Managed 24-Port Modular Fast Ethernet Switch with 2 Gigabit Combo Ports

User's Manual

DOC.100720

Contents

1. Introduction

This Management Switch is a Layer2 Management switch with lots of advanced network functions including VLAN, trunking, spanning tree, mirror port, rate limit, IGMP and port configuration. Console is supported for command-line settings. Web, Telnet, and SNMP interfaces are for remote switch management through network. IEEE 802.1x is supported for port security application. These functions can meet most of the management request for current network.

1.1 Package Contents

- One Management Switch
- One AC power cord
- One console cable
- Two rack-mount kits and screws

2. Where To Place the Switch

This Switch can be placed on a flat surface (your desk, shelf or table).
Place the Switch at a location with these connection considerations in mind:

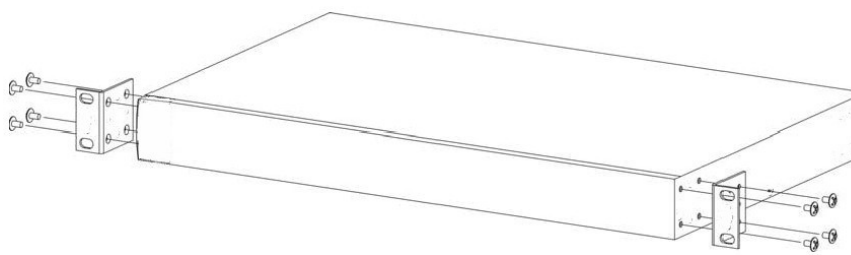
- The switch configuration does not break the rules as specified in Section 3.
- The switch is accessible and cables can be connected easily to it.
- The cables connected to the switch are away from sources of electrical interference such as radio, computer monitor, and light fixtures.
- There is sufficient space surrounding the switch to allow for proper ventilation (the switch may not function according to specifications beyond the temperature range of 0 to 50 degrees C).

<< Rack-Mount Installation >>

Before rack mounting the switch,please pay attention to the following factors :

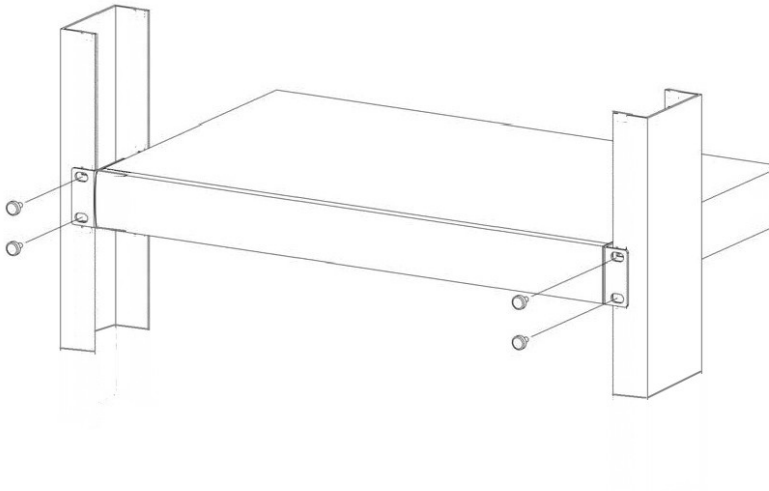
1. **Temperature** - Because the temperature in a rack assembly could be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range. (Please refer to Product Specifications in the manual.) Air flow is necessary in a rack for temperature stable.
2. **Mechanical Loading** - Do not place any equipment on top of this rack-mounted switch.
3. **Circuit Overloading** - Be sure that the supply circuit to the rack assembly is not overload after installing this switch.
4. **Grounding** - Rack-mounted equipment should be properly and well grounded. Particular attention should be given to supply connections other than direct connections to the mains.

[Attach Rack-Mount Brackets to the Switch]



1. Position a Rack-Mount Bracket on one side of the Switch.
2. Line up the screw holes on the bracket with the screw holes on the side of the switch.
3. Use a screwdriver to install the M3 flat head screws through the mounting bracket holes into the switch. (There could have two or four screws for one bracket. That depends on the model that installed.)
4. Repeat Step 1~3 to install another bracket to the switch.
5. Now it is ready to mount to a rack.

[Mount the Switch on a Rack]



1. Position a bracket that is already attached to the switch on one side of the rack.
2. Line up the screw holes on the bracket with the screw holes on the side of the rack.
3. Use a screwdriver to install the rack screws through the mounting bracket holes into the rack.
4. Repeat Step 1~3 to attach another bracket that is already attached to the switch on another side of the rack.

3. Configure Network Connection

3.1 Connecting Devices to the Switch

[Connection Guidelines:]

- For 10BaseT connection : Category 3 or 5 twisted-pair Ethernet cable
- For 100BaseTX connection : Category 5 twisted-pair Ethernet cable
- For 1000BaseTX connection: Category 5e or 6 twisted-pair Ethernet cable
- For TX cable connection, always limit the cable distance to 100 meters (328 ft) as defined by IEEE specification
- If your switch has 1000BaseSX/1000BaseLX connections, you can connect long distance fiber optic cable to the switch.
- Because this switch supports **Auto MDI/MDI-X** detection on each TX port, you can use normal straight through cable for both workstation connection and hub/switch cascading.

3.2 Connecting to Another Ethernet Switch/Hub

This Switch can be connected to existing 10Mbps / 100Mbps / 1000Mbps hubs/switches. Because all TX ports on the Switch support Auto MDI/MDI-X function, you can connect from any TX port of the Switch to the MDI or MDI-X port of another hub/switch with Straight Through or Crossover cables. If the switches have fiber-optic ports, you can cascade them with fiber optic cable.

3.3 Application

A switch can be used to overcome the hub-to-hub connectivity limitations as well as improve overall network performance. Switches make intelligent decisions about where to send network traffic based on the destination address of the packet. As a result, the switch can significantly reduce unnecessary traffic.

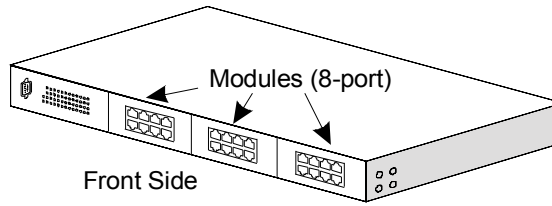
The example below demonstrates the switch ability to segment the network. The number of nodes on each segment is reduced thereby minimizing network contention (collisions) and boosting the available bandwidth per port.

With Management function of the switch, network administrator is easy to monitor network status and configure for different applications.

4. Add/Remove Module

This model supports three 8-port 10/100Mbps TX/FX modules at front panel and two TX/SFP gigabit ports at rear panel.

-- Modules at Front Side --



Note: This module does not support hot-swap function. Turn off the switch first before adding or removing module. Otherwise, the switch and module could be damaged.

[Adding Modules to the Switch at Front Panel]

1. Power OFF the switch first.
2. If the switch is rack-mounted, you have to remove the switch from rack first.
3. Loosen the screws of the cover on the module slot with screwdriver. Two at the front side, one at bottom side.
4. Remove the cover of the module slot.
5. Follow the rails on both sides of the module slot to slide in the module slowly.
6. Push the module firmly to make the module connecting well with the connector in the switch.
7. Drive the screws to fix the module to the switch firmly with screwdriver. Two at the front side, one at bottom side.
8. If the switch is rack-mounted, you can put the switch back to rack.
9. Power ON the switch.
10. If 100FX module is added, please configure these FX ports to *100/Full*.
11. Connect network cables to the connectors on the module. If the connected devices are working, the Link/Act LED will be ON.

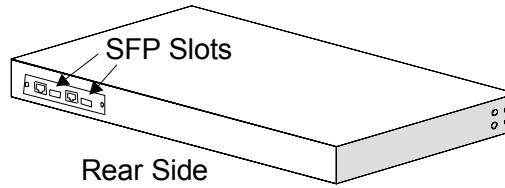
Note: We suggest you to keep these removed module slot covers. It can be use when these modules are removed in the future.

[Remove Modules from the Switch at Front Panel]

1. Power OFF the switch first.
2. If the switch is rack-mounted, you have to remove the switch from rack first.
3. Loosen the screws of the module with screwdriver - two at the front side, one at bottom side.
4. Remove the module slowly from the module slot.
5. Put on the module cover and fix it to the switch by driving its screws with screwdriver - two at the front side, one at bottom side.
6. If the switch is rack-mounted, you can put the switch back to rack.

7. Power ON the switch.

– Modules at Rear Side –



This switch supports both RJ-45 (for 1000TX) and SFP (for 1000SX/LX/…) connectors for gigabit ports at rear side. Because SFP slots support hot-swap function, you can plug/unplug SFP transceiver to/from SFP slot directly. The switch can auto-detect the gigabit connection from RJ45 or SFP slot. You can check Port 25/26 configuration from Console, Telnet or Web interface.

Follow the steps for module adding and removing.
[Add SFP Transceiver]
1. Plug in SFP Transceiver to SFP slot directly.
2. Connect network cable to the SFP Transceiver. If the connected devices are working, the Link/Act LED will be ON.

[Remove SFP Transceiver]
Unplug the SFP Transceiver from SFP slot directly.

5. LEDs Indication

The LEDs provide useful information about the switch and the status of all individual ports.

LED	STATUS	CONDITION
Power	ON	Switch is receiving power.
Link / Act	ON	Port has established a valid link.
	Flashing	Data packets being received or sent.
FDX / Col.	ON	The connection is Full Duplex.
	OFF	The connection is Half Duplex.
	Flashing	Collisions happen for half duplex connection

6. Manage / Configure the Switch

6.1 Introduction of the management functions

This switch is a L2 Management switch. It supports in-band management function from Http/Telnet/SNMP interfaces. Console is supported for local command-line settings. It supports network configuration functions, like VLAN, Trunking, Port Mirror, QoS, spanning tree and software backup/update. Users can configure these functions for different network applications. The following is a brief introduction about these functions before the detail operation sections.

1. VLAN (Virtual LAN)
   VLAN can divide the switch to several broadcast domains to prevent network traffic between different user groups. This switch supports 802.1Q tag-based VLAN and Port-based VLAN. Users with the same VLAN ID can transfer data to each other. The network traffic will be blocked if they have different VLAN ID. VLAN Stacking function for 802.1Q tag-based VLAN is supported. It allows two VLAN tags in a packet for 802.1Q VLAN tunnelling application through a central network.

2. Trunk
   If two switches are cascaded together, the bottleneck will happen at the cascading connection. If more cables could be used for the cascading connection, it will reduce the bottleneck problem. In normal case, switches will become unstable because of traffic looping when more than one cable is connected between them. If the switches support trunk function, they can treat these cables as one connection between them. The traffic looping will not happen between these cables and the switches will work stable with bigger bandwidth between them.

   Notes: About redundant application
   The trunk connection supports redundant function. If any trunk cable is broken, the traffic going through that cable will be transferred to another trunk cable automatically. For example, if traffic of user port Port 6 is assigned to Port 1 in a Trunk and Port 1 connection breaks, Port 2 will take over the traffic for Port 6 automatically. (It could be used for redundant application.)

3. Spanning Tree Protocol / Rapid Spanning Tree Protocol
   Spanning tree is a protocol to prevent network loop in network topology. If network loop happens, it will cause switches in the network unstable because more and more traffic will loop in the network. If network loop happens, spanning tree protocol will block one connection in the loop automatically. But it will also cause a period of delay (30 seconds for STP and shorter time for RSTP) if any network connection is changed because of the network topology detection operation of the protocol.

Because there could be more than one switch in the network, users can configure this function for their network spanning tree application.

4. Port Mirror
   This switch operates in store-and-forward algorithm so it is not possible to monitor network traffic from another connection port. But the port mirror function can copy packets from some monitored port to another port for network monitor.

5. QoS
   For Quality of Service request in a network, packets could be classified to different forwarding priorities. For real-time network traffic (like video, audio), it needs higher priority than normal network traffic. With the definition of packet priority, it could have 8 priority levels (from 0 to 7). This switch supports four priority level queues on each port. It could be configured for port-based, 802.1P tagged based, or DiffServ of IP packets priority. User can define the mapping of priority values to the priority queues.

6. Static Mac ID in ARL table
   The switch can learn the Mac address from user's packets and keep these Mac address in the ARL table for store-and-forward table lookup operation. But these Mac addresses will be deleted from ARL table after some time when users do not send any packets to the switch. This operation is called aging and the time is called aging time. It is about 5 minutes normally (it could be changed by users.) If users want to keep a Mac address always in ARL table on some port, they can assign the Mac address to ARL table. These Mac ID are called Static Mac address. This switch supports static Mac address assignment. *The static Mac address assignment will also limit the Mac address could be used on the assigned port only with the port security configuration function.* For example, assigning "00-00-e2-11-22-33" to Port 5 will always keep this Mac ID alive on Port 5 but also limit this Mac address could work on Port 5 only.

   Note: About Static Mac Address Filter-in (port binding) function
   There is a "Mac Security Configuration" function for port security. If it is set to "Accept function", only these static Mac addresses can access network through the assigned port. The other Mac addresses will be forbidden for network access through that port. This function can be used for port binding security application.

7. Dynamic Mac ID Number Limit
   Beside Static Mac ID Limit, there is another Dynamic Mac ID Number Limit function for Mac address security on port. This function can limit the Mac ID number to access network through a port. For example, five Mac ID are allowed for Port 2. That means up to five users are allowed, but don't care who the users are. It is done by "Limit by Mac no." option in "Mac Security Configuration" function.

8. IEEE 802.1x Port Security Function

If the 802.1x function is enabled, the switch will act as an authenticator for users accessing network through the switch. It will need a RADIUS server for the authentication function. Users will be asked for username and password before network access. If the RADIUS server authenticates it, the switch will enable the port for network access. This function is very useful for network security application to prevent illegal users access network through the switch.

9. Rate Control

This function can limit the traffic rate for physical ports. The traffic could be ingress traffic or egress traffic. This function can limit the network bandwidth utilization of users.

10. Private VLAN

Three kinds of VLAN are defined for this application – Primary VLAN, Community VLAN, and Isolated VLAN. Community VLAN and Isolated VLAN can communicate with Primary VLAN, but they cannot communicate with each other. And users in Isolated VLAN cannot communicate with each other. This is a special VLAN configuration. This switch supports a dedicated configure interface for such application.

11. IP Multicast with IGMP Snooping

IP multicast function can forward packets to a group of users connected on different ports. The user group is learned by the switch from packets of IGMP active router with IGMP snooping function. It is often used for video applications

12. MVR (Multicast VLAN Registration)

VLAN function will isolate traffic between VLAN groups. But it will also isolate IP multicast traffic for subscribers in different VLANs. The MVR function allows one multicast VLAN to be shared by subscribers in different VLANs. That can reduce the multicast traffic for VLANs.

13. DHCP Relay & DHCP Option 82

DHCP Relay function will control DHCP requests and forward DHCP requests to the assigned DHCP server. DHCP Option 82 function will add port and switch information to DHCP requests and then send to the assigned DHCP server. Based on those information, DHCP server will assign an IP configuration in the DHCP reply. This is a security function.

14. DHCP Snooping

DHCP Snooping function will assign a trusted port for DHCP server connection, and snoop the DHCP activity between clients and server. The DHCP result will be recorded for monitor. And it will also be applied for IP-Mac binding on port for security.

15. IP-Mac-Port Binding

This function can limit the IP address and/or Ethernet Mac address accessing network from switch port. That can prevent illegal IP address and/or illegal Ethernet Mac address in network. And this function can be used to create IP-

Mac address mapping for network access.

16. ACL (Access Control List)

This function is used to define network access control policy - a list of packet filtering rules. The filtering conditions are Layer2 ~ Layer4 - including Mac address, VLAN ID, Ethernet Type, IP address, Service Port, ... If conditions are matched, the traffic could be discarded, forwarded, or rate limit. For example, you can limit traffic rate for Port 80 (http service) as 1Mbps to prevent Web browsing taking too much bandwidth from your network.

17. LLDP (Link Layer Discover Protocol)

LLDP protocol is used by network devices to advertise their identity, capabilities, and interconnections on a LAN network. This switch can advertise its system information, and show the information of the connected network devices by LLDP protocol.

18. Software Backup/Update

This switch supports backup and update functions for its internal software and its network configuration. It could be done in two ways.

a. From console when booting : doing by Xmodem protocol and by terminal program for boot code and run-time code updating.

b. From web browser : doing by http protocol and by web browser for run-time code and configuration backup/update.

c. From telnet or console command : doing by tftp protocol for run-time code and configuration backup/update.

6.2 Settings with Console Connection

6.2.1 Basic of the Console Interface

<< Enter Console Interface >>
Please follow the steps to complete the console hardware connection first.

1. Connect from console port of the switch to COM port of PC with the console cable.
2. Start the terminal program of Windows. Create a new connection and select COM port of PC used for the console. Set the configuration of the terminal as **[9600,8,N,1]**. (You can find the terminal program in [Start] -> [Programs] -> [Accessory Programs] -> [Communication] -> [Terminal]. If you cannot find it, please install it from your Windows Installation Disk. Please refer to your Windows user manual for the installation.)
3. Power on the switch.

If everything is correct, the booting screen will appear in the terminal program when the switch is powered on. It will stop at the following screen after some initializing messages.

```
---------------------------------------------------------------------------------------------------
Bootloader Ver. 1.05.00(256K Config),at 11:06:04, Apr 30 2009

RAM: 0x00000000-0x00800000, 0x0000cc78-0x007f3000 available
FLASH: 0x05800000 - 0x05a00000, 32 blocks of 0x00010000 bytes each.
==> enter ^C to abort booting within 3 seconds .....


Start to run system initialization task.
M1:TX insert
M2:TX insert
M3:TX insert
[System Configuration]
Company Name        :
Model Name          : SW24F2GB
MAC   Address       : 00:C0:F6:63:0A:2B

Firmware version : 2.01.23 (built at Jul   6 2010 15:49:41)
Username:
---------------------------------------------------------------------------------------------------
```

<< User Modes >>
There are two user modes for the switch - one is administrator mode (privileged mode), another is guest mode (normal mode).

[administrator mode]
The default user name and password is "**admin**" / "**admin**".

After login the switch, a prompt will be shown. Because this switch supports command-line for console interface, you can press "**?**" to check the command list first.

With “**?**” command, you can find the command list as follow.

```
-------------------------------------------------------------------------------------------
# ?
   exit                    Exit from current mode
   help                     Show available commands
   history                 Show a list of previously run commands
   logout                   Disconnect
   ping                     Sends ICMP echo packets to other network nodes
   quit                    Quit commands
   reload                   Halts and performs a warm restart
   show                      Shows information
   calendar                 Data and time information
   configure               Enter configuration mode
   copy                     Copies from one file to another
#
-------------------------------------------------------------------------------------------
```

These are the basic system commands for the switch.

For system configuring, “**configure**” command can enter the configure mode. And the prompt will become ...

```
-------------------------------------------------------------------
# configure
  (config)#
-------------------------------------------------------------------
```

In the configure mode, the general configuration of switch can be done. And “exit” command can leave this mode.

If settings for port, “**interface**” command is used. And the prompt will become ...

```
-------------------------------------------------------------------
  (config)# interface ethernet 1/5
  (config -if)#
-------------------------------------------------------------------
```

“ethernet 1/5” means Ethernet interface 1, port 5. And “exit” command can leave this mode.

“interface” command has another sub-command “**vlan**”. IP address of the switch can be configured in this mode.

```
-------------------------------------------------------------------
  (config)# interface vlan 10
  (config -if)#
-------------------------------------------------------------------
```

[guest mode]

If “**guest**” / “**guest**” is used for username / password, the console inerface will enter guest mode. Its prompt is ended with “**>**”. With “**?**” command, you can find the command list as follow.

```
-------------------------------------------------------------------------------------------
> ?
   exit                    Exit from current mode
   help                    Show available commands
   history                 Show a list of previously run commands
   logout                  Disconnect
   ping                    Sends ICMP echo packets to other network nodes
   quit                    Quit commands
   show                    Shows information
>
-------------------------------------------------------------------------------------------
```

In guest mode, it is allowed to view the switch configuration only. No setup/ configure commands are supported.

<< Function Keys >>

Here is the function keys for console interface.

[**Tab**] key: this key can help to get the full command keyword with just several beginning letters. For example, “cal-Tab” will get the full “calendar” command word.
[**Esc**] key: this key can use to break message display and go back to command prompt.
[**Up-Arrow**] key: this key can get last input command.
[**Down-Arrow**] key: this key can get next input command.
[**Left-Arrow**]/[**Right-Arrow**] key: the key can move the cursor.
[**Backspace**] key: this key can delete the letter in front of cursor
[**?**] key: this key can get the command list.

<< Command Mode >>

There are four command modes for console interface.

1. **General Basic Commands**
   These are basic commands after login. Users can show switch configueartion/status, ping network device, reboot switch, ... The prompt is “SW24F2GB #” for admin user, and “SW24F2GB >” for guest user.

2. **Configure Mode Commands**
   With “configure” command, user can enter Configure Mode. Commands in Configuring Mode are for general switch settings. And its prompt is “**(config)#**”.

3. **Interface Configuring Commands for Port / VLAN Group**
   If the settings are for ports, it is done with “interface ethernet 1/x” command in configure mode. And the prompt will become “**(config-if)#**”. For example,

"interface ethernet 1/5" is for settings on Port 5.

If the settings are for VLAN group, it is done with "interface vlan x" command in configure mode. And the prompt will become "**(config-if)#**". For example, "interface vlan 100" is for settings on VLAN 100.

4. VLAN Configuring Commands

If the settings are general VLAN settings, it is done with "vlan database" command in configure mode. And its prompt will become "**(config-vlan)#**".

6.2.2 General Basic Commands

When “admin” / “admin” is used for username/password, the console will enter administrator mode. Enter “?”, command list will be shown.

```
-----------------------------------------------------------------------------------------------
# ?
   exit                    Exit from current mode
   help                     Show available commands
   history                 Show a list of previously run commands
   logout                   Disconnect
   ping                     Sends ICMP echo packets to other network nodes
   quit                    Quit commands
   reload                   Halts and performs a warm restart
   show                      Shows information
   calendar                 Data and time information
   configure               Enter configuration mode
   copy                     Copies from one file to another
#
-----------------------------------------------------------------------------------------------
```

1. **exit** command
   This command is used to leave current operation mode. It will do logout at this basic command interface.

2. **help** command
   This is a help command and the console will prompt with all available commands.

3. **history** command
   This command will show the history of entering commands.

4. **logout** command
   This is a logout command.

5. **ping** command
   User can use this command to ping another network device to verify the network connection and activity. (It is similar to the ping command in MS-DOS.)

   Enter “ping ?” at the prompt, the command syntax will be shown.

```
# ping ?
Syntax: ping [-n count] [-l length] [-t] [-w timeout] ip
-n count    : Number of echo requests to send.
```

-l length : Send buffer size, and length is between 64~8148
-t : Ping the specified host until stopped by <ESC> key.
-w : Timeout in milliseconds to wait for each reply.
ip : IP address (xxx.xxx.xxx.xxx)

For example, “ping 192.168.1.80”. “Esc” can be used to break continuous ping operation.

6. **quit** command
This command is used to quit the console interface.

7. **reload** command
This command is used to reset switch. It will halt and perform a warm restart.
Enter “reload” at the prompt, you will be asked to confirm the action.
reload
Are you sure to reset switch now?(Y/N)

If “y” is entered, the switch will reboot. If “n” is entered, just leave and no any action will go.

8. **show** command
This command is used to show current system information and system configuration.

Enter “show ?” at the prompt, the sub-command list will be shown.
show ?

aaa	Show AAA service configuration
access-list	Packet Access Control List
address-binding	Address binding
calendar	Date and time information
dhcp-relay	DHCP Relay Configuration
dot1x	802.1x content
gvrp	GVRP configuration
history	History information
interface	Interface information
ip	IP information
lacp	LACP statistics
line	TTY line information
lldp	Show lldp Configuration
log	Log records
mac-address-table	Configuration of the address table
mac-security	MAC Security Configuration
management	Management IP filter
map	Maps priority
mvr	Show MVR Status
port	Port characteristics
protected-port	Protected port Configuration
queue	Priority queue information
radius-server	RADIUS server information

```
running-config      Information on the running configuration
rate-limit          rate-limits
rmon                rmon
snmp                Simple Network Management Protocol statistis
sntp                Simple Network Time Protocol configuration
spanning-tree       Spanning-tree configuration
system              System information
trunk               Trunk information
version             System hardware and software versions
vlan                Virtual LAN settings
```

With sub-commands, function configuration settings will be displayed.
And more help information for functions will be prompted with “show xxxx ?” (xxxx is the sub-command). For example, entering “show ip ?” will get the prompt message...

```
# show ip ?
  dhcp              DHCP snooping
  igmp              IGMP snooping
  interface         Interface information
  redirects         Default gateway configured for this device
```

And entering “show ip igmp ?” will get next help message...

```
# show ip igmp ?
  snooping          IGMP snooping configuration
```

And entering “show ip igmp snooping” will get the IGMP settings...

```
# show ip igmp snooping
IGMP Status:                    Disable
IGMP Querying:                  Disable
Unregistered IPMC Flooding:Disable
IGMP Filtering:                 Disable
IGMP Query Interval:            125     seconds
IGMP Report Delay:              15      seconds
IGMP Query Timeout:             255     seconds
```

If the display is more than one console page, “Esc” can be used to break the display.

For the details, please refer to section **6.2.6 Show commands**.

9. **calendar** command

This command is used to set the system time. It is entered in <hour minute second month day year> order.
For example,

```
# calendar set 10 30 0 october 15 2008
# show calendar
Current Time : 2008/10/15-10:30:18
```

It is 18 seconds passby after the setting command.

10. **configure** command

This command will change the console interface to configure mode. And the prompt will become "(config)#". In this mode, administrator can do system configuration of the switch.

The operation of configure mode will be described in next section.

"exit" command can be used to quit this operation mode.

11. **copy** command

This command is used to backup system configuration/firmware to TFTP server, restore system configuration from TFTP server, and update firmware from TFTP server.

```
# copy ?
  binary-config          Copies binary configuration file
  config                 Copies configuration file
  firmware               Copies run-time firmware
```

copy binary-config running-config tftp xxx.xxx.xxx.xxx yyy command is used to backup current switch running configuration to TFTP Server at IP "xxx.xxx.xxx.xxx" as file name "yyy" in binary format.

copy binary-config tftp running-config xxx.xxx.xxx.xxx yyy command is used to restore binary configuration file "yyy" from TFTP Server at IP "xxx.xxx.xxx.xxx".

copy config running-config tftp xxx.xxx.xxx.xxx yyy command is used to backup current switch running configuration to TFTP Server at IP "xxx.xxx.xxx.xxx" as file name "yyy" in text format.

copy config tftp running-config xxx.xxx.xxx.xxx yyy command is used to restore text configuration file "yyy" from TFTP Server at IP "xxx.xxx.xxx.xxx".

copy firmware running-firmware tftp xxx.xxx.xxx.xxx yyy command is used to backup current running firmware to TFTP Server at IP "xxx.xxx.xxx.xxx" as file name "yyy" in binary format

copy firmware tftp running-firmware xxx.xxx.xxx.xxx yyy command is used to update the running firmware file "yyy" from TFTP Server at IP "xxx.xxx.xxx.xxx".

6.2.3 Configure Mode Commands

Entering "**configure**" command at console interface, the prompt will become ... "(config)#".
All the general settings for the switch can be done in this mode.

If the settings are for ports, it is done with "interface" command in configure mode. For example, "interface ethernet 1/5" is for settings on Port 5 and "interface ethernet 1/5,6,10-15" is for settings on Port 5, 6, 10, 11, 12, 13, 14, 15. Please refer to next section for the details of this command.

Enter "?" at the prompt, the sub-command list will be shown.

```
-------------------------------------------------------------------------------------------
(config)# ?
  exit                 Exit from current mode
  help                 Show available commands
  history              Show a list of previously run commands
  logout               Disconnect
  quit                 Quit commands
  aaa                  AAA Service
  access-list          Set Packet Access Control List
  address-binding      Address Binding
  automode             Set Auto Negotiation or Auto Detect mode
  default              Restore to factory default setting
  dhcp-relay           DHCP relay setting
  dot1x                Configures 802.1x port-based access control
  end                  Exit from configure mode
  hostname             Sets system's network name
  interface            Enters privileged interface configuration
  ip                   Global IP configuration sub commands
  lacp                 Configures LACP status
  lldp                 LLDP setting
  logging              Modifies message logging facilities
  mac-address-table    Configuration of the address table
  mac-security         Configuration of mac security
  management           Specifies management IP filter
  map                  Maps priority
  mirror               Configuration of mirror
  mvr                  Multicast VLAN Registration
  no                   Negates a command or sets its defaults
  prompt               Sets system's prompt
  protected-port       Configuration of Protected Port
  qos                  Configuration of QoS
  queue                Assigns priority queues
  radius-server        Configures login to RADIUS server
  rate-limit           Configures rate-limits
  rmon                 Configures RMON function
  snmp-server          Modifies SNMP server parameters
  sntp                 Simple Network Time Protocol configuration
  spanning-tree        Configures spanning tree parameters
  storm-control        Configures storm control
```

```
  trunk                Configures trunk function
  username              Establishes user name authentication
  vlan                 Switch Virtual LAN interface
  watchdog              Set watchdog function to be enabled
-------------------------------------------------------------------------------------------
```

1 **exit** command
This command is used to leave current operation mode. Go back to last mode.

2 **help** command
This command is used to show all the available commands in this mode.

3 **history** command
This command is used to show the history of entering commands.

4 **logout** command
This command is used to logout from console interface.

5 **quit** command
This command is used to quit from console interface. It has the same function as logout.

6 **aaa** command
This command is used to set the authentication manner for administrator of the switch when login by http(s)/telnet for management. It could be authenticated by local switch or by RADIUS Server.

Here is the command for the setting.
aaa authentication login local command will set the authentication manner for administrator by local switch when login by http(s)/telnet for management.
aaa authentication login radius command will set the authentication manner for administrator by RADIUS Server when login by http(s)/telnet for management.
aaa authentication login local radius command will set the authentication manner for administrator by local switch first when login by http(s)/telnet for management. If authentication fail, try by RADIUS Server next.

RADIUS Server is set by **radius-server** command for command line interface or set in 802.1x function for web interface.

7 **access-list** command

This command is used to configure ACL(access control list) function of the switch. For ACL settings, two steps for the settings ...

1). Filtering rule must be defined first. It could be Layer2 ~ Layer4 content of packets - Mac address, VLAN ID, Ethernet Type, IP address, Service Port, ...
Note: More than one filter matching conditions can be set for one rule. And all of these conditions must be matched for this rule to take action.

2). Define the action when packets match the rule - permit or discard or forward to other port with "frame" command, and do rate limit with "rate" and "rate-unit" commands in ACL configuring mode.

With "access-list ?" command , the sub-commands will be shown.

```
(config)# access-list ?
  <1-256>                Define Rule#
  <cr>                   Enable ACL Function
```

access-list command can enable ACL function. And "**no access-list**" can disable ACL function.

access-list x command will change the command prompt to "**(config-acl-x)#**" for ACL setting for this filtering rule. "**x**" is the index number of this rule.
After ACL rules are defined, apply connection ports to ACL rules with "access-list" command in port interface configuring mode (prompt "(config-if)**#**") next.

Enter "?" at the prompt, the sub-command will be shown.

For example,

```
(config)# access-list 10
(config-acl-10)# ?
  exit                      Exit from current mode
  help                      Show available commands
  history                   Show a list of previously run commands
  logout                    Disconnect
  quit                      Quit commands
  active                    Specify the rule to be actived
  destination-ip            Specify destination ip address
  destination-mac           Specify destination mac address
  destination-socket-port Specify destination socket port number
  ethernet-type             Specify ethernet type
  frame                     Specify frames action
  ip-protocol               Specify ip protocol
  l2-frame                  Specify l2 frame
  l3-frame                  Specify l3 frame
  l4-frame                  Specify l4 frame
  name                      Specify rule's name
  no                        Negates a command or sets its defaults
  rate                      Specify rule's rate
  rate-unit                 Specify rule's rate unit
  source-ip                 Specify source ip address
  source-mac                Specify source mac address
```

```
source-socket-port     Specify socket port number
tagged                 Specify tagged/untagged frames tagged
vid                    Specify vlan id
```

Here is the details of these sub-commands.

1). **exit** : this command is used to exit the ACL setting.

2). **help** : this command will show all of the help message of these sub-commands.

3). **history** : this command will list the input command history.

4). **logout** : this command will logout from the command line interface.

5). **quit** : this command will quit from the command line interface.

6). **active** : this command will activate this ACL rule. "no active" will disable it.

7). **destination-ip** and **source-ip** : this command is used to set L3 destination/source IP address of packet for filter matching.
destination-ip any
destination-ip xxx.xxx.xxx.xxx y
source-ip any
source-ip xxx.xxx.xxx.xxx y
It could be "any" or some IP address "xxx.xxx.xxx.xxx" with subnet mask y (y=1~32). For example, "destination-ip 192.168.1.100 32" will set the packet matching for this destination IP address.

8). **destination-mac** and **source-mac** : this command is used to set L2 destination/source Mac address of packet for filter matching.
destination-mac any
destination-mac x-x-x-x-x-x y-y-y-y-y-y
source-mac any
source-mac x-x-x-x-x-x y-y-y-y-y-y
It could be "any" or some Mac address "x-x-x-x-x-x" with bit-mask y-y-y-y-y-y. For example, "destination-mac 00-00-e2-82-c8-e9 ff-ff-ff-ff-ff-ff" will set the packet matching for this destination Mac address. (If bit-mask is "ff-ff-ff-00-00-00", only the first three bytes will be checked.)

