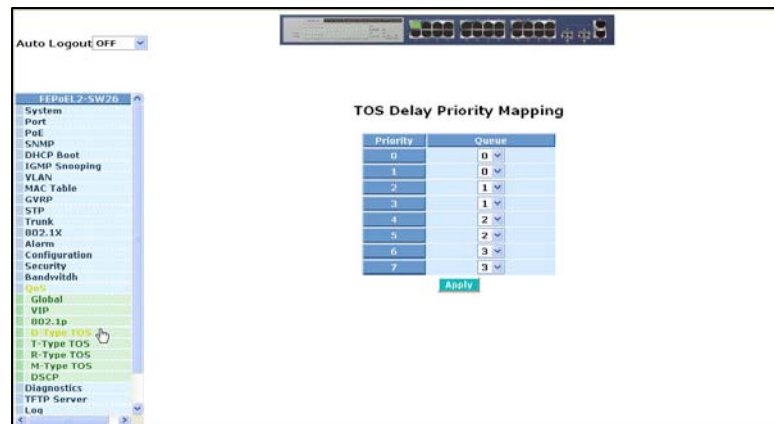
Figure 5.67 – TOS Delay Mapping

Function name:

T-Type TOS

Function description:

IP TOS Priority affects the TOS fields of the IP header. It has an 8-bit SERVICE TYPE field that specifies how the datagram should be handled. The field can be divided into the following six subfields: PRECEDENCE (3 bits), D-Type (Delay Priority, 1 bit), T-Type (Throughput Priority, 1bit), R-Type (Reliability Priority, 1bit), M-Type (Monetary Cost Priority, 1bit), and UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. TOS Throughput Priority Mapping works while T-TYPE in TOS field of IP header of the packets received by the switch is configured.
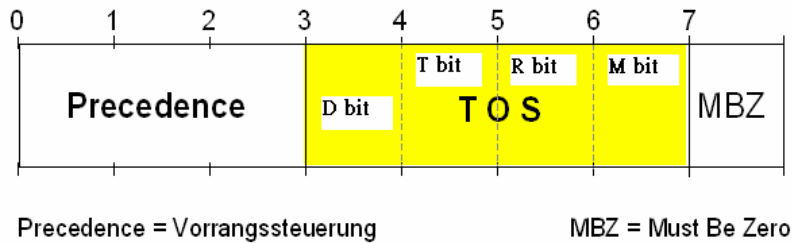
Parameter description:

TOS Throughput Priority Mapping:

Each Priority can select Queue 0 ~ Queue 3. In Default, Priority 0 is mapped to Queue 0, Priority 1 is mapped to Queue 0, Priority 2 is mapped to Queue 1, Priority 3 is mapped to Queue 1, Priority 4 is mapped to Queue 2, Priority 5 is mapped to Queue 2, Priority 6 is mapped to Queue 3, and Priority 0 is mapped to Queue 3.
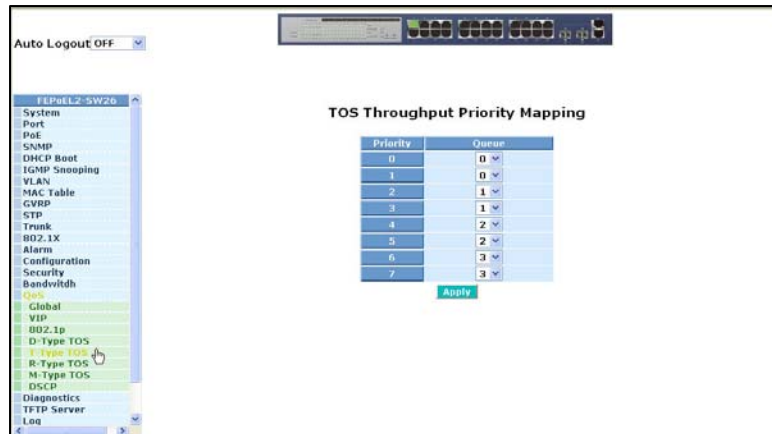
Figure 5.68 – TOS Throughput Mapping

Function name:

R-Type TOS

Function description:

The IP TOS Priority affects the TOS fields of the IP header It has an 8-bit SERVICE TYPE field that specifies how the datagram should be handled. The field can be divided into the following six subfields: PRECEDENCE (3 bits), D-Type (Delay Priority, 1 bit), T-Type (Throughput Priority, 1bit), R-Type (Reliability Priority, 1bit), M-Type (Monetary Cost Priority, 1bit), and UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. TOS Reliability Priority Mapping works while R-TYPE in TOS field of IP header of the packets received by the switch is configured.
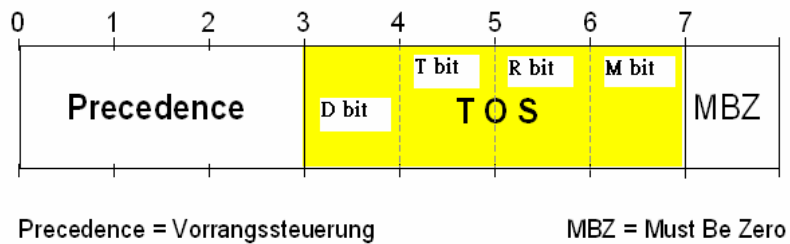
Parameter description:

TOS Reliability Priority Mapping:

Each Priority can select Queue 0 ~ Queue 3. In Default, Priority 0 is mapped to Queue 0, Priority 1 is mapped to Queue 0, Priority 2 is mapped to Queue 1, Priority 3 is mapped to Queue 1, Priority 4 is mapped to Queue 2, Priority 5 is mapped to Queue 2, Priority 6 is mapped to Queue 3, and Priority 0 is mapped to Queue 3.
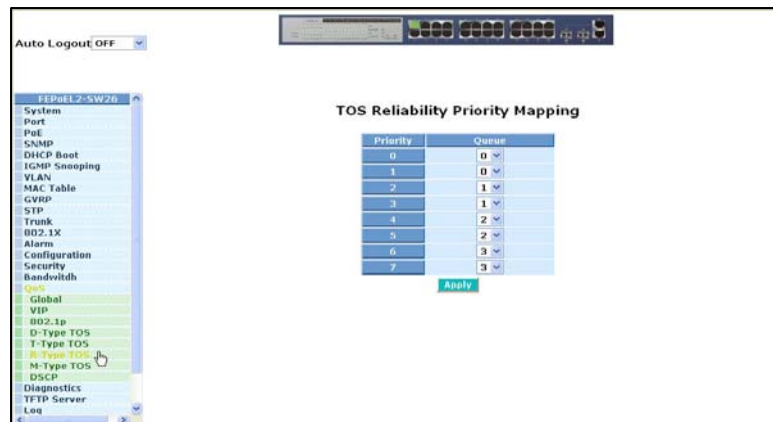
Figure 5.69 – TOS Reliability Mapping

Function name:

M-Type TOS

Function description:

The IP TOS Priority affects the TOS fields of IP header. It has an 8-bit SERVICE TYPE field that specifies how the datagram should be handled. The field can be divided into the following six subfields: PRECEDENCE (3 bits), D-Type (Delay Priority, 1 bit), T-Type (Throughput Priority, 1bit), R-Type (Reliability Priority, 1bit), M-Type (Monetary Cost Priority, 1bit), and UNUSED. PRECEDENCE 3-bits can be arranged in eight types of priorities corresponding to the 0~7 priority in the following priority diagram. TOS Monetary Cost Priority Mapping works while M-TYPE in TOS field of IP header of the packets received by the switch is configured.
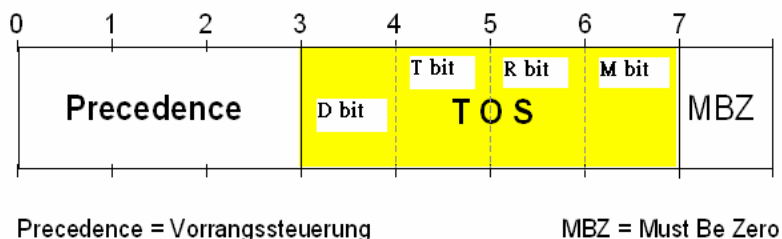
Parameter description:

TOS Monetary Cost Priority Mapping:

Each Priority can select Queue 0 ~ Queue 3. In Default, Priority 0 is mapped to Queue 0, Priority 1 is mapped to Queue 0, Priority 2 is mapped to Queue 1, Priority 3 is mapped to Queue 1, Priority 4 is mapped to Queue 2, Priority 5 is mapped to Queue 2, Priority 6 is mapped to Queue 3, and Priority 0 is mapped to Queue 3.

