WATERS NETWORK SYSTEMS™

OPERATING MANUAL

ProSwitch 2800M/MR

Managed Modular Fiber and Copper Switch Chassis

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1.0 Specifications

OPERATIONAL CHARACTERISTICS

MAC Address Table: 8K
Switching Mode: Store-and-forward
Memory Buffer Size:
256Kb packet buffer
128Kb control buffer

PERFORMANCE

Non-blocking wire speed
Auto negotiation
Auto-MDIX
Back pressure flow control for half duplex
Flow control for full duplex
Filtering/Forwarding Rate Performance

10Mbps:	14,880 pps
100Mbps:	148,800 pps
1000Mbps:	1,488,000 pps

LED INDICATORS

Per port: Power; Link/Activity; FDX; speed
System LED Power

NETWORK STANDARDS

IEEE 802.3
IEEE 802.3u
IEEE 802.3z
IEEE 802.3ad
IEEE 802.3ab
IEEE 802.3x
IEEE 802.1p/q
IEEE 802.1d/w
IEEE 802.1x

MANAGEMENT FUNCTIONS

Web-based, SNMP, CLI, or Telnet
RMON
RFC1757 group 1, 2, 3 and 9
DHCP client
IGMP snooping function
802.1x port-based authentication
QoS (four levels)
VLANs 4094/Maximum 256 groups

GVRP
Port mirroring
Port trunking
Flow control
Port security
Static MAC address security
TFTP software upgrade capability

EMI/SAFETY COMPLIANCE

FCC Class A & CE Mark Approval

CABLE CONNECTORS

Copper:
RJ45 shielded female ports
    10/100Mbps: CAT5 UTP or better
Console Port:
    RS232 Cable/DB9 connector
Fiber:
    MM FX port: 50/125um, 62.5/125mm
    SM FX port: 9/125um
    MM SX port: 50/125um, 62.5/125mm
    SM LX port: 9/125um
    SC, ST and SC connectors

FIBER DISTANCE

100Base-FX
    MM: 2km
    SM: 20km
1000Base-SX SFPs
    MM: 850m
1000Base-LX SFPs
    SM: 10km, 1310nm
    SM: 40km, 1310nm

POWER SUPPLY

Internal power supply
Input Voltage
    100 to 240 VAC, 50 to 60Hz
Power Consumption
    45 watts maximum

OPERATING ENVIRONMENT

Ambient Temperature:
32° to 104°F (0° to 40°C)
Storage:
-68° to 158°F (20° to 70°C)
Ambient Humidity:
32% to 104% (non-condensing)

MECHANICAL

Enclosure: Rugged high-strength sheet metal suitable for stand alone or rack mountable
Cooling Method: Fan cooled

PHYSICAL CHARACTERISTICS

Dimensions: 17.4 W x 11 D x 1.75” H (442 x 281 x 44mm)
Weight:
2800M Chassis: 7.5 lbs (3.4 kg)
2800MR Chassis: 10 lbs (4.6 kg)
Copper Module: .61 lbs (.28 kg)
Fiber Module: .75 lbs (3.34 kg)

WARRANTY:

Limited Lifetime

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.

- ProSwitch 2800M or MR switch chassis
- Modules (sold separately)
- Mounting Accessory for (19” rack shelf)
- User’s manual
- AC power cord
- RS-232 Cable

3.0 Introduction

The ProSwitch 2800M is a managed modular switch chassis providing outstanding performance in any network environment requiring a combination of fiber and copper ports. The 2800M has three module bays for 10/100Base-TX or 100Base-FX (multi or singlemode) 8 port modules. In addition to the three module bays, the 2800M has two 10/100/1000Base-TX ports and two mini GBIC slots for 1000Base-SX or 1000Base-LX SFP modules, providing a total of 28 usuable ports.

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 application.

3.1 Hardware Features

The 2800M 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
- 256KB packet buffer
- Maximum useable ports is 28
- Programmable classifier for QoS
- 8K MAC address and 4K VLAN support (IEEE802.1Q)
- Per-port shaping, policing, and broadcast storm control
- IEEE802.1Q-in-Q nested VLAN support
- Full-duplex flow control (IEEE802.3x) and half-duplex backpressure
- Supports online plug/unplug of SFP modules
- Extensive front-panel diagnostic LEDs

3.2 Software Features

The following lists management highlights of the 2800M switch:

- Supports concisely the status of ports and easily port configuration
- Supports per port traffic monitoring counters

- Supports a snapshot of the system Information upon login
- Port mirror function
- Static trunk function
- Supports 802.1Q VLAN with 256 entries
- User management limited to three users; only first admin can configure device
- DHCP broadcasting suppression to avoid network suspensions or crashes
- Sends traps events while monitoring
- Default configuration can be restored to overwrite the current configuration which can be used via web browser and CLI
- Supports on-line plug/unplug SFP modules
- Supports five types of QoS: MAC Priority, 802.1p Priority, IP TOS Priority, and DiffServ DSCP Priority
- Built-in web-based and CLI management and CLI management
- Rapid spanning tree (802.1w RSTP)
- 802.1x port security on a VLAN
- SNMP access can be disabled to prevent illegal SNMP access
- Support Ingress, Non-Unicast, and Egress bandwidth rating management
- The trap events and alarm messages can be transferred via e-mail and mobile phone short messages service
- Supports diagnostics informing administrator of hardware status
- Supports external loopback test to check if link is OK
- TFTP for firmware upgrade, system log upload, and config file import/export
- Remote boot the device through user interface and SNMP
- Network time synchronization and daylight saving
- Records 120 event logs in main memory and displays on the local console

3.3 Uplink Modules

The following module configurations are available for the 2800M/MR.

2800-8TX	8-port 10/100Base-TX module with RJ45 connectors
2800-8FXSC	8-port 100Base-FX MM fiber module with SC connectors
2800-8FXST	8-port 100Base-FX MM fiber module with ST connectors
2800-8SMSC-20	8-port 100Base-FX SM (20km, 1310nm) fiber module with SC connectors
SFP-1000SXLC	1-port 1000Base-SX MM fiber module with LC connector
SFP-1000LXLC	1-port 1000Base-LX SM (10km) fiber module with LC connector
SFP-1000SXLC	1-port 1000Base-LX SM (30km) fiber module with LC connector

3.4 Redundant Power

Optional redundant power is available for the 2800MR model.

2800-PWR-AC/DC	1U AC/DC power module
2800-PWR-DC/DC	1U DC/DC power module

3.5 Hardware Description

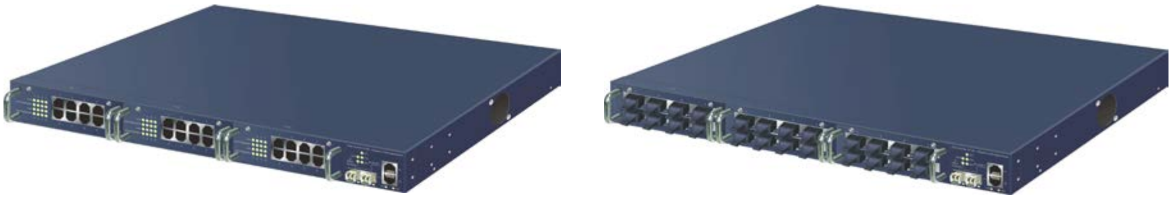
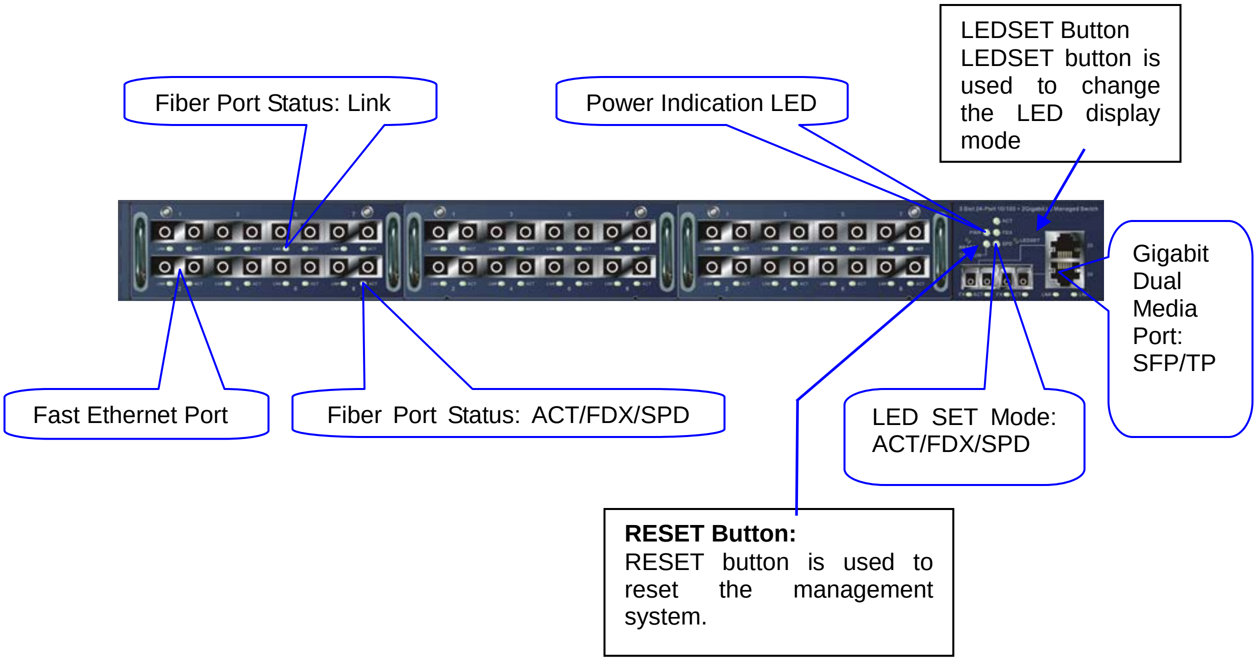


Figure 3.1 - 2800M Switches with Copper and Fiber Modules



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

Fiber Port Status: Link

Power Indication LED

Gigabit Dual Media Port: SFP/TP

Fast Ethernet Port

Fiber Port Status: ACT/FDX/SPD

LED SET Mode: ACT/FDX/SPD

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

Figure 3.2 - Front View of 2800M Switch with Fiber Modules

3.6 LEDs

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

LED	Color	Function
System LED		
CPURUN	Green	Blinks when CPU is on and good
POWER	Green	Switch is receiving power
ACT	Green	Lit when LEDSET set on active mode
FDX	Green	Lit when LEDSET set on full-duplex mode
SPD	Green	Lit when LEDSET set on speed mode
10/100Mbps Ethernet Port 1 to 8 of 3 Module LED		
LNK	Green	Port has established a valid link Off when there is no connection
ACT/FDX/SPD	Amber (TP Port 1 to 8 of 3 module LED) Green (Fiber Port 1 to 8 of 3 module 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 are occurring c. LEDSET set on SPD (speed) mode: Lit when 100Mbps speed is active Off when 10Mbps speed is active
10/100/1000Mbps Gigabit TP/Fiber Port 25, 26 LED		
LNK	Green	Lit when connection with remote device is good Off when there is no connection
FB	Green	Lit when fiber port is active Off when copper 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 are occurring c. LEDSET set on SPD (speed) mode: Lit when 1000Mbps speed is active Off when 10/100Mbps speed is active

Table 3.1 – LED Staus

3.7 Rear Panel

Located on the rear panel is the RS-232 DB-9 interface which is used for switch management configuration.

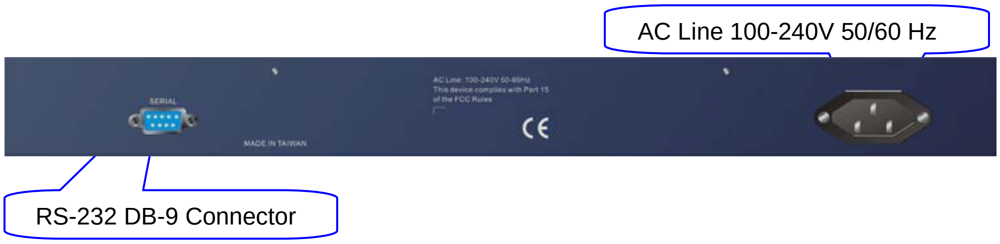


Figure 3.4 - Rear View of 2800M

3.8 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.

3.9 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.

3.10 Power On

Once the switch is on, the bootloader loads the firmware into the memory. It will take about 30 seconds. Once the firmware is loaded, the switch will flash all of the LEDs once and automatically perform a self test.

3.11 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.

3.11.1 Cabling Requirements for SFP Module

The GSM2800M has four slots for SFP modules. These slots provide fiber connectivity for Gigabit Ethernet and are optional. The switch supports both multimode and singlemode fiber connectivity. The following table lists the types of fiber that are supported by the GSM2800M/MR.

IEEE 802.3z Gigabit Ethernet 1000SX 850nm	Multimode Fiber Cable and Modal Bandwidth			
	Multimode 62.5/125μm		Multimode 50/125μm	
	Modal Bandwidth	Distance	Modal Bandwidth	Distance
	160MHz-Km	220m	400MHz-Km	500m
	200MHz-Km	275m	500MHz-Km	550m
1000Base-LX/LHX/XD/ZX	Singlemode Fiber 9/125μm			
	Singlemode transceiver 1310nm 10Km			
	Singlemode transceiver 1550nm 30, 50Km			
1000Base-LX Singlemode (BIDI LC)	Singlemode *20km		TX (Transmit)	1310nm
			RX (Receive)	1550nm
	Singlemode *20km		TX (Transmit)	1550nm
			RX (Receive)	1310nm

Table 3.2 – Fiber Cable

3.11.2 Cable Bit-Time

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 3.3 – Cable Bit-Time

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 3.4).

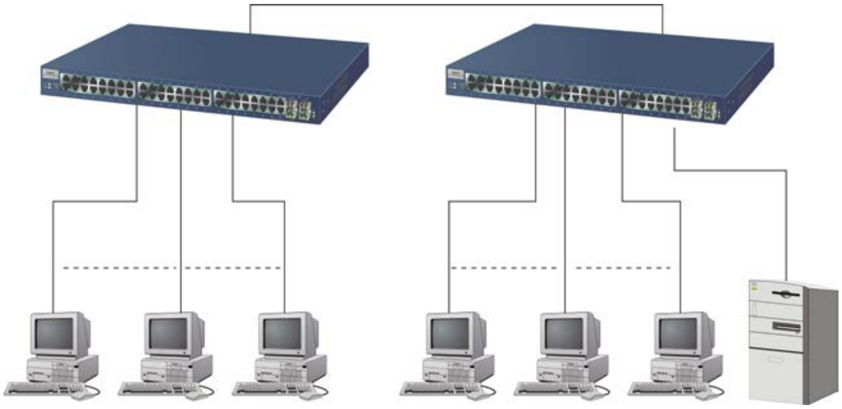


Figure 3.4 - No VLAN Configuration Diagram

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 3.5).

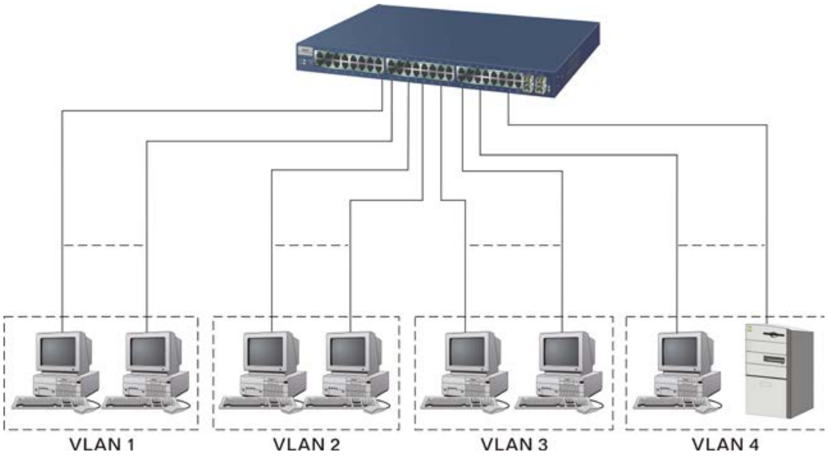


Figure 3.5 - Port-based VLAN Diagram

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 3.6)

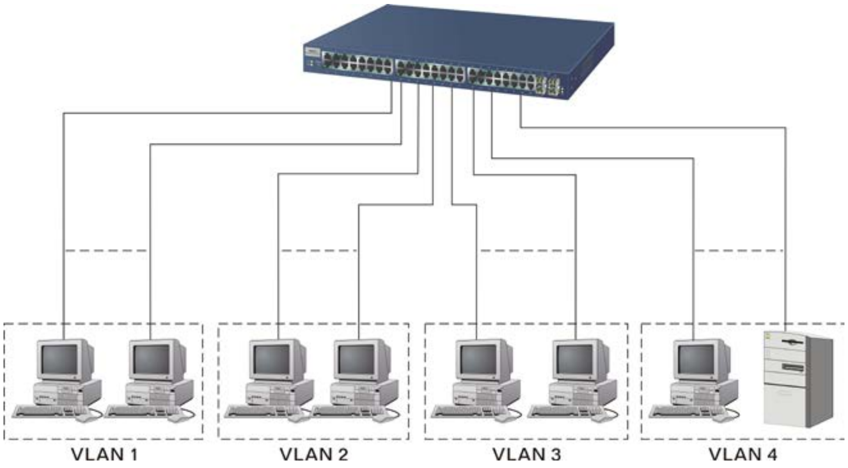


Figure 3.6 - Port-based VLAN Diagram

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 3.7).

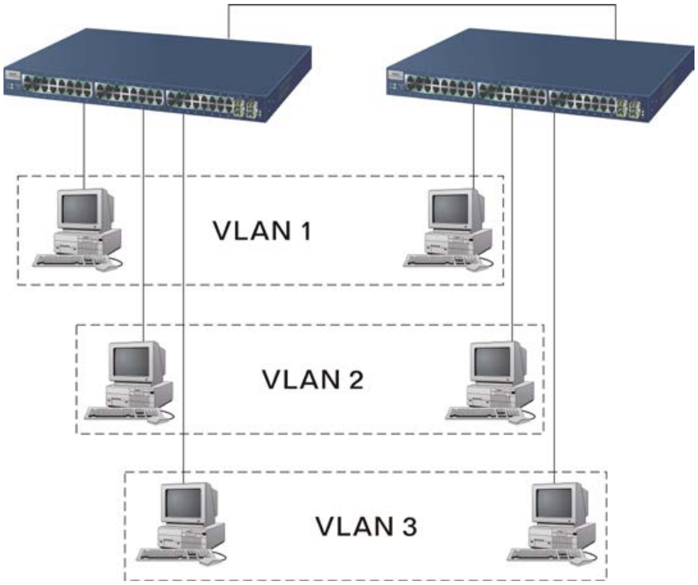


Figure 3.7 - Attribute-based VLAN Diagram

4.0 Access to Management Functions

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):	**115200**
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

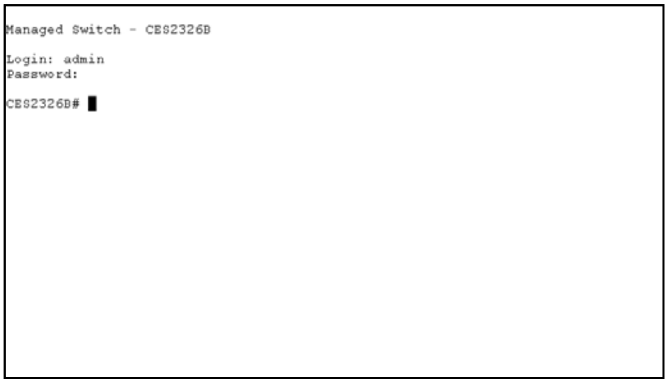
The default settings for your switch are listed in the following table:

Default Value	GSM2800M/MR
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.



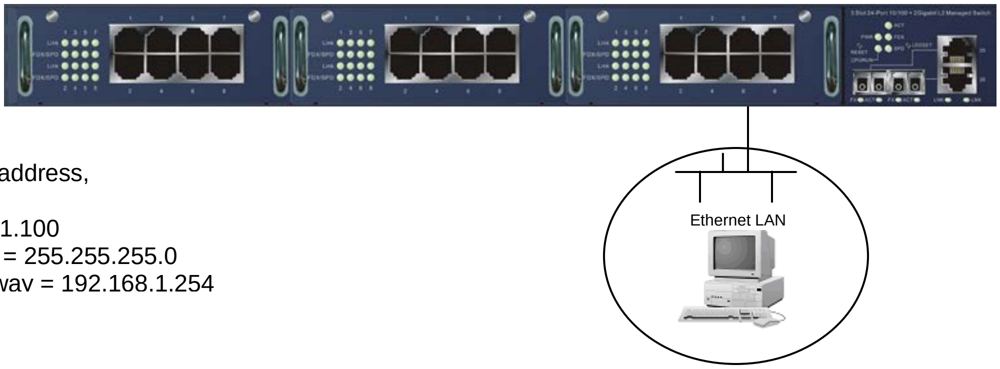
```
Managed Switch - CES2326B

Login: admin
Password:

CES2326B# █
```

Figure 4.1 – Login screen

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.



Assign an IP address,
For example:
IP = 192.168.1.100
Subnet Mask = 255.255.255.0
Default Gatewav = 192.168.1.254

Figure 4.2 – Ethernet Port Connection

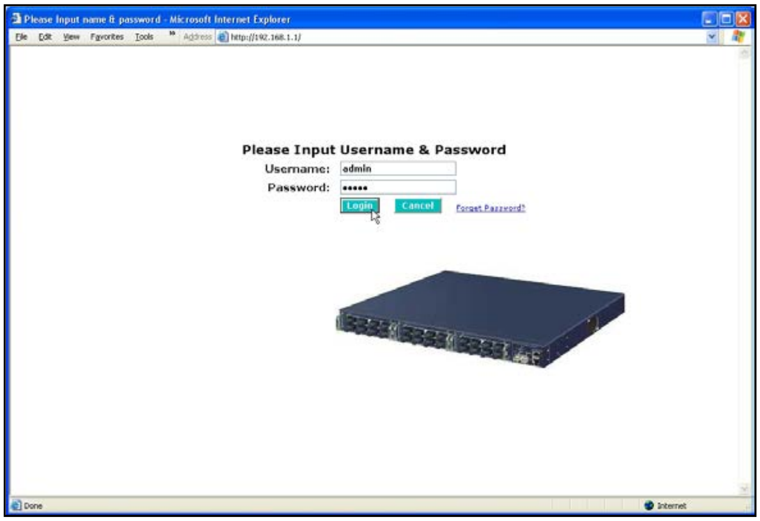
Before you are able to communicate with the switch, you must know the IP address of the switch. The default IP setting for the 2800M is:

- IP = 192.168.1.100
- Subnet Mask = 255.255.255.0
- Default Gateway = 192.168.1.253

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.



Please Input name & password - Microsoft Internet Explorer

Address: http://192.168.1.1/

Please Input Username & Password

Username: admin

Password: •••••

Figure 4.3 - Login Screen via a Web browser

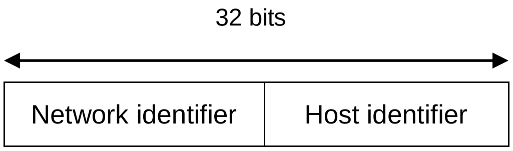
4.4 IP Address Assignment

For IP address configuration, the following three parameters are required:

- IP address
- Subnet Mask
- Default Gateway and DNS.

IP Address:

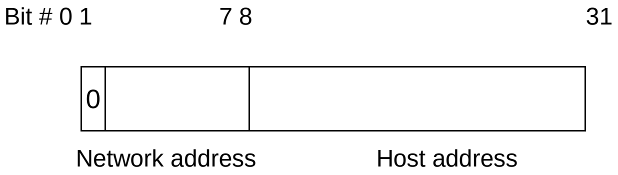
The address of the network device is used for internetworking communication. IP addresses are split into predefined address classes or categories. This is referred to as “classful” addressing because the address is spilt into three predefined classes, groupings or categories. Each IP address comprises 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.



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.

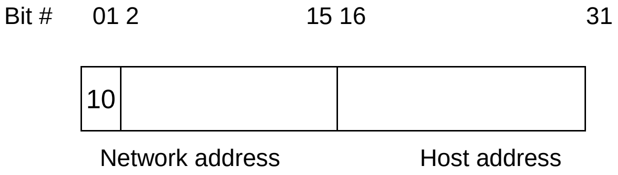
Class A:

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.



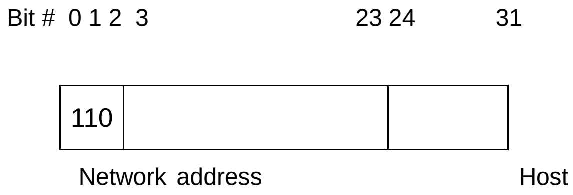
Class B:

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.



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.



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

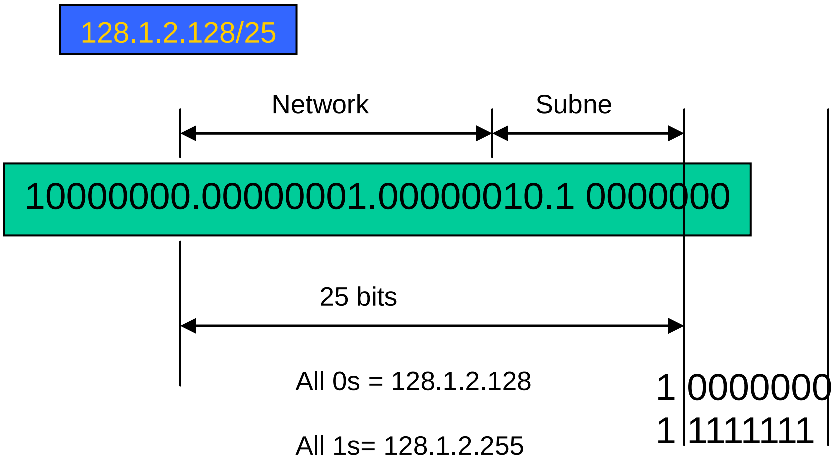
Please refer to RFC 1597 and RFC 1466 for more information.

<u>Subnet mask</u>:

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.



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.

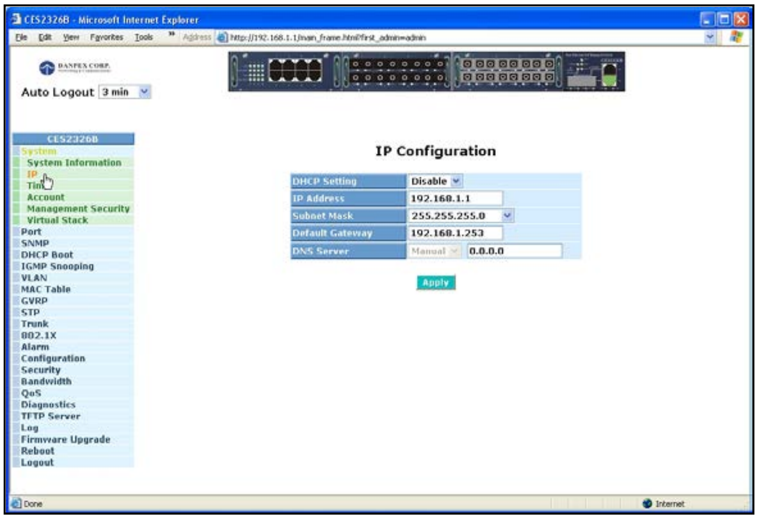
With the subnet mask, a bigger network can be divided into smaller pieces. If you want to have more than two independent networks in a LAN, the network must be partitioned. The subnet mask must be applied.

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.



IP Configuration

DHCP Setting	Disable
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.253
DNS Server	Manual 0.0.0.0

Figure 4.4 – IP Configuration

IP Address: as shown in the Figure 4.4, enter “192.168.1.1”, for instance. An IP address such as 192.168.1.x must be set on your PC.

Subnet Mask: as shown in the Figure 4.4, enter “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 GSM 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	192.168.1.253
Username	admin
Password	admin

Table 5.1

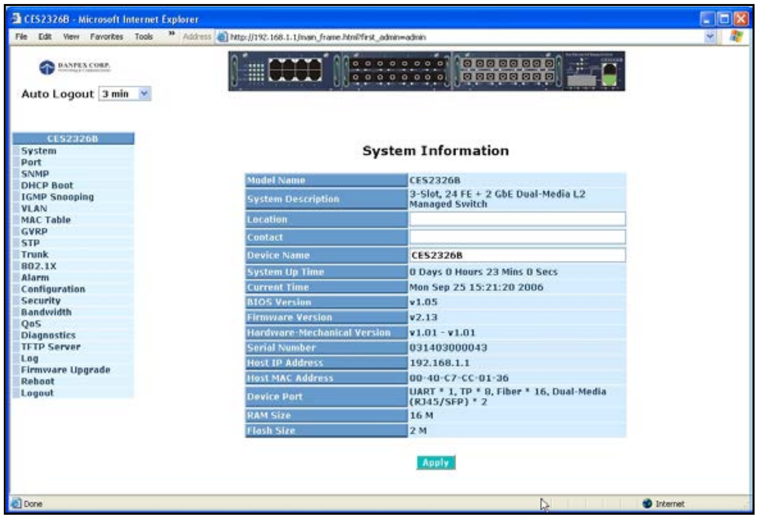
Once the 2800M switch has been configured via the switch's serial interface, you are ready to use the web management function. You must be connected to the switch via one of the Ethernet ports.

