CONNECTION TECHNOLOGY SYSTEMS

HES-3109 SERIES

9 PORTS 10/100/1000BASE-T ETHERNET MANAGED SWITCH

8 PORTS 10/100/1000BASE-T ETHERNET MANAGED SWITCH WITH 1 PORT 1000BASE-X UPLINK OR 1 PORT 100/1000BASE-X UPLINK

8 PORTS 10/100/1000BASE-T ETHERNET MANAGED SWITCH WITH 1 PORT 1000BASE-X UPLINK OR 1 PORT 100/1000BASE-X UPLINK AND TV RF RECEIVER

8 PORTS 10/100/1000BASE-T ETHERNET MANAGED SWITCH WITH 1 PORT 1000BASE-X UPLINK OR 1 PORT 100/1000BASE-X UPLINK WITH BATTERY CHARGING FUNCTION

8 PORTS 10/100/1000BASE-T ETHERNET MANAGED SWITCH WITH 1 PORT 1000BASE-X UPLINK OR 1 PORT 100/1000BASE-X UPLINK WITH BATTERY CHARGING FUNCTION AND TV RF RECEIVER

Network Management

User's Manual

Version 1.0

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your local distributors or an experienced radio/TV technician for help.
- Shielded interface cables must be used in order to comply with emission limits.

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Table of Content

1. INTRODUCTION

Thank you for using the 8 Ports 10/100/1000Base-T plus 1 Port 1000Base-X or 100/1000Base-X Uplink, or 9 Ports 10/100/1000Base-T Ethernet Managed Switch. The built-in management module allows users to configure this Switch and monitor the operation status locally or remotely through network.

The Managed Switch is fully compliant with IEEE 802.3 and 802.3u standards. By employing store and forward switching mechanism, the Switch provides low latency and faster data transmission. Moreover, it also supports more advanced functions such as QoS, Q-in-Q VLAN Tunneling, Rate Limiting, IGMP Snooping, etc.. Users can configure the required settings of the Switch and monitor its real-time operational status via Command Line Interface (CLI). For detailed descriptions on how to use CLI, please refer to Section 2.

1.1 Interfaces

Depending on the main device and optional accessories that you purchased, the front panel and rear panel of your Switch may look differently from model to model. Figure 1 to 4 show the front and rear panel for 9-Port 10/100/1000Base-T Ethernet Managed Switch in stylish plastic housing or metal housing respectively; whereas, Figure 5 to 8 show the front and rear panel for 8-Port 10/100/1000Base-T plus 1-Port 1000Base-X or 100/1000Base-X Uplink Ethernet Managed Switch with optional CATV RF module in stylish plastic housing or metal housing.

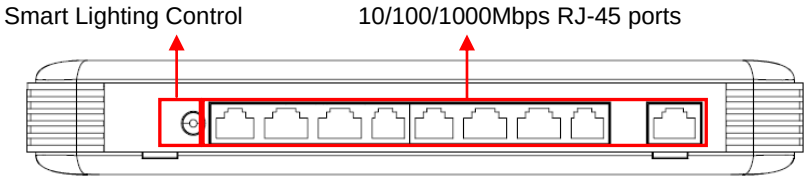


Figure 1. Front Panel for 9-Port 10/100/1000Base-T Managed Switch (plastic housing)

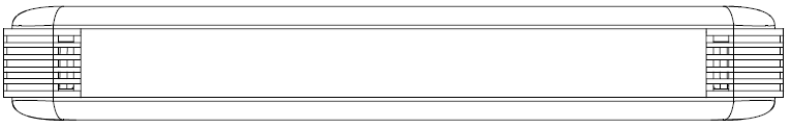


Figure 2. Rear Panel for 9-Port 10/100/1000Base-T Managed Switch (plastic housing)

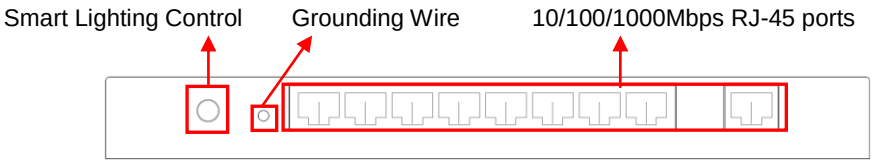


Figure 3. Front Panel for 9-Port 10/100/1000Base-T Ethernet Managed Switch (metal housing)

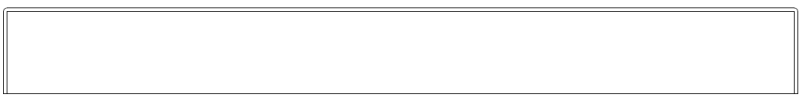


Figure 4. Rear Panel for 9-Port 10/100/1000Base-T Ethernet Managed Switch (metal housing)

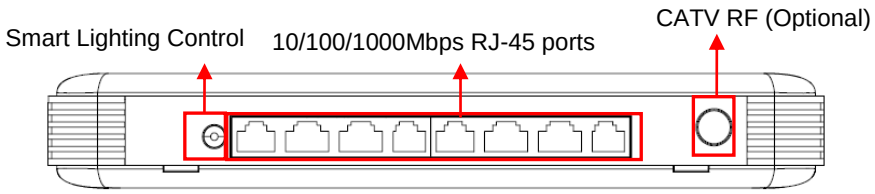


Figure 5. Front Panel for 8-Port 10/100/1000Base-T plus 1-Port 1000Base-X or 100/1000Base-X Uplink Ethernet Managed Switch with CATV RF Module (plastic housing)

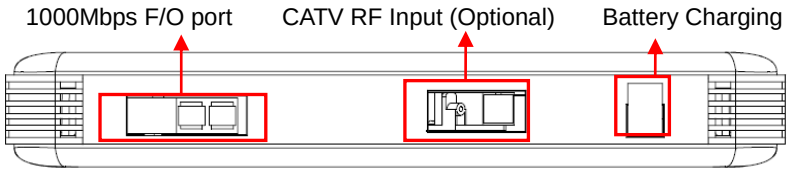


Figure 6. Rear Panel for 8-Port 10/100/1000Base-T plus 1-Port 1000Base-X or 100/1000Base-X Uplink Ethernet Managed Switch with CATV RF & Battery Charging Module (plastic housing)

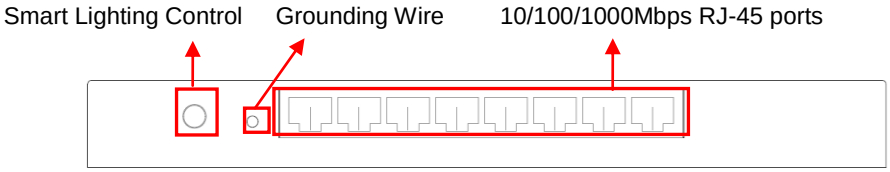


Figure 7. Front Panel for 8-Port 10/100/1000Base-T plus 1-Port 1000Base-X or 100/1000Base-X Uplink Ethernet Managed Switch (metal housing)

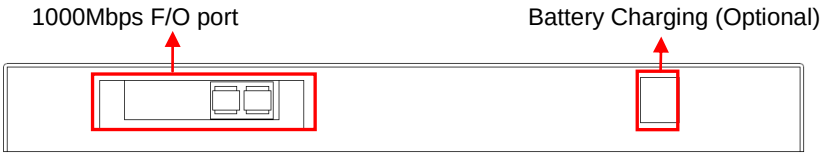


Figure 8. Rear Panel for 8-Port 10/100/1000Base-T plus 1-Port 1000Base-X or 100/1000Base-X Uplink Ethernet Managed Switch with Battery Charging Module (metal housing)

All models have the same top, left and right panel.

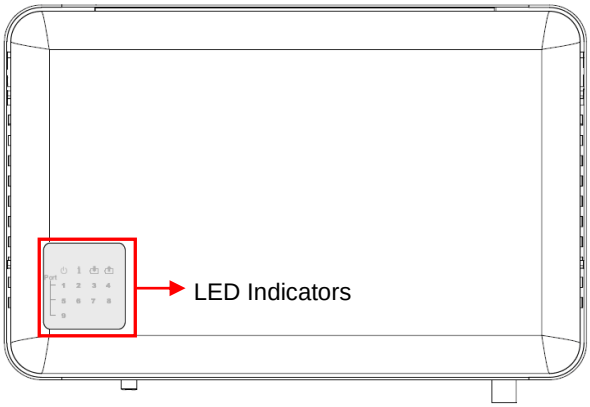


Figure 9. Top Panel with LEDs (plastic housing)

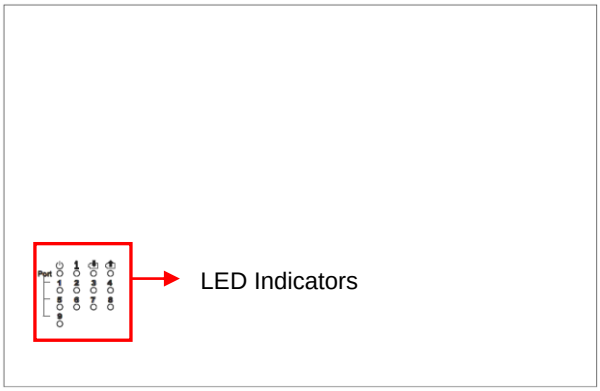


Figure 10. Top Panel with LEDs (metal housing)

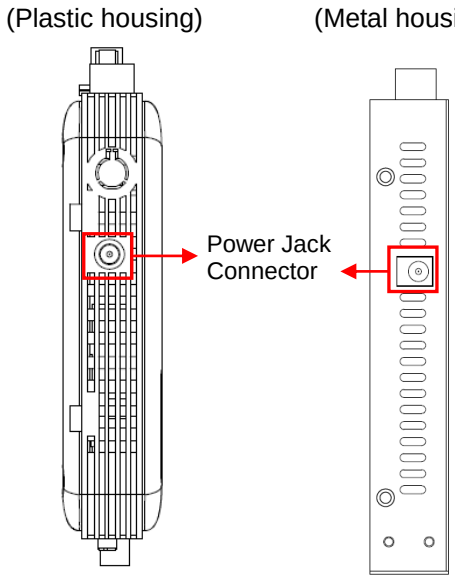


Figure 11. Left Panel

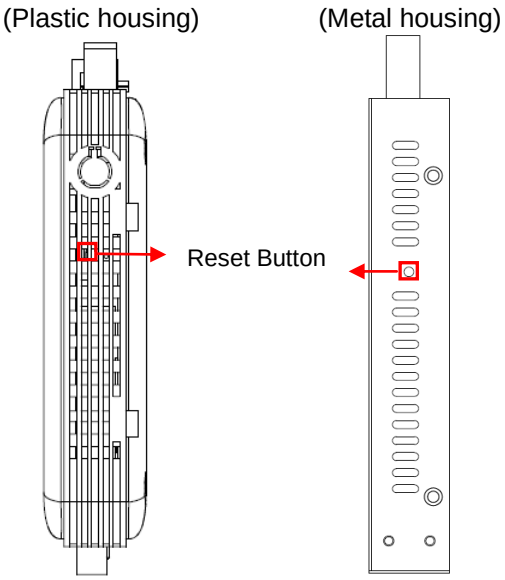


Figure 12. Right Panel

1.2 Management Preparations

The Managed Switch can be accessed through both Telnet connection and a web browser, such as Internet Explorer or Netscape, etc.. Before you can access the Managed Switch to configure it, you need to connect cables properly.

1.2.1 Connecting the Managed Switch

It is extremely important that proper cables are used with correct pin arrangements when connecting Managed Switch to other devices such as switches, hubs, workstations, etc..

- **1000Base-X Fiber Port or 100/1000 Base-X Fiber Port**

  The 1000Base-X fiber port is located at the rear panel of the Managed Switch. This port is primarily used for uplink connection and can operate at 1000M/Full or Half Duplex mode. Duplex SC or WDM Simplex SC types of connectors are available. Use proper multimode or single-mode optical fiber cable to connect this port with the other Ethernet Fiber port.

  Before connecting to other switches, workstations or media converters, make sure both sides of the fiber transfer are with the same media type, for example 1000Base-X Single-mode to 1000Base-X Single-mode, 1000Base-X Multimode to 1000Base-X Multimode. Check that the fiber-optic cable type matches the fiber transfer model. To connect to 1000Base-SX transfer, use the multimode fiber cable (one side must be male duplex SC connector type). To connect to 1000Base-LX transfer, use the single-mode fiber cable (one side must be male duplex LC connector type).

- **10/100/1000Base-T RJ-45 Ports**

  Depending on the model that you purchased, 8 or 9 10/100/1000Base-T RJ-45 ports are located on the front panel of the Managed Switch. These RJ-45 ports allow users to connect their traditional copper-based Ethernet devices to network. All these ports support auto-negotiation and MDI/MDIX auto-crossover, i.e. the crossover or straight through CAT-5 cable may be used.

1.2.2 Assigning IP Addresses

IP addresses have the format n.n.n.n, for example 168.168.8.100.

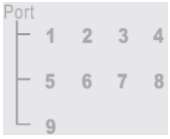
IP addresses are made up of two parts:

- The first part (168.168.XXX.XXX in the example) indicates network address identifying the network where the device resides. Network addresses are assigned by three allocation organizations. Depending on your location, each allocation organization assigns a globally unique network number to each network that wishes to connect to the Internet.
- The second part (XXX.XXX.8.100 in the example) identifies the device within the network. Assigning unique device numbers is your responsibility. If you are unsure of the IP addresses allocated to you, consult the allocation organization from which your IP addresses were obtained.

Remember that an address can be assigned to only one device on a network. If you connect to the outside, you must change all the arbitrary IP addresses to comply with those you have been allocated by the allocation organization. If you do not do this, your outside communications will not be connected.

A subnet mask is a filtering system for IP addresses. It allows you to further subdivide your network. You must use the proper subnet mask for a proper operation of a network with subnets defined.

1.3 LED Definitions

LED	Definition	Color	Operation
	Power	Off	Device is powered off.
		Green	Device is powered on.
	System Status	Orange	System is booting up.
		Green	System is working normally.
		Orange Blinking	When the system is set back to default factory setting, the Status LED indicator will blink in orange for 3 times.
			When the system is restarted, the Status LED indicator will blink in orange once.
	Battery Charging (For BAT models only)	Green	When the battery is connected to the device, steady green indicates that it is fully charged.
		Green Blinking	When the battery is connected to the device, green blinking indicates that it is charging.
	Battery Discharging (For BAT models only)	Orange	The battery is installed or connected incorrectly.
		Orange Blinking	When battery is installed to the device, orange blinking indicates that the battery is in use.
	Port Link Status	Off	Port link is down
		Green	Link is up and works under 10/100Mbps.
		Orange	Link is up and works under 1000Mbps.
		Green/Orange Blinking	The port is receiving and transmitting data.

1.4 Button Definitions

Button	Operation
Smart Lighting Control Button	System Status LED and Port Link LEDs will be turned off by pressing the button. Only Power and Battery Discharging LED indicators stay on.
Reset Button	Insert a pin or paper clip to press the Reset button for 5 seconds to restart the device.
	Insert a pin or paper clip to press the Reset button for 10 seconds to reset the device to factory defaults.

2. Command Line Interface (CLI)

This chapter guides you to use Command Line Interface (CLI) via Telnet connection, specifically in:

- Configuring the system
- Resetting the system
- Upgrading newly released firmware

2.1 Remote Console Management-Telnet

You can use Command Line Interface to manage the Managed Switch via Telnet session. For first-time users, you must first assign a unique IP address to the Managed Switch before you can manage it remotely. Use any one of the RJ-45 ports on the front panel as the temporary management console port to login to the device with the default username & password and then assign the IP address using IP command in Global Configuration mode.

Follow steps described below to access the Managed Switch through Telnet session:

Step 1. Use any one of the RJ-45 ports on the front panel as a temporary management console port to login to the Managed Switch.

Step 2. Run Telnet client and connect to *192.168.0.1*. For first-time users, make sure the IP address of your PC or workstation is assigned to an IP address between 192.168.0.2 and 192.168.0.254 with subnet mask 255.255.255.0.

Step 3. When asked for a username, enter "***admin***". When asked for a password, *leave the password field blank* and press Enter (by default, no password is required.)

Step 4. If you enter CLI successfully, the prompt display *Switch*> (the model name of your device together with a greater than sign) will appear on the screen.

Step 5. Once you enter CLI successfully, you can set up the Switch's IP address, subnet mask and the default gateway using "IP" command in Global Configuration mode. The telnet session will be terminated immediately once the IP address of the Switch has been changed.

Step 6. Use new IP address to login to the Managed Switch via Telnet session again.

Limitation: Only one active Telnet session can access the Managed Switch at a time.

2.2 Navigating CLI

After you successfully access to the Managed Switch, you will be asked for a login username. Enter your authorized username and password, and then you will be directed to the User Mode. In CLI management, the User Mode only provides users with basic functions to operate the Managed Switch. If you would like to configure advanced features of the Managed Switch, such as, VLAN, QoS, and Rate limit control, you must enter the Configuration Mode. The following table provides an overview of modes available in this Managed Switch.

Command Mode	Access Method	Prompt Displayed	Exit Method
User Mode	Login username & password	Switch>	logout
Privileged Mode	From user mode, enter the *enable* command	Switch#	disable, exit, logout
Configuration Mode	From the enable mode, enter the *config* or *configure* command	Switch(config)#	exit

NOTE: *By default, the model name will be used for the prompt display. You can change the prompt display to the one that is ideal for your network environment using the "host-name" command. However, for convenience, the prompt display "Switch" will be used throughout this user's manual.*

2.2.1 General Commands

This section introduces you some general commands that you can use in all modes, including "help", "exit", "history" and "logout".

Entering the command…	To do this…	Available Modes
help	Obtain a list of available commands in the current mode.	User Mode Privileged Mode Configuration Mode
exit	Return to the previous mode or login screen.	User Mode Privileged Mode Configuration Mode
history	List all commands that have been used.	User Mode Privileged Mode Configuration Mode
logout	Logout from the CLI or terminate Telnet session.	User Mode Privileged Mode

2.2.2 Quick Keys

In CLI, there are several quick keys that you can use to perform several functions. The following table summarizes the most frequently used quick keys in CLI.

Keys	Purpose
tab	Enter an unfinished command and press “Tab” key to complete the command.
?	Press “?” key in each mode to get available commands.

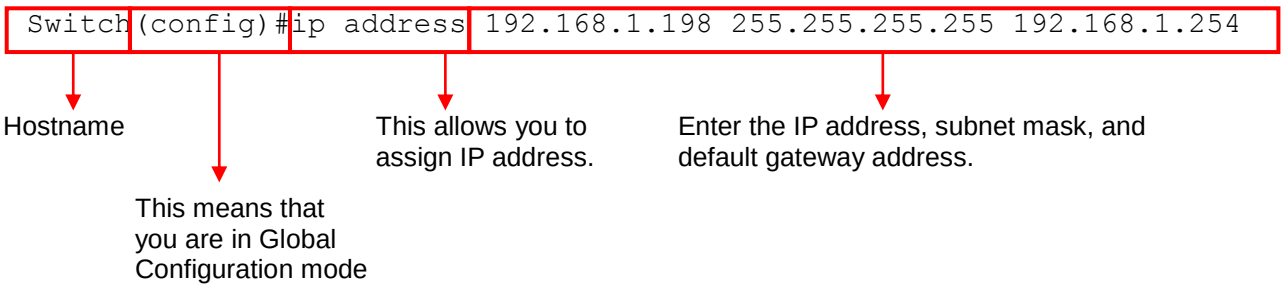
Unfinished command followed by ?	Enter an unfinished command or keyword and press “?” key to complete the command and get command syntax help.
	
	Examples:
	`Switch#h?`
	`help` `Show available commands`
	`history` `Show history commands`
	
	`Switch#he?`
	`<cr>`
	
	`Switch#help`

Up arrow	Use Up arrow key to scroll through the previous entered commands, beginning with the most recent key-in commands.
Down arrow	Use Down arrow key to scroll through the previous entered commands, beginning with the commands that are entered first.

2.2.3 Command Format

While in CLI, you will see several symbols very often. As mentioned above, you might already know what “>”, “#” and (config)# represent. However, to perform what you intend the device to do, you have to enter a string of complete command correctly. For example, if you want to assign IP address for the Managed Switch, you need to enter the following command with the required parameter and IP, subnet mask and default gateway:

IP command syntax: `Switch(config)#ip address [A.B.C.D] [255.X.X.X] [A.B.C.D]`



The following table lists common symbols and syntax that you will see very frequently in this User's Manual for your reference:

Symbols	Brief Description
>	Currently, the device is in User Mode.
#	Currently, the device is in Privileged Mode.
(config)#	Currently, the device is in Global Configuration Mode.
Syntax	**Brief Description**
[ ]	Brackets mean that this field is required information.
[A.B.C.D]	Brackets represent that this is a required field. Enter an IP address or gateway address.
[255.X.X.X]	Brackets represent that this is a required field. Enter the subnet mask.
[port-based | 802.1p | dscp | vid]	There are four options that you can choose. Specify one of them.
[1-8191]	Specify a value between 1 and 8191.

[0-7] 802.1p_list
[0-63] dscp_list
	Specify one or more values or a range of values.
	
	For example: specifying one value
	
	`Switch(config)#qos 802.1p-map 1 0`
	
	`Switch(config)#qos dscp-map 10 3`
	
	For example: specifying three values (separated by commas)
	
	`Switch(config)#qos 802.1p-map 1,3 0`
	
	`Switch(config)#qos dscp-map 10,13,15 3`
	
	For example: specifying a range of values (separating by a hyphen)
	
	`Switch(config)#qos 802.1p-map 1-3 0`
	
	`Switch(config)#qos dscp-map 10-15 3`

2.2.4 Login Username & Password

Default Login

After you enter Telnet session, a login prompt will appear to request a valid and authorized username and password combination. For first-time users, enter the default login username "**admin**" and "**press Enter key**" in password field (no password is required for default setting). When system prompt shows "Switch>", it means that the user has successfully entered the User Mode.

For security reasons, it is strongly recommended that you add a new login username and password using User command in Configuration Mode. When you create your own login username and password, you can delete the default username (admin) to prevent unauthorized accesses.

Forgot Your Login Username & Password?

If you forgot your login username and password, you can use the "reset button" to set all configurations back to factory defaults. Once you have performed system reset to defaults, you can login with default username and password. Please note that if you use this method to gain access to the Managed Switch, all configurations saved in Flash will be lost. It is strongly recommended that a copy of configurations is backed up in your local hard-drive or file server from time to time so that previously-configured settings can be restored to the Managed Switch for use after you gain access again to the device.

2.3 User Mode

In User mode, only a limited set of commands are provided. Please note that in Use Mode, you have no authority to configure advanced settings. You need to enter Privileged mode and Configuration mode to set up advanced functions of a switch feature. For a list of commands available in User Mode, enter the question mark (?) or "help" command after the system prompt displays "Switch>".

Command	Description
exit	Quit the User mode or close the terminal connection.
help	Display a list of available commands in User mode.
history	Display the command history.
logout	Logout from the Managed Switch.
enable	Enter the Privileged mode.

2.4 Privileged Mode

The only place where you can enter the Privileged (Enable) Mode is in User Mode. When you successfully enter Enable mode, the prompt will be changed to Switch# (the model name of your device together with a pound sign). Enter the question mark (?) or help command to view a list of commands available for use.

Command	Description
copy-cfg	Restore or backup configuration file via FTP or TFTP server.
configure	Enter Global Configuration mode.
disable	Exit Enable Mode and return to User Mode.
exit	Exit Enable Mode and return to User Mode.
firmware	Upgrade Firmware via FTP or TFTP server.
help	Display a list of available commands in Enable Mode.
history	Show commands that have been used.
logout	Logout from the Managed Switch.
reload	Restart the Managed Switch.
write	Save your configurations to Flash.
show	Show a list of commands or show the current setting of each listed command.

2.4.1 Copy-cfg Command

Use “copy-cfg” command to backup a configuration file via FTP or TFTP server or restore the Managed Switch back to the defaults or to the defaults without changing IP configurations.

1. Restore a configuration file via FTP or TFTP server.

Command	Parameter	Description
Switch# copy-cfg from ftp [A.B.C.D] [file name] [user_name] [password]	[A.B.C.D]	Enter the IP address of your FTP server.
	[file_name]	Enter the configuration file name that you want to restore.
	[user_name]	Enter the username for FTP server login.
	[password]	Enter the password for FTP server login.
Switch# copy-cfg from tftp [A.B.C.D] [file_name]	[A.B.C.D]	Enter the IP address of your TFTP server.
	[file_name]	Enter the configuration file name that you want to restore.
Example		
Switch# copy-cfg from ftp 192.168.1.198 HS_0600_file.conf misadmin1 abcxyz		
Switch# copy-cfg from tftp 192.168.1.198 HS_0600_file.conf		

2. Restore the Managed Switch back to default settings.

Command / Example
Switch# copy-cfg from default

NOTE: *There are two ways to set the Managed Switch back to the factory default settings. Users can use the “copy-cfg from default” command in CLI or simply press the “Reset Button” located on the front panel to restore the device back to the initial state.*

3. Restore the Managed Switch back to default settings but keep IP configurations.

Command / Example
Switch# copy-cfg from default keep-ip

4. Backup a configuration file to TFTP server.

Command	Parameter	Description
Switch# copy-cfg to ftp [A.B.C.D] [file_name] [user_name] [password]	[A.B.C.D]	Enter the IP address of your FTP server.
	[file_name]	Enter the configuration file name that you want to backup.
	[user_name]	Enter the username for FTP server login.
	[password]	Enter the password for FTP server login.
Switch# copy-cfg to tftp [A.B.C.D] [file_name]	[A.B.C.D]	Enter the IP address of your TFTP server.
	[file_name]	Enter the configuration file name that you want to backup.
Example		
Switch# copy-cfg to ftp 192.168.1.198 HS_0600_file.conf misadmin1 abcxyz		
Switch# copy-cfg to tftp 192.168.1.198 HS_0600_file.conf		

2.4.2 Firmware Command

To upgrade Firmware via FTP or TFTP server.

