LINKSYS

User Guide

MANAGED SWITCH

LGS3XX

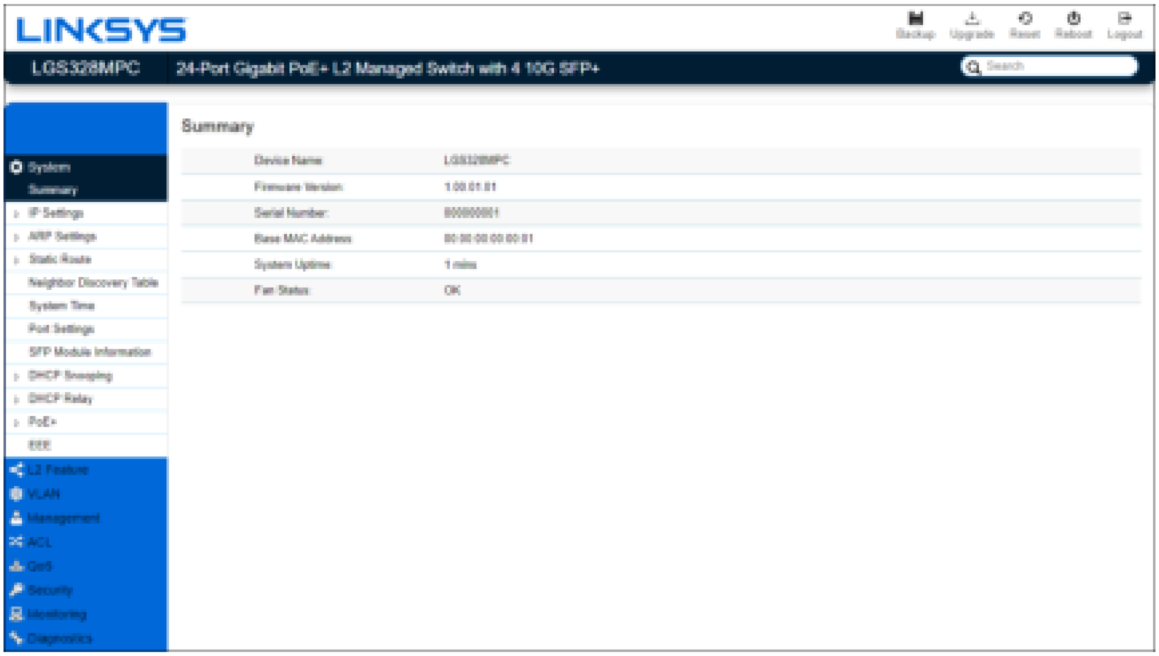
Contents

Ethernet Switch Features

System

Summary

The Summary page shows general system information for the Switch including the device name, firmware version, serial number, base MAC address, system uptime and fan status.



Summary

Device Name	LGS328MPC
Firmware Version:	1.00.01.01
Serial Number:	000000001
Base MAC Address:	00:00:00:00:00:01
System Uptime:	1 mins
Fan Status:	OK

Device Name	Displays the model name of the device.
FW Version	Displays the installed firmware version of the device.
Serial Number	Displays the serial number of the device.
Base MAC Address	Displays the MAC base address of the device.
System Uptime	Displays the number of days, hours, and minutes since the last system restart. The System Uptime is displayed in the following format: days, hours, and minutes.
Fan Status	Displays the fan status

IP Settings

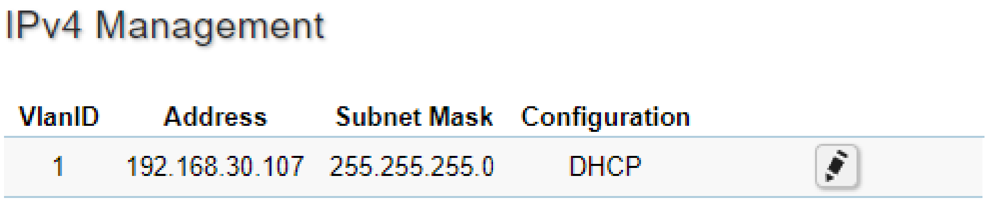
This switch supports multiple IP interfaces can be configurable. There are 4 IPv4 address and 4 IPv6 link local address, and 16 global IPv6 address share with 4 IP interfaces.

The IP Setting page contains fields for assigning IP addresses. IP addresses are either defined as static or are retrieved using the Dynamic Host Configuration Protocol (DHCP). DHCP assigns dynamic IP addresses to devices on a network. DHCP ensures that network devices can have a different IP address every time the device connects to the network.

To access the page, click **IP Settings** under the **System** menu.

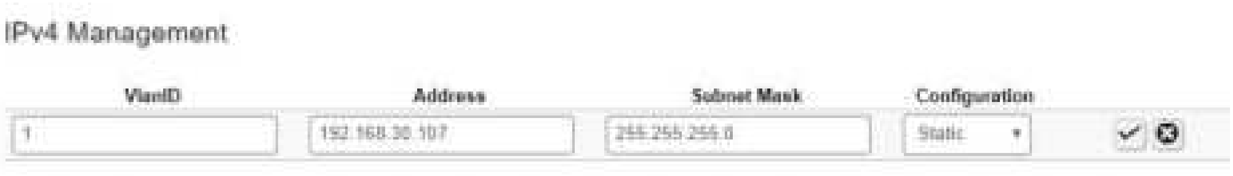
IPv4 Management

This page provides you to modify the management VLAN interface either set to static IP or DHCP/BOOTP for auto-configuration.



IPv4 Management

VlanID	Address	Subnet Mask	Configuration
1	192.168.30.107	255.255.255.0	DHCP



IPv4 Management

VlanID	Address	Subnet Mask	Configuration
1	192.168.30.107	255.255.255.0	Static ▾

Important--*If the device fails to retrieve an IP address through DHCP, the default IP address is 192.168.1.251 and the factory default subnet mask is 255.255.255.0.*

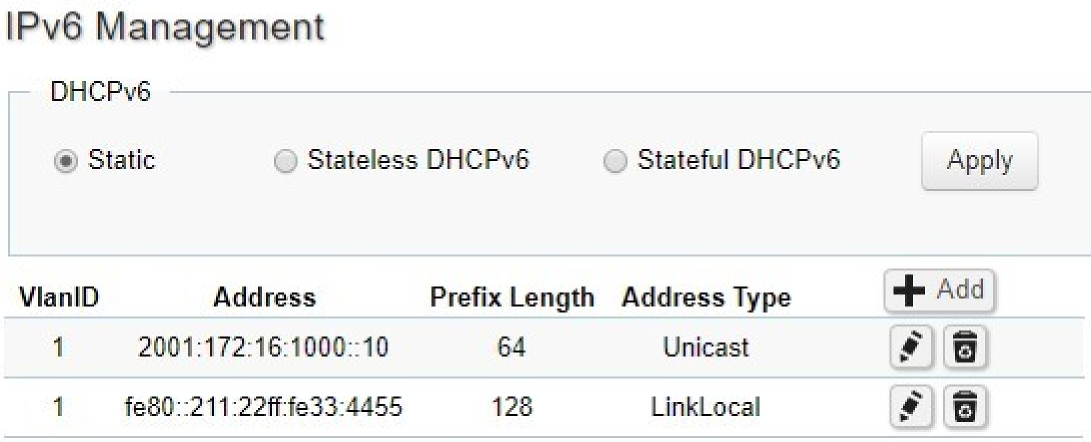
Dynamic IP Address (DHCP/BOOTP)	Enables the IP address to be configured automatically by the DHCP server. Select this option if you have a DHCP server that can assign the Switch an IP address, subnet mask, default gateway IP address, and a domain name server IP address automatically. Selecting this field disables the IP Address, Subnet Mask fields.
Static IP Address	Allows the entry of an IP address, subnet mask for the Switch. Select this option if you don't have a DHCP server or if you wish to assign a static IP address to the Switch.
IP Address	This field allows the entry of an IPv4 address to be assigned to this IP interface. Enter the IP address of your Switch in dotted decimal notation. The factory default value is: 192.168.1.251
Subnet Mask	A subnet mask separates the IP address into the network and host addresses. A bitmask that determines the extent of the subnet that the Switch is on. This should be labeled in the form: xxx.xxx.xxx.xxx, where each xxx is a number (represented in decimals) between 0 and 255. The value should be 255.0.0.0 for a Class A network, 255.255.0.0 for a Class B network, and 255.255.255.0 for a Class C network, but custom subnet masks are allowed. Enter the IP subnet mask of your Switch in dotted decimal notation. The factory default value is: 255.255.255.0

Click the button ✎ to modify specific IPv4 interface.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

IPv6 Management

IPv6 is an upgraded version to IPv4, providing more available IP addresses as well as other benefits. To access the switch over an IPv6 network you must first configure it with IPv6 information (IPv6 address, prefix length, and LinkLocal or Global address type). To configure IPv6 for the Switch, select VLAN interface to modify or press add button to add a new IPv6 address.



IPv6 Management

DHCPv6

● Static ○ Stateless DHCPv6 ○ Stateful DHCPv6 Apply

VlanID	Address	Prefix Length	Address Type	+ Add
1	2001:172:16:1000::10	64	Unicast	✎ 🗑
1	fe80::211:22ff:fe33:4455	128	LinkLocal	✎ 🗑

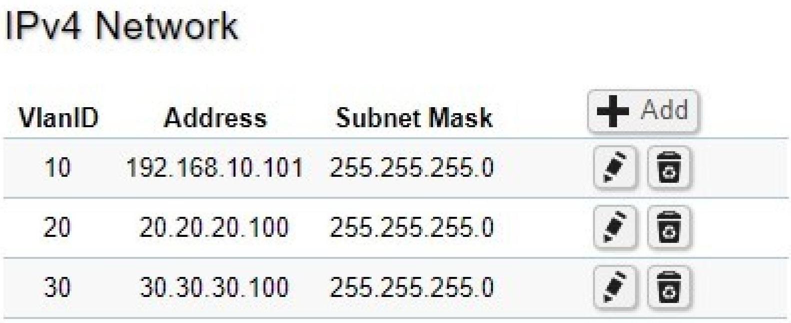
Interface	VLAN interface need to add / modify.
Address / Prefix Length	This field allows the entry of an IPv6 address/prefix to be assigned to this IP interface.
Address Type	Unicast for IPv6 Global address type and LinkLocal for IPv6 link local address type.

Click the button ✎ to modify specific IPv6 interface and button 🗑 to delete an IPv6 interface entry manually.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

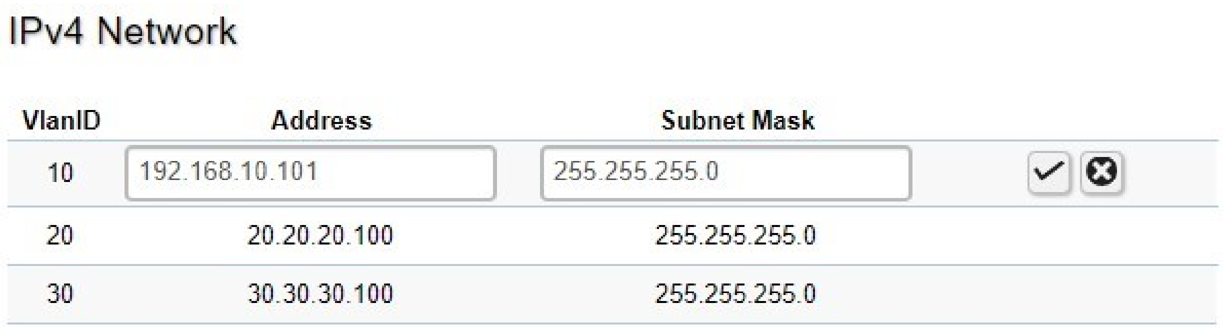
IPv4 Network

In this page, you can add IPv4 address on un-management VLAN.



IPv4 Network

VlanID	Address	Subnet Mask	+ Add
10	192.168.10.101	255.255.255.0	✎ 🗑
20	20.20.20.100	255.255.255.0	✎ 🗑
30	30.30.30.100	255.255.255.0	✎ 🗑



IPv4 Network

VlanID	Address	Subnet Mask	
10	192.168.10.101	255.255.255.0	✓ ⊗
20	20.20.20.100	255.255.255.0	
30	30.30.30.100	255.255.255.0	

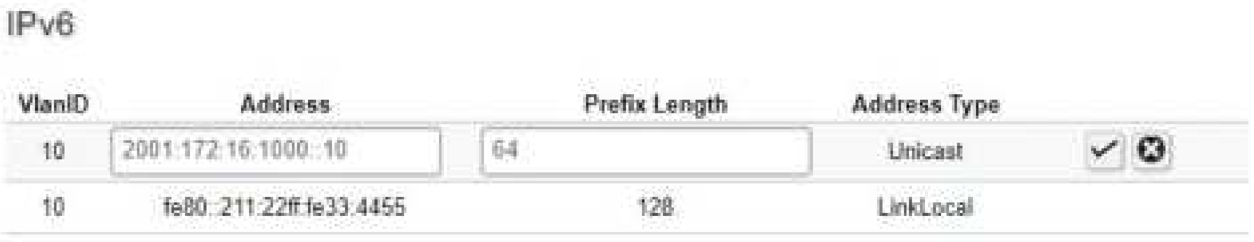
VLAN	Specify the VLAN ID.
IP Address	This field allows the entry of an IPv4 address to be assigned to this IP interface. Enter the IP address of your Switch in dotted decimal notation.
Subnet Mask	A subnet mask separates the IP address into the network and host addresses. A bitmask that determines the extent of the subnet that the Switch is on. This should be labeled in the form: xxx.xxx.xxx.xxx, where each xxx is a number (represented in decimals) between 0 and 255. The value should be 255.0.0.0 for a Class A network, 255.255.0.0 for a Class B network, and 255.255.255.0 for a Class C network, but custom subnet masks are allowed. Enter the IP subnet mask of your Switch in dotted decimal notation. The factory default value is: 255.255.255.0.

Click the button ✎ to modify specific IPv4 interface.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

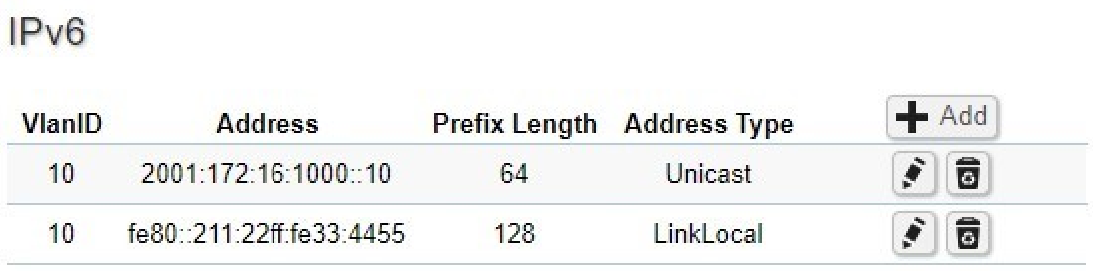
IPv6 Network

In this page, you can add IPv6 address on un-management VLAN.



IPv6

VlanID	Address	Prefix Length	Address Type	
10	2001:172:16:1000::10	64	Unicast	✓ ⊗
10	fe80::211:22ff:fe33:4455	128	LinkLocal	



IPv6

VlanID	Address	Prefix Length	Address Type	+ Add
10	2001:172:16:1000::10	64	Unicast	✎ 🗑
10	fe80::211:22ff:fe33:4455	128	LinkLocal	✎ 🗑

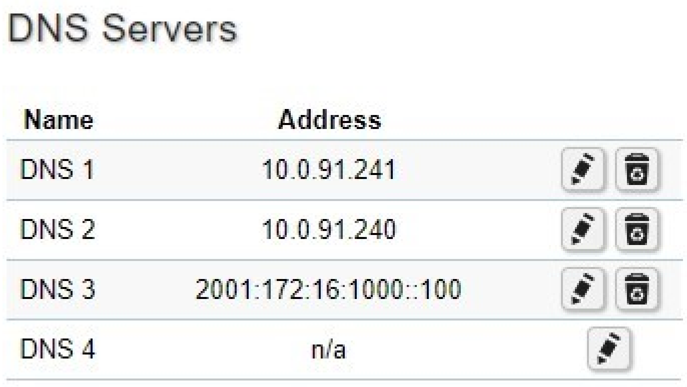
VLAN	Specify the VLAN ID.
IP Address	This field allows the entry of an IPv6 address/prefix to be assigned to this IP interface.
Subnet Mask	Unicast for IPv6 Global address type and LinkLocal for IPv6 link local address type

Click the button ✎ to modify specific IPv6 interface and button 🗑 to delete an IPv6 interface entry.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

DNS Servers

DNS (Domain Name System) can transfer host name to IP address. This switch supports 4 IP address list of DNS servers. If DHCP is selected in IPv4 interface and DNS info in DHCP option will auto add in DNS IP address list.



DNS Servers

Name	Address	
DNS 1	10.0.91.241	✎ 🗑
DNS 2	10.0.91.240	✎ 🗑
DNS 3	2001:172:16:1000::100	✎ 🗑
DNS 4	n/a	✎

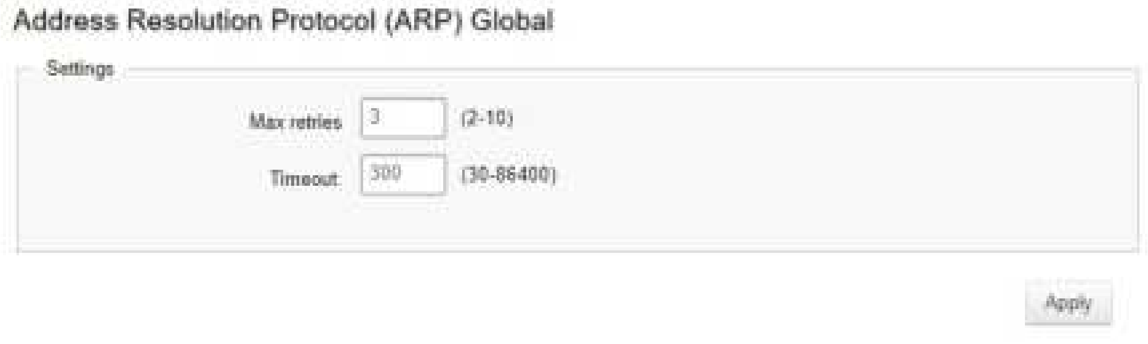
Address	This field allows the entry of an IPv4/IPv6 address to be DNS server IP address.

Click the button ✎ to modify specific IPv4 interface

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

ARP Settings

To access the page, click **ARP Settings** under the **System** menu.



Address Resolution Protocol (ARP) Global

Settings

Max retries: 3 (2-10)

Timeout: 300 (30-86400)

ARP Global

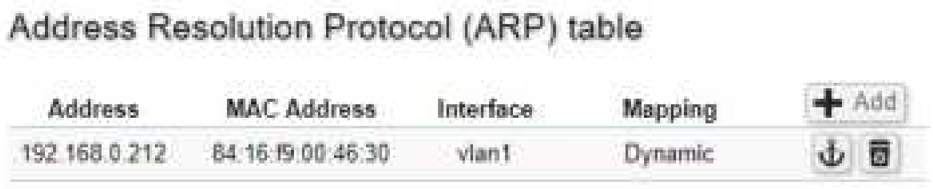
Set retry times and age out timer for ARP table.

Max retries	Max ARP request retries times if switch can't get ARP reply.
Timeout	Aging time for Dynamic ARP entries.

Click **Apply** to save settings.

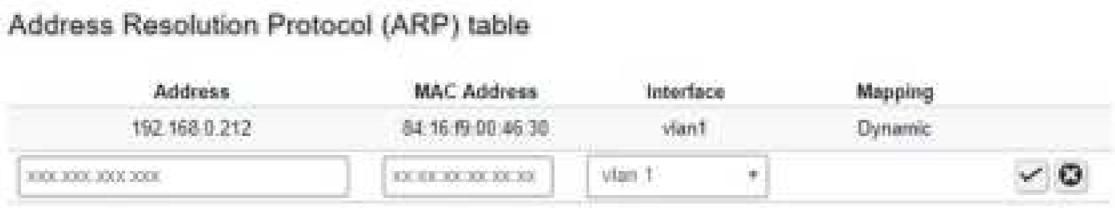
Address Resolution Protocol (ARP) table

Display ARP table and ARP entries in switch. Administrator can move Dynamic ARP entry as Static ARP entry, create a Static ARP entry, and delete an ARP entry.



Address Resolution Protocol (ARP) table

Address	MAC Address	Interface	Mapping	+ Add
192.168.0.212	84:16:f9:00:46:30	vlan1	Dynamic	⚓ 🗑



Address Resolution Protocol (ARP) table

Address	MAC Address	Interface	Mapping	
192.168.0.212	84:16:f9:00:46:30	vlan1	Dynamic	
xxx.xxx.xxx.xxx	xx:xx:xx:xx:xx:xx	vlan 1 ▾		✓ ⊗

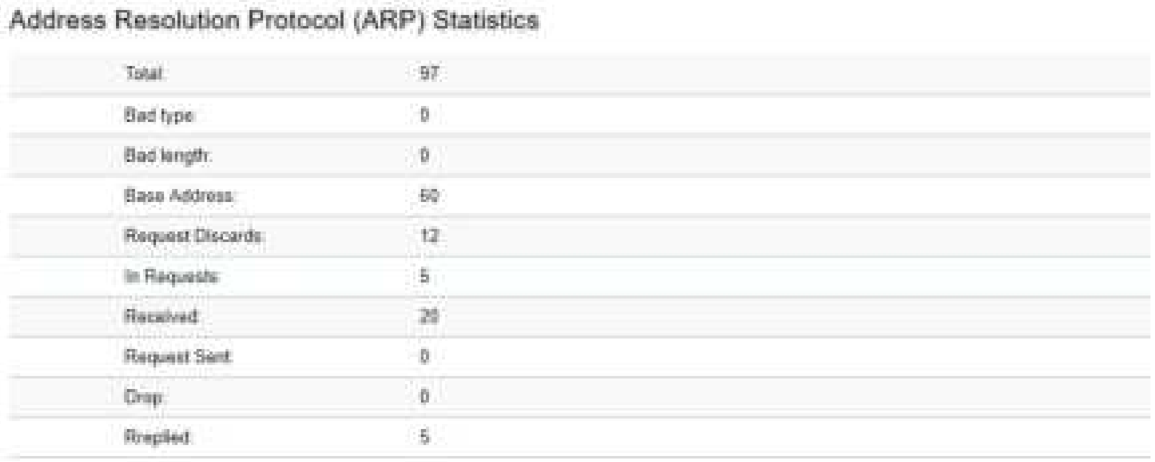
Move to Static	Administrator can move Dynamic ARP entry as Static ARP entry. Static ARP will not take effect by timeout timer in global settings.
Address	This field allows the entry of an IPv4 address to be IP address in ARP entry.
MAC Address	This field allows the entry of a MAC address format to be MAC address in ARP entry.
Interface	Select or display ARP entry belongs which IP interface.
Mapping	To display status of ARP entry.

Click the button ⚓ to move dynamic ARP to static ARP and button 🗑 to delete an ARP entry manually.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Address Resolution Protocol (ARP) Statistics

To display counters related to ARP.



Address Resolution Protocol (ARP) Statistics

Total:	97
Bad type:	0
Bad length:	0
Base Address:	50
Request Discards:	12
In Requests:	5
Received:	20
Request Sent:	0
Drop:	0
Rreplied:	5

Static Route

Switch will forward IP packets follow ARP/ND table and Static route configuration.

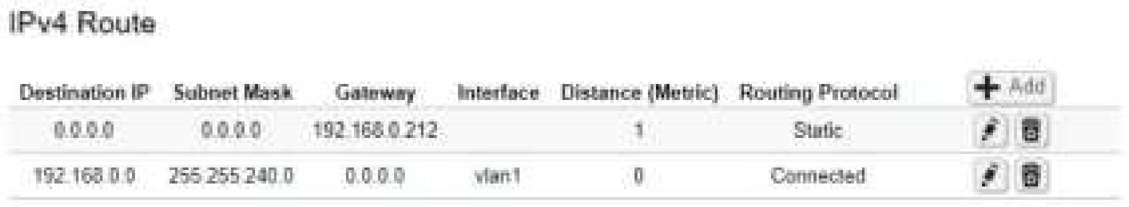
Static route can be configurable by administrator manually. Static route can also assign a next hop for stub network, or a default gateway for whole switch.

The DIP filed in packets were not in IP subnet range of switch and also not hit by any route configuration, will forward to default gateway then.

All gateway fields need to be including of subnet range of switch IP interfaces.

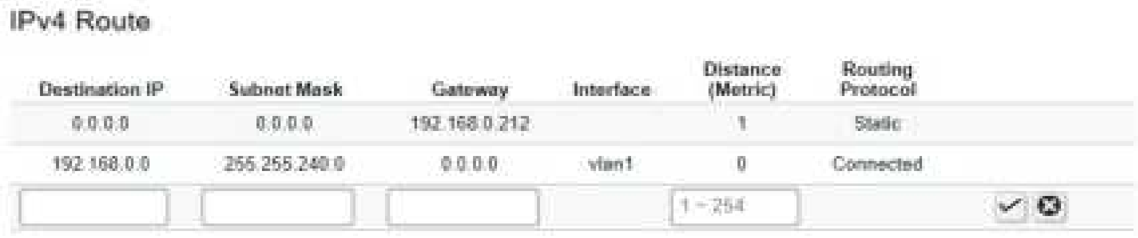
To access the page, click **Static Route** under the **System** menu.

IPv4



IPv4 Route

Destination IP	Subnet Mask	Gateway	Interface	Distance (Metric)	Routing Protocol	+ Add
0.0.0.0	0.0.0.0	192.168.0.212		1	Static	
192.168.0.0	255.255.240.0	0.0.0.0	vlan1	0	Connected	



IPv4 Route

Destination IP	Subnet Mask	Gateway	Interface	Distance (Metric)	Routing Protocol	
0.0.0.0	0.0.0.0	192.168.0.212		1	Static	
192.168.0.0	255.255.240.0	0.0.0.0	vlan1	0	Connected	
				1 ~ 254		✓ ⊗

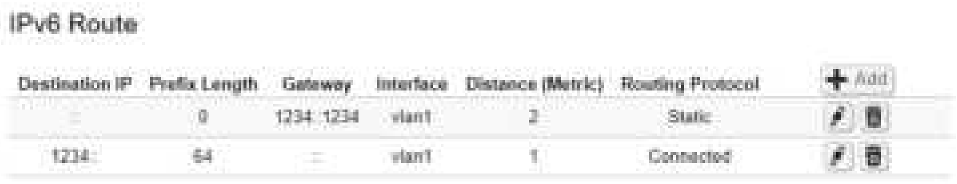
Important*—Destination IP and Subnet Mask are set to 0.0.0.0, then this entry will be default*

Destination IP	The DIP field in packets need to route.
Subnet Mask	The field decides the range that packets hit this route entry.
Gateway	The next hop IPv4 address if packets hit route entry.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

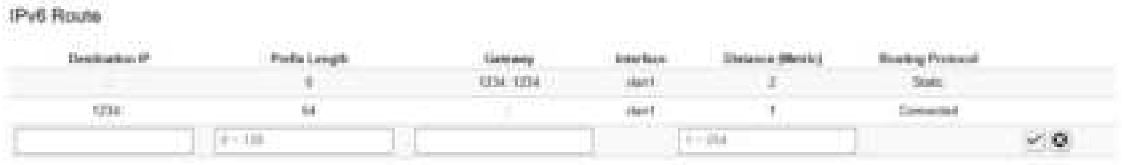
IPv6

IPv6 global address in IP interface is needed before creating IPv6 static route.



IPv6 Route

Destination IP	Prefix Length	Gateway	Interface	Distance (Metric)	Routing Protocol	
::	0	1234::1234	vlan1	2	Static	
1234::	64	::	vlan1	1	Connected	



IPv6 Route

Destination IP	Prefix Length	Gateway	Interface	Distance (Metric)	Routing Protocol	
::	0	1234::1234	vlan1	2	Static	
1234::	64	::	vlan1	1	Connected	
	0 ~ 128			1 ~ 254		✓ ⊗

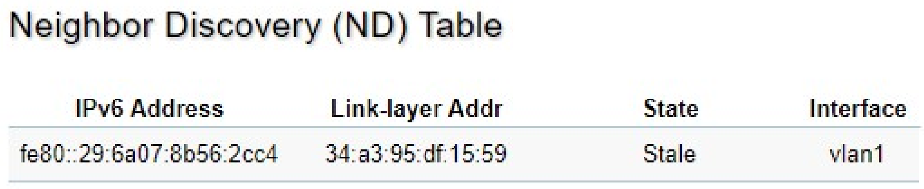
***Important**—If the Destination IP is set to :: and the Prefix Length is set to 0, then this entry will be default gateway entry in route table.*

Destination IP	The DIP field in packets need to route.
Prefix Length	The field decides the range that packets hit this route entry.
Gateway	The next hop IPv6 address with global format if packets hit route entry.

Click **Apply** to save settings.

Neighbor Discovery (ND) table

ND is responsible for gathering information from nearby nodes in IPv6 format.



Neighbor Discovery (ND) Table

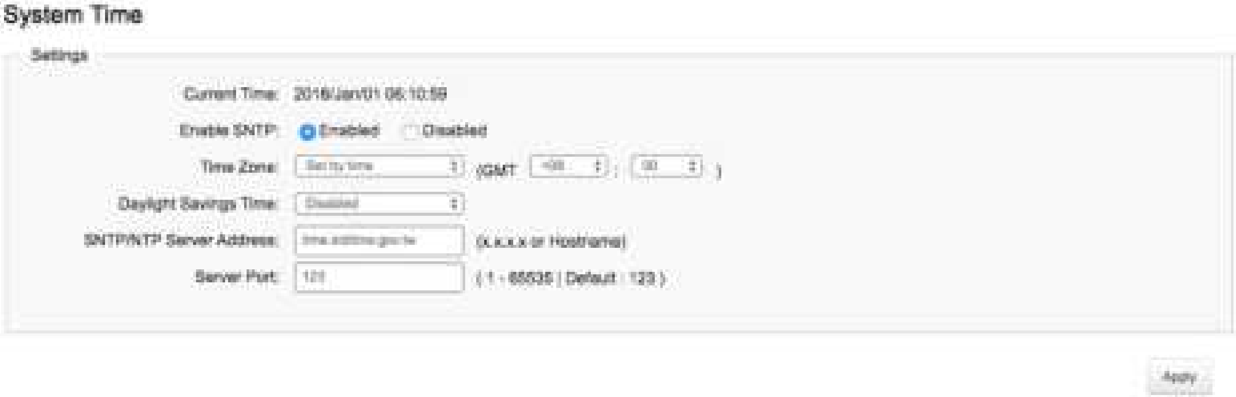
IPv6 Address	Link-layer Addr	State	Interface
fe80::29:6a07:8b56:2cc4	34:a3:95:df:15:59	Stale	vlan1

IPv6 Address	This field allows the entry of an IPv6 address to be IP address in ND entry.
Link-layer Addr	This field allows the entry of a MAC address format to be MAC address in ND entry.
Interface	Select or display ND entry belongs which IP interface.
State	Displays the status of ARP entry.

System Time

Use the System Time screen to view and adjust date and time settings.

The Switch supports Simple Network Time Protocol (SNTP). SNTP assures accurate network device clock time synchronization up to the millisecond. Time synchronization is performed by a network SNTP server. This switch operates only as an SNTP client and cannot provide time services to other systems.



System Time

Settings

Current Time: 2018/Jan/01 06:10:59

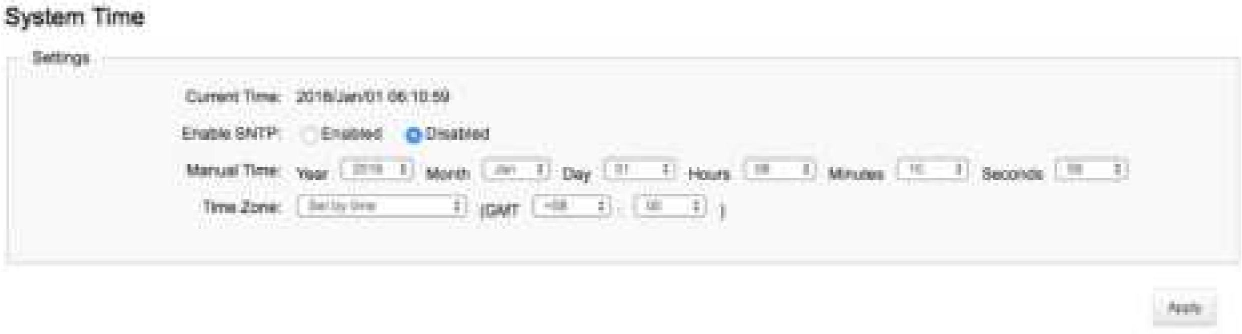
Enable SNTP: ● Enabled ○ Disabled

Time Zone: Set by time (GMT +08 : 00)

Daylight Savings Time: Disabled

SNTP/NTP Server Address: time.stdtime.gov.tw (x.x.x.x or Hostname)

Server Port: 123 (1 - 65535 | Default : 123)



System Time

Settings

Current Time: 2018/Jan/01 06:10:59

Enable SNTP: ○ Enabled ● Disabled

Manual Time: Year 2018 Month Jan Day 01 Hours 06 Minutes 10 Seconds 59

Time Zone: Set by time (GMT +08 : 00)

Current time	Displays the current system time.
Enable SNTP	Select whether to enable or disable system time synchronization with an SNTP server.
Time Zone	Configure the time zone setting either by setting GMT difference or by country.
Daylight Savings Time	Select from Disabled, Recurring or Non-recurring.
Daylight Savings Time Offset	Enter the time of Daylight Savings Time Offset.
Recurring From	Select the Day, Week, Month, and Hour from the list.
Recurring To	Select the Day, Week, Month, and Hour from the list.
SNTP/NTP Server Address	Enter the IP address or hostname of the SNTP/NTP server.
Server Port	Enter the server port of the SNTP/NTP server.