9). **destination-socket-port** and **source-socket-port** : this command is used to set L4 destination/source service port of packet for filter matching.
destination-socket-port any
destination-socket-port x
source-socket-port any
source-socket-port x
It could be "any" or some service port x. For example, "destination-socket-port 80" will set the packet matching for service port 80(http).

10). **ethernet-type** : this command is used to set L2 Ethernet Type of packet for filter matching.

```
(config-acl-10)# ethernet-type ?
  any                  Define Ethernet Type to any
  ip                   Define Ethernet Type to IP
  ipx                  Define Ethernet Type to IPX
  arp                  Define Ethernet Type to ARP
  rarp                 Define Ethernet Type to RARP
  apple-talk           Define Ethernet Type to Apple Talk
  decnet               Define Ethernet Type to DECNet
```

```
sna                     Define Ethernet Type to SNA
<0000-FFFF>             Define Ethernet Type (Hex)
```

Select one of the Ethernet Type or give the Ethernet Type number directly for packet filter matching.

11). **frame** : this command is used to define the action for packets matching this filter rule. It could be permit it, deny it, or forward it to some other port.

```
(config-acl-10)# frame ?
  permit                Define permit frames
  deny                  Define deny frames
  forward               Define forward frames
```

12). **ip-protocol** : this command is used to set L3 IP Protocol of packet for filter matching.

```
(config-acl-10)# ip-protocol ?
  any                   Define IP protocol to any
  tcp                   Define IP protocol to TCP
  udp                   Define IP protocol to UDP
  icmp                  Define IP protocol to ICMP
  egp                   Define IP protocol to EGP
  ospf                  Define IP protocol to OSPF
  rsvp                  Define IP protocol to RSVP
  igmp                  Define IP protocol to IGMP
  igp                   Define IP protocol to IGP
  pim                   Define IP protocol to PIM
  <0-255>               Define IP protocol to Others (Dec)
```

Select one of the IP Protocol or give the IP Protocol number directly for packet filter matching.

13). **l2-frame** : this command is used to set L2 frame of packet for filter matching.

```
(config-acl-10)# l2-frame ?
  any                   Define L2 frame to any
  ether_ii              Define L2 frame to ether_ii
  ieee_802.2_snap       Define L2 frame to ieee_802.2_snap
  l2_others             Define L2 frame to others
```

Select one of the L2 frame or give the L2 frame type directly for packet filter matching.

14). **l3-frame** : this command is used to set L3 frame of packet for filter matching.

```
(config-acl-10)# l3-frame ?
  any                   Define L3 Frame to any
  ipv4                  Define L3 Frame to IPv4 Frame
  ipv6                  Define L3 Frame to IPv6 Frame
  l3_others             Define L3 Frame Type to L3_others Frame
```

Select one of the L3 frame or give the L3 frame type directly for packet filter matching.

15). **l4-frame** : this command is used to set L4 frame of packet for filter matching.

```
(config-acl-10)# l4-frame ?
  any                   Define L4 frame to any
```

```
tcp                 Define L4 frame to TCP
udp                 Define L4 frame to UDP
icmp-igmp           Define L4 frame to ICMP/IGMP
l4_others           Define L4 frame to L4_others
```

Select one of the L4 frame or give the L4 frame type directly for packet filter matching.

16). **name** : this command is used to set the name of this ACL rule. For example, “name abc”. And “no name” can clear it.

17). **no** : this command is used to disable a setting or clear it.

```
(config-acl-10)# no ?
  active            Specify the rule to be not actived
  name              Delete the rule's name
```

18). **rate** and **rate-unit** : this command is used to set the rate limit for traffic matching this filter rule.

There are two units for rate limit - 62.5Kbps and 1Mbps. The number of rate multiplying the rate-unit gets the rate limit number.

```
(config-acl-10)# rate ?
  <0-1000>          rate[ N*unit, ,N=0=>NO LIMIT]
(config-acl-10)# rate-unit ?
  62.5Kbps          Set Suppression Unit Rate to be 62.5Kbps
  1Mbps             Set Suppression Unit Rate to be 1Mbps
```

19). **tagged** : this command is used to set tagged or untagged packet for filter rule.

tagged any for both tagged and untagged packets (i.e. ignore it)
tagged tagged for tagged packets as the filter matching rule.
tagged untagged for untagged packets as the filter matching rule.

20). **vid** : command is used to set VLAN ID of packet for filter rule.

vid any for ignoring VLAN ID.
vid x for packets tagged with VLAN “x”.

8 **address-binding** command

This command is used to set IP-Mac-Port binding of the switch. This function can do the following applications.

a. IP address access limit on port - only the assigned IP addresses can access network via the port
b. Mac address access limit on port - only the assigned Mac address can access network via the port

   Note: This is similar to the “Accept” function in Mac Security function. And the difference is ...

   - “Accept” function in Mac Security function is done by static Mac address limit on port and the Mac address is allowed for network access on the port only.
   - The Mac address limit here does not have this port limitation and the Mac address can access network via other port. But the port allow the assigned Mac address only for network access.

c. IP-Mac addresses access limit on port - only the IP-Mac pair (matched both IP and Mac addresses at the same time) can access network via the port

Two steps to setup this function ...
1). Assign IP/Mac address on port
2). Enable this function on the port

With “address-binding ?”, the sub-commands will be shown.

```
(config)# address-binding ?
  <1-256>                Define address binding
  ethernet               Enable Address binding   of the ports
```

address-binding ethernet 1/x command is used to enable this function on Port “**x**”.
And “**no address-binding ethernet 1/x**” can disable this function on Port x.

address-binding x command is used to set IP and Mac addresses for this function. “**x**” is the index number for IP-Mac-Port binding settings. And the prompt will become “**(config-address-binding-x)#**”.
And “**no address-binding x”** will delete this address binding setting. (“x” is the index number.)

Enter “?”, the commands will be listed.
For example,

```
(config)# address-binding 10
(config-address-binding-10)# ?
  exit                   Exit from current mode
  help                   Show available commands
  history                Show a list of previously run commands
  logout                 Disconnect
  quit                   Quit commands
  mac                      Specify source mac address
  ip                     Specify source ip address
  ethernet               Specify source ports
```

1). **exit** : this command will exit this address-binding setup interface.
2). **help** : this command will list all of the commands with description.
3). **history** : this command will show the history of command input.
4). **logout** : this command will logout from the command line interface
5). **quit** : this command will quit from the command line interface
6). **mac** : this command is used to set the Mac address for access limit on the port.

```
(config-address-binding-10)# mac ?
  any                    Define source MAC address to any
  xx-xx-xx-xx-xx-xx      Define source MAC address
```

mac any will ingore Mac address (no limit on Mac address)
mac x-x-x-x-x-x will assign the Mac address x-x-x-x-x-x
7). **ip** : this command is used to set the IP address for access limit on the port.

```
(config-address-binding-10)# ip ?
  any                    Define source IP address   to any
  A.B.C.D                Define source IP Address
```

ip any will ingore IP address (no limit on IP address)
ip x.x.x.x will assign the IP address x.x.x.x

8). **ethernet** : this command is used to assigned the ethernet port for this IP/Mac address binding.
ethernet 1/x command will assign Port x as the binding port.

9 **automode** command
With the command, user can select the operation mode of port when "auto" is set to disabled.

For "Auto Negotiation" mode, the switch will disable port auto-negotiation function when the auto function of port (in Port Configuration setting) is disabled.

For "Auto Detect" mode, the switch will always keep port auto-negotiation function ON but just modify its attribution if auto function of port (in Port Configuration setting) is disabled.

For applications, you should select "Auto Detect"mode if the connected device is auto-negotiation enabled. (For example, customer's PC is auto-negotiation enable and you want to set his network connection to work at 10Mbps.)
And you can select "Auto Negotiation"mode if the connected device is auto-negotiation disabled (it is called forced mode, sometimes). Some old TX-FX Converters needs to work in this mode because FX supports 100/Full forced mode only. For most applications, "Auto Detect" mode is OK.

With "automode ?", the sub-commands will be shown.

```
(config)# automode ?
  detect                Auto Detect mode
  negotiation           Auto Negotiation mode
```

automode detect command will set it to auto-detect mode.
automode negotiation command will set it to auto-negotiation mode.

10 **default** command
This command is used to restore factory default settings. Before start it, a confirm message wil be prompted.

11 **dhcp-relay** command
This command is used to configure DHCP Relay and DHCP Option 82 function.
Note: The DHCP-Relay function here does not support relay between different IP subnets. But it supports relay cross VLANs. (If only "one port in a VLAN", the switch will not do DHCP Relay for the port. That is a limitation.)

DHCP Relay function can relay DHCP requests to a specified DHCP server. That can prevent illegal DHCP server problem in network.

And DHCP Relay Option 82 function will add the following information to DHCP

request packet.

1. Port number that DHCP request packet comes from
2. VLAN ID for this DHCP request
3. Mac address of the switch
4. A additional string as information. (*Adding the information string must be enabled first.)

And DHCP server will assign IP configuration according to the information in Option 82.

Note: Not every DHCP server supports Option 82 function. If DHCP server does not support it, please disable Option 82 function and use DHCP Relay only.

Here is the Option 82 definition of the switch.

1. Circuit ID sub-option setup information for DHCP server :
   <Format>
   [Slot ID/1-Byte] [Port ID/1-Byte] [VLAN ID/2-Bytes] [Information/X-Bytes]
   Slot ID - plase set to "0".
   Port ID - please set according to the port number of the switch.
   VLAN ID - please set according to its VLAN ID.
   Information - this is a string with variable length
   For example, "000500c8" means Slot ID 0, Port 5, VLAN ID 200, no information. All of the numbers are hexadecimal numbers.
2. Remote ID sub-option setup information for DHCP server :
   <Format>
   [Mac Address/6-Bytes]
   Mac Address - this is the Mac Address of the switch. For example, "000000828ce6" in hexadecimal numbers.

If the Option 82 of DHCP request meets these settings, DHCP server will assign the IP configuration according to this Option 82 content.

Entering "dhcp-relay ?", the sub-commands will be shown.

```
(config)# dhcp-relay ?
  helper-address      Specify DHCP servers' IP addresses
  information         Specify a additional information for DHCP Option 82
  option              Enable to add the additional information to Option 82
  relay-option82      Enable DHCP ralay Option 82
  <cr>                Enable DHCP relay
```

dhcp-relay command is used to enable DHCP Relay function. "**no dhcp-relay**" command is used to disable it.

dhcp-relay relay-option82 command is used to enabled Option 82 function. "**no dhcp-relay relay-option82**" command is used to disable it.

dhcp-relay helper-address xxx.xxx.xxx.xxx command is used to assign the DHCP server for DHCP Relay operation. "**xxx.xxx.xxx.xxx**" is the IP address of DHCP server. "**no dhcp-relay helper-address**' command will clear the IP address.

dhcp-relay option command is used to enable adding the additional string to Option 82. "**no dhcp-relay option**" command is used to disable it.

dhcp-relay information xxx command is used to specify the additional information string for DHCP Option 82 operation. "**xxx**" is the string. "**no dhcp-relay information**" command will clear the setting.

12 **dot1x** command

This command is used configure the general settings of 802.1x function of the switch. Entering "dot1x ?", the sub-commands will be shown.

```
(config)# dot1x ?
  authcount              Set 802.1x Re-authentication Max Count
  dynamic-vlan           VLANs are assigned based on a MAC address
  guest-vlan             Migrating end users to an 802.1X environment and for delivering
                         limited services to unauthorized users
  mac-based              Enables/disables MAC based 802.1x
  max-req                Max EAP request/identity packet retransmissions
  re-authentication      Forces re-authentication on all ports/interfaces
  system-auth-control    Enables/disables port based 802.1x to change port modes
  timeout                Timeout value
  transparent            Transparent 802.1x packets
```

dot1x authcount x command is used to set max count for re-authentication request in the re-authentication process. If the max count is met, it will become un-authentication state. The valid value of "**x**" is 1~10.

dot1x dynamic-vlan command is used to enable Dynamic VLAN function for 802.1x operation. If it is enabled, the switch will assign the user to the VLAN assigned from RADIUS server. And **no dot1x dynamic-vlan** command can be used to disable it.

dot1x guest-vlan x command is used to enable and select the VLAN for users fail to authenticated by RADIUS server. "**x**" is the VLAN ID. And **no dot1x guest-vlan** command can be used to disable it.

dot1x mac-based command is used to set 802.1x operation mode as Mac-based instead of Port-based. And **no dot1x mac-based** command will set it back to Port-based.

dot1x mac-based reauth command will release current authenticated users and ask users to do re-authentication.

dot1x max-req x command is used to set max request timeout count between the switch and RADIUS server before authentication fail. The valid value of "**x**" is 1~10.

dot1x re-authentication command is used to force re-authentication on all ports.

dot1x system-auth-control command is used to enable 802.1x function on the switch. And **no dot1x system-auth-control** command can be used to disable it.

dot1x timeout ... command is used to setup timeout values in 802.1x operation.

Entering “dot1x timeout ?”, the sub-command will be shown.

(config)# dot1x timeout ?

quiet-period	Time after Max Request Count before gets new client
re-authperiod	Time after connected client must be re-authenticated
server-period	Time after an authenticator sends a RADIUS Access-Request packet to the authentication server
supplicant-period	Time after an authenticator sends an EAP-Request/ MD5 Challenge frame to a supplicant
tx-period	Time switch waits before re-transmitting EAP packet

dot1x timeout quiet-period x command is used to set the quiet time value between the switch and the user before next authentication process when authentication fail. The valid value of “**x**” is 0~65535.

dot1x timeout re-authperiod x command is used to set the timeout period for doing re-authentication process. The valid value of “**x**” is 0~65535.

dot1x timeout server-period x command is used to set the request timeout value between the switch and RADIUS server. The valid value of “**x**” is 0~65535.

dot1x timeout supplicant-period x command is used to set the timeout value between the switch and users (called “supplicant” in 802.1x) after first identification. The valid value of “**x**” is 0~65535.

dot1x timeout tx-period x command is used to set the timeout value for the identification request from the switch to users. The request will be re-tried until the ***authcount*** is met. After that, authentication fail message will be sent. The valid value of “**x**” is 0~65535.

dot1x transparent command is used to set the switch to transparent mode. And packets for 802.1x operation will just be forwarded by the switch.

Note:

1. Setting 802.1x function on ports, use “dot1x” command in interface configuring mode.
2. Setting for RADIUS server, use “radius-server” command.

Please refer to sections for the commands.

13 **end** command

This command is used to exit from configure mode.

14 **hostname** command

This command is used to set the name of the switch in network. This name is also used as the hostname for SNMP agent function of the switch.

15 **interface** command

This command is used to entering **interface configuring mode**. There are two sub-commands for it - one is “ethernet”, it is for port setting, another is

"vlan", it is for VLAN groups characteristics setting.

```
(config)# interface ?
  ethernet                Ethernet port
  vlan                    Switch Virtual LAN interface
```

All the port setting commands are put in interface configuring mode - like rate-limit setting, speed-duplex setting, ... And characteristics settings for VLAN groups are also done in interface configuring mode - like IP address assignment.

For example, the console will enter interface configuring mode for Port 5 with "interface ethernet 1/5" command. And the prompt will become ...

```
(config)# interface ethernet 1/5
(config-if)#
```

With "interface ethernet 1/5,6,10-13", the console will enter interface configuring mode for Port 5, 6, 10, 11, 12, 13. And all the settings will be applied to those ports at the same time.

The description of commands in interface configuring mode is put in Section **6.2.4 Interface Configuring Commands**. Please refer to the section for the details.

16 **ip** command

This command is used to configure some IP-depending functions. Entering "ip ?", the sub-commands will be shown.

```
(config)# ip ?
  default-gateway         Specifies the default gateway
  dhcp                    DHCP snooping
  http                    HTTP server configuration
  igmp                    IGMP protocol
```

ip default-gateway x.x.x.x command is used to specify the default gateway of IP configuration of the switch. x.x.x.x is the IP address of the gateway device.

ip dhcp snooping ... command is used to configure DHCP Snooping function of the switch. Entering "ip dhcp snooping ?", the sub-command will be shown.

```
(config)# ip dhcp snooping ?
  database                Enable Write delay
  delaytime               Write delay time for dhcp snooping Configuration
  filename                Filename for dhcp snooping Configuration
  agentip                 Agent IP address for dhcp snooping Configuration
  timeout                 Timeout for dhcp snooping Configuration
  renew                   Download dhcp snooping table from tftp server
  <cr>
```

ip dhcp snooping command is used to enable DHCP Snooping function. And **no ip dhcp snooping** command is used to disable it.

The following sub-command is used to configure database function for DHCP snooping table. The switch will save DHCP snooping table to a TFTP server after a time delay(interval) to prevent data loss if power is off. And administrator can load it back when switch is reboot or power on. And this function could be enabled/disabled.

ip dhcp snooping database command is used to enable database function for DHCP snooping table. And **no ip dhcp snooping database** command is used to disable it.

ip dhcp snooping delaytime command is used to set the delay time (interval) for update data to database of DHCP snooping table.

ip dhcp snooping filename command is used to set the file name of the database of DHCP snooping table in TFTP server.

ip dhcp snooping agentip command is used to set the IP address of the TFTP server for the database of DHCP snooping table.

ip dhcp snooping timeout command defines the timout setting for communicating with the TFTP server.

ip dhcp snooping renew command will get DHCP snooping table from the database in TFTP server.

ip http ... command is used to configure http service of the switch.
Entering "ip http ?", the sub-command will be shown.

```
(config)# ip http ?
  secure-server          Enable secure HTTP server
  server                 Enable HTTP server
```

ip http secure-server command is used to enable the SSL function of http service (https) of the switch. And **no ip http secure-server** command can be used to disable it.

ip http server command is used to enable http service of the switch. And **no ip http server** command can be used to disable it.

Because hacker or worm/virus (like ColdRed) often attacks http server, this command is provided to enable/disable http service to prevent it. (If this switch is installed in public Internet without any firewall protection, we suggest users to disable the http interface and use Telnet or SNMP instead.)

ip igmp ... command is used to configure IGMP operation of the switch. Entering "ip igmp snooping ?", the sub-command will be shown.

```
(config)# ip igmp snooping ?
  filtering                Enable IGMP filtering
  mrouter                  Multicast router
  query                    Enable IGMP query function
  query-interval           Configures query interval
  query-max-response-time Configures the report delay
  router-port-expire-time Configures router port expire time
  unregflood               Enable IGMP unregister flood function
  <cr>
```

ip igmp snooping command is used to enable IGMP snooping function of the switch. And **no ip igmp snooping** command can be used to disable it.

ip igmp snooping filtering command is used to enable IGMP filtering function. The IGMP filtering function can limit the IP multicast address range

working on a port. The IP multicast address ranges are defined in profiles. For example, define a profile "A1" with IP multicast address 224.0.1.10 ~ 224.0.1.20. And assign "A1" on Port 5 for IP multicast address filtering operation. That will limit only IP mulitcast traffic in 224.0.1.10 ~ 224.0.1.20 to be forwarded on Port 5. (Assigning profile to port is done with "ip igmp snooping filtering profile xxx" command under (config-if)# prompt.)

ip igmp snooping filtering profile xxx start-address y.y.y.y end-address z.z.z.z command is used to create a profile. "**xxx**" is the profile name. "**y.y.y.y**" is the start of IP multicast address range. "**z.z.z.z**" is the end of IP multicast address range. For example, "ip igmp snooping filtering profile A1 start-address 224.0.1.10 end-address 224.0.1.20".

ip igmp snooping mrouter ethernet 1/x command is used to set the port that connecting to the IP Multicast router (the IGMP active device). "**x**" is the port number.

ip igmp snooping query command is used to enable the IGMP query function. And **no ip igmp snooping query** command can be used to disable it.

ip igmp snooping query-interval x command is used to set the IGMP query time interval if query function is enabled. "**x**" is the time interval, and its valid value is 60-125.

ip igmp snooping query-max-response-time x command is used to set the maximum response time for query operation. "**x**" is the time interval, and its valid value is 5-25.

ip igmp snooping router-port-expire-time x command is used to set the time interval of router port expire time. "**x**" is the time interval, and its valid value is 255-500.

ip igmp snooping unregflood command is used to enable IGMP unregister traffic flooding function. And **no ip igmp snooping unregflood** command can be used to disable it. If it is enable, the unregistered (not joined) IP multicast traffic will be flooded to every port. If it is disable, the unregistered (not joined) IP multicast traffic will be discarded.

17 **lacp** command

This command is used to configure LACP function of the switch. Entering "lacp ?", the sub-commands will be shown.

```
(config)# lacp ?
  system-priority        Combined with MAC address to form LAG identifier
```

lacp system-priority x command is used to configure the system priority for LACP operation of the switch. Its value is 1~65535 and higher numbers have lower priority. Combining with the Mac address of the switch, it is used to identify this switch in LACP protocol operation.

Adding ports to LACP trunk group is by "lacp" command in "Interface Configuring Commands for Port". Please refer to Section 6.2.4.1 for the details.

18 **lldp** command

This command is used to configure LLDP (Link Layer Discover Protocol) function. LLDP protocol is used by network devices to advertise their identity, capabilities, and interconnections on a LAN network. This switch also can read and show the LLDP information from other connected LLDP-enabled devices.

Entering "lldp ?", the sub-commands will be shown.

```
(config)# lldp ?
  port_description        Transmit Port Description
  system_name             Transmit System Name
  system_description      Transmit System Description
  system_capabilities     Transmit System Capabilities
  management_address      Transmit Management Address
  interval                Specify transmit interval
  tx_hold                 Specify hold time multiplier
  tx_delay                Specify delay interval
  reinit_delay            Specify reinit delay
  <cr>                    Enable lldp
```

lldp command will enable this function. And **no lldp** command can be used to disable it.

lldp port_description command will enable the switch to send port description by LLDP protocol. It is the ifDescr object of rfc2863 (Interface Group MIB). And **no lldp port_description** command can be used to disable it.

lldp system_name command will enable the switch to send system name of the switch by LLDP protocol. It is the sysName object of rfc3418 (MIB for SNMP). And **no lldp system_name** command can be used to disable it.

lldp system_description command will enable the switch to send system description of the switch by LLDP protocol. It is the sysDescr object of rfc3418 (MIB for SNMP). And **no lldp system_description** command can be used to disable it.

lldp system_capabilities command will enable the switch to send system capability of the switch by LLDP protocol. It is "Bridge" for the switch. And **no lldp system_capabilities** command can be used to disable it.

lldp management_address command will enable the switch to send IP address of the switch by LLDP protocol. And **no lldp management_address** command can be used to disable it.

lldp interval x command is used to set the periodic transmit interval of LLDP protocol advertisements. "**x**" is the time interval and its range is 5~32768 seconds and default is 30 seconds. The rule limit for the value is "(interval) x (tx_hold) ≤ 65536.

lldp tx_hold x command is used to set the valid time for the LLDP information sent by the switch. "**x**" is the hold time and its range is 2~10 seconds and default is 4 seconds. The rule limit for the value is "(interval) x (tx_hold) ≤ 65536.

lldp tx_delay x command is used to set the transmit delay between the successive LLDP advertisements caused by a change in local LLDP MIB variables. "**x**" is the delay time and its range is 1~8192 seconds and default is 2 seconds. The rule limit for the value is "4 x (tx_delay) ≤ (tx_interval).
lldp reinit_delay x command is used to set the re-initialization delay time after LLDP port is disabled or link down. "**x**" is the delay time and its range is 1~10 seconds and default is 2 seconds. When LLDP is re-initialized on a port, all the information about it in remote system will be deleted.

LLDP function can be set to disable, tx_only, rx_only, or tx_and_rx on each port. It is set in the interface configuring mode and its prompt is "(config-if)#".

19 **logging** command

This command is used to configure logging function of the switch. The logging function can record events at local flash or remote log server. Entering "logging ?", the sub-commands will be shown.

```
(config)# logging ?
  log-level          Log level
  on                   Enable logging to all supported destination
  remote-log         Enable logging to remote host
  clear              Clear logging table information
```

logging log-level x command is used to define the log level of events. The valid value of "**x**" is 0~7.
logging on command is used to enable the logging function. And **no logging on** command is used to disable the logging function.
logging remote-log command is used to configure remote logging function. Entering "logging remote-log ?", the sub-commands will be shown.

```
(config)# logging remote-log ?
  <1-5>              Index
  <cr>
```

logging remote-log command is used to enable the remote logging function. Events will also be sent to syslog servers. **no logging remote-log** command is used to disable it.
logging remote-log x host y.y.y.y command is used to set IP address "y.y.y.y" for syslog server indexed "x". Up to five (x=1~5) syslog servers are supported.

logging clear command is used to clear log table.

20 **mac-address-table** command

This command is used to configure functions for Mac address table of the switch. Entering "mac-address-table ?", the sub-commands will be shown.

```
(config)# mac-address-table ?
  aging-time         Aging time for entries in the address table
  static             Sets MAC address table static information
```

mac-address-table aging-time x command is used to set to aging time of the switch. The valid value of "**x**"(aging time in seconds) is 30-1000000 and 0. If x=0, the aging operation will be disable.
mac-address-table static x-x-x-x-x-x interface ethernet 1/y command is used to assign a static Mac address x-x-x-x-x-x to Port y of the switch. The static mac address will not be aging out by the switch.

21 **mac-security** command

This command is used to enable Mac address security function (static binding or dynamic limit) on port. "**no mac-security**" command can be used to disable it.

22 **management** command

This command is used to setup management interface security function. The management interface security function can limit the IP / subnet / remote interfaces(http,telnet,snmp) / access right(view,modify) for management from network. Different administrators could have different rights to manage this switch. This is for security of this management switch. (Four user groups are supported for this function.)

Entering "management ?", the sub-commands will be shown.

```
(config)# management ?
  <1-4>                  Index
(config)# management 2 ?
  enable                 Set enable for a specified set
  ipaddr                 Set IP and net mask for a specified set
  mode                   Set mode for a specified set
  protocol               Set protocol for a specified set
```

management x enable command is used to enable the security settings for some user groups ("**x**" is the index of the user group). And **no management x enable** command can be used to disable it. And users in this group are allowed to manage this switch remotely.
management x ipaddr y.y.y.y z.z.z.z command is used to set the IP/subnet for some user groups ("**x**" is the index of the user group, **y.y.y.y** is the IP address, **z.z.z.z** is the IP subnet mask). Users in this IP subnet will belong to this users groups.
management x mode modify/view command is used to set the access right for some user groups ("**x**" is the index of the user group). If "management x mode modify" command, users in this groups have "modify" right for management. If "management x mode view" command, users in this groups have "view" right only.
management x protocol http|snmp|telnet command is used to enable the remote management protocol for some user groups ("**x**" is the index of the user group). More than one protocols can be enabled at the same time - e.g. "management 2 protocol http snmp telnet". And **no management x protocol** command is used to disable all remote management protocols for the user

group.

23 **map** command

This command is used to set the mapping between priority queues and priority values of DSCP and 802.1P. There are four priority queues for each port of the switch. And the priority value of DSCP is 0~63, the priority value of 802.1P(in VLAN tag) is 0~7. The mapping between priority values and the four priority queues are defined here.

Entering "map ?", the sub-commands will be shown.

```
(config)# map ?
  dscp                IP DSCP priority map
  802.1p              802.1p priority map
```

map dscp x y z command is used to define the mapping between DSCP priority values and priority queues. Up to seven DSCP values can be defined for the mapping. "**x**" is the index(0~6) of the seven DSCP values. "**y**" is the DSCP value(0~63). "**z**" is the priority queue - 0:Low / 1:Normal / 2:Medium / 3:High.

map dscp other x command is used to define the mapping between other DSCP values beside the seven indexed values. "**x**" is the priority queue - 0:Low / 1:Normal / 2:Medium / 3:High.

map 802.1p x y command is used to define the mapping between 802.1P priority values and priority queues. "**x**" is 802.1P priority values(0~7). "**y**" is the priority queue - 0:Low / 1:Normal / 2:Medium / 3:High.

24 **mirror** command

This command is used to enable mirror function of the switch. And **no mirror** command can be used to disable mirror function of the switch.

25 **mvr** command

This command is used to configure MVR (Multicast VLAN Registration) function. VLAN function will isolate traffic between VLAN groups. But it will also isolate IP multicast traffic for subscribers in different VLANs. The MVR function allows one multicast VLAN to be shared by subscribers in different VLANs. That can reduce the multicast traffic for VLANs.

** Before configuring MVR function, complete the VLAN setting first

** Using MVR function, you have to enable IGMP snooping function first.

This switch supports three MVR VLANs. They are referred with their VLAN ID. For any MVR setting, you have to assign the VLAN ID in the command.

Entering "mvr x ?", the sub-commands will be shown. "x" is a VLAN ID with number in 2~4094. For example, "mvr 10".

```
(config)# mvr 10 ?
  8021p-priority      Configure 802.1p priority tagging
```

active	Active a MVR VLAN
group	Create a multicast group for MVR VLAN
mode	Set MVR VLAN operation mode
name	Set MVR VLAN name
<cr>	Create a MVR VLAN

mvr x command is used to create a MVR VLAN with VLAN ID "**x**". "**no mvr x**" command is used to delete a MVR VLAN.
mvr x 8021p-priority y command is used to set the 802.1P priority (0~7) for MVR operation. The IGMP control packets for this VLAN will be assigned this priority when tag is added. "**x**" is the MVR VLAN ID. "**y**" is the 802.1P priority value.
mvr x active command is used to set the MVR VLAN to "active" state. "**x**" is the MVR VLAN ID. "**no mvr x active**" command is used to set the MVR VLAN to "inactive" state.
mvr x group yyy start-address m.m.m.m end-address n.n.n.n command is used to create a IP multicast group for the MVR VLAN. After MVR VLAN is created, you can assign IP multicast groups (video channels) to the MVR VLAN. And you can assign more than one IP multicast groups (video channels) to one MVR VLAN. "**x**" is the MVR VLAN ID. "**yyy**" is the name of the IP multicast group. "**m.m.m.m**" is the start IP multicast address. "**n.n.n.n**" is the end IP multicast address. For example, "mvr 10 group abc start-address 224.0.1.1 end-address 224.0.1.2". "**no mvr x group yyy**" command is used to delete the IP multicast group named "yyy" from MVR VLAN "x".
mvr x mode compatible / **mvr x mode dynamic** command is used to set the operation mode of the MVR VLAN. There are two operation modes for this MVR function. One is Dynamic mode. Another is Compatible mode. In Dynamic mode, the switch will send IGMP reports to every MVR source port in the MVR VLAN. In Compatible mode, the switch will not send IGMP reports. "**x**" is the MVR VLAN ID.
mvr x name yyy command is used to assign a name to the MVR VLAN. "**x**" is the MVR VLAN ID. "**yyy**" is the name string.

After MVR VLAN is created, source port of IP multicast traffic and receiver ports of subscribers will be assigned next. Assigning source port and receiver port to MVR VLAN is done in "(config-if)#" mode (go with "interface ethernet 1/x" command. "x" is the port number.) Please refer to "mvr" command in Section 6.2.4.1 for the details.

26 **no** command

This command can do the following settings. And it depends on the command after it.

1) **Disable a function**. For example, "mirror" command can enable the mirror function and "no mirror" command can disable it.

2) **Restore a setting to factory default of the switch**. For example, "ip default-gateway 192.168.1.100" will set the IP gateway of the switch to

192.168.1.100, and “no ip default-gateway” will put it to factory default setting 192.168.1.254.

3) **Clear a setting**. For example, “hostname abc” will set the SNMP host name as “abc”. And “no hostname” will clear this setting.

Entering “no ?”, the sub-commands will be shown.

```
(config)# no ?
  aaa                  AAA Service
  access-list          Set Packet Access Control List
  address-binding      Address binding
  automode             Set Auto Negotiation or Auto Detect mode
  dhcp-relay           Configuration of DHCP relay
  dot1x                Configures 802.1x port-based access control
  hostname             Sets system's network name
  ip                   Global IP configuration sub commands
  lacp                 Configures LACP status
  lldp                 LLDP setting
  logging              Modifies message logging facilities
  mac-address-table    Configuration of the address table
  mac-security         Configuration of mac security
  management           Specifies management IP filter
  map                  Maps priority
  mirror               Configuration of mirror
  mvr                  Multicast VLAN Registration
  protected-port       Configuration of Protected Port
  qos                  Configuration of QoS
  queue                Assigns priority queues
  radius-server        Configures login to RADIUS server
  rate-limit           Configures rate-limits
  rmon                 Configures RMON function
  snmp-server          Modifies SNMP server parameters
  sntp                 Simple Network Time Protocol configuration
  spanning-tree        Configures spanning tree parameters
  trunk                Configures trunk function
  watchdog             Configures watchdog function
```

27 **prompt** command

This command is used to set the prompt word for command line interface.

For example,

```
(config)# prompt AAA
AAA(config)#
```

28 **protected-port** command

This command is used to enable protected-port function. If ports are marked as portected ports, they cannot communicate with each other even they are in the same VLAN. But they can communicate with other non-protected ports if they are in the same VLAN.

protected-port command is used to enable protected-port function. “**no**

protected-port" command can be used to disable it.

Setting ports as protected ports, do it with "protected-port" command in port interface configure mode (go with "interface ethernet 1/x" command ("x" is the port number) and the prompt will become "(config-if)#").

29 **qos** command

This command is used to enable QoS function of the switch. And "**no qos**" can be used to disable it.

The traffic scheduling mode (strict priority - ST or weight round robin - WRR) is selected in "queue" command.