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. 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 Firefox V1.00 or above as your web browser.



System Information

Model Name	CES2326B
System Description	3-Slot, 24 FE + 2 GbE Dual-Media L2 Managed Switch
Location	
Contact	
Device Name	CES2326B
System Up Time	0 Days 0 Hours 23 Mins 0 Secs
Current Time	Mon Sep 25 15:21:20 2006
BIOS Version	v1.05
Firmware Version	v2.13
Hardware-Mechanical Version	v1.01 - v1.01
Serial Number	031403000043
Host IP Address	192.168.1.1
Host MAC Address	00-40-C7-CC-01-36
Device Port	UART * 1, TP * 8, Fiber * 16, Dual-Media (RJ45/SFP) * 2
RAM Size	16 M
Flash Size	2 M

Figure 5.1 – Login Screen

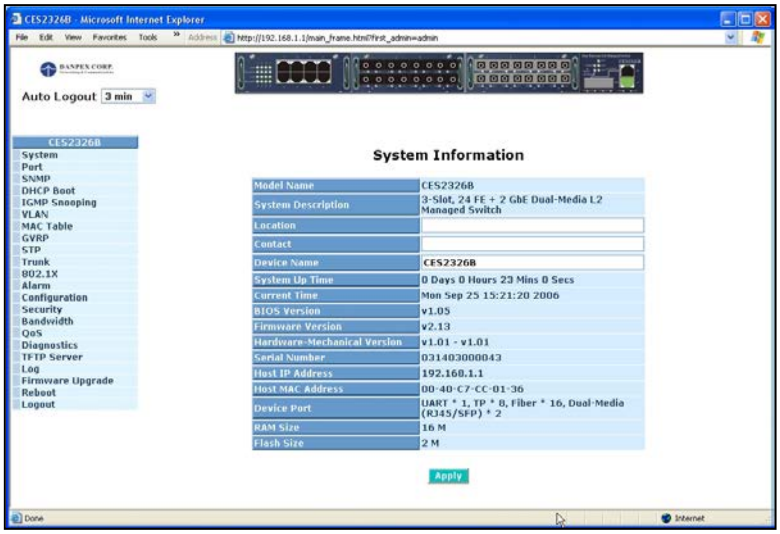
5.1 Overview of Web Management

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.



System Information

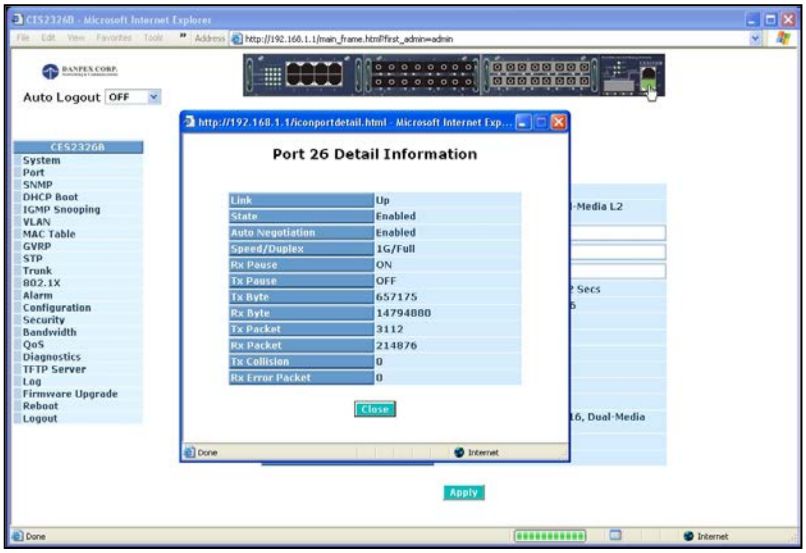
Model Name	CES2326B
System Description	3-Slot, 24 FE + 2 GbE Dual-Media L2 Managed Switch
Location	
Contact	
Device Name	CES2326B
System Up Time	0 Days 0 Hours 23 Mins 0 Secs
Current Time	Mon Sep 25 15:21:20 2006
BIOS Version	v1.05
Firmware Version	v2.13
Hardware-Mechanical Version	v1.01 - v1.01
Serial Number	031403000043
Host IP Address	192.168.1.1
Host MAC Address	00-40-C7-CC-01-36
Device Port	UART * 1, TP * 8, Fiber * 16, Dual-Media (RJ45/SFP) * 2
RAM Size	16 M
Flash Size	2 M

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)



Auto Logout OFF

Port 26 Detail Information

Link	Up
State	Enabled
Auto Negotiation	Enabled
Speed/Duplex	1G/Full
Rx Pause	ON
Tx Pause	OFF
Tx Byte	657175
Rx Byte	14794880
Tx Packet	3112
Rx Packet	214876
Tx Collision	0
Rx Error Packet	0

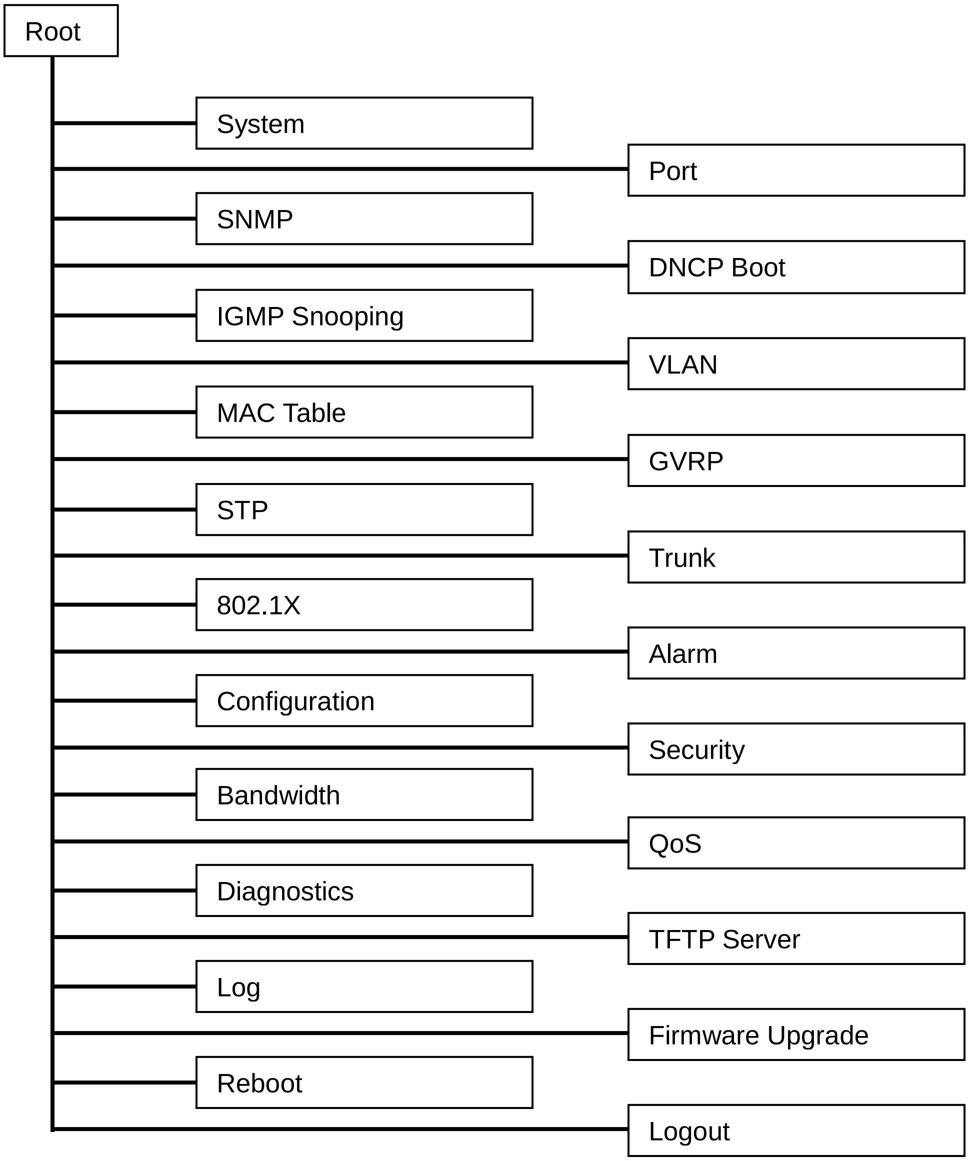
Figure 5.3 – Port Detail Information

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.



5.2 System Information

Function name:

System Information

Function description:

Show the basic system information.

Parameter description:

Model name:

The model name of this device.

System description:

Describes the device. “3 Slot, 24 FE + 2 GbE Dual Media L2 Managed Switch”.

Location:

The location where this switch is being used. 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 CES2326B.

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 Ethernet MAC address of the management agent in this switch.

Device Port:

Show all types and numbers of the port in the switch.

RAM size:

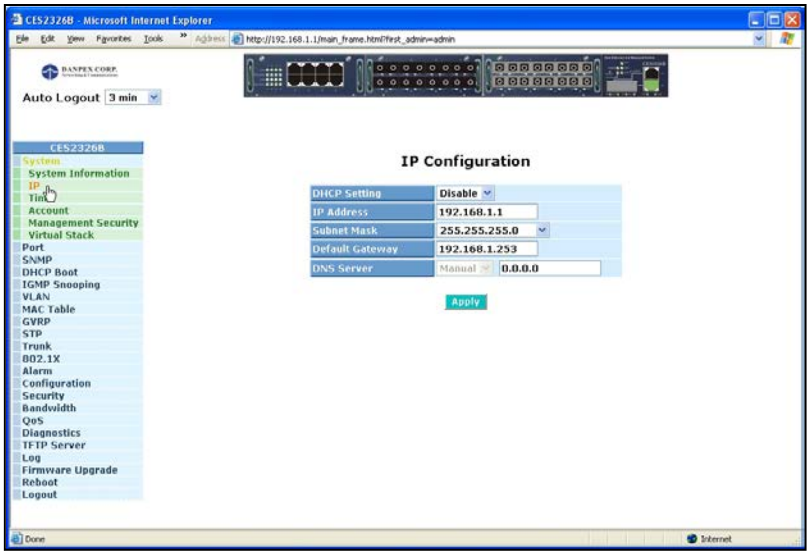
The size of the DRAM in this switch.

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.



IP Configuration

DHCP Setting	Disable
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.253
DNS Server	Manual 0.0.0.0

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:

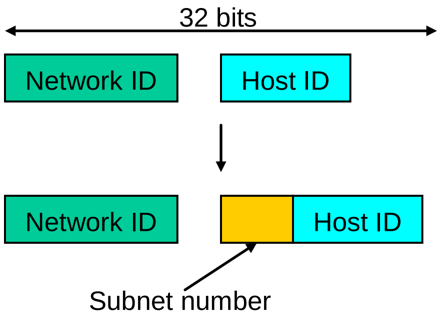
Users can configure the IP settings and enter new values if the DHCP function is set to **Disable**. Click the **Apply** button to update.

When DHCP is disabled, the default is **192.168.1.1**.

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

Subnet mask:

The purpose of the subnet mask is to retrieve 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. A subnet mask uses some bits from the 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: **255.255.255.0**

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: **192.168.1.253**

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 press the **Apply** button. 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. Input the wrong figure and press the **Apply** button, the device will reject the time adjustment request. There is no time zone setting in 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 pressing the **Apply** button. 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 daylight 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 daylight saving time is –5 ~ +5 step one hour. The zero for this parameter means it need not have to adjust 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 be non-zero, you have to set the starting/ending date 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.

Daylight Saving Start :

This is used to set when to start performing the daylight saving time.

Month:

Range is 1 ~ 12.

Default: 1

Day:

Range is 1 ~ 31.

Default: 1

Hour:

Range is 0 ~ 23.

Default: 0

Daylight Saving End :

This is used to set when to stop performing the daylight saving time.

Month:

Range is 1 ~ 12.

Default: 1

Day:

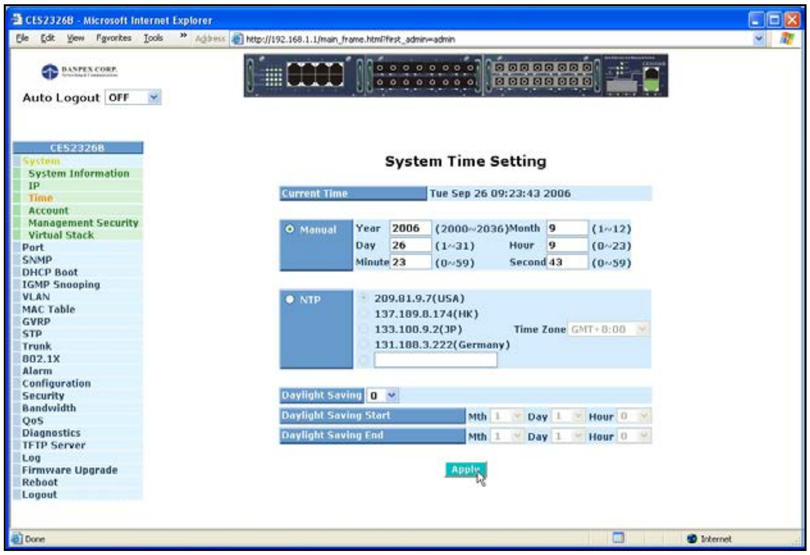
Range is 1 ~ 31.

Default: 1

Hour:

Range is 0 ~ 23.

Default: 0



Auto Logout: OFF

System Time Setting

Current Time: Tue Sep 26 09:23:43 2006

○ Manual
Year 2006 (2000~2036) Month 9 (1~12)
Day 26 (1~31) Hour 9 (0~23)
Minute 23 (0~59) Second 43 (0~59)

● NTP
○ 209.81.9.7(USA)
○ 137.189.8.174(HK)
○ 133.100.9.2(JP) Time Zone GMT+8:00
○ 131.188.3.222(Germany)
○

Daylight Saving: 0
Daylight Saving Start: Mth 1 Day 1 Hour 0
Daylight Saving End: Mth 1 Day 1 Hour 0

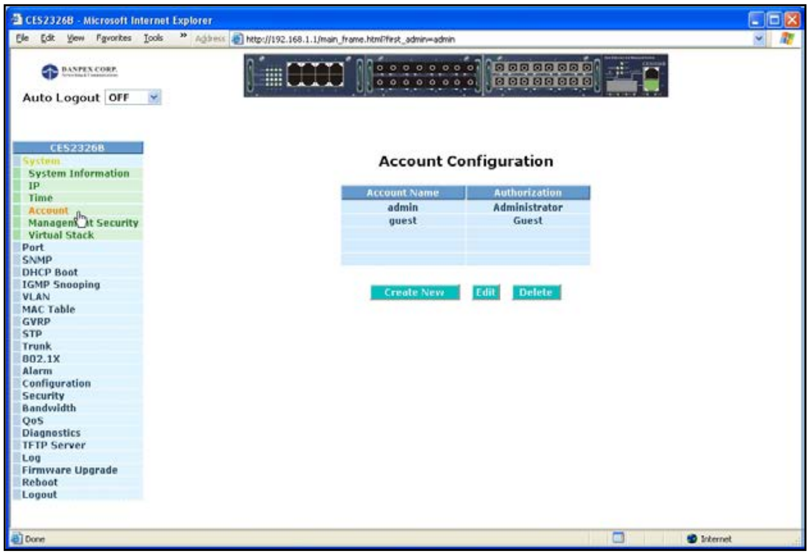
Figure 5.5 – System Time Setting

5.5 Account Configuration

Only the administrator can create, modify or delete the username and password. The administrator can modify passwords without confirming the password. Guest users can modify their own 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**



Account Configuration

Account Name	Authorization
admin	Administrator
guest	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 denied.

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

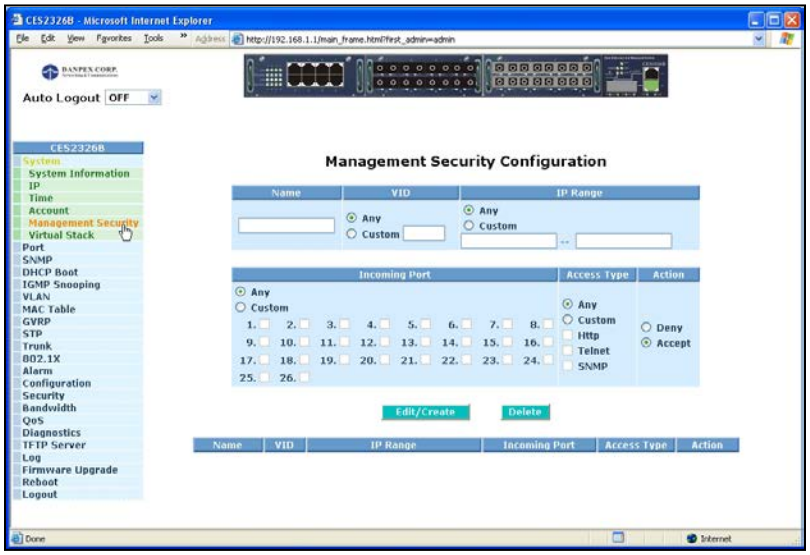
Deny| Acc | Deny | Acc | Deny

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.



Management Security Configuration

Name	VID	IP Range
	● Any ○ Custom	● Any ○ Custom --

Incoming Port	Access Type	Action
● Any ○ Custom 1. □ 2. □ 3. □ 4. □ 5. □ 6. □ 7. □ 8. □ 9. □ 10. □ 11. □ 12. □ 13. □ 14. □ 15. □ 16. □ 17. □ 18. □ 19. □ 20. □ 21. □ 22. □ 23. □ 24. □ 25. □ 26. □	● Any ○ Custom □ Http □ Telnet □ SNMP	○ Deny ● Accept

Name	VID	IP Range	Incoming Port	Access Type	Action

Figure 5.7 – Management 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 kinds of options for managed valid VLAN VID, including **Any** and **Custom**. Default is **Any**. **Custom** allows you to fill in the VID number. The valid VID range is 1~4094.

IP Range:

The switch supports two kinds of options for managed valid IP Range, including **Any** and **Custom**. 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 kinds of options for managed valid Port Range, including **Any** and **Custom**. The default is **Any**. Custom allows you 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** are three ways to access and manage the switch if **Custom** has been chosen.

Action:

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

Edit/Create:

A new entry of Management Security Configuration can be created after the parameters as mentioned above had been setup and then press **<Edit/Create>** button. Of course, the existed entry also can be modified by pressing this button.

Delete:

Remove 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) provides a simple centralized management function capable of managing up to sixteen (16) switches. Through the proper configuration of the VSM function, switches in the same LAN will be grouped automatically. One switch will be the master device, and the others in the group will become the slave devices.

It is not necessary to remember the address of all the VSM devices; the manager is capable of managing the network and all devices within the VSM stack.

VSM is only available using Web UI. With one switch functioning as the master, two rows of buttons for the group devices will appear on the top of the Web UI. By pressing these buttons, users will be allowed to connect to the Web UI of the devices of the group in the same window without the logging into these devices.

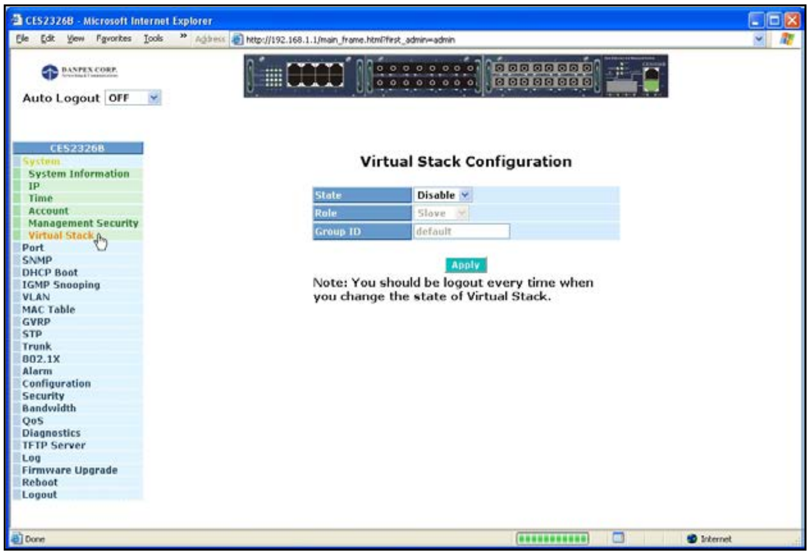
The top-left button is only for the Master device (Figure 5.8). The background color of the button you press will be changed to represent that the device is under your management.

Note: It will remove the grouping temporarily if you login the switch via the console.

The device of the group will be shown as the station address (the last number of IP Address) + device name on the button (e.g. 196_CES2326B). If no corresponding device exists, it will show ”----“.

Once the devices join the group successfully, they can be managed via Master device, and users will not be able to manage them 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 Master device and back up each other.



Auto Logout OFF

Virtual Stack Configuration

State	Disable
Role	Slave
Group ID	default

Note: You should be logout every time when you change the state of Virtual Stack.

Figure 5.8 – Virtual Stack Configuration

Parameter description:

State:

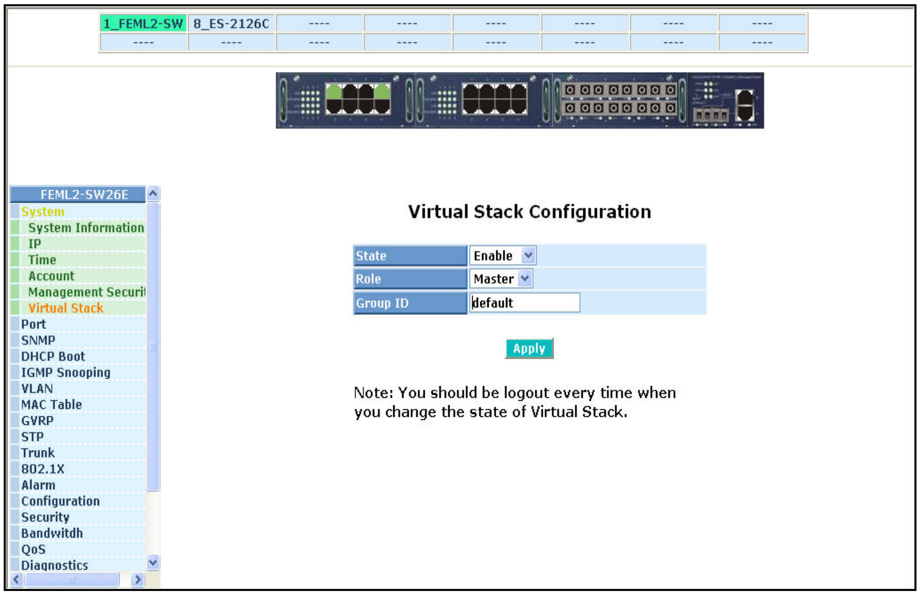
It is used for the activation or de-activation of VSM. Default is **Enable**.

Role:

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

Group ID:

GID is the group identifier which signs for VSM. Valid letters are A-Z, a-z, 0-9, “-“, and “_” characters. The maximal length is 15 characters.



Virtual Stack Configuration

State	Enable
Role	Master
Group ID	default

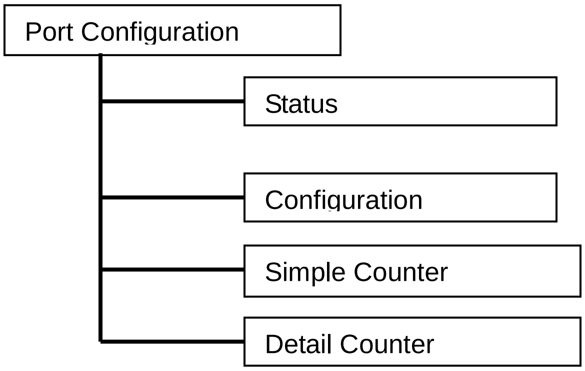
Apply

Note: You should be logout every time when you change the state of Virtual Stack.

Figure 5.9 – Virtual Stack Configuration

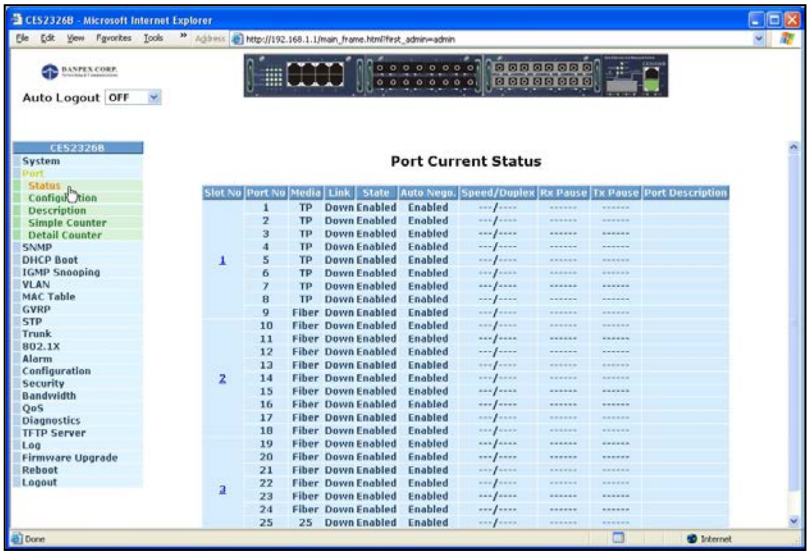
5.8 Port Configuration

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



Port Current Status

Slot No	Port No	Media	Link	State	Auto Nego.	Speed/Duplex	Rx Pause	Tx Pause	Port Description
1	1	TP	Down	Enabled	Enabled	---/----	------	------	
	2	TP	Down	Enabled	Enabled	---/----	------	------	
	3	TP	Down	Enabled	Enabled	---/----	------	------	
	4	TP	Down	Enabled	Enabled	---/----	------	------	
	5	TP	Down	Enabled	Enabled	---/----	------	------	
	6	TP	Down	Enabled	Enabled	---/----	------	------	
	7	TP	Down	Enabled	Enabled	---/----	------	------	
	8	TP	Down	Enabled	Enabled	---/----	------	------	
	9	Fiber	Down	Enabled	Enabled	---/----	------	------	
2	10	Fiber	Down	Enabled	Enabled	---/----	------	------	
	11	Fiber	Down	Enabled	Enabled	---/----	------	------	
	12	Fiber	Down	Enabled	Enabled	---/----	------	------	
	13	Fiber	Down	Enabled	Enabled	---/----	------	------	
	14	Fiber	Down	Enabled	Enabled	---/----	------	------	
	15	Fiber	Down	Enabled	Enabled	---/----	------	------	
	16	Fiber	Down	Enabled	Enabled	---/----	------	------	
	17	Fiber	Down	Enabled	Enabled	---/----	------	------	
	18	Fiber	Down	Enabled	Enabled	---/----	------	------	
3	19	Fiber	Down	Enabled	Enabled	---/----	------	------	
	20	Fiber	Down	Enabled	Enabled	---/----	------	------	
	21	Fiber	Down	Enabled	Enabled	---/----	------	------	
	22	Fiber	Down	Enabled	Enabled	---/----	------	------	
	23	Fiber	Down	Enabled	Enabled	---/----	------	------	
	24	Fiber	Down	Enabled	Enabled	---/----	------	------	
	25	25	Down	Enabled	Enabled	---/----	------	------	

Figure 5.10 – Current 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:

Slot No.:

Displays the port number. The number is 1 – 3.

Port No.:

Displays the port number. The number is 1 -26. Both Port 25 and 26 are optional modules.

Media:

Shows the media type used in all ports. Ports 25-26 are optional modules, which support either fiber or UTP media with either Gigabit Ethernet or Fast Ethernet. They may have different media types and speed. 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.

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 user.

Default: **Enabled**.

Auto Nego:

Displays the exchange mode of Ethernet MAC. There are two modes supported in the switch; 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 copper 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.

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

Rx Pause:

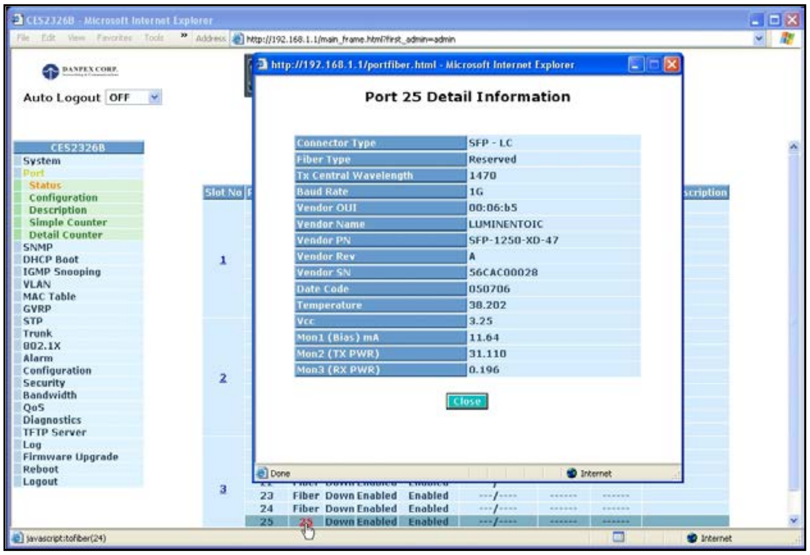
Rx displays the way that the port processes the PAUSE frame. If **On**, the port will follow the PAUSE frame; otherwise, the port will ignore the PAUSE frame.