To configure date/time through SNTP:

1. Next to the Enable SNTP, select Enable.
2. In the Time Zone Offset list, select by country or by the GMT time zone in which the Switch is located.
3. Next select Disabled or Recurring for Daylight Savings Time. Daylight saving is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening.
4. In the SNTP/NTP Server Address field, enter the IP address or the host name of the SNTP/NTP server.
5. Finally, enter the port number on the SNTP server to which SNTP requests are sent. The valid range is from 1-65535. The default is: 123.
6. Click Apply to update the system settings.

To configure date/time manually:

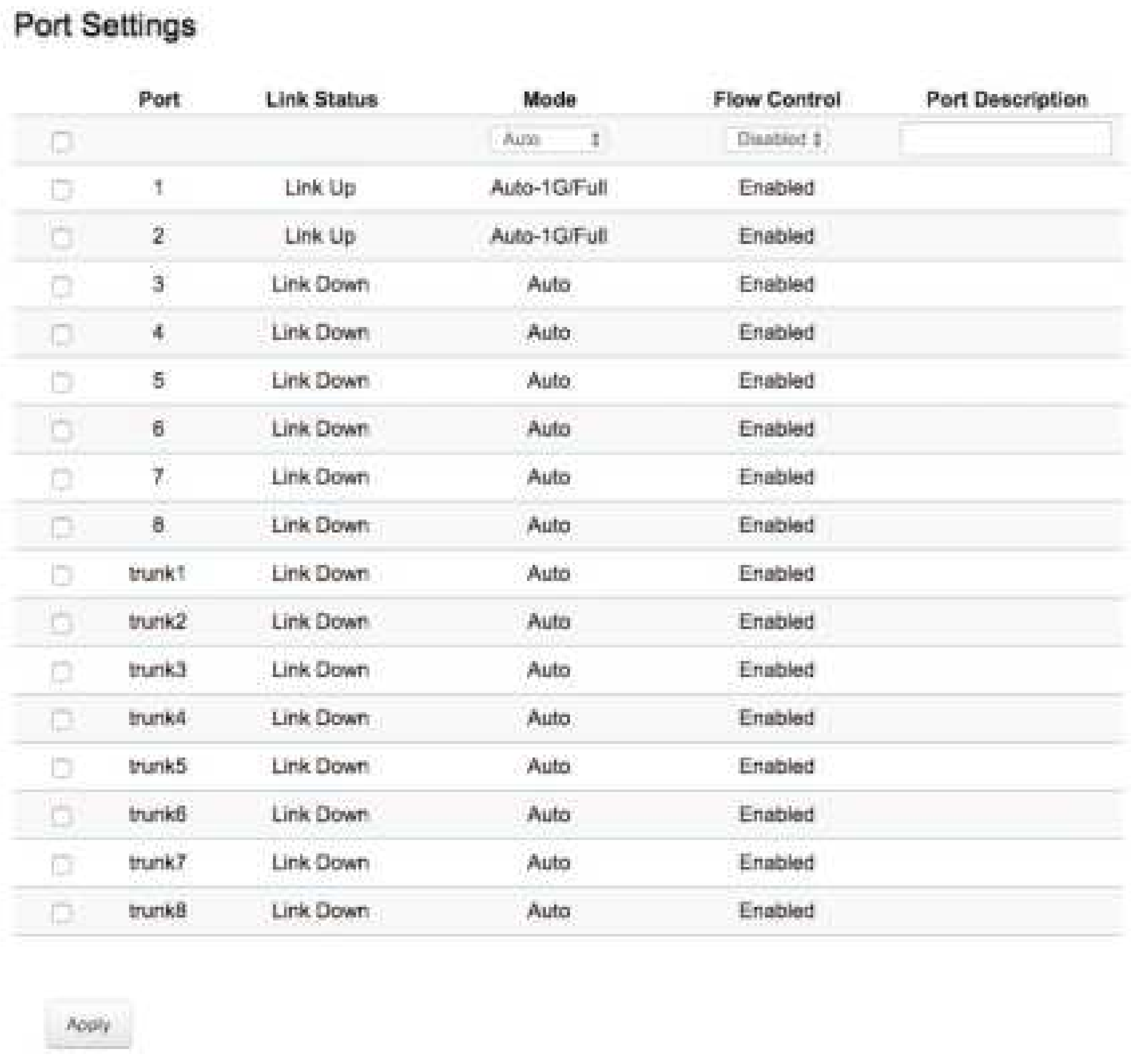
1. Next to the Enable SNTP, select Disable.
2. In the Manual Time field, use the drop-down boxes to manually select the date and time you wish to set.

3. In the Time Zone Offset list, select by country or by the Coordinated Universal Time (UTC/GMT) time zone in which the Switch is located.
4. Next select Disabled, Recurring or Non-recurring for Daylight Savings Time. Daylight saving is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening.
5. Click Apply to update the system settings.

Port Settings

Use this screen to view and configure Switch port settings. The Port Settings page allows you change the configuration of the ports on the Switch in order to find the best balance of speed and flow control according to your preferences. Configuring Gigabit ports require additional factors to be considered when arranging your preferences for the Switch compared to 10/100Mb ports.

To access the page, click **Port Settings** under the **System** menu.



Port Settings

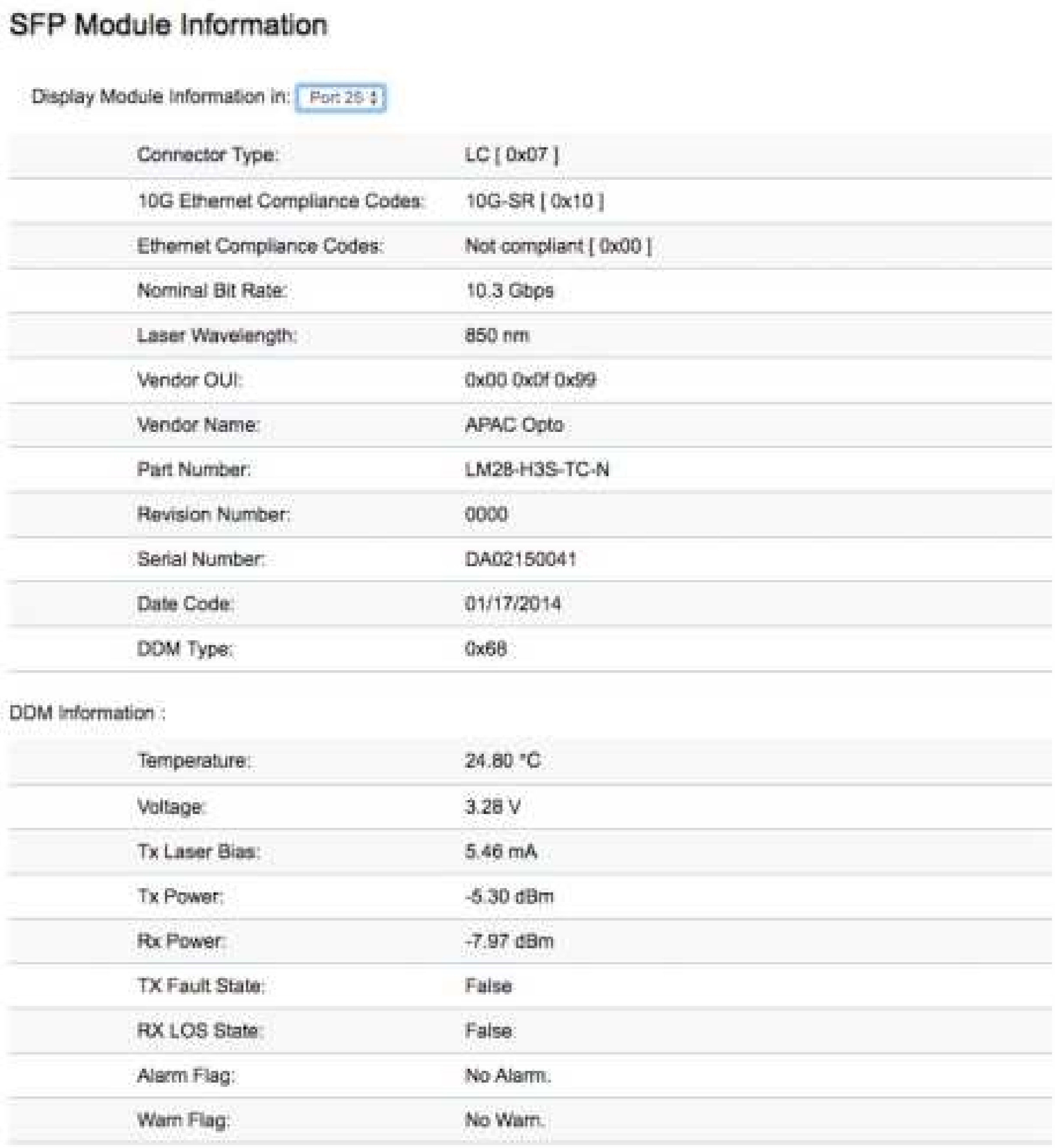
	Port	Link Status	Mode	Flow Control	Port Description
□			Auto	Disabled	
□	1	Link Up	Auto-1G/Full	Enabled	
□	2	Link Up	Auto-1G/Full	Enabled	
□	3	Link Down	Auto	Enabled	
□	4	Link Down	Auto	Enabled	
□	5	Link Down	Auto	Enabled	
□	6	Link Down	Auto	Enabled	
□	7	Link Down	Auto	Enabled	
□	8	Link Down	Auto	Enabled	
□	trunk1	Link Down	Auto	Enabled	
□	trunk2	Link Down	Auto	Enabled	
□	trunk3	Link Down	Auto	Enabled	
□	trunk4	Link Down	Auto	Enabled	
□	trunk5	Link Down	Auto	Enabled	
□	trunk6	Link Down	Auto	Enabled	
□	trunk7	Link Down	Auto	Enabled	
□	trunk8	Link Down	Auto	Enabled	

Port	Displays the port number.
Link Status	Indicates whether the link is up or down.
Mode	Select the speed and the duplex mode of the Ethernet connection on this port. Selecting Auto (auto-negotiation) allows one port to negotiate with a peer port automatically to obtain the connection speed and duplex mode that both ends support. When auto-negotiation is turned on, a port on the Switch negotiates with the peer automatically to determine the connection speed and duplex mode. If the peer port does not support auto-negotiation or turns off this feature, the Switch determines the connection speed by detecting the signal on the cable and using half duplex mode. When the Switch's auto-negotiation is turned off, a port uses the pre-configured speed and duplex mode when making a connection, thus requiring you to make sure that the settings of the peer port are the same in order to connect.
Flow Control	A concentration of traffic on a port decreases port bandwidth and overflows buffer memory causing packet discards and frame losses. Flow Control is used to regulate transmission of signals to match the bandwidth of the receiving port. The Switch uses IEEE 802.3x flow control in full duplex mode and backpressure flow control in half duplex mode. IEEE 802.3x flow control is used in full duplex mode to send a pause signal to the sending port, causing it to temporarily stop sending signals when the receiving port memory buffers fill. Back Pressure flow control is typically used in half duplex mode to send a "collision" signal to the sending port (mimicking a state of packet collision) causing the sending port to temporarily stop sending signals and resend later.
Port **Description**	For user’s convenience, user can have a description of this port by input text into this field.

Click **Apply** to save settings.

SFP Information

The SFP Information screen contains SFP Module status and basic information. To access the page, click SFP Information under the System menu.



SFP Module Information

Display Module Information in: Port 28

Connector Type:	LC [0x07]
10G Ethernet Compliance Codes:	10G-SR [0x10]
Ethernet Compliance Codes:	Not compliant [0x00]
Nominal Bit Rate:	10.3 Gbps
Laser Wavelength:	850 nm
Vendor OUI:	0x00 0x0f 0x99
Vendor Name:	APAC Opto
Part Number:	LM28-H3S-TC-N
Revision Number:	0000
Serial Number:	DA02150041
Date Code:	01/17/2014
DDM Type:	0x68

DDM Information :

Temperature:	24.80 °C
Voltage:	3.28 V
Tx Laser Bias:	5.46 mA
Tx Power:	-5.30 dBm
Rx Power:	-7.97 dBm
TX Fault State:	False
RX LOS State:	False
Alarm Flag:	No Alarm.
Warn Flag:	No Warn.

Port	The port number of SFP port to be displayed.

DHCP Snooping

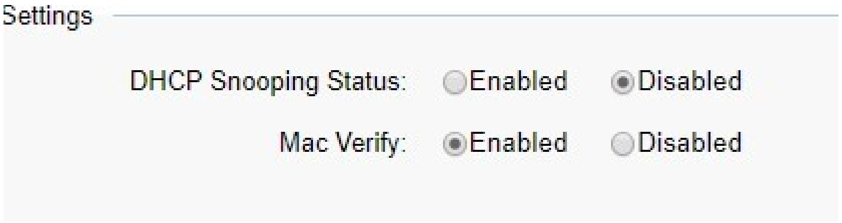
DHCP snooping is a DHCP security feature that provides security by filtering untrusted DHCP messages and by building and maintaining a DHCP snooping binding table. An untrusted message is a message that is received from outside the network or firewall and that can cause traffic attacks within your network.

The DHCP snooping binding table contains the MAC address, IP address, lease time, binding type, VLAN number, and interface information that corresponds to the local untrusted interfaces of a switch; it does not contain information regarding hosts interconnected with a trusted interface. An untrusted interface is an interface that is configured to receive messages from outside the network or firewall. A trusted interface is an interface that is configured to receive only messages from within the network.

DHCP snooping acts like a firewall between untrusted hosts and DHCP servers. It also gives you a way to differentiate between untrusted interfaces connected to the end-user and trusted interfaces connected to the DHCP server or another switch.

Global Settings

The global settings allow you to enable or disable DHCP snooping feature. You can also enable the MAC Verify at this page.



Settings

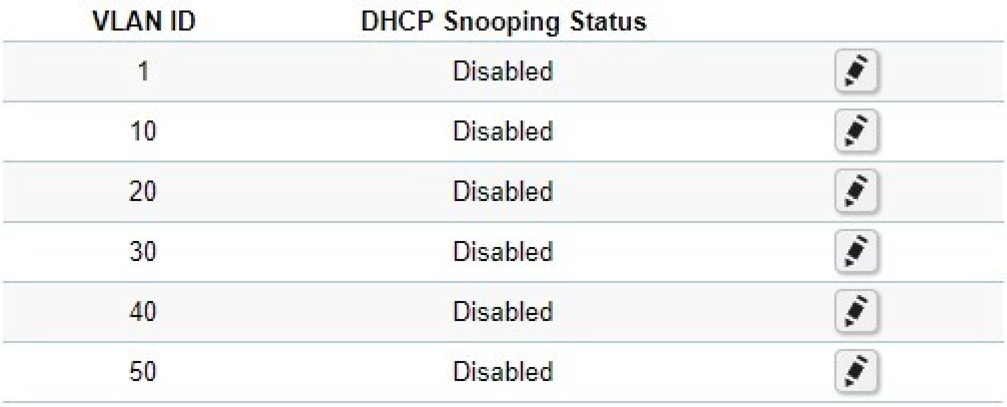
DHCP Snooping Status: ○Enabled ●Disabled

Mac Verify: ●Enabled ○Disabled

To access this page, click DHCP snooping under the System menu.

DHCP Snooping Status	Enable or Disable the DHCP snooping feature.
Mac Verify	Enable the MAC address verify or not.

VLAN Settings

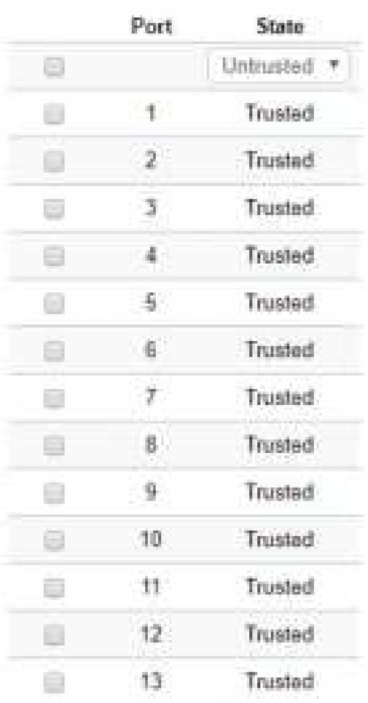


VLAN ID	DHCP Snooping Status	
1	Disabled	✎
10	Disabled	✎
20	Disabled	✎
30	Disabled	✎
40	Disabled	✎
50	Disabled	✎

VLAN ID	Specify the VLAN to have the DHCP Snooping function.
DHCP Snooping Status	Enable or Disable the DHCP snooping on the VLAN.

Trust Port Settings

Set the DCHP Server at trusted ports.



	Port	State
□		Untrusted ▾
□	1	Trusted
□	2	Trusted
□	3	Trusted
□	4	Trusted
□	5	Trusted
□	6	Trusted
□	7	Trusted
□	8	Trusted
□	9	Trusted
□	10	Trusted
□	11	Trusted
□	12	Trusted
□	13	Trusted

Port	Select the port as the DHCP server trusted port.
State	Set the port to be trust or un-trust port.

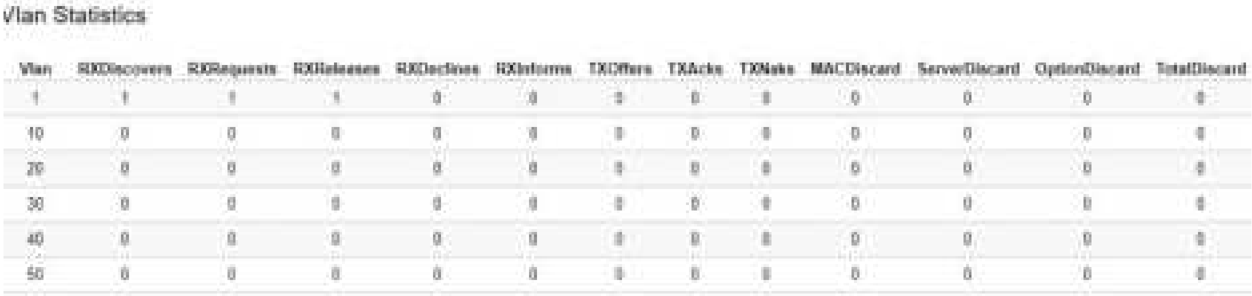
Binding list

Display the DHCP client information.

VID	Display the VLAN id of client information.
Port	Display the port number of client information.
MAC address	Display the MAC address of client information.
IP address	Display the IP address of client information.

VLAN Statistics

Display the DHCP snooping packet information on each VLAN



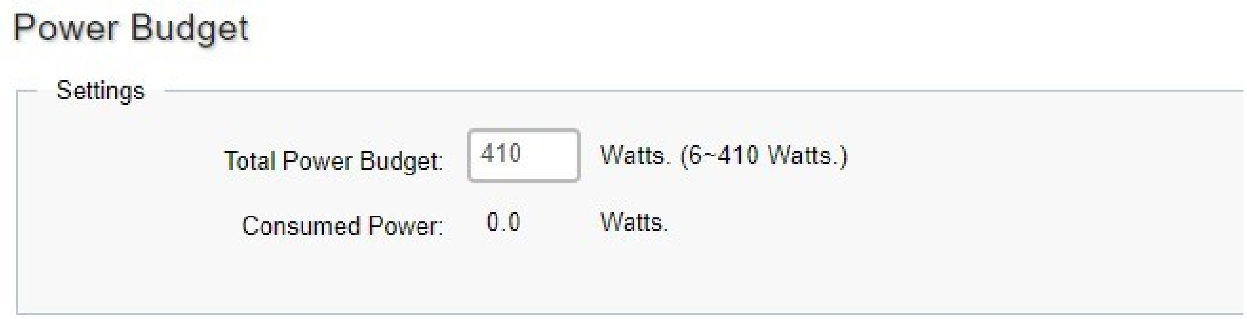
Vlan Statistics

Vlan	RXDiscovers	RXRequests	RXReleases	RXDeclines	RXInforms	TXOffers	TXAcks	TXNaks	MACDiscard	ServerDiscard	OptionDiscard	TotalDiscard
1	1	1	1	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0

PoE

The PoE management page contains PoE subsystem information for monitoring the current power usage and assigns the total amount of power the Switch can provide to all of its PoE ports. To access the page, click PoE under the System menu.

Power Budget



Power Budget

Settings

Total Power Budget: 410 Watts. (6~410 Watts.)

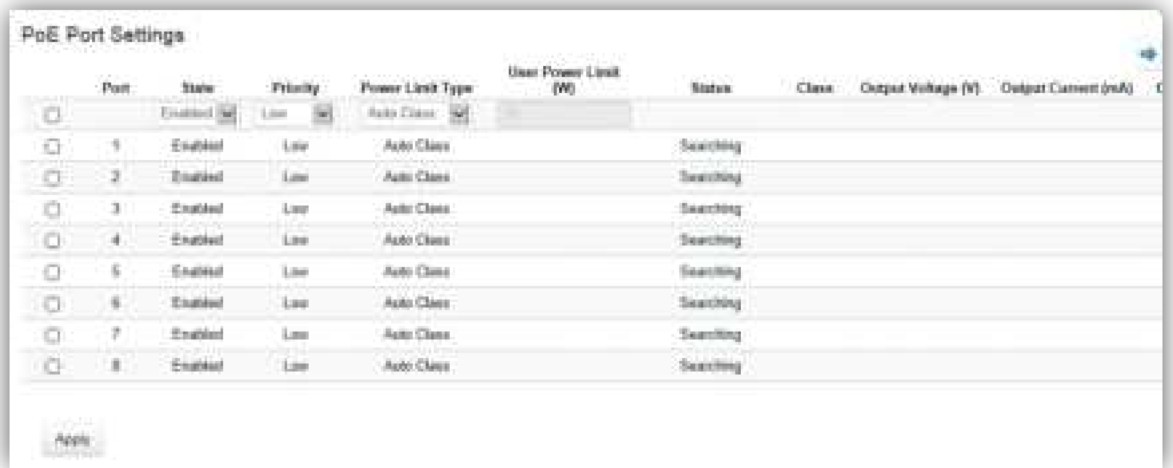
Consumed Power: 0.0 Watts.

Total Power Budget: Enter the amount of power the Switch can provide to all ports.

Consumed Power: Displays the total amount of power (in watts) currently being delivered to all PoE ports.

NOTE: *With different platform, the total power budget could be different.*

PoE Port Settings



PoE Port Settings

	Port	State	Priority	Power Limit Type	User Power Limit (W)	Status	Class	Output Voltage (V)	Output Current (mA)
☐		Enabled	Low	Auto Class					
☐	1	Enabled	Low	Auto Class		Searching			
☐	2	Enabled	Low	Auto Class		Searching			
☐	3	Enabled	Low	Auto Class		Searching			
☐	4	Enabled	Low	Auto Class		Searching			
☐	5	Enabled	Low	Auto Class		Searching			
☐	6	Enabled	Low	Auto Class		Searching			
☐	7	Enabled	Low	Auto Class		Searching			
☐	8	Enabled	Low	Auto Class		Searching			

Port	Displays the specific port for which PoE parameters are defined. PoE parameters are assigned to the powered device that is connected to the selected port.
State	Displays the active participating members of the trunk group.
Priority	Select the port priority if the power supply is low. The field default is Low. For example, if the power supply is running at 99% usage, and port 1 is prioritized as high, but port 6 is prioritized as low, port 1 is prioritized to receive power and port 6 may be denied power. **Low**: Sets the PoE priority level as low. **Medium:** Sets the PoE priority level as medium. **High**: Sets the PoE priority level as high. **Critical:** Sets the PoE priority level as critical.

Power Limit Type	Shows the classification of the powered device. The class defines the maximum power that can be provided to the powered device. The possible field values are: **Class 0:** The maximum power level at the Power Sourcing Equipment is 15.4 Watts. **Class 1:** The maximum power level at the Power Sourcing Equipment is 4.0 Watts. **Class 2:** The maximum power level at the Power Sourcing Equipment is 7.0 Watts. **Class 3:** The maximum power level at the Power Sourcing Equipment is 15.4 Watts. **Class 4**: The maximum power level at the Power Sourcing Equipment is 30 Watts.
Class (User	Select this option to base the power limit on the value configured in the User
Defined)	Power Limit field.
User Power Limit	Set the maximum amount of power that can be delivered by a port. **Note**: The User Power Limit can only be implemented when the Class value is set to User-Defined.
Status	Shows the port's PoE status. The possible field values are: **Delivering Power:** The device is enabled to deliver power via the port. **Disabled:** The device is disabled for delivering power via the port. **Test Fail:** The powered device test has failed. For example, a port could not be enabled and cannot be used to deliver power to the powered device. **Testing:** The powered device is being tested. For example, a powered device is tested to confirm it is receiving power from the power supply. **Searching:** The device is currently searching for a powered device. Searching is the default PoE operational status. **Fault:** The device has detected a fault on the powered device when the port is forced on. For example, the power supply voltage is out of range, a short occurs, a communication or there is a communication error with PoE devices, or an unknown error occurs.

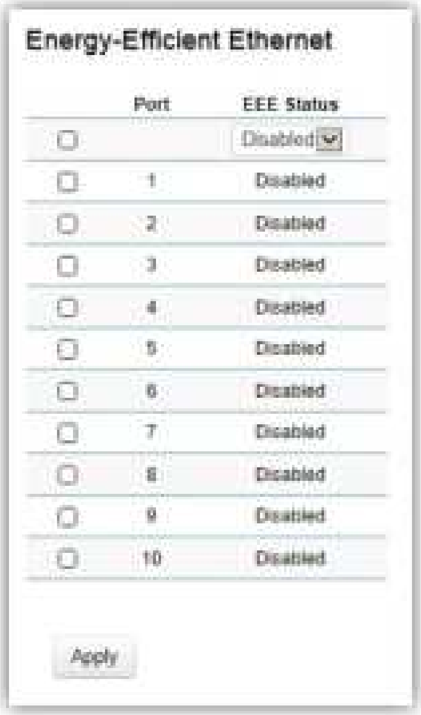
Click **Apply** to save settings.

EEE

Energy Efficient Ethernet (EEE), an Institute of Electrical and Electronics Engineers (IEEE) 802.3az standard, reduces the power consumption of physical layer devices during periods of low link utilization. EEE saves energy by allowing PHY non-essential circuits shut down when there is no traffic.

Network administrators have long focused on the energy efficiency of their infrastructure, and the EnGenius Layer 2 Switch complies with the IEEE's Energy-Efficient Ethernet (EEE) standard. The EEE compliant Switch offers users the ability to utilize power that Ethernet links use only during data transmission. Lower Power Idle (LPI) is the method for achieving the power saving during Ethernet ideal time.

Use the **EEE** configuration page to configure Energy Efficient Ethernet.



Energy-Efficient Ethernet

	Port	EEE Status
□		Disabled ▾
□	1	Disabled
□	2	Disabled
□	3	Disabled
□	4	Disabled
□	5	Disabled
□	6	Disabled
□	7	Disabled
□	8	Disabled
□	9	Disabled
□	10	Disabled

Port	Display the port for which the EEE setting is displayed.
EEE Status	Enable or disable EEE for the specified port.

Click **Apply** to save settings.

L2 Feature

The L2 Feature tab exhibits complete standard-based Layer 2 switching capabilities, including: Link Aggregation, 802.1D Spanning Tree Protocol, 802.1w Rapid Spanning Tree Protocol, 802.1s Multiple Spanning Tree Protocol, MAC Address Table, Internet Group Management Protocol (IGMP) Snooping, Port Mirroring, 802.1ab Link Layer Discovery Protocol (LLDP), and Multicast Listener Discovery (MLD) snooping. Utilize these features to configure the Switch to your preferences.

Link Aggregation

A Link Aggregation Group (LAG) optimizes port usage by linking a group of ports together to form a single, logical, higher-bandwidth link. Aggregating ports multiplies the bandwidth and increases port flexibility for the Switch. Link Aggregation is most commonly used to link a bandwidth intensive network device (or devices), such as a server, to the backbone of a network.

The participating ports are called Members of a port trunk group. Since all ports of the trunk group must be configured to operate in the same manner, the configuration of the one port of the trunk group is applied to all ports of the trunk group. Thus, you will only need to configure one of any of the ports in a trunk group. A specific data communication packet will always be transmitted over the same port in a trunk group. This ensures the delivery of individual frames of a data communication packet will be received in the correct order. The traffic load of the LAG will be balanced among the ports according to Aggregate Arithmetic. If the connections of one or several ports are broken, the traffic of these ports will be transmitted on the normal ports, so as to guarantee the connection reliability.

When you aggregate ports, the ports and LAG must fulfill the following conditions:

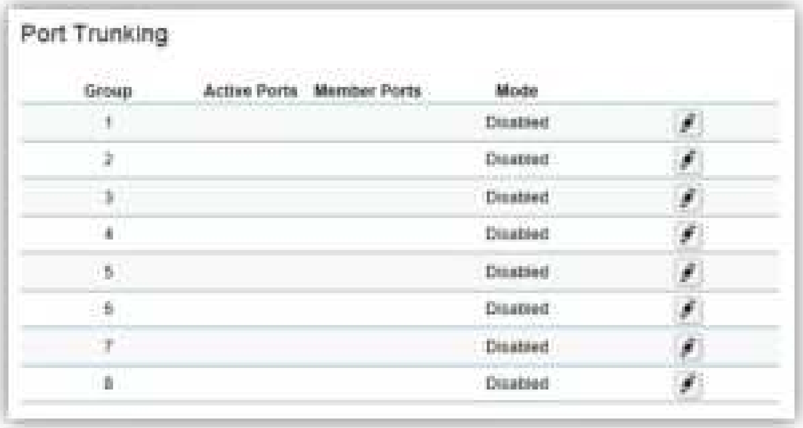
- All ports within a LAG must be the same media/format type.
- A VLAN is not configured on the port.
- The port is not assigned to another LAG.
- The Auto-negotiation mode is not configured on the port.
- The port is in full-duplex mode.
- All ports in the LAG have the same ingress filtering and tagged modes.
- All ports in the LAG have the same back pressure and flow control modes.
- All ports in the LAG have the same priority.
- All ports in the LAG have the same transceiver type.
- Ports can be configured as LACP ports only if the ports are not part of a previously configured LAG.

LACP is a dynamic protocol which helps to automate the configuration and maintenance of LAG's. The main purpose of LACP is to automatically configure individual links to an aggregate bundle, while adding new links and helping to recover from link failures if the need arises. LACP can monitor to verify if all the links are connected to the authorized group. LACP is a standard in computer networking; hence LACP should be enabled on the Switch's trunk ports initially in order for both the participating Switches/devices that support the standard to use it.

Port Trunking

Port Trunking allows you to assign physical links to one logical link that functions as a single, higher-speed link, providing dramatically increased bandwidth. Use Port Trunking to bundle multiple connections and use the combined bandwidth as if it were a single larger pipe.

Important: *You must enable Trunk Mode before you can add a port to a trunk group.*



Port Trunking

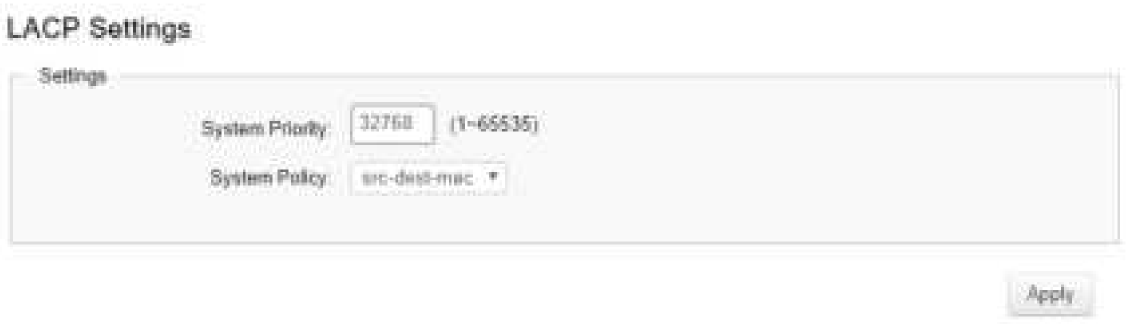
Group	Active Ports	Member Ports	Mode	
1			Disabled	✎
2			Disabled	✎
3			Disabled	✎
4			Disabled	✎
5			Disabled	✎
6			Disabled	✎
7			Disabled	✎
8			Disabled	✎

Group	Displays the number of the given trunk group. You can utilize up to 8 link aggregation groups and each group consisting up to 8 ports on the Switch.
Active Ports	Displays the active participating members of the trunk group.
Member Port	Select the ports you wish to add into the trunk group. Up to eight ports per group can be assigned. **Static:** The Link Aggregation is configured manually for specified trunk group. **LACP:** The Link Aggregation is configured dynamically for specified trunk group.
Mode	LACP allows for the automatic detection of links in a port trunking group when connected to a LACP-compliant Switch. You will need to ensure that both the Switch and device connected to are in the same mode in order for them to function, otherwise they will not work. Static configuration is used when connecting to a Switch that does not support LACP.

Click the **Apply** button ☑ to accept the changes or the **Cancel** button ⊗ to discard them.

LACP Settings

Assign a system priority to run with Link Aggregation Control Protocol (LACP) and is become for a backup link if a link goes down. The lowest system priority is allowed to make decisions about which ports it is actively participating in in case a link goes down. If two or more ports have the same LACP port priority, the port with the lowest physical port number will be selected as the backup port. If a LAG already exists with the maximum number of allowed port members, and LACP is subsequently enabled on another port using a higher priority than an existing member, the newly configured port will replace the existing port member that has a lower priority. A smaller number indicates a higher priority level. The range is from 0-65535 and default is: **32768**.