The other QoS settings on ports are configured in "(config-if)#" mode (go with "interface ethernet 1/x" command. "x" is the port number.) Please refer to "qos" command in Section 6.2.4.1 for the details.

30 **queue** command

This command is used to select traffic scheduling mode (strict priority(SP) or weight round robin(WRR)) between the four priority queues of switch. If WRR is selected, weighting of each queue is 8:4:2:1 for High:Medium:Normal:Low queues..

Entering "queue mode ?", the sub-commands will be shown.

```
(config)# queue mode ?
  wrr          Shares bandwidth at the egress ports
  1sp-3wrr     Shares bandwidth at the egress ports and sequential order
  2sp-2wrr     Shares bandwidth at the egress ports and sequential order
  4sp          Services egress queues in sequential order
```

queue mode wrr command is used to select the traffic scheduling mode as WRR. Bandwidth is shared between the four queues with their weighting.

queue mode 1sp-3wrr command is used to select the traffic scheduling mode as 1*SP+3*WRR. That means High priority queue is strict priority and get bandwidth service first. The other three priority queues share the rest bandwidth with their weighting.

queue mode 2sp-2wrr command is used to select the traffic scheduling mode as 2*SP+2*WRR. That means High priority queue and Medium priority queue are strict priority and get bandwidth service first. (But High priority queue first. Then Medium priority queue.) The other two priority queues share the rest bandwidth with their weighting.

queue mode 4sp command is used to select the traffic scheduling mode as 4*SP. That means all the four priority queues are strict priority, but with the the order - High priority queue first, Medium priority queue second, Normal priority queue third, Low priority queue fourth.

31 **radius-server** command

This command is used to configure the settings for RADIUS Server of 802.1x operation. This switch supports two RADIUS Servers for redundant applications.

Entering "radius-server x ?" (x=1 for first RADIUS Server. x=2 for second RADIUS Server.), the sub-commands will be shown.

```
(config)# radius-server ?
  active                Active the RADIUS server
  host                  Specifies the RADIUS server
  key                   Sets the RADIUS encryption key
  port                  Sets the RADIUS server network port
```

radius-server x active command is used to activate RADIUS Server x. "**x**" is 1 or 2.(x=1 for first RADIUS Server. x=2 for second RADIUS Server.)

radius-server x host y.y.y.y command is used to set the IP address of RADIUS Server x for 802.1x operation. "**x**" is 1 or 2.(x=1 for first RADIUS Server. x=2 for second RADIUS Server.). "**y.y.y.y**" is the IP address.

radius-server x key yyy command is used to set the security key to handshake with RADIUS Server x. "**x**" is 1 or 2.(x=1 for first RADIUS Server. x=2 for second RADIUS Server.) "**yyy**" is the key string.

radius-server x port y command is used to set the communication port of RADIUS Server x. "**x**" is 1 or 2.(x=1 for first RADIUS Server. x=2 for second RADIUS Server.) "**y**" is the port number and its valid value is 1~65535.

32 **rate-limit** command

This command is used to define the ingress drop operation when ingress traffic exceeds ingress rate limit. When ingress traffic rate exceeds Ingress Rate Limit, the switch will drop packets or pause the traffic. If packet drop is enabled, flow control of ports will be disabled and packets could be dropped. If packet drop is disabled, flow control of ports will be enabled and pause frame will be sent when ingress traffic rate exceeds the limit.

rate-limit packet-drop command is used to enable ingress drop operation when ingress traffic exceeds ingress rate limit.. "**no rate-limit packet-drop**" command can be used to disable it.

33 **rmon** command

This command is used enabled RMON function of the switch. This switch supports RMON groups 1,2,3,9 for remote traffic monitor. "**no rmon**" command can disable it.

34 **snmp-server** command

This command is used to configure SNMP operation of the switch.

Entering "snmp-server ?", the sub-commands will be shown.

```
(config)# snmp-server ?
  <1-5>                 Index of Trap
  community             Defines SNMP community access string
  contact               Sets the system contact string
  location              Sets the system location string
  username              Sets the snmpv3 user informations
  version               Sets the snmp version
```

snmp-server community get xxx command is used to set the community string of get command for SNMP operation. "**xxx**" is the community string.
snmp-server community set xxx command is used to set the community string of set command for SNMP operation. "**xxx**" is the community string.
snmp-server contact xxx command is used to set the contact information for this switch. "**xxx**" is the contact information string.
snmp-server location xxx command is used to set the location information for this switch. "**xxx**" is the location information string.
snmp-server version x command is used to select the SNMP operation version. "**x**" could be **v1**, **v2c**, **v3**, **v3v2c**, **v3v2cv1**.

The following commands are for SNMPv3 function.
snmp-server username xxx securitylevel y command is used set security level of user xxx. "**xxx**" is the user name. "**y**" could be **noauth**, **auth**, or **priv**.

- "noauth" : no authentication, no encryption
- "auth" : do authentication, no encryption
- "priv" : do authentication and encryption(by DES)

snmp-server username xxx authentication y command is used to set the authentication manner. "**xxx**" is the user name. "**y**" could be **md5**or **sha**.

35 **sntp** command

This command is used to configure SNTP protocol of the switch.

Entering "sntp ?", the sub-commands will be shown.

```
(config)# sntp ?
  client                Accepts time from specified time server
  server                Specified one time server
  zone                  Set time zone
  dst                   Config daylight saving time function.
  start-time            Set start time of daylight saving time
  end-time              Set end time of daylight saving time
```

sntp client command is used to enable SNTP protocol. And **no sntp client** command can be used to disable it. If it is disabled, the system time will be got from manual setting.
sntp server x.x.x.x command is used to set the IP address of network time server for SNTP protocol operation. "**x.x.x.x**" is the IP address.
sntp zone xxx command is used to set the time zone. "**xxx**" is the location of the time zone. With "sntp zone ?", the locations will be shown.
sntp dst command is used enabled Daylight Saving Time function. And **no sntp dst** command can be used to disabled it. Daylight Saving Time function

will set the system time one-hour early than normal time in a period of time. “start-time” and “end-time” sub-commands can be used to set the time period.

sntp start-time w/x/y/z command is used to set the start time of Daylight Saving Time.

- “**w**” is the week number in the month. Its value is 1~5.
- “**x**” is the day number in the week. Its value is 0~6.
- “**y**” is the month number. Its value is 1~12.
- “**z**” is the hour number in the day. Its value is 0~23.

sntp end-time w/x/y/z command is used to set the end time of Daylight Saving Time.

- “**w**” is the week number in the month. Its value is 1~5.
- “**x**” is the day number in the week. Its value is 0~6.
- “**y**” is the month number. Its value is 1~12.
- “**z**” is the hour number in the day. Its value is 0~23.

36 **spanning-tree** command

This command is used to configure spanning tree protocol of the switch.

Entering “spanning-tree”, the sub-commands will be shown.

```
(config)# spanning-tree ?
  compatible          Compatible with old STP
  forward-delay       Global STA forward time configuration. Range: <4-30 seconds>
  hello-time          Global STA hello time configuration. Range: <1-10 seconds
  max-age             Global STA maximum age configuration. Range <6-40 seconds>
  priority            Specifies spanning tree priority
  <cr>
```

spanning-tree command is used to enable spanning tree protocol function. And **no spanning-tree** command is used to disable it.

spanning-tree compatible command is used to change its operation to 802.1D STP instead of 802.1w RSTP. And **no spanning-tree complatible** command is used to set it back.

spanning-tree forward-delay x command is used to set the forwarding delay of spanning tree operation. It is the maximum waiting time before changing states. This delay is required because every device must receive information about topology changes before it starts to forward frames. “**x**” is the delay time, and its valid value is 4-30 in seconds

spanning-tree hello-time x command is used to set the period to send spanning tree maintenance packet if the switch is the root of spanning tree. “**x**” is the period time, and its valid value is 1-10 in seconds.

spanning-tree max-age x command is used to set the spanning tree aging time if no spanning tree maintenance packet is received. “**x**” is the time, and its valid value is 6-40 in seconds.

spanning-tree priority x command is used to set the bridge priority of the switch. Bridge priority is for selecting the root device, root port, and designated port. The device with the highest priority (lowest value) becomes the STA root device. If all devices have the same priority, the device with the lowest MAC address will then become the root device. “**x**” is the priority, and

its valid value is 0-61440.

The settings of spanning tree on port are done in “interface” command. The settings here are for bridge only.

37 **storm-control** command

This command is used to set the storm control rate. The packet storms that could be controlled are broadcast, multicast, and unicast flooding traffic. And the limit rate is counted with storm control rate number multiplying with storm control rate unit. The storm control rate unit could be 62.5Kbps or 1Mbps.

storm-control unit x command is used to set the storm control rate unit. “**x**” could be “62.5Kbps” or “1Mbps”.
storm-control rate x command is used to set the storm control rate number. “**x**” is a number between 0~1000. (“0” means No Limit.)

Storm control function can be enabled/disabled by port. It is set with “storm-control” command in port interface configuring mode (enter with “interface etherent 1/x” command. “x” is the port number. And its prompt is “(config-if)”)

38 **trunk** command

This command is used to enable trunk function of the switch. And **no trunk** comand can be used to disable it.

The trunk function for the switch works with LACP protocol. The system priority of LACP is set by “lacp” command. And the settings on ports is done in interface configuring mode of ports. Its prompt is “(config-if)**#**”.

39 **username** command

This command is used to set the username and password for administrator and guest.

username admin www xxx yyy zzz command is used to set the username and password for administrator. “**www**” is the old username. “**xxx**” is the old password. “**yyy**” is the new username. “**zzz**” is the new password.
username guest yyy zzz command is used to set the username and password for guest. “**yyy**” is the new username. “**zzz**” is the new password.

Administrator is the user who has the right to do configuration modification. Guest is the user who has the right to view configuration only.

40 **vlan** command

This command is used to enter VLAN configuring mode. And the prompt will become ...

(config)# vlan database
(config-vlan)#

The operations for VLAN are configured in VLAN configuring mode. Please refer to **6.2.5 VLAN Configuring Commands** section for the details.

41 **watchdog** command

This function is used to enabled watchdog function of the switch. Watchdog function will check CPU working status of the switch. If CPU works abmornally, watchdog function will reboot the switch automatically. That can recover the switch to normal working state. And "**no watchdog**" command can be used to disabled it.

Note: Disable/stop watchdog when it is running will cause the switch reboot.

6.2.4 Interface Configuring Commands

Commands in Configuring Mode are for general switch settings. And its prompt is "(config)**#**".

The port interface function and VLAN group interface function are set with "interface" command.

```
(config)# interface ?
  ethernet                Ethernet port
  vlan                    Switch Virtual LAN interface
```

interface ethernet 1/x command is used to configure settings for **Port x**. Please refer to section **6.2.4.1 Interface Configuring Commands for Port** for the details.

interface vlan x command is used to configure **VLAN Group x** ("x" is the VLAN ID). Please refer to section **6.2.4.2 Interface Configuring Commands for VLAN** for the details.

Both commands will change the prompt from "(config)**#**" to "**(config-if)#**".

Note: The general VLAN settings are done with "**vlan database**" command. Please refer to section **6.2.5 VLAN Configuring Commands** for the details. And **interface vlan x** command is used to assign characteristics to a VLAN interface. For example, assigning IP address to a VLAN interface is done with this command.

6.2.4.1 Interface Configuring Commands for Port

Commands in Configuring Mode are for general switch settings. And its prompt is "(config)#".
If the settings are for ports, it is done in port interface configuring mode. Port interface configuring mode is entered with "**interface ethernet 1/x**" command in configure mode. For example, "interface ethernet 1/5" is for settings on Port 5.

Some syntax are supported for port selection.

1. **interface ethernet 1/x** and "**x**" is port number. All the settings after this command will be applied to this port. For example, "interface ethernet 1/5" and all the settings after this command will be applied to Port 5.
2. **interface ethernet 1/x,y,z,...** and "**x**", "**y**", "**z**",.. are port number. All the settings after this command will be applied to these ports. For example, "interface ethernet 1/2,4,7" and the settings after this command will be applied to Port 2, Port 4, and Port 7.
3. **interface ethernet 1/x-y** and "**x**","**y**" are port number. All the settings after this command will be applied to ports in this range. For example, "interface ethernet 1/4-7" and the settings after this command will be applied to Port 4, Port 5, Port 6, and Port 7. (Port 4~7)
4. **interface ethernet 1/w,x,..,y-z** and "**w**","**x**","**y**","**z**" are port number. All the settings after this command will be applied to those ports. For example, "interface ethernet 1/1,2,4-7" and the settings after this command will be applied to Port 1, Port 2, Port 4, Port 5, Port 6, and Port 7. (Port 4~7)

Entering "interface ethernet 1/5", and its prompt will become ...

```
(config)# interface ethernet 1/5
(config-if)#
```

Enter "?" at the prompt, the sub-command list will be shown.

```
---------------------------------------------------------------------------------------------
(config-if)# ?
  exit                Exit from current mode
  help                Show available commands
  history             Show a list of previously run commands
  logout              Disconnect
  quit                Quit commands
  access-list         Adds ports to an access list
  channel-group       Adds ports to a trunk
  description         Interface specific description
  dot1x               Configures 802.1x port-based access control
  duplex              Configures duplex operation
  end                 Exit from interface mode
  flowcontrol         Enables flow control during autoneg
  interface           Enters privileged interface configuration
  ip                  Global IP configuration sub commands
  lacp                Configures LACP status
  lldp                Configures lldp
  loopback-detection  Configures loopback detection
  mvr                 Multicast VLAN Registration
```

```
no                Negates a command or sets its defaults
port              Configures the characteristics of the port
port-vlan         Configures Port-Based VLAN
protected-port    Configures Protected Port
qos               Configuration of QoS
rate-limit        Configures rate-limits
shutdown          Shuts down the selected interface
spanning-tree     Specifies spanning tree configuration
speed             Configures speed operation
storm-control     Configures storm control
switchport        Configures switching mode characteristics
-------------------------------------------------------------------------------
```

1 **exit** command
This command is used to leave current operation mode. Go back to last mode.

2 **help** command
This command is used to show all the available commands in this mode.

3 **history** command
This command is used to show the history of entering commands.

4 **logout** command
This command is used to logout from console interface.

5 **quit** command
This command is used to quit from console interface. It has the same function as logout.

6 **access-list** command
This command is used to apply the ports to some ACL(Access Control List) rule. And packets ingress to these ports, will go this ACL matching prcess. If packets match this ACL settings, switch will follow the action defined in this ACL rule to process these packets.

access-list x command will apply the ports to the ACL rule indexed with "**x**". And "**no access-list x**" command will remove the ports from the ACL rule indexed with "x".

7 **channel-group** command
This command is used to add the interface port(s) to a trunk group. This is a static port-trunk assignment. And the static assigned port(s) will be ignored by LACP protocol.

channel-group x will add the interface port(s) to the trunk group "**x**". "**x**" is the trunk group number, and its valid value is 1-8.
no channel-group will remove the interface port(s) from any trunk group.

8 **description** command
This command is used to assign a description string for the port(s).

description xxx command will assign a description string for the port(s). "**xxx**" is the string.
no description command will clear the description string.

9 **dot1x** command
This command is used to configure 802.1x function for the interface port(s).

dot1x port-control auto command is used to set the interface port(s) to need dot1x-aware client RADIUS server authorization.
dot1x port-control force-authorized command is used to set the interface port(s) to grant access to all clients.
dot1x port-control force-unauthorized command is used to set the interface port(s) to deny access to all clients.
dot1x port-control none command is used to set the interface port(s) not to need 802.1x operation.

10 **duplex** command
This command is used to set the duplex mode of the interface port(s). It could be full duplex or half duplex.
Note: Half duplex is for 10M and 100M speed mode only. 1000M speed mode don't support half duplex.

duplex full command will set the interface port(s) to full duplex.
duplex half command will set the interface port(s) to half duplex.

11 **end** command
This command is used to exit from interface mode.
(config-if)# end
(config)#

12 **flowcontrol** command
This command is used to enable flow control function of the interface port(s).

flowcontrol command is used to enable flow control function of the interface port(s).

no flowcontrol command is used to disable flow control function of the interface port(s).

13 **interface** command

This command is used to change the interface port(s) or interface VLAN groups for next setup commands.

```
(config-if)# interface ?
  ethernet                Ethernet port
  vlan                    Switch Virtual LAN interface
```

For example,
"(config)# interface ethernet 1/5" will set current setup interface to Port 5 and all the commands will be applied to Port 5.
"(config-if)# interface ethernet 1/6-7" will change current setup interface to Port 6-7 and all the commands will be applied to Port 6-7.

If "vlan" sub-command is used, current setup interface will be changed to some VLAN groups. For example,
"(config-if)# interface vlan 100" will change current setup interface to VLAN 100 and all next commands will be applied to VLAN 100.

The description of commands in interface configuring mode is put in Section **6.2.4 Interface Configuring Commands**. Please refer to the section for the details.

14 **ip** command

This command is used to configure IGMP Snooping and DHCP Snooping function on port(s).

```
(config-if)# ip ?
  igmp                    IGMP protocol
  dhcp                    DHCP Snooping
```

With "ip igmp snooping ?" command, the sub-commands will be shown.

```
(config-if)# ip igmp snooping ?
  filtering               IGMP filtering setting
  group-limited           IGMP group limited setting
  leave-mode              Set IGMP leave mode on this port
```

ip igmp snooping filtering profile xxx command is used assign IGMP filtering profile to this port(s). "**xxx**" is the profile name and is defined with "ip igmp snooping filtering profile xxx start-address y.y.y.y end-address z.z.z.z" command under (config)# prompt. ("xxx" is the profile name. "y.y.y.y is the start IP multicast address range. "z.z.z.z" is the end IP multicast address range.)
ip igmp snooping group-limited command is used to enabled IP multicast group number limit function on this port(s). "**no ip igmp snooping group-limited**" command is used to disable it.
ip igmp snooping group-limited number x command is used to set the IP

multicast group limit number on this port(s). "**x**" is a number between 0~255.
ip igmp snooping leave-mode xxx command is used to set the leave mode of IP multicast operation. "**xxx**" could be "**fast**", "**immediate**", or "**normal**". When a subscriber wants to leave a IP multicast group, it will send a leave message. And the switch could have different leave processes for it.
In *normal* leave mode, the switch will forward this leave message to multicast router. Then query and reply messges will happen between multicast router and all subscribers. After that, the port will be removed from IP multicast group. That will cause some delay for the leave operation.
In *fast* mode, the switch will send query to the subscriber directly. And then remove the port from IP multicast group. That will shorten the leave process.
In *immediate* mode, the switch will remove the port from IP multicast group without any query to the subscriber. That will shorten the leave process.

With "ip dhcp snooping ?" command, the sub-commands will be shown.

```
(config-if)# ip dhcp snooping ?
  rate_limit              DHCP Snooping limit
  trust                   DHCP Snooping trust config
```

ip dhcp snooping rate_limit x command is used to set the maximum rate for DHCP request packets on the port(s). "**x**" is a number between 0~5. And the maximum rate is "x" multiplying by 62.5Kbps. "0" is for no no limit.
ip dhcp snooping trust command is used to assign this port(s) as trusted port(s) for DHCP server connection. DHCP request will be forwarded to trusted port(s) only.

15 **lacp** command

This command is used to enable LACP protocol working on the interface port(s).

lacp command will enable LACP protocol working on the interface port(s).
no lacp command will disable LACP protocol working on the interface port(s).

If the interface port(s) are already assigned to trunk by "channel-group" command, its LACP function will be ignored.

16 **lldp** command

This command is used to configure LLDP function on the port(s).

```
(config-if)# lldp ?
  disabled                Configure to disabled the port in a LLDP State
  rx_and_tx               Configure to rx_and_tx the port in a LLDP State
  tx_only                 Configure to tx_only the port in a LLDP State
  rx_only                 Configure to rx_only the port in a LLDP State
```

lldp disable command will disable LLDP function on the port(s).
lldp rx_and_tx command will enable both receive and transmit LLDP packets

on the port(s)..
lldp tx_only command will enable transmit LLDP packets only on the port(s).
lldp rx_only command will enable receive LLDP packets only on the port(s).

17 **loopback-detection** command
This command is used to configure loopback detection function on the port(s). Loopback will cause traffic storm in the switch. This function can detect loopback happening on port(s) and send warning trap and log, or even block the loopback port.

```
(config-if)# loopback-detection ?
  control              Configure the system to shutdown the port in a loop
  shutdown             Configure the system to shutdown the port
  <cr>
```

loopback-detection command will enable loopback detection function on the port(s). And **no loopback-detection** command will disable it.
loopback-detection control command will enable to block the port automatically if loopback happens. And **no loopback-detection control** command will disable the blocking action.
loopback-detection shutdown command will shutdown the port(s) manually. And **no loopback-detection shutdown** command will remove the shutdown condition of the port(s). If ports are blocked because of loopback, "no loopback-detection shutdown" can be used to release it.

Note: We don't suggest to enable loopback-detection and trunk functions on the port(s) at the same time. That could cause trunk function fail to work if connecting to some switch models.

18 **mvr** command
This command is used to assign the port(s) as source port of IP multicast traffic or as receiver port of subscribers for some MVR VLAN. And the port(s) can be set as tagged port or untagged port in the MVR VLAN.

mvr x receiver-port command is used to set the port(s) as the IP multicast traffic receiver port of MVR VLAN. "**x**" is the MVR VLAN ID.
And "**no mvr x receiver-port**" command can be used to remove the ports from receiver ports of the MVR VLAN.

mvr x source-port command is used to set the port(s) as the IP multicast traffic source port of MVR VLAN. "**x**" is the MVR VLAN ID.
And "**no mvr x source-port**" command can be used to remove the ports from source port of the MVR VLAN.

mvr x tagged command is used to set the ports as tagged port in the MVR VLAN. "**x**" is the MVR VLAN ID.
And "**no mvr x tagged**" command can be used to set the ports as untagged

ports in the MVR VLAN.
For most cases, receiver ports are untagged ports and source port is tagged port. It depends on your application.

19 **no** command

This command can do the following settings. And it depends on the command after it.

1) **Disable a function**. For example, “lacp” command can enable LACP function on the interface port(s) and “no lacp” command can disable it.

2) **Restore a setting to factory default of the switch**. For example, “dot1x port-control force-authorized” will set the port(s) as “force-authorized” in 802.1x operation. And “no dot1x port-control” will set it to factory default setting.

3) **Clear a setting**. For example, “description abc” will set the description of the port(s) as “abc”. And “no description” will clear this setting.

4) **Remove port(s) from a function**. For example, “mvr 10 receiver-port” command will set the port(s) as receiver port of MVR VLAN 10. And “no mvr 10 receiver-port” command will remove the port(s) from receiver port of MVR VLAN 10.

Here is the sub-commands.

```
(config-if)# no ?
  access-list          Adds all ports to an access list
  channel-group          delete ports frome a trunk
  description          Interface specific description
  dot1x                  Configures 802.1x port-based access control
  duplex                 Configures duplex operation
  flowcontrol          Enables flow control during autoneg
  ip                     Global IP configuration sub commands
  lacp                   Configures LACP status
  lldp                 Configures lldp
  loopback-detection   Configures loopback detection
  mvr                    Multicast VLAN Registration
  port                 Configures the characteristics of the port
  port-vlan            Configures Port-Based VLAN
  protected-port       Configures Protected Port
  qos                    Configuration of QoS
  rate-limit           Configures rate-limits
  shutdown               Shuts down the selected interface
  spanning-tree        Specifies spanning tree configuration
  speed                  Configures speed operation
  storm-control        Configures storm ontrol
  switchport           Configures switching mode characteristics
```

20 **port** command

This command can be used to setup monitored port of mirror function and Mac address security function on the interface port(s).

```
(config-if)# port ?
  monitor                Monitors another interface
  security               Specifies port security
```

[Monitor Function for Mirror Operation]
This command is used to configure the monitored port of mirror function. And current port under the interface command will act as the capture port.

The port mirror operation could mirror received packets and/or transmited packets. And the mirror operation could take place for every some packets, and could just works for a specified source Mac address or destination Mac address.

```
(config-if)# port monitor ?
  capture-frequency      Capture Frequency
  ethernet               Ethernet port
  filter-mode            Filter Mode
```

port monitor capture-frequency rx x / port monitor capture-frequency tx x command is used to set the capture frequency of mirror operation. "**x**" is a number between 1-1023. That will make the mirror operation to take place for every "x" packets. "**rx**" is for ingress packets. "**tx**" is for egress packets.

port monitor ethernet 1/x rx / **port monitor ethernet 1/x tx** command is used to add Port x to the monitored port list of mirror function. The ingress/egress packets from monited ports will be copied to current interface port(s). "**x**" is the monitored port number. "**rx**" is for ingress packets mirror operation. "**tx**" is for egress packets mirror operation.
And **no port monitor ethernet 1/x rx** / **no port monitor ethernet 1/x tx** command will remove Port x from monitored port list.
For example, "port monitor ethernet 1/2 rx" command will add Port 2 to the monitored port list, and ingress traffic to Port 2 will be copied to the interface port(s). If current setup interface port is Port 5, Port 5 will be the monitoring port.

port monitor filter-mode rx all / **port monitor filter-mode tx all** command will capture all ingress/egress packets of monitored port to capture port(current interface port). "**rx**" is for ingress packets. "**tx**" is for egress packets.
port monitor filter-mode rx sa x-x-x-x-x-x / **port monitor filter-mode tx sa x-x-x-x-x-x** command will capture ingress/egress packets of monitored port whose source Mac address is "**x-x-x-x-x-x**" to capture port(current interface port). "**rx**" is for ingress packets. "**tx**" is for egress packets.
port monitor filter-mode rx da x-x-x-x-x-x / **port monitor filter-mode tx da x-x-x-x-x-x** command will capture ingress/egress packets of monitored port whose destination Mac address is "**x-x-x-x-x-x**" to capture port(current interface port). "**rx**" is for ingress packets. "**tx**" is for egress packets.

[Mac Address Security Function]

port security action command will set the interface port(s) to "accept" mode. In "accept" mode, only devices/PC with static Mac addresses assigned on the interface port(s) can access network through the interface port(s). Other devices/PC will be rejected.

port security max-mac-count x command is used to set the maximum Mac address number allowed on the interface port(s). "**x**" is the maximum number and its valid value is 0-8191. For example, x=5 will allow up to five network devices / PC access network through the interface port(s). And the port Mac address security function will be set to this operation mode(Limited by Mac no.) with this command.

no port security command can be used to disable the Mac address security function on the interface port(s).

21 **port-vlan** command

This command is used to assign the interface port(s) to a Port-based VLAN, and set the name(description) for the Port-based VLAN.

port-vlan x command will assign the interface port(s) to a Port-based VLAN. "**x**" is the index of the Port-based VLAN.

port-vlan x yyy command will assign the interface port(s) to a Port-based VLAN, and set the name(description) to the Port-based VLAN. "**x**" is the index of the Port-based VLAN. "**yyy**" is the name(description) for it.

22 **protected-port** command

This command is used to set the interface port(s) as protected port. If ports are marked as portected ports, they cannot communicate with each other even they are in the same VLAN. But they can communicate with other non-protected ports if they are in the same VLAN.

protected-port command is used to set the interface port(s) as protected port.
no protected-port command is used to remove the interface port(s) from protected port.

This command is just to set the ports as protected port. Enabling protected port function is done by "protected-port" command in "(config)#" mode.

23 **qos** command

This command is used to set port-based priority, enable 802.1P priority, enable DSCP priority on the interface port(s).

```
(config-if)# qos ?
  dscp                    Enable IP DSCP priority
  port                    Enable Port priority
  priority                Enable 802.1p priority
```

qos dscp command is used to enable DSCP priority operation on the interface port(s). And **no qos dscp** command is used to disable it.
qos priority command is used to enable 802.1P priority operation on the interface port(s). And **no qos priority** command is used to disable it.
qos port xxx command is used to set port-based priority on the interface port(s). "**xxx**" is the priority queue, and it could be "**low**" / "**normal**" / "**medium**" / "**high**".

Note: If Port-base priority, 802.1P priority, and DSCP priority are enabled on the interface port(s) at the same time, the QoS decision will be made with the order - DSCP priority first, 802.1P priority next, Port-based priority last.

24 **rate-limit** command

This command is used to set the ingress and egress rate limit of the interface port(s). The working rate limit number is counted with **(rate limit level)x(rate limit unit)**.

rate-limit input level x / **rate-limit output level x** command is used to specify the ingress/egress rate-limit level of the interface port(s). "**x**" is the level number and its valid value is 0~1000. If "**x**"=0, it means "no limit". "**input**" is for ingress traffic. "**output**" is for egress traffic.

rate-limit input unit x / **rate-limit output unit x** command is used to specify the ingress/egress rate-limit unit of the interface port(s). "**x**" is the unit number and its valid value is "62.5Kbps" or "1Mbps". "**input**" is for ingress traffic. "**output**" is for egress traffic.

25 **shutdown** command

This command is used to disable the interface port(s).

shutdown command is used to disable the interface port(s).
no shutdown command is used to enable it.

26 **spanning-tree** command

This command is used to configure spanning tree function on interface port(s).

```
(config-if)# spanning-tree ?
  cost                    Specifies spanning tree cost
  edge-port               Specifies spanning tree edge port
  port-priority           Specifies spanning tree port priority
  spanning-disabled       Disables the spanning tree
```

spanning-tree cost x command is used to set spanning tree port path cost value on the interface port(s). It is used to determine the best path between devices if looping happens. Lower values will be forwarded and should be assigned to ports with fast connections. Higher values will be blocked and should be assigned to ports with slow connections. "**x**" is the cost value and its valid value is 1~65535. The suggestion values are 100(50~600) for 10M, 19(10~60) for 100M and 4(3~10) for 1000M connections.

spanning-tree edge-port command is used to set the interface port(s) as edge port. And **no spanning-tree edge-port** command is used to set it as non-edge port. "Edge port" means the interface port(s) are connected to end device(s) but not switch-to-switch connection.

spanning-tree port-priority x command is used to set the spanning tree port priority value on the interface port(s). "**x**" is the port-priority value and its valid value is 0~240. If the path cost for all ports on a switch are the same, the port with the highest priority (lowest value) will be forwarded when looping happens. If more than one port have the same highest priority, the port with lowest port number will be forwarded.

spanning-tree spanning-disabled command is used to disable spanning tree operation on the interface port(s). And **no spanning-tree spanning-disabled** command will enable it.

27 **speed** command

This command is used to set the operation speed of the interface port(s).

```
(config-if)# speed ?
  auto                Set port speed to be auto
  10                  Set port speed to be 10M
  100                 Set port speed to be 100M
  1000                Set port speed to be 1G
```

speed auto command will set the interface port(s) to auto-negotiation mode.
speed 10 command will set the interface port(s) to 10M speed.
speed 100 command will set the interface port(s) to 100M speed.
speed 1000 command will set the interface port(s) to 1000M(gigabit) speed.

28 **storm-control** command

This command is used to enable broadcast, multicast, and unicast(flooding) storm control on the interface port(s). Those storm control functions are enabled by port.

```
(config-if)# storm-control ?
  broadcast           Configures Broadcast
  multicast           Configures Multicast
```

flooding Configures Flooding

storm-control broadcast command is used to enabled broadcast storm control on the interface port(s). And "**no storm-control broadcast**" command can be used to disable it.
storm-control multicast command is used to enabled multicast storm control on the interface port(s). And "**no storm-control multicast**" command can be used to disable it.
storm-control flooding command is used to enabled unicast flooding storm control on the interface port(s). And "**no storm-control flooding**" command can be used to disable it.

29 **switchport** command
This command is used to configure some switch function characteristics for the interface port(s).

```
(config-if)# switchport ?
  acceptable-frame-types Specifies frame type
  allowed                Configures the VLAN port list
  mode                   Configures the port mode
  native                 Configures the PVID of the port
  private-vlan           Private VLAN
  vlan-stacking          VLAN Stacking port mode
```

[Accept Frame Type]
switchport acceptable-frame-types all command is used to allow the interface port(s) to accept all types of frame.

switchport acceptable-frame-types tagged command is used to allow the interface port(s) to accept tagged frame only. Other frame type will be rejected.

[VLAN Port Assignment]
switchport allowed vlan add x
switchport allowed vlan add x untagged
switchport allowed vlan add x tagged command will add the interface port(s) to VLAN x. "**x**" is the VLAN ID and its valid value is 2~-4094. "**tagged**" will set the port as tagged port in the VLAN. "**untagged**" will set the port as untagged port. If "tagged"/"untagged" is not specified, "untagged" will be applied.

switchport allowed vlan remove x command will remove the interface port(s) from VLAN x. "**x**" is the VLAN ID and its valid value is 2~-4094.

[VLAN Port Mode Setting for Private VLAN]
switchport mode private-vlan host command will set the port type of the interface port(s) in Private VLAN as "host". "host" port(s) could be for Community VLAN or Isolated VLAN.

switchport mode private-vlan promiscuous command will set the port type of the interface port(s) in Private VLAN as “promiscuous”. “promiscuous” port(s) could be for Primary VLAN or Isolated VLAN.

no switchport mode private-vlan command will set the port type of the interface port(s) in Private VLAN as “normal”. “normal” port(s) is for normal 802.1Q VLAN operation.

[Port VLAN ID Setting]

switchport native vlan x command is used to assign VLAN ID of the native VLAN for classifying untagged frames on ingress port. “**x**” is the port VLAN ID (PVID) and its valid value is 1~4094.

When untagged packet is received, PVID of the ingress port will be used as its working VLAN ID. PVID is also used as the VLAN ID for tag adding when untagged packet is translated to tagged packet.