Default: **None**

Tx Pause:

Tx decides if the port transmits the PAUSE frame or not. If it shows **On**, the port will send the PAUSE frame; otherwise, the port will not send the PAUSE frame.

Default: **None**



Port 25 Detail Information

Connector Type	SFP - LC
Fiber Type	Reserved
Tx Central Wavelength	1470
Baud Rate	1G
Vendor OUI	00:06:b5
Vendor Name	LUMINENTOIC
Vendor PN	SFP-1250-XD-47
Vendor Rev	A
Vendor SN	56CAC00028
Date Code	050706
Temperature	38.202
Vcc	3.25
Mon1 (Bias) mA	11.64
Mon2 (TX PWR)	31.110
Mon3 (RX PWR)	0.196

Figure 5.11 – Port Detail

Parameter description of Port 25 and Port 26:

Connector Type:

Displays connector type (UTP, SC, ST, LC, etc.)

Fiber Type:

Display the fiber mode (multi 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, for instance (10M, 100M, 1G, etc.)

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 the SFP module was made.

Temperature:

Displays the current temperature of the SFP module.

Vcc:

Displays the working DC voltage of SFP module.

Mon1(Bias) mA:

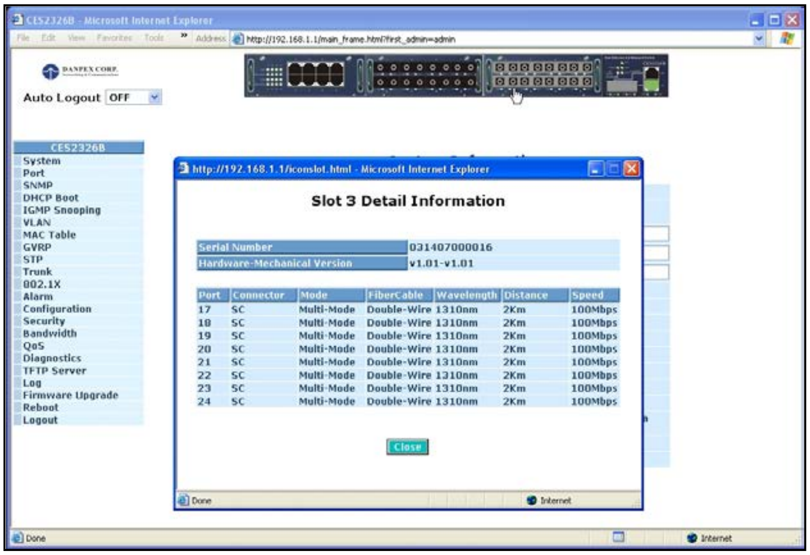
Displays the Bias the installed SFP module.

Mon2(TX PWR):

Displays the transmit power of SFP module.

Mon3(RX PWR):

Displays the receiver power of SFP module.



Slot 3 Detail Information

Serial Number	031407000016
Hardware-Mechanical Version	v1.01-v1.01

Port	Connector	Mode	FiberCable	Wavelength	Distance	Speed
17	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
18	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
19	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
20	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
21	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
22	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
23	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps
24	SC	Multi-Mode	Double-Wire	1310nm	2Km	100Mbps

Figure 5.12 – Slot Detail Information

Parameter description of slots 1-3:

Serial number:

The serial number is assigned by the manufacturer.

Hardware-Mechanical version:

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

Connector*(for fiber module only)*:

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

Mode*(for fiber module only)*:

Displays the fiber mode, multi or singlemode.

Fiber Cable *(for fiber module only)*:

Displays the cable type, Two Wires, Single Wire.

Wavelength *(for fiber module only)*:

Displays the wavelength of the light transmitted in the fiber (850nm, 1310nm).

Distance *(for fiber module only)*:

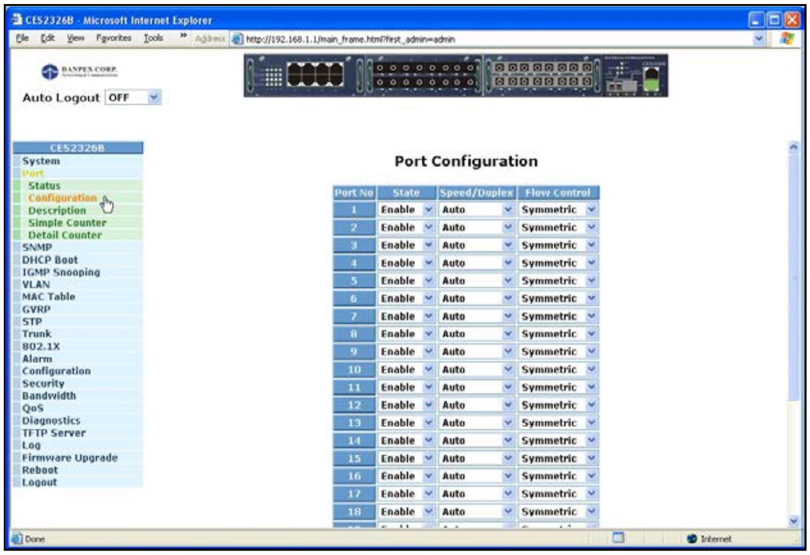
Displays the maximum distance the port supports (100m, 10km, 20km, etc).

Speed *(for fiber module only)*:

Displays the maximum speed of the port, 1G or 100M.

5.8.2 Port Configuration

Port Configuration is used to change the setting of each port. Port Configuration allows you to set or reset the functions described below.



Port Configuration

Port No	State	Speed/Duplex	Flow Control
1	Enable	Auto	Symmetric
2	Enable	Auto	Symmetric
3	Enable	Auto	Symmetric
4	Enable	Auto	Symmetric
5	Enable	Auto	Symmetric
6	Enable	Auto	Symmetric
7	Enable	Auto	Symmetric
8	Enable	Auto	Symmetric
9	Enable	Auto	Symmetric
10	Enable	Auto	Symmetric
11	Enable	Auto	Symmetric
12	Enable	Auto	Symmetric
13	Enable	Auto	Symmetric
14	Enable	Auto	Symmetric
15	Enable	Auto	Symmetric
16	Enable	Auto	Symmetric
17	Enable	Auto	Symmetric
18	Enable	Auto	Symmetric

Figure 5.13 – Port Configuration

Function name:

Port Configuration

Function description:

Used to set each port's operation mode. The switch supports three parameters for each port. They are state, mode and 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 transferred through this port. Port State is configurable by the user. If a port is set to **disable**, no traffic can pass even if it linked up.

Default: **Enable**.

Speed/Duplex:

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

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

There is no default value in auto-negotiation mode. In Forced mode, default value depends on your setting.

Flow Control:

There are two modes to choose in flow control: Symmetric and Asymmetric. If flow control is set Symmetric, both parties can send PAUSE frame to the transmitting device(s) if the receiving port is too busy. When set to Asymmetric, the receiving port follows the PAUSE frame from the transmitting device(s), but it doesn't send the PAUSE frame. This is one-way flow control.

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 is overflow, 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.

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 Packet:

The number of the packets received.

Tx Packet:

The number of the packets transmitted.

Tx Packet:

The number of the packets received.

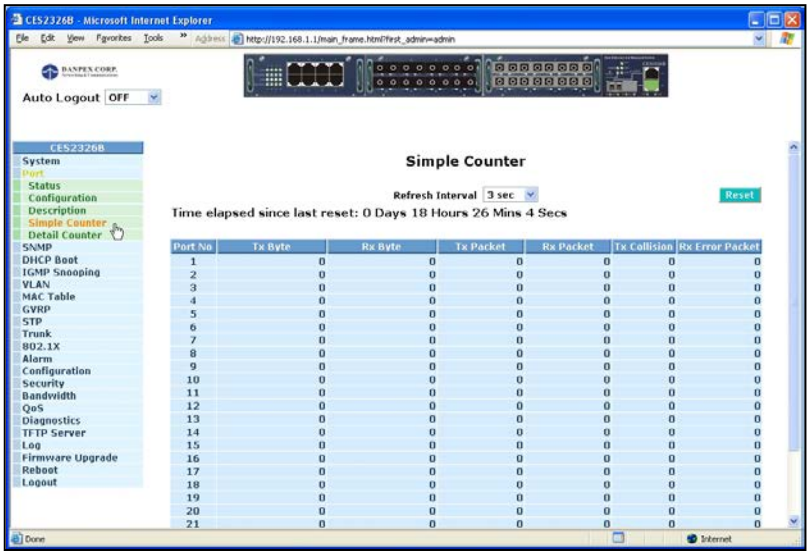
Tx Collision:

Number of collisions.

Rx Error Packet:

Number of bad packets received.

Figure 5.14 – Simple Counter



Auto Logout OFF

Simple Counter

Refresh Interval 3 sec

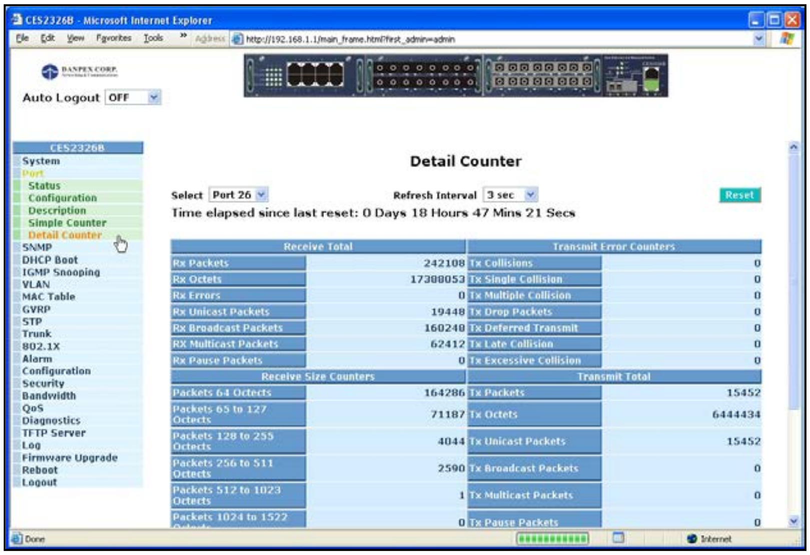
Time elapsed since last reset: 0 Days 18 Hours 26 Mins 4 Secs

Port No	Tx Byte	Rx Byte	Tx Packet	Rx Packet	Tx Collision	Rx Error Packet
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0

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.



Detail Counter

Auto Logout: OFF

Select: Port 26

Refresh Interval: 3 sec

Time elapsed since last reset: 0 Days 18 Hours 47 Mins 21 Secs

Receive Total		Transmit Error Counters	
Rx Packets	242108	Tx Collisions	0
Rx Octets	17388053	Tx Single Collision	0
Rx Errors	0	Tx Multiple Collision	0
Rx Unicast Packets	19448	Tx Drop Packets	0
Rx Broadcast Packets	160248	Tx Deferred Transmit	0
RX Multicast Packets	62412	Tx Late Collision	0
Rx Pause Packets	0	Tx Excessive Collision	0
Receive Size Counters		**Transmit Total**	
Packets 64 Octects	164286	Tx Packets	15452
Packets 65 to 127 Octects	71187	Tx Octets	6444434
Packets 128 to 255 Octects	4044	Tx Unicast Packets	15452
Packets 256 to 511 Octects	2590	Tx Broadcast Packets	0
Packets 512 to 1023 Octects	1	Tx Multicast Packets	0
Packets 1024 to 1522	0	Tx Pause Packets	0

Figure 5.15 – Detail Counter

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.

Function name:

Detail Counter

Function description:

Displays the detailed 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 number of packets received.

Rx Octets:

Total received bytes.

Rx Errors:

Number of bad packets received.

Rx Unicast Packets:

Displays the number of received unicast packets

Rx Broadcast Packets:

Displays the number of received broadcast packets.

Rx Multicast Packets:

Displays the number of received multicast packets.

Rx Pause Packets:

Displays the number of received pause packets.

Tx Collisions:

Number of collisions from transmitting frames.

Tx Single Collision:

Number of frames transmitted that experienced exactly one collision.

Tx Multiple Collision:

Number of frames transmitted that experienced more than one collision.

Tx Drop Packets:

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

Tx Deferred Transmit:

Number of frames delayed to transmission because the medium is busy.

Tx Late Collision:

Number of times that a collision is detected later than 512 bit-times into the transmission of a frame.

Tx Excessive Collision:

Number of frames that are not transmitted because the frame has experienced 16 transmission attempts.

Packets 64 Octets:

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

Packets 65-127 Octets:

Number of 65 ~ 127-byte frames from good and bad packets received.

Packets 128-255 Octets:

Number of 128 ~ 255-byte frames from good and bad packets received.

Packets 256-511 Octets:

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

Packets 512-1023 Octets:

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

Packets 1024- 1522 Octets:

Number of 1024-1522-byte frames from good and bad packets received.

Tx Packets:

The number of packets transmitted.

TX Octets:

Total transmitted bytes.

Tx Unicast Packets:

Displays the number of transmitted unicast packets.

Tx Broadcast Packets:

Displays the number of transmitted broadcast packets.

Tx Multicast Packets:

Displays the number of transmitted multicast packets.

Tx Pause Packets:

Displays the number of transmitted pause packets.

Rx FCS Errors:

Number of bad FSC packets received.

Rx Alignment Errors:

Number of Alignment error packets received.

Rx Fragments:

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

Rx Jabbers:

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

Rx Drop Packets:

Frames dropped due to the lack of receiving buffer.

Rx Undersize Packets:

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

Rx Oversize Packets:

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

5.9 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. SNMP manager must pass the authentication by identifying both community names. It can then can access the MIB information of the target device. So, both parties must have the same community name. Once you have completed the setting, click **Apply**.

Parameters description:

SNMP:

The term SNMP here 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 the device with a different community name via SNMP protocol; If they both have the same community name, they can talk to each other.

The 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 allowable.

The community name for each function works independently. Each function has its own community name. For example, the community name for GET only works for the GET function and can't be applied to other functions 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

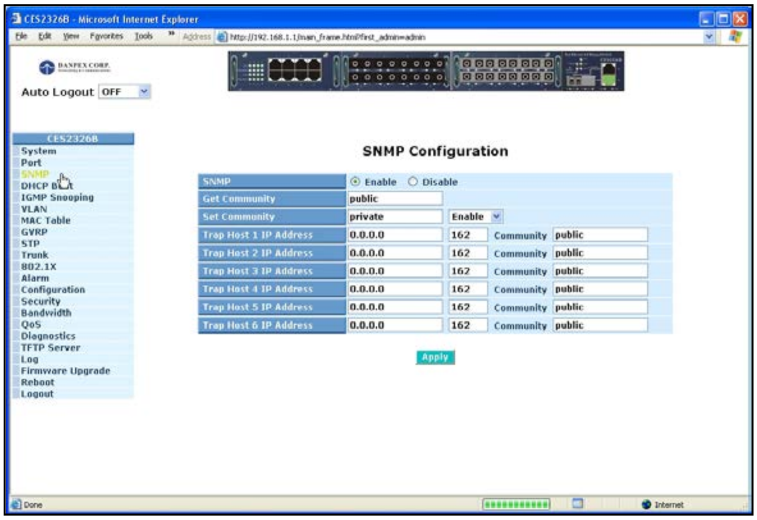
Default port number: 162

Trap:

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

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

Default for all public traps: **Enable**.



SNMP Configuration

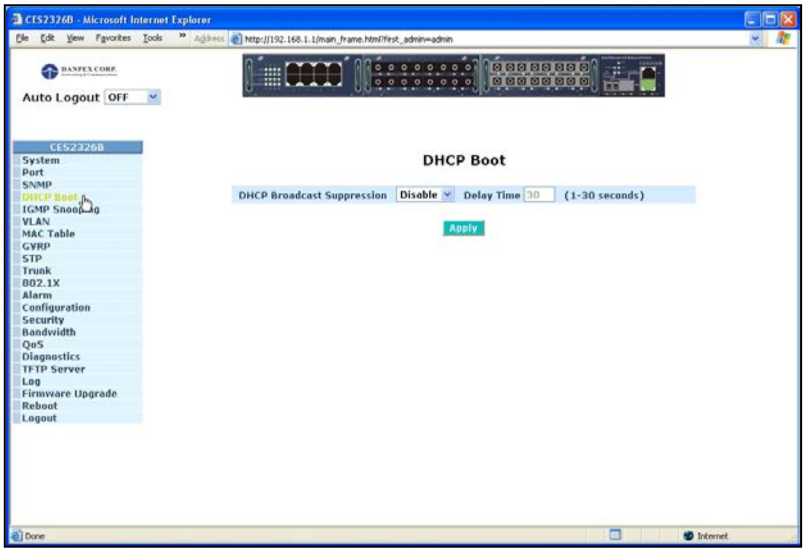
SNMP	● Enable ○ Disable			
Get Community	public			
Set Community	private	Enable		
Trap Host 1 IP Address	0.0.0.0	162	Community	public
Trap Host 2 IP Address	0.0.0.0	162	Community	public
Trap Host 3 IP Address	0.0.0.0	162	Community	public
Trap Host 4 IP Address	0.0.0.0	162	Community	public
Trap Host 5 IP Address	0.0.0.0	162	Community	public
Trap Host 6 IP Address	0.0.0.0	162	Community	public

Figure 5.16 – SNMP Configuration

5.10 DHCP Boot

The DHCP Boot function is used to spread the request broadcast packet into a bigger time frame. This is done to prevent the traffic congestion due to broadcast packets from many network devices which may seek its NMS, boot server, DHCP server and many connections predefined when the whole building or block loses power and then reboots and recovers. Switches and other network devices on the LAN will try their best to find the server to obtain services or try to set up the predefined links, so they will issue many broadcast packets in the network.

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



Auto Logout OFF

DHCP Boot

DHCP Broadcast Suppression Disable Delay Time 30 (1-30 seconds)

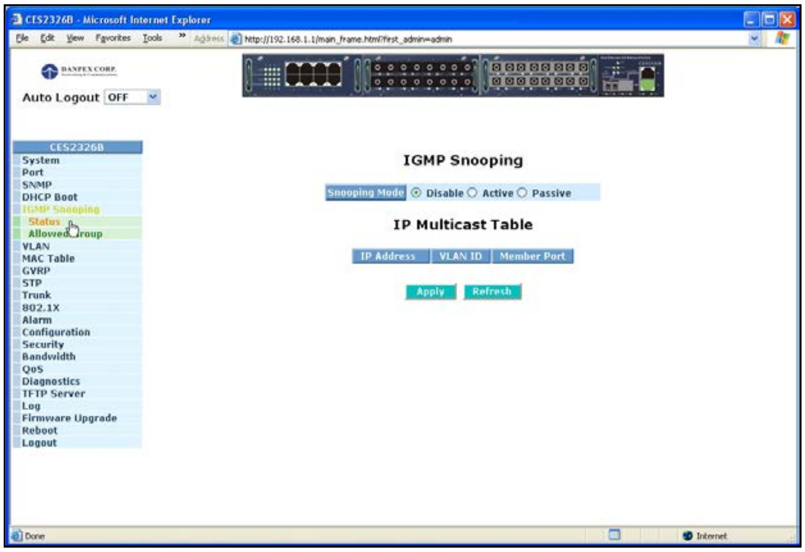
Figure 5.17 – DHCP Boot

5.11 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.

Multicast packets will be discarded by IGMP Snooping if the user transmits multicast packets to the multicast group which has not been set-up in advance.



Auto Logout OFF

IGMP Snooping

Snooping Mode ● Disable ○ Active ○ Passive

IP Multicast Table

IP Address	VLAN ID	Member Port

Figure 5.18 – IGMP Snooping Configuration

Function name:

IGMP Snooping Status

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. By enabling IGMP, 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:

Disable:

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

Default: **Disable**

Active:

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

Passive:

In **Passive** 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:

Displays multicast group IP addresses that are registered on this device.

VLAN ID:

Displays VLAN ID for each multicast group.

Member Port:

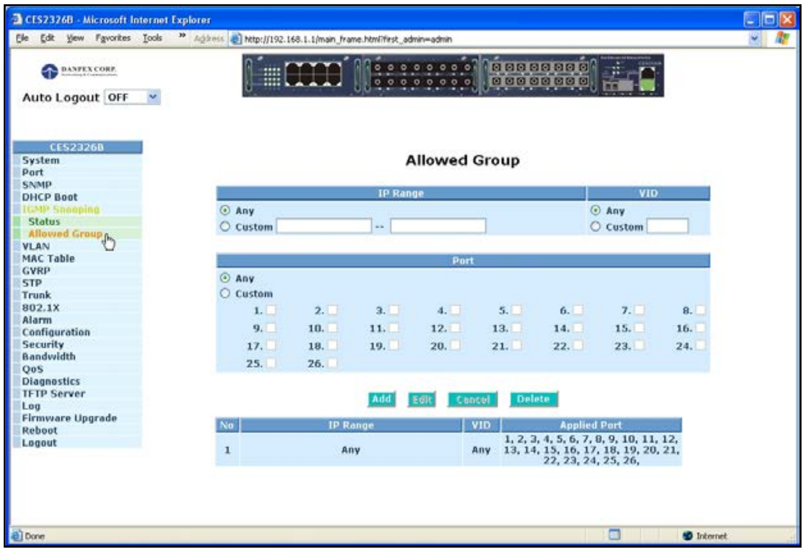
Displays member ports that join each multicast group.

Function name:

Allowed Group

Function description:

The Allowed Group function allows IGMP Snooping to set up the IP multicast table based on user's specific conditions. IGMP report packets that meet the items you set up will be joined or form the multicast group.



Allowed Group

IP Range: ● Any ○ Custom ____ -- ____

VID: ● Any ○ Custom ____

Port: ● Any ○ Custom

1. □ 2. □ 3. □ 4. □ 5. □ 6. □ 7. □ 8. □
9. □ 10. □ 11. □ 12. □ 13. □ 14. □ 15. □ 16. □
17. □ 18. □ 19. □ 20. □ 21. □ 22. □ 23. □ 24. □
25. □ 26. □

No	IP Range	VID	Applied Port
1	Any	Any	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26,

Figure 5.19 – Allowed Group

Parameter description:

IP Range:

The switch supports two option types for managed valid IP range, including **Any** and **Custom**. Default is **Any**. In case that **Custom** had been chosen, you can assign an effective IP range. The valid range is **224.0.0.0~239.255.255.255**.

VID:

The switch supports two option types for managed valid VLAN VID, including **Any** and **Custom**. Default is **Any**. When you choose **Custom**, you can fill in VID number. The valid VID range is **1~4094**.

Port:

The switch supports two option types for managed valid port range, including **Any** and **Custom**. Default is **Any**. You can select the ports to be used and restricted in the allowed group configuration if **Custom** has been chosen.

Add:

A new entry of allowed group configurations can be created after the parameters as mentioned above had been setup by choosing **Add**.

Edit:

The entry also can be modified by choosing **Edit**.

Delete:

The entry of allowed group configuration can be removed from the allowed group.

5.12 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.

5.12.1 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. 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 up to a maximum of 24 port-based VLAN groups.

Symmetric VLAN:

Symmetric VLAN follows an Ingress Rule (Rule 1, The Ingress Filtering Rule 1 is “forward only packets with VID matching this port’s configured VID”.). For example, if port 1 receives a tagged packet with VID=100 (VLAN name=VLAN100), and if Symmetric-VLAN function is enabled, the switch will check to see if port 1 is a member of VLAN100. If it is, the received packet is forwarded; otherwise, the received packet is dropped.

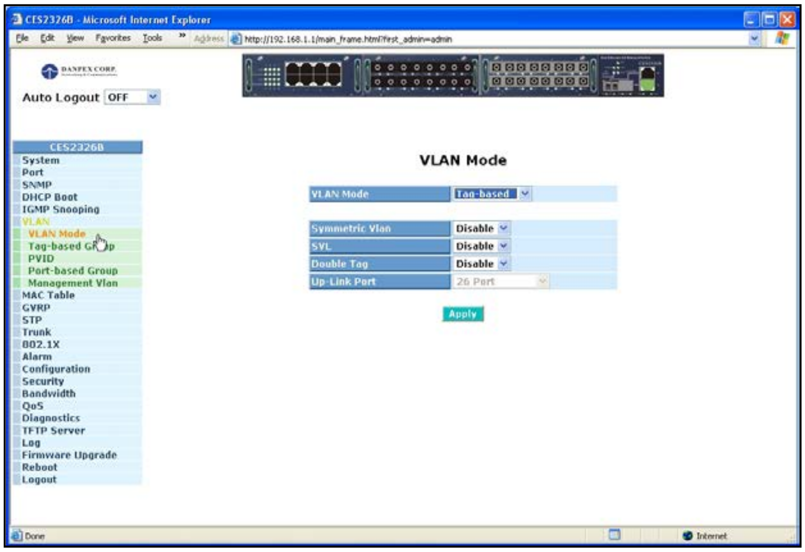
Note: If Symmetric is enabled, and port 1, for example, receives an untagged packet, the switch will apply the PVID of port 1 to tag this packet. The packet then will be forwarded. But if the PVID of port 1 is not 100, the packet will be dropped.

SVL:

While SVL is enable, 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**, it means learning mode is IVL. In this mode, different VLANs use a 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 tag with PVID will be added into all packets. These packets will be forwarded as Tag-based VLAN. So, the incoming packets with tag will become the double-tag ones.



VLAN Mode

VLAN Mode	Tag-based
Symmetric Vlan	Disable
SVL	Disable
Double Tag	Disable
Up-Link Port	26 Port

Figure 5.20 – VLAN Mode

5.12.2 Tag-based Group

Function name:

Tag-based Group Configuration

Function description:

Displays the information of existing Tag-based VLAN Groups. You can also easily create, edit and delete a Tag-based VLAN group by choosing the **Add**, **Edit** or **Delete** functions. Users can add a new VLAN group by inputting a new VLAN name and VLAN ID after choosing **Add**.

Parameter description:

VLAN Name:

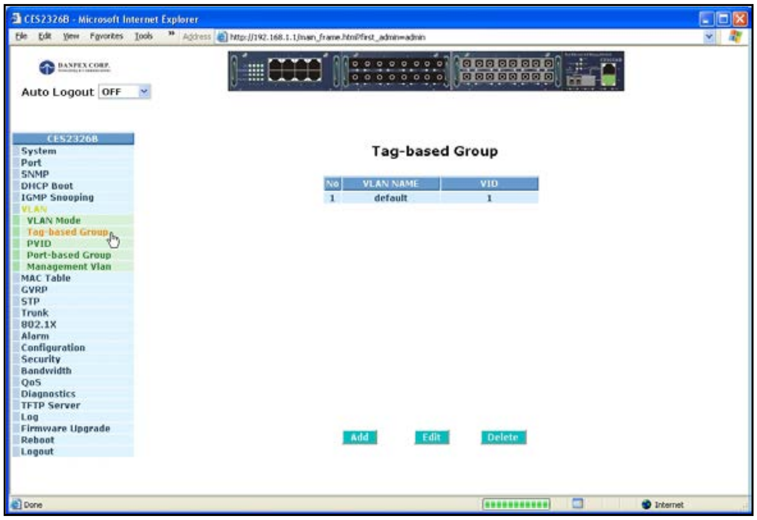
The name defined by administrator is associated with a VLAN group. Valid letters are A-Z, a-z, 0-9, “-“, and “_” characters. The maximal length is 15 characters.

VID:

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

Member:

This is used to enable or disable when a port is a member of the new added VLAN. **Enable** means it is a member of the VLAN. Check the box beside the port x to enable it.



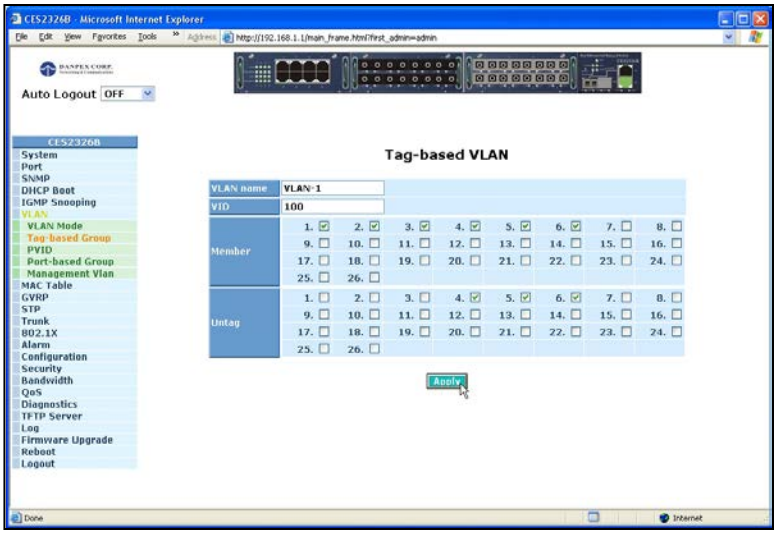
Tag-based Group

No	VLAN NAME	VID
1	default	1

5.21 – Tag-based Group

Add Group:

Input the VLAN name, VID and then choose the member by clicking the check box beside the port No. to create a new Tag-based VLAN. The parameter of Untag stands for an egress rule of the port. If you check box beside the port No., outgoing packets with this VID from this port will be untagged. Choose **Apply** save the setting.