Figure 5.70 – TOS Monetary Mapping

Function name:

DSCP Setting

Function description:

In the late 1990s, the IETF redefined the meaning of the 8-bit SERVICE TYPE field to accommodate a set of differentiated services (DS). Under the differentiated services interpretation, the first six bits comprise a codepoint, which is sometimes abbreviated DSCP, and the last two bits are left unused.

DSCP can handle a total of 64 (0~63) kinds of Traffic Class based on the arrangement of 6-bit field in DSCP of the IP packet. You can set these 64 types of Class that belong to queues 0~3.

Parameter description:

DSCP Priority Mapping:

64 types of priority traffic can be set. You can set Queues 0~3. By default, Priority 0~15 are mapped to Queue 0, Priority 16~31 are mapped to Queue 1, Priority 32~47 are mapped to Queue 0, Priority 48~63 are mapped to Queue 0.

Figure 5.71 – DSCP Priority Mapping

5.24   Diagnostics

Three functions, including Diagnostics, Loopback Test and Ping Test are available for device self-diagnostics. Each of them will be described in detail in the following sections.
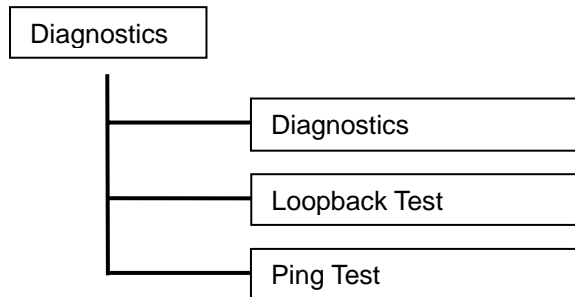
Function name:

Diagnostics

Function description:

Diagnostics provides a set of basic system diagnosis. Diagnostics provides tests to see if the system in working order. The basic system check includes EEPROM test, UART test, DRAM test and Flash test.
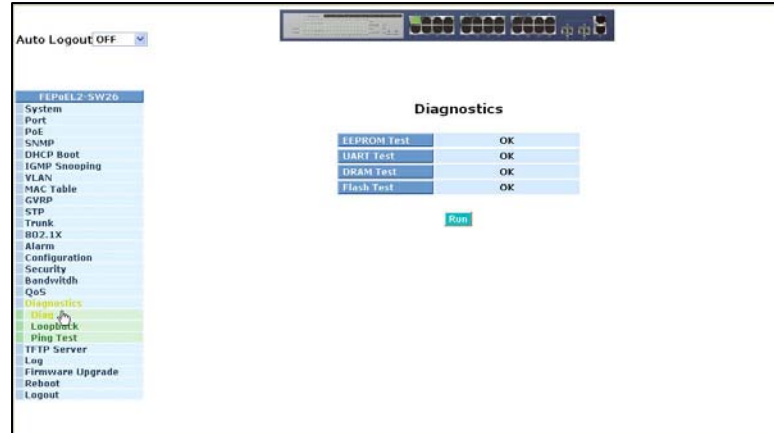
Figure 5.72 - Diagnostics

Function name:

Loopback Test

Function description:

In the Loopback Test function, there are two loopback tests -- Internal Loopback Test and External Loopback Test. The Internal test function will not send the test signal outside the switch box. The test signal only wraps around in the switch. The External function will send the test signal to its link partner. If the switch is not connected to active network devices, i.e. the ports are link down, the switch will report the port numbers failed. If they all are okay, OK is displayed.

Note: When you choose either of these tests, there will be interference with the normal system. Packets that are being sent and received will stop temporarily.
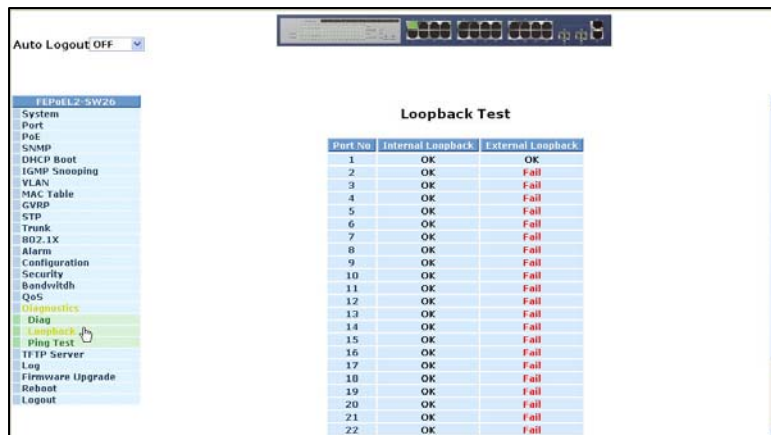
Figure 5.73 – Loopback Test

Function name:

Ping Test

Function description:

Ping Test function is a tool for detecting whether or not the target device is making a connection through the ICMP protocol which submits report messages. The switch provides Ping Test function to let you know whether the target device is available or not. You can simply fill in a known IP address and then click **Ping**. After a few seconds, the switch will report to the pinged device the result of the Ping.

Parameter description:

IP Address:

An IP address with the version of v4, e.g. 192.168.1.1.

Default Gateway:

IP address of the default gateway.
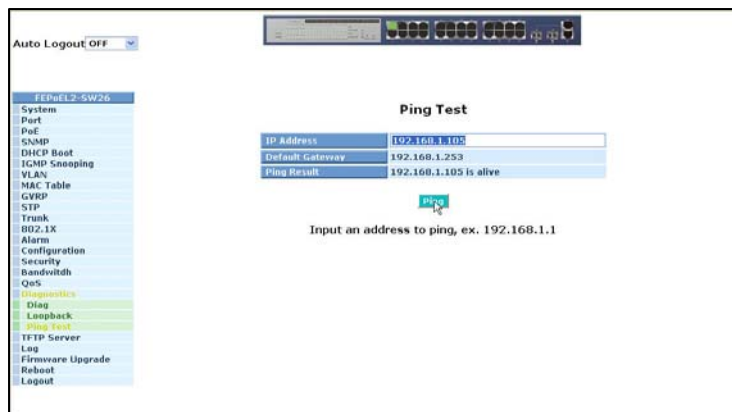
For more details, please see the section of IP address in Section 4.4.

Figure 5.74 – Ping Test

5.25   TFTP Server

Function name:

Trivial File Transfer Protocol (TFTP) Server

Function description:

Set up IP address of TFTP server.

Parameter description:

Specify the IP address of the TFTP server. Once you have entered the IP of the TFTP server, click on **Apply** so the setting will take effect.
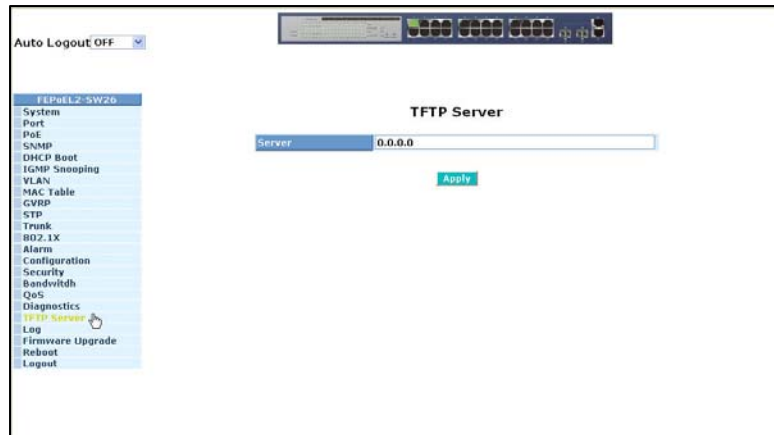
Figure 5.75 – TFTP Server

5.26   Log Data

This function displays the log data. The switch provides system log data for users. There are seventeen private trap logs and five public trap logs. The switch supports a total 120 log entries. For more details on log items, please refer to Section 5.19 for Trap/Alarm Configuration and SNMP Configuration.