Command	Parameter	Description
Switch# firmware upgrade ftp [A.B.C.D] [file_name] [user_name] [password]	[A.B.C.D]	Enter the IP address of your FTP server.
	[file_name]	Enter the firmware file name that you want to upgrade.
	[user_name]	Enter the username for FTP server login.
	[password]	Enter the password for FTP server login.
Switch# firmware upgrade tftp [A.B.C.D] [file_name]	[A.B.C.D]	Enter the IP address of your TFTP server.
	[file_name]	Enter the firmware file name that you want to upgrade.
Example		
Switch# firmware upgrade ftp 192.168.1.198 HS_0600_file.bin edgeswitch10 abcxyz		
Switch# firmware upgrade tftp 192.168.1.198 HS_0600_file.bin		

2.4.3 Reload Command

To restart the Managed Switch, enter the reload command.

Command / Example
Switch# reload

2.4.4 Write Command

To save running configurations to startup configurations, enter the write command. All unsaved configurations will be lost when you restart the Managed Switch.

Command / Example
Switch# write

2.4.5 Configure Command

The only place where you can enter Global Configuration Mode is in Privileged Mode. You can type in “configure” or “config” for short to enter Global Configuration Mode. The display prompt will change from “Switch#” to “Switch(config)#” once you successfully enter Global Configuration Mode.

Command / Example
Switch# config Switch(config)#
Switch# configure Switch(config)#

2.5 Configuration Mode

When you enter “configure” or “config” and press “Enter” in Privileged Mode, you will be directed to Global Configuration Mode where you can set up advanced switching functions, such as QoS, VLAN, and storm control security globally. Any command entered will be applied to running-configuration and the device’s operation. From this level, you can also enter different sub-configuration modes to set up specific configurations for VLAN, QoS, security or interfaces.

Command	Description
catv	Enable or disable CATV RF module
exit	Exit the Configuration Mode.
help	Display a list of available commands in Configuration Mode.
history	Show commands that have been used.
ip	Set up the IP address and enable DHCP mode & IGMP snooping.
loop-detection	Enable or disable Loop Detection function
mac	Set up each port’s MAC learning function.
management	Set up the system service type.
ntp	Set up required configurations for Network Time Protocol.
qos	Set up the priority of packets within the Managed Switch.
snmp-server	Create a new SNMP community and trap destination and specify the trap types.
switch	Enable or disable SFP and counter polling function.
switch-info	Specify company name, host name, system location, etc..
user	Create a new user account.
vlan	Set up VLAN mode and VLAN configuration.
no	Disable a command or set it back to its default setting.
interface	Set up the selected interfaces’ advanced features.
show	Show a list of commands or show the current setting of each listed command.

2.5.1 Entering Interface Numbers

In the Global Configuration Mode, you can configure a command that is only applied to interfaces specified. For example, you can set up each interface's VLAN assignment, speed, or duplex mode. To configure, you must first enter the interface number. There are four ways to enter your interface numbers to signify the combination of different interfaces that apply to a command or commands.

Commands	Description
Switch(config)# interface 1 Switch(config-if-1)#	Enter a single interface. Only interface 1 will apply to commands entered.
Switch(config)# interface 1,3,5 Switch(config-if-1,3,5)#	Enter three discontinuous interfaces, separating by a comma. Interface 1, 3, 5 will apply to commands entered.
Switch(config)# interface 1-3 Switch(config-if-1-3)#	Enter three continuous interfaces. Use a hyphen to signify a range of interface numbers. In this example, interface 1, 2, and 3 will apply to commands entered.
Switch(config)# interface 1,3-5 Switch(config-if-1,3-5)#	Enter a single interface number together with a range of interface numbers. Use both commas and hyphens o signify the combination of different interface numbers. In this example, interface 1, 3, 4, 5 will apply to commands entered.

The "interface" command can be used together with "Loop Detection", "QoS", "VLAN" and "Security" commands. For detailed usages, please refer to Loop Detection, QoS, VLAN and Security sections below.

2.5.2 No Command

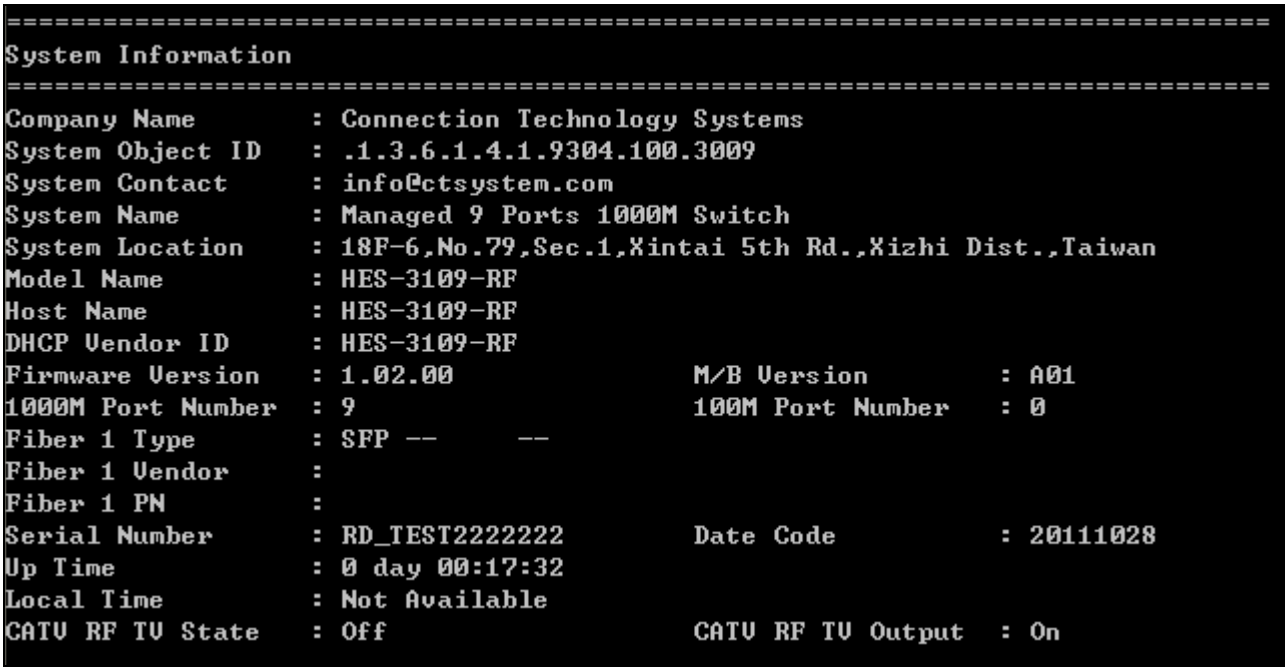
Most commands that you enter in Configuration mode can be negated using "no" command followed by the same or original command. The purpose of "no" command is to disable a function, remove a command, or set the setting back to the default value. In each sub-section below, the use of no command to fulfill different purposes will be introduced.

2.5.3 Show Command

The command "show" is very important for network administrators to get information about the device, receive outputs to verify a command's configurations or troubleshoot a network configuration error. "Show" command can be used in Privileged or Configuration mode. The following describes different uses of "show" command.

1. Display system information

Enter “show switch-info” command in Privileged or Configuration mode, and then the following similar screen page will appear.



Company Name: Display a company name for this Managed Switch. Use “switch-info company-name [company-name]” command to edit this field.

System Object ID: Display the predefined System OID.

System Contact: Display contact information for this Managed Switch. Use “switch-info sys-contact [sys-contact]” command to edit this field.

System Name: Display a descriptive system name for this Managed Switch. Use “switch-info sys-name [sys-name]” command to edit this field.

System Location: Display a brief location description for this Managed Switch. Use “switch-info sys-location [sys-location]” command to edit this field.

Model Name: Display the product’s model name.

Host Name: Display the product’s host name.

DHCP Vendor ID: Display the product’s DHCP Vendor ID.

Firmware Version: Display the firmware version used in this device.

M/B Version: Display the main board version.

1000M Port Number: The number of ports transmitting at the speed of 1000Mbps

100M Port Number: The number of ports transmitting at the speed of 100Mbps

Fiber 1 Type: Display the information about the slide-in or fixed fiber type.

Fiber 1 Vendor: Display the vendor of the slide-in or fixed fiber.

Fiber 1 PN: Displays the PN of the slide-in or fixed fiber.

Serial Number: Display the serial number of this Managed Switch.

Date Code: Displays the Managed Switch Firmware date code.

Uptime: Display the time the device has been up.

Local Time: Display the time of the location where the switch is.

CATV RF TV State: View-only field that shows whether RF TV is ready or not.

CATV RF TV Output: Turn on or off the RF TV Output.

2. Display or verify currently-configured settings

Refer to “interface command”, “ip command”, “mac command”, “qos command”, “security command”, “snmp-server command”, “user command”, and “vlan command” sections.

3. Display interface information or statistics

Refer to “show interface statistics command” and “show sfp information command” sections.

4. Show running and startup configurations

Refer to “show running-config command” and “show start-up-config command” sections.

2.5.4 Interface Command

Use this command to set up various port configurations of discontinuous or a range of ports.

Command	Parameter	Description
Switch(config)# interface [port_list]	[port_list]	Enter several port numbers separated by commas or a range of port numbers. For example: 1,3 or 2-4
Switch(config-if-PORT-PORT)# auto-negotiation		Set the selected interfaces’ to auto-negotiation. When auto-negotiation is enabled, speed configuration will be ignored.

Switch(config-if-PORT-PORT)# duplex full		Set the selected interfaces' to full duplex mode.
Switch(config-if-PORT-PORT)# flowcontrol		Enable the selected interfaces' flow control function.
Switch(config-if-PORT-PORT)# speed [1000 |100 | 10]	[1000 |100 | 10]	Set up the selected interfaces' speed. Speed configuration only works when "no auto-negotiation" command is issued.
Switch(config-if-PORT-PORT)# description [description]	[description]	Specify a descriptive name for the selected interfaces.
Switch(config-if-PORT-PORT)# shutdown		Administratively disable the selected ports' status.
No command		
Switch(config-if-PORT-PORT)# no auto-negotiation		Set auto-negotiation setting to the default setting.
Switch(config-if-PORT-PORT)# no duplex		Set the selected ports' duplex mode to the default setting.
Switch(config-if-PORT-PORT)# no speed		Set the selected ports' speed to the default setting.
Switch(config-if-PORT-PORT)# no flowcontrol		Set the selected ports' flow control function to the default setting.
Switch(config-if-PORT-PORT)# no description		Remove the entered description name for the selected ports.
Switch(config-if-PORT-PORT)# no shutdown		Administratively enable the selected ports' status.
Show command		
Switch(config)# show interface status		Show each interface's port status including media type, forwarding state, speed, duplex mode, flow control and link up/down status.
Interface command example		
Switch(config)# interface 1-3		Enter port 1 to port 3's interface mode.
Switch(config-if-1-3)# auto-negotiation		Set the selected interfaces' to auto-negotiation.
Switch(config-if-1-3)# duplex full		Set the selected interfaces' to full duplex mode.
Switch(config-if-1-3)# speed 100		Set the selected ports' speed to 100Mbps.
Switch(config-if-1-3)# shutdown		Administratively disable the selected ports' status.

2.5.5 CATV Command

Enable or disable CATV RF module.

CATV command	Description
Switch(config)# catv	Enable CATV RF module.
No command	
Switch(config)# no catv	Disable CATV RF module.
Show command	
Switch(config)# show switch-info	Show current CATV RF module status.

2.5.6 IP Command

Configure IP address and related settings such as DHCP snooping and IGMP snooping.

1. Set up or remove the IP address of the Managed Switch.

IP command	Parameter	Description
Switch(config)# ip address [A.B.C.D] [255.X.X.X] [A.B.C.D]	[A.B.C.D]	Enter the desired IP address for the Managed Switch.
	[255.X.X.X]	Enter subnet mask of your IP address.
	[A.B.C.D]	Enter the default gateway address.
Switch(config)# ip dhcp snooping		Enable DHCP Snooping function
Switch(config)# ip dhcp snooping dhcp-server [port_list]	[port_list]	Specify DHCP server trust ports.
No command		
Switch(config)# no ip address		Remove the Switch's IP address.
Show command		
Switch(config)# show ip address		Show the current IP configurations or verify the configured IP settings.
IP command example		
Switch(config)# ip address 192.168.1.198 255.255.255.0 192.168.1.254		Set up the Switch's IP to 192.168.1.198, subnet mask to 255.255.255.0, and default gateway to 192.168.1.254.

2. Enable the Managed Switch to automatically get IP address from the DHCP server.

Command / Example	Description
Switch(config)# ip address dhcp	Enable DHCP mode.
No command	
Switch(config)# no ip address dhcp	Disable DHCP mode.
Show command	
Switch(config)# show ip address	Show the current IP configurations or verify the configured IP settings.

3. Enable or disable DHCP snooping globally.

Command / Example	Parameter	Description
Switch(config)# ip dhcp snooping		Enable DHCP snooping function.
Switch(config)# ip dhcp snooping dhcp-server [port_list]	[port_list]	Specify DHCP server trust ports.
No command		
Switch(config)# no ip dhcp snooping		Disable IGMP snooping function.
Switch(config)# no ip dhcp snooping dhcp-server		Remove all the DHCP server trust ports
Show command		
Switch(config)# show ip dhcp snooping		Show current DHCP snooping status including DHCP server trust ports.

4. Enable or disable IGMP snooping globally.

IGMP, Internet Group Management Protocol, is a communications protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships. It can be used for online streaming video and gaming, and allows more efficient use of resources when supporting these uses.

IGMP Snooping is the process of listening to IGMP traffic. IGMP snooping, as implied by the name, is a feature that allows the switch to “listen in” on the IGMP conversation between hosts and routers by processing the layer 3 packets IGMP packets sent in a multicast network.

When IGMP snooping is enabled in a switch, it analyses all the IGMP packets between hosts connected to the switch and multicast routers in the network. When a switch hears an IGMP report from a host for a given multicast group, the switch adds the host’s port number to the multicast list for that group. And, when the switch hears an IGMP Leave, it removes the host’s port from the table entry.

IGMP snooping can very effectively reduce multicast traffic from streaming and other bandwidth intensive IP applications. A switch using IGMP snooping will only forward multicast traffic to the hosts interested in that traffic. This reduction of multicast traffic reduces the packet processing at the switch (at the cost of needing additional memory to handle the

multicast tables) and also reduces the workload at the end hosts since their network cards (or operating system) will not have to receive and filter all the multicast traffic generated in the network.

Command / Example	Parameter	Description
Switch(config)# ip igmp snooping		Enable IGMP snooping function.
Switch(config)# ip igmp snooping aging-time	[1-6000] /10 sec.	Specify the IGMP querier aging time. If the switch does not receive join packets from the end device within the specified time, the entry associated with this end device will be removed from the IGMP table.
No command		
Switch(config)# no ip igmp snooping		Disable IGMP snooping function.
Switch(config)# no ip igmp snooping aging time		Remove IGMP querier aging time setting.
Show command		
Switch(config)# show ip igmp snooping		Show current IGMP snooping status including immediate leave function.
Switch(config)# show ip igmp snooping groups		Show IGMP group table. When IGMP Snooping is enabled, the Switch is able to read multicast group IP and the corresponding MAC address from IGMP packets that enter the device.

5. Enable or disable IGMP snooping immediate-leave function.

This works only when IGMP Snooping is enabled. When Immediate Leave is enabled, the Switch immediately removes the port when it detects IGMPv1 & IGMPv2 leave message on that port.

Command / Example	Description
Switch(config)# ip igmp snooping immediate-leave	Enable IGMP immediate leave function.
No command	
Switch(config)# no ip igmp snooping immediate-leave	Disable IGMP immediate leave function.
Show command	
Switch(config)# show ip igmp snooping	Show current IGMP snooping status including immediate leave function.
Switch(config)# show ip igmp snooping groups	Show IGMP group table.

2.5.7 Loop Detection Command

Enable or disable Loop Detection function.

Loop Detection allows users to configure the Managed Switch to lock a port when it detects packets that sent out on that port loop back to the switch. When loops occur, it will cause broadcast storm and affect the performance of layer two Access switch. To avoid this, Loop Detection can be enabled on LAN port of the Managed Switch. When it detects the loop, it will lock the port which receives the loop packet immediately and send out SNMP trap to inform the network administrator.

Loop Detection command	Parameter	Description
Switch(config)# loop-detection		Globally enable Loop Detection function. By default, this function is disabled.
Switch(config)# interface [port_list]	[port_list]	Enter several port numbers separated by commas or a range of port numbers. For example: 1,3 or 2-4
Switch(config-if-PORT-PORT)# loop-detection		Enable Loop Detection function on the selected physical ports.
No command		
Switch(config)# no loop-detection		Globally disable Loop Detection function.
Switch(config-if-PORT-PORT)# no loop-detection		Disable Loop Detection function on the selected physical ports.
Show command		
Switch(config)# show loop-detection		Show current Loop Detection configuration information.
Switch(config)# show loop-detection status		Show information concerning locked ports and locked cause.

Note: *Please note that Loop Detection function is only available on LAN 1~8 port.*

2.5.8 MAC Command

Set up MAC address table aging time. Entries in the MAC address table containing source MAC addresses and their associated ports will be deleted if they are not accessed within the specified aging time.

MAC Command	Parameter	Description
Switch(config)# mac address-table aging-time [1-800]	[1-800]	Enter aging time for MAC address table. Numbers available are from 1 to 800.
No command		
Switch(config)# no mac address-table aging-time		Set MAC address table aging time to the default value (300 seconds).

Show command		
Switch(config)# show mac aging-time		Show current MAC address table aging time or verify currently configured aging time.
Switch(config)# show mac address-table		Show MAC addresses learned by the Managed Switch
Switch(config)# show mac address-table interface [port_list]	[port_list]	Show MAC addresses learned by the selected ports.
Switch(config)# show mac address-table mac [mac_addr]	[mac_addr]	Show the specified MAC address information including the MAC learning type (Static or Dynamic) and MAC learning port.
MAC command example		
Switch(config)# mac address-table aging-time 600		Set MAC address table aging time to 600 seconds.

2.5.9 Management Command

Management command	Parameter	Description
Switch(config)# management [ssh | telnet]	[ssh | telnet]	Select the system service type, SSH or telnet.
No command		
Switch(config)# no management [ssh | telnet]	[ssh | telnet]	Set system service type to Disabled.
Show command		
Switch(config)# show management		Show the current system service type.
Management command example		
Switch(config)# management ssh		Enable SSH system service type.

2.5.10 NTP Command

Set up required configurations for Network Time Protocol.

Command	Parameter	Description
Switch(config)# ntp		Enable the Managed Switch to synchronize the clock with a time server.
Switch(config)# ntp server1 [A.B.C.D]	[A.B.C.D]	Specify the primary time server IP address.
Switch(config)# ntp server2 [A.B.C.D]	[A.B.C.D]	Specify the secondary time server IP address.
Switch(config)# ntp syn-interval [1-99999]	[1-99999]	Specify the interval time to synchronize from NTP time server. The allowable value is between 1 and 99999 minutes.

Switch(config)# ntp time-zone [0-132]	[0-132]	Specify the time zone to that the Managed Switch belongs. Use any key to view the complete code list of 132 time zones. For example, “Switch(config)# ntp time-zone ?”
No command		
Switch(config)# no ntp		Disable the Managed Switch to synchronize the clock with a time server.
Switch(config)# no ntp server1		Delete the primary time server IP address.
Switch(config)# no ntp server2		Delete the secondary time server IP address.
Switch(config)# no ntp syn-interval		Set the synchronization interval back to the default setting.
Switch(config)# no ntp time-zone		Set the time-zone setting back to the default setting.
Show command		
Switch(config)# show ntp		Show or verify current time server settings.
NTP command example		
Switch(config)# ntp		Enable the Managed Switch to synchronize the clock with a time server.
Switch(config)# ntp server1 192.180.0.12		Set the primary time server IP address to 192.180.0.12.
Switch(config)# ntp server2 192.180.0.13		Set the secondary time server IP address to 192.180.0.13.
Switch(config)# ntp syn-interval 6000		Set the synchronization interval to 6000 minutes.
Switch(config)# ntp time-zone 4		Set the time zone to GMT-8:00 Vancouver.

2.5.11 QoS Command

1. Specify the desired QoS mode.

QoS command	Parameter	Description
Switch(config)# qos [port-based | 802.1p | dscp | vid]	[port-based | 802.1p | dscp | vid]	Specify one QoS mode. **port-based:** Use “*interface”* and “*qos default-class”* command to assign a queue to the selected interfaces. **802.1p:** Use *“qos 802.1p_map”* command to assign priority bits to a queue. **dscp:** Use “*qos dscp-map [0-63] dscp_list [0-3]”* to assign several DSCP values to a priority value. **vid:** Use *vid-map* command to assign the specific VIDs to the specific queue.

No command	
Switch(config)# no qos	Disable QoS function.
Show command	
Switch(config)# show qos	Show or verify QoS configurations.
QoS command example	
Switch(config)# qos 802.1p	Enable QoS function and use 802.1p mode.
Switch(config)# qos dscp	Enable QoS function and use DSCP mode.
Switch(config)# qos port-based	Enable QoS function and use port-based mode.
Switch(config)# qos vid	Enable QoS function and use VID mode.

2. Set up the DSCP and queue mapping.

DSCP-map command	Parameter	Description
Switch(config)# qos dscp-map [0-63] dscp_list [0-3]	[0-63] dscp_list	Specify the corresponding DSCP value you want to map to a priority queue.
	[0-3]	Specify a queue to which the specified DSCP value is assigned.
No command		
Switch(config)# no qos		Disable QoS function
Show command		
Switch(config)# show qos		Show or verify QoS configurations.
DSCP-map example		
Switch(config)# qos dscp-map 50 3		Mapping DSCP value 50 to priority queue 3.

3. Set up management traffic priority and port user priority.

Management-priority command	Parameter	Description
Switch(config)# qos management-priority [0-7]	[0-7]	Specify management traffic default 802.1p priority bit.
Port user priority command		
Switch(config-if-PORT-PORT)# qos user-priority [0-7]	[0-7]	Specify the user priority between 0 and 7.
No command		
Switch(config)# no qos management-priority		Set management traffic priority back to the default setting.
Switch(config-if-PORT-PORT)# no qos user-priority		Set user priority setting to the default.
Management-priority example		
Switch(config)# qos management-priority 4		Set management traffic priority to 4.
Port user priority example		
Switch(config)# interface 1-3		Enter several discontinuous port numbers separated by commas or a range of ports with a hyphen.

Switch(config-if-1-3)# qos user-priority 3	Set the user priority to 3 for the selected ports.

NOTE: *To check the setting of management traffic priority and port user priority, please refer to 2.5.17 VLAN Command.*

4. Set up QoS queuing mode.

Queuing-mode command	Parameter	Description
Switch(config)# qos queuing-mode [weight]	[weight]	By default, “strict” queuing mode is used. If you want to use “weight” queuing mode, you need to disable “strict” queuing mode. **Strict mode:** This indicates that services to each egress queues are offered based on rates specified. Use *“qos rate-limit egress”* to specify egress rate in Strict mode. **Weight mode**: This mode enables users to assign different weights to 4 queues. Use *“qos queue-weighted”* to specify egress rate in Weight mode.
No command		
Switch(config)# no qos queuing-mode		Set the queuing mode to Strict mode.
Show command		
Switch(config)# show qos		Show or verify QoS configurations.
Queuing-mode example		
Switch(config)# qos queuing-mode weight		Change the queuing mode from strict to Weight.

5. Set up 802.1p and DSCP remarking

Remarking command	Parameter	Description
Switch(config)# qos remarking [dscp | 802.1p]	[dscp | 802.1p]	Enable the specific remarking mode **dscp:** Configure the queue and DSCP mapping **<Q0 | Q1 | Q2 | Q3>:** Specify the queue. **<0-63>:** Assign DSCP to the specific queue. Example: Switch(config)# qos remarking dscp Q1 48 **802.1p:** configure the queue and 802.1p priority bit mapping **<Q0 | Q1 | Q2 | Q3>:** Specify the queue. **<0-7>:** Assign 802.1p priority bit to the specific queue. Example: Switch(config)# qos remarking 802.1p Q3 5
No command		
Switch(config)# no qos remarking [dscp | 802.1p]		Disable DSCP or 802.1p bit remarking.
Switch(config)# no qos remarking [dscp | 802.1p] [Q0 | Q1 | Q2 | Q3]		Set the DSCP or 802.1p bit value in the specific queue back to the default setting.
Show command		
Switch(config)# show qos remarking		Show current DSCP and 802.1p priority bit remarking configuration.
Remarking example		
Switch(config)# qos remarking 802.1p Q3 5		Assign 802.1p bit 5 to priority queue3.
Switch(config)# no qos remarking dscp Q1		Set the DSCP value in priority queue 1 back to the default setting.

6. Set up VLAN ID and queue mapping

Vid-map command	Parameter	Description
Switch(config)# qos vid-map [1-8]	[1-8]	Select the mapping entry.
Switch(config-vid-map-ID)# active		Enable the mapping entry.
Switch(config-vid-map-ID)# vlan-id [1-4094]	[1-4094]	Specify the VLAN ID.
Switch(config-vid-map-ID)# queue [0-3]	[0-3]	Specify the queue to which the specified VLAN ID is assigned.
Switch(config-vid-map-ID)# exit		Exit the specific entry.