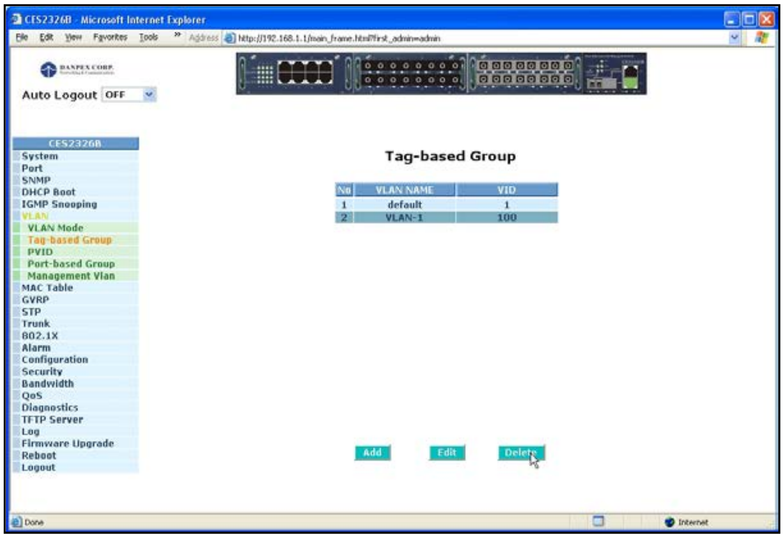
Tag-based VLAN

VLAN name	VLAN-1							
VID	100							
Member	1. ☑	2. ☑	3. ☑	4. ☑	5. ☑	6. ☑	7. □	8. □
	9. □	10. □	11. □	12. □	13. □	14. □	15. □	16. □
	17. □	18. □	19. □	20. □	21. □	22. □	23. □	24. □
	25. □	26. □						
Untag	1. □	2. □	3. □	4. ☑	5. ☑	6. ☑	7. □	8. □
	9. □	10. □	11. □	12. □	13. □	14. □	15. □	16. □
	17. □	18. □	19. □	20. □	21. □	22. □	23. □	24. □
	25. □	26. □						

Figure 5.22 – Tag-based VLAN

Delete Group:

Choose **Delete** to remove the selected group entry from the Tag-based group table.



Tag-based Group

No	VLAN NAME	VID
1	default	1
2	VLAN-1	100

Figure 5.23 – Tag-based Group

Edit a group:

Select a group entry and choose **Edit** to modify a group’s description, member and untag settings.

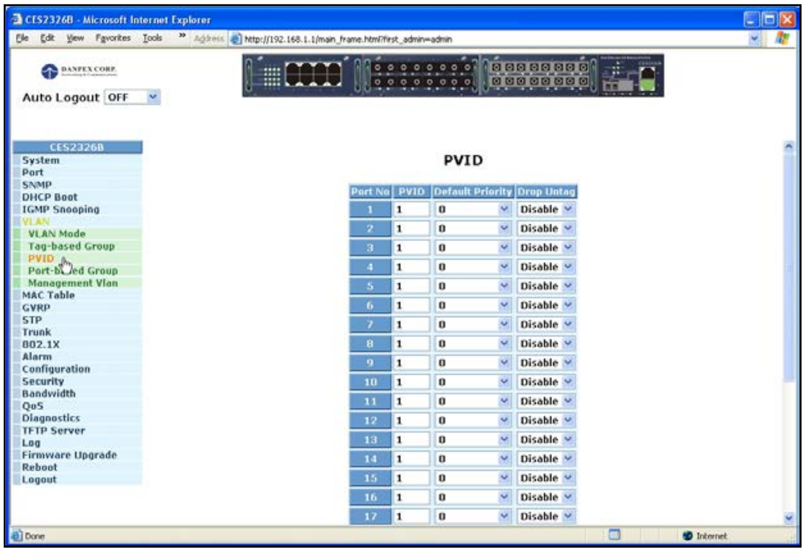
5.12.3 PVID

Function name:

PVID

Function description:

In PVID Setting, user can input VID number to each port. The range of VID number is from 1 to 4094. You can also can choose ingress filtering rule (Rule 2) to each port. The Ingress Filtering Rule 2 is “drop untagged frames”. While Rule 2 is enabled, the port will discard all Untagged-frames.



Auto Logout OFF

PVID

Port No	PVID	Default Priority	Drop Untag
1	1	0	Disable
2	1	0	Disable
3	1	0	Disable
4	1	0	Disable
5	1	0	Disable
6	1	0	Disable
7	1	0	Disable
8	1	0	Disable
9	1	0	Disable
10	1	0	Disable
11	1	0	Disable
12	1	0	Disable
13	1	0	Disable
14	1	0	Disable
15	1	0	Disable
16	1	0	Disable
17	1	0	Disable

Figure 5.24 - PVID

Parameter description:

Port 1-26:

Port number.

PVID:

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

Default Priority:

Default priority is based on 802.1p QoS and affects untagged packets. When packets enter the switch, the priority precedence according to the Default Priority setting and map to 802.1p priority setting in the QoS function is followed. For example, while you set Default Priority of port 2 with 2 and transmit untagged packets to port 2, these packets will follow priority 2 precedence and will be placed into Queue 1.

Drop Untag:

Drop untagged frame. You can configure a given 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.

5.12.4 Port-based Group

Function name:

Port-based Group Configuration

Function description:

Displays the information of the existing Port-based VLAN Groups. You can easily create, edit and delete a Port-based VLAN group by choosing **Add**, **Edit** and **Delete**. You can add a new VLAN group by inputting a new VLAN name.

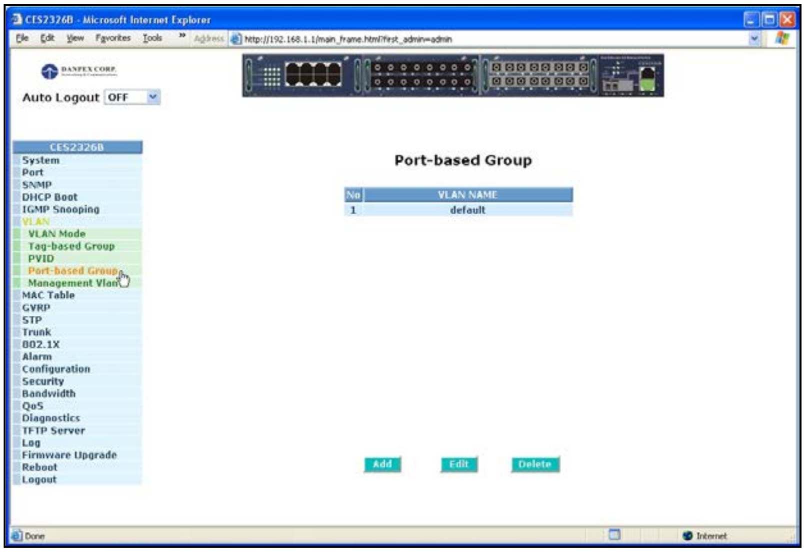
Parameter description:

VLAN Name:

The name defined by administrator is associated with a VLAN group. Valid letters are A-Z, a-z, 0-9, "-", and "_" characters. The maximum length is 15 characters.

Member:

Used to enable or disable if a port is a member of the new added VLAN, **Enable** means it is a member of the VLAN. Click the check box beside the port x to enable it.



Auto Logout OFF

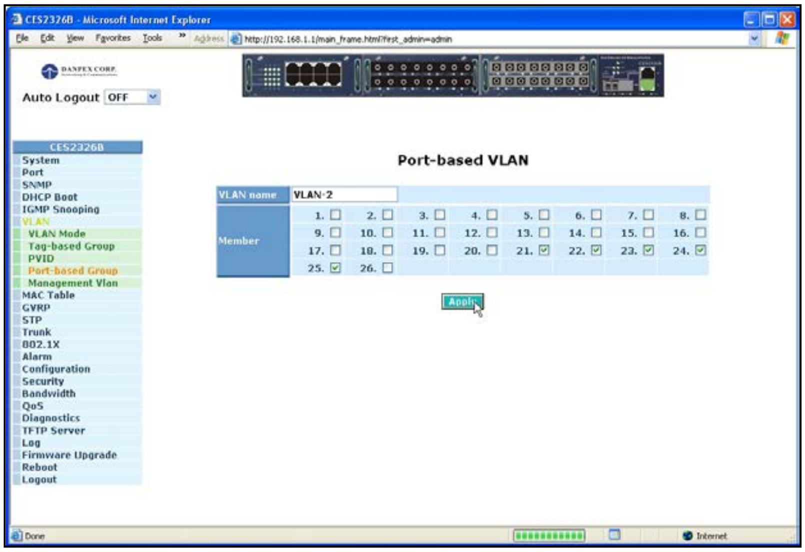
Port-based Group

No	VLAN NAME
1	default

Figure 5.25 – Port-based Group

Add Group:

Create a new Port-based VLAN. Input the VLAN name and choose the member by clicking the check box beside the port No. Choose **Apply** save the setting.



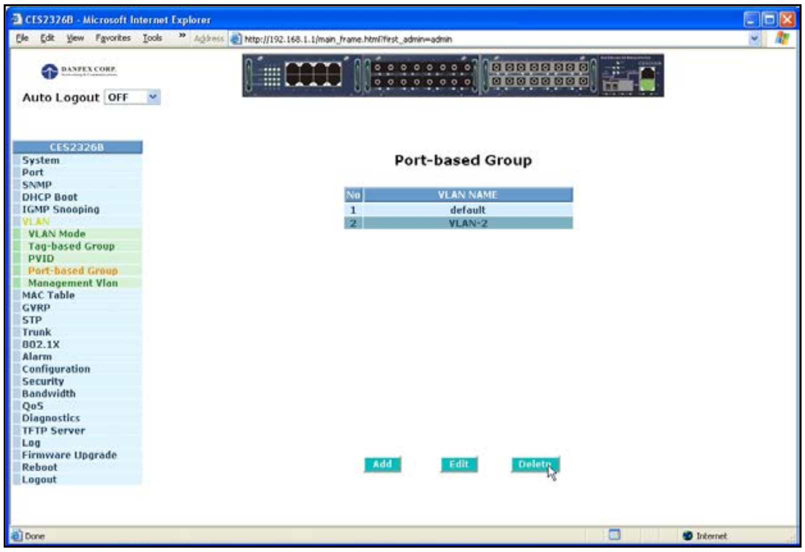
Port-based VLAN

VLAN name	VLAN-2							
Member	1. □	2. □	3. □	4. □	5. □	6. □	7. □	8. □
	9. □	10. □	11. □	12. □	13. □	14. □	15. □	16. □
	17. □	18. □	19. □	20. □	21. ☑	22. ☑	23. ☑	24. ☑
	25. ☑	26. □						

Figure 5.26 – Port-based VLAN

Delete Group:

Choose **Delete** to remove the selected group entry from the Port-based group table.



Port-based Group

No	VLAN NAME
1	default
2	VLAN-2

Figure 5.27 – Port-based Group

Edit a group:

Select a group entry and press **Edit** to modify a group‘s description and member set.

Select a group entry and select **Edit.** This allows you to modify the group's setting.

5.13 MAC Table

MAC Table Configuration includes the following functions:

- MAC Table Information
- MAC Table Maintenance
- Static Forward
- Static Filter
- MAC Alias

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 desired port.

Search:

Click on search to find your entry

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:

Set the Alias of MAC entry.

Search:

Find the entry.

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:

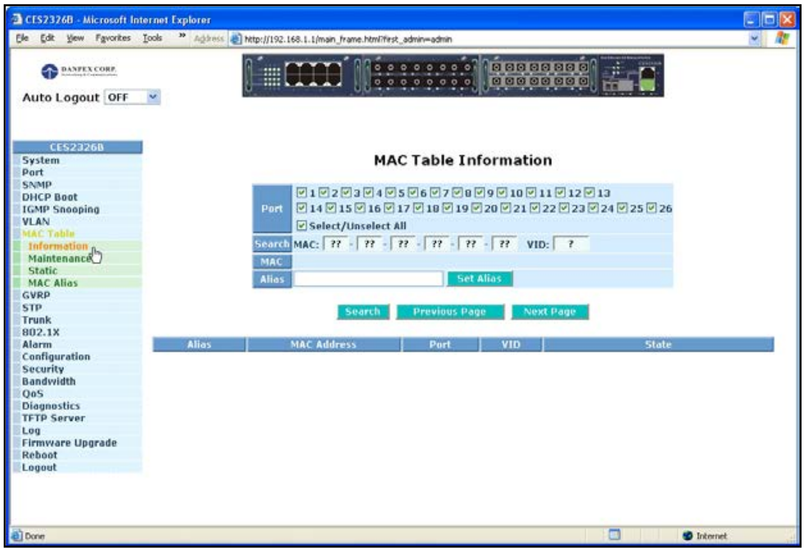
The port that exists in the searched MAC Entry.

VID:

VLAN Group that MAC Entry exists.

State:

Display the method that this MAC Entry is built. It may show **Dynamic MAC** or **Static MAC**.



Auto Logout OFF

MAC Table Information

Port ☑1 ☑2 ☑3 ☑4 ☑5 ☑6 ☑7 ☑8 ☑9 ☑10 ☑11 ☑12 ☑13
☑14 ☑15 ☑16 ☑17 ☑18 ☑19 ☑20 ☑21 ☑22 ☑23 ☑24 ☑25 ☑26
☑ Select/Unselect All

Search MAC: ?? - ?? - ?? - ?? - ?? - ?? VID: ?

MAC

Alias

Alias	MAC Address	Port	VID	State

Figure 5.28 – MAC Table Information

Function Name:

MAC Table Maintenance

Function Description:

This function allows the user to set up the processing mechanism of 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.

In addition, the learning limit of MAC maintenance is able to limit the amount of MAC that each port can learn.

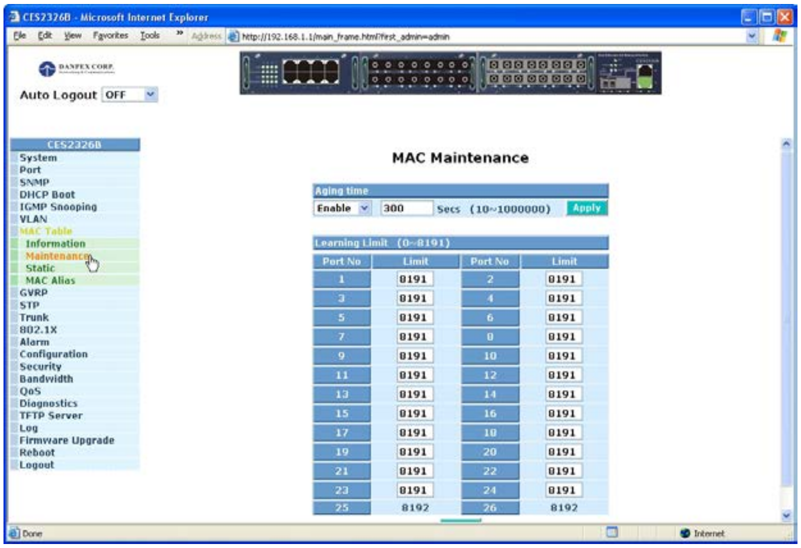
Parameter description:

Aging Time:

Delete a MAC address 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:

Used to set the maximum amount of MAC that each port can learn. Valid value of learning limit for port 1~24 ranges from 0-8191. As to port 25~port 26, only the fixed value “8192” is assigned to these two ports. This value cannot be configured.



Auto Logout: OFF

MAC Maintenance

Aging time: Enable 300 Secs (10~1000000)

Learning Limit (0~8191)

Port No	Limit	Port No	Limit
1	8191	2	8191
3	8191	4	8191
5	8191	6	8191
7	8191	8	8191
9	8191	10	8191
11	8191	12	8191
13	8191	14	8191
15	8191	16	8191
17	8191	18	8191
19	8191	20	8191
21	8191	22	8191
23	8191	24	8191
25	8192	26	8192

Figure 5.29 – MAC Maintenance

Function Name:

Static Setting

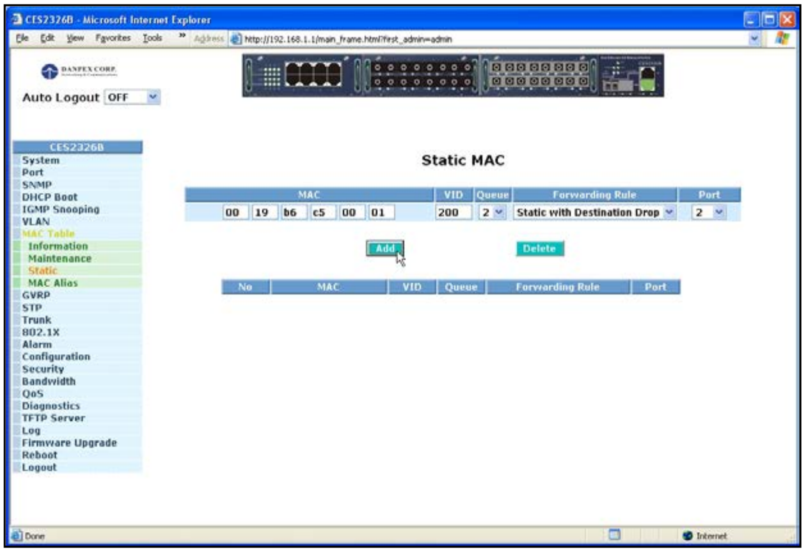
Function Description:

The function of Static is used to configure MAC's manners inside of the switch. Three kinds of manners are included in this function: static, static with destination drop and static with source drop.

When **static** is chosen, assign a MAC address to a specific port. All of the switch's traffics sent to this MAC address will be forwarded to this port.

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

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



Auto Logout OFF

Static MAC

MAC	VID	Queue	Forwarding Rule	Port
00 19 b6 c5 00 01	200	2	Static with Destination Drop	2

No	MAC	VID	Queue	Forwarding Rule	Port

Figure 5.30 – Static MAC

Parameter description:

MAC:

MAC is six-byte long Ethernet hardware address and usually expressed by hex and separated by hyphens. For example, 00 – 19 – B6 – C5 – 00 – 01

VID:

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

Queue:

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

Forwarding Rule:

Static:

A MAC address is assigned to a specific port. All of the switch’s traffics sent to this MAC address will be forwarded to this port.

Static with Destination Drop:

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

Static with Source Drop:

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

Port:

Select the port number you would like to setup in the switch.

Function name:

MAC Alias

Function description:

MAC Alias function is used to let you assign a MAC address a plain English name. This will help you tell which MAC address belongs to which user in the illegal access report. At the initial time, it shows all pairs of the existed alias name and MAC address.

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

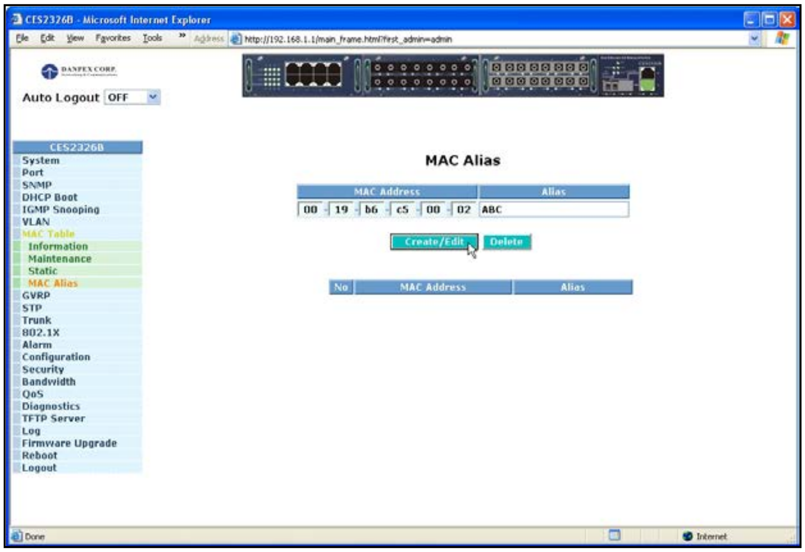
Function name:

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 a plain English name. You can choose **Create/Edit** to add a new record with name.

As to MAC Alias Delete function is used to let you remove an alias name to a MAC address. You can select an existed MAC address or alias name to remove.



http://192.168.1.1/main_frame.html?first_admin=admin

Auto Logout OFF

MAC Alias

MAC Address	Alias
00 - 19 - b6 - c5 - 00 - 02	ABC

No	MAC Address	Alias

Figure 5.31 – MAC Alias

Parameter description:

MAC Address:

MAC address is a six-byte long Ethernet hardware address and usually expressed by hex and separated by hyphens. For example, 00 – 19 – B6 – C5 – 00 – 02

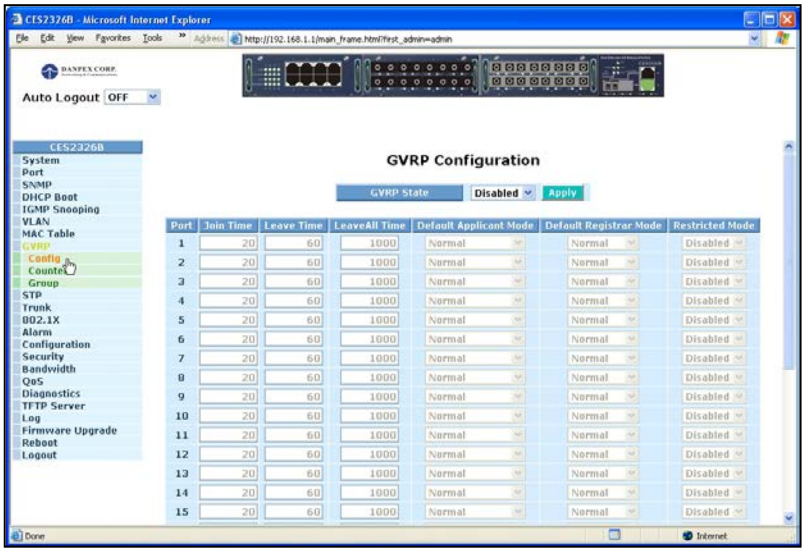
Alias:

MAC alias name you assign.

Note: If there are too many MAC addresses learned in the table, we recommend you input the MAC address and alias name directly.

5.14 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.



Auto Logout OFF

GVRP Configuration

GVRP State: Disabled

Port	Join Time	Leave Time	LeaveAll Time	Default Applicant Mode	Default Registrar Mode	Restricted Mode
1	20	60	1000	Normal	Normal	Disabled
2	20	60	1000	Normal	Normal	Disabled
3	20	60	1000	Normal	Normal	Disabled
4	20	60	1000	Normal	Normal	Disabled
5	20	60	1000	Normal	Normal	Disabled
6	20	60	1000	Normal	Normal	Disabled
7	20	60	1000	Normal	Normal	Disabled
8	20	60	1000	Normal	Normal	Disabled
9	20	60	1000	Normal	Normal	Disabled
10	20	60	1000	Normal	Normal	Disabled
11	20	60	1000	Normal	Normal	Disabled
12	20	60	1000	Normal	Normal	Disabled
13	20	60	1000	Normal	Normal	Disabled
14	20	60	1000	Normal	Normal	Disabled
15	20	60	1000	Normal	Normal	Disabled

Figure 5.32 – GVRP Configuration

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:

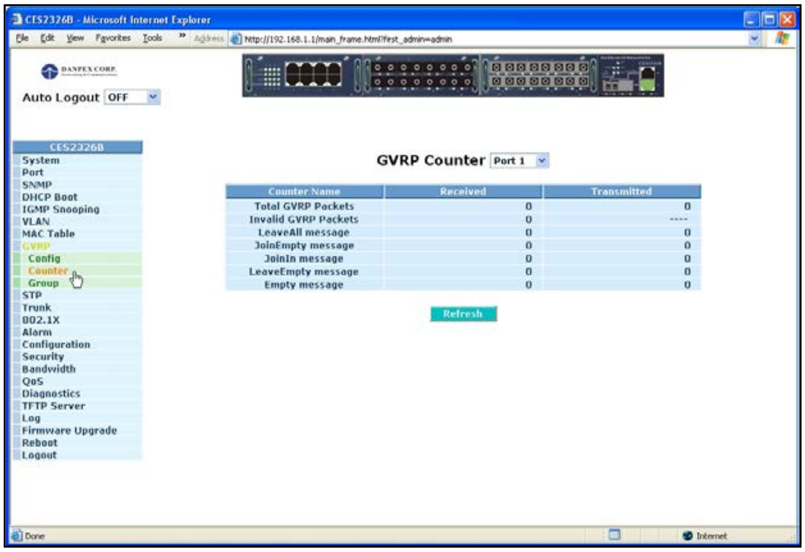
In this mode, the switch does not create dynamic VLAN when this port received GVRP PDU. Except received dynamic VLAN message of the GVRP PDU is an existed static VLAN in the switch. This port will be added into the static VLAN members dynamically.

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.



GVRP Counter Port 1

Counter Name	Received	Transmitted
Total GVRP Packets	0	0
Invalid GVRP Packets	0	----
LeaveAll message	0	0
JoinEmpty message	0	0
JoinIn message	0	0
LeaveEmpty message	0	0
Empty message	0	0

Figure 5.33– 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:

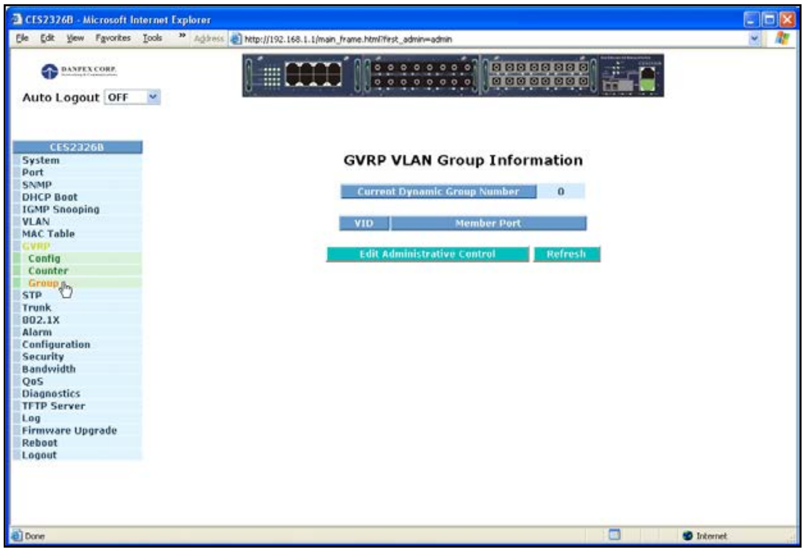
Those are the members belonging to the same dynamic VLAN group.

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.



Auto Logout OFF

GVRP VLAN Group Information

Current Dynamic Group Number 0

VID	Member Port

Figure 5.34– GVRP Group Information

5.15 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.

5.15.1 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:

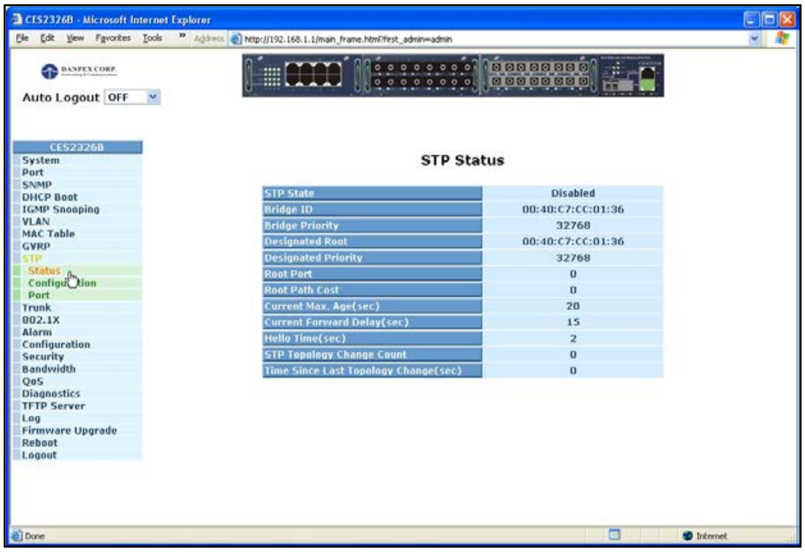
Displays the current hello time of the root bridge. Hello time is a time interval specified by root bridge. It is used to request all other bridges periodically sending hello message to the bridge attached to its designated port.

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.