Function name:

Log Data

Function description:

The Trap Log Data displays the log items including all SNMP Private Trap events, SNMP Public traps and user logs occurred in the system. In the report table, No., Time and Events are three fields contained in each trap record.
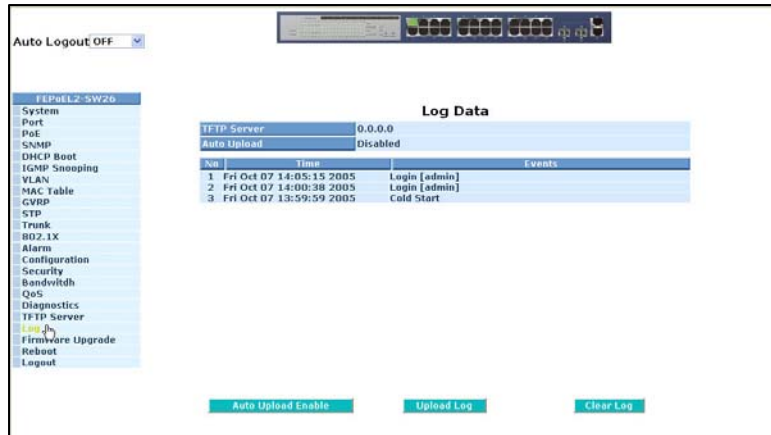
Figure 5.76 – Log Data

Parameter description:

No.:

Displays the order number of the traps.

Time:

Displays the time of the trap.

Events:

Displays the trap event name.

Auto Upload Enable:

Switch the enabled or disabled status of the auto upload function.

Upload Log:

Upload log data through tftp.

Clear Log:

Clear log data.

5.27   Firmware Upgrade

A software upgrade tool is used to upgrade the software functions and to fix or improve the functionality of the switch. The switch provides a TFTP client for software upgrade which is done through the network connection.

Function name:

    Firmware Upgrade

Function description:

The switch supports software upgrade through a TFTP server. To apply a firmware upgrade, follow this procedures:

1. Specify the IP address TFTP server.

2. Specify the filename and the full path for the location of the file.

3. Select **Upgrade**.

4. When the download is complete, the switch begins upgrading the software. You will be prompted to reboot the switch after completing the upgrade. The switch must be rebooted so the new software will be applied.

Note: If the download is not successful, the switch will return to "Software Upgrade." Software upgrade is hazardous if power is off.

Parameter description:

TFTP Server: A TFTP server stores the image file you want to upgrade.

Path and Filename: File path and filename stored the image file you want to upgrade.

Figure 5.77 – Firmware Upgrade

5.28   Reboot

There are a few 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. After upgrading software, changing IP configuration or modifying VLAN configurations, you must reboot in order for the new configuration to take effect.

Function name:

Reboot

Function description:

Reboot the switch. Reboot takes the same effect as the RESET button on the front panel of the switch. It will take around thirty (30) seconds to complete the system boot.

Parameter description:

Save and Reboot:

Save the current settings as start configuration before rebooting the switch.

Reboot:

Reboot the system directly.
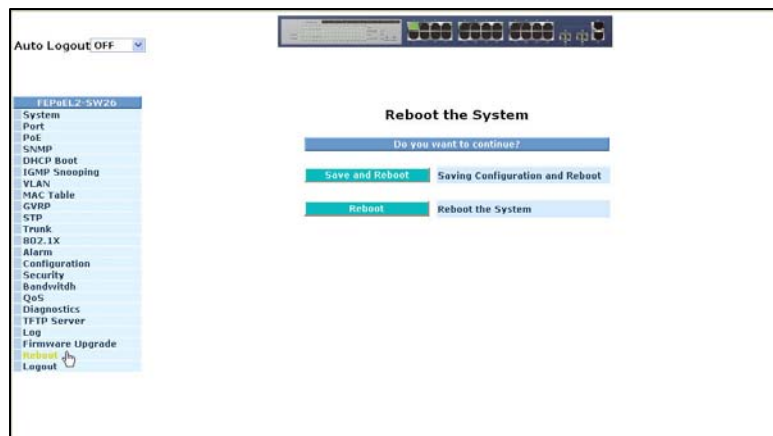
Figure 5.78 - Reboot

5.29   Logout

You can manually logout by using Logout function. You can also configure the switch to logout automatically.

Function name:

Logout

Function description:

The switch provides and automatic logout to prevent unauthorized users from using the system. If you do not logout and exit the browser, the switch will automatically logout. You can use **Auto Logout**.

Parameter description:

Auto Logout:

Default is ON (three minutes). If no action is taken within three minutes, the switch will logout automatically.
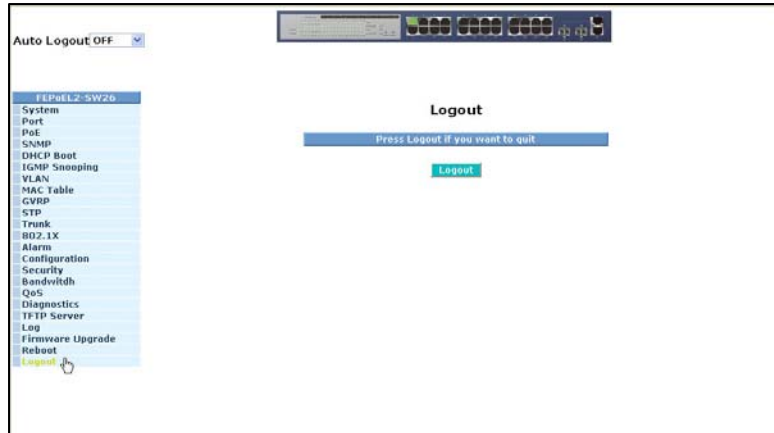
Figure 5.79 - Logout

6.0   Operation of CLI Management

6.1   Login

The command-line interface (CLI) is a text-based interface. You can access the CLI through either a direct serial connection to the device or a Telnet session. The default login identification is:

Username: **admin**
Password: **admin**

After you login successfully, the prompt will be shown as "**#**" if you are the first login person and your authorization is administrator; otherwise it may show "**$**". The "**#**" symbol allows you to perform administrator functions and have full access to the system. The "**$**" symbol allows you to perform guest functions. Guest functions only permit the system to be viewed. You will not be able to modify settings on the switch with the guest login.

```
L2 Managed Switch - GEL2-SW8

Login: admin
Password:

GEL2-SW8#
```

Figure 6.1 – Login Screen

6.2   Commands of CLI

To see the commands of the mode, please input "**?**" after the prompt, then all commands will be listed in the screen. All commands can be divided into two categories, including global commands and local commands. The following **global commands** can be used in any mode:

- Exit

- End

- Help

- History

- Logout

- Save start

- Save user

- Restore default

- Restore user

Command instructions residing in the corresponding modes are **local commands**. The same commands can be used in different modes and will perform a different function resulting in totally different information. For example, **show** in IP mode displays the IP information; however, in system mode, it will display the system information.

```
L2 Managed Switch - GEL2-SW8

Login: admin
Password:

GEL2-SW8# ?
  802.1x             Enter into 802.1x mode
  account            Enter into account mode
  alarm              Enter into alarm mode
  autologout         Change autologout time
  bandwidth          Enter into bandwidth mode
  config-file        Enter into config file mode
  dhcp-boot          Enter into dhcp-boot mode
  diag               Enter into diag mode
  firmware           Enter into firmware mode
  gvrp               Enter into gvrp mode
  hostname           Change hostname
  igmp               Enter into igmp mode
  ip                 Enter into ip mode
  log                Enter into log mode
  mac-table          Enter into mac table mode
  management         Enter into management mode
  max-pkt-len        Enter into max packet length mode
  mirror             Enter into mirror mode
```

Figure 6.2 – Command List

The following table lists the CLI commands and descriptions.