LACP Settings

Settings

System Priority: 32768 (1~65535)

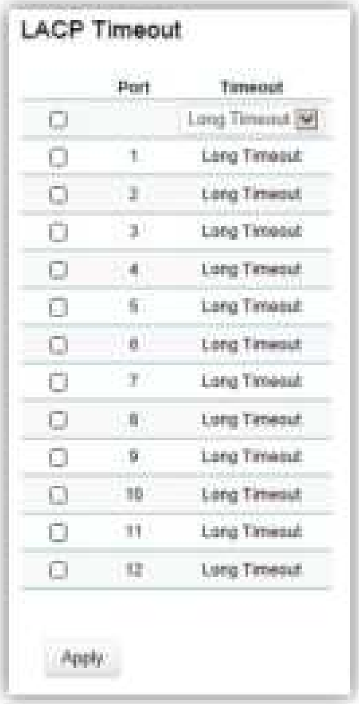
System Policy: src-dest-mac

System Priority	Enter the LACP priority value to the system. The default is 32768 and the range is from 1 to 65535.
System Policy	Select trunk load balance policy to the system. The default is src-dest-mac.

Click **Apply** to save settings.

LACP Timeout

Link Aggregation Control Protocol (LACP) allows the exchange of information with regard to the link aggregation between two members of aggregation. The LACP Time Out value is measured in a periodic interval. Check first whether the port in the trunk group is up. When the interval expires, it will be removed from the trunk. Set a Short Timeout (one second) for busy trunked links to ensure that disabled ports are removed from the trunk group as soon as possible. The default value for LACP time out is: **Long Timeout.**



LACP Timeout

	Port	Timeout
□		Long Timeout ▾
□	1	Long Timeout
□	2	Long Timeout
□	3	Long Timeout
□	4	Long Timeout
□	5	Long Timeout
□	6	Long Timeout
□	7	Long Timeout
□	8	Long Timeout
□	9	Long Timeout
□	10	Long Timeout
□	11	Long Timeout
□	12	Long Timeout

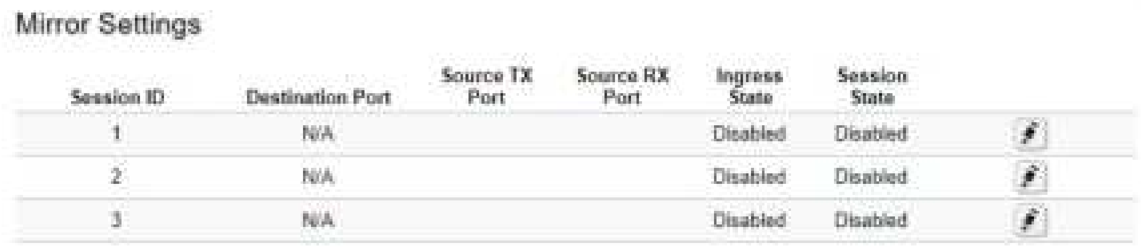
Timeout	Select the administrative LACP timeout. **Long Timeout:** The LACP PDU will be sent for every 30 seconds, and the LACP timeout value is 90 seconds.
	Short Timeout: The LACP PDU will be sent every second. The timeout value is 3 seconds.

Click **Apply** to save settings.

Mirror Settings

Mirrors network traffic by forwarding copies of incoming and outgoing packets from specific ports to a monitoring port. The packet that is copied to the monitoring port will be the same format as the original packet.

Port mirroring is useful for network monitoring and can be used as a diagnostic tool. Use port mirroring to send traffic to applications that analyze traffic for purposes such as monitoring compliance, detecting intrusions, monitoring and predicting traffic patterns, and other correlating events. Port Mirroring is needed for traffic analysis on a Switch because a Switch normally sends packets only to the port to which the destination device is connected. The analyzer captures and evaluates the data without affecting the client on the original port. Port mirroring can consume significant CPU resources while active, so be cautious of such usage when configuring the Switch.



Mirror Settings

Session ID	Destination Port	Source TX Port	Source RX Port	Ingress State	Session State	
1	N/A			Disabled	Disabled	✎
2	N/A			Disabled	Disabled	✎
3	N/A			Disabled	Disabled	✎

Session ID	A number identifying the mirror session. This Switch only supports up to 4 mirror sessions.
Destination Port	Select the port for traffic purposes from source ports mirrored to this port.
Source TX/RX Port	Sets the source port from which traffic will be mirrored. **TX Port:** Only frames transmitted from this port are mirrored to the destination port. **RX Port:** Only frames received on this port are mirrored to the destination port. **Both:** Frames received and transmitted on this port are mirrored to the specified destination port. **None:** Disables mirroring for this port.
Ingress State	Select whether to enable or disable ingress traffic forwarding.
Session State	Select whether to enable or disable port mirroring.

Note: *You cannot mirror a faster port onto a slower port. For example, if you try to mirror the traffic from a 100Mbps port onto a 10Mbps port, this can cause throughput problems. The port you are copying frames from should always support an equal or lower speed than the port to which you are sending the copies. Please note a target port and a source port cannot be the same port.*

Click the button ✎ to modify specific mirror entry.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

STP

The Spanning Tree Algorithm (STA) can be used to detect and disable network loops, and to provide backup links between Switches. This allows the Switch to interact with other bridging devices in your network to ensure that only one route exists between any two stations on the network and provide backup links which automatically take over when a primary link goes down.

STP provides a tree topology for the Switch. There are different types of Spanning tree versions, including Multiple Spanning Tree Protocol (MSTP) IEEE 802.1w, and Rapid Spanning Tree Protocol (RSTP) IEEE 802.1s. Please note that only one spanning tree protocol can be activated on the Switch at a time.

Global Settings

Spanning Tree Protocol (STP) is a Layer 2 protocol that runs on Switches. Spanning Tree Protocol (STP) allows you to ensure that you do not create loops when you have redundant paths in the network. STP provides a single active path between two devices on a network in order to prevent loops from being formed when the Switch is interconnected via multiple paths.

STP uses a distributed algorithm to select a bridging device that serves as the root for the spanning tree network. By selecting a root port on each bridging device, it can incur the lowest path cost when forwarding a packet from that device to the root device. It then selects a designated bridging device from each LAN which incurs the lowest path cost when forwarding a packet from that LAN to the root device. Next, all ports connected to designated bridging devices are assigned as designated ports. After determining the lowest cost spanning tree, it enables all root ports and designated ports, disabling all other ports. Network packets are therefore only forwarded between root ports and designated ports, eliminating any possible network loops. STP provides a single active path between two devices on a network in order to prevent loops from being formed when the Switch is interconnected via multiple paths.

Once a stable network topology has been established, all bridges listen for Hello Bridge Protocol Data

Units (BPDUs) transmitted from the Root Bridge of the Spanning Tree. If a bridge does not receive a Hello BPDU after a predefined interval (known as the Maximum Age), the bridge will assume that the link to the Root Bridge is down and unavailable. This bridge then initiates negotiations with other bridges to reconfigure the network to reestablish a valid network topology.

Loops occur when alternate routes exist between hosts. Loops in an extended network can cause the Switch to forward traffic indefinitely, resulting in increased traffic and reducing network efficiency. Once the STP is enabled and configured, primary links are established and duplicated links are blocked automatically. The reactivation of the blocked links is also accomplished automatically.

STP provides a tree topology and other Spanning tree versions supported include STP, Multiple Spanning Tree Protocol (MSTP), and Rapid Spanning Tree Protocol (RSTP). Please note that only one spanning tree can be active on the Switch at a time. The default setting is: MSTP.

The Common Instance Spanning Tree (CIST) protocol is formed by the spanning tree algorithm running among bridges that support the IEEE 802.1w, IEEE 802.1s, and IEEE 802.1D standard. A Common and Internal Spanning Tree (CIST) represents the connectivity of the entire network and it is equivalent to a spanning tree in an STP/RSTP.

The CIST inside a Multiple Spanning Tree Instance (MST) region is the same as the CST outside a region. All regions are bound together using a CIST, which is responsible for creating loop-free topology across regions, whereas the MSTI controls topology inside regions. CST instances allow different regions to communicate between themselves. CST is also used for traffic within the region for any VLANs not covered by a MSTI. In an MSTP-enabled network, there is only one CIST that runs between MST regions and single spanning tree devices. A network may contain multiple MST regions and other network segments running RSTP. Multiple regions and other STP bridges are interconnected using a single CST.

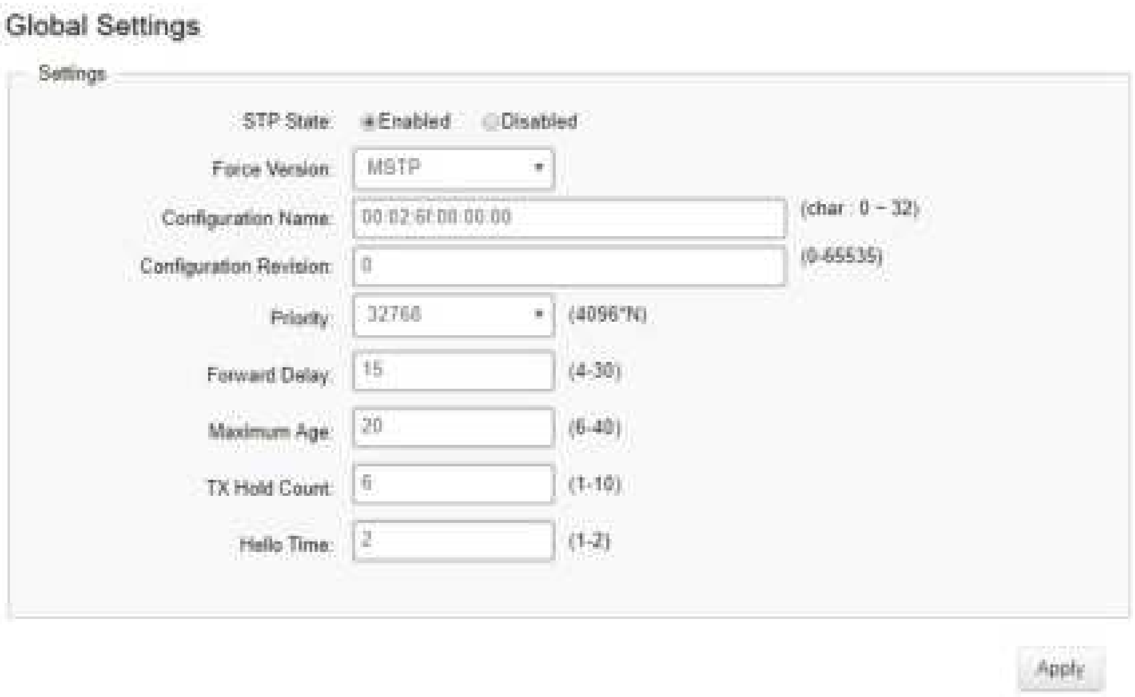
Multiple Spanning Tree Protocol (MSTP) defined in IEEE 802.1s, enables multiple VLANs to be mapped to reduce the number of spanning-tree instances needed to support a large number of VLANs. If there is only one VLAN in the network, a single STP works appropriately.

If the network contains more than one VLAN however, the logical network configured by a single STP would work, but it becomes more efficient to use the alternate paths available by using an alternate spanning tree for different VLANs or groups of VLANs. MSTP (which is based on RSTP for fast convergence) is designed to support independent spanning trees based on VLAN groups. MSTP provides multiple forwarding paths for data traffic and enables load balancing.

STP and RSTP prevent loops from forming by ensuring that only one path exists between the end nodes in your network. RSTP is designed as a general replacement for the slower, legacy STP. RSTP is also incorporated into MSTP. With STP, convergence can take up to a minute to complete in a larger network. This can result in the loss of communication between various parts of the network during the convergence process so STP can subsequently lose data packets during transmission.

RSTP on the other hand is much faster than STP. It can complete a convergence in seconds, so it greatly diminishes the possible impact the process can have on your network compared to STP. RSTP reduces the number of state changes before active ports start learning, predefining an alternate route that can be used when a node or port fails and retain the forwarding database for ports insensitive to changes in the tree structure when reconfiguration occurs.

Select whether to Enable or Disable the Spanning Tree function for the Switch. Next, select whether you wish to enable STP, RSTP, or MSTP. Again, please note that only one Spanning tree function can be active at a time.



Global Settings

Settings

STP State: ● Enabled ○ Disabled

Force Version: MSTP

Configuration Name: 00:02:6f:00:00:00 (char : 0 – 32)

Configuration Revision: 0 (0-65535)

Priority: 32768 (4096*N)

Forward Delay: 15 (4-30)

Maximum Age: 20 (6-40)

TX Hold Count: 6 (1-10)

Hello Time: 2 (1-2)

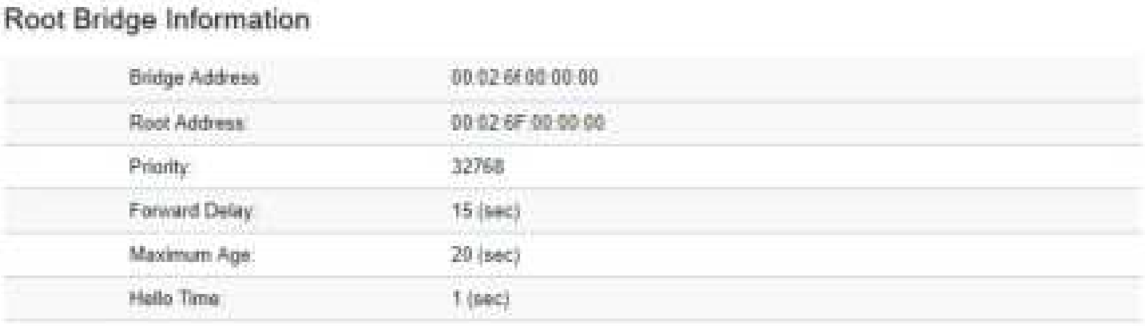
STP State	Select enable or disable the spanning tree operation on the Switch.
Force Version	Select the Force Protocol Version parameter for the Switch. **RSTP (Rapid Spanning Tree Protocol):** IEEE 802.1w **MSTP (Multiple Spanning Tree Protocol):** IEEE 802.1s
Configuration Name	For the switch within the same MST region, must have the same MST configuration name and configuration revision.
Configuration Revision	For the switch within the same MST region, must have the same MST configuration name and configuration revision.
Priority	Displays the priority for the bridge. When switches are running STP, each is assigned a priority. After exchanging BPDUs, the Switch with the lowest priority value becomes the root bridge.
Forward Delay	Displays the Switch Forward Delay Time. This is the time (in seconds) the root switch will wait before changing states (called listening to learning).
Maximum Age	Displays the bridge Switch Maximum Age Time. This is the amount of time a bridge waits before sending a configuration message. The default is 20 seconds.

Hello Time	Displays the Switch Hello Time. This is the amount of time a bridge remains in a listening and learning state before forwarding packets. The default is 15 seconds.

Click **Apply** to save settings.

The Root Bridge serves as an administrative point for all Spanning Tree calculations to determine which redundant links to block in order to prevent network loops. From here, you can view all the information regarding the Root Bridge within the STP.

All other decisions in a spanning tree network, such as ports being blocked and ports being put in a forwarding mode, are made regarding a root bridge. The root bridge is the “root” of the constructed “tree” within a spanning tree network. Thus, the root bridge is the bridge with the lowest bridge ID in the spanning tree network. The bridge ID includes two parts; the bridge priority (2 bytes) and the bridge MAC address (6 bytes). The 802.1d default bridge priority is: 32768. STP devices exchange Bridge Protocol Data Units (BPDUs) periodically. All bridges “listen” for Hello BPDUs (Bridge Protocol Data Units) transmitted from the root bridge. If a bridge does not get a Hello BPDU after a predefined interval (called the Maximum Age), the bridge assumes that the link to the root bridge is down. The bridge then initiates negotiations with other bridges to reconfigure the network to re-establish a valid network topology.



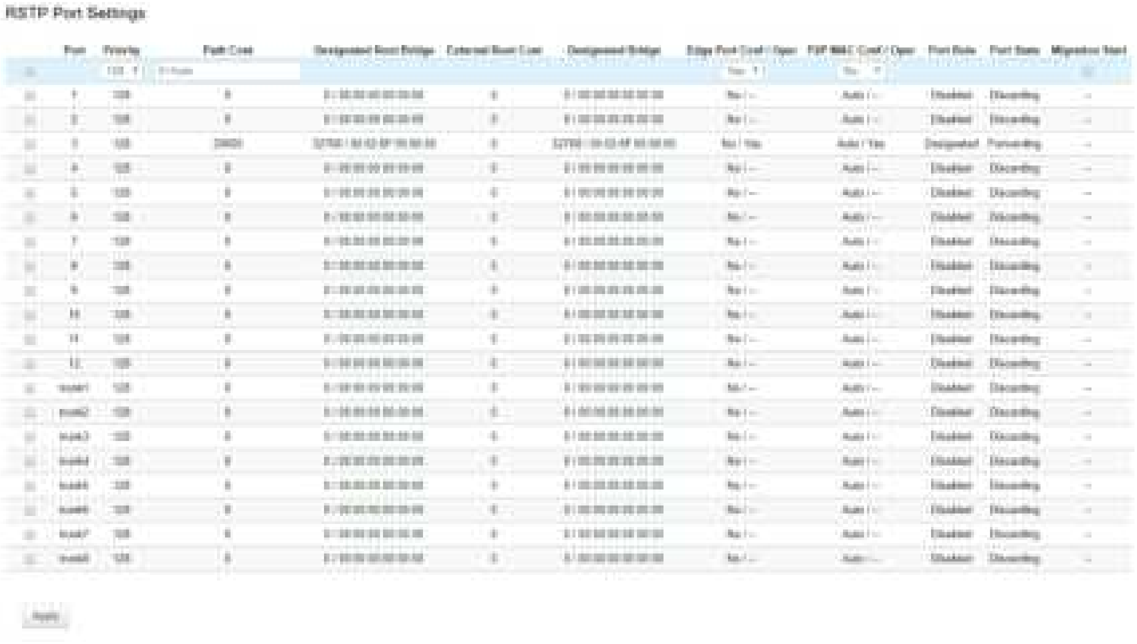
Root Bridge Information

Bridge Address:	00:02:6f:00:00:00
Root Address:	00:02:6F:00:00:00
Priority:	32768
Forward Delay:	15 (sec)
Maximum Age:	20 (sec)
Hello Time:	1 (sec)

Bridge Address	Displays the local bridge MAC address. It will be MAC address of switch.
Root Address	Displays the root bridge MAC address. Root in root bridge refers to the base of the spanning tree, which the Switch could be configured for.
Priority	Displays the priority for the bridge. When switches are running STP, each is assigned a priority. After exchanging BPDUs, the Switch with the lowest priority value becomes the root bridge.
Forward Delay	Displays the Switch Forward Delay Time. This is the time (in seconds) the root switch will wait before changing states (called listening to learning).
Maximum Age	Displays the bridge Switch Maximum Age Time. This is the amount of time a bridge waits before sending a configuration message. The default is 20 seconds.
Hello Time	Displays the Switch Hello Time. This is the amount of time a bridge remains in a listening and learning state before forwarding packets. The default is 15 seconds.

RSTP Port Settings

Use the RSTP Ports Settings page to configure and view STA attributes for interfaces when the spanning tree mode is set to RSTP. You may use a different priority or path cost for ports of the same media type to indicate a preferred path or edge port to indicate if the attached device can support fast forwarding or link type to indicate a point-to-point connection or shared-media connection.



RSTP Port Settings

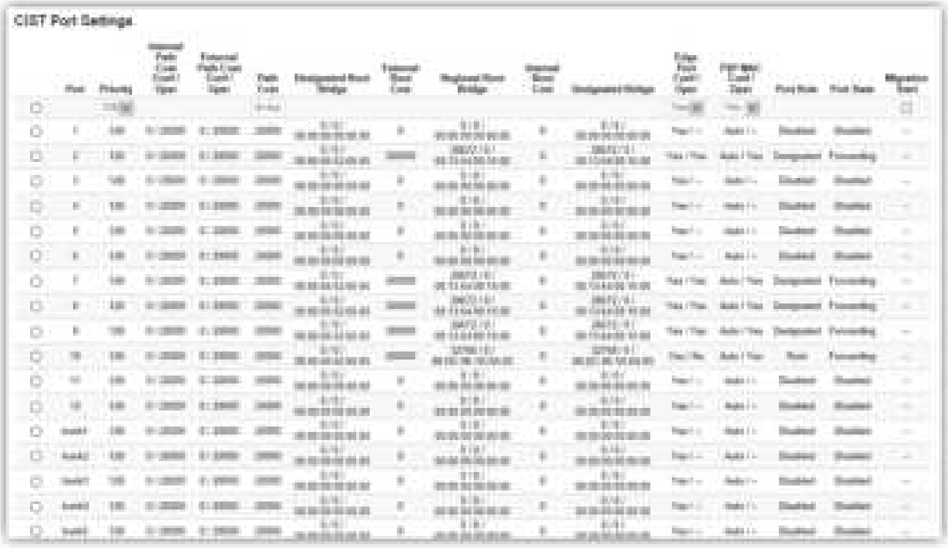
	Port	Priority	Path Cost	Designated Root Bridge	External Root Cost	Designated Bridge	Edge Port Conf / Oper	P2P MAC Conf / Oper	Port Role	Port State	Migration Start
□		128	[illegible]				Yes	No			□
□	1	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	2	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	3	128	20000	[illegible]	0	[illegible]	No / Yes	Auto / Yes	Designated	Forwarding	--
□	4	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	5	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	6	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	7	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	8	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	9	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	10	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	11	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	12	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk1	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk2	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk3	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk4	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk5	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk6	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk7	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--
□	trunk8	128	0	[illegible]	0	[illegible]	No / --	Auto / --	Disabled	Discarding	--

Port	Port or trunked port identifier.
Priority	Defines the priority used for this port in the Spanning Tree Algorithm. If the path cost for all ports on a Switch are the same, the port with the highest priority (i.e., lowest value) will be configured as an active link in the Spanning Tree. This makes a port with higher priority less likely to be blocked if the Spanning Tree Algorithm is detecting network loops. When more than one port is assigned the highest priority, the port with lowest numeric identifier will be enabled. The range is from 0 to 240, in steps of 16; and the default is: 128.
Path Cost	The Internal Path Cost setting allows you to specify the relative cost of sending spanning tree traffic through the interface to adjacent bridges within a spanning tree region.
Designated Root Bridge	Displays the root bridge. It is comprised using the bridge priority and the base MAC address of the bridge.
External Root Cost	External root cost is the cost to the root.
Edge Port Conf/Oper	Displays the edge port state.
P2P MAC Conf/Oper	Modify link type to point-to-point or a shared LAN.
Designated Bridge	This is the bridge identifier of the bridge of the designated port. It is made up using the bridge priority and the base MAC address of the bridge.
Port Role	Each bridge port that is enabled is assigned a port role within each spanning tree. The port role will be one of the following values: Root Port, Designated Port, Alternate Port, Backup Port, Master Port, or Disabled.
Port State	The forwarding state of this port. The state parameters are: Discarding, Learning, Forwarding, or Disabled.
Migration Start	When STP migrate between different protocol, basically device will keep (or lock) the using protocol for a while to avoid flapping or toggling.

Click **Apply** to update the system settings.

CIST Port Settings

Use the CIST Ports Settings page to configure and view STA attributes for interfaces when the spanning tree mode is set to MSTP. You may use a different priority or path cost for ports of the same media type to indicate a preferred path or edge port to indicate if the attached device can support fast forwarding or link type to indicate a point-to-point connection or shared-media connection.



CIST Port Settings

Port	Port or trunked port identifier.
Priority	Defines the priority used for this port in the Spanning Tree Algorithm. If the path costs for all ports on a Switch are the same, the port with the highest priority (i.e., lowest value) will be configured as an active link in the Spanning Tree. This makes a port with higher priority less likely to be blocked if the Spanning Tree Algorithm is detecting network loops. When more than one port is assigned the highest priority, the port with lowest numeric identifier will be enabled. The range is from 0 to 240, in steps of 16; and the default is: 128.
Path Cost	The Internal Path Cost setting allows you to specify the relative cost of sending spanning tree traffic through the interface to adjacent bridges within a spanning tree region.
Designated Root Bridge	Displays the root bridge for the CST. It is comprised using the bridge priority and the base MAC address of the bridge.
External Root Cost	External root cost is the cost to the CIST root.
Regional Root Bridge	This is the bridge identifier of the CST regional root. It is made up using the bridge priority and the base MAC address of the bridge.
Designated Bridge	This is the bridge identifier of the bridge of the designated port. It is made up using the bridge priority and the base MAC address of the bridge.
Edge Port Conf/Oper	Displays the edge port state.
P2P MAC Conf/Oper	Modify link type to point-to-point or a shared LAN.
Port Role	Each MST bridge port that is enabled is assigned a port role within each spanning tree. The port role will be one of the following values: Root Port, Designated Port, Alternate Port, Backup Port, Master Port, or Disabled.
Port State	The forwarding state of this port. The state parameters are: Discarding, Learning, Forwarding, or Disabled.
Migration Start	When STP migrate between different protocol, basically device will keep (or lock) the using protocol for a while to avoid flapping or toggling.

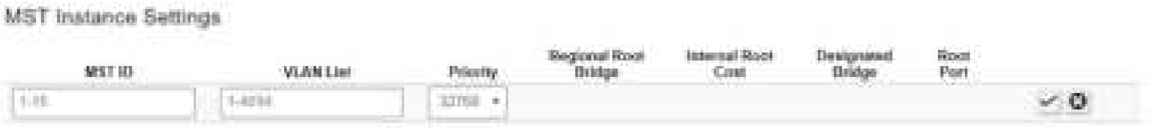
Click **Apply** to update the system settings.

MST Instance Settings

Multiple Spanning Tree Protocol (MSTP) enables the grouping of multiple VLANs with the same topology requirements into one Multiple Spanning Tree Instance (MSTI). MSTP then builds an Internal Spanning Tree (IST) for the region containing commonly configured MSTP bridges. Instances are not supported in STP or RSTP. Instead, they have the same spanning tree in common within the VLAN. MSTP provides the capability to logically divide a Layer 2 network into regions. Every region can contain multiple instances of spanning trees. In MSTP, all of the interconnected bridges that have the same MSTP configuration comprise an MST region.

A Common Spanning Tree (CST) interconnects all adjacent MST regions and acts as a virtual bridge node for communications between STP or RSTP nodes in the global network. MSTP connects all bridges and LAN segments with a single Common and Internal Spanning Tree (CIST). The CIST is formed as a result of the running spanning tree algorithm between switches that support STP, RSTP, and MSTP protocols. Once you specify the VLANs you wish to include in a Multiple Spanning Tree Instance (MSTI), the protocol will automatically build an MSTI tree to maintain connectivity among each of the VLANs. MSTP maintains contact with the global network because each instance is treated as an RSTP node in the Common Spanning Tree (CST).

Click the **Edit** button to configure the MST settings. Next, enter information for the VLAN List and choose the priority you wish to use from the drop-down list.



MST Instance Settings

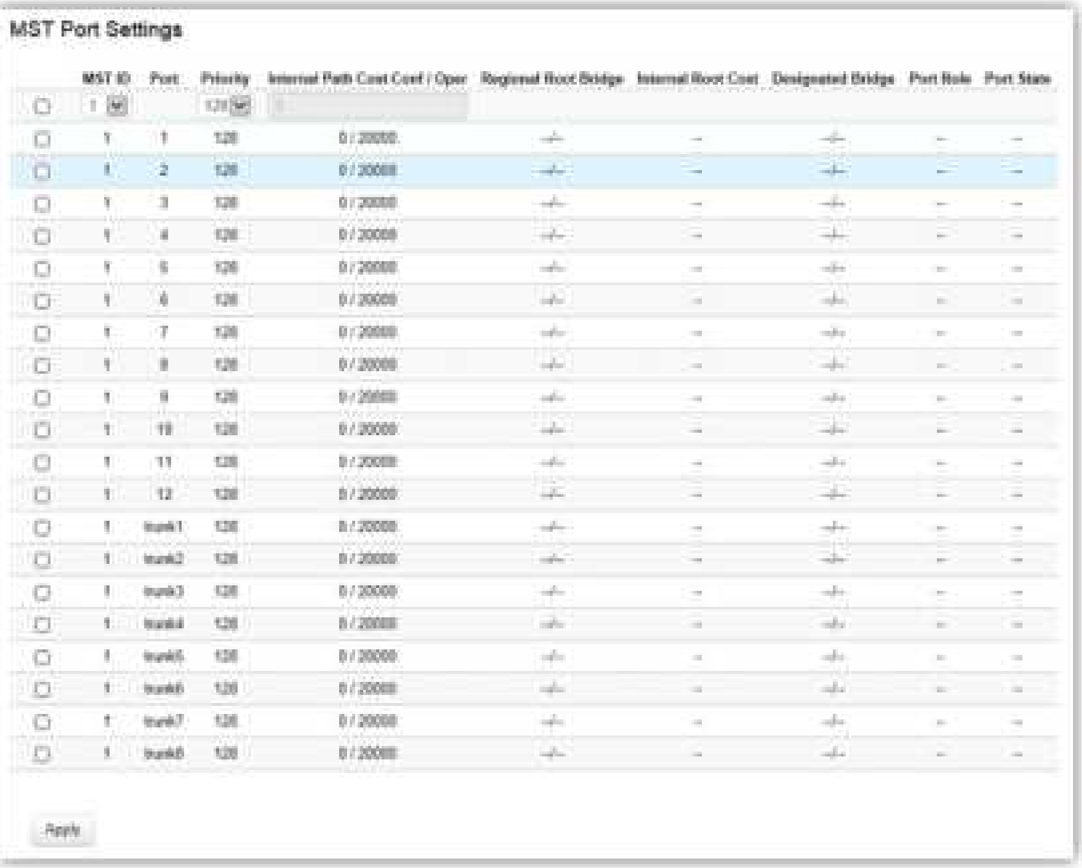
MST ID	VLAN List	Priority	Regional Root Bridge	Internal Root Cost	Designated Bridge	Root Port	
1-15	1-4094	32768 ▾					✓ ⊗

MST ID	Displays the ID of the MST group that is created. A maximum of 15 groups can be set for the Switch.
VLAN List	Enter the VLAN ID range from for the configured VLANs to associate with the MST ID. The VLAN ID number range is from 1 to 4094.
Priority	Select the bridge priority value for the MST. When Switches or bridges are running STP, each is assigned a priority. After exchanging BPDUs, the Switch with the lowest priority value becomes the root bridge. The default value is: 32768. The range is from 0 to 61440. The bridge priority is a multiple of 4096.
Regional Root Bridge	This is the bridge identifier of the CST regional root. It is made up using the bridge priority and the base MAC address of the bridge.
Internal Root Cost	Displays the path cost to the designated root for the MST instance.
Designated Bridge	Displays the bridge identifier of the bridge with the designated port. It is made up using the bridge priority and the base MAC address of the bridge.
Root Port	Displays the port that accesses the designated root for MST instance.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

MST Port Settings

This page displays the current MSTI configuration information for the Switch. From here you can update the port configuration for an MSTI ID. If a loop occurs, the MSTP function will use the port priority to select an interface to put into the forwarding state. Set a higher priority value for ports you wish to be selected for forwarding first. In instances where the priority value is identical, the MSTP function will implement the lowest MAC address into the forwarding state and other interfaces will be blocked. Note that a lower priority values mean higher priorities for forwarding packets.



MST Port Settings

	MST ID	Port	Priority	Internal Path Cost Conf / Oper	Regional Root Bridge	Internal Root Cost	Designated Bridge	Port Role	Port State
□	1		128						
□	1	1	128	0 / 20000	-:-	-	-:-	-	-
□	1	2	128	0 / 20000	-:-	-	-:-	-	-
□	1	3	128	0 / 20000	-:-	-	-:-	-	-
□	1	4	128	0 / 20000	-:-	-	-:-	-	-
□	1	5	128	0 / 20000	-:-	-	-:-	-	-
□	1	6	128	0 / 20000	-:-	-	-:-	-	-
□	1	7	128	0 / 20000	-:-	-	-:-	-	-
□	1	8	128	0 / 20000	-:-	-	-:-	-	-
□	1	9	128	0 / 20000	-:-	-	-:-	-	-
□	1	10	128	0 / 20000	-:-	-	-:-	-	-
□	1	11	128	0 / 20000	-:-	-	-:-	-	-
□	1	12	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk1	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk2	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk3	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk4	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk5	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk6	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk7	128	0 / 20000	-:-	-	-:-	-	-
□	1	trunk8	128	0 / 20000	-:-	-	-:-	-	-

Apply

MST ID	Displays the ID of the MST group that is created. A maximum of 15 groups can be set for the Switch.
Port	Displays port or trunked port ID.
Priority	Select the bridge priority value for the MST. When switches or bridges are running STP, each is assigned a priority. After exchanging BPDUs, the Switch with the lowest priority value becomes the root bridge. The bridge priority is a multiple of 4096. If you specify a priority that is not a multiple of 4096, the priority is automatically set to the next lowest priority that is a multiple of 4096. For example, if you set the priority to any value from 0 through 4095, the priority is set to 0. The default priority is: 32768. The valid range is from 0 to 61440.
Internal Path Cost Conf	The Internal Path Cost setting allows you to specify the relative cost of sending spanning tree traffic through the interface to adjacent bridges within a spanning tree region.