[Private VLAN Port Assignment]

switchport private-vlan host-association x command is used to assign this interface port(s) to a Community VLAN. And the port type of the interface port(s) must be “host” first. “**x**” is the VLAN ID of the Community VLAN and its valid value is 2~4094.

switchport private-vlan isolated x command is used to assign this interface port(s) to a Isolated VLAN. And the port type of the interface port(s) must be “host” or “promiscuous” first. “**x**” is the VLAN ID of the Isolated VLAN and its valid value is 2~4094.

switchport private-vlan mapping x command is used to assign this interface port(s) to a Primary VLAN. And the port type of the interface port(s) must be “promiscuous” first. “**x**” is the VLAN ID of the Primary VLAN and its valid value is 2~4094.

[VLAN Stacking (Q-in-Q) Setting]

switchport vlan-stacking normal command is used to set the port(s) as normal 802.1Q VLAN port(s). And the tagged/untagged setting will follow the settings in 802.1Q VLAN.

switchport vlan-stacking access command is used to set the port(s) as access port(s) for VLAN stacking operation. It will strip a tag from tagged or double-tagged packets before forwarding. It is for downward connection of VLAN stacking operation.

switchport vlan-stacking tunnel command is used to set the port as tunnel port for VLAN stacking operation. It will add a tag and allow two 802.1Q VLAN tags in a packet. It is for tunnel and upward connection of VLAN stacking operation. For this switch, only gigabit ports support tunnel function of VLAN Stacking operation.

6.2.4.2 Interface Configuring Commands for VLAN

Commands in Configuring Mode are for general switch settings. And its prompt is "(config)#".
If the characteristics are for VLAN group, it is done with "**interface vlan x**" command in configure mode. For example, "interface vlan 100" is for characteristics settings on VLAN 100.

Note: The general VLAN settings are done with "**vlan database**" command. Please refer to section **6.2.5 VLAN Configuring Commands** for the details. And **interface vlan x** command is used to assign characteristics to a VLAN group interface. For example, assigning IP address to a VLAN interface is done with this command.

Entering "interface vlan 100", and its prompt will become ...
(config)# interface vlan 100
(config-if)#

Enter "?" at the prompt, the sub-command list will be shown.

```
-------------------------------------------------------------------------------------------
(config-if)# ?
  exit                 Exit from current mode
  help                 Show available commands
  history              Show a list of previously run commands
  logout               Disconnect
  quit                 Quit commands
  interface            Enters privileged interface configuration
  ip                   Internet protocol
  no                   Negates a command or sets its defaults
-------------------------------------------------------------------------------------------
```

1. **exit** command
   This command is used to leave current operation mode. Go back to last mode.

2. **help** command
   This command is used to show all the available commands in this mode.

3. **history** command
   This command is used to show the history of entering commands.

4. **logout** command
   This command is used to logout from console interface.

5. **quit** command
   This command is used to quit from console interface. It has the same function as logout.

6. **interface** command
   This command is used to change to interface port(s) or another interface VLAN groups for next setup commands.

```
(config-if)# interface ?
  ethernet              Ethernet port
  vlan                  Switch Virtual LAN interface
```

   For example,
   "(config)# interface ethernet 1/5" will change the setup interface to Port 5 and all the following commands will be applied to Port 5.
   "(config-if)# interface ethernet 1/6-7" will change the setup interface to Port 6-7 and all the following commands will be applied to Port 6-7.

   If "vlan" sub-command is used, the setup interface will be changed to some VLAN groups. For example,
   "(config-if)# interface vlan 100" will change the setup interface to VLAN 100 and all following commands will be applied to VLAN 100.

   The description of commands in interface configuring mode is put in Section **6.2.4 Interface Configuring Commands**. Please refer to the section for the details.

7. **ip** command
   This command is used to set IP address of the switch on this VLAN interface. And only users in this VLAN can access this switch with the IP address remotely.

```
(config-if)# ip address ?
  dhcp                  Dynamic host configuration protocol
  A.B.C.D               IP address
  renew                 Renew IP
  release               Release IP
```

   ip address dhcp command is used to enable DHCP client function. DHCP client function will try to get IP configuration from DHCP server in network. And **no ip address dhcp** command can be used to disable it.

   ip address x.x.x.x y.y.y.y command is used to set IP address of the switch on this VLAN. "**x.x.x.x**" is the IP address. "**y.y.y.y**" is the subnet mask.
   For example, "ip address 192.168.1.12 255.255.255.0" will set the IP address of the switch on this VLAN group for remote management.

ip address renew command is used to refresh the lease time of the IP address got by DHCP. If IP configuration is not got when boot-up, this command will try to get IP configuration again.

ip address release command is used to release current IP address got by DHCP. Then, you can try to get the IP configuration again by "ip address renew" command.

8. **no** command
   This command is used to disable a function or restore a setting to factory default of the switch.

```
(config-if)# no ?
  ip                    Internet protocol
```

   For example,
   "**ip address dhcp**" command can enable DHCP client function on the VLAN group interface and "**no ip address dhcp**" command can disable it.
   "**ip address x.x.x.x y.y.y.y**" command can set the IP address x.x.x.x on the VLAN group interface and "**no ip address**" command can set it to default settings - "192.168.1.1".

6.2.5 VLAN Configuring Commands

Commands in Configuring Mode are for general switch settings. And its prompt is "(config)#".

If the settings are for VLANs, it should enter VLAN configuring mode first by "**vlan database**" command in configure mode. And its prompt will become "**(config-vlan)#**".
Note: If the settings are for some VLAN group (VLAN ID is known), it should enter interface configuring mode for VLAN first by "interface vlan x" command. ("x" is the VLAN ID.) And its prompt is "(config-if)#". It is described in Section 6.2.4.2.

Entering "vlan database", and the prompt will become ...
(config)# vlan database
(config-vlan)#

Enter "?" at the prompt, the sub-command list will be shown.

```
-------------------------------------------------------------------------------------------
(config-vlan)# ?
  exit                Exit from current mode
  help                Show available commands
  history             Show a list of previously run commands
  logout              Disconnect
  quit                Quit commands
  end                 Exit from vlan mode
  1q-vlan             Configures 802.1Q VLAN
  metro               Configures Metro VLAN
  no                  Negates a command or sets its defaults
  port-vlan           Configures Port-Based VLAN
  private-vlan        Private VLAN
  vlan                Switch Virtual LAN interface
-------------------------------------------------------------------------------------------
```

1 **exit** command
This command is used to leave current operation mode. Go back to last mode.

2 **help** command
This command is used to show all the available commands in this mode.

3 **history** command
This command is used to show the history of entering commands.

4 **logout** command

This command is used to logout from console interface.

5 **quit** command
This command is used to quit from console interface. It has the same function as logout.

6 **end** command
This command is used to exit from VLAN Configuring mode.

```
(config-vlan)# end
(config)#
```

7 **1q-vlan** command
This command is used to configure 802.1Q VLAN characteristics.

```
(config-vlan)# 1q-vlan ?
  gvrp                Enables GVRP globally for the switch
  ingress-filtering   Configures frame filtering base on VLAN membership
  vlan-mode           Configures Vlan Mode
  <cr>
```

1q-vlan command can enable 802.1Q VLAN function. And **no 1q-vlan** command can disable it.

1q-vlan gvrp command is used to enable GVRP function of 802.1Q VLAN. This command works only if 802.1Q VLAN is enabled. And GVRP will be disable automatically when 802.1Q VLAN is set to disable. **no 1q-vlan gvrp** command can disable it.

1q-vlan ingress-filtering command is used to enable doing VLAN membership filtering at ingress port instead of egress port. **no 1q-vlan ingress-filtering** command can disable it.

1q-vlan vlan-mode svl / **1q-vlan vlan-mode ivl** command is used to set the 802.1Q VLAN operation mode as SVL(Shared VLAN Learning) mode or IVL(Independent VLAN Learning) mode.
For SVL mode, VLAN ID will be ignored when switch Mac address table lookup for packet forwarding. Mac address is unique in the switch even they are in different VLANs.
For IVL mode, VLAN ID will be applied when switch Mac address table lookup for packet forwarding. Mac address could be not unique in the switch if they are in different VLANs.

8 **metro** command
This command is used to configure Metro-VLAN. Metro-VLAN is a popular setting of Port-based VLAN. In this setting, one or two ports are uplink ports to

central switch or router. Other ports are downlink to users. And those downlink ports are isolated to each other. This setting works by Port-based VLAN and is a very popular security application.

metro command is used to set VLAN operation of the switch to Metro-VLAN. And "**no metro**" can be used to disable it.

metro uplink-port x command is used to set the uplink ports of Metro-VLAN. It could be the last port or the last two ports of the switch. "**x**" is the uplink port number.

9 **no** command

This command is used to disable a function or restore a setting to factory default of the switch.

```
(config-vlan)# no ?
  1q-vlan          Configures 802.1Q VLAN
  port-vlan        Configures Port-Based VLAN
  metro            Configures Metro VLAN
  private-vlan     Private VLAN
  vlan             Switch Virtual LAN interface
```

For example,
"**1q-vlan**" command can enable 802.1Q VLAN function and "**no 1q-vlan**" command can disable it. "**no vlan 100**" command will remove VLAN 100.

10 **port-vlan** command

This command is used to enable Port-base VLAN. And 802.1Q VLAN function will be disable at the same time.

port-vlan command is used to enable Port-base VLAN.
no port-vlan command is used to disable it.

11 **private-vlan** command

This command is used to create VLAN groups for Private VLAN and create the associations between Primary VLAN and Community VLAN.

```
(config-vlan)# private-vlan 100 ?
  association      Association
  name             VLAN interface name
```

private-vlan x association y command is used to create the association between Primary VLAN "**x**" and Community VLAN "**y**"
private-vlan x association add y command is used to add the association between Primary VLAN "**x**" and Community VLAN "**y**".
private-vlan x association remove y command is used to remove the

association between Primary VLAN "**x**" and Community VLAN "**y**".
no private-vlan x association command is used to reomove all the association for Primary VLAN "**x**".

```
(config-vlan)# private-vlan 100 name sales ?
  community              Community
  isolated               Isolated
  primary                Primary
```

private-vlan x name yyy community command is used to create a Community VLAN with VLAN ID "**x**", VLAN name "**yyy**" for Private VLAN application.
private-vlan x name yyy isolated command is used to create a Isolated VLAN with VLAN ID "**x**", VLAN name "**yyy**" for Private VLAN application.
private-vlan x name yyy primary command is used to create a Primary VLAN with VLAN ID "**x**", VLAN name "**yyy**" for Private VLAN application.
no private-vlan x command can be used delete a Private VLAN "**x**". ("**x**" is the VLAN ID).

12 **vlan** command

This command is used to create a 802.1Q VLAN. In this command, you have to assign the VLAN ID and VLAN name for VLAN creation.

vlan x command is used to create a 802.1Q VLAN. "**x**" is the VLAN ID.

vlan x name yyy media ethernet command is used to create a 802.1Q VLAN with VLAN ID "**x**" and VLAN name "**yyy**". For example, "vlan 500 name sales media ethernet" will create a VLAN with VLAN ID 500 and VLAN name "sales". (Note: If VLAN "x" already exists but name "yyy" is different, this command will rename the VLAN.)

no vlan x command can be used to remove the VLAN with VLAN ID "**x**".

6.2.6 Show Commands

Show command is put in General Basic Commands for viewing system configuration and information.

Enter “show ?” at the prompt, the sub-command list will be shown.

```
---------------------------------------------------------------------------------------------
  # show ?
    aaa                    Show AAA service configuration
    access-list            Packet Access Control List
    address-binding        Address binding
    calendar               Date and time information
    dhcp-relay             DHCP Relay Configuration
    dot1x                  802.1x content
    gvrp                   GVRP configuration
    history                History information
    interface              Interface information
    ip                     IP information
    lacp                   LACP statistics
    line                   TTY line information
    lldp                   Show lldp Configuration
    log                    Log records
    mac-address-table      Configuration of the address table
    mac-security           MAC Security Configuration
    management             Management IP filter
    map                    Maps priority
    mvr                    Show MVR Status
    port                   Port characteristics
    protected-port         Protected port Configuration
    queue                  Priority queue information
    radius-server          RADIUS server information
    running-config         Information on the running configuration
    rate-limit             rate-limits
    rmon                   rmon
    snmp                   Simple Network Management Protocol statistis
    sntp                   Simple Network Time Protocol configuration
    spanning-tree          Spanning-tree configuration
    system                 System information
    trunk                  Trunk information
    version                System hardware and software versions
    vlan                   Virtual LAN settings
---------------------------------------------------------------------------------------------
```

1. **show aaa authentication login** command
   This command will show the authentication settings for admin of the switch when login for management. It could be authenticated by local switch or RADIUS Server, or local switch first RADIUS Server next.
   For example,
   # show aaa authentication login
   Authentication:
   local

2. **show access-list** command

This command is used to show ACL(Access Control List) configuration.

For example,

```
# show access-list
[Packet Access Control List ]
ACL Function: Enable
Access-list#1                Test Active Rate= 10 Mb (L2+L3+l4)
  Permit any any any any any any 0.0.0.0/0 0.0.0.0/0 any any 80      80
  Ingress Port= All
```

ACL Rule will be listed one after another. And content of rule are displayed in the following order...

[Index] [Name] [Active Status] [Rate Limit] (L2+L3+L4) [Action] [L2 Frame] [Source Mac Address] [Source Mac Address Mask] [Destination Mac address] [Destination Mac Address Mask] [Tagged Frame] [VLAN ID] [Ethernet Type] [L3 Frame] [Source IP Address]/[Source IP Prefix] [Destination IP Address]/[Destionation IP Prefix] [IP Protocol] [L4 Frame] [Source Socket Port Number] [Destination Socket Port Number] [Ingress Port]

3. **show address-binding** command

This command is used to show “IP-Mac_Address-Port” binding configuration.

For example,

```
# show address-binding
[Address Binding Port Configuration ]
 Ports/Port channel:    Eth1/ 1 Eth1/ 2 Eth1/ 4
                        Eth1/ 5
[All Address Binding List ]
Address-Bindingt#1:
  MAC Address= 00-00-00-00-00-01
  IP Address= 192.168.1.1
  Port= Eth 1/1

Address-Bindingt#2:
  MAC Address=
  IP Address= 192.168.1.2
  Port= Eth 1/2

Address-Bindingt#3:
  MAC Address= 00-00-00-00-00-03
  IP Address=
  Port= Eth 1/4

Address-Bindingt#4:
  MAC Address=
  IP Address= 192.168.1.3
  Port= Eth 1/5
```

“Ports/Port channel” shows the ports that this function is enabled.

Then the IP-Mac_address-Port binding settings will be displayed one after another.

4. **show calendar** command
   This command will show current system time.
   For example,
   # show calendar
   Current Time : 2008/08/29-11:27:12

5. **show dhcp-relay** command
   This command will show current DHCP Relay and Option 82 settings.
   For example,
   # show dhcp-relay
   DHCP Relay Configuration
   DHCP Relay Status: Disable
   DHCP Relay Option82: Disable
   Add additional option82 information: Disable
   Relay Agent information:
   DHCP Server IP Address:

6. **show dot1x** command
   This command is used to show 802.1x configuration and status.

   show dot1x command is used to show current 802.1x configuration and status of each port. For example,
   # show dot1x
   [Port Authentication Configuration]

Port	Status	Authentication Mode
1/1		Force-Authorized
1/2		Force-Authorized
1/3	Yes	Force-Authorized
1/4		Force-Authorized
1/5		Force-Authorized
1/6		Force-Authorized
1/7		Force-Authorized
1/8		Force-Authorized
1/9		Force-Authorized
1/10		Force-Authorized

   show dot1x configuration command is used to show 802.1x configuration and status of the switch. For example,
   # show dot1x configuration
   [802.1x Configuration]
   802.1x System Authentication Status: Disable
   Re-authentication: Disable
   Re-authentication Timeout Period : 3600 seconds
   Re-authentication Max Count: 2
   Max Request Count: 2
   Server Timeout Period: 30 seconds

Supplicant Timeout Period: 30 seconds
Quiet Timeout Period: 60 seconds
Tx Timeout Period: 30 seconds
Supplicant Allowed In Guest Vlan: Disable
Dynamic vlan: Disable

show dot1x mac-based command is used to show 802.1x Mac-based authentication status of the switch. If Mac-based is enabled, the authentication result will be applied to a PC instead of a switch port. For example,

show dot1x mac-based
[MAC Based 802.1x Authenticator State]

Index	Vid	Mac	Port
---	---	---	---

7. **show gvrp** command

This command is used to show current GVRP configuration.

show gvrp configuration command will show current GVRP configuration.

show gvrp configuration
GVRP configuration: Disable

8. **show history** command

This command is used to show the history of input commands.

show history
0. show
1. show gvrp configuration
2. show history

9. **show interface** command

This command is used to show port information and status.

show interface ?

counters	Interface counters information
loopback	Interface loopback detection information
status	Interface status information
switchport	Interface switchport information

show interface counters command will show total statistics counters for all ports.

show interface counters ethernet 1/x command will show statistics counters for Port x. ("**x**" is the port number).

For example,

show interface counters ethernet 1/3
Port: 1/3
==========

Rx Counter	Statistics
Good Unicast Frame	27695
Good Broadcast Frame	206

```
Good Multicast Frame                3
802.3X MAC Control                  0
Total Receive Byte Count            2971831
CRC Error                           0
Fragment                            0
Jabbers                             0
=========================================
Tx Counter                      Statistics
Good Unicast Frame                  28317
Good Broadcast Frame                434
Good Multicast Frame                21
802.3X MAC Control                  2
Total Transmit Byte Count           10370597
```

show interface loopback command will show port loopback-detection setting and status for each port (one after another). For example,

```
# show interface loopback
Configuration:
  Port 1 Name :                     Port 1
  Loopback Enabled:                   Disabled
  Loopback Control:                 Disabled
  In Shutdown:                       No
  In Loopback :                     No
---More---
.....
```

show interface status command will show port status of all ports (one after another).

show interface status ethernet 1/x command will show port status of Port x. ("**x**" is the port number).

For example,

```
# show interface status ethernet 1/4
Basic information:
  Port type:                    100TX
  Mac address:                    00:00:00:00:53:47
Configuration:
  Name:                           Port 4
  Port admin:                   Enable
  Speed-duplex:                  Auto_on
  Capabilities:                 10half,10full,100half,100full
  Broadcast storm:               Disable
  Flooding storm :              Disable
  Multicast storm:              Disable
  Flow control:                 Disable
  LACP:                           Disable
  Max MAC count:                  0
Current status:
  Link status:                  Up
  Operation speed-duplex:        100Half
```

show interface switchport command will show function configuration of all ports (one after another).

show interface switchport ethernet 1/x command will show function

configuration of Port x. ("**x**" is the port number).
For example,

```
# show interface switchport ethernet 1/1
Information of Eth 1/1
  Rate-limit level of input:       0
  Ingress rate limit:                Disable
  Rate-limit level of output:     0
  Egress rate limit:                 Disable
  Ingress rule:                        Disable
  Acceptable frame type:           All frames
  Native VLAN:                         1
  Priority for untagged traffic:Low
  Private-VLAN mode:                 Normal
  VLAN stacking role:                normal
  IGMP leave mode:                   Normal
  IGMP group limited:                Disable
  IGMP maximum group number:       0
  IGMP filtering profile:            Default
  LLDP State:                          Rx and Tx
```

10. **show ip** command

This command is used to show current DHCP Snooping configuration, IGMP configuration and switch IP configuration.

```
# show ip ?
   dhcp                  DHCP snooping
   igmp                  IGMP snooping
   interface             Interface information
   redirects             Default gateway configured for this device
```

show ip dhcp snooping command will show current DHCP Snooping configuration.
For example,

```
# show ip dhcp snooping
DHCP Snooping:      Disable
    Interface          Trusted          Rate limit(Kbps)
    -------------      -------          ----------------
```

show ip dhcp snooping binding command will show current IP-Mac-Port binding status got by DHCP Snooping function.
For example,

```
# show ip dhcp snooping binding
     IP Address          MAC Address        Expires(s)     Port   vid
-------------------------------------------------------------------------------------
```

show ip dhcp snooping database command will show current DHCP Snooping Table backup configuration. If it is enabled, the table will be backup to a TFTP server.
For example,

```
# show ip dhcp snooping database
Database:          Disable
Write delay:       300
Timeout:           300
File Name:
```

TFTP Server IP Address:

show ip igmp snooping command will show current IGMP Snooping configuration.
For example,

```
# show ip igmp snooping
IGMP Status:                    Disable
IGMP Querying:                  Disable
Unregistered IPMC Flooding:Disable
IGMP Filtering:                 Disable
IGMP Query Interval:            125       seconds
IGMP Report Delay:              15        seconds
IGMP Query Timeout:             255       seconds
```

show ip igmp snooping filtering profile command will show current IGMP filtering profile list.
For example,

```
# show ip igmp snooping filtering profile
   IGMP Filtering Profile Configuration:
   Profile Name
   ---------------
   Default
```

show ip igmp snooping filtering profile rule command will show current IGMP filtering profile content.
For example,

```
# show ip igmp snooping filtering profile rule
   IGMP Filtering Profile Rule Configuration:
   Profile Name        Start Address       End Address
   ---------------     ---------------     ---------------
   Default              0.   0.   0.   0      0.   0.   0.   0
```

show ip igmp snooping mrouter command will show current IGMP multicast router setting.
For example,

```
# show ip igmp snooping mrouter
  Type   M'cast Router Ports
  ------   --------------------
  static     Eth 1/
```

show ip interface command will show current switch IP configuration.
For example,

```
# show ip interface
IP address and netmask: 192.168.1.12 255.255.255.0 on VLAN 1
```

show ip redirects command will show current IP gateway setting of the switch.
For example,

```
# show ip redirects
gateway: 192.168.1.254
```

11.**show lacp** command
This command is used to show current LACP configuration of the switch.

```
# show lacp ?
```

internal	Shows config settings/operational state for local side
portstatus	Shows LACP Port Status
sysid	Shows channel groups system priority/MAC address

show lacp internal command is used to show system priority and protocol enable/disable status of ports.

```
# show lacp internal
[Lacp Port Configuration]
System Priority: 65535
   Port     Protocol Enabled
------- ------------------
Eth 1/1            Disable
Eth 1/2            Disable
Eth 1/3            Disable
Eth 1/4            Disable
Eth 1/5            Disable
Eth 1/6            Disable
Eth 1/7            Disable
Eth 1/8            Disable
Eth 1/9            Disable
Eth 1/10           Disable
```

show lacp portstatus command is used to show LACP working status of ports.

```
# show lacp portstatus
[ LACP Port Status ]
Port     Protocol Active      Partner Port Number     Operational Port Key
1              no
2              no
3              no
4              no
5              no
6              no
7              no
8              no
9              no
10             no
```

show lacp sysid command is used to show system ID of the switch for LACP protocol.

```
# show lacp sysid
65535
```

12. **show line** command

This command is used to show current console line configuration.

show line console command is used to show current console line configuration.

```
# show line console
Password threshold: open-end time
Baudrate: 9600
Databits: 8
Parity   : 0 [0|1|2|3][NONE|EVEN|ODD|MARK|SPACE]
```

Stopbits: 1

13. **show lldp** command
This command is used to show current LLDP table and LLDP configuration.

```
# show lldp ?
  remote_information     lldp table
  <cr>
```

show lldp command is used to show LLDP configuration.
For example,

```
# show lldp
LLDP Configuration    : Disable
Transmitted TLVs
--------------------------------
Port Description       : on
System Name              : on
System Description    : on
System Capabilities : on
Management Address    : on
Parameters
--------------------------------
Interval       : 30
Tx Hold        : 4
Tx Delay       : 2
Reinit Delay: 2
```

show lldp remote_information command is used to show remote system information got by LLDP protocol.

14. **show log** command
This command is used to show current system log and system log configuration.

```
# show log ?
  configuration            logging configuration
  <cr>
```

show log command is used to show current system log content.
For example,

```
# show log
[5]   Thu Jan 01 09:00:02 1970
    Level: 4 System Started [port 0]
[4]   Thu Jan 01 09:08:20 1970
    Level: 4 Link down [port 8]
[3]   Thu Jan 01 09:07:50 1970
    Level: 4 Link up [port 8]
[2]   Thu Jan 01 09:07:45 1970
    Level: 4 Link down [port 8]
[1]   Thu Jan 01 09:00:06 1970
    Level: 4 System Started
```

show log configuration command is used to show current system log configuration.
For example,

```
# show log configuration
  [System Log]
System Log Status      : Enable
Log Level(0-7): 7
Remote Log             : Disable
Remote Log Server IP : Empty
Remote Log Server IP : Empty
Remote Log Server IP : Empty
Remote Log Server IP : Empty
Remote Log Server IP : Empty
```

15. **show mac-address-table** command
This command is used to show Mac address table and configuration about it.

```
# show mac-address-table ?
  aging-time          Aging time for entries in the address table
  address             Address information
  interface           Ethernet or port channel-interface
  multicast           Knowns multicast addresses
  <cr>
```

show mac-address-table command will show mac address table content.
For example,

```
# show mac-address-table
Interface        MAC Address         VLAN       Type
================================================
Eth 1/3       00-00-E2-82-8C-E6              Learned
Eth 1/8       00-19-CB-B3-A6-30              Learned
Total mac address number: 2
```

show mac-address-table aging-time command will show aging time of mac address table.
For example,

```
# show mac-address-table aging-time
Status:       Enable
Aging time: 300 sec
```

show mac-address-table address x-x-x-x-x-x command will show the mac address table for mac address "x-x-x-x-x-x".
For example,

```
# show mac-address-table address 00-00-e2-82-8c-e6
Interface        MAC Address         VLAN       Type
================================================
Eth 1/3       00-00-E2-82-8C-E6              Learned
```

show mac-address-table interface ethernet 1/x command will show the mac address table for Port x. ("**x**" is the port number).

For example,

```
# show mac-address-table interface ethernet 1/3
Interface        MAC Address          VLAN        Type
================================================
Eth 1/3        00-00-01-00-00-20                Learned
Eth 1/3        00-90-CC-82-A5-D6                Learned
Eth 1/3        00-00-E2-82-8C-E6                Learned
Eth 1/3        00-00-F6-01-04-28                Learned
```

show mac-address-table multicast command will show multicast address table of IGMP Snooping function.

For example,

```
# show mac-address-table multicast
Group   VID   Group Address    Members Port
-----     ---    ---------------      -------------
```

16. **show mac-security** command

This command is used to show mac address security settings on port. There are two mac address security functions for ports. One is “accept” function that allows static mac addresses on ports to access network only. Another is “limit by mac no.” function and up to a limit number of mac addresses are allowed to access network from the port.

For example,

```
# show mac-security
 [MAC Security Configuration]
============================================================
   Port#      Max. MAC no.      Learned no.          Security Control
Eth 1/ 1        0                  N/A                    No Security
Eth 1/ 2        0                  N/A                    No Security
Eth 1/ 3        0                  N/A                    No Security
Eth 1/ 4        0                  N/A                    No Security
Eth 1/ 5       10                   0                     Limited by MAC no
Eth 1/ 6        0                  N/A                    No Security
Eth 1/ 7        0                  N/A                    Accept function
Eth 1/ 8        0                  N/A                    No Security
Eth 1/ 9        0                  N/A                    No Security
Eth 1/10        0                  N/A                    No Security
```

17. **show management** command

This command is used to show switch management security settings. The IP/subnet, access mode, and protocol functions security settings will be shown.

For example,

```
# show management
[Management IP configuration]
Index   Enabled          Address     /     Net Mask          Mode     Http Telnet SNMP
=====================================================================
  1        Yes                0.0.0.0/0.0.0.0                Modify   Yes     Yes     Yes
  2        No          0.0.0.0/255.255.255.255          View     No      No      No
```

```
  3       No          0.0.0.0/255.255.255.255      View     No     No     No
  4       No          0.0.0.0/255.255.255.255      View     No     No     No
==============================================================================
```

18. **show map** command

This command is used to show 802.1P priority, DSCP priority, and port-based priority to priority queues mapping. There are four priority queues on each port of the switch.

```
# show map ?
  dscp                    IP DSCP priority map
  port                    IP port priority
  priority                802.1p priority map
```

show map dscp command is used to show DSCP values(0~63) to priority queue mapping, and enable/disable status on each port for IP DSCP QoS function.

For example,

```
# show map dscp
QoS                 :Disabled
 Priority type:[0/1/2/3][Low/Normal/Medium/High]
 DSCP     Class
 --------  --------
    10        3
    20        2
    30        1
    40        0
 Others       0

 Port        DSCP
---------- -----------
 Eth 1/1    off
 Eth 1/2    off
 Eth 1/3    off
 Eth 1/4    off
 Eth 1/5    off
 Eth 1/6    off
 Eth 1/7    off
 Eth 1/8    off
 Eth 1/9    off
 Eth 1/10   off
```

show map port command is used to show connection port to priority queues mapping. This is called port-based priority.

For example,

```
# show map port
QoS                 :Disabled
 Priority type:[0/1/2/3][Low/Normal/Medium/High]
 Port        Class
----------  -----
 Eth 1/1      0
 Eth 1/2      0
```

```
Eth 1/3         0
Eth 1/4         0
Eth 1/5         0
Eth 1/6         0
Eth 1/7         0
Eth 1/8         0
Eth 1/9         0
Eth 1/10        0
```

show map priority command is used to show 802.1P priority values(0~7) to priority queues mapping, and 802.1P enable/disable status on each port.
For example,

```
# show map priority
QoS                 :Disabled
 Priority type:[0/1/2/3][Low/Normal/Medium/High]
 Precedence Class
            0    0
            1    0
            2    1
            3    1
            4    2
            5    2
            6    3
            7    3

 Port         802.1p
------------  -----------
 Eth 1/1     off
 Eth 1/2     off
 Eth 1/3     off
 Eth 1/4     off
 Eth 1/5     off
 Eth 1/6     off
 Eth 1/7     off
 Eth 1/8     off
 Eth 1/9     off
 Eth 1/10    off
```

19. **show mvr** command
This command is used to show MVR configuration.

show mvr command is used to show MVR VLAN setting one after another.
show mvr x command is used to show a MVR VLAN setting. "**x**" is the MVR VLAN ID.

For example,

```
# show mvr 200
   Active: Yes
   Name: MVR Test
   MVLAN: 200
   802.1p Priority: 0
   Mode: Dynamic
```

Source Port: Eth1/ 10
Receiver Port: Eth1/ 1 Eth1/ 2 Eth1/ 4 Eth1/ 5

Tagged Port:
MVR Group Configuration:

Name	Start Address	End Address
Test	224. 0. 0. 1	224. 0. 0. 5

20. **show port** command

This command is used to show port mirror function setting.

show port monitor command is used to show port mirror function setting.
For example,

```
# show port monitor
Mirror: Disable
Destination port: 2

Rx Filter Mode: All Packets
Rx Capture Frequency: Mirror one of 1 Packets
Rx port: Eth1/1

Tx Filter Mode: All Packets
Tx Capture Frequency: Mirror one of 1 Packets
Tx port:
```

21. **show protected-port** command

This command is used to show protected port settings.
For example,

```
# show protected-port
 [Protected Port  Configuration]
 Protected Port : Enable
 Ports/Port channel:  Eth1/ 2 Eth1/ 4
```

22. **show queue** command

This command is used to show traffic scheduling settings for priority queues on ports.

show queue mode command is used to show traffic scheduling mode for priority queues. It could be SP (Strict Priority, higher priority always get bandwidth service first) or WRR (Weight Round Robin, bandwidth is shared between priority queues with weighting).

For example,

```
# show queue mode
Queue mode: 1SP-3WRR
```

23. **show radius-server** command

This command is used to show settings for RADIUS Server of 802.1x function.

For example,

```
# show radius-server
Server 1*
  Active          : Yes
  IP Address    : 192.168.1.222
  Port Number : 1812
  Security Key: 12345678

Server 2*
  Active          : Yes
  IP Address    : 192.168.1.222
  Port Number : 1812
  Security Key: 12345678
```

24. **show running-config** command

This command is used to show current running configuration of the switch.

For example,

```
# show running-config
!building running-config, please wait.....
!
calendar set 9 33 11 january 1 1970
!
sntp server 220.130.158.54
!
sntp zone japan
!
!
!
!
automode negotiation
!
map dscp 0 10 3
map dscp 1 20 2
map dscp 2 30 1
map dscp 3 40 0
queue mode 1sp-3wrr
!
……
……
!
interface vlan 1
ip address 192.168.1.10 255.255.255.0
!
!
!end
```

25. **show rate-limit** command

This command is used to show rate limit settings.

For example,

```
# show rate-limit
[Rate Control Configuration]
Packet Drop for Ingress Limit: Disable
============================================================
  Port      Ingress-Unit   Ingress-Rate      Egress-Unit     Egress-Rate
============================================================
    1        62.5Kbps       No Limit          62.5Kbps       No Limit
    2        62.5Kbps       No Limit          62.5Kbps       No Limit
    3        62.5Kbps       No Limit          62.5Kbps       No Limit
    4        62.5Kbps       No Limit          62.5Kbps       No Limit
    5        62.5Kbps       No Limit          62.5Kbps       No Limit
    6        62.5Kbps       No Limit          62.5Kbps       No Limit
    7        62.5Kbps       No Limit          62.5Kbps       No Limit
    8        62.5Kbps       No Limit          62.5Kbps       No Limit
    9        62.5Kbps       No Limit          62.5Kbps       No Limit
   10        62.5Kbps       No Limit          62.5Kbps       No Limit
============================================================
```

26. **show rmon** command

This command is used to show rmon enable/disable status.

