ORING 9000 Series
Web Graphical User Interface Manual

Application Note

V1.3

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Management

The switch can be controlled via a built-in web server which supports Internet Explorer (Internet Explorer 5.0 or above versions) and other Web browsers such as Chrome. Therefore, you can manage and configure the switch easily and remotely. You can also upgrade firmware via a web browser. The Web management function not only reduces network bandwidth consumption, but also enhances access speed and provides a user-friendly viewing screen.

By default, IE5.0 or later version do not allow Java applets to open sockets. You need to modify the browser setting separately in order to enable Java applets for network ports.

Preparing for Web Management

You can access the management page of the switch via the following default values:

IP Address: **192.168.10.1**

Subnet Mask: **255.255.255.0**

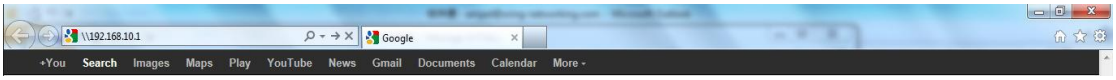
Default Gateway: **192.168.10.254**

User Name: **admin**

Password: **admin**

System Login

1. Launch the Internet Explorer.
2. Type http:// and the IP address of the switch. Press **Enter**.



3. A login screen appears.
4. Type in the username and password. The default username and password is **admin**.
5. Click **Enter** or **OK** button, the management Web page appears.

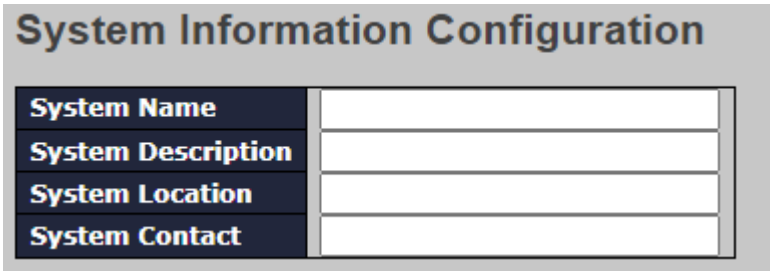
After logging in, you can see the information of the switch as below.

1.1 Basic Settings

Basic Settings allow you to configure the basic functions of the switch.

1.1.1 System Information

This page shows the general information of the switch.



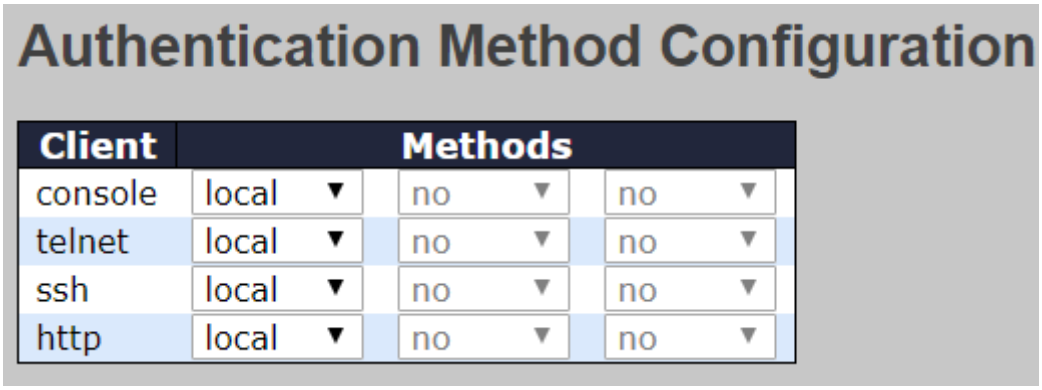
.

Label	Description
System Name	An administratively assigned name for the managed node. By convention, this is the node's fully-qualified domain name. A domain name is a text string consisting of alphabets (A-Z, a-z), digits (0-9), and minus sign (-). Space is not allowed to be part of the name. The first character must be an alpha character. And the first or last character must not be a minus sign. The allowed string length is 0 to 255.
System Description	Description of the device
System Location	The physical location of the node (e.g., telephone closet, 3rd floor). The allowed string length is 0 to 255, and only ASCII characters from 32 to 126 are allowed.
System Contact	The textual identification of the contact person for this managed node, together with information on how to contact this person. The allowed string length is 0 to 255, and only ASCII characters from 32 to 126 are allowed.
Save	Click to save changes.
Reset	Click to undo any changes made locally and revert to previously saved values.

1.1.2 Auth Method

Authentication Method Configuration

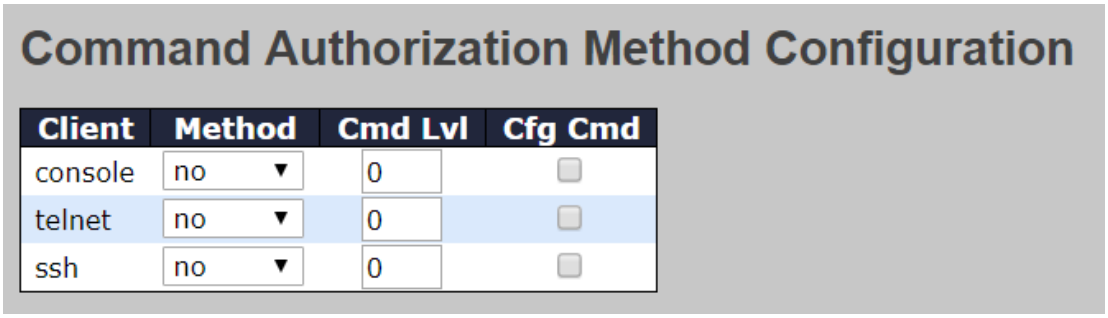
The authentication section allows you to configure how a user is authenticated when he logs into the switch via one of the management client interfaces.



Label	Description
Client	The management client for which the configuration below applies.
Methods	Method can be set to one of the following values: · **no**: Authentication is disabled and login is not possible. · **local**: Use the local user database on the switch for authentication. · **radius**: Use remote RADIUS server(s) for authentication. · **tacacs**: Use remote TACACS+ server(s) for authentication.

Command Authorization Method Configuration

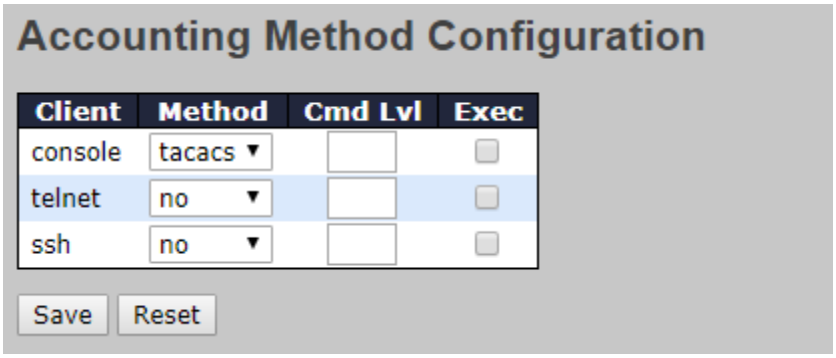
The command authorization section allows you to limit the CLI commands available to a user.



Label	Description
Client	The management client for which the configuration below applies.
Methods	Method can be set to one of the following values: · **no**: Command authorization is disabled. User is granted access to CLI commands according to his privilege level. · **tacacs**: Use remote TACACS+ server(s) for command authorization. If all remote servers are offline, the user is granted access to CLI commands according to his privilege level.

Accounting Method Configuration

The accounting section allows you to configure command and exec (login) accounting.

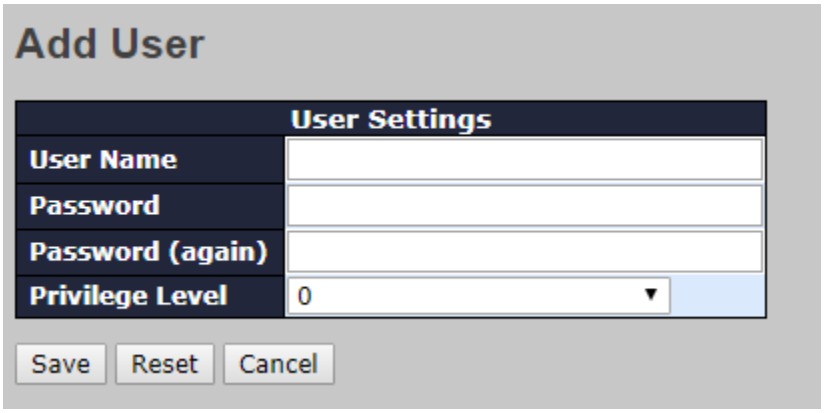


Label	Description
Client	The management client for which the configuration below applies.
Methods	Method can be set to one of the following values: · **no**: Accounting is disabled. · **tacacs**: Use remote TACACS+ server(s) for accounting.
Cmd Lvl	Enable accounting of all commands with a privilege level higher than or equal to this level. Valid values are in the range of 0 to 15. Leave the field empty to disable command accounting.
Exec	Enable exec (login) accounting.

1.1.3 Users

Configuration

This page provides an overview of the current users. Currently the only way to login as another user on the web server is to close and reopen the browser.

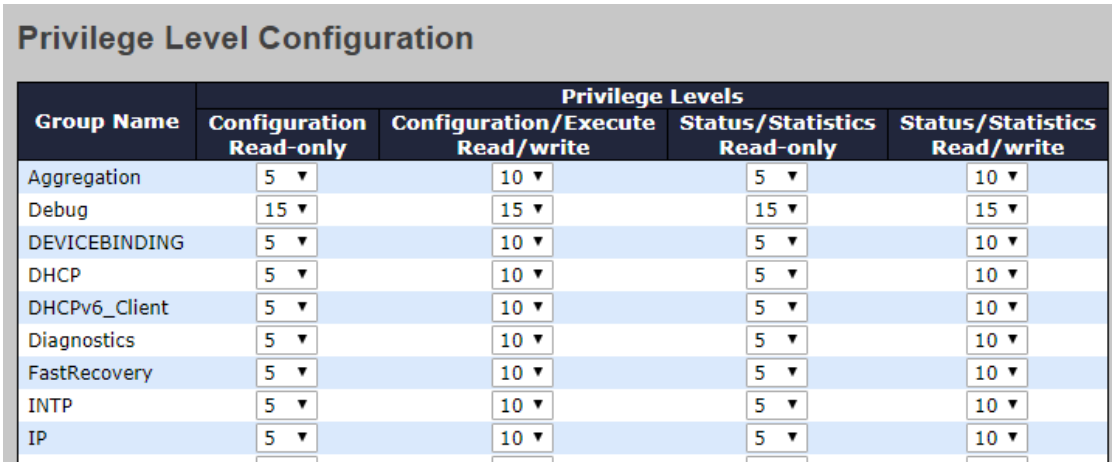


Label	Description
User Name	A string identifying the user name that this entry should belong to. The allowed string length is 1 to 31. The valid user name can be letters, numbers and underscores.
Password	The password of the user. The allowed string length is 0 to 31. Any printable characters including space are accepted.
Privilege Level	The privilege level of the user. The allowed range is 0 to 15. If the privilege level value is 15, it can access all groups, i.e. that is granted the fully control of the device. But other values need to refer to each group privilege level. User's privilege should be the

	same or greater than the group privilege level to have the access of that group. By default, the group privilege level of 5 has the read-only access and the privilege level of 10 has the read-write access. System maintenance (software upload, factory defaults and etc.) requires the user privilege level of 15. Generally, the privilege level of 15 can be used for an administrator account, privilege level 10 for a standard user account and privilege level 5 for a guest account.

Privilege Levels

This page provides an overview of the privilege levels.



Privilege Level Configuration

Group Name	Privilege Levels			
	Configuration Read-only	Configuration/Execute Read/write	Status/Statistics Read-only	Status/Statistics Read/write
Aggregation	5	10	5	10
Debug	15	15	15	15
DEVICEBINDING	5	10	5	10
DHCP	5	10	5	10
DHCPv6_Client	5	10	5	10
Diagnostics	5	10	5	10
FastRecovery	5	10	5	10
INTP	5	10	5	10
IP	5	10	5	10

Label	Description
Group Name	The name identifying the privilege group. In most cases, a privilege level group consists of a single module (e.g. LACP, RSTP or QoS), but a few of them contains more than one. The following description defines these privilege level groups in details: **System**: Contact, Name, Location, Timezone, Daylight Saving Time, Log. **Security**: Authentication, System Access Management, Port (contains Dot1x port, MAC based and the MAC Address Limit), ACL, HTTPS, SSH, IP source guard. **IP**: Everything except 'ping'. **Port**: Everything except 'VeriPHY'. **Diagnostics**: 'ping' and 'VeriPHY'. **Maintenance**: CLI- System Reboot, System Restore Default, System Password, Configuration Save, Configuration Load and Firmware Load. Web- Users, Privilege Levels and everything in Maintenance. **Debug**: Only present in CLI.
Privilege Levels	Every group has an authorization Privilege level for the following

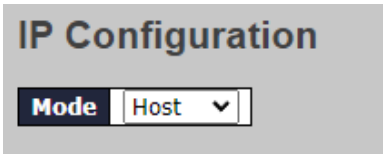
	sub groups: configuration read-only, configuration/execute read-write, status/statistics read-only, status/statistics read-write (e.g. for clearing of statistics). User Privilege should be same or greater than the authorization Privilege level to have the access to that group.

1.1.4 IP Settings

This page allows you to configure IP information for the switch. You can configure the settings of the device operating in host or router mode.

IP Configuration (only for Layer 3 Model)

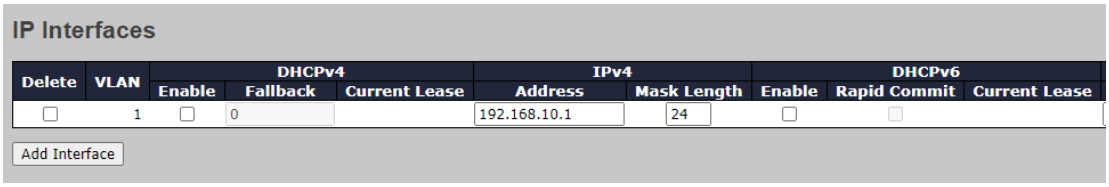
the item provides user setting switch mode .



Label	Description
Mode	Configure whether the IP stack should act as a Host or a Router. ***In Host mode*** = IP traffic between interfaces will not be routed. ***In Router mode*** = traffic is routed between all interfaces.

IP Interface

This page provides an overview of the privilege levels.



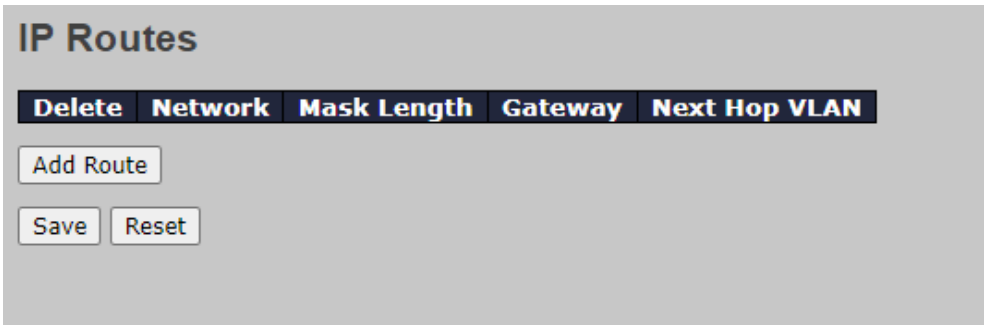
Label	Description
VLAN	The VLAN associated with the IP interface. Only ports in this VLAN will be able to access the IP interface. This field is only available for input when creating a new interface.
IPv4 DHCP Enabled	Enable the DHCPv4 client by checking this box. If this option is enabled, the system will configure the IPv4 address and mask of the interface using the DHCPv4 protocol. The DHCPv4 client will announce the configured System Name as hostname to provide DNS lookup.
IPv4 DHCP Fallback Timeout	The number of seconds for trying to obtain a DHCP lease. After this period expires, a configured IPv4 address will be used as IPv4 interface address. A value of zero disables the fallback mechanism, such that DHCP will keep retrying until a valid lease is obtained. Legal values are 0 to 4294967295 seconds.

IPv4 DHCP Current Lease	For DHCP interfaces with an active lease, this column show the current interface address, as provided by the DHCP server.
IPv4 Address	The IPv4 address of the interface in dotted decimal notation. If DHCP is enabled, this field configures the fallback address. The field may be left blank if IPv4 operation on the interface is not desired - or no DHCP fallback address is desired.
IPv4 Mask	The IPv4 network mask, in number of bits (*prefix length*). Valid values are between 0 and 30 bits for an IPv4 address. If DHCP is enabled, this field configures the fallback address network mask. The field may be left blank if IPv4 operation on the interface is not desired - or no DHCP fallback address is desired.
DHCPv6 Enable	Enable the DHCPv6 client by checking this box. If this option is enabled, the system will configure the IPv6 address of the interface using the DHCPv6 protocol.
DHCPv6 Rapid Commit	Enable the DHCPv6 Rapid-Commit option by checking this box. If this option is enabled, the DHCPv6 client terminates the waiting process as soon as a Reply message with a Rapid Commit option is received. This option is only manageable when DHCPv6 client is enabled.
DHCPv6 Current Lease	For DHCPv6 interface with an active lease, this column shows the interface address provided by the DHCPv6 server.
IPv6 Address	The IPv6 address of the interface. An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, fe80::215:c5ff:fe03:4dc7. The symbol :: is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can appear only once. System accepts the valid IPv6 unicast address only, except IPv4-Compatible address and IPv4-Mapped address. This field may be left blank if IPv6 operation on the interface is not desired.
IPv6 Mask	The IPv6 network mask, in number of bits (*prefix length*). Valid values are between 1 and 128 bits for an IPv6 address. This field may be left blank if IPv6 operation on the interface is not desired.
Resolving IPv6 DAD	The link-local address is formed from an interface identifier based on the hardware address which is supposed to be uniquely assigned. Once the DAD (Duplicate Address Detection) detects the address duplication, the operation on the interface SHOULD be disabled. At this moment, manual intervention is required to resolve the

	address duplication. For example, check whether the loop occurs in the VLAN or there is indeed other device occupying the same hardware address as the device in the VLAN. After making sure the specific link-local address is unique on the IPv6 link in use, delete and then add the specific IPv6 interface to restart the IPv6 operations on this interface.
Gateway	Input gateway address .
Add Interface (only for Layer 3 model)	Click to add a new IP interface. A maximum of 128 interfaces is supported.

IP Routes (only for Layer 3 Model)

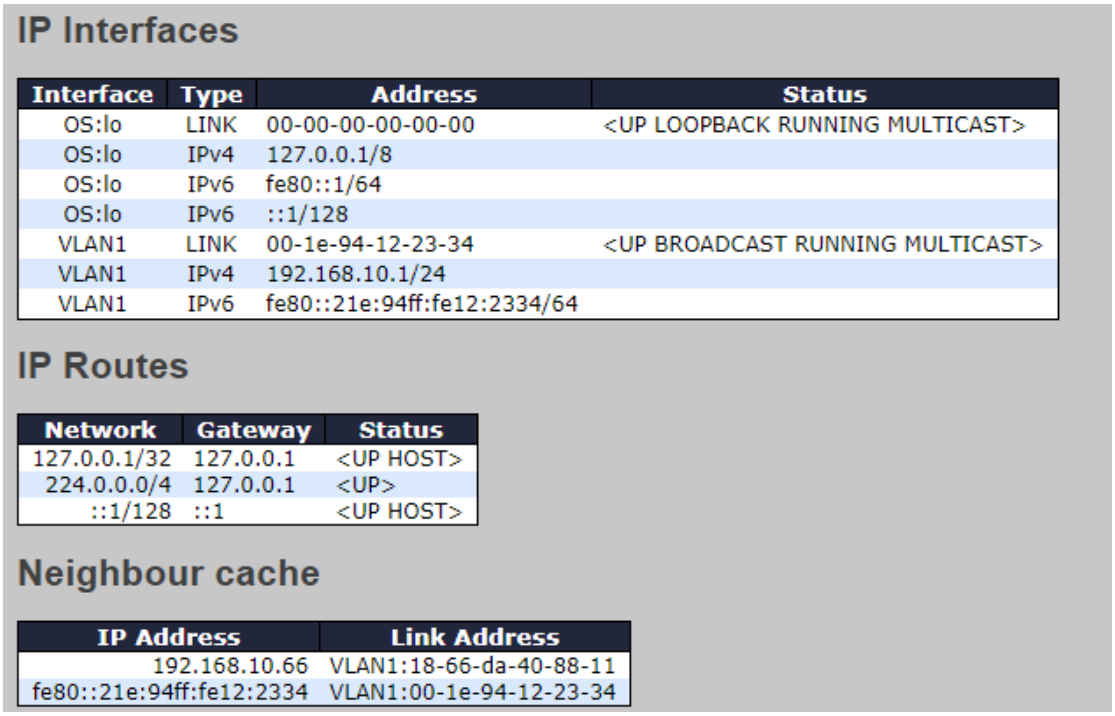
This page provides user setting static route entry



Label	Description
Delete	Select this option to delete an existing IP route.
Network	The destination IP network or host address of this route. Valid format is dotted decimal notationor a valid IPv6 notation. A default route can use the value 0.0.0.0or IPv6 :: notation.
Mask Length	The destination IP network or host mask, in number of bits (prefix length). It defines how much of a network address that must match, in order to qualify for this route. Valid values are between 0 and 32 bits respectively 128 for IPv6 routes. Only a default route will have a mask length of 0 (as it will match anything).
Gateway	The IP address of the IP gateway. Valid format is dotted decimal notationor a valid IPv6 notation. Gateway and Network must be of the same type.
Next Hop VLAN (only for IPv6)	The VLAN ID (VID) of the specific IPv6 interface associated with the gateway. The given VID ranges from 1 to 4095 and will be effective only when the corresponding IPv6 interface is valid. If the IPv6 gateway address is link-local, it must specify the next hop VLAN for the gateway. If the IPv6 gateway address is not link-local, system ignores the next hop VLAN for the gateway.

1.1.5 IP Status

This page displays the status of the IP protocol layer. The status is defined by the IP interfaces, the IP routes and the neighbor cache (ARP cache) status.



IP Interfaces

Interface	Type	Address	Status
OS:lo	LINK	00-00-00-00-00-00	<UP LOOPBACK RUNNING MULTICAST>
OS:lo	IPv4	127.0.0.1/8	
OS:lo	IPv6	fe80::1/64	
OS:lo	IPv6	::1/128	
VLAN1	LINK	00-1e-94-12-23-34	<UP BROADCAST RUNNING MULTICAST>
VLAN1	IPv4	192.168.10.1/24	
VLAN1	IPv6	fe80::21e:94ff:fe12:2334/64	

IP Routes

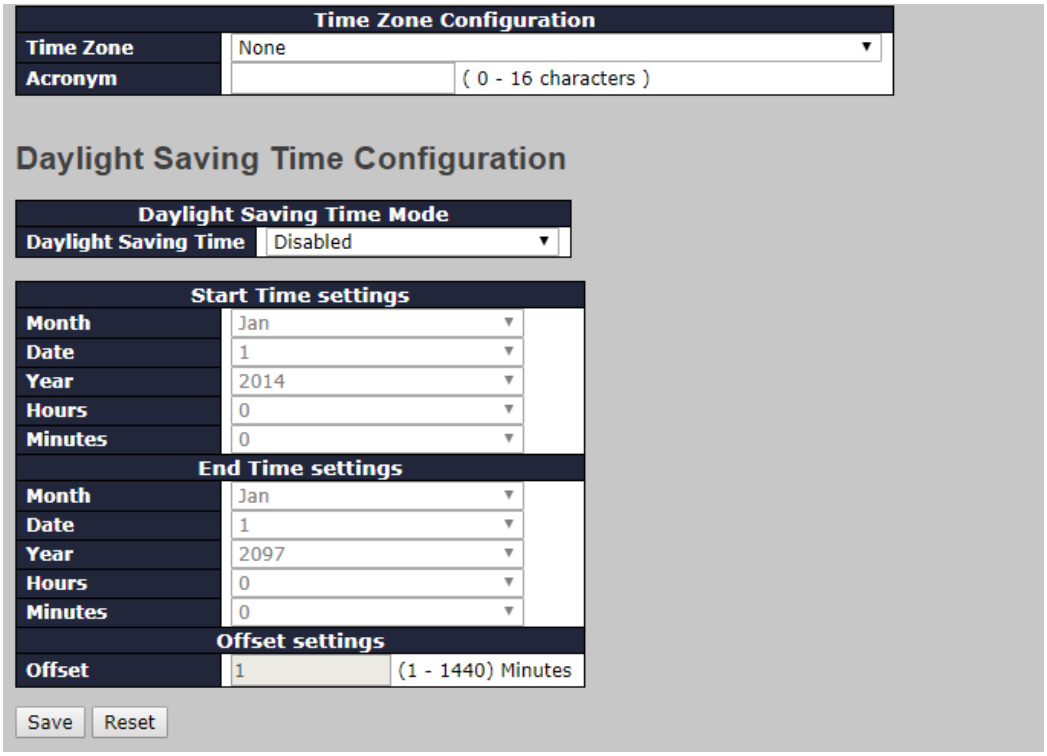
Network	Gateway	Status
127.0.0.1/32	127.0.0.1	<UP HOST>
224.0.0.0/4	127.0.0.1	<UP>
::1/128	::1	<UP HOST>

Neighbour cache

IP Address	Link Address
192.168.10.66	VLAN1:18-66-da-40-88-11
fe80::21e:94ff:fe12:2334	VLAN1:00-1e-94-12-23-34

Label	Description
IP Interface	
Interface	The name of the interface.
Type	The address type of the entry. This may be LINK or IPv4.
Address	The current address of the interface (of the given type).
Status	The status flags of the interface (and/or address).
IP Routes	
Network	The destination IP network or host address of this route.
Gateway	The gateway address of this route.
Status	The status flags of the route.
Neighbor Cache	
IP Address	The IP address of the entry.
Link Address	The Link (MAC) address for which a binding to the IP address given exist.

1.1.6 Daylight Saving Time



Label	Description
Time Zone Configuration	**Time Zone**: Set the switch location time zone. The following table lists the different location time zone for your reference. **Acronym**: User can set the acronym of the time zone. This is a User configurable acronym to identify the time zone. (Range: Up to 16 alpha-numeric characters and can contain '-', '_' or '.').
Daylight Saving Time Configuration	**Daylight Saving Time Mode**: Enable or disable daylight saving time function. This is used to set the clock forward or backward according to the configurations set below for a defined daylight saving time duration. Select **'Disable'** to disable the daylight saving time configuration. Select **'Recurring'** and configure the Daylight Saving Time duration to repeat the configuration every year. Select '**Non-Recurring**' and configure the daylight saving time duration for single time configuration. (Default : Disabled). Start Time Settings: Set up the start time of the daylight saving time period. End Time Settings: Set up the ending time of the daylight saving time period. Offset Settings: Set up the offset time.

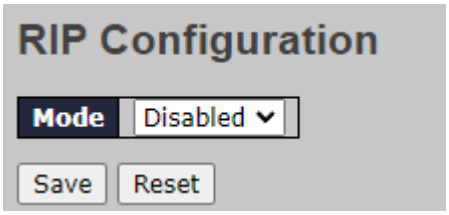
Local Time Zone	Conversion from UTC	Time at 12:00 UTC

November Time Zone	- 1 hour	11 am
Oscar Time Zone	-2 hours	10 am
ADT - Atlantic Daylight	-3 hours	9 am
AST - Atlantic Standard EDT - Eastern Daylight	-4 hours	8 am
EST - Eastern Standard CDT - Central Daylight	-5 hours	7 am
CST - Central Standard MDT - Mountain Daylight	-6 hours	6 am
MST - Mountain Standard PDT - Pacific Daylight	-7 hours	5 am
PST - Pacific Standard ADT - Alaskan Daylight	-8 hours	4 am
ALA - Alaskan Standard	-9 hours	3 am
HAW - Hawaiian Standard	-10 hours	2 am
Nome, Alaska	-11 hours	1 am
CET - Central European FWT - French Winter MET - Middle European MEWT - Middle European Winter SWT - Swedish Winter	+1 hour	1 pm
EET - Eastern European, USSR Zone 1	+2 hours	2 pm
BT - Baghdad, USSR Zone 2	+3 hours	3 pm
ZP4 - USSR Zone 3	+4 hours	4 pm
ZP5 - USSR Zone 4	+5 hours	5 pm
ZP6 - USSR Zone 5	+6 hours	6 pm
WAST - West Australian Standard	+7 hours	7 pm
CCT - China Coast, USSR Zone 7	+8 hours	8 pm
JST - Japan Standard, USSR Zone 8	+9 hours	9 pm
EAST - East Australian Standard GST	+10 hours	10 pm

Guam Standard, USSR Zone 9		
IDLE - International Date Line NZST - New Zealand Standard NZT - New Zealand	+12 hours	Midnight

1.1.7 RIP (only for Layer 3 Model)

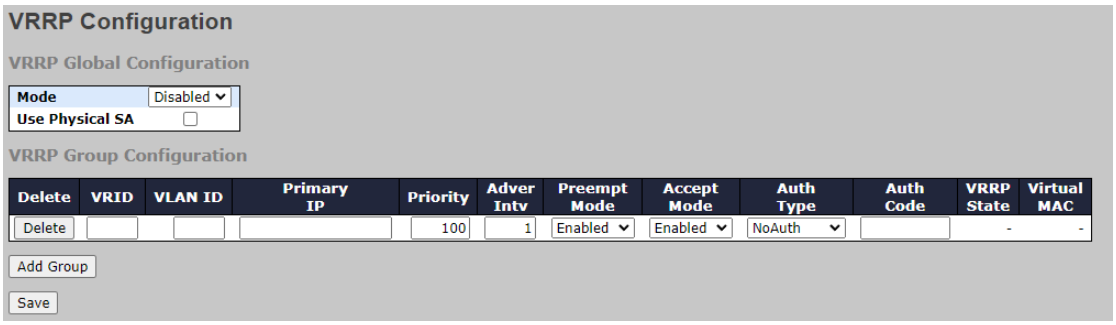
Configure RIP on this page.



Label	Description
Mode	Indicates the RIP mode operation. Possible modes are: Enabled: Enable RIP mode operation. Disabled: Disable RIP mode operation.

1.1.8 VRRP (only for Layer 3 Model)

Configure VRRP on this page.

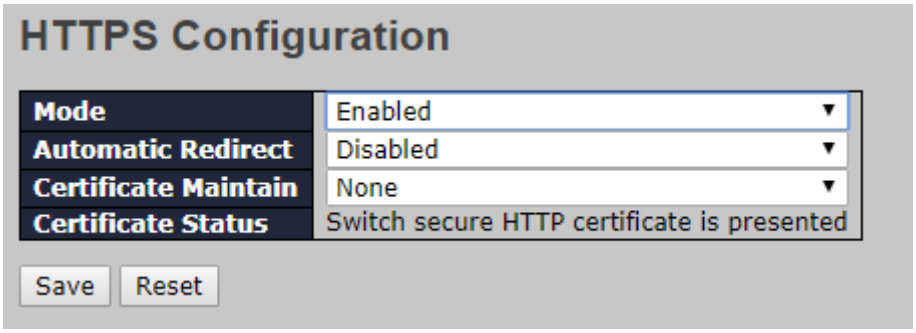


Label	Description
VRRP Global Configuration	
Mode	Enable / Disable VRRP Function
Use Physical SA	Use physical source MAC address for ARP reply.
VRRP Group Configuration	
Delete	Delete the group
VRID	Virtual Router ID, from 1 to 254
VLAN ID	VLAN interface ID
Primary IP	Primary interface for a VRRP Group
Priority	Priority, from 1 to 254
Adver Intv	Advertisement Interval (0 - 10)
Accept Mode	Preemption of a backup VRRP device acting as a master device is allowed when another backup device has a higher priority
Auth Mode	Enabling accept mode allows a backup VRRP device to

	respond to ping, if the backup device becomes the master VRRP device
Auth Type	A simple text password can be used for interface authentication in a network
Auth Code	Password, 8 characters
VRRP State	Show the role of group
Virtual MAC	If device is master, this shows the Virtual MAC of group

1.1.9 HTTPS

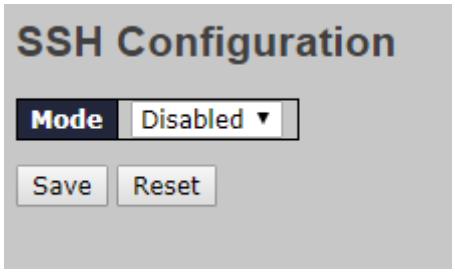
You can configure the HTTPS mode in this page.



Label	Description
Mode	Enables or disables HTTPS mode.
Automatic Redirect	Enables or disables automatic redirect function. It is only significant when HTTPS mode is enabled. When the redirect mode is enabled, the HTTP connection will be redirected to HTTPS connection automatically. Notice that the browser may not allow redirection due to security considerations unless the switch certificate is trusted to the browser. You need to initialize the HTTPS connection manually for this case.
Certificate Maintain	The operation of certificate maintenance including: **None**: No operation. **Delete**: Delete the current certificate. **Upload**: Upload a certificate PEM file through a Web browser or URL. **Generate**: Generate a new self-signed RSA certificate.
Certificate Status	Display the current status of certificate on the switch. Possible statuses are: **Switch secure HTTP certificate is presented.** **Switch secure HTTP certificate is not presented.** **Switch secure HTTP certificate is generating**.

1.1.10 SSH

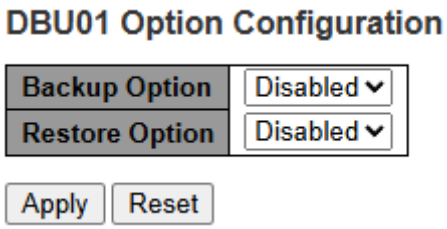
You can configure the SSH mode in this page.



Label	Description
Mode	Enable or disable SSH.
Save	Click to save changes
Reset	Click to undo any changes made locally and revert to previously saved values.

1.1.11 DBU01 Option Config

DBU01 is an embedded configuration backup/restore function. It allows you to store and restore device configurations without using a PC



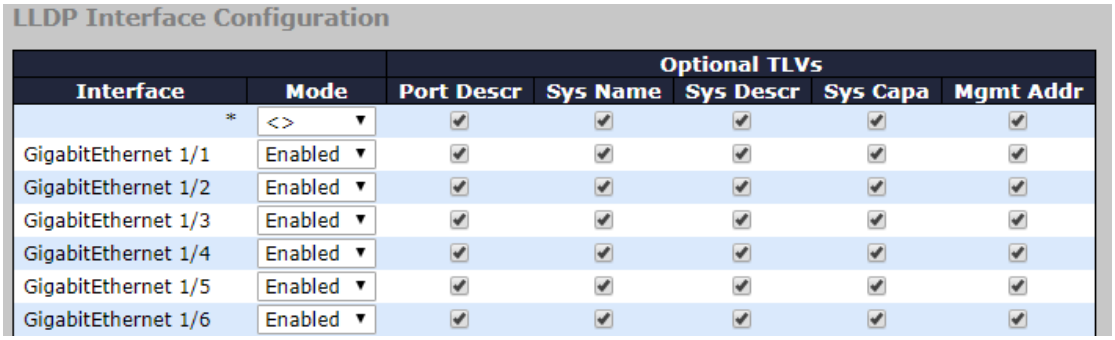
Label	Description
Backup Option	Enable or disable backup function. If enabled, existing configurations will be stored as a backup file.
Restore Option	Enable or disable backup function. If enabled, the system will apply saved configurations to the device.

1.1.12 LLDP

LLDP Configurations

This page allows you to examine and configure current LLDP port settings.

Label	Description
Tx Interval	The switch periodically transmits LLDP frames to its neighbors to update the network discovery information. The interval between each LLDP frame is determined by the Tx Interval value which must be between 5 - 32768 seconds.
Tx Hold	Each LLDP frame contains information about how long time the information in the LLDP frame shall be considered valid. The LLDP information valid period is set to Tx Hold multiplied by Tx Interval seconds. Valid values must be between 2 - 10 times.
Tx Delay	When a setting is changed (e.g. the IP address), a new LLDP frame is transmitted, but the time between the LLDP frames will always be at least the value of **Tx Delay** seconds. **Tx Delay** cannot be larger than 1/4 of the **Tx Interval** value. Valid values must be between 1 - 8192 seconds.
Tx Reinit	When an interface is disabled, LLDP is disabled or the switch is rebooted, a LLDP shutdown frame is transmitted to the neighboring units, signaling that the LLDP information isn't valid anymore. Tx Reinit controls the amount of seconds between the shutdown frame and a new LLDP initialization. Valid values must be between 1 - 10 seconds.

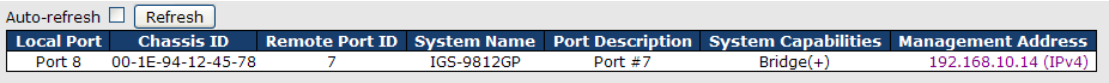


Label	Description
Interface	The switch interface name of the logical LLDP interface.
Mode	Select a LLDP mode from the drop down list. **Rx only**: The switch will not send out LLDP information, but LLDP information from neighbor units is analyzed.

	Tx only: The switch will drop LLDP information received from neighbors, but will send out LLDP information. **Disabled**: The switch will not send out LLDP information, and will drop LLDP information received from neighbors. **Enabled**: The switch will send out LLDP information, and will analyze LLDP information received from neighbors.
Port Descr	Optional TLV: When checked, the "port description" is included in LLDP information transmitted.
Sys Name	Optional TLV: When checked, the "system name" is included in LLDP information transmitted.
Sys Descr	Optional TLV: When checked, the "system description" is included in LLDP information transmitted.
Sys Capa	Optional TLV: When checked, the "system capability" is included in LLDP information transmitted.
Mgmt Addr	Optional TLV: When checked, the "management address" is included in LLDP information transmitted.

LLDP Neighbor Information

This page provides a status overview for all LLDP neighbors. The following table contains information for each port on which an LLDP neighbor is detected.

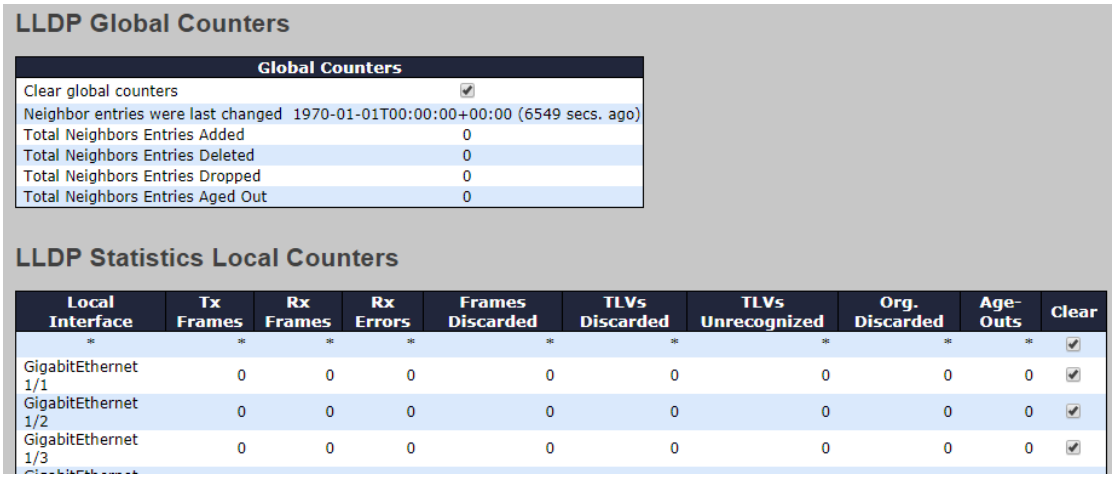


Label	Description
Local Port	The port that you use to transmits and receives LLDP frames.
Chassis ID	The identification number of the neighbor sending out the LLDP frames.
Remote Port ID	The identification of the neighbor port
System Name	The name advertised by the neighbor.
Port Description	The description of the port advertised by the neighbor.
System Capabilities	Description of the neighbor's capabilities. The capabilities include: 1. **Other** 2. **Repeater** 3. **Bridge** 4. **WLAN Access Point** 5. **Router** 6. **Telephone** 7. **DOCSIS Cable Device** 8. **Station Only** 9. **Reserved** When a capability is enabled, a (+) will be displayed. If the capability is disabled, a (-) will be displayed.

Management Address	The neighbor's address which can be used to help network management. This may contain the neighbor's IP address.
Refresh	Click to refresh the page immediately.
Auto-refresh	Check to enable an automatic refresh of the page at regular intervals.

Port Statistics

This page provides an overview of all LLDP traffic. Two types of counters are shown. Global counters will apply settings to the whole switch stack, while local counters will apply settings to specified switches.



Global Counters

Label	Description
Clear Global Counters	If checked the global counters are cleared when **Clear** is pressed.
Neighbor entries were last changed	Shows the time when the last entry was last deleted or added. It also shows the time elapsed since the last change was detected.
Total Neighbors Entries Added	Shows the number of new entries added since switch reboot
Total Neighbors Entries Deleted	Shows the number of new entries deleted since switch reboot
Total Neighbors Entries Dropped	Shows the number of LLDP frames dropped due to full entry table
Total Neighbors Entries Aged Out	Shows the number of entries deleted due to expired time-to-live

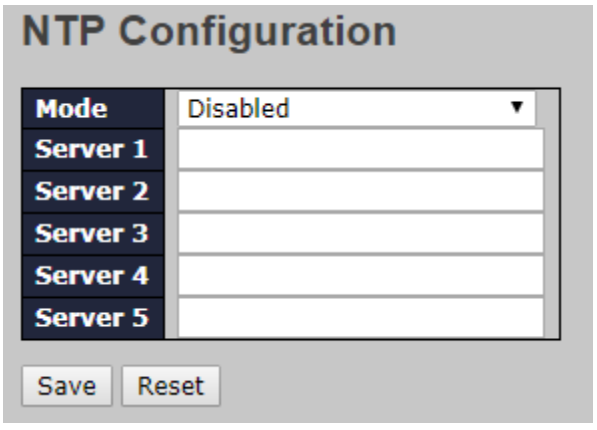
Local Counters

Label	Description
Local Port	The port that receives or transmits LLDP frames
Tx Frames	The number of LLDP frames transmitted on the port
Rx Frames	The number of LLDP frames received on the port
Rx Errors	The number of received LLDP frames containing errors
Frames Discarded	If a port receives an LLDP frame, and the switch's internal table is

	full, the LLDP frame will be counted and discarded. This situation is known as "too many neighbors" in the LLDP standard. LLDP frames require a new entry in the table if Chassis ID or Remote Port ID is not included in the table. Entries are removed from the table when a given port links down, an LLDP shutdown frame is received, or when the entry ages out.
TLVs Discarded	Each LLDP frame can contain multiple pieces of information, known as TLVs (Type Length Value). If a TLV is malformed, it will be counted and discarded.
TLVs Unrecognized	The number of well-formed TLVs, but with an unknown type value
Org. Discarded	The number of organizationally TLVs received
Age-Outs	Each LLDP frame contains information about how long the LLDP information is valid (age-out time). If no new LLDP frame is received during the age-out time, the LLDP information will be removed, and the value of the age-out counter will be incremented.
Clear	If checked the counters for the specific interface are cleared when **Clear** is pressed.

1.1.13 NTP

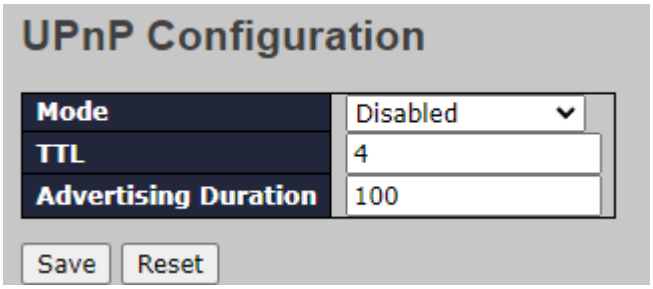
The function allows you to specify the Network Time Protocol (NTP) servers to query for the current time to maintain an accurate time on the switch, ensuring the system log record meaningful dates and times for event entries. With NTP, the switch can set its internal clock periodically according to an NTP time server. Otherwise, the switch will only record the time from the factory default set at the last bootup. When the NTP client is enabled, the switch regularly sends a request for a time update to a configured time server. A maximum of five time servers are supported. The switch will attempt to poll each server in the configured sequence.



Label	Description
Mode	Select a NTP mode from the drop down list.
Server	Sets the IP address for up to five time servers. The switch will update the time from the servers, starting from the first to the fifth in sequence if any of them fails. The polling interval is fixed at 15 minutes.

1.1.14 UPnP

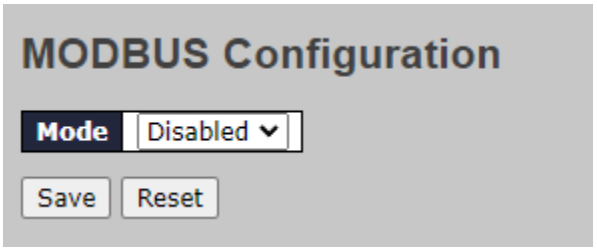
UPnP is an acronym for Universal Plug and Play. The goals of UPnP are to allow devices to connect seamlessly and to simplify the implementation of networks in the home (data sharing, communications, and entertainment) and in corporate environments for simplified installation of computer components



Label	Description
Mode	Indicates the UPnP operation mode. Possible modes are: Enabled: Enable UPnP mode operation. Disabled: Disable UPnP mode operation. When the mode is enabled, two ACEs are added automatically to trap UPNP related packets to CPU. The ACEs are automatically removed when the mode is disabled.
TTL	The TTL value is used by UPnP to send SSDP advertisement messages. Valid values are in the range 1 to 255.
Advertising Duration	The duration, carried in SSDP packets, is used to inform a control point or control points how often it or they should receive an SSDP advertisement message from this switch. If a control point does not receive any message within the duration, it will think that the switch no longer exists. Due to the unreliable nature of UDP, in the standard it is recommended that such refreshing of advertisements to be done at less than one-half of the advertising duration. In the implementation, the switch sends SSDP messages periodically at the interval one-half of the advertising duration minus 30 seconds. Valid values are in the range 100 to 86400.

1.1.15 Modus TCP

Support Modbus TCP. (About Modbus please reference http://www.modbus.org/)

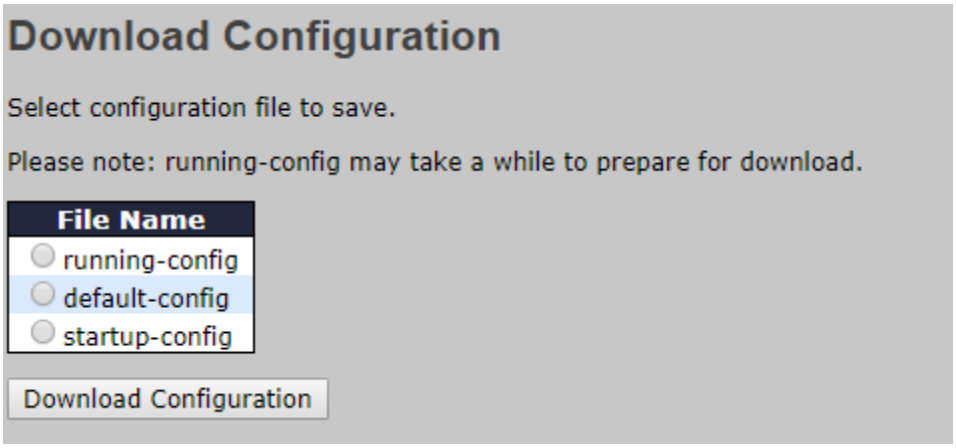


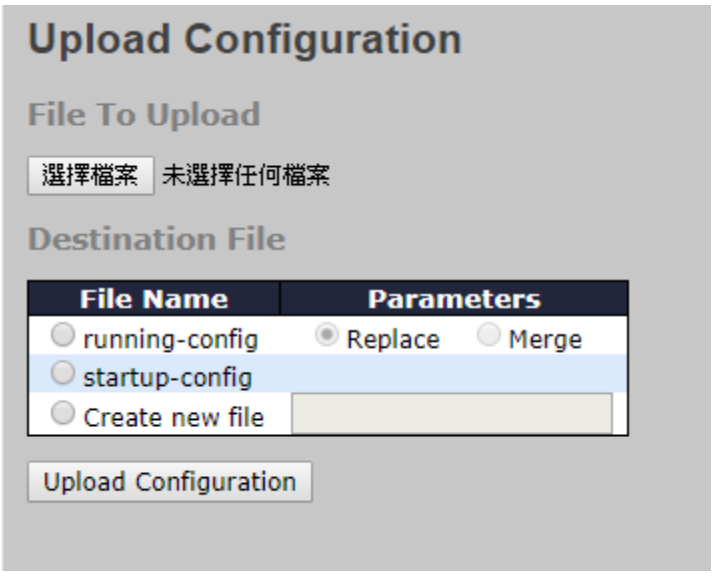
The following table describes the labels in this screen.

Label	Description
Mode	Enable or Disalble Modbus TCP function

1.1.16 Backup/Restore Configurations

You can save/view or load switch configurations.





1.1.17 Firmware Update

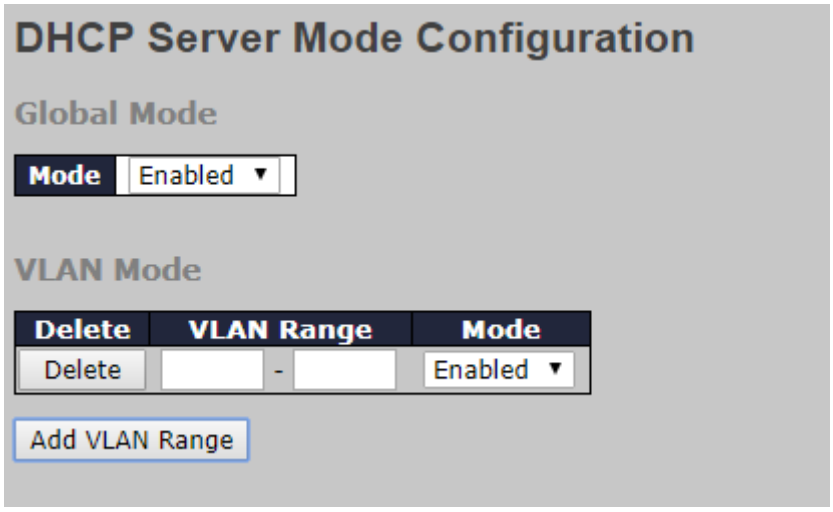
This page allows you to update the firmware of the switch.

1.2 DHCP

1.2.1 DHCP Server

This page configures global mode and VLAN mode to enable/disable DHCP server per system and per VLAN.and per VLAN.

Mode

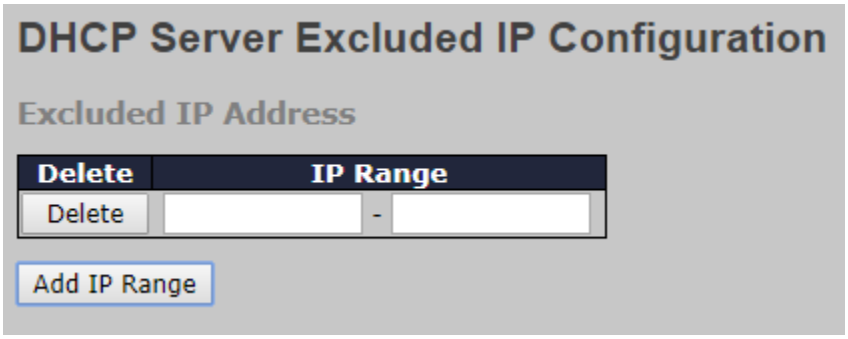


Label	Description
Global Mode	
Mode	Configure the operation mode per system. Possible modes are: **Enabled**: Enable DHCP server per system. **Disabled**: Disable DHCP server pre system.
VLAN Mode	
VLAN Range	Indicate the VLAN range in which DHCP server is enabled or disabled. The first VLAN ID must be smaller than or equal to the second VLAN ID. BUT, if the VLAN range contains only 1 VLAN ID, then you can just input it into either one of the first and second VLAN ID or both. On the other hand, if you want to disable existed VLAN range, then you can follow the steps. 1. Press **Add VLAN Range** to add a new VLAN range. 2. input the VLAN range that you want to disable. 3. choose Mode to be **Disabled**. 4. press Save to apply the change.

	Then, you will see the disabled VLAN range is removed from the DHCP Server mode configuration page.
Mode	Indicate the operation mode per VLAN. Possible modes are: **Enabled:** Enable DHCP server per VLAN. **Disabled**: Disable DHCP server pre VLAN.

Excluded IP

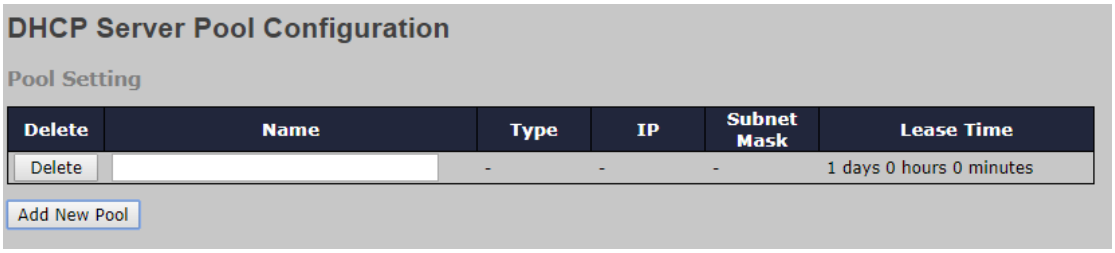
This page configures excluded IP addresses. DHCP server will not allocate these excluded IP addresses to DHCP client



Label	Description
IP Range	Define the IP range to be excluded IP addresses. The first excluded IP must be smaller than or equal to the second excluded IP. BUT, if the IP range contains only 1 excluded IP, then you can just input it to either one of the first and second excluded IP or both.