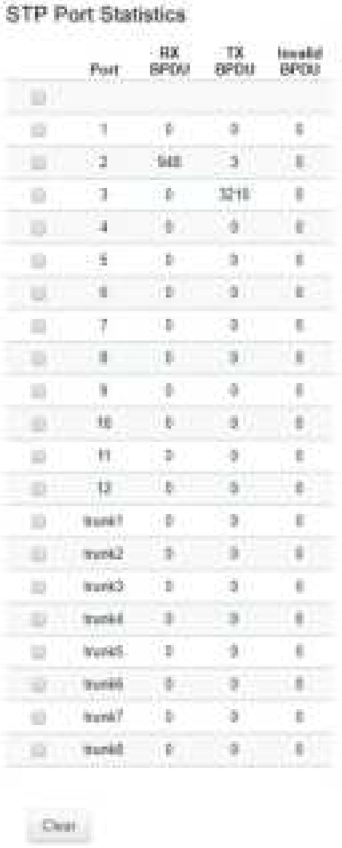
Internal Path Cost Oper	Displays the operation cost of the path from this bridge to the root bridge.
Regional Root Bridge	This is the bridge identifier of the CST regional root. It is made up using the bridge priority and the base MAC address of the bridge.
Internal Root Cost	Displays the path cost to the designated root for the selected MST instance.
Designated Bridge	Displays the bridge identifier of the bridge for the designated port. It is made up using the bridge priority and the base MAC address of the bridge.
Internal Port Cost	This parameter is set to represent the relative cost of forwarding packets to specified ports when an interface is selected within an STP instance. Selecting this parameter with a value in the range of 1 to 200000000 will set the quickest route when a loop occurs. A lower internal cost represents a quicker transmission. Selecting 0 (zero) for this parameter will set the quickest optimal route automatically for an interface.
Port Role:	Each MST bridge port that is enabled is assigned a port role for each spanning tree. The port role is one of the following values: Root, Designated, Alternate, Backup, Master, or Disabled.
Port State	Displays the state of the selected port.
Edge Port Ope	Displays the operating edge port state.
P2P MAC Conf	Displays the P2P MAC state.
P2P MAC Oper	Displays the operating P2P MAC state.
Port Role	Displays the port role. Shows each MST bridge port that is assigned a port role for each spanning tree.

Port State	Indicates the current STP state of a port. If enabled, the port state determines what forwarding action is taken regarding traffic. The possible port states are: **Disabled:** STP is disabled on the port. The port forwards traffic while learning MAC addresses. **Blocking:** The port is blocked and cannot be used to forward traffic or learn MAC addresses. **Listening:** The port is in listening mode. The port cannot forward traffic or learn MAC addresses in this state. **Learning:** The port is in learning mode. The port cannot forward traffic. However, it can learn new MAC addresses. **Forwarding:** The port is in forwarding mode. The port can forward traffic and learn new MAC addresses in this state.

Click **Apply** to update the system settings.

STP Port Statistics

Display STP related packet counters on each port.



STP Port Statistics

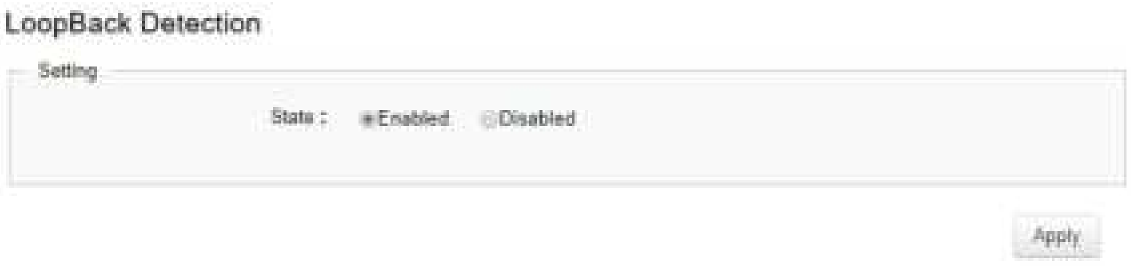
	Port	RX BPDU	TX BPDU	Invalid BPDU
□				
□	1	0	0	0
□	2	948	0	0
□	3	0	3216	0
□	4	0	0	0
□	5	0	0	0
□	6	0	0	0
□	7	0	0	0
□	8	0	0	0
□	9	0	0	0
□	10	0	0	0
□	11	0	0	0
□	12	0	0	0
□	trunk1	0	0	0
□	trunk2	0	0	0
□	trunk3	0	0	0
□	trunk4	0	0	0
□	trunk5	0	0	0
□	trunk6	0	0	0
□	trunk7	0	0	0
□	trunk8	0	0	0

Click **Clear** to clear STP packet counters on specific ports.

LBD

Loopback Detection (LBD) can be used to detect loops by transmit loop protocol packets. Ports will send out loop protocol packets, once the same packet is received, the port will be shut down to prevent loop.

LBD Global



LoopBack Detection

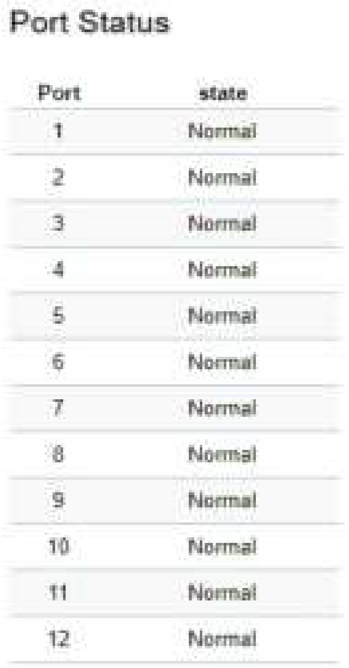
Setting

State : ● Enabled ○ Disabled

State	All ports send loop packets out if Enabled is set, and when the same packet is received, the port will be shut down to prevent loop.

Click **Apply** to update the system settings.

LBD Port Status



Port Status

Port	state
1	Normal
2	Normal
3	Normal
4	Normal
5	Normal
6	Normal
7	Normal
8	Normal
9	Normal
10	Normal
11	Normal
12	Normal

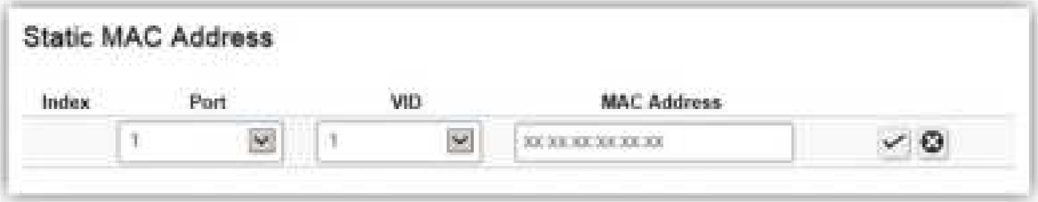
Port	Port index of physical port.
state	Displays the state of per port LBD status.

MAC Address Table

The MAC address table contains address information that the Switch uses to forward traffic between the inbound and outbound ports. All MAC addresses in the address table are associated with one or more ports. When the Switch receives traffic on a port, it searches the Ethernet switching table for the MAC address of the destination. If the MAC address is not found, the traffic is flooded out all of the other ports associated with the VLAN. All of the MAC address that the Switch learns by monitoring traffic are stored in the dynamic address. A static address allows you to manually enter a MAC address to configure a specific port and VLAN.

Static MAC Address

The address table lists the destination MAC address, the associated VLAN ID, and port number associated with the address. When you specify a static MAC address, you set the MAC address to a VLAN and a port; thus it makes an entry into its forwarding table. These entries are then used to forward packets through the Switch. Static MAC addresses along with the Switch's port security allow only devices in the MAC address table on a port to access the Switch.



Static MAC Address

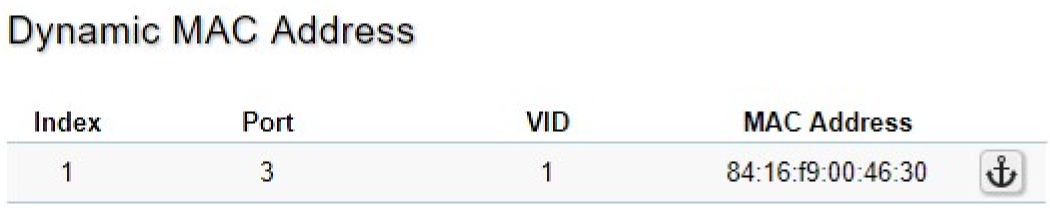
Index	Port	VID	MAC Address	
	1	1	xx:xx:xx:xx:xx:xx	✓ ⊗

Index	Displays the index for the static MAC address table.
Port	Select the port where the MAC address entered in the previous field will be automatically forwarded.
VID	Enter the VLAN ID on which the IGMP Snooping querier is administratively enabled and for which the VLAN exists in the VLAN database.
MAC Address	Enter a unicast MAC address for which the switch has forwarding or filtering information.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Dynamic MAC Address

The Switch will automatically learn the device's MAC address and store it to the dynamic MAC address table. If there is no packet received from the device within the aging time, the Switch adopts an aging mechanism for updating the tables from which MAC address entries will be removed from related network devices. The dynamic MAC address table shows the MAC addresses and their associated VLANs learned on the selected port.



Dynamic MAC Address

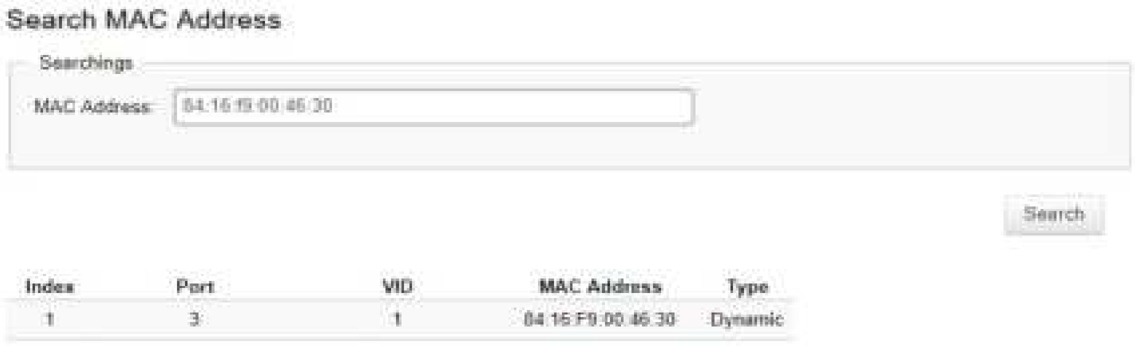
Index	Port	VID	MAC Address	
1	3	1	84:16:f9:00:46:30	⚓

Move to Static	Administrator can move Dynamic MAC address entry as Static MAC address entry. Static MAC address will not take effect by timeout timer in global settings.
Index	Displays the index for the dynamic MAC address table.
Port	Select the port to which the entry refers.
VID	Displays the VLAN ID corresponding to the MAC address.
MAC Address	Displays the MAC addresses that the Switch learned from a specific port.

Click the button ⚓ to move dynamic MAC address to static MAC address.

Search MAC Address

To search specific MAC address from whole MAC address table.



Search MAC Address

Searchings

MAC Address: 84:16:f9:00:46:30

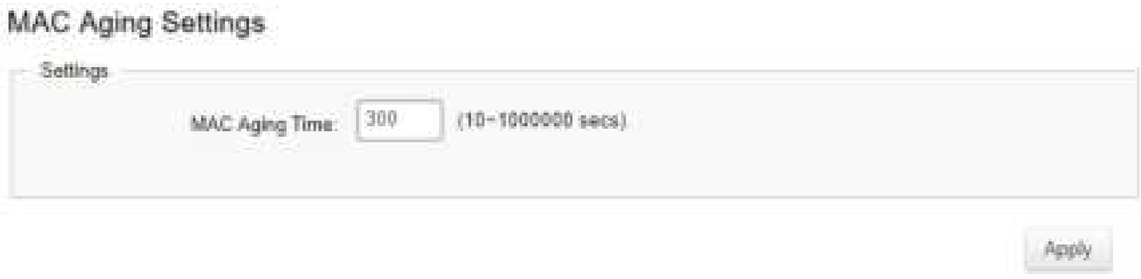
Index	Port	VID	MAC Address	Type
1	3	1	84:16:F9:00:46:30	Dynamic

Index	Displays the index for the dynamic MAC address table.
Port	Select the port to which the entry refers.
VID	Displays the VLAN ID corresponding to the MAC address.
MAC Address	Displays the MAC addresses that the Switch learned from a specific port.
Type	Displays the MAC addresses entry is static or dynamic.

Click **Search** to search specific MAC address from MAC address table.

MAC Aging Settings

To set aging time of whole MAC address table.



MAC Aging Settings

Settings

MAC Aging Time: 300 (10~1000000 secs)

MAC Aging Time	Administrator can move Dynamic MAC address entry as Static MAC address entry. Static MAC address will not take effect by timeout timer in global settings. Default value is 5 minutes.

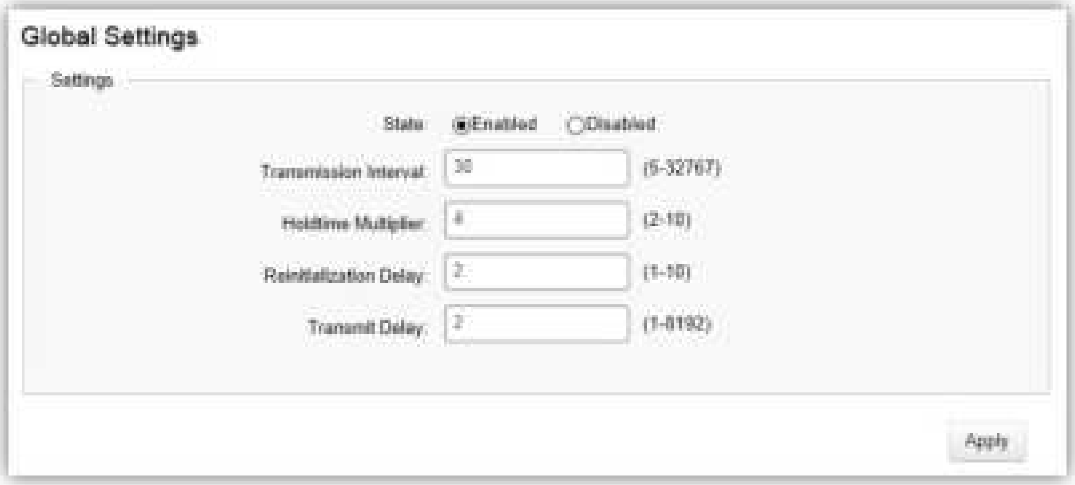
Click **Apply** to update the system settings.

LLDP

Link Layer Discovery Protocol (LLDP) is the IEEE 802.1AB standard for Switches to advertise their identity, major capabilities, and neighbors on the 802 LAN. LLDP allows users to view the discovered information to identify system topology and detect faulty configurations on the LAN. LLDP is essentially a neighbor discovery protocol that uses Ethernet connectivity to advertise information to devices on the same LAN and store information about the network. The information transmitted in LLDP advertisements flow in one direction only; from one device to its neighbors. This information allows the device to quickly identify a variety of other devices, resulting in a LAN that interoperates smoothly and efficiently.

LLDP transmits information as packets called LLDP Data Units (LLDPDUs). A single LLDPDU is transmitted within a single 802.3 Ethernet frame. A basic LLDPDU consists of a set of Type-Length-Value elements (TLV), each of which contains information about the device. A single LLDPDU contains multiple TLVs. TLVs are short information elements that communicate complex data. Each TLV advertises a single type of information.

Global Settings



State: ● Enabled ○ Disabled

Transmission Interval: 30 (5-32767)

Holdtime Multiplier: 4 (2-10)

Reinitialization Delay: 2 (1-10)

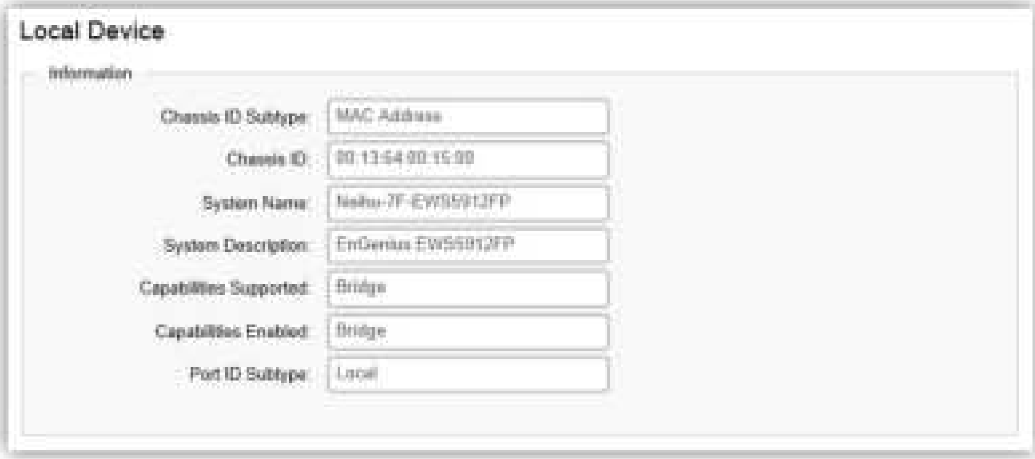
Transmit Delay: 2 (1-8192)

Select whether to enable or disable the LLDP feature on the Switch. Next, enter the Transmission Interval, Holdtime Multiplier, Reinitialization Delay parameter, and the Transmit Delay parameter. When finished, click Apply to update the system settings.

State	Select Enabled or Disabled to activate LLDP for the Switch.
Transmission Interval	Enter the interval at which LLDP advertisement updates are sent. The default value is 30. The range is from 5 to 32768.
Holdtime Multiplier	Enter the amount of time that LLDP packets are held before packets are discarded and measured in multiples of the Advertised Interval. The default is 4. The range is from 2 to 10.
Reinitialization Delay	Enter the amount of time of delay before reinitializing LLDP. The default is 2. The range is from 1 to 10.
Transmit Delay	Enter the amount of time that passes between successive LLDP frame transmissions. The default is 2 seconds. The range is from 1 to 8191 seconds.

Local Device

LLDP devices must support chassis and port ID advertisement, as well as the system name, system ID, system description, and system capability advertisements. Here, you can view detailed LLDP information for the Switch.



Local Device

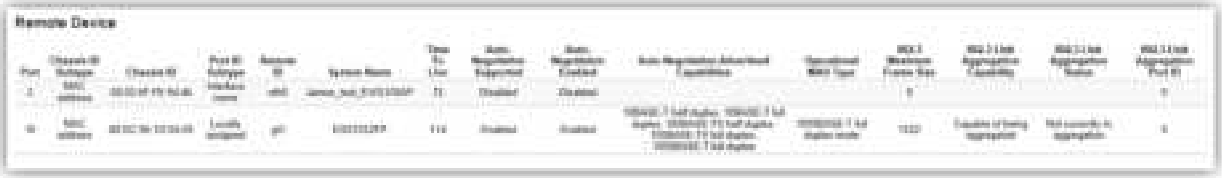
Information

Chassis ID Subtype:	MAC Address
Chassis ID:	00:13:64:00:15:00
System Name:	Neihu-7F-EWS5912FP
System Description:	EnGenius EWS5912FP
Capabilities Supported:	Bridge
Capabilities Enabled:	Bridge
Port ID Subtype:	Local

Chassis ID Subtype	Displays the chassis ID type.
Chassis ID	Displays the chassis ID of the device transmitting the LLDP frame.
System Name	Displays the administratively assigned device name.
System Description	Describes the device.
Capabilities Supported	Describes the device functions.
Capabilities Enabled	Describes the device functions.
Port ID Subtype	Displays the port ID type.

Remote Device

LLDP devices must support chassis and port ID advertisement, as well as the system name, system ID, system description, and system capability advertisements. From here you can viewing detailed LLDP Information for the remote device.



Remote Device

Port	Chassis ID Subtype	Chassis ID	Port ID Subtype	Remote ID	System Name	Time To Live	Auto-Negotiation Supported	Auto-Negotiation Enabled	Auto-Negotiation Advertised Capabilities	Operational MAU Type	802.3 Maximum Frame Size	802.3 Link Aggregation Capability	802.3 Link Aggregation Status	802.3 Link Aggregation Port ID
2	MAC address	[illegible]	Interface name	eth0	[illegible]	71	Disabled	Disabled			0			0
10	MAC address	[illegible]	Locally assigned	gi1	[illegible]	114	Enabled	Enabled	10BASE-T half duplex, 10BASE-T full duplex, 100BASE-TX half duplex, 100BASE-TX full duplex, 1000BASE-T full duplex	1000BASE-T full duplex mode	1522	Capable of being aggregated	Not currently in aggregation	0

Port	Displays the port.
Chassis ID Subtype	Displays the chassis ID type.
Chassis ID	Displays the chassis ID of the device that is transmitting the LLDP frame.
Port ID Subtype	Displays the port ID type.
Remote ID	Displays the remote ID.
System Name	Displays the administratively assigned device name.
Time to Live	Displays the time to live.
Auto-Negotiation Supported	Displays state for the auto-negotiation supported.
Auto-Negotiation Enabled	Displays state for the auto-negotiation enabled.
Auto-Negotiation Advertised Capabilities	Displays the type of auto-negotiation advertised capabilities.
Operational MAU Type	Displays the type of MAU.
802.3 Maximum Frame Size	Displays the maximum size of 802.3 maximum frame.
802.3 Link Aggregation Capabilities	Displays the 802.3 Link Aggregation capabilities.
802.3 Link Aggregation Status	Displays the status of 802.3 Link Aggregation.
802.3 Link Aggregation Port ID	Displays the port ID of 802.3 Link Aggregation.

IGMP Snooping

Internet Group Management Protocol (IGMP) Snooping allows a Switch to forward multicast traffic intelligently. Multicasting is used to support real-time applications such as video conferencing or streaming audio. A multicast server does not have to establish a separate connection with each client. It merely broadcasts its service to the network, and any host that wishes to receive the multicast register with their local multicast Switch.

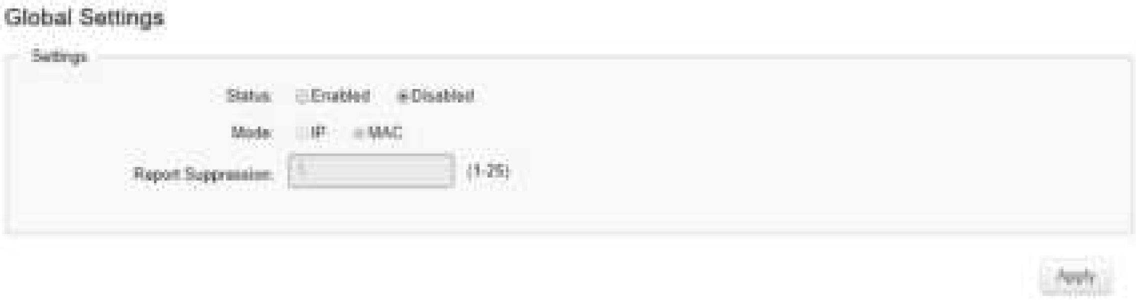
A multicast group is a group of end nodes that want to receive multicast packets from a multicast application. After joining a multicast group, a host node must continue to periodically issue reports to remain a member. Any multicast packets belonging to that multicast group are then forwarded by the Switch from the port.

A Switch supporting IGMP Snooping can passively snoop on IGMP Query, Report, and Leave packets transferred between IP Multicast switches and IP Multicast hosts to determine the IP Multicast group membership. IGMP Snooping checks IGMP packets passing through the network and configures multicasting accordingly. Based on the IGMP query and report messages, the Switch forwards traffic only to the ports that request the multicast traffic. It enables the Switch to forward packets of multicast groups to those ports that have validated host nodes. The Switch can also limit flooding of traffic to IGMP designated ports. This improves network performance by restricting the multicast packets only to switch ports where host nodes are located. IGMP Snooping significantly reduces overall Multicast traffic passing through your Switch. Without IGMP Snooping, Multicast traffic is treated in the same manner as a broadcast transmission, which forwards packets to all ports on the network.

IGMPv1	Defined in RFC 1112. An explicit join message is sent to the Switch, but a timeout is used to determine when hosts leave a group.
IGMPv2	Defined in RFC 2236. Adds an explicit leave message to the join message so that Switch can more easily determine when a group has no interested listeners on a LAN.
IGMPv3	Defined in RFC 3376. Support for a single source of content for a multicast group.

Global Settings

Click to enable or disable the IGMP Snooping feature for the Switch. Next, select whether you wish to use V2 or V3. Finally, select whether you wish to enable or disable the Report Suppression feature for the Switch.



Global Settings

Settings

Status: ○ Enabled ● Disabled

Mode: ○ IP ● MAC

Report Suppression: 1 (1-25)

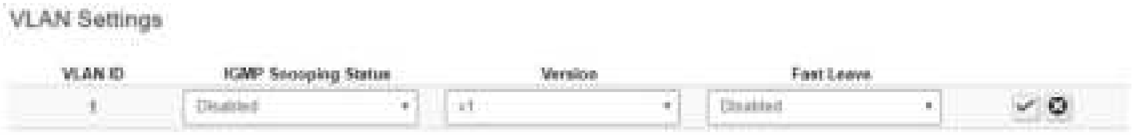
Status	Select to enable or disable IGMP Snooping on the Switch. The Switch snoops all IGMP packets it receives to determine which segments should receive packets directed to the group address when enabled. The default setting is: Disabled.
Mode	IP mode: Group List will be changed to IP mode, and switch will learn group by igmp join packet's IP address, for example, 238.255.0.1 and 239.255.0.1 are different groups. MAC mode: Group List will be changed to mac mode, and switch will learn group by igmp join packet's mac address, for example, 238.255.0.1 and 239.255.0.1 are the same group.
Report Suppression	Select whether Report Suppression is Enabled or Disabled for IGMP Snooping. The Report Suppression feature limits the amount of membership reports the member sends to multicast capable routers.

Click **Apply** to update the system settings.

VLAN Settings

Use the IGMP Snooping VLAN Settings to configure IGMP Snooping settings for VLANs on the system.

The Switch performs IGMP Snooping on VLANs that send IGMP packets. You can specify the VLANs that IGMP Snooping should be performed on. Choose from the drop-down box whether to enable or disable IGMP Snooping. Next, choose to enable or disable Fast Leave for the VLAN ID.



VLAN Settings

VLAN ID	IGMP Snooping Status	Version	Fast Leave	
1	Disabled	v1	Disabled	✓ ⊗

VLAN ID	Displays the VLAN ID.
IGMP Snooping Status	Enables or disables the IGMP Snooping feature for the specified VLAN ID.
Version	This value will affect the igmp packets type that encode and send from switch, by the way, this value is the same as Querier Version in the "Querier Settings" page.
Fast Leave	Enables or disables the IGMP Snooping Fast Leave for the specified VLAN ID. Enabling this feature allows the Switch to immediately remove the Layer 2 LAN port from its forwarding table entry upon receiving an IGMP leave message without first sending out IGMPgroup-specific (GS) queries to the port.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ☒ to discard them.

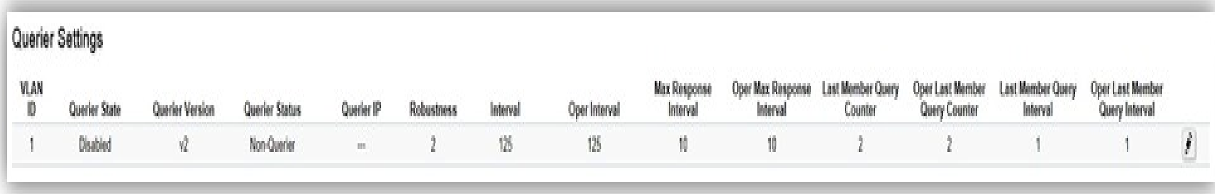
If Fast Leave is not used, a multicast querier will send a GS-query message when an IGMPv2/v3 group leave message is received. The querier stops forwarding traffic for that group only if no host replies to the query within the specified timeout period. If Fast Leave is enabled, the Switch assumes that only one host is connected to the port. Therefore, Fast Leave should only be enabled on a port if it is connected to only one IGMP-enabled device.

Fast Leave is supported only with IGMPv2 or IGMPv3 Snooping when IGMP Snooping is enabled. Fast Leave does not apply to a port if the Switch has learned that a multicast querier is attached to it.

Fast Leave can improve bandwidth usage for a network which frequently experiences many IGMP host add and leave requests.

Querier Settings

IGMP Snooping requires that one central Switch to periodically query all end devices on the network to announce their multicast memberships and this central device is the IGMP querier. The snooping Switch sends out periodic queries with a time interval equal to the configured querier query interval. The IGMP query keeps the Switch updated with the current multicast group membership information. If the Switch does not received the updated membership information, then it will stop forwarding multicasts to specified VLANs.



Querier Settings

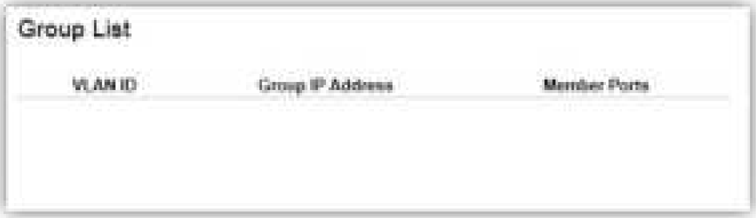
VLAN ID	Querier State	Querier Version	Querier Status	Querier IP	Robustness	Interval	Oper Interval	Max Response Interval	Oper Max Response Interval	Last Member Query Counter	Oper Last Member Query Counter	Last Member Query Interval	Oper Last Member Query Interval	
1	Disabled	v2	Non-Querier	---	2	125	125	10	10	2	2	1	1	✎

VLAN ID	Displays the VLAN ID.
Querier State	Select whether to enable or disable the IGMP querier state for the specified VLAN ID. A querier can periodically ask their hosts if they wish to receive multicast traffic. The querier feature will check whether hosts wish to receive multicast traffic when enabled. An elected querier will assume the role of querying the LAN for group members, and then propagates the service requests on to any upstream multicast Switch to ensure that it will continue to receive the multicast service. This feature is only supported for IGMPv1 and v2 snooping.
Querier Version	Enter the version of IGMP packet that will be sent by this port. If an IGMP packet received by the port has a version higher than the specified version, this packet will be dropped.
Querier Status	The role of the switch in our network topology, querier or nonquerier
Querier IP	The IP adderss of the querier in our network topology, if switch is querier, this value will be switch IP address.
Interval	Enter the amount of time in seconds between general query
	transmissions. The default is 125 seconds.
Max Response Interval	Enter the maximum response time used in the queries that are sent by the snooping querier. The default is 10 seconds.
Startup Query Counter	The number of general query that be sent by switch, when the switch become the querier.
Startup Query Interval	The interval of general query that be sent by switch, when the switch become the querier.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Group List

The Group List displays VLAN ID, group IP address, and members port in the IGMP Snooping list.

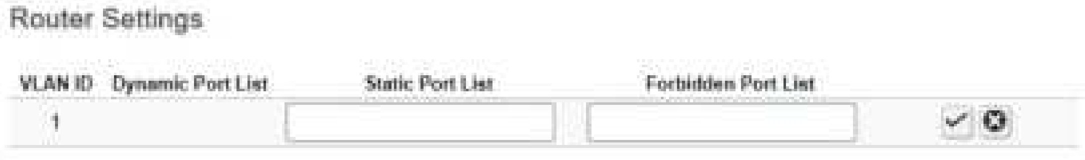


Group List

VLAN ID	Group IP Address	Member Ports

Router Settings

The Router Settings shows the learned multicast router attached port if the port is active and a member of the VLAN. Select the VLAN ID you would like to configure and enter the Static and Forbidden ports for the specified VLAN IDs. All IGMP packets snooped by the Switch will be forwarded to the multicast router reachable from the port.



Router Settings

VLAN ID	Dynamic Port List	Static Port List	Forbidden Port List	
1				✓ ⊗

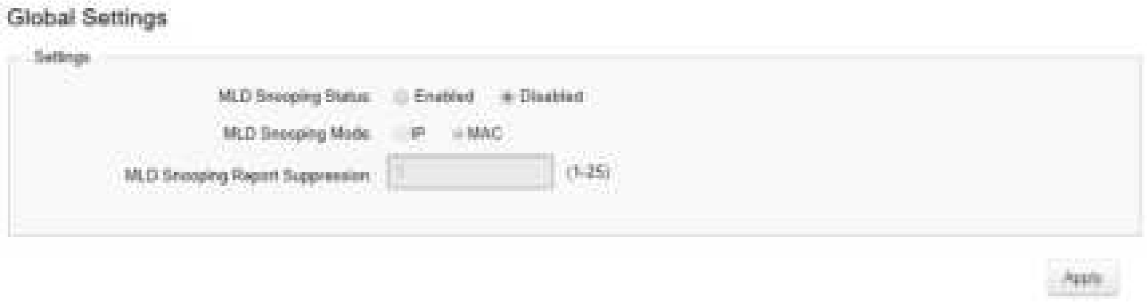
VLAN ID	Displays the VLAN ID.
Dynamic Port List	Displays router ports that have been dynamically configured.
Forbidden Port List	Designates a range of ports as being disconnected to multicast-enabled routers. Ensures that the forbidden router port will not propagate routing packets out.
Static Port list	Designates a range of ports as being connected to multicast-enabled routers. Ensures that all the packets will reach the multicast-enabled router.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

MLD Snooping

Multicast Listener Discovery (MLD) Snooping operates on the IPv6 traffic level for discovering multicast listeners on a directly attached port and performs a similar function to IGMP Snooping for IPv4. MLD snooping allows the Switch to examine MLD packets and make forwarding decisions based on content. MLD Snooping limits IPv6 multicast traffic by dynamically configuring the Switch port so that multicast traffic is forwarded only to those ports that wish to receive it. This reduces the flooding of IPv6 multicast packets in the specified VLANs. Both IGMP and MLD Snooping can be active at the same time.