STP Status

STP State	Disabled
Bridge ID	00:40:C7:CC:01:36
Bridge Priority	32768
Designated Root	00:40:C7:CC:01:36
Designated Priority	32768
Root Port	0
Root Path Cost	0
Current Max. Age(sec)	20
Current Forward Delay(sec)	15
Hello Time(sec)	2
STP Topology Change Count	0
Time Since Last Topology Change(sec)	0

Figure 5.35 – STP Status

5.15.2 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 GSM 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 seconds.

Default is 2 seconds.

Max. Age:

When the GSM 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.

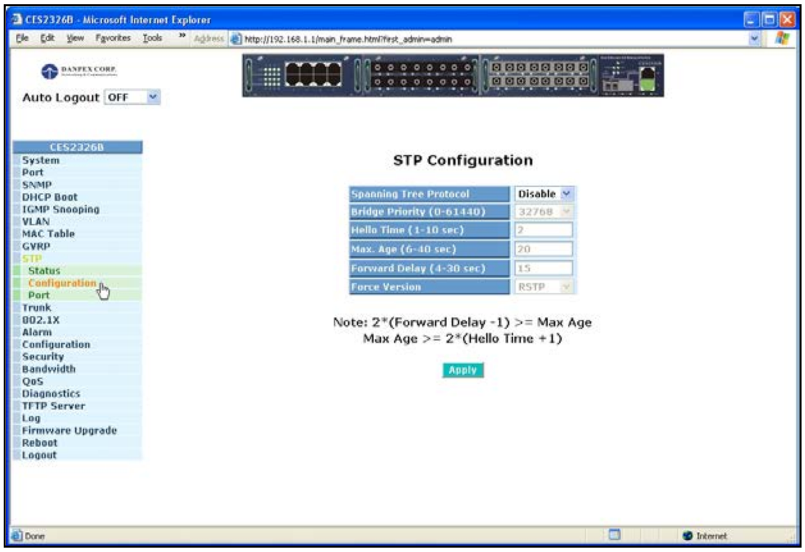
Forward Delay:

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).



STP Configuration

Spanning Tree Protocol	Disable
Bridge Priority (0-61440)	32768
Hello Time (1-10 sec)	2
Max. Age (6-40 sec)	20
Forward Delay (4-30 sec)	15
Force Version	RSTP

Note: 2*(Forward Delay -1) >= Max Age
Max Age >= 2*(Hello Time +1)

Figure 5.36 – STP Status

5.15.3 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. According to the 802.1w specification, there are three possible states.

- 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:

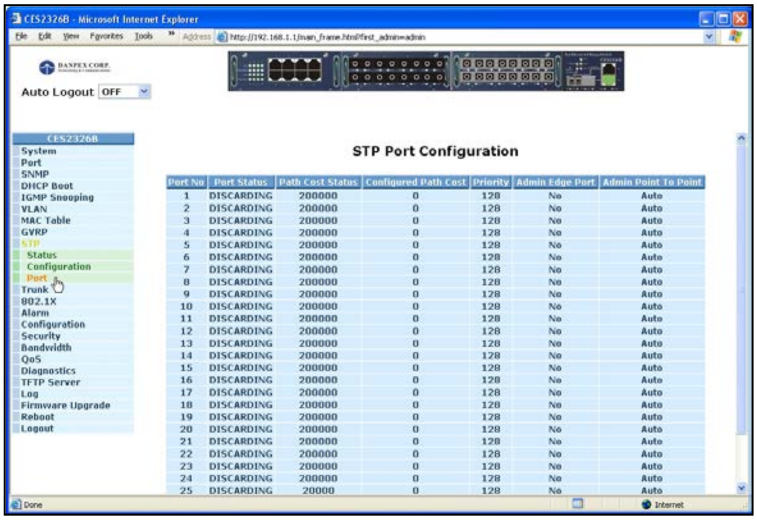
A port is a point-to-point link, from RSTP's view, if it is in full-duplex mode. It is a shared link if it is in half-duplex mode. RSTP fast convergence can only happen on point-to-point links and on edge ports. This can expedite the convergence because this will have the port fast transited to forwarding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



STP Port Configuration

Port No	Port Status	Path Cost Status	Configured Path Cost	Priority	Admin Edge Port	Admin Point To Point
1	DISCARDING	200000	0	128	No	Auto
2	DISCARDING	200000	0	128	No	Auto
3	DISCARDING	200000	0	128	No	Auto
4	DISCARDING	200000	0	128	No	Auto
5	DISCARDING	200000	0	128	No	Auto
6	DISCARDING	200000	0	128	No	Auto
7	DISCARDING	200000	0	128	No	Auto
8	DISCARDING	200000	0	128	No	Auto
9	DISCARDING	200000	0	128	No	Auto
10	DISCARDING	200000	0	128	No	Auto
11	DISCARDING	200000	0	128	No	Auto
12	DISCARDING	200000	0	128	No	Auto
13	DISCARDING	200000	0	128	No	Auto
14	DISCARDING	200000	0	128	No	Auto
15	DISCARDING	200000	0	128	No	Auto
16	DISCARDING	200000	0	128	No	Auto
17	DISCARDING	200000	0	128	No	Auto
18	DISCARDING	200000	0	128	No	Auto
19	DISCARDING	200000	0	128	No	Auto
20	DISCARDING	200000	0	128	No	Auto
21	DISCARDING	200000	0	128	No	Auto
22	DISCARDING	200000	0	128	No	Auto
23	DISCARDING	200000	0	128	No	Auto
24	DISCARDING	200000	0	128	No	Auto
25	DISCARDING	20000	0	128	No	Auto

Figure 5.37 – STP Port Configuration

5.16 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 (1~8) 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 following:

- 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 the 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 aggregate together to form a logical trunked port. Using Static Trunk on both ends 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. Some configuration examples are listed below:

- Rule 1 – Maximum of three groups are allowed.
- Rule 2 - The members of each group cannot exceed more than four ports.
- Rule 3 – Group 1 and 2 cannot have as members ports 25 and 26.
- Rule 4 – Group 3 cannot have members from 1 to 24 ports.

Function name:

Port Setting/Status

Function description:

Port setting/status is used to configure the trunk property of each and every port in the switch system.

Parameter description:

Method:

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

None:

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 one 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:

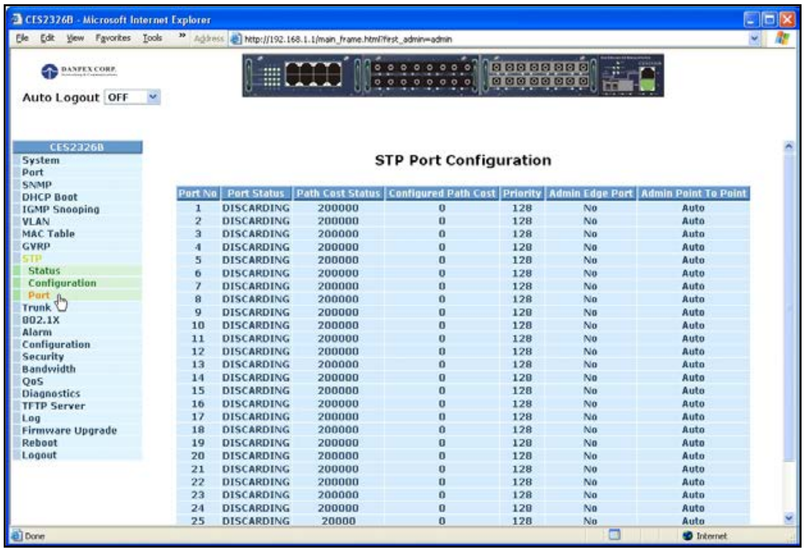
A Passive LACP port will not actively send LACPDU out until it receives an LACPDU from its link partner.

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”



STP Port Configuration

Port No	Port Status	Path Cost Status	Configured Path Cost	Priority	Admin Edge Port	Admin Point To Point
1	DISCARDING	200000	0	128	No	Auto
2	DISCARDING	200000	0	128	No	Auto
3	DISCARDING	200000	0	128	No	Auto
4	DISCARDING	200000	0	128	No	Auto
5	DISCARDING	200000	0	128	No	Auto
6	DISCARDING	200000	0	128	No	Auto
7	DISCARDING	200000	0	128	No	Auto
8	DISCARDING	200000	0	128	No	Auto
9	DISCARDING	200000	0	128	No	Auto
10	DISCARDING	200000	0	128	No	Auto
11	DISCARDING	200000	0	128	No	Auto
12	DISCARDING	200000	0	128	No	Auto
13	DISCARDING	200000	0	128	No	Auto
14	DISCARDING	200000	0	128	No	Auto
15	DISCARDING	200000	0	128	No	Auto
16	DISCARDING	200000	0	128	No	Auto
17	DISCARDING	200000	0	128	No	Auto
18	DISCARDING	200000	0	128	No	Auto
19	DISCARDING	200000	0	128	No	Auto
20	DISCARDING	200000	0	128	No	Auto
21	DISCARDING	200000	0	128	No	Auto
22	DISCARDING	200000	0	128	No	Auto
23	DISCARDING	200000	0	128	No	Auto
24	DISCARDING	200000	0	128	No	Auto
25	DISCARDING	20000	0	128	No	Auto

Figure 5.38 – 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:

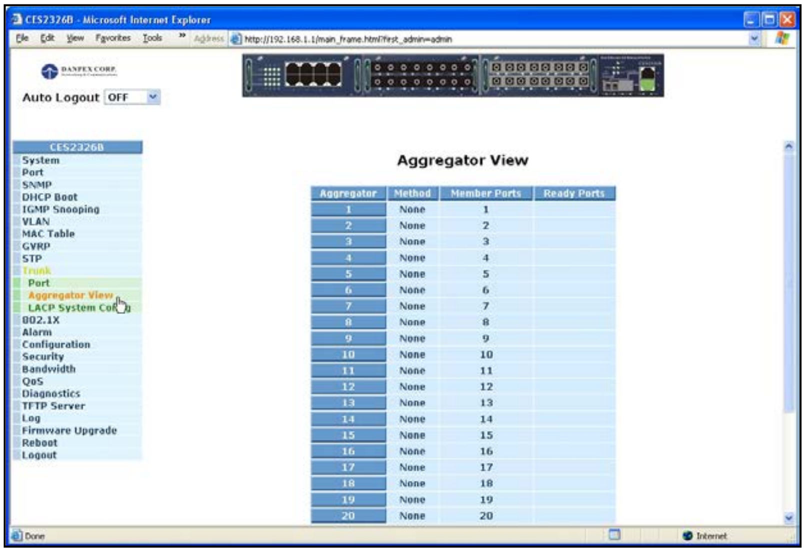
Displays the method a port uses to aggregate with other ports.

Member Ports:

Displays all member ports of an aggregator (port).

Ready Ports:

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



Auto Logout OFF

Aggregator View

Aggregator	Method	Member Ports	Ready Ports
1	None	1	
2	None	2	
3	None	3	
4	None	4	
5	None	5	
6	None	6	
7	None	7	
8	None	8	
9	None	9	
10	None	10	
11	None	11	
12	None	12	
13	None	13	
14	None	14	
15	None	15	
16	None	16	
17	None	17	
18	None	18	
19	None	19	
20	None	20	

Figure 5.39 – 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:

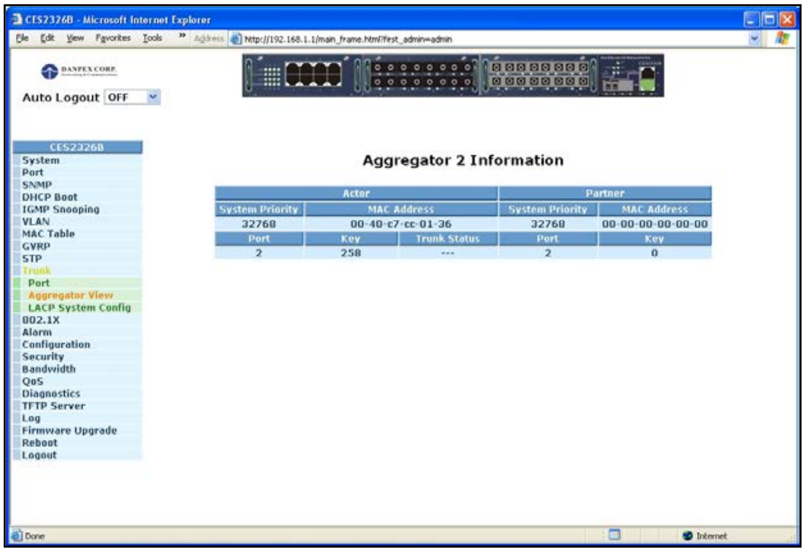
Displays the port number of an LACP port ID.

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”



Auto Logout OFF

Aggregator 2 Information

Actor			Partner	
System Priority	MAC Address		System Priority	MAC Address
32768	00-40-c7-cc-01-36		32768	00-00-00-00-00-00
Port	Key	Trunk Status	Port	Key
2	258	---	2	0

Figure 5.40 – LACP System Priority

Function name:

LACP System Priority

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 available for the Link Aggregation of the switch. Packets will determine the path to transmit according to the mode of Hash chosen

Default: DA and SA

5.17 802.1x 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 5.41.

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 5.41 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.

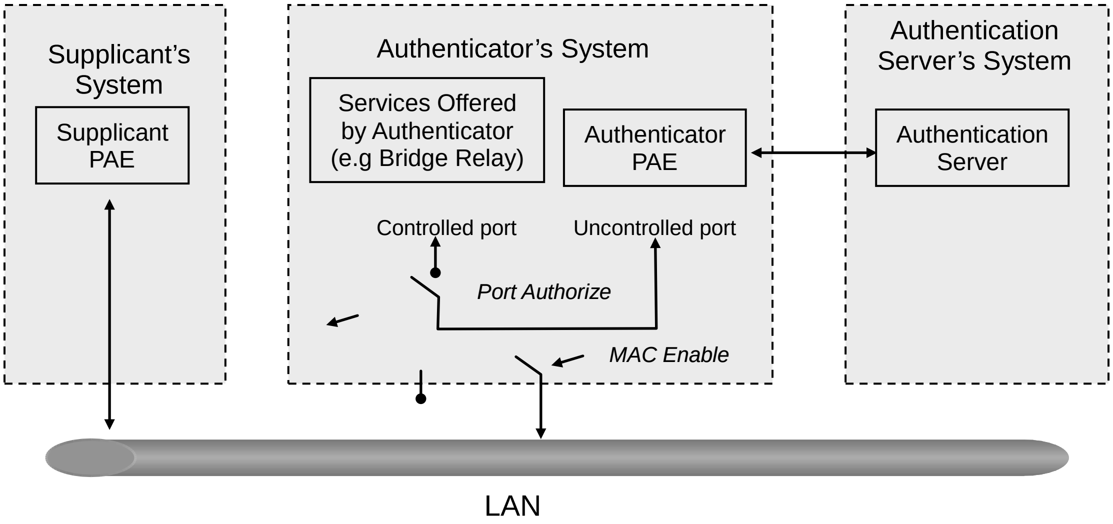


Figure 5.41

Figure 5.42 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.

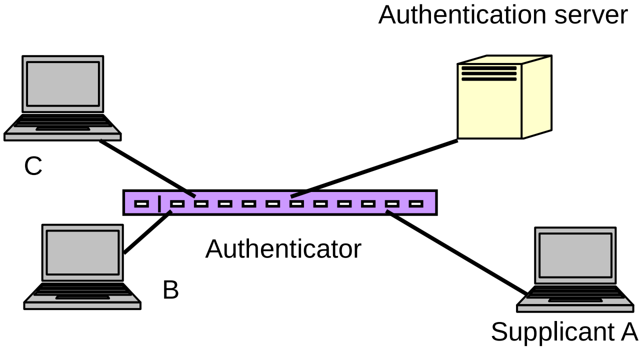


Figure 5.42

Figure 5.43 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.

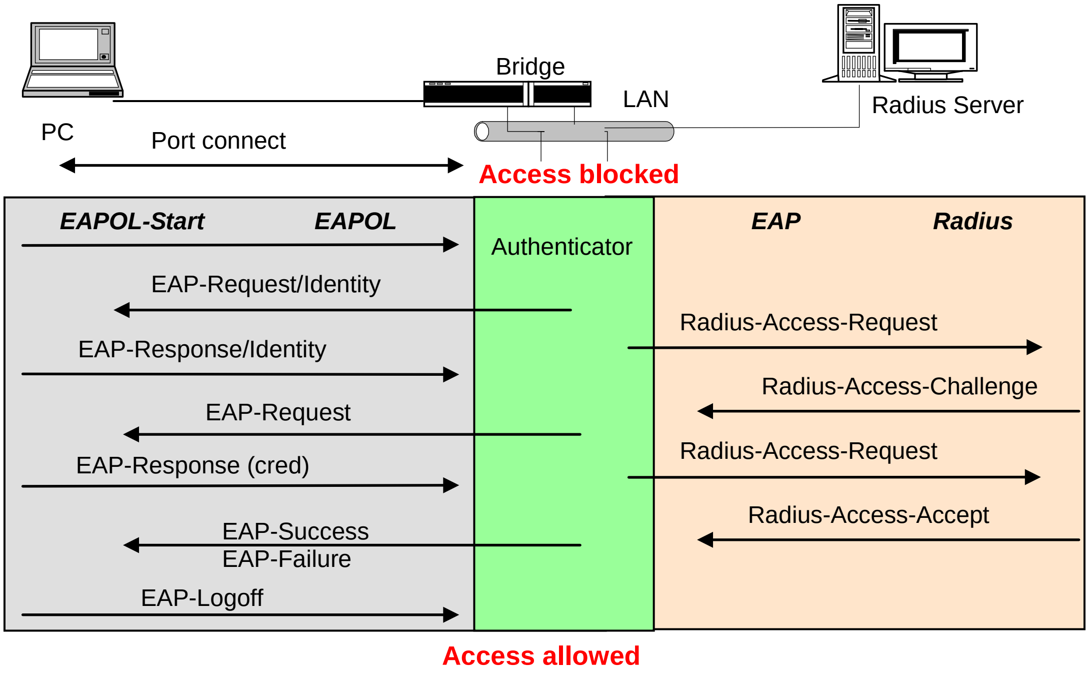


Figure 5.43 – 802.1x Authentication

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 5.2

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**

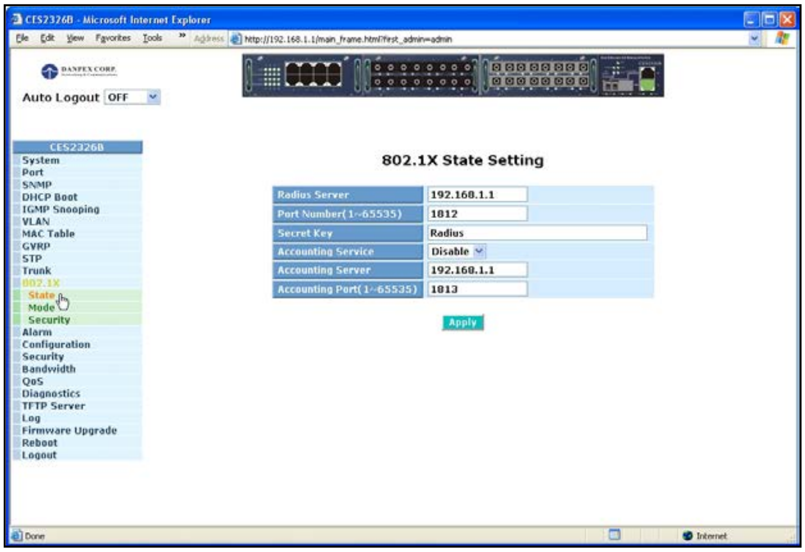
Port number:

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**



802.1X State Setting

Radius Server	192.168.1.1
Port Number(1~65535)	1812
Secret Key	Radius
Accounting Service	Disable
Accounting Server	192.168.1.1
Accounting Port(1~65535)	1813

Figure 5.44 – 802.1X State 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.

Mode:

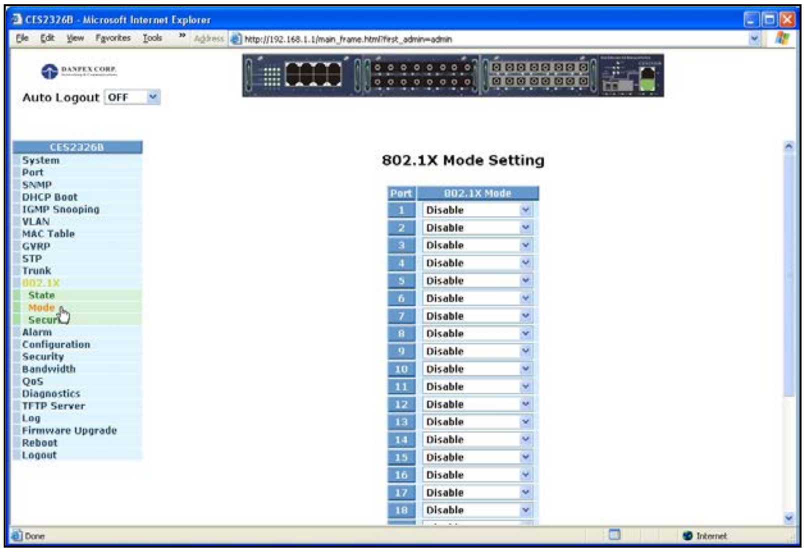
802.1X operation mode. There are three options, including Disable, Normal and Advanced. Default is **Disable**.

- 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.



802.1X Mode Setting

Port	802.1X Mode
1	Disable
2	Disable
3	Disable
4	Disable
5	Disable
6	Disable
7	Disable
8	Disable
9	Disable
10	Disable
11	Disable
12	Disable
13	Disable
14	Disable
15	Disable
16	Disable
17	Disable
18	Disable

Figure 5.45 – 802.1X Port Configuration

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:

Port Number:

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

Disable Mode:

Disable mode means the port is in the uncontrolled port sate, so the 802.1x authenticator is not applied. Any node attached to this port can access the network without the 802.1x authenticator. The port status will show the screen displayed in Figure 5.46.

802.1X with Multihost mode:

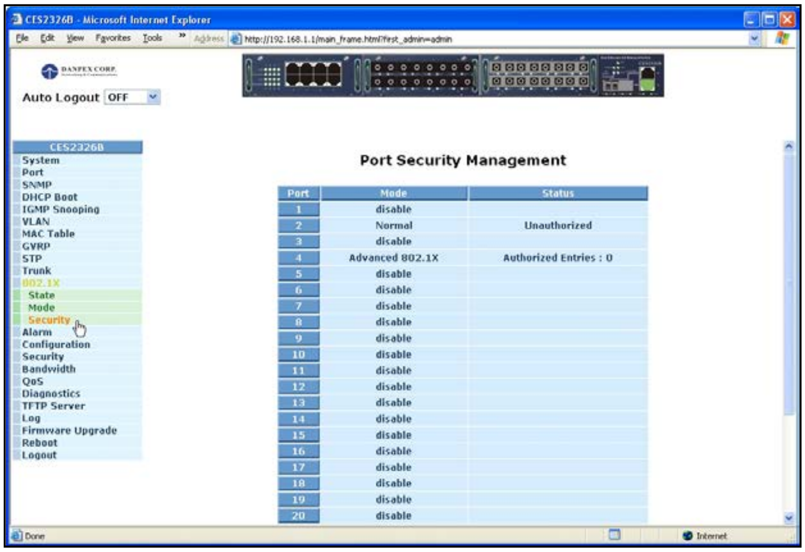
With the function 802.1X Port Mode Configuration, devices can access the network through this port once the authenticator is authorized. The Port Status will display the following screen. If the port is granted to access the network, the port status is authorized, otherwise, unauthorized.

Port Status:

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

Status:

The current 802.1X status of the port.



Auto Logout OFF

Port Security Management

Port	Mode	Status
1	disable	
2	Normal	Unauthorized
3	disable	
4	Advanced 802.1X	Authorized Entries : 0
5	disable	
6	disable	
7	disable	
8	disable	
9	disable	
10	disable	
11	disable	
12	disable	
13	disable	
14	disable	
15	disable	
16	disable	
17	disable	
18	disable	
19	disable	
20	disable	

Figure 5.46 – 802.1x Status

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.

Deafult: 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):

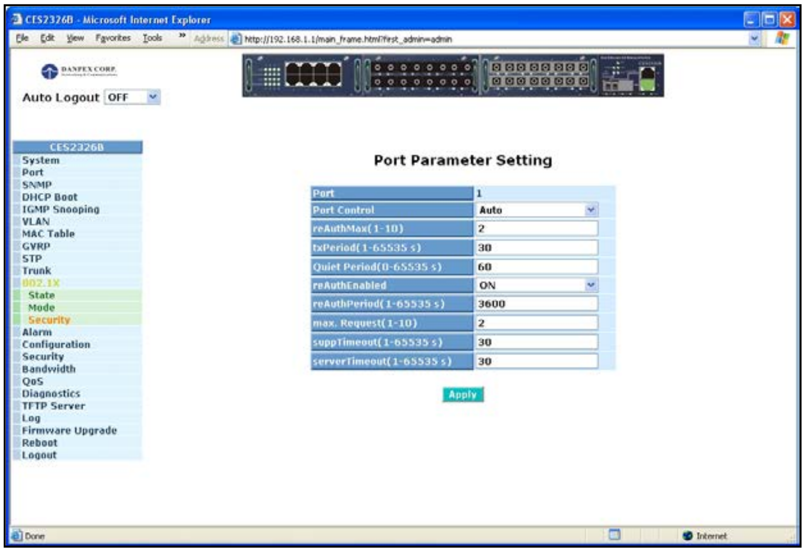
A timeout condition in the exchange between the authenticator and the supplicant. The valid range: 1 –65535.

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



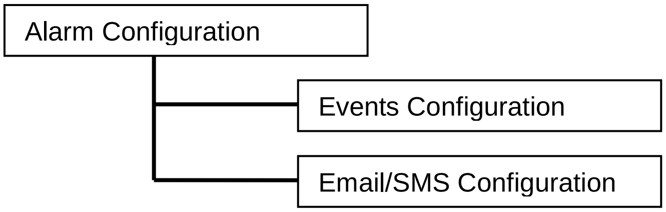
Auto Logout OFF

Port Parameter Setting

Port	1
Port Control	Auto
reAuthMax(1-10)	2
txPeriod(1-65535 s)	30
Quiet Period(0-65535 s)	60
reAuthEnabled	ON
reAuthPeriod(1-65535 s)	3600
max. Request(1-10)	2
suppTimeout(1-65535 s)	30
serverTimeout(1-65535 s)	30

Figure 5.47 – Port Parameter Setting

5.18 Alarm Configuration


Alarm Configuration

Events Configuration

Email/SMS 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 23 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

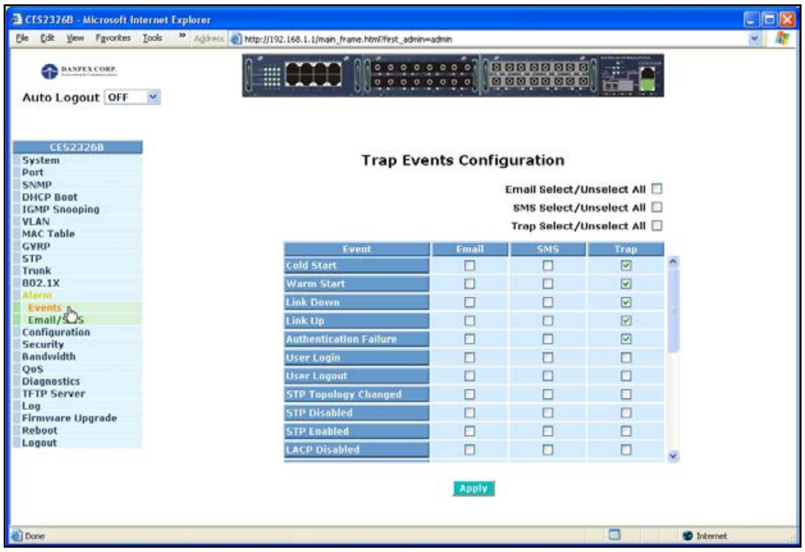
STP: STP Topology Changed, STP Disabled, STP Enabled

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, Slot Inserted, Slot Removed



Trap Events Configuration

Email Select/Unselect All ☐
SMS Select/Unselect All ☐
Trap Select/Unselect All ☐

Event	Email	SMS	Trap
Cold Start	☐	☐	☑
Warm Start	☐	☐	☑
Link Down	☐	☐	☑
Link Up	☐	☐	☑
Authentication Failure	☐	☐	☑
User Login	☐	☐	☐
User Logout	☐	☐	☐
STP Topology Changed	☐	☐	☐
STP Disabled	☐	☐	☐
STP Enabled	☐	☐	☐
LACP Disabled	☐	☐	☐

Apply

Figure 5.48 – 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 5.49). 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 23 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: Mail server username.

Password: Mail server password.

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: ISP username.

Password: ISP password.

Mobile Phone 1-6: Additional mobile phone numbers that would like to receive the alarm message.