Pool

This page manages DHCP pools. According to the DHCP pool, DHCP server will allocate IP address and deliver configuration parameters to DHCP client.

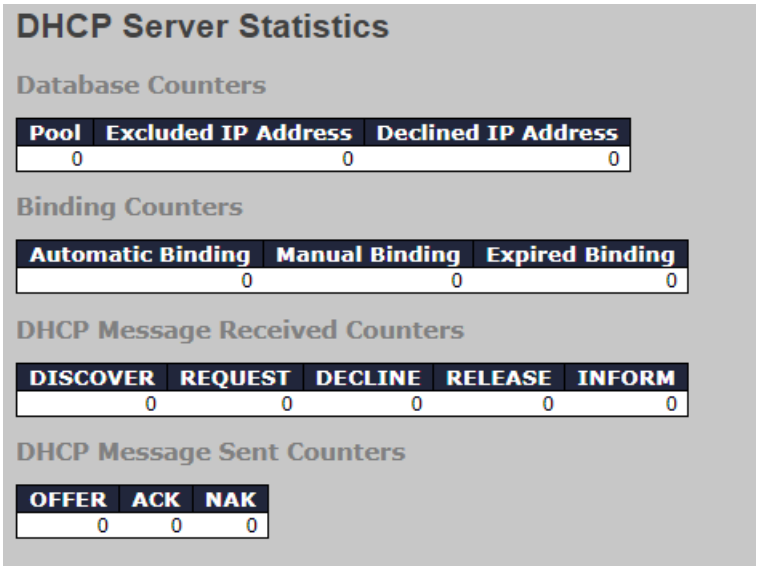


Label	Description
Name	Configure the pool name that accepts all printable characters, except white space. If you want to configure the detail settings, you can click the pool name to go into the configuration page.
Type	Display which type of the pool is. **Network**: the pool defines a pool of IP addresses to service more than one DHCP client. **Host**: the pool services for a specific DHCP client identified by client identifier or hardware address. If "-" is displayed, it means not defined.

IP	Display network number of the DHCP address pool. If "-" is displayed, it means not defined.
Subnet Mask	Display subnet mask of the DHCP address pool. If "-" is displayed, it means not defined.
Lease Time	Display lease time of the pool.

Statistics

This page displays the database counters and the number of DHCP messages sent and received by DHCP server.



Label	Description
Database Counters	
Pool	Number of pools.
Excluded IP Address	Number of excluded IP address ranges.
Declined IP Address	Number of declined IP addresses.
Binding Counters	
Automatic Binding	Number of bindings with network-type pools.
Manual Binding	Number of bindings that administrator assigns an IP address to a client. That is, the pool is of host type.
Expired Binding	Number of bindings that their lease time expired or they are cleared from Automatic/Manual type bindings.
DHCP Message Received Counters	
DISCOVER	Number of DHCP DISCOVER messages received.
REQUEST	Number of DHCP REQUEST messages received.
DECLINE	Number of DHCP DECLINE messages received.
RELEASE	Number of DHCP RELEASE messages received.
INFORM	Number of DHCP INFORM messages received.
DHCP Message Sent Counters	
OFFER	Number of DHCP OFFER messages sent.

ACK	Number of DHCP ACK messages sent.
NAK	Number of DHCP NAK messages sent.

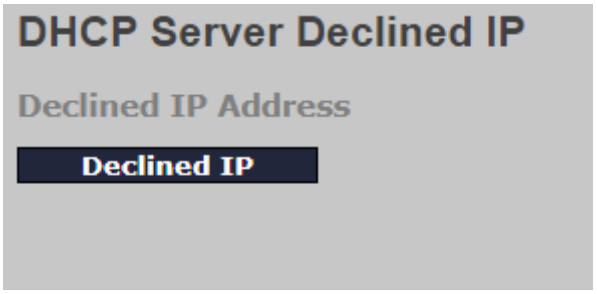
Binding

This page displays bindings generated for DHCP clients.

Label	Description
IP	IP address allocated to DHCP client.
Type	Type of binding. Possible types are Automatic, Manual, Expired.
State	State of binding. Possible states are Committed, Allocated, Expired.
Pool Name	The pool that generates the binding.
Server ID	Server IP address to service the binding.

Declined IP

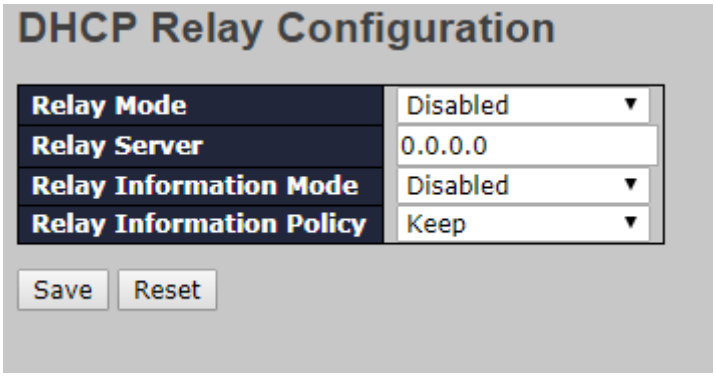
Display IP addresses declined by DHCP clients.



Label	Description
Declined IP	List of IP addresses declined.

1.2.2 DHCP Relay

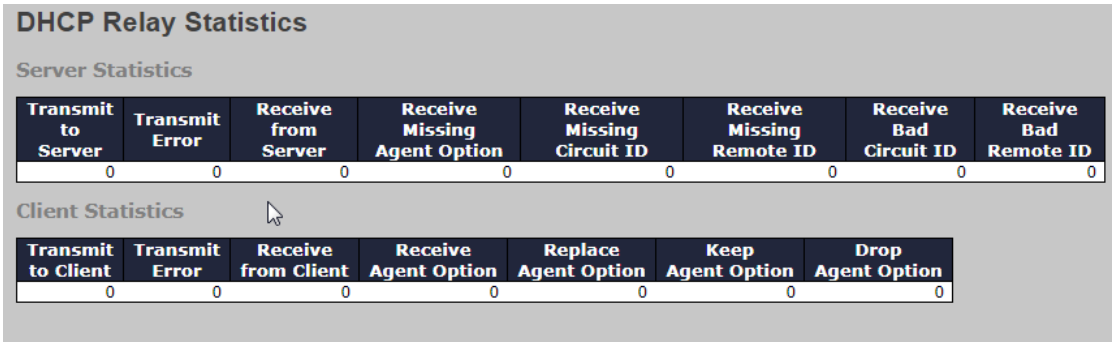
DHCP relay is used to forward and transfer DHCP messages between the clients and the server when they are not in the same subnet domain. You can configure the function in this page.



Label	Description
Relay Mode	Indicates the existing DHCP relay mode. The modes include: **Enabled**: activate DHCP relay. When DHCP relay is enabled, the agent forwards and transfers DHCP messages between the clients and the server when they are not in the same subnet domain to prevent the DHCP broadcast message from flooding for security considerations. **Disabled**: disable DHCP relay
Relay Server	Indicates the DHCP relay server IP address. A DHCP relay agent is used to forward and transfer DHCP messages between the clients and the server when they are not in the same subnet domain.
Relay Information Mode	Indicates the existing DHCP relay information mode. The format of DHCP option 82 circuit ID format is "[vlan_id][module_id][port_no]". The first four characters represent the VLAN ID, and the fifth and sixth characters are the module ID. In stand-alone devices, the module ID always equals to 0; in stacked devices, it means switch ID. The last two characters are the port number. For example, "00030108" means the DHCP message received form VLAN ID 3, switch ID 1, and port No. 8. The option 82 remote ID value equals to the switch MAC address. The modes include: **Enabled**: activate DHCP relay information. When DHCP relay information is enabled, the agent inserts specific information (option 82) into a DHCP message when forwarding to a DHCP server and removes it from a DHCP message when transferring to a DHCP client. It only works when DHCP relay mode is enabled. **Disabled**: disable DHCP relay information
Relay Information Policy	Indicates the policies to be enforced when receiving DHCP relay information. When DHCP relay information mode is enabled, if the agent receives a DHCP message that already contains relay agent information, it will enforce the policy. The Replace option is invalid when relay information mode is disabled. The policies includes: **Replace**: replace the original relay information when a DHCP message containing the information is received.

	Keep: keep the original relay information when a DHCP message containing the information is received. **Drop**: drop the package when a DHCP message containing the information is received.

The relay statistics shows the information of relayed packets of the switch.

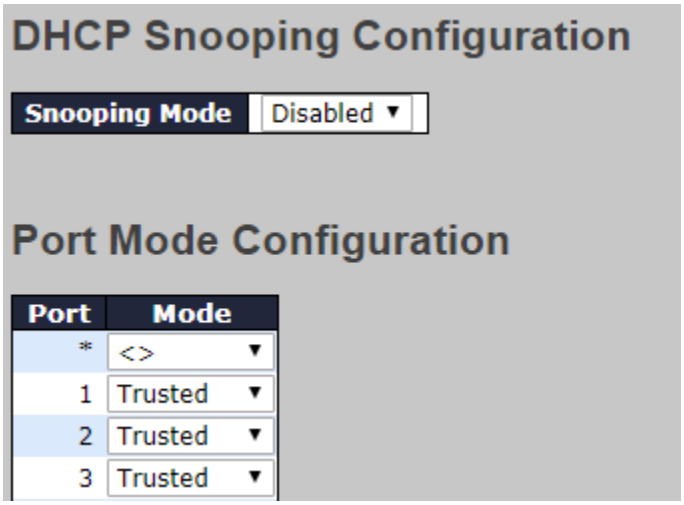


Label	Description
Transmit to Sever	The number of packets relayed from the client to the server
Transmit Error	The number of packets with errors when being sent to clients
Receive from Server	The number of packets received from the server
Receive Missing Agent Option	The number of packets received without agent information
Receive Missing Circuit ID	The number of packets received with Circuit ID
Receive Missing Remote ID	The number of packets received with the Remote ID option missing.
Receive Bad Circuit ID	The number of packets whose Circuit ID do not match the known circuit ID
Receive Bad Remote ID	The number of packets whose Remote ID do not match the known Remote ID
Transmit to Client	The number of packets relayed from the server to the client
Transmit Error	The number of packets with errors when being sent to servers
Receive from Client	The number of packets received from the server
Receive Agent Option	The number of received packets containing relay agent information
Replace Agent Option	The number of packets replaced when received messages contain relay agent information.
Keep Agent Option	The number of packets whose relay agent information is retained
Drop Agent Option	The number of packets dropped when received messages contain relay agent information.

1.2.3 DHCP Snooping

Snooping

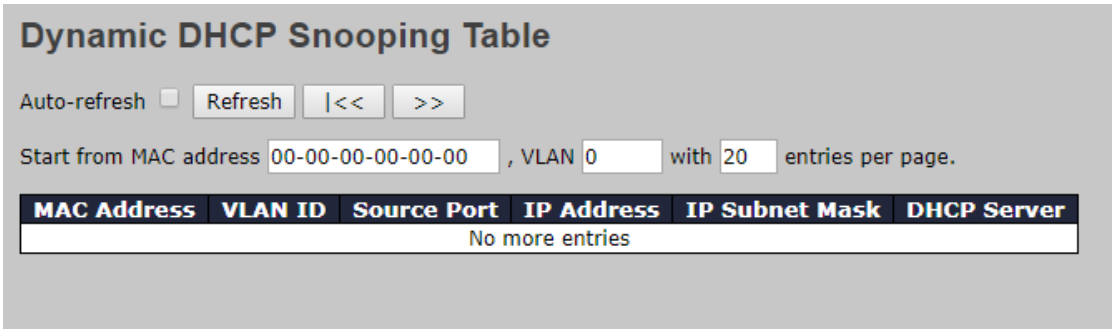
Configure DHCP Snooping on this page.



Label	Description
Snooping Mode	Indicates the DHCP snooping mode operation. Possible modes are: **Enabled**: Enable DHCP snooping mode operation. When DHCP snooping mode operation is enabled, the DHCP request messages will be forwarded to trusted ports and only allow reply packets from trusted ports. **Disabled**: Disable DHCP snooping mode operation.
Port Mode Configuration	Indicates the DHCP snooping port mode. Possible port modes are: **Trusted**: Configures the port as trusted source of the DHCP messages. **Untrusted**: Configures the port as untrusted source of the DHCP messages.

Snooping Table

This page display the dynamic IP assigned information after DHCP Snooping mode is disabled. All DHCP clients obtained the dynamic IP address from the DHCP server will be listed in this table except for local VLAN interface IP addresses. Entries in the Dynamic DHCP snooping Table are shown on this page.

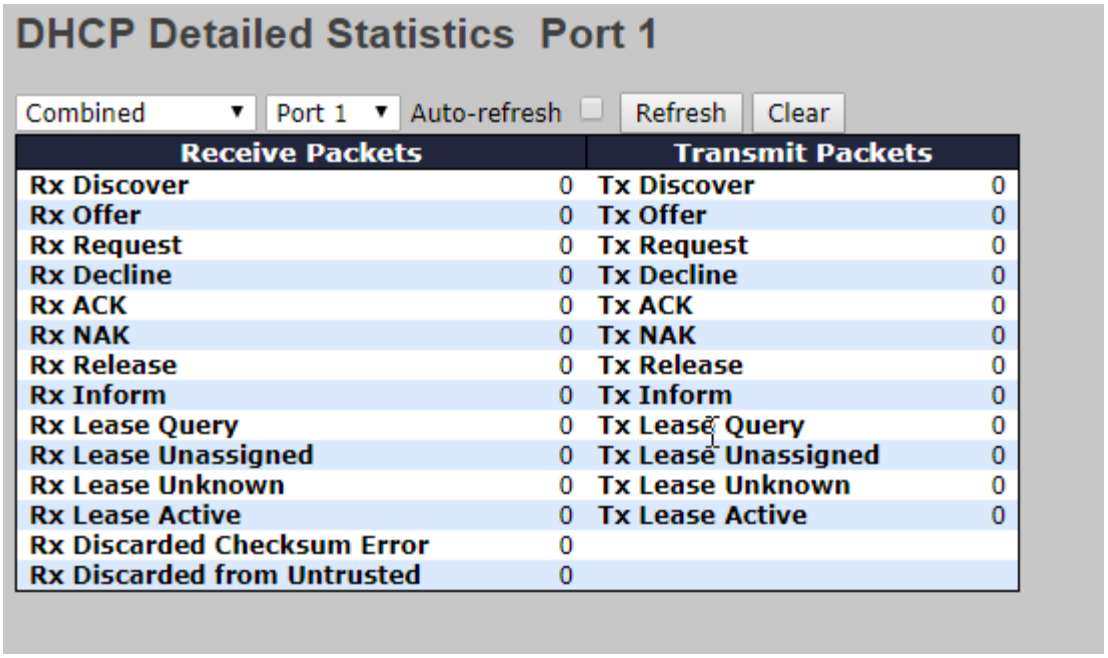


Label	Description
MAC Address	User MAC address of the entry.
VLAN ID	VLAN-ID in which the DHCP traffic is permitted.

Source Port	Switch Port Number for which the entries are displayed.
IP Address	User IP address of the entry.
IP Subnet Mask	User IP subnet mask of the entry.
DHCP Server Address	DHCP Server address of the entry.

Detailed Statistics

This page provides statistics for DHCP snooping. Notice that the normal forward per-port TX statistics isn't increased if the incoming DHCP packet is done by L3 forwarding mechanism. And clear the statistics on specific port may not take effect on global statistics since it gathers the different layer overview.



Label	Description
Rx and Tx Discover	The number of discover (option 53 with value 1) packets received and transmitted.
Rx and Tx Offer	The number of offer (option 53 with value 2) packets received and transmitted.
Rx and Tx Request	The number of request (option 53 with value 3) packets received and transmitted.
Rx and Tx Decline	The number of decline (option 53 with value 4) packets received and transmitted.
Rx and Tx ACK	The number of ACK (option 53 with value 5) packets received and transmitted.
Rx and Tx NAK	The number of NAK (option 53 with value 6) packets received and transmitted.
Rx and Tx Release	The number of release (option 53 with value 7) packets received and transmitted.
Rx and Tx Inform	The number of inform (option 53 with value 8) packets received and transmitted.

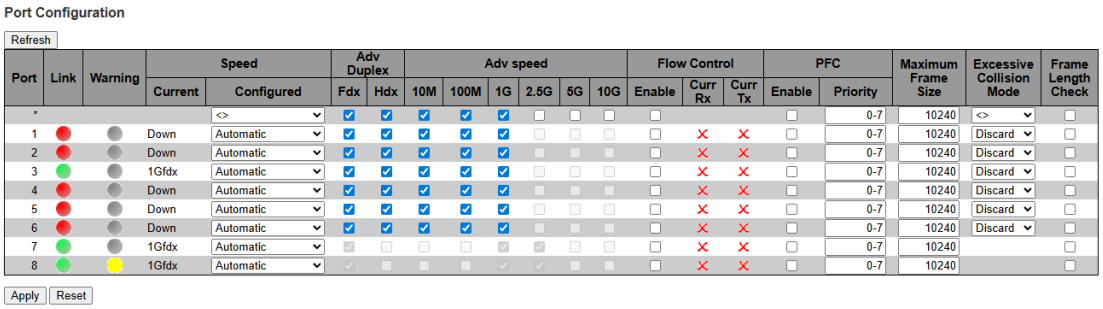
Rx and Tx Lease Query	The number of lease query (option 53 with value 10) packets received and transmitted.
Rx and Tx Lease Unassigned	The number of lease unassigned (option 53 with value 11) packets received and transmitted.
Rx and Tx Lease Unknown	The number of lease unknown (option 53 with value 12) packets received and transmitted.
Rx and Tx Lease Active	The number of lease active (option 53 with value 13) packets received and transmitted.
Rx Discarded checksum error	The number of discard packet that IP/UDP checksum is error.
Rx Discarded from Untrusted	The number of discarded packet that are coming from untrusted port.

1.3 Port Setting

Port Setting allows you to manage individual ports of the switch, including traffic, power, and trunks.

1.3.1 Port Control

This page shows current port configurations. Ports can also be configured here.



Label	Description
Port	This is the logical port number for this row.
Link	The current link state is displayed graphically. Green indicates the link is up and red that it is down.
Warring	Operational warnings of the port. ●: No warnings ●: There are warnings, use tooltip to see.
Current Link Speed	Provides the current link speed of the port.
Configured Link Speed	Selects any available link speed for the given switch port. Only speeds supported by the specific port are shown. Possible speeds are: **Disabled** - Disables the switch port operation.

	Auto - Port auto negotiating speed with the link partner and selects the highest speed that is compatible with the link partner. **10Mbps HDX** - Forces the cu port in 10Mbps half duplex mode. **10Mbps FDX** - Forces the cu port in 10Mbps full duplex mode. **100Mbps HDX** - Forces the cu port in 100Mbps half duplex mode. **100Mbps FDX** - Forces the cu port in 100Mbps full duplex mode. **1Gbps FDX** - Forces the port in 1Gbps full duplex **2.5Gbps FDX** - Forces the Serdes port in 2.5Gbps full duplex mode.
Advertise Duplex	When duplex is set as auto i.e auto negotiation, the port will only advertise the specified duplex as either **Fdx or Hdx to** the link partner. By default port will advertise all the supported duplexes if the Duplex is Auto.
Advertise Speed	When Speed is set as auto i.e auto negotiation, the port will only advertise the specified speeds (**10M 100M 1G**) to the link partner. By default port will advertise all the supported speeds if speed is set as Auto.
Flow Control	When Auto Speed is selected on a port, this section indicates the flow control capability that is advertised to the link partner. When a fixed-speed setting is selected, that is what is used. The Current Rx column indicates whether pause frames on the port are obeyed, and the Current Tx column indicates whether pause frames on the port are transmitted. The Rx and Tx settings are determined by the result of the last Auto Negotiation. Check the configured column to use flow control. This setting is related to the setting for Configured Link Speed. NOTICE: The 100FX standard doesn't support Auto Negotiation, so when in 100FX mode the flow control capabilities will always be shown as "disabled".
PFC	When PFC (802.1Qbb Priority Flow Control) is enabled on a port then flow control on a priority level is enabled. Through the **Priority** field, range (one or

	more) of priorities can be configured, e.g. '0-3,7' which equals '0,1,2,3,7'. PFC is not supported through auto negotiation. PFC and Flow control cannot both be enabled on the same port.
Maximum Frame Size	Enter the maximum frame size allowed for the switch port, including FCS. The range is 1518-10240 bytes.
Excessive Collision Mode	Configure port transmit collision behavior. **Discard**: Discard frame after 16 collisions (default). **Restart**: Restart backoff algorithm after 16 collisions.
Frame Length Check	Configures if frames with incorrect frame length in the EtherType/Length field shall be dropped. An Ethernet frame contains a field EtherType which can be used to indicate the frame payload size (in bytes) for values of 1535 and below. If the EtherType/Length field is above 1535, it indicates that the field is used as an EtherType (indicating which protocol is encapsulated in the payload of the frame). If "frame length check" is enabled, frames with payload size less than 1536 bytes are dropped, if the EtherType/Length field doesn't match the actually payload length. If "frame length check" is disabled, frames are not dropped due to frame length mismatch. Note: No drop counters count frames dropped due to frame length mismatch

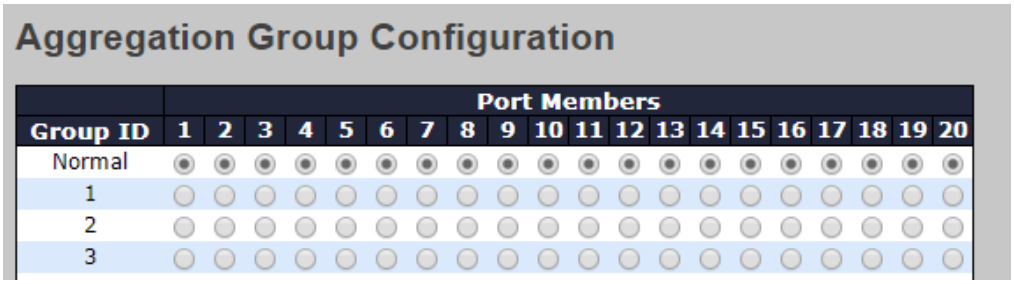
1.3.2 Port Trunk

A port trunk is a group of ports that have been grouped together to function as one logical path. This method provides an economical way for you to increase the bandwidth between the switch and another networking device. In addition, it is useful when a single physical link between the devices is insufficient to handle the traffic load. This page allows you to configure the aggregation hash mode and the aggregation group.

Configurations

Label	Description
Source MAC Address	Calculates the destination port of the frame. You can check this box to enable the source MAC address, or uncheck to disable. By

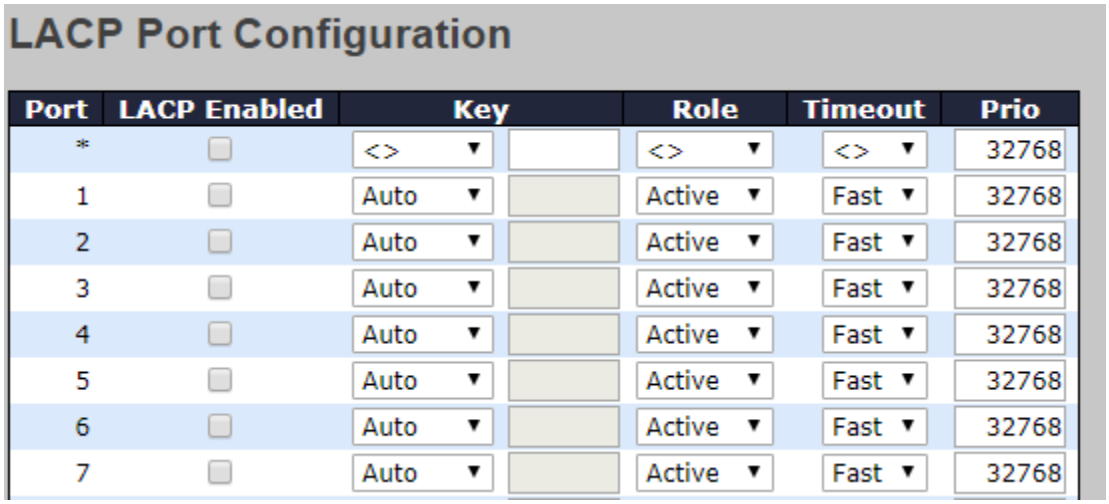
	default, **Source MAC Address** is enabled.
Destination MAC Address	Calculates the destination port of the frame. You can check this box to enable the destination MAC address, or uncheck to disable. By default, **Destination MAC Address** is disabled.
IP Address	Calculates the destination port of the frame. You can check this box to enable the IP address, or uncheck to disable. By default, **IP Address** is enabled.
TCP/UDP Port Number	Calculates the destination port of the frame. You can check this box to enable the TCP/UDP port number, or uncheck to disable. By default, **TCP/UDP Port Number** is enabled.



Label	Description
Group ID	Indicates the ID of each aggregation group. **Normal** means no aggregation. Only one group ID is valid per port.
Port Members	Lists each switch port for each group ID. Select a radio button to include a port in an aggregation, or clear the radio button to remove the port from the aggregation. By default, no ports belong to any aggregation group. Only full duplex ports can join an aggregation and the ports must be in the same speed in each group.

LACP

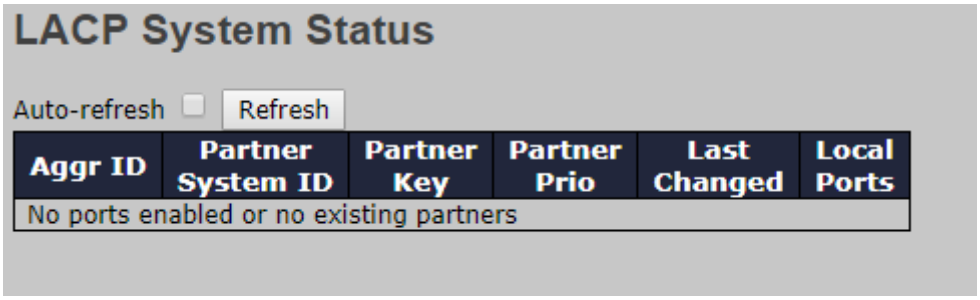
LACP (Link Aggregation Control Protocol) trunks are similar to static port trunks, but they are more flexible because LACP is compliant with the IEEE 802.3ad standard. Hence, it is interoperable with equipment from other vendors that also comply with the standard. This page allows you to enable LACP functions to group ports together to form single virtual links and change associated settings, thereby increasing the bandwidth between the switch and other LACP-compatible devices.



Label	Description
Port	Indicates the ID of each aggregation group. **Normal** indicates there is no aggregation. Only one group ID is valid per port.
LACP Enabled	Lists each switch port for each group ID. Check to include a port in an aggregation, or clear the box to remove the port from the aggregation. By default, no ports belong to any aggregation group. Only full duplex ports can join an aggregation and the ports must be in the same speed in each group.
Key	The **Key** value varies with the port, ranging from 1 to 65535. **Auto** will set the key according to the physical link speed (10Mb = 1, 100Mb = 2, 1Gb = 3). **Specific** allows you to enter a user-defined value. Ports with the same key value can join in the same aggregation group, while ports with different keys cannot.
Role	Indicates LACP activity status. **Active** will transmit LACP packets every second, while **Passive** will wait for a LACP packet from a partner (speak if spoken to).
Timeout	The **Timeout** controls the period between BPDU transmissions. **Fast** will transmit LACP packets each second, while **Slow** will wait for 30 seconds before sending a LACP packet.
Prio	The **Prio** controls the priority of the port, range 1-65535. If the LACP partner wants to form a larger group than is supported by this device then this parameter will control which ports will be active and which ports will be in a backup role. Lower number means greater priority.

LACP System Status

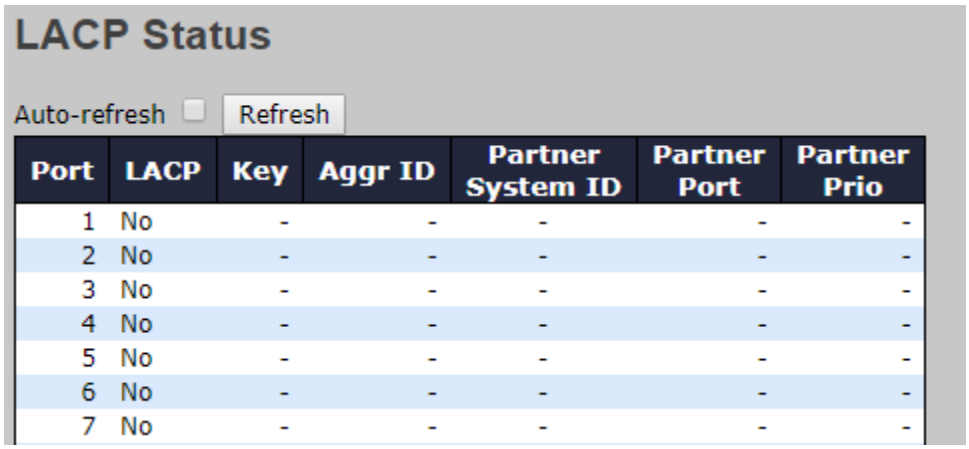
This page provides a status overview for all LACP instances.



Label	Description
Aggr ID	The aggregation ID is associated with the aggregation instance. For LLAG, the ID is shown as '**isid:aggr-id**' and for GLAGs as '**aggr-id**'
Partner System ID	System ID (MAC address) of the aggregation partner
Partner Key	When connecting the device to other manufactures' devices, you may need to configure LACP partner key. Partner key is the operational key value assigned to the port associated with this link by the Partner.
Last Changed	The time since this aggregation is changed.
Local Ports	Indicates which ports belong to the aggregation of the switch/stack. The format is: "**Switch ID:Port**".
Refresh	Click to refresh the page immediately
Auto-refresh	Check to enable an automatic refresh of the page at regular intervals

LACP Port Status

This page provides an overview of the LACP status for all ports.

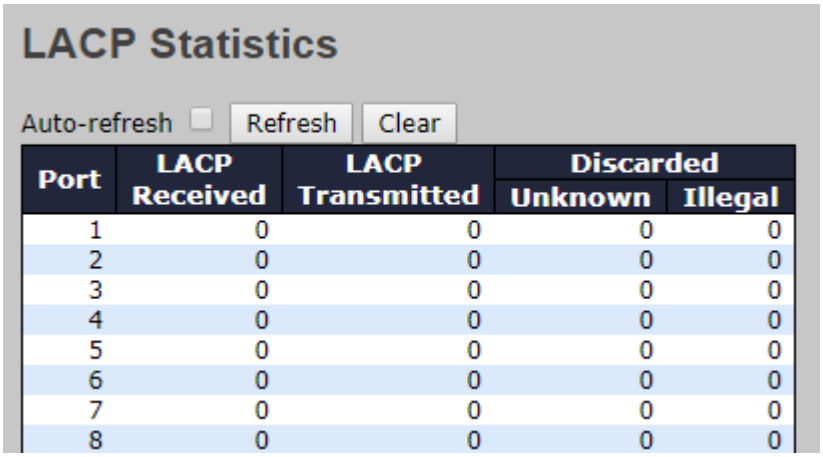


Label	Description
Port	Switch port number
LACP	**Yes** means LACP is enabled and the port link is up. **No** means

	LACP is not enabled or the port link is down. **Backup** means the port cannot join in the aggregation group unless other ports are removed. The LACP status is disabled.
Key	The key assigned to the port. Only ports with the same key can be aggregated
Aggr ID	The aggregation ID assigned to the aggregation group
Partner System ID	The partner's system ID (MAC address)
Partner Port	The partner's port number associated with the port
Partner Prio	The partner's port priority.
Refresh	Click to refresh the page immediately
Auto-refresh	Check to enable an automatic refresh of the page at regular intervals

LACP Port Statistics

This page provides an overview of the LACP statistics for all ports.

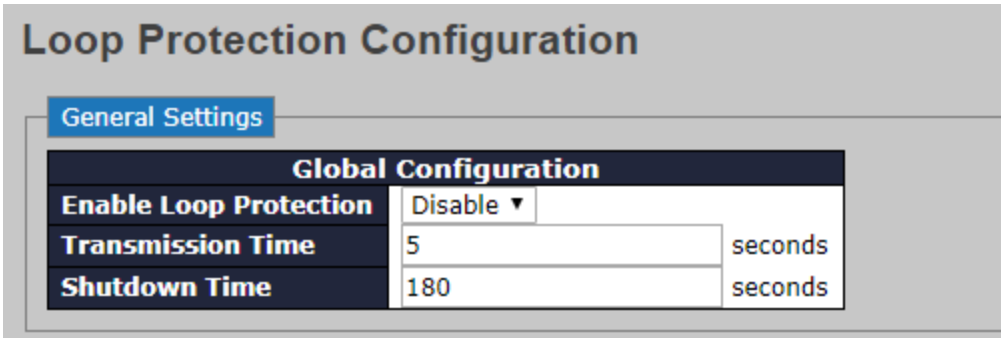


Label	Description
Port	Switch port number
LACP Transmitted	The number of LACP frames sent from each port
LACP Received	The number of LACP frames received at each port
Discarded	The number of unknown or illegal LACP frames discarded at each port.
Refresh	Click to refresh the page immediately
Auto-refresh	Check to enable an automatic refresh of the page at regular intervals
Clear	Click to clear the counters for all ports

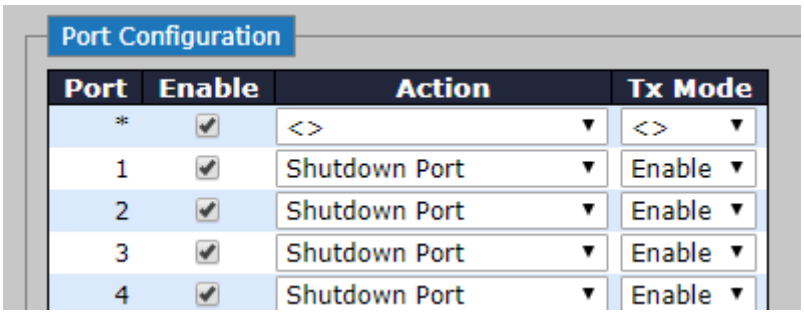
1.3.3 Loop Protection

This feature prevents loop attack. When receiving loop packets, the port will be disabled automatically, preventing the loop attack from affecting other network devices.

Configuration



Label	Description
Enable Loop Protection	Activate loop protection functions (as a whole)
Transmission Time	The interval between each loop protection PDU sent on each port. The valid value is 1 to 10 seconds.
Shutdown Time	The period (in seconds) for which a port will be kept disabled when a loop is detected (shutting down the port). The valid value is 0 to 604800 seconds (7 days). A value of zero will keep a port disabled permanently (until the device is restarted).

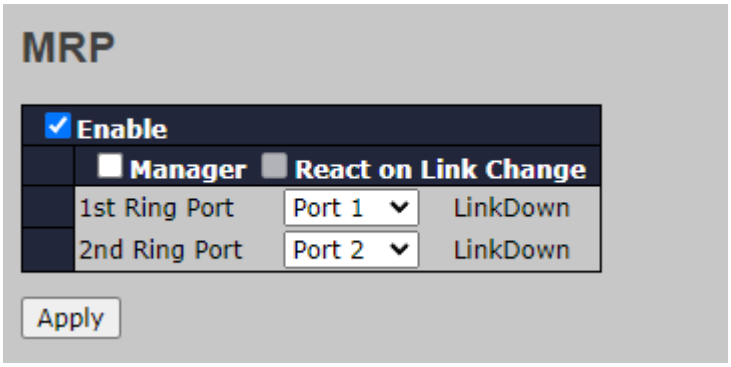


Label	Description
Port	Switch port number
Enable	Activate loop protection functions (as a whole)
Action	Configures the action to take when a loop is detected. Valid values include **Shutdown Port**, **Shutdown Port**, and **Log or Log Only**.
Tx Mode	Controls whether the port is actively generating loop protection PDUs or only passively look for looped PDUs.

1.4 Redundancy

1.4.1.1 MRP

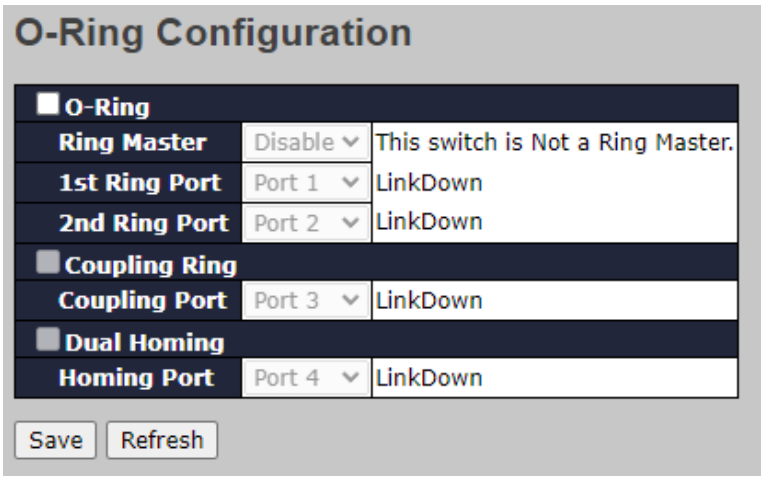
MRP (Media Redundancy Protocol) is an industry standard for high-availability Ethernet networks. MRP allowing Ethernet switches in ring configuration to recover from failure rapidly to ensure seamless data transmission. A MRP ring (IEC 62439) can support up to 50 devices and will enable a back-up link in 80ms (adjustable to max. 200ms/500ms).



Label	Description
Enable	Enables the MRP function
Manager	Every MRP topology needs a MRP manager. One MRP topology can only have a Manager. If two or more switches are set to be Manager, the MRP topology will fail.
React on Link Change (Advanced mode)	Faster mode. Enabling this function will cause MRP topology to converge more rapidly. This function only can be set in MRP manager switch.
1st Ring Port	Chooses the port which connects to the MRP ring
2nd Ring Port	Chooses the port which connects to the MRP ring

1.4.1.2 O-Ring

Ring is the most powerful Ring in the world. The recovery time of Ring is less than 30 ms. It can reduce unexpected damage caused by network topology change. Ring Supports 3 Ring topology: Ring, Coupling Ring and Dual Homing.



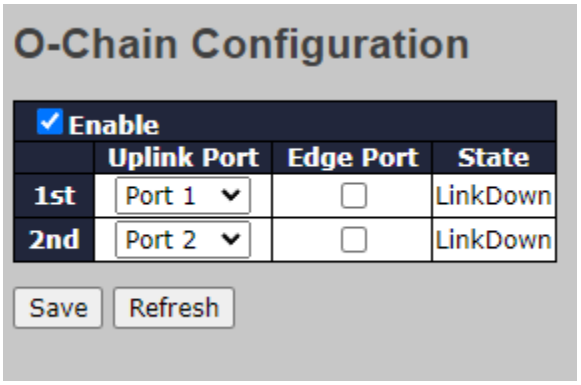
The following table describes the labels in this screen.

Label	Description
Redundant Ring	Mark to enable Ring.
Ring Master	There should be one and only one Ring Master in a ring. However if there are two or more switches which set Ring Master to enable, the switch with the lowest MAC address will be the actual Ring Master and others will be Backup Masters.
1st Ring Port	The primary port, when this switch is Ring Master.
2nd Ring Port	The backup port, when this switch is Ring Master.
Coupling Ring	Mark to enable Coupling Ring. Coupling Ring can be used to divide a big ring into two smaller rings to avoid effecting all switches when network topology change. It is a good application for connecting two Rings.
Coupling Port	Link to Coupling Port of the switch in another ring. Coupling Ring need four switch to build an active and a backup link. Set a port as coupling port. The coupled four ports of four switches will be run at active/backup mode.
Dual Homing	Mark to enable Dual Homing. By selecting Dual Homing mode, Ring will be connected to normal switches through two RSTP links (ex: backbone Switch). The two links work as active/backup mode, and connect each Ring to the normal switches in RSTP mode.
Apply	Click "**Apply**" to set the configurations.

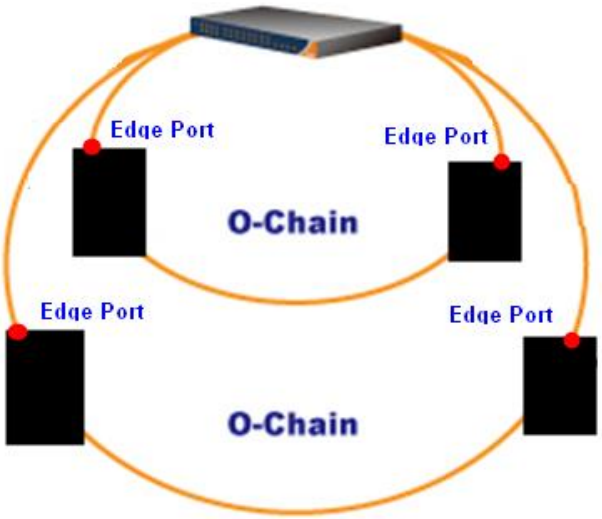
Note: We don't suggest you to set one switch as a Ring Master and a Coupling Ring at the same time due to heavy load.

1.4.1.3 O-Chain

O-Chain is the revolutionary network redundancy technology that provides the add-on network redundancy topology for any backbone network, providing ease-of-use while maximizing fault-recovery swiftness, flexibility, compatibility, and cost-effectiveness in one set of network redundancy topologies O-Chain allows multiple redundant network rings of different redundancy protocols to join and function together as a larger and more robust compound network topology, i.e. the creation of multiple redundant networks beyond the limitations of current redundant ring technology.



Label	Description
Enable	Enabling the O-Chain function
1st Ring Port	Choosing the port which connect to the ring
2nd Ring Port	Choosing the port which connect to the ring
Edge Port	In the O-Chain application, the head and tail of two Switch Port, must start the Edge,MAC smaller Switch, Edge port will be the backup and RM LED Light.

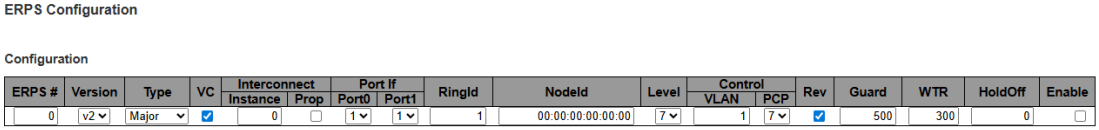


1.4.1.4 G.8032

1.4.1.4.1 ERPS

ERPS is an abbreviation for Ethernet Ring Protection Switching defined in ITU/T G.8032. It provides fast protection and recovery switching for Ethernet traffic in a ring topology while also ensuring that the Ethernet layer remains loop-free.

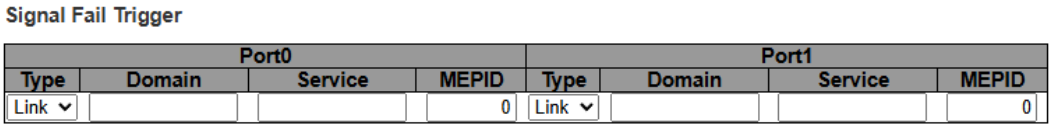
Config



Label	Description
ERPS#	The ID of ERPS. The allowed value is from 1 - 64.

Version	ERPS protocol version. **v1** and **v2** are supported.
Type	Type of ring. Possible values: **Major:** ERPS major ring (G.8001-2016, clause 3.2.39) **Sub:** ERPS sub-ring (G.8001-2016, clause 3.2.66) **InterSub:** ERPS sub-ring on an interconnection node (G.8001-2016, clause 3.2.66)
VC	Controls whether to use a Virtual Channel with a sub-ring.
Interconnect Instance	For a sub-ring on an interconnection node, this must reference the instance ID of the ring to which this sub-ring is connected.
Interconnect Prop	Controls whether the ring referenced by Interconnect Instance shall propagate R-APS flush PDUs whenever this sub-ring's topology changes.
Ring ID	The Ring ID is used - along with the control VLAN - to identify R-APS PDUs as belonging to a particular ring.
Node ID	The Node ID is used inside the R-APS specific PDU to uniquely identify this node (switch) on the ring.
Level	MD/MEG Level of R-APS PDUs we transmit.
Control VLAN	The VLAN on which R-APS PDUs are transmitted and received on the ring ports.
Control PCP	The PCP value used in the VLAN tag of the R-APS PDUs.
Rev	Revertive (true) or Non-revertive (false) mode.
Guard	Guard time in ms. Valid range is 10 - 2000 ms.
WTR	Wait-to-Restore time in seconds. Valid range 1 - 720 sec.
Hold Off	Hold off time in ms. Value is rounded down to 100ms precision. Valid range is 0 - 10000 ms.
Enable	The administrative state of this ERPS. Check to make it function normally and uncheck to make it cease functioning.

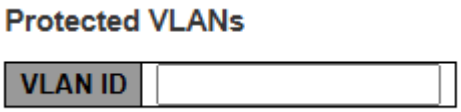
Signal Fail Trigger



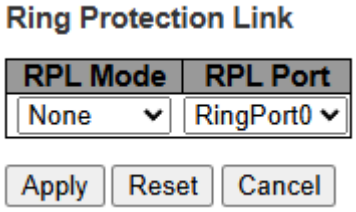
Label	Description
Type	Selects whether Signal Fail (SF) comes from the link state of a given interface, or from a Down-MEP.
Domain, Service MEPID	Identification of the MEP instance to provide Signal Fail, if Type is MEP.

Protected VLANs

VLANs which are protected by this ring instance. At least one VLAN must be protected. Specify as a comma separated list of vlan numbers or vlan ranges. Ex.: 1,4,7,30-70



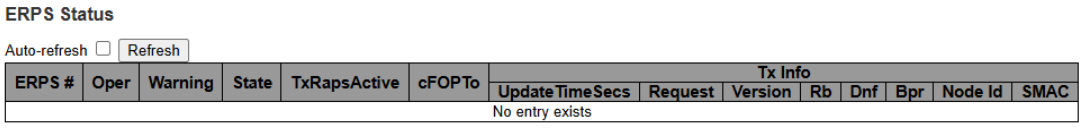
Ring Protection Link



Label	Description
RPL Mode	Ring Protection Link mode. One of **None:** This switch doesn't have the RPL port in the ring **Owner:** This switch is RPL owner for the ring (G.8001-2016, clause 3.2.61) **Neighbor:** This switch is RPL neighbor for the ring (G.8001-2016, clause 3.2.60)
RPL Port	Indicates whether it is port0 or port1 that is the Ring Protection Link. Not used if RPL Mode is **None**.

1.4.1.4.2 Status

This shows the current status of the ERPS instances.



Label	Description
ERPS#	The ID of the ERPS. Click on link to get to ERPS detailed instance page, you can reset counters and issue commands.
Oper	The operational state of ERPS instance. ●: Active. ●: Disabled or Internal error.
Warning	Operational warnings of ERPS instance. ●: No warnings. ●: There are warnings, use tooltip to see.
State	Specifies protection/node state of ERPS.

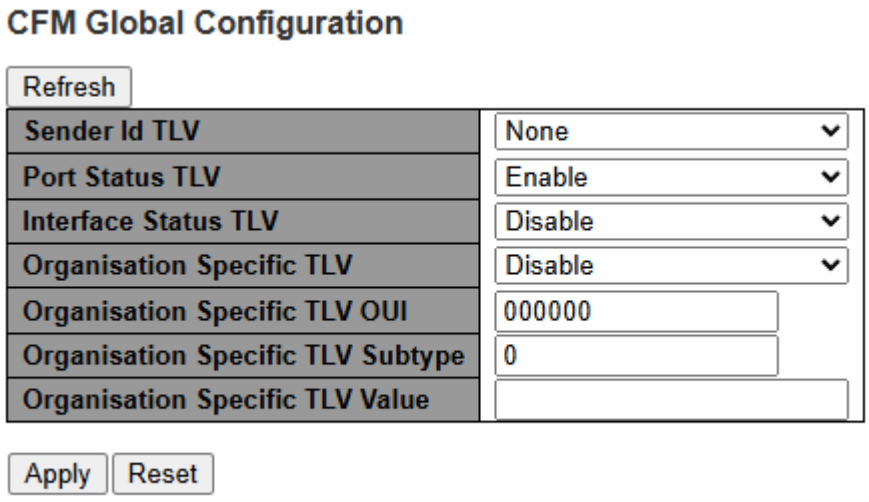
TxRapsActive	Specifies whether we are currently supposed to be transmitting R-APS PDUs on our ring ports.
cFOPTo	Failure of Protocol - R-APS Rx Time Out.
Update TimeSecs	Time in seconds since boot that this structure was last updated.
Request	Request/state according to G.8032, table 10-3.
Version	Version of received/used R-APS Protocol. 0 means v1, 1 means v2, etc.
Rb	RB (RPL blocked) bit of R-APS info. See Figure 10-3 of G.8032.
Dnf	DNF (Do Not Flush) bit of R-APS info. See Figure 10-3 of G.8032."
Bpr	BPR (Blocked Port Reference) of R-APS info. See Figure 10-3 of G.8032.
Node ID	Node ID of this request.
SMAC	The Source MAC address used in the request/state.

1.4.1.5 CFM

CFM is an acronym for Connectivity Fault Management. CFM is a standard defined by IEEE802.1ag. It defines protocols and practices for OAM (Operations, Administration, and Maintenance) and is largely identical with ITU-T Recommendation Y.1731.

Global

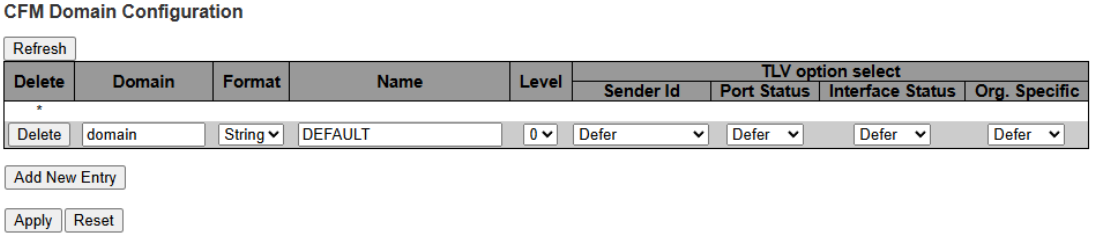
Configure CFM Global parameters on this page.



Label	Description
Sender Id TLV	Choose whether and what to use as Sender ID TLVs in CCMs

	generated by this switch. Can be overridden by Domain and Service level configuration. **None** **Chassis** **Manage** **ChassisManage**
Port Status TLV	Choose whether to send Port Status TLVs in CCMs generated by this switch. Can be overridden by Domain and Service level configuration. **Enable** Send Port Status TLVs in CCMs generated by this switch. **Disable** Do not send Port Status TLVs in CCMs generated by this switch.
Interface Status TLV	Choose whether to send Interface Status TLVs in CCMs generated by this switch. Can be overridden by Domain and Service level configuration. **Enable** Send Interface Status TLVs in CCMs generated by this switch. **Disable** Do not Send Interface Status TLVs in CCMs generated by this switch.
Organisation Specific TLV	Choose whether to send Organisation Specific TLVs in CCMs generated by this switch. Can be overridden by Domain and Service level configuration. **Enable** Send Organisation Specific TLVs in CCMs generated by this switch. **Disable** Do not send Organisation Specific TLVs in CCMs generated by this switch.
Organisation Specific TLV OUI	This is the three-bytes OUI transmitted with the Organization-Specific TLVs. Enter as 6 characters 0-9, a-f.
Organisation Specific TLV Subtype	This is the subtype transmitted with the Organization-Specific TLV. Can be any value in range [0; 255]
Organisation Specific TLV Value	This is the value transmitted in the Organization-Specific TLVs. Value is a printable character string of length 0-63.

Domain

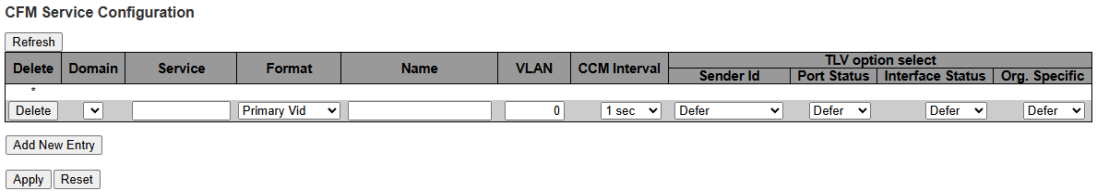


Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.

Domain	Name of Domain. Value is a single word which begins with an alphabetic letter A-Z or a-z with length 1-15.
Format	Select the MD name format. To mimic Y.1731 MEG IDs, use type None. **None** **String**
Name	The contents of this pamameter depends on the value of the format member. If format is **None**: Name is not used, but will be set to all-zeros behind the scenes. This format is typically used by Y.1731-kind-of-PDUs. If format is **String**: Name must contain a string from 1 to 43 characters long.
Level	MD/MEG level of this domain. Valid values are restricted to 0 - 7. **About leak prevention** Leak prevention is about discarding OAM PDUs with MEG levels lower than the MEP they hit when the OAM PDUs are ingressing the port on which the MEP resides, and to discard OAM PDUs with MEG levels at or lower than the MEP's when the OAM PDUs are ingressing other ports. There are two categories of architectures, when it comes to leak-prevention: Those that use Shared MEG level and those that use Independent MEG level: **Shared MEG level** On Shared MEG level architectures, Port Down MEPs always perform level filtering no matter which VLAN ID (VID) OAM PDUs get classified to, unless the same port has a VLAN MEP on the VID in question. So if you have a Port MEP in VID X and a VLAN MEP in VID Y, an OAM frame arriving on the port and gets classified to VID X or VID Z will be handled/level-filtered by the Port MEP, whereas an OAM frame ingressing the port in VID Y will be handled by the VLAN MEP. Likewise, if the switch has a Port MEP on VID X on Port X and an OAM frame ingresses on VID Y on Port Y, it is subject to level filtering before egressing Port X, unless Port X also has a VLAN MEP on VID Y, in which case the VLAN MEP will take care of level-filtering the OAM PDU. On Shared MEG level architectures, all Port MEPs must have the same MEG level and any VLAN MEP must have a MEG level higher than the Port MEPs' MEG level.