Global Settings



Global Settings

Settings

MLD Snooping Status: ○ Enabled ● Disabled

MLD Snooping Mode: ○ IP ○ MAC

MLD Snooping Report Suppression: 1 (1-25)

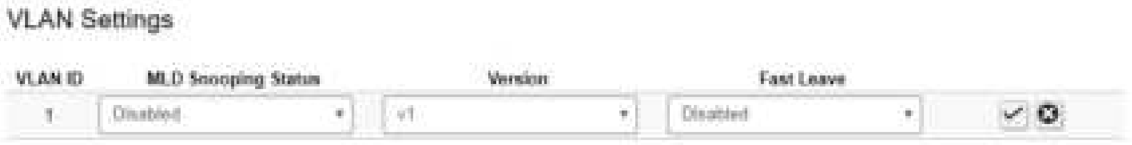
Apply

Status	Select to enable or disable MLD Snooping on the Switch. The Switch snoops all MLD packets it receives to determine which segments should receive packets directed to the group address when enabled. The default setting is: Disabled.
Mode	IP mode: Group List will be changed to IP mode, and switch will learn group by MLD join packet's IP address. MAC mode: Group List will be changed to mac mode, and switch will learn group by MLD join packet's mac address.
Report Suppression	Select whether Report Suppression is Enabled or Disabled for MLD Snooping. The Report Suppression feature limits the amount of membership reports the member sends to multicast capable routers.

Click **Apply** to update the system settings.

VLAN Settings

If the Fast Leave feature is not used, a multicast querier will send a GS-query message when an MLD group leave message is received. The querier stops forwarding traffic for that group only if no host replies to the query within the specified timeout period. If Fast Leave is enabled, the Switch assumes that only one host is connected to the port. Therefore, Fast Leave should only be enabled on a port if it is connected to only one MLD-enabled device.



VLAN Settings

VLAN ID	MLD Snooping Status	Version	Fast Leave	
1	Disabled	v1	Disabled	✓ ⊗

Fast Leave does not apply to a port if the Switch has learned that a multicast querier is attached to it. Fast Leave can improve bandwidth usage for a network which frequently experiences many MLD host add and leave requests.

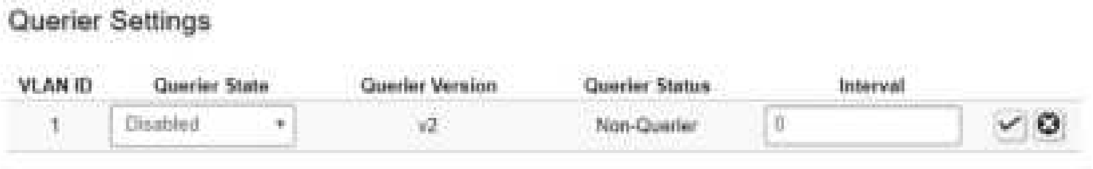
VLAN ID	Displays the VLAN ID.
MLD Snooping Status	Select to enable or disable the MLD snooping feature for the specified VLAN ID.
Version	This value will affect the MLD packets type that encode and send from switch, by the way, this value is the same as Querier Version in the "Querier Settings" page.
Fast Leave	Enables or disables the MLD snooping Fast Leave feature for the specified VLAN ID. Enabling this feature allows the Switch to immediately remove the Layer 2 LAN port from its forwarding table entry upon receiving an MLD leave message without first sending out an MLD group-specific (GS) query to the port.

Select from the drop-down list whether to enable or disable MLD Snooping. Next, select to enable or disable Fast Leave for the specified VLAN ID.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Querier Settings

IGMP Snooping requires that one central Switch to periodically query all end devices on the network to announce their multicast memberships and this central device is the IGMP querier. The snooping Switch sends out periodic queries with a time interval equal to the configured querier query interval. The IGMP query keeps the Switch updated with the current multicast group membership information. If the Switch does not receive the updated membership information, then it will stop forwarding multicasts to specified VLANs.



Querier Settings

VLAN ID	Querier State	Querier Version	Querier Status	Interval	
1	Disabled	v2	Non-Querier	0	✓ ⊗

VLAN ID	Displays the VLAN ID.
Querier State	Select whether to enable or disable the MLD querier state for the specified VLAN ID. A querier can periodically ask their hosts if they wish to receive multicast traffic. The querier feature will check whether hosts wish to receive multicast traffic when enabled. An elected querier will assume the role of querying the LAN for group members, and then propagates the service requests on to any upstream multicast Switch to ensure that it will continue to receive the multicast service. This feature is only supported for IGMPv1 and v2 snooping.
Querier Version	Enter the version of MLD packet that will be sent by this port. If an IGMP packet received by the port has a version higher than the specified version, this packet will be dropped.
Querier Status	The role of the switch in our network topology, querier or nonquerier
Interval	Enter the amount of time in seconds between general query transmissions. The default is 125 seconds.

Group List

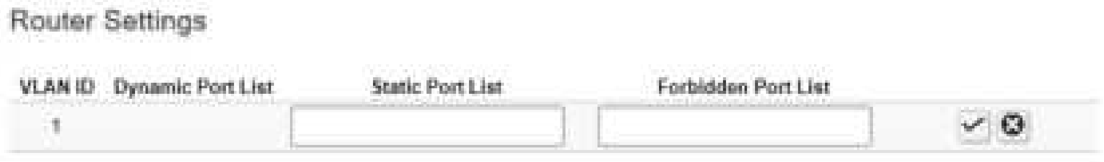
The Group List displays the VLAN ID, IPv6 address, and members port in the MLD Snooping List.

Group List

VLAN ID	IPv6 Address	Member Ports

Router Settings

The Router Settings feature shows the learned multicast router attached port if the port is active and a member of the VLAN. Select the VLAN ID you would like to configure and enter the static and forbidden ports for the specified VLAN IDs that are utilizing MLD Snooping. All MLD packets snooped by the Switch will be forwarded to the multicast router reachable from the port.



Router Settings

VLAN ID	Dynamic Port List	Static Port List	Forbidden Port List	
1				✓ ⊗

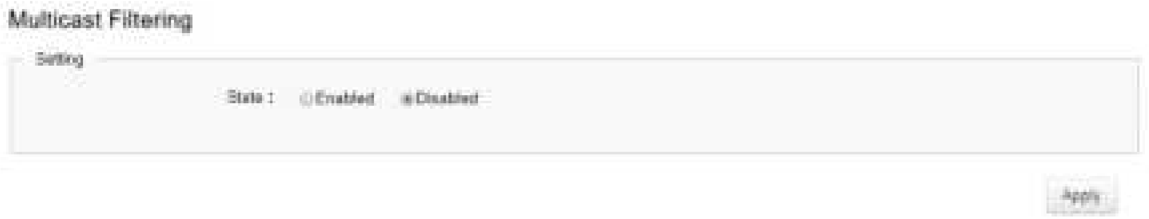
VLAN ID	Displays the VLAN ID.
Dynamic Port List	Displays router ports that have been dynamically configured.
Forbidden Port List	Designates a range of ports as being disconnected to multicast-enabled routers. Ensure that the forbidden router port will not propagate routing packets out.
Static Port List	Designates a range of ports as being connected to multicast-enabled routers. Ensure that all the packets will reach the multicast-enabled router.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Multicast Filtering

When multicast filtering is enabled, unknown multicast packets (did not learn by IGMP and MLD) will be dropped, and the multicast packets already learnt by IGMP/MLD will forward as multicast forwarding table.

When multicast filtering is disabled, unknown multicast packets (did not learn by IGMP and MLD) will be flooded, and the multicast packets already learnt by IGMP/MLD will forward as multicast forwarding table.



Multicast Filtering

Setting

State : ○ Enabled ● Disabled

State	To set multicast filtering as enabled or disabled. Default is disabled.

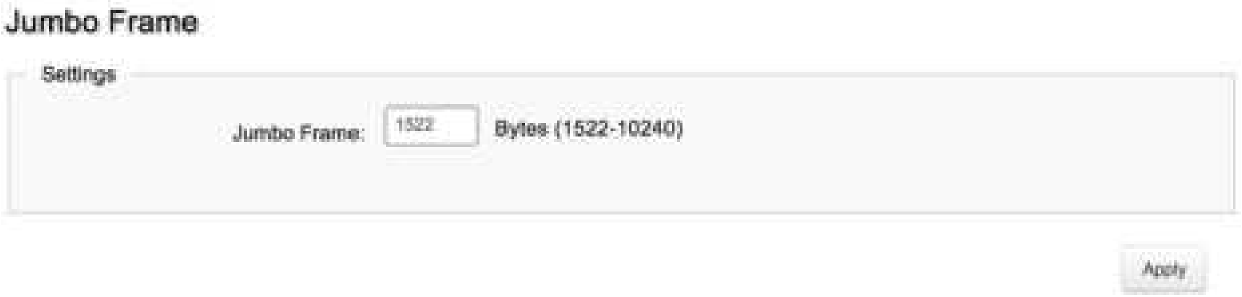
Click **Apply** to update the system settings.

Jumbo Frame

Ethernet has used the 1500 byte frame size since its inception. Jumbo frames are network-layer PDUs that have a size much larger than the typical 1500 byte Ethernet Maximum Transmission Unit (MTU) size. Jumbo frames extend Ethernet to 10240 bytes, making them large enough to carry an 10 KB application datagram plus packet header overhead. If you intend to leave the local area network at high speeds, the dynamics of TCP will require you to use large frame sizes.

The switch supports a jumbo frame size of up to 10240 bytes. Jumbo frames need to be configured to work on the ingress and egress port of each device along the end-to-end transmission path.

Furthermore, all devices in the network must also be consistent on the maximum jumbo frame size, so it is important to do a thorough investigation of all your devices in the communication paths to validate their settings.



Jumbo Frame

Settings

Jumbo Frame: 1522 Bytes (1522-10240)

Jumbo Frame	Enter the size of jumbo frame. The range is from **1522 to 10240** bytes.

Note: *With different platforms, the max jumbo frame maybe different.*

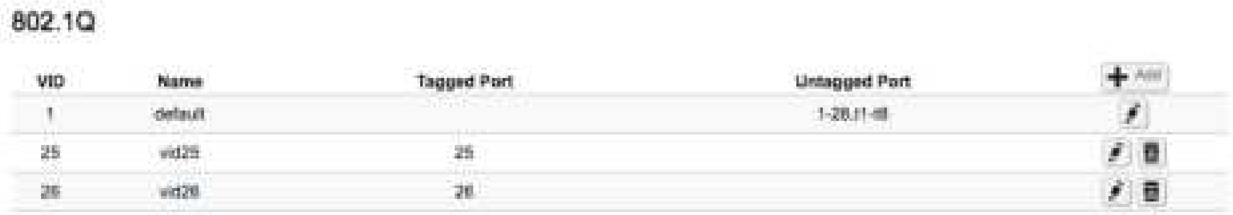
Click **Apply** to update the system settings.

VLAN

A Virtual LAN (VLAN) is a group of ports that form a logical Ethernet segment on a Layer 2 Switch which provides better administration, security, and management of multicast traffic. A VLAN is a network topology configured according to a logical scheme rather than a physical layout. When you use a VLAN, users can be grouped by logical function instead of physical location. All ports that frequently communicate with each other are assigned to the same VLAN, regardless of where they are physically on the network. VLANs let you logically segment your network into different broadcast domains so that you can group ports with related functions into their own separate, logical LAN segments on the same Switch. This allows broadcast packets to be forwarded only between ports within the VLAN which can avoid broadcast packets being sent to all the ports on a single Switch. A VLAN also increases network performance by limiting broadcasts to a smaller and more manageable logical broadcast domain. VLANs also improve security by limiting traffic to specific broadcast domains.

802.1Q

Each VLAN in a network has an associated VLAN ID, which appears in the IEEE 802.1Q tag in the Layer 2 header of packets transmitted on a VLAN. The IEEE 802.1Q specification establishes a standard method for tagging Ethernet frames with VLAN membership information. The key for IEEE 802.1Q to perform its functions is in its tags. 802.1Q-compliant Switch ports can be configured to transmit tagged or untagged frames. A tag field containing VLAN information can be inserted into an Ethernet frame. When using 802.1Q VLAN configuration, you configure ports to be a part of a VLAN group. When a port receives data tagged for a VLAN group, the data is discarded unless the port is a member of the VLAN group.


802.1Q

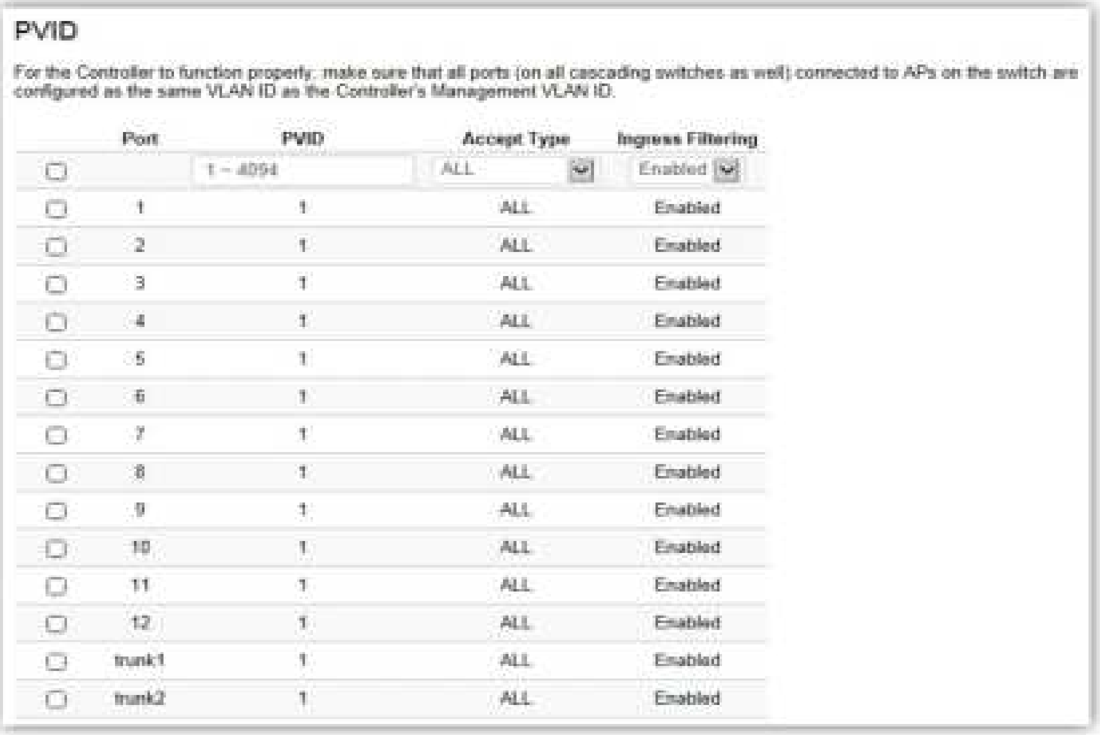
VID	Name	Tagged Port	Untagged Port	+ Add
1	default		1-28,l1-l8	
25	vid25	25		
26	vid26	26		

VID	Displays the VLAN ID for which the network policy is defined. The range of the VLAN ID is from 1 to 4094.
Name	Enter the VLAN name. You can use up to 32 alphanumeric characters.
Tagged Port	Frames transmitted from this port are tagged with the VLAN ID.
Untagged Port	Frames transmitted from this port are untagged.

Note: *The Switch's default setting is to assign all ports to a single 802.1Q VLAN(VID 1). Please keep this in mind when configuring the VLAN settings for the Switch.*

PVID

When an untagged packet enters a Switch port, the PVID (Port VLAN ID) will be attached to the untagged packet and forward frames to a VLAN specified VID part of the PVID. A packet received on a given port would be assigned that port's PVID and then be forwarded to the port that corresponded to the packet's destination address. If the PVID of the port that received the packet is different from the PVID of the port that is to transmit the packet, the Switch will drop the packet. Within the Switch, different PVIDs mean different VLANs, so VLAN identification based upon the PVIDs cannot create VLANs that extend outside a given Switch. If no VLANs are defined on the Switch, all ports are then assigned to a default VLAN with a PVID equal to 1.



PVID

For the Controller to function properly, make sure that all ports (on all cascading switches as well) connected to APs on the switch are configured as the same VLAN ID as the Controller's Management VLAN ID.

	Port	PVID	Accept Type	Ingress Filtering
☐		1 - 4094	ALL	Enabled
☐	1	1	ALL	Enabled
☐	2	1	ALL	Enabled
☐	3	1	ALL	Enabled
☐	4	1	ALL	Enabled
☐	5	1	ALL	Enabled
☐	6	1	ALL	Enabled
☐	7	1	ALL	Enabled
☐	8	1	ALL	Enabled
☐	9	1	ALL	Enabled
☐	10	1	ALL	Enabled
☐	11	1	ALL	Enabled
☐	12	1	ALL	Enabled
☐	trunk1	1	ALL	Enabled
☐	trunk2	1	ALL	Enabled

Port	Displays the VLAN ID to which the PVID tag is assigned. Configure the PVID to assign untagged or tagged frames received on the selected port.
PVID	Enter the PVID value. The range is from 1 to 4094.
Accept Type	Select Tagged Only and Untagged Only from the list. **Tagged Only:** The port discards any untagged frames it receives. The port only accepts tagged frames. **Untagged Only:** Only untagged frames received on the port are accepted. **All:** The port accepts both tagged and untagged frames.
Ingress Filtering	Specify how you wish the port to handle tagged frames. Select Enabled or Disabled from the list. **Enabled:** Tagged frames are discarded if VID does not match the PVID of the port. **Disabled:** All frames are forwarded in accordance with the IEEE 802.1Q VLAN.

Note: *To enable PVID functionality, the following requirements must be met:*

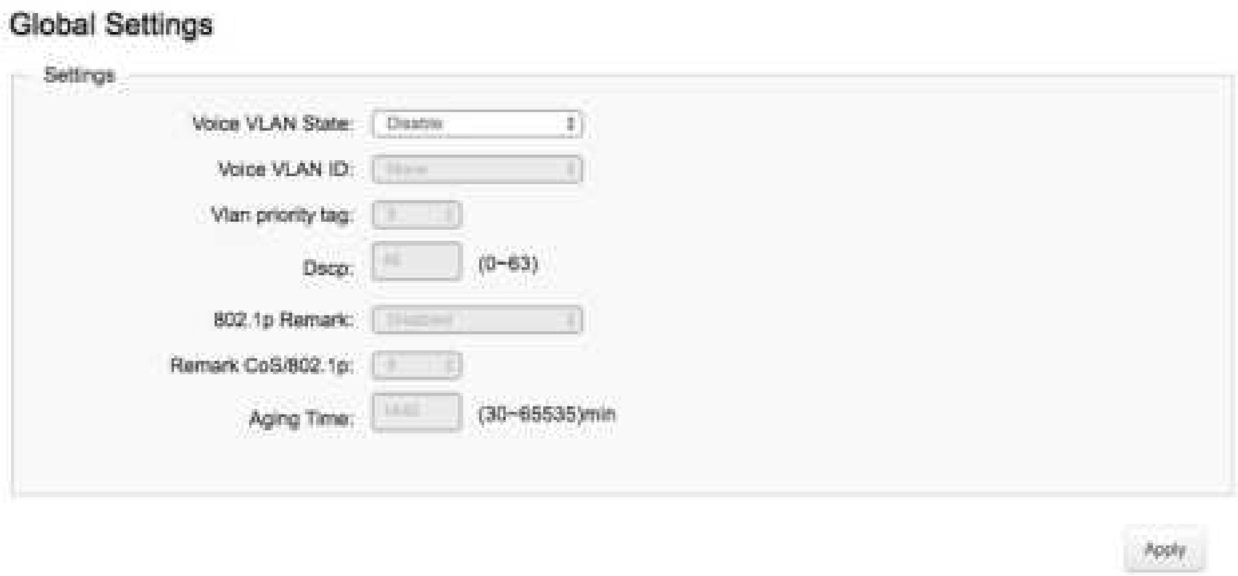
- *All ports must have a defined PVID.*
- *If no other value is specified, the default VLAN PVID is used.*
- *If you wish to change the port's default PVID, you must first create a VLAN that includes the port as a member.*

Click **Apply** to update the system settings.

Voice VLAN

Enhance your Voice over IP (VoIP) service by configuring ports to carry IP voice traffic from IP phones on a specific VLAN. Voice VLAN provides QoS to VoIP, ensuring that the quality of the call does not deteriorate if the IP traffic is received erratically or unevenly.

Global Settings



Global Settings

Settings

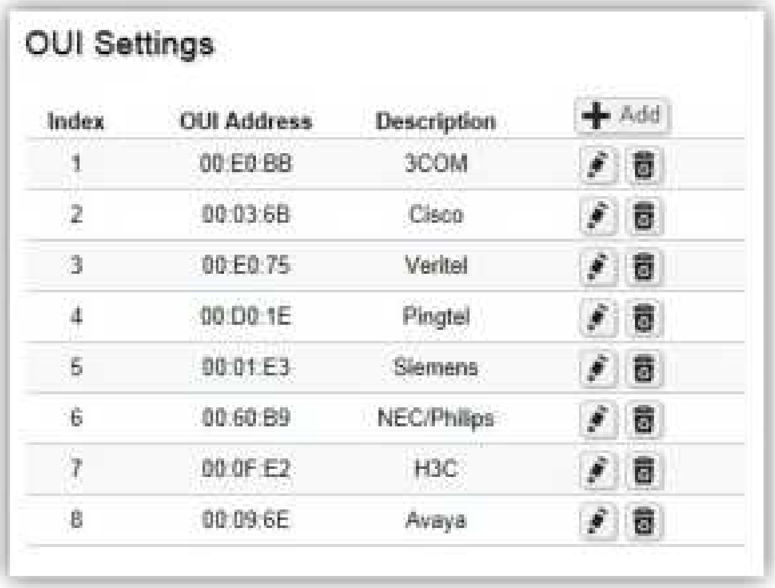
Voice VLAN State:	Disable	
Voice VLAN ID:	None	
Vlan priority tag:	6	
Dscp:	46	(0~63)
802.1p Remark:	Disabled	
Remark CoS/802.1p:	6	
Aging Time:	1440	(30~65535)min

Voice VLAN State	Select Enabled or Disabled for Voice VLAN on the Switch.
Voice VLAN ID	Sets the Voice VLAN ID for the network. Only one Voice VLAN is supported on the Switch.
VLAN priority tag	Set the Voice VLAN COS value for the network
DSCP	Set the DSCP value for the Voice VLAN
802.1p Remark	Enable this function to have outgoing voice traffic to be marked with the selected CoS value.
Remark CoS/802.1p	Defines a service priority for traffic on the Voice VLAN. The priority of any received VoIP packet is overwritten with the new priority when the Voice VLAN feature is active on a port. (Range: 0 to 7; Default: 6)
Aging Time	The aging time is used to remove a port from voice VLAN if the port is an automatic VLAN member. When the last voice device stops sending traffic
	and the MAC address of this voice device is aged out, the voice VLAN aging timer will be started. The port will be removed from the voice VLAN after expiration of the voice VLAN aging timer. If the voice traffic resumes during the aging time, the aging timer will be reset and stop. The range for aging time is from 1 to 65535 minutes. The default is 1440 minutes.

Click **Apply** to update the system settings.

OUI Settings

The Switches determines whether a received packet is a voice packet by checking its source MAC address. VoIP traffic has a pre-configured Organizationally Unique Identifiers (OUI) prefix in the source MAC address. You can manually add specific manufacturer's MAC addresses and description to the OUI table. All traffic received on the Voice VLAN ports from the specific IP phone with a listed OUI is forwarded on the voice VLAN.



OUI Settings

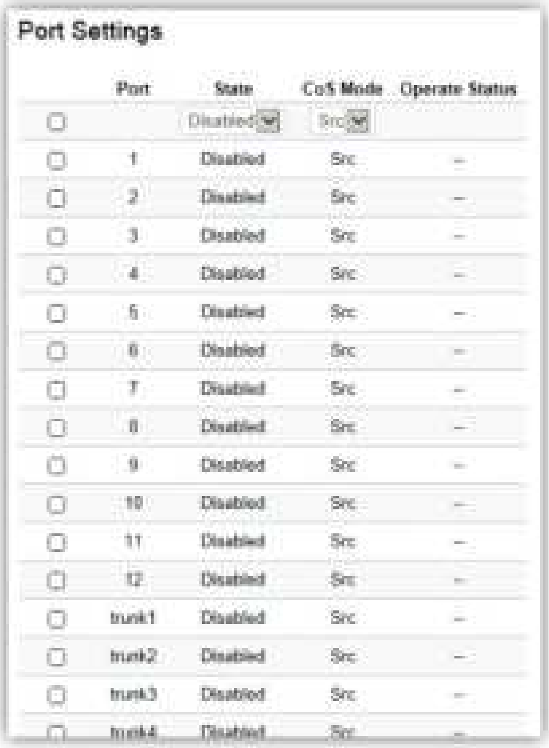
Index	OUI Address	Description
1	00:E0:BB	3COM
2	00:03:6B	Cisco
3	00:E0:75	Veritel
4	00:D0:1E	Pingtel
5	00:01:E3	Siemens
6	00:60:B9	NEC/Philips
7	00:0F:E2	H3C
8	00:09:6E	Avaya

Index	Displays the VoIP sequence ID.
OUI Address	This is the globally unique ID assigned to a vendor by the IEEE to identify VoIP equipment.
Description	Displays the ID of the VoIP equipment vendor.

To configure the OUI settings, click the **Edit** button to re-configure the specific entry. Click the **Delete** button to remove the specific entry and click the **Add** button to create a new OUI entry. Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Port Settings

Enhance your VoIP service further by configuring ports to carry IP voice traffic from IP phones on a specific VLAN. Voice VLAN provides QoS to VoIP, ensuring that the quality of voice does not deteriorate if the IP traffic is received unevenly.



Port Settings

	Port	State	CoS Mode	Operate Status
□		Disabled	Src	
□	1	Disabled	Src	–
□	2	Disabled	Src	–
□	3	Disabled	Src	–
□	4	Disabled	Src	–
□	5	Disabled	Src	–
□	6	Disabled	Src	–
□	7	Disabled	Src	–
□	8	Disabled	Src	–
□	9	Disabled	Src	–
□	10	Disabled	Src	–
□	11	Disabled	Src	–
□	12	Disabled	Src	–
□	trunk1	Disabled	Src	–
□	trunk2	Disabled	Src	–
□	trunk3	Disabled	Src	–
□	trunk4	Disabled	Src	–

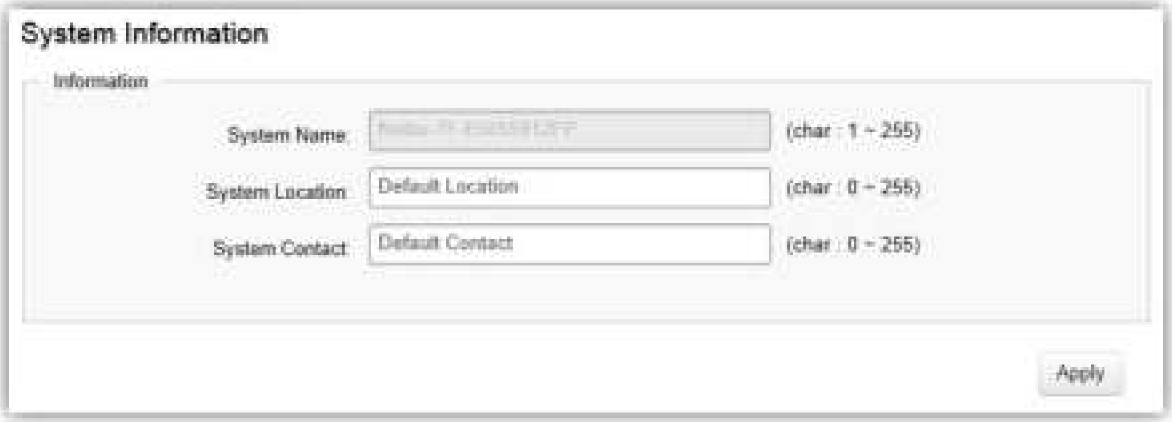
Port	Displays the port to which the Voice VLAN settings are applied.
State	Select Enabled to enhance VoIP quality on the selected port. The default is Disabled.
CoS Mode	Select Src or All from the list. **Src:** Src QoS attributes are applied to packets with OUIs in the source MAC address. **All:** All QoS attributes are applied to packets that are classified to the Voice VLAN.
Operate Status	Displays the operating status for the Voice VLAN on the selected port.

Click **Apply** to update the system settings.

Management

System Information

The System Information screen contains general device information including the system name, system location, and system contact for the Switch.



System Information

Information

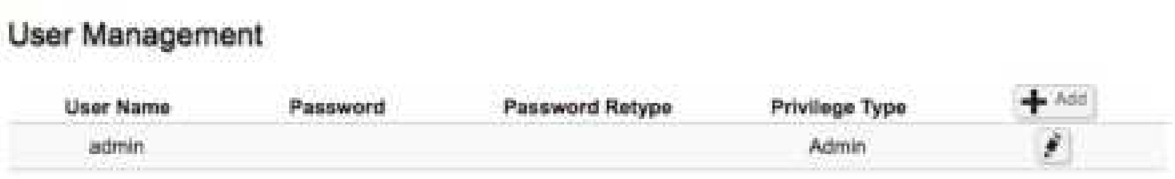
System Name	[illegible]	(char : 1 ~ 255)
System Location	Default Location	(char : 0 ~ 255)
System Contact	Default Contact	(char : 0 ~ 255)

System Name	Enter the name you wish to use to identify the Switch. You can use up to 255 alphanumeric characters.
System Location	Enter the location of the Switch. You can use up to 255 alphanumeric characters. The factory default is: Default Location.
System Contact	Enter the contact person for the Switch. You can use up to 255 alphanumeric characters. The factory default is: Default Location.

Click **Apply** to update the system settings.

User Management

Use the User Management page to control management access to the Switch based on manually configured user names and passwords. A User account can only view settings without the right to configure the Switch, and an Admin account can configure all the functions of the Switch. Click the Add button to add an account or the Edit button to edit an existing account.


User Management

User Name	Password	Password Retype	Privilege Type	➕ Add
admin			Admin	✎

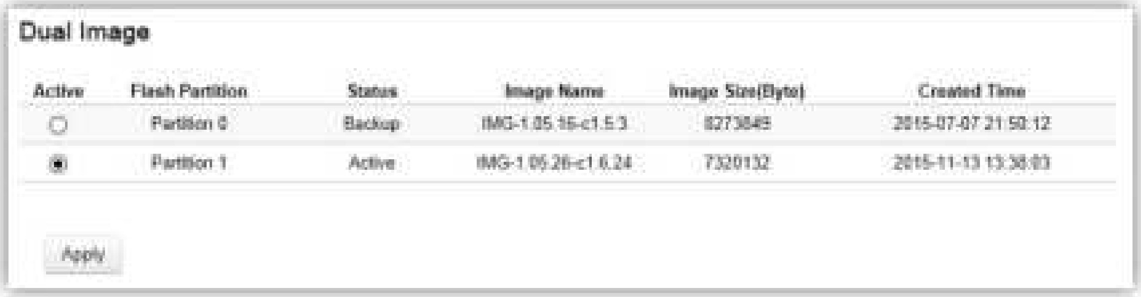
User Name	Enter a username. You can use up to 18 alphanumeric characters.
Password	Enter a new password for accessing the Switch.
Password Retype	Repeat the new password used to access the Switch.
Privilege Type	Select **Admin** or **User** from the list to regulate access rights.

Important: *Note that Admin users have full access rights to the Switch when determining the authority of the user account.*

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ☒ to discard them.

Dual Image

The Switch maintains two versions of the Switch image in its permanent storage. One image is the active image, and the second image is the backup image. The Dual Image screen enables the user to select which partition will be set as active after the next reset. The Switch boots and runs from the active image. If the active image is corrupt, the system automatically boots from the non-active image.


Dual Image

Active	Flash Partition	Status	Image Name	Image Size(Byte)	Created Time
○	Partition 0	Backup	IMG-1.05.16-c1.5.3	8273849	2015-07-07 21:50:12
●	Partition 1	Active	IMG-1.05.26-c1.6.24	7320132	2015-11-13 13:38:03

Active	Selects the partition you wish to be active.
Flash Partition	Displays the number of the partition.
Status	Displays the partition which is currently active on the Switch.
Image Name	Displays the name/version number of the image
Image Size	Displays the size of the image file.
Created Time	Displays the time the image was created.

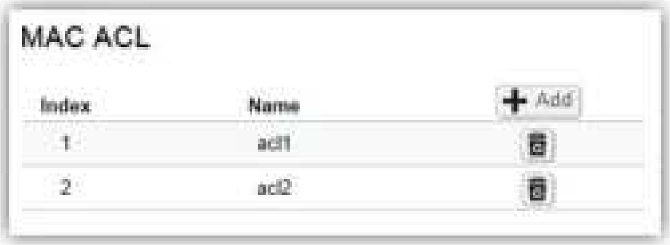
Click **Apply** to update the system settings.