Command	Syntax	Description	Argument	Possible Value
Global Commands				
End	end	Return to top mode	None	None
Exit	exit	Returns to previous mode	None	None
Help	help	Displays available commands. When you use *help*, all commands are displayed. This command will help you distinguish between local and global commands.	None	None
History	history	Displays the list of commands you have been using during the session. CLI supports up to 256 records. If no argument is entered, CLI will list total records up to 256. If an argument is provided, CLI would display the number of records equal to the argument.	Optional (Show last number of history records)	1, 2, 3....256
Logout	logout	If you use this command via Telnet connection, you will logout and disconnect. If you used this command through direct console connection, you will be logged out of the system and return to the login prompt.	None	None
Restore Default	restore default	Use this command to restore the startup configuration provided by factory default. If the restore is successful, you will be prompted to reboot. Once rebooted, startup configuration will be reset to factory default.	None	None
Restore user	restore user	Restores startup configuration as defined by user configuration. If restoring is successful, you will be prompted to reboot. After restoring the user defined configuration, all changes in the startup configuration would be lost. After rebooting, the entire startup configuration will replace the user defined configuration.	None	None
Save Start	save start	Use this command to save the current configuration as the startup configuration. This command must be used in	None	None

Command	Syntax	Description	Argument	Possible Value
		order to use the current configuration if the switch is rebooted.		
Save User	save user	Use this command to save the current configuration as the user-defined configuration. This command saves your current configuration into the non-volatile FLASH as the user-defined configuration.	None	None
Local Commands				
802.1x				
Set max-request	set max-request <port-range> <times>	This command sets the number of times the state machine will retransmit an EAP request packet to the Supplicant before it times out the authentication session.	<port range>: syntax 1, 5-7, available from 1 to 12 <times>: max-times, range 1-10	<port range> 1 to 12 <times>: 1-10, default is 2
Set mode	set mode <port-range> <mode>	This command is used to set up the 802.1x authentication mode of each port	<port range>: syntax, 1, 5-7, available from 1 to 12 <mode>: set up 802.1x mode 0:disable the 802.1x function 1:set 802.1x to multihost mode	<port range>: 1 to 12 <mode>: 0 or 1
Set port-control	set port-control <port-range>	Use this command to set up the 802.1x status of each port	<port range>: syntax 1, 5-7, available from 1 to 12 <authorized>: set up the status of each port 0:ForceUnauthorized 1:ForceAuthorized 2:Auto	<port range>: 1 to 12 <authorized>: 0, 1 or 2
Set quiet period	set quiet-period <port-range> >sec>	This command is used to define periods of time when the authenticator state machine will not attempt to acquire a supplicant.	<port range>: syntax 1, 5-7, available from 1 to 12 <sec>: timer, range 0-65535	<port range>: 1 to 12 <sec>: 0~65535, default is 60
Set reAuthEnabled	set reauthenabled >port range> <ebl>	Use to define whether regular reauthentication will take place on a particular port	<port range>: syntax 1, 5-7, available 1 to 12 <ebl> : 0 :OFF Disable reauthentication 1 :ON Enable reauthentication	<port range>: 1 to 12 <ebl>: 0 or 1, default is 1
Set reAuthMax	set reauthmax	Use to set the number of reauthentication attempts that are permitted before the port	<port range>: syntax 1, 5-7, available 1 to 12	<port range> : 1 to 12 <max> : 1-10,

Command	Syntax	Description	Argument	Possible Value
		becomes unauthorized.	<max> : max. value, range 1-10	default is 2
Set ReAuthPeriod	Set reauthperiod <port-range> <sec>	This command sets a constant that defines a non zero number of seconds between periodic reauthentication of the supplicant.	<port range>: syntax 1, 5-7, available 1 to 12 <sec> : timer, range 1-65535	<port range>: 1 to 12 <sec> : 1~65535, default is 3600
Set serverTimeout	set servertimeout <port-range> <sec>	This command sets a timer used by the Backend Authentication state machine to determine timeout conditions in the exchanges between the Authenticator and the Supplicant or Authentication Server. The initial value of this time is either suppTimeout or serverTimeout.	<port-range>: syntax 1, 5-7, available 1 to 12 <sec> :timer, range 1~65535	<port-range> : 1 to 12 <sec> :1~6553 5, default is 30
Set state	set state <ip> <port number> <secret-key>	Used to configure the settings related to the 802.1x radius server.	<ip>: the IP address of the radius server. <port-number> the service port of radius server (authorization port) <secret-key)\>: set up the value of secret-lkey and the length of secret-key is from 1 to 31	<port-number> :1~65 535, default is 1812
Set suppTimeout	set supptimeout <port range> <sec>	A timer is provided by the Backend Authentication state machine to determine timeout conditions in the exchanges between the Authenticator and the Supplicant or Authentication Server. The initial value is either suppTimeout or serverTimout as determined by the operation of the Backend Authentication state machine.	<port-range>: syntax 1, 5-7, available 1 to 12 <sec> :timer, range 1-65535	<port-range>: 1 to 12 <sec> 1~65535, default is 30
Set txPeriod	set txperiod <port-range> <sec>	A time used by the Authenticator PAE state machine to determine when an EAPOL PDU is to be transmitted.	<port-range>: syntax 1, 5-7, available 1 to 12 <sec> :timer, range 1-65535	<port-range>: 1 to 12 <sec> 1~65535, default is 30
Show mode	show mode	Displays the mode of each port	None	None
Show parameter	show parameter	Displays the parameters of each port	None	None
Show security	show security	Displays the authentication status of each port	None	None

Command	Syntax	Description	Argument	Possible Value
Show state	Show state	Displays the Radius server configuration	None	None
Account Commands				
Add	add	Used to create a new guest user. When a new guest user is created, the new password must be entered and confirmed.	<name> : new account name	At least 5 characters
Del	del <name>	Used to delete an existing account	<name>: existing user account	None
Modify	modify <name>	Used to modify the username and password of an existing account	<name>: existing user account	None
Show	show	Used to display the system account, including account name and identity	None	None
Alarm <<email>>				
Del mail-address	del mail-address <#>	Used to remove the configuration of an email address	<#>: email address number, range 1 to 6	<#> 1 to 6
Del server-user	del server-user	Used to remove the configuration of the server user account and password	None	None
Set mail-address	set mail-address <#> <mail address>	Used to set up an email address	<#>:email address number, range 1 to 6	<#> 1 to 6
Set server	set server <ip>	Used to set up the IP address of the email server	<ip>:email server ip address or domain name	None
Set user	set user <username>	Used to set up the account for the email server	<username>: email server account and password	None
Show	Show	Used to display email configuration	None	None
<<email>>				
Del all	del all <range>	Used to disable email, sms and trap of events	<range>: del the range of events, syntax 1, 5-7	<range> 1~24
Del email	del email <range>	Used to disable email of events	<range>: del the range of email, syntax 1, 5-7	<range> 1~24
Del sms	del sms <range>	Used to disable sms of events	<range>: del the range of sms, syntax 1, 5-7	<range> 1~24
Del trap	del trap <range>	Used to disable trap of events	<range>: del the range of trap, syntax 1, 5-7	<range> 1~24
Set all	set all <range>	Used to enable email, sms and trap of events	<range>: set the range of events, syntax 1, 5-7	<range> 1~24
Set email	set email <range>	Used to enable email of the events	<range>: set the range of email,	<range> 1~24