No command		
Switch(config)# no qos vid-map [1-8]	[1-8]	Set the specific entry back to the default setting.
Switch(config-vid-map-ID)# no [active | vlan-id | queue]	[active | vlan-id | queue]	Disable the mapping entry, or set VLAN ID or queue back to the default setting.
Show command		
Switch(config-vid-map-ID)# show		Display the mapping configuration of the specific entry.
Vid-map example		
Switch(config)# qos vid-map 1		Configure vid-map entry 1.
Switch(config-vid-map-1)# active		Enable vid-map entry 1.
Switch(config-vid-map-1)# vlan-id 100		Assign VID 100 to vid-map entry 1.
Switch(config-vid-map-1)# queue 2		Assign vid-map entry 1 to queue 2.
Switch(config-vid-map-1)# exit		Exit vid-map entry 1.

7. Assign a tag priority to the specific queue.

802.1p-map command	Parameter	Description
Switch(config)# qos 802.1p-map [0-7] 802.1p_list [0-3]	[0-7] 802.1p_list	Assign a 802.1p priority bit or several 802.1p priority bits for mapping. Set up the corresponding priority value Priority Level: Low, Low, Low, Normal, Medium, Medium, High, High 802.1p Value: 0, 1, 2, 3, 4, 5, 6, 7
	[0-3]	Assign a queue value for mapping.
No command		
Switch(config)# no qos 802.1p-map [0-7] 802.1p_list	[0-7] 802.1p_list	Assign a 802.1p priority bit or several 802.1p priority bits that you want to delete or remove.
Show command		
Switch(config)# show qos		Show or verify QoS configurations.
802.1p-map example		
Switch(config)# qos 802.1p-map 6-7 3		Map priority bit 6 and 7 to queue 4.
Switch(config)# no qos 802.1p-map 6-7		Delete or remove 802.1p priority bit 6 and 7's mapping.

8. Use interface command to set up default class and ingress and egress rate limit.

QoS & Interface command	Parameter	Description
Switch(config)# interface [port_list]	[port_list]	Enter several port numbers separated by commas or a range of port numbers. For example: 1,3 or 2-4

Switch(config-if-PORT-PORT)# qos default-class [0-3]	[0-3]	Specify the default class for the selected interfaces.
Switch(config-if-PORT-PORT)# qos rate-limit ingress [8-1048568] kbps	[8-1048568] kbps	Specify the ingress rate between 8 and 1048568.
Switch(config-if-PORT-PORT)# qos rate-limit egress [8-1048568] kbps	[8-1048568] kbps	Specify the egress rate between 8 and 1048568.
No command		
Switch(config-if-PORT-PORT)# no qos default-class		Set QoS default class setting to the default.
Switch(config-if-PORT-PORT)# no qos rate-limit ingress		Set QoS ingress rate limit setting to the default.
Switch(config-if-PORT-PORT)# no qos rate-limit egress		Set QoS ingress rate limit setting to the default.
Show command		
Switch(config)# show qos interface [port_list]	[port_list]	Show or verify the selected interfaces' ingress and egress rate configurations.
Switch(config)# show qos interface		Show or verify each interface's ingress and egress rate configurations.
Switch(config)# show qos		Show or verify QoS configurations.
QoS & Interface example		
Switch(config)# interface 1-3		Enter several discontinuous port numbers separated by commas or a range of ports with a hyphen. For example:1,3 or 2-4
Switch(config-if-1-3)# qos rate-limit ingress 1550		Configure the selected interfaces' ingress rate-limit to 1550.
Switch(config-if-1-3)# qos rate-limit egress 3 1550		Set the selected interfaces' queue 3 to egress rate 1550.

2.5.12 Security Command

When a device on the network is malfunctioning or application programs are not well designed or properly configured, broadcast storms may occur, which may degrade network performance or in the worst situation cause a complete halt. The Managed Switch allows users to set a threshold rate for broadcast traffic on a per switch basis so as to protect network from broadcast/ multicast/ unknown unicast storms. Any broadcast/multicast/unknown unicast packet exceeding the specified value will then be dropped.

1. Enable or disable broadcast/multicast/unknown unicast storm control.

Security command	Parameter	Description
Switch(config)# interface [port_list]	[port_list]	Enter several port numbers separating by a comma or a range of port numbers. For example: 1,3 or 2-4
Switch(config-if-PORT-PORT)# security storm-protection		Enable the selected interfaces' storm protection function.

Switch(config-if-PORT-PORT)# security storm-protection broadcast		Enable the selected interfaces' broadcast storm protection function.
Switch(config-if-PORT-PORT)# security storm-protection multicast		Enable the selected interfaces' multicast storm protection function.
Switch(config-if-PORT-PORT)# security storm-protection unknown-multicast		Enable the selected interfaces' unknown multicast storm protection function.
Switch(config-if-PORT-PORT)# security storm-protection unknown-unicast		Enable the selected interfaces' unknown unicast storm protection function.
No command		
Switch(config-if-PORT-PORT)# no security storm-protection		Disable storm protection globally.
Switch(config-if-PORT-PORT)# no security storm-protection broadcast		Disable broadcast storm protection.
Switch(config-if-PORT-PORT)# no security storm-protection multicast		Disable multicast storm protection.
Switch(config-if-PORT-PORT)# no security storm-protection unknown-multicast		Disable unknown multicast storm protection.
Switch(config-if-PORT-PORT)# no security storm-protection unknown-unicast		Disable unknown unicast storm protection.
Show command		
Switch(config)# show security storm-protection interface [port_list]	[port_list]	Show the selected interfaces' security settings and storm control rates.
Switch(config)# show security storm-protection interface		Show each interface's security settings including storm control rates.

2. Specify the broadcast, multicast, unknown multicast and unknown unicast storm protection rates per second.

Security command	Parameter	Description
Switch(config-if-PORT-PORT)# security storm-protection rates [8-1048568]	[8-1048568]	Enter the maximum rate per second. Any broadcast, multicast, unknown multicast and unknown unicast packet exceeding the specified value will be dropped.
No command		
Switch(config-if-PORT-PORT)# no security storm-protection rates		Remove the rate setting. The storm protection rate will be set to the default (256kbps).
Show command		
Switch(config)# show security storm-protection interface [port_list]	[port_list]	Show the selected interfaces' security settings and storm control rates.
Switch(config)# show security storm-protection interface		Show each interface's security settings including storm control rates.

Security command example	
Switch(config-if-PORT-PORT)# security storm-protection rates 5000	Set broadcast, multicast, unknown multicast, and unknown unicast storm protection rates to 5000kbps.

2.5.13 SNMP-Server Command

1. Create a SNMP community and set up detailed configurations for this community.

Snmp-server command	Parameter	Description
Switch(config)# snmp-server community [community]	[community]	Specify a SNMP community name up to 20 alphanumeric characters.
Switch(config-community-NAME)# active		Enable this SNMP community account.
Switch(config-community-NAME)# description [Description]	[Description]	Enter the description up to 35 alphanumerical characters for this SNMP community.
Switch(config-community-NAME)# level [admin | rw | ro]	[admin | rw | ro]	Specify the access privilege for this SNMP account. By default, when you create a community, the access privilege for this account is set to “read only”. **Admin:** Full access right, including maintaining user account, system information, loading factory settings, etc.. **rw:** Read & Write access privilege. Partial access right, unable to modify system information, user account, load factory settings and upgrade firmware. **Ro:** Read Only access privilege.
No command		
Switch(config)# no snmp-server community [community]	[community]	Delete the specified community.
Switch(config-community-NAME)# no active		Disable this SNMP community account.
Switch(config-community-NAME)# no description		Remove the entered SNMP community descriptions.
Switch(config-community-NAME)# no level		Remove the configured level. This will set this community’s level to read only.
Show command		
Switch(config)# show snmp-server community [community]	[community]	Show the specified SNMP server account’s settings.

Switch(config)# show snmp-server community	Show SNMP community account's information in Global Configuration Mode.
Switch(config-community-NAME)# show	View or verify the configured SNMP community account's information.
Exit command	
Switch(config-community-NAME)# exit	Return to Global Configuration Mode.
Snmp-server example	
Switch(config)# snmp-server community mycomm	Create a new community "mycomm" and edit the details of this community account.
Switch(config-community-mycomm)# active	Activate the SNMP community "mycomm".
Switch(config-community-mycomm)# description rddeptcomm	Add a description for "mycomm" community.
Switch(config-community-mycomm)# level admin	Set "mycomm" community level to admin.

2. Set up a SNMP trap destination.

Trap-dest command	Parameter	Description
Switch(config)# snmp-server trap-destination [1-3]	[1-3]	Create a trap destination account.
Switch(config-trap-ACCOUNT)# active		Enable this SNMP trap destination account.
Switch(config-trap-ACCOUNT)# community [community]	[community]	Enter the community name of network management system.
Switch(config-trap-ACCOUNT)# destination [A.B.C.D]	[A.B.C.D]	Enter the SNMP server IP address.
No command		
Switch(config)# no snmp-server trap-destination [1-3]	[1-3]	Delete the specified trap destination account.
Switch(config-trap-ACCOUNT)# no active		Disable this SNMP trap destination account.
Switch(config-trap-ACCOUNT)# no community		Delete the configured community name.
Switch(config-trap-ACCOUNT)# no description		Delete the configured trap destination description.
Show command		
Switch(config)# show snmp-server trap-destination [1-3]	[1-3]	Show the specified trap destination information.
Switch(config)# show snmp-server trap-destination		Show SNMP trap destination information in Global Configuration mode.
Switch(config-trap-ACCOUNT)# show		View this trap destination account's information.

Exit command	
Switch(config- trap-ACCOUNT)# exit	Return to Global Configuration Mode.
Trap-destination example	
Switch(config)# snmp-server trap-destination 1	Create a trap destination account.
Switch(config-trap-1)# active	Activate the trap destination account.
Switch(config-trap-1)# community mycomm	Refer this trap destination account to the community “mycomm”.
Switch(config-trap-1)# description redepttrapdest	Add a description for this trap destination account.
Switch(config-trap-1)# destination 172.168.1.254	Set trap destination IP address to 192.168.1.254.

3. Set up SNMP trap types that will be sent.

Trap-type command	Parameter	Description
Switch(config)# snmp-server trap-type [all |auth-fail | cold-start | port-link | power-down | warm-start]	[all |auth-fail | cold-start | catv | port-link | power-down | warm-start]	Specify the trap type that will be sent when a certain situation occurs. **all:** A trap will be sent when authentication fails, the device cold /warm starts, port link is up or down, power is down, or the CATV optical-fiber source is less than -9 dBm. **auth-fail:** A trap will be sent when any unauthorized user attempts to login. **cold-start:** A trap will be sent when the device boots up. **catv:** A trap will be sent when the optical-fiber source is less than -9 dBm. **port-link:** A trap will be sent when the link is up or down. **power-down:** A trap will be sent when the device’s power is down. **warm-start:** A trap will be sent when the device restarts.
No command		
Switch(config)# no snmp-server trap-type auth-fail		Authentication failure trap will not be sent.
Show command		
Switch(config)# show snmp-server trap-type		Show the current enable/disable status of each type of trap.

Trap-type example	
Switch(config)# snmp-server trap-type all	All types of SNMP traps will be sent.

2.5.14 Switch Command

Switch command	Description
Switch(config)# switch sfp polling	Enable the Switch to refresh SFP DMI information and current state in a fixed interval.
Switch(config)# switch statistics polling	Enable the Switch to refresh counter information and current state in a fixed interval.
No command	
Switch(config)# no switch sfp polling	Disable the Switch to refresh SFP DMI information and current state in a fixed interval.
Switch(config)# no switch statistics polling	Disable the Switch to refresh counter information and current state in a fixed interval.

2.5.15 Switch-info Command

Set up the Managed Switch's basic information including company name, hostname, system name, etc..

Switch-info Command	Parameter	Description
Switch(config)# switch-info company-name [company_name]	[company_name]	Enter a company name for this Switch, up to 55 alphanumeric characters.
Switch(config)# switch-info dhcp-vendor-id [dhcp_vendor_id]	[dhcp_vendor_id]	Enter the user-defined DHCP vendor ID up to 55 alphanumeric characters. Please make sure you have an exact DHCP Vendor ID with the value specified in "vendor-classes" in your dhcp.conf file. For detailed information, see Appendix A.
Switch(config)# switch-info system-contact [system_contact]	[system_contact]	Enter contact information up to 55 alphanumeric characters for this Managed switch.
Switch(config)# switch-info system-location [system_location]	[system_location]	Enter a brief description of the Managed Switch location up to 55 alphanumeric characters. Like the name, the location is for reference only, for example, "13th Floor".
Switch(config)# switch-info system-name [system_name]	[system_name]	Enter a unique name up to 55 alphanumeric characters for this Managed Switch. Use a descriptive name to identify the Managed Switch in relation to your network, for example, "Backbone 1". This name is mainly used for reference only.

Switch(config)# switch-info host-name [host_name]	[host_name]	Enter a new hostname up to 15 alphanumeric characters for this Managed Switch. By default, the hostname prompt shows the model name of this Managed Switch. You can change the factory-assigned hostname prompt to the one that is easy for you to identify during network configuration and maintenance.
No command		
Switch(config)# no switch-info company-name		Delete the entered company name information.
Switch(config)# no switch-info system-contact		Delete the entered system contact information.
Switch(config)# no switch-info system-location		Delete the entered system location information.
Switch(config)# no switch-info system-name		Delete the entered system name information.
Switch(config)# no switch-info host-name		Set the hostname to the factory default.
Show command		
Switch(config)# show switch-info		Show Switch information including company name, system contact, system location, system name, model name, firmware version and fiber type.
Switch-info example		
Switch(config)# switch-info company-name telecomxyz		Set the company name to “telecomxyz”.
Switch(config)# switch-info system-contact info@company.com		Set the system contact field to “info@compnay.com”.
Switch(config)# switch-info system-location 13thfloor		Set the system location field to “13thfloor”.
Switch(config)# switch-info system-name backbone1		Set the system name field to “backbone1”.

2.5.16 User Command

Create a new login account.

User command	Parameter	Description
Switch(config)# user name [user_name]	[user_name]	Enter the new account’s username. The authorized user login name is up to 20 alphanumeric characters. Only 3 login accounts can be registered in this device.
Switch(config-user-USERNAME)# active		Activate this user account.

Switch(config-user-USERNAME)# description [description]	[description]	Enter the brief description for this user account.
Switch(config-user-USERNAME)# level [admin | rw | ro]	[admin | rw | ro]	Specify user account level. By default, when you create a community, the access privilege for this account is set to “read only”. **Admin:** Full access right, including maintaining user account, system information, loading factory settings, etc.. **rw:** Read & Write access privilege. Partial access right, unable to modify system information, user account, load factory settings and upgrade firmware. **Ro:** Read Only access privilege.
Switch(config-user-USERNAME)# password [password]	[password]	Enter the password for this user account up to 20 alphanumeric characters.
No command		
Switch(config)# no user name [user_name]	[user_name]	Delete the specified user account.
Switch(config-user-USERNAME)# no description		Remove the configured description.
Switch(config-user-USERNAME)# no level		Remove the configured level value. The account level will return to the default setting.
Switch(config-user-USERNAME)# no password		Remove the configured password value.
Show command		
Switch(config)# show user name [user_name]	[user_name]	Show the specified account’s information.
Switch(config)# show user name		List all user accounts.
Switch(config-user-USERNAME)# show		Show or verify the newly-created user account’s information.
User command example		
Switch(config)# user name miseric		Create a new login account “miseric”.
Switch(config-user-USERNAME)# description misengineer		Add a description to this new account “miseric”.
Switch(config-user-USERNAME)# level rw		Set this new account’s access privilege to “read & write”.
Switch(config-user-USERNAME)# password mis2256i		Set up a password for this new account “miseric”

2.5.17 VLAN Command

Create a 802.1q VLAN and management VLAN rule.

<table>
<tr><th>VLAN dot1q command</th><th>Parameter</th><th>Description</th></tr>
<tr><td>Switch(config)# vlan dot1q-vlan [1-4094]</td><td>[1-4094]</td><td>Enter a VID number to create a 802.1q VLAN.</td></tr>
<tr><td>Switch(config)# vlan dot1q-vlan isolation</td><td></td><td>Enable VLAN isolation mode. When enabled, each LAN port is separated and can not communicate with each other except for forwarding packets to port 9 (WAN port).

In other words, the device will be forced to follow the rule shown below.
<table>
<tr><td>Port</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
<tr><td>1</td><td>V</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td></tr>
<tr><td>2</td><td></td><td>V</td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td></tr>
<tr><td>3</td><td></td><td></td><td>V</td><td></td><td></td><td></td><td></td><td></td><td>V</td></tr>
<tr><td>4</td><td></td><td></td><td></td><td>V</td><td></td><td></td><td></td><td></td><td>V</td></tr>
<tr><td>5</td><td></td><td></td><td></td><td></td><td>V</td><td></td><td></td><td></td><td>V</td></tr>
<tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td>V</td><td></td><td></td><td>V</td></tr>
<tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td><td></td><td>V</td></tr>
<tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td><td>V</td></tr>
<tr><td>9</td><td>V</td><td>V</td><td>V</td><td>V</td><td>V</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
</table></td></tr>
<tr><td>Switch(config-vlan-VID)# name</td><td>[vlan_name]</td><td>Specify a descriptive name up to 15 characters for this VLAN.</td></tr>
<tr><td rowspan="2">Switch(config)# vlan management-vlan [1-4094] management-port [port_list]</td><td>[1-4094]</td><td>Enter the management VLAN ID.</td></tr>
<tr><td>[port_list]</td><td>Specify the management port number.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan</td><td></td><td>Enable Q-in-Q (double tag) VLAN.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan bypass-ctag</td><td></td><td>Ignore the C-tag checking.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan pass-through-mode</td><td></td><td>Enable VLAN pass-through mode. This enables the device to be managed remotely via the specified VLAN.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan pass-through-vlan [1-4094]</td><td>[1-4094]</td><td>Specify pass-through VLAN ID.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan isp-port [port_list]</td><td>[port_list]</td><td>Specify ISP ports.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan stag-ethertype [0xWXYZ]</td><td>[0xWXYZ]</td><td>Specify the ether type for the service tag.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan stag-priority [0-7]</td><td>[0-7]</td><td>Specify a priority bit for the service tag.</td></tr>
<tr><td>Switch(config)# vlan qinq-vlan stag-vid [1-4094]</td><td>[1-4094]</td><td>Specify a VID for the service tag.</td></tr>
</table>

VLAN & Interface command		
Switch(config)# interface [port_list]	[port_list]	Enter several discontinuous port numbers separated by commas or a range of ports with a hyphen. For example:1,3 or 2-4
Switch(config-if-PORT-PORT)# vlan dot1q-vlan access-vlan [1-4094]	[1-4094]	Set up the selected ports' PVID.
Switch(config-if-PORT-PORT)# vlan dot1q-vlan trunk-vlan [1-4094]	[1-4094]	Assign the selected ports to a specified VLAN.
Switch(config-if-PORT-PORT)# vlan dot1q-vlan mode access		Set the selected ports to access mode (untagged).
Switch(config-if-PORT-PORT)# vlan dot1q-vlan mode trunk		Set the selected ports to trunk mode (tagged).
Switch(config-if-PORT-PORT)# vlan dot1q-vlan mode trunk native		Enable native VLAN for untagged traffic.
No command		
Switch(config)# no vlan dot1q-vlan [1-4094]	[1-4094]	Delete the specified VID.
Switch(config)# no vlan dot1q-vlan isolation		Disable VLAN Isolation mode.
Switch(config)# no vlan qinq-vlan		Disable Q-in-Q VLAN.
Switch(config)# no vlan qinq-vlan bypass-ctag		Activate C-tag checking.
Switch(config)# no vlan qinq-vlan pass-through-mode		Disable pass-through mode.
Switch(config)# no vlan qinq-vlan pass-through-vlan		Set the pass-through VLAN ID to the default setting.
Switch(config)# no vlan qinq-vlan isp-port		Remove ISP port settings.
Switch(config)# no vlan qinq-vlan stag-ethertype		Remove the ether type for the service tag settings.
Switch(config)# no vlan qinq-vlan stag-priority		Remove the priority bit for the service tag settings.
Switch(config)# no vlan qinq-vlan stag-vid		Remove the VID for the service tag settings.
Switch(config-if-PORT-PORT)# no vlan dot1q-vlan access-vlan		Set the selected ports' PVID to the default setting.
Switch(config-if-PORT-PORT)# no vlan dot1q-vlan mode		Remove port mode.
Switch(config-if-PORT-PORT)# no vlan dot1q-vlan mode trunk native		Disable native VLAN for untagged traffic.
Switch(config-if-PORT-PORT)# no vlan dot1q-vlan trunk [1-4094]	[1-4094]	Remove the selected ports' VLAN membership. The selected ports are no longer member ports in the specified VLAN.

Show command		
Switch(config)# show vlan dot1q-vlan		Show 802.1q VLAN configuration.
Switch(config)#show vlan interface		Show each interface's VLAN ID, user priority and VLAN mode information.
Switch(config)#show vlan interface [port_list]	[port_list]	Show the selected ports' VLAN ID user priority and VLAN mode information.
Switch(config)# show vlan qinq-vlan		Show Q-in-Q VLAN configuration.
VLAN dot1q & interface example		
Switch(config)# vlan dot1q-vlan 100		Create a new VLAN 100.
Switch(config)# vlan management-vlan 1 management-port 1-3		Set port 1~3 to management ports.
Switch(config)# interface 1-3		Enter port 1 to port 3's interface mode.
Switch(config-if-1-3)# vlan dot1q-vlan trunk-vlan 100		Assign the selected ports to VLAN 100.
Switch(config-if-1-3)# vlan dot1q-vlan mode access		Set the selected ports to access mode (untagged).
Switch(config-if-1-3)# vlan dot1q-vlan access-vlan 100		Set the selected ports' PVID to 100.

2.5.18 Show interface statistics Command

The command "show interface statistics" that can display port traffic statistics, port packet error statistics and port analysis history can be used either in Privileged mode # and Global Configuration mode (config)#. "show interface statistics" is useful for network administrators to diagnose and analyze port traffic real-time conditions.

Command	Parameter	Description
Switch(config)# show interface statistics analysis		Display packets analysis (events) for each port.
Switch(config)# show interface statistics analysis [port_list]	[port_list]	Display packets analysis for the selected ports.
Switch(config)# show interface statistics analysis rate		Display packets analysis (rates) for each port.
Switch(config)# show interface statistics error		Display error packets statistics (events) for each port.
Switch(config)# show interface statistics error [port_list]	[port_list]	Display error packets statistics (events) for the selected ports.
Switch(config)# show interface statistics error rate		Display error packets statistics (rates) for each port.
Switch(config)# show interface statistics traffic		Display traffic statistics (events) for each port.
Switch(config)# show interface statistics traffic [port_list]	[port_list]	Display traffic statistics (events) for the selected ports.
Switch(config)# show interface statistics traffic rate		Display traffic statistics (rates) for each port.

Switch(config)# show interface statistics clear		Clear all statistics.

2.5.19 Show sfp Command

When you slide in SFP transceiver, detailed information about this module can be viewed by issuing this command.

Command	Description
Switch(config)# show sfp information	Display the slide-in SFP information including speed, distance, vendor name, vendor PN and vendor serial number.
Switch(config)# show sfp state	Display the slide-in SFP information including temperature, voltage, TX bias, TX power, and RX power.

2.5.20 Show log Command

Command	Description
Switch(config)# show log	Show event logs currently stored in the Managed Switch. The total number of event logs that can be displayed is 500.

2.5.21 Show running-config & start-up-config Command

Command	Description
Switch(config)# show running-config	Show configurations currently used in the Managed Switch. Please note that you must save running configurations into your switch flash before rebooting or restarting the device.
Switch(config)# show start-up-config	Display system configurations that are stored in flash.

3. WEB MANAGEMENT

The Managed Switch can be managed via a Web browser. The default IP of the Managed Switch can be reached at **"http://192.168.0.1"**. You can change the Switch's IP address to the intended one later in its **Network Management** menu.