ACL

An Access Control List (ACL) allows you to define classification rules or establish criteria to provide security to your network by blocking unauthorized users and allowing authorized users to access specific areas or resources. ACLs can provide basic security for access to the network by controlling whether packets are forwarded or blocked at the Switch ports. Access Control Lists (ACLs) are filters that allow you to classify data packets according to a particular content in the packet header, such as the source address, destination address, source port number, destination port number, and more. Packet classifiers identify flows for more efficient processing. Each filter defines the conditions that must match for inclusion in the filter. ACLs (Access Control Lists) provide packet filtering for IP frames (based on the protocol, TCP/UDP port number or frame type) or layer 2 frames (based on any destination MAC address for unicast, broadcast, or multicast, or based on VLAN ID or VLAN tag priority). ACLs can be used to improve performance by blocking unnecessary network traffic or to implement security controls by restricting access to specific network resources or protocols. Policies can be used to differentiate service for client ports, server ports, network ports, or guest ports. They can also be used to strictly control network traffic by only allowing incoming frames that match the source MAC and source IP address on a specific port. ACLs are composed of Access Control Entries (ACEs), which are rules that determine traffic classifications. Each ACE is a considered as a single rule, and up to 256 rules may be defined on each ACL, with up to 3000 rules globally. ACLs are used to provide traffic flow control, restrict contents of routing updates, and determine which types of traffic are forwarded or blocked. This criterion can be specified on a basis of the MAC address or IP address.

MAC ACL

This page displays the currently defined MAC-based ACLs profiles. To add a new ACL, click **Add** and enter the name of the new ACL.



MAC ACL

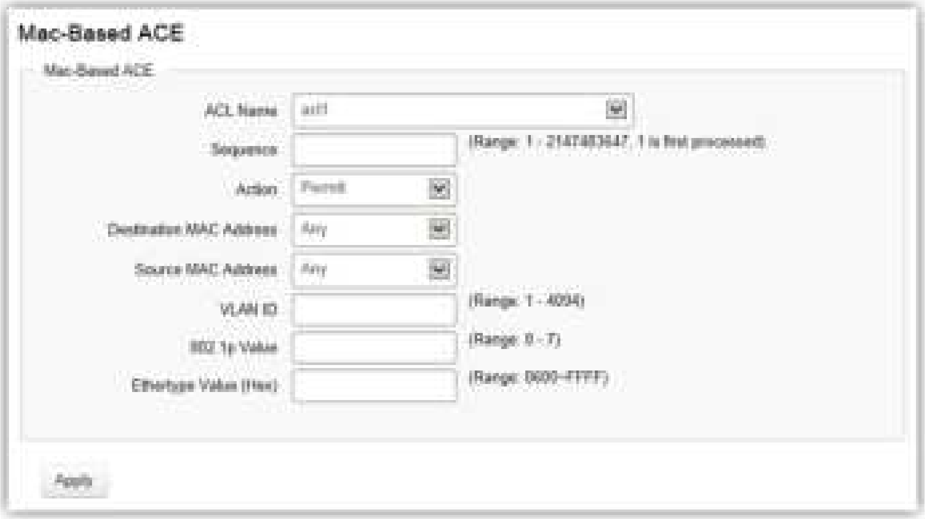
Index	Name	
1	acl1	
2	acl2	

Index	Profile identifier.
Name	Enter the MAC based ACL name. You can use up to 32 alphanumeric characters.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ☒ to discard them.

MAC ACE

Use this page to view and add rules to MAC-based ACLs.



Mac-Based ACE

Mac-Based ACE

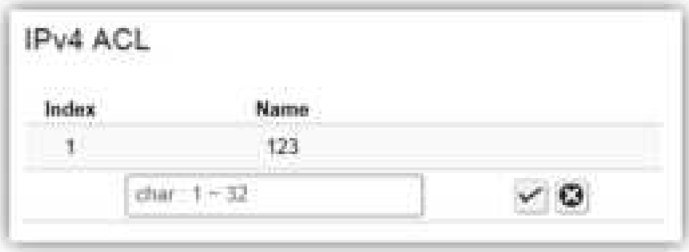
ACL Name	acl1	
Sequence		(Range: 1 - 2147483647, 1 is first processed)
Action	Permit	
Destination MAC Address	Any	
Source MAC Address	Any	
VLAN ID		(Range: 1 - 4094)
802.1p Value		(Range: 0 - 7)
Ethertype Value (Hex)		(Range: 0600~FFFF)

ACL Name	Select the ACL from the list.
Sequence	Enter the sequence number which signifies the order of the specified ACL relative to other ACLs assigned to the selected interface. The valid range is from **1** to **2147483647**, **1** being processed first.
Action	Select what action taken if a packet matches the criteria. **Permit:** Forward packets that meet the ACL criteria. **Deny:** Drops packets that meet the ACL criteria.
Destination MAC Value	Enter the destination MAC address.
Destination MAC Wildcard Mask	Enter a MAC address mask for the destination MAC address. A mask of **00:00:00:00:00:00** means the bits must be matched exactly; **ff:ff:ff:ff:ff:ff** means the bits are irrelevant. Any combination of 0s and ffs can be used.
Source MAC Value	Enter the source MAC address.
Source MAC Wildcard Mask	Enter a MAC address mask for the source MAC address. A mask of **00:00:00:00:00:00** means the bits must be matched exactly; **ff:ff:ff:ff:ff:ff** means the bits are irrelevant. Any combination of 0s and ffs can be used.
VLAN ID	Enter the VLAN ID to which the MAC address is attached in MAC ACE.
	The range is from **1** to **4094**.
802.1p Value	Enter the 802.1p value. The range is from **0** to **7**.
Ethertype Value	Selecting this option instructs the Switch to examine the Ethernet type value in each frame's header. This option can only be used to filter Ethernet II formatted packets. A detailed listing of Ethernet protocol types can be found in RFC 1060. A few of the more common types include 0800 (IP), 0806 (ARP), and 8137 (IPX).

Click **Apply** to update the system settings.

IPv4 ACL

This page displays the currently defined IPv4-based ACLs profiles. To add a new ACL, click **Add** and enter the name of the new ACL.



IPv4 ACL

Index	Name
1	123

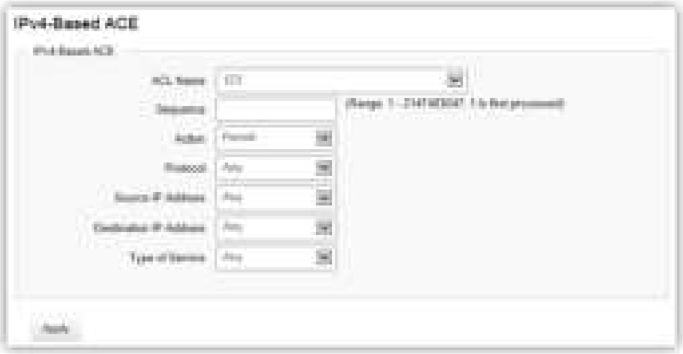
char : 1 ~ 32

Index	Displays the current number of ACLs.
Name	Enter the IP based ACL name. You can use up to 32 alphanumeric characters.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ☒ to discard them.

IPv4 ACE

Use this page to view and add rules to IPv4-based ACLs.



IPv4-Based ACE

IPv4-Based ACE

ACL Name: 123

Sequence: (Range: 1 - 2147483647, 1 is first processed)

Action: Permit

Protocol: Any

Source IP Address: Any

Destination IP Address: Any

Type of Service: Any

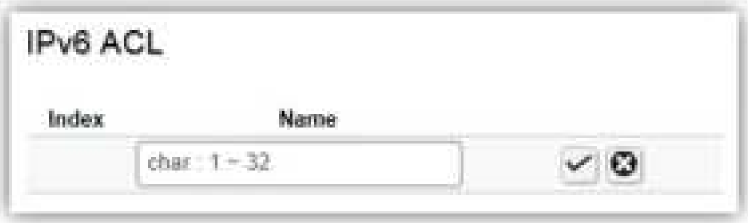
ACL Name	Select the ACL from the list for which a rule is being created.
Sequence	Enter the sequence number which signifies the order of the specified ACL relative to other ACLs assigned to the selected interface. The valid range is from **1** to **2147483647**, 1 being processed first.
Action	Select what action to take if a packet matches the criteria. **Permit**: Forwards packets that meet the ACL criteria. **Deny**: Drops packets that meet the ACL criteria.
Protocol	Select **Any, Protocol ID,** or **Select from a List** in the drop-down menu. **Any**: Check Any to use any protocol. **Protocol ID**: Enter the protocol in the ACE to which the packet is matched. **Select from List**: Selects the protocol from the list in the provided field. **ICMP**: Internet Control Message Protocol (ICMP). The ICMP enables the gateway or destination host to communicate with the source host. **IPinIP**: IP in IP encapsulates IP packets to create tunnels between two routers. This ensures that IP in IP tunnel appears as a single interface, rather than several separate interfaces. **TCP:** Transmission Control Protocol (TCP). Enables two hosts to communicate and exchange data streams. TCP guarantees packet delivery, and guarantees that packets are transmitted and received in the order they are sent. EGP Exterior Gateway Protocol (EGP). Permits exchanging routing information between two neighboring gateway hosts in an autonomous systems network. **IGP**: Interior Gateway Protocol (IGP). Enables a routing information exchange between gateways within an autonomous network. **UDP**: User Datagram Protocol (UDP). UDP is a communication protocol that transmits packets but does not guarantee their delivery. **HMP**: The Host Mapping Protocol (HMP) collects network information from various networks hosts. HMP monitors hosts spread over the Internet as well as hosts in a single network. **RDP**: Reliable Data Protocol (RDP). Provides a reliable data transport service for packet-based applications. **IPv6**: Matches the packet to the IPV6 protocol. **IPv6: Rout:** Routing Header for IPv6. **IPv6: Frag:** Fragment Header for IPv6. **RVSP**: Matches the packet to the ReSerVation Protocol (RSVP).

	IPv6: ICMP: The Internet Control Message Protocol (ICMP) allows the gateway or destination host to communicate with the source host. **OSPF**: The Open Shortest Path First (OSPF) protocol is a link-state hierarchical interior gateway protocol (IGP) for network routing Layer Two (2) Tunneling Protocols. It is an extension to the PPP protocol that enables ISPs to operate Virtual Private Networks (VPNs). **PIM**: Matches the packet to Protocol Independent Multicast (PIM). **L2TP**: Matches the packet to Internet Protocol (L2IP).
Source IP Address Value	Enter the source IP address.
Source IP Mask	Enter the mask of the new source IP address.
Destination IP Address Value	Enter the destination IP address.
Destination IP Mask	Enter the mask of the new source IP address.
Type of Service	Select **Any** or **DSCP to match** from drop-down list. When **DSCP to match** is selected, enter the DSCP. The range is from 0 to 63.
ICMP Type	Select **Any, Protocol ID**, or **Select from List** from drop-down menu. **Protocol ID**: Enter the protocol in the ACE to which the packet is matched. The range is from 0 to 255. **Select from List:** Select the ICMP from the list in the provided field.
ICMP Code	Select **Any** or **User Defined** from drop-down menu. When **User Defined** is selected, enter the ICMP code value. The range is from 0 to 255.

Click **Apply** to update the system settings.

IPv6 ACL

This page displays the currently defined IPv6-based ACLs profiles. To add a new ACL, click **Add** and enter the name of the new ACL.



IPv6 ACL

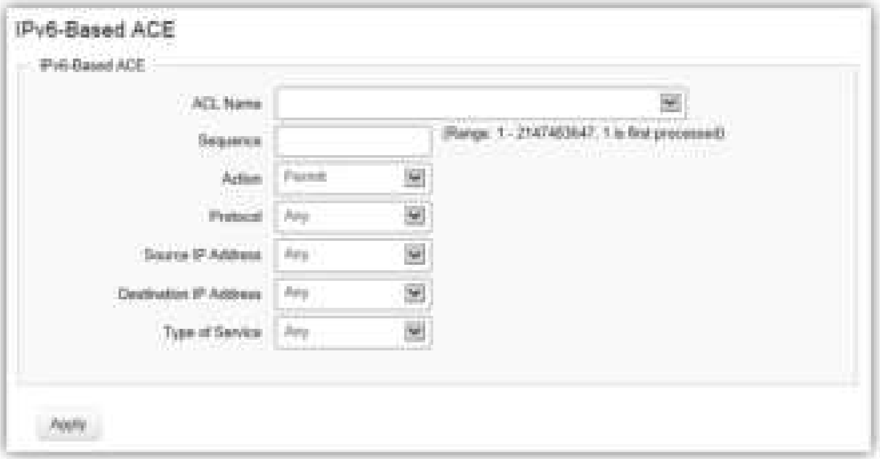
Index	Name
	char : 1 ~ 32

Index	Displays the current number of ACLs.
Name	Enter the IPv6 based ACL name. You can use up to 32 alphanumeric characters.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

IPv6 ACE

Allows IPv6 Based Access Control Entry (ACE) to be defined within a configured ACL.



IPv6-Based ACE

IPv6-Based ACE

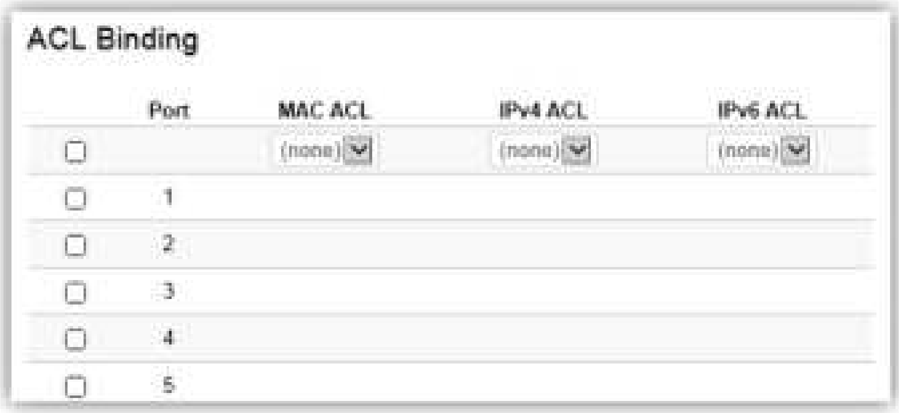
ACL Name	
Sequence	(Range: 1 - 2147483647, 1 is first processed)
Action	Permit
Protocol	Any
Source IP Address	Any
Destination IP Address	Any
Type of Service	Any

ACL Name	Select the ACL from the list.
Sequence	Enter the sequence number which signifies the order of the specified ACL relative to other ACLs assigned to the selected interface. The valid range is from **1** to **2147483647**, 1 being processed first.
Action	Select what action taken if a packet matches the criteria. **Permit**: Forward packets that meet the ACL criteria. **Deny**: Drops packets that meet the ACL criteria.
Protocol	Select the **Any, Protocol ID**, or **Select from List** from drop-down menu. **Protocol ID:** Enter the protocol in the ACE to which the packet is matched. **Select from List:** Select the protocol from the list in the provided field.
Source IP Address Value	Enter the source IP address.
Source IP Prefix Length	Enter the prefix length of the new source IP address. The range is from 0 to 128.
Destination IP Address Value	Enter the destination IP address.
Destination IP Prefix Length	Enter the prefix length of the new source IP address. The range is from 0 to 128.
Source Port	Select **Single** or **Range** from the list. Enter the source port that is matched to packets. The range is from 0 to 65535.
Destination Port	Select **Single** or **Range** from the list. Enter the destination port that is matched to packets. The range is from 0 to 65535.
TCP Flags	Select whether to handle each six TCP control flags; **URG** (Urgent), ACK (Acknowledgment), PSH (Push), RST (Reset), SYN (Synchronize), and FIN (Fin) from drop-down menu. **Don't Care:** The ACE do not treat the TCP control flag. **Set**: The packet with the TCP control flag being set matches the criteria. **Unset**: The packet with the TCP control flag being unset matches the criteria.
Type of Service	Select **Any** or **DSCP to match** from drop down list. When DSCP to match is selected, enter the DSCP. The range is from 0 to 63.

Click **Apply** to update the system settings.

ACL Binding

When an ACL is bound to an interface, all the rules that have been defined for the ACL are applied to that interface. Whenever an ACL is assigned on a port or LAG, flows from that ingress or egress interface that do not match the ACL, are matched to the default rule of dropping unmatched packets. To bind an ACL to an interface, simply select an interface and select the ACL(s) you wish to bind.



ACL Binding

	Port	MAC ACL	IPv4 ACL	IPv6 ACL
☐		(none)	(none)	(none)
☐	1			
☐	2			
☐	3			
☐	4			
☐	5			

Port	Select the port for which the ACLs are bound to.
MAC ACL	Select the MAC ACL rule to apply to the port.
IPv4 ACL	Select the IPv4 ACL rule to apply to the port.
IPv6 ACL	Select the IPv6 ACL rule to apply to the port.

Click **Apply** to update the system settings.

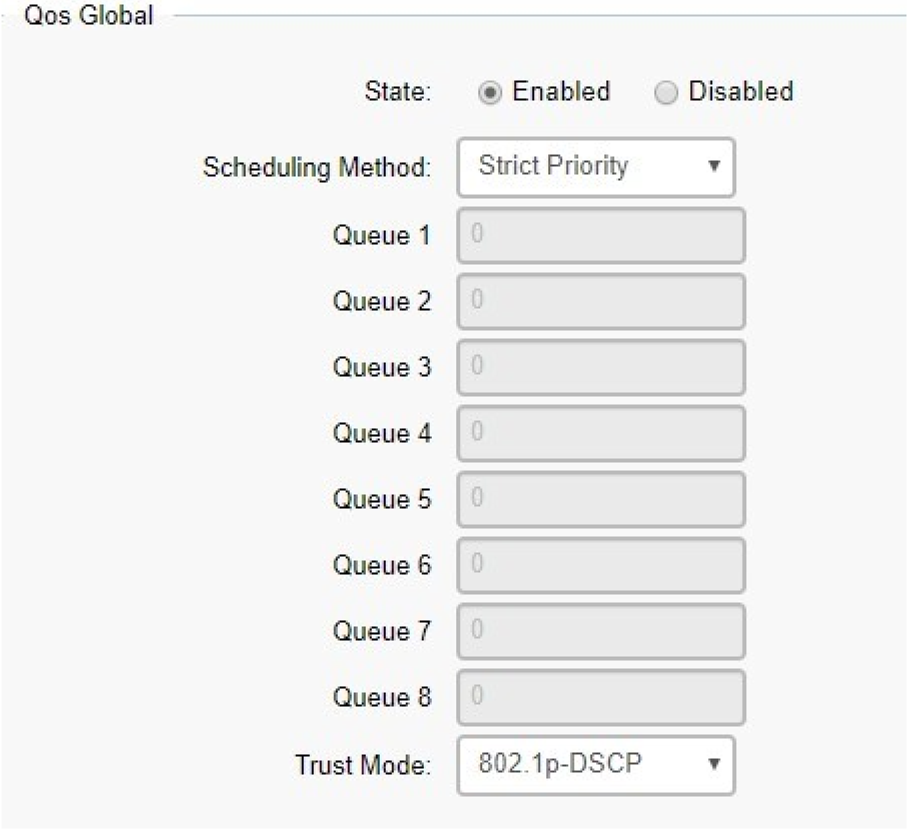
QoS

Quality of Service (QoS) provides the ability to implement priority queuing within a network. QoS is a means of providing consistent and predictable data delivery to the Switch by distinguishing between packets that have stricter timing requirements from those that are more tolerant of delays. QoS enables traffic to be prioritized while avoiding excessive broadcast and multicast traffic. Traffic such as Voice and Video streaming which require minimal delays can be assigned to a high priority queue, while other traffic can be assigned to a lower priority queue, resulting in uninterrupted actions. Without QoS, all traffic data is as likely to be dropped when the network is congested. This can result in reductions in network performance and hinder the network in time-critical situations.

In a Switch, multiple queues per port are often provided to give preference to certain packets over others based on user-defined criteria. When a packet is queued for transmission within a port, the rate at which it is processed depends on how the queue is configured and the amount of traffic present within other queues on the port. If a delay is necessary, packets are held in the queue until they are authorized for transmission.

Global Settings

There are two options for applying QoS information onto packets: the 802.1p Class of Service (CoS) priority field within the VLAN tag of tagged Ethernet frames, and Differentiated Services (DiffServ) Code Point (DSCP). Each port on the Switch can be configured to trust one of the packet fields (802.1p , DSCP or DSCP+802.1p). Packets that enter the Switch's port may carry no QoS information as well. If so, the Switch places such information into the packets before transmitting them to the next node. Thus, QoS information is preserved between nodes within the network and the nodes know which label to give each packet. A trusted field must exist in the packet for the mapping table to be of any use. When a port is configured as untrusted, it does not trust any incoming packet priority designations and uses the port default priority value instead to process the packet.



Qos Global

State: ● Enabled ○ Disabled

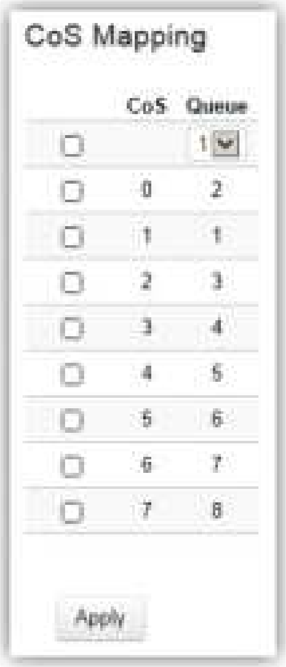
Scheduling Method:	Strict Priority ▾
Queue 1	0
Queue 2	0
Queue 3	0
Queue 4	0
Queue 5	0
Queue 6	0
Queue 7	0
Queue 8	0
Trust Mode:	802.1p-DSCP ▾

State	Select whether QoS is enabled or disabled on the switch.
Scheduling Method	Selects the Strict Priority or WRR to specify the traffic scheduling method. **Strict Priority**: Specifies traffic scheduling based strictly on the queue priority. **WRR**: Use the Weighted Round-Robin (WRR) algorithm to handle packets in priority classes of service. It assigns WRR weights to queues.
Queue 1-8	Select the queue proportion when using the WRR mode.
Trust Mode	Select which packet fields to use for classifying packets entering the Switch. **802.1p-DSCP:** Classify traffic based on 802.1p and DSCP depend on if packet have tar or not. **DSCP**: Classify traffic based on the DSCP (Differentiated Services Code Point) tag value. **802.1p**: Classify traffic based on the 802.1p. The eight priority tags that are specified in IEEE 802.1p are from 1 to 8.

Click **Apply** to update the system settings.

CoS Mapping

Use the Class of Service (CoS) Mapping feature to specify which internal traffic class to map to the corresponding CoS value. CoS allows you to specify which data packets have greater precedence when traffic is buffered due to congestion.



CoS Mapping

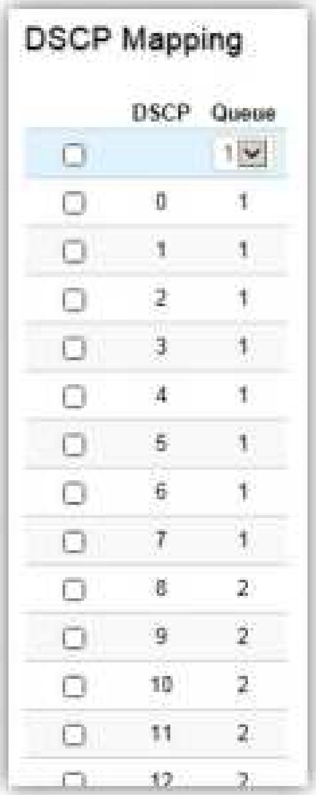
	CoS	Queue
□		1
□	0	2
□	1	1
□	2	3
□	3	4
□	4	5
□	5	6
□	6	7
□	7	8

CoS	Displays the CoS priority tag values, where 0 is the lowest and 7 is the highest.
Queue	Check the CoS priority tag box and select the Queue values for each CoS value in the provided fields. Eight traffic priority queues are supported and the field values are from 1 to 8, where one is the lowest priority and eight is the highest priority.

Click **Apply** to update the system settings.

DSCP Mapping

Use Differentiated Services Code Point (DSCP) Mapping feature to specify which internal traffic class to map to the corresponding DSCP values. DSCP Mapping increases the number of definable priority levels by reallocating bits of an IP packet for prioritization purposes.



DSCP Mapping

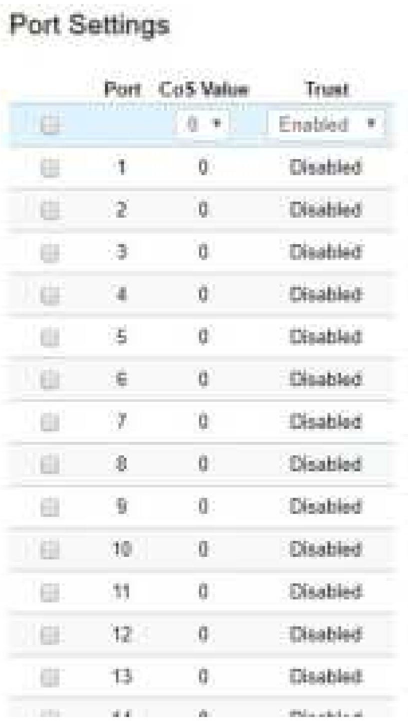
	DSCP	Queue
□		1 ▾
□	0	1
□	1	1
□	2	1
□	3	1
□	4	1
□	5	1
□	6	1
□	7	1
□	8	2
□	9	2
□	10	2
□	11	2
□	12	2

DSCP	Displays the packet's DSCP values, where 0 is the lowest and 10 is the highest.
Queue	Check the CoS priority tag box and select the Queue values for each DSCP in the provided fields. Eight traffic priority queues are supported and the field values are from 1 to 8, where one is the lowest priority and eight is the highest priority.

Click **Apply** to update the system settings.

Port Settings

From here, you can configure the QoS port settings for the Switch. Select a port you wish to set and choose a CoS value from the dropdown box. Next, select to enable or disable the Trust setting to let any CoS packet be marked at ingress.



Port Settings

	Port	CoS Value	Trust
□		0 ▾	Enabled ▾
□	1	0	Disabled
□	2	0	Disabled
□	3	0	Disabled
□	4	0	Disabled
□	5	0	Disabled
□	6	0	Disabled
□	7	0	Disabled
□	8	0	Disabled
□	9	0	Disabled
□	10	0	Disabled
□	11	0	Disabled
□	12	0	Disabled
□	13	0	Disabled
□	14	0	Disabled

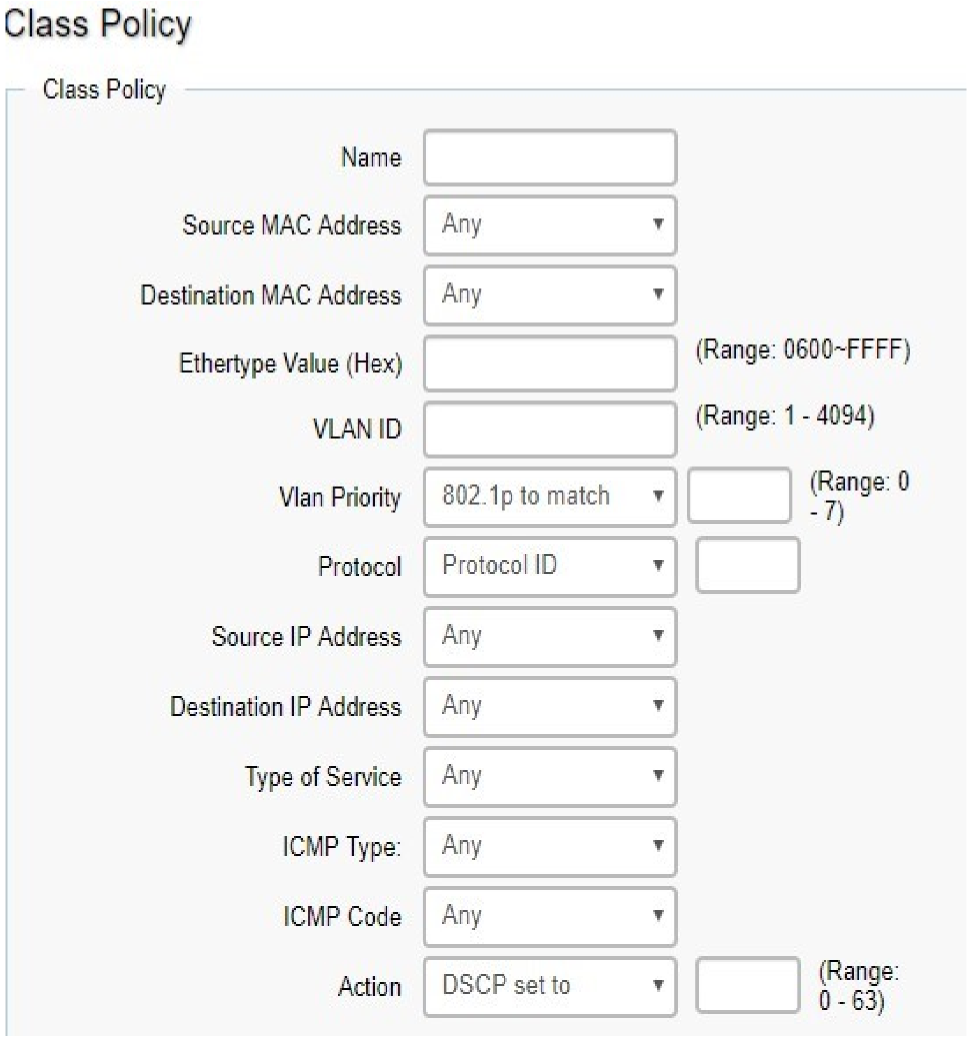
Port	Displays the ports for which the CoS parameters are defined.
CoS Value	Select the CoS priority tag values, where 0 is the lowest and 7 is the highest.
Trust	Select Enabled to trust any CoS packet marking at ingress. Select Disabled to not trust any CoS packet marking at ingress.

Click **Apply** to update the system settings.

Advanced Settings

Set the new 802.1p or DSCP value on specific packets.

Class Mapping



Class Policy

Class Policy

Name			
Source MAC Address	Any ▾		
Destination MAC Address	Any ▾		
Ethertype Value (Hex)		(Range: 0600~FFFF)	
VLAN ID		(Range: 1 - 4094)	
Vlan Priority	802.1p to match ▾		(Range: 0 - 7)
Protocol	Protocol ID ▾		
Source IP Address	Any ▾		
Destination IP Address	Any ▾		
Type of Service	Any ▾		
ICMP Type:	Any ▾		
ICMP Code	Any ▾		
Action	DSCP set to ▾		(Range: 0 - 63)

Name	Set the class policy name.
Source Mac Address	Define the source MAC address.
Destination Mac Address	Define the destination MAC address.
Ethertype Value	Define the specific ehtertype.
VLAN ID	Define the specific VLAN ID
VLAN Priority	Define the VLAN or 802.1p value.
Protocol	Define the specific protocol. (select from list or protocol ID)
Source IP Address	Define the source IP address.
Destination IP Address	Define the destination IP address.
Type of Service	Define the specific ToS.
Action	Set the packet 802.1p value or DSCP to specific vlan when packet meet the rule.

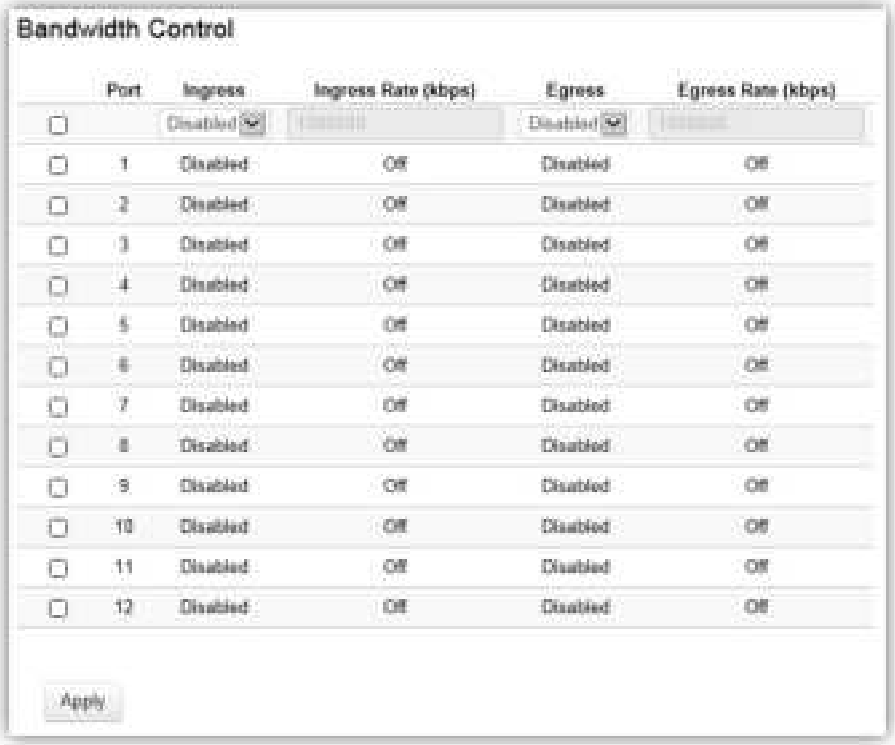
Policy Mapping

Display the information with class mapping.

Policy Name	Display the policy name when any packet meet in the class mapping.
Binding Ports	Display the binding ports when any packet meet in the class mapping.

Bandwidth Control

The Bandwidth Control feature allows users to define the bandwidth settings for a specified port's Ingress Rate Limit and Egress Rate.