	Independent MEG level On Independent MEG level architectures, Port Down MEPs never perform level filtering on frames not classified to the MEP's VID. So if you have a Port MEP on VID X and a VLAN MEP on VID Y and an OAM frame ingresses any port on VID Z, it is not subject to handling/level-filtering by any of the two MEPs. **This switch exhibits Shared MEG level.**
TLV option select	Sender Id: Default Sender ID TLV format to be used in CCMs generated by this Domain (may be overridden in service) None Do not include Sender ID TLVs. Chassis Enable Sender ID TLV and send Chassis ID (MAC Address). Manage Enable Sender ID TLV and send Management address (IPv4 Address). ChassisManage Enable Sender ID TLV and send both Chassis ID (MAC Address) and Management Address (IPv4 Address). Defer Let the global configuration decide if Sender ID TLVs shall be included (may be overridden in service). Port Status: Include or exclude Port Status TLV in CCMs generated by this Domain or let higher level determine (may be overridden in Service). Disable Do not include Port Status TLVs. Enable Include Port Status TLVs. Defer Let the global configuration decide if Port Status TLVs shall be included (may be overridden in Service). Interface Status: Include or exclude Interface Status TLV in CCMs generated by this Domain or let higher level determine (may be overridden in Service). Disable Do not include Interface Status TLVs. Enable Include Interface Status TLVs. Defer Let the global configuration decide if Interface Status TLVs shall be included (may be overridden in Service). Org. Specific: Exclude Organization-Specific TLV in CCMs generated by this Domain or let higher level determine (may be overridden in Service). Disable Do not include Organization-Specific TLVs. Defer Let the global configuration decide if Organization-Specific TLVs shall be included (may be overridden in Service).

Service



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Domain	Name of Domain under which this Service resides.
Service	Name of Service. Value is a single word which begins with an alphabetic letter A-Z or a-z with length 1-15.
Format	Select the short Service name format. This decides how the value of the Name parameter will be interpreted. To mimic Y.1731 MEG IDs, create an MD instance with an empty name and use **Y1731 ICC** or **Y1731 ICC CC**. Possible values are: **String** **Two Octets** **Y1731 ICC** **Y1731 ICC CC** Look under **Name** for explanation.
Name	The contents of this parameter depends on the value of the format member. Besides the limitations explained for each of them, the following applies in general: If the Domain **Format** is **None**, the size of this cannot exceed 45 bytes. If the Domain **Format** is not **None**, the size of this cannot exceed 44 bytes. If **Format** is **String**, the following applies: length must be in range [1; 44] Contents must be in range [32; 126] If **Format** is **Two Octets**, the following applies: **Name[0]** and **Name[1]** will both be interpreted as unsigned 8-bit integers (allowing a range of [0; 255]). **Name[0]** will be placed in the PDU before **Name[1]**. The remaining available bytes in name will not be used. If **Format** is **Y1731 ICC**, the following applies: length must be 13.

	Contents must be in range [a-z,A-Z,0-9] Y.1731 specifies that it is a concatenation of ICC (ITU Carrier Code) and UMC (Unique MEG ID Code): ICC: 1-6 bytes UMC: 7-12 bytes In principle UMC can be any value in range [1; 127], but this API does not allow for specifying length of ICC, so the underlying code doesn't know where ICC ends and UMC starts. The Domain **Format** must be **None**. If **Format** is **Y1731 ICC CC**, the following applies: length must be 15. First 2 chars (CC): Must be amongst [A-Z] Next 1-6 chars (ICC): Must be amongst [a-z,A-Z,0-9] Next 7-12 chars (UMC): Must be amongst [a-z,A-Z,0-9] There may be ONE (slash) present in name[3-7]. The Domain **format** must be **None**.
VLAN	The MA's primary VID. A primary VID of 0 means that all MEPs created within this MA will be created as port MEPs (interface MEPs). There can only be one port MEP per interface. A given port MEP may still be created with tags, if that MEP's VLAN is non-zero." A non-zero primary VID means that all MEPs created within this MA will be created as VLAN MEPs. A given MEP may be configured with another VLAN than the MA's primary VID, but it is impossible to have untagged VLAN MEPs.
CCM Interval	The CCM rate of all MEPs bound to this Service.
TLV	**Sender Id**: Default Sender ID TLV format to be used in CCMs generated by this Service. **None** Do not include Sender ID TLVs. **Chassis** Enable Sender ID TLV and send Chassis ID (MAC Address). **Manage** Enable Sender ID TLV and send Management address (IPv4 Address). **ChassisManage** Enable Sender ID TLV and send both Chassis ID (MAC Address) and Management Address (IPv4 Address). **Defer** Let the Domain configuration decide if Sender ID TLVs shall be included. **Port Status**: Include or exclude Port Status TLV in CCMs generated by this Service or let higher level determine. **Disable** Do not include Port Status TLVs.

	Enable Include Port Status TLVs. **Defer** Let the Domain configuration decide if Port Status TLVs shall be included. **Interface Status**: Include or exclude Interface Status TLV in CCMs generated by this Service or let higher level determine. **Disable** Do not include Interface Status TLVs. **Enable** Include Interface Status TLVs. **Defer** Let the Domain configuration decide if Interface Status TLVs shall be included. **Org. Specific**: Exclude Organization-Specific TLV in CCMs generated by this Service or let higher level determine. **Disable** Do not include Organization-Specific TLVs. **Defer** Let the Domain configuration decide if Organization-Specific TLVs shall be included.

MEP

This switch supports two types of MEP: Port Down-MEPs and VLAN Down-MEPs.

Port Down-MEPs

In 802.1Q terminology, Port MEPs are located below the EISS entity, that is, closest to the physical port. Port MEPs are used by e.g. APS for protection purposes.
Port MEPs are created when the encompassing service has type "Port".
Port MEPs may send OAM PDUs tagged or untagged. An OAM PDU will be sent untagged only if the MEP's VLAN is set to "Inherit" (0). Any other value will cause it to be sent tagged with the port's TPID, whether or not the VLAN matches the port's PVID and that PVID is meant to be sent untagged.

VLAN Down-MEPs

in 802.1Q terminology, VLAN MEPs are located above the EISS entity.

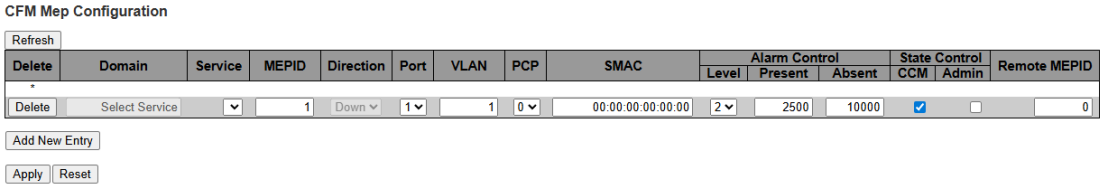
This means that tagging of OAM PDUs will follow the port's VLAN configuration.
Thus, if a VLAN MEP is created on the Port's PVID and PVID is configured to be untagged, OAM PDUs will be transmitted untagged.
VLAN MEPs are created when the encompassing service has type "VLAN".

Down-MEP creation rules

There are a few rules to obey when creating Down-MEPs:

1. There can only be one Port MEP on the same port.
2. There can only be one VLAN MEP on the same port and VLAN.
3. A VLAN MEP must have a higher MD/MEG level than a Port MEP on the same port and VLAN.
4. All Port MEPs must have the same MD/MEG level
5. Any VLAN MEP must have an ME/MEG level higher than a Port MEP

These checks are performed automatically on administratively enabled MEPs when you change a particular MEP, change the Service Type from Port to VLAN or vice versa, or change the domain's MD/MEG level.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Domain	Name of Domain under which this MEP resides.
Service	Name of Service under which this MEP resides.
MEPID	The identification of this MEP. Must be an integer [1..8091]
Direction	Set whether this MEP is an Up- or a Down-MEP.
Port	Port on which this MEP resides.
VLAN	VLAN ID. Use the value 0 to indicate untagged traffic (implies a port MEP)..
PCP	Choose PCP value in PDUs' VLAN tag. Not used if untagged.
SMAC	Set a Source MAC address to be used in CCM PDUs originating at this MEP. Must be a unicast address. Format is XX:XX:XX:XX:XX:XX. If all-zeros, the switch port's MAC address will be used instead.
Alarm Control	**Level:** If a defect is detected with a priority higher than this level, a fault alarm notification will be generated. Valid range is [1; 6] with 1 indicating that any defect will cause a fault alarm and 6 indicating that no defect can cause a fault alarm. See 802.1Q-2018, clause 20.9.5, LowestAlarmPri The possible defects and their priorities are:

	Short name / Description / Priority DefRDICCM / Remote Defect Indication / 1 DefMACstatus / MAC Status / 2 DefRemoteCCM / Remote CCM / 3 DefErrorCCM / Error CCM Received / 4 DefXconCCM / Cross Connect CCM Received / 5 **Present:** The time in milliseconds that defects must be present before a fault alarm notification is issued. Default is 2500 ms. **Absent:** The time in milliseconds that defects must be absent before a fault alarm notification is reset. Default is 10000 ms.
State Control	**CCM:** Enable or disable generation of continuity-check messages (CCMs) **Admin:** Enable or disable this MEP. When this MEP is enabled, it will check received/missing CCMs and can raise defects.
Remote MEPID	Specify the Remote MEP that this MEP is expected to receive CCM PDUs from. Must be an integer [0..8091] where 0 means undefined. The value of Remote MEPID must be different from the value of MEPID.

Status

CFM MEP Status

Auto-refresh ☐ Refresh

Domain	Service	MEPID	Port	State		SMAC	Defects		CCM Rx			CCM Tx
				Active	Fng		Highest	Defects	Valid	Invalid	Errors	
No entry exists												

Label	Description
Domain	Name of Domain under which this MEP resides.
Service	Name of Service under which this MEP resides.
MEPID	The identification of this MEP.
Port	Port on which this MEP resides.
State	**Active** Operational state of the MEP. ● : OFF. This indicates that the MEP Admin State is disabled. ● : DOWN. The MEP Admin State is enabled, but an error state exists. ● : UP. The MEP Admin State is enabled, and no errors and defects exists. **Fng** : Holds the current state of the Fault Notification Generator

<table>
<tr><td></td><td>State Machine. Values will be one of the following:
<table><tr><th>state</th><th>Description</th></tr><tr><td>reset</td><td>No defect has been present since reset timer expired or the State Machine was last reset.</td></tr><tr><td>defect</td><td>A defect is present, but not for a long enough time to be reported.</td></tr><tr><td>reportDefect</td><td>A transient state during which the defect is reported.</td></tr><tr><td>defectReported</td><td>A defect is present, and some defect has been reported.</td></tr><tr><td>defectClearing</td><td>No defect is present, but the ResetTime timer has not yet expired.</td></tr></table></td></tr>
<tr><td>SMAC</td><td>This MEP's MAC address.</td></tr>
<tr><td>Defects</td><td>Highest Highest priority defect that has been present since the MEP's fault notification generator state machine was last in the reset state.

Defects : A MEP can detect and report a number of defects, and multiple defects can be present at the same time. This is indicated the following letter code.
<table><tr><th>Code</th><th>Defect</th><th>Description</th></tr><tr><td>-</td><td>Defect not present</td><td>Defect not present</td></tr><tr><td>R</td><td>someRDIdefect</td><td>RDI received from at least one remote MEP</td></tr><tr><td>M</td><td>someMACstatusDefect</td><td>Received Port Status TLV != psUp or Interface Status TLV != isUp</td></tr><tr><td>C</td><td>someRMEPCCMdefect</td><td>Valid CCM is not received within 3.5 times CCM interval from at least one remote MEP</td></tr><tr><td>E</td><td>errorCCMdefect</td><td>Received CCM from an unknown remote MEP-ID or CCM interval mismatch</td></tr><tr><td>X</td><td>xconCCMdefect</td><td>Received CCM with an MD/MEG level smaller than configured or wrong MAID/MEGID (cross-connect)</td></tr></table></td></tr>
</table>

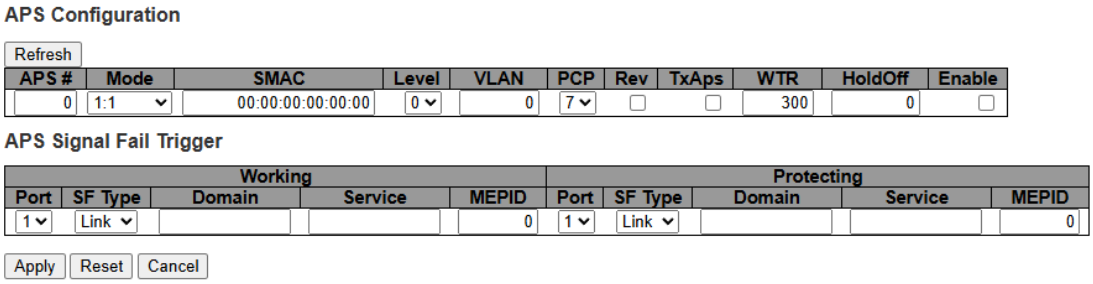
CCM Rx	**Valid**: Total number of CCMs that hit this MEP and passed the validation test. **Invalid**: Total number of CCMs that hit this MEP and didn't pass the validation test. **Errors**: Total number of out-of-sequence errors seen from RMEPs.
CCM Tx	Total number of CCM PDUs transmitted by this MEP.

1.4.1.6 APS

The APS module implements the protocol and linear protection switching mechanisms for point-to-point VLAN-based ETH SNC in Ethernet transport networks. Automatic Protection Switching is defined by the ITU G.8031 standard.

This page allows the user to create and configure an APS Instance.

Configuration



Label	Description
APS#	The ID of the APS. Maximum number of creatable APS instances is 8 . Click on link to get to APS instance page, you can reset counters and issue commands.
Port	The Port this flow is attached to.
SF Trigger	Selects whether Signal Fail (SF) comes from the link state of a given Port, or from a Down-MEP.
SF MEP	The Domain::Service::MEPID refers to a MEP instance which shall represent the Working flow. Only used when SF Trigger is MEP. The selected MEP instance does not need to exist when this APS is configured.
Mode	**1:1** This will create a 1:1 APS. In the linear 1:1 protection switching architecture, the protection transport entity is dedicated to the working transport entity. However, the normal traffic is transported either on the working transport entity or on the protection transport entity using a selector bridge at the source of the protected domain. The selector at the sink of the protected domain selects the entity which carries the normal traffic. **1+1 Uni** This will create a 1+1 Unidirectional APS. **1+1 Bi** This will create a 1+1 Bidirectional APS.

	In the linear 1+1 protection switching architecture, a protection transport entity is dedicated to each working transport entity. The normal traffic is copied and fed to both working and protection transport entities with a permanent bridge at the source of the protected domain. The traffic on working and protection transport entities is transmitted simultaneously to the sink of the protected domain, where a selection between the working and protection transport entities is made based on some predetermined criteria, such as server defect indication.
Level	MD/MEG Level (0-7).
VLAN	The VLAN ID used in the L-APS PDUs. 0 means untagged.
PCP	PCP (priority) (default 7). The PCP value used in the VLAN tag unless the L-APS PDU is untagged. Must be a value in range 0 - 7.
SMAC	Source MAC address used in L-APS PDUs. Must be a unicast address. If all-zeros, the switch port's MAC address will be used.
Rev	When checked, the port recovery mode is revertive, that is, traffic switches back to the working port after the condition(s) causing a switch has cleared. In the case of clearing a command (e.g. forced switch), this happens immediately. In the case of clearing of a defect, this generally happens after the expiry of the WTR (Wait-To-Restore) timer. When unchecked, the port recovery mode is non-revertive and traffic is allowed to remain on the protect port after a switch reason has cleared.
TxAps	Choose whether this end transmits APS PDUs. Only used for 1+1, unidirectional.
WTR	When Rev is checked, WTR (Wait-To-Restore) tells how many seconds to wait before restoring to the working port after a fault condition has cleared. Valid range 1 - 720
HoldOff	When a new (or more severe) defect occurs, the hold-off timer will be started and the event will be reported after the timer expires. HoldOff time is measured in milliseconds, and valid values are in the range 0 - 10000. Default is 0, which means immediate reporting of the defect.
Enable	The administrative state of this APS instance. Check to make it function normally and uncheck to make it cease functioning.
Oper	This field can not be configured, but shows the operational state. You can click on the link in the APS # field to get more details on the status. ● APS instance is functional. ● APS instance is not functional.

Warning	If the operational state is Active, the APS instance is indeed active, but it may be that it doesn't run as the administrator thinks, because of configuration errors, which are reflected in the warnings below. The Warning information is indicated by ●: no warning, ●: warning. Use the tooltip to get the detailed warning information.

Status

APS Status

Auto-refresh ☐ Refresh

APS #	State			Defect state		TxAps		
	Operational	Warning	Protection	Working	Protecting	Request	ReSignal	BrSignal
No entry exists								

RxAps			Dfop				SMAC	TxCnt	RxCnt	
Request	ReSignal	BrSignal	CM	PM	NR	TO			Valid	Invalid

Label	Description
APS#	The ID of the APS. Click on link to get to APS instance page, you can reset counters and issue commands.
State, Operational	The operational state of the APS instance. There are many ways to not have the instance active. Each of them has its own value. Only when the state is Active, will the APS instance be active and up and running. If the Operational state is not "Active", the remaining fields are invalid. The possible values of this field are shown below: **Administratively disabled:** Instance is inactive, because it is administratively disabled. **Active:** The instance is active and up and running. **Internal Error:** Instance is inactive, because an internal error has occurred. **Working MEP not Found:**Instance is inactive, because the Working MEP is not found. **Protecting MEP not Found:** Instance is inactive, because the Protecting MEP is not found. **Working MEP is not administrative active:** Instance is inactive, because the Working MEP is not admin enabled. **Protecting MEP is not administrative active:** Instance is inactive, because the Protecting MEP is not admin enabled. **Working MEP is not a Down MEP:** Instance is inactive, because the Working MEP is not a Down-MEP. **Protecting MEP is not a Down MEP:** Instance is inactive,

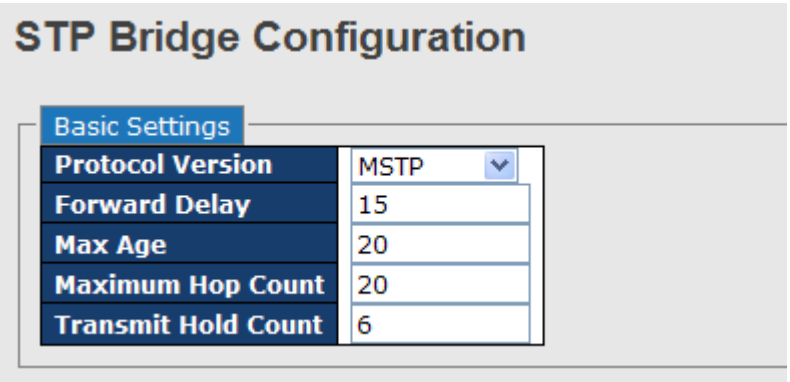
	because the Protecting MEP is not a Down-MEP. **Working and Protecting MEP use the same interface:** Instance is inactive, because both Working and Protecting MEPs use the same I/F. **Another instance use the same Working port:** Instance is inactive, because another instance uses the same Working port.
State, Warning	If the operational state is Active, the APS instance is indeed active, but it may be that it doesn't run as the administrator thinks, because of configuration errors, which are reflected in the warnings below. The Warning information is indicated by ●: no warning, ●: warning. Use the tooltip to get the detailed warning information.
State, Protection	The possible protection group states. The letters refers to the state as described in G.8031 Annex **No request Working:** A. **No request Protecting:** B. **Lockout:** C. **Forced Switch:** D. **Signal fail Working:** E. **Signal fail Protecting:** F. **Manual switch to Protecting:** G. **Manual switch to Working:** H. **Wait to restore:** I. **Do not revert:** J. **Exercise Working:** K. **Exercise Protecting:** L. **Reverse request Working:** M. **Reverse request Protecting:** N. **Signal degrade Working:** P. **Signal degrade Protecting:** Q.
Defect State, Working, Protection	The possible values of this field are shown below: **ok:** The port defect state is OK **sd:** The port defect state is Signal Degrade **sf:** The port defect state is Signal Fail
TxAps, RxAps - Request	The possible transmitted or received APS request according to G.8031, Table 11-1. **nr:** No Request. **dnr:** Do Not Revert. **rr:** Reverse Request. **exer:** Exercise. **wtr:** Wait-To-Restore.

	ms: Manual Switch. **sd:** Signal Degrade. **sfW:** Signal Fail for Working. **fs:** Forced Switch. **sfP:** Signal Fail for Protect. **lo:** Lockout.
TxAps, ReSignal	Transmitted requested signal according to G.8031 figure 11-2
TxAps,BrSignal	Transmitted bridged signal according to G.8031 figure 11-2
RxAps, Resignal	Received requested signal according to G.8031 figure 11-2
RxAps, BrSignal	Received bridged signal according to G.8031 figure 11-2
Dfop	Dfop is "Failure of Protocol defect" and the presence of a defect is indicated by ●: no defect, ●: defect. **CM:** Configuration Mismatch (received APS PDU on working interface within last 17.5 seconds). **PM:** Provisioning Mismatch (far and near ends are not using the same mode; bidir only) **NR:** No Response (far end hasn't agreed on 'Requested Signal' within 50 ms; bidir only) **TO:** Time Out (near end hasn't received a valid APS PDU within last 17.5 seconds; bidir only)
SMAC	Source MAC address of last received APS PDU or all-zeros if no PDU has been received.
TxCnt	Number of APS PDU frames transmitted.
RxCnt,Valid	Number of valid APS PDU frames received on the protect port.
RxCnt, Invalid	Number of invalid APS PDU frames received on the protect port.

1.4.1.7 MSTP

Bridge Settings

This page allows you to configure RSTP system settings. The settings are used by all RSTP Bridge instances in the Switch Stack.

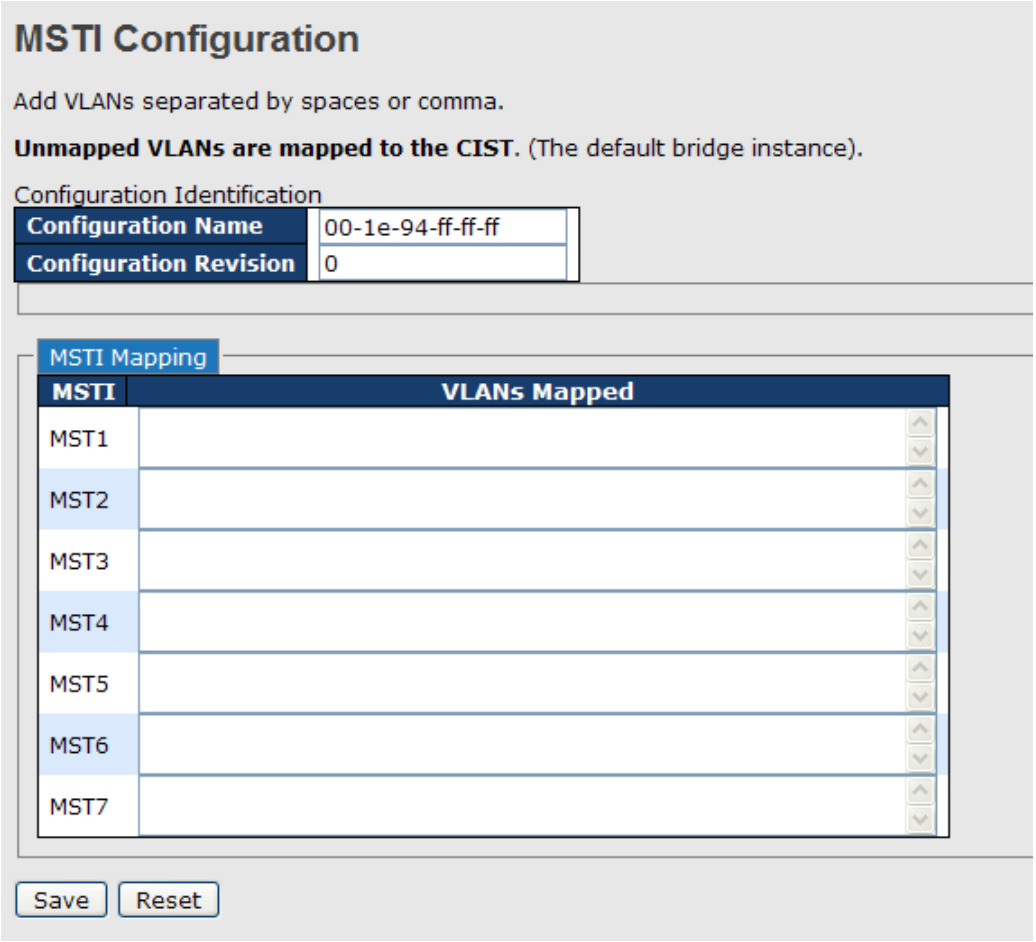


Label	Description
Protocol Version	The STP protocol version setting. Valid values are STP, RSTP

	and MSTP.
Forward Delay	The delay used by STP Bridges to transition Root and Designated Ports to Forwarding (used in STP compatible mode). Valid values are in the range 4 to 30 seconds.
Max Age	The maximum age of the information transmitted by the Bridge when it is the Root Bridge. Valid values are in the range 6 to 40 seconds, and MaxAge must be <= (FwdDelay-1)*2.
Maximum Hop Count	This defines the initial value of remainingHops for MSTI information generated at the boundary of an MSTI region. It defines how many bridges a root bridge can distribute its BPDU information. Valid values are in the range 4 to 30 seconds, and MaxAge must be <= (FwdDelay-1)*2.
Transmit Hold Count	The number of BPDU's a bridge port can send per second. When exceeded, transmission of the next BPDU will be delayed. Valid values are in the range 1 to 10 BPDU's per second.
Save	Click to save changes.
Reset	Click to undo any changes made locally and revert to previously saved values.

MSTI Mapping

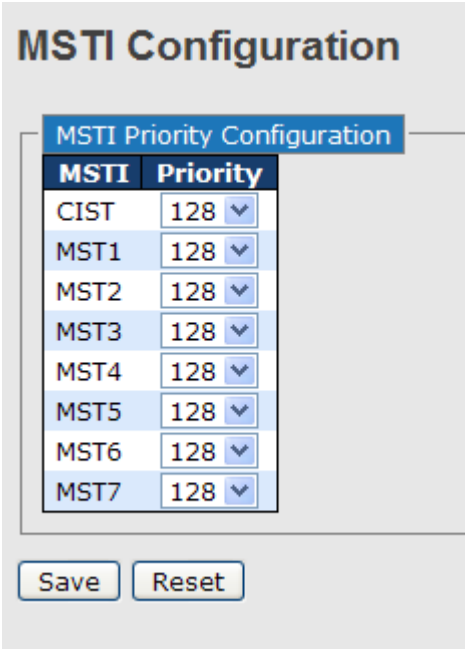
This page allows the user to inspect the current STP MSTI bridge instance priority configurations, and possibly change them as well.



Label	Description
Configuration Name	The name identifiying the VLAN to MSTI mapping. Bridges must share the name and revision (see below), as well as the VLAN-to-MSTI mapping configuration in order to share spanning trees for MSTI's. (Intra-region). The name is at most 32 characters.
Configuration Revision	The revision of the MSTI configuration named above. This must be an integer between 0 and 65535.
MSTI	The bridge instance. The CIST is not available for explicit mapping, as it will receive the VLANs not explicitly mapped.
VLANS Mapped	The list of VLAN's mapped to the MSTI. The VLANs must be separated with comma and/or space. A VLAN can only be mapped to one MSTI. An unused MSTI should just be left empty. (I.e. not having any VLANs mapped to it.)
Save	Click to save changes.
Reset	Click to undo any changes made locally and revert to previously saved values.

MSTI Priorities

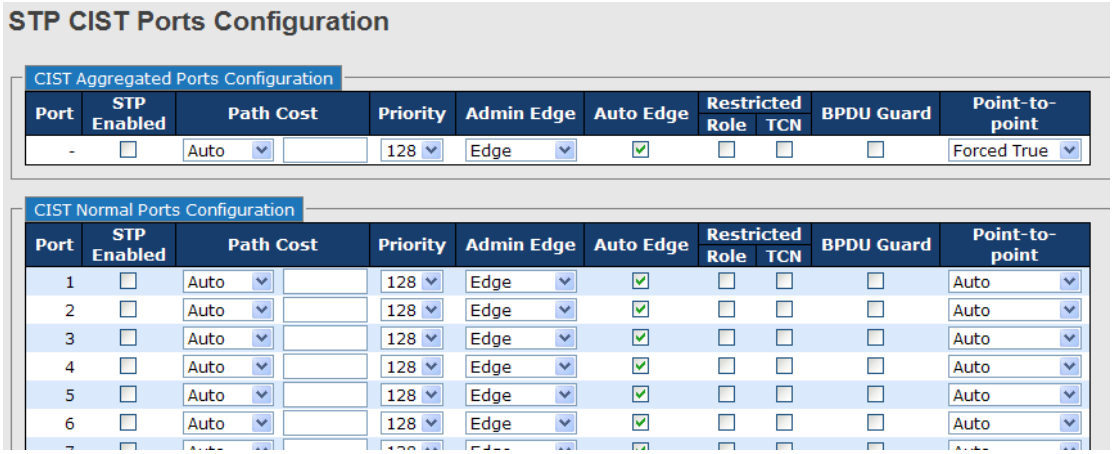
This page allows the user to inspect the current STP MSTI bridge instance priority configurations, and possibly change them as well.



Label	Description
MSTI	The bridge instance. The CIST is the default instance, which is always active.
Priority	Controls the bridge priority. Lower numerical values have better priority. The bridge priority plus the MSTI instance number, concatenated with the 6-byte MAC address of the switch forms a Bridge Identifier.
Save	Click to save changes.
Reset	Click to undo any changes made locally and revert to previously saved values.

CIST Ports

This page allows the user to inspect the current STP CIST port configurations, and possibly change them as well. This page contains settings for physical and aggregated ports. The aggregation settings are stack global.



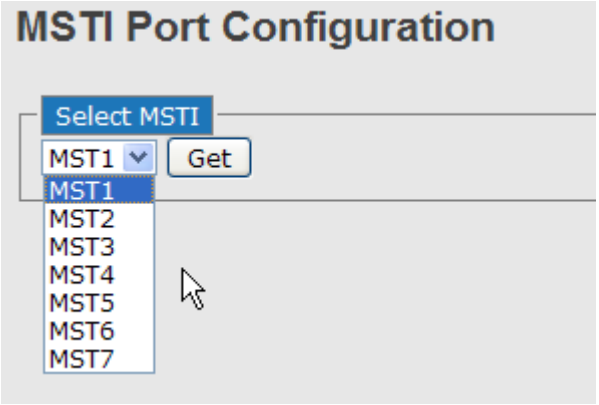
Label	Description
Port	The switch port number of the logical STP port.
STP Enabled	Controls whether STP is enabled on this switch port.
Path Cost	Controls the path cost incurred by the port. The Auto setting will set the path cost as appropriate by the physical link speed, using the 802.1D recommended values. Using the Specific setting, a user-defined value can be entered. The path cost is used when establishing the active topology of the network. Lower path cost ports are chosen as forwarding ports in favor of higher path cost ports. Valid values are in the range 1 to 200000000.
Priority	Controls the port priority. This can be used to control priority of ports having identical port cost. (See above).
OpenEdge(setate flag)	Operational flag describing whether the port is connecting directly to edge devices. (No Bridges attached). Transitioning to the forwarding state is faster for edge ports (having operEdge true) than for other ports.
AdminEdge	Controls whether the operEdge flag should start as beeing set or cleared. (The initial operEdge state when a port is initialized).
AutoEdge	Controls whether the bridge should enable automatic edge detection on the bridge port. This allows operEdge to be derived from whether BPDU's are received on the port or not.
Restricted Role	If enabled, causes the port not to be selected as Root Port for the CIST or any MSTI, even if it has the best spanning tree priority vector. Such a port will be selected as an Alternate Port after the Root Port has been selected. If set, it can cause lack of spanning tree connectivity. It can be set by a network administrator to prevent bridges external to a core region of the network influencing the spanning tree active topology, possibly because those bridges are not under the full control of the administrator. This feature is also know as Root Guard.
Restricted TCN	If enabled, causes the port not to propagate received topology change notifications and topology changes to other ports. If set it can cause temporary loss of connectivity after changes in a spanning trees active topology as a result of persistent incorrectly learned station location information. It is set by a network administrator to prevent bridges external to a core region of the network, causing address flushing in that region, possibly because those bridges are not under the full control of the administrator or is the physical link state for the attached LANs transitions frequently.
Point2Point	Controls whether the port connects to a point-to-point LAN rather

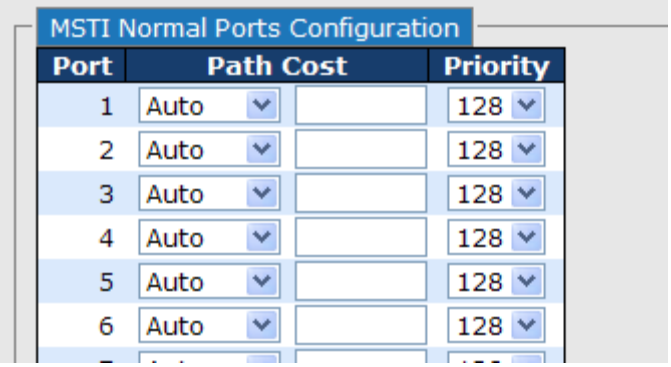
	than a shared medium. This can be automatically determined, or forced either true or false. Transition to the forwarding state is faster for point-to-point LANs than for shared media.
Save	Click to save changes.
Reset	Click to undo any changes made locally and revert to previously saved values.

MSTI Ports

This page allows the user to inspect the current STP MSTI port configurations, and possibly change them as well. A MSTI port is a virtual port, which is instantiated seperately for each active CIST (physical) port for each MSTI instance configured and applicable for the port. The MSTI instance must be selected before displaying actual MSTI port configuration options.

This page contains MSTI port settings for physical and aggregated ports. The aggregation settings are stack global.





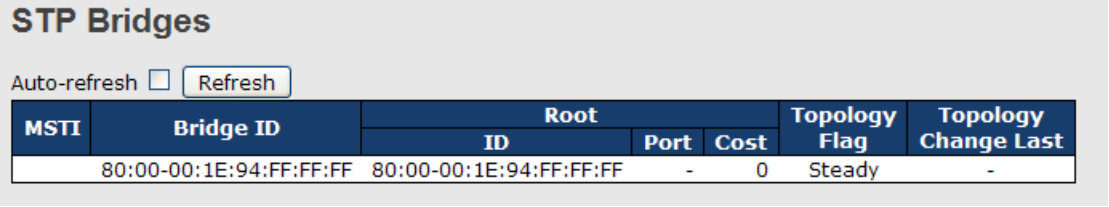
Label	Description
Port	The switch port number of the corresponding STP CIST (and MSTI) port.
Path Cost	Controls the path cost incurred by the port. The Auto setting will set the path cost as appropriate by the physical link speed, using the 802.1D recommended values. Using the Specific setting, a user-defined value can be entered. The path cost is used when establishing the active topology of the network. Lower path cost

	ports are chosen as forwarding ports in favor of higher path cost ports. Valid values are in the range 1 to 200000000.
Priority	Controls the port priority. This can be used to control priority of ports having identical port cost. (See above).
Save	Click to save changes.
Reset	Click to undo any changes made locally and revert to previously saved values.

STP Bridges

This page provides a status overview for all STP bridge instances.

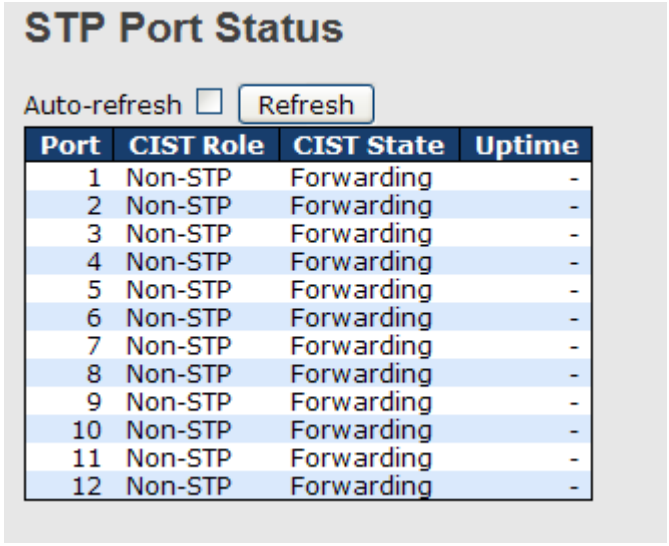
The displayed table contains a row for each STP bridge instance, where the column displays the following information:



Label	Description
MSTI	The Bridge Instance. This is also a link to the STP Detailed Bridge Status.
Bridge ID	The Bridge ID of this Bridge instance.
Root ID	The Bridge ID of the currently elected root bridge.
Root Port	The switch port currently assigned the root port role.
Root Cost	Root Path Cost. For the Root Bridge this is zero. For all other Bridges, it is the sum of the Port Path Costs on the least cost path to the Root Bridge.
Topology Flag	The current state of the Topology Change Flag for this Bridge instance.
Topology Change Last	The time since last Topology Change occurred.
Refresh	Click to refresh the page immediately.
Auto-refresh	Check this box to enable an automatic refresh of the page at regular intervals.

STP Port Status

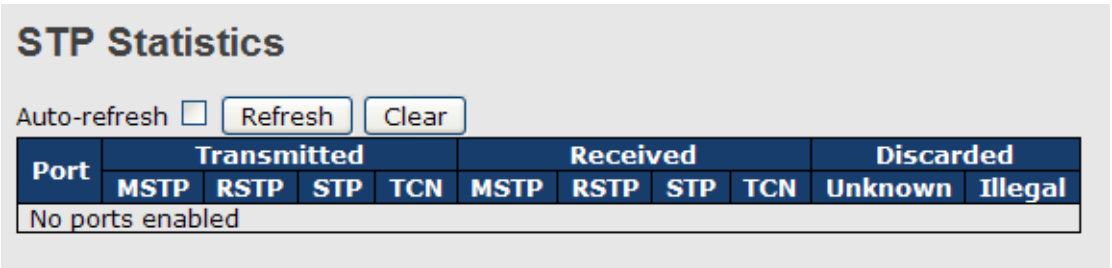
This page displays the STP CIST port status for port physical ports in the currently selected switch.



Label	Description
Port	The switch port number of the logical STP port.
CIST Role	The current STP port role of the CIST port. The port role can be one of the following values: AlternatePort BackupPort RootPort DesignatedPort.
State	The current STP port state of the CIST port. The port state can be one of the following values: Blocking Learning Forwarding.
Uptime	The time since the bridge port was last initialized.
Refresh	Click to refresh the page immediately.
Auto-refresh	Check this box to enable an automatic refresh of the page at regular intervals.

STP Statistics

This page displays the RSTP port statistics counters for bridge ports in the currently selected switch.

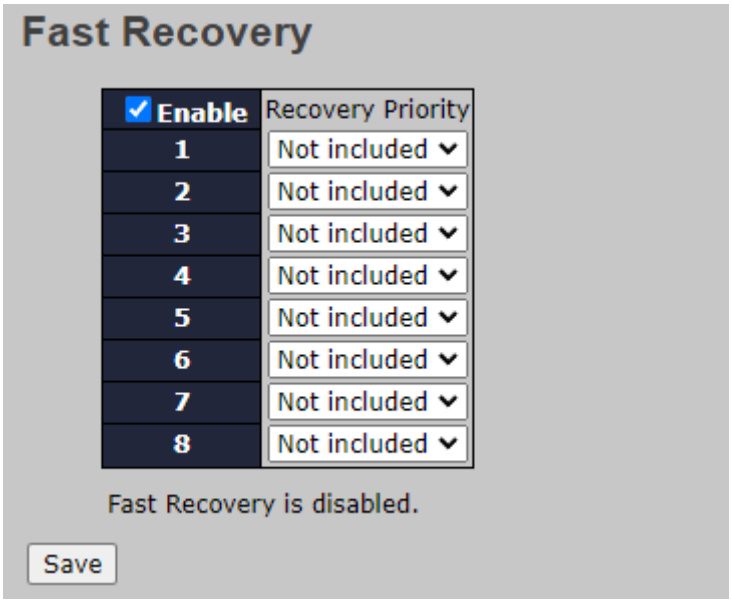


Label	Description
Port	The switch port number of the logical RSTP port.
RSTP	The number of RSTP Configuration BPDU's received/transmitted on the port.
STP	The number of legacy STP Configuration BPDU's received/transmitted on the port.

TCN	The number of (legacy) Topology Change Notification BPDU's received/transmitted on the port.
Discarded Unknown	The number of unknown Spanning Tree BPDU's received (and discarded) on the port.
Discarded Illegal	The number of illegal Spanning Tree BPDU's received (and discarded) on the port.
Refresh	Click to refresh the page immediately.
Auto-refresh	Check this box to enable an automatic refresh of the page at regular intervals.

1.4.1.8 Fast Recovery Mode

The Fast Recovery Mode can be set to connect multiple ports to one or more switches. The IGPS-9084GP-LA with its fast recovery mode will provide redundant links. Fast Recovery mode supports 12 priorities, only the first priority will be the act port, the other ports configured with other priority will be the backup ports.



The following table describes the labels in this screen.

Label	Description
Active	Activate the fast recovery mode.
port	Port can be configured as 12 priorities. Only the port with highest priority will be the active port. 1st Priority is the highest.
Apply	Click "**Apply**" to activate the configurations.

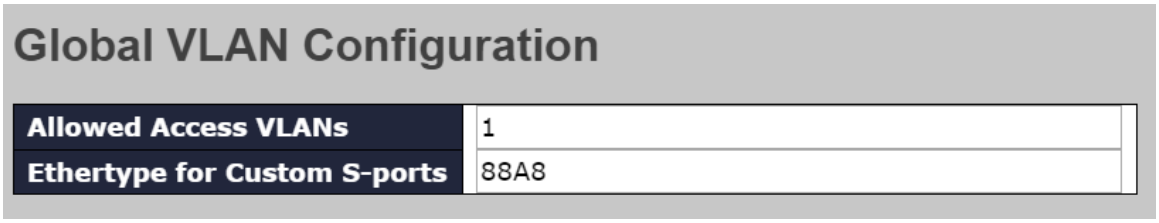
1.5 VLAN

1.5.1 VLAN Membership

A VLAN is a group of end devices with a common set of requirements, independent of physical location. With the same

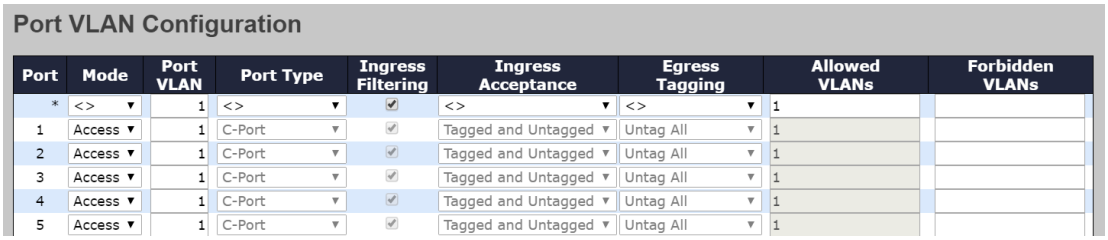
attributes as a physical LAN, VLANs enable you to group end devices even if they are not located physically on the same LAN segment. By splitting up a network into sets of VLANs, assigning ports to individual VLANs, and defining criteria for VLAN membership for workstations connected to those ports, traffic for the same VLAN can be sent between switches.

Global VLAN Configuration



Label	Description
Allowed Access VLANs	This field shows the allowed Access VLANs, i.e. it only affects ports configured as Access ports. Ports in other modes are members of the VLANs specified in the Allowed VLANs field. By default, only VLAN 1 is enabled. More VLANs may be created by using a list syntax where the individual elements are separated by commas. Ranges are specified with a dash separating the lower and upper bound. The following example will create VLANs 1, 10, 11, 12, 13, 200, and 300: **1,10-13,200,300**. Spaces are allowed in between the delimiters.
Ethertype for Custom S-ports	This field specifies the ethertype/TPID (specified in hexadecimal) used for Custom S-ports. The setting is in force for all ports whose Port Type is set to S-Custom-Port.

Port VLAN Configuration



Label	Description
Port	This is the logical port number of this row.
Mode	The port mode (default is Access) determines the fundamental behavior of the port in question. A port can be in one of three modes as described below. Whenever a particular mode is selected, the remaining fields in that row will be either grayed out or made changeable depending on the mode in question.

	Grayed out fields show the value that the port will get when the mode is applied. **Access:** Access ports are normally used to connect to end stations. Dynamic features like Voice VLAN may add the port to more VLANs behind the scenes. Access ports have the following characteristics: • Member of exactly one VLAN, the Port VLAN (a.k.a. Access VLAN), which by default is 1 • Accepts untagged and C-tagged frames • Discards all frames not classified to the Access VLAN • On egress all frames are transmitted untagged **Trunk:** Trunk ports can carry traffic on multiple VLANs simultaneously, and are normally used to connect to other switches. Trunk ports have the following characteristics: • By default, a trunk port is member of all VLANs (1-4095) • The VLANs that a trunk port is member of may be limited by the use of Allowed VLANs • Frames classified to a VLAN that the port is not a member of are discarded • By default, all frames but frames classified to the Port VLAN (a.k.a. Native VLAN) get tagged on egress. Frames classified to the Port VLAN do not get C-tagged on egress • Egress tagging can be changed to tag all frames, in which case only tagged frames are accepted on ingress **Hybrid:** Hybrid ports resemble trunk ports in many ways, but adds additional port configuration features. In addition to the characteristics described for trunk ports, hybrid ports have these abilities: • Can be configured to be VLAN tag unaware, C-tag aware, S-tag aware, or S-custom-tag aware • Ingress filtering can be controlled

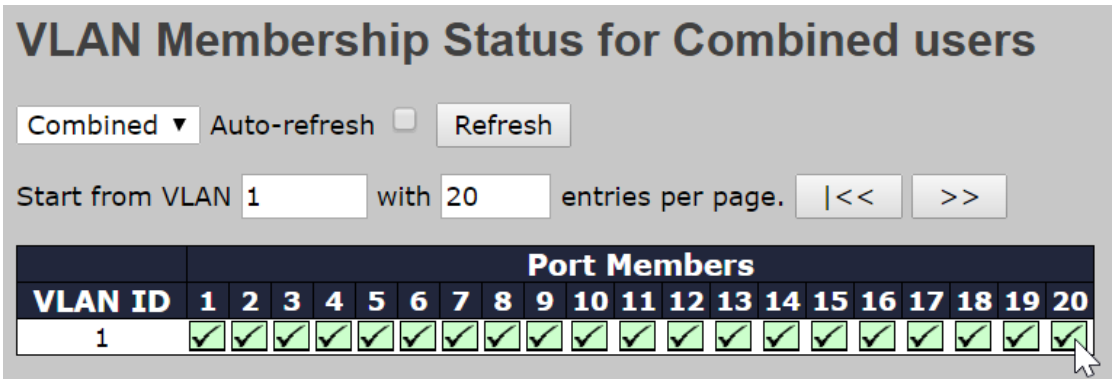
	• Ingress acceptance of frames and configuration of egress tagging can be configured independently
Port VLAN	Determines the port's VLAN ID (a.k.a. PVID). Allowed VLANs are in the range 1 through 4095, default being 1. On ingress, frames get classified to the Port VLAN if the port is configured as VLAN unaware, the frame is untagged, or VLAN awareness is enabled on the port, but the frame is priority tagged (VLAN ID = 0). On egress, frames classified to the Port VLAN do not get tagged if Egress Tagging configuration is set to untag Port VLAN. The Port VLAN is called an "Access VLAN" for ports in Access mode and Native VLAN for ports in Trunk or Hybrid mode.
Port Type	Ports in hybrid mode allow for changing the port type, that is, whether a frame's VLAN tag is used to classify the frame on ingress to a particular VLAN, and if so, which TPID it reacts on. Likewise, on egress, the Port Type determines the TPID of the tag, if a tag is required. **Unaware:** On ingress, all frames, whether carrying a VLAN tag or not, get classified to the Port VLAN, and possible tags are not removed on egress. **C-Port:** On ingress, frames with a VLAN tag with TPID = 0x8100 get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with a C-tag. **S-Port:** On ingress, frames with a VLAN tag with TPID = 0x88A8 get classified to the VLAN ID embedded in the tag. Priority-tagged frames are classified to the Port VLAN. If the port is configured to accept Tagged Only frames (see Ingress Acceptance below), frames without this TPID are dropped. If frames must be tagged on egress, they will be tagged with an S-tag. **S-Custom-Port:** On ingress, frames with a VLAN tag with a TPID equal to the Ethertype configured for Custom-S ports get classified to

	the VLAN ID embedded in the tag. Priority-tagged frames are classified to the Port VLAN. If the port is configured to accept Tagged Only frames (see Ingress Acceptance below), frames without this TPID are dropped. If frames must be tagged on egress, they will be tagged with the custom S-tag.
Ingress Filtering	Hybrid ports allow for changing ingress filtering. Access and Trunk ports always have ingress filtering enabled. If ingress filtering is enabled (checkbox is checked), frames classified to a VLAN that the port is not a member of get discarded. If ingress filtering is disabled, frames classified to a VLAN that the port is not a member of are accepted and forwarded to the switch engine. However, the port will never transmit frames classified to VLANs that it is not a member of.
Ingress Acceptance	Hybrid ports allow for changing the type of frames that are accepted on ingress. **Tagged and Untagged** Both tagged and untagged frames are accepted. See Port Type for a description of when a frame is considered tagged. **Tagged Only** Only frames tagged with the corresponding Port Type tag are accepted on ingress. **Untagged Only** Only untagged frames are accepted on ingress. See Port Typefor a description of when a frame is considered untagged.
Egress Tagging	Ports in Trunk and Hybrid mode may control the tagging of frames on egress. **Untag Port VLAN** Frames classified to the Port VLAN are transmitted untagged. Other frames are transmitted with the relevant tag. **Tag All** All frames, whether classified to the Port VLAN or not, are transmitted with a tag. **Untag All** All frames, whether classified to the Port VLAN or not, are transmitted without a tag. This option is only available for ports in Hybrid mode.
Allowed VLANs	Ports in Trunk and Hybrid mode may control which VLANs they are allowed to become members of. Access ports can only be member of one VLAN, the Access VLAN.

	The field's syntax is identical to the syntax used in the Enabled VLANs field. By default, a Trunk or Hybrid port will become member of all VLANs, and is therefore set to **1-4095**. The field may be left empty, which means that the port will not become member of any VLANs
Forbidden VLANs	A port may be configured to never become member of one or more VLANs. This is particularly useful when dynamic VLAN protocols like MVRP and GVRP must be prevented from dynamically adding ports to VLANs. The trick is to mark such VLANs as forbidden on the port in question. The syntax is identical to the syntax used in the Enabled VLANs field. By default, the field is left blank, which means that the port may become a member of all possible VLANs.

1.5.2 Membership Status

This page provides an overview of membership status of VLAN users.

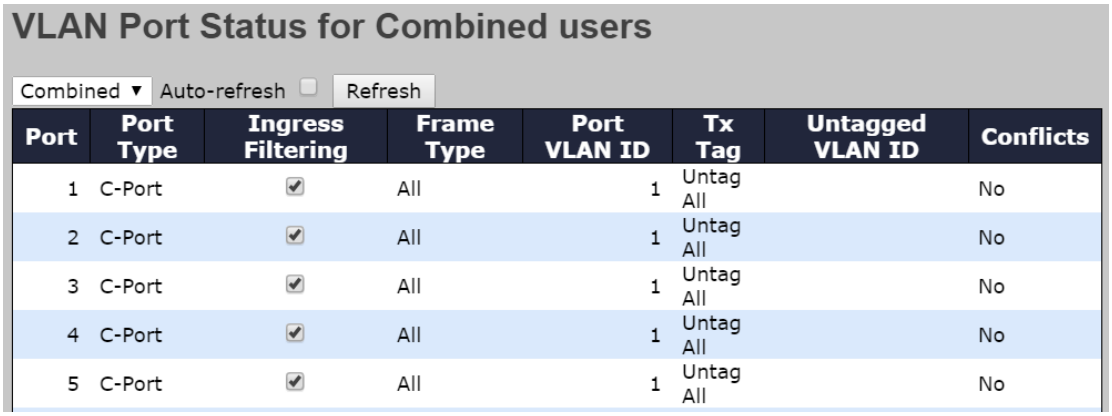


Label	Description
VLAN User	Various internal software modules may use VLAN services to configure VLAN memberships on the fly. The drop-down list on the right allows for selecting between showing VLAN memberships as configured by an administrator (Admin) or as configured by one of these internal software modules. The "Combined" entry will show a combination of the administrator

	and internal software modules configuration, and basically reflects what is actually configured in hardware
VLAN ID	VLAN ID for which the Port members are displayed.
Port Members	A row of check boxes for each port is displayed for each VLAN ID. If a port is included in a VLAN, the following image will be displayed: ✓. If a port is in the forbidden port list, the following image will be displayed: ✗. If a port is in the forbidden port list and at the same time attempted included in the VLAN, the following image will be displayed: ✗. The port will not be a member of the VLAN in this case.