Follow these steps to manage the Managed Switch through a Web browser:

1. Use one of the 10/100/1000Base-TX RJ-45 ports (as the temporary RJ-45 Management console port) to set up the assigned IP parameters of the Managed Switch including the following:

    - IP address
    - Subnet Mask
    - Default Switch IP address, if required

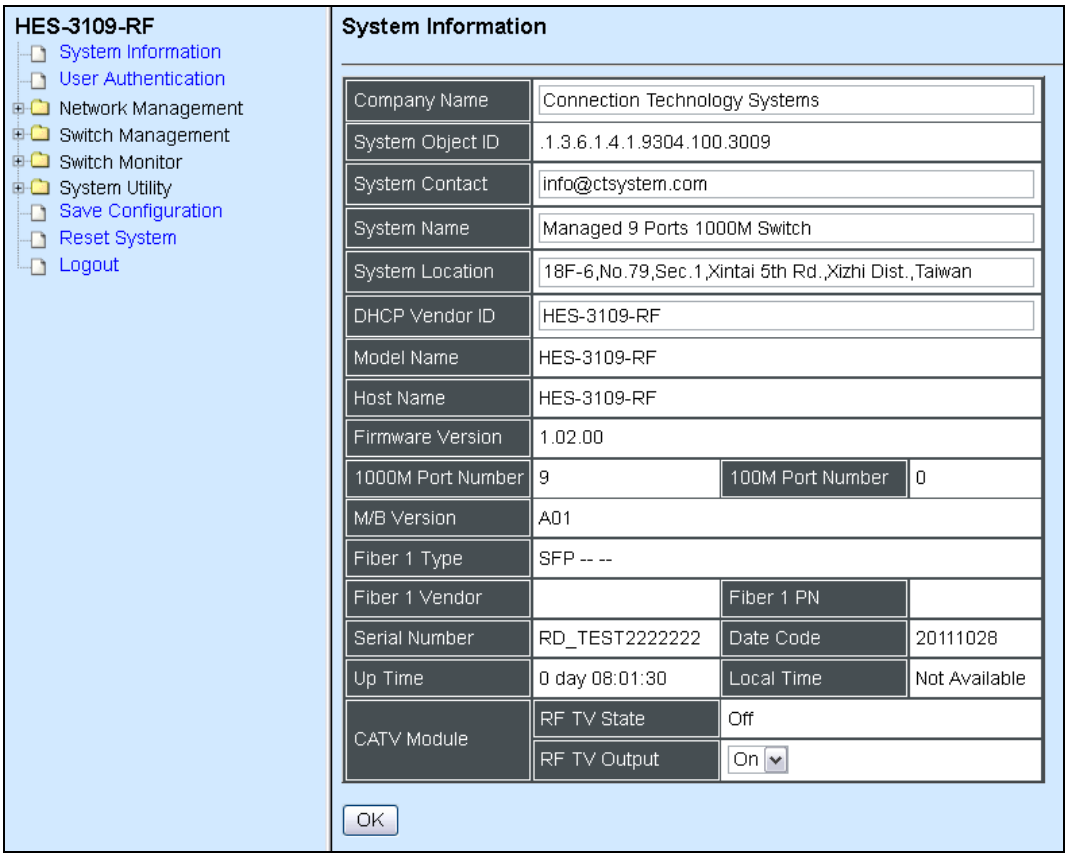
2. Run a Web browser and specify the Managed Switch's IP address to reach it. (The default IP address for the Managed Switch can be reached at **"http://192.168.0.1"** before any change.)

3. Login to the Managed Switch.

    Once you gain the access, you are requested to login.

Enter the administrator name and password for the initial login and then click "Login". The default administrator name is ***admin*** and without password (leave the password field blank).

After a successful login, the screen appears as below.



1. **System Information:** Name the Managed Switch, specify the location and check the current version of information.

2. **User Authentication:** Create and view the registered user list.

3. **Network Management:** Set up or view the IP address and related information about the Managed Switch required for network management applications.

4. **Switch Management:** Set up switch or port configuration, VLAN configuration, QoS and other functions.

5. **Switch Monitor:** View the operation status and traffic statistics of the ports.

6. **System Utility:** Upgrade firmware and load factory settings.

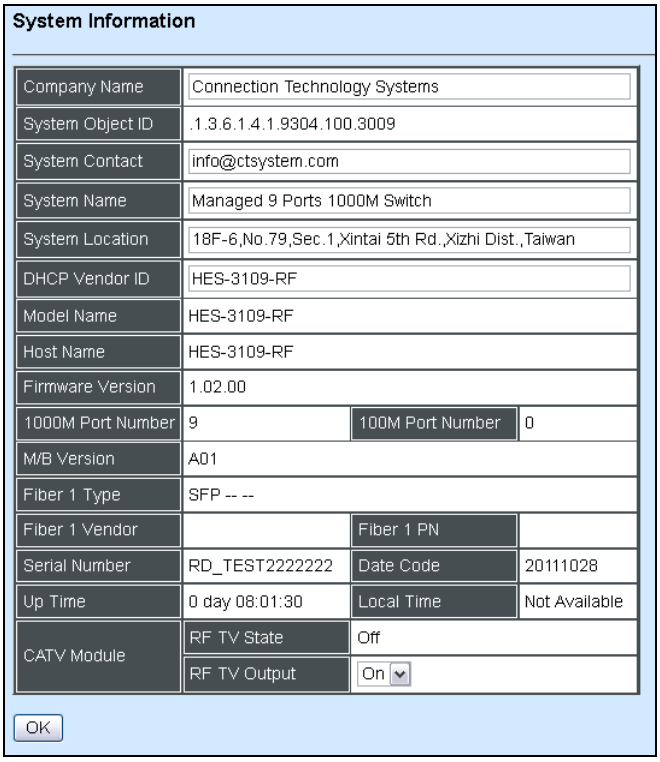
7. **Save Configuration:** Save all changes to the system.

8. **Reset System:** Reset the Managed Switch.

9. **Logout:** Exit the management interface.

3.1 System Information

Select **System Information** from the left column and then the following screen shows up.



Company Name: Enter a company name up to 55 alphanumeric characters for this Managed Switch.

System Object ID: View-only field that shows the predefined System OID.

System Contact: Enter contact information up to 55 alphanumeric characters for this Managed Switch.

System Name: Enter a unique name up to 55 alphanumeric characters for this Managed Switch. Use a descriptive name to identify the Managed Switch in relation to your network, for example, “Backbone 1”. This name is mainly used for reference.

System Location: Enter a brief description of the Managed Switch location up to 55 alphanumeric characters. The location is for reference only.

DHCP Vendor ID: Enter the user-defined vendor ID up to 55 alphanumeric characters. Please make sure you have an exact DHCP Vendor ID with the value specified in “vendor-classes” in your dhcp.conf file. For detailed information, see Appendix A.

Model Name: View-only field that shows the product’s model name.

Host Name: View-only field that shows the product’s host name.

Firmware Version: View-only field that shows the product’s firmware version.

1000M Port Number: The number of ports transmitting at the speed of 1000Mbps

100M Port Number: The number of ports transmitting at the speed of 100Mbps

M/B Version: View-only field that shows the main board version.

Fiber 1 Type: View-only field that shows information about the slide-in or fixed fiber type.

Fiber 1 Vendor: View-only field that shows the vendor of the slide-in or fixed fiber.

Fiber 1 PN: View-only field that shows the PN of the slide-in or fixed fiber.

Serial Number: View-only field that shows the serial number of this switch.

Date Code: View-only field that shows the Managed Switch firmware date code.

Up time: View-only field that shows how long the device has been powered on.

Local Time: View-only field that shows the time of the location where the switch is.

CATV Module- RF TV State: View-only field that shows whether RF TV is ready or not.

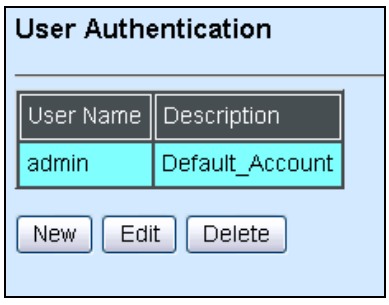
CATV Module- RF TV Output: Turn on or off the RF TV Output.

Click the **"OK"** button to apply the modifications.

3.2 User Authentication

To prevent any un-authorized operation, only registered users are allowed to operate the Managed Switch. Users who want to operate the Managed Switch need to register into the user's list first.

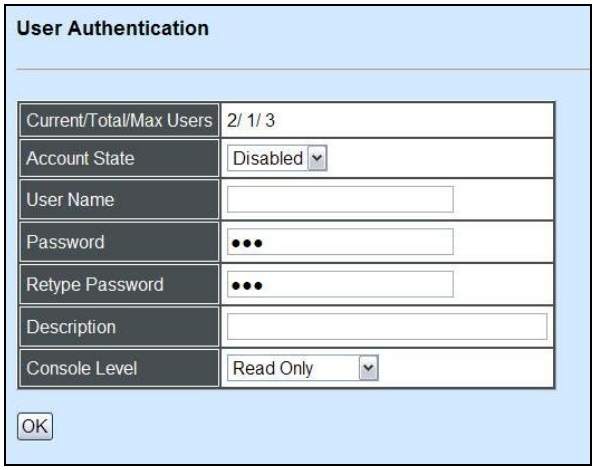
To view or change current registered users, select **User Authentication** from the left column and then the following screen page shows up.



Click **New** to add a new user account, then the following screen page appears.

Click **Edit** to view and edit a registered user setting.

Click **Delete** to remove a registered user setting.



Current/Total/Max Users: View-only field.

Current: This shows the number of current registered user.

Total: This shows the total number of the registered users.

Max: This shows the maximum number available for registration. The maximum number is 3.

Account State: Enable or disable the selected account.

User Name: Specify the authorized user login name, up to 20 alphanumeric characters.

Password: Enter the desired user password, up to 20 alphanumeric characters.

Retype Password: Enter the password again to confirm.

Description: Enter a unique description up to 35 alphanumeric characters for this user. This is mainly for reference only.

Console Level: Select the preferred access level for this newly created account.

Administrator: Full access right, including maintaining user account, system information, loading factory settings, etc..

Read & Write: Partial access right, unable to modify system information, user account, load factory settings and upgrade firmware.

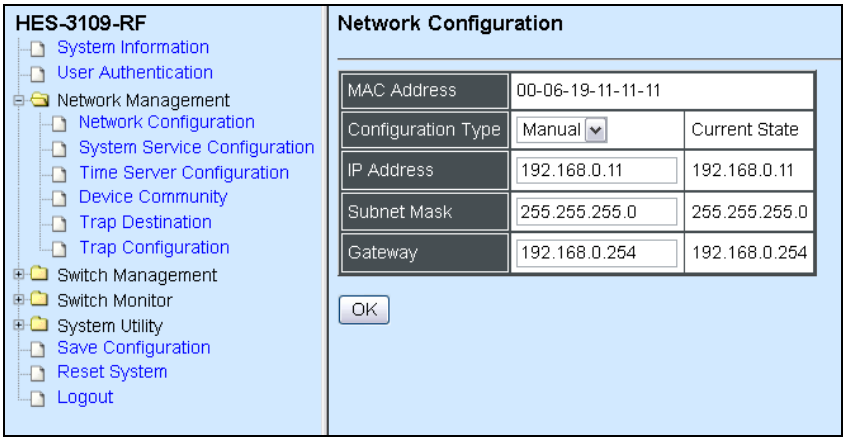
Read Only: Read only access right.

NOTE: *If you forget the login password, the only way to gain access to the Web Management is to set the Managed Switch back to the factory default setting by pressing the Reset button for 10 seconds (The Reset button is located on the Right Panel of the Managed Switch.). When the Managed Switch returns back to the default setting, you can login with the default login username and password (By default, no password is required. Leave the field empty and then press Login.)*

Click the **"OK"** button to apply the settings.

3.3 Network Management

In order to enable network management of the Managed Switch, proper network configuration is required. To do this, click the folder **Network Management** from the left column and then the following screen page appears.



1. **Network Configuration:** Set up the required IP configuration of the Managed Switch.

2. **System Service Configuration:** Set up the system service type.

3. **Time Server Configuration:** Set up the time server's configuration.

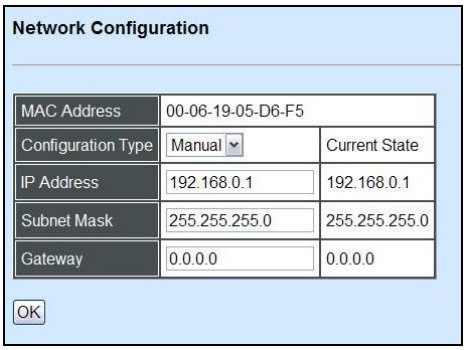
4. **Device Community:** View the registered SNMP community name list. Add a new community name or remove an existing community name.

5. **Trap Destination:** View the registered SNMP trap destination list.

6. **Trap Configuration:** Set up which type of trap is sent when a certain situation occurs.

3.3.1 Network Configuration

Click the option **Network Configuration** from the **Network Management** menu and then the following screen page appears.



MAC Address: This view-only field shows the unique and permanent MAC address pre-assigned to the Managed Switch. You cannot change the Managed Switch's MAC address.

Configuration Type: There are two configuration types that users can select from the pull-down menu; these are **"DHCP"** and **"Manual"**. When **"DHCP"** is selected and a DHCP server is also available on the network, the Managed Switch will automatically get the IP address from the DHCP server. If "**Manual"** is selected, users need to specify the IP address, Subnet Mask and Gateway.

NOTE: *This* Managed Switch *supports auto-provisioning function that enables DHCP clients to automatically download the latest firmware and configuration image from the server. For information about how to set up a DHCP server, please refer to APPENDIX A.*

IP Address: Enter the unique IP address for this Managed Switch. You can use the default IP address or specify a new one when the situation of address duplication occurs or the address does not match up with your network. (The default factory setting is 192.168.0.1.)

Subnet Mask: Specify the subnet mask. The default subnet mask values for the three Internet address classes are as follows:

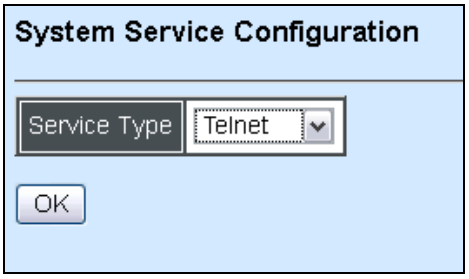
- Class A: 255.0.0.0
- Class B: 255.255.0.0
- Class C: 255.255.255.0

Gateway: Specify the IP address of a gateway or a router, which is responsible for the delivery of the IP packets sent by the Managed Switch. This address is required when the Managed Switch and the network management station are on different networks or subnets. The default value of this parameter is 0.0.0.0, which means no gateway exists and the network management station and Managed Switch are on the same network.

Click the **"OK"** button to apply the settings.

3.3.2 System Service Configuration

Click the option **System Service Configuration** from the **Network Management** menu and then the following screen page appears.

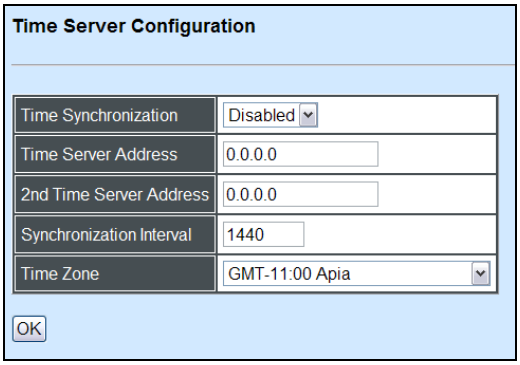


Service Type: Select **disabled**, **Telnet** or **SSH** for the system service type.

Click the **"OK"** button to apply the settings.

3.3.3 Time Server Configuration

Click the option **Time Server Configuration** from the **Network Management** menu and then the following screen page appears.



Time Synchronization: Enable or disable time synchronization.

Time Server Address: Specify the primary NTP time server address.

2nd Time Server Address: When the default time server is down, the Managed Switch will automatically connect to the 2nd time server.

Synchronization Interval: The time interval to synchronize from NTP time server. The allowable value is from 1 to 99999 minutes.

Time Zone: Select the appropriate time zone from the pull-down menu.

Click the **"OK"** button to apply the settings.

3.3.4 Device Community

Click the option **Device Community** from the **Network Management** menu and then the following screen page appears.

Click **New** to add a new SNMP community name list and then the following screen page appears.

Click **Edit** to view the current community settings.

Click **Delete** to remove a registered community.

Current/Total/Max Agents: View-only field.

Current: This shows the number of currently registered communities.

Total: This shows the number of total registered community users.

Max Agents: This shows the number of maximum number available for registration. The default maximum number is 3.

Account State: Enable or disable this Community Account.

Community: Specify the authorized SNMP community name, up to 20 alphanumeric characters.

Description: Enter a unique description up to 35 alphanumeric characters for this community name,. This is mainly for reference only.

SNMP Level: Select the preferred SNMP level for this newly created community.

Administrator: Full access right, including maintaining user account, system information, loading factory settings, etc..

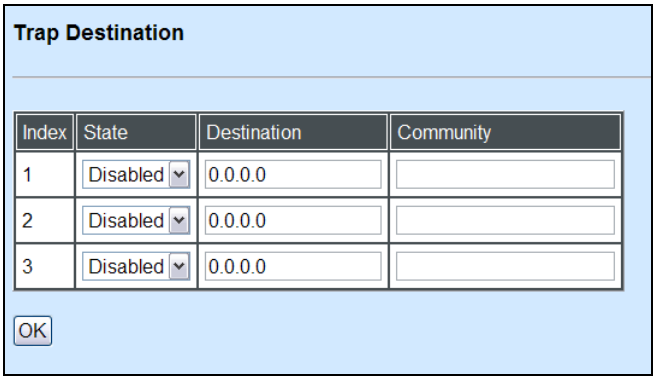
Read & Write: Partial access right, unable to modify system information, user account, load factory settings and upgrade firmware.

Read Only: Read only access right.

Click the **"OK"** button to apply the settings.

3.3.5 Trap Destination

Click the option **Trap Destination** from the **Network Management** menu and then the following screen page appears.



State: Enable or disable the function of sending traps to the specified destination.

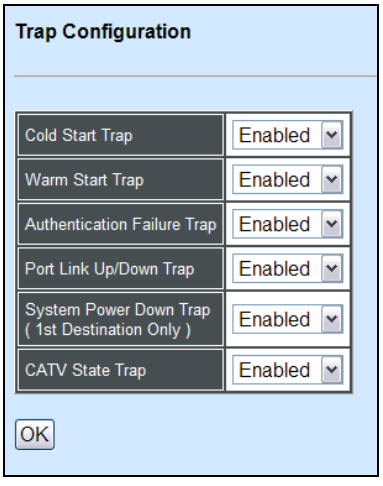
Destination: Enter the specific IP address of the network management system that will receive traps.

Community: Enter the community name of the network management system.

Click the **"OK"** button to apply the settings.

3.3.6 Trap Configuration

Click the option **Trap Configuration** from the **Network Management** menu and then the following screen page appears.



Cold Start Trap: Enable or disable the Managed Switch to send a trap when the Managed Switch cold starts.

Warm Start Trap: Enable or disable the Managed Switch to send a trap when the Managed Switch warm starts.

Authentication Failure Trap: Enable or disable the Managed Switch to send authentication failure trap after any unauthorized users attempt to login.

Port Link Up/Down Trap: Enable or disable the Managed Switch to send the port link up/link down trap when the selected port(s) is link up or down.

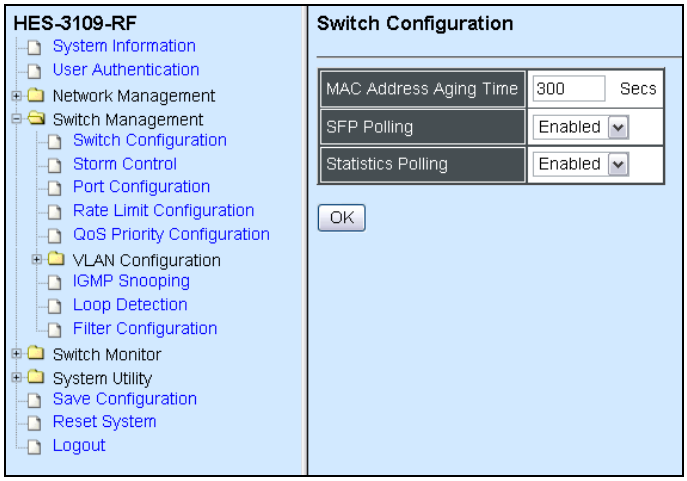
System Power Down Trap: Enable or disable the Managed Switch to send a trap while the Managed Switch is power down.

CATV State Trap: Enable or disable the Managed Switch to send a trap when the optical-fiber source is less than -9 dBm.

Click the **"OK"** button to apply the settings.

3.4 Switch Management

To manage the Managed Switch and set up required switching functions, click the folder **Switch Management** from the left column and then several options and folders will be displayed for your selection.



1. **Switch Configuration:** Set up address learning aging time and enable or disable IGMP Snooping and Fast Leave.

2. **Storm Control:** Prevent the Managed Switch from unicast, broadcast, and multicast storms.

3. **Port Configuration:** Enable or disable port speed, flow control, etc..

4. **Rate Limit Configuration:** Enable or disable Port Priority and set up Port Rate Limit, etc..

5. **QoS Priority Configuration:** Set up QoS Priority based on Port-based, IEEE 802.1p, ToS/DSCP and VID Qos mode.

6. **VLAN Configuration:** Set up IEEE 802.1q Tag VLAN and Q in Q VLAN configuration.

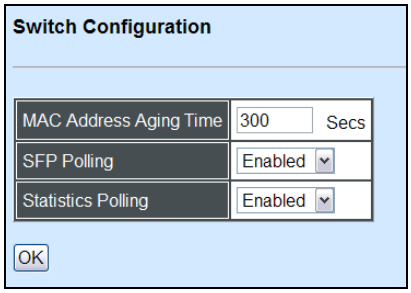
7. **IGMP Snooping:** Set up IGMP Snooping function.

8. **Loop Detection:** Enable or disable Loop Detection function.

9. **Filter Configuration:** Set up DHCP snooping and DHCP server trust ports.

3.4.1 Switch Configuration

Click the option **Switch Configuration** from the **Switch Management** menu and then the following screen page appears.



MAC Address Aging Time: Set up MAC Address aging time manually. Entries in the MAC address table containing source MAC addresses and their associated ports will be deleted if they are not accessed within the aging time.

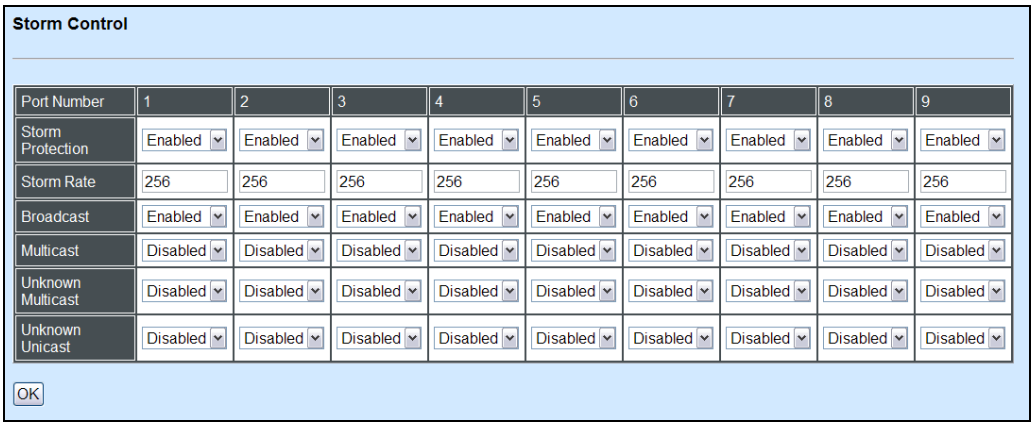
SFP Polling: Enable or disable SFP Polling.

Statistics Polling: Enable or disable Statistics Polling.

Click the **"OK"** button to apply the settings.

3.4.2 Storm Control

Click the option **Storm Control** from the **Switch Management** menu and then the following screen page appears.



Storm Protection: Enable or disable Storm Protection function.

Storm Rate: Set up storm rate value. Packets exceeding the value will be dropped.

Broadcast: Select Enabled to receive, or Disabled to reject broadcasts.

Multicast: Select Enabled to receive, or Disabled to reject multicasts.

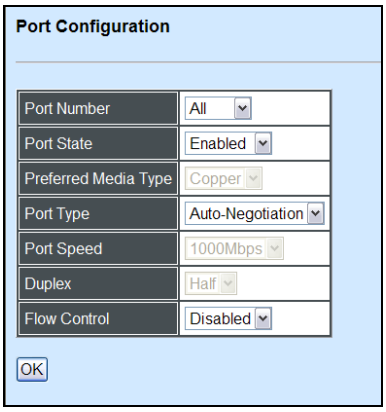
Unknown Multicast: Select Enabled to receive, or Disabled to reject unknown multicasts.

Unknown Unicast: Select Enabled to receive, or Disabled to reject unknown unicasts.

Click the **"OK"** button to apply the settings.

3.4.3 Port Configuration

Click the option **Port Configuration** from the **Switch Management** menu and then the following screen page appears.



Port Number: Click the pull-down menu to select the port number for configuration.

Port State: Enable or disable the current port state.

Preferred Media Type: This shows the media type (either Fiber or Copper) of the selected port. This field is open to select only when ports of the device have two media type.

Port Type: Select Auto-Negotiation or Manual mode as the port type.

Port Speed: When you select Manual port type, you can further specify the transmission speed (10Mbps/100Mbps/1000Mbps) of the port(s).

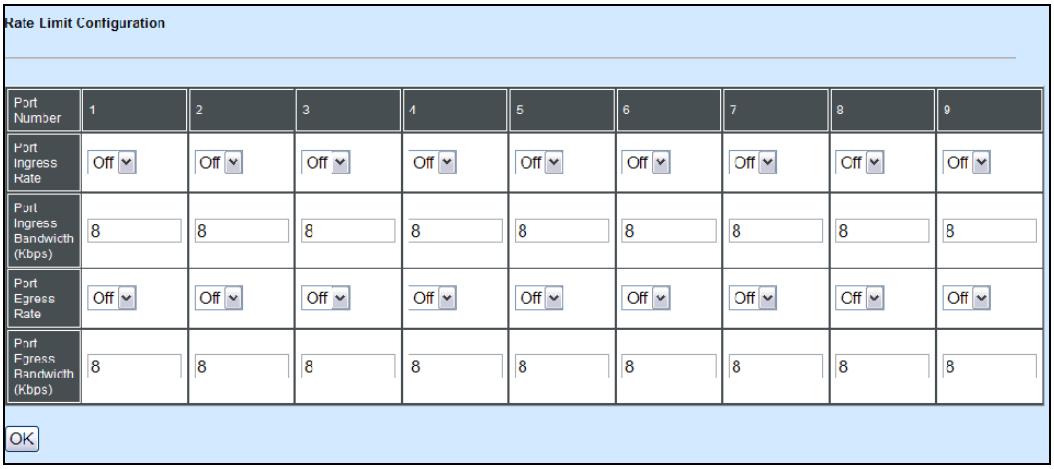
Duplex: When you select Manual port type, you can further specify the current operation Duplex mode (full or half duplex) of the port(s).