Command	Syntax	Description	Argument	Possible Value
			syntax 1, 5-7	
Set sms	set sms <range>	Used to enable the SMS of the events	<range>: set the range of sms, syntax 1, 5-7	<range> 1~24
Set trap	set trap <range>	Used to enable the trap of events	<range>: set the range of sms, syntax 1, 5-7	<range> 1~24
Show	show	Used to display the configuration of an alarm event	None	None
Show (alarm)	show	Alarm is used to display the configuration of Trap, SMS or email	None	None
<<sms>>				
Del phone-number	del phone-number <#>	Used to delete SMS phone number	<#> : mobile phone number, range 1 to 6	<#>: 1 to 6
Del server-user	del server-user	Used to delete SMS server, user account and password	None	None
Set phone-number	set phone-number <#> <phone-number>	Used to add SMS phone number	<#>: mobile phone number, range 1 to 6 <phone-number>; phone number	<#>: 1 to 6
Set server	set server <ip>	Used to set up the IP address of SMS sever	<ip>; SMS server ip address or domain name	None
Set user	set user <username>	Used to set up user account and password of SMS server	<username>: SMS server account	None
Show	show	Used to display the configuration os SMS trap event	None	None
Autologout				
Autologout	autologout <time>	Used to set time for autologout	<time>: range 1 to 3600 seconds, 0 for autologout OFF; default setting is 180 seconds	<time>: 1, 1-3600
Bandwidth				
Disable egress-rate	disable egress-rate <range>	Used to cancel the egress-rate of the port.	<range> : syntax 1, 5-7, available from 1 to 12	<range>; 1 to 12
Disable ingress-rate	disable ingress-rate <range>	Used to cancel the ingress-rate of the port.	<range> : syntax 1, 5-7, available from 1 to 12	<range>; 1 to 12
Disable storm-rate	disable store-rate <range>	Used to cancel the storm-rate of the port	<range> : syntax 1, 5-7, available from 1 to 12	<range>; 1 to 12
Enable egress-rate	enable egress-rate <range> <data_rate>	Used to set the egress-rate of the port.	<range> : syntax 1, 5-7, available from 1 to 12 <data rate>: 0-1000	<range>; 1 to 12<data rate>: 0-1000
Enable ingress-rate	enable ingress-rate <range>	Used to set up the Ingress-rate of the port	<range> : syntax 1, 5-7, available from 1 to	<range>; 1 to 12

Command	Syntax	Description	Argument	Possible Value
	<data_rate>		12 <data rate>: 0-1000	<data rate>: 0-1000
Enable storm-rate	enable storm-rate <range> <data_rate>	Used to set the storm-rate of the port	<range> : syntax 1, 5-7, available from 1 to 12 <data rate>: 0-1000	<range>; 1 to 12 <data rate>: 0-1000
Show	Show	Used to display all current settings for bandwidth	None	None
Config-file				
Export start	export start	Used to run the export start function	None	None
Export user-conf	export-user conf	Used to export user-conf function	None	None
Import start	import start	Used to run the import start function	None	None
Import user-conf	import user-conf	Used to run the import user-conf function	None	None
Set export-path	set export-path <filepath>	Used to set the filepath and filename that will be exported	<filepath>:filepath and filename	<filepath>:filepath and filename
Set import-path	set import-path <filepath>	Used to set the filepath and filename that will be imported	<filepath>:filepath and filename	<filepath>:file path and filename
Show	show	Used to display the config-file information	None	None
DHCP-boot				
Set dhcp-boot	set dhcp-boot <sec>	Used to set the delay time for DHCP boot	<sec>:range syntax: 0, 1-30; the value "o" is used to disable DHCP boot delay	<sec>: 0-30
Show	show	Used to display the status of DHCP boot	None	None
Diag				
Diag	diag	Used to determine whether UART, DRAM, Flash and EEPROM is normal or not normal.	None	None
Loopback	loopback	Used for internal/external loopback test	None	None
Ping	ping <ip>	Used to confirm the remote end-station or switch itself is making a connection	<ip>:ip address or domain name	IP address, e.g. 192.168.2.65 or domain name, e.g. yahoo.com
Firmware				
Set upgrade-path	set upgrade-path <filepath>	Used to download the image for firmware upgrade	<filepath>:upgrade file path	<filepath>: upgrade file path
Show	show	Used to display information for fttp server	None	None
Upgrade	upgrade	Used to run the upgrade function	None	None

Command	Syntax	Description	Argument	Possible Value
GVRP				
Disable	disable	Used to disable the GVRP function	None	None
Enable	enable	Used to enable the GVRP function	None	None
Group	group <group number>	Used to modify a GVRP group's setting. The applicant or registrar mode of an existing GVRP group per port can be changed.	<group number>: enter the GVRP group you have created using the VID. Available range 1 to 4094	<group number>: 1~4094
Set applicant	set applicant <range> <normal|non-participant>	Used to set default applicant mode for each port	<range>:port range, syntax 1, 5-7, available from 1 to 12 <normal>: set applicant as normal mode <non-participant>: set applicant as non-partipant mode	<range> : 1 to 12
Set registrar	set registrar <range> <normal|fixed|forbidden>	Used to set default registrar mode for each port	<range>:port range, syntax 1, 5-7, available from 1 to 12 <normal>: set registrar as normal mode <fixed>: set registrar as fixed mode <forbidden>: set registrar as forbidden mode	<range>: 1 to 12 <normal|fixed|forbidden>:normal or fixed or forbidden
Set restricted	set restricted <range> <enable|disable>	Used to set the restricted mode for each port	<range>: port range, syntax 1, 5-7, available from 1 to 12 <enable>: set restricted enabled <disabled>: set restricted disabled	<range>: 1 to 12 <enable / disable>: enable or disable
Set timer	set timer <range> <join> <leaveall>	Used to set GVRP join time, leave time and leaveall time for each port.	<range>:port range, syntax 1, 5-7, available from 1 to 12 <join>: join timer, available from 20 to 100 <leave>: leave timer, available from 60 to 300 <leaveall>: 1000 to 5000 Leave time must be equal to or greater to the join time	<range> 1 to 12 <join>: 20 to 100 <leave>: 60 to 300 <leaveall>: 1000 to 5000

Command	Syntax	Description	Argument	Possible Value
Show config	show config	To display the GVRP configuration	None	None
Show counter	show counter	Used to display the counter number of the port	<port>: port number	<port>: available from 1 to 8
Show group	show group	Used to display the GVRP groups	None	None
Hostname				
Hostname	hostname <name>	Used to set the hostname of the switch	<name>:hostname, max 40 characters	<name>:hostname, max 40 characters
IGMP				
Set igmp_ snooping	set igmp_snooping <status>	Use to set the most for IGMP snooping	<status>:0:disable 1:active 2:passive	<status>: 0, 1 or 2
Show	show	Used to display IGMP snooping mode and IP multicast table	None	None
IP				
Disable DHCP	disable dhcp	Used to disable the DHCP function	None	None
Enable DHCP	enable dhcp	Used to enable the DHCP function and set DNS server for manual or auto mode	<manual|auto>:set DHCP with either manual or auto mode	<manual|auto>: manual or auto
Set DNS	set dns	Used to set the IP address of the DNS server	<ip>:dns ip address	168.95.1.1
Set IP	set <ip> <mask> <gateway>	Used to set the system IP address, subnet mask and gateway	<ip>:ip address <mask>:subnet mask <gateway>:default gateway	<ip>:192.168.1.2 or others <mask>:255.255.255.0 or others <gateway>:192.168.1.253 or others
Show	show	Used to display the system's DHCP state, IP address, subnet mask, default gateway, DNS mode, DNS server IP address and current IP address	None	None
Log				
Clear	clear	Used to clear the log data	None	None
Disable auto-upload	disable auto-upload	Used to disable the auto-upload function	None	None
Enable auto-upload	enable auto-upload	Used to enable the auto-upload function	None	None
Show	show	Used to display a list of the trap log events. When a log event occurs, it is recorded. Show is used to query the log functions. Up to 120 records are supported.	None	None
Upload	upload	Used to upload log data through	None	None