1.5.3 Port Status

This page provides VLAN Port Status



Label	Description
VLAN User	Various internal software modules may use VLAN services to configure VLAN port configuration on the fly. The drop-down list on the right allows for selecting between showing VLAN memberships as configured by an administrator (Admin) or as configured by one of these internal software modules. The "Combined" entry will show a combination of the administrator and internal software modules configuration, and basically reflects what is actually configured in hardware. If a given software modules hasn't overridden any of the port

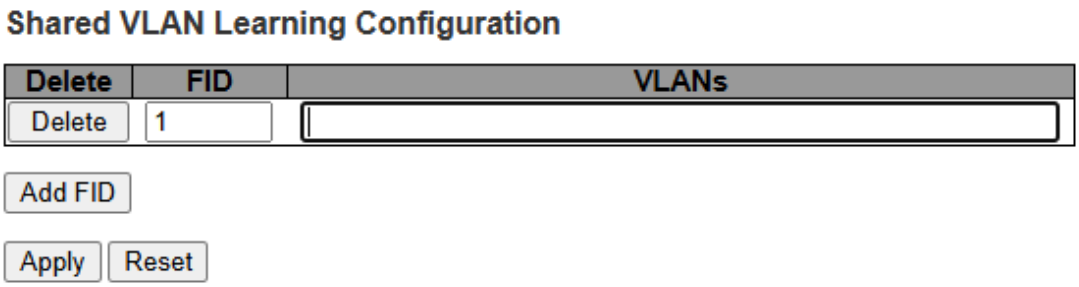
	settings, the text "No data exists for the selected user" is shown in the table.
Port	The logical port for the settings contained in the same row.
Port Type	Shows the port type (Unaware, C-Port, S-Port, S-Custom-Port.) that a given user wants to configure on the port. The field is empty if not overridden by the selected user.
Ingress Filtering	Shows whether a given user wants ingress filtering enabled or not. The field is empty if not overridden by the selected user.
Frame Type	Shows the acceptable frame types (All, Taged, Untagged) that a given user wants to configure on the port. The field is empty if not overridden by the selected user.
Port VLAN ID	Shows the Port VLAN ID (PVID) that a given user wants the port to have. The field is empty if not overridden by the selected user.
Tx Tag	Shows the Tx Tag requirements (Tag All, Tag PVID, Tag UVID, Untag All, Untag PVID, Untag UVID) that a given user has on a port. The field is empty if not overridden by the selected user.
Untagged VLAN ID	If Tx Tag is overridden by the selected user and is set to Tag or Untag UVID, then this field will show the VLAN ID the user wants to tag or untag on egress. The field is empty if not overridden by the selected user.
Conflicts	Two users may have conflicting requirements to a port's configuration. For instance, one user may require all frames to be tagged on egress while another requires all frames to be untagged on egress. Since both users cannot win, this gives rise to a conflict, which is solved in a prioritized way. The Administrator has the least priority. Other software modules are prioritized according to their position in the drop-down list: The higher in the list, the higher priority. If conflicts exist, it will be displayed as "Yes" for the "Combined" user and the offending software module. The "Combined" user reflects what is actually configured in hardware.

1.5.4 SVL

This page allows for controlling SVL configuration on the switch.

In SVL, one or more VLANs map to a Filter ID (FID). By default, there is a one-to-one mapping from VLAN to FID, in which case the switch acts as an IVL bridge, but with SVL multiple VLANs may share the same MAC address table

entries.



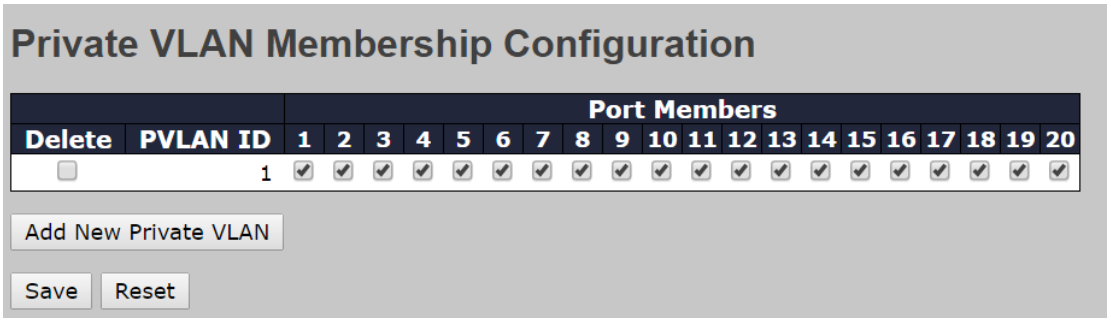
Label	Description
Delete	A previously allocated FID can be deleted by the use of this button.
FID	The Filter ID (FID) is the ID that VLANs get learned on in the MAC table when SVL is in effect. No two rows in the table can have the same FID and the FID must be a number between 1 and 63.
VLANS	List of VLANs mapped into FID. The syntax is as follows: Individual VLANs are separated by commas. Ranges are specified with a dash separating the lower and upper bound. The following example will map VLANs 1, 10, 11, 12, 13, 200, and 300: **1,10-13,200,300**. Spaces are allowed in between the delimiters. The range of valid VLANs is 1 to 4095. The same VLAN can only be a member of one FID. A message will be displayed if one VLAN is grouped into two or more FIDs. All VLANs must map to a particular FID, and by default VLAN x maps to FID x. This implies that if FID x is defined, then VLAN x is implicitly a member of FID x unless it is specified for another FID. If FID x doesn't exist, a confirmation message will be displayed, asking whether to continue adding VLAN x implicitly to FID x.

1.5.5 Private VLAN

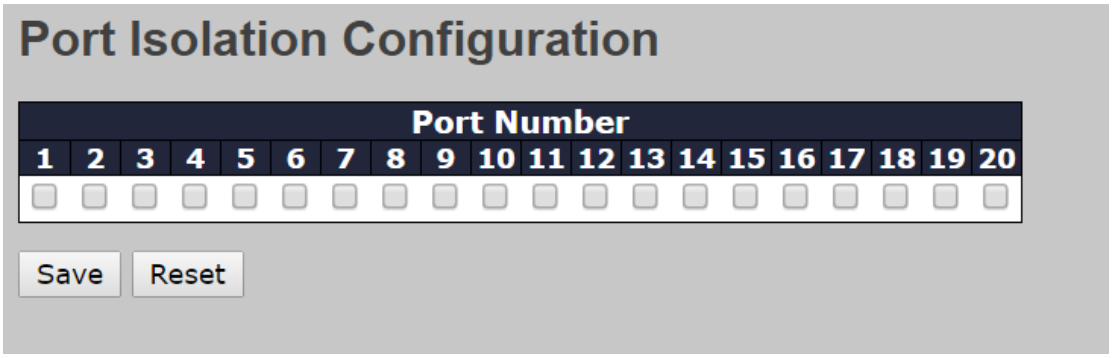
The private VLAN membership configuration for the switch can be monitored and modified here. Private VLANs can be added or deleted here. Port members of each private VLAN can be added or removed here. Private VLANs are based on the source port mask, and there are no connections to VLANs. This means that VLAN IDs and private VLAN IDs can be identical.

A port must be a member of both a VLAN and a private VLAN to be able to forward packets. By default, all ports are VLAN unaware and members of VLAN 1 and private VLAN 1.

A VLAN-unaware port can only be a member of one VLAN, but it can be a member of multiple private VLANs.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Private VLAN ID	Indicates the ID of this particular private VLAN.
MAC Address	The MAC address for the entry.
Port Members	A row of check boxes for each port is displayed for each private VLAN ID. You can check the box to include a port in a private VLAN. To remove or exclude the port from the private VLAN, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.
Adding a New Static Entry	Click **Add New Private WLAN** to add a new private VLAN ID. An empty row is added to the table, and the private VLAN can be configured as needed. The allowed range for a private VLAN ID is the same as the switch port number range. Any values outside this range are not accepted, and a warning message appears. Click OK to discard the incorrect entry, or click Cancel to return to the editing and make a correction. The private VLAN is enabled when you click Save. The **Delete** button can be used to undo the addition of new private VLANs.



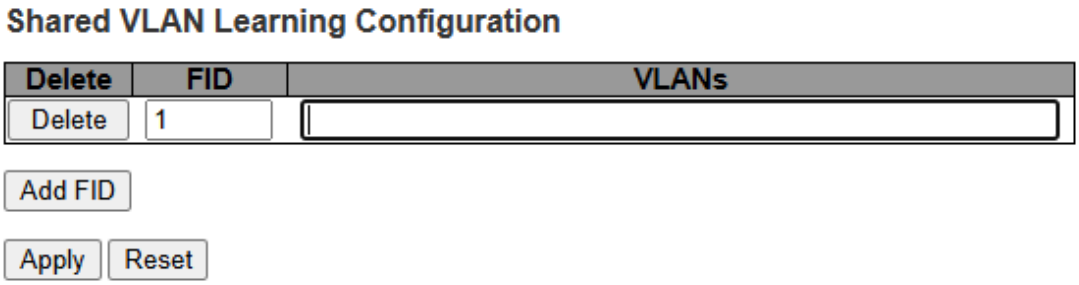
Label	Description
Port Members	A check box is provided for each port of a private VLAN. When checked, port isolation is enabled for that port.

	When unchecked, port isolation is disabled for that port. By default, port isolation is disabled for all ports.

1.5.6 MVRP

Multiple Vlan Registration Protocol is a protocol that defines the dynamic registration and de-registration of VLAN identifiers across a Bridged Local Area Network. It is using the MRP framework to define its operation and therefore it is also called a MRP Application. The standard was originally defined by IEEE 802.1ak, and its latest incorporation is in IEEE 802.1Q-2014.

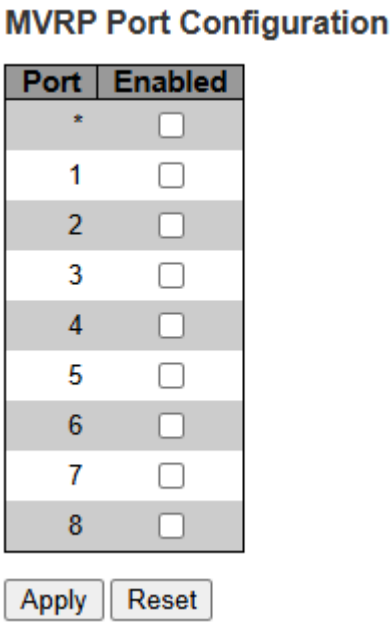
MVRP Config – Global Confguration



MVRP Global Configuration

Label	Description
Global State	Enable or disable the MVRP protocol globally. This will enable or disable the protocol globally and at the same time on the switch ports that are MVRP enabled.
Managed VLANs	This field shows the managed VLANs, i.e. the VLANs that MVRP will operate upon. By default, only VLANs 1- 4094 are managed, i.e. the entire range as defined in IEEE802.1Q-2014 for MVRP. However this range can be limited by using a list syntax where the individual elements are separated by commas. Ranges are specified with a dash separating the lower and upper bound. The following example will create VLANs 1, 10, 11, 12, 13, 200, and 300: **1,10-13,200,300**. Spaces are allowed in between the delimiters.

MVRP Config –Port Confguration



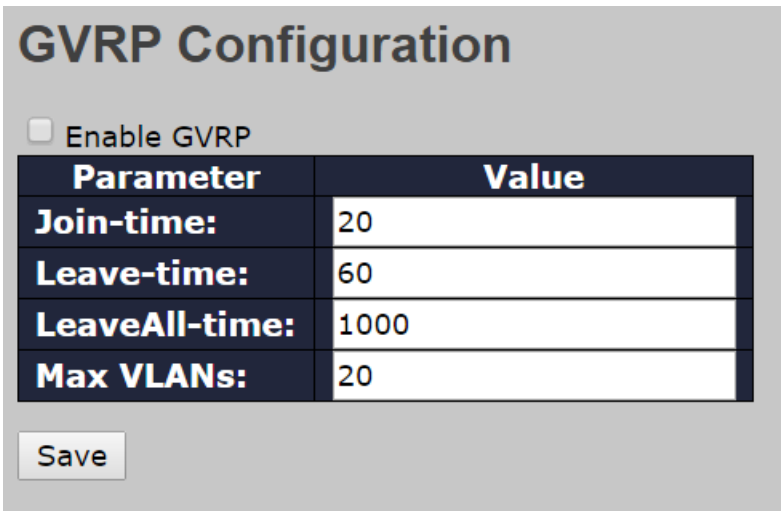
Label	Description
Port	The port number for which the following configuration applies.
Enabled	Enable or disable the MVRP protocol on this switch port. This will enable or disable the protocol on the switch port given that MVRP is also globally enabled.

1.5.7 GVRP

GVRP is an acronym for **G**ARP **V**LAN **R**egistration **P**rotocol. It is a protocol for dynamicaly registering VLANs on ports, and is specified in IEEE 802.1Q-2005, clause 11. GVRP is an example of the use of GARP, hence the G in GVRP.

GVRP Config

This page allows you to configure the global GVRP configuration settings that are commonly applied to all GVRP enabled ports.

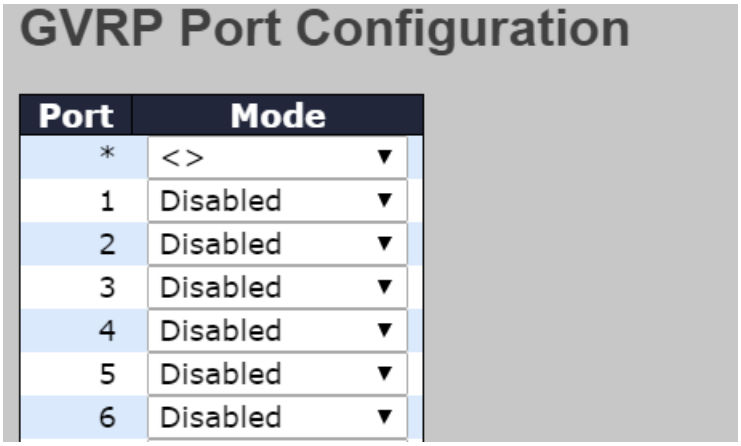


Label	Description
Enable VRRP Globally	The GVRP feature is globally enabled by setting the check

	mark in the checkbox named Enable GVRP and pressing the Save button.
GVRP Protocol Timers	Join-time is a value in the range of 1-20cs, i.e. in units of one hundredth of a second. The default value is 20cs. Leave-time is a value in the range of 60-300cs, i.e. in units of one hundredth of a second. The default is 60cs. LeaveAll-time is a value in the range of 1000-5000cs, i.e. in units of one hundredth of a second. The default is 1000cs.
Max number of VLANs	When GVRP is enabled, a maximum number of VLANs supported by GVRP is specified. By default this number is 20. This number can only be changed when GVRP is turned off.

Port Config

This page allows you to enable or disable a port for GVRP operation. This configuration can be performed either before or after GVRP is configured globally - the protocol operation will be the same.

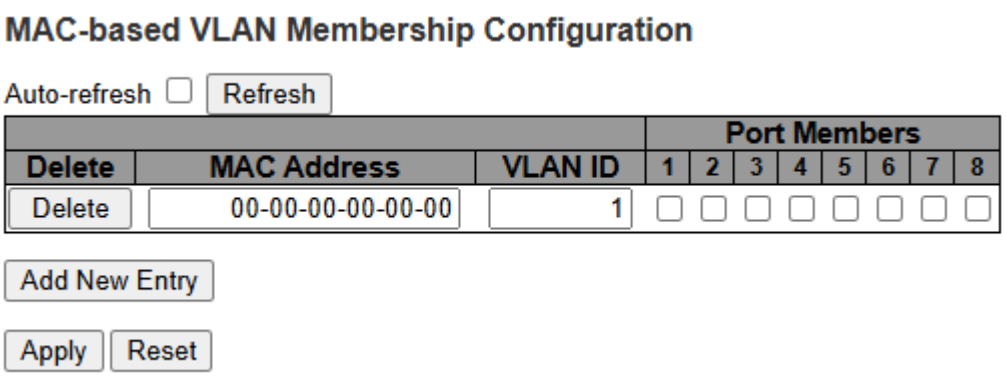


Label	Description
Port	The logical port that is to be configured.
Mode	Mode can be either 'Disabled' or 'GVRP enabled'. These values turn the GVRP feature off or on respectively for the port in question.

1.5.8 VCL

The MAC address to VLAN ID mappings can be configured here. This page allows adding and deleting MAC-based VLAN Classification List entries and assigning the entries to different ports.

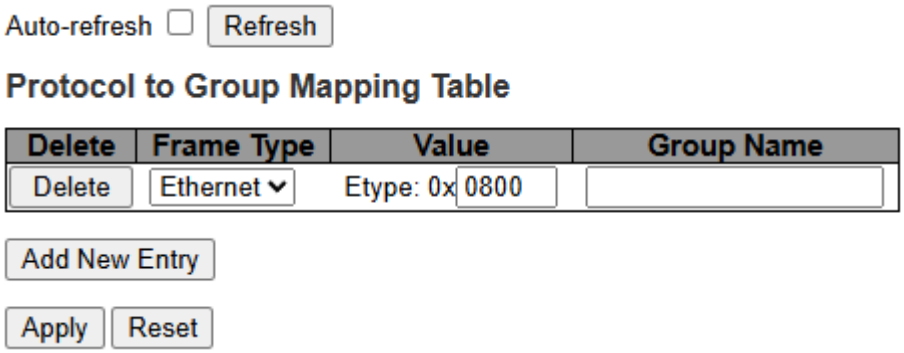
MAC-Based VLAN



Label	Description
Delete	To delete a MAC to VLAN ID mapping entry, check this box and press save. The entry will be deleted in the stack.
MAC Address	Indicates the MAC address of the mapping.
VLAN ID	Indicates the VLAN ID the above MAC will be mapped to.
Port Members	A row of check boxes for each port is displayed for each MAC to VLAN ID mapping entry. To include a port in the mapping, check the box. To remove or exclude the port from the mapping, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.
Adding a New MAC to VLAN ID mapping entry	Click Add New Entry to add a new MAC to VLAN ID mapping entry. An empty row is added to the table, and the mapping can be configured as needed. Any unicast MAC address can be used to configure the mapping. No broadcast or multicast MAC addresses are allowed. Legal values for a VLAN ID are **1** through **4095**. The MAC to VLAN ID entry is enabled when you click on "Save". A mapping without any port members will not be added when you click "Save". The Delete button can be used to undo the addition of new mappings. The maximum possible MAC to VLAN ID mapping entries are limited to 256.

Protocol-Based VLAN – Protocol to Group

This page allows you to add new Protocol to Group Name (each protocol can be part of only one Group) mapping entries as well as allow you to see and delete already mapped entries for the switch .

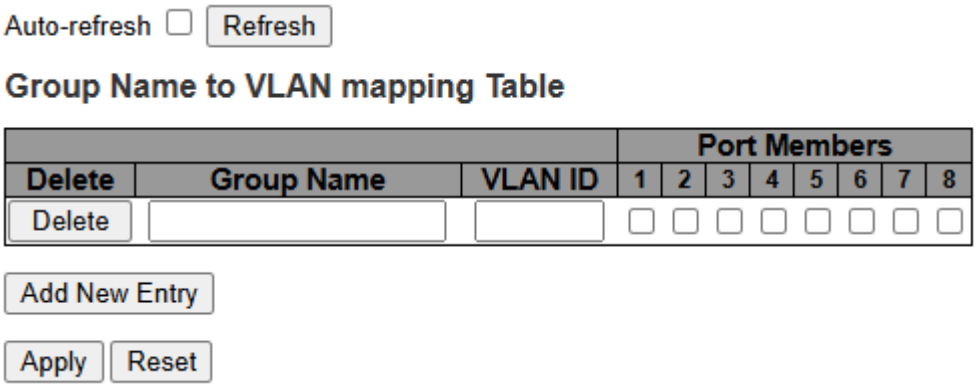


Label	Description
Delete	To delete a Protocol to Group Name map entry, check this box. The entry will be deleted from the switch during the next Save.
Frame Type	Frame Type can have one of the following values: 1. **Ethernet** 2. **LLC** 3. **SNAP** Note: When changing the Frame type field, the valid value of the following text field will vary depending on the new frame type you selected.
Value	Valid value that can be entered in this text field depends on the option selected from the preceding Frame Type selection menu. Below are the criteria for the three different Frame Types: 1. **Ethernet:** Value in the text field when Ethernet is selected as a Frame Type is called etype. Valid values for etype range between 0x0600 and 0xffff 2. **LLC:** Valid value in this case is comprised of two different sub-values. a. **DSAP:** 1-byte long string (0x00-0xff) b. **SSAP:** 1-byte long string (0x00-0xff) 3. **SNAP:** Valid value in this case is also comprised of two different sub-values. a. **OUI:** OUI (Organizationally Unique Identifier) is a parameter in the format of xx-xx-xx where each pair (xx) in the string is a hexadecimal value ranging between 0x00 and 0xff. b. **PID:** PID (Protocol ID). If OUI is hexadecimal 000000, then the protocol ID is the Ethernet type (EtherType) field value for the protocol running on top of SNAP; if OUI is an

	OUI for a particular organization, the protocol ID is a value assigned by that organization to the protocol running on top of SNAP. In other words, if the value of OUI field is 00-00-00 then the value of PID will be etype (0x0600-0xffff) and if the value of OUI is other than 00-00-00 then valid values of PID will be any value between 0x0000 and 0xffff.
Group Name	A valid Group Name is a 16-character long string, unique for every entry, which consists of a combination of alphabets (a-z or A-Z) and integers(0-9). **Note:** Special characters and underscores (_) are not allowed.
Adding a New Group to VLAN mapping entry	Click Add New Entry to add a new entry in the mapping table. An empty row is added to the table, where Frame Type, Value and the Group Name can be configured as needed. The Delete button can be used to undo the addition of new entry. The maximum possible Protocol to Group mappings are limited to 128.

Protocol-Based VLAN – Group to VLAN

This page allows you to map a Group Name (already configured or to be configured in the future) to a VLAN for the switch .

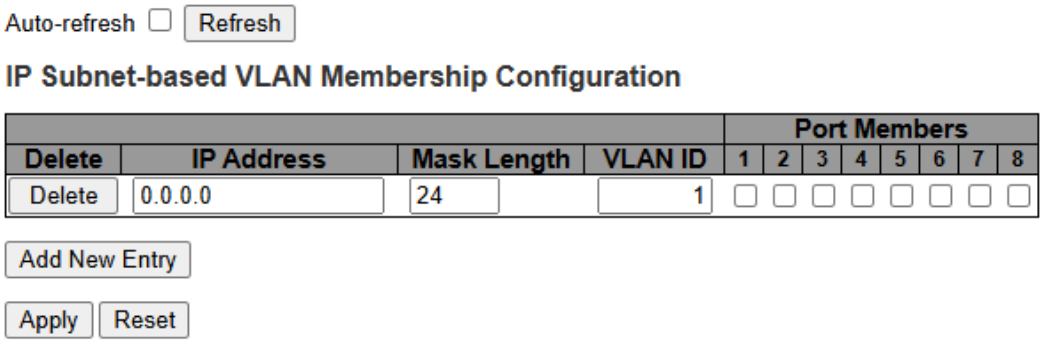


Label	Description
Delete	To delete a Group Name to VLAN mapping, check this box. The entry will be deleted from the switch during the next Save.
Group Name	A valid Group Name is a string, at the most 16 characters long, which consists of a combination of alphabets (a-z or A-Z) and integers(0-9) with no special characters allowed. You may either use a Group that already includes one or more protocols (see Protocol to Group mappings), or create a Group to VLAN ID mapping that will become active the moment you add one or more protocols inside

	that Group. Furthermore, the Group to VLAN ID mapping is not unique, as long as the port lists of these mappings are mutually exclusive (e.g. Group1 can be mapped to VID 1 on port#1 and to VID 2 on port#2).
VLAN ID	Indicates the VLAN ID to which the Group Name will be mapped. A valid VLAN ID ranges from 1 to 4095.
Port Members	A row of check boxes for each port is displayed for each Group Name to VLAN ID mapping. To include a port in the mapping, check the box. To remove or exclude the port from the mapping, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.
Adding a new Group to VLAN mapping entry	Click Add New Entry to add a new entry in the mapping table. An empty row is added to the table and the Group Name, VLAN ID and port members can be configured as needed. Legal values for a VLAN ID are **1** through **4095**. The Delete button can be used to undo the addition of new entry. The maximum possible Group to VLAN mappings are limited to 256.

IP Subnet-Based VLAN

The IP subnet to VLAN ID mappings can be configured here. This page allows adding, updating and deleting IP subnet to VLAN ID mapping entries and assigning them to different ports.

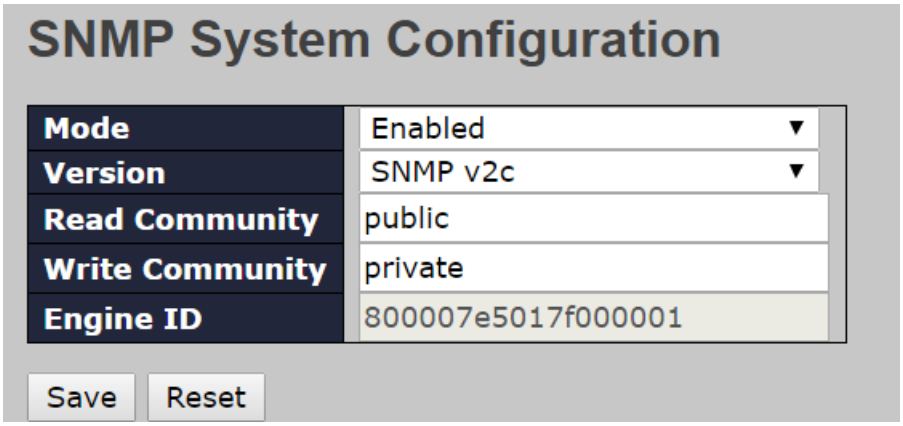


Label	Description
Delete	To delete a mapping, check this box and press save. The entry will be deleted in the stack.
IP Address	Indicates the subnet's IP address (Any of the subnet's host addresses can be also provided here, the application will convert it automatically).
Mask Length	Indicates the subnet's mask length.
VLAN ID	Indicates the VLAN ID the subnet will be mapped to. IP Subnet to

	VLAN ID is a unique matching.
Port Memberrs	A row of check boxes for each port is displayed for each IP subnet to VLAN ID mapping entry. To include a port in a mapping, simply check the box. To remove or exclude the port from the mapping, make sure the box is unchecked. By default, no ports are members and all boxes are unchecked.
Adding a New IP subnet-based VLAN	Click Add New Entry to add a new IP subnet to VLAN ID mapping entry. An empty row is added to the table, and the mapping can be configured as needed. Any IP address/mask can be configured for the mapping. Legal values for the VLAN ID are **1** to **4095**. The IP subnet to VLAN ID mapping entry is enabled when you click on "Save". The Delete button can be used to undo the addition of new mappings. The maximum possible IP subnet to VLAN ID mappings are limited to 128. **Chapter 1 Buttons**

1.6 SNMP

1.6.1 SNMP System Configurations

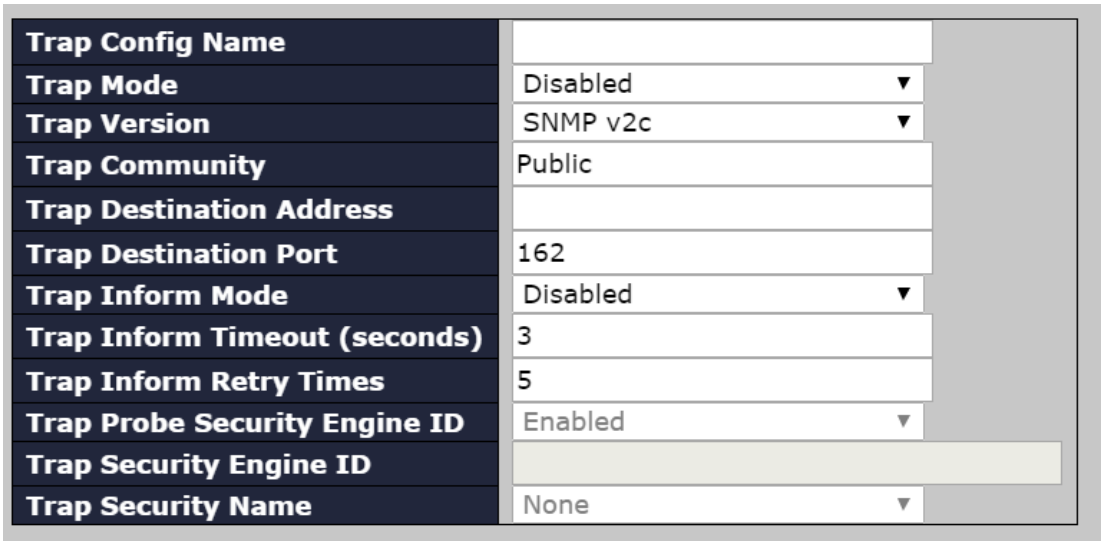


Label	Description
Mode	Indicates existing SNMP mode. Possible modes include: **Enabled**: enable SNMP mode **Disabled**: disable SNMP mode
Version	Indicates the supported SNMP version. Possible versions include: **SNMP v1**: supports SNMP version 1.

	SNMP v2c: supports SNMP version 2c. **SNMP v3**: supports SNMP version 3.
Read Community	Indicates the read community string to permit access to SNMP agent. The allowed string length is 0 to 255, and only ASCII characters from 33 to 126 are allowed. The field only suits to SNMPv1 and SNMPv2c. SNMPv3 uses USM for authentication and privacy and the community string will be associated with SNMPv3 community table.
Write Community	Indicates the write community string to permit access to SNMP agent. The allowed string length is 0 to 255, and only ASCII characters from 33 to 126 are allowed. The field only suits to SNMPv1 and SNMPv2c. SNMPv3 uses USM for authentication and privacy and the community string will be associated with SNMPv3 community table.
Engine ID	Indicates the SNMPv3 engine ID. The string must contain an even number between 10 and 64 hexadecimal digits, but all-zeros and all-'F's are not allowed. Change of the Engine ID will clear all original local users.

1.6.2 Trap

SNMP Trap Detailed Configuration

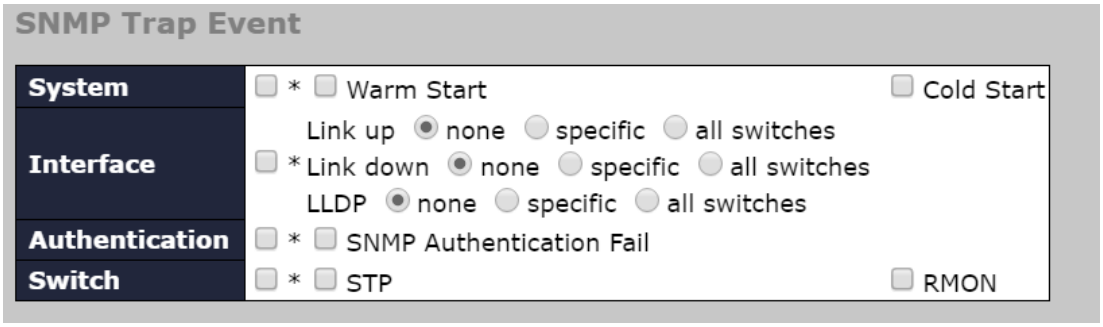


Label	Description
Trap Config Name	Indicates which trap Configuration's name for configuring. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.
Trap Mode	Indicates existing SNMP trap mode. Possible modes include: **Enabled**: enable SNMP trap mode **Disabled**: disable SNMP trap mode
Trap Version	Indicates the supported SNMP trap version. Possible versions

	include: **SNMP v1**: supports SNMP trap version 1 **SNMP v2c**: supports SNMP trap version 2c **SNMP v3**: supports SNMP trap version 3
Trap Community	Indicates the community access string when sending SNMP trap packets. The allowed string length is 0 to 255, and only ASCII characters from 33 to 126 are allowed.
Trap Destination Address	Indicates the SNMP trap destination address. It allow a valid IP address in dotted decimal notation ('x.y.z.w'). And it also allows a valid hostname. A valid hostname is a string drawn from the alphabet (A-Za-z), digits (0-9), dot (.), dash (-). Spaces are not allowed, the first character must be an alpha character, and the first and last characters must not be a dot or a dash. Indicates the SNMP trap destination IPv6 address. IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can appear only once. It can also represent a legally valid IPv4 address. For example, '::192.1.2.34'.
Trap Destination Port	Indicates the SNMP trap destination port. SNMP Agent will send SNMP message via this port, the port range is 1~65535.
Trap Inform Mode	Indicates the SNMP trap inform mode. Possible modes include: **Enabled**: enable SNMP trap inform mode **Disabled**: disable SNMP trap inform mode
Trap Inform Timeout(seconds)	Configures the SNMP trap inform timeout. The allowed range is 0 to 2147.
Trap Inform Retry Times	Configures the retry times for SNMP trap inform. The allowed range is 0 to 255.
Trap Probe Secuirty Engine ID	Indicates the SNMP trap probe security engine ID mode of operation. Possible values are: **Enabled**: Enable SNMP trap probe security engine ID mode of operation. **Disabled**: Disable SNMP trap probe security engine ID mode of operation.
Trap Security Engine ID	Indicates the SNMP trap security engine ID. SNMPv3 sends traps and informs using USM for authentication and privacy. A unique engine ID for these traps and informs is needed. When "Trap Probe Security Engine ID" is enabled, the ID will be probed automatically. Otherwise, the ID specified in this field is used. The string must contain an even number (in hexadecimal format) with number of

	digits between 10 and 64, but all-zeros and all-'F's are not allowed.
Trap Security Name	Indicates the SNMP trap security name. SNMPv3 traps and informs using USM for authentication and privacy. A unique security name is needed when traps and informs are enabled.

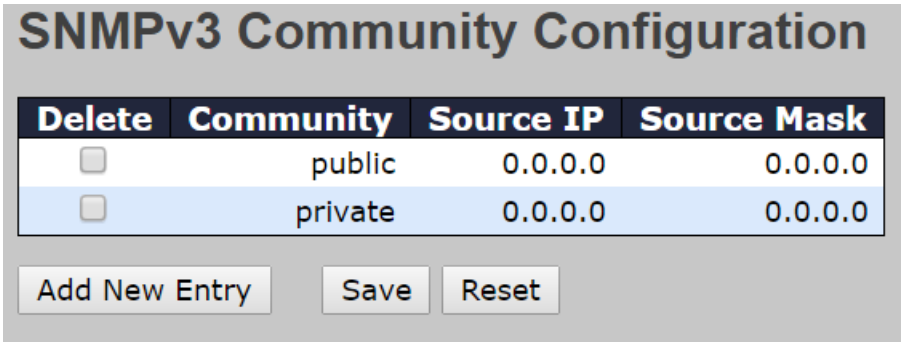
SNMP Trap Event



Label	Description
System	Enable/disable that the Interface group's traps. Possible traps are: **Warm Start**: Enable/disable Warm Start trap. **Cold Start**: Enable/disable Cold Start trap.
Interface	Indicates that the Interface group's traps. Possible traps are: Indicates that the SNMP entity is permitted to generate authentication failure traps. Possible modes are: **Link Up**: Enable/disable Link up trap. **Link Down**: Enable/disable Link down trap. **LLDP**: Enable/disable LLDP trap.
Authentication	Indicates that the authentication group's traps. Possible traps are: **SNMP Authentication Fail**: Enable/disable SNMP trap **authentication** failure trap.
Switch	Indicates the Switch group's traps. Possible traps are: **STP**: Enable/disable STP trap. **RMON**: Enable/disable RMON trap.

1.6.3 SNMP Community Configurations

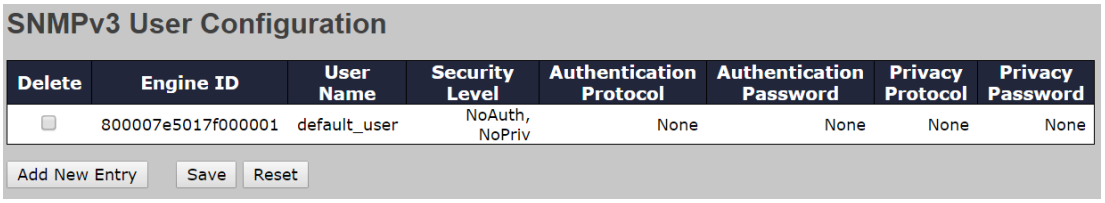
This page allows you to configure SNMPv3 community table. The entry index key is **Community**.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Community	Indicates the community access string to permit access to SNMPv3 agent. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.
Source IP	Indicates the SNMP source address
Source Mask	Indicates the SNMP source address mask

1.6.4 SNMP User Configurations

This page allows you to configure SNMPv3 user table. The entry index keys are **Engine ID** and **User Name**.

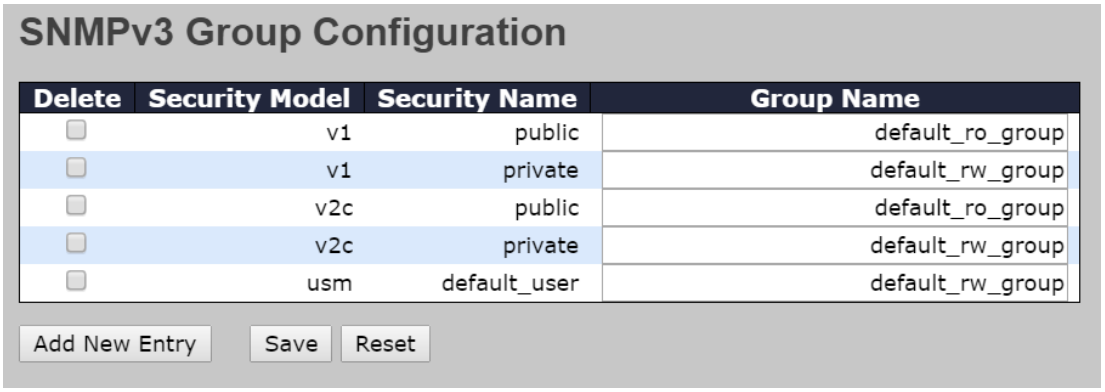


Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Engine ID	An octet string identifying the engine ID that this entry should belong to. The string must contain an even number between 10 and 64 hexadecimal digits, but all-zeros and all-'F's are not allowed. The SNMPv3 architecture uses User-based Security Model (USM) for message security and View-based Access Control Model (VACM) for access control. For the USM entry, the **usmUserEngineID** and **usmUserName** are the entry keys. In a simple agent, usmUserEngineID is always that agent's own snmpEngineID value. The value can also take the value of the snmpEngineID of a remote SNMP engine with which this user can communicate. In other words, if user engine ID is the same as system engine ID, then it is local user; otherwise it's remote user.
User Name	A string identifying the user name that this entry should belong to. The allowed string length is 1 to 32, and only ASCII

	characters from 33 to 126 are allowed.
Security Level	Indicates the security model that this entry should belong to. Possible security models include: **NoAuth, NoPriv**: no authentication and none privacy **Auth, NoPriv**: Authentication and no privacy **Auth, Priv**: Authentication and privacy The value of security level cannot be modified if the entry already exists, which means the value must be set correctly at the time of entry creation.
Authentication Protocol	Indicates the authentication protocol that this entry should belong to. Possible authentication protocols include: **None**: no authentication protocol **MD5**: an optional flag to indicate that this user is using MD5 authentication protocol **SHA**: an optional flag to indicate that this user is using SHA authentication protocol The value of security level cannot be modified if the entry already exists, which means the value must be set correctly at the time of entry creation.
Authentication Password	A string identifying the authentication pass phrase. For MD5 authentication protocol, the allowed string length is 8 to 32. For SHA authentication protocol, the allowed string length is 8 to 40. Only ASCII characters from 33 to 126 are allowed.
Privacy Protocol	Indicates the privacy protocol that this entry should belong to. Possible privacy protocols include: **None**: no privacy protocol **DES**: an optional flag to indicate that this user is using DES authentication protocol
Privacy Password	A string identifying the privacy pass phrase. The allowed string length is 8 to 32, and only ASCII characters from 33 to 126 are allowed.

1.6.5 SNMP Group Configurations

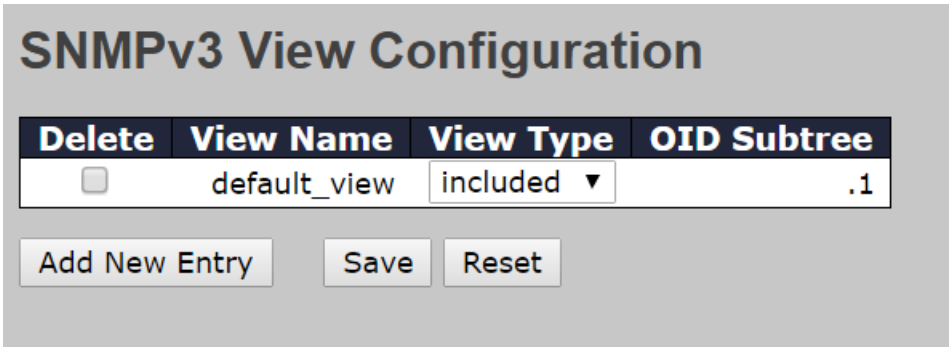
This page allows you to configure SNMPv3 group table. The entry index keys are **Security Model** and **Security Name**.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Security Model	Indicates the security model that this entry should belong to. Possible security models included: **v1**: Reserved for SNMPv1. **v2c**: Reserved for SNMPv2c. **usm**: User-based Security Model (USM).
Security Name	A string identifying the security name that this entry should belong to. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.
Group Name	A string identifying the group name that this entry should belong to. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.

1.6.6 SNMP View Configurations

This page allows you to configure SNMPv3 view table. The entry index keys are **View Name** and **OID Subtree**.

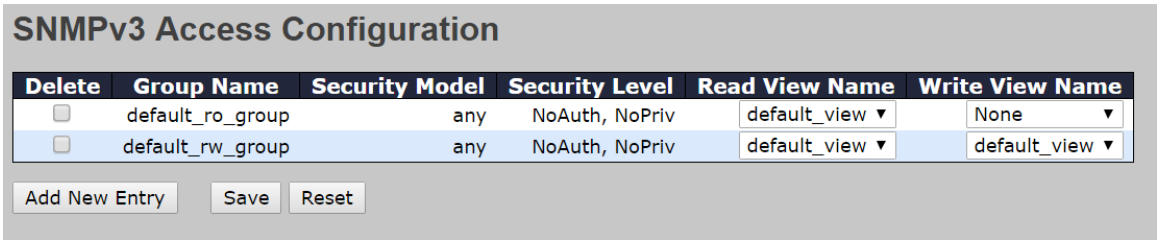


Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
View Name	A string identifying the view name that this entry should belong to. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.
View Type	Indicates the view type that this entry should belong to. Possible view types include: **Included**: an optional flag to indicate that this view subtree should be included. **Excluded**: An optional flag to indicate that this view subtree should be excluded. Generally, if an entry's view type is **Excluded**, it should exist another entry whose view type is **Included, and** its OID subtree oversteps the **Excluded** entry.
OID Subtree	The OID defining the root of the subtree to add to the named view. The allowed OID length is 1 to 128. The allowed string content is

	digital number or asterisk (*).

1.6.7 SNMP Access Configurations

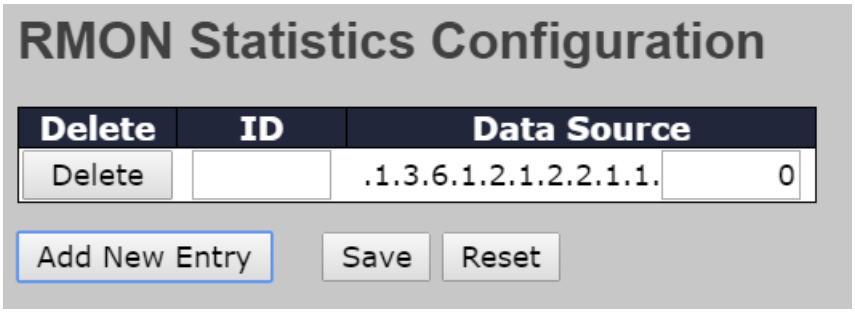
This page allows you to configure SNMPv3 access table. The entry index keys are **Group Name**, **Security Model**, and **Security Level**.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Group Name	A string identifying the group name that this entry should belong to. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.
Security Model	Indicates the security model that this entry should belong to. Possible security models include: **any**: Accepted any security model (v1|v2c|usm). **v1**: Reserved for SNMPv1. **v2c**: Reserved for SNMPv2c. **usm**: User-based Security Model (USM).
Security Level	Indicates the security model that this entry should belong to. Possible security models include: **NoAuth, NoPriv**: no authentication and no privacy **Auth, NoPriv**: Authentication and no privacy **Auth, Priv**: Authentication and privacy
Read View Name	The name of the MIB view defining the MIB objects for which this request may request the current values. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.
Write View Name	The name of the MIB view defining the MIB objects for which this request may potentially SET new values. The allowed string length is 1 to 32, and only ASCII characters from 33 to 126 are allowed.

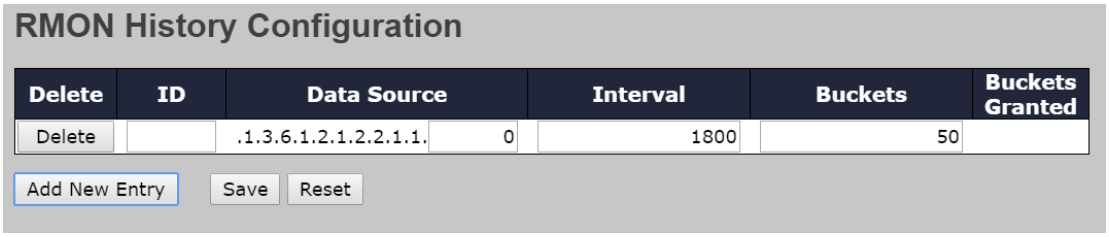
1.6.8 RMON

Statistics Configuration



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
ID	Indicates the index of the entry. The range is from 1 to 65535.
Data Source	Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000000*(switch ID-1), for example, if the port is switch 3 port 5, the value is 2000005.

History Configuration



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
ID	Indicates the index of the entry. The range is from 1 to 65535.
Data Source	Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000000*(switch ID-1), for example, if the port is switch 3 port 5, the value is 2000005.
Interval	Indicates the interval in seconds for sampling the history statistics data. The range is from 1 to 3600, default value is 1800 seconds.
Buckets	Indicates the maximum data entries associated this History control entry stored in RMON. The range is from 1 to 3600, default value is 50.
Buckets Granted	The number of data shall be saved in the RMON.

Alarm Configuration

Label	Description

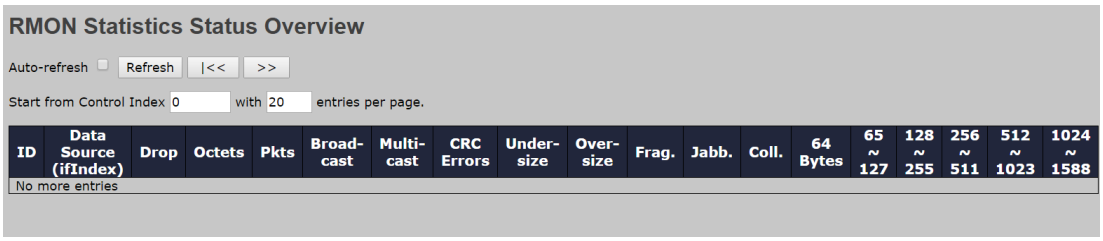
Delete	Check to delete the entry. It will be deleted during the next save.
ID	Indicates the index of the entry. The range is from 1 to 65535.
Interval	Indicates the interval in seconds for sampling and comparing the rising and falling threshold. The range is from 1 to 2^31-1.
Variable	Indicates the particular variable to be sampled, the possible variables are: **InOctets**: The total number of octets received on the interface, including framing characters. **InUcastPkts:** The number of uni-cast packets delivered to a higher-layer protocol. **InNUcastPkts**: The number of broad-cast and multi-cast packets delivered to a higher-layer protocol. **InDiscards**: The number of inbound packets that are discarded even the packets are normal. **InErrors**: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. **InUnknownProtos**: the number of the inbound packets that were discarded because of the unknown or un-support protocol. **OutOctets**: The number of octets transmitted out of the interface , including framing characters. **OutUcastPkts**: The number of uni-cast packets that request to transmit. **OutNUcastPkts**: The number of broad-cast and multi-cast packets that request to transmit. **OutDiscards**: The number of outbound packets that are discarded even the packets are normal. **OutErrors**: The number of outbound packets that could not be transmitted because of errors. **OutQLen**: The length of the output packet queue (in packets).
Sample Type	The method of sampling the selected variable and calculating the value to be compared against the thresholds, possible sample types are: **Absolute**: Get the sample directly. **Delta**: Calculate the difference between samples (default).
Value	The value of the statistic during the last sampling period.
Startup Alarm	The method of sampling the selected variable and calculating the value to be compared against the thresholds, possible sample types are: **Rising**Trigger alarm when the first value is larger than the rising threshold. **Falling**Trigger alarm when the first value is less than the falling threshold.

	RisingOrFallingTrigger alarm when the first value is larger than the rising threshold or less than the falling threshold (default).
Rising Threshold	Rising threshold value (-2147483648-2147483647).
Rising Index	Rising event index (1-65535).
Falling Threshold	Falling threshold value (-2147483648-2147483647)
Falling Index	Falling event index (1-65535).

Event Configuration

Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
ID	Indicates the index of the entry. The range is from 1 to 65535.
Desc	Indicates this event, the string length is from 0 to 127, default is a null string.
Type	Indicates the notification of the event, the possible types are: **none**: No SNMP log is created, no SNMP trap is sent. **log**: Create SNMP log entry when the event is triggered. **snmptrap**: Send SNMP trap when the event is triggered. **logandtrap**: Create SNMP log entry and sent SNMP trap when the event is triggered.
Community	Specify the community when trap is sent, the string length is from 0 to 127, default is "public".
Event Last Time	Indicates the value of sysUpTime at the time this event entry last generated an event.

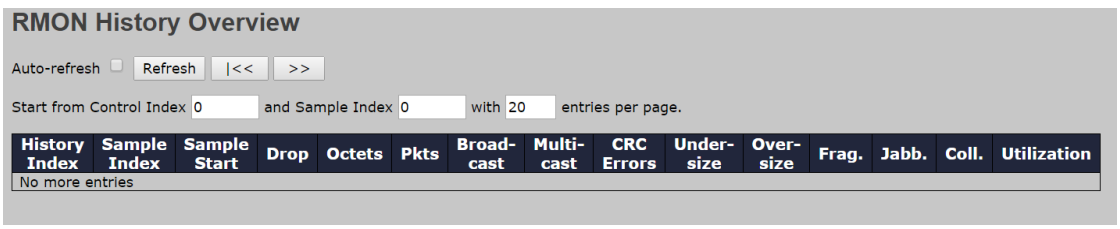
Statistics Stauts



Label	Description
ID	Indicates the index of Statistics entry.
Data Source	The port ID which wants to be monitored.
Octets	The total number of events in which packets were dropped by the probe due to lack of resources.
Pkts	The total number of packets (including bad packets, broadcast

	packets, and multicast packets) received.
Broad-Cast	The total number of good packets received that were directed to the broadcast address.
Muulti-Cast	The total number of good packets received that were directed to a multicast address.
CRC Errors	The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Under-size	The total number of packets received that were less than 64 octets.
Over-size	The total number of packets received that were longer than 1518 octets.
Frag	The number of frames which size is less than 64 octets received with invalid CRC.
Jabb	The number of frames which size is larger than 64 octets received with invalid CRC.
Coll.	The best estimate of the total number of collisions on this Ethernet segment.
64	The total number of packets (including bad packets) received that were 64 octets in length.
65~127	The total number of packets (including bad packets) received that are between 65 to 127 octets in length.
128~255	The total number of packets (including bad packets) received that are between 128 to 255 octets in length.
256~511	The total number of packets (including bad packets) received that are between 256 to 511 octets in length.
512~1023	The total number of packets (including bad packets) received that are between 512 to 1023 octets in length.
1024~1588	The total number of packets (including bad packets) received that were between 1024 to 1588 octets in length.

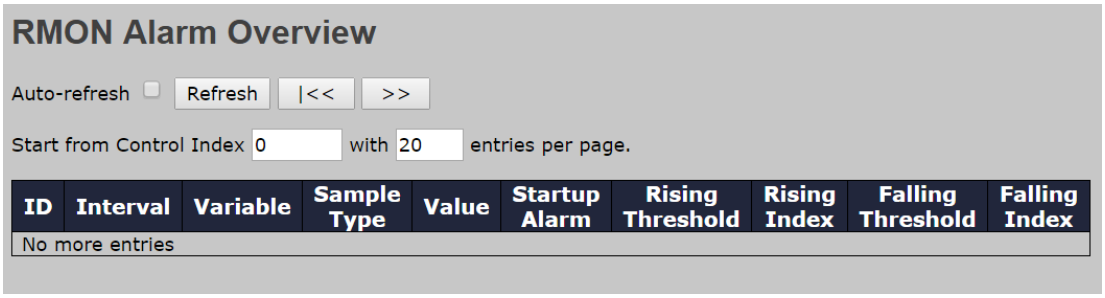
History Status



Label	Description
History Index	Indicates the index of History control entry.
Sample Index	Indicates the index of the data entry associated with the control entry.