Bandwidth Control

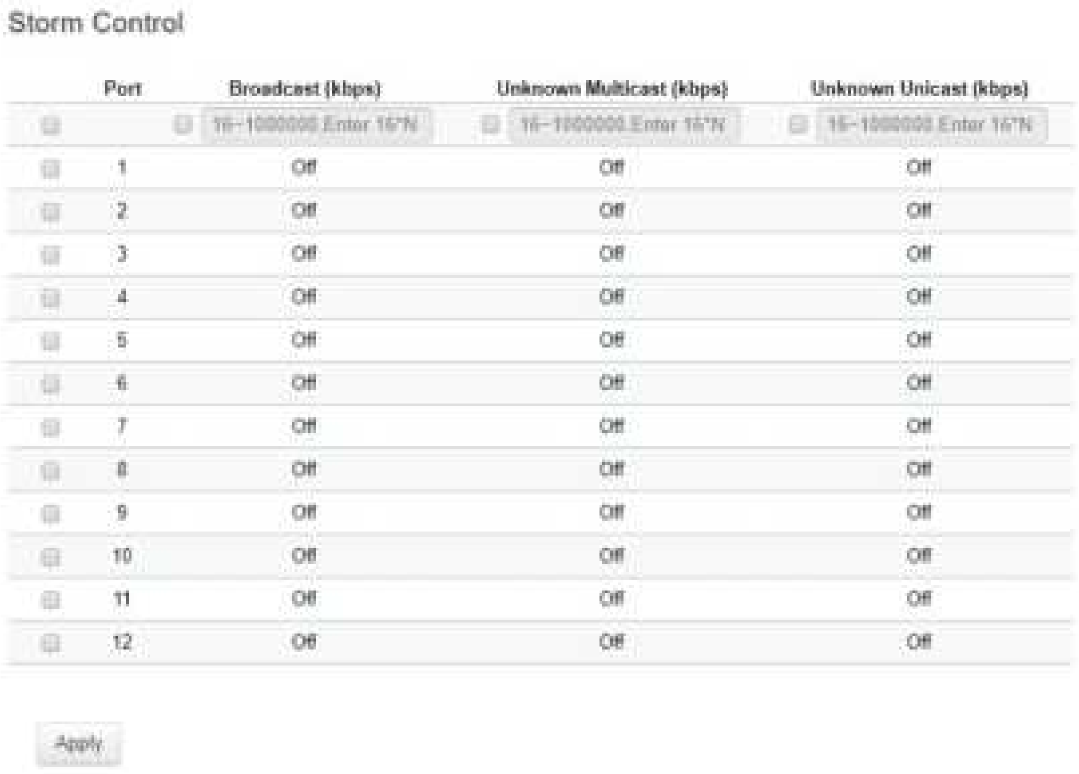
	Port	Ingress	Ingress Rate (kbps)	Egress	Egress Rate (kbps)
□		Disabled		Disabled	
□	1	Disabled	Off	Disabled	Off
□	2	Disabled	Off	Disabled	Off
□	3	Disabled	Off	Disabled	Off
□	4	Disabled	Off	Disabled	Off
□	5	Disabled	Off	Disabled	Off
□	6	Disabled	Off	Disabled	Off
□	7	Disabled	Off	Disabled	Off
□	8	Disabled	Off	Disabled	Off
□	9	Disabled	Off	Disabled	Off
□	10	Disabled	Off	Disabled	Off
□	11	Disabled	Off	Disabled	Off
□	12	Disabled	Off	Disabled	Off

Port	Displays the ports for which the bandwidth settings are displayed.
Ingres	Select enable or disable ingress on the interface.
Ingress Rate	Enter the ingress rate in kilobits per second. The gigabit Ethernet ports have a maximum speed of 1000000 kilobits per second.
Egress	Select from the drop-down box to Enable or Disable egress on the interface.
Egress Rate	Enter the egress rate in kilobits per second. The gigabit Ethernet ports have a maximum speed of 1000000 kilobits per second.

Click **Apply** to update the system settings.

Storm Control

Storm Control limits the amount of Broadcast, Unknown Multicast, and Unknown Unicast frames accepted and forwarded by the Switch. Storm Control can be enabled per port by defining the packet type and the rate that the packets are transmitted at. The Switch measures the incoming Broadcast, Unknown Multicast, and Unknown Unicast frames rates separately on each port, and discards the frames when the rate exceeds a user-defined rate.



Storm Control

	Port	Broadcast (kbps)	Unknown Multicast (kbps)	Unknown Unicast (kbps)
□		□ 16~1000000 Enter 16*N	□ 16~1000000 Enter 16*N	□ 16~1000000 Enter 16*N
□	1	Off	Off	Off
□	2	Off	Off	Off
□	3	Off	Off	Off
□	4	Off	Off	Off
□	5	Off	Off	Off
□	6	Off	Off	Off
□	7	Off	Off	Off
□	8	Off	Off	Off
□	9	Off	Off	Off
□	10	Off	Off	Off
□	11	Off	Off	Off
□	12	Off	Off	Off

Port	Displays the ports for which the Storm Control information is displayed.
Status	Select whether Storm Control is Enabled or Disabled ingress on the interface.
Broadcast	Enter the broadcast rate in kilobits per second. The Gigabit Ethernet ports have a maximum speed of 1000000 kilobits per second. If the rate of broadcast traffic ingress on the interface increases beyond the configured threshold, the traffic is dropped.

Unknown Multicast	Enter the Unknown Multicast rate in kilobits per second. The gigabit Ethernet ports have a maximum speed of 1000000 kilobits per second. If the rate of broadcast traffic ingress on the interface increases beyond the configured threshold, the traffic is dropped.
Unknown Unicast	Enter the Unknown Unicast rate in kilobits per second. The gigabit Ethernet ports have a maximum speed of 1000000 kilobits per second. If the rate of broadcast traffic ingress on the interface increases beyond the configured threshold, the traffic is dropped.

Click **Apply** to update the system settings.

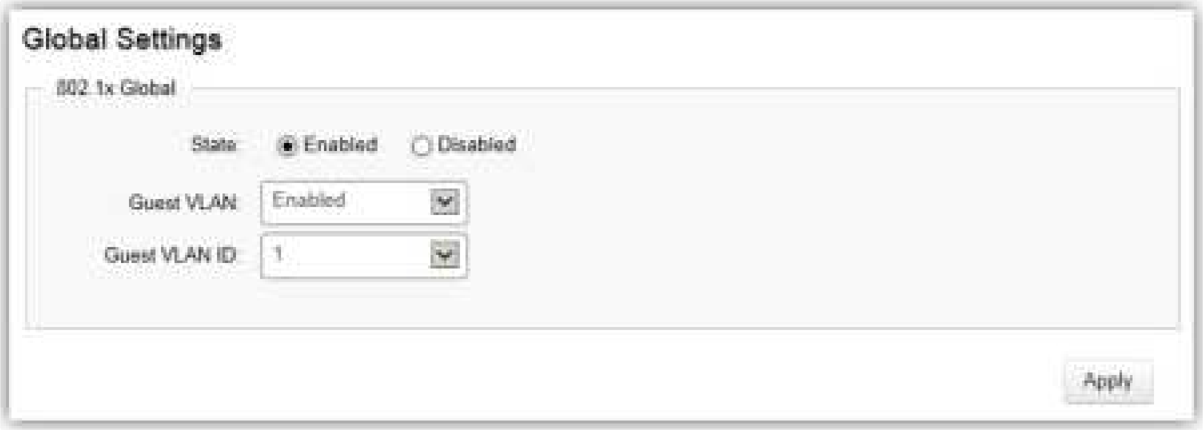
Security

802.1x

The IEEE 802.1X standard authentication uses the RADIUS (Remote Authentication Dial In User Service) protocol to validate users and provide a security standard for network access control. The user that wishes to be authenticated is called a supplicant. The actual server doing the authentication, typically a RADIUS server, is called the authentication server. The mediating device, such as a Switch, is called the authenticator. Clients connected to a port on the Switch must be authenticated by the Authentication server (RADIUS) before accessing any services offered by the Switch on the LAN. Use a RADIUS server to authenticate users trying to access a network by relaying Extensible Authentication Protocol over LAN (EAPOL) packets between the client and server. This establishes the requirements needed for a protocol between the authenticator (the system that passes an authentication request to the authentication server) and the supplicant (the system that requests authentication), as well as between the authenticator and the authentication server.

Global Settings

When a supplicant is connected to a Switch port, the port issues an 802.1X authentication request to the attached the 802.1X supplicant. The supplicant replies with the given username and password in an authentication request, then passed to a configured RADIUS server. The authentication server's user database supports Extended Authentication Protocol (EAP), which allows particular guest VLAN memberships to be defined based on each individual user. Before successful authorization, the port connected to the authenticated supplicant becomes a member of the specified guest VLAN. When the supplicant is successfully authenticated, traffic will be automatically assigned to the VLAN user configured in 802.1Q VLAN. The EAP authentication methods supported by the Switch are: EAP-MD5, EAPTLS, EAP-TTLS, and EAP-PEAP.



Global Settings

802.1x Global

State: ● Enabled ○ Disabled

Guest VLAN: Enabled

Guest VLAN ID: 1

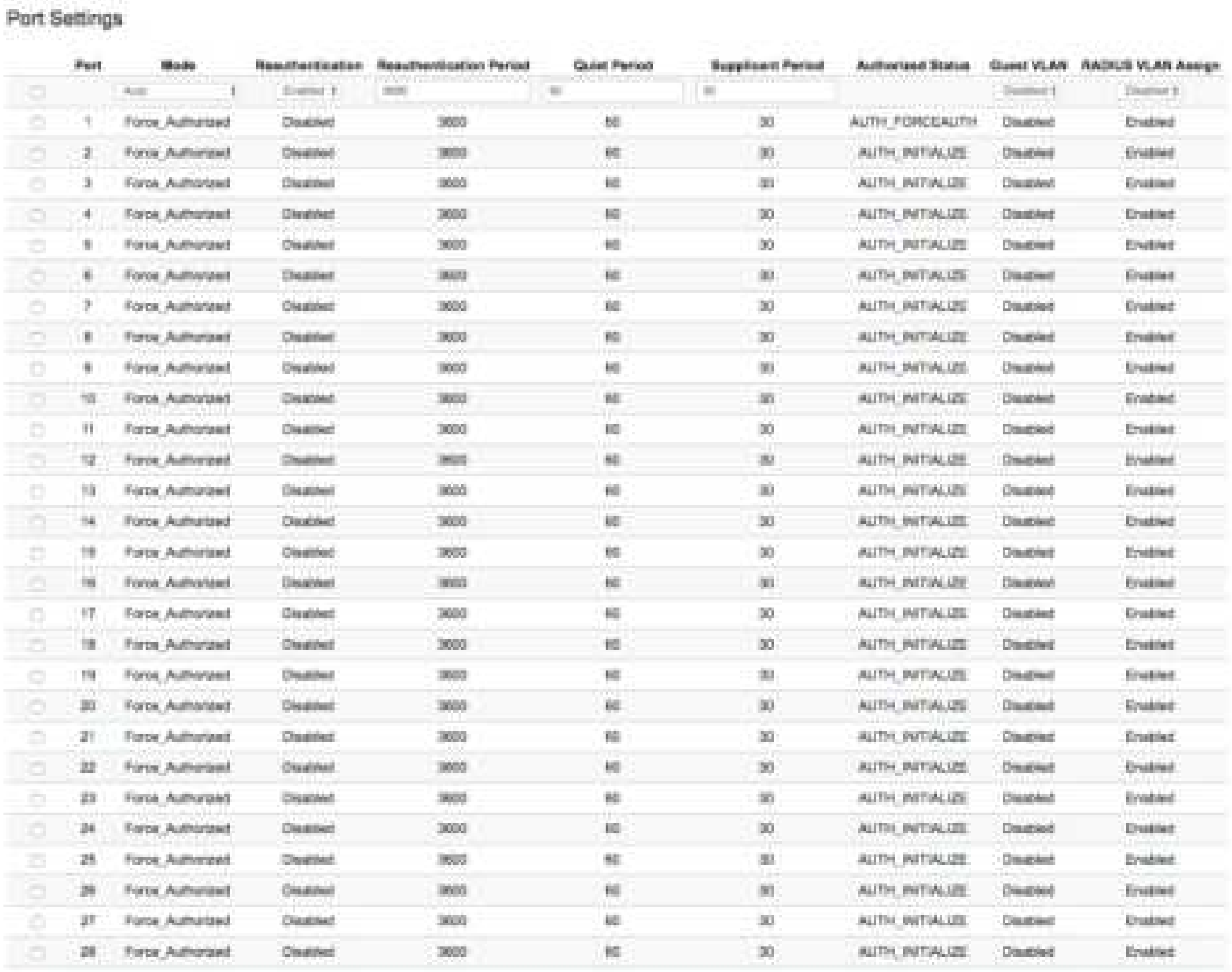
State	Select authentication is Enabled or Disabled on the Switch.
Guest VLAN	Select Guest VLAN is Enabled or Disabled on the Switch. The default is Disabled.
Guest VLAN ID	Select the guest VLAN ID from the list of currently defined VLANs.

Click **Apply** to update the system settings.

Port Settings

The IEEE 802.1X port-based authentication provides a security standard for network access control with RADIUS servers and holds a network port block, until authentication is completed. With 802.1X port-based authentication, the supplicant provides the required credentials, such as user name, password, or digital certificate to the authenticator, and the authenticator forwards the credentials to the authentication server for verification. If the authentication server determines the credentials are valid, the supplicant is allowed to access resources located on the protected side of the network.

From here, you can configure the port settings as they relate to 802.1X. First, select the mode you wish to utilize from the drop-down box. Next, choose enable or disable re-authentication setting for the port. Enter the time span that you wish to elapse for the re-authentication Period, Quiet Period, and Supplicant Period. After this, enter the max number of times you wish for the Switch to retransmit the EAP request. Finally, choose you wish to enable or disable the Guest VLAN.



Port Settings

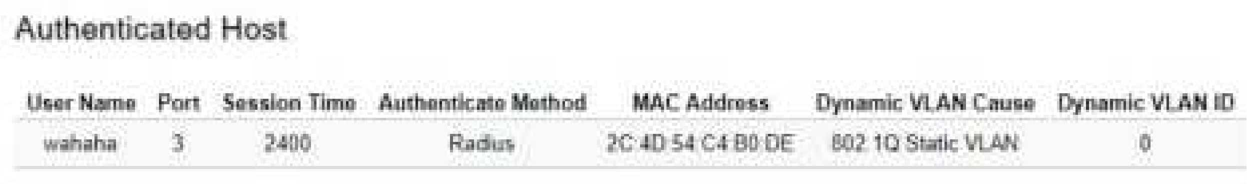
○	Port	Mode	Reauthentication	Reauthentication Period	Quiet Period	Supplicant Period	Authorized Status	Guest VLAN	RADIUS VLAN Assign
○		Auto	Enabled	3600	60	30		Disabled	Disabled
○	1	Force_Authorized	Disabled	3600	60	30	AUTH_FORCEAUTH	Disabled	Enabled
○	2	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	3	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	4	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	5	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	6	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	7	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	8	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	9	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	10	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	11	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	12	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	13	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	14	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	15	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	16	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	17	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	18	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	19	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	20	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	21	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	22	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	23	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	24	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	25	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	26	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	27	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled
○	28	Force_Authorized	Disabled	3600	60	30	AUTH_INITIALIZE	Disabled	Enabled

Port	Displays the ports for which the 802.1X information is displayed.
Mode	Select Auto or Force_UnAuthorized or Force_Authorized mode from the list.
Re-Authentication	Select port re-authentication is Enabled or Disabled.
Re-authentication period	Enter the time span in which the selected port is re-authenticated. The default is 3600 seconds.
Quiet Period	Enter the number of the device that remains in the quiet state following a failed authentication exchange. The default is 60 seconds.
Supplicant Period	Enter the amount of time that lapses before an EAP request is resent to the supplicant. The default is 30 seconds.
Authorized Status	Displays the authorized status of 802.1x information.
Guest VLAN	Select guest VLAN is Enabled or Disabled on specific ports.
RADIUS VLAN Assign	Enable the feature client will get the VLAN from RADIUS server.

Click **Apply** to update the system settings.

Authenticated Host

The Authenticated Host section displays the Authenticated Port, Authenticated Method, and Mac Address.



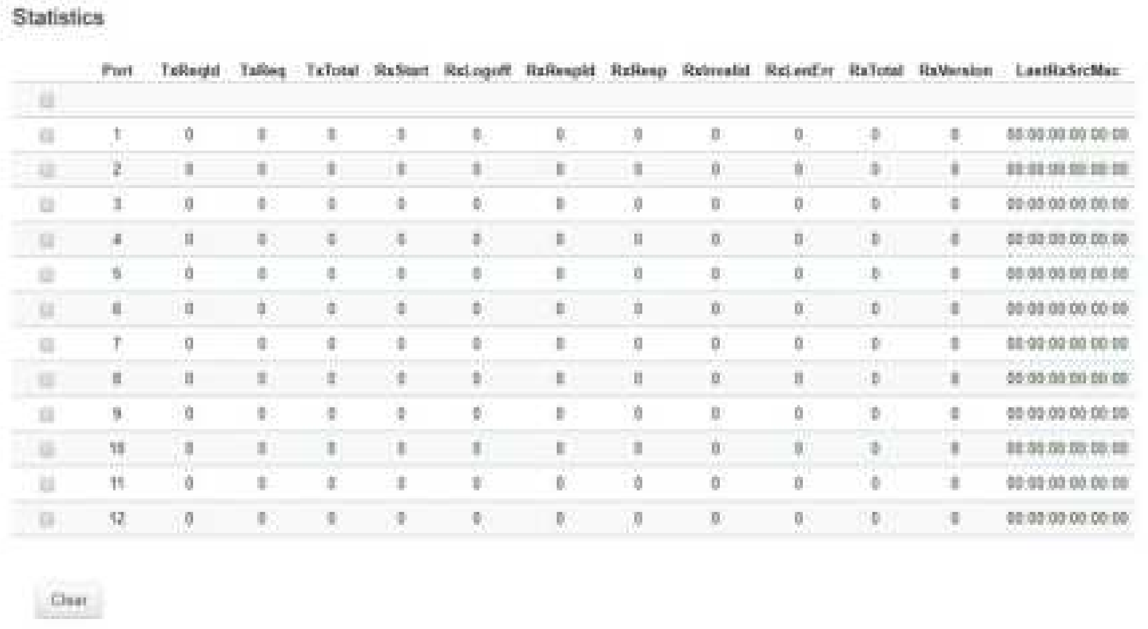
Authenticated Host

User Name	Port	Session Time	Authenticate Method	MAC Address	Dynamic VLAN Cause	Dynamic VLAN ID
wahaha	3	2400	Radius	2C:4D:54:C4:B0:DE	802.1Q Static VLAN	0

User Name	Display client's username via 802.1x RADIUS server authentication.
Port	Display client's authenticated port number.
Session Time	Display client's 802.1x session time.
Authenticate Method	Display client's authenticated method.
MAC Address	Display client's MAC address.
Dynamic VLAN Cause	Display client's VLAN information.
Dynamic VLAN ID	Display client's VLAN ID if RADIUS server assign it.

Statistics

Display 802.1x related packet counters and source MAC of last received 802.1x packet on each port.



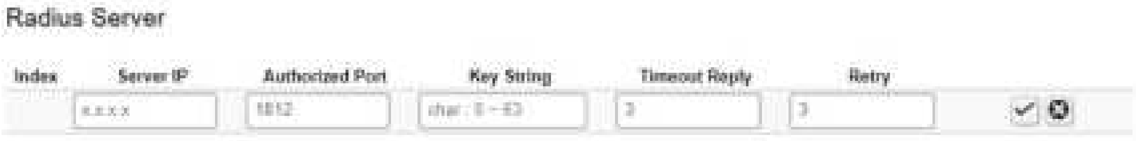
Statistics

	Port	TxReqId	TxReq	TxTotal	RxStart	RxLogoff	RxRespId	RxResp	RxInvalid	RxLenErr	RxTotal	RxVersion	LastRxSrcMac
□													
□	1	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	2	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	3	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	4	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	5	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	6	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	7	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	8	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	9	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	10	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	11	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00
□	12	0	0	0	0	0	0	0	0	0	0	0	00:00:00:00:00:00

Click **Clear** to clear 802.1x packet counters on specific ports.

RADIUS Server

RADIUS servers are used for centralized administration. Remote Authentication Dial In User Service (RADIUS) is a networking protocol that provides centralized Authentication, Authorization, and Accounting (AAA) management for users that connect and use a network service for greater convenience. RADIUS is a server protocol that runs in the application layer, using UDP as transport. The Network Switch with port-based authentication and all have a RADIUS client component that communicates with the RADIUS server. Clients connected to a port on the Switch must be authenticated by the Authentication server before accessing services offered by the Switch on the LAN. Use a RADIUS server to authenticate users trying to access a network by relaying Extensible Authentication Protocol over LAN (EAPOL) packets between the client and server. The RADIUS server maintains a user database, which contains authentication information. The Switch passes information to the configured RADIUS server, which can authenticate a user name and password before authorizing use of the network.



Radius Server

Index	Server IP	Authorized Port	Key String	Timeout Reply	Retry	
	x.x.x.x	1812	char : 0 ~ 63	3	3	✓ ☒

Index	Displays the index for which RADIUS server is displayed.
Server IP	Enter the RADIUS server IP address.
Authorized Port	Enter the authorized port number. The default port is 1812.
Accounting Port	Enter the name you wish to use to identify this Switch.
Key String	Enter the key string used for encrypting all RADIUS communication between the device and the RADIUS server.
Timeout Reply	Enter the time device waits for an answer from the RADIUS server before switching to the next server. The default value is 3.
Retry	Enter the number of transmitted requests sent to the RADIUS server before a failure occurs. The default is 3.

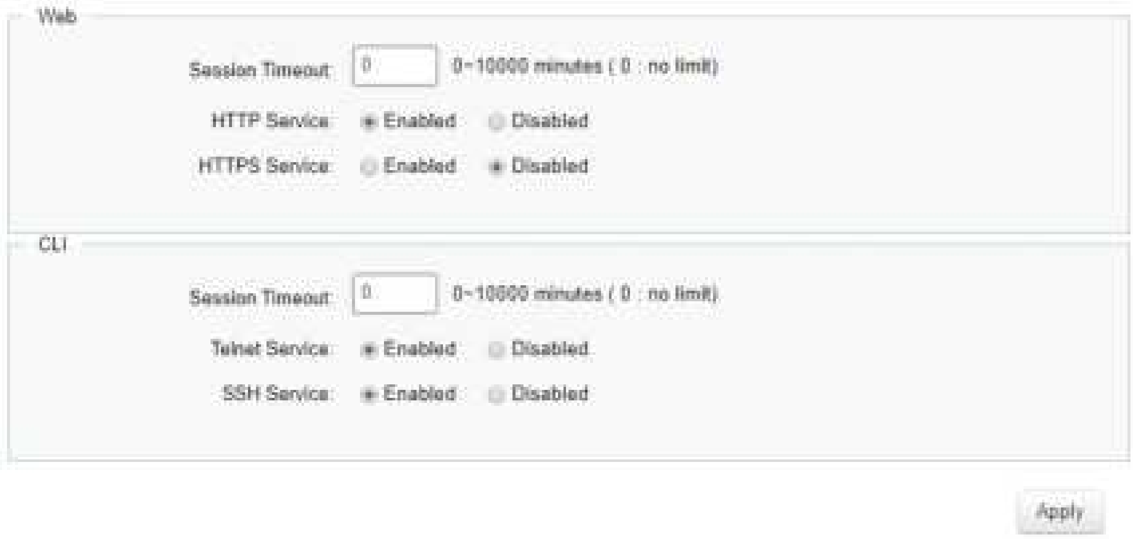
Click the **Apply** button ✓ to accept the changes or the **Cancel** button ☒ to discard them.

Access

The Linksys switch provides a built-in browser interface that you can configure and manage the Switch via Hypertext Transfer Protocol (HTTP) and Hypertext Transfer Protocol Secure (HTTPS) requests selectively to help prevent security breaches on the network. You can manage your HTTP and HTTPS settings for the Switch further by configuring session timeouts for HTTP and HTTPS requests. Select enable or disable the HTTP service and enter the HTTP Timeout session. Next, select enable or disable the HTTPS service and enter the HTTPS timeout session for the Switch.

The Telnet protocol is a standard Internet protocol which enables terminals and applications to interface over the Internet with remote hosts by providing Command Line Interface (CLI) communication using a virtual terminal connection. This protocol provides the basic rules for making it possible to link a client to a command interpreter. The Telnet service for the Switch is enabled by default. Please note that for secure communication, it is better to use SSH over Telnet.

Secure Shell (SSH) is a cryptographic network protocol for secure data communication network services. SSH is a way of accessing the command line interface on the network Switch. The traffic is encrypted, so it is difficult to eavesdrop on as it creates a secure connection within an insecure network such as the Internet. Even if an attacker was able to view the traffic, the data would be incomprehensible without the correct encryption key to decode it.



Web

Session Timeout: 0 0~10000 minutes (0 : no limit)

HTTP Service: ● Enabled ○ Disabled

HTTPS Service: ○ Enabled ● Disabled

CLI

Session Timeout: 0 0~10000 minutes (0 : no limit)

Telnet Service: ● Enabled ○ Disabled

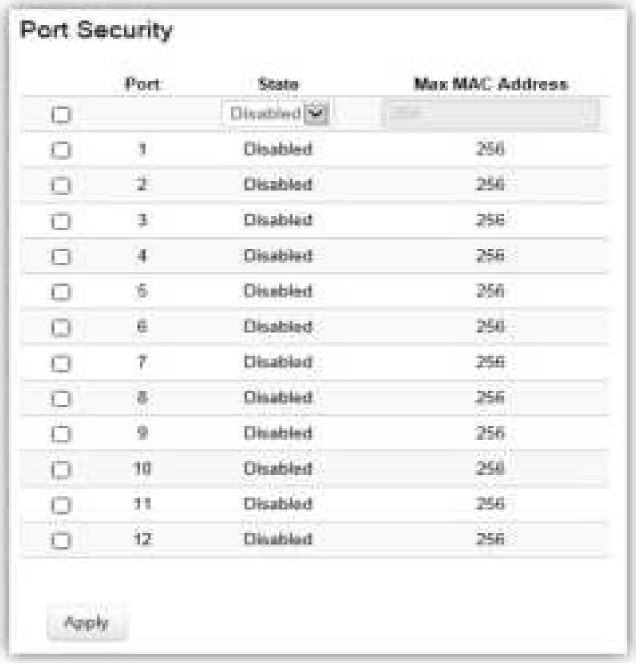
SSH Service: ● Enabled ○ Disabled

HTTP Session Timeout	Enter the amount of time that elapses before HTTP is timed out. The default is 5 minutes. The range is from 0 to 10000 minutes.
HTTP Service	Select HTTP service for the Switch is Enabled or Disabled. This is enabled by default.
HTTPS Service	Select the HTTP service is Enabled or Disabled. This is disabled by default.
CLI Session Timeout	Enter the amount of time that elapses before telnet/SSH is timed out. The default is 5 minutes. The range is from 0 to 10000 minutes.
Telnet Service	Select Telnet service for the Switch is Enabled or Disabled. This is enabled by default.
SSH Service	Select the SSH service is Enabled or Disabled. This is disabled by default.

Click **Apply** to update the system settings.

Port Security

Network security can be increased by limiting access on a specific port to users with specific MAC addresses. Port Security prevents unauthorized device to the Switch prior to stopping auto-learning processing.



Port Security

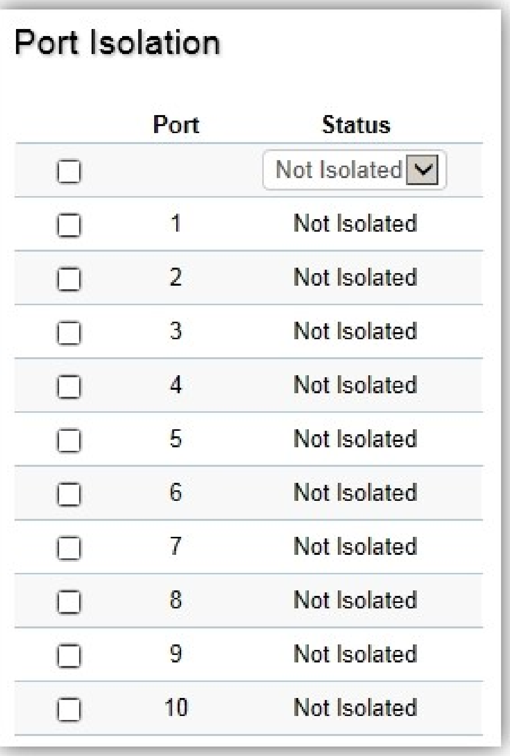
	Port	State	Max MAC Address
□		Disabled	
□	1	Disabled	256
□	2	Disabled	256
□	3	Disabled	256
□	4	Disabled	256
□	5	Disabled	256
□	6	Disabled	256
□	7	Disabled	256
□	8	Disabled	256
□	9	Disabled	256
□	10	Disabled	256
□	11	Disabled	256
□	12	Disabled	256

Max MAC Address	Enter the maximum number of MAC addresses that can be learned on the port. The range is from 1 to 256.
Port	Displays the port for which the port security is defined.
State	Select Enabled or Disabled for the port security feature for the selected port.

Click **Apply** to update the system settings.

Port Isolation

Port Isolation feature provides L2 isolation between ports within the same broadcast domain. When enabled, **Isolated ports** can forward traffic to **Not Isolated ports,** but not to other **Isolated ports**. **Not Isolated ports** can send traffic to any port; whether **Isolated** or **Not Isolated**. The default setting is **Not Isolated**.



Port Isolation

	Port	Status
□		Not Isolated ▼
□	1	Not Isolated
□	2	Not Isolated
□	3	Not Isolated
□	4	Not Isolated
□	5	Not Isolated
□	6	Not Isolated
□	7	Not Isolated
□	8	Not Isolated
□	9	Not Isolated
□	10	Not Isolated

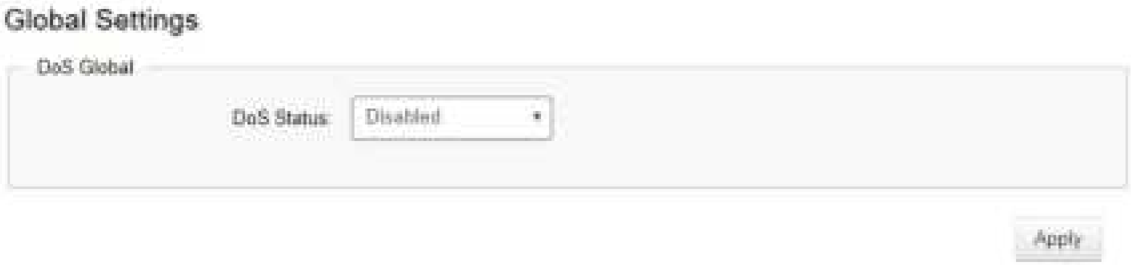
Click **Apply** to update the system settings.

DoS

DoS (Denial of Service) is used for classifying and blocking specific types of DoS attacks. From here, you can configure the Switch to monitor and block different types of attacks.

Global Settings

On this page, the user can enable or disable the prevention of DoS attacks globally. When enabled, the switch will drop the packets matching the types of DoS attack detected.



Global Settings

DoS Global

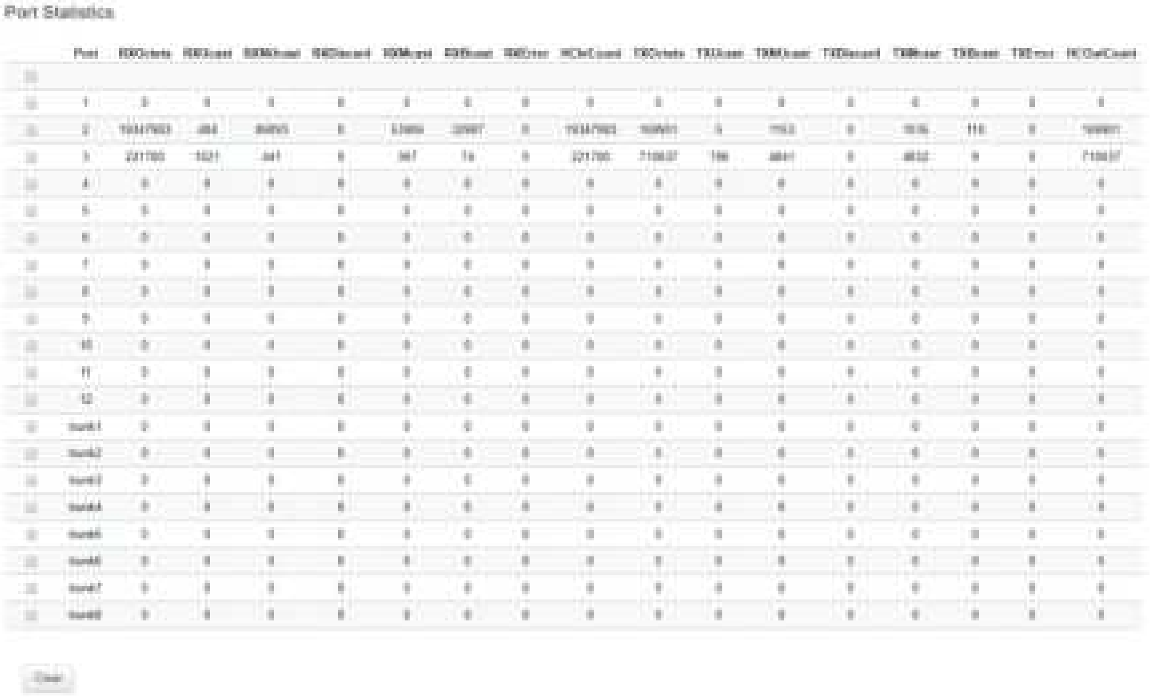
DoS Status: Disabled

Click **Apply** to update the system settings.

Monitoring

Port Statistics

The Port Statistics page displays a summary of all port traffic statistics.