Command	Syntax	Description	Argument	Possible Value
		tffp.		
Mac-Table <<alias>>				
Del	del <mac>	Used to delete the MAC alias entry	<mac>; mac address, format: 00-02-03-04-05-06	<mac>:mac address
Set	set <mac> <alias>	Used to set the MAC alias entry.	<mac>; mac address, format: 00-02-03-04-05-06 <alias> mac alias name, max 15 characters	None
Show	show	Used to display the MAC alias entry	None	None
<<information>>				
Search	search <port> <mac> <vid>	Used to find the relative MAC information in the MAC table	<port>: set up the range of the ports to search for Syntax 1, 5-7, available from 1 to 12 <mac>: mac address, format: 01-02-03-04-05-06 '?" can be used <vid>: vlan id from 1 to 4094; '?" as don't care, 0 as untagged	<port>; 1 to 12 <vid>:0, 1~4094
show	show	Used to display all MAC table information	None	None
<<maintain>>				
Set aging	set aging	Used to set up the age out time of dynamic learning MAC	<#>; age-timer in seconds 0, 10 to 65535. The value "0" means to disable aging	<#>; 0, 10 to 65535
Set flush	set flush	Used to delete all MACs learned dynamically	None	None
Show	show	Used to display the age timer settings	None	None
<<static mac>>				
Add	add <mac> <port> <vid> [alias]	Used to add the static MAC entry	<mac>: mac address, format: 00-02-03-04-05-06 <port>: 0-12. The value "0" means this entry is a filtering entry <vid>: vlan id 0, 1-4094. VID must be zero if vlan mode is not tag-based [alias]: mac alias name, max 15	<mac>: mac address <port>:0-12 <vid>:0, 1-4094 [alias]: mac alias name

Command	Syntax	Description	Argument	Possible Value
			characters	
Del	del <mac> <vid>	Used to remove the static MAC entry	<mac>: mac address, format 00-02-03-04-05-06 <vid>:vlan id. 0, 1-4094. VID must be zero if VLAN mode is not tag-based	<mac>: mac address <vid>: 0, 1-4094
Show filter	show filter	Used to display the static filter table	None	None
Show forward	show forward	Used to display the static forward table	None	None
Management				
Add	set [<name> <value>] [<vid> <value>] [<ip> <value>] [<port> <value>] [<type> <value>] [<action> <value>]	Used to set management policy records	[<name> <value>] ACL entry name [<vid> <value>] VLAN ID [<ip> <value>] Incoming port [<type> <value>] Access type [<action> <value>] a(ccept) or d (eny)	[<name> <value>] No default, must be set [<vid> <value>] Range is 1-4095 and can be set to any [<ip> <value>] Any valid IP address [<port> <value>] 1 or 1-9 [<type> <value>] h(ttp), s(nmp) or t(elnet) or any [<action> <value>] No default and must be set
Delete	delete #	Used to delete a specific record or range	<#>: a specific or range management security entry	None
Edit [#}] the specific management policy entry	edit # [<name> <value>] [<vid> <value>] [<ip> <value>] [<port> <value>] [<type> <value>] [<action> <value>]	Used to edit a management policy record	[<name> <value>] ACL entry name [<vid> <value>] VLAN ID [<ip> <value>] Incoming port [<type> <value>] Access type [<action> <value>] a(ccept) or d (eny)	[<name> <value>] No default, must be set [<vid> <value>] Range is 1-4095 and can be set to any [<ip> <value>] Any valid IP address [<port> <value>] 1 or 1-9

Command	Syntax	Description	Argument	Possible Value
				[<type> <value>] h(ttp), s(nmp) or t(elnet) or any [<action> <value>] No default and must be set
Show	show	Used to show the specific management policy record	None	None
Max-pkt-len				
Set len	set len <range> <lenth>	Used to set the maximum length of the packet that each port of the switch can accept	<range>: port range, syntax 1, 5-7, available from 1 to 12<length (bytes)>: maximum packet length	<range>: 1 to 12 <length (bytes)>: 1518/1343/9216
Show	show	Used to display current setting for maximum packet length	None	None
Mirror				
Set mirror-mode	set mirror-mode <rx|disable>	Used to set the mirror mode (rx mode or disable)	<rx | disable>: rx:enable the mode of mirror (only mirror packets that are received) Disable: end of the function of mirroring	<rx | diable>: rx or disable
Set monitored port	set monitored-port <range>	Used to set the port that will be monitored. The packets received by this port will be copied to the monitoring port.	<range>: the port that is chosen for monitored port for the mirror function, syntax 1, 5-7, available from 1 to 12	<range>: 1 to 12
Set monitoring-port	set monitoring-port	Used to set the monitoring port for the mirror function. User can observe the packets of the monitored port received by this port.	<#>: the monitoring port that is chosen for the mirror function. Only one port is allowed to configure, available from 1 to 12	<#>: 1 to 12
Show	show	Used to display the setting status of the Mirror function	None	None
Port				
Clear counter	clear counter	Used to clear all ports' counter information (including simple and detailed port counter)	None	None
Disable flow-control	disable flow-control <range>	Used to disable the flow control function of the port	<range>: syntax 1, 5-7, available from 1 to 12	<range>: 1~12
Disable state	disable state <range>	Used to disable the communication capability of the port	<range>: syntax 1, 5-7, available from 1 to 12	<range> :1~12

Command	Syntax	Description	Argument	Possible Value
Enable flow-control	enable flow-control <range>	Used to enable the flow control function of the port	<range>:syntax 1, 5-7, available from 1 to 12	<range>: 1~12
Enable state	enable state <range>	Used to enable the communication capability of the port	<range>:syntax 1, 5-7, available from 1 to 12	<range>: 1~12
Set speed-duplex	set speed-duplex <range> <auto|10half|10full|100half|100full|1gfull>	Used to set the speed and duplex mode of all ports	<range>:syntax 1, 5-7, available from 1 to 12 <port-speed>: auto: set auto-negotiation mode 10half: set speed/duplex 10M Half 10full: set speed/duplex 10M Full 100half:set speed/duplex 100M half 100full: set speed/duplex 100M full 1Gfull: set speed/duplex 1G full	<range>: 1 to 12 <port-speed>: auto, 10half, 10full, 100half, 100full, 1Gfull
Show conf	show conf	Used to display each port's configuration regarding state, speed-duplex and flow control	None	None
Show detail-counter	show detail-counter <#>	Used to display the detailed counter number for port traffic	<#>: port, available from 1 to 12	<#>: 1~12
Show sfp	show sfp <port>	Used to display the SFP module information	<port>: SFP port, available 11-12	<port>: 11, 12
Show simple-counter	show simple-counter	Used to display the summary counter for each port's traffic	None	None
Show status	show status	Used to display the port's current status	None	None
QoS				
Set advance-layer4	set advance-layer4 <port-range> <#> <tcp/udp port> <default> <match>	Used to set class of ports on advanced mode for Layer 4 QoS	<port-range>:port range, syntax 1, 5-7, available from 1 to 12 <#>: special UDP/TCP port selection, range: 1-10 <tcp/udp port range>: 0-65535 <default>: default class (all other TCP/UDP ports) 1:high, 0:low <match>:special	<port –range>: 1 to 12 <#>: 1-10 <tcp/udp port range>:0-65535 <default>: 1 or 0 <match>: 1 or 0