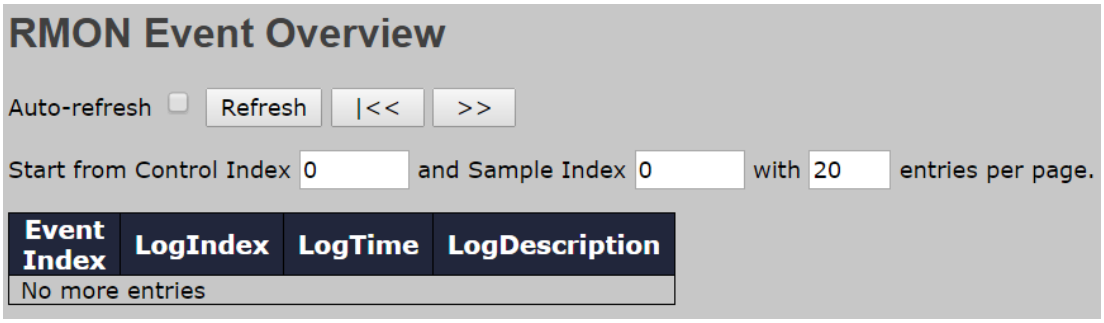
Sample Start	The value of sysUpTime at the start of the interval over which this sample was measured.
Drop	The total number of events in which packets were dropped by the probe due to lack of resources.
Octets	The total number of octets of data (including those in bad packets) received on the network.
Pkts	The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
Broadcast	The total number of good packets received that were directed to the broadcast address.
Multicast	The total number of good packets received that were directed to a multicast address.
CRC Error	The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Undersize	The total number of packets received that were less than 64 octets.
Oversize	The total number of packets received that were longer than 1518 octets.
Frag.	The number of frames which size is less than 64 octets received with invalid CRC.
Jabb.	The total number of packets received that were longer than 1518 octets.
Coll.	The best estimate of the total number of collisions on this Ethernet segment.
Utilization	The best estimate of the mean physical layer network utilization on this interface during this sampling interval, in hundredths of a percent.

Alarm Status



Label	Description
ID	Indicates the index of Alarm control entry.
Interval	Indicates the interval in seconds for sampling and comparing the rising and falling threshold.
Variable	Indicates the particular variable to be sampled
Sample Type	The method of sampling the selected variable and calculating the value to be compared against the thresholds.
Value	The value of the statistic during the last sampling period.
Startup Alarm	The alarm that may be sent when this entry is first set to valid.
Rising Threshold	Rising threshold value.
Rising Index	Rising threshold value.
Filing Threshold	Falling threshold value.
Falling Index	Falling event index.

Event Status



Label	Description
Event Index	Indicates the index of the event entry.
Log Index	Indicates the index of the log entry.
Log Time	Indicates Event log time
LogDescripi	Indicates the Event description.

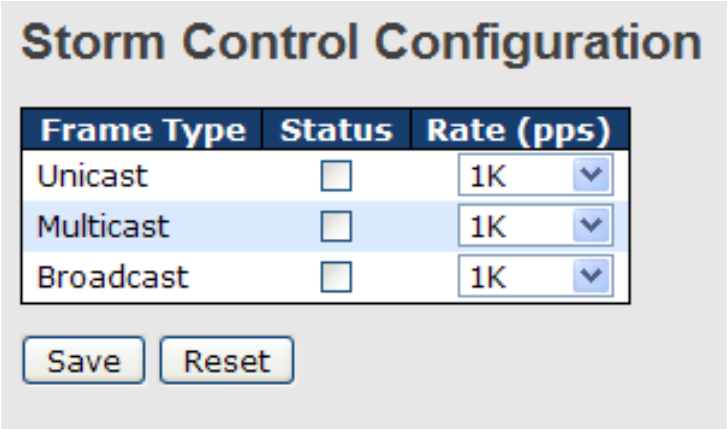
1.7 Traffic Prioritization

1.7.1 Storm Control

There is a unicast storm rate control, multicast storm rate control, and a broadcast storm rate control. These only affect flooded frames, i.e. frames with a (VLAN ID, DMAC) pair not present on the MAC Address table.

The rate is 2^n, where n is equal to or less than 15, or "No Limit". The unit of the rate can be either pps (packets per second) or kpps (kilopackets per second). The configuration indicates the permitted packet rate for unicast, multicast, or broadcast traffic across the switch.

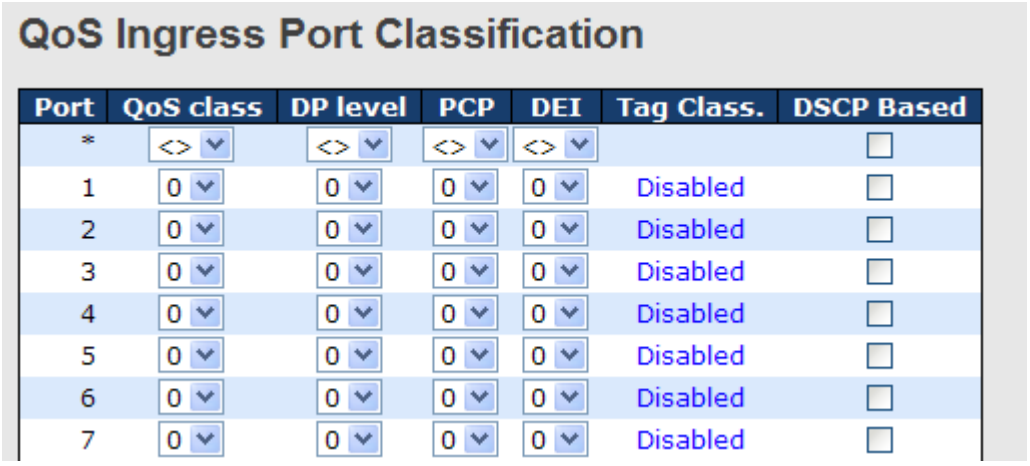
Note: frames sent to the CPU of the switch are always limited to approximately 4 kpps. For example, broadcasts in the management VLAN are limited to this rate. The management VLAN is configured on the IP setup page.



Label	Description
Frame Type	The settings in a particular row apply to the frame type listed here: **unicast**, **multicast**, or **broadcast**.
Status	Enable or disable the storm control status for the given frame type.
Rate	The rate unit is packet per second (pps), configure the rate as 1K, 2K, 4K, 8K, 16K, 32K, 64K, 128K, 256K, 512K, or 1024K. The 1 kpps is actually 1002.1 pps.

1.7.2 Port Classification

QoS is an acronym for Quality of Service. It is a method to achieve efficient bandwidth utilization between individual applications or protocols.



Label	Description
Port	The port number for which the configuration below applies

QoS Class	Controls the default QoS class All frames are classified to a QoS class. There is a one to one mapping between QoS class, queue, and priority. A QoS class of 0 (zero) has the lowest priority. If the port is VLAN aware and the frame is tagged, then the frame is classified to a QoS class that is based on the PCP value in the tag as shown below. Otherwise the frame is classified to the default QoS class. PCP value: 0 1 2 3 4 5 6 7 QoS class: 1 0 2 3 4 5 6 7 If the port is VLAN aware, the frame is tagged, and Tag Class is enabled, then the frame is classified to a QoS class that is mapped from the PCP and DEI value in the tag. Otherwise the frame is classified to the default QoS class. The classified QoS class can be overruled by a QCL entry. Note: if the default QoS class has been dynamically changed, then the actual default QoS class is shown in parentheses after the configured default QoS class.
DP level	Controls the default Drop Precedence Level All frames are classified to a DP level. If the port is VLAN aware and the frame is tagged, then the frame is classified to a DP level that is equal to the DEI value in the tag. Otherwise the frame is classified to the default DP level. If the port is VLAN aware, the frame is tagged, and Tag Class is enabled, then the frame is classified to a DP level that is mapped from the PCP and DEI value in the tag. Otherwise the frame is classified to the default DP level. The classified DP level can be overruled by a QCL entry.
PCP	Controls the default PCP value All frames are classified to a PCP value. If the port is VLAN aware and the frame is tagged, then the frame is classified to the PCP value in the tag. Otherwise the frame is classified to the default PCP value.
DEI	Controls the default DEI value All frames are classified to a DEI value. If the port is VLAN aware and the frame is tagged, then the frame is classified to the DEI value in the tag. Otherwise the frame is classified to the default DEI value.
Tag Class	Shows the classification mode for tagged frames on this port **Disabled**: Use default QoS class and DP level for tagged frames **Enabled**: Use mapped versions of PCP and DEI for tagged

	frames Click on the mode to configure the mode and/or mapping Note: this setting has no effect if the port is VLAN unaware. Tagged frames received on VLAN-unaware ports are always classified to the default QoS class and DP level.
DSCP Based	Click to enable DSCP Based QoS Ingress Port Classification

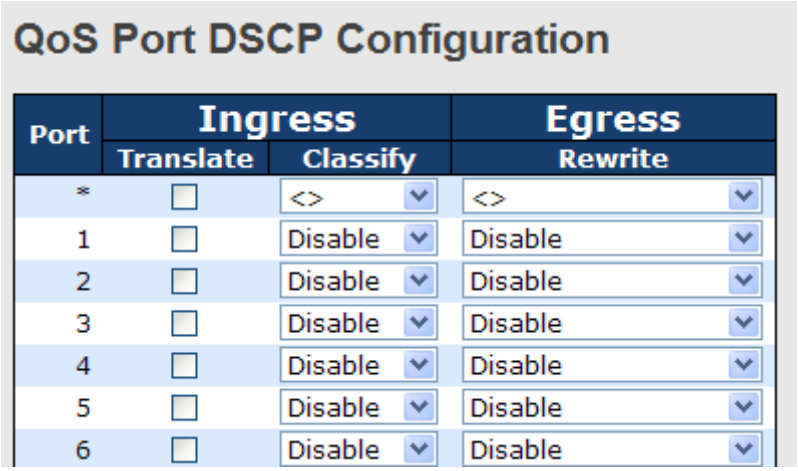
1.7.3 Port Tag Remaking

This page provides an overview of QoS Egress Port Tag Remarking for all switch ports.

Label	Description
Port	The switch port number to which the following settings will be applied. Click on the port number to configure tag remarking
Mode	Shows the tag remarking mode for this port **Classified**: use classified PCP/DEI values **Default**: use default PCP/DEI values **Mapped**: use mapped versions of QoS class and DP level

1.7.4 Port DSCP

This page allows you to configure basic QoS Port DSCP settings for all switch ports.

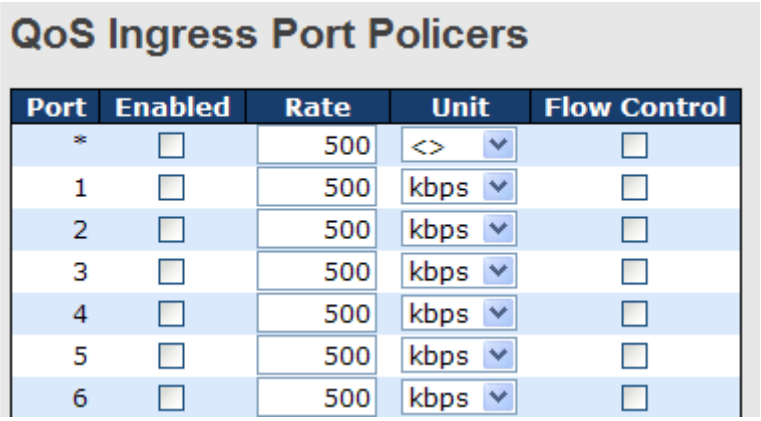


Label	Description
Port	Shows the list of ports for which you can configure DSCP Ingress and Egress settings.

Ingress	In **Ingress** settings you can change ingress translation and classification settings for individual ports. There are two configuration parameters available in Ingress: 1. **Translate** 2. **Classify**
1. Translate	Check to enable ingress translation
2. Classify	Classification has 4 different values. Disable: no Ingress DSCP classification DSCP=0: classify if incoming (or translated if enabled) DSCP is 0. Selected: classify only selected DSCP whose classification is enabled as specified in **DSCP Translation** window for the specific DSCP. All: classify all DSCP
Egress	Port egress rewriting can be one of the following options: **Disable**: no Egress rewrite **Enable**: rewrite enabled without remapping **Remap DP Unaware**: DSCP from the analyzer is remapped and the frame is remarked with a remapped DSCP value. The remapped DSCP value is always taken from the '**DSCP Translation->Egress Remap DP0**' table. **Remap DP Aware**: DSCP from the analyzer is remapped and the frame is remarked with a remapped DSCP value. Depending on the DP level of the frame, the remapped DSCP value is either taken from the '**DSCP Translation->Egress Remap DP0**' table or from the '**DSCP Translation->Egress Remap DP1**' table.

1.7.5 Port Policing

This page allows you to configure Policer settings for all switch ports.

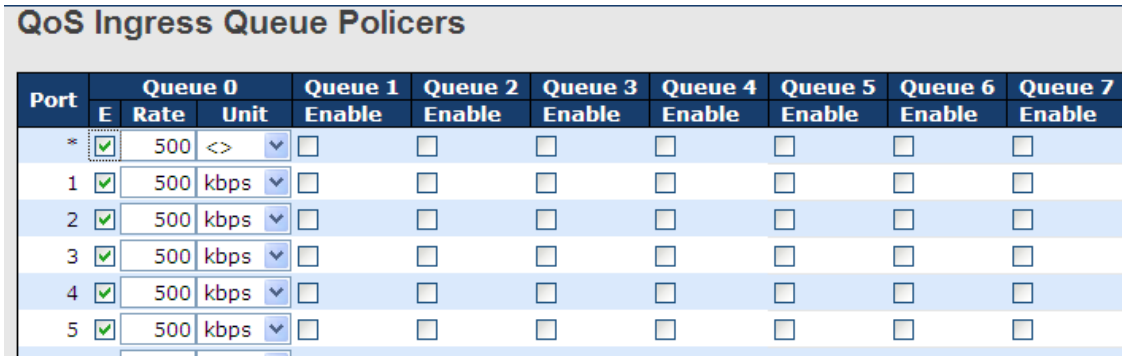


Label	Description

Port	The port number for which the configuration below applies
Enable	Check to enable the policer for individual switch ports
Rate	Configures the rate of each policer. The default value is **500**. This value is restricted to 100 to 1000000 when the **Unit** is **kbps** or **fps**, and is restricted to 1 to 3300 when the **Unit** is **Mbps** or **kfps**.
Unti	Configures the unit of measurement for each policer rate as **kbps**, **Mbps**, **fps**, or **kfps**. The default value is **kbps**.
Flow Control	If **Flow Control** is enabled and the port is in **Flow Control** mode, then pause frames are sent instead of being discarded.

1.7.6 Queue Policing

This page allows you to configure Queue Policer settings for all switch ports.

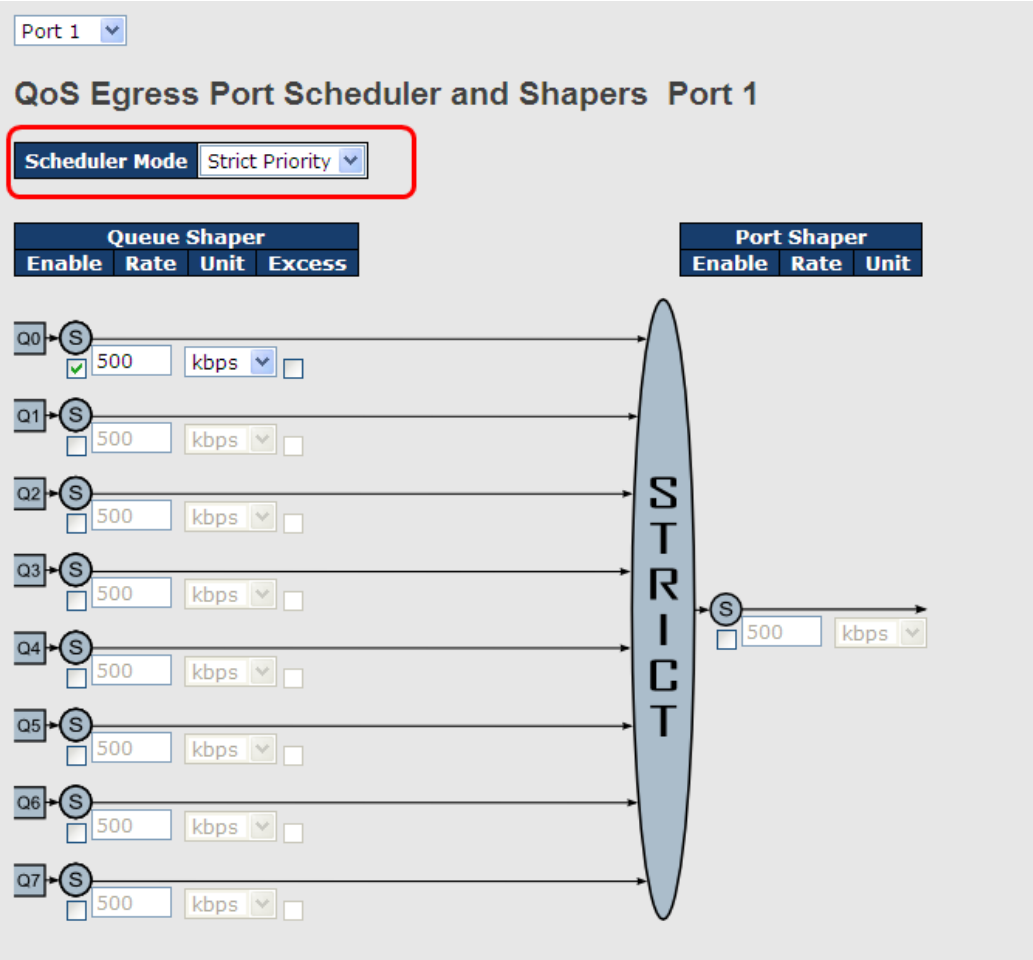


Label	Description
Port	The port number for which the configuration below applies.
Enable(E)	Check to enable queue policer for individual switch ports
Rate	Configures the rate of each queue policer. The default value is **500**. This value is restricted to 100 to 1000000 when the **Unit** is **kbps**, and is restricted to 1 to 3300 when the **Unit** is **Mbps**. This field is only shown if at least one of the queue policers is enabled.
Unit	Configures the unit of measurement for each queue policer rate as kbps or Mbps. The default value is **kbps**. This field is only shown if at least one of the queue policers is enabled.

1.7.7 QoS Egress Port Scheduler and Shapers

This page allows you to configure Scheduler and Shapers for a specific port.

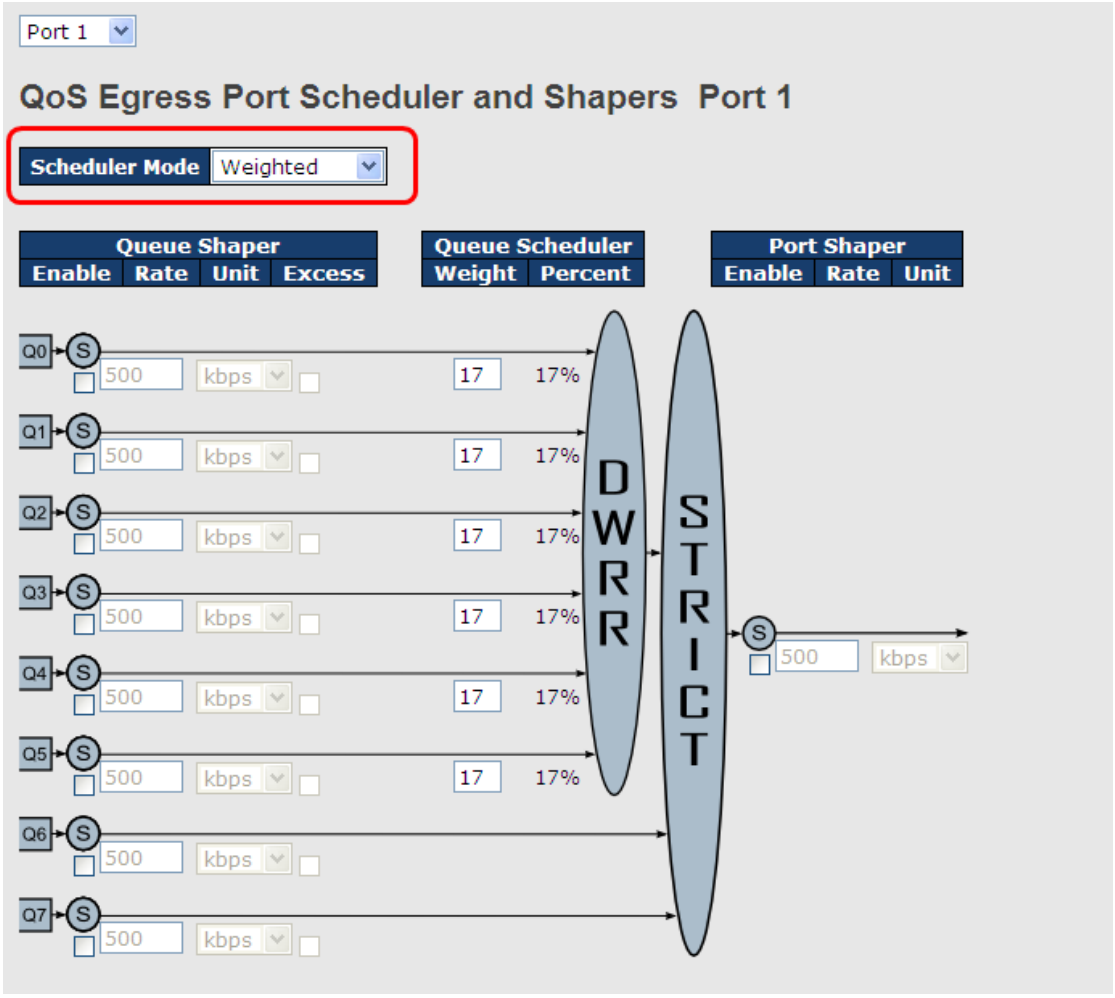
Strict Priority



Label	Description
Scheduler Mode	Controls whether the scheduler mode is **Strict Priority** or **Weighted** on this switch port
Queue Shaper Enable	Check to enable queue shaper for individual switch ports
Queue Shaper Rate	Configures the rate of each queue shaper. The default value is **500**. This value is restricted to 100 to 1000000 whn the **Unit** is **kbps**", and it is restricted to 1 to 3300 when the **Unit** is **Mbps**.
Queues Shaper Unit	Configures the rate for each queue shaper. The default value is **500**. This value is restricted to 100 to 1000000 when the **Unit** is **kbps**, and it is restricted to 1 to 3300 when the **Unit** is **Mbps**.
Queue Shaper	Allows the queue to use excess bandwidth

Excess	
Port Shaper Enable	Check to enable port shaper for individual switch ports
Port Shaper Rate	Configures the rate of each port shaper. The default value is **500** This value is restricted to 100 to 1000000 when the **Unit** is **kbps**, and it is restricted to 1 to 3300 when the **Unit** is **Mbps**.
Port Shaper Unit	Configures the unit of measurement for each port shaper rate as **kbps** or **Mbps**. The default value is **kbps**.

Weighted

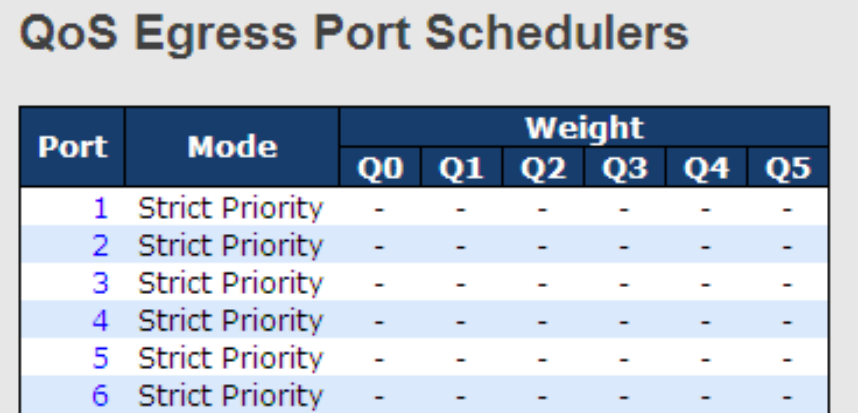


Label	Description
Scheduler Mode	Controls whether the scheduler mode is **Strict Priority** or **Weighted** on this switch port
Queue Shaper Enable	Check to enable queue shaper for individual switch ports
Queue Shaper Rate	Configures the rate of each queue shaper. The default value is **500**. This value is restricted to 100 to 1000000 when the **Unit** is **kbps**, and it is restricted to 1 to 3300 when the **Unit** is **Mbps**.
Queues Shaper Unit	Configures the rate of each queue shaper. The default value is **500**. This value is restricted to 100 to 1000000 when the **Unit**" is **kbps**, and it is restricted to 1 to 3300 when the **Unit** is **Mbps**.

Queue Shaper Excess	Allows the queue to use excess bandwidth
Queue Scheduler Weight	Configures the weight of each queue. The default value is **17**. This value is restricted to 1 to 100. This parameter is only shown if **Scheduler Mode** is set to **Weighted**.
Queue Scheduler Percent	Shows the weight of the queue in percentage. This parameter is only shown if **Scheduler Mode** is set to **Weighted**.
Port Shaper Enable	Check to enable port shaper for individual switch ports
Port Shaper Rate	Configures the rate of each port shaper. The default value is **500**. This value is restricted to 100 to 1000000 when the **Unit** is **kbps**, and it is restricted to 1 to 3300 when the **Unit** is **Mbps**.
Port Shaper Unit	Configures the unit of measurement for each port shaper rate as **kbps** or **Mbps**. The default value is **kbps**.

1.7.8 Port Scheduler

This page provides an overview of QoS Egress Port Schedulers for all switch ports.



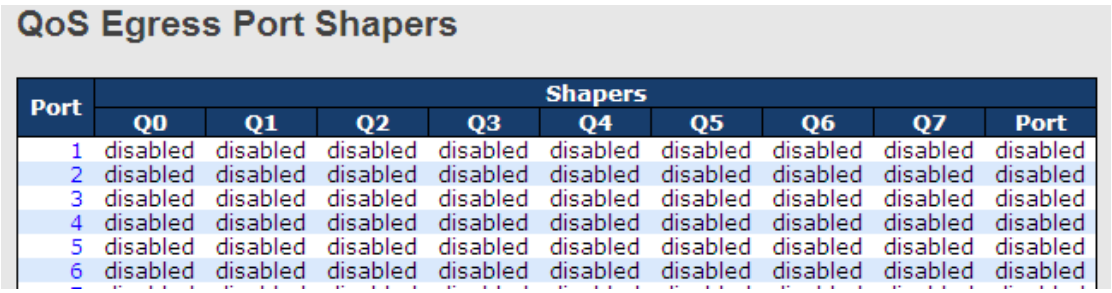
QoS Egress Port Schedulers

Port	Mode	Weight					
		Q0	Q1	Q2	Q3	Q4	Q5
1	Strict Priority	-	-	-	-	-	-
2	Strict Priority	-	-	-	-	-	-
3	Strict Priority	-	-	-	-	-	-
4	Strict Priority	-	-	-	-	-	-
5	Strict Priority	-	-	-	-	-	-
6	Strict Priority	-	-	-	-	-	-

Label	Description
Port	The switch port number to which the following settings will be applied. Click on the port number to configure the schedulers
Mode	Shows the scheduling mode for this port
Qn	Shows the weight for this queue and port

1.7.9 Port Shaping

This page provides an overview of QoS Egress Port Shapers for all switch ports.



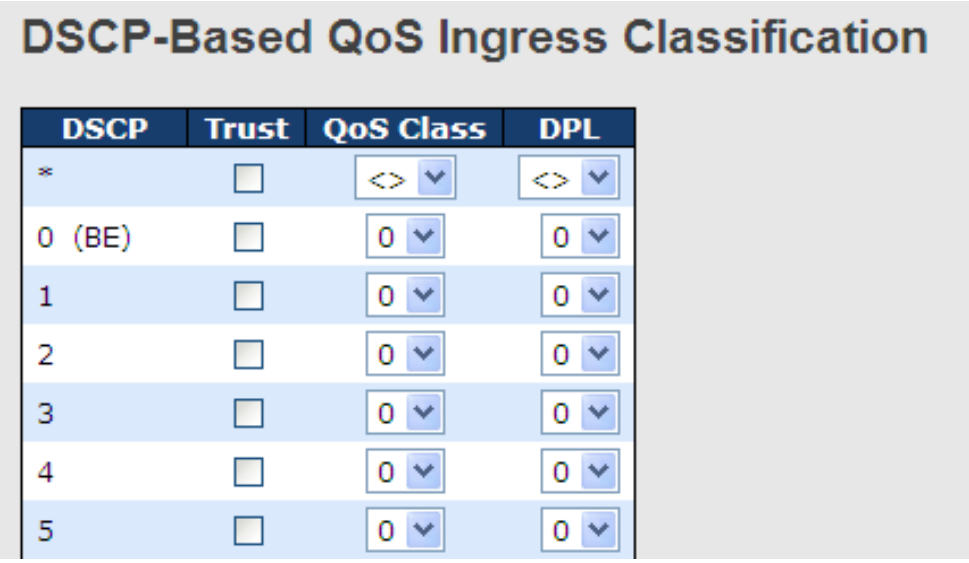
QoS Egress Port Shapers

Port	Shapers								
	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Port
1	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled
2	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled
3	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled
4	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled
5	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled
6	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled	disabled

Label	Description
Port	The switch port number to which the following settings will be applied. Click on the port number to configure the shapers
Mode	Shows **disabled** or actual queue shaper rate - e.g. "800 Mbps"
Qn	Shows **disabled** or actual port shaper rate - e.g. "800 Mbps"

1.7.10 DSCP-Based QoS

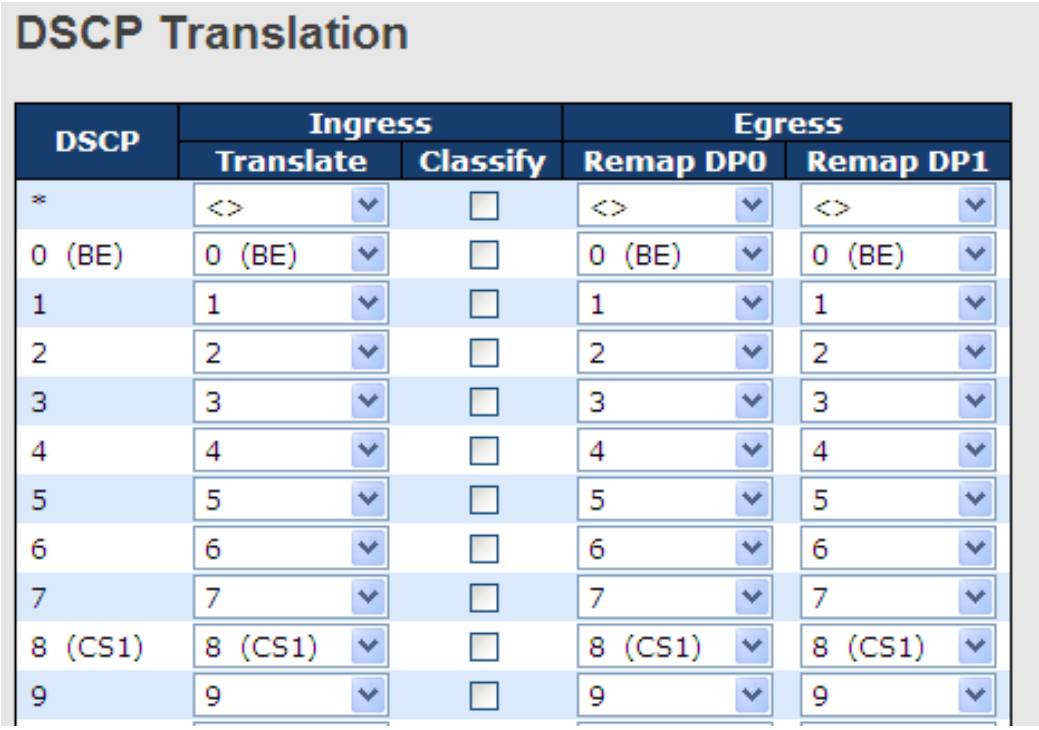
This page allows you to configure basic QoS DSCP-based QoS Ingress Classification settings for all switches.



Label	Description
DSCP	Maximum number of supported DSCP values is 64
Trust	Check to trust a specific DSCP value. Only frames with trusted DSCP values are mapped to a specific QoS class and drop precedence level. Frames with untrusted DSCP values are treated as a non-IP frame.
QoS Class	QoS class value can be any number from 0-7.
DPL	Drop Precedence Level (0-1)

1.7.11 DSCP Translation

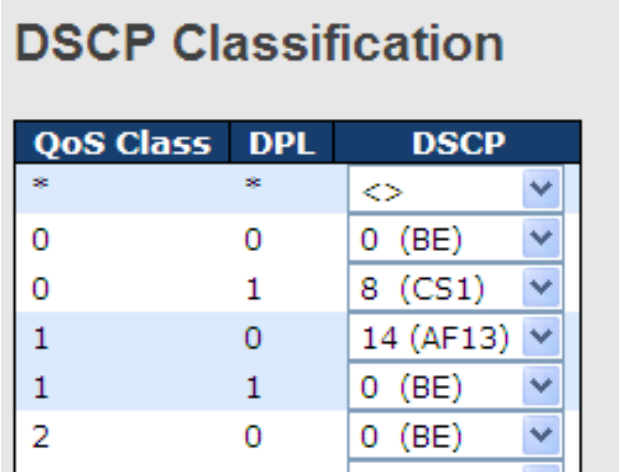
This page allows you to configure basic QoS DSCP translation settings for all switches. DSCP translation can be done in **Ingress** or **Egress**.



Label	Description
DSCP	Maximum number of supported DSCP values is 64 and valid DSCP value ranges from 0 to 63.
Ingress	Ingress DSCP can be first translated to new DSCP before using the DSCP for QoS class and DPL map. There are two configuration parameters for DSCP Translation - 1. **Translate:** DSCP can be translated to any of (0-63) DSCP values. 2. **Classify:** check to enable ingress classification
Egress	Configurable engress parameters include; **Remap DP0**: controls the remapping for frames with DP level 0. You can select the DSCP value from a selected menu to which you want to remap. DSCP value ranges from 0 to 63. **Remap DP1**: controls the remapping for frames with DP level 1. You can select the DSCP value from a selected menu to which you want to remap. DSCP value ranges from 0 to 63.

1.7.12 DSCP Classification

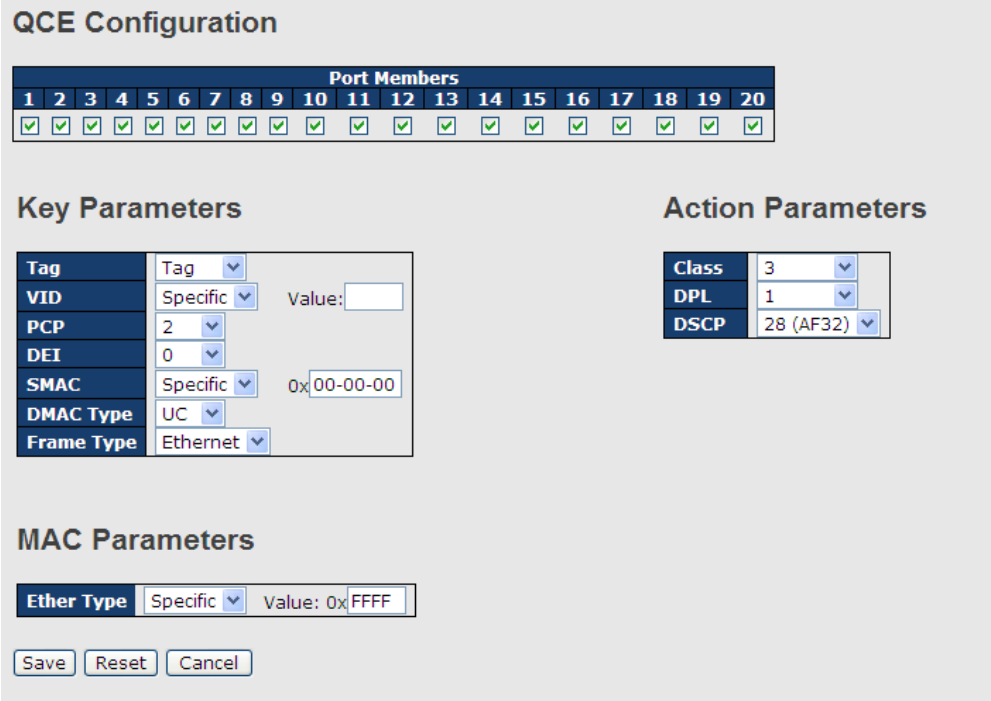
This page allows you to configure the mapping of QoS class and Drop Precedence Level to DSCP value.



Label	Description
QoS Class	Actual QoS class
DPL	Actual Drop Precedence Level
DSCP	Select the classified DSCP value (0-63)

1.7.13 QoS Control List

This page allows you to edit or insert a single QoS control entry at a time. A QCE consists of several parameters. These parameters vary with the frame type you select.



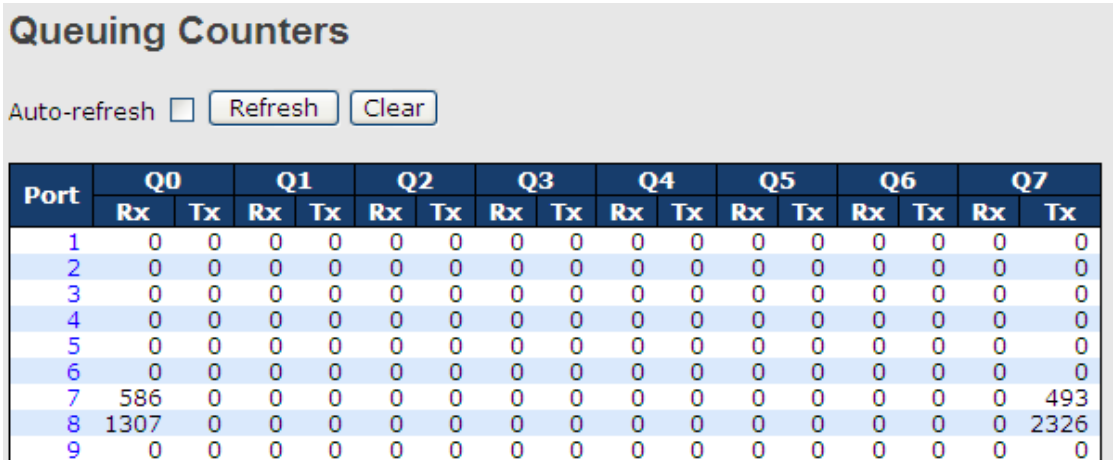
Label	Description
Port Members	Check to include the port in the QCL entry. By default, all ports are included.
Key Parameters	Key configurations include: **Tag**: value of tag, can be **Any**, **Untag** or **Tag**. **VID**: valid value of VLAN ID, can be any value from 1 to 4095 **Any**: user can enter either a specific value or a range of VIDs.

	PCP: Priority Code Point, can be specific numbers (0, 1, 2, 3, 4, 5, 6, 7), a range (0-1, 2-3, 4-5, 6-7, 0-3, 4-7) or **Any** **DEI**: Drop Eligible Indicator, can be any of values between 0 and 1 or **Any** **SMAC**: Source MAC Address, can be 24 MS bits (OUI) or **Any** **DMAC Type**: Destination MAC type, can be **unicast** (**UC**), **multicast** (**MC**), **broadcast** (**BC**) or **Any** Frame Type can be the following values: **Any** **Ethernet** **LLC** **SNAP** **IPv4** **IPv6** Note: all frame types are explained below.
Any	Allow all types of frames
Ethernet	Valid Ethernet values can range from 0x600 to 0xFFFF or Any' but excluding 0x800(IPv4) and 0x86DD(IPv6). The default value is **Any**.
LLC	SSAP Address: valid SSAP (Source Service Access Point) values can range from 0x00 to 0xFF or **Any**. The default value is **Any**. DSAP Address: valid DSAP (Destination Service Access Point) values can range from 0x00 to 0xFF or **Any**. The default value is **Any**. Control Valid Control: valid values can range from 0x00 to 0xFF or **Any**. The default value is **Any**.
SNAP	PID: valid PID (a.k.a ethernet type) values can range from 0x00 to 0xFFFF or Any. The default value is Any.
IPv4	Protocol IP Protocol Number: (0-255, TCP or UDP) or **Any** Source IP: specific Source IP address in value/mask format or **Any**. IP and mask are in the format of x.y.z.w where x, y, z, and w are decimal numbers between 0 and 255. When the mask is converted to a 32-bit binary string and read from left to right, all bits following the first zero must also be zero. DSCP (Differentiated Code Point): can be a specific value, a range, or **Any**. DSCP values are in the range 0-63 including BE, CS1-CS7, EF or AF11-AF43. IP Fragment: Ipv4 frame fragmented options include **'yes'**, **'no'**, and **'any'**. Sport Source TCP/UDP Port: (0-65535) or **Any**, specific

	value or port range applicable for IP protocol UDP/TCP Dport Destination TCP/UDP Port: (0-65535) or **Any**, specific value or port range applicable for IP protocol UDP/TCP
IPv6	Protocol IP protocol number: (0-255, TCP or UDP) or **Any** Source IP IPv6 source address: (a.b.c.d) or **Any**, 32 LS bits DSCP (Differentiated Code Point): can be a specific value, a range, or **Any**. DSCP values are in the range 0-63 including BE, CS1-CS7, EF or AF11-AF43. Sport Source TCP/UDP port: (0-65535) or **Any**, specific value or port range applicable for IP protocol UDP/TCP Dport Destination TCP/UDP port: (0-65535) or **Any**, specific value or port range applicable for IP protocol UDP/TCP
Action Parameters	Class QoS class: (0-7) or **Default** Valid Drop Precedence Level value can be (0-1) or **Default**. Valid DSCP value can be (0-63, BE, CS1-CS7, EF or AF11-AF43) or **Default**. Default means that the default classified value is not modified by this QCE.

1.7.14 QoS Statistics

This page provides the statistics of individual queues for all switch ports.

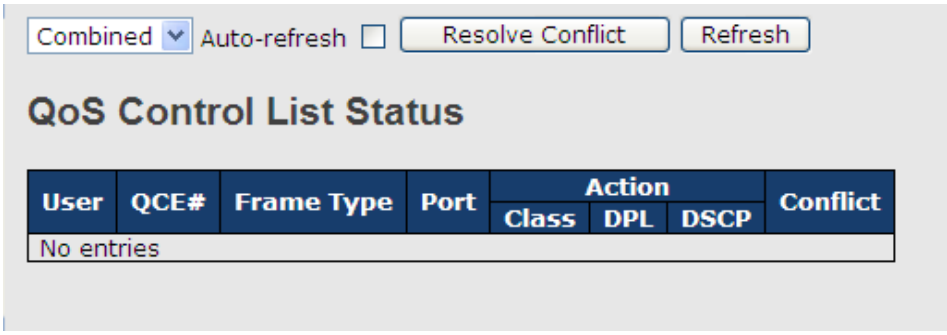


Port	Q0		Q1		Q2		Q3		Q4		Q5		Q6		Q7	
	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	586	0	0	0	0	0	0	0	0	0	0	0	0	0	0	493
8	1307	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2326
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Label	Description
Port	The switch port number to which the following settings will be applied.
Qn	There are 8 QoS queues per port. Q0 is the lowest priority
Rx / Tx	The number of received and transmitted packets per queue

1.7.15 QCL Status

This page shows the QCL status by different QCL users. Each row describes the QCE that is defined. It is a conflict if a specific QCE is not applied to the hardware due to hardware limitations. The maximum number of QCEs is 256 on each switch.



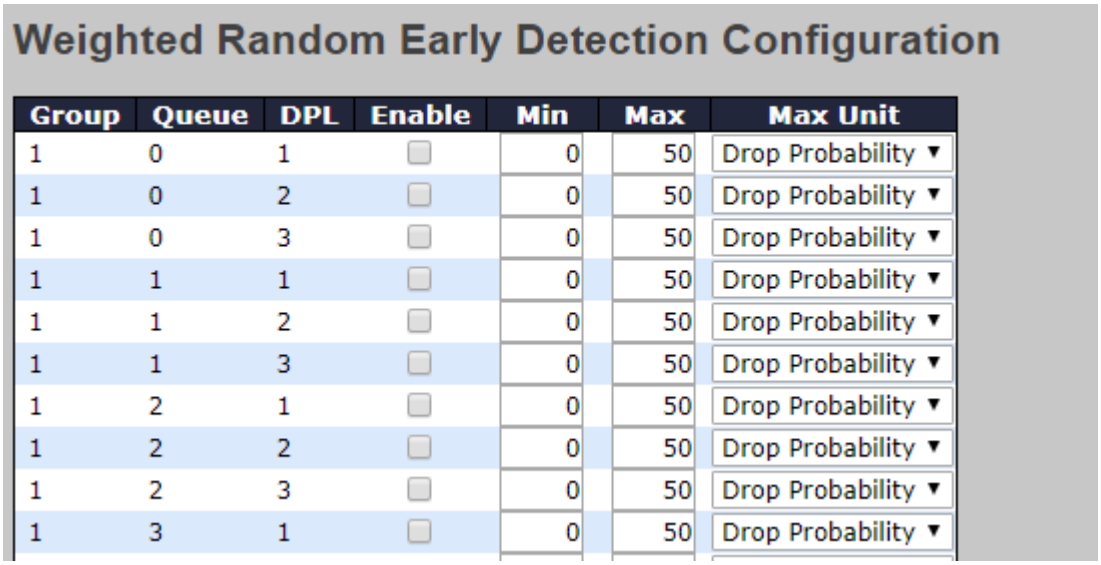
Label	Description
User	Indicates the QCL user
QCE#	Indicates the index of QCE
Frame Type	Indicates the type of frame to look for incoming frames. Possible frame types are: **Any**: the QCE will match all frame type. **Ethernet**: Only Ethernet frames (with Ether Type 0x600-0xFFFF) are allowed. **LLC**: Only (LLC) frames are allowed. **SNAP**: Only (SNAP) frames are allowed. **IPv4**: the QCE will match only IPV4 frames. **IPv6**: the QCE will match only IPV6 frames.
Port	Indicates the list of ports configured with the QCE.
Action	Indicates the classification action taken on ingress frame if parameters configured are matched with the frame's content. There are three action fields: **Class**, **DPL**, and **DSCP**. **Class**: Classified QoS; if a frame matches the QCE, it will be put in the queue. **DPL**: Drop Precedence Level; if a frame matches the QCE, then DP level will set to a value displayed under DPL column. **DSCP**: if a frame matches the QCE, then DSCP will be classified with the value displayed under DSCP column.
Conflict	Displays the conflict status of QCL entries. As hardware resources are shared by multiple applications, resources required to add a QCE may not be available. In that case, it shows conflict status as **Yes**, otherwise it is always **No**. Please note that conflict can be resolved by releasing the hardware resources required to add the QCL entry by pressing Resolve Conflict button.

1.7.16 WRED

This page allows you to configure the Random Early Detection (RED) settings.

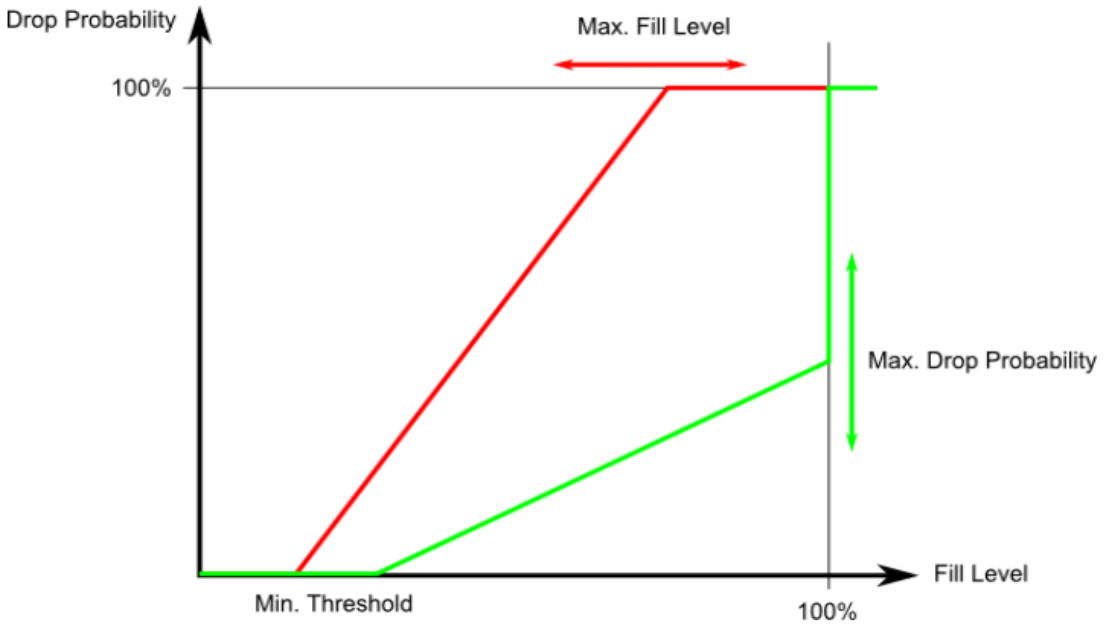
Through different RED configuration for the queues (QoS classes) it is possible to obtain Weighted Random Early Detection (WRED) operation between queues.

The settings are global for all ports in the switch.



Label	Description
Group	The WRED group number for which the configuration below applies.
Queue	The queue number (QoS class) for which the configuration below applies.
DPL	The Drop Precedence Level for which the configuration below applies.
Enable	Controls whether RED is enabled for this entry.
Min	Controls the lower RED fill level threshold. If the queue filling level is below this threshold, the drop probability is zero. This value is restricted to 0-100%.
Max	Controls the upper RED drop probability or fill level threshold for frames marked with Drop Precedence Level > 0 (yellow frames). This value is restricted to 1-100%.
Max Unit	Selects the unit for Max. Possible values are: Drop Probability: Max controls the drop probability just below 100% fill level. Fill Level: Max controls the fill level where drop probability reaches 100%.

RED Drop Probability Function



Min is the fill level where the queue randomly start dropping frames marked with Drop Precedence Level > 0 (yellow frames).

If Max Unit is 'Drop Probability' (the green line), Max controls the drop probability when the fill level is just below 100%.

If Max Unit is 'Fill Level' (the red line), Max controls the fill level where drop probability reaches 100%. This configuration makes it possible to reserve a portion of the queue exclusively for frames marked with Drop Precedence Level 0 (green frames). The reserved portion is calculated as (100 - Max) %.

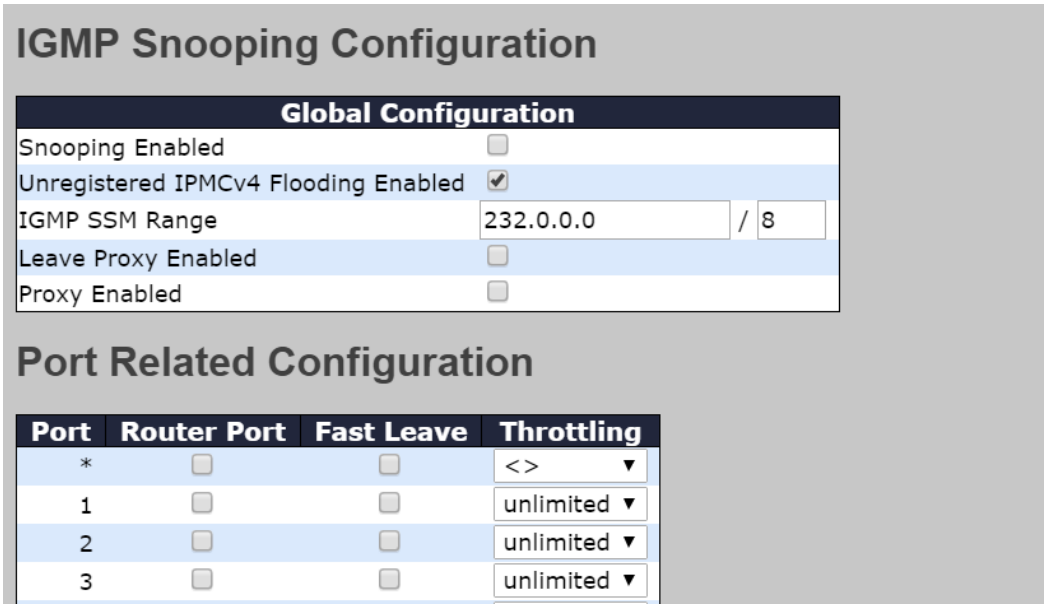
Frames marked with Drop Precedence Level 0 (green frames) are never dropped.

The drop probability for frames increases linearly from zero (at Min average queue filling level) to Max Drop Probability or Fill Level.

1.8 Multicast

1.8.1 IGMP Snooping

This page provides IGMP Snooping related configurations.



Label	Description
Snooping Enabled	Check to enable global IGMP snooping
Unregistered IPMCv4Flooding enabled	Enable unregistered IPMCv4 traffic flooding. The flooding control takes effect only when IGMP Snooping is enabled. When IGMP Snooping is disabled, unregistered IPMCv4 traffic flooding is always active in spite of this setting.
IGMP SSM Range	SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers run the SSM service model for the groups in the address range. Assign valid IPv4 multicast address as prefix with a prefix length (from 4 to 32) for the range.
Leaver Proxy Enabled	Enable IGMP Leave Proxy. This feature can be used to avoid forwarding unnecessary leave messages to the router side.
Proxy Enable	Enable IGMP Proxy. This feature can be used to avoid forwarding unnecessary join and leave messages to the router side.
Router Port	Specifies which ports act as router ports. A router port is a port on the Ethernet switch that leads towards the Layer 3 multicast device or IGMP querier. If an aggregation member port is selected as a router port, the whole aggregation will act as a router port.
Fast Leave	Check to enable fast leave on the port
Throttling	Enable to limit the number of multicast groups to which a switch port can belong.