Flow Control: Enable or disable Flow Control function.

Click the **"OK"** button to apply the settings.

3.4.4 Rate Limit Configuration

Click the folder **Rate Limit Configuration** from the left column and then the following screen page appears.



Port Ingress Rate: Click the pull-down menu to set up Port Ingress Rate, on or off.

Port Ingress Bandwidth (Kbps): Enter ingress bandwidth for each port (the allowable bandwidth is between 8 and 1048568).

Port Egress Rate: Click the pull-down menu to set up Port Egress Rate, on or off.

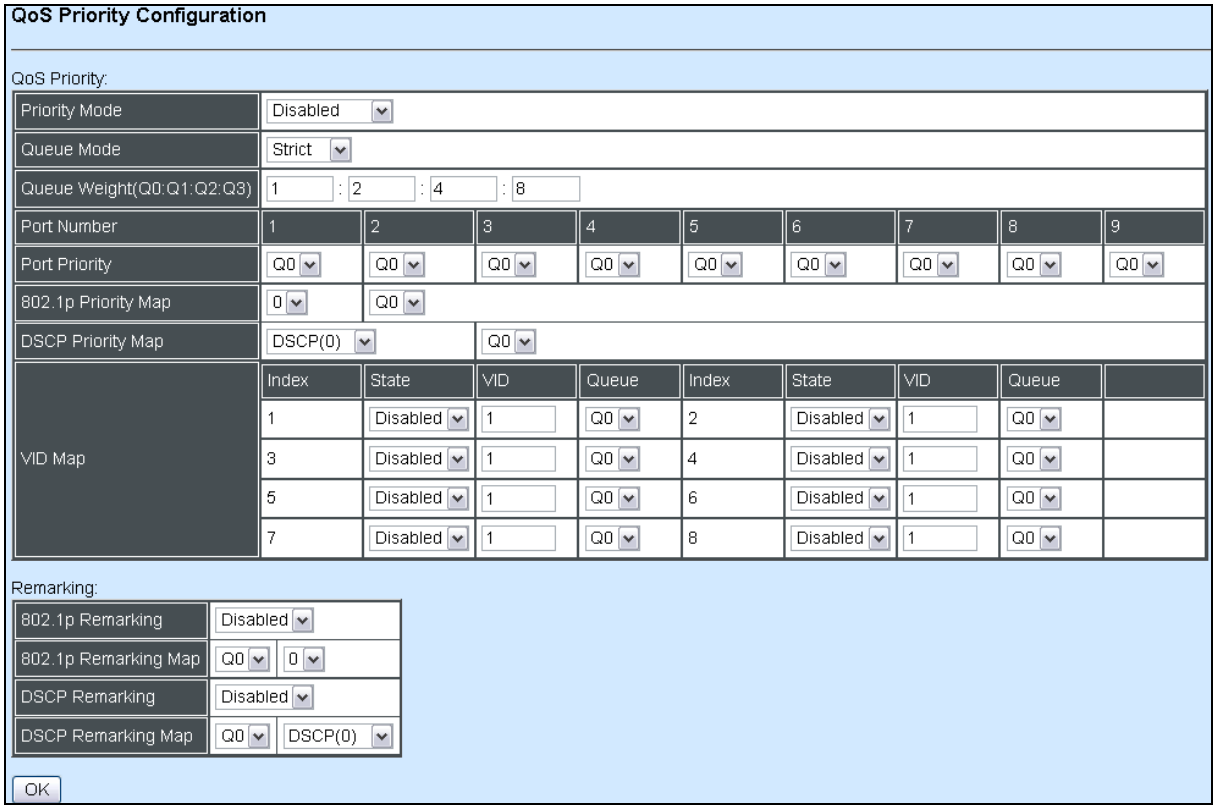
Port Egress Bandwidth (Kbps): Enter egress bandwidth for each port (the allowable bandwidth is between 8 and 1048568).

Click the **"OK"** button to apply the settings.

3.4.5 QoS Priority Configuration

Network traffic is always unpredictable and the only basic assurance that can be offered is the best effort traffic delivery. To overcome this challenge, Quality of Service (QoS) is applied throughout the network. This ensures that network traffic is prioritized according to specified criterion and receives preferential treatments.

QoS enables users to assign various grades of network service to different types of traffic, such as multi-media, video, protocol-specific, time critical, and file-backup traffic. Click the option **QoS Priority Configuration** from the **Switch Management** menu and then the following screen page appears.



Priority Mode: Five options are available; these are Disabled, Port Based, IEEE 802.1p, DSCP, and VID.

Queue Mode: Click the pull-down menu to select the Queue Mode, Strict or Weight.

Strict mode: This indicates that egress traffic is prioritized based on a queue value assigned to each port. When congestion happens, traffic assigned to queue 3 will be transmitted first. The traffic assigned to queue 2 will not be transmitted until queue 3's traffic is done transmitting, and so forth.

Weight mode: This mode enables users to assign different weights to 4 queues, which have fair opportunity of dispatching, and the egress traffic of queue 3 will be transmitted first. Each queue has the specific amount of bandwidth according to its assigned weight.

Queue Weight (Q0:Q1:Q2:Q3): Specify the weight of four queues.

Port Priority: Click the pull-down menu to set up the priority of each port.

802.1p Priority Map: Assign a tag priority to the specific queue.

There are eight priority levels that you can choose to classify data packets. Choose one of the listed options from the pull-down menu for CoS (Class of Service) priority tag values. The default value is "0".

The default 802.1p settings are shown in the following table:

Priority Level	Low	Low	Low	Normal	Medium	Medium	High	High
802.1p Value	0	1	2	3	4	5	6	7

DSCP Priority Map: Select priority queue mapping for the DSCP field of every IP packet from the pull-down menu. The DSCP includes DSCP (0) to DSCP (63), and the priority queue includes Q0, Q1, Q2 and Q3.

VID Map: Set up the priority by assigning the specific VID to the specific queue.

Index: The entry number; 8 entries in total.

State: Disable or enable the entry.

VID: Enter the specific VLAN ID to be assigned to the queue.

Queue: Select the queue (Q0~Q3) to which the VLAN ID is assigned.

Remarking: Set up **802.1p** or **DSCP Remarking.**

802.1p Remarking: Enable or disable 802.1p Remarking.

802.1p Remarking Map: Assign the priority bits to the specific queue.

DSCP Remarking: Enable or disable 802.1p Remarking.

DSCP Remarking Map: Assign the DSCPs to the specific queue.

Click the **"OK"** button to apply the settings.

3.4.6 VLAN Configuration

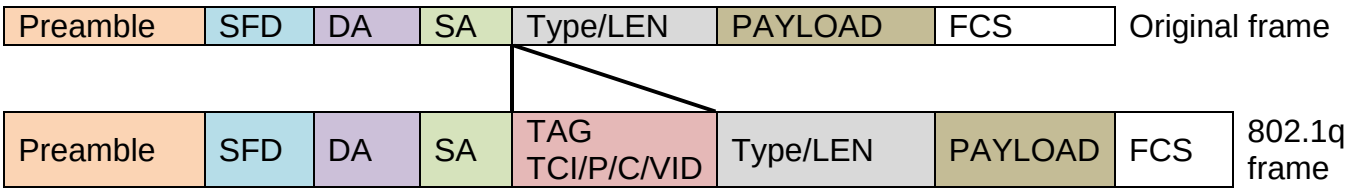
A Virtual Local Area Network (VLAN) is a network topology configured according to a logical scheme rather than the physical layout. VLAN can be used to combine any collections of LAN segments into a group that appears as a single LAN. VLAN also logically segments the network into different broadcast domains. All broadcast, multicast, and unknown packets entering the Switch on a particular VLAN will only be forwarded to the stations or ports that are members of that VLAN.

VLAN can enhance performance by conserving bandwidth and improve security by limiting traffic to specific domains. A VLAN is a collection of end nodes grouped by logics instead of physical locations. End nodes that frequently communicate with each other are assigned to the same VLAN, no matter where they are physically located on the network. Another benefit of VLAN is that you can change the network topology without physically moving stations or changing cable connections. Stations can be 'moved' to another VLAN and thus communicate with its members and share its resources, simply by changing the port VLAN settings from one VLAN to another. This allows VLAN to accommodate network moves, changes and additions with the greatest flexibility.

The Managed Switch supports two types of VLAN, these are: **IEEE 802.1q Tag VLAN** and **Q in Q VLAN.**

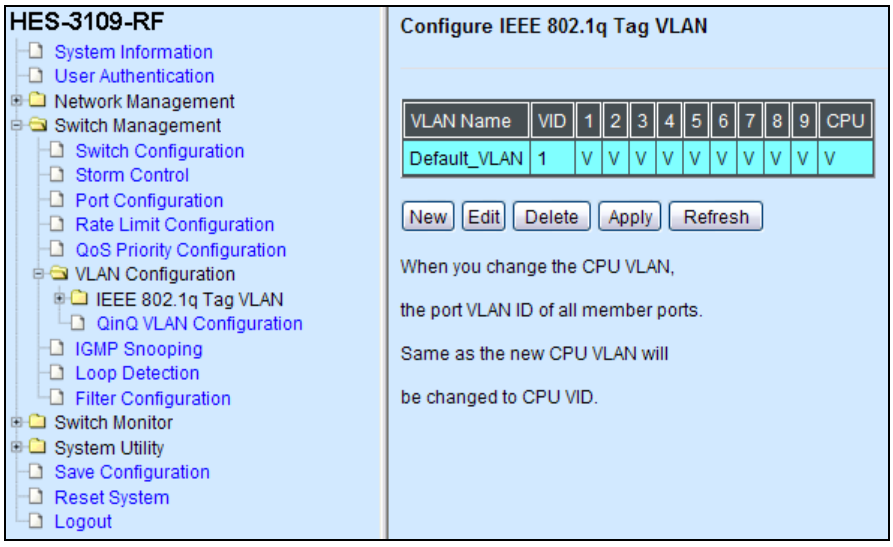
IEEE 802.1Q VLAN Concepts

Introduction to 802.1Q frame format:



PRE	Preamble	62 bits	Used to synchronize traffic
SFD	Start Frame Delimiter	2 bits	Marks the beginning of the header
DA	Destination Address	6 bytes	The MAC address of the destination
SA	Source Address	6 bytes	The MAC address of the source
TCI	Tag Control Info	2 bytes set to	8100 for 802.1p and Q tags
P	Priority	3 bits	Indicates 802.1p priority level 0-7
C	Canonical Indicator	1 bit	Indicates if the MAC addresses are in Canonical format – Ethernet set to “0”
VID	VLAN Identifier	12 bits	Indicates the VLAN (0-4095)
T/L	Type/Length Field	2 bytes	Ethernet II “type” or 802.3 “length”
Payload < or = 1500 bytes User data			
FCS	Frame Check Sequence	4 bytes	Cyclical Redundancy Check

Click the folder **VLAN Configuration** from the **Switch Management** folder and then the following screen page appears.

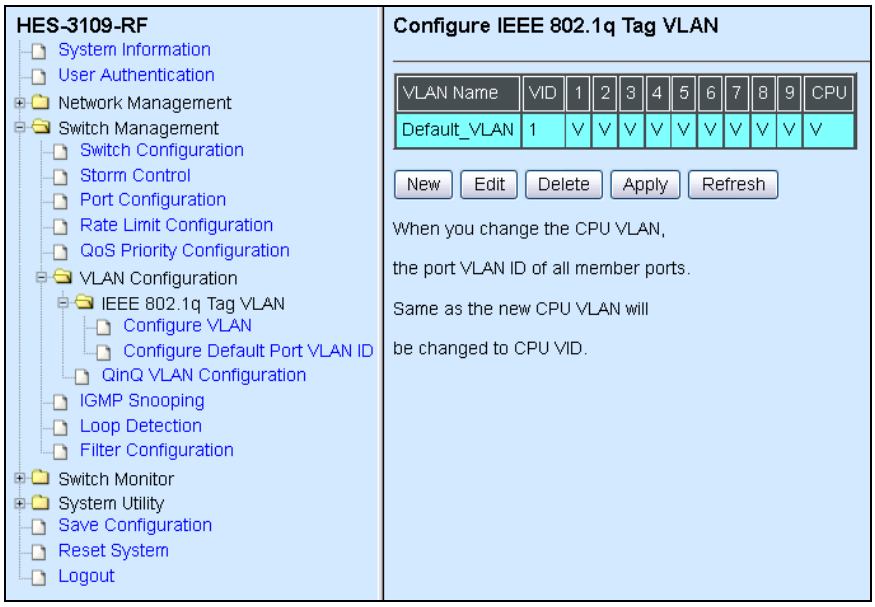


1. IEEE 802.1Q Tag VLAN: Configure IEEE 802.1Q Tag VLAN.

2. QinQ VLAN Configuration: Configure Q-in-Q VLAN.

3.4.6.1 IEEE 802.1q Tag VLAN

Click the folder **IEEE 802.1Q Tag VLAN** from the **VLAN Configuration** menu and then the following screen page appears.

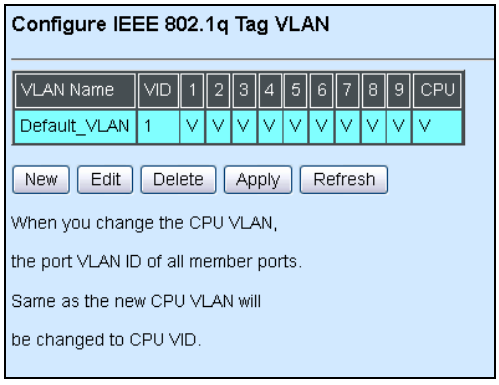


1. **Configure VLAN:** To create, edit, delete, or apply 802.1Q Tag VLAN settings.

2. **Configure Default Port VLAN ID:** To set up 802.1q Port VLAN ID.

3.4.6.1.1 Configure VLAN

Click the option **Configure VLAN** from the **IEEE 802.1q Tag VLAN** menu and then the following screen page appears.



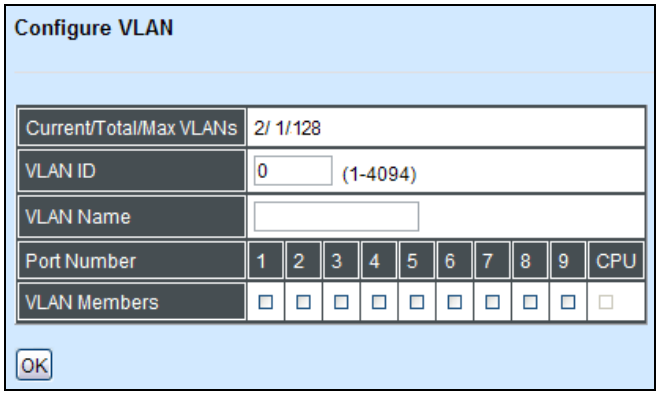
Click **New** to add a new VLAN entity and then the following screen page appears.

Click **Edit** to view and edit current IEEE 802.1Q Tag VLAN setting.

Click **Delete** to remove a VLAN entity.

Click **Apply** to make the current VLAN settings effective.

Click **Refresh** to get the latest status of VLAN membership table.



Current/Total/Max VLANs: View-only field.

Current: This shows the number of currently registered VLAN.

Total: This shows the number of total registered VLANs.

Max: This shows the maximum number of available VLANs to be registered.

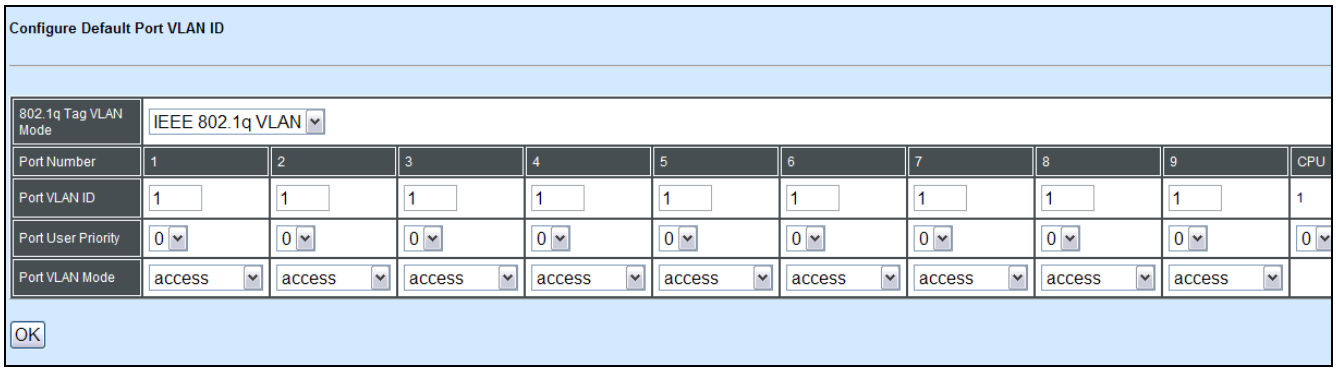
VLAN ID: Specify the ID for the currently registered VLAN.

VLAN Name: Specify the name for the currently registered VLAN.

VLAN Member: Assign ports to be the members of the currently registered VLAN.

3.4.6.1.2 Configure Default Port VLAN ID

Click the option **Configure Default Port VLAN ID** from the **IEEE 802.1q Tag VLAN** menu and then the following screen page appears.



802.1q Tag VLAN Mode: Select IEEE802.1q VLAN mode, Port Isolation mode or Pass Through C-Tag mode.

Port VLAN ID: Specify the default port VLAN ID for each port.

Port User Priority: Specify the user priority for each port.

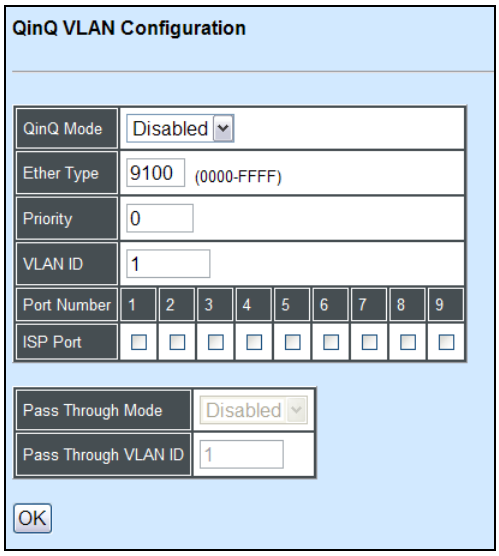
Port VLAN Mode: Set up egress traffic as untagged or tagged.

Mode	Port Behavior	
Access	Receive untagged packets only. Drop tagged packets.	
	Send untagged packets only.	
Trunk	Receive tagged packets only. Drop untagged packets.	
	Send tagged packets only.	
Trunk Native	Receive both untagged and tagged packets	Untagged packets: PVID is added
		Tagged packets: Stay intact
	When sending packets, PVID and VID will be compared. If PVID and VID are the same, PVID will be removed. If PVID and VID are different, the packets with the original tag (VID) will be sent.	

Click the **"OK"** button to apply the settings.

3.4.6.2 Q-in-Q VLAN Configuration

Click the **Option Q-in-Q VLAN Configuration** from the **VLAN Configuration** folder and then the following screen page appears.



QinQ Mode: Enable or disable Q-in-Q VLAN.

Ether Type: Specify the ether type for the service tag.

Priority: Specify a priority bit for the service tag.

VLAN ID: Specify a VID for the service tag.

ISP Port: Select ISP ports.

Pass Through Mode: Enable or disable Pass Through mode. This enables the device to be managed remotely via the specified VLAN.

Pass Through VLAN ID: Specify the Pass Through VLAN ID.

Click the **"OK"** button to apply the settings.

Q-in-Q Management VLAN Limitation:

1. *Port 9 is the only port that can be set as the ISP port to bind a single-tagged Management VLAN.*
2. *If a single-tagged VLAN is used for management traffic via ISP port, the VLAN ID cannot be used for other data transmissions.*

3.4.7 IGMP Snooping

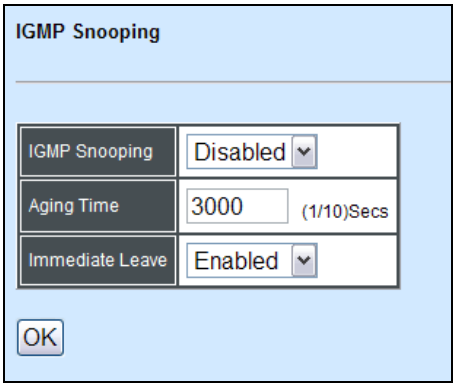
IGMP, Internet Group Management Protocol, is a communications protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships. It can be used for online streaming video and gaming, and allows more efficient use of resources when supporting these uses.

IGMP Snooping is the process of listening to IGMP traffic. IGMP snooping, as implied by the name, is a feature that allows the switch to "listen in" on the IGMP conversation between hosts and routers by processing the layer 3 packets IGMP packets sent in a multicast network.

When IGMP snooping is enabled in a switch it analyses all the IGMP packets between hosts connected to the switch and multicast routers in the network. When a switch hears an IGMP report from a host for a given multicast group, the switch adds the host's port number to the multicast list for that group. And, when the switch hears an IGMP Leave, it removes the host's port from the table entry.

IGMP snooping can very effectively reduce multicast traffic from streaming and other bandwidth intensive IP applications. A switch using IGMP snooping will only forward multicast traffic to the hosts interested in that traffic. This reduction of multicast traffic reduces the packet processing at the switch (at the cost of needing additional memory to handle the multicast tables) and also reduces the workload at the end hosts since their network cards (or operating system) will not have to receive and filter all the multicast traffic generated in the network.

Click the option **IGMP Snooping** from the **Management** menu and then the following screen page appears.



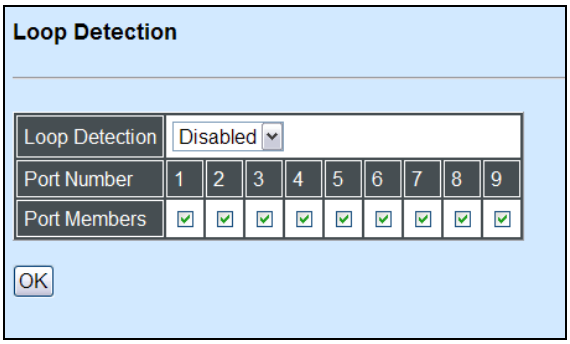
IGMP Snooping: Enable or disable IGMP Snooping.

Aging Time: Specify the IGMP querier aging time. If the switch does not receive join packets from the end device within the specified time, the entry associated with this end device will be removed from the IGMP table.

Immediate Leave: Enable or disable Immediate Leave function. This works only when IGMP Snooping is enabled. When Fast Leave is enabled, the Managed Switch immediately removes the port when it detects IGMPv1 & IGMPv2 leave message on that port.
Click the **"OK"** button to apply the settings.

3.4.8 Loop Detection

Click the option **Loop Detection** from the **Switch Management** menu and then the following screen page appears.



Loop Detection: Enable or disable Loop Detection Function.

Loop Detection allows users to configure the Managed Switch to lock a port when it detects packets that are sent out on that port loop back to the switch. When loops occur, it will cause broadcast storm and affect the performance of layer two Access switch. To avoid this, Loop Detection can be enabled on LAN port of the Managed Switch. When it detects the loop, it will lock the port which receives the loop packet immediately and send out SNMP trap to inform the network administrator.

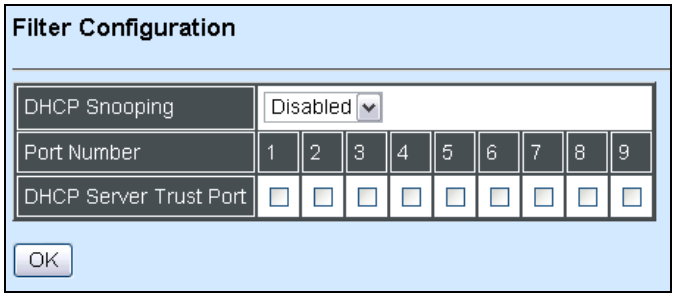
Port Members: Enabled or disabled Loop Detection function on select the ports.

Click the **"OK"** button to apply the settings.

Note: *Please note that Loop Detection function is only available on LAN port 1~8.*

3.4.9 Filter Configuration

Click the option **Filter Configuration** from the **Switch Management** menu and then the following screen page appears.



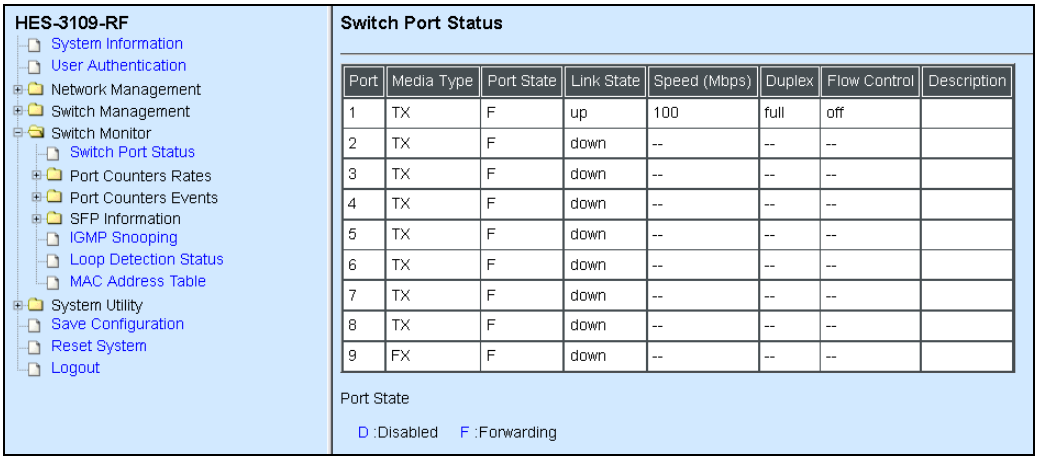
DHCP Snooping: Enable or disable DHCP Snooping function.