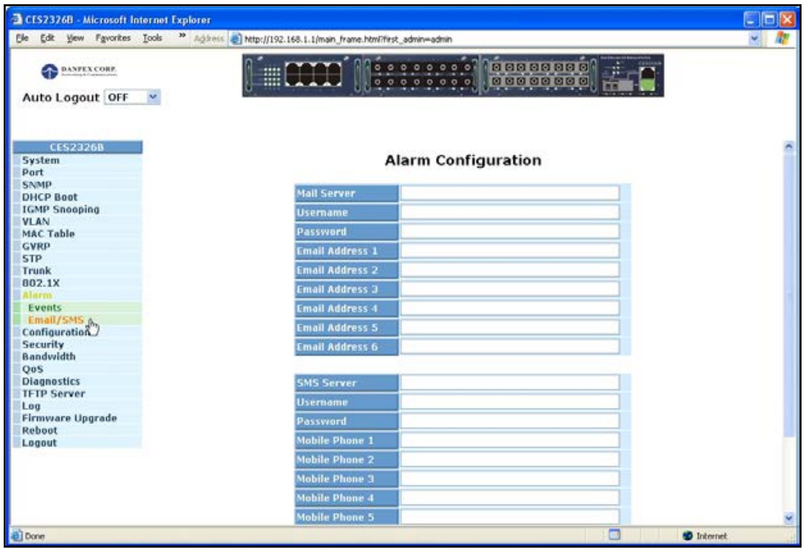


Figure 5.49 – Alarm Configuration

5.19 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:

Note: If you make changes to the configuration, you must **save** the configuration before rebooting the switch.

Default Configuration:

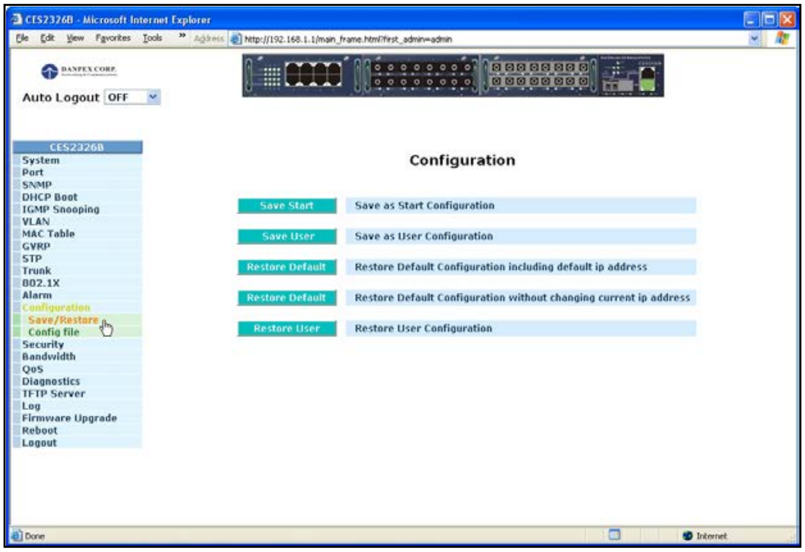
- The factory setting and cannot be altered. There are two restore default functions available. The first is **Restore Default Configuration** which includes the default IP address (192.168.1.1). The second is **Restore Default Configuration without changing current IP Address**. This option will not change your current IP address.

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.



Auto Logout OFF

Configuration

Save Start	Save as Start Configuration
Save User	Save as User Configuration
Restore Default	Restore Default Configuration including default ip address
Restore Default	Restore Default Configuration without changing current ip address
Restore User	Restore User Configuration

Figure 5.50 – Configuration Screen

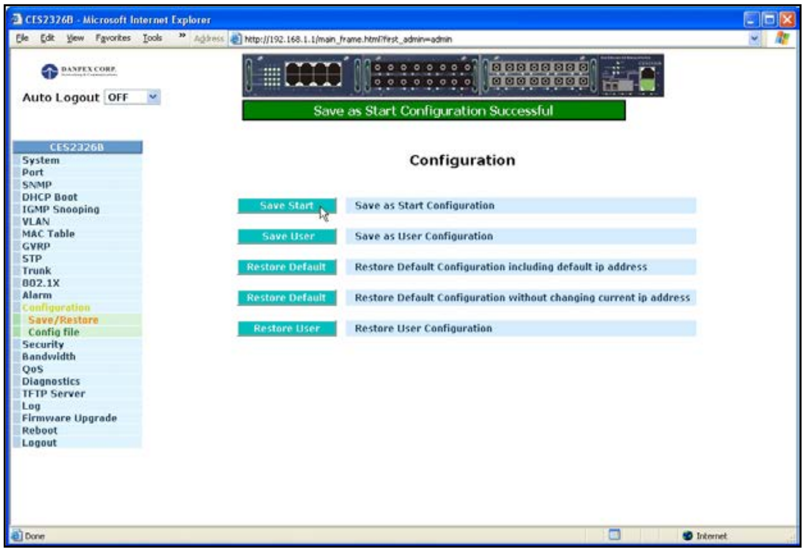
5.19.1 Save/Restore

Function name:

Save As Start Configuration

Function description:

Save the current configuration as a start configuration file in flash memory.



Save as Start Configuration Successful

Configuration

Save Start	Save as Start Configuration
Save User	Save as User Configuration
Restore Default	Restore Default Configuration including default ip address
Restore Default	Restore Default Configuration without changing current ip address
Restore User	Restore User Configuration

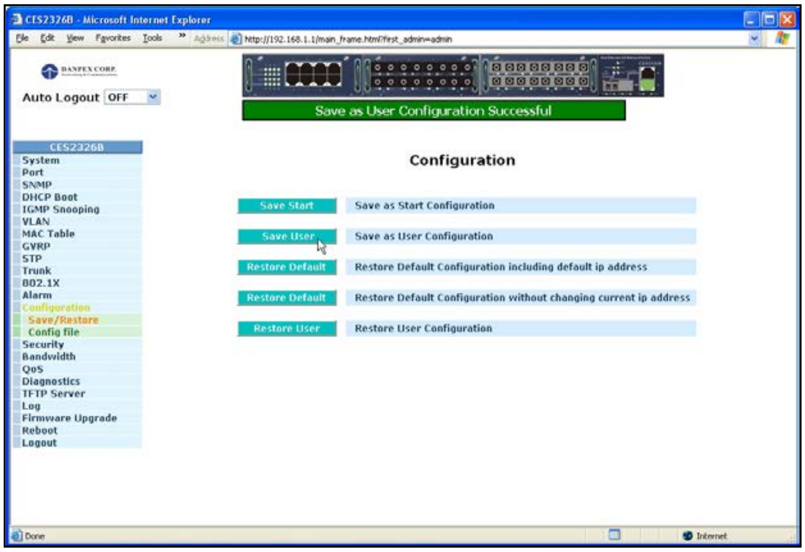
Figure 5.51 – Configuration Screen

Function name:

Save As User Configuration

Function description:

Save the current configuration as a user configuration file in flash memory.



Save as User Configuration Successful

Configuration

Save Start	Save as Start Configuration
Save User	Save as User Configuration
Restore Default	Restore Default Configuration including default ip address
Restore Default	Restore Default Configuration without changing current ip address
Restore User	Restore User Configuration

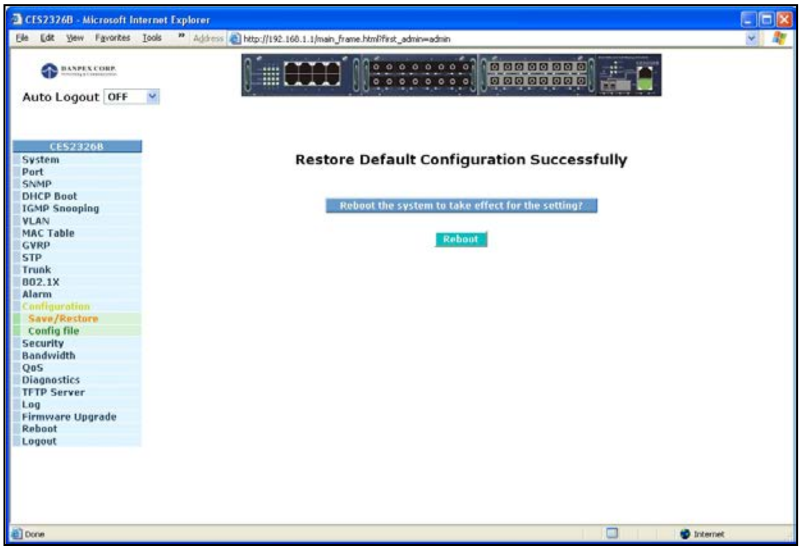
Figure 5.52 – Configuration Screen

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.



Restore Default Configuration Successfully

Reboot the system to take effect for the setting?

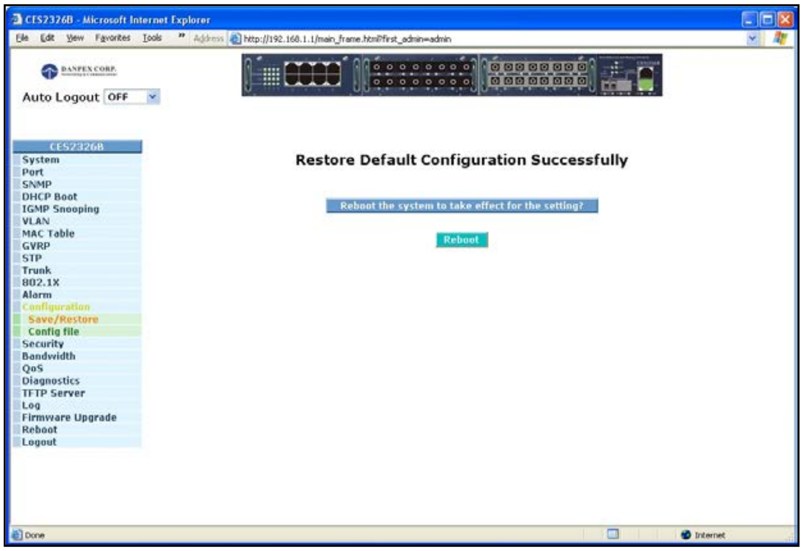
Figure 5.53 – Restore Configuration

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.



Restore Default Configuration Successfully

Reboot the system to take effect for the setting?

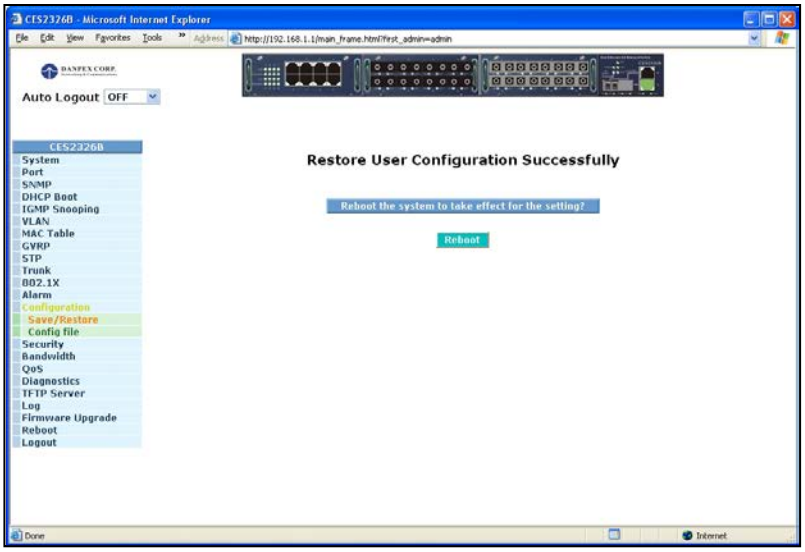
Figure 5.54 – Restore Default Configuration

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.



Restore User Configuration Successfully

Reboot the system to take effect for the setting?

Figure 5.55 – Restore User Configuration

5.19.2 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.

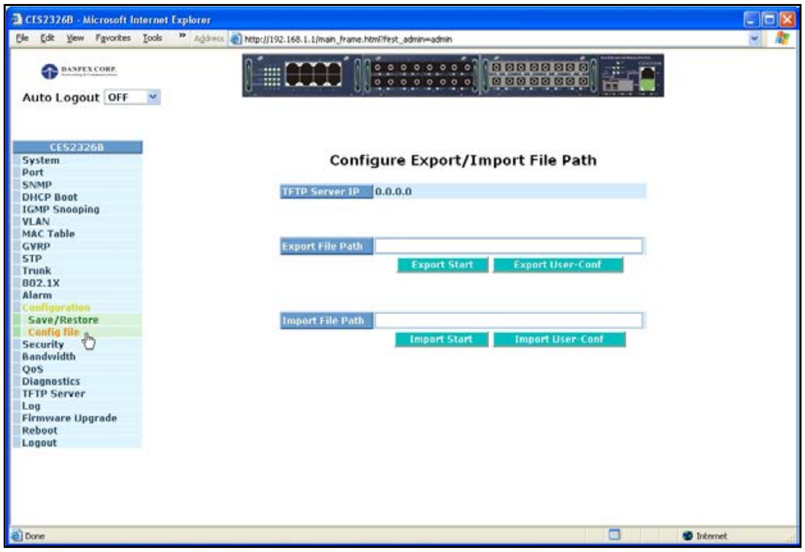
Import File Path:

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.



Auto Logout OFF

Configure Export/Import File Path

TFTP Server IP 0.0.0.0

Export File Path

Import File Path

Figure 5.56– Restore User Configuration

5.20 Security

Function name:

Mirror Configuration

Function description:

The Mirror Configuration is used to monitor the traffic of the network. For example, Port A and Port B are Monitoring Port and Monitored Port respectively, thus, 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 Port Mirror function. Default is **disable**.

Monitoring Port:

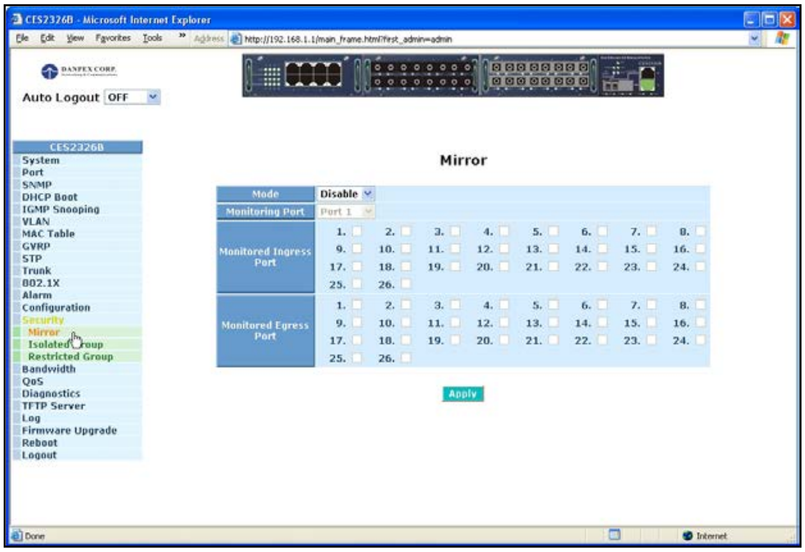
The monitoring port is used to set the port for monitoring. Valid port is Port 1~26 and the default is Port 1.

Monitored Ingress Port:

The monitored ingress port is used to set the port to be monitored. It only monitors the packets received by the port that is set. Click in the check box (☑) beside the port x. Valid ports are Ports 1~26.

Monitored Egress Port:

The monitored egress port is used to set the port to be monitored. It only monitors the packets transmitted by the port that has been set. Click in the check box (☑) beside the port x. Valid ports are Port 1~26.



Mirror

Mode	Disable
Monitoring Port	Port 1
Monitored Ingress Port	1. □ 2. □ 3. □ 4. □ 5. □ 6. □ 7. □ 8. □ 9. □ 10. □ 11. □ 12. □ 13. □ 14. □ 15. □ 16. □ 17. □ 18. □ 19. □ 20. □ 21. □ 22. □ 23. □ 24. □ 25. □ 26. □
Monitored Egress Port	1. □ 2. □ 3. □ 4. □ 5. □ 6. □ 7. □ 8. □ 9. □ 10. □ 11. □ 12. □ 13. □ 14. □ 15. □ 16. □ 17. □ 18. □ 19. □ 20. □ 21. □ 22. □ 23. □ 24. □ 25. □ 26. □

Figure 5.57 – Mirror Configuration

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 not possible between these ports. But, the ports of the Isolated group are still able to communicate with the ports of the non-Isolated group. With this design, you can find and resolve looping problems on the network.

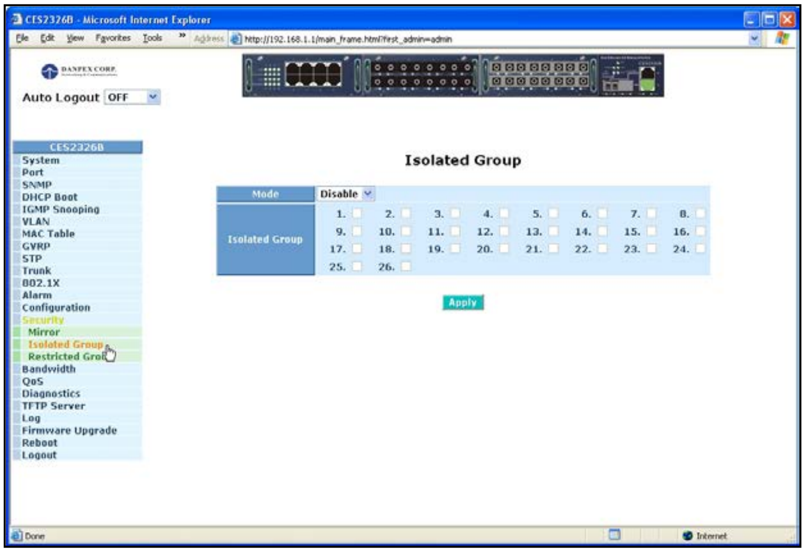
Parameter description:

Mode:

Used for the activation or de-activation of the Isolated Group function. Default is **disable**.

Isolated Group:

Any port can be selected to be a member of this group. Click the check box (☑) beside the port x. Valid ports are Port 1~26. In this group, all member ports cannot forward packets with each other. Thus, the switch will not be capable of forwarding packets if all ports become the members of the Isolated group.



Isolated Group

Mode	Disable
Isolated Group	1. □ 2. □ 3. □ 4. □ 5. □ 6. □ 7. □ 8. □ 9. □ 10. □ 11. □ 12. □ 13. □ 14. □ 15. □ 16. □ 17. □ 18. □ 19. □ 20. □ 21. □ 22. □ 23. □ 24. □ 25. □ 26. □

Figure 5.58 – 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 Restricted Group will be sent to the ports with the “Egress” mode of Restricted Group.

Parameter description:

Mode:

Used for the activation or de-activation of Restricted Group function. Default is **disable**.

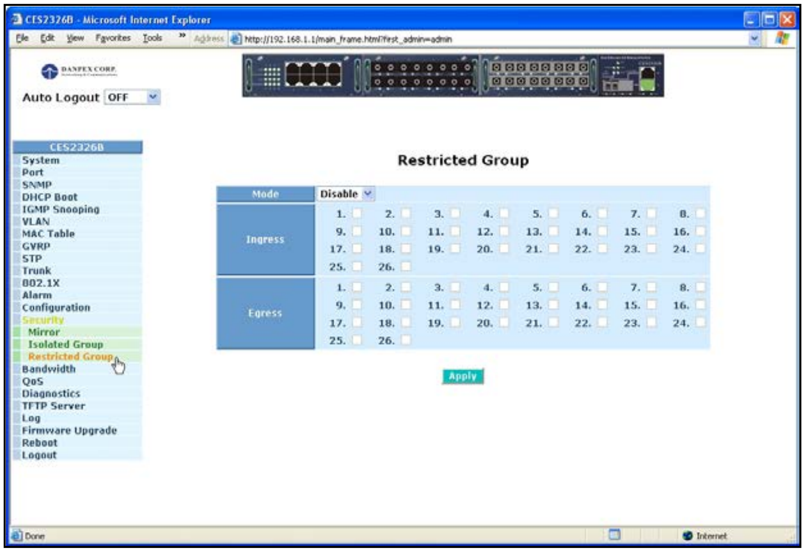
Ingress:

Select the ports that you would like their Restricted Group to set into “Ingress” mode. Click the check box beside port x. Valid ports are Ports 1~26.

Egress:

Select the ports for the Restricted Group to set into “Egress” mode. Click the check box beside port x. Valid ports are Ports 1~26.

.



Auto Logout OFF

Restricted Group

Mode	Disable							
Ingress	1. □	2. □	3. □	4. □	5. □	6. □	7. □	8. □
	9. □	10. □	11. □	12. □	13. □	14. □	15. □	16. □
	17. □	18. □	19. □	20. □	21. □	22. □	23. □	24. □
	25. □	26. □						
Egress	1. □	2. □	3. □	4. □	5. □	6. □	7. □	8. □
	9. □	10. □	11. □	12. □	13. □	14. □	15. □	16. □
	17. □	18. □	19. □	20. □	21. □	22. □	23. □	24. □
	25. □	26. □						

Figure 5.59 – Restricted Group

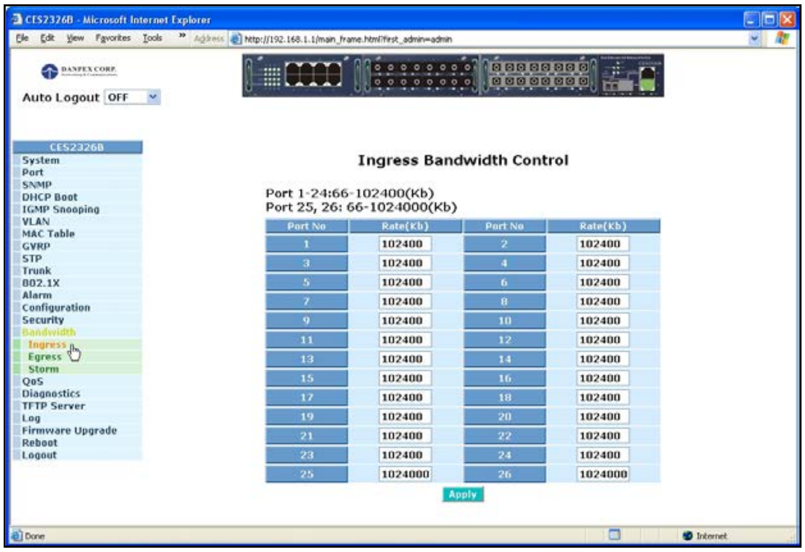
5.21 Bandwidth Management

Function name:

Ingress Bandwidth Setting

Function description:

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



Auto Logout OFF

Ingress Bandwidth Control

Port 1-24:66-102400(Kb)
Port 25, 26: 66-1024000(Kb)

Port No	Rate(Kb)	Port No	Rate(Kb)
1	102400	2	102400
3	102400	4	102400
5	102400	6	102400
7	102400	8	102400
9	102400	10	102400
11	102400	12	102400
13	102400	14	102400
15	102400	16	102400
17	102400	18	102400
19	102400	20	102400
21	102400	22	102400
23	102400	24	102400
25	1024000	26	1024000

Figure 5.60 – Ingress Bandwidth Control

Parameter description:

Port No.:

Choose the port number. Valid ports are 1~26.

Rate:

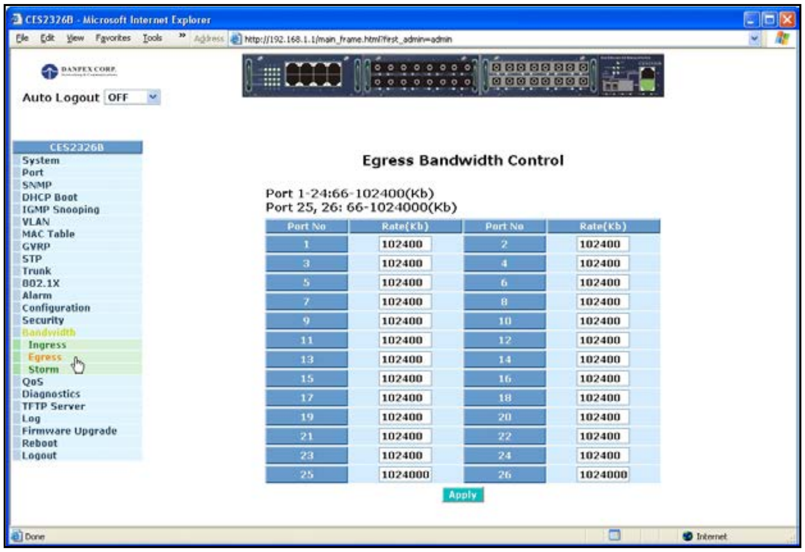
Rate is used to set the limit of Ingress bandwidth for the port. Incoming traffic will be discarded if the rate exceeds the value you set up in Data Rate field. Pause frames are also generated if flow control is enabled. The format of the packets are limited to unicast, broadcast and multicast. Port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

Function name:

Egress Bandwidth Setting

Function description:

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



Auto Logout OFF

Egress Bandwidth Control

Port 1-24:66-102400(Kb)
Port 25, 26: 66-1024000(Kb)

Port No	Rate(Kb)	Port No	Rate(Kb)
1	102400	2	102400
3	102400	4	102400
5	102400	6	102400
7	102400	8	102400
9	102400	10	102400
11	102400	12	102400
13	102400	14	102400
15	102400	16	102400
17	102400	18	102400
19	102400	20	102400
21	102400	22	102400
23	102400	24	102400
25	1024000	26	1024000

Apply

Figure 5.61 – Egress Bandwidth Control

Parameter description:

Port No.:

Choose the port number. Valid ports are 1~26.

Rate:

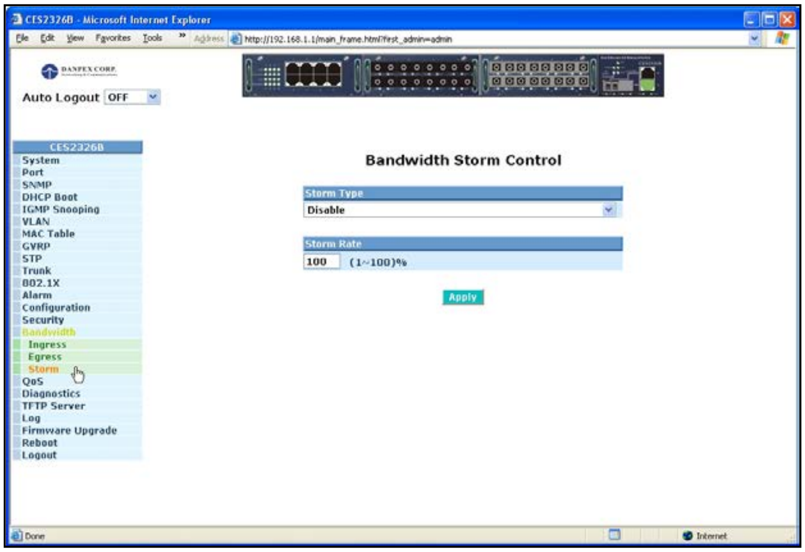
Rate is used to set limit of Egress bandwidth for the port. Packet transmission will be delayed if the rate exceeds the value you set in the Data Rate field. Traffic may be lost if egress buffers run full. The format of the packets are limited to unicast, broadcast and multicast. Port 1~24 port numbers range from 66~102400. Port 25~26 port numbers ranges from 66~1024000 with the minimum unit of 1. Default value of Port 1~24 is 102400 and Port 25~26 is 1024000.

Function name:

Storm Setting

Function description:

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



Auto Logout OFF

Bandwidth Storm Control

Storm Type: Disable

Storm Rate: 100 (1~100)%

Figure 5.62 – Bandwidth Storm Control

Parameter description:

Storm Type:

Disable:

Disable the function of the bandwidth storm control.

Broadcast Storm Control:

Enable the function of bandwidth storm control for broadcast packets.

Multicast Storm Control:

Enable the function of bandwidth storm control for multicast packets.

Unknown Unicast Storm Control:

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

Broadcast, Multicast, and Unknown Unicast Storm Control:

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

Storm Rate:

Set the limit of bandwidth for storm type. Valid value of the storm rate ranges from 1-100 with the minimum unit of 1. Only integers are acceptable. Default is **100**.

5.22 QoS (Quality of Service) Configuration

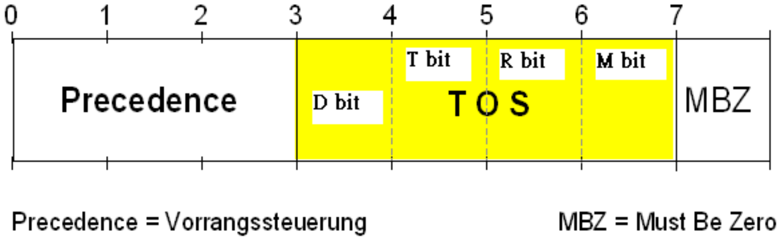
The switch supports the following five QoS functions:

- MAC Priority
- 802.1p Priority
- IP TOS Priority
- DiffServ DSCP Priority
- Port Based Priority (VIP Port)

Packets in the VIP Port will have highest transmitting priority. MAC Priority act on the destination address of MAC in packets. VLAN tagged priority field is affected by the 802.1p Priority setting.