Command	Syntax	Description	Argument	Possible Value
			TCP/UDP class. 1:high, 0:low	
Set default	set default <class>	Used to set priority class of the packets that QoS doesn't affect	<class>: class of service setting 1:high, 0:low	<class>: 1 or 0
Set diffserv	set diffserve <ds-range> <class>	Used to set class of ports on IP DiffServe QoS	<ds-range>: dscp field, syntax 1, 5-7, available from 0 to 63 <class>: class of service setting. 1:high, 0:low	<ds-range>: 0 to 63 <class>: 1 or 0
Set mode	set mode <port/pri_tax/tos/layer4/diffserv>	Used to set QoS priority mode of the switch	<port>: per port priority <pri_tag>:vlan tag priority <tos>: ip tos classification <diffserv>:ip diffserv classification	Port/pri_tag/tos / layer4/diffserv
Set port <range> <class>	set port <range> <class>	Used to set class of ports on port-based QoS	<range>: port range, syntax 1, 5-7, available from 1 to 12 <class>: class of service setting. 1: high, 0:low	<range>: 1 to 12 <class> 1 or 0
Set pri-tag	set pri_tax <port-range><tag-range> <class>	Used to set class of ports on VLAN tag-based QoS	<range>: port range, syntax 1, 5-7, available from 1 to 12 <tag-range>: tag priority level, syntax: 1, 5-7, available 0 to 7 <class>: class of service setting. 1: high, 0:low	<port-range>: 1 to 12 <tag-range>: 0 to 7 <class> 1 or 0
Set simple layer4	set simple-layer4 <#>	Used to set class of ports on simple mode of Layer 4 QoS	<#>: layer4-configuration mode, valid values are as follows: 0:disable ip tcp/udp port classification 1 :down prioritize web browsing, e-mail, FTP and news 2:prioritize IP telephony (VoIP) 3: prioritize iSCSI 4: prioritize web browsing, email, FTP transfers and news 5: prioritize streaming audio/video	<#>: 0~6

Command	Syntax	Description	Argument	Possible Value
			6: prioritize databases (Oracle, IBM DB2, SQL, Microsoft)	
Set tos	set tos <port-range> <tos-range> <class>	Used to set class of ports on IP TOS QoS	<port-range>:, syntax: 1, 5-7, available from 1 to 12<tos-range>: tos precedence field, syntax 1, 5-7, available from 0 to 7 <class>: classof service setting. 1:high, 0:low	<port-range> 1 to 12 <tos-range>: 0 to 7 <class> : 1 or 0
Show	show	Used to display the information of the mode you have chosen	None	None
Reboot				
Reboot	reboot	Used to reboot the switch	None	None
SNMP				
Disable	disable set-ability disable snmp	Disable used in this mode will deactivate SNMP or set-community	None	None
Enable	enable set-ability enable snmp	Enable used in this mode will activate SNMP or set-community	None	None
Set	set get-community <community> set set-community <community> set trap <#> <ip> [port] [community]	Set used in this mode is used to set up get-community, set-community, trap host IP, host port and trap-community.	<#>: trap number <ip>: IP address or domain name <port>: trap port <community>:trap community name	<#>: 1 to 6 <port>:1~65535
show	show	Used to display the configuration of SNMP	None	None
STP				
Mcheck	mcheck <range>	Used to force the port to transmit RST BPDUs	<range>: syntax 1, 5-7, available form 1 to 12	<range>: 1 to 12
Disable	disable	Used to disable the STP function	None	None
Enable	enable	Used to enable the STP function	None	None
Set config	set config <bridge priority> <hello time> <max.age> <forward delay>	Used to set the parameters of STP	<bridge priority>: priority must be a multiple of 4096, available from 0 to 61440 <hello time>: available from 1 to 10	bridge priority>: 0 to 61440 <hello time>: 1 to 10 <max.age> : 6 to 40 <forward

Command	Syntax	Description	Argument	Possible Value
			<max.age> : available from 6 to 40 <forward delay>: available from 4 to 30. Note: 2*(Forward delay -1)>=MaxAge Max Age> =2*(Hello Time +1)	delay>: 4 to 30
Set port	set port <range> <path cost> <priority> <edge_port> <admin p2p>	Used to set up the port information of STP	<range>: syntax 1, 5-7, available from 1 to 12 <path cost>: 0, 1-200000000. The value zero means auto status <priority>: priority must be a multiple of 16, available from 0 to 240 <edge_port>: Admin Edge Port, <yes|no> <admin p2p>: Admin point to point, <auto|true|false>	<range>: 1 to 12 <path cost>: 0, 1-200000000 <priority>: 0 to 240 <edge_port>: Admin Edge Port, <yes/no> <admin p2p>: <auto/true/false>
Set version	set version <stp|rstp>	Used to set up the version of STP	<stp|rstp>: stp/rstp	<stp|rstp>: stp/tstp
Show config	show config	Used to display the configuration of STP	None	None
Show port	show port	Used to display the port information of STP	None	None
Show status	show status	Used to display the status of STP	None	None
System				
Set contact	set contact <contact string>	Used to set the contact description of the switch	<contact>: string length up to 40 characters	<contact>: a, b, c, d, …z and 1, 2, 3, … etc.
Set device-name	set device-name <device-name string>	Used to set the description of the device name of the switch	<device-name>: string length up to 40 characters	<device-name>: a, b, c, d, …z and 1, 2, 3, … etc.
Set location	set location <location string>	Used to set the description of the location of the switch	<location>: string length up to 40 characters	<location>: a, b, c, d, …z and 1, 2, 3, … etc.
Show	show	Used to display the basic information of the switch	None	None
TFFP				
Set server	set server <IP>	Used to set the IP address of the TFFP server	<IP>: the IP address of the TFFP server	<IP>: TFFP server IP
Show	show	Used to display information of the TFFP server	None	None
Time				

Command	Syntax	Description	Argument	Possible Value
Set daylightsaving	Set daylightsaving <hr> <MM/DD/HH> <mm/dd/hh>	Used to set daylight saving time	hr:daylight saving hour, range -5 to +5 MM: daylight saving start month (01-12) DD: daylight saving start Day (01-31) HH: daylight saving start hour (01-23) mm: daylight saving end month (01-12) dd: daylight saving end day (01-31) hh: daylight saving end hour (00-23)	hr:daylight: -5 to +5 MM: (01-12) DD: (01-31) HH: (01-23) mm: (01-12) dd: (01-31) hh: (00-23)
Set manual	set manual <YYYY/MM/DD> <hh:mm:ss>	Used to set the current time manually	YYYY: Year (2000-2036) MM: Month (01-12) DD: Day (01-31) hh: Hour (00-23) mm: minute (00-59) ss: second (00-59)	YYYY: (2000-2036) MM: (01-12) DD: (01-31) hh: (00-23) mm: (00-59) ss: (00-59)
Set ntp	set ntp <ip> <timezone>	Used to set the current time via the NTP server	<IP>: ntp server IP address or domain name <timezone>: time zone (GMT), range: -12 to +13	<timezone>: -12, -11…, 0, 1…, 13
Show	show	Used to show the time configuration, including *current time, NTP server, timezone, daylight saving, daylight saving start and daylight saving endl*	None	None
Trunk				
Del trunk	del trunk <port-range>	Used to delete the truanking port	<port-range>: port range, syntax 1, 5-7, available from 1 to 12	<port-range>: 1 to 12
Set priority	set priority <range>	Used to set up the LACP system priority	<range>: available from 1 to 65535	<range>: 1 to 65535, default: 32768
Set trunk	set trunk <port-range> <method> <group> <active LACP>	Used to set up the status of trunk, including the group number and mode of the trunk as well as LACP mode	<port-range>: port range, syntax 1, 5-7, available from 1 to 12 <method>: static: adopt the static link aggregation; lacp: adopt the dynamic link aggregation-link aggregation control protocol <group>: 1-12 <active LACP>: active: set the LACP	<port-range>: 1 to 12 <method>: static /lacp <group>: 1 to 12 <active LACP>: active / passive