DHCP Server Trust Port: Assign the specific port(s) to be the DHCP Server Trust Port(s).

Click the **"OK"** button to apply the settings.

3.5 Switch Monitor

Switch Monitor allows users to monitor the real-time operation status of the Managed Switch. Users may monitor the port link-up status or traffic counters for maintenance or diagnostic purposes. Select the folder **Switch Monitor** from the **Main Menu** and then the following screen page appears.



1. **Switch Port State:** View the current port media type, port state, etc..

2. **Port Counters Rates:** This folder includes port traffic statistics (rates), port packet error statistics (rates), and port packet analysis statistics (rates).

3. **Port Counters Events:** This folder includes port traffic statistics (events), port packet error statistics (events), and port packet analysis statistics (events).

4. **SFP Information:** View the current port's SFP information, e.g. speed, distance, vendor name, vendor PN, Vendor SN, temperature, voltage, TX Bias, TX power, etc..

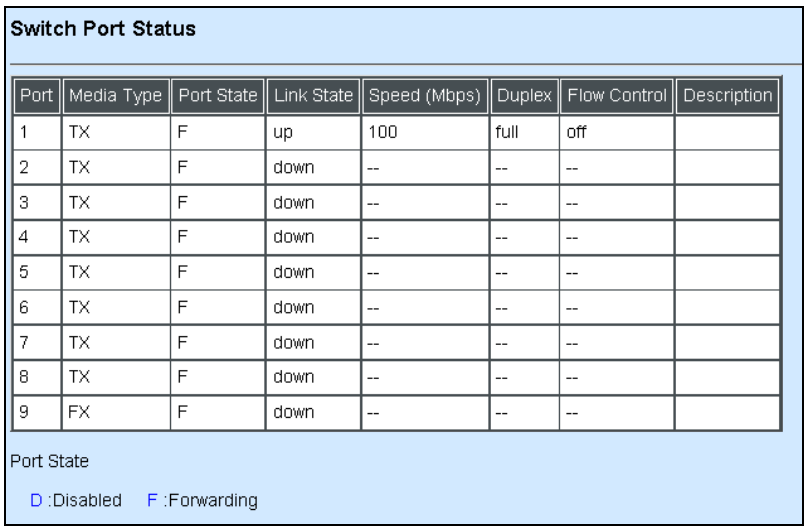
5. **IGMP Snooping:** View a list of IGMP queries' information in VLAN(s) such as VLAN ID, Querier and reports.

6. **Loop Detection Status:** View the current Loop Detection status of each port.

7. **MAC Address Table:** List current MAC addresses learned by the Managed Switch.

3.5.1 Switch Port State

The following screen page appears if you choose **Switch Monitor** menu and then select **Switch Port State**.



Port: The number of the port.

Media Type: The media type of the port, either Copper (TX) or Fiber (FX).

Port Sate: This shows each port's state which can be **D** (Disabled) or **F** (Forwarding).

Disabled: A port in this state can not receive and forward packets.

Forwarding: Packets can be forwarded.

Link State: The current link status of the port, either up or down.

Speed (Mbps): The current operation speed of each port.

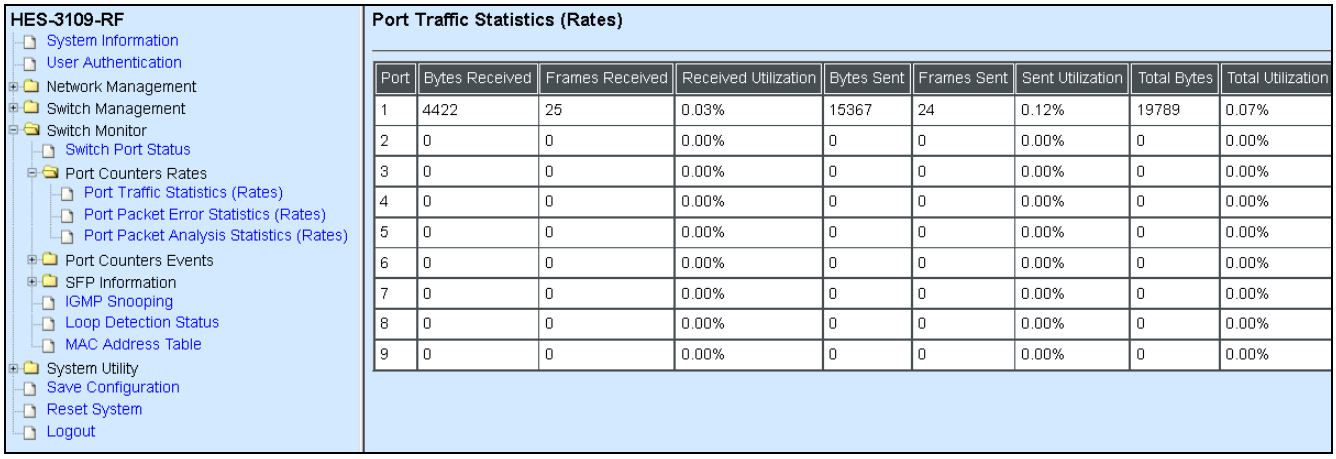
Duplex: The current operation Duplex mode of each port, either Full or Half.

Flow Control: This shows the status of Flow Control function, either on or off.

Description: This shows the description of this port described in “Port Configuration”.

3.5.2 Port Counters Rates

The rate mode of port counters will be re-calculated when that counter is reset or cleared. Click **Port counters Rates** folder and then three options appear.



Port	Bytes Received	Frames Received	Received Utilization	Bytes Sent	Frames Sent	Sent Utilization	Total Bytes	Total Utilization
1	4422	25	0.03%	15367	24	0.12%	19789	0.07%
2	0	0	0.00%	0	0	0.00%	0	0.00%
3	0	0	0.00%	0	0	0.00%	0	0.00%
4	0	0	0.00%	0	0	0.00%	0	0.00%
5	0	0	0.00%	0	0	0.00%	0	0.00%
6	0	0	0.00%	0	0	0.00%	0	0.00%
7	0	0	0.00%	0	0	0.00%	0	0.00%
8	0	0	0.00%	0	0	0.00%	0	0.00%
9	0	0	0.00%	0	0	0.00%	0	0.00%

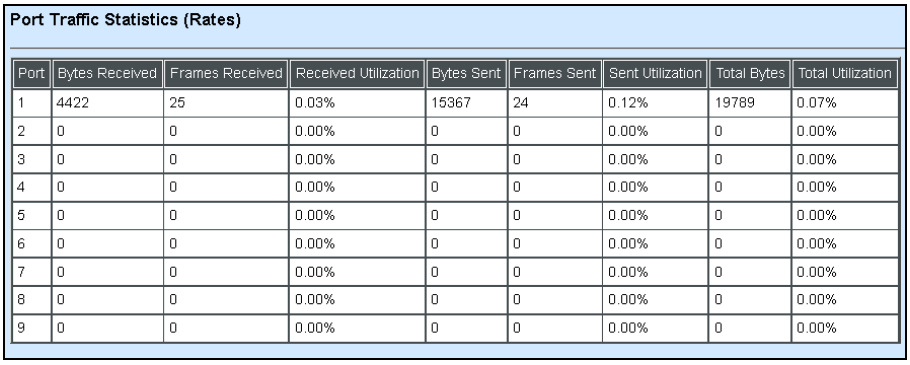
1. **Port Traffic Statistics (Rates):** View the number of bytes received, frames received, bytes sent, frames sent, and total bytes and clear each row’s statistics.

2. **Port Packet Error Statistics (Rates):** View the number of CRC errors, undersize frames, oversize frames, etc and clear each row’s statistics.

3. **Port Packet analysis Statistics (Rates):** View each port’s analysis history and clear each row’s statistics.

3.5.2.1 Port Traffic Statistics (Rates)

The following screen page appears if you choose **Port Counters Rates** and then select **Port Traffic Statistics (Rates)**.



Port	Bytes Received	Frames Received	Received Utilization	Bytes Sent	Frames Sent	Sent Utilization	Total Bytes	Total Utilization
1	4422	25	0.03%	15367	24	0.12%	19789	0.07%
2	0	0	0.00%	0	0	0.00%	0	0.00%
3	0	0	0.00%	0	0	0.00%	0	0.00%
4	0	0	0.00%	0	0	0.00%	0	0.00%
5	0	0	0.00%	0	0	0.00%	0	0.00%
6	0	0	0.00%	0	0	0.00%	0	0.00%
7	0	0	0.00%	0	0	0.00%	0	0.00%
8	0	0	0.00%	0	0	0.00%	0	0.00%
9	0	0	0.00%	0	0	0.00%	0	0.00%

Bytes Received: Total bytes received from each port.

Frames Received: Total frames received from each port.

Received Utilization: The ratio of each port's receiving traffic to current port's total bandwidth.

Bytes Sent: The total bytes sent from current port.

Frames Sent: The total frames sent from current port.

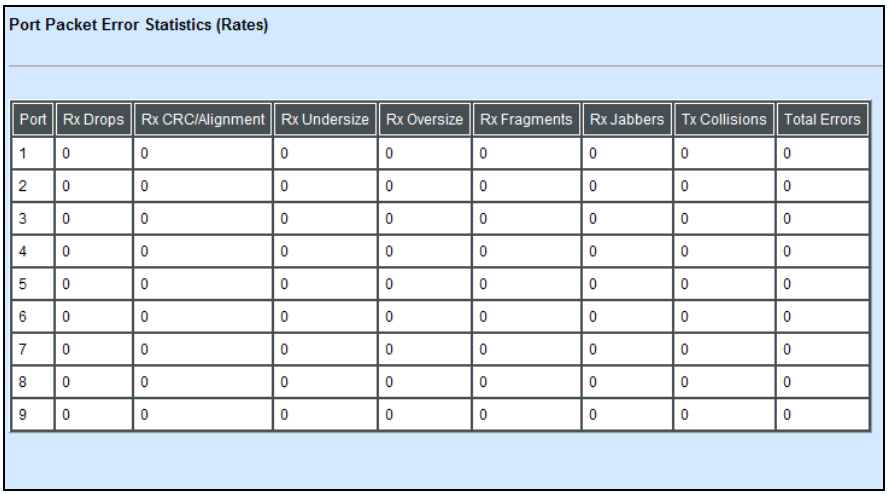
Sent Utilization: The ratio of each port's sending traffic to current port's total bandwidth.

Total Bytes: Total bytes received and sent from current port.

Total Utilization: The ratio of each port's receiving and sending traffic to current port's total bandwidth.

3.5.2.2 Port Packet Error Statistics (Rates)

The following screen page appears if you choose **Port Counters Rates** and then select **Port Packet Error Statistics (Rates)**.


Port Packet Error Statistics (Rates)

Port	Rx Drops	Rx CRC/Alignment	Rx Undersize	Rx Oversize	Rx Fragments	Rx Jabbers	Tx Collisions	Total Errors
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0

RX Dropped: The number of packets received that are dropped.

RX CRC/Alignment: The number of packets received with a bad FCS with an integral number of bytes.

RX Undersize: Undersize frames received.

RX Oversize: Oversize frames received.

RX Fragments: Fragment frames received.

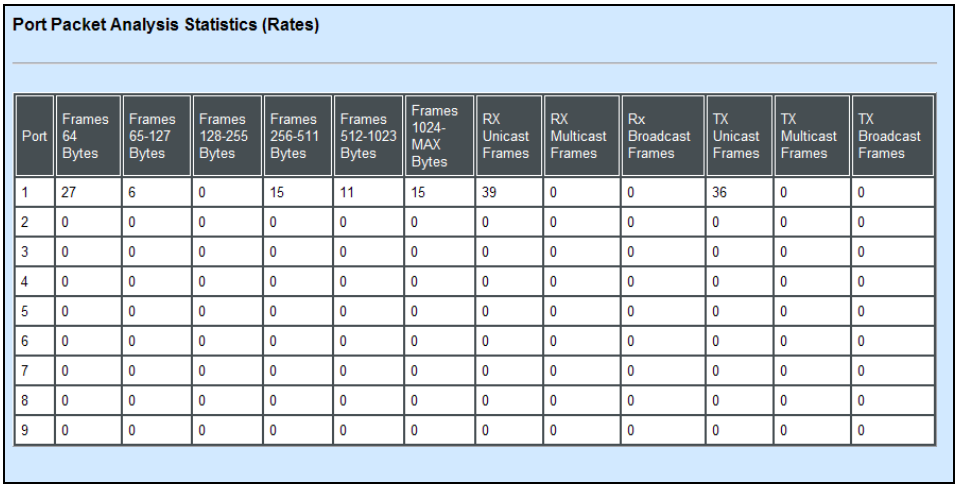
RX Jabbers: Jabber frames received.

TX Collisions: Total frames collision detected.

Total Errors: The number of total errors occurred.

3.5.2.3 Port Packet Analysis Statistics (Rates)

The following screen page appears if you choose **Port Counters Rates** and then select **Port Packet Analysis Statistics (Rates)**.



Port Packet Analysis Statistics (Rates)

Port	Frames 64 Bytes	Frames 65-127 Bytes	Frames 128-255 Bytes	Frames 256-511 Bytes	Frames 512-1023 Bytes	Frames 1024-MAX Bytes	RX Unicast Frames	RX Multicast Frames	Rx Broadcast Frames	TX Unicast Frames	TX Multicast Frames	TX Broadcast Frames
1	27	6	0	15	11	15	39	0	0	36	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0

Frames 64 Bytes: 64 bytes frames received.

Frames 65-127 Bytes: 65-127 bytes frames received.

Frames 128-255 Bytes: 128-255 bytes frames received.

Frames 256-511 Bytes: 256-511 bytes frames received.

Frames 512-1023 Bytes: 512-1023 bytes frames received.

Frames 1024-MAX Bytes: Over 1024 bytes frames received.

RX Unicast Frames: Good unicast frames received.

RX Multicast Frames: Good multicast frames received.

RX Broadcast Frames: Good broadcast frames received.

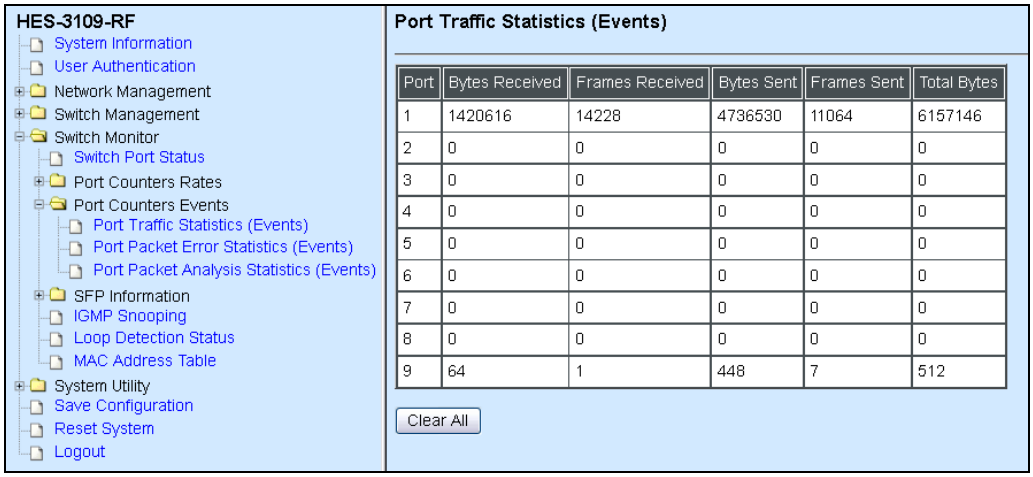
TX Unicast Frames: Good unicast packets sent.

TX Multicast Frames: Good multicast packets sent.

TX Broadcast Frames: Good broadcast packets sent.

3.5.3 Port Counters Events

The event mode of port counters will be re-calculated when that counter is reset or cleared. Click **Port counters Events** folder and then three options appear.



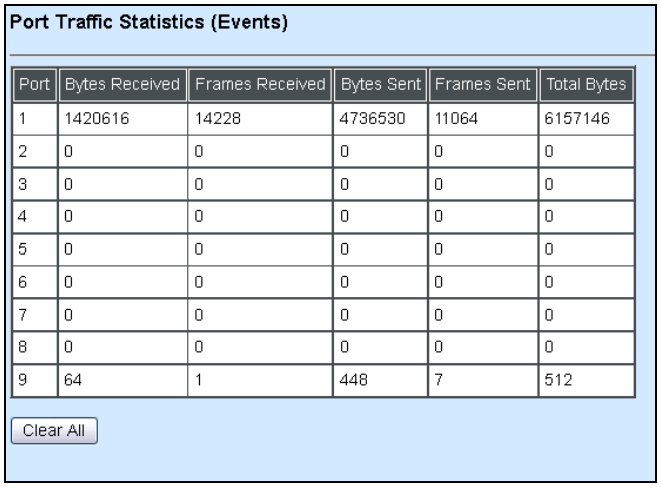
1. **Port Traffic Statistics (Events):** View the number of bytes received, frames received, bytes sent, frames sent, and total bytes and clear each row's statistics.

2. **Port Packet Error Statistics (Events):** View the number of CRC errors, undersize frames, oversize frames, etc and clear each row's statistics.

3. **Port Packet Analysis Statistics (Events):** View each port's analysis history and clear each row's statistics.

3.5.3.1 Port Traffic Statistics (Events)

The following screen page appears if you choose **Port Counters Events** and then select **Port Traffic Statistics (Events)**.



Bytes Received: Total bytes received from each port.

Frames Received: Total frames received from each port.

Bytes Sent: The total bytes sent from current port.

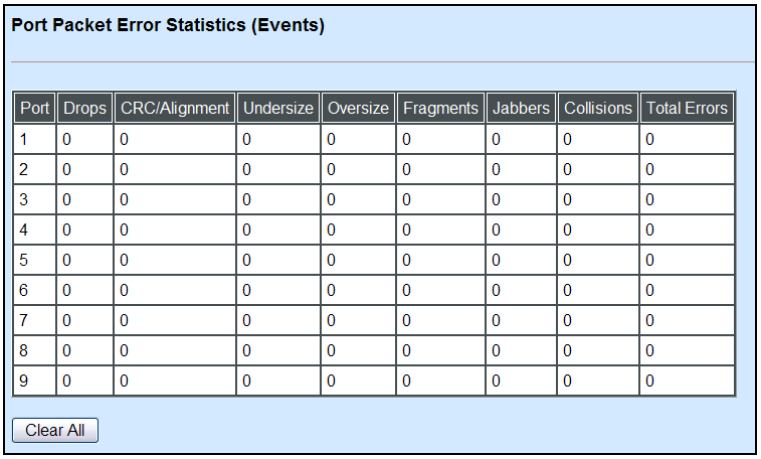
Frames Sent: The total frames sent from current port.

Total Bytes: Total bytes received and sent from current port.

Clear All: Click "**Clear All**" button to clear all ports' statistics.

3.5.3.2 Port Packet Error Statistics (Events)

The following screen page appears if you choose **Port Counters Events** and then select **Port Packet Error Statistics (Events)**.



Drops: The number of packets received that are dropped.

CRC/Alignment: The number of packets received that have a bad FCS with an integral number of bytes.

Undersize: Undersize frames received.

Oversize: Oversize frames received.

Fragments: Fragment frames received.

Jabbers: Jabber frames received.

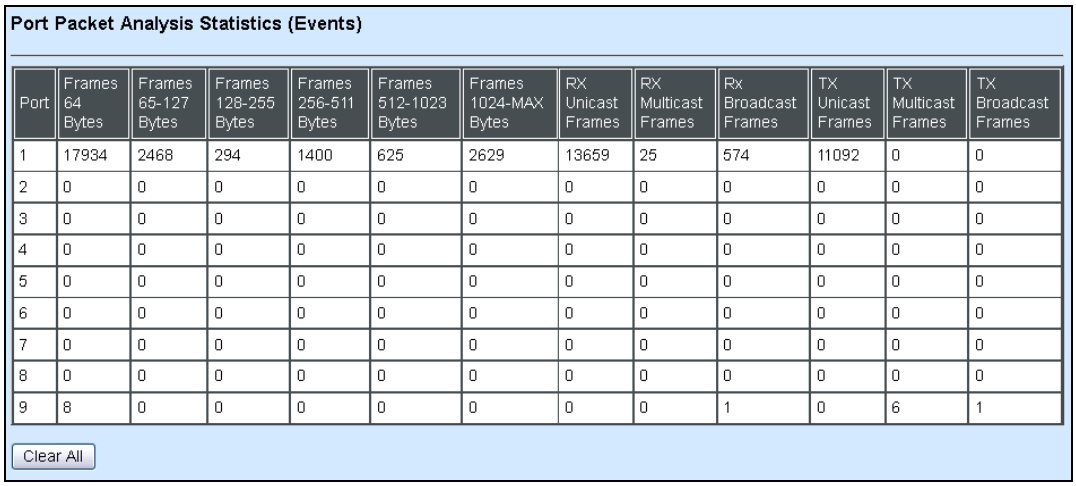
Collisions: Total frames collision detected.

Total Errors: The number of total errors occurred.

Clear All: Click "**Clear All**" button to clear all ports' statistics.

3.5.3.3 Port Packet Analysis Statistics (Events)

The following screen page appears if you choose **Port Counters Events** and then select **Port Packet Analysis Statistics (Events)**.



Frames 64 Bytes: 64 bytes frames received.

Frames 65-127 Bytes: 65-127 bytes frames received.

Frames 128-255 Bytes: 128-255 bytes frames received.

Frames 256-511 Bytes: 256-511 bytes frames received.

Frames 512-1023 Bytes: 512-1023 bytes frames received.

Frames 1024-MAX Bytes: Over 1024 bytes frames received.

RXUnicast Frames: Good unicast frames received.

RX Multicast Frames: Good multicast frames received.

RX Broadcast Frames: Good broadcast frames received.

TX Unicast Frames: Good unicast packets sent.

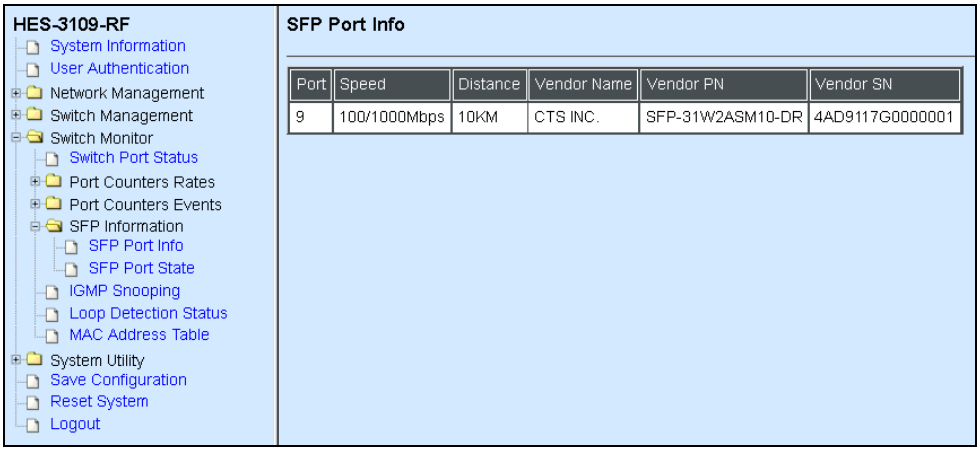
TX Multicast Frames: Good multicast packets sent.

TX Broadcast Frames: Good broadcast packets sent.

Clear All: Click "**Clear All**" button to clear all ports' statistics.

3.5.4 SFP Information

Click **SFP Information** folder from the left column and then two options appear.

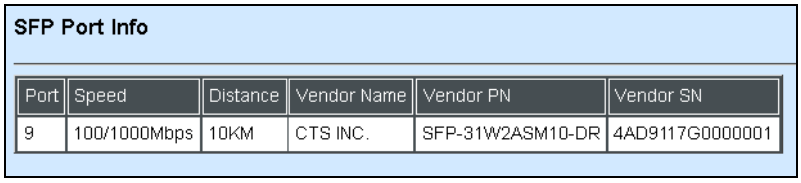


SFP Port Info: This shows the information of Speed, Distance, Vendor Name, Vendor PN, and Vendor SN of the SFP Port.

SFP Port State: This shows the state of Temperature, Voltage, TX Bias, TX Power, and RX Power of the SFP Port.

3.5.4.1 SFP Port Info

The following screen page appears if you choose **SFP Information** and then select **SFP Port Info**.



Port: The port number of the slide-in SFP module.

Speed: The transmitting speed of the slide-in SFP module.

Distance: The transmitting distance of the slide-in SFP module.

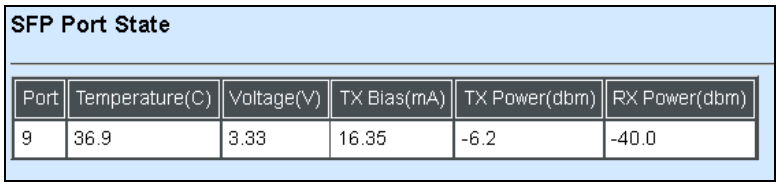
Vendor Name: The vendor name of the slide-in SFP module.

Vendor PN: The vendor part number of the slide-in SFP module.

Vendor SN: The vendor serial number of the slide-in SFP module.

3.5.4.2 SFP Port State

The following screen page appears if you choose **SFP Information** and then select **SFP Port State**.



Port: The port number of the slide-in SFP module.

Temperature (C): The Slide-in SFP module operation temperature.

Voltage (V): The slide-in SFP module operation voltage.