For example,

```
# show rmon
RMON fuction:Disabled
```

27. **show snmp** command

This command is used to show SNMP configuration of the switch.

For example,

```
# show snmp
[SNMP Configuration]
Object ID        :
System up Time: 6232 (seconds)
System Name      :
Location         :
Contact name     :
Get Community : public
Set Community : private
[Trap Community]
ID   Status      Community          IP Address
1    Disabled    public             0.0.0.0
2    Disabled    public             0.0.0.0
3    Disabled    public             0.0.0.0
4    Disabled    public             0.0.0.0
5    Disabled    public             0.0.0.0
Version: V3V2cV1
Username: admin
SnmpSecurityLevel: noauth
```

Authentication: MD5
Privacy: Des

28. **show sntp** command

This command is used to show system time settings of the switch. (D.S.T. means Daylight Saving Time)

For example,

```
# show sntp
====================================
[Time Configuration]
====================================
Get Time By    : Manually
Time Server    : 220.130.158.54
Time Zone      : Japan(+9)(37)
Current Time : 1970/01/01-10:46:24
D.S.T. status: Disable
D.S.T. start : 1st/SUN/JAN/0:00
D.S.T. end     : 1st/SUN/JAN/0:00
====================================
```

29. **show spanning-tree** command

This command is used to show spanning tree configuration of the switch.

show spanning-tree command is used to show all spanning tree configuration (for bridge and ports).
show spanning-tree ethernet 1/x command is used show spanning tree configuration of Port x. ("**x**" is the port number.)

For example,

```
# show spanning-tree ethernet 1/5
Bridge Port Number:              5
Port Priority(0..240),in steps of 16 : 128
Port State:                      Linked Down
Port Enable :                    Enabled
Is edge   :                      No
Port Path Cost(1..65535):    100
Port Designated Root:            00:00:00:00:00:00    [ 0 ]
Port Designated Cost:            0
Port Designated Bridge:          00:00:00:00:00:00    [ 0 ]
Designated Port:                 5: [ 128 ]
Port Forward Transitions:    0
Port Role:                       Nonstp
Point To Point:                  Yes
```

30. **show system** command

This command is used to show general system information/configuration of the switch.

For example,

```
# show system
System Configuration
Main Board Information:
Firmware Version:          2.01.19 (built at Mar  9 2010 11:07:22)
Mac Address:               00:00:00:00:53:47
Number of Ports:           10
1Q VLAN Max. Group:        1024
DHCP Client:               Disable
Time Server:               Disable
System Log Status:         Enable
Remote Log:                Disable
Web server:                Enable
Web server port:           80
Web secure server:         Disable
Web secure server port:    443
```

31. **show trunk** command

This command is used to show trunk configuration of the switch.

```
# show trunk ?
  configuration        Show Trunk Configuration
  all                  Shows all Trunking Group Configuration
  group                Shows Each Trunking Group Configuration
```

show trunk configuration command is used to show trunk function enable/disable setting.

show trunk all command is used to show port member settings of all trunk groups.

show trunk group x command is used to show port member settings of Trunk Group x. ("**x**" is the trunk group index.)

For example,

```
# show trunk group 1
Trunk 1
Member selection:        No Member selection
```

32. **show version** command

This command is used to show system version information and model information.

For example,

```
# show version
Firmware Version:     2.01.23 (built at Jul  9 2010 13:55:46)
Number of Ports:      26
Model Name:           SW24F2GB
```

33. **show vlan** command

This command is used to show VLAN configuration of the switch.

```
# show vlan ?
  private-vlan          Private VLAN
  id                    VLAN interface
  name                    VLAN interface name
  port-based            Port-Based Virtual LAN Configuration
  metro                 Metro Mode Configuration
  <cr>
```

show vlan command is used to show all 802.1Q VLAN settings (enable/disable, VLAN ID, VLAN Name, VLAN Type, and Assigned ports).

show vlan id x command is used to show VLAN setting of VLAN x. ("**x**" is the VLAN ID).

show vlan name yyy command is used to show VLAN setting of VLAN yyy. ("**yyy**" is the VLAN name, and upper case and lower case are different - "a" and "A" are different.)

For example,

```
# show vlan id 100
Vlan ID:    100
VLAN Type: Static
Name:         Test-2
Ports/Port channel:    Eth1/ 5(su) Eth1/ 6(su)

# show vlan name Test-2
Vlan ID:    100
VLAN Type: Static
Name:         Test-2
Ports/Port channel:    Eth1/ 5(su) Eth1/ 6(su)
```

show vlan private-vlan command is used to show Private VLAN settings.
For example,

```
# show vlan private-vlan
[Private VLAN Port Configuration]
 Port#       Port Type     Primary VLAN     Community VLAN     Isolated VLAN
================================================================================
Eth 1/ 1       Normal            none              none              none
Eth 1/ 2       Normal            none              none              none
Eth 1/ 3       Normal            none              none              none
Eth 1/ 4       Normal            none              none              none
Eth 1/ 5       Normal            none              none              none
Eth 1/ 6       Normal            none              none              none
Eth 1/ 7       Normal            none              none              none
Eth 1/ 8       Normal            none              none              none
Eth 1/ 9       Normal            none              none              none
Eth 1/10       Normal            none              none              none
```

show vlan port-based command is used to show Port-based VLAN configuration.
For example,

```
# show vlan port-based
[Port-based VLAN Configuration]
Port-based VLAN : Disabled
================================================
[VLAN]   [Port List]
======   ========================================
 [ 1]        1   2   3   4   5   6   7   8   9   10
======= ========================================
 [ 2]        2
======= ========================================
 [ 3]        2
======= ========================================
 [ 4]        2
================================================
```

show vlan metro command is used to show Metro-VLAN settings.
For example,

```
# show vlan metro
Metro VLAN:       Disable
Metro Uplink Port:    10
```

6.3 About Telnet and SNMP Management Interfaces

6.3.1 About Telnet Management Interface

If you want to use Telnet to manage the switch from remote site, you have to set the IP/NetMask/Gateway address to the switch first from console. Then use "**telnet <IP>**" command to connect to the switch. Its operation interface is the same as console interface.

6.3.2 About SNMP Management Interface

If you want to use NMS to management the switch from remote site, you have to set the IP/NetMask/Gateway address to the switch and configure the SNMP setting of the switch from console first. Then you can use SNMP management program to manage this switch.

This switch supports SNMP v1, v2c, and v3 agent function and MIB II(Interface), Bridge MIB, 802.1Q MIB and Private MIB. The default GET community name is “public” and SET community name is “private”.

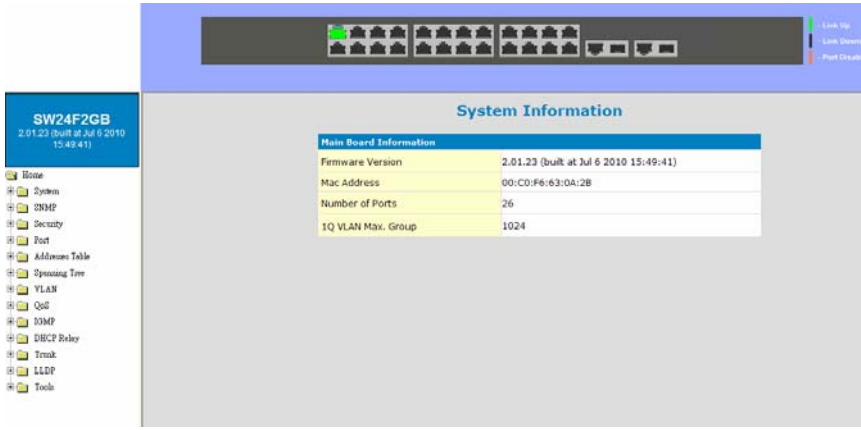
This switch supports up to five trap receivers with different trap community names.

6.4 Management with Http Connection

Users can manage the switch with Http Web Browser connection. The default IP setting is **192.168.1.1** and NetMask **255.255.255.0**. The default IP Gateway is **192.168.1.254**. Before http connection, IP address configuration of the switch could be changed first.

1 Please follow the instruction in Section 6.2 to complete the console connection.
2 Login in with "**admin**" (password is also "**admin**" by default.)
3 Use "**show ip interface**" command to check IP address of the switch first.
4 If IP address needs to be changed, follow the steps ...
   4.1 Enter "**config**" command, and the prompt will become "(config)**#**".
   4.2 Enter "**interface vlan 1**" command, and the prompt will become "(config-if)**#**".
   4.3 Enter "**ip address xxx.xxx.xxx.xxx yyy.yyy.yyy.yyy**" command (**xxx.xxx.xxx.xxx** is the IP address and **yyy.yyy.yyy.yyy** is the netmask) to modify IP address of the switch.
   4.4 Enter "**exit**" command to go back to "(config)**#**" prompt.
   4.5 If IP Gateway will be set, enter "**ip default-gateway xxx.xxx.xxx.xxx**" command to set the IP gateway of the switch. (**xxx.xxx.xxx.xxx** is the IP address.)
   4.6 Enter "**exit**" command to go back to "**#**" prompt.
   4.7 Enter "**show ip interface**" to check the IP settings.
   4.8 Enter "**show ip redirects**" to check IP gateway setting.

After IP address configuration done and the switch is connected to network, users can start Http connection by entering IP address of the switch to the web address line in Web Browser. A login screen will be prompted for user name and password. The default user name and password is "**admin**" / "**admin**". Then the management homepage will appear.



Left part of the homepage is a function list. Users can select one of them for status monitoring or switch configuration.

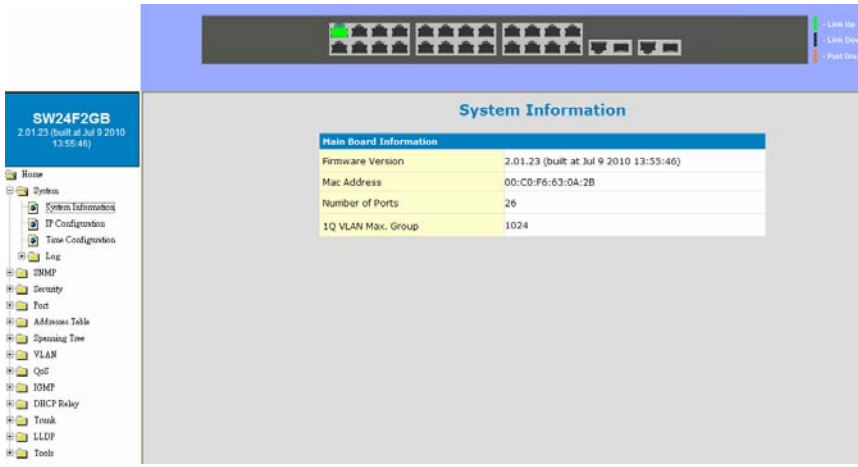
Upper part of the homepage is the link status of the switch. Three different colors are used to show different status of ports – Link Up, Link Down and Port Disable.

Middle part of homepage is the main operation area for each function.
The details about management with http connection will be shown in the following sub-sections.

6.4.1 System

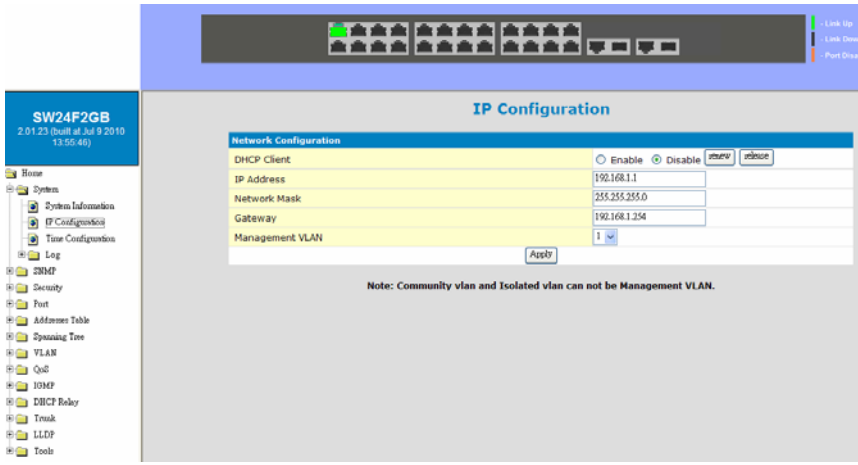
"System Information" is the homepage of the switch. And there are four sub-functions for it.

6.4.1.1 System Information



This function lists the system information about the switch. You can find the firmware version, Mac address, connection port number, and maximum VLAN group number here.

6.4.1.2 IP Configuration

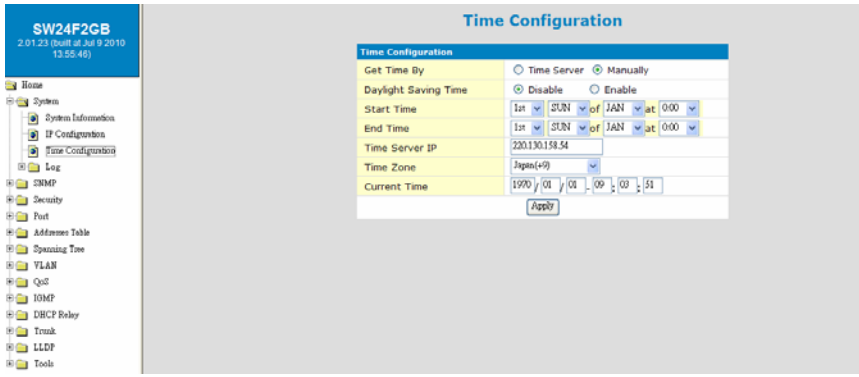


This function is used to setup IP configuration of the switch.
You can enable DHCP client function to get IP configuration from DHCP server automatically. Or, disable DHCP client function and set IP configuration manually.

Management VLAN : This is used to setup the VLAN ID for remote management interface of the switch. Only users in the same VLAN can manage the switch remotely. For example, setting it to "5" will allow users in the VLAN with VLAN ID 5 to manage the switch remotely. It works only 802.1Q VLAN function is enable.

About DHCP Client [renew] and [release] button ...
[renew] button: If DHCP client function is enabled, you can click [renew] button to refresh the lease time of the IP address. If IP configuration is not got when boot-up, clicking [renew] button will try to get IP configuration again.
[release] button: If DHCP client function is enabled and IP configuration is got, clicking [release] button will release current IP configuration. After that, you can click [renew] button to get the IP configuration again.

6.4.1.3 Time Configuration



There are two ways to get the system time.

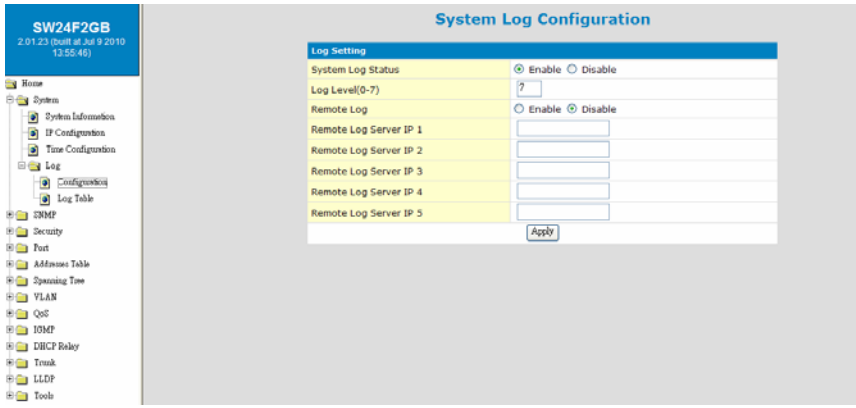
a). Get time from Time Server
This switch support NTP protocol to get time from Internet time server. For such application, you have to select Get Time by “Time Server”, input the IP of Time Server, and select the Time Zone of your location. Then click [Apply]
If time is got from Time Server, it will be shown at “Current Time”.
For such application, you have to get the IP of Time Server from your network administrator first.

b). Set time manually
This switch can count time internal. You can select Get Time by “Manually”, and input current time manually. Then click [Apply].

About [Daylight Saving Time] ...
Daylight Saving Time function will set the system time one-hour early than normal time in a period of time. [Start Time] and [End Time] can be used to set the time period.

6.4.1.4 Log

[Configuration]



Users can configure System Log function and view log records here. If this function is enabled, the switch will record events to a log file in flash.

Up to 512 records are allowed for local logging. If more than 512 events happen, the records will be overwritten from beginning. And if remote syslog server is applied, the switch will also send event record to the syslog server.

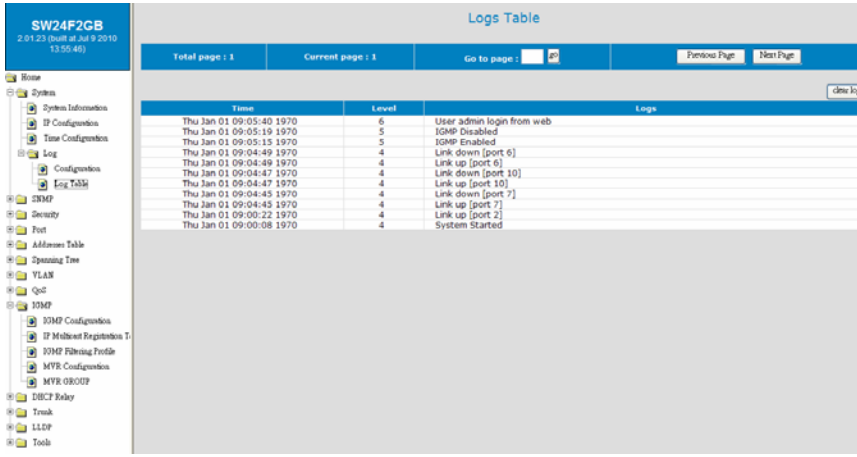
About log function configuration ...
System Log Status : This can enable/disable system logging function.

Log Level (0~7) : Log levels 0~7 are defined as below. And events with lower log level than this number will be recorded.

Level	Name	Description
0	Emergency	System is unusable
1	Alert	Action must be taken immediately
2	Critical	Critical conditions
3	Error	Error conditions
4	Warning	Warning conditions
5	Notice	Normal but significant condition
6	Informational	Informational messages
7	Debug	Debug-level messages

Remote Log : This can enable/disable remote syslog function.
Remote Log Server IP : This is the syslog server IP for remote logging. Up to five syslog servers is supported. Event logs will be sent to those syslog servers at the same time.

[Log Table]



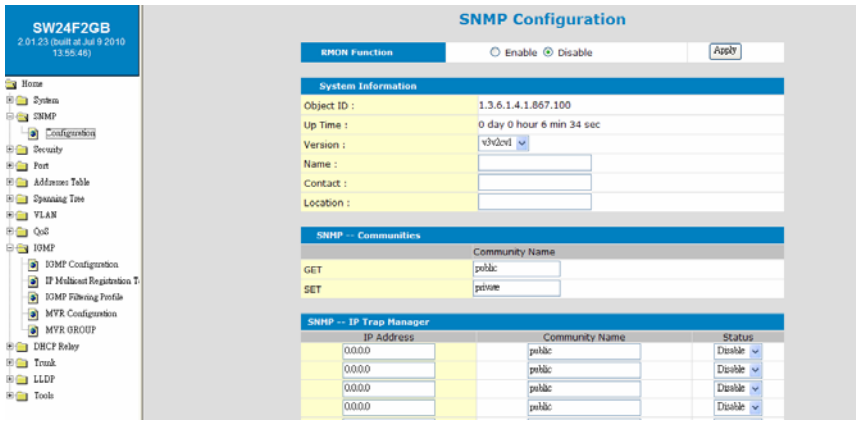
You can view log table content here.

There could be more than one page. You may change the page or go to a page by its operation icons.

Clicking [clear log] button will clear the local log table.

6.4.2 SNMP

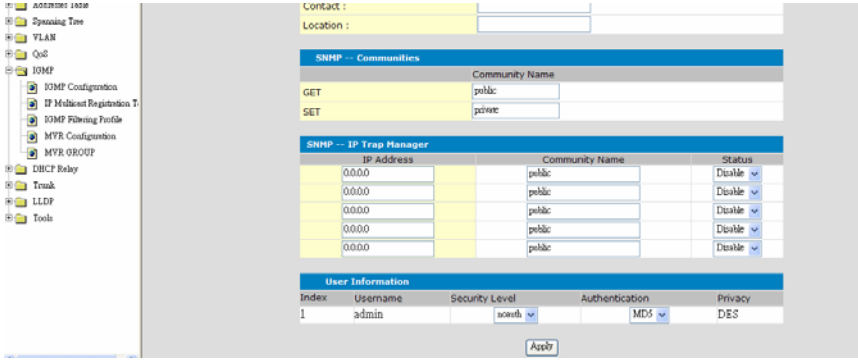
This function is used to configure SNMP and RMON function of the switch. This switch supports SNMP v1, v2c, and v3 agent function and MIB II(Interface), Bridge MIB, 802.1Q MIB and Private MIB. For RMON, this switch supports Group 1,2,3,9.



RMON Function : RMON function can be enabled/disabled here. If RMON is enabled, Group 1,2,3,9 are supported.

[System Information]
Object ID: this is the SNMP Object ID of the switch for SNMP management.
Up Time: this is the power-up running time of the switch.
Version: this is used to select SNMP agent operation version.
Name: this the host name of the switch.
Contact: this is the contact information for the switch.
Location: this is the location information of the switch.

[SNMP -- Communities]
Get: this is the community string of GET command for SNMP operation. GET command is used to read switch configuration/information.
Set: this is the community string of SET command for SNMP operation. SET command is used to set switch configuration.



[SNMP — IP Trap Manager]
Trap function will send notice message to SNMP management station when some events happen. Up to five SNMP management stations are supported for Trap function.
The community string and enable/disable setting for each trap are set here.

[User Information]
This is used to configure SNMPv3 administrator settings. The default user name is “admin”. The security level and authentication manner could be configured here. The default encryption for privacy is by DES.

The security level could be ...

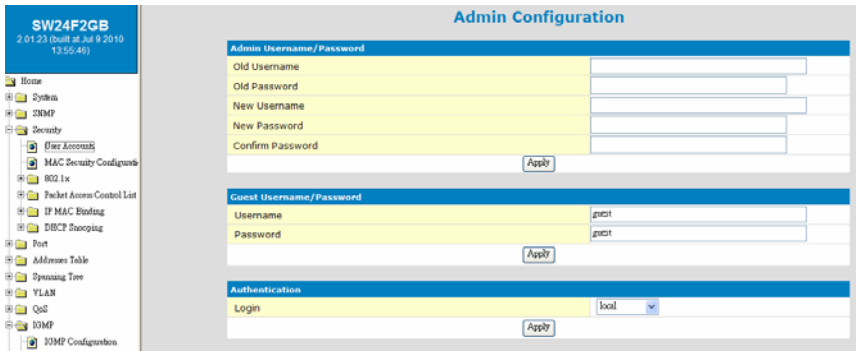
- **noauth** : no authentication, no encryption
- **auth** : do authentication, no encryption
- **priv** : do authentication and encryption(by DES)

The authentication manner could be **MD5** or **SHA**.

6.4.3 Security

This function is used to configure security functions of the switch. Those security functions are Administrator Management Security, Mac ID Access Security, ACL, IP-Mac-Port Binding function, 802.1x Authentication and DHCP Snooping.

6.4.3.1 User Accounts (Administrator Management Security)



Administrator Username/Password : This is for network administrator to change his/her username and password. (Default is admin/admin.)

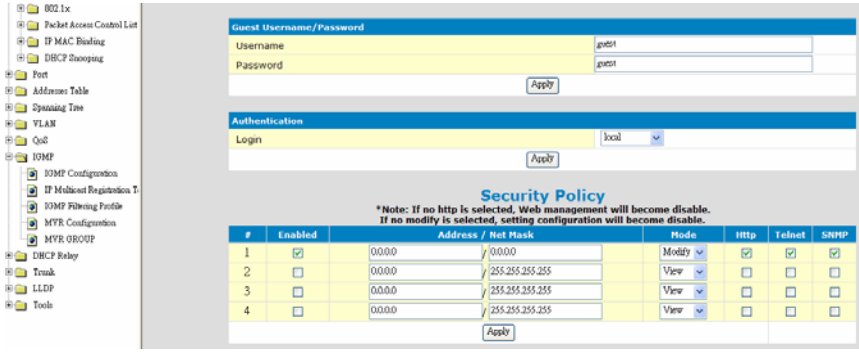
Guest Username/Password : This is used to setup the username/password for guest-right user who just can view the setting of the switch.

Authentication : This is used to setup the authentication manner for administrator of the switch when login by http(s)/telnet for management. It could be authenticated by local switch or by RADIUS Server.

- **local**: authenticated by local switch
- **radius**: authenticated by RADIUS Server
- **local, radius**: authenticated by local switch first. If authentication fail, try by RADIUS Server next

RADIUS Server is set in 802.1x function.

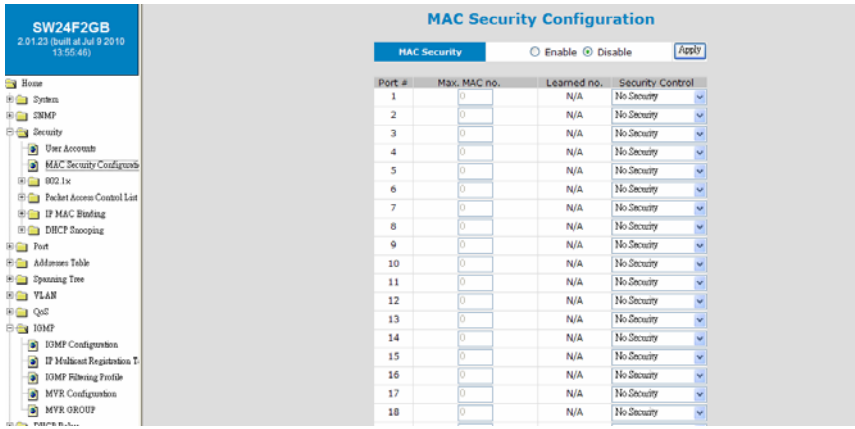
[Security Policy]



This is used to setup the IP addresses of administrators that can manage this switch. They have different access rights set in “Mode”. And the remote management interfaces (Http/Telnet/SNMP) could be enable/disable for different administrators. This function is for security policy of switch management.

Note: Remember to enable at least one IP/Subnet with Modify right for Http/ Telnet/SNMP interface. Otherwise, configuring switch from remote will become impossible. In that case, you can manage the switch from console only.

6.4.3.2 Mac Security Configuration



There are two Mac address security modes for the switch. One is Static Mac address Filter on Port, another is Dynamic Mac address Number Limit on Port.

[Static Mac Address Filter on Port]
This function can limit only static Mac addresses on the port can access network. Other Mac addresses will be rejected by the port. Sometimes it is called "Mac-Port Binding".

Follow the steps to configure it.
a. Set the "Security Control" to "Accept" on those ports that will apply static Mac address security. Then click [Apply].
b. Set Static Mac Addresses that are allowed for network access at [Static Address] of [Address Table] function. Please refer to that section for the details.

[Dynamic Mac Address Number Limit on Port]
This function can limit the Mac address number to access network through a port. For example, five Mac addresses are allowed for Port 2. That means up to five users are allowed, but don't care who the users are.

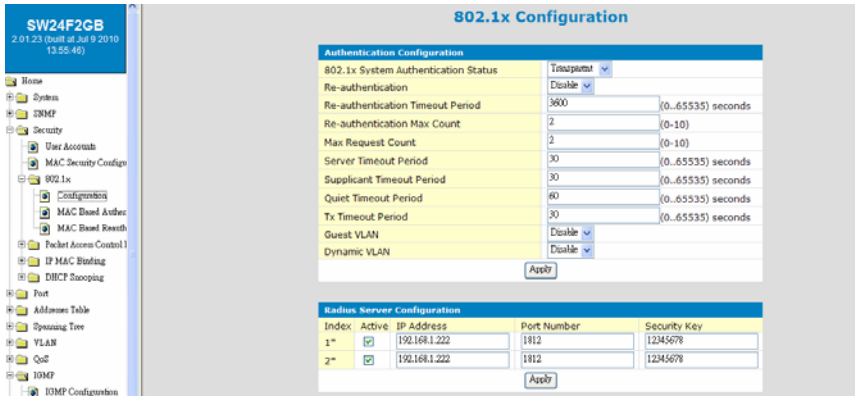
Follow the steps to configure it.
a. Set the "Security Control" to "Limited by MAC no." on those ports that will apply dynamic Mac address number security. And set the "Max. MAC no." as the users number allowed on the ports.
b. Then click [Apply].

The switch will learn users automatically and show current user number at "Learned no.".

6.4.3.3 802.1x

A. Configuration

If 802.1x function is enabled, the switch will act as an authenticator for users accessing network through the switch. And a RADIUS server is needed for the authentication function. Users will be asked for username and password before network access. If the RADIUS server authenticates it, the switch will enable the port/user for network access. This function is very useful for network security application to prevent illegal users access network through the switch.



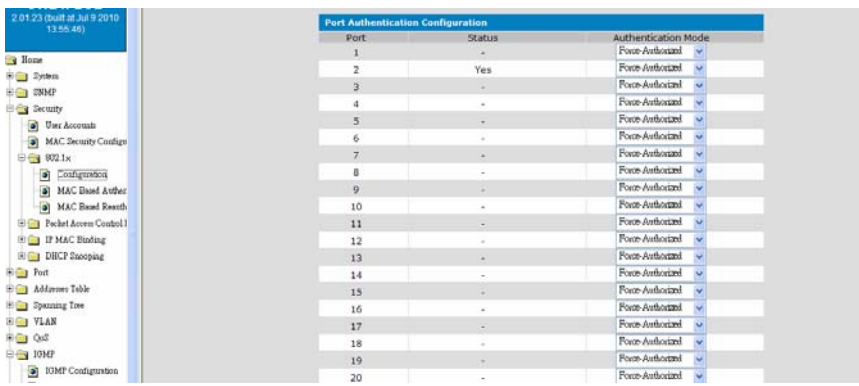
Follow the steps to do basic configuration for 802.1x function.

1. Select 802.1x operation mode in “802.1x Authentication Status” - Port Based or Mac Based. If Transparent mode is selected, 802.1x packet is just forwarded and no any further setup is needed.
2. Assign RADIUS server IP address, Port number, and Security Key. Two RADIUS servers are supported for redundant applications. Remember to check [Active] to enable the settings of RADIUS server.
3. Set the Ports that will applied 802.1x security to “Auto” in “Port Authentication Configuration”.

Here is the details for 802.1x function configuration.

1. **802.1x Authentication Status**: [Disable / Port-Based / MAC-Based/Transparent]
   Disable: disable 802.1x function
   Port Based: 802.1x will run in Port-Based mode. If authenticated, the port will be enabled for network access.
   Mac Based: 802.1x will run in MAC-Based mode. If authenticated, the user will be enabled for network access,
   Transparent: only forwarding 802.1x packets
2. **Re-authentication (enable/disable)**, **Timeout Period** and **Max Count**:
   The re-authentication function will re-authenticate users after the timeout period. The Max Count is the maximum re-try count between the switch and

3. **Max Request Count** and **Server Timeout Period**:
   The Server Timeout Period is the timeout period for the request between the switch and RADIUS server.
   The Max Request Count is the maximum re-try count between the switch and RADIUS server before authentication fail.
4. **Supplicant Timeout Period**:
   This is the timeout value between the switch and users (called “supplicant” in 802.1x) after first identification. The valid value is 0~65535.
5. **Quiet Timeout Period**:
   This is the quiet timeout value between the switch and user before next authentication process when authentication fails.
6. **Tx Timeout Period**:
   This is the timeout value for the identification request from the switch to users. The request will be re-tried until the **Re-authentication Max Count** is met. After that, authentication fail message will be sent. The valid value is 0~65535.
7. **Guest VLAN**:
   This function will put those users who are authenticated fail in 802.1x operation to a “Guest VLAN”. The Guest VLAN could be selected here.
8. **Dynamic VLAN**:
   This function will assign user to a VLAN that are indicated by RADIUS Server when 802.1x authentication is pass. That is, VLAN for users are assigned from RADIUS Server.



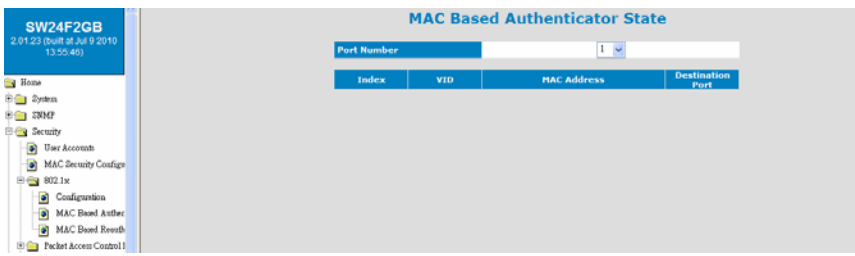
[Radius Server Configuration]
This function is for the configuration between switch and RADIUS server. You can assign the IP address of Radius Server, the protocol port number, and the security key.
Two RADIUS servers are supported for redundant applications. The first RADIUS server will be used for authentication first. If connection fails, the second RADIUS server will be used for authentication.
Remember to check [Active] to enable the settings of RADIUS server.

[Port Authentication Configuration]
The Port Authentication Configuration is used to select the authentication mode for each port of the switch.

1. Auto: This is the normal 802.1x operation mode. The authentication status (authenticated or unauthenticated) depends on the authentication result of port.
2. Force-Authorized: This mode will force the port always being authentication successful in 802.1x process and the real authentication result will be ignored.
3. Force-Unauthorized: This mode will force the port always being authentication fail in 802.1x process and the real authentication result will be ignored.
4. None: This mode will disable 802.1x operation on this port.