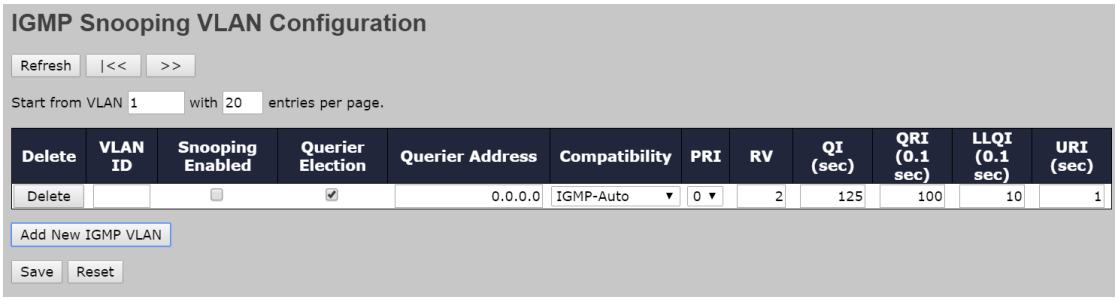
VLAN Configurations of IGMP Snooping

Each page shows up to 99 entries from the VLAN table, with a default value of 20, selected by the **Entries Per Page** input field. When first visited, the web page will show the first 20 entries from the beginning of the VLAN Table. The first displayed will be the one with the lowest VLAN ID found in the VLAN Table.

The **VLAN** input field allows the user to select the starting point in the VLAN Table. Clicking the **Refresh** button will

update the displayed table starting from that or the next closest VLAN Table match.

The **>>** will use the last entry of the currently displayed entry as a basis for the next lookup. When the end is reached, the text **No more entries** is shown in the displayed table. Use the **|<<** button to start over.

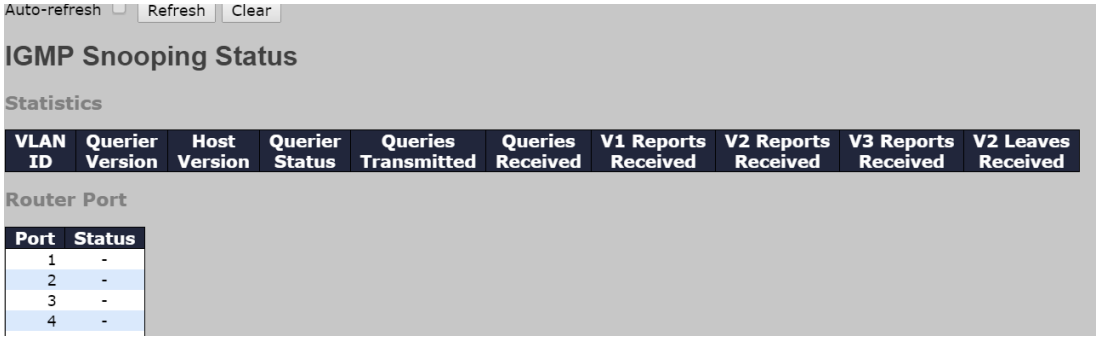


Label	Description
Delete	Check to delete the entry. The designated entry will be deleted during the next save.
VLAN ID	The VLAN ID of the entry
IGMP Snooping Enable	Check to enable IGMP snooping for individual VLAN. Up to 32 VLANs can be selected.
Querier Election	Enable to join IGMP Querier election in the VLAN. Disable to act as an IGMP Non-Querier.
Querier Address	Define the IPv4 address as source address used in IP header for IGMP Querier election. When the Querier address is not set, system uses IPv4 management address of the IP interface associated with this VLAN. When the IPv4 management address is not set, system uses the first available IPv4 management address.
Compatibility	Compatibility is maintained by hosts and routers taking appropriate actions depending on the versions of IGMP operating on hosts and routers within a network. The allowed selection is **IGMP-Auto**, **Forced IGMPv1**,**Forced IGMPv2**, **Forced IGMPv3**, default compatibility value is IGMP-Auto.
PRI	Priority of Interface. It indicates the IGMP control frame priority level generated by the system. These values can be used to prioritize different classes of traffic. The allowed range is **0** (best effort) to **7** (highest), default interface priority value is 0.
RV	Robustness Variable. The Robustness Variable allows tuning for the expected packet loss on a network. The allowed range is **1** to **255**, default robustness variable value is 2.
QI	Query Interval.

	The Query Interval is the interval between General Queries sent by the Querier. The allowed range is **1** to **31744** seconds, default query interval is 125 seconds.
QRI	Query Response Interval. The Maximum Response Delay used to calculate the Maximum Response Code inserted into the periodic General Queries. The allowed range is **0** to **31744** in tenths of seconds, default query response interval is 100 in tenths of seconds (10 seconds).
LLQI(LMQI for IGMP)	Last Member Query Interval. The Last Member Query Time is the time value represented by the Last Member Query Interval, multiplied by the Last Member Query Count. The allowed range is **0** to **31744** in tenths of seconds, default last member query interval is 10 in tenths of seconds (1 second).
URI	Unsolicited Report Interval. The Unsolicited Report Interval is the time between repetitions of a host's initial report of membership in a group. The allowed range is **0** to **31744** seconds, default unsolicited report interval is 1 second.

IGMP Snooping Status

This page provides IGMP snooping status.

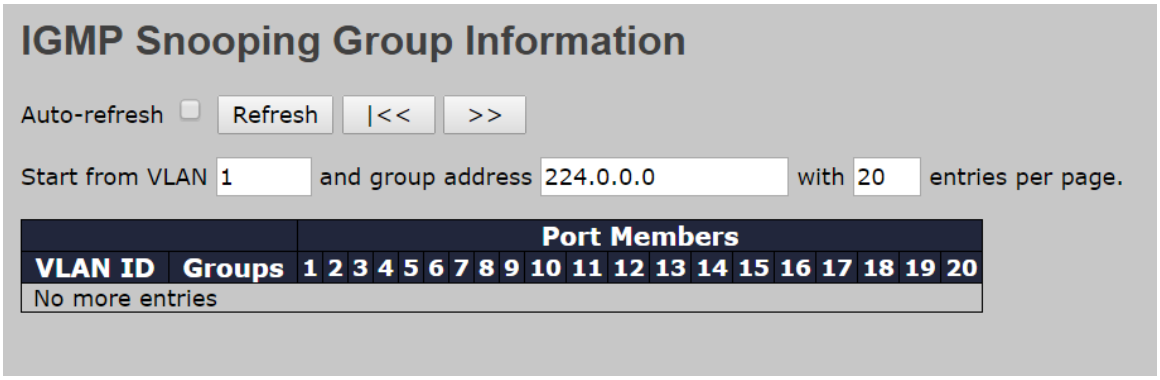


Label	Description
VLAN ID	The VLAN ID of the entry
Querier Version	Active Querier version
Host Version	Active Host version
Querier Status	Shows the Querier status as **ACTIVE** or **IDLE**
Querier Receive	The number of transmitted Querier
V1 Reports Receive	The number of received V1 reports
V2 Reports Receive	The number of received V2 reports
V3 Reports Receive	The number of received V3 reports
V2 Leave Receive	The number of received V2 leave packets
Refresh	Click to refresh the page immediately

Clear	Clear all statistics counters
Auto-refresh	Check to enable an automatic refresh of the page at regular intervals
Port	Switch port number
Status	Indicates whether a specific port is a router port or not

Groups Information of IGMP Snooping

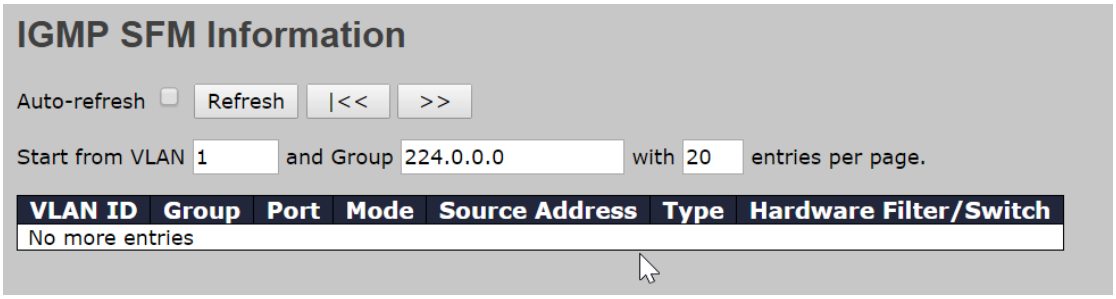
Entries in the **IGMP Group Table** are shown on this page. The **IGMP Group Table** is sorted first by VLAN ID, and then by group.



Label	Description
VLAN ID	The VLAN ID of the group
Groups	The group address of the group displayed
Port Members	Ports under this group

IPv4 SFM Information

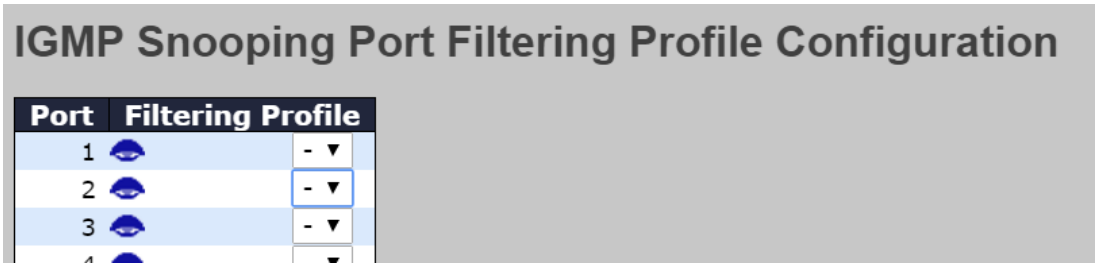
Entries in the IGMP SFM Information Table are shown on this page. The IGMP SFM (Source-Filtered Multicast) Information Table also contains the SSM (Source-Specific Multicast) information. This table is sorted first by VLAN ID, then by group, and then by Port. Different source addresses belong to the same group are treated as single entry.



Label	Description
VLAN ID	The VLAN ID of the group
Groups	The group address of the group displayed
Port	Switch port number.
Mode	Indicates the filtering mode maintained per (VLAN ID, port number, Group Address) basis. It can be either Include or Exclude.
Source Address	IP Address of the source.

	Currently, the maximum number of IPv4 source address for filtering (per group) is 8. When there is no any source filtering address, the text "None" is shown in the Source Address field.
Type	Indicates the Type. It can be either Allow or Deny.
Hardware Filter / Switch	Indicates whether data plane destined to the specific group address from the source IPv4 address could be handled by chip or not.

Port Group Filtering



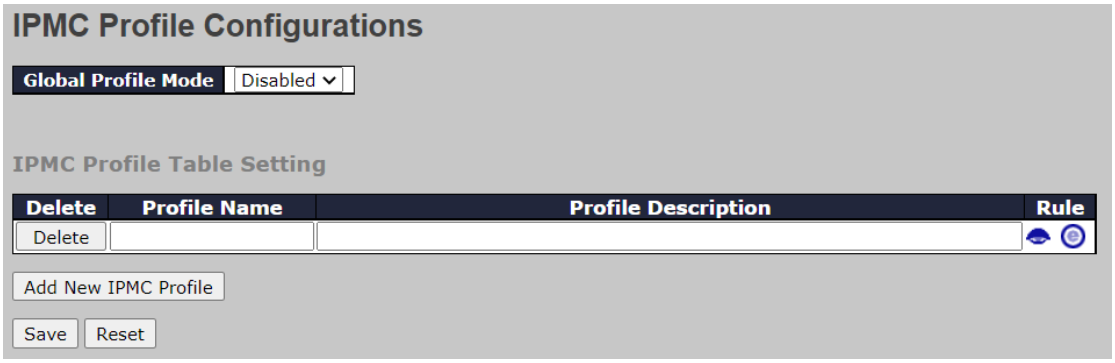
Label	Description
Port	The logical port for the settings.
Filtering Profile	Select the IPMC Profile as the filtering condition for the specific port. Summary about the designated profile will be shown by clicking the view button.
Profile Management Button	You can inspect the rules of the designated profile by using the following button: : List the rules associated with the designated profile.

1.8.2 IPMC Profile

Profile table

This page provides IPMC Profile related configurations.

The IPMC profile is used to deploy the access control on IP multicast streams. It is allowed to create at maximum 64 Profiles with at maximum 128 corresponding rules for each.



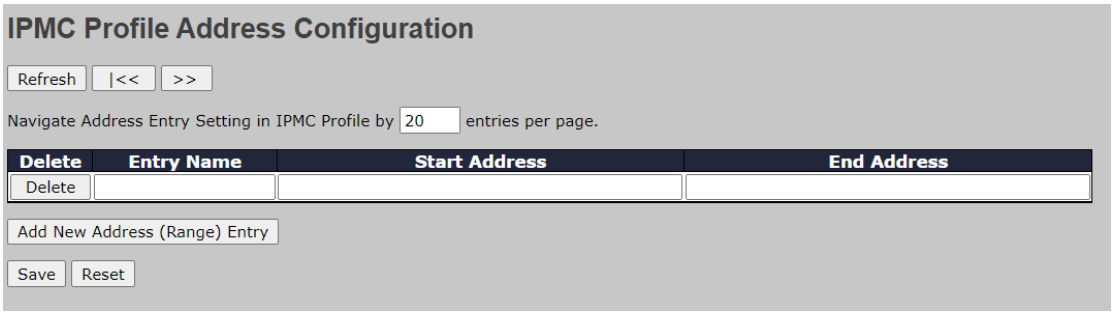
Label	Description

Global Profile Mode	Enable/Disable the Global IPMC Profile. System starts to do filtering based on profile settings only when the global profile mode is enabled.
Delete	Check to delete the entry. The designated entry will be deleted during the next save.
Profile Name	The name used for indexing the profile table. Each entry has the unique name which is composed of at maximum 16 alphabetic and numeric characters. At least one alphabet must be present.
Profile Description	Additional description, which is composed of at maximum 64 alphabetic and numeric characters, about the profile. No blank or space characters are permitted as part of description. Use "_" or "-" to separate the description sentence.
Rule	When the profile is created, click the edit button to enter the rule setting page of the designated profile. Summary about the designated profile will be shown by clicking the view button. You can manage or inspect the rules of the designated profile by using the following buttons: : List the rules associated with the designated profile. : Adjust the rules associated with the designated profile.

Address Entry

This page provides address range settings used in IPMC profile.

The address entry is used to specify the address range that will be associated with IPMC Profile. It is allowed to create at maximum 128 address entries in the system.



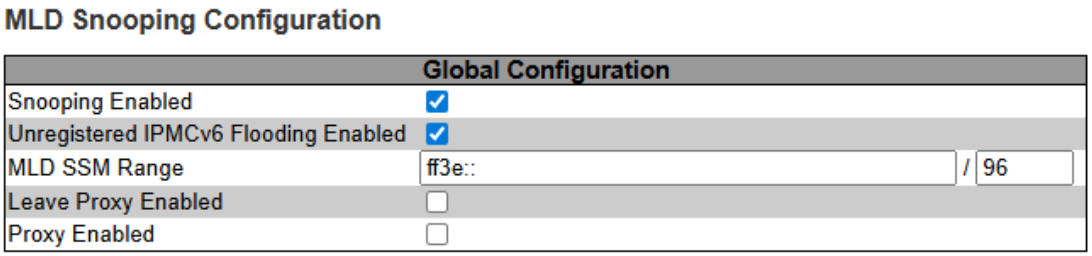
Label	Description
Delete	Check to delete the entry. The designated entry will be deleted during the next save.
Entry Name	The name used for indexing the address entry table. Each entry has the unique name which is composed of at maximum 16 alphabetic and numeric characters. At least one alphabet must be present.

Start Address	The starting IPv4/IPv6 Multicast Group Address that will be used as an address range.
End Address	The ending IPv4/IPv6 Multicast Group Address that will be used as an address range.

1.8.3 MLD Snooping

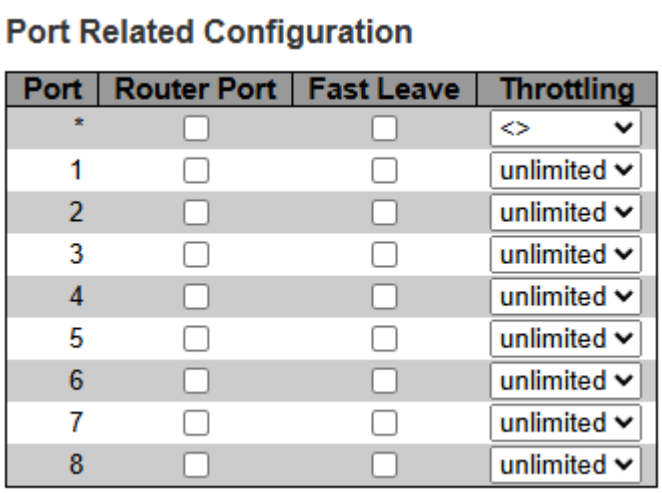
MLD is an acronym for **M**ulticast **L**istener **D**iscovery for IPv6. MLD is used by IPv6 routers to discover multicast listeners on a directly attached link, much as IGMP is used in IPv4. The protocol is embedded in ICMPv6 instead of using a separate protocol.

Basic Configuration- MLD Snooping Config



Label	Description
Snooping Enabled	Enable the Global MLD Snooping.
Unregistered IPMCv6 Flooding Enabled	Enable unregistered IPMCv6 traffic flooding. The flooding control takes effect only when MLD Snooping is enabled. When MLD Snooping is disabled, unregistered IPMCv6 traffic flooding is always active in spite of this setting.
MLD SSM Range	SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers run the SSM service model for the groups in the address range. Requests made by MLDv1 hosts in this range are ignored. Assign a valid IPv6 multicast address as prefix with a prefix length (from 8 to 128) for the range.
Leave Proxy Enabled	Enable MLD Leave Proxy. This feature can be used to avoid forwarding unnecessary leave messages to the router side.
Proxy Enabled	Enable MLD Proxy. This feature can be used to avoid forwarding unnecessary join and leave messages to the router side.

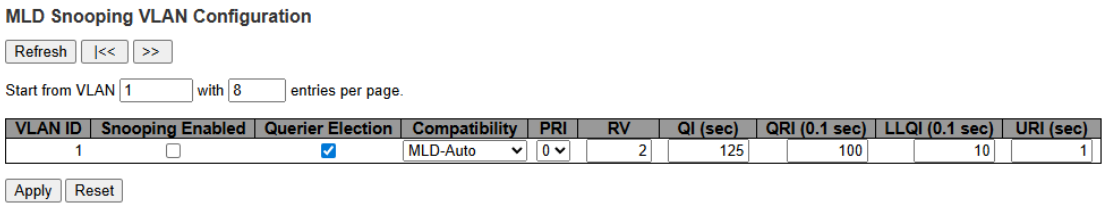
Basic Configuration- Port Related Configuration



Label	Description
Router Port	Specify which ports act as router ports. A router port is a port on the Ethernet switch that leads towards the Layer 3 multicast device or MLD querier. If an aggregation member port is selected as a router port, the whole aggregation will act as a router port.
Fast Leave	Enable the fast leave on the port. System will remove group record and stop forwarding data upon receiving the MLDv1 leave message without sending last member query messages. It is recommended to enable this feature only when a single MLDv1 host is connected to the specific port.
Throttling	Enable to limit the number of multicast groups to which a switch port can belong.

VLAN Configuration

Each page shows up to 99 entries from the VLAN table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the VLAN Table. The first displayed will be the one with the lowest VLAN ID found in the VLAN Table. The "VLAN" input fields allow the user to select the starting point in the VLAN Table. Clicking the Refresh button will update the displayed table starting from that or the next closest VLAN Table match. The Refresh will use the last entry of the currently displayed entry as a basis for the next lookup. When the end is reached the text "No more entries" is shown in the displayed table. Use the |<< button to start over.

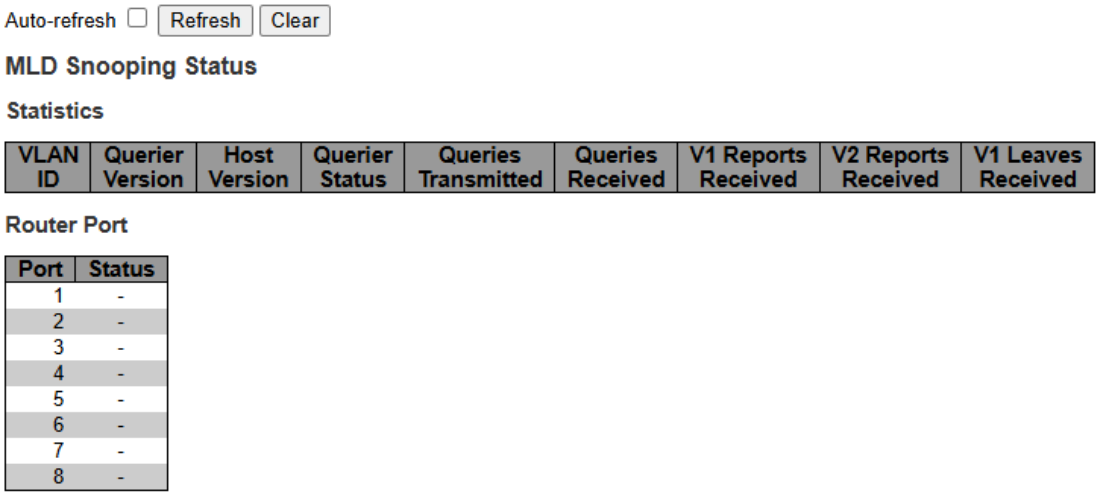


For MLD VLAN interface creation, you need to enter IP configuration page to setup IP interface first. **System -> IP -> Add IP interface**.

Label	Description
VLAN ID	The VLAN ID of the entry.
Snooping Enabled	Enable the per-VLAN MLD Snooping. Up to **8** VLANs can be selected for MLD Snooping.
Querier Election	Enable to join MLD Querier election in the VLAN. Disable to act as a MLD Non-Querier.
Compatibility	Compatibility is maintained by hosts and routers taking appropriate actions depending on the versions of MLD operating on hosts and routers within a network. The allowed selection is **MLD-Auto**, **Forced MLDv1**, **Forced MLDv2**, default compatibility value is MLD-Auto.
PRI	Priority of Interface. It indicates the MLD control frame priority level generated by the system. These values can be used to prioritize different classes of traffic. The allowed range is 0 (best effort) to 7 (highest), default interface priority value is 0.
RV	Robustness Variable. The Robustness Variable allows tuning for the expected packet loss on a link. The allowed range is **2** to **255**, default robustness variable value is 2.
QI(sec)	Query Interval. The Query Interval is the interval between General Queries sent by the Querier. The allowed range is **1** to **31744** seconds, default query interval is 125 seconds.
QRI(0.1sec)	Query Response Interval. The Maximum Response Delay used to calculate the Maximum Response Code inserted into the periodic General Queries. The allowed range is **0** to **31744** in tenths of seconds, default query response interval is 100 in tenths of seconds (10 seconds).
LLQI (0.1sec)	Last Listener Query Interval.

	The Last Listener Query Interval is the Maximum Response Delay used to calculate the Maximum Response Code inserted into Multicast Address Specific Queries sent in response to Version 1 Multicast Listener Done messages. It is also the Maximum Response Delay used to calculate the Maximum Response Code inserted into Multicast Address and Source Specific Query messages. The allowed range is **0** to **31744** in tenths of seconds, default last listener query interval is 10 in tenths of seconds (1 second).
URI (sec)	Unsolicited Report Interval. The Unsolicited Report Interval is the time between repetitions of a node's initial report of interest in a multicast address. The allowed range is **0** to **31744** seconds, default unsolicited report interval is 1 second.

Status



Label	Description
VLAN ID	The VLAN ID of the entry.
Querier Vesion	Working Querier Version currently.
Host Version	Working Host Version currently.
Querier Status	Shows the Querier status is "ACTIVE" or "IDLE". "DISABLE" denotes the specific interface is administratively disabled.
Querier Transmitted	The number of Transmitted Queries.
Querier Received	The number of Received Queries.
V1 Reports	The number of Received V1 Reports.

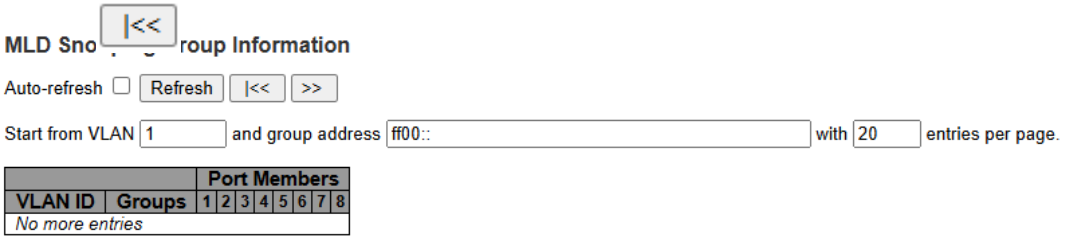
Received	
V2 Reports Received	The number of Received V2 Reports.
V1 Leaves Received	The number of Received V1 Leaves.
Router Port	Display which ports act as router ports. A router port is a port on the Ethernet switch that leads towards the Layer 3 multicast device or MLD querier. Static denotes the specific port is configured to be a router port. Dynamic denotes the specific port is learnt to be a router port. Both denote the specific port is configured or learnt to be a router port.
Port	Switch port number.
Status	Indicate whether specific port is a router port or not.

Groups Information

Each page shows up to 99 entries from the MLD Group table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the MLD Group Table.

The "Start from VLAN", and "group" input fields allow the user to select the starting point in the MLD Group Table. Clicking the button Refresh the displayed table starting from that or the closest next MLD Group Table match. In addition, the two input fields will - upon a button click - assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The >> will use the last entry of the currently displayed table as a basis for the next lookup. When the end is reached the text "No more entries" is shown in the displayed table. Use the button to start over.



Label	Description
VLAN ID	VLAN ID of the Group.
Groups	Group address of the group displayed.
Port Member	Ports under this group.

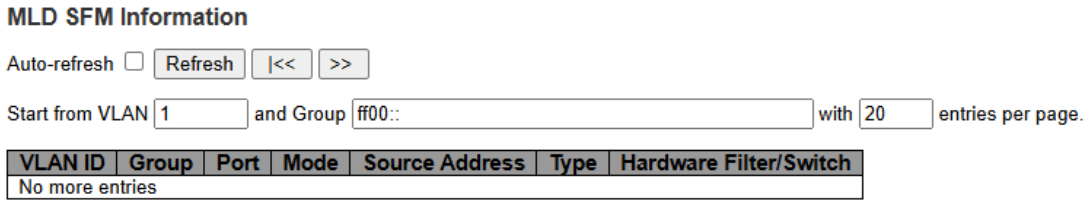
IPv6 SFM Information

Each page shows up to 99 entries from the MLD SFM Information table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the MLD SFM Information Table.

The "Start from VLAN", and "group" input fields allow the user to select the starting point in the MLD SFM Information Table. Clicking the button will u Refresh displayed table starting from that or the closest next MLD SFM Information Table match. In addition, the two input fields will - upon a button click - assume the value of the first displayed entry, allo Refresh ntinuous refresh with the same start address.

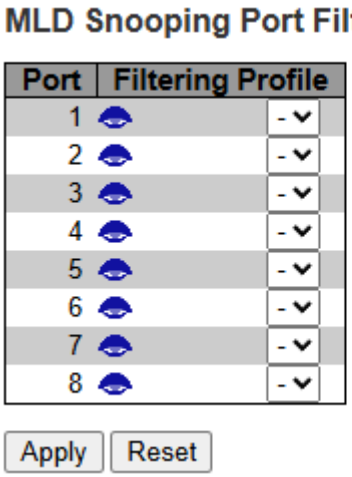
>>

The will use the last entry of the currently displayed table as a basis for the next lookup. When the end is reached the text "No more entries" is shown in the displayed table. Use the button to start over.



Label	Description
VLAN ID	VLAN ID of the Group.
Groups	Group address of the group displayed.
Port	Switch port number.
Mode	Each <VLAN ID, Group, Port> has a filter mode of either Include or Exclude, described further in section 7.2.1 of RFC3810.
Source Address	IP Address of the source. If there are no specific source addresses the text is "< Any>". This may happen if a host on the port is in MLDv1 mode or simply hasn't specified particular sources in the MLDv2 reports. On the contrary, if there indeed are sources in the MLDv2 reports, there is also a "Catch-remaining" entry, which matches on source addresses not already specified above its line. This is marked with "<Other>". Currently, the maximum number of IPv6 source address per VLAN ID per group is 8.
Type	This field indicates whether the entry is forwarding (Allow) or blocking (Deny).
Hardware Filter / Switch	Shows whether blocking/forwarding of this entry is handled by hardware or not.

Port Group Filtering

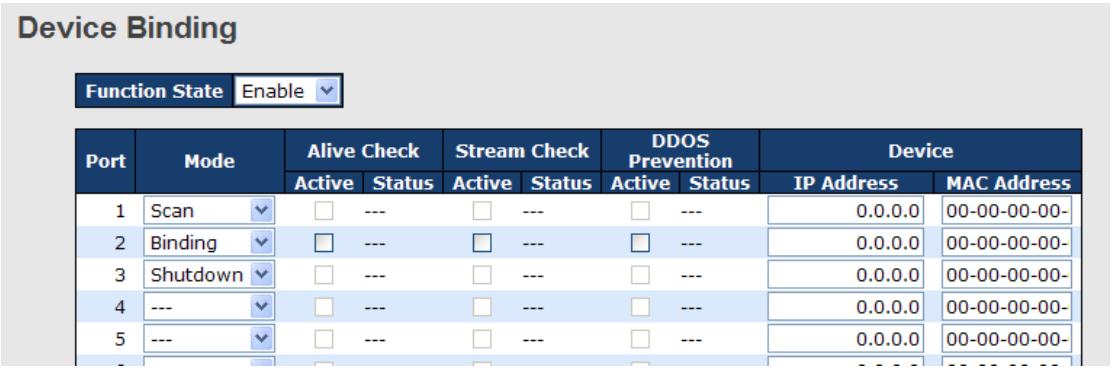


Label	Description
Port	VLAN ID of the Group.
Filtering Profile	Select the IPMC Profile as the filtering condition for the specific port. Summary about the designated profile will be shown by clicking the view button.
Profile Management Button	You can inspect the rules of the designated profile by using the following button: : List the rules associated with the designated profile.

1.9 Security

1.9.1 Device Binding

This page provides device binding configurations. Device binding is a powerful way to monitor devices and network security.



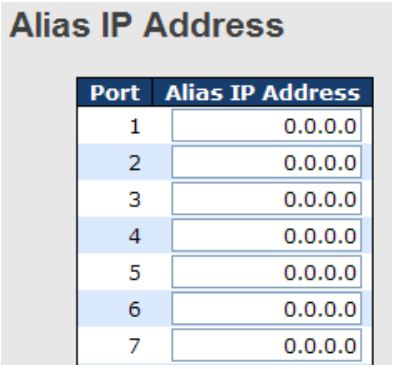
Label	Description
Mode	Indicates the device binding operation for each port. Possible modes are: **---**: disable **Scan**: scans IP/MAC automatically, but no binding function **Binding**: enables binding. Under this mode, any IP/MAC that does not match the entry will not be allowed to access the network.

	Shutdown: shuts down the port (No Link)
Alive Check Active	Check to enable alive check. When enabled, switch will ping the device continually.
Alive Check Status	Indicates alive check status. Possible statuses are: **---**: disable **Got Reply**: receive ping reply from device, meaning the device is still alive **Lost Reply**: not receiving ping reply from device, meaning the device might have been dead.
Stream Check Active	Check to enable stream check. When enabled, the switch will detect the stream change (getting low) from the device.
Stream Check Status	Indicates stream check status. Possible statuses are: **---**: disable **Normal**: the stream is normal. **Low**: the stream is getting low.
DDoS Prevention Acton	Check to enable DDOS prevention. When enabled, the switch will monitor the device against DDOS attacks.
DDoS Prevention Status	Indicates DDOS prevention status. Possible statuses are: **---**: disable **Analyzing**: analyzes packet throughput for initialization **Running**: analysis completes and ready for next move **Attacked**: DDOS attacks occur
Device IP Address	Specifies IP address of the device
Device MAC Address	Specifies MAC address of the device

Advanced Configurations

Alias IP Address

This page provides Alias IP Address configuration. Some devices might have more than one IP addresses. You could specify the other IP address here.

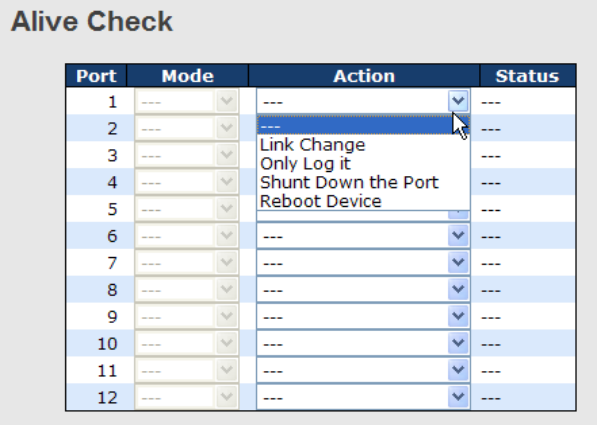


Label	Description
Alias IP Address	Specifies alias IP address. Keep **0.0.0.0** if the device does not have

	an alias IP address.

Alive Check

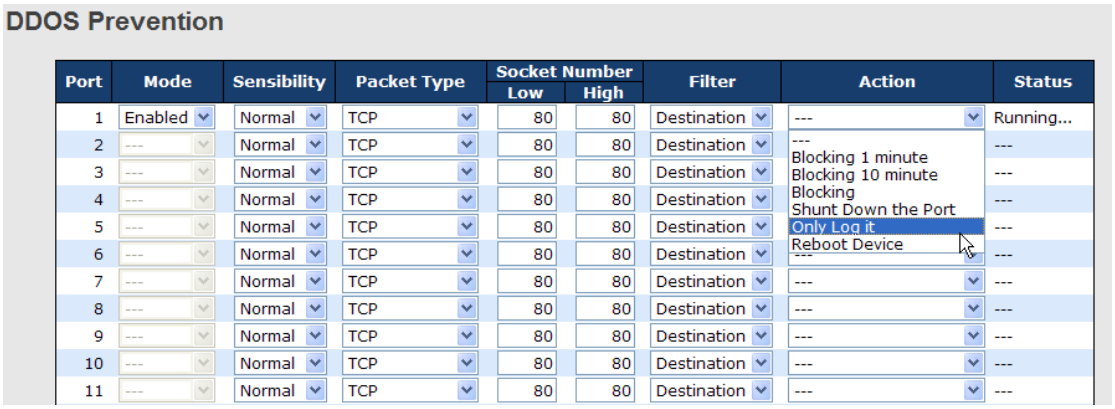
You can use ping commands to check port link status. If port link fails, you can set actions from the drop-down list.



Label	Description
Link Change	Disables or enables the port
Only log it	Simply sends logs to the log server
Shunt Down the Port	Disables the port
Reboot Device	Disables or enables PoE power

DDoS Prevention

This page provides DDOS Prevention configurations. The switch can monitor ingress packets, and perform actions when DDOS attack occurred on this port. You can configure the setting to achieve maximum protection.

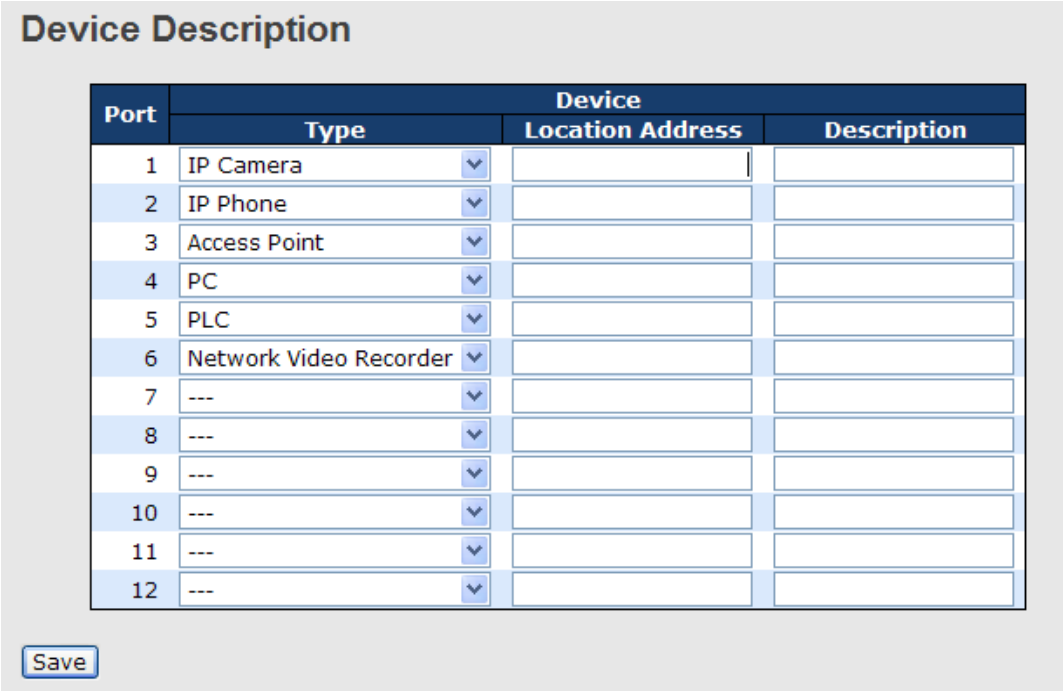


Label	Description
Mode	Enables or disables DDOS prevention of the port
Sensibility	Indicates the level of DDOS detection. Possible levels are: **Low**: low sensibility **Normal**: normal sensibility **Medium**: medium sensibility **High**: high sensibility
Packet Type	Indicates the types of DDoS attack packets to be monitored.

	Possible types are: **RX Total**: all ingress packets **RX Unicast**: unicast ingress packets **RX Multicast**: multicast ingress packets **RX Broadcast**: broadcast ingress packets **TCP**: TCP ingress packets **UDP**: UDP ingress packets
Socket Number	If packet type is UDP (or TCP), please specify the socket number here. The socket number can be a range, from low to high. If the socket number is only one, please fill the same number in the low and high fields.
Filter	If packet type is UDP (or TCP), please choose the socket direction (**Destination**/**Source**).
Action	Indicates the action to take when DDOS attacks occur. Possible actions are: **---**: no action **Blocking 1 minute**: blocks the forwarding for 1 minute and log the event **Blocking 10 minute**: blocks the forwarding for 10 minutes and log the event **Blocking**: blocks and logs the event **Shunt Down the Port**: shuts down the port (No Link) and logs the event **Only Log it**: simply logs the event **Reboot Device**: if PoE is supported, the device can be rebooted. The event will be logged.
Status	Indicates the DDOS prevention status. Possible statuses are: **---**: disables DDOS prevention **Analyzing**: analyzes packet throughput for initialization **Running**: analysis completes and ready for next move **Attacked**: DDOS attacks occur

Device Description

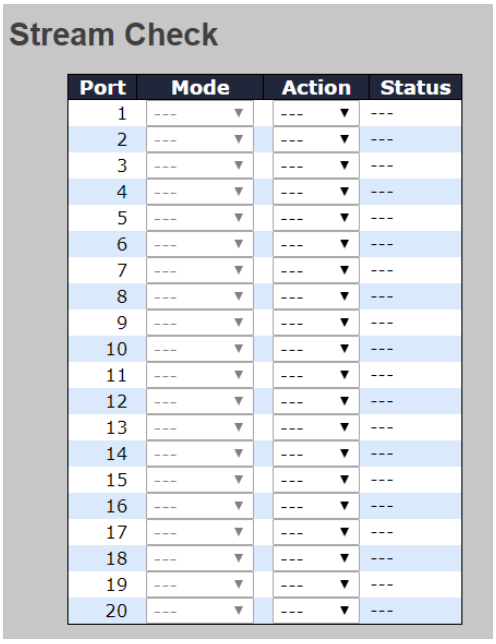
This page allows you to configure device description settings.



Label	Description
Type	Indicates device types. Possible types are: **---** (no specification), **IP Camera**, **IP Phone**, **Access Point**, **PC**, **PLC**, and **Network Video Recorder**
Location Address	Indicates location information of the device. The information can be used for Google Mapping.
Description	Device descriptions

Stream Check

This page allows you to configure stream check settings.

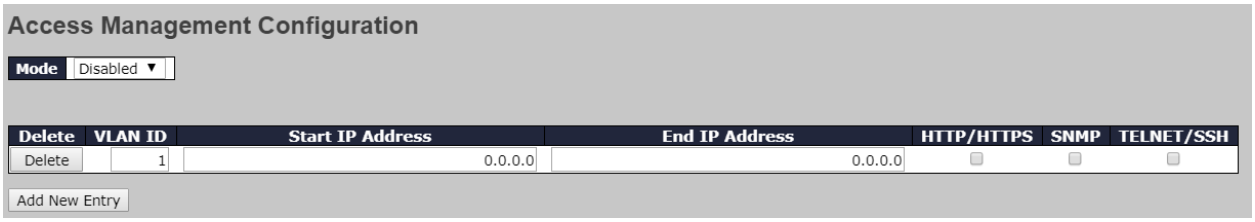


Label	Description

Mode	Enables or disables stream monitoring of the port
Action	Indicates the action to take when the stream gets low. Possible actions are: **---**: no action **Log it**: simply logs the event

1.9.2 Access Management Configuration

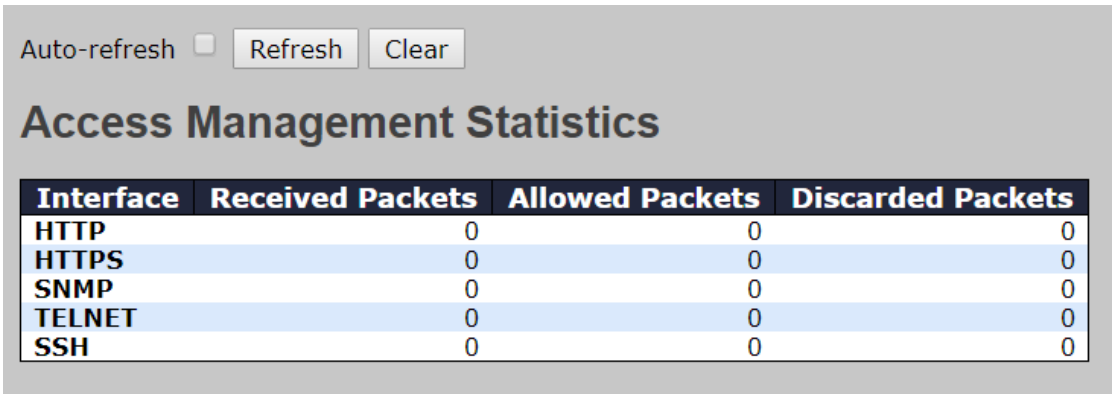
You can configure access management table on this page. If the application's type match any one of the access management entries, it will allow access to the switch.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
VLAN ID	The VLAN ID for the access management entry.
Start IP Address	The start IP address for the access management entry.
End IP Address	The end IP address for the access management entry.
HTTP/HTTPS	The host can access the switch from HTTP/HTTPS interface if the host IP address matches the IP address range provided in the entry.
SNMP	The host can access the switch from SNMP interface if the host IP address matches the IP address range provided in the entry.
TELNET/SSH	The host can access the switch from TELNET/SSH interface if the host IP address matches the IP address range provided in the entry.

Statistics

This page provides an overview of access management configurations.

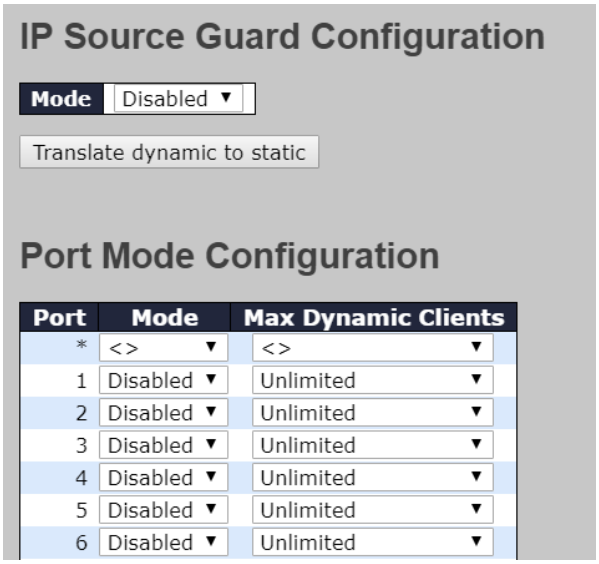


1.9.3 IP Source Guard

IP source guard can prevent traffic attacks if a host tries to use the IP address of its neighbor. You can enable IP source guard when DHCP snooping is enabled on an untrusted interface. With this function enabled, the switch blocks all IP

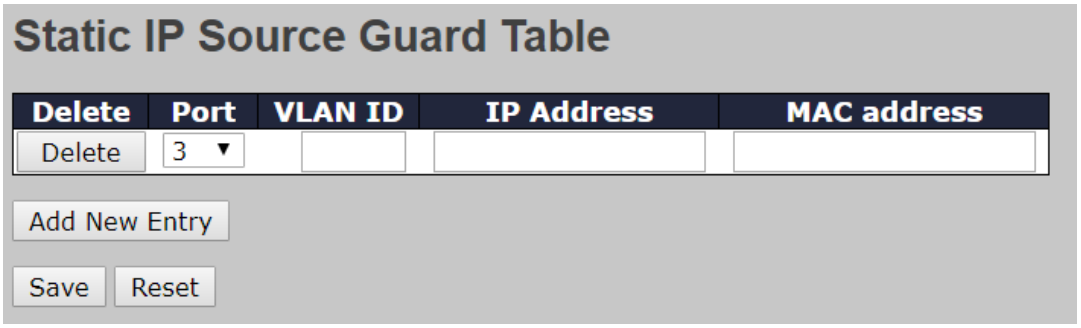
traffic received on the interface except for DHCP packets allowed by DHCP snooping.

Configuration



Label	Description
Mode	Enable or disable this function.
Max Dynamic Clients	Specify the number of clients supported.

Static Table



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
Port	The logical port for the settings.
VLAN ID	The vlan id for the settings.
IP Address	Allowed Source IP address.
MAC Address	Allowed Source MAC address.

Dynamic Table

This page shows entries in the Dynamic IP Source Guard table. The default value is 20.

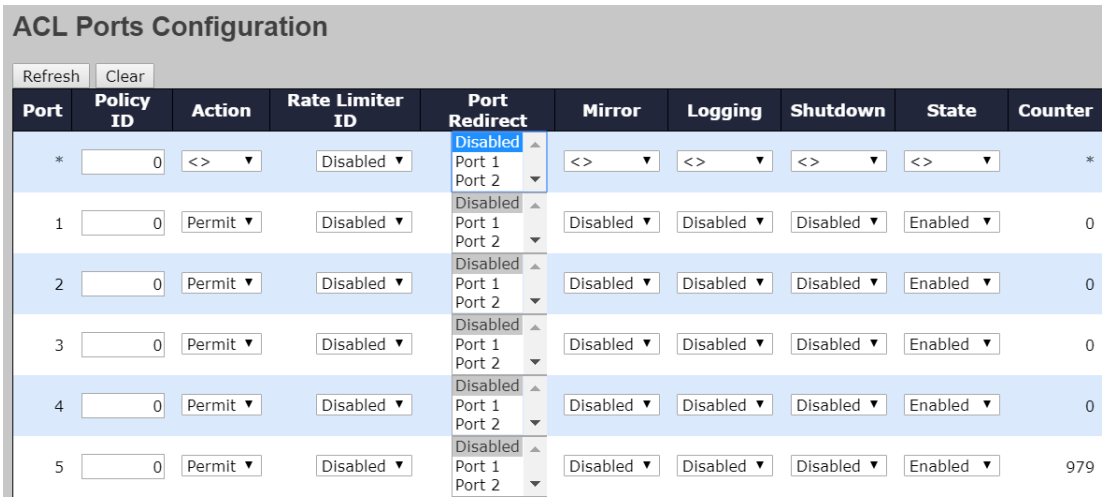
The Start from port address, VLAN, MAC address, and IP address input fields allow you to select the starting point in the table.

Label	Description
Port	The logical port for the settings.
VLAN ID	The vlan id for the settings.
IP Address	Allowed source IP address.
MAC Address	Allowed source MAC address.

1.9.4 ACL

Ports

This page allows you to configure the ACL parameters (ACE) of each switch port. These parameters will affect frames received on a port unless the frame matches a specific ACE.

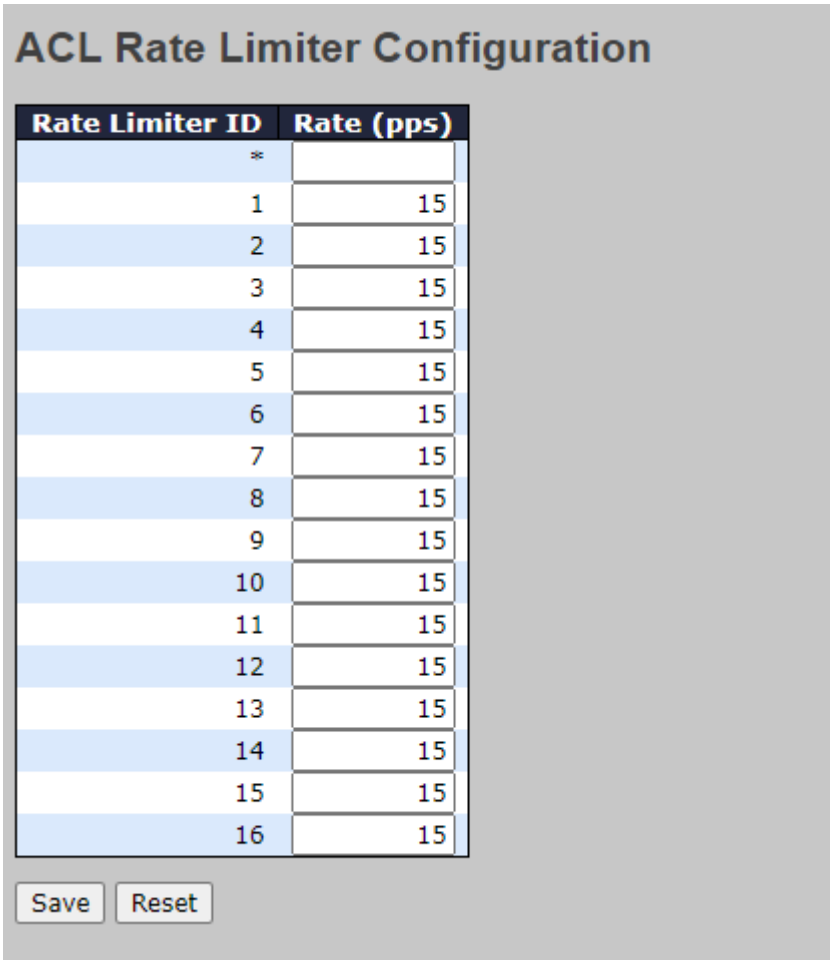


Label	Description
Port	The switch port number to which the following settings will be applied
Policy ID	Select to apply a policy to the port. The allowed values are 1 to 8. The default value is **1**.
Action	Select to **Permit** to permit or **Deny** to deny forwarding. The default value is **Permit**.
Rate Limiter ID	Select a rate limiter for the port. The allowed values are **Disabled** or numbers from 1 to 15. The default value is **Disabled**.
Port Redirect	Indicates the port redirect operation implemented by the ACE. Frames matching the ACE are redirected to the listed port.
Mirror	Select which port frames are copied to. The allowed values are **Disabled** or a specific port number. The default value is **Disabled**.
Logging	Specifies the logging operation of the port. The allowed values are:

	Enabled: frames received on the port are stored in the system log **Disabled**: frames received on the port are not logged The default value is **Disabled**. Please note that system log memory capacity and logging rate is limited.
Shutdown	Specifies the shutdown operation of this port. The allowed values are: **Enabled**: if a frame is received on the port, the port will be disabled. **Disabled**: port shut down is disabled. The default value is **Disabled**.
Counter	Counts the number of frames that match this ACE.

Rate Limiters

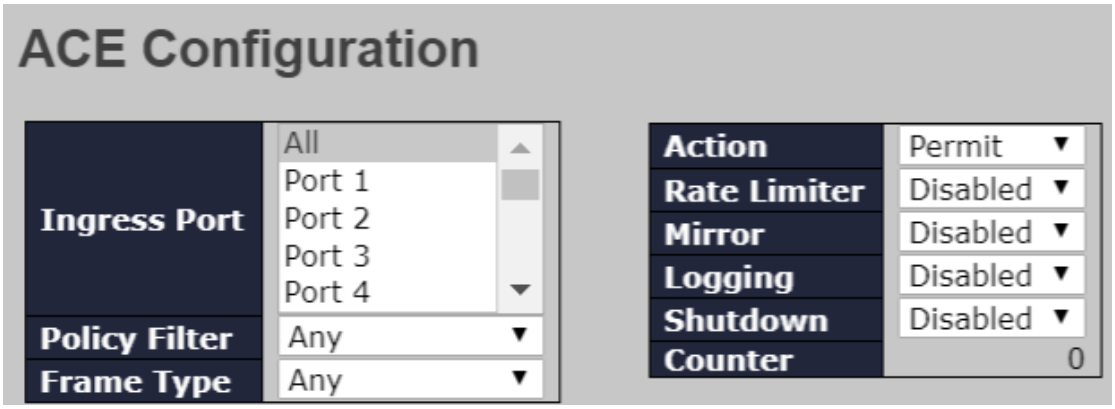
This page allows you to configure the rate limiter for the ACL of the switch.