IP TOS Priority affects TOS fields of IP header. It has 8-bit SERVICE TYPE field that specifies how the datagram should be handled. The field could be divided into six subfields as follows, PRECEDENCE (3 bits), D-Type (Delay Priority, 1 bit), T-Type (Throughput Priority, 1 bit), R-Type (Reliability Priority, 1 bit), M-Type (Monetary Cost Priority, 1 bit), and UNUSED (1 bit).

You can randomly control these fields to achieve some special QoS goals. When bits D, T, R, or M set, the D bit requests low delay, the T bit requests high throughput, the R bit requests high reliability, and the M bit requests low cost.



DiffServ DSCP Priority act on DSCP field of IP Header. 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. The last two bits are left unused.

High Priority Packet streams will experience less delay into the switch. For handing different priority packets, each egress port has designed up to four queues. Each QoS is influenced by two scheduling, WRR (Weighted Round Robin) and Strict Priority as well. Once the priority mapping has been set, WRR scheduling will distribute the bandwidth according to the weight you set for four queues (queue 0 to queue 3). Another scheduling type is Strict Priority which is dedicated for the function named VIP Port of QoS. Ports selected as the VIP Ports own the highest transmitting priority in egress queue of the switch.

The QoS functions as we mentioned above can be enabled at the same time. But, the following precedence will decide whether these functions work or not.

- enable both VIP and TOS
  - Choose priorities of VIP and TOS.
- enable both VIP and DSCP
  - Choose priorities of VIP and DSCP.
- enable both TOS and DSCP
  - Choose "DSCP".
- enable both VIP and DSCP
  - Choose priorities of VIP and DSCP.
- enable both 802.1p and TOS
  - Choose "TOS".
- enable both 802.1p and DSCP
  - Choose "DSCP".
- enable both 802.1p and DSCP and TOS
  - Choose "DSCP".
- 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:

When you want to use the QoS function, you must enable the QoS Mode. Once QoS is enableld, you can use MAC Priority, 802.1p Priority, IP TOS Priority, DiffServ DSCP Priority, or VIP Port functions. Choose a Priority Control, such as 802.1p, TOS, DSCP. You can select the Scheduling Method of WRR (Weighted Round Robin) or Strict Priority. Once that has been selected, set the Weight values for queue 0 to queue 3.

Parameter description:

QoS Mode:

Enable QoS Mode. Default is **Disable**.

Priority Control:

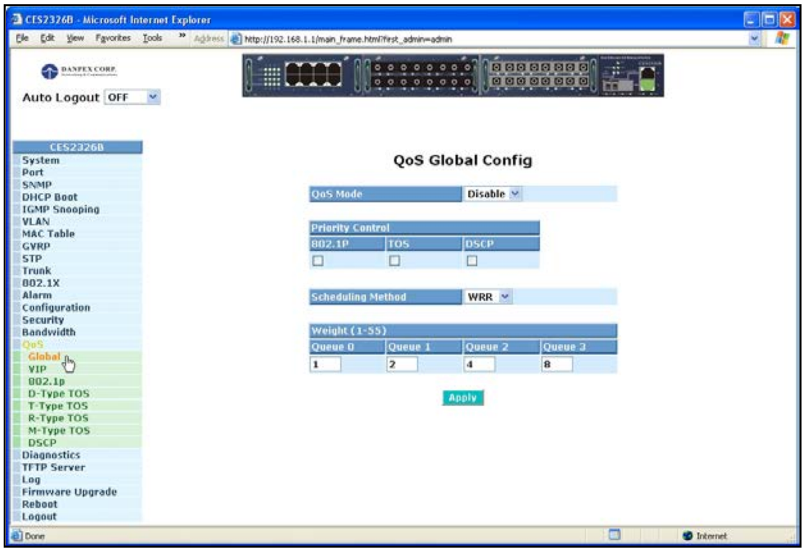
Click in the check box (☑) for 802.1P, TOS, or DSCP QoS. Click the Apply button.

Scheduling Method:

There are two Scheduling Methods: WRR and Strict Priority. Default is **WRR**. Once you have chosen the Scheduling Method, click Apply.

Weight (1~55):

You can set the Weight values of Queue 0 to Queue 3. The range of Weight is 1~55. The default weight for Queue 0 is 1, Queue 1 is 2, Queue 2 is 4, and Queue 3 is 8.



Auto Logout: OFF

QoS Global Config

QoS Mode	Disable

Priority Control		
802.1P	TOS	DSCP
□	□	□

Scheduling Method	WRR

Weight (1-55)			
Queue 0	Queue 1	Queue 2	Queue 3
1	2	4	8

Apply

Figure 5.63 – QoS Global Setting

Function name:

VIP Port Setting

Function description:

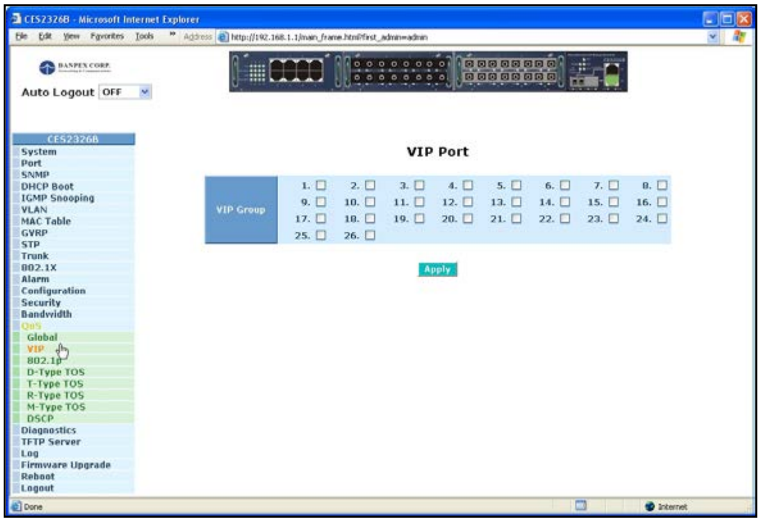
When the port is set as VIP Port, the packets enter this port and will have highest transmitting priority. For example, as you choose port 2 is VIP Port, simultaneously transmit packets from port 2 and port 3 to port 3 at speed of 100MB and let congestion happen. The packets for port 3 will be dropped because the packets from port 2 own highest precedence. For the sake of this function taking effect, you must choose Scheduling Method of Strict Priority ahead.

Parameter description:

VIP Port:

Click in the check box (☑) to select any port (Ports 1~26) as the VIP Port. Click **Apply**.

Figure 5.64 – VIP Port



Auto Logout OFF

VIP Port

VIP Group							
1. □	2. □	3. □	4. □	5. □	6. □	7. □	8. □
9. □	10. □	11. □	12. □	13. □	14. □	15. □	16. □
17. □	18. □	19. □	20. □	21. □	22. □	23. □	24. □
25. □	26. □						

Function name:

802.1p Setting

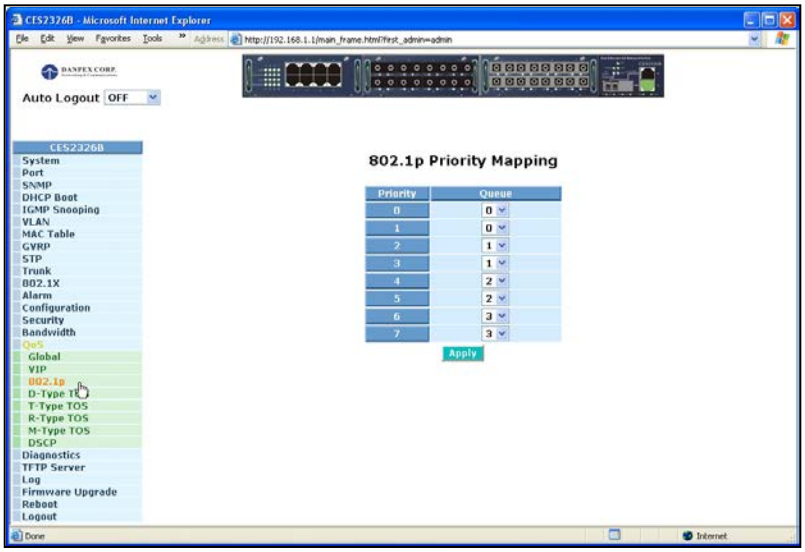
Function description:

This function will affect the priority of the VLAN tag. Based on priority of VLAN tag, it can handle up to eight priorities. Priorities can map to four queues (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. 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.



802.1p Priority Mapping

Priority	Queue
0	0
1	0
2	1
3	1
4	2
5	2
6	3
7	3

Figure 5.65 – Priority Mapping

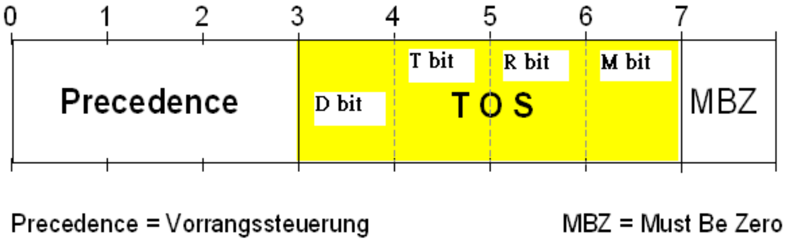
Function name:

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 subfields.

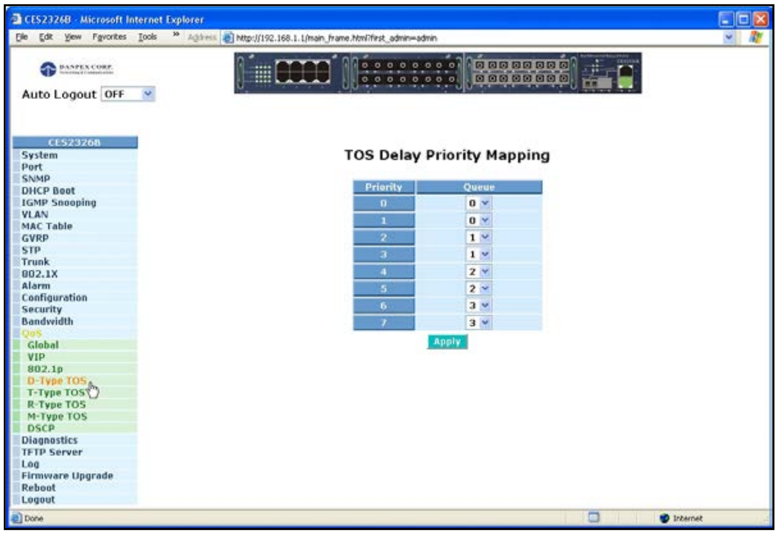
- PRECEDENCE (3 bits), D-Type (Delay Priority, 1 bit)
- T-Type (Throughput Priority, 1bit)
- R-Type (Reliability Priority, 1 bit)
- M-Type (Monetary Cost Priority, 1 bit)
- UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. TOS Delay Priority Mapping works while D-TYPE in TOS field of the 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.



Auto Logout OFF

TOS Delay Priority Mapping

Priority	Queue
0	0
1	0
2	1
3	1
4	2
5	2
6	3
7	3

Apply

Figure 5.66 – TOS Delay Mapping

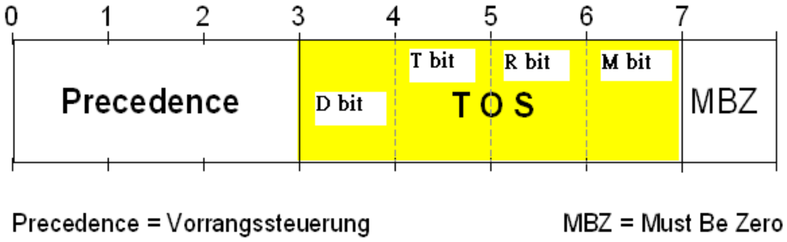
Function name:

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 could be divided into the following six subfields:

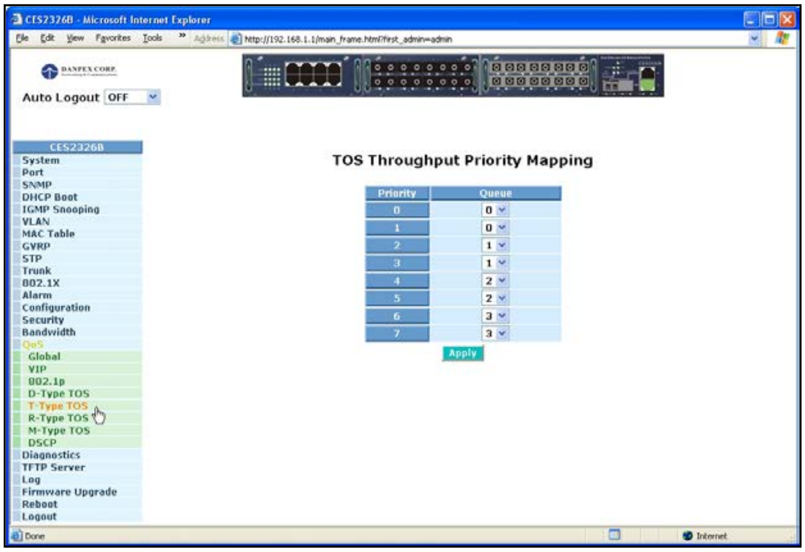
- PRECEDENCE (3 bits)
- D-Type (Delay Priority, 1 bit)
- T-Type (Throughput Priority, 1 bit)
- R-Type (Reliability Priority, 1 bit)
- M-Type (Monetary Cost Priority, 1 bit)
- UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. TOS Throughput Priority Mapping works while T-TYPE in the TOS field of the 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. 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.



Auto Logout OFF

TOS Throughput Priority Mapping

Priority	Queue
0	0
1	0
2	1
3	1
4	2
5	2
6	3
7	3

Figure 5.67 – TOS Throughput Priority Mapping

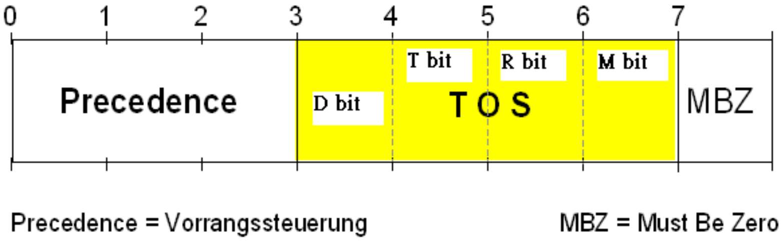
Function name:

R-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:

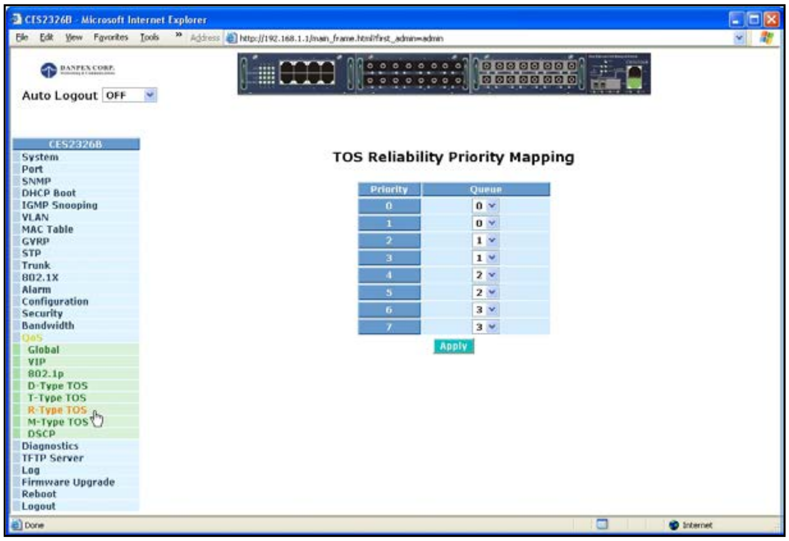
- PRECEDENCE (3 bits)
- D-Type (Delay Priority, 1 bit)
- T-Type (Throughput Priority, 1 bit)
- R-Type (Reliability Priority, 1 bit)
- M-Type (Monetary Cost Priority, 1 bit)
- UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. 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.



TOS Reliability Priority Mapping

Priority	Queue
0	0
1	0
2	1
3	1
4	2
5	2
6	3
7	3

Figure 5.68 – TOS Reliability Priority Mapping

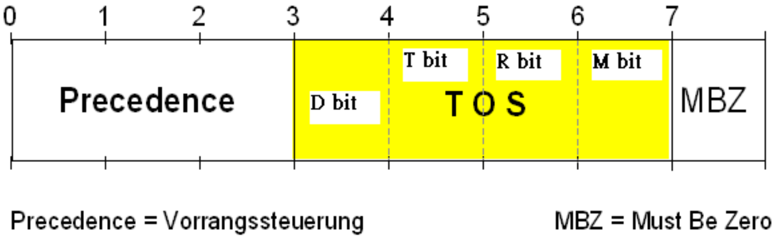
Function name:

M-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 subfields:

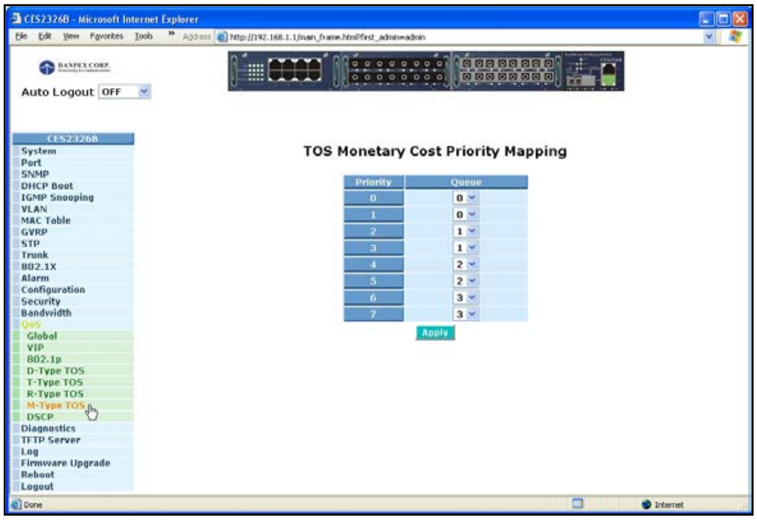
- PRECEDENCE (3 bits)
- D-Type (Delay Priority, 1 bit)
- T-Type (Throughput Priority, 1 bit)
- R-Type (Reliability Priority, 1 bit)
- M-Type (Monetary Cost Priority, 1 bit)
- UNUSED. PRECEDENCE 3-bits can arrange eight types of priorities corresponding to the 0~7 priority in the following priority diagram. 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. 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.



TOS Monetary Cost Priority Mapping

Priority	Queue
0	0
1	0
2	1
3	1
4	2
5	2
6	3
7	3

Figure 5.69 – TOS Monetary Priority Mapping

Function name:

DSCP Setting

Function description:

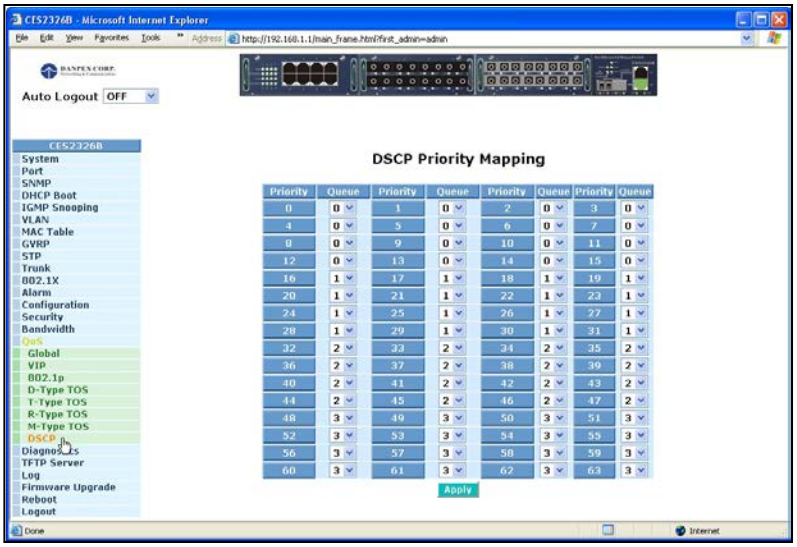
In the late 1990s, the IETF redefined the meaning of the 8-bit SERVICE TYPE field to accommodate a set of differentiated services (DS). Under the differentiated services interpretation, the first six bits comprise a codepoint, which is sometimes abbreviated DSCP, and the last two bits are left unused.

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

Parameter description:

DSCP Priority Mapping:

64 types of priority traffic as mentioned above. You can set up Queue 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.



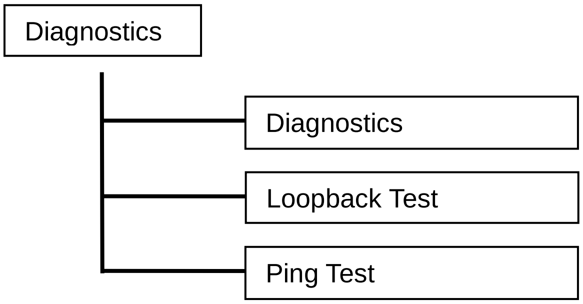
DSCP Priority Mapping

Priority	Queue	Priority	Queue	Priority	Queue	Priority	Queue
0	0	1	0	2	0	3	0
4	0	5	0	6	0	7	0
8	0	9	0	10	0	11	0
12	0	13	0	14	0	15	0
16	1	17	1	18	1	19	1
20	1	21	1	22	1	23	1
24	1	25	1	26	1	27	1
28	1	29	1	30	1	31	1
32	2	33	2	34	2	35	2
36	2	37	2	38	2	39	2
40	2	41	2	42	2	43	2
44	2	45	2	46	2	47	2
48	3	49	3	50	3	51	3
52	3	53	3	54	3	55	3
56	3	57	3	58	3	59	3
60	3	61	3	62	3	63	3

Figure 5.70 – DSCP Priority Mapping

5.23 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.

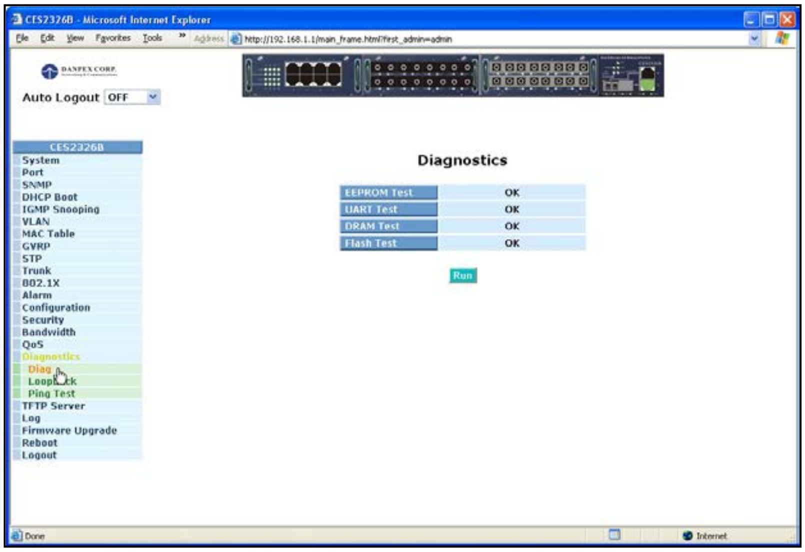


Function name:

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.



Diagnostics

EEPROM Test	OK
UART Test	OK
DRAM Test	OK
Flash Test	OK

Run

Figure 5.71 - Diagnostics

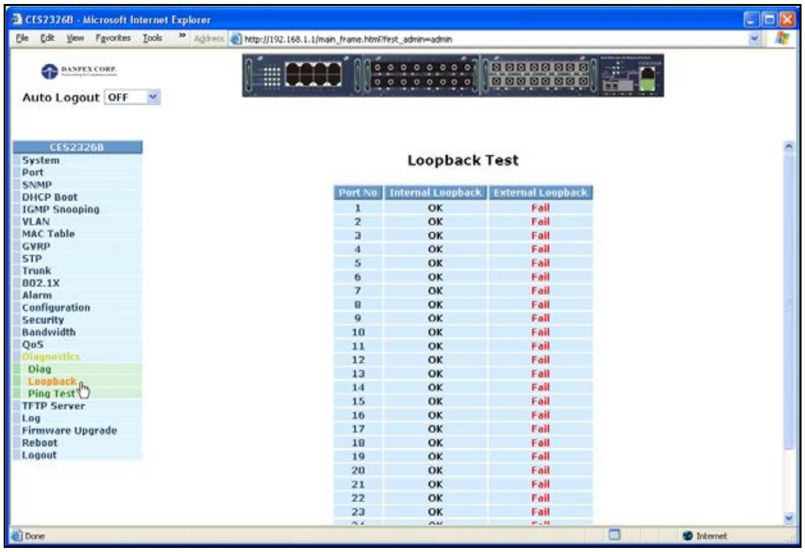
Function name:

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 Test 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 working, **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.



Loopback Test

Port No	Internal Loopback	External Loopback
1	OK	Fail
2	OK	Fail
3	OK	Fail
4	OK	Fail
5	OK	Fail
6	OK	Fail
7	OK	Fail
8	OK	Fail
9	OK	Fail
10	OK	Fail
11	OK	Fail
12	OK	Fail
13	OK	Fail
14	OK	Fail
15	OK	Fail
16	OK	Fail
17	OK	Fail
18	OK	Fail
19	OK	Fail
20	OK	Fail
21	OK	Fail
22	OK	Fail
23	OK	Fail

Figure 5.72 – 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:

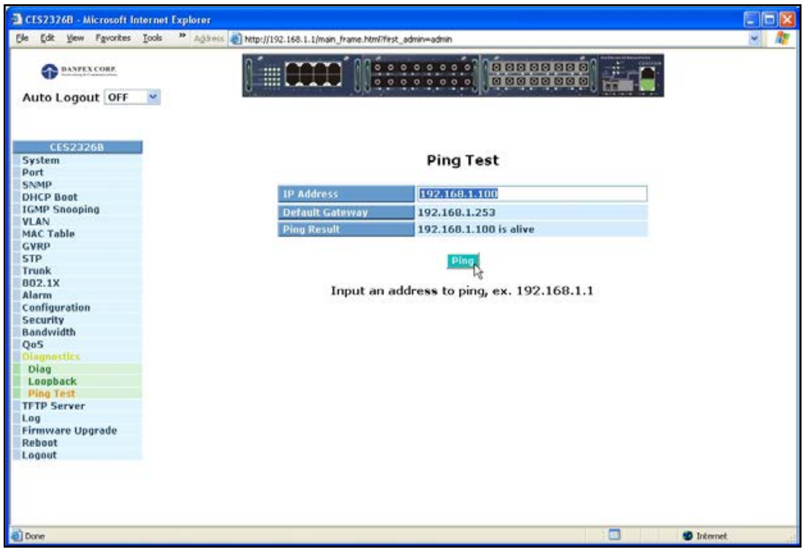
IP Address:

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.



Ping Test

IP Address	192.168.1.100
Default Gateway	192.168.1.253
Ping Result	192.168.1.100 is alive

Input an address to ping, ex. 192.168.1.1

Figure 5.73 - Ping Test

5.24 TFTP Server

Function name:

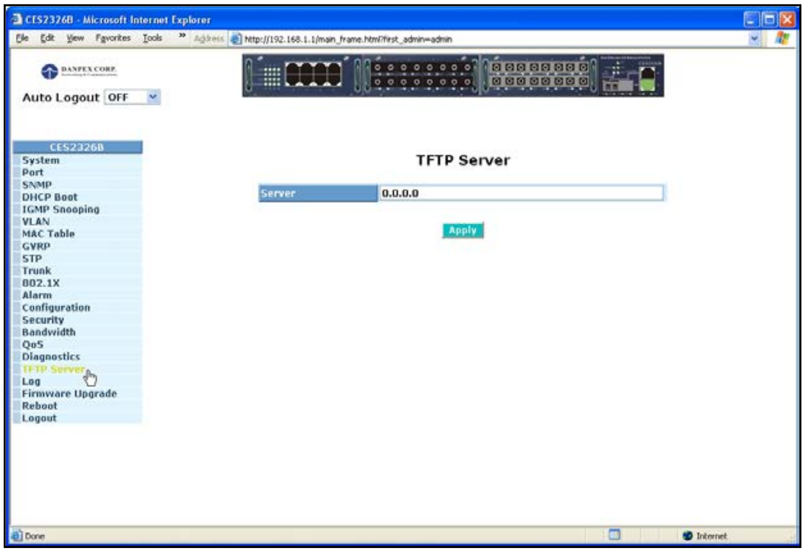
Trivial File Transfer Protocol (TFTP) Server

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.