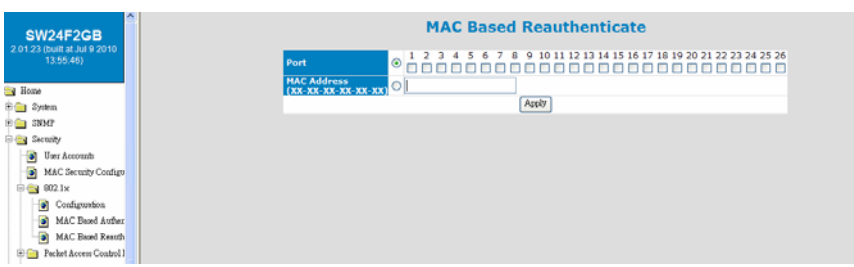
And you can see current 802.1x status on each port.

B. MAC Based Authenticator State



With this function, the authenticated Mac ID will be listed.
Select a port, and the Mac ID list for the port will be shown.

C. MAC Based Reauthenticated



This function is used to do reauthentication for some Mac ID or some port.

If some Mac ID will be asked to do reauthentication, check “Mac Address” and

enter the Mac ID. Then click [Apply]. The network connection for the user will be blocked and the user will be asked to do authentication again.

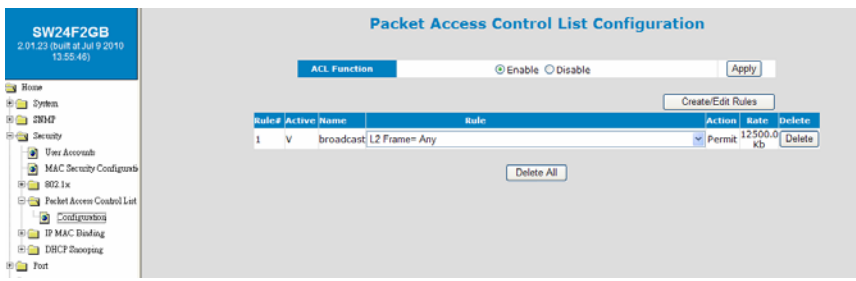
If some port will be asked to do reauthentication, check “Port” and select the Port. Then click [Apply]. The network connection for the users on the port will be blocked and the users will be asked to do authentication again.

6.4.3.4 Packet Access Control List

This page is used to configure ACL(Access Control List) function of the switch. ACL can define a pattern of packet - called a ACL rule. The pattern are L2~L4 content of packet. If packets match the pattern, the packets could be permited, denied, or forwarded to other ports (called "Action"). Rate limit can also be applied for matched packets.

Up to 256 ACL rules could be defined for the switch. They are configured in this web page.

Clicking "Packet Access Control List", the following page will be shown. ACL function can be enabled/disabled here. And ACL rule table will be shown in the page.



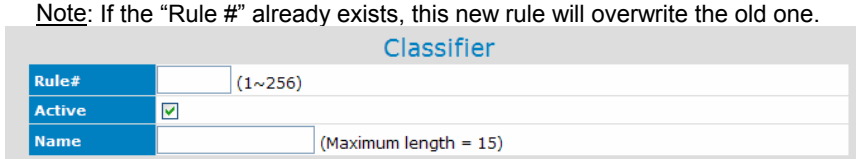
[View a ACL Rule]
Clicking on "Rule" part of a ACL rule, content of a rule will be displayed.

[Delete a ACL Rule]
Clicking [Delete] button, the ACL rule will be deleted.

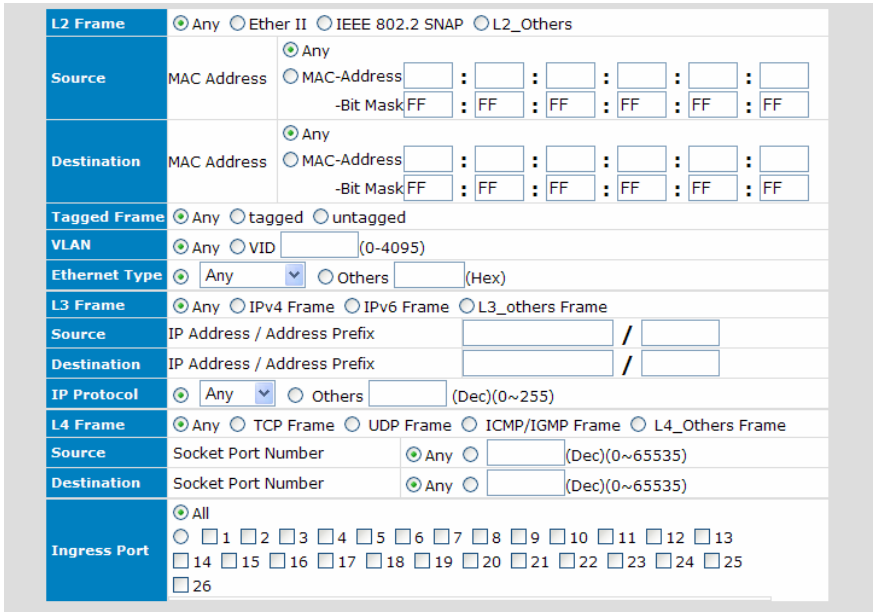
[Create a ACL Rule]
Clicking [Create New Rules] button, the ACL creating page will be shown.

Follow the steps to create a ACL rule.

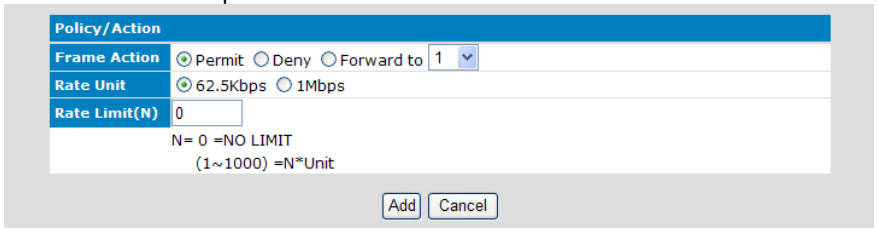
1. Enter "Rule #"(the index number in ACL Rule Table), check "Active", and enter "Name" of the rule.
   Note: If the "Rule #" already exists, this new rule will overwrite the old one.



2. Set the L2~L4 content of packet as the pattern for rule matching.



3. Set the action for packets that match the rule.



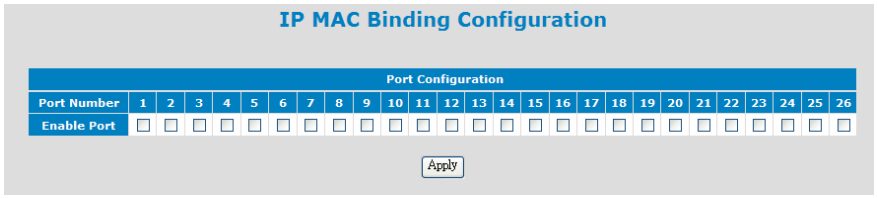
4. Click [Add] button to add this new rule to ACL Rule Table.

6.4.3.5 IP Mac Binding

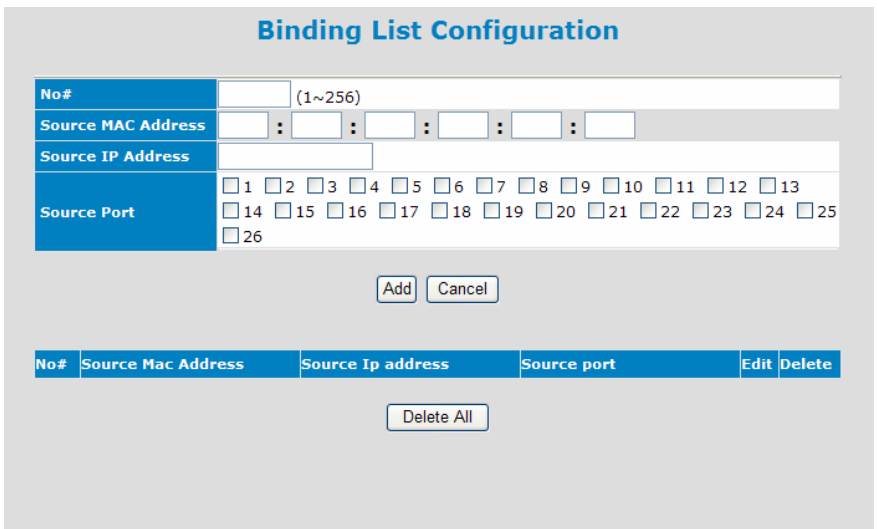
This function is used to configure IP-Mac_Address-Port binding function. Limiting the IP address and/or Mac Address for network access on connection port is a popular security application of switch. That can prevent illegal IP address and/or illegal Mac address entering network.

Two steps to complete the setting.

1. Enable this function on port in “Port Configuration” page of IP Mac Binding function.



2. Set the IP address and/or Mac address for access limit on ports in “Address Binding List” page of IP Mac Binding function.
   Note: “No#” is the index of IP-Mac_address-Port in the Address Binding List. If the “No#” already exists, this new setting will overwrite the old one.

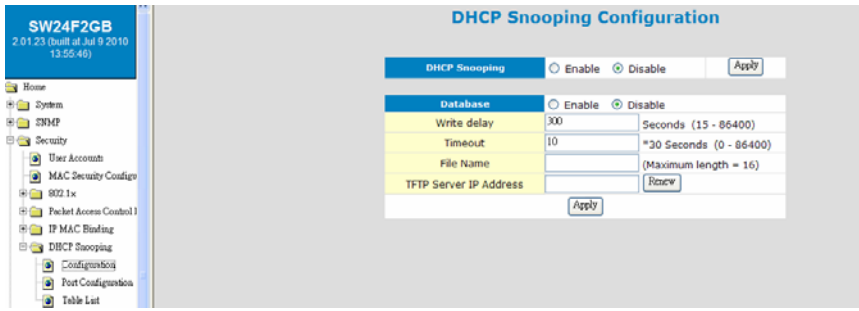


6.4.3.6 DHCP Snooping

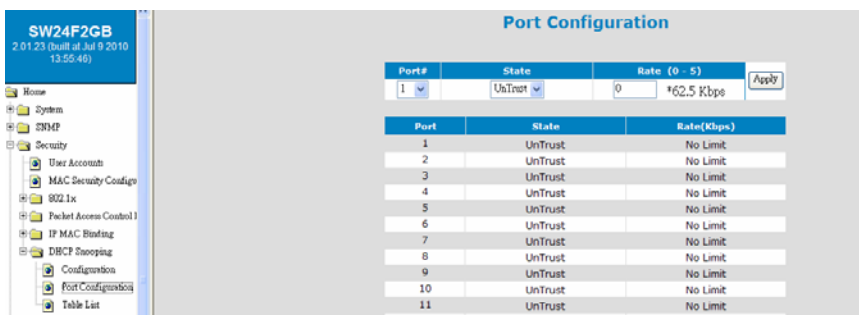
This function is used to configure DHCP Snooping function. DHCP Snooping function can prevent illegal DHCP server by trusted port assignment. And the result of DHCP Snooping will be shown in a table and be applied as IP-Mac-Port binding security on port.

The DHCP Snooping Table could be saved in a TFTP server. Administrator can load it from the server if switch reboot.

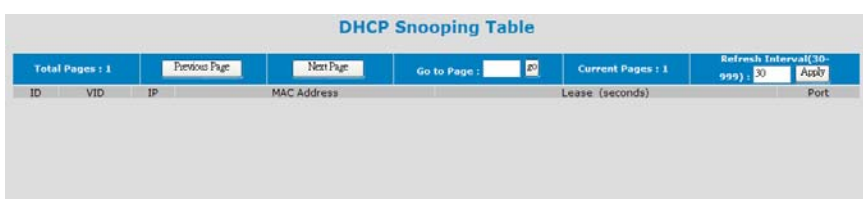
Follow the steps to configuration DHCP Snooping function.
1. Enable DHCP Snooping function in “Configuration” page.



2. Select trusted port for DHCP server connection in “Port Configuration” page.

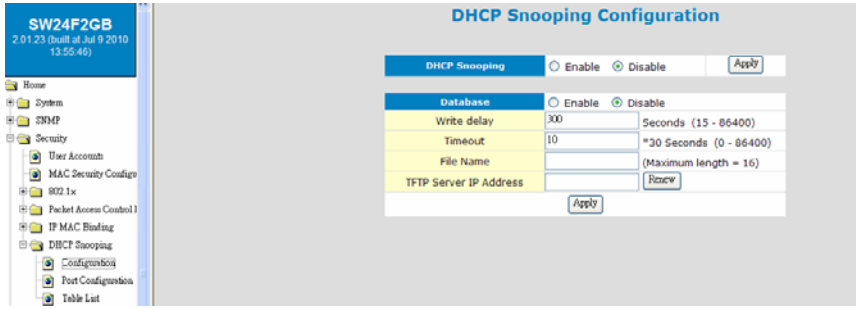


3. If any PC doing DHCP request through the switch, the result will be shown in “Table List” page.



4. If DHCP Snooping table will be backup to a TFTP server, follow the steps to do it.

a. enable the Database function in “Configuration” page.
b. set IP address of the TFTP server.
c. give the file name.
d. set the Write Delay as backup interval.
e. set the Timeout for TFTP server connection.



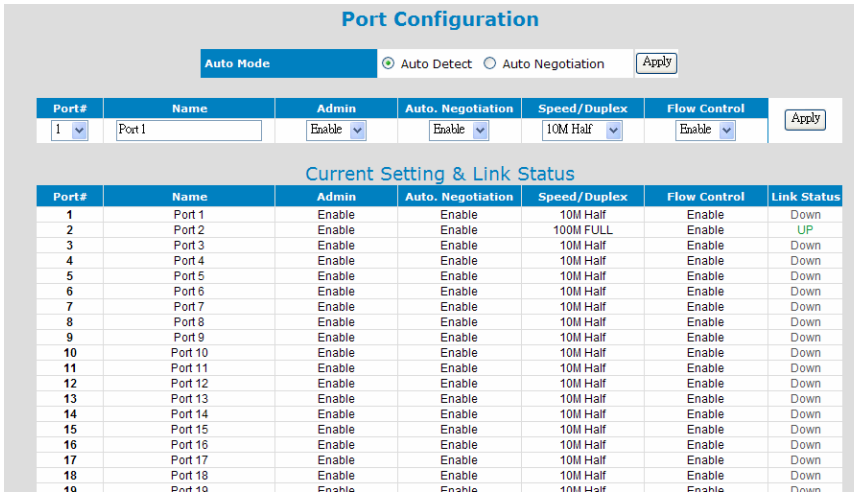
After the setting, DHCP Snooping Table will be backup to the TFTP server. Clicking [Renew] button can get the backup DHCP Snooping Table from TFTP server if switch is reboot.

Note: If DHCP Snooping function is enabled, only users getting IP from DHCP server can access network. DHCP fail or static IP users will be rejected.
But if the users is assigned in “IP Mac Binding” function, the network access will still be accepted.

6.4.4 Port

This section is about configurations for ports. For port speed setting, protected port setting, mirror port setting, port bandwidth limit, and port statistics.

6.4.4.1 Port Configuration



This function is used to configure port settings of the switch. You can enable /disable a port, set it to fixed 10M or 100M or 1000M ... and so on.

Auto Mode : User can select the operation mode of port when “auto” is set to disabled.

For “Auto Negotiation” mode, the switch will do port auto-negotiation function ON/OFF when the auto function of port (in Port Configuration setting) is enabled/disabled.

For “Auto Detect” mode, the switch will always keep port auto-negotiation function ON but just modify its attribution if auto function of port (in Port Configuration setting) is disabled.

For applications, you should select “Auto Detect”mode if the connected device is auto-negotiation enabled. (For example, customer’s PC is auto-negotiation enable and you want to set his network connection to work at 10Mbps.)
And you can select “Auto Negotiation”mode if the connected device is auto-negotiation disabled (it is called forced mode, sometimes). Some of old TX-FX Converters needs to work in this mode because FX supports 100/Full forced mode only.

For most applications, “Auto Detect” mode is OK.

Port Setting : It is for modifying the setting of port. Follow the steps to do it.

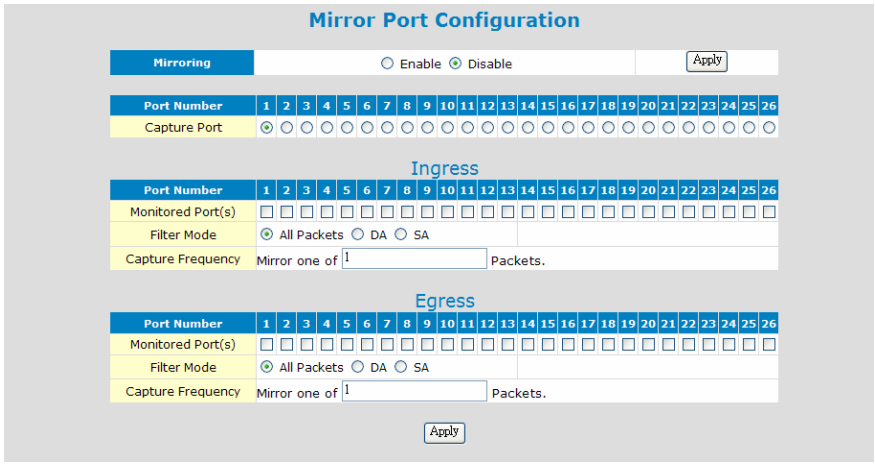
1. Select the port that you want to modify in “Port#” first.
2. Fill the name of the port.
3. Select Enable/Disable state in “Admin”. If Disable is selected, this port will be disabled for any network access.
4. Select the Enable/Disable state of Auto function of port. The auto mode could be auto-negotiation or auto-detect operation when auto is set to disable.
5. If Auto is disabled, select the operation speed and duplex mode of the port in “Speed/Duplex”.
6. Select the Enable/Disable state of Flow Control function of port.
7. Click [Apply] after any modification.

Current Setting & Link Status : It is current status of ports.

Name: The name of the port.
Admin: It shows current port enable/disable status.
Auto: It shows current Auto enable/disable status of ports.
Speed/Duplex: It shows current working speed and duplex mode if ports are link up. Or the setting of speed/duplex when auto is disable.
Flow Control: It shows current Flow Control function status of ports.
Link Status: It shows the link status of each port.

6.4.4.2 Mirror Port Configuration

This switch operates in store-and-forward algorithm so it is not possible to monitor network traffic from another connection port. But the port mirror function can copy packets from some monitored port to another port for network monitor.



Mirroring : This is used to enabled/disable port mirror function.

Capture Port : This is used to set the capture port. Switch will copy traffic from Monitored Port to this port if Mirror function is enabled.

Monitored Port : This is the monitored port. The switch will copy traffic from this port to Capture Port. If this is set for "**Ingress**", the ingress traffic will be copied to capture port. If this is set for "**Egress**", the egress traffic will be copied to capture port.

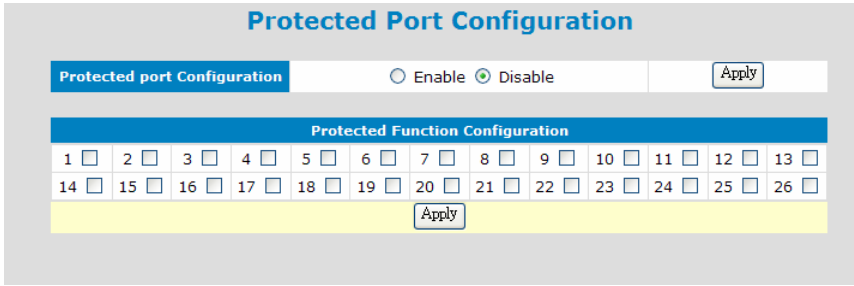
Filter Mode : The traffic mirror could be done for all packets or for some special source/destination Mac address. It is set with "Filter Mode". If "DA" or "SA" is selected, a Mac address field will be prompted for Mac address entering.

Capture Frequency : The packet mirroring could be done for every packet or every some packets. It is set here.

6.4.4.3 Protected Port Configuration

This is used to configure portected port function of the switch.

If ports are marked as “Protected Port” and this function is enabled, they can not communicate with each other even they are in the same VLAN. But they can communicate with other “non-protected port” if they are in the same VLAN. It is for some security applications.

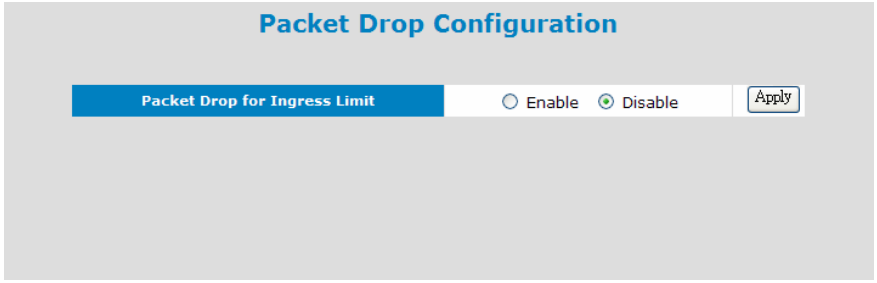


6.4.4.4 Rate Limit

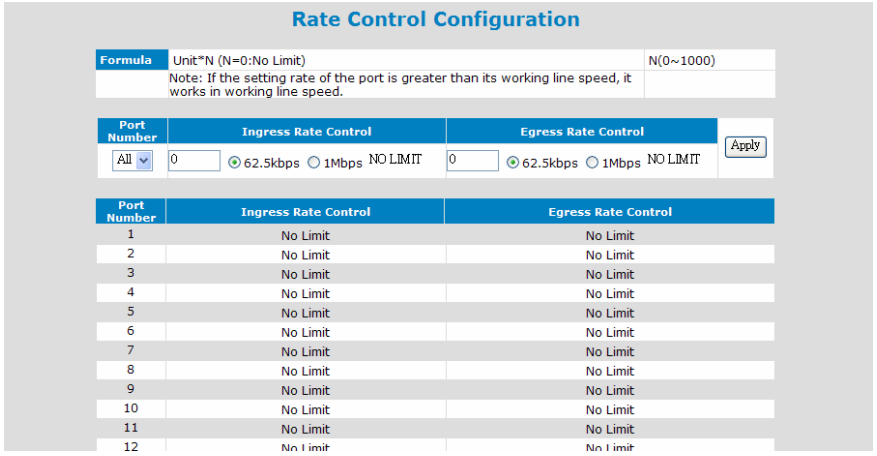
Two traffic rates could be controlled by the switch. One is the ingress/egress traffic of each port. Another is Broadcast/Multicast/Unicast Storm Control.

1) Packet Drop Configuration
This function is used to enable/disable packet dropping function when ingress traffic exceeds ingress rate limit on port.

When Ingress traffic rate exceeds Ingress Rate Limit, the switch can drop packets or pause the traffic. If packet drop is enabled, flow control of ports will be disabled and packets could be dropped. If packet drop is disabled, flow control of ports will be enabled and pause frame will be sent when ingress traffic rate exceeds the limit.



2) Rate Control Configuration
This function can setup the ingress and egress rate limit of ports.

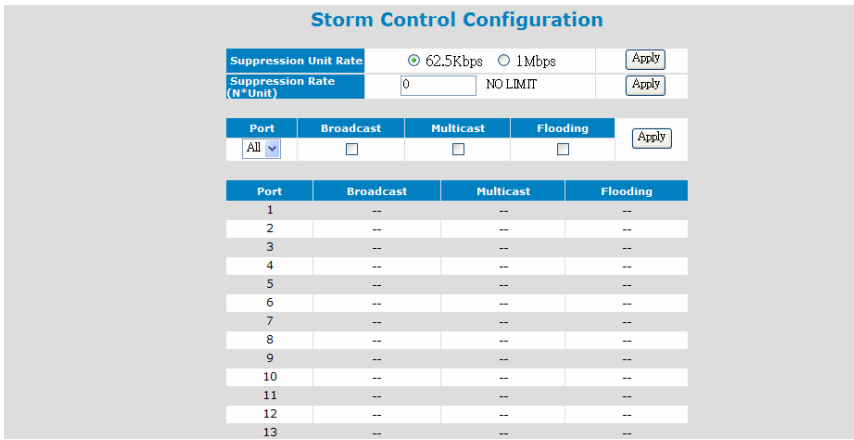


Follow the steps to configure ...

a. Select the port at “Port Number”.
b. Select the unit - 62.5Kbps or 1Mbps for Ingress and Egress traffic.
c. Set the rate limit number (0~1000) for Ingress and Egress traffic. “0” means “NO LIMIT”.
d. Click [Apply} to activate the settings.

The rate limit value is counted by “unit” multiplying by “rate limit number”.
Note: If rate limit value is more than port connection speed, the link speed will be the maximum working speed. For example, if rate limit value is 20Mbps and port is linked at 10Mbps, the maximum working speed will be 10Mbps.

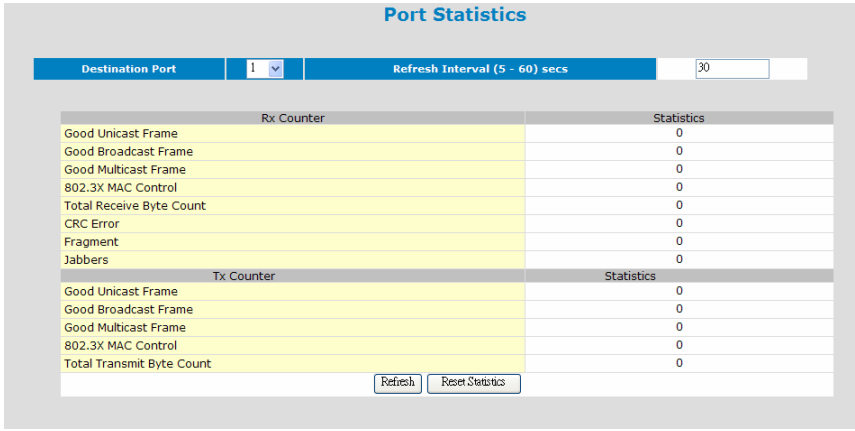
3) Storm Control Configuration
This function can setup broadcast, multicast, and unicast(flooding) storm rate control of the switch.



Follow the steps to complete the settings.
a. Select the unit - 62.5Kbps or 1Mbps. Then click [Apply].
b. Enter rate limit number(0~1000). “0” means “NO LIMIT”. Then click [Apply].
c. Select Port.
d. Apply Broadcast/Multicast/Unicast(Flooding) storm control to the port. Then click [Apply].

The rate limit value is counted by “unit” multiplying with “rate limit number”.

6.4.4.5 *Port Statistics*



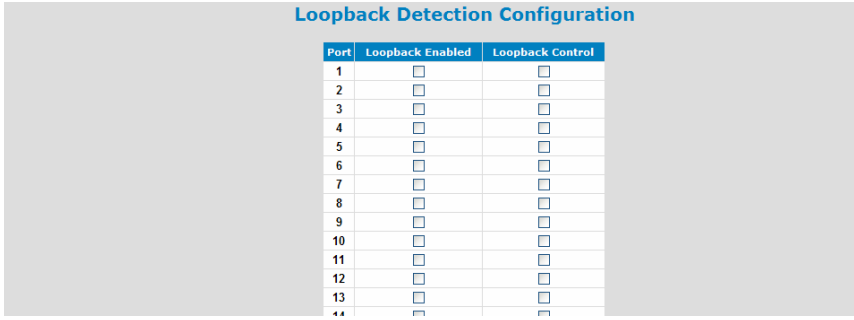
Port statistics counters could be read here.
Select a port to get its counters.

[Refresh]
The counters will be refreshed automatically. You can modify the refresh interval.
And you can click [Refresh] to refresh the counters immediatelly.

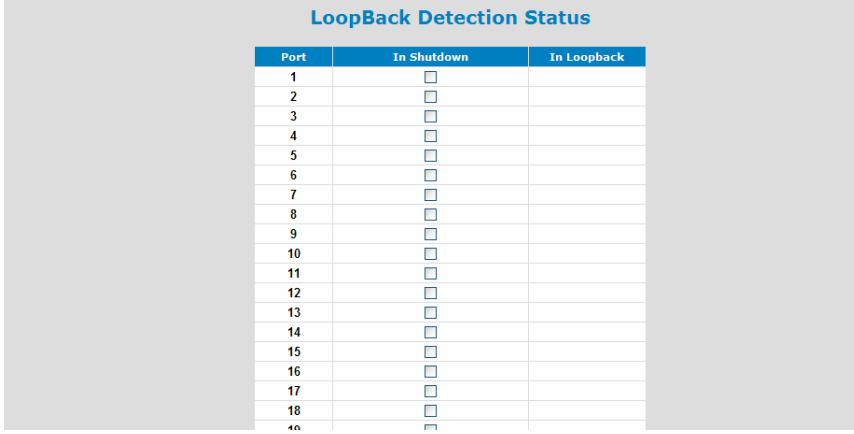
[Reset Counters]
Click [Reset Statistics] can reset all counters to “0”.

6.4.4.6 Loopback Detection

Loopback detection function can detect loopback happening on ports. And switch will send trap to alarm it. If control function is enabled, the loopback ports will be blocked automatically.



Loopback Enable: This is used to enable loopback detection function.
Loopback Control: This is used to enable port blocking function if loopback is detected. Removing port blocking condition is done in "LoopBack Detection Status" page if loopback problem is fixed.

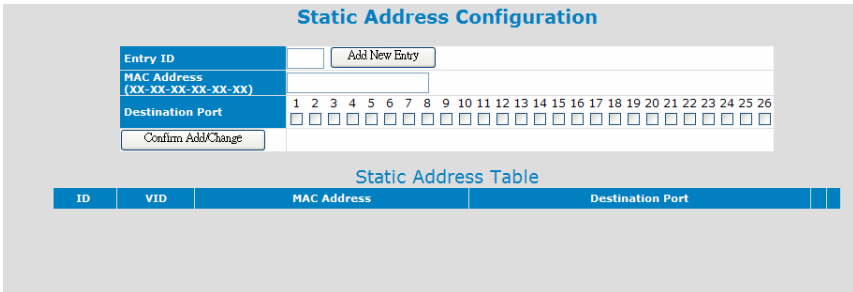


In Shutdown: If port is blocked, this item will be checked. Uncheck it will remove the blocking status.
In Loopback: If loopback is detected, this item will be checked. And trap will be sent.

6.4.5 Address Table

These are functions about Mac address table. They are “Static Address Assign”, “Dynamic Address Table”, and “Aging Time Setup”.

6.4.5.1 Static Address Configuration



This switch supports static Mac address assignment. You can assign static Mac addresses by the following steps ...

a. Give an Entry ID. This ID is used as the index of the entry in Static Address Table.
b. If 802.1Q VLAN is enabled, give the VLAN ID. If 802.1Q is disable, the VID will always be 1. This VID will put the static Mac address in some VLAN for 802.1Q VLAN operation.
c. Fill the Mac address. This is the Static Mac Address for this entry.
d. Select the port for this Static Address.
e. Click [Confirm Add/Change] button.

Then this entry will be added to the table.
In “Static Address Table”, you can edit and delete an entry. (Different Mac Address will be another entry. Mac Address is not allowed to edit for an entry.)

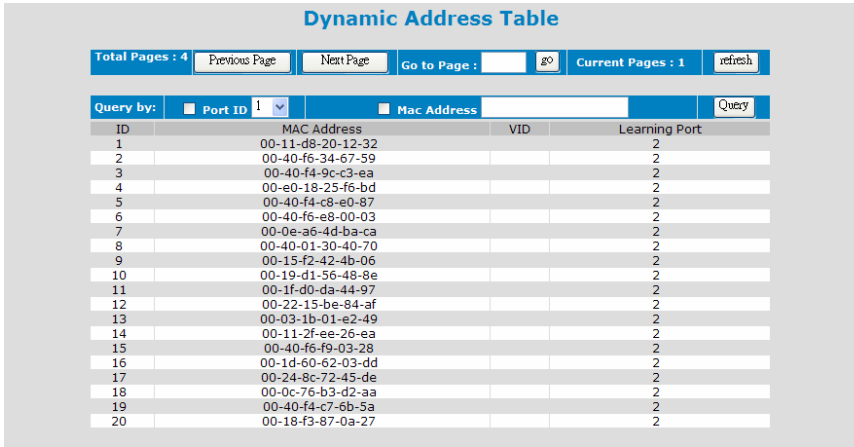
The switch will not age out these static Mac addresses. But there is a limitation for these static Mac addresses - *they are allowed to work on the assigned port only because they are static fixed on the assigned port*.

If you want to delete an entry in the static Mac address table, click [Delete] button of the entry and the static Mac address will be removed from the table.

If you want to modify an entry, click [Edit] button of the entry. Do the modification and click [Confirm Add/Change] button. (Different Mac Address will be another entry. Mac Address is not allowed to edit for an entry.)

About Mac ID Security function on port . . .
You can configure “Mac Security Configuration” function (under “Security” function) for port access security with Mac address. Select “Accept” for such security application.

6.4.5.2 *Dynamic Address Table*

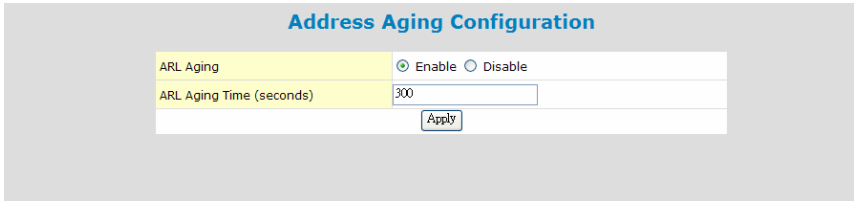


This function can show the dynamic Mac addresses learned by the switch. Clicking [refresh] button will refresh it.