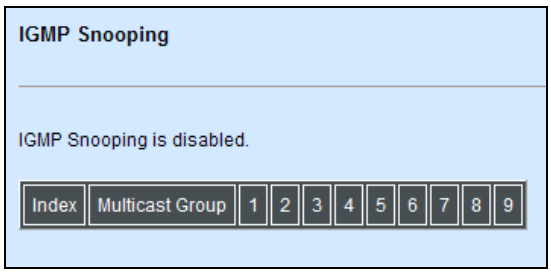
TX Bias (mA): The slide-in SFP module operation current.

TX Power (dbm): The slide-in SFP module optical Transmission power.

RX Power (dbm): The slide-in SFP module optical Receiver power.

3.5.5 IGMP Snooping

The following screen page appears if you choose **Switch Monitor** and then select **IGMP Snooping**.

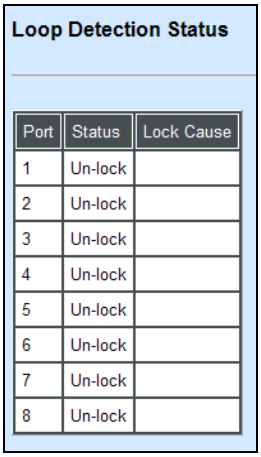


Multicast Group: This shows the multicast IP address of IGMP querier.

Port: The port(s) grouped in the specific multicast group.

3.5.6 Loop Detection

The following screen page appears if you choose **Switch Monitor** and then select **Loop Detection Status**.

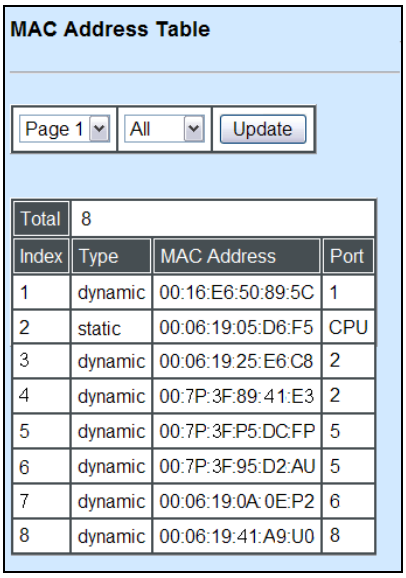


Status: This shows the status of the port, Lock or Un-lock.

Lock Cause: This shows the factor that causes the port to be locked.

3.5.7 MAC Address Table

MAC Address Table displays MAC addresses learned after the system reset.

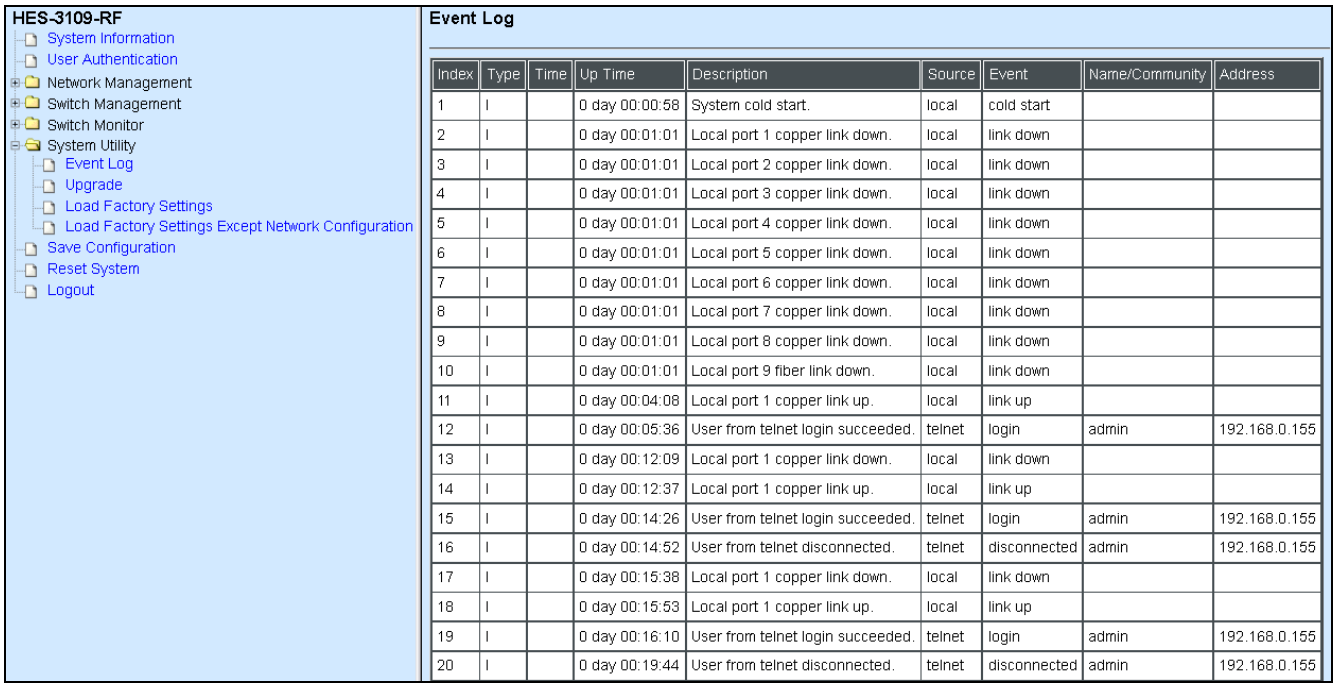


The table above shows the MAC addresses learned from each port of the Managed Switch.

Click **Update** to update the MAC Address Table.

3.6 System Utility

Select the folder **System Utility** from the left column and then the following screen page appears.



Index	Type	Time	Up Time	Description	Source	Event	Name/Community	Address
1	I		0 day 00:00:58	System cold start.	local	cold start		
2	I		0 day 00:01:01	Local port 1 copper link down.	local	link down		
3	I		0 day 00:01:01	Local port 2 copper link down.	local	link down		
4	I		0 day 00:01:01	Local port 3 copper link down.	local	link down		
5	I		0 day 00:01:01	Local port 4 copper link down.	local	link down		
6	I		0 day 00:01:01	Local port 5 copper link down.	local	link down		
7	I		0 day 00:01:01	Local port 6 copper link down.	local	link down		
8	I		0 day 00:01:01	Local port 7 copper link down.	local	link down		
9	I		0 day 00:01:01	Local port 8 copper link down.	local	link down		
10	I		0 day 00:01:01	Local port 9 fiber link down.	local	link down		
11	I		0 day 00:04:08	Local port 1 copper link up.	local	link up		
12	I		0 day 00:05:36	User from telnet login succeeded.	telnet	login	admin	192.168.0.155
13	I		0 day 00:12:09	Local port 1 copper link down.	local	link down		
14	I		0 day 00:12:37	Local port 1 copper link up.	local	link up		
15	I		0 day 00:14:26	User from telnet login succeeded.	telnet	login	admin	192.168.0.155
16	I		0 day 00:14:52	User from telnet disconnected.	telnet	disconnected	admin	192.168.0.155
17	I		0 day 00:15:38	Local port 1 copper link down.	local	link down		
18	I		0 day 00:15:53	Local port 1 copper link up.	local	link up		
19	I		0 day 00:16:10	User from telnet login succeeded.	telnet	login	admin	192.168.0.155
20	I		0 day 00:19:44	User from telnet disconnected.	telnet	disconnected	admin	192.168.0.155

1. **Event Log:** Event log can keep a record of system's log events such as system warm start, cold start, link up/down, user login/logout, etc. They will be kept only when your CPU version is A06 with Boot ROM version A08 or later version. If your CPU or Boot ROM version is older than the one mentioned above, all events will lose when the system is shut down or rebooted.

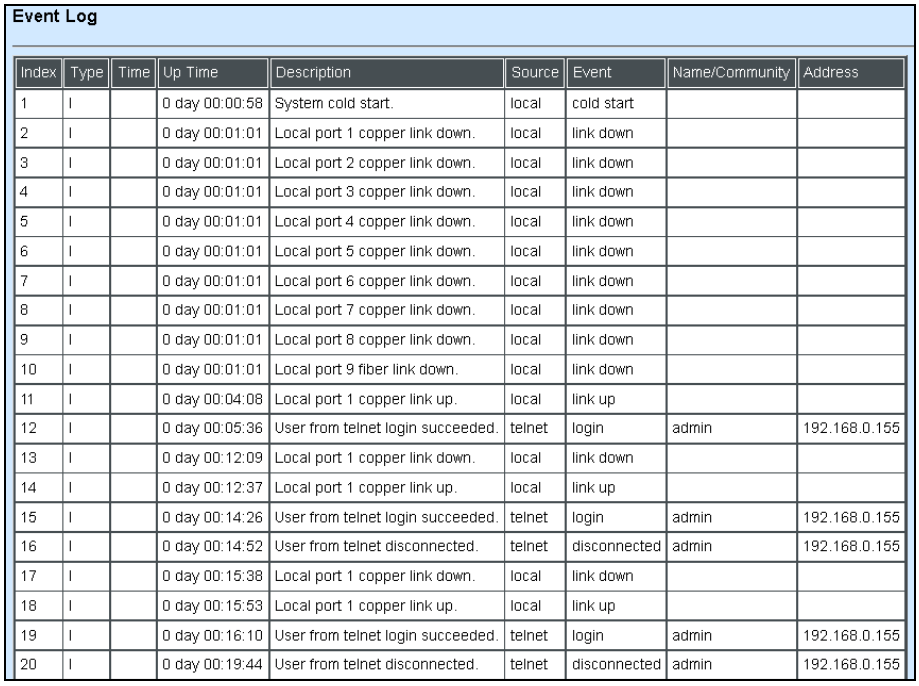
2. **Update:** This allows users to update the latest firmware.

3. **Load Factory Settings:** Load Factory Setting will set the configuration of the Managed Switch back to the factory default settings. The IP and Gateway addresses will be set to the factory default as well.

4. **Load Factory Settings Except Network Configuration:** Selecting this function will also restore the configuration of the Managed Switch to its original factory default settings. However, this will not reset the IP and Gateway addresses to the factory default.

3.6.1 Event Log

Event log keeps a record of user login and logout timestamp information. Select **Event Log** from the **System Utility** menu and then the following screen page appears.



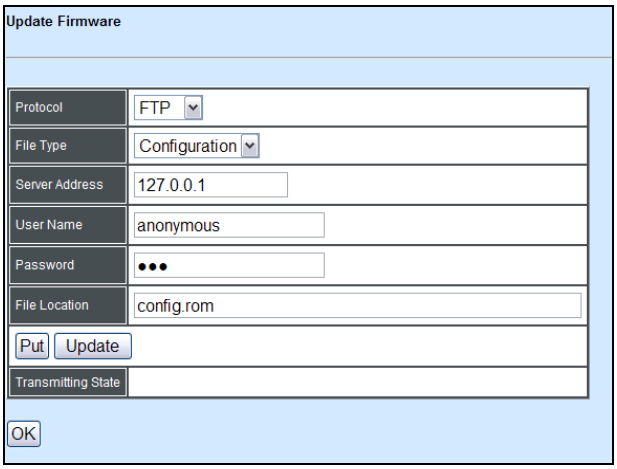
Event Log

Index	Type	Time	Up Time	Description	Source	Event	Name/Community	Address
1	I		0 day 00:00:58	System cold start.	local	cold start		
2	I		0 day 00:01:01	Local port 1 copper link down.	local	link down		
3	I		0 day 00:01:01	Local port 2 copper link down.	local	link down		
4	I		0 day 00:01:01	Local port 3 copper link down.	local	link down		
5	I		0 day 00:01:01	Local port 4 copper link down.	local	link down		
6	I		0 day 00:01:01	Local port 5 copper link down.	local	link down		
7	I		0 day 00:01:01	Local port 6 copper link down.	local	link down		
8	I		0 day 00:01:01	Local port 7 copper link down.	local	link down		
9	I		0 day 00:01:01	Local port 8 copper link down.	local	link down		
10	I		0 day 00:01:01	Local port 9 fiber link down.	local	link down		
11	I		0 day 00:04:08	Local port 1 copper link up.	local	link up		
12	I		0 day 00:05:36	User from telnet login succeeded.	telnet	login	admin	192.168.0.155
13	I		0 day 00:12:09	Local port 1 copper link down.	local	link down		
14	I		0 day 00:12:37	Local port 1 copper link up.	local	link up		
15	I		0 day 00:14:26	User from telnet login succeeded.	telnet	login	admin	192.168.0.155
16	I		0 day 00:14:52	User from telnet disconnected.	telnet	disconnected	admin	192.168.0.155
17	I		0 day 00:15:38	Local port 1 copper link down.	local	link down		
18	I		0 day 00:15:53	Local port 1 copper link up.	local	link up		
19	I		0 day 00:16:10	User from telnet login succeeded.	telnet	login	admin	192.168.0.155
20	I		0 day 00:19:44	User from telnet disconnected.	telnet	disconnected	admin	192.168.0.155

The Event Log table stores the latest 500 logs in the Managed Switch. Click **Clear All** to clear all Event Log records.

3.6.2 Update

Click the option **Update** from the **System Utility** menu and then the following screen page appears.



Protocol: Select the preferred protocol, either FTP or TFTP.

File Type: Select the file type to process, either Configuration or Firmware.

Server Address: Enter the specific IP address of the File Server.

User Name: Enter the specific username to access the File Server.

Password: Enter the specific password to access the File Server.

File Location: Enter the specific path and filename within the File Server.

Put: Click **Put** to start the upload process and transmit files to the server.

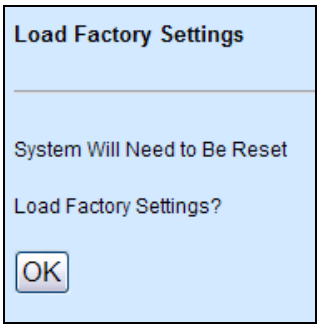
Update: Click **Update** to instruct the Managed Switch to update existing firmware or configuration to the latest one received. After a successful update, a message will pop up. The Managed Switch will need a reset to make changes effective.

Transmitting State: This field displays the uploading or updating progress.

3.6.3 Load Factory Settings

Load Factory Settings will set all configurations of the Managed Switch back to the factory default settings, including the IP and Gateway address. This function is useful when network administrators would like to re-configure the system. A system reset is required to make all changes effective after Load Factory Setting.

Select **Load Factory Settings** from the **System Utility** menu and then the following screen page appears.

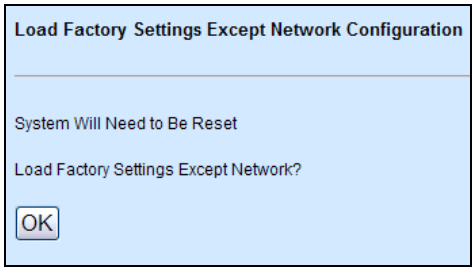


Click the **"OK"** button to restore the Managed Switch back to the defaults.

3.6.4 Load Factory Settings Except Network Configuration

Load Factory Settings Except Network Configuration will set all configurations of the Managed Switch back to the factory default settings. However, IP and Gateway addresses will not restore to the factory default. **Load Factory Settings Except Network Configuration** is very useful when network administrators need to re-configure the system "REMOTELY" because conventional Factory Reset will bring network settings back to default and lose all remote network connections.

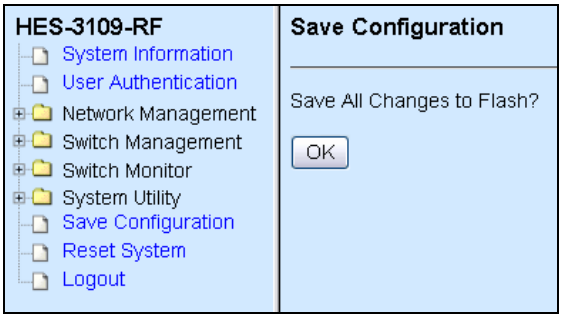
Select **Load Factory Setting Except Network Configuration** from the **System Utility** menu, then the following screen page shows up.



Click the **"OK"** button to restore the Managed Switch back to the defaults excluding network configurations.

3.7 Save Configuration

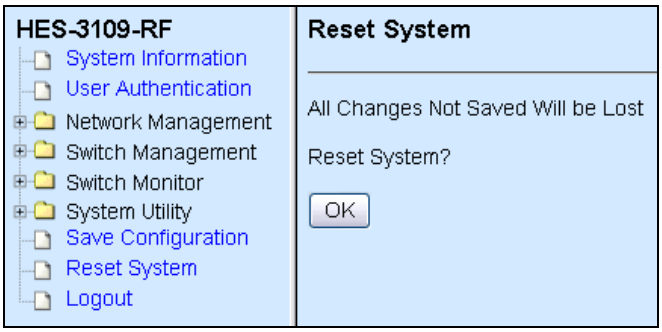
In order to save configuration settings permanently, users need to save configuration first before resetting the Managed Switch. Select **Save Configuration** from the **Main Menu** and then the following screen page appears.



Click the **"OK"** button to save changes or running configurations to Flash.

3.8 Reset System

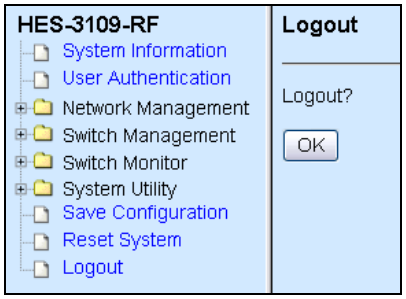
After any configuration changes, **Reset System** can make changes effective. Select **Reset System** from the **Main menu** and then the following screen page appears.



Click the **"OK"** button to restart the Managed Switch.

3.9 Logout

Select **Logout** from the **Main menu** and then the following screen page appears.



Click the **"OK"** button to logout the Managed Switch.

APPENDIX A: DHCP Auto-Provisioning Setup

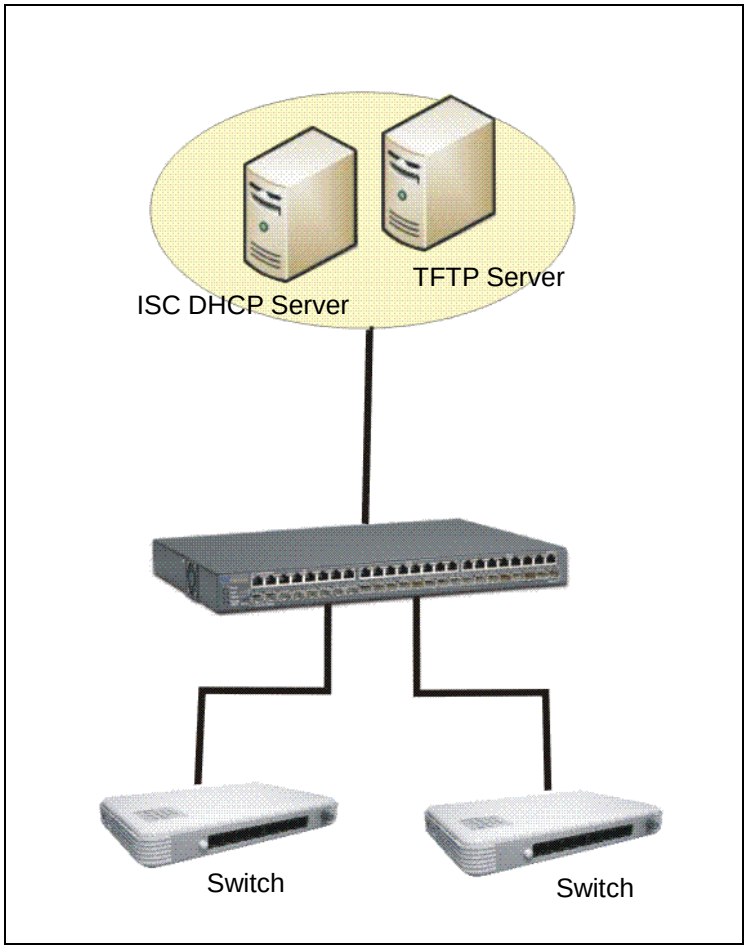
Networking devices, such as switches or gateways, with DHCP Auto-provisioning function allow you to automatically upgrade firmware and configuration at startup process. Before setting up DHCP Server for auto-upgrade of firmware and configuration, please make sure the Managed Switch that you purchased supports DHCP Auto-provisioning. Setup procedures and auto-provisioning process are described below for your reference.

A. Setup Procedures

Follow the steps below to set up Auto Provisioning server, modify dhcpd.conf file and generate a copy of configuration file.

Step 1. Set Up Environment

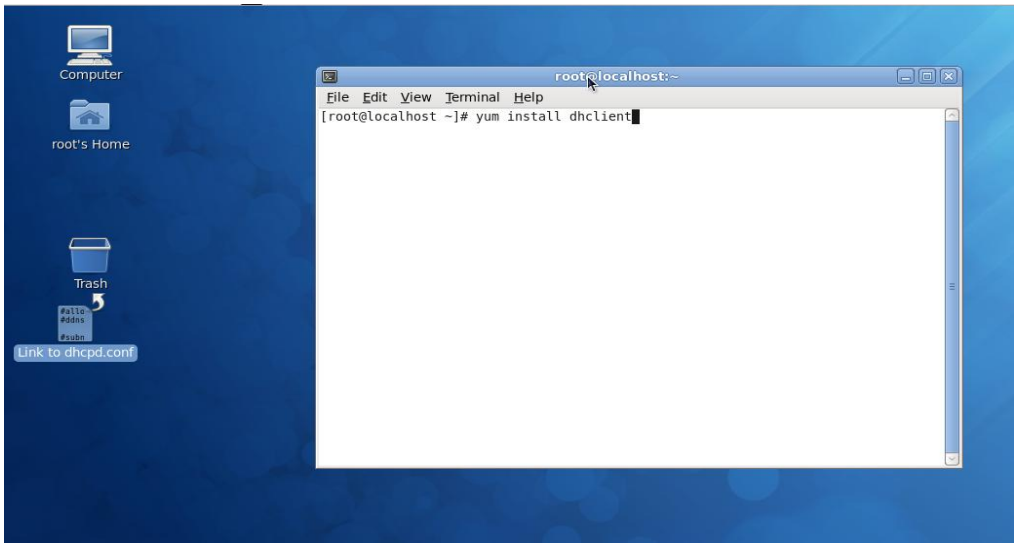
DHCP Auto-provisioning-enabled products that you purchased support the DHCP option 60 to work as a DHCP client. To make auto-provisioning function work properly, you need to prepare ISC DHCP server, File server (TFTP or FTP) and the switching device. See below for a possible network topology example.



Topology Example

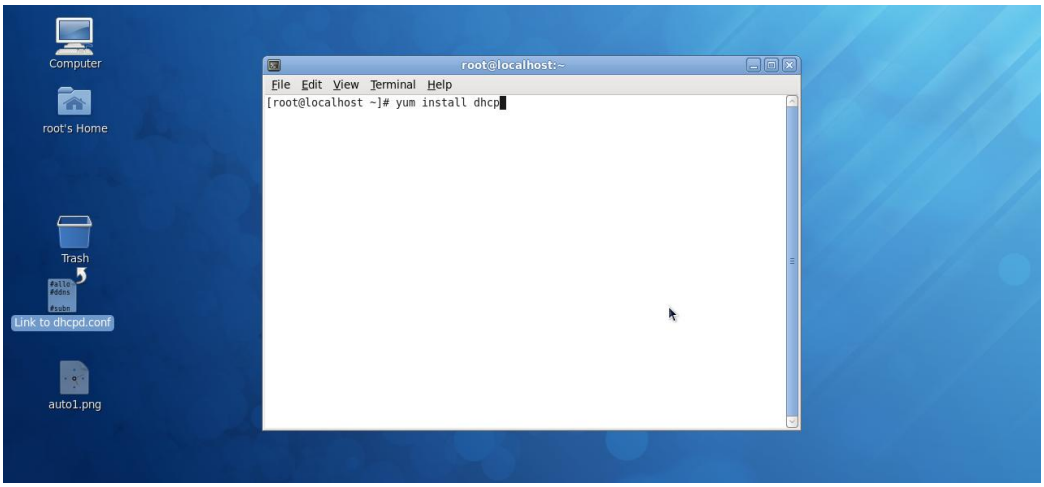
Step 2. Set Up Auto Provision Server

- **Update DHCP client**



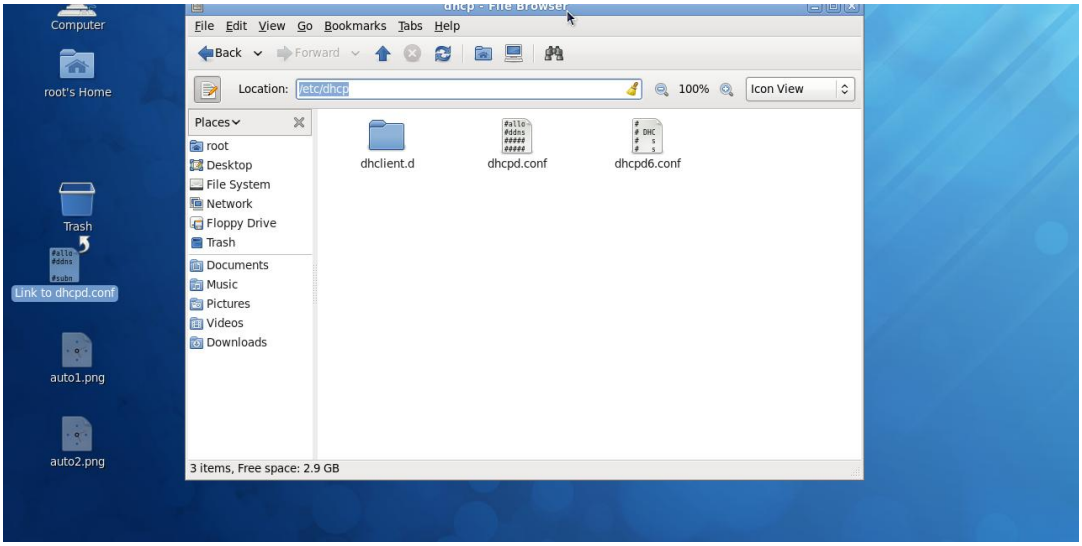
Linux Fedora 12 supports “yum” function by default. First of all, update DHCP client function by issuing “yum install dhclient” command.