Port Statistics

	Port	RXOctets	RXUcast	RXNUcast	RXDiscard	RXMcast	RXBcast	RXError	HCInCount	TXOctets	TXUcast	TXNUcast	TXDiscard	TXMcast	TXBcast	TXError	HCOutCount
□																	
□	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	2	19347923	484	89853	0	53969	32987	0	19347923	169691	5	1153	0	1036	116	0	169691
□	3	221700	1021	441	0	367	74	0	221700	710637	786	4841	0	4832	9	0	710637
□	4	0	0	0	0	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	0	0	0	0
□	6	0	0	0	0	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	0	0	0	0
□	8	0	0	0	0	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	0	0	0	0
□	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	trunk8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Port	Displays the port for which statistics are displayed.
RXOctets	Displays the number of all octets received on the port.
RXUcast	Displays the number of unicast packets received on the port.
RXNUcast	Displays the number of non-unicast packets received on the port.
RXDiscard	Displays the number of received packets discarded on the port.
TXOctets	Displays the number of all octets transmitted on the port.
TXUcast	Displays the number of unicast packets transmitted on port.
TXNUcast	Displays the number of unicast packets transmitted on the port.
TXDiscard	Displays the number of transmitted packets discarded on the port.
RXMcast	Displays the number of multicast packets received on the port.
RXBcast	Displays the number of broadcast packets received on the port.
TXMcast	Displays the number of multicast packets transmitted on the port.
TXBcast	Displays the number of broadcast packets transmitted on the port.

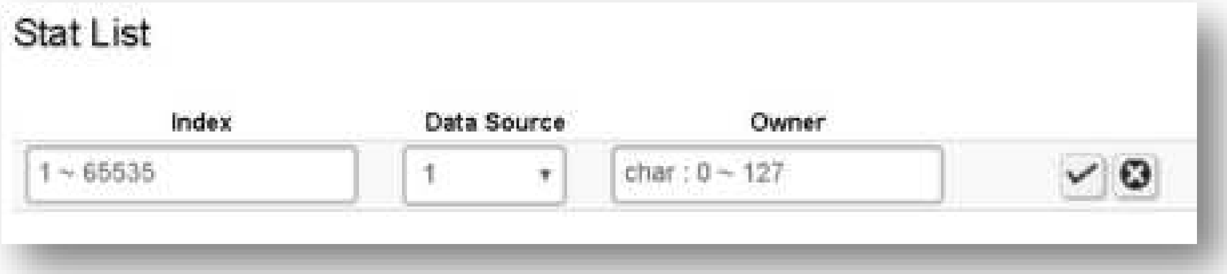
Click **Clear** to clear packet counters on specific ports.

RMON

Remote Network Monitoring, or RMON is used for support monitoring and protocol analysis of LANs by enabling various network monitors and console systems to exchange network monitoring data through the Switch.

Stat List

The Status List defines RMON status on the switch.

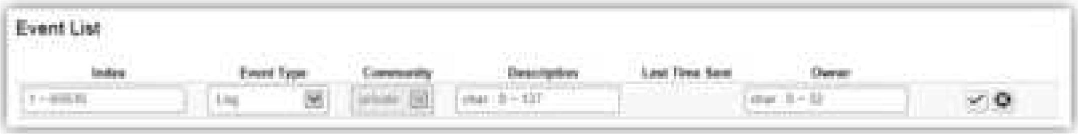


Index	Enter the entry number for event.
Data Source	Select the data source from the port.
Owner	Enter the switch that defined the event.

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Event List

The Event List defines RMON events on the Switch.

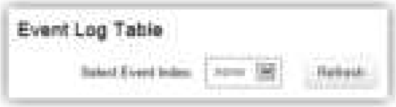


Index	Enter the entry number for event.
Event Type	Select the event type. Log: The event is a log entry. SNMP Trap: The event is a trap. Log & Trap: The event is both a log entry and a trap.
Community	Enter the community to which the event belongs.
Description	Displays the number of good broadcast packets received on the interface.
Last Time Sent	Displays the time that event occurred.
Owner	Enter the switch that defined the event.

Click the Apply button ✓ to accept the changes or the Cancel button ⊗ to discard them.

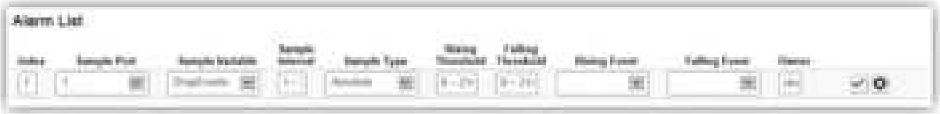
Event Log Table

From here, you can view specific event logs for the switch. Choose an event log you wish to view from the drop-down list.



Alarm List

You can configure network alarms to occur when a network problem is detected. Choose your preferences for the alarm from the drop-down boxes.



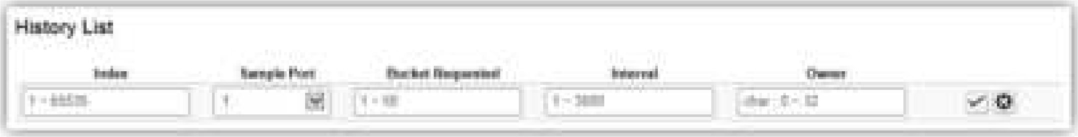
Alarm List

Index	Sample Port	Sample Variable	Sample Interval	Sample Type	Rising Threshold	Falling Threshold	Rising Event	Falling Event	Owner
1	1	DropEvents	[illegible]	Absolute	[illegible]	[illegible]			[illegible]

Index	Enter the entry number for the Alarm List.
Sample Port	Select the port from which the alarm samples were taken.
Sample Variable	Select the variable of samples for the specified alarm sample.
Sample Interval	Enter the alarm interval time.
Sample Type	Select the sampling method for the selected variable and comparing the value against the thresholds. Absolute: Compares the values with the thresholds at the end of the sampling interval. Delta: Subtracts the last sampled value from the current value.
Rising Threshold	Enter the rising number that triggers the rising threshold alarm.
Falling Threshold	Enter the falling number that triggers the falling threshold alarm.
Rising Event	Enter the event number by the falling alarm are reported.
Falling Event	Enter the event number by the falling alarms are reported.
Owner	Enter the Switch that defined the alarm.

Click the Apply button ✓ to accept the changes or the Cancel button ⊗ to discard them.

History List



History List

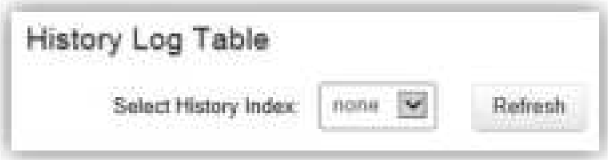
Index	Sample Port	Bucket Requested	Interval	Owner
1 - 65535	1	1 - 50	1 - 3600	char : 0 - 32

Index	Enter the entry number for the History List.
Sample Port	Select the port from which the history samples were taken.
Bucket Requested	Enter the number of samples to be saved. The range is from 1 to 50.
Interval	Enter the time that samples are taken from the ports. The field range is from 1 to 3600.
Owner	Enter the RMON user that requested the RMON information. The range is from 0 to 32 characters.

Click the Apply button ✓ to accept the changes or the Cancel button ⊗ to discard them.

History Log Table

From here, you can view the History Index for history logs on the Switch. Select a history index to view from the drop-down box.

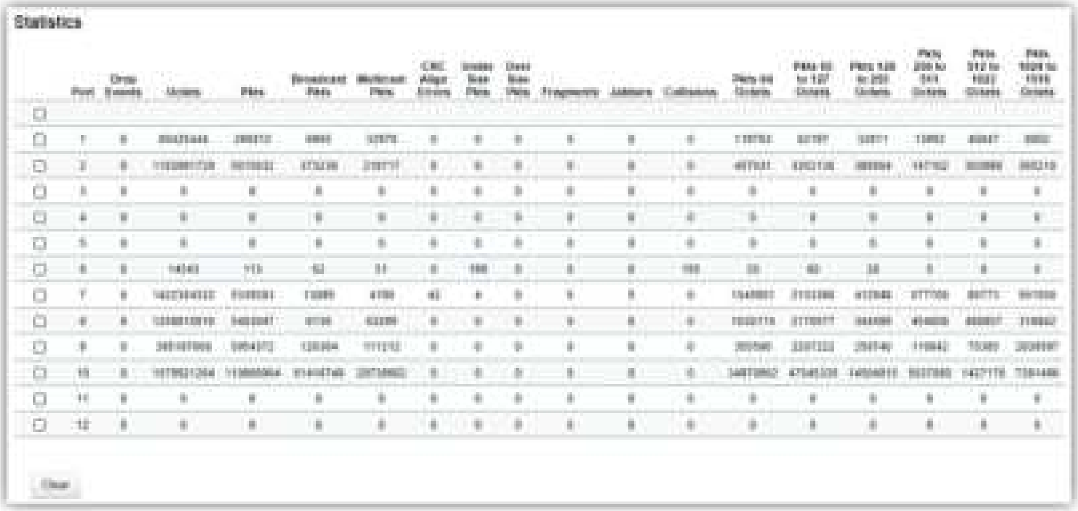


History Log Table

Select History Index: none

Statistics

From here, you can view all the RMON statistics of the Switch.



Statistics

	Port	Drop Events	Octets	Pkts	Broadcast Pkts	Multicast Pkts	CRC Align Errors	Undersize Pkts	Oversize Pkts	Fragments	Jabbers	Collisions	Pkts 64 Octets	Pkts 65 to 127 Octets	Pkts 128 to 255 Octets	Pkts 256 to 511 Octets	Pkts 512 to 1023 Octets	Pkts 1024 to 1518 Octets
□																		
□	1	0	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□	2	0	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□	3	0	0	0	0	0	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	0	0	0	0	0
□	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	6	0	14143	113	52	31	0	598	0	0	0	193	33	60	18	0	0	0
□	7	0	[illegible]	[illegible]	[illegible]	[illegible]	42	4	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□	8	0	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□	9	0	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□	10	0	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
□	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
□	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Port	Indicates the specific port for which RMON statistics are displayed.
Drop Events	Displays the number of dropped events that have occurred on the port.
Octets	Displays the number of octets received on the port.
Pkts	Displays the number of packets received on the port.
Broadcast Pkts	Displays the number of good broadcast packets received on the port. This number does not include Multicast packets.
Multicast Pkts	Displays the number of good Multicast packets received on the port.

CRC & Align Errors	Displays the number of CRC and Align errors that have occurred on the port.
Undersize Pkts	Displays the number of undersized packets (less than 64 octets) received on the port.
Oversize Pkts	Displays the number of oversized packets (over 1518 octets) received on the port.
Fragments	Displays the number of fragments received on the port.
Jabbers	Displays the total number of received packets that were longer than 1518 octets.
Collisions	Displays the number of collisions received on the port.
Pkts of 64 Octets	Displays the number of 64-byte frames received on the port.
Pkts of 65 to 127 Octets	Displays the number of 65 to 127 byte packets received on the port.
Pkts of 128 to 255 Octets	Displays the number of 128 to 255 byte packets received on the port.
Pkts of 256 to 511 Octets	Displays the number of 256 to 511 byte packets received on the port.
Pkts of 512 to 1023 Octets	Displays the number of 512 to 1023 byte packets received on the port.
Pkts of 1024 to 1518 Octets	Displays the number of 1024 to 1518 byte packets received on port.

Log

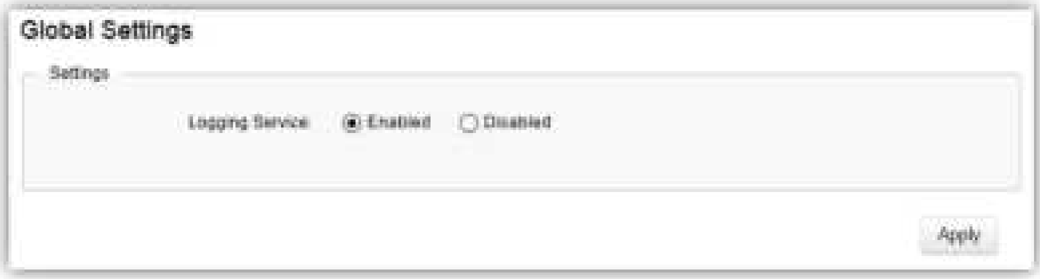
The Syslog protocol allows devices to send event notification messages in response to events, faults, or errors occurring on the platform as well as changes in configuration or other occurrences across an IP network to syslog servers. It then collects the event messages, providing powerful support for users to monitor network operation and diagnose malfunctions. A Syslog-enabled device can generate a syslog message and send it to a Syslog server.

Syslog is defined in RFC 3164. The RFC defines the packet format, content, and system log related information of Syslog messages. Each Syslog message has a facility and severity level. The Syslog facility identifies a file in the Syslog server. Refer to the documentation of your Syslog program for details. The following table describes the Syslog severity levels.

Code	Severity	Description	General Description
0	EMERG	System is unusable.	A "panic" condition usually affecting multiple apps/servers/sites. At this level it would usually notify all tech staff on call.
1	ALERT	Action must be taken immediately.	Should be corrected immediately, therefore notify staff who can fix the problem. An example would be the loss of a primary ISP connection.
2	CRIT	Critical conditions.	Should be corrected immediately, but indicates failure in a secondary system, an example is a loss of a backup ISP connection.
3	ERROR	Error conditions.	Non-urgent failures, these should be relayed to developers or admins; each item must be resolved within a given time.
4	WARNIN G	Warning conditions.	Warning messages, not an error, but indication that an error will occur if action is not taken, e.g. file system 85% full - each item must be resolved within a given time.
5	NOTICE	Normal but significant condition.	Events that are unusual but not error conditions - might be summarized in an email to developers or admins to spot potential problems - no immediate action required.
6	INFO	Informational messages	Normal operational messages - may be harvested for reporting, measuring throughput, etc. - no action required.

Global Settings

From here, you can Enable or Disable the log settings for the Switch.



Global Settings

Settings

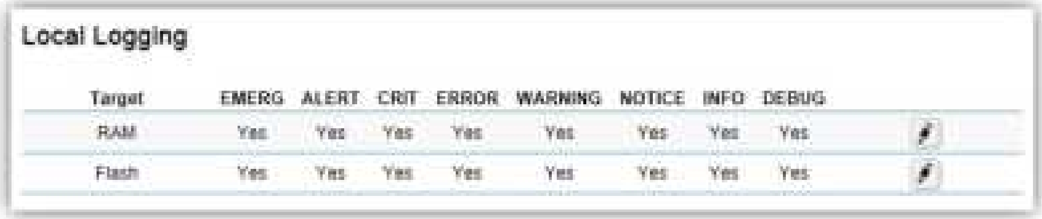
Logging Service ● Enabled ○ Disabled

Click **Apply** to update the system settings.

Local Logging

The System Log is designed to monitor the operation of the Switch by recording the event messages it generates during normal operation. These events may provide vital information about system activity that can help in the identification and solutions of system problems.

The Switch supports log output to two directions: Flash and RAM. The information stored in the system's RAM log will be lost after the Switch is rebooted or powered off, whereas the information stored in the system's Flash will be kept effective even if the Switch is rebooted or powered off. The log has a fixed capacity; at a certain level, the EWS Switch will start deleting the oldest entries to make room for the newest.



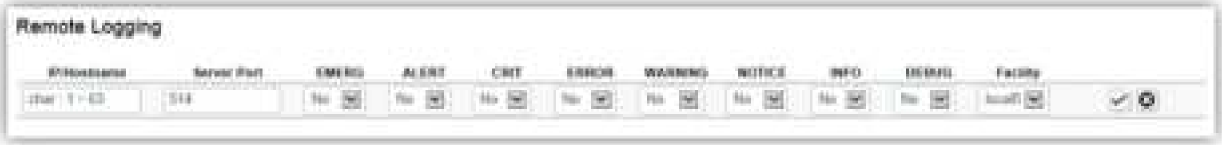
Local Logging

Target	EMERG	ALERT	CRIT	ERROR	WARNING	NOTICE	INFO	DEBUG	
RAM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	✎
Flash	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	✎

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Remote Logging

The internal log of the Switch has a fixed capacity; at a certain level, the Switch will start deleting the oldest entries to make room for the newest. If you want a permanent record of all logging activities, you can set up your syslog server to receive log contents from the Switch. Use this page to direct all logging to the syslog server. Click the **Add** button, define your syslog server, and select the severity level of events you wish to log.



Remote Logging

IP/Hostname	Server Port	EMERG	ALERT	CRIT	ERROR	WARNING	NOTICE	INFO	DEBUG	Facility	
char: 1 - 63	514	No	No	No	No	No	No	No	No	local0	✓ ⊗

Click the **Apply** button ✓ to accept the changes or the **Cancel** button ⊗ to discard them.

Log Table

This page displays the most recent records in the Switch's internal log. Log entries are listed in reverse chronological order (with the latest logs at the top of the list). Click a column header to sort the contents by that category.

Display logs in

- **RAM**: The information stored in the system's RAM log will be lost after the Switch is rebooted or powered off
- **Flash**: The information stored in the system's Flash will be kept effective even if the Switch is rebooted or powered off.

Type

- **Switch**: Display switch related logs.
- **All**: Display logs for both controller and switch.

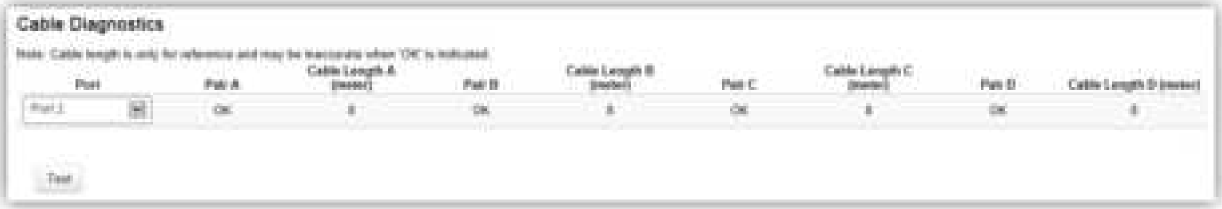
Export: Click Export button to export the current buffered log to a .txt file.

Clear: Click Clear button to clear the buffered log in the system's memory.

Diagnostics

Cable Diagnostics

Cable Diagnostics helps you to detect whether your cable has connectivity problems provides information about where errors have occurred in the cable. The tests use Time Domain Reflectometry (TDR) technology to test the quality of a copper cable attached to a port. TDR detects a cable fault by sending a signal through the cable and reading the signal that is reflected back. All or part of the signal is reflected back either by cable defects or by the end of the cable when an issue is present. Cables are tested when the ports are in the down state, with the exception of the cable length test.



Cable Diagnostics

Note: Cable length is only for reference and may be inaccurate when 'OK' is indicated.

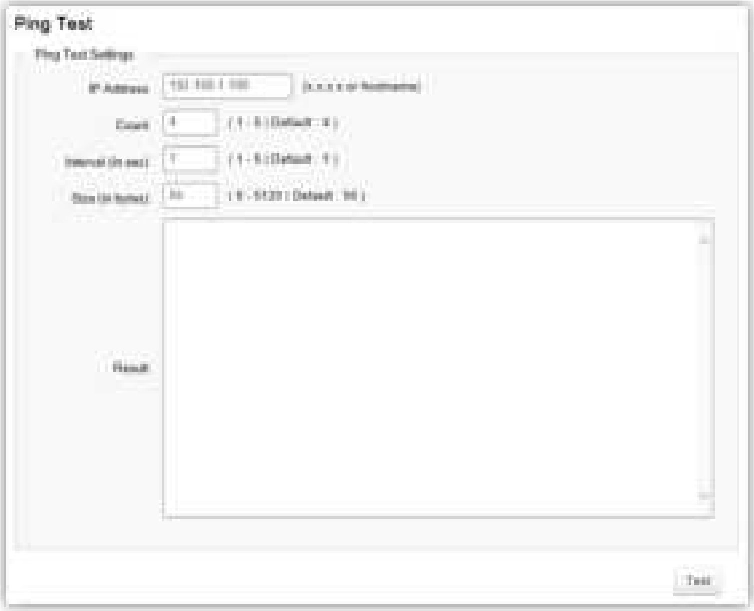
Port	Pair A	Cable Length A (meter)	Pair B	Cable Length B (meter)	Pair C	Cable Length C (meter)	Pair D	Cable Length D (meter)
Port 1	OK	0	OK	0	OK	0	OK	0

To verify accuracy of the test, it is recommended that you run multiple tests in case of test fault or user error.

Click **Test** to perform the cable tests for the selected port.

Ping Test

The Packet Internet Groper (Ping)Test allows you to verify connectivity to remote hosts. The Ping test operates by sending Internet Control Message Protocol (ICMP) request packets to the tested host and waits for an ICMP response. In the process it measures the time from transmission to reception and records any packet loss. Send a ping request to a specified IPv4 address. Check whether the Switch can communicate with a particular network host before testing.



Ping Test

Ping Test Settings

IP Address: 192.168.1.100 (x.x.x.x or hostname)

Count: 4 (1 - 5 | Default : 4)

Interval (in sec): 1 (1 - 5 | Default : 1)

Size (in bytes): 56 (8 - 5120 | Default : 56)

Result:

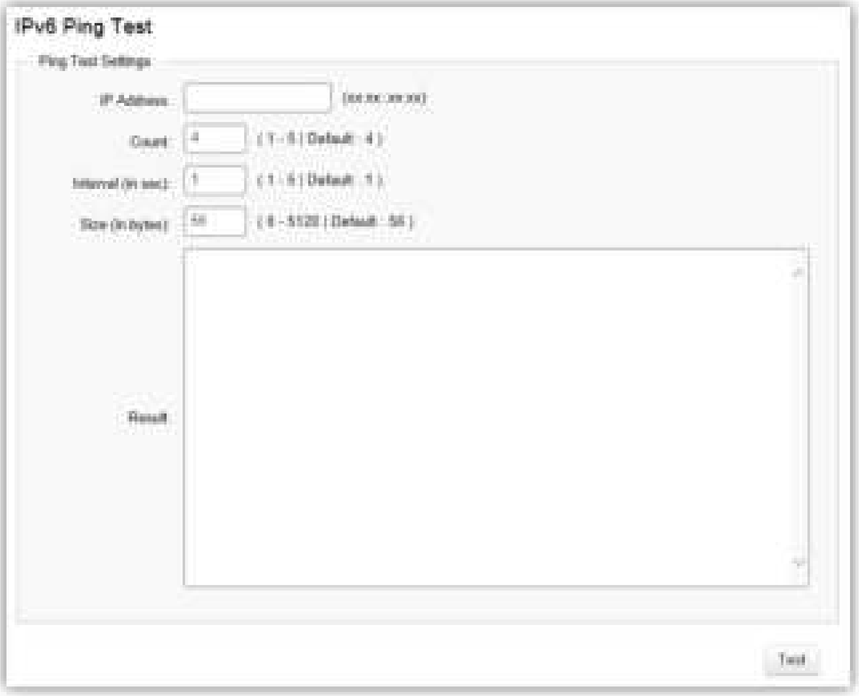
You can vary the test parameters by entering the data in the appropriate boxes. To verify accuracy of the test, it is recommended that you run multiple tests in case of a test fault or user error.

IP Address	Enter the IP address or the host name of the station you want the Switch to ping to.
Count	Enter the number of ping to send. The range is from 1 to 5 and the default is 4.
Interval	Enter the number of seconds between pings sent. The range is from 1 to 5 and the default is 1.
Size	Enter the size of ping packet to send. The range is from 8 to 5120 and the default is 56.
Result	Displays the ping test results.

Click **Test** to perform the ping test.

IPv6 Ping Test

Send a ping request to a specified IPv6 address. Check whether the Switch can communicate with a particular network host before testing.



IPv6 Ping Test

Ping Test Settings

IP Address: (xx:xx::xx:xx)

Count: 4 (1 - 5 | Default : 4)

Interval (in sec): 1 (1 - 5 | Default : 1)

Size (in bytes): 56 (8 - 5120 | Default : 56)

Result:

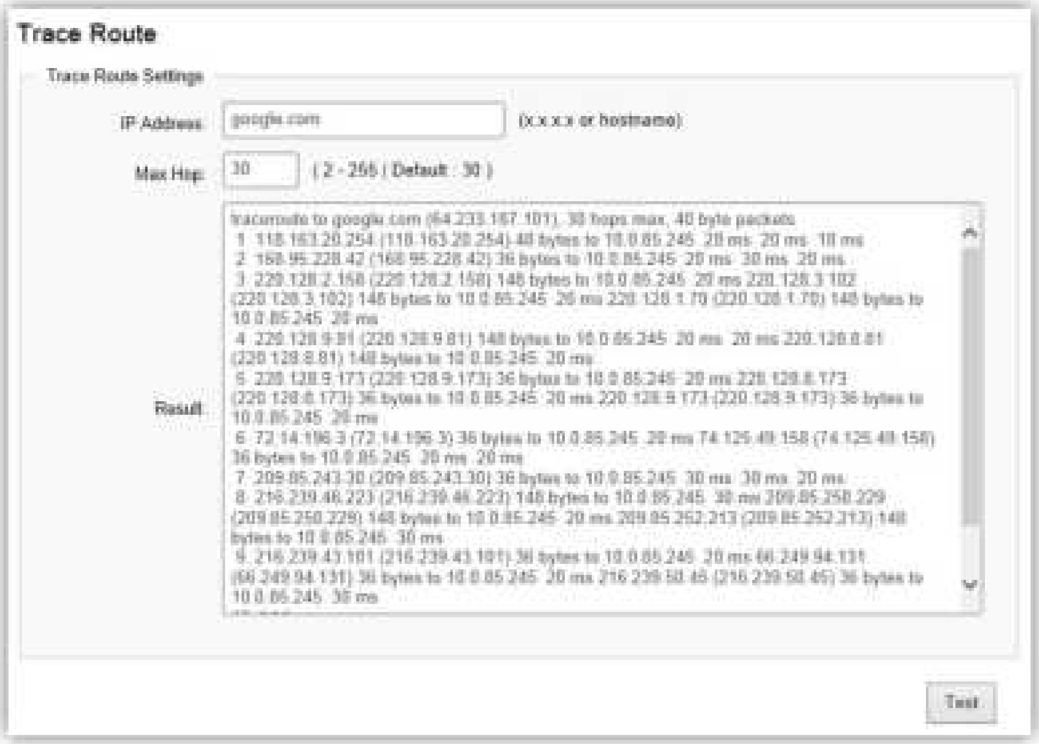
You can vary the test parameters by entering the data in the appropriate boxes. To verify accuracy of the test, it is recommended that you run multiple tests in case of a test fault or user error.

IP Address	Enter the IPv6 address or the host name of the station you want the Switch to ping to.
Count	Enter the number of ping to send. The range is from 1 to 5 and the default is 4.
Interval	Enter the number of seconds between pings sent. The range is from 1 to 5 and the default is 1.
Size	Enter the size of ping packet to send. The range is from 8 to 5120 and the default is 56.
Result	Displays the ping test results.

Click **Test** to perform the ping test.

Trace Route

The traceroute feature is used to discover the routes that packets take when traveling to their destination. It will list all the routers it passes through until it reaches its destination, or fails to reach the destination and is discarded. In testing, it will tell you how long each hop from router to router takes via the trip time of the packets it sends and receives from each successive host in the route.



IP Address: google.com (x.x.x.x or hostname)

Max Hop: 30 (2 - 255 | Default : 30)

Result:

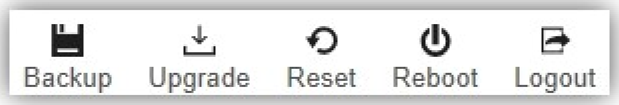
```
traceroute to google.com (64.233.187.101), 30 hops max, 40 byte packets
 1  118.163.20.254 (118.163.20.254) 40 bytes to 10.0.85.245  20 ms  20 ms  10 ms
 2  168.95.228.42 (168.95.228.42) 36 bytes to 10.0.85.245  20 ms  30 ms  20 ms
 3  220.128.2.158 (220.128.2.158) 148 bytes to 10.0.85.245  20 ms 220.128.3.102
(220.128.3.102) 148 bytes to 10.0.85.245  20 ms 220.128.1.70 (220.128.1.70) 148 bytes to
10.0.85.245  20 ms
 4  220.128.9.81 (220.128.9.81) 148 bytes to 10.0.85.245  20 ms  20 ms 220.128.8.81
(220.128.8.81) 148 bytes to 10.0.85.245  20 ms
 5  220.128.9.173 (220.128.9.173) 36 bytes to 10.0.85.245  20 ms 220.128.8.173
(220.128.8.173) 36 bytes to 10.0.85.245  20 ms 220.128.9.173 (220.128.9.173) 36 bytes to
10.0.85.245  20 ms
 6  72.14.196.3 (72.14.196.3) 36 bytes to 10.0.85.245  20 ms 74.125.48.158 (74.125.48.158)
36 bytes to 10.0.85.245  20 ms  20 ms
 7  209.85.243.30 (209.85.243.30) 36 bytes to 10.0.85.245  30 ms  30 ms  20 ms
 8  216.239.46.223 (216.239.46.223) 148 bytes to 10.0.85.245  30 ms 209.85.250.229
(209.85.250.229) 148 bytes to 10.0.85.245  20 ms 209.85.252.213 (209.85.252.213) 148
bytes to 10.0.85.245  30 ms
 9  216.239.43.101 (216.239.43.101) 36 bytes to 10.0.85.245  20 ms 66.249.94.131
(66.249.94.131) 36 bytes to 10.0.85.245  20 ms 216.239.50.45 (216.239.50.45) 36 bytes to
10.0.85.245  30 ms
```

IP Address	Enter the IP address or the host name of the station you wish the Switch to ping to.
Max Hop	Enter the maximum number of hops. The range is from 2 to 255 and the default is 30.
Result	Displays the trace route results.

Click **Test** to initiate the trace route.

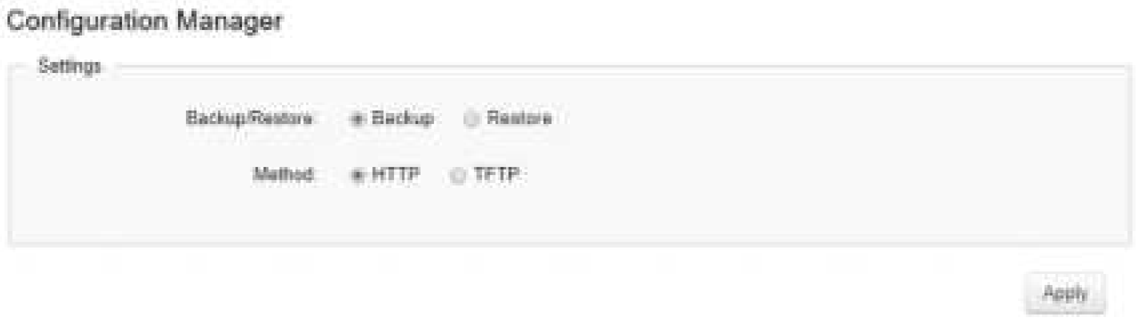
Maintenance

Maintenance functions are available from the maintenance bar located on the upper right corner of the user interface. Maintenance functions include saving configuration settings, upgrading firmware, resetting the configuration to factory default standards, rebooting the device, and logging out of the interface. The following represents the Maintenance menu bar.



Configuration Manager

The File Management feature is used for saving your current configuration to a file on your computer or a TFTP server, or to restore previously saved configuration settings to the Switch using a configuration file from your local drive or TFTP server. Click the Backup icon enters into the configuration manager function.



Configuration Manager

Settings

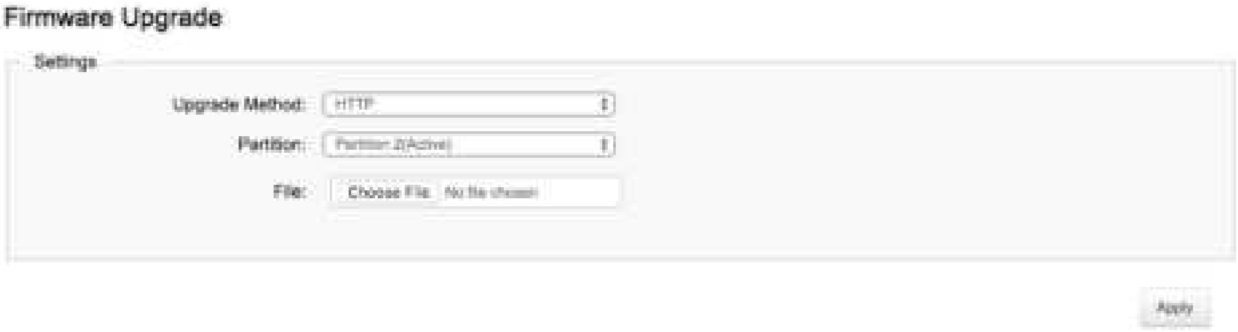
Backup/Restore ● Backup ○ Restore

Method ● HTTP ○ TFTP

Apply

Click **Apply** to download configuration settings to your computer or a TFTP server, or to upload previously saved configuration file to the system.

Firmware Upgrade



Firmware Upgrade

Settings

Upgrade Method: HTTP

Partition: Partition 2(Active)

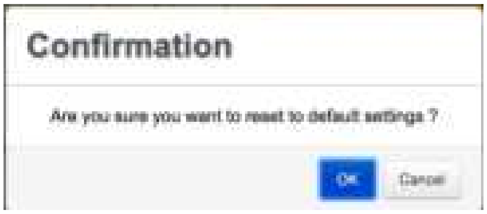
File: Choose File No file chosen

WARNING *Backup your configuration before upgrading to prevent loss of settings information.*

Note: *The upgrade process may require a few minutes to complete. It is advised to clear your browser cache after upgrading your firmware.*

Reset

Restore switch to system default.



Confirmation

Are you sure you want to reset to default settings ?

Visit linksys.com/support for award-winning 24/7 technical support.

LNKPG-00782 Rev B00