The address table could be more than one page. You can click [Previous Page], [Next Page] to change page. Or, give the page number directly.

Query function is supported by the switch. It could be queried by Port or queried by Mac Address(xx-xx-xx-xx-xx-xx). Select the query function and input the query target. Then click [Query]. The result will be shown.

6.4.5.3 Address Aging



The switch will learn Mac addresses to an ARL table automatically. And follow the table to do packet forwarding operation. If Mac addresses are not received for some time, the Mac addresses will be removed from the table. This operation is called aging.

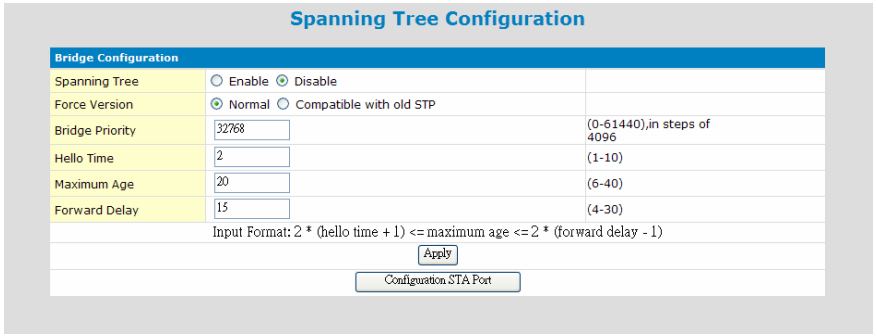
The aging operation could be disable here. And all the learned Mac addresses will not be removed from the ARL table.

The time interval for aging operation could be modified here. It is 300 seconds by default.

6.4.6 Spanning Tree

Spanning Tree Protocol can prevent traffic looping in network. It can be configured for switch unit (bridge) and port unit. If spanning tree function is enabled, any link down to link up will have several seconds delay before the port going to forwarding state.

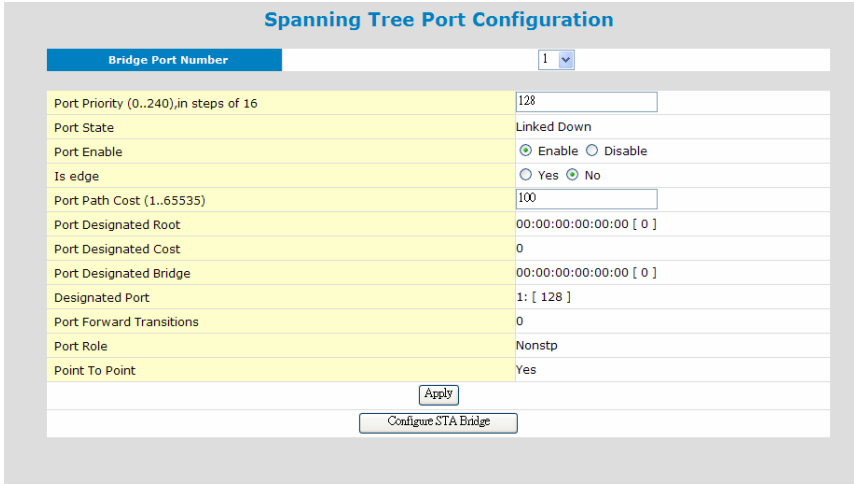
[Setting of Bridge]



Here are the parameters for Spanning Tree operation on the switch.
Enable/Disable : enable/disable spanning tree operation
Force Version : It will operate as Rapid Spanning Tree in “Normal” state. And it can be forced to operate at old Spanning Tree mode if “Compatible with old STP” is selected.
Bridge Priority (0~61440) : Bridge priority is for selecting the root device, root port, and designated port. The device with the highest priority (lowest value) becomes the STA root device. If all devices have the same priority, the device with the lowest MAC address will then become the root device.
Hello Time (1~10) : It is the period to send the spanning tree maintenance packet if the switch is the root of the spanning tree. Default is 2 seconds.
Maximum Age (6~40) : It is the spanning tree aging time if no spanning tree maintenance packet is received. It will cause the spanning tree to re-create. Default is 20 seconds.
Forward Delay (4~30): It is the maximum waiting time before changing states (i.e., learning to forwarding). This delay is required because every device must receive information about topology changes before it starts to forward frames. In addition, each port needs time to listen for conflicting information that would make it return to a blocking state; otherwise, temporary data loops might result.

The parameters have relation with each other. And here is the rule for it.
2*(Hello Time +1) is less or equal to Maximum Age, and Maximum Age is less or equal to 2*(Forward Delay -1).

[Setting of Port]
Click [Configuration STA Port]. You can configure RSTP/STP on ports.



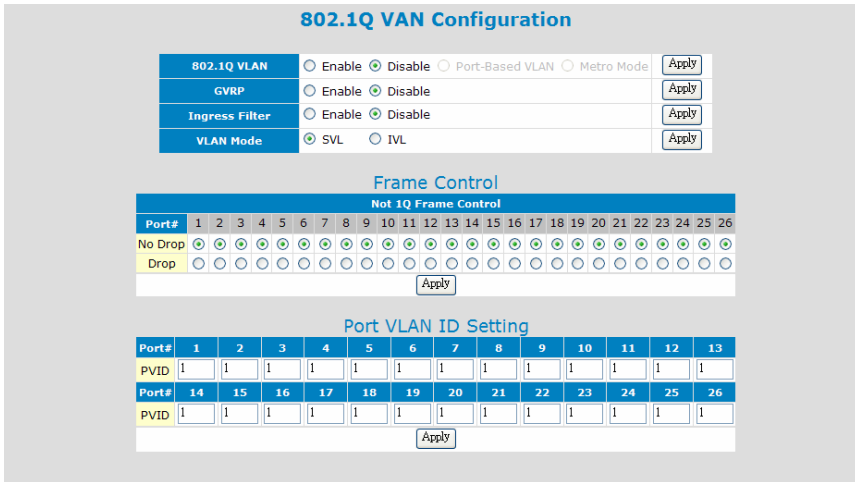
Bridge Port Number It is the Ethernet port that will be configured.
Port Priority (0~240) : If the path cost for all ports on a switch are the same, the port with the highest priority (lowest value) will be forwarded when looping happens. If more than one port have the same highest priority, the port with lowest port number will be forwarded.
Port State : It is current spanning tree operation state of the port.
Port Enable : It can enable/disable spanning tree function on the port.
Is edge : If this switch is at “edge” of the network tree, please select “Yes”. If there are another switches connected, please select “No”. This parameter is used by RSTP to increase its operation speed.
Port Path Cost (1~65535) : It is used to determine the best path between devices if looping happens. Lower values will be forwarded and should be assigned to ports with high speed connections. Higher values will be blocked and should be assigned to ports with low speed connections. The suggestion values are 100(50~600) for 10M, 19(10~60) for 100M and 4(3~10) for 1000M connections.
Port Designated Root : This shows the root bridge ID of this segment and its bridge priority.
Port Designated Cost : This shows the path cost between the root port and the designated port of the root bridge.
Port Designated Bridge : This shows the switch’s bridge ID and its bridge priority setting.
Designated Port : This shows the port number and its port priority..
Port Forward Transitions : This is the forwarding transition counter on the port.
Port Role : It is the role of the port for the STP operation. It could be Root, Designated, Backup, or Alternated. If the port is link down, the port role will be Nonstp.
Point To Point : This is a Point-to-Point link on the port.

6.4.7 VLAN

This switch supports 802.1Q VLAN, Port-based VLAN, Metro-VLAN and Private VLAN.

6.4.7.1 802.1Q VLAN

A. 802.1Q VLAN



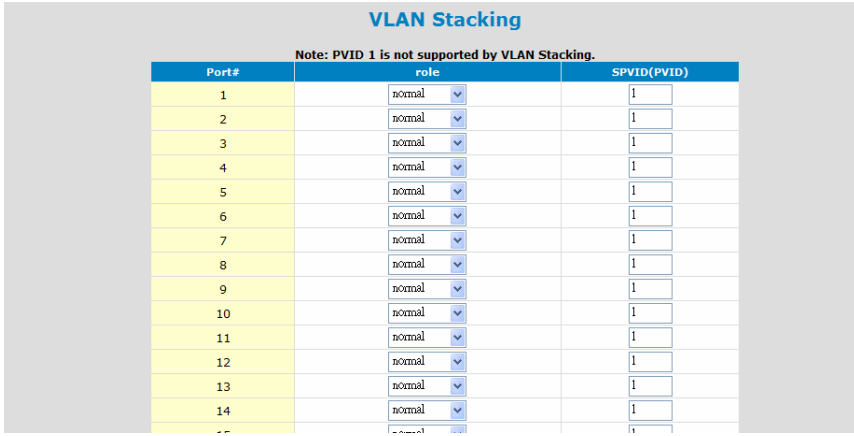
802.1Q VLAN : This is used to enable/disable 802.1Q VLAN function.
GVRP : GVRP protocol can learn remote 802.1Q VLAN on other switches and add to dynamic 802.1Q VLAN table. You can enable/disable the operation of this protocol.
Ingress Filter : This is used to enable/disable doing VLAN filtering function at ingress port. If it is enable, the ingress port must be in the same VLAN for packet forwarding. If it is disable, VLAN filtering function will be done at egress port.
VLAN Mode : This is used to set applying VLAN ID for Mac address table lookup. For SVL(Shared VLAN Learning), VLAN ID will be ignored for Mac address table lookup. And every Mac address is unique in the switch.
For IVL(Indenpent VLAN Learning), VLAN ID is applied for Mac address table lookup, i.e. VLAN ID + Mac Address being the lookup target. And Mac address could be not unique if they are in different VLANs.
For most applications, SVL is OK. IVL is for some special applications.

[Frame Control]
This function is used to drop non-802.1Q frames (untagged packets).

[Port VLAN ID Setting]

PVID is used to set Port VLAN ID. When untagged packet is received, PVID of the ingress port will be used as the its VLAN ID. PVID is also used as the VLAN ID for tag adding when untagged packet is translated to tagged packet.

B. VLAN Stacking



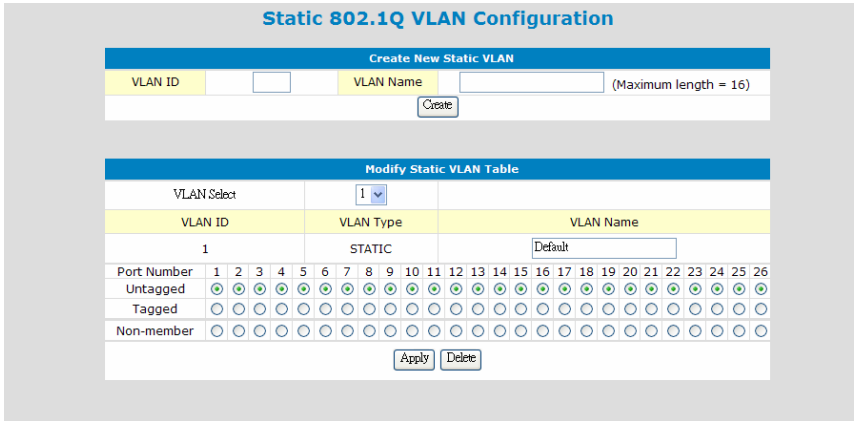
VLAN Stacking function allows two VLAN tags in a packet for 802.1Q VLAN tunnelling application through a central network.

For VLAN Stacking operation, port role definition is needed for each port. There are three roles for gigabit port - Normal, Tunnel, and Access. And there are two roles for 10/100M ports - Normal and Access.

Normal - It will set the port(s) as normal 802.1Q VLAN port(s). And the tagged/untagged setting will follow the settings in 802.1Q VLAN.
Access - It will set the port(s) as access port(s) for VLAN stacking operation. It will strip a tag from tagged or double-tagged packets before forwarding. It is for downward connection of VLAN stacking operation.
Tunnel - It will set the port as tunnel port for VLAN stacking operation. It will add a tag and allow two 802.1Q VLAN tags in a packet. It is for tunnel and upward connection of VLAN stacking operation. For the switch, only gigabit ports support tunnel function.

SPVID is used as the Port VLAN ID of VLAN Stacking (L2 Tunnel) operation if the port role is “access”.

C. Static 1Q VLAN



This function is used to maintain 802.1Q static VLAN.

Create an 802.1Q VLAN:

1. Input the VLAN ID and VLAN Name in "Create New Static VLAN". Click [Create] to create the VLAN. The valid VLAN ID is 1 ~ 4094.
2. Select the VLAN in "Modify Static VLAN Table". The new VLAN is empty by default. You can select ports for the VLAN - tagged or untagged. After that, click [Apply] to complete the VLAN configuration.

Modify an 802.1Q VLAN:

1. Select the VLAN in "Modify Static VLAN Table".
2. Modify its setting and click [Apply] to activate the new setting.

Delete an 802.1Q VLAN:

1. Select the VLAN in "Modify Static VLAN Table".
2. Click [Delete] to delete the 802.1Q VLAN.

* About tagged/untagged for ports in 802.1Q VLAN ...
For 802.1Q VLAN, every port could be tag port or untag port.
Tag port will always send tagged packets and is used for switch-to-switch cascading. It is a VLAN trunk connection because there could be more than one VLAN working through it.
Untag port will always send untagged packets and is used for switch to users connection. And its role is a access connection for users.

D. VLAN Table

This table will show the activity of 802.1Q VLAN. Both static and dynamic 802.1Q VLAN will be shown in the table.

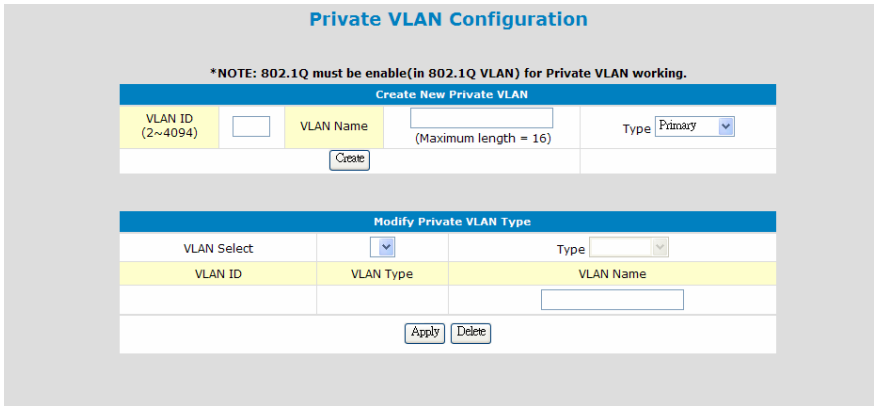
For ports, “U” means Untagged port and “T” means Tagged port.

If GVRP protocol is enabled, this table will also show the learned remote 802.1Q VLAN.

6.4.7.2 Private VLAN

Three kinds of VLAN are defined for this application – Primary VLAN, Community VLAN, and Isolated VLAN. Community VLAN and Isolated VLAN can communicate with Primary VLAN, but they cannot communicate with each other. And users in Isolated VLAN cannot communicate with each other. This is a special 802.1Q VLAN configuration and 802.1Q VLAN must be enabled first.

A. Configuration

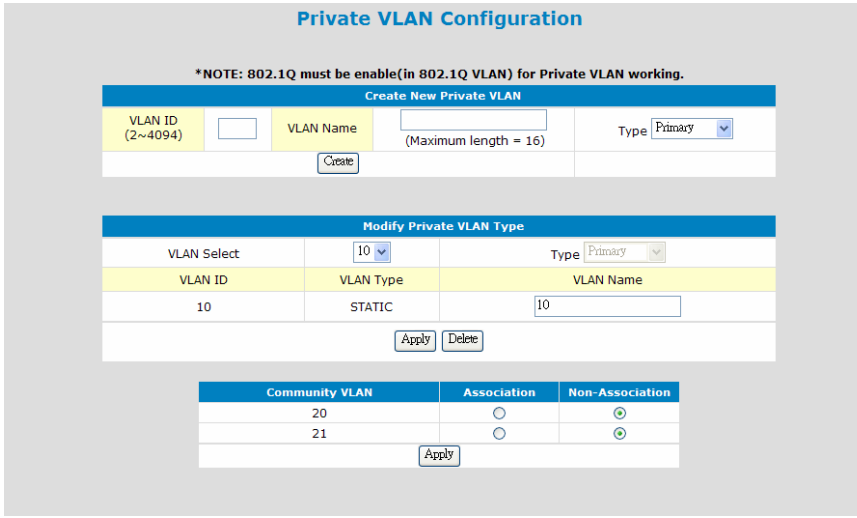


Creating Private VLAN, complete the steps first.

a. Create VLAN groups, and define as “Primary”, “Community”, or “Isolated”.
b. Associate Community VLAN with Primary VLAN. If more than one Primary VLAN, select Primary VLAN first and then do the association.

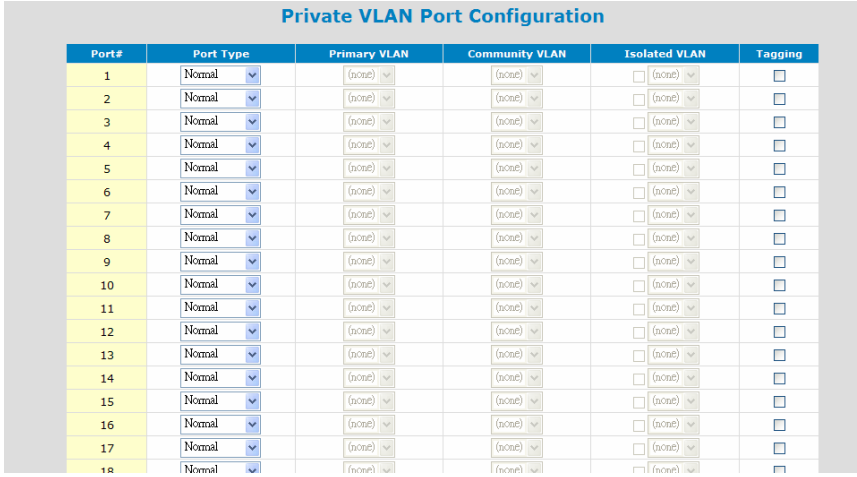
In “Modify Private VLAN Type”, VLAN name and VLAN type can be modified.
If a Primary VLAN is selected, association between Community VLAN can also be set. After Primary VLAN is associated with Community VLAN, communication between them starts to work then.

See the following picture.



2). Port Configuration

After VLANs are created, assign ports to VLANs.

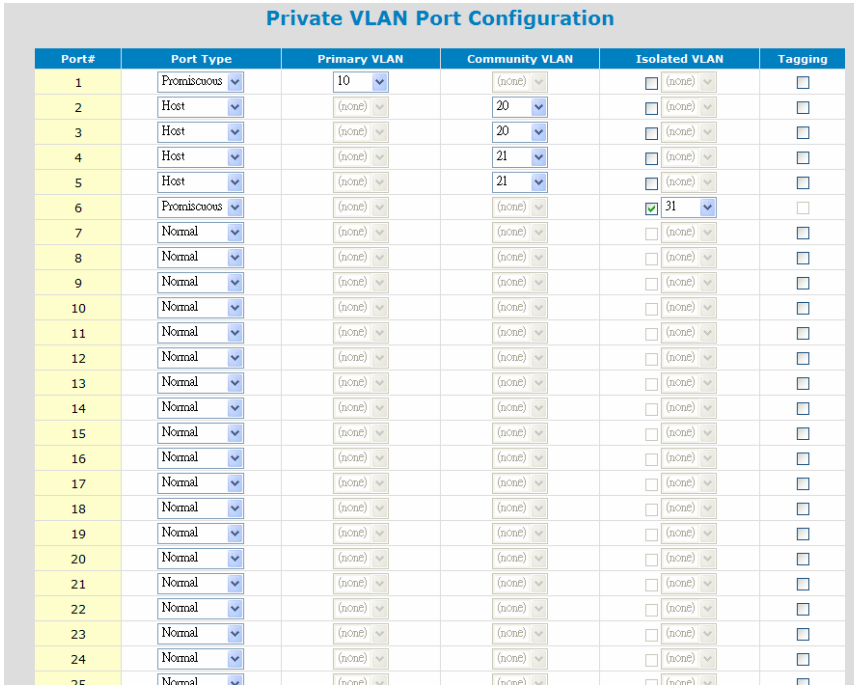


There are three types for a port - Normal, Host, and Promiscuous.
"**Normal**" is for ports doing normal 802.1Q operation instead of Private VLAN.
"**Host**" is for ports that could be in Community VLAN or Isolated VLAN.
"**Promiscuous**" is for ports that could be in Primary VLAN or Isolated VLAN.

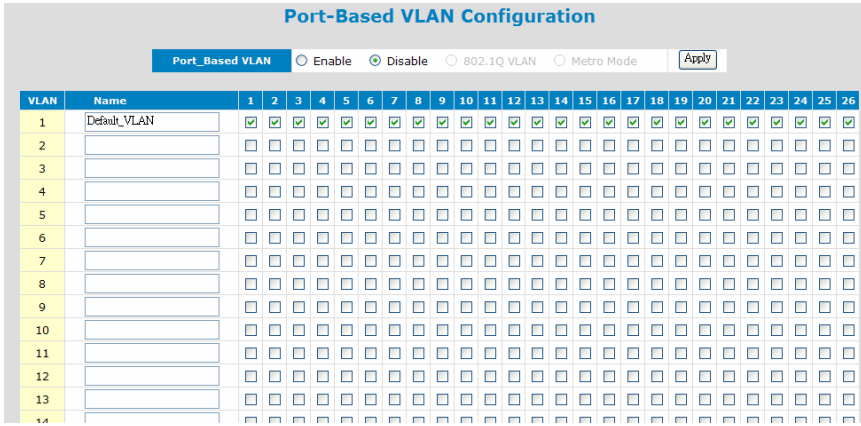
Follow the steps to do the port assignment.

a. Select the type for a port.
b. If it is “Host”, you can select a VLAN from Community VLAN or check Isolated VLAN and select from it. (Community VLAN must be associated first.)
c. If it is “Promiscuous”, you can select a VLAN from Primary VLAN or check Isolated VLAN and select from it.
d. Repeat a.~c. to complete the port assigment.
e. Click [Apply].

Please see the following picture.



6.4.7.3 *Port-based VLAN*



Follow the steps to configure Port-based VLAN.

a. Enable Port-based VLAN. And click [Apply] button.
b. Give VLAN name.
c. Select ports for each VLAN.
d. Click [Apply] button.

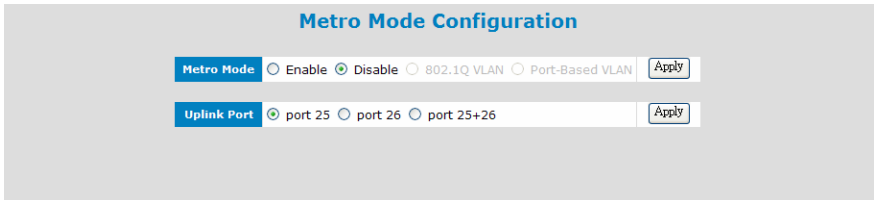
Port-based VLAN can isolate traffic between ports, and ports in the same VLAN can communicate with each other.

6.4.7.4 Metro Mode

Metro Mode is a popular port-based VLAN settings, and it is called Concentration VLAN sometimes.

For this setting, there are one or two uplink ports. Every port can communicate with uplink port(s). But they cannot communicate with each other.

The uplink port is for upward connection to central switch or router. The other ports are for downward connection to users. Users are isolated to each other, but they can get public service, like internet.



Follow the steps to complete the setting.

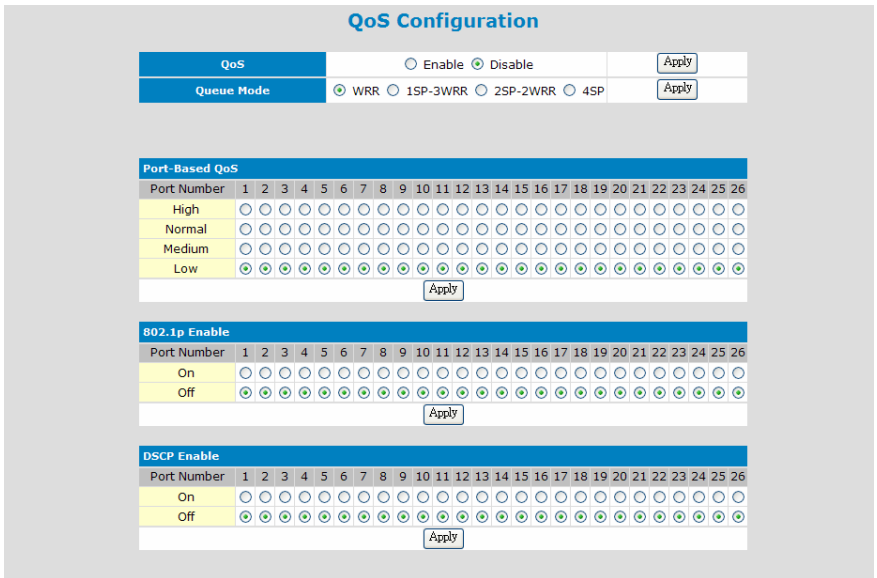
1. Enable Metro Mode. Then click [Apply].
2. Select the Uplink Port. Then click [Apply].

6.4.8 QoS

This switch supports Port-based priority, 802.1P priority, and DSCP priority. These priority operations could be enable/disable on each port.

For 802.1P and DSCP priority operations, their priority values can be mapped to four priority queues of each connection port for QoS operation.

6.4.8.1 QoS Configuration



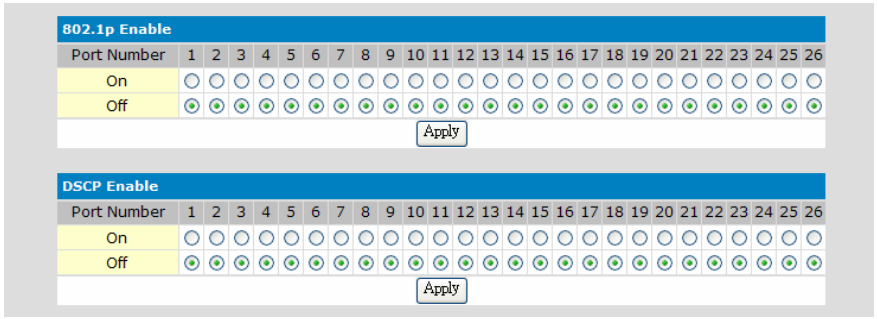
QoS : This is for QoS function enable/disable.

Queue Mode : This is used to select traffic scheduling mode (strict priority(SP) or weight round robin(WRR)) between the four priority queues of switch. If WRR is selected, weighting of each queue is 8:4:2:1 for High:Medium:Normal:Low queues.

- **WRR** will set the traffic scheduling mode as WRR. Bandwidth is shared between the four queues with their weighting.
- **1SP-3WRR** will set the traffic scheduling mode as 1*SP+3*WRR. That means High priority queue is strict priority and get bandwidth service first. The other three priority queues share the rest bandwidth with their weighting.
- **2SP-2WRR** will set the traffic scheduling mode as 2*SP+2*WRR. That means High priority queue and Medium priority queue are strict priority and get bandwidth service first. (High priority queue first. Then Medium priority queue.) The other two priority queues share the rest bandwidth with their weighting.

- 4SP will set the traffic scheduling mode as 4*SP. That means all the four priority queues are strict priority, but with the the order - High priority queue first, Medium priority queue second, Normal priority queue third, Low priority queue fourth.

Port-Based QoS : this is used to define the priority of each port. It will map to the four priority queues of the switch.



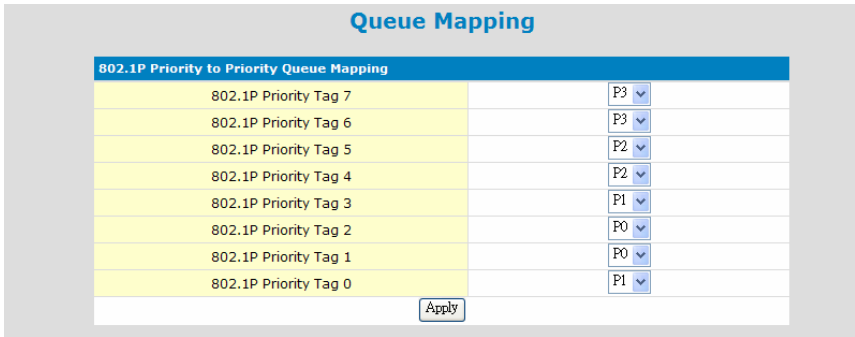
802.1P Enable : This is for 802.1P priority operation enable/diable on each port. 802.1P priority operation will use the priority value in 802.1Q tag of packets for QoS operation. The mapping of 802.1P priority values (0~7) to priority queue could be defined at “Queue Mapping” page.

DSCP Enable : This is for DSCP(Differential Service Code Point) priority operation enable/disable on each port. DSCP priority operation will use the priority value in ToS field of IP packets for QoS operation. Seven DSCP values (0~63) could be defined and map to priority queue at “Queue Mapping” page.

Note: If Port-base priority, 802.1P priority, and DSCP priority are enabled at the same time, the QoS decision will be made with the order - DSCP priority first, 802.1P priority next, Port-based priority last

6.4.8.2 Queue Mapping

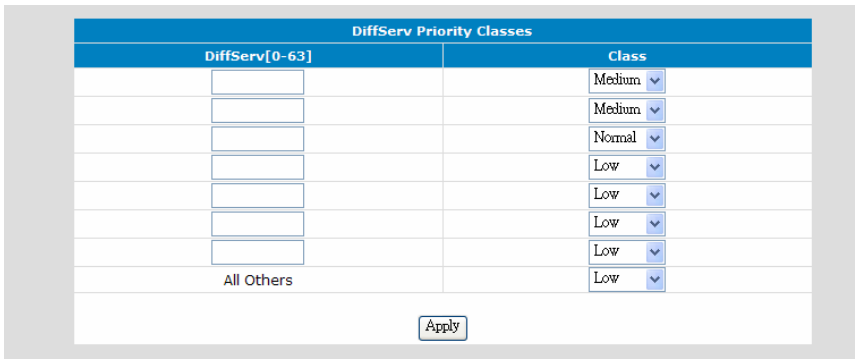
[802.1P Priority Mapping]



For 802.1P priority, priority value (0~7) in VLAN tag will be used for QoS operation. And the mapping of priority values to priority queues (High-P3 / Medium-P2 / Normal-P1 / Low-P0) could be defined here.

If 802.1P priority function is enabled, these settings will be followed for QoS operation.

[DiffServ Priority Mapping]



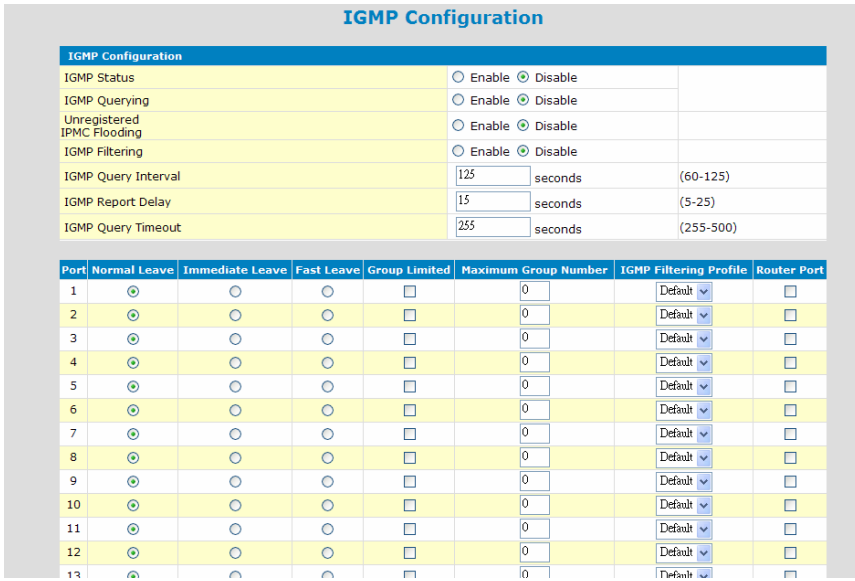
DSCP priority operation will use the priority setting in ToS field of IP packets for QoS operation. Seven DSCP values (0~63) could be defined and map to priority queues (High/Medium/Normal/Low).

If DSCP priority function is enabled, these settings will be followed for QoS operation.

6.4.9 IGMP

This switch supports IGMP Snooping function for IP Multicast traffic. Switch will learn IP Multicast Groups from IGMP protocol packets. Here is for IGMP function configuration settings.

6.4.9.1 IGMP Configuration



IGMP Status: this is used to enable/disable IGMP function.

IGMP Querying: this is used to enable/disable IGMP Query function. This switch will send IGMP Query at a fixed interval if it is enable. The IGMP query responses, known as IGMP reports (which look very much like an IGMP join) keep the switch updated with the current multicast group membership on a port-by-port basis.