Label	Description
Rate Limiter ID	The rate limiter ID for the settings contained in the same row.
Rate	The rate unit is packet per second (pps), which can be configured as 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1K, 2K, 4K, 8K, 16K, 32K, 64K, 128K, 256K, 512K, or 1024K. The 1 kpps is actually 1002.1 pps.
Unit	Specify the unit for the rate.

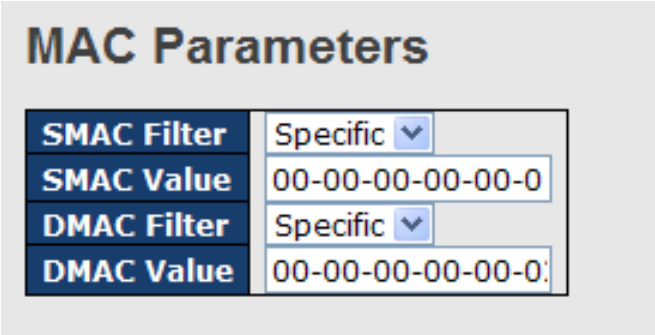
ACL Control List

This page allows you to configure ACE (Access Control Entry). An ACE consists of several parameters. These parameters vary with the frame type you have selected. First select the ingress port for the ACE, and then the frame type. Different parameter options are displayed according to the frame type you have selected. A frame matching the ACE can be configured here.

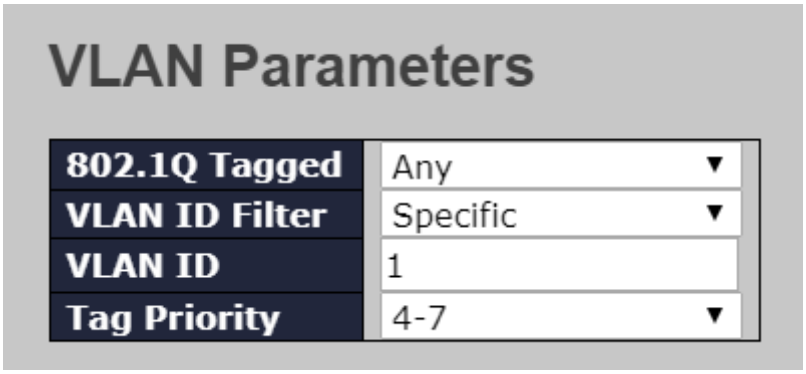


Label	Description
Ingress Port	Indicates the ingress port to which the ACE will apply. **Any**: the ACE applies to any port **Port n**: the ACE applies to this port number, where n is the number of the switch port. **Policy n**: the ACE applies to this policy number, where n can range from 1 to 8.
Frame Type	Indicates the frame type of the ACE. These frame types are mutually exclusive. **Any**: any frame can match the ACE. **Ethernet Type**: only Ethernet type frames can match the ACE. The IEEE 802.3 descripts the value of length/types should be greater than or equal to 1536 decimal (equal to 0600 hexadecimal). **ARP**: only ARP frames can match the ACE. Notice the ARP frames will not match the ACE with Ethernet type. **IPv4**: only IPv4 frames can match the ACE. Notice the IPv4 frames will not match the ACE with Ethernet type.
Action	Specifies the action to take when a frame matches the ACE. Permit: takes action when the frame matches the ACE. Deny: drops the frame matching the ACE.
Rate Limiter	Specifies the rate limiter in number of base units. The allowed range is 1 to 15. **Disabled** means the rate limiter operation is disabled.
Port Copy	Frames matching the ACE are copied to the port number specified here. The allowed range is the same as the switch port number range. Disabled means the port copy operation is disabled.
Logging	Specifies the logging operation of the ACE. The allowed values are: **Enabled**: frames matching the ACE are stored in the system log.

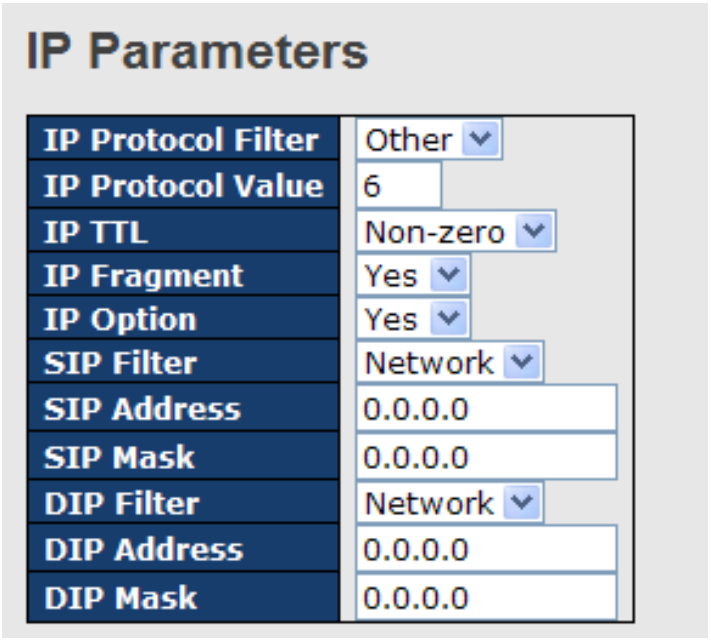
	Disabled: frames matching the ACE are not logged. Please note that system log memory capacity and logging rate is limited.
Shutdown	Specifies the shutdown operation of the ACE. The allowed values are: **Enabled**: if a frame matches the ACE, the ingress port will be disabled. **Disabled**: port shutdown is disabled for the ACE.
Counter	Indicates the number of times the ACE matched by a frame.



Label	Description
SMAC Filter	(Only displayed when the frame type is Ethernet Type or ARP.) Specifies the source MAC filter for the ACE. **Any**: no SMAC filter is specified (SMAC filter status is "**don't-care**"). **Specific**: if you want to filter a specific source MAC address with the ACE, choose this value. A field for entering an SMAC value appears.
SMAC Value	When **Specific** is selected for the SMAC filter, you can enter a specific source MAC address. The legal format is "xx-xx-xx-xx-xx-xx". Frames matching the ACE will use this SMAC value.
DMAC Filter	Specifies the destination MAC filter for this ACE **Any**: no DMAC filter is specified (DMAC filter status is "**don't-care**"). **MC**: frame must be multicast. **BC**: frame must be broadcast. **UC**: frame must be unicast. **Specific**: If you want to filter a specific destination MAC address with the ACE, choose this value. A field for entering a DMAC value appears.
DMAC Value	When **Specific** is selected for the DMAC filter, you can enter a specific destination MAC address. The legal format is "xx-xx-xx-xx-xx-xx". Frames matching the ACE will use this DMAC value.



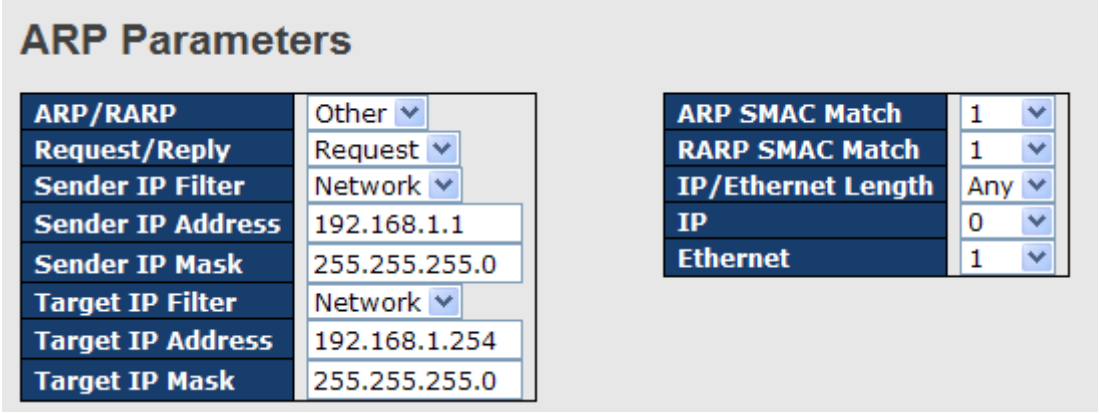
Label	Description
VLAN ID Filter	Specifies the VLAN ID filter for the ACE **Any**: no VLAN ID filter is specified (VLAN ID filter status is "**don't-care**"). **Specific**: if you want to filter a specific VLAN ID with the ACE, choose this value. A field for entering a VLAN ID number appears.
VLAN ID	When **Specific** is selected for the VLAN ID filter, you can enter a specific VLAN ID number. The allowed range is 1 to 4095. Frames matching the ACE will use this VLAN ID value.
Tag Priority	Specifies the tag priority for the ACE. A frame matching the ACE will use this tag priority. The allowed number range is 0 to 7. **Any** means that no tag priority is specified (tag priority is "**don't-care**").



Label	Description
IP Protocol Filter	Specifies the IP protocol filter for the ACE **Any**: no IP protocol filter is specified ("**don't-care**"). **Specific**: if you want to filter a specific IP protocol filter with the ACE, choose this value. A field for entering an IP protocol filter appears. ICMP: selects ICMP to filter IPv4 ICMP protocol frames. Extra fields

	for defining ICMP parameters will appear. For more details of these fields, please refer to the help file. **UDP**: selects UDP to filter IPv4 UDP protocol frames. Extra fields for defining UDP parameters will appear. For more details of these fields, please refer to the help file. **TCP**: selects TCP to filter IPv4 TCP protocol frames. Extra fields for defining TCP parameters will appear. For more details of these fields, please refer to the help file.
IP Protocol Value	**Specific** allows you to enter a specific value. The allowed range is 0 to 255. Frames matching the ACE will use this IP protocol value.
IP TTL	Specifies the time-to-live settings for the ACE **Zero**: IPv4 frames with a time-to-live value greater than zero must not be able to match this entry. **Non-zero**: IPv4 frames with a time-to-live field greater than zero must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
IP Fragment	Specifies the fragment offset settings for the ACE. This includes settings of More Fragments (MF) bit and Fragment Offset (FRAG OFFSET) for an IPv4 frame. **No**: IPv4 frames whose MF bit is set or the FRAG OFFSET field is greater than zero must not be able to match this entry. **Yes**: IPv4 frames whose MF bit is set or the FRAG OFFSET field is greater than zero must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
IP Option	Specifies the options flag settings for the ACE **No**: IPv4 frames whose options flag is set must not be able to match this entry. **Yes**: IPv4 frames whose options flag is set must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
SIP Filter	Specifies the source IP filter for this ACE **Any**: no source IP filter is specified (Source IP filter is "**don't-care**"). **Host**: source IP filter is set to **Host**. Specify the source IP address in the **SIP Address** field that appears. **Network**: source IP filter is set to **Network**. Specify the source IP address and source IP mask in the **SIP Address** and **SIP Mask** fields that appear.
SIP Address	When **Host** or **Network** is selected for the source IP filter, you can enter a specific SIP address in dotted decimal notation.
SIP Mask	When **Network** is selected for the source IP filter, you can enter a specific SIP mask in dotted decimal notation.
DIP Filter	Specifies the destination IP filter for the ACE

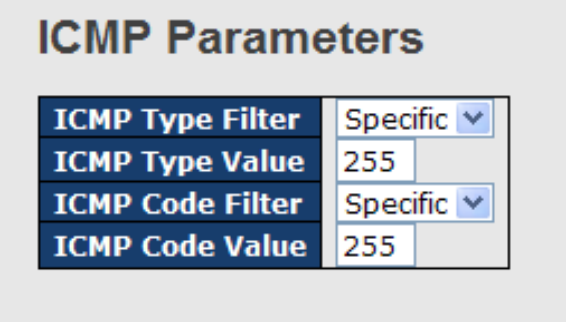
	Any: no destination IP filter is specified (destination IP filter is "**don't-care**"). **Host**: destination IP filter is set to **Host**. Specify the destination IP address in the **DIP Address** field that appears. **Network**: destination IP filter is set to **Network**. Specify the destination IP address and destination IP mask in the **DIP Address** and **DIP Mask** fields that appear.
DIP Address	When **Host** or **Network** is selected for the destination IP filter, you can enter a specific DIP address in dotted decimal notation.
DIP Mask	When **Network** is selected for the destination IP filter, you can enter a specific DIP mask in dotted decimal notation.



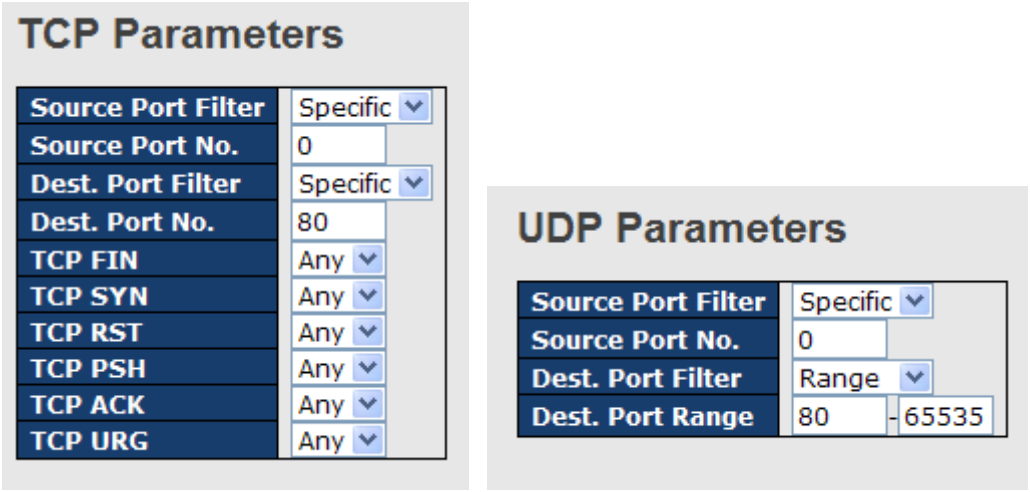
Label	Description
ARP/RARP	Specifies the available ARP/RARP opcode (OP) flag for the ACE **Any**: no ARP/RARP OP flag is specified (OP is "**don't-care**"). **ARP**: frame must have ARP/RARP opcode set to ARP **RARP**: frame must have ARP/RARP opcode set to RARP. **Other**: frame has unknown ARP/RARP Opcode flag.
Request/Reply	Specifies the available ARP/RARP opcode (OP) flag for the ACE **Any**: no ARP/RARP OP flag is specified (OP is "**don't-care**"). **Request**: frame must have ARP Request or RARP Request OP flag set. **Reply**: frame must have ARP Reply or RARP Reply OP flag.
Sender IP Filter	Specifies the sender IP filter for the ACE **Any**: no sender IP filter is specified (sender IP filter is "**don't-care**"). **Host**: sender IP filter is set to **Host**. Specify the sender IP address in the **SIP Address** field that appears. **Network**: sender IP filter is set to **Network**. Specify the sender IP address and sender IP mask in the **SIP Address** and **SIP Mask** fields that appear.

Sender IP Address	When Host or Network is selected for the sender IP filter, you can enter a specific sender IP address in dotted decimal notation.
Sender IP Mask	When Network is selected for the sender IP filter, you can enter a specific sender IP mask in dotted decimal notation.
Target IP Filter	Specifies the target IP filter for the specific ACE **Any**: no target IP filter is specified (target IP filter is "**don't-care**"). **Host**: target IP filter is set to **Host**. Specify the target IP address in the **Target IP Address** field that appears. **Network**: target IP filter is set to **Network**. Specify the target IP address and target IP mask in the **Target IP Address** and **Target IP Mask** fields that appear.
Target IP Address	When **Host** or **Network** is selected for the target IP filter, you can enter a specific target IP address in dotted decimal notation.
Target IP Mask	When **Network** is selected for the target IP filter, you can enter a specific target IP mask in dotted decimal notation.
ARP SMAC Match	Specifies whether frames will meet the action according to their sender hardware address field (SHA) settings. **0**: ARP frames where SHA is not equal to the SMAC address **1**: ARP frames where SHA is equal to the SMAC address **Any**: any value is allowed ("**don't-care**").
RARP SMAC Match	Specifies whether frames will meet the action according to their target hardware address field (THA) settings. **0**: RARP frames where THA is not equal to the SMAC address **1**: RARP frames where THA is equal to the SMAC address **Any**: any value is allowed ("**don't-care**")
IP/Ethernet Length	Specifies whether frames will meet the action according to their ARP/RARP hardware address length (HLN) and protocol address length (PLN) settings. **0**: ARP/RARP frames where the HLN is equal to Ethernet (0x06) and the (PLN) is equal to IPv4 (0x04) must not match this entry. **1**: ARP/RARP frames where the HLN is equal to Ethernet (0x06) and the (PLN) is equal to IPv4 (0x04) must match this entry. **Any**: any value is allowed ("**don't-care**").
IP	Specifies whether frames will meet the action according to their ARP/RARP hardware address space (HRD) settings. **0**: ARP/RARP frames where the HLD is equal to Ethernet (1) must not match this entry.

	1: ARP/RARP frames where the HLD is equal to Ethernet (1) must match this entry. **Any**: any value is allowed ("**don't-care**").
Ethernet	Specifies whether frames will meet the action according to their ARP/RARP protocol address space (PRO) settings. **0**: ARP/RARP frames where the PRO is equal to IP (0x800) must not match this entry. **1**: ARP/RARP frames where the PRO is equal to IP (0x800) must match this entry. **Any**: any value is allowed ("**don't-care**").



Label	Description
ICMP Type Filter	Specifies the ICMP filter for the ACE **Any**: no ICMP filter is specified (ICMP filter status is "**don't-care**"). **Specific**: if you want to filter a specific ICMP filter with the ACE, you can enter a specific ICMP value. A field for entering an ICMP value appears.
ICMP Type Value	When **Specific** is selected for the ICMP filter, you can enter a specific ICMP value. The allowed range is 0 to 255. A frame matching the ACE will use this ICMP value.
ICMP Code Filter	Specifies the ICMP code filter for the ACE **Any**: no ICMP code filter is specified (ICMP code filter status is "**don't-care**"). **Specific**: if you want to filter a specific ICMP code filter with the ACE, you can enter a specific ICMP code value. A field for entering an ICMP code value appears.
ICMP Code Value	When **Specific** is selected for the ICMP code filter, you can enter a specific ICMP code value. The allowed range is 0 to 255. A frame matching the ACE will use this ICMP code value.



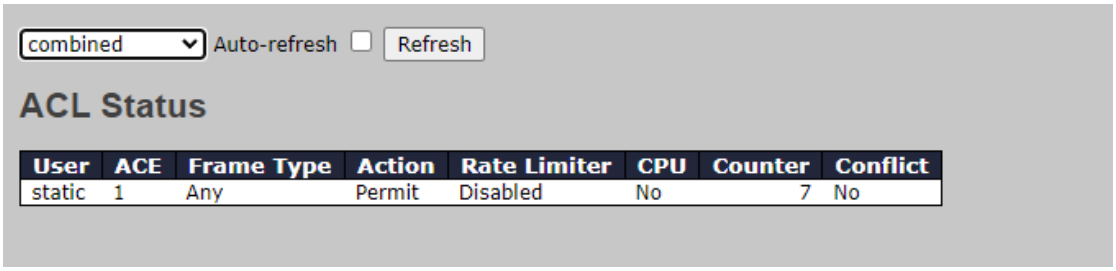
Label	Description
TCP/UDP Source Filter	Specifies the TCP/UDP source filter for the ACE **Any**: no TCP/UDP source filter is specified (TCP/UDP source filter status is "**don't-care**"). **Specific**: if you want to filter a specific TCP/UDP source filter with the ACE, you can enter a specific TCP/UDP source value. A field for entering a TCP/UDP source value appears. **Range**: if you want to filter a specific TCP/UDP source range filter with the ACE, you can enter a specific TCP/UDP source range. A field for entering a TCP/UDP source value appears.
TCP/UDP Source No.	When **Specific** is selected for the TCP/UDP source filter, you can enter a specific TCP/UDP source value. The allowed range is 0 to 65535. A frame matching the ACE will use this TCP/UDP source value.
TCP/UDP Source Range	When **Range** is selected for the TCP/UDP source filter, you can enter a specific TCP/UDP source range value. The allowed range is 0 to 65535. A frame matching the ACE will use this TCP/UDP source value.
TCP/UDP Destination Filter	Specifies the TCP/UDP destination filter for the ACE **Any**: no TCP/UDP destination filter is specified (TCP/UDP destination filter status is "**don't-care**"). **Specific**: if you want to filter a specific TCP/UDP destination filter with the ACE, you can enter a specific TCP/UDP destination value. A field for entering a TCP/UDP destination value appears. **Range**: if you want to filter a specific range TCP/UDP destination filter with the ACE, you can enter a specific TCP/UDP destination range. A field for entering a TCP/UDP destination value appears.
TCP/UDP Destination Number	When **Specific** is selected for the TCP/UDP destination filter, you can enter a specific TCP/UDP destination value. The allowed range is 0 to 65535. A frame matching the ACE will use this TCP/UDP

	destination value.
TCP/UDP Destination Range	When **Range** is selected for the TCP/UDP destination filter, you can enter a specific TCP/UDP destination range value. The allowed range is 0 to 65535. A frame matching the ACE will use this TCP/UDP destination value.
TCP FIN	Specifies the TCP FIN ("no more data from sender") value for the ACE. **0**: TCP frames where the FIN field is set must not be able to match this entry. **1**: TCP frames where the FIN field is set must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
TCP SYN	Specifies the TCP SYN ("synchronize sequence numbers") value for the ACE **0**: TCP frames where the SYN field is set must not be able to match this entry. **1**: TCP frames where the SYN field is set must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
TCP PSH	Specifies the TCP PSH ("push function") value for the ACE **0**: TCP frames where the PSH field is set must not be able to match this entry. **1**: TCP frames where the PSH field is set must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
TCP ACK	Specifies the TCP ACK ("acknowledgment field significant") value for the ACE **0**: TCP frames where the ACK field is set must not be able to match this entry. **1**: TCP frames where the ACK field is set must be able to match this entry. **Any**: any value is allowed ("**don't-care**").
TCP URG	Specifies the TCP URG ("urgent pointer field significant") value for the ACE **0**: TCP frames where the URG field is set must not be able to match this entry. **1**: TCP frames where the URG field is set must be able to match this entry. **Any**: any value is allowed ("**don't-care**").

ACL Status

This page shows the ACL status by different ACL users. Each row describes the ACE that is defined. It is a conflict if a

specific ACE is not applied to the hardware due to hardware limitations. The maximum number of ACEs is 512 on each switch.

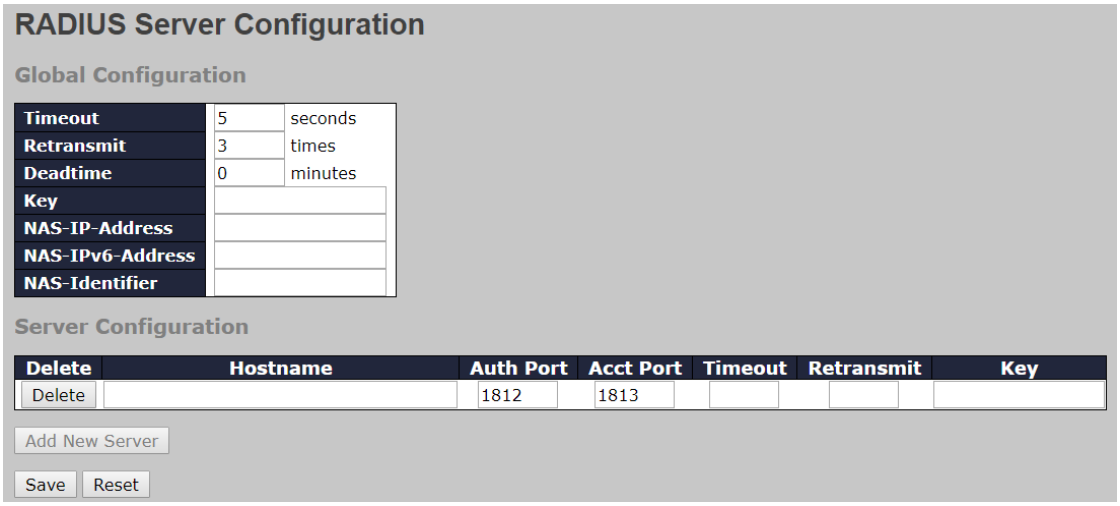


Label	Description
User	Indicates the ACL user.
ACE	Indicates the ACE ID on local switch.
Frame Type	Indicates the frame type of the ACE. Possible values are: **Any:** The ACE will match any frame type. **EType:** The ACE will match Ethernet Type frames. Note that an Ethernet Type based ACE will not get matched by IP and ARP frames. **ARP:** The ACE will match ARP/RARP frames. **IPv4:** The ACE will match all IPv4 frames. **IPv4/ICMP:** The ACE will match IPv4 frames with ICMP protocol. **IPv4/UDP:** The ACE will match IPv4 frames with UDP protocol. **IPv4/TCP:** The ACE will match IPv4 frames with TCP protocol. **IPv4/Other:** The ACE will match IPv4 frames, which are not ICMP/UDP/TCP. **IPv6:** The ACE will match all IPv6 standard frames.
Action	Indicates the forwarding action of the ACE. **Permit:** Frames matching the ACE may be forwarded and learned. **Deny:** Frames matching the ACE are dropped.
Rate Limiter	Indicates the rate limiter number of the ACE. The allowed range is 1 to 16. When Disabled is displayed, the rate limiter operation is disabled.
CPU	Forward packet that matched the specific ACE to CPU.
Counter	The counter indicates the number of times the ACE was hit by a frame.
Conflict	Indicates the hardware status of the specific ACE. The specific ACE is not applied to the hardware due to hardware limitations.

1.9.5 AAA

Common Server Configurations

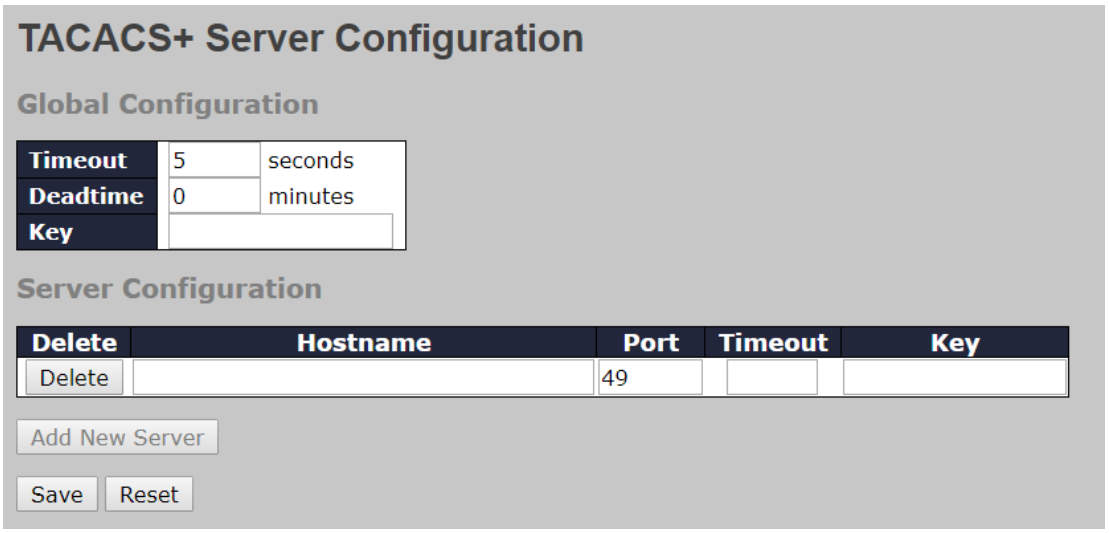
This page allows you to configure authentication servers.



Label	Description
Timeout	The timeout, which can be set to a number between 3 and 3600 seconds, is the maximum time to wait for a reply from a server. If the server does not reply within this time frame, we will consider it to be dead and continue with the next enabled server (if any). RADIUS servers are using the UDP protocol, which is unreliable by design. In order to cope with lost frames, the timeout interval is divided into 3 subintervals of equal length. If a reply is not received within the subinterval, the request is transmitted again. This algorithm causes the RADIUS server to be queried up to 3 times before it is considered to be dead.
Retransmit	The number of times the switch tries to connect to a RADIUS server.
Dead Time	The dead time, which can be set to a number between 0 and 3600 seconds, is the period during which the switch will not send new requests to a server that has failed to respond to a previous request. This will stop the switch from continually trying to contact a server that it has already determined as dead. Setting the dead time to a value greater than 0 (zero) will enable this feature, but only if more than one server has been configured.
NAS-IP-Address	Indicates the identifying IP Address of the NAS which is requesting authentication of the user, and SHOULD be unique to the NAS within the scope of the RADIUS server.
NAS-ID	Network Access Server identifier (NAS-ID) for the interface. The NAS-ID is sent to the RADIUS server by the controller (as a RADIUS client) using the authentication request, which is used to classify users to different groups. You can enter up to 32 alphanumeric characters.

Delete	Click to delete an entry from the table.
Hostname	Specifies the host name of the RADIUS server. The maximum supported length for the AAA RADIUS hostname is 40 characters.
Auth Port	The authentication port which specifies the UDP port used to connect the RADIUS server for authentication. The default is 1812.
Acct Port	The UDP port to use on the RADIUS accounting server. If the port is set to 0 (zero), the default port (1813) is used on the RADIUS accounting server.
Key	The shared secret between the switch and the RADIUS server.
Timeout	The time to wait for the RADIUS server to respond.
Retransmit	The number of times the switch tries to connect to a RADIUS server.

1.9.6 TACACS+



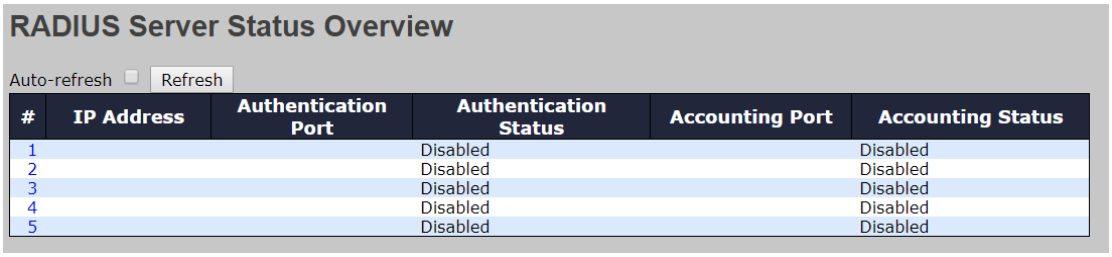
Label	Description
Timeout	The timeout, which can be set to a number between 3 and 3600 seconds, is the maximum time to wait for a reply from a server. If the server does not reply within this time frame, we will consider it to be dead and continue with the next enabled server (if any). TACACS+ servers are using the UDP protocol, which is unreliable by design. In order to cope with lost frames, the timeout interval is divided into 3 subintervals of equal length. If a reply is not received within the subinterval, the request is transmitted again. This algorithm causes the RADIUS server to be queried up to 3 times before it is considered to be dead.
Dead Time	The dead time, which can be set to a number between 0 and

	3600 seconds, is the period during which the switch will not send new requests to a server that has failed to respond to a previous request. This will stop the switch from continually trying to contact a server that it has already determined as dead. Setting the dead time to a value greater than 0 (zero) will enable this feature, but only if more than one server has been configured.
Key	The shared secret between the switch and the TACACS+ server.
Hostname	Specifies the host name of the TACACS+ server. The maximum supported length for the AAA RADIUS hostname is 40 characters.
Timeout	The time to wait for the TACACS+ server to respond.
Key	The shared secret between the switch and the TACACS+ server.

1.9.7 RADIUS

Authentication and Accounting Server Configurations

This page provides an overview of the status of the RADIUS servers configurable on the authentication configuration page.

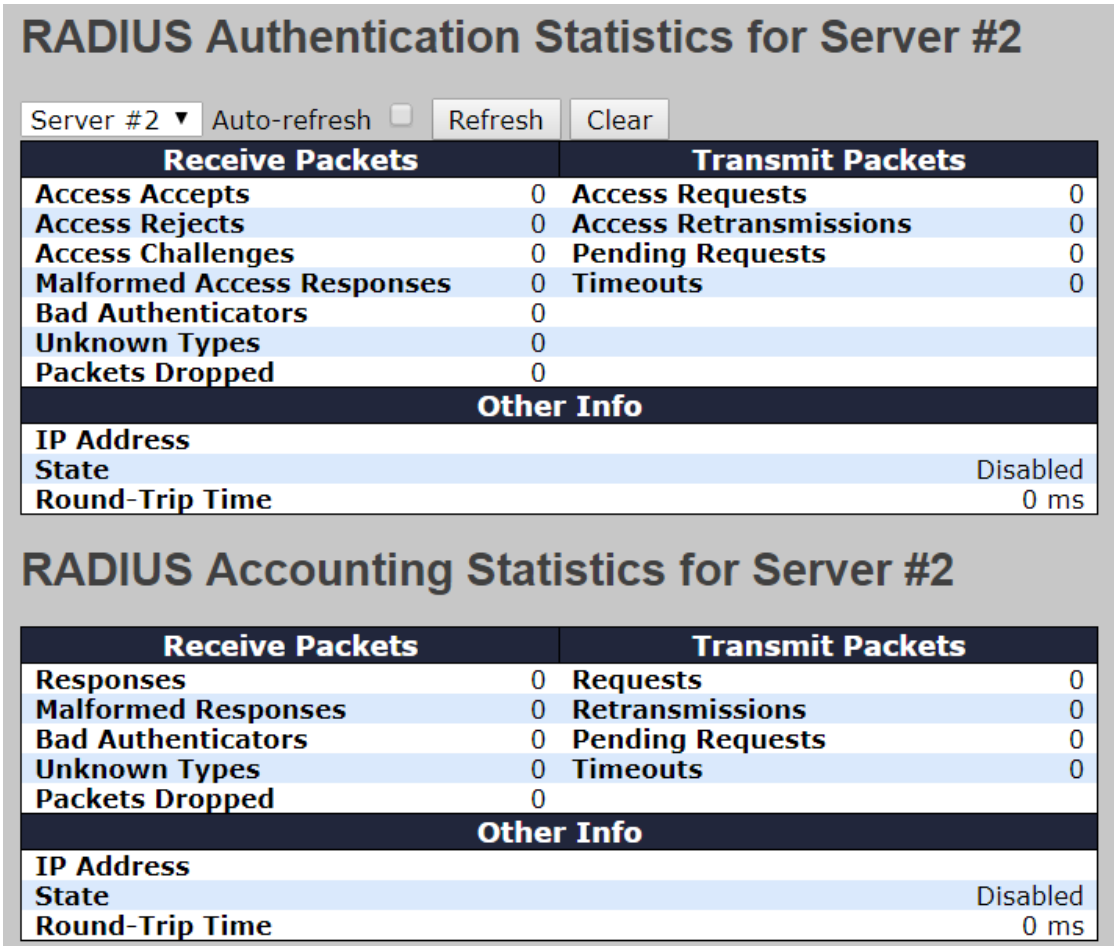


Label	Description
#	The RADIUS server number. Click to navigate to detailed statistics of the server
IP Address	The IP address and UDP port number (in <IP Address>:<UDP Port> notation) of the server
Status	The current status of the server. This field has one of the following values: **Disabled**: the server is disabled. **Not Ready**: the server is enabled, but IP communication is not yet up and running. **Ready**: the server is enabled, IP communications are built, and the RADIUS module is ready to accept access attempts. **Dead** (X seconds left): access attempts are made to this server, but it does not reply within the configured timeout. The server has temporarily been disabled, but will be re-enabled when the dead-time

	expires. The number of seconds left before this occurs is displayed in parentheses. This state is only reachable when more than one server is enabled.

RADIUS Details

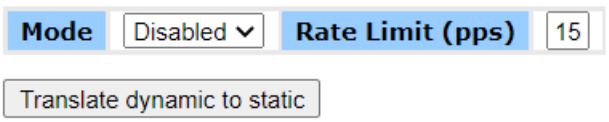
This page shows the access statistics of the authentication and accounting servers. Use the server drop-down list to switch between the backend servers to show related details.



1.9.8 ARP Inspection (only for Layer 3 Model)

This page provides ARP Inspection related configuration.

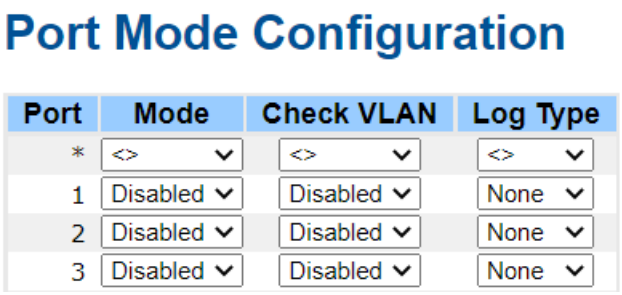
Configuration



Label	Description
Mode	Enable the Global ARP Inspection or disable the Global ARP Inspection.
Rate Limit (PPS	The Rate Limit for ARP Inspection. The valid rate is 0-131071 in pps.

Port Mode Configuration

Specify ARP Inspection is enabled on which ports. Only when both Global Mode and Port Mode on a given port are enabled, ARP Inspection is enabled on this given port. Possible modes are:



Label	Description
Port Mode Configuration	**Enabled:** Enable ARP Inspection operation. **Disabled:** Disable ARP Inspection operation. If you want to inspect the VLAN configuration, you have to enable the setting of "Check VLAN". The default setting of "Check VLAN" is disabled. When the setting of "Check VLAN" is disabled, the log type of ARP Inspection will refer to the port setting. And the setting of "Check VLAN" is enabled, the log type of ARP Inspection will refer to the VLAN setting. Possible setting of "Check VLAN" are: **Enabled:** Enable check VLAN operation. **Disabled:** Disable check VLAN operation. Only the Global Mode and Port Mode on a given port are enabled, and the setting of "Check VLAN" is disabled, the log type of ARP Inspection will refer to the port setting. There are four log types and possible types are: **None:** Log nothing. **Deny:** Log denied entries. **Permit:** Log permitted entries. **ALL:** Log all entries. Buttons

1.9.9 NAS (802.1x)

This page allows you to configure the IEEE 802.1X and MAC-based authentication system and port settings.

The IEEE 802.1X standard defines a port-based access control procedure that prevents unauthorized access to a

network by requiring users to first submit credentials for authentication. One or more central servers (the backend servers) determine whether the user is allowed access to the network. These backend (RADIUS) servers are configured on the authentication configuration page.

MAC-based authentication allows for authentication of more than one user on the same port, and does not require the users to have special 802.1X software installed on their system. The switch uses the users' MAC addresses to authenticate against the backend server. As intruders can create counterfeit MAC addresses, MAC-based authentication is less secure than 802.1X authentication.

Overview of 802.1X (Port-Based) Authentication

In an 802.1X network environment, the user is called the supplicant, the switch is the authenticator, and the RADIUS server is the authentication server. The switch acts as the man-in-the-middle, forwarding requests and responses between the supplicant and the authentication server. Frames sent between the supplicant and the switch are special 802.1X frames, known as EAPOL (EAP Over LANs) frames which encapsulate EAP PDUs (RFC3748). Frames sent between the switch and the RADIUS server are RADIUS packets. RADIUS packets also encapsulate EAP PDUs together with other attributes like the switch's IP address, name, and the supplicant's port number on the switch. EAP is very flexible as it allows for different authentication methods, like MD5-Challenge, PEAP, and TLS. The important thing is that the authenticator (the switch) does not need to know which authentication method the supplicant and the authentication server are using, or how many information exchange frames are needed for a particular method. The switch simply encapsulates the EAP part of the frame into the relevant type (EAPOL or RADIUS) and forwards it.

When authentication is complete, the RADIUS server sends a special packet containing a success or failure indication. Besides forwarding the result to the supplicant, the switch uses it to open up or block traffic on the switch port connected to the supplicant.

Note: in an environment where two backend servers are enabled, the server timeout is configured to X seconds (using the authentication configuration page), and the first server in the list is currently down (but not considered dead), if the supplicant retransmits EAPOL Start frames at a rate faster than X seconds, it will never be authenticated because the switch will cancel on-going backend authentication server requests whenever it receives a new EAPOL Start frame from the supplicant. Since the server has not failed (because the X seconds have not expired), the same server will be contacted when the next backend authentication server request from the switch. This scenario will loop forever. Therefore, the server timeout should be smaller than the supplicant's EAPOL Start frame retransmission rate.

Overview of MAC-Based Authentication

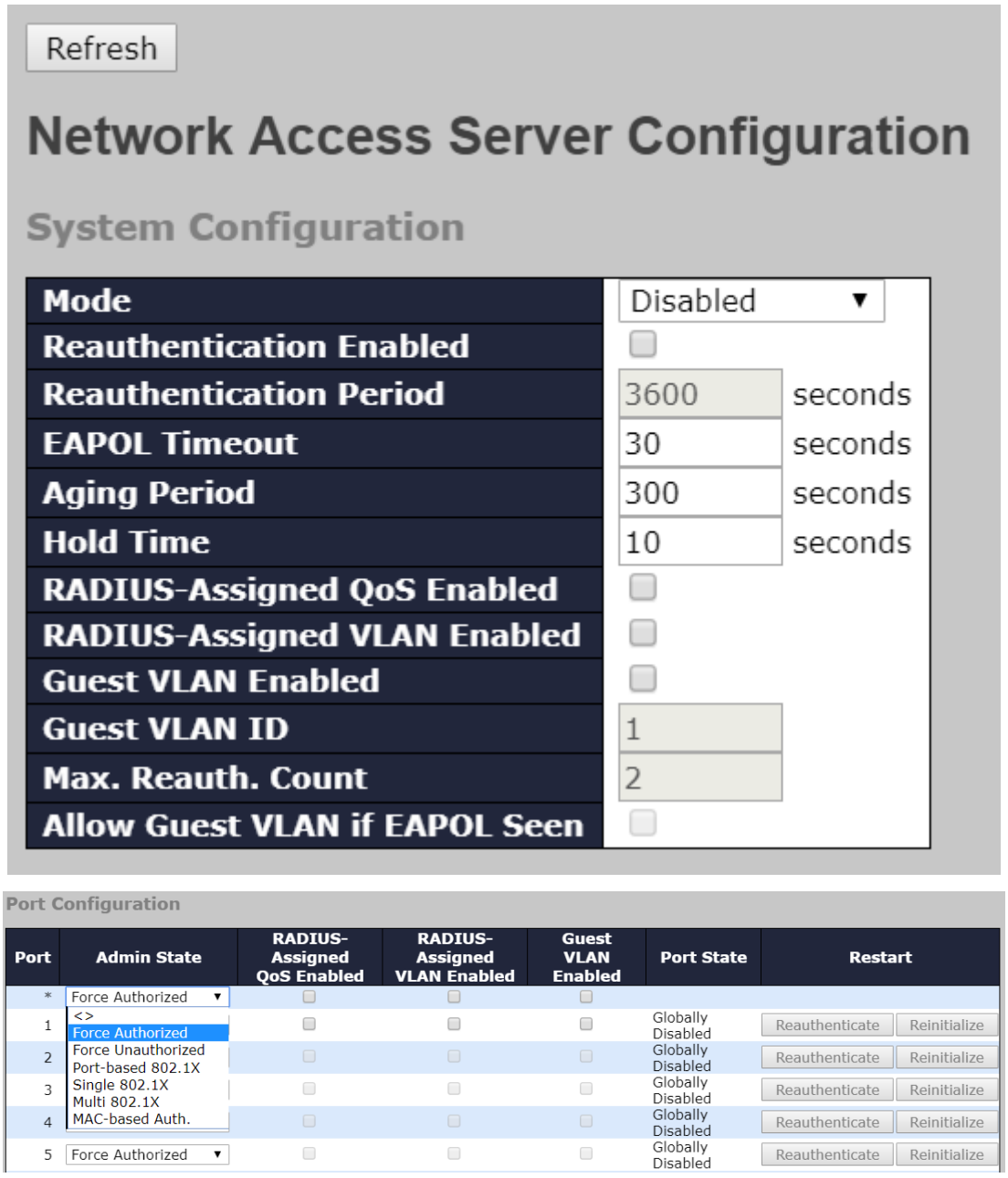
Unlike 802.1X, MAC-based authentication is not a standard, but merely a best-practices method adopted by the industry. In MAC-based authentication, users are called clients, and the switch acts as the supplicant on behalf of clients. The initial frame (any kind of frame) sent by a client is snooped by the switch, which in turn uses the client's MAC address as both username and password in the subsequent EAP exchange with the RADIUS server. The 6-byte MAC address is converted to a string in the following form "xx-xx-xx-xx-xx-xx", that is, a dash (-) is used as separator between the lower-cased hexadecimal digits. The switch only supports the MD5-Challenge authentication method, so the RADIUS server must be configured accordingly.

When authentication is complete, the RADIUS server sends a success or failure indication, which in turn causes the

switch to open up or block traffic for that particular client, using static entries into the MAC Table. Only then will frames from the client be forwarded on the switch. There are no EAPOL frames involved in this authentication, and therefore, MAC-based authentication has nothing to do with the 802.1X standard.

The advantage of MAC-based authentication over 802.1X is that several clients can be connected to the same port (e.g. through a 3rd party switch or a hub) and still require individual authentication, and that the clients do npt need special supplicant software to authenticate. The disadvantage is that MAC addresses can be spoofed by malicious users, equipment whose MAC address is a valid RADIUS user can be used by anyone, and only the MD5-Challenge method is supported.

802.1X and MAC-Based authentication configurations consist of two sections: system- and port-wide.



Label	Description
Mode	Indicates if 802.1X and MAC-based authentication is globally

	enabled or disabled on the switch. If globally disabled, all ports are allowed to forward frames.
Reauthentication Enabled	If checked, clients are reauthenticated after the interval specified by the Reauthentication Period. Reauthentication for 802.1X-enabled ports can be used to detect if a new device is plugged into a switch port. For MAC-based ports, reauthentication is only useful if the RADIUS server configuration has changed. It does not involve communication between the switch and the client, and therefore does not imply that a client is still present on a port (see Age Period below).
Reauthentication Period	Determines the period, in seconds, after which a connected client must be re-authenticated. This is only active if the **Reauthentication Enabled** checkbox is checked. Valid range of the value is 1 to 3600 seconds.
EAPOL Timeout	Determines the time for retransmission of Request Identity EAPOL frames. Valid range of the value is 1 to 65535 seconds. This has no effect for MAC-based ports.
Age Period	This setting applies to the following modes, i.e. modes using the **Port Security** functionality to secure MAC addresses: **MAC-Based Auth**.: When the NAS module uses the Port Security module to secure MAC addresses, the Port Security module needs to check for activity on the MAC address in question at regular intervals and free resources if no activity is seen within a given period of time. This parameter controls exactly this period and can be set to a number between 10 and 1000000 seconds. For ports in **MAC-based Auth.** mode, reauthentication does not cause direct communications between the switch and the client, so this will not detect whether the client is still attached or not, and the only way to free any resources is to age the entry.
Hold Time	This setting applies to the following modes, i.e. modes using the **Port Security** functionality to secure MAC addresses: **MAC-Based Auth**.: If a client is denied access - either because the RADIUS server denies the client access or because the RADIUS server request times out (according to the timeout specified on the "**Configuration→Security→AAA**" page) - the client is put on hold in Unauthorized state. The hold timer does not count during an on-going authentication. The switch will ignore new frames coming from the client during

	the hold time. The hold time can be set to a number between 10 and 1000000 seconds.
Port	The port number for which the configuration below applies
Admin State	If NAS is globally enabled, this selection controls the port's authentication mode. The following modes are available: **Force Authorized** In this mode, the switch will send one EAPOL Success frame when the port link is up, and any client on the port will be allowed network access without authentication. **Force Unauthorized** In this mode, the switch will send one EAPOL Failure frame when the port link is up, and any client on the port will be disallowed network access. **Port-based 802.1X** In an 802.1X network environment, the user is called the supplicant, the switch is the authenticator, and the RADIUS server is the authentication server. The authenticator acts as the man-in-the-middle, forwarding requests and responses between the supplicant and the authentication server. Frames sent between the supplicant and the switch are special 802.1X frames, known as EAPOL (EAP Over LANs) frames which encapsulate EAP PDUs (RFC3748). Frames sent between the switch and the RADIUS server is RADIUS packets. RADIUS packets also encapsulate EAP PDUs together with other attributes like the switch's IP address, name, and the supplicant's port number on the switch. EAP is very flexible as it allows for different authentication methods, like MD5-Challenge, PEAP, and TLS. The important thing is that the authenticator (the switch) does not need to know which authentication method the supplicant and the authentication server are using, or how many information exchange frames are needed for a particular method. The switch simply encapsulates the EAP part of the frame into the relevant type (EAPOL or RADIUS) and forwards it. When authentication is complete, the RADIUS server sends a special packet containing a success or failure indication. Besides forwarding the result to the supplicant, the switch uses it to open up or block traffic on the switch port connected to the supplicant. Note: in an environment where two backend servers are enabled, the server timeout is configured to X seconds (using the authentication configuration page), and the first server in the list is

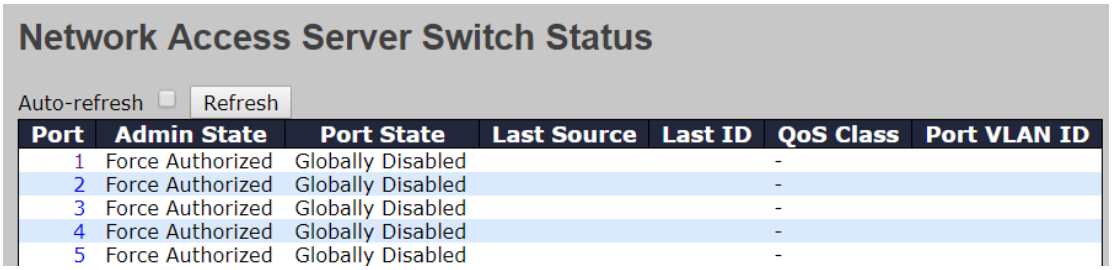
	currently down (but not considered dead), if the supplicant retransmits EAPOL Start frames at a rate faster than X seconds, it will never be authenticated because the switch will cancel on-going backend authentication server requests whenever it receives a new EAPOL Start frame from the supplicant. Since the server has not failed (because the X seconds have not expired), the same server will be contacted when the next backend authentication server request from the switch This scenario will loop forever. Therefore, the server timeout should be smaller than the supplicant's EAPOL Start frame retransmission rate. **a. Single 802.1X** In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access even though they are not authenticated individually. To overcome this security breach, use the Single 802.1X variant. Single 802.1X is not yet an IEEE standard, but features many of the same characteristics as port-based 802.1X. In Single 802.1X, at most one supplicant can get authenticated on the port at a time. Normal EAPOL frames are used in the communications between the supplicant and the switch. If more than one supplicant are connected to a port, the one that comes first when the port's link is connected will be the first one considered. If that supplicant does not provide valid credentials within a certain amount of time, the chance will be given to another supplicant. Once a supplicant is successfully authenticated, only that supplicant will be allowed access. This is the most secure of all the supported modes. In this mode, the Port Security module is used to secure a supplicant's MAC address once successfully authenticated. **b. Multi 802.1X** In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access even though they are not authenticated individually. To overcome this security breach, use the Multi 802.1X variant. Multi 802.1X is not yet an IEEE standard, but features many of the same characteristics as port-based 802.1X. In Multi 802.1X, one or more supplicants can be authenticated on the same port at the

	same time. Each supplicant is authenticated individually and secured in the MAC table using the Port Security module. In Multi 802.1X it is not possible to use the multicast BPDU MAC address as the destination MAC address for EAPOL frames sent from the switch to the supplicant, since that would cause all supplicants attached to the port to reply to requests sent from the switch. Instead, the switch uses the supplicant's MAC address, which is obtained from the first EAPOL Start or EAPOL Response Identity frame sent by the supplicant. An exception to this is when no supplicants are attached. In this case, the switch sends EAPOL Request Identity frames using the BPDU multicast MAC address as destination - to wake up any supplicants that might be on the port. The maximum number of supplicants that can be attached to a port can be limited using the Port Security Limit Control functionality. **MAC-based Auth.** Unlike port-based 802.1X, MAC-based authentication is not a standard, but merely a best-practices method adopted by the industry. In MAC-based authentication, users are called clients, and the switch acts as the supplicant on behalf of clients. The initial frame (any kind of frame) sent by a client is snooped by the switch, which in turn uses the client's MAC address as both username and password in the subsequent EAP exchange with the RADIUS server. The 6-byte MAC address is converted to a string in the following form "xx-xx-xx-xx-xx-xx", that is, a dash (-) is used as separator between the lower-cased hexadecimal digits. The switch only supports the MD5-Challenge authentication method, so the RADIUS server must be configured accordingly. When authentication is complete, the RADIUS server sends a success or failure indication, which in turn causes the switch to open up or block traffic for that particular client, using the Port Security module. Only then will frames from the client be forwarded on the switch. There are no EAPOL frames involved in this authentication, and therefore, MAC-based authentication has nothing to do with the 802.1X standard. The advantage of MAC-based authentication over port-based 802.1X is that several clients can be connected to the same port (e.g. through a 3rd party switch or a hub) and still require individual authentication, and that the clients don't need special supplicant software to authenticate. The advantage of MAC-based authentication over 802.1X-based authentication is

	that the clients do not need special supplicant software to authenticate. The disadvantage is that MAC addresses can be spoofed by malicious users - equipment whose MAC address is a valid RADIUS user can be used by anyone. Also, only the MD5-Challenge method is supported. The maximum number of clients that can be attached to a port can be limited using the Port Security Limit Control functionality.
Port State	The current state of the port. It can undertake one of the following values: **Globally Disabled**: NAS is globally disabled. **Link Down**: NAS is globally enabled, but there is no link on the port. **Authorized**: the port is in Force Authorized or a single-supplicant mode and the supplicant is authorized. **Unauthorized:** the port is in Force Unauthorized or a single-supplicant mode and the supplicant is not successfully authorized by the RADIUS server. **X Auth/Y Unauth**: the port is in a multi-supplicant mode. Currently X clients are authorized and Y are unauthorized.
Restart	Two buttons are available for each row. The buttons are only enabled when authentication is globally enabled and the port's Admin State is in an EAPOL-based or MAC-based mode. Clicking these buttons will not cause settings changed on the page to take effect. **Reauthenticate**: schedules a reauthentication whenever the quiet-period of the port runs out (EAPOL-based authentication). For MAC-based authentication, reauthentication will be attempted immediately. The button only has effect on successfully authenticated clients on the port and will not cause the clients to be temporarily unauthorized. **Reinitialize**: forces a reinitialization of the clients on the port and hence a reauthentication immediately. The clients will transfer to the unauthorized state while the reauthentication is in progress.