Command	Syntax	Description	Argument	Possible Value
			to active mode; passive: set the LACP to passive mode	
Show aggtr-view	show aggtr-view	Used to display the aggregator list	None	None
Show lacp-detail	show lacp-detail <aggtr>	Used to display the detailed information of the LACP trunk group	<aggtr>: aggregator, available from 1 to 12	<aggtr>: 1 to 12
Show lacp-priority	show lacp-priority	Used to display the value of LACP priority	None	None
Show status	show status	Used to display the aggregator status and the settings of each port	None	None
VLAN				
Del port-group	del port-group <name>	Used to delete the port-based VLAN group	<name>: VLAN group to be deleted	<name>: port-VLAN name
Del tag-group	del tag-group	Used to delete the tag-based VLAN group	<vid>: VLAN group to be deleted	<vid>: 1 to 4094
Disable drop-untag	disable drop-untag <range>	Used to set untagged frames to not be dropped	<range>: ports to be set, syntax 1, 5-7, available 1 to 12	<range>: 1 to 12
Disable sym-vlan	disable sym-vlan	Used to drop frames from the non-member port	<range>: ports to be set, syntax 1, 5-7, available 1 to 12	<range>: 1 to 12
Enable drop-untag	enable drop-untag <range>	Used to drop the untagged frames	<range>: ports to be set, syntax 1, 5-7, available 1 to 12	<range>: 1 to 12
Enable sym-vlan	enable sym-vlan <range>	Used to drop frames from the non-member port	<range>: ports to be set, syntax 1, 5-7, available 1 to 12	<range>: 1 to 12
Set mode	set mode <disable| port|tag|metro| double-tag> [up-link]	Used to switch LVAN mode, including disable, port-based, tag-based, metro and double-tag modes	<disable>: vlan disable <tag>: set tag-based vlan <port>: set port-based vlan <metro>: set metro mode vlan <double-tag>: enable Q-in-Q function <up-link>: syntax 1, 5-7, available from 11 to 12, only for metro mode vlan	<disable|port| tag|metro| double-tag>: disable, port, tag, metro, double-tag [up-link] 11 or 12
Set port-group	set port-group <name> <range>	Used to add or edit a port-based VLAN group	<name>: port-vlan name <range>: syntax 1, 5-7, available from 1 to 12	<range>: 1 to 12
Set port-role	set port-role	Used to set the egress rule.	<range>: ports to be	<range>: 1 to

Command	Syntax	Description	Argument	Possible Value
	<range> <access|trunk |hybrid> [vid}	Configure the port roles.	set, syntax 1, 5-7, available from 1 to 12 <access>: do not tag frames <trunk>: tag all frames <hybrid>: tag all frames except a specific VID <vid>: untag-vid for hybrid port	12 <vid>: 1 to 4094
Set pvid	set pvid <range> <pvid>	Used to set the PVID of the VLAN	<range> ports to be set PVID(s), 1, 5-7, available from 1 to 12 <pvid>; PVIDs to be set, available 1 to 4094	<range>: 1 to 12 <pvid>: 1 to 4094
Set tag-group	set tag-group <vid> <name> <range> <#>	Used to add or edit the tag-based vlan group	<vid>: vlan ID, range from 1 to 4094 <name>: tag-vlan name <range>: vlan group members, syntax 1, 5-7, available from 1 to 12 <#>: sym/asym vlan setting. 1:symmetric vlan, 0: asymmetric vlan	<vid>: 1 to 4094 <range>: 1 to 12 <#>: 0 or 1
Show group	show group	Used to display the VLAN mode and VLAN group	None	None
Show pvid	show pvid	Used to display pvid, ingress/egress rule	None	None
VS				
Disable	disable	Used to disable the virtual stack	None	None
Enable	enable	Used to enable the virtual stack	None	None
Set gid	set gid <gid>	Used to set the group ID	<gid>: group ID	<gid>: a-z, A-Z, 0-9
Set role	set role <master|slave>	Used to set role	<master|slave>: master: act as master, slave: act as slave	<master|slave>; master or slave
Show	show	Used to display the configuration of the virtual stack.	None	None

7.0   Maintenance

- 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

7.1   Examples

1. Computer A connects to Computer B but cannot connect to Computer C.
   a. The network cable from Computer C may be faulty. Check the link/act status of Computer C on the LED indicator. Try another network device with this connection.
   b. The network configuration of Computer C may be faulty. Verify the network configuration on Computer C.
2. The uplink connection function fails to work.
   a. Please check the uplink setup of the Managed Switch to verify the uplink function is enabled.
3. The console interface does not appear on the console port connection.
   a. The COM port default parameters are: Baud Rate: 57600, Data Bits: 8, Parity Bits: None, Stop Bit: A, Flow Control: None. Check the COM port to confirm that it is working property in the terminal program and that you are using the correct COM port.
   b. Check the RS-232 cable is to make sure it is connected to console port on the switch and the COM port of PC.
   c. Check to make sure the COM port of the PC is enabled.

8.0   Troubleshooting

All Waters' switching products are designed to provide reliability and consistently high performance in all network environments. The installation of Waters' ProSwitch PS-2126M switch is a straightforward procedure. Should problems develop during installation or operation, this section is intended to help locate, identify and correct these types of problems. Please follow the suggestions listed below prior to contacting your supplier. However, if you are unsure of the procedures described in this section or if the switch is not performing as expected, do not attempt to repair the unit; instead contact your supplier for assistance or contact Waters Network Systems' Customer Support Center at **800.328.2275** or email <u>carolynl@watersnet.com</u>.

8.1   Before Calling for Assistance

1. If difficulty is encountered when installing or operating the unit, refer back to the Installation
    Section of this manual. Also check to make sure that the various components of the network
    are operational and compatible.

2. Check the cables and connectors to ensure that they have been properly connected and the
    cables/wires have not been crimped or in some way impaired during installation. (About
    90% of network downtime can be attributed to wiring and connector problems.)

3. Make sure that an AC power cord is properly attached to the switch.

4. Be certain that each AC power cord is plugged into a functioning electrical outlet. Use the
    PWR LEDs to verify each unit is receiving power.

5. If the problem is isolated to a network device other than the switch, it is recommended that
    the problem device be replaced with a known good device. Verify whether or not the
    problem is corrected. If not, go to next step. If the problem is corrected, the Waters's switch
    and its associated cables are functioning properly.

6. If the problem continues, contact Waters Network Systems Customer Service at
    800.328.2275 or email <u>carolynl@watersnet.com</u> for assistance.

When Calling for Assistance

Please be prepared to provide the following information.

1. A complete description of the problem, including the following:
    a. The nature and duration of the problem
    b. Situations when the problem occurs
    c. The components involved in the problem
    d. Any particular application that, when used, appears to create the problem
2. An accurate list of Waters Network Systems product model(s) involved. Include the date(s)

that you purchased the products from your supplier.

3. It is useful to include other network equipment models and related hardware, including personal computers, workstations, terminals and printers; plus, the various network media types being used.

4. A record of changes that have been made to your network configuration prior to the occurrence of the problem. Any changes to system administration procedures should all be noted in this record.

8.2 Return Material Authorization (RMA) Procedure

All returns for repair must be accompanied by a Return Material Authorization (RMA) number. To obtain an RMA number, call Waters Network Systems Customer Service at 800.328.2275 during business hours of 8:00 am to 5:00 pm (CT) or email carolynl@watersnet.com. When calling, please have the following information readily available:

- Name and phone number of your contact person

- Name of your company/institution

- Your shipping address

- Product name

- Failure symptoms, including a full description of the problem

- Waters Network Systems will carefully test and evaluate all returned products, will repair products that are under warranty at no charge, and will return the warranty-repaired units to the sender with shipping charges prepaid (see Warranty Information at the end of this manual for complete details). However, if Waters cannot duplicate the problem or condition causing the return, the unit will be returned as: **No Problem Found**.

Waters Network Systems reserves the right to charge for the testing of non-defective units under warranty. Testing and repair of product that is not under warranty will result in a customer (user) charge.

8.3 Shipping and Packaging Information

Should you need to ship the unit back to Waters Network Systems, please follow these instructions: Package the unit carefully. It is recommended that you use the original container if available.   Units should be wrapped in a "bubble-wrap" plastic sheet or bag for shipping protection. (You may retain all connectors and this Installation Guide.) CAUTION: Do not pack the unit in Styrofoam "popcorn" type packing material. This material may cause electro-static shock damage to the unit.

Clearly mark the Return Material Authorization (RMA) number on the outside of the shipping container. Waters Network Systems is not responsible for your return shipping charges.

Ship the package to:

> Waters Network Systems
> Attention: Customer Service
> 945 37th Avenue, NW
> Rochester, MN 55901

9.0   Warranty

Waters' warranty statement is available on our web site at: <u>www.watersnet.com</u>.