TFTP Server

Server	0.0.0.0

Figure 5.74 – TFTP Server Assignment

5.25 Log

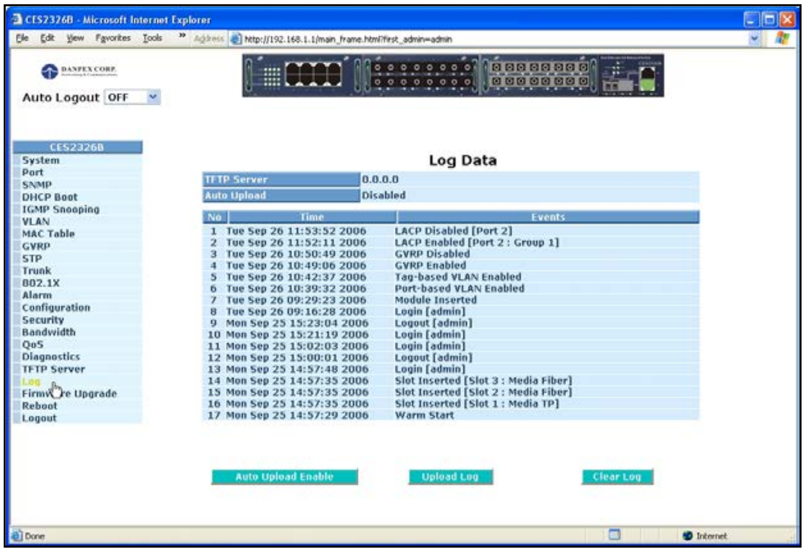
This function displays the log data. The switch provides system log data for users. There are eighteen private trap logs and five public trap logs. The switch supports a total 120 log entries. For more details on log items, please refer to Section **5.22** for Trap/Alarm Configuration and SNMP Configuration.

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.



Log Data

TFTP Server	0.0.0.0
Auto Upload	Disabled

No	Time	Events
1	Tue Sep 26 11:53:52 2006	LACP Disabled [Port 2]
2	Tue Sep 26 11:52:11 2006	LACP Enabled [Port 2 : Group 1]
3	Tue Sep 26 10:50:49 2006	GVRP Disabled
4	Tue Sep 26 10:49:06 2006	GVRP Enabled
5	Tue Sep 26 10:42:37 2006	Tag-based VLAN Enabled
6	Tue Sep 26 10:39:32 2006	Port-based VLAN Enabled
7	Tue Sep 26 09:29:23 2006	Module Inserted
8	Tue Sep 26 09:16:28 2006	Login [admin]
9	Mon Sep 25 15:23:04 2006	Logout [admin]
10	Mon Sep 25 15:21:19 2006	Login [admin]
11	Mon Sep 25 15:02:03 2006	Login [admin]
12	Mon Sep 25 15:00:01 2006	Logout [admin]
13	Mon Sep 25 14:57:48 2006	Login [admin]
14	Mon Sep 25 14:57:35 2006	Slot Inserted [Slot 3 : Media Fiber]
15	Mon Sep 25 14:57:35 2006	Slot Inserted [Slot 2 : Media Fiber]
16	Mon Sep 25 14:57:35 2006	Slot Inserted [Slot 1 : Media TP]
17	Mon Sep 25 14:57:29 2006	Warm Start

Figure 5.75 – 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.

5.26 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:

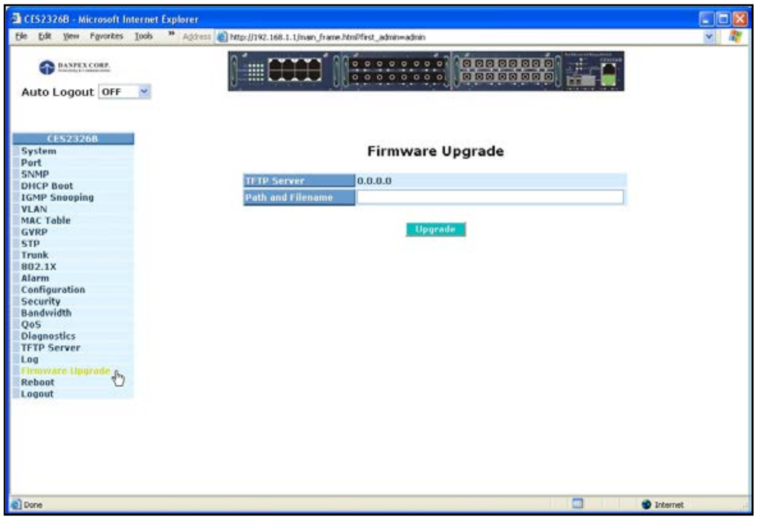
1. Specify the IP address TFTP server.
2. Specify the filename.
3. Select **Upgrade**.
4. When the download is complete, the switch begins upgrading the software. You will be prompted to reboot the switch after completing the upgrade. The switch must be rebooted so the new software will be applied.

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 of the stored the image file used for the upgrade. Do you need the path?



Auto Logout OFF

Firmware Upgrade

TFTP Server	0.0.0.0
Path and Filename	

Figure 5.76 – Firmware Upgrade

5.27 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 takes approximately 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.

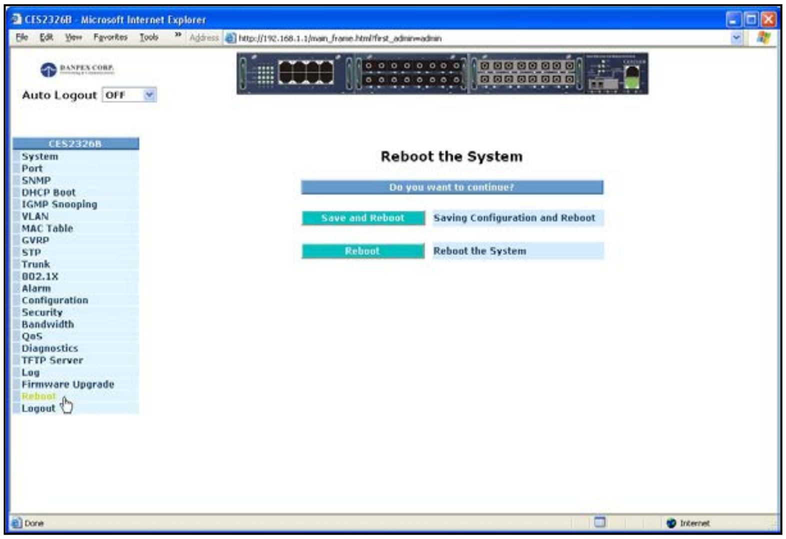


Figure 5.77 – Reboot the System

5.28 Logout

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

Function name:

Logout

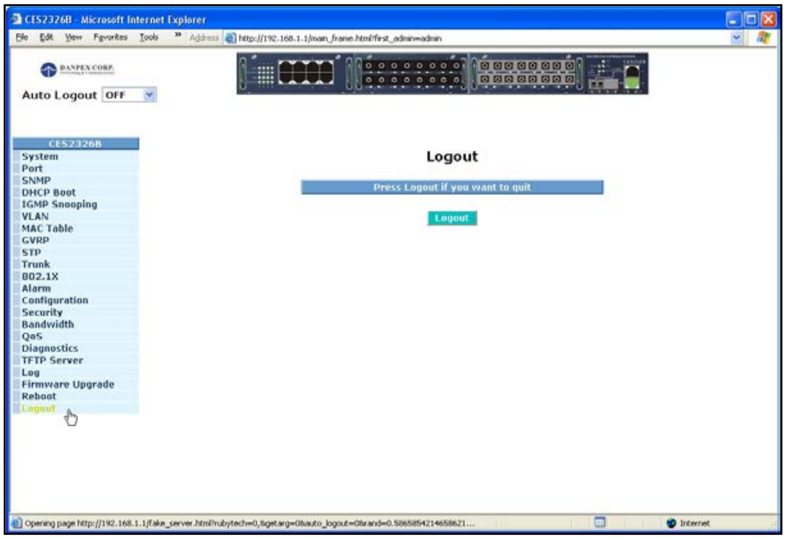
Function description:

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.



Auto Logout OFF

Logout

Press Logout if you want to quit

Opening page http://192.168.1.1/fake_server.html?rubytech=0,&getarg=0&auto_logout=0&rand=0.5865854214658621...

Figure 5.78 - Logout

6.0 Operation of CLI Management

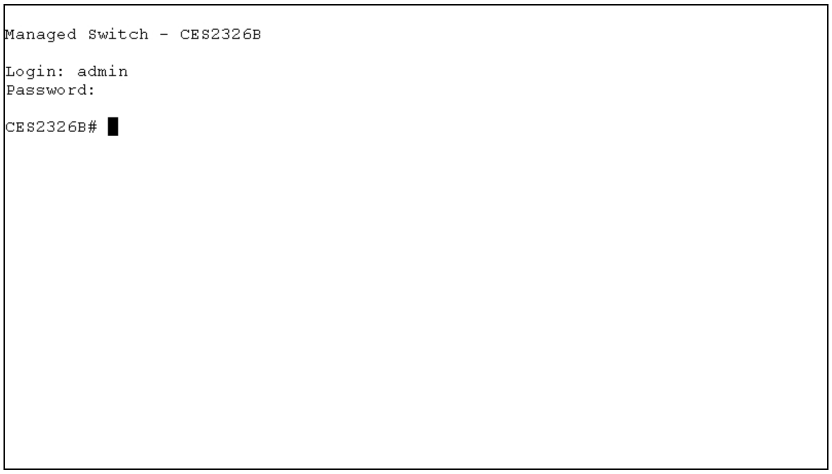
Section 4 of this manual provides detailed information for console connection to the switch. This section provides detailed syntax and examples for CLI management.

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.



```
Managed Switch - CES2326B

Login: admin
Password:

CES2326B# █
```

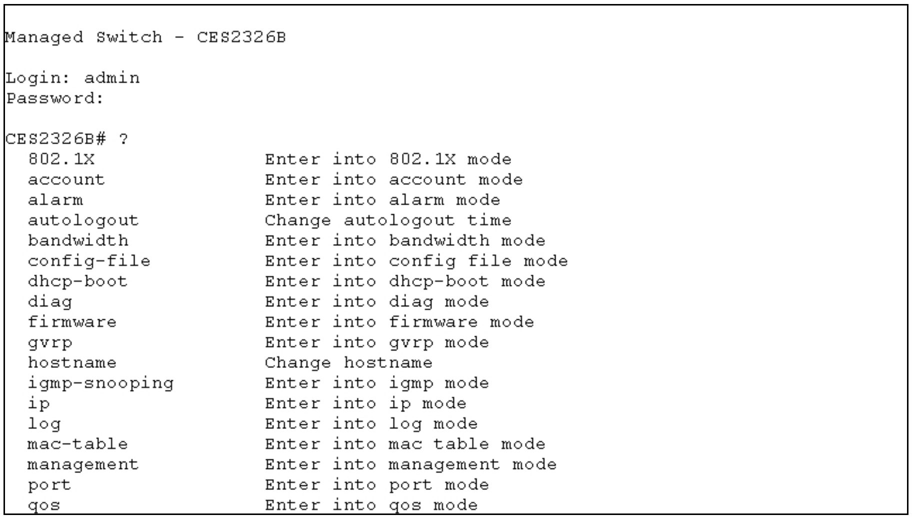
Figure 6.1 – Login Screen

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.



```
Managed Switch - CES2326B

Login: admin
Password:

CES2326B# ?
  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-snooping         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
  port                  Enter into port mode
  qos                   Enter into qos mode
```

Figure 6.2 – CLI Commands

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 26 <times>: max-times, range 1-10	<port range> 1 to 26 <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 26 <mode>: set up 802.1x mode 0:disable the 802.1x function 1:set 802.1x to multihost mode	<port range>: 1 to 26 <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 26 <authorized>: set up the status of each port 0:ForceUnauthorized 1:ForceAuthorized 2:Auto	<port range>: 1 to 26 <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 26 <sec>: timer, range 0-65535	<port range>: 1 to 26<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 26 <ebl> : 0 :OFF Disable reauthentication 1 :ON Enable reauthentication	<port range>: 1 to 26 <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 26	<port range> : 1 to 26 <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 26 <sec> : timer, range 1-65535	<port range>: 1 to 26 <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 26 <sec> :timer, range 1~65535	<port-range> : 1 to 26 <sec> :1~65535, 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> :1~65535, 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 26 <sec> :timer, range 1-65535	<port-range>: 1 to 26 <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 26 <sec> :timer, range 1-65535	<port-range>: 1 to 26 <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
<<events>>				
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> 1~23
Del email	del email <range>	Used to disable email of events	<range>: del the range of email, syntax 1, 5-7	<range> 1~23
Del sms	del sms <range>	Used to disable sms of events	<range>: del the range of sms, syntax 1, 5-7	<range> 1~23
Del trap	del trap <range>	Used to disable trap of events	<range>: del the range of trap, syntax 1, 5-7	<range> 1~23
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> 1~23
Set email	set email <range>	Used to enable email of the events	<range>: set the range of email,	<range> 1~23

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> 1~23
Set trap	set trap <range>	Used to enable the trap of events	<range>: set the range of sms, syntax 1, 5-7	<range> 1~23
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 26	<range>; 1 to 26
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 16 (24)	<range>; 1 to 16 (24)
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 16 (24)	<range>; 1 to 16 (24)
Set egress-rate	set egress-rate <range> <data_rate>	Used to set the egress-rate of the port.	<range> : syntax 1, 5-7, available from 1 to 26 <data rate>: 0-1000	<range>; 1 to 26) <data rate>: 0-1000
Set ingress-rate	set 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 26

Command	Syntax	Description	Argument	Possible Value
	<data_rate>		26 <data rate>: 0-1000	<data rate>: 0-1000
Set storm-rate	set storm-rate <range> <data_rate>	Used to set the storm-rate of the port	<range> : syntax 1, 5-7, available from 1 to 5 <data rate>: 0-1000	<range>; 1 to 5 <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>:filepath 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 “0” 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 tftp 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 26 <normal>: set applicant as normal mode <non-participant>: set applicant as non-partipant mode	<range> : 1 to 26
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 26 <normal>: set registrar as normal mode <fixed>: set registrar as fixed mode <forbidden>: set registrar as forbidden mode	<range>: 1 to 26 <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 26 <enable>: set restricted enabled <disabled>: set restricted disabled	<range>: 1 to 26 <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 26<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 26 <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 available from 1 to 26	<port>: available from 1 to 26
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 26 <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 26 <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 1000000. The value "0" means to disable aging	<#>; 0, 10 to 65535
Set learning	set learning	Used to set the maximum of all MACs that each port can learn	<port> port range, syntax 1, 5-7, available from 1 to 24; <num> MAC address numbers which can be dynamically learned num range; between 0 and 8191; 0 for learning disabled	<port> 1 to 24; <num> 0 and 8191
Show	show	Used to display the settings of MAC table age out time and the learning limit of each port	None	None
<<static mac>>				
Add	add <mac> <vid> <queue> <rule> <port>	Used to add the static MAC entry	<mac>: mac address, format: 00-02-03-04-05-06 <vid>: vlan id 0, 1-	<vid>:0, 1-4094 <queue>: 0 to 3 <rule>: 0 to 2 <port>: 1 to 26

Command	Syntax	Description	Argument	Possible Value
			4094 <queue>: which queue you want to set, from 0 to 3; <rule>:forwarding rule, from 0 to 2 0:static 1:drop destination address matches 2:drop source address matches <port>: forwarded destination port, from 1 to 26	
Del	del <mac>	Used to remove the static MAC entry	<mac>: mac address, format 00-02-03-04-05-06	<mac>: mac address
Show	show	Used to display the static MAC entry	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 1-8 or 1,3-5 or any [<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>]	Used to edit a management policy record	[<name> <value>] ACL entry name [<vid> <value>] VLAN ID [<ip> <value>] IP range [<port> <value>] Incoming port [<type> <value>] Access type	[<name> <value>] No default; must be set [<vid> <value>] Range is 1-4095 [<ip> <value>]

Command	Syntax	Description	Argument	Possible Value
	[<action> <value>]		[<action> <value>] a(ccept) or d(eny)	Any [<port> <value>] 1 or 1-8 or 1, 3-5 or any [<type> <value>] h(ttp), s(nmp), t(elnet) or any [<action> <value>] No default; 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 16 (24) <length (bytes)>: maximum packet length	<range>: 1 to 16 (24) <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 16 (24)	<range>: 1 to 16 (24)
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 16 (24)	<#>: 1 to 16 (24)
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	None	None

Command	Syntax	Description	Argument	Possible Value
		information (including simple and detailed port counter)		
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 16 (24)	<range>: 1~16 (24)
Disable state	disable state <range>	Used to disable the communication capability of the port	<range>: syntax 1, 5-7, available from 1 to 26	<range> :1~26
Enable state	enable state <range>	Used to enable the communication capability of the port	<range>:syntax 1, 5-7, available from 1 to 26	<range>: 1~26
Set flow control	set flow-control <range> <symmetric|asymmetric>	Used to set the flow control for ports	<range>:syntax 1, 5-7, available from 1 to 26	<range>: 1~26
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 26 <port-speed>: auto: set auto-negotiation mode 10: set speed to 10M 100: set speed to 100M 1000M set speed to 1000M <port duplex>: half; set to half duplex full:set to full duplex	<range>: 1 to 26 <port-speed>: auto, 10, 10, 100 <port duplex>: full, half
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 26	<#>: 1~26
Show media	show media <#>	Used to display the module in ports 25 and 26	<#>:1, 2, 3, 25 or 26	1, 2, 3 for slot module media 25, 26 for SFP module media
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				
Disable 1p	disable 1p	Used to disable IP 802.1p QoS	None	None
Disable DSCP	disable dscp	Used to disable IP DSCP QoS	None	None
Disable QOS	disable qos	Used to disable QoS	None	None
Disable TOS	disable tos	Used to disable IP TOS QoS	None	None
Enable 1p	enable 1p	Used to enable 802.1p QoS	None	None
Enable DSCP	enable dscp	Used to enable IP DSCP QoS	None	None

Command	Syntax	Description	Argument	Possible Value
Enable QOS	enable qos	Used to enable QoS function	None	None
Enable TOS	enable tos	Used to enable TOS	None	None
Set DSCP	set discp [<q0><priority>] [<q1><priority> 1] [<q2><priority>] {<q3><priority> }	Used to set IP DSCP QoS weighting for 4 queues	<q>:queue level, q0:queue 0; q1: queue 1: 12:queue 2; q3:queue 3, <priority>: priority level. One queue has been assigned 2 different priorities. Don't need use all of queue, but must assign queue in order. Syntax: 1,2 or 2, 5-7, available from 0 to 63	<priority>:0 to 63
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 16 (24) <#>: 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 TCP/UDP class. 1:high, 0:low	<port –range>: 1 to 16 (24) <#>: 1-10 <tcp/udp port range>:0-65535 <default>: 1 or 0 <match>: 1 or 0
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 16	<range>: 1 to 16 (24) <class> 1 or 0

Command	Syntax	Description	Argument	Possible Value
			(24) <class>: class of service setting. 1: high, 0:low	
Set pri-tag	set pri-tag [<q0><priority>] [<q2><priority>] [<q3><priority>] <port-range><tag-range> <class>	Used to set 802.1p QoS weighting for 4 queues	<q>:queue level, q0:queue 0; q1: queue 1: 12:queue 2; q3:queue 3, <priority>: priority level. One queue has been assigned 2 different priorities. Don't need use all of queue, but must assign queue in order. Syntax: 1,2 or 2, 5-7, available from 0 to 7	<priority>:0 to 7
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 6: prioritize databases (Oracle, IBM DB2, SQL, Microsoft)	<#>: 0~6
Set tos	set tos <type_value> [<q0><priority>] [<q1><priority>] [<q2><priority>]	Used to set IP TOS QoS weighting for 4 queues	<type_value>: Delay Priority:-; Throughput Priority: 1: Reliability Priority:2; Monetary Cost Priority:3. <q>:queue level, q0: queue 0; q1: queue 1; q2: queue 2; q3: queue 3. <priority>: priority level. One queue has been assigned 2 different priorities.	<type_value>: 0~3 <priority>: 0 to 7

Command	Syntax	Description	Argument	Possible Value
			You don't need to use all of queues, but must assign queues in order (from low queue to high queue). Syntax: 1,2 or 2,5-7, available from 0 to 7.	
Set VIP	set vip >port_range> <mode>	Used to set VIP port for strict priority	<port_range>: syntax 1,5-7, available from 1 to 26 <mode>: enable/disable vip port for each port. 1: enable. 0: disable	<port_range>: 1 to 26 <mode>: 1 or 0
Show DSCP	show dscp	Used to show IP DSCP QoS configuration	None	None
Show port	show port	Used to show VIP port configuration	None	None
Show priority-tag	show priority-tag	Used to show 802.1p QoS configuration	None	None
Show TOS	show tos	Used to show IP tos QoS configuration	None	None
Reboot				
Reboot	reboot	Used to reboot the switch	None	None
Security <<isolated-group>>				
Set	set <port>	Used to set the function of the isolated group	<port>:isolated port; range syntax: 1, 5-7, available from 0 to 26	<port>:0 to 26
Show	show	Used to display the current setting status of the isolated group	None	None
<<mirror>>				
Disable	disable	Used to disable the mirror function	None	None
Enable	enable	Used to enable the mirror function	None	None
Set	set <spy> <ingress> <egress>	Used to set the monitoring port and monitored port for the mirror function	<spy>:monitoring port <ingress>:monitored ingress port range syntax: 1,5-7, available from 0 to 26 <egress>:monitored egress port; range syntax: 1,5-7, vailable from 0 to 26 set ingress/egress to 0 as ingress/egress disabled	<ingress>: 0 to 26 <egress>: 0 to 26
Show	show	Used to display the current mirror status	None	None

Command	Syntax	Description	Argument	Possible Value
Set	set <ingress> <egress>	Used to set the function of the restricted group	<ingress>: ingress group port; range syntax: 1,5-7, available from 0 to 26 <egress>: egress group port; range syntax: 1,5-7, available from 0 to 26 set ingress or egress to 0 as disabled	<ingress>: 0 to 26 <egress>: 0 to 26
Show	show	Used to display the restricted group	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 26	<range>: 1 to 26
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 <max.age> : available from 6 to 40 <forward delay>: available from 4 to 30. Note: 2*(Forward	bridge priority>: 0 to 61440 <hello time>: 1 to 10 <max.age> : 6 to 40 <forward delay>: 4 to 30

Command	Syntax	Description	Argument	Possible Value
			delay -1)>=MaxAge Max Age> =2*(Hello Time +1)	
Set port	set port <range> <path cost> <priority> <edge_port> <admin p2p>	Used to set the port information of STP	<range>: syntax 1, 5-7, available from 1 to 26 <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 26 <path cost>: 0, 1-200000000 <priority>: 0 to 240 <edge_port>: Admin Edge Port, <yes/no> <admin p2p>:
Set version	set version <stp|rstp>	Used to set 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
TFTP				
Set server	set server <IP>	Used to set the IP address of the TFTP server	<IP>: the IP address of the TFTP server	<IP>: TFTP server IP
Show	show	Used to display information of the TFTP server	None	None
Time				
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	hr:daylight: -5 to +5 MM: (01-12) DD: (01-31) HH: (01-23)

Command	Syntax	Description	Argument	Possible Value
			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)	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 end*	None	None
Trunk				
Del trunk	del trunk <port-range>	Used to delete the trunking port	<port-range>: port range, syntax 1, 5-7, available from 1 to 26	<port-range>: 1 to 26
Set hash	set hash <method>	Used to set trunk hash method	<method>:hash method 0:DA and SA 1:SA 2:DA This has method applies to both LACP and static trunk	<method>:0-2
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 26 <method>: static: adopt the static link aggregation; lacp: adopt the dynamic link aggregation-link aggregation control protocol <group>: 1-3 <active LACP>:	<port-range>: 1 to 26 <method>: static /lacp <group>: 1 to 3 <active LACP>: active / passive

Command	Syntax	Description	Argument	Possible Value
			active: set the LACP 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-config	show lacp-config	Used to display the value of the LACP priority	None	None
Show lacp-detail	show lacp-detail	Used to display the detailed information of the LACP group	<aggtr>:aggregator, available from 1 to 26	<aggtr> 1 to 26
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 double-tag	disable double-tag	Used to disable the double-tag	None	None
Disable drop-untag	disable drop-untag <range>	Used to disable the drop-untag	<port-range>: ports to be set, syntax 1, 5-7, available 1 to 26	<range>: 1 to 26
Disable svl	disable svl	Used to disable independent VLAN learning	None	None
Disable symmetric	disable symmetric	Used to keep frames from being dropped from the non-member port	None	None
Enable double-tag	enable double-tag	Used to enable double tag	None	None
Enable drop-untag	enable drop-untag <range>	Used to drop the untagged frames	<port_range>: ports to be set, syntax 1, 5-7, available 1 to 26	<range>: 1 to 26
Enable svl	enable svl	Used to enable shared VLAN learning	None	None
Enable symmetric	enable symmetric	Used to drop frames from the non-member port	None	None
Set mode	set mode < port|tag>	Used to switch LVAN mode between port-based and tag-based	<por|tag>:port or tag tag:set tag-based vlan port:set port-based vlan	<port|tag>: port or tag
Set PVID	set pvid <port_range> <pvid> <default_ priority>	Used to set VLAN PVID and port priority	<port_range>: which port(s) you want to set PVID(s). Syntax 1,5-7, available from 1 to 26 <pvid>: which PVID you want to set, available from 1 to 4094	<port_range>: 1 to 26 <pvid>: 1 to 4094 <default_priority>: 0 to 7

Command	Syntax	Description	Argument	Possible Value
			<default_priority>: which priority you want to set, available from 0 to 7	
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 26	<range>: 1 to 26
Set port-role	set port-role <range> <access|trunk |hybrid> [vid}	Used to set the egress rule. Configure the port roles.	<range>: ports to be set, syntax 1, 5-7, available from 1 to 16 (24) <access>: do not tag frames <trunk>: tag all frames <hybrid>: tag all frames except a specific VID <vid>: untag-vid for hybrid port	<range>: 1 to 16 (24) <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 16 (24) <pvid>; PVIDs to be set, available 1 to 4094	<range>: 1 to 16 (24) <pvid>: 1 to 4094
Set tag-group	set tag-group <vid> <name> <range> <member_range> <untag_range>	Used to add or edit the tag-based vlan group	<vid>: vlan id, from 1 to 4094 <name>: tag-vlan group name <member_range>: member port; syntax 1,5-7, available from 1 to 26 <untag_range>:untagged out port; syntax 1,5-7, available from 0 to 26 set untag_range to 0 as none of the ports are force untagged	<vid>: 1 to 4094 <name>: tag-vlan group name <member_range>: 1 to 26 <untag_range>: 0 to 26
Show config	show config	Used to display the current vlan mode, symmetric vlan, SVL and double tag states	None	None
Show group	show group	Used to display the VLAN mode and VLAN group	None	None
Show pvid	show pvid	Used to display pvid, priority and drop untag results	None	None

Command	**Syntax**	**Description**	**Argument**	**Possible Value**
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 the roll for VS	<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 GSM 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 Waters' GSM 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 carolynl@watersnet.com.

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 GSM.
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 Waters' GSM 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' GSM 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 carolynl@watersnet.com 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 Network Systems'
Warranty Statement

Waters Network Systems' products are warranted against defects in materials and workmanship. The warranty period for each product will be provided upon request at the time of purchase. Unless otherwise stated, the warranty period is for the useable life of the product.

In the event of a malfunction or other indication of product failure attributable directly to faulty materials and/or workmanship, Waters Network Systems will, at its option, repair or replace the defective products or components at no additional charge as set for herein. This limited warranty does not include service to repair damage resulting from accident, disaster, misuse, neglect, lightning, acts of God, tampering or product modification.

Service under the warranty may be obtained by contacting Waters Network Systems and receiving a Return Material Authorization (RMA) number from Waters Network Systems. Returned product accompanied with the issued RMA number and prepaid shipping will be repaired or replaced by Waters Network Systems. Repaired or replaced products will be returned at no cost to the original Buyer and shipped via the carrier and method of delivery chosen by Waters Network Systems.

Specific warranty by product family is as follows:

ProSwitch-Secure:	Limited Lifetime (see note)
ProSwitch-SecureAir+:	Limited Lifetime
ProSwitch-Xpress:	Limited Lifetime
ProSwitch-PSX	Limited Lifetime
ProSwitch-Xtreme:	Limited Lifetime (see note)
ProSwitch-FlexPort:	Limited Lifetime
ProSwitch-FixPort:	Limited Lifetime
ProSwitch-CS and CSX:	3 Years from date of manufacture (see note)
ProMedia Converters	3 Years from date of manufacture (see note)

Note: Warranty period for any and all external power supplies is one (1) year from date of purchase.

EXCEPT FOR THE EXPRESS WARRANTY SET FORTH ABOVE, *WATERS NETWORK SYSTEMS* GRANTS NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, BY STATUTE OR OTHERWISE, REGARDING THE PRODUCTS, THEIR FITNESS FOR ANY PURPOSE, THEIR QUALITY, THEIR MERCHANTABILITY, OR OTHERWISE.

WATERS NETWORK SYSTEMS' LIABILITY UNDER THE WARRANTY SHALL BE LIMITED TO PRODUCT REPAIR, OR REPLACEMENT OF THE BUYER'S PURCHASE PRICE. IN NO EVENT SHALL *WATERS NETWORK SYSTEMS* BE LIABLE FOR THE COST OF PROCUREMENT OF SUBSTITUTE GOODS BY THE CUSTOMER OR FOR ANY CONSEQENTIAL OR INCIDENTAL DAMAGES FOR BREACH OR WARRANTY.