- **Install DHCP server**



Issue “yum install dhcp” command to install DHCP server.

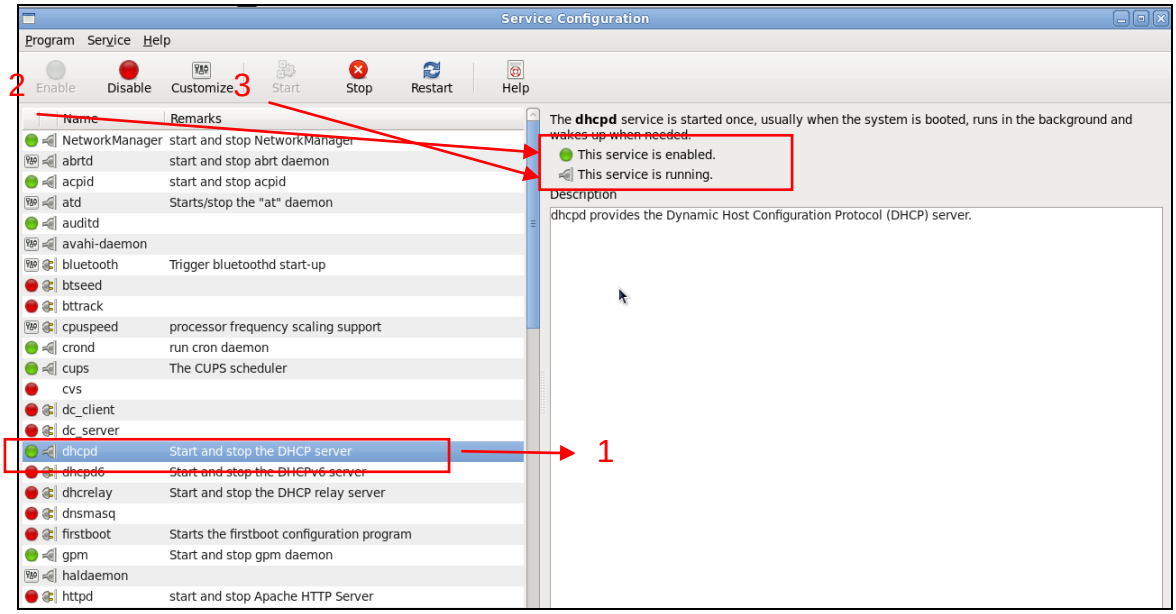
- **Copy dhcpd.conf to /etc/dhcp/ directory**



Copy dhcpd.conf file provided by the vendor to /etc/dhcp/ directory.

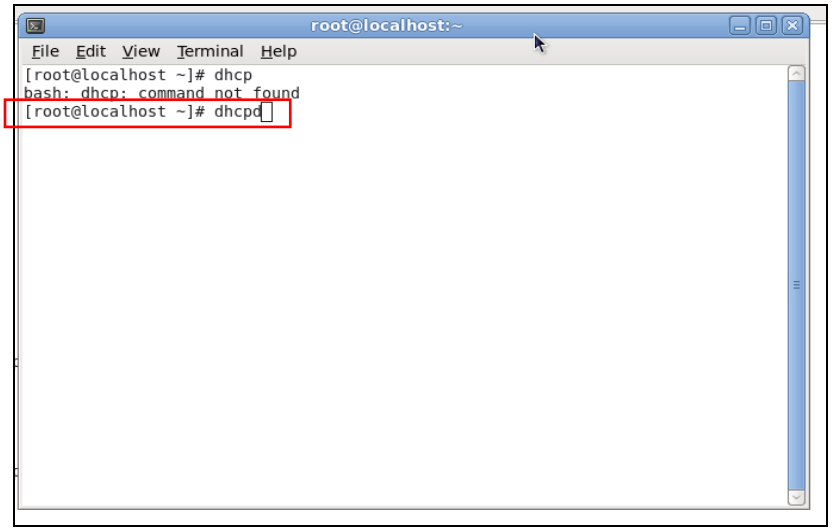
Please note that each vendor has its own way to define auto-provisioning. Make sure to use the file provided by the vendor.

- **Enable and run DHCP service**



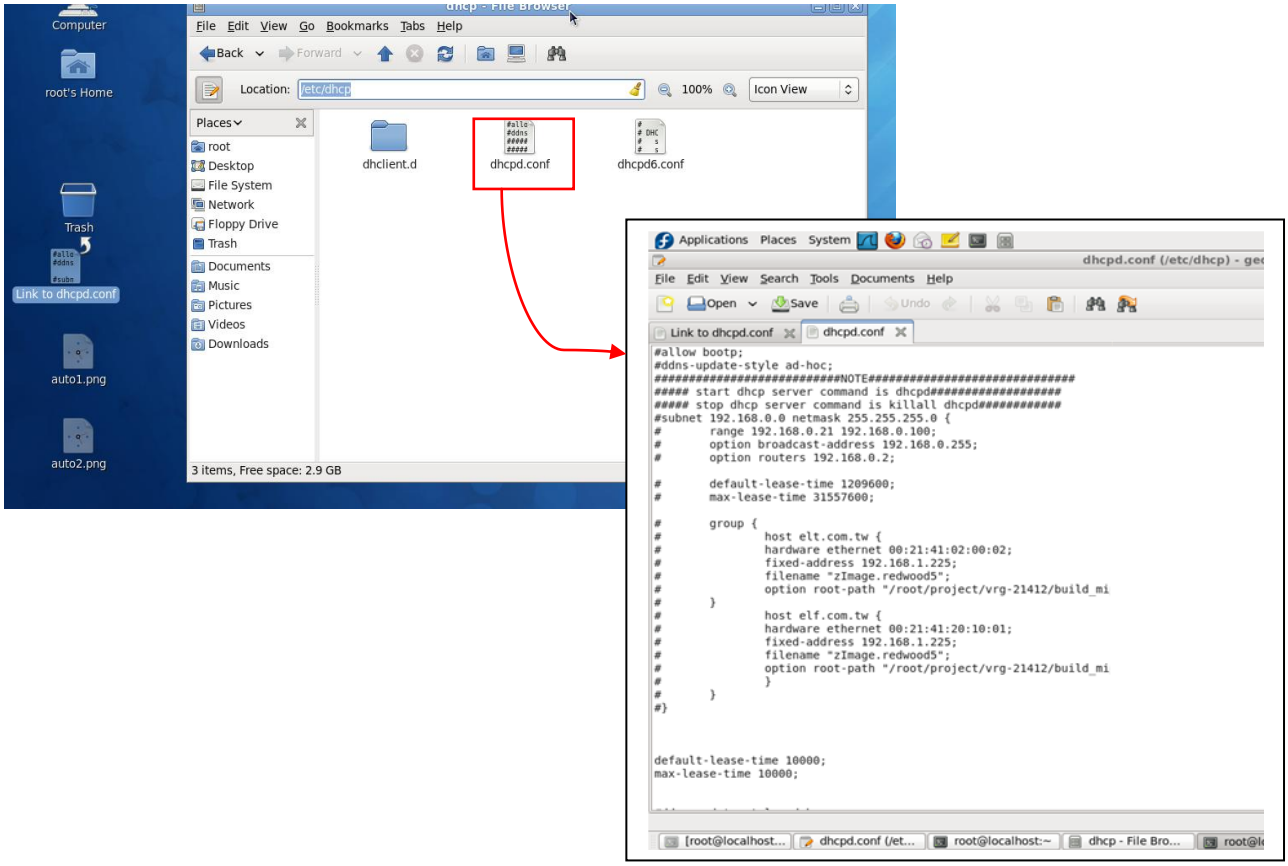
1. Choose dhcpd.
2. Enable DHCP service.
3. Start running DHCP service.

NOTE: *DHCP service can also be enabled using CLI. Issue "dhcpd" command to enable DHCP service.*



Step 3. Modify dhcpd.conf File

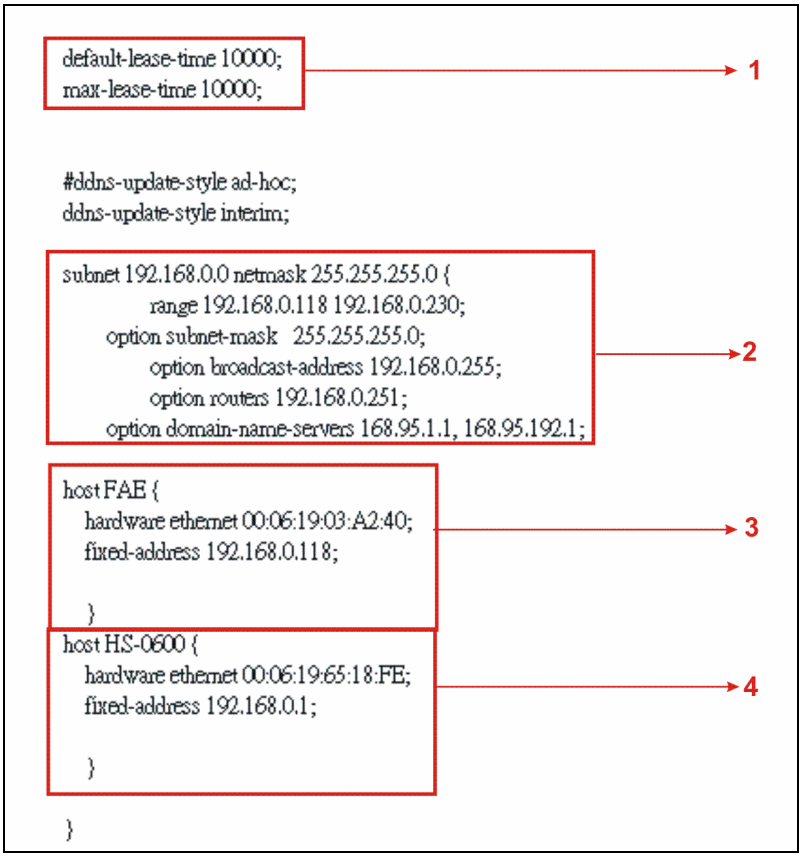
- **Open dhcpd.conf file in /etc/dhcp/ directory**



Double-click dhcpd.conf placed in /etc/dhcp/ directory to open it.

Modify dhcpd.conf file

The following marked areas in dhcpd.conf file can be modified with values that work with your networking environment.



1. Define DHCP default and maximum lease time in seconds.

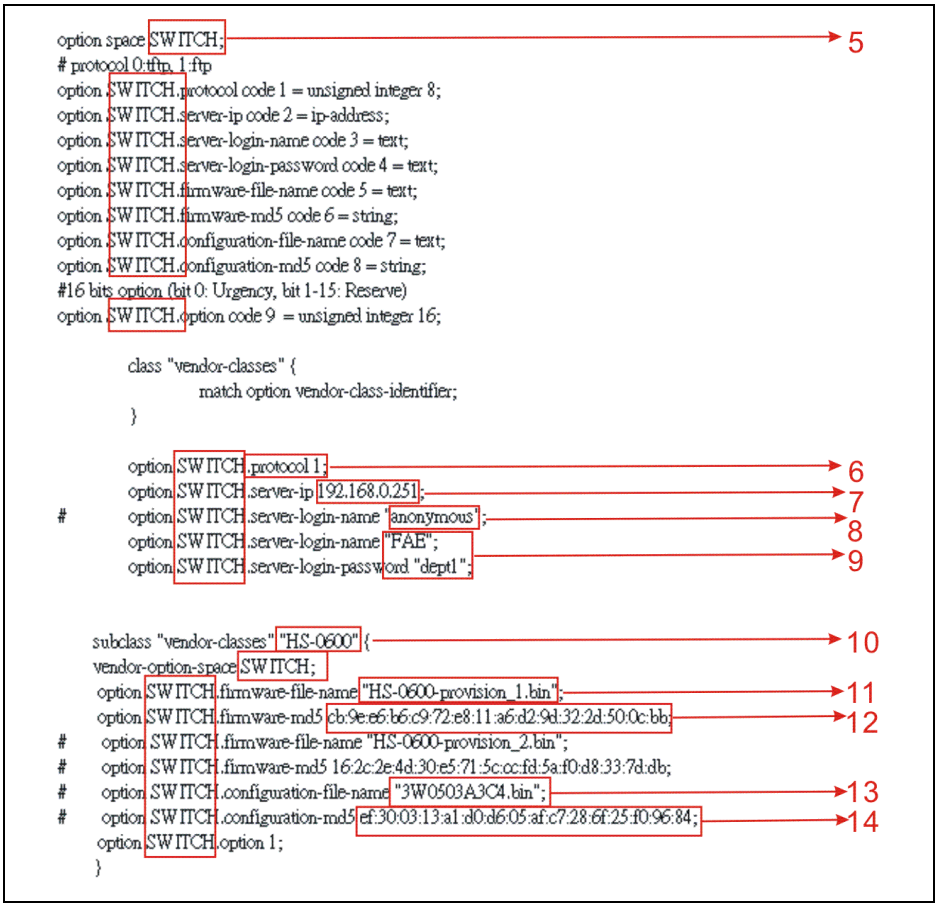
   Default lease time: If a client does not request a specific IP lease time, the server will assign a default lease time value.

   Maximum lease time: This is the maximum length of time that the server will lease for.

2. Define subnet, subnet mask, IP range, broadcast address, router address and DNS server address.

3. Map a host's MAC address to a fixed IP address.

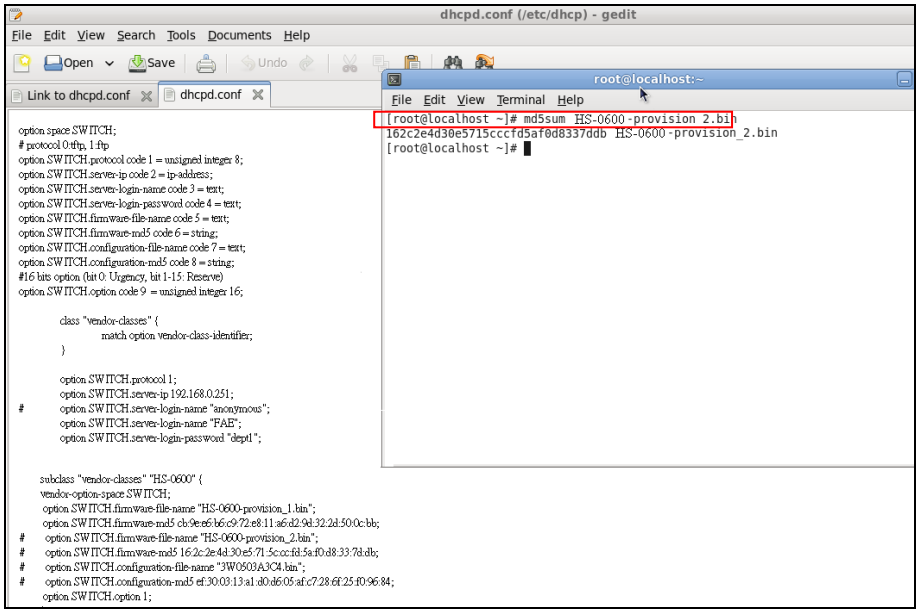
4. Map a host's MAC address to a fixed IP address. Use the same format to create multiple MAC-to-IP address bindings.



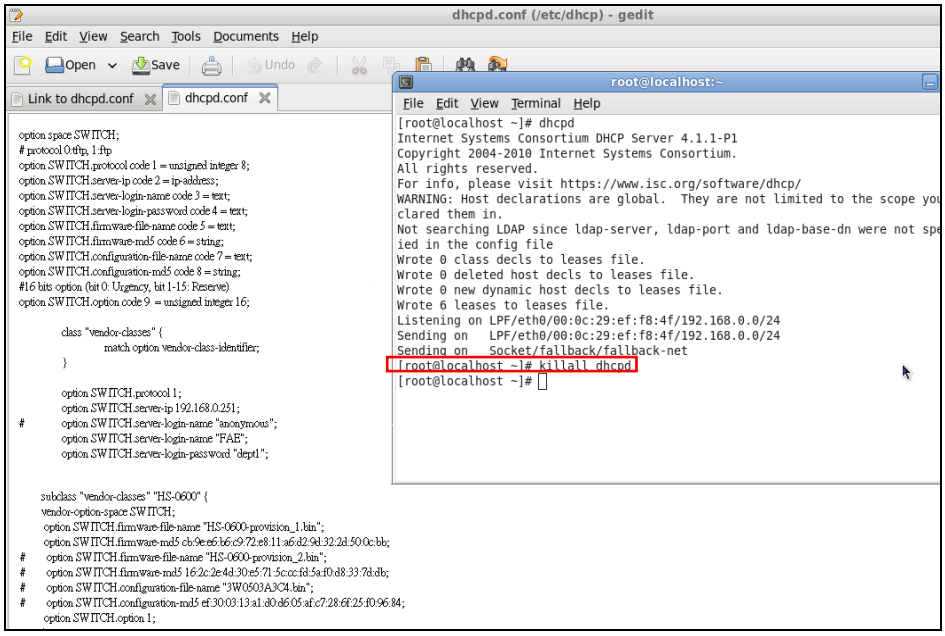
5. This value is configurable and can be defined by users.
6. Specify the protocol used (Protocol 1: FTP; Protocol 0: TFTP).
7. Specify the FTP or TFTP IP address.
8. Login TFTP server anonymously (TFTP does not require a login name and password).
9. Specify FTP Server login name and password.
10. Specify the product model name.
11. Specify the firmware filename.
12. Specify the MD5 for firmware image.
13. Specify the configuration filename.
14. Specify the MD5 for configuration file.

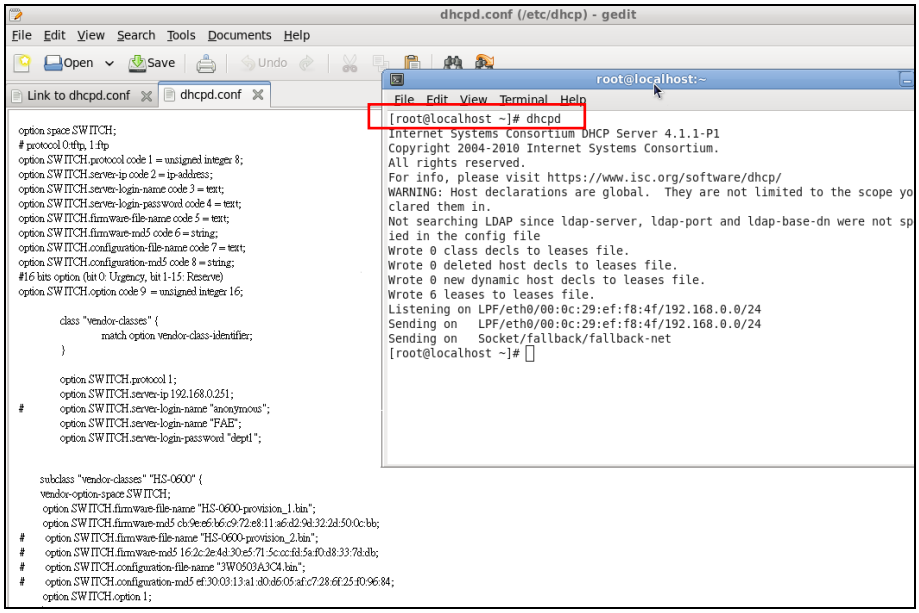
NOTE 1: *The text beginning with a pound sign (#) will be ignored by the DHCP server. For example, in the figure shown above, firmware-file-name "HS-0600-provision_2.bin" and firmware-md5 (line 5 & 6 from the bottom) will be ignored. If you want DHCP server to process these two lines, remove pound signs in the initial of each line.*

NOTE 2: *You can use either free software program or Linux default md5sum function to get MD5 checksum for firmware image and configuration file.*



- **Restart DHCP service**





Every time you modify dhcpd.conf file, DHCP service must be restarted. Issue “killall dhcpd” command to disable DHCP service and then issue “dhcpd” command to enable DHCP service.

Step 4. Backup a Configuration File

Before preparing a configuration file in TFTP/FTP Server, make sure the device generating the configuration file is set to **“Get IP address from DHCP”** assignment. DHCP Auto-provisioning is running under DHCP mode, so if the configuration file is uploaded by the network type other than DHCP mode, the downloaded configuration file has no chance to be equal to DHCP when provisioning, and it results in MD5 never matching and causes the device to reboot endlessly.

In order to have your Managed Switch retrieve the correct configuration image in TFTP/FTP Server, please make sure the filename of your configuration file is defined exactly the same as the one specified in **dhcpd.conf**. For example, if the configuration image’s filename specified in dhcpd.conf is “metafile”, the configuration image filename should be named to “metafile” as well.

Step 5. Place a Copy of Firmware and Configuration File in TFTP/FTP

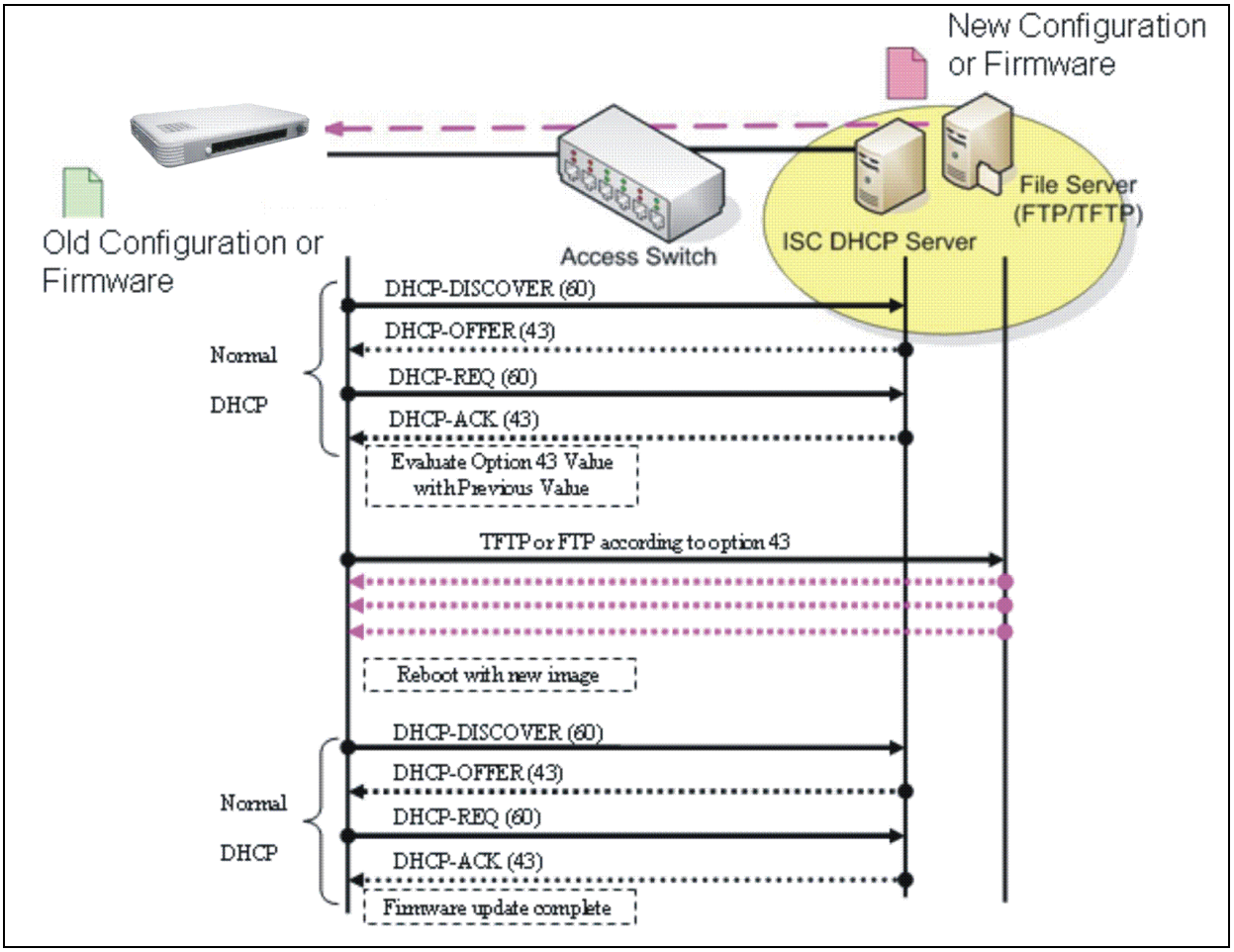
The TFTP/FTP File server should include the following items:

1. Firmware image (This file is provided by the vendor.)
2. Configuration file (This file is generally created by users.)
3. User account for your device (For FTP server only.)

B. Auto-Provisioning Process

This switching device is setting-free (through auto-upgrade and configuration) and its upgrade procedures are as follows:

1. ISC DHCP server will recognize the device when it receives an IP address request sent by the device, and it will tell the device how to get a new firmware or configuration.
2. The device will compare the firmware and configuration MD5 code form of DHCP option every time it communicates with DHCP server.
3. If MD5 code is different, the device will then upgrade the firmware or configuration. However, it will not be activated immediately.
4. If the Urgency Bit is set, the device will be reset to activate the new firmware or configuration immediately.
5. The device will retry for 3 times if the file is incorrect, and then it gives up until getting another DHCP ACK packet again.



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