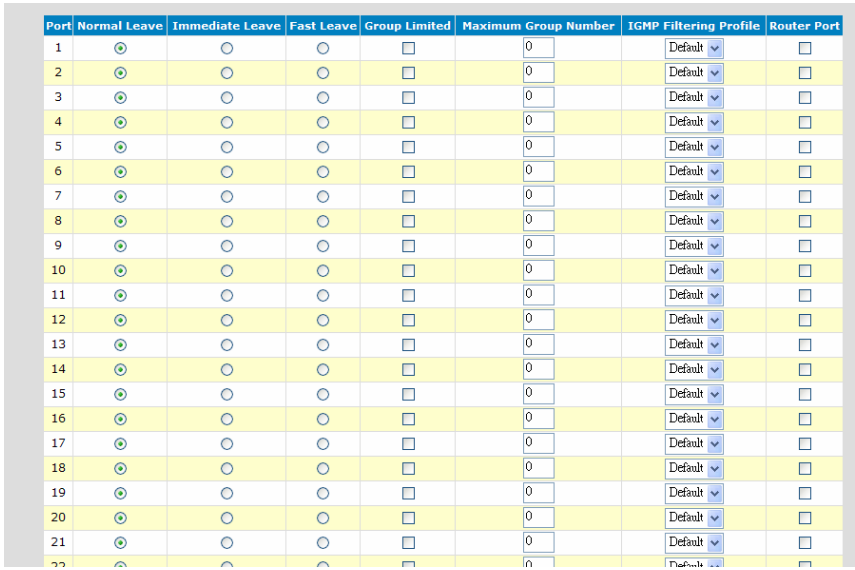
Unregistered IPMC Flooding: unregistered (un-joined) IP multicast traffic will be flooded to every port if this setting is enable. If it is disable, the unregistered IP multicast traffic will be discarded.

IGMP Query Interval: this is used to set the IGMP query packet sending interval if IGMP Query function is enable.

IGMP Report Delay: this is used to set the delay time to send report after receiving a query. When a host receives a Query, it doesn't send a report

immediately but it starts a report delay timer for each group membership on the network interface of the incoming Query. When the timer expires, a report is generated for the corresponding host group.

IGMP Query Timeout: this is used to set the timeout interval for IGMP Query operation. If the switch does not receive updated membership information in a timely fashion, it will stop forwarding multicasts to the delinquent port where the end-device is located.



Port	Normal Leave	Immediate Leave	Fast Leave	Group Limited	Maximum Group Number	IGMP Filtering Profile	Router Port
1	◉	○	○	☐	0	Default	☐
2	◉	○	○	☐	0	Default	☐
3	◉	○	○	☐	0	Default	☐
4	◉	○	○	☐	0	Default	☐
5	◉	○	○	☐	0	Default	☐
6	◉	○	○	☐	0	Default	☐
7	◉	○	○	☐	0	Default	☐
8	◉	○	○	☐	0	Default	☐
9	◉	○	○	☐	0	Default	☐
10	◉	○	○	☐	0	Default	☐
11	◉	○	○	☐	0	Default	☐
12	◉	○	○	☐	0	Default	☐
13	◉	○	○	☐	0	Default	☐
14	◉	○	○	☐	0	Default	☐
15	◉	○	○	☐	0	Default	☐
16	◉	○	○	☐	0	Default	☐
17	◉	○	○	☐	0	Default	☐
18	◉	○	○	☐	0	Default	☐
19	◉	○	○	☐	0	Default	☐
20	◉	○	○	☐	0	Default	☐
21	◉	○	○	☐	0	Default	☐

Normal Leave: In normal leave mode, the switch will forward this leave message to multicast router. Then query and reply messges will happen between multicast router and all subscribers. After that, the port will be removed from IP multicast group. That will cause some delay for the leave operation.

Immediate Leave: In immediate mode, the switch will remove the port from IP multicast group without any query to the subscriber. That will shorten the leave process.

Fast Leave: In fast mode, the switch will send query to the subscriber directly. And then remove the port from IP multicast group. That will shorten the leave process.

Group Limited: This is used to enable IP multicast group number limit function on the port. The setting of “Maximum Group Number” is the limit.

Maximum Group Number: This is the maximum IP multicast group number for the port. If “Group Limited” is enabled, this number will be applied as the limit.

IGMP Filtering Profile: This is used to selecte IGMP Filtering Profile. Profile will define a IP multicast address range and it is configured in “IGMP Filtering Profile”.

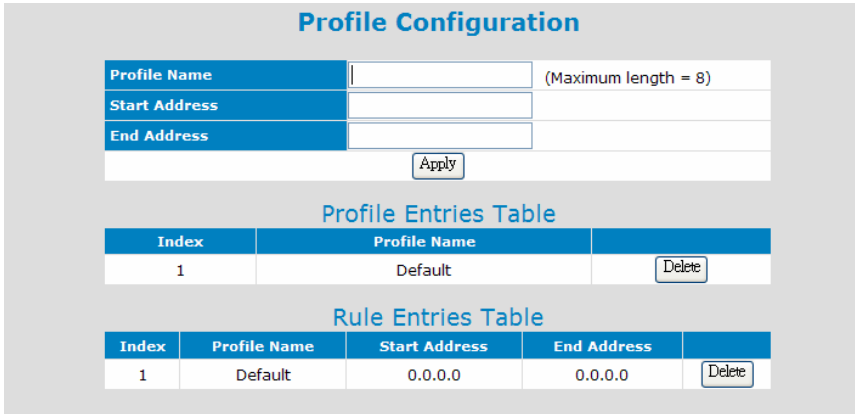
Router Port: This is used to select the port that connected to IGMP active router.

6.4.9.2 IP Multicast Registration Table

This table will show the learned IP multicast groups.

6.4.9.3 IGMP Filtering Profile

This function is used to define profiles for IGMP Filtering operation.

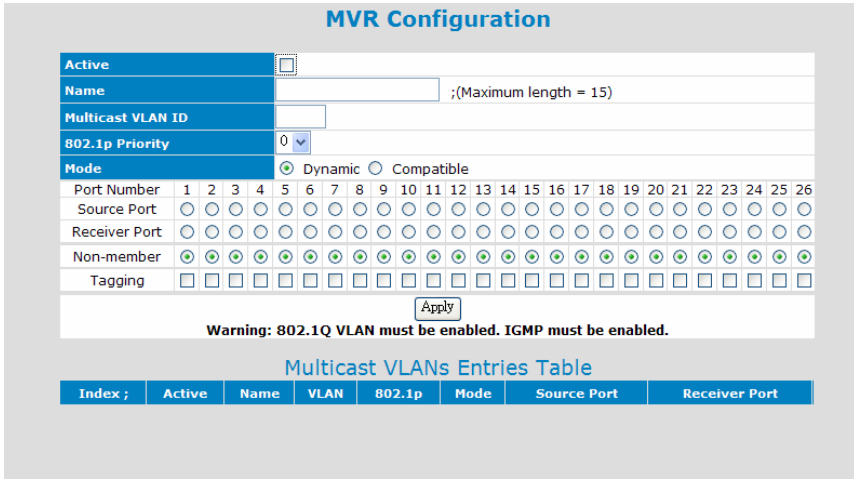


Follow the steps to create a profile.
1. Give the profile name.
2. Set the start address of the IP multicast address range.
3. Set the end address of the IP multicast address range.
4. Click [Apply].

Profiles are listed in “Profile Entries Table”.

Content of profiles is listed in “Rule Entries Table”.

6.4.9.3 MVR Configuration



This page is used to configure MVR (Multicast VLAN Registration) function. VLAN function will isolate traffic between VLAN groups. But it will also isolate IP multicast traffic for subscribers in different VLANs. The MVR function allows one multicast VLAN to be shared by subscribers in different VLANs. That can reduce the multicast traffic for VLANs.

Before configure MVR, complete the following two functions configuration first.
1. Complete 802.1Q VLAN setting first.
2. Enable IGMP snooping function first.

This switch supports three MVR VLANs, and MVR VLAN can be created in this page.

Here is the description about those settings.
Active – this MVR VLAN is enabled/disabled.

Name – assign a name for the MVR VLAN for identification.

Multicast VLAN ID – this is the VLAN ID for this MVR VLAN. It is 1 ~ 4094.

802.1P Priority – this is an 802.1P priority value(0~7). The IGMP control packets for this VLAN will be assigned this priority when tag is added.

Mode – there are two operation modes for MVR function. One is Dynamic mode. Another is Compatible mode. In Dynamic mode, the switch will send IGMP reports to every MVR source port in the MVR VLAN. In Compatible mode, the switch will not send IGMP reports.

Source Port – this is the uplink port of this MVR VLAN to the IP multicast traffic source. It could be tagged port or untagged port. (It is a tagged port for most applications because the uplink port could also be a VLAN trunk connection.)

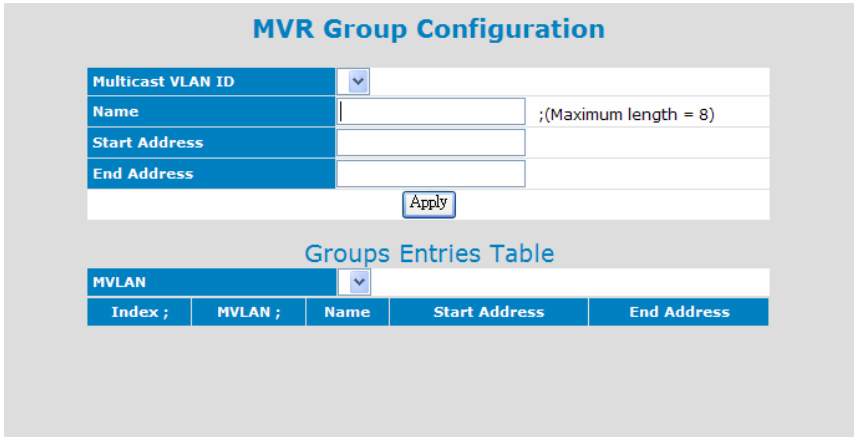
Receiver Port – this is the ports connecting to subscribers receiving IP multicast traffic in the MVR VLAN. (It is a untagged port for most applications because it is for subscribers - an access connection.)

Tagging – if Tagging is checked, this port is a tagged port for this MVR VLAN.

After MVR VLAN is configured, you can assign IP multicast groups (video channels) to the MVR VLAN in "MVR Group" page. You can assign more than one IP multicast groups (video channels) to one MVR VLAN.

Note:
1. After MVR VLANs are created, those VLAN will be added to 802.1Q VLAN. Checking "VLAN Table" of 802.1Q VLAN, those VLAN will be seen.
2. If source port is an untagged port, remember to set its Port VLAN ID in "802.1Q VLAN" according to your application.

6.4.9.4 MVR Group



After MVR VLAN is configured, you can assign IP multicast groups (video channels) to the MVR VLAN in "MVR Group" page. You can assign more than one IP multicast groups (video channels) to one MVR VLAN.

Assigning IP multicast groups to MVR VLAN, you have to select one MVR VLAN first.

Creating an IP multicast group for MVR VLAN, complete the following settings.
Name – this is the name for this IP multicast group for identification.
Start Address – this is the start IP multicast address for the IP multicast group.
End Address – this is the end IP multicast address for the IP multicast group.
Then click [Apply].

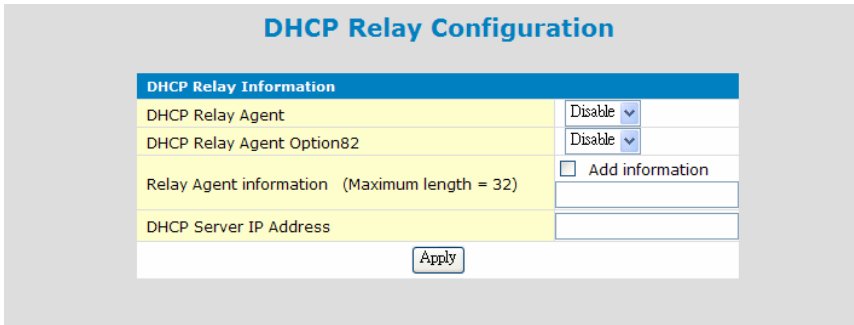
After both MVR VLAN and IP multicast groups are configured, subscribers at the receive ports can receive IP multicast traffic in the IP multicast groups from source port even they are in difference VLANs.

[Group Entry Table]
This table will show current IP multicast groups for MVR VLAN. Select the MVR VLAN, IP multicast groups for the MVR VLAN will be shown.

If you want to remove an IP multicast group, click [Delete]. The IP multicast group will be removed from the list.

Note: The list does not support edit function. If you want to make any modification, you have to remove it first. Then create the new one.

6.4.10 DHCP Relay



This function is used to configure DHCP Relay and DHCP Option 82 function.
Note: The DHCP-Relay function here does not support relay between different IP subnets. But it supports relay cross VLANs. (If only one port in a VLAN, the switch will not do DHCP Relay for the port. That is a limitation.)

DHCP Relay function will control DHCP requests and forward DHCP requests to the assigned DHCP server. That can prevent illegal DHCP server problem in network.

DHCP Option 82 function will add "connection port" and "switch Mac ID" information to DHCP requests and then send to the specified DHCP server. Based on the information, DHCP server will assign an IP configuration in the DHCP reply. This is a security function.

DHCP Relay Agent : This is used to enable/disable DHCP Relay function.

DHCP Relay Agent Option82 : This is used to enable/disable Option 82 operation for DHCP Relay.
Note: Not every DHCP server supports Option 82 function. If DHCP server does not support it, please disable Option 82 function and use DHCP Relay only.

Relay Agent Information : This is the information string for Option 82 operation. Checking "Add information" to enable it.

DHCP Server IP Address : This is the DHCP Server IP address.

[About DHCP Relay Option 82]
DHCP Relay Option 82 function will add the following information to DHCP request packet.

1. Port number that DHCP request packet comes from
2. VLAN ID for this DHCP request
3. Mac address of the switch

4. An additional string as information. (*"Adding the information string" must be enabled first.)

And DHCP server will assign IP configuration according to the information in Option 82.

Here is the Option 82 definition of the switch.

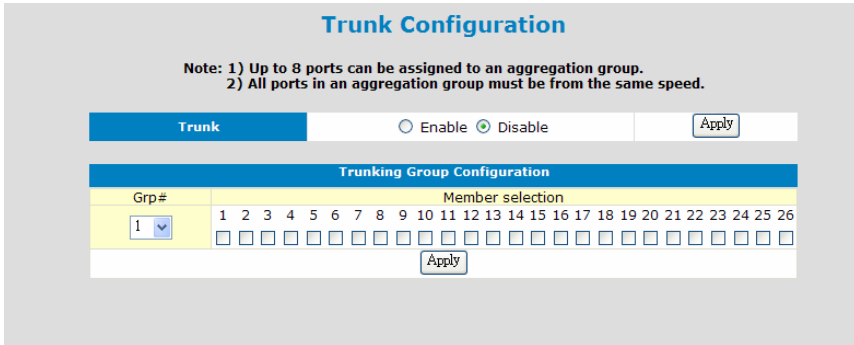
1. Circuit ID sub-option setup information for DHCP server :
   <Format>
   [Slot ID/1-Byte] [Port ID/1-Byte] [VLAN ID/2-Bytes] [Information/X-Bytes]
   Slot ID - plase set to "0".
   Port ID - please set according to the port number of the switch.
   VLAN ID - please set according to its VLAN ID.
   Information - this is a string with variable length
   For example, "000500c8" means Slot ID 0, Port 5, VLAN ID 200, no information. All of the numbers are hexadecimal numbers.
2. Remote ID sub-option setup information for DHCP server :
   <Format>
   [Mac Address/6-Bytes]
   Mac Address - this is the Mac Address of the switch. For example, "000000828ce6" in hexadecimal numbers.

If the Option 82 of DHCP request meets these settings, DHCP server will assign the IP configuration according to this Option 82 content.

6.4.11 Trunk

This switch supports up to fourteen trunk groups. And the trunk could be configured with static assigned or by LACP (Link Aggregation Control Protocol) protocol.

6.4.11.1 Trunk Information

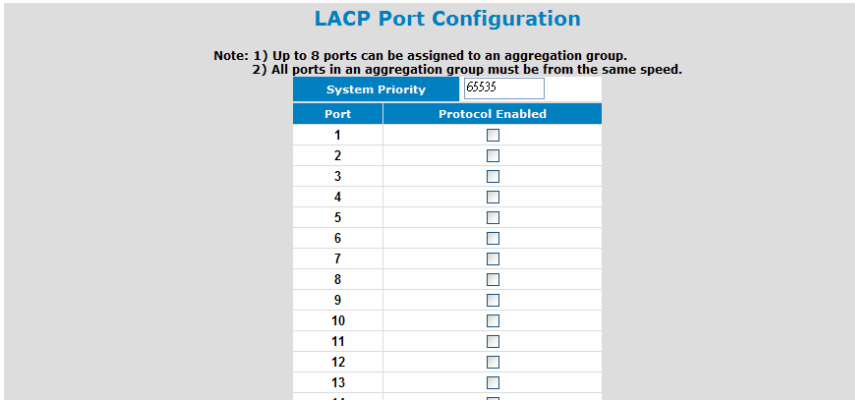


This table is used to assign ports to Trunk groups statically.

Follow the steps to do it. (*Don't connect trunk cables until this function is set.)
a. Enable Trunk function first. Then click [Apply].
b. Select a Trunk Group at "Grp#".
c. Select the member ports.
d. Click [Apply].
e. Repeat b.~d. for another Trunk group setting.

Note: If a port are used as static port for any Trunk group, its LACP function will be disable. And ports in a trunk group should work in the same connection speed.

6.4.11.2 Lacp Port Configuration



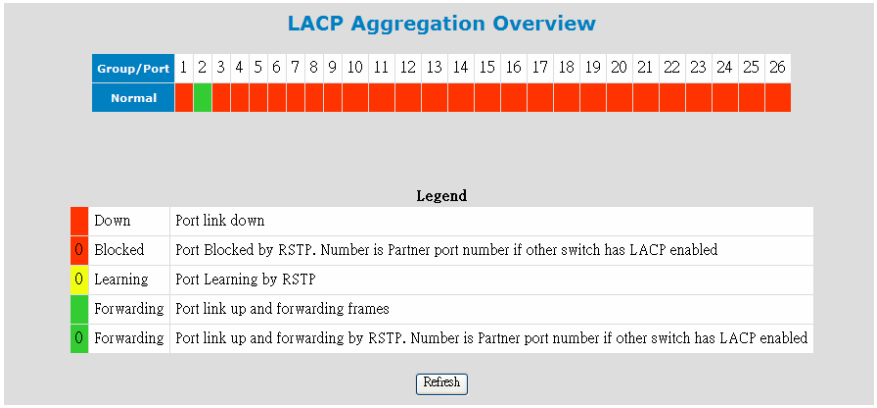
This page is used to configure LACP function. With LACP protocol, switches can learn trunk connections automatically.

Follow the steps to do it. (*Don't connect trunk cables until this function is set.)

a. Enable Trunk function at "Trunk Information" page first. Then click [Apply].
b. Assign System Priority. (Its value is 1~65535 and higher number has lower priority. Combining with the Mac address of the switch, it is used to identify this switch in LACP protocol operation.)
c. Select ports that will run LACP protocol.
d. Click [Apply].

Note: If ports are already in static trunk group, they are not allowed to apply as LACP ports. If static ports are selected as LACP ports, warning message will be prompted when [Apply] is clicked. And ports in a trunk group should work in the same connection speed.

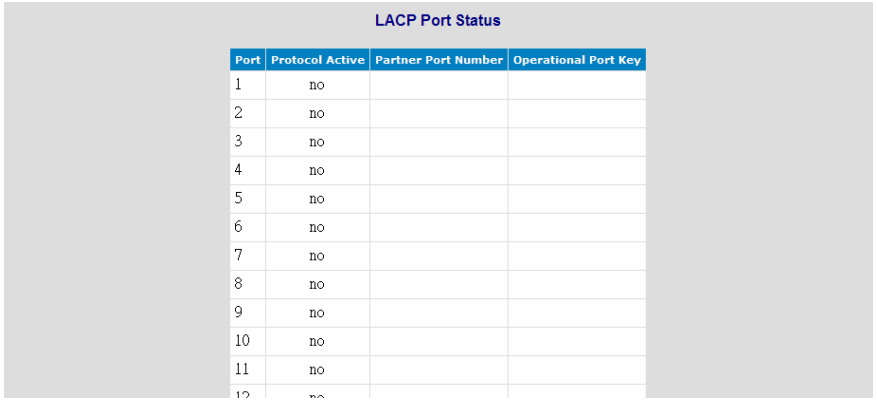
6.4.11.3 Lacp Port Status



This is for LACP protocol running status.

You can see current port status with colors. If LACP trunk is created, another port groups message will be shown.
Click [Refresh] can update the status information.

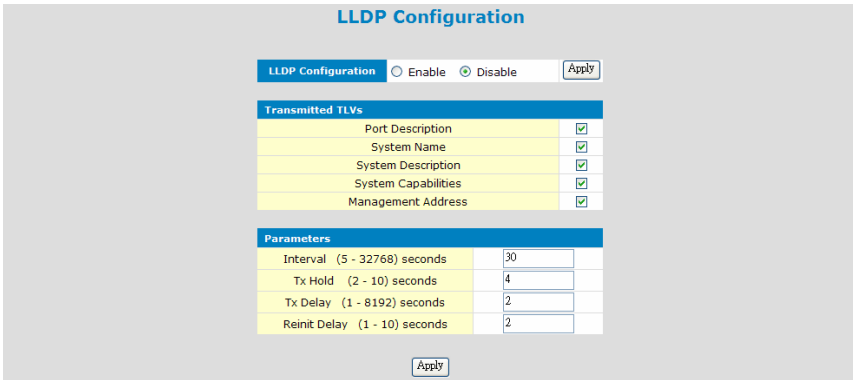
The following table will show the LACP enable/disable status of each port. Port number and port key of the partner switch will also be shown in the table when LACP Trunk is running.



6.4.12 LLDP

[LLDP Configuration]

This is used to configure LLDP (Link Layer Discover Protocol) function. LLDP protocol is used by network devices to advertise their identity, capabilities, and interconnections on a LAN network. This switch also can read and show the LLDP information from other connected LLDP-enabled devices.



LLDP Configuration can enable/disable this function.

Transmitted TLVs is used to select the system information for LLDP transmission.

- **Port Description:** enable the switch to send port description by LLDP protocol. It is the ifDescr object of rfc2863 (Interface Group MIB).
- **System Name:** enable the switch to send system name of the switch by LLDP protocol. It is the sysName object of rfc3418 (MIB for SNMP).
- **System Description:** enable the switch to send system description of the switch by LLDP protocol. It is the sysDescr object of rfc3418 (MIB for SNMP).
- **System Capabilities:** enable the switch to send system capability of the switch by LLDP protocol. It is "Bridge" for the switch.
- **Management Aaddress:** enable the switch to send IP address of the switch by LLDP protocol.

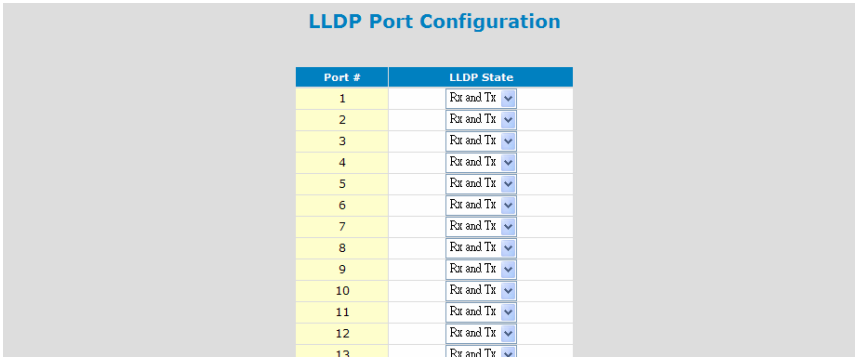
Parameters: is used to configure LLDP transmission parameters.

- **Interval**: is used to set the periodic transmit interval of LLDP protocol advertisements. The time interval range is 5~32768 seconds and default is 30 seconds. The rule limit for the value is "(interval) x (tx_hold) ≤ 65536.
- **Tx Hold**: is used to set the valid time for the LLDP information sent by the switch. Its range is 2~10 seconds and default is 4 seconds. The rule limit for the value is "(interval) x (tx_hold) ≤ 65536.
- **Tx Delay**: is used to set the transmit delay between the successive LLDP

advertisements caused by a change in local LLDP MIB variables. Its range is 1~8192 seconds and default is 2 seconds. The rule limit for the value is “4 x (tx_delay) ≤ (tx_interval).

- Reinit Delay is used to set the re-initialization delay time after LLDP port is disabled or link down. Its range is 1~10 seconds and default is 2 seconds. When LLDP is re-initialized on a port, all the information about it in remote system will be deleted.

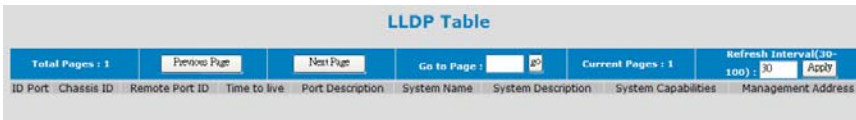
[Port Configuration]



This is used to configure LLDP function on the port(s).

- disable will disable LLDP function on the port(s).
- rx_and_tx will enable both receive and transmit LLDP packets on the port(s)..
- tx_only will enable transmit LLDP packets only on the port(s).
- rx_only will enable receive LLDP packets only on the port(s).

[Port Statistics]



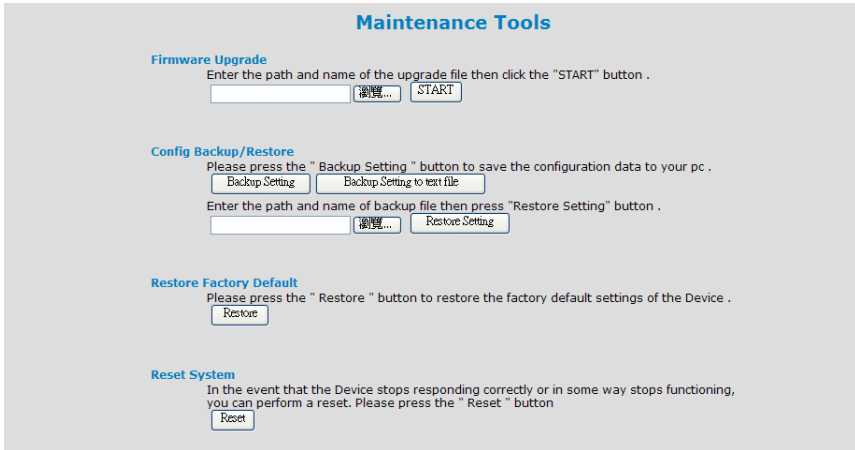
This table will show LLDP information of the connected devices.

6.4.13 Tools

The follow functions are used for system maintenance. They are Software Upgrade, Configuration Backup/Restore, Restore Factory Default, Reset System, and Ping functions.

6.4.13.1 Tools Information

Four functions are supported as the system maintenance tools.



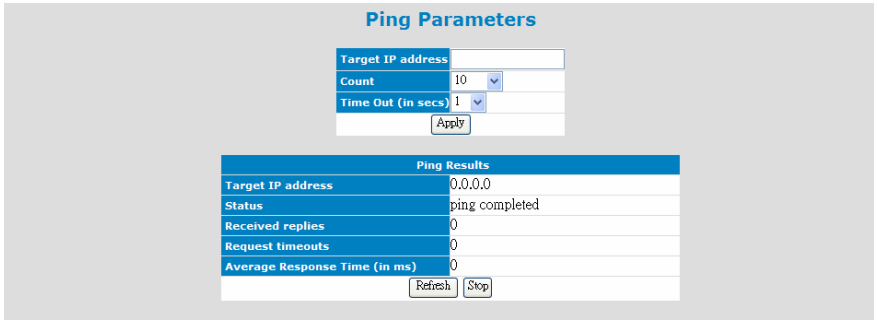
Firmware Upgrade : This function will upgrade the system operation software from the web management PC.

Config Backup/Restore :
[Backup Setting]: Clicking this button, the switch will backup the configuration of the switch to the web management PC.
[Backup Setting to text file]: Clicking this button, the switch will backup the configuration of the switch to the web management PC in text format.
[Restore Setting]: The configuration of the switch can be restored to switch by clicking this button after the configuration file is selected.

Restore Factory Default : This function will restore the switch configuration to factory default setting.

Reset System : This function will cause the switch to reboot itself.

6.4.13.2 Ping



This function is used to ping network devices from the switch. It can be used to verify network connection.

Target IP address : This is the target IP address for the ping operation.
Count : This is the repeat count for the ping operation.
Time Out : This is the timeout value for the ping operation.
After the above items are set, click [Apply] to start the ping operation.

Then the result of ping operation will be shown.

7. Software Update and Backup

This switch supports software update and configuration backup/update/restore functions. It could be done in two ways.

1. **From console when booting**: by Xmodem protocol and doing by terminal program. This function can be used for run-time code and boot code updating. (Boot code works only at boot time - before the main program starts.)

   Press Ctrl-C when the switch is booting, the following message will be shown.

   ```
            Boot Menu
   ==========================
   0: Start the Run-time code
   1: Upgrade Run-time code
   2: Upgrade Boot Code

   => Select:
   ```

   a. *Start Run-time code* : This option will continue the booting process.

   b. *Upgrade Run-time code* : This option will try to update run-time code (main code) from terminal program with Xmodem protocol. If this option is selected, the following message will be shown.
   "Waiting to receive file by Xmodem ...."
   Then user can select "Send File" function of terminal program and select Xmodem protocol and the update file, then start the file upgrade.

   c. *Upgrade Boot Code* : This option will try to update boot code from terminal program with Xmodem protocol. User can select "Send File" function of terminal program and select Xmodem protocol and the update file, then start the file upgrade.

2. **From web browser**: Doing by http protocol and by web browser. Please refer to the description of "*Tools*" function in Section 6.4.13.

3. **From console/telnet command**: Doing by tftp protocol and done by "copy" command. Please refer to the description of "*copy*" command in Section 6.2.2.

A. Product Specifications

Access Method	Ethernet, CSMA/CD
Standards Conformance	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE IEEE 802.3z, IEEE 802.3ab (1000Base)
Communication Rate	10/100/1000Mbps, Full / Half duplex (auto-negotiation)
MDI/MDIX	Auto-detect on TX ports
Indicator Panel	LEDs - each unit : *Power* each port : *Link/Act, Full/Col*
Number of Ports	3* 8-port(TX/FX) modules, 2* gigabit TX/SFP combo ports
Dimensions	440W x 254D x 44H mm
Certification	CE Mark, FCC Class A
Input Power	Full range: 100 to 240V, 50 to 60 Hz
Temperature	Standard Operating: 0 to 50℃
Humidity	10% to 90% (Non-condensing)

Bridging Function	Filtering, forwarding and learning
Switching Method	Store-and-forward
Address Table	8K entries
Filtering/Forwarding Rate	Line speed
Maximum Packet Size	2048 Bytes (including 4 CRC bytes)
Flow Control	802.3x for full duplex, backpressure for half duplex

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VLAN	802.1Q VLAN /w GVRP (up to 1024 groups), Port-based VLAN, Private VLAN, Metro Mode
VLAN Stacking	Yes
QoS	4 priority queues per port, for port-based/802.1P tagged-based/DSCP priority operation
Spanning Tree	Support RSTP/STP protocol
Loopback Detection	Yes, enabled by port
Trunking	14 groups max., Static and LACP are supported
Mirror Port	Yes, for Ingress/Egress traffic, DA/SA filtering function is supported
IGMP Snooping	Yes, for IP multicast traffic
IGMP Group Number Limit	Yes
Multicast IP Range Limit	Yes.
MVR	Yes, up to 3* MVR VLANs are supported
Mac ID Security on Port	Static Mac address access limit on port,and Dynamic Mac address number limit on port
IP-Mac-Port Binding	Yes, up to 256 bindings

802.1x	Yes, support Port-based/Mac-based Authentication mode and Transparent modes Guest VLAN and Dynamic VLAN are supported Two RADIUS servers are supported
ACL	Yes, for L2~L4 content of packets, up to 256 rules
Protected Port	Yes
DHCP Relay & Option 82	Yes, DHCP Relay function & Option 82 function
DHCP Snooping	Yes, support DHCP IP port binding function
Rate Control	Yes, 62.5Kbps~1000Mbps, for ingress/egress traffic
Storm Control	Broadcast, Multicast, and Unicast Storm Control
Admin Manage Security	Yes, by IP/Subnet/Protocol-interface limit, could be authenticated by RADIUS server
System Time	Yes, by NTP protocol, support Daylight-Saving
System Log	Yes, Local and Remote (by syslog) logging. Up to 5 syslog servers are supported
LLDP	Yes

Out-band Management	Console
In-band Management	Telnet, Http/Https, SNMP
SNMP	Agent Ver 1,2c, 3 Supports MIB II(RFC1213), Bridge MIB, Etherlike MIB, VLAN MIB, Private MIB
RMON	Support group 1,2,3,9
Software Update/Backup	by http/TFTP protocols, Xmodem, for firmware/ configuration(binary/text)
Configuration File	Support both binary and text format

B. Compliances

EMI Certification FCC Class A Certification (USA)

Warning: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures are required to correct the interference.

CE Mark Declaration of Conformance for EMI and Safety (EEC)

This is to certify that this product complies with ISO/IEC Guide 22 and EN45014. It conforms to the following specifications:

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

This product complies with the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

Warning! Do not plug a phone jack connector into the RJ-45 port. This may damage this device.

C. Warranty

We warrant to the original owner that the product delivered in this package will be free from defects in material and workmanship for a period of warranty time from the date of purchase from us or the authorized reseller. The warranty does not cover the product if it is damaged in the process of being installed. We recommend that you have the company from whom you purchased this product install it.