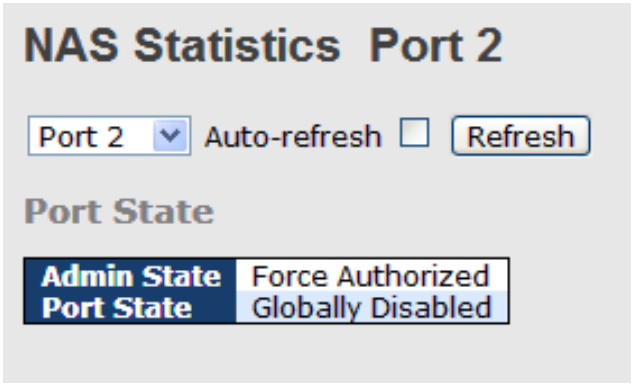
Switch

This page provides an overview of the current NAS port states.



Label	Description
Port	The switch port number. Click to navigate to detailed 802.1X statistics of each port.
Admin State	The port's current administrative state. Refer to **NAS Admin State** for more details regarding each value.
Port State	The current state of the port. Refer to **NAS Port State** for more details regarding each value.
Last Source	The source MAC address carried in the most recently received EAPOL frame for EAPOL-based authentication, and the most recently received frame from a new client for MAC-based authentication.
Last ID	The user name (supplicant identity) carried in the most recently received Response Identity EAPOL frame for EAPOL-based authentication, and the source MAC address from the most recently received frame from a new client for MAC-based authentication.
QoS Class	Shows the level of QoS.

This page provides detailed IEEE 802.1X statistics for a specific switch port using port-based authentication. For MAC-based ports, only selected backend server (RADIUS Authentication Server) statistics is showed. Use the port drop-down list to select which port details to be displayed.



Label	Description
Admin State	The port's current administrative state. Refer to **NAS Admin State** for more details regarding each value.
Port State	The current state of the port. Refer to **NAS Port State** for more details regarding each value.

EAPOL Counters

These supplicant frame counters are available for the following administrative states:

- **Force Authorized**
- **Force Unauthorized**
- 802.1X

EAPOL Counters			
Direction	**Name**	**IEEE Name**	**Description**
Rx	**Total**	dot1xAuthEapolFramesRx	The number of valid EAPOL frames of any type that have been received by the switch.
Rx	**Response ID**	dot1xAuthEapolRespIdFramesRx	The number of valid EAP Resp/ID frames that have been received by the switch.
Rx	**Responses**	dot1xAuthEapolRespFramesRx	The number of valid EAPOL response frames (other than Resp/ID frames) that have been received by the switch.
Rx	**Start**	dot1xAuthEapolStartFramesRx	The number of EAPOL Start frames that have been received by the switch.
Rx	**Logoff**	dot1xAuthEapolLogoffFramesRx	The number of valid EAPOL logoff frames that have been received by the switch.
Rx	**Invalid Type**	dot1xAuthInvalidEapolFramesRx	The number of EAPOL frames that have been received by the switch in which the frame type is not recognized.
Rx	**Invalid Length**	dot1xAuthEapLengthErrorFramesRx	The number of EAPOL frames that have been received by the switch in which the Packet Body Length field is invalid.
Tx	**Total**	dot1xAuthEapolFramesTx	The number of EAPOL frames of any type that have been transmitted by the switch.
Tx	**Request ID**	dot1xAuthEapolReqIdFramesTx	The number of EAP initial request frames that have been transmitted by the switch.
Tx	**Requests**	dot1xAuthEapolReqFramesTx	The number of valid EAP Request frames (other than initial request frames) that have been transmitted by the switch.

Backend Server Counters

These backend (RADIUS) frame counters are available for the following administrative states:

- **802.1X**
- **MAC-based Auth.**

Backend Server Counters			
Direction	**Name**	**IEEE Name**	**Description**
Rx	**Access Challenges**	dot1xAuthBackendAccessChallenges	**Port-based**: Counts the number of times that the switch receives the first request from the backend server following the first response from the supplicant. Indicates that the backend server has communication with the switch. **MAC-based**: Counts all Access Challenges received from the backend server for this port (left-most table) or client (right-most table).
Rx	**Other Requests**	dot1xAuthBackendOtherRequestsToSupplicant	**Port-based**: Counts the number of times that the switch sends an EAP Request packet following the first to the supplicant. Indicates that the backend server chose an EAP-method. **MAC-based**: Not applicable.
Rx	**Auth. Successes**	dot1xAuthBackendAuthSuccesses	**Port- and MAC-based**: Counts the number of times that the switch receives a success indication. Indicates that the supplicant/client has successfully authenticated to the backend server.
Rx	**Auth. Failures**	dot1xAuthBackendAuthFails	**Port- and MAC-based**: Counts the number of times that the switch receives a failure message. This indicates that the supplicant/client has not authenticated to the backend server.
Tx	**Responses**	dot1xAuthBackendResponses	**Port-based:** Counts the number of times that the switch attempts to send a supplicant's first response packet to the backend server. Indicates the switch attempted communication with the backend server. Possible retransmissions are not counted. **MAC-based:** Counts all the backend server packets sent from the switch towards the backend server for a given port (left-most table) or client (right-most table). Possible retransmissions are not counted.

Last Supplicant/Client Info

Information about the last supplicant/client that attempts to authenticate. This information is available for the following administrative states:

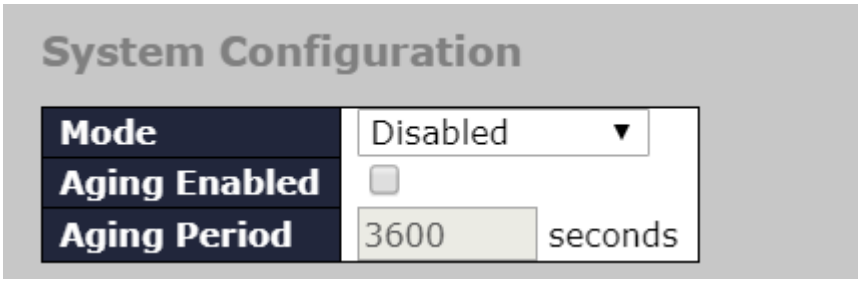
- **802.1X**
- **MAC-based Auth.**

	Last Supplicant/Client Info Name / IEEE Name / Description **MAC Address** / dot1xAuthLastEapolFrameSource / The MAC address of the last supplicant/client. **VLAN ID** / - / The VLAN ID on which the last frame from the last supplicant/client was received. **Version** / dot1xAuthLastEapolFrameVersion / **802.1X-based**: The protocol version number carried in the most recently received EAPOL frame. **MAC-based**: Not applicable. **Identity** / - / **802.1X-based**: The user name (supplicant identity) carried in the most recently received Response Identity EAPOL frame. **MAC-based**: Not applicable.

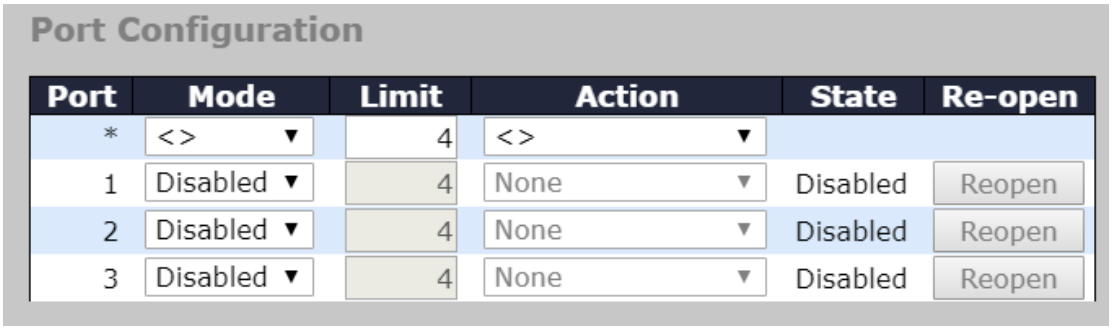
1.9.10 Port Security

Limit Control

This page allows you to configure limit control for port security system- or port-wise. It will limit the number of users on a given port. If the specified number is exceeded, an action is taken..



Label	Description
Mode	Indicates if Limit Control is globally enabled or disabled on the switch. If globally disabled, other modules may still use the underlying functionality, but limit checks and corresponding actions are disabled.
Aging Enabled	If checked, secured MAC addresses are subject to aging as discussed under Aging Period.
Aging Period	You can specify the aging period in seconds. The Aging Period can be set to a number between 10 and 10,000,000 seconds.

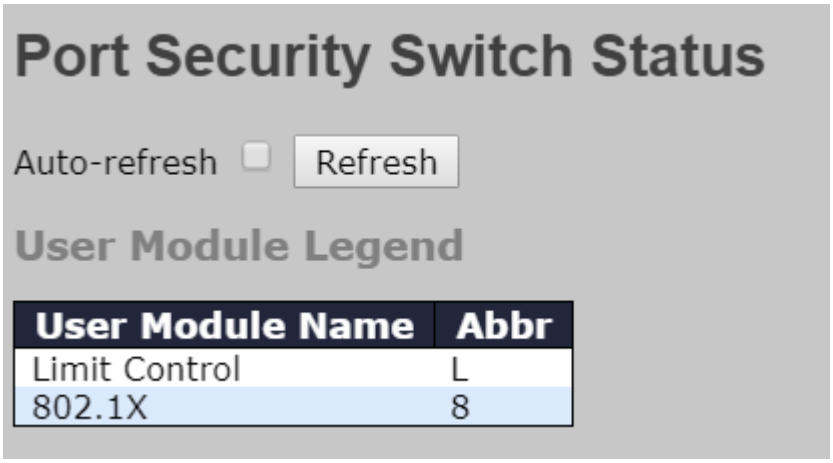


Label	Description
Mode	Controls whether Limit Control is enabled on this port. Both this and the Global Mode must be set to Enabled for Limit Control to be in effect. Notice that other modules may still use the underlying

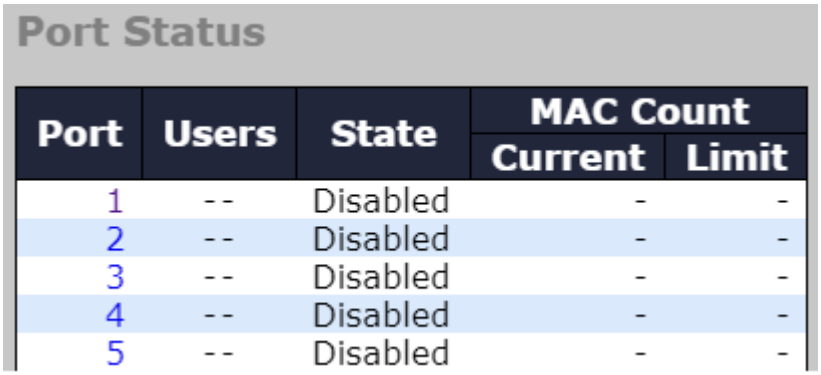
	port security features without enabling Limit Control on a given port.
Limit	The maximum number of MAC addresses that can be secured on this port. The maximum allowed value is 1024. If the limit is exceeded, the corresponding action is taken.
Action	If the limit number is reached, the switch will take one of the following actions: **None**: Do not allow more than Limit MAC addresses on the port, but take no further action. **Trap**: If Limit + 1 MAC addresses is seen on the port, send an *SNMP (Simple Network Management Protocol)* trap. If Aging is disabled, only one SNMP trap will be sent, but with Aging enabled, new SNMP traps will be sent every time the limit gets exceeded. **Shutdown**: If Limit + 1 MAC addresses is seen on the port, shut down the port. This implies that all secured MAC addresses will be removed from the port, and no new address will be learned. Even if the link is physically disconnected and reconnected on the port (by disconnecting the cable), the port will remain shut down. **Trap & Shutdown**: If Limit + 1 MAC addresses is seen on the port, both the “Trap” and the “Shutdown” actions described above will be taken.
State	This column shows the current state of the port as seen from the Limit Control's point of view. The state takes one of four values: **Disabled**: Limit Control is either globally disabled or disabled on the port. **Ready**: The limit is not yet reached. This can be shown for all actions. **Limit Reached**: Indicates that the limit is reached on this port. This state can only be shown if Action is set to None or Trap. **Shutdown**: Indicates that the port is shut down by the Limit Control module. This state can only be shown if Action is set to Shutdown or Trap & Shutdown.
Re-open	If a port is shut down by this module, you may reopen it by clicking this button, which will only be enabled if this is the case. Note that clicking the **Re-open** button causes the page to be refreshed, so non-committed changes will be lost.

Switch

This page allows you to review the port security status.



Label	Description
User Module Name	The full name of a module that may request Port Security services.
Abbr	A one-letter abbreviation of the user module. This is used in the Users column in the port status table.

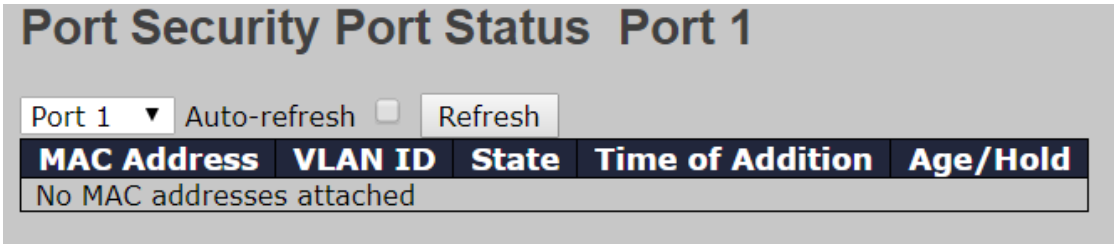


Label	Description
Users	Each of the user modules has a column that shows whether that module has enabled Port Security or not. A '-' means that the corresponding user module is not enabled, whereas a letter indicates that the user module abbreviated by that letter (see Abbr) has enabled port security.
State	Shows the current state of the port which includes the following values: **Disabled**: No user modules are currently using the Port Security service. **Ready**: The Port Security service is in use by at least one user module, and is awaiting frames from unknown MAC addresses to arrive. **Limit Reached**: The Port Security service is enabled by at least the Limit Control user module, and that module has indicated that the limit is reached and no more MAC addresses should be taken

	in. **Shutdown**: The Port Security service is enabled by at least the Limit Control user module, and that module has indicated that the limit is exceeded. No MAC addresses can be learned on the port until it is administratively re-opened on the Limit Control configuration Web-page.
MAC Count	The two columns indicate the number of currently learned MAC addresses (forwarding as well as blocked) and the maximum number of MAC addresses that can be learned on the port, respectively. If no user modules are enabled on the port, the Current column will show a dash (-). If the Limit Control user module is not enabled on the port, the Limit column will show a dash (-).

Port

This page allows you to review the MAC addresses secured by the Port Security module.



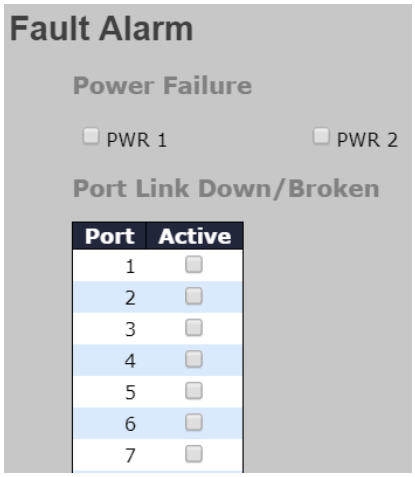
Label	Description
MAC Address	The MAC address that is seen on this port. If no MAC addresses are learned, a single row stating No MAC addresses attached is displayed.
VLAN ID	The VLAN ID that is seen on this port.
State	Indicates whether the corresponding MAC address is blocked or forwarding. If blocked, it will not be allowed to transmit or receive traffic.
Time of Addition	Shows the date and time when this MAC address was first seen on the port.
Age/Hold	If at least one user module has decided to block this MAC address, it will stay in the blocked state until the hold time (measured in seconds) expires. If all user modules have decided to allow this MAC address to forward, and aging is enabled, the Port Security module will periodically check that this MAC address still forwards traffic. If the age period (measured in seconds) expires and no frames have been seen, the MAC address will be removed from the MAC table. Otherwise a new age period will begin. If aging is disabled or a user module has decided to hold the MAC

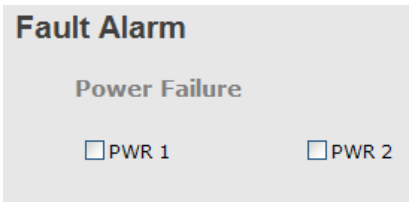
	address indefinitely, a dash (-) will be shown.

1.10 Warning

1.10.1 Fault Alarm

When any selected fault event happens, the Fault LED on the switch panel will light up and the electric relay will signal at the same time.

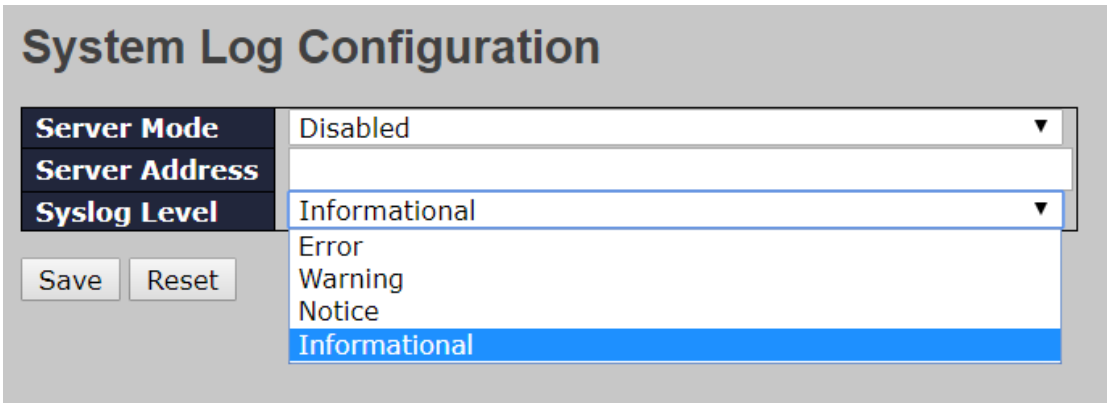




1.10.2 System Warning

SYSLOG Setting

The SYSLOG is a protocol that transmits event notifications across networks.

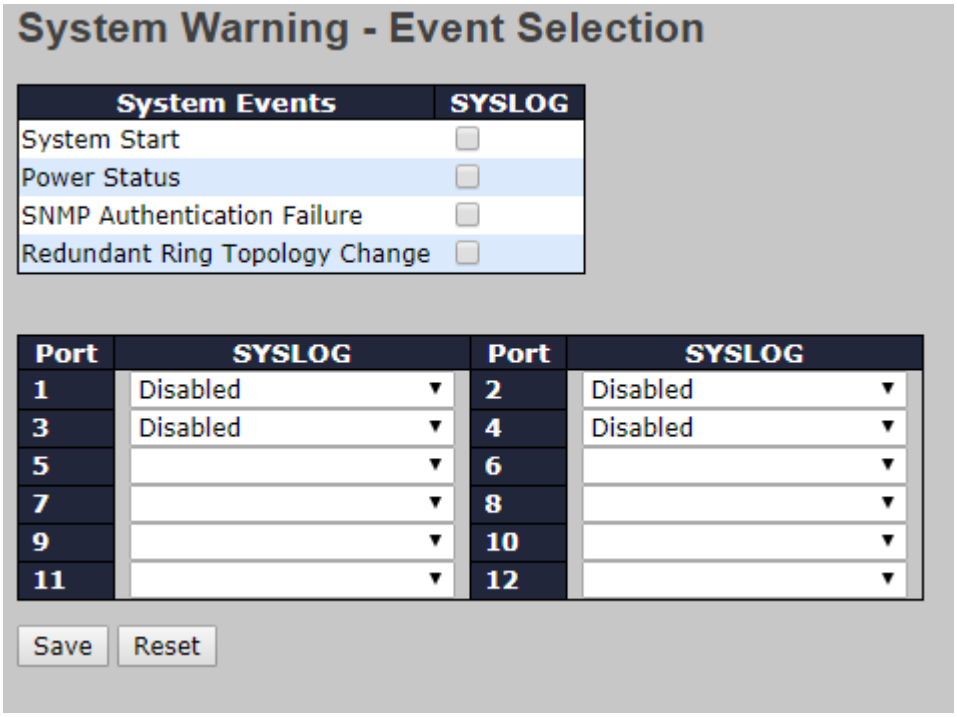


Label	Description
Server Mode	Indicates existing server mode. When the mode operation is enabled, the syslog message will be sent to syslog server. The syslog protocol is based on UDP communications and received on UDP port 514 and the syslog server will not send acknowledgments back to the sender since UDP is a connectionless protocol and it does not provide acknowledgments. The syslog packet will always be sent even if the syslog server does not exist. Possible modes are: **Enabled**: enable server mode **Disabled**: disable server mode
Server Address	Indicates the IPv4 host address of syslog server. If the switch provides

	DNS functions, it also can be a host name.
Syslog Level	Select the severity level for the syslog messages to be logged. The list contains: **Error**: Log error messages. **Warning**: Log warning messages. **Notice**: Log messages that represent significant condition but not errors. **Informational**: Log informational messages.

Event Selection

SYSLOG and SMTP are two warning methods supported by the system. Check the corresponding box to enable the system event warning method you want. Please note that the checkbox cannot be checked when SYSLOG or SMTP is disabled.

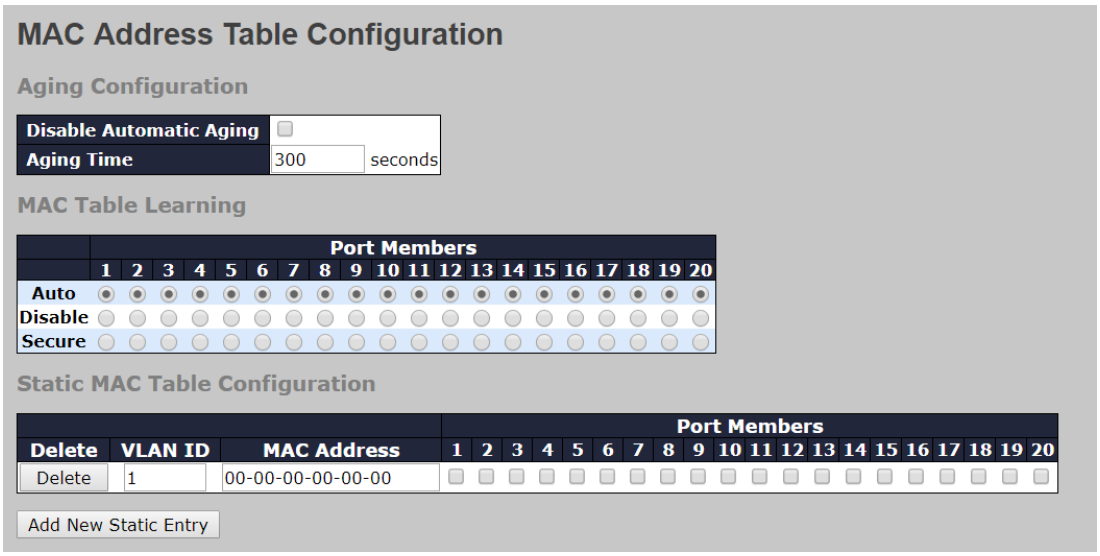


Label	Description
System Cold Start	Sends out alerts when the system is restarted
Power Status	Sends out alerts when power is up or down
SNMP Authentication Failure	Sends out alert when SNMP authentication fails
Redundant-Ring Topology Change	Sends out alerts when Redundant-Ring topology changes
Port Event SYSLOG	■ **Disable** ■ **Link Up** ■ **Link Down** ■ **Link Up & Link Down**
Apply	Click to activate the configurations
Help	Shows help file

1.11 Monitor and Diag

1.11.1 MAC Table

The MAC address table can be configured on this page. You can set timeouts for entries in the dynamic MAC table and configure the static MAC table here.



Aging Configuration

By default, dynamic entries are removed from the MAC after 300 seconds. This removal is called aging.

You can configure aging time by entering a value in the box below in seconds; for example, **Age Time** seconds.

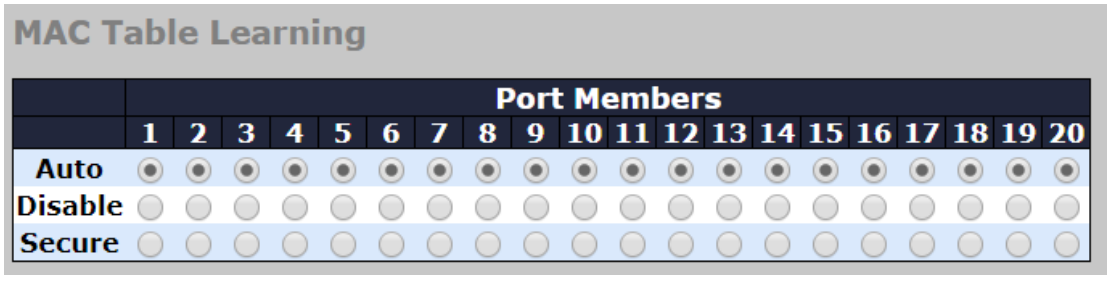
The allowed range is 10 to 1000000 seconds.

You can disable the automatic aging of dynamic entries by checking **Disable Automatic Aging**.

MAC Table Learning

If the learning mode for a given port is grayed out, it means another module is in control of the mode, and thus the user cannot change the configurations. An example of such a module is MAC-Based authentication under 802.1X.

You can configure the port to dynamically learn the MAC address based upon the following settings:

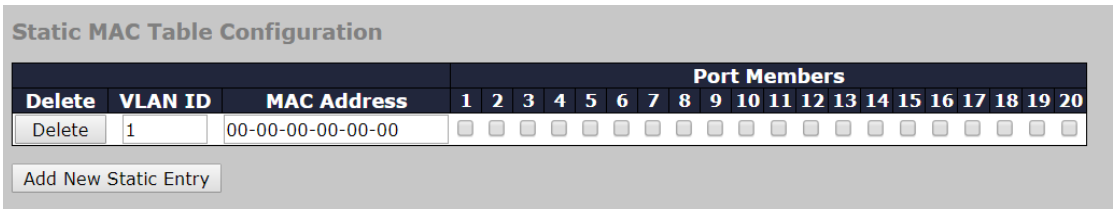


Label	Description
Auto	Learning is done automatically as soon as a frame with unknown SMAC is received.
Disable	No learning is done.
Secure	Only static MAC entries are learned, all other frames are dropped.

	Note: make sure the link used for managing the switch is added to the static Mac table before changing to secure learning mode, otherwise the management link will be lost and can only be restored by using another non-secure port or by connecting to the switch via the serial interface.

Static MAC Table Configurations

The static entries in the MAC table are shown in this table. The static MAC table can contain up to 64 entries. The entries are for the whole stack, not for individual switches. The MAC table is sorted first by VLAN ID and then by MAC address.



Label	Description
Delete	Check to delete an entry. It will be deleted during the next save.
VLAN ID	The VLAN ID for the entry
MAC Address	The MAC address for the entry
Port Members	Checkmarks indicate which ports are members of the entry. Check or uncheck to modify the entry.
Adding New Static Entry	Click to add a new entry to the static MAC table. You can specify the VLAN ID, MAC address, and port members for the new entry. Click **Save** to save the changes.

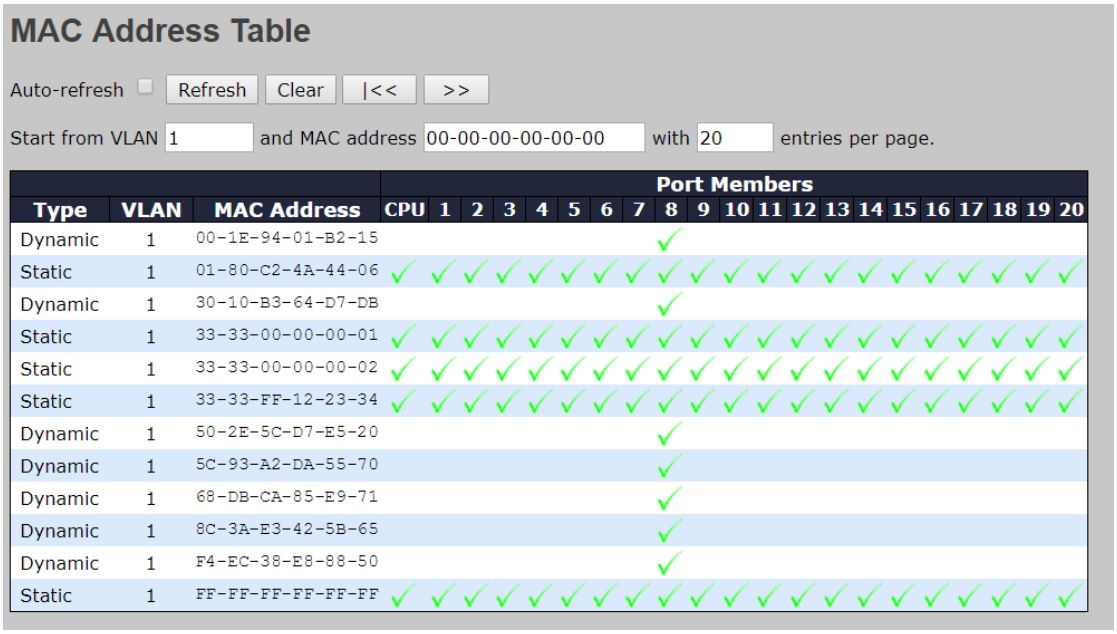
MAC Table

Each page shows up to 999 entries from the MAC table, with a default value of 20, selected by the **Entries Per Page** input field. When first visited, the web page will show the first 20 entries from the beginning of the MAC Table. The first displayed will be the one with the lowest VLAN ID and the lowest MAC address found in the MAC Table.

Each page shows up to 999 entries from the MAC table, with a default value of 20, selected by the **Entries Per Page** input field. When first visited, the web page will show the first 20 entries from the beginning of the MAC Table. The first displayed will be the one with the lowest VLAN ID and the lowest MAC address found in the MAC Table.

The **Start from MAC address** and **VLAN** fields allow the user to select the starting point in the MAC table. Clicking the **Refresh** button will update the displayed table starting from that or the closest next MAC table match. In addition, the two input fields will – upon clicking **Refresh** - assume the value of the first displayed entry, allows for continuous refresh with the same start address.

The **>>** will use the last entry of the currently displayed VLAN/MAC address pairs as a basis for the next lookup. When it reaches the end, the text "**no more entries**" is shown in the displayed table. Use the **|<<** button to start over.

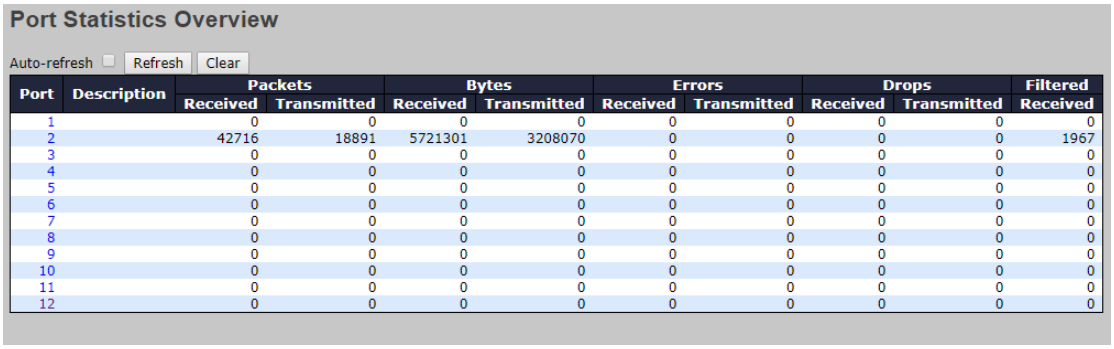


Label	Description
Type	Indicates whether the entry is a static or dynamic entry
MAC Address	The MAC address of the entry
VLAN	The VLAN ID of the entry
Port Members	The ports that are members of the entry.

1.11.2 Port Statistics

Traffic Overview

This page provides an overview of general traffic statistics for all switch ports.



Label	Description
Port	The switch port number to which the following settings will be applied.
Packets	The number of received and transmitted packets per port
Bytes	The number of received and transmitted bytes per port
Errors	The number of frames received in error and the number of incomplete transmissions per port

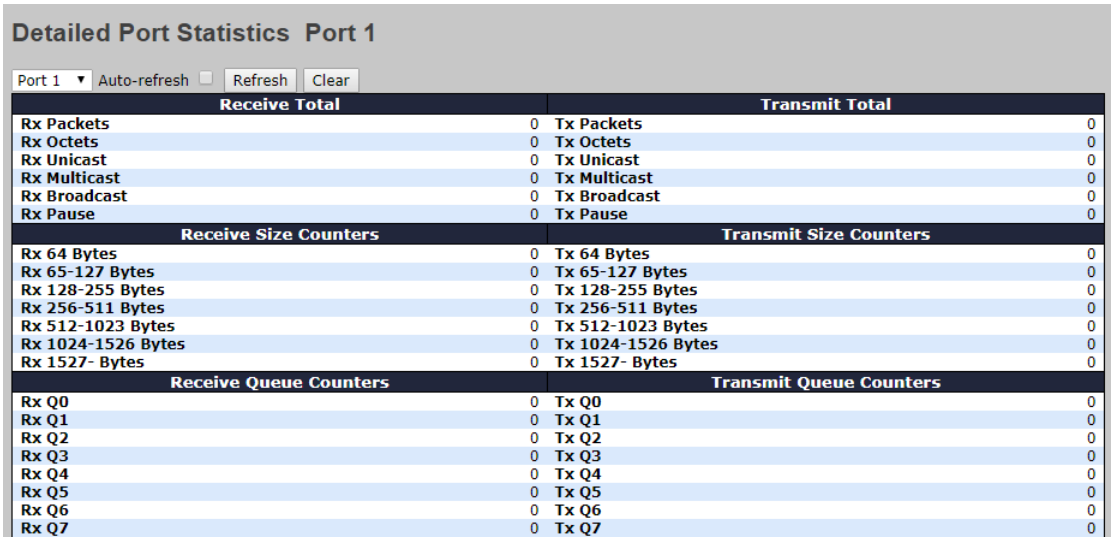
Drops	The number of frames discarded due to ingress or egress congestion
Filtered	The number of received frames filtered by the forwarding process
Auto-refresh	Check to enable an automatic refresh of the page at regular intervals.
Refresh	Updates the counter entries, starting from the current entry ID.
Clear	Flushes all counters entries

Detailed Statistics

This page provides detailed traffic statistics for a specific switch port. Use the port drop-down list to decide the details of which switch port to be displayed.

The displayed counters include the total number for receive and transmit, the size for receive and transmit, and the errors for receive and transmit.

Detailed Statistics – Total Receive & Transmit



Label	Description
Rx and Tx Packets	The number of received and transmitted (good and bad) packets
Rx and Tx Octets	The number of received and transmitted (good and bad) bytes, including FCS, except framing bits
Rx and Tx Unicast	The number of received and transmitted (good and bad) unicast packets
Rx and Tx Multicast	The number of received and transmitted (good and bad) multicast packets
Rx and Tx Broadcast	The number of received and transmitted (good and bad) broadcast packets
Rx and Tx Pause	The number of MAC Control frames received or transmitted on this port that have an opcode indicating a PAUSE operation
Rx Drops	The number of frames dropped due to insufficient receive buffer or egress congestion
Rx CRC/Alignment	The number of frames received with CRC or alignment errors

Rx Undersize	The number of short[1] frames received with a valid CRC
Rx Oversize	The number of long[2] frames received with a valid CRC
Rx Fragments	The number of short[1] frames received with an invalid CRC
Rx Jabber	The number of long[2] frames received with an invalid CRC
Rx Filtered	The number of received frames filtered by the forwarding process
Tx Drops	The number of frames dropped due to output buffer congestion
Tx Late / Exc.Coll.	The number of frames dropped due to excessive or late collisions

1. Short frames are frames smaller than 64 bytes.
2. Long frames are frames longer than the maximum frame length configured for this port.

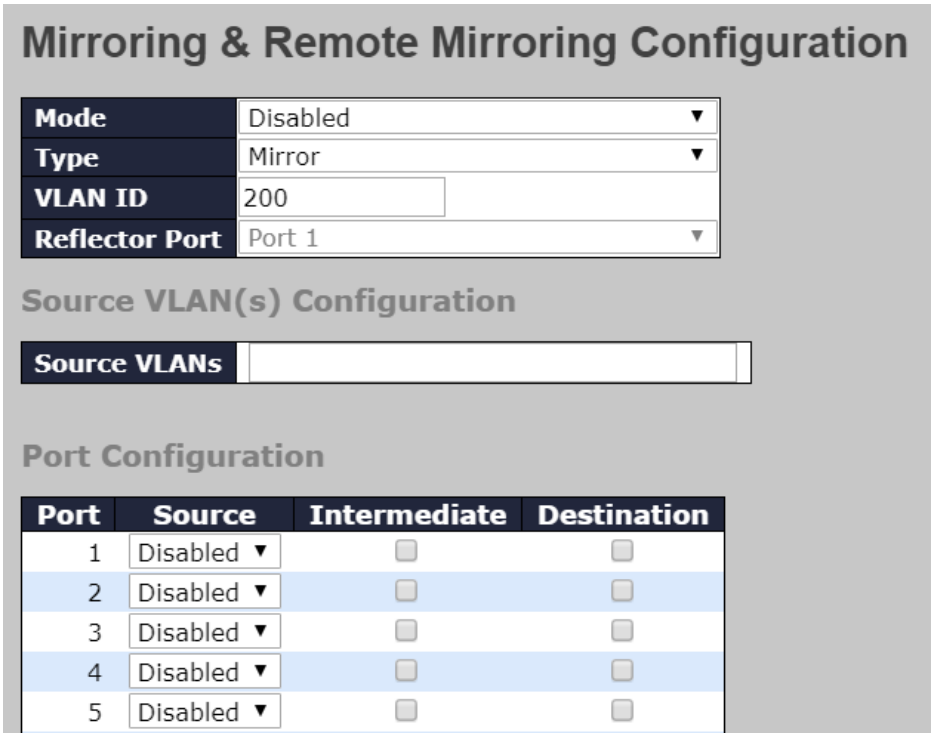
1.11.3 Port Monitoring

You can configure port mirroring on this page. To solve network problems, selected traffic can be copied, or mirrored, to a mirror port where a frame analyzer can be attached to analyze the frame flow. The traffic to be copied to the mirror port is selected as follows:

All frames received on a given port (also known as ingress or source mirroring).

All frames transmitted on a given port (also known as egress or destination mirroring).

Port to mirror is also known as the mirror port. Frames from ports that have either source (rx) or destination (tx) mirroring enabled are mirrored to this port. Disabled option disables mirroring.

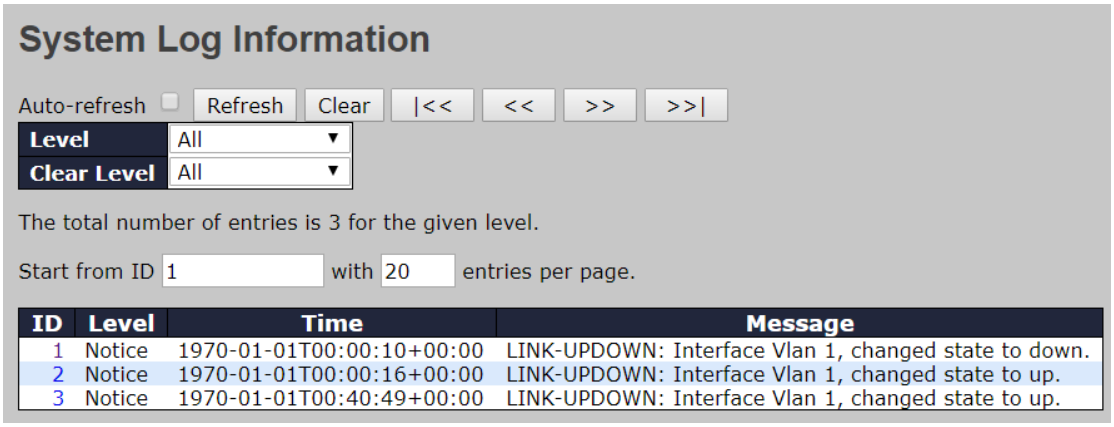


Label	Description
Mode	Enable or disable this function.
Type	Mirror: the switch is running on mirror mode. The source port(s) and destination port are located on this switch. Source: the switch is a source node for monitor flow. The source port(s) and intermediate port(s) are located on this switch.

	Intermediate: the switch is a forwarding node for monitor flow and the switch is an option node. The object is to forward traffic from source switch to destination switch. The intermediate ports are located on this switch. Destination: the switch is an end node for monitor flow. The destination port(s) and intermediate port(s) are located on this switch.
VLAN ID	The VLAN ID points out where the monitor packet will copy to. The default VLAN ID is 200.
Reflector Port	Select a reflector port. This port carries all the mirrored traffic at source switch.
Source VLANs	The switch can support VLAN-based mirroring. If you want to monitor some VLANs on the switch, you can set the selected VLANs on this field.
Port	The logical port for the settings contained in the same row. The CPU also can be selected.
Source	Selects mirror mode. **Disabled**: Neither frames transmitted nor frames received are mirrored. **Both**: Frames received and frames transmitted are mirrored on the Intermediate/Destination port. **Rx only**: Frames received on this port are mirrored on the Intermediate/Destination port. Frames transmitted are not mirrored. **Tx only**: Frames transmitted on this port are mirrored on the Intermediate/Destination port. Frames received are not mirrored.
Intermediate	Select intermediate port. This checkbox is designed for Remote Mirroring. The intermediate port is a switched port to connect to other switch. All packets that are going through intermediate port will be tagged when the mirror function is enabled.
Destination	Select destination port. This checkbox is designed for mirror or Remote Mirroring. The destination port is a switched port that you receive a copy of traffic from the source port.

1.11.4 System Log Information

This page provides switch system log information.

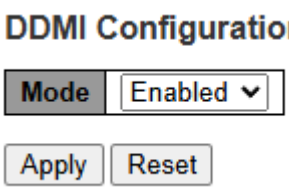


Label	Description
ID	The ID (>= 1) of the system log entry
Level	The level of the system log entry. The following level types are supported: **Notice:** Log messages that represent significant condition but not errors. **Informational**: Log informational messages. **Warning**: Log warning messages. **Error**: Log error messages. **All**: Log all messages.
Time	The time of the system log entry
Message	The MAC address of the switch
Auto-refresh	Check this box to enable an automatic refresh of the page at regular intervals.
Refresh	Updates system log entries, starting from the current entry ID
Clear	Flushes all system log entries
|<<	Updates system log entries, starting from the first available entry ID
<<	Updates system log entries, ending at the last entry currently displayed
>>	Updates system log entries, starting from the last entry currently displayed.
>>|	Updates system log entries, ending at the last available entry ID.

1.11.5 DDMI

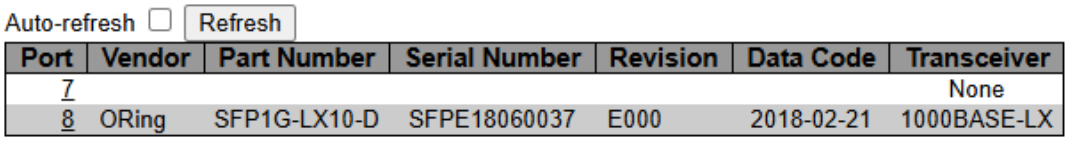
DDMI is an acronym for Digital Diagnostics Monitoring Interface. It provides an enhanced digital diagnostic monitoring interface for optical transceivers which allows real time access to device operating parameters.

DDMI Configuration



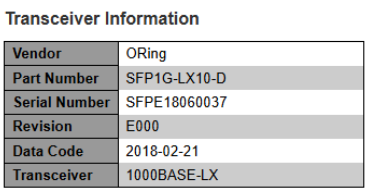
Label	Description
Mode	Indicates the DDMI mode operation. Possible modes are: **Enabled**: Enable DDMI mode operation. **Disabled**: Disable DDMI mode operation.

DDMI Overview



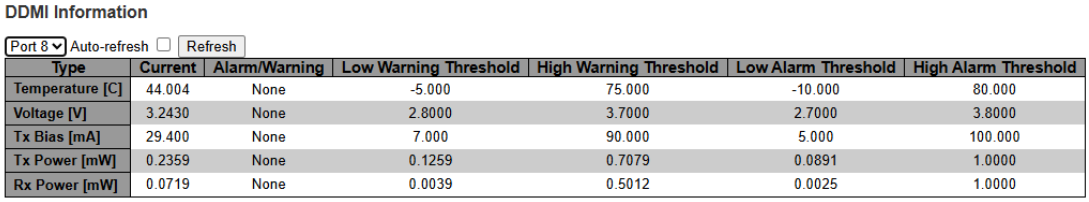
Label	Description
Port	DDMI port.
Vendor	Indicates Vendor name SFP vendor name.
Part Number	Indicates Vendor PN Part number provided by SFP vendor.
Serial Number	Indicates Vendor SN Serial number provided by vendor.
Revision	Indicates Vendor rev Revision level for part number provided by vendor.
Data Code	Indicates Date code Vendor's manufacturing date code.
Transceiver	Indicates Transceiver compatibility.

DDMI Detailed



Label	Description
Vendor	Indicates SFP vendor name.
Part Number	Indicates part number provided by SFP vendor.
Serial Number	Indicates serial number provided by SFP vendor.
Revision	Indicates revision level for part number provided by SFP vendor.

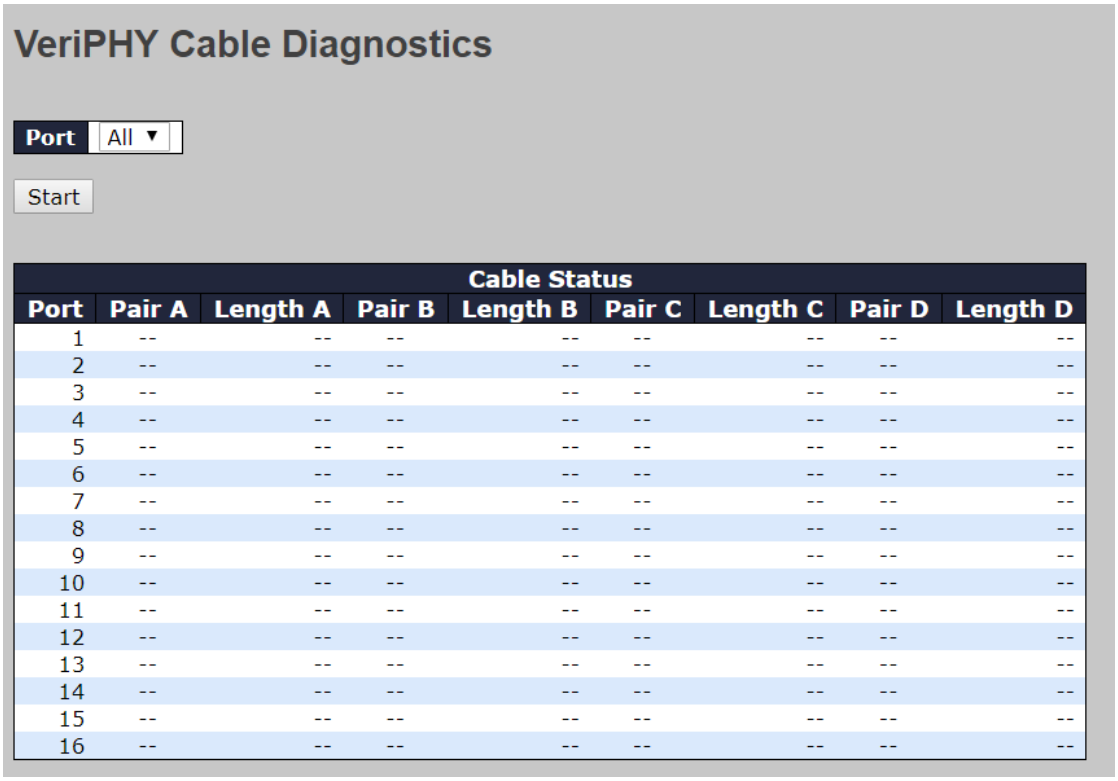
Data Code	Indicates vendor's manufacturing date code.
Transceiver	Indicates SFP transceiver compatibility.



Label	Description
Current	The current value of temperature, voltage, Tx bias, Tx power, and Rx power.
Alarm / Warning	Indicates whether there is an alarm or warning.
Low Warning Threshold	The low warning threshold value of temperature, voltage, Tx bias, Tx power, and Rx power.
High Warning Threshold	The high warning threshold value of temperature, voltage, Tx bias, Tx power, and Rx power.
Low Alarm Threshold	The low alarm threshold value of temperature, voltage, Tx bias, Tx power, and Rx power.
High Alarm Threshold	The high alarm threshold value of temperature, voltage, Tx bias, Tx power, and Rx power.

1.11.6 VeriPHY Cable Diagnostics

This page allows you to perform VeriPHY cable diagnostics.



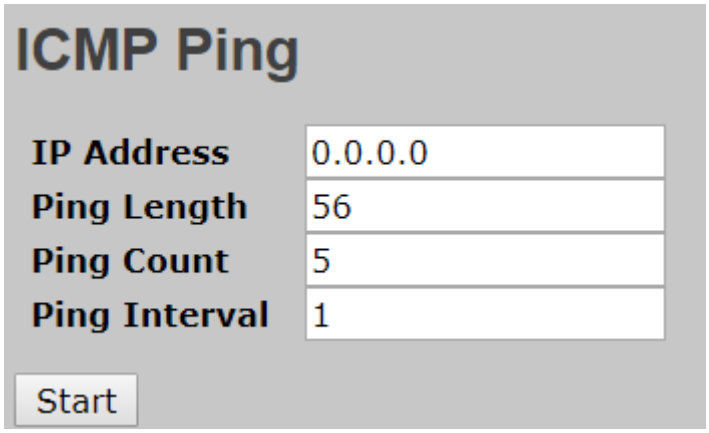
Press **Start** to run the diagnostics. This will take approximately 5 seconds. If all ports are selected, this can take approximately 15 seconds. When completed, the page refreshes automatically, and you can view the cable diagnostics results in the cable status table. Note that VeriPHY diagnostics is only accurate for cables 7 - 140 meters long.

10 and 100 Mbps ports will be disconnected while running VeriPHY diagnostics. Therefore, running VeriPHY on a 10 or 100 Mbps management port will cause the switch to stop responding until VeriPHY is complete.

Label	Description
Port	The port for which VeriPHY Cable Diagnostics is requested
Cable Status	Port: port number Pair: the status of the cable pair Length: the length (in meters) of the cable pair

1.11.7 Ping(IPv4)

This page allows you to issue ICMP PING packets to troubleshoot IP connectivity issues.



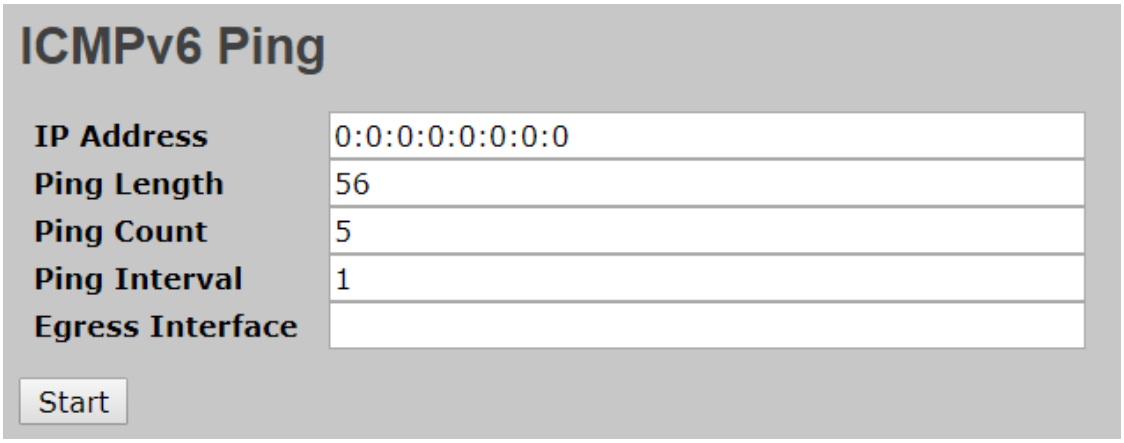
After you press **Start**, five ICMP packets will be transmitted, and the sequence number and roundtrip time will be displayed upon reception of a reply. The page refreshes automatically until responses to all packets are received, or until a timeout occurs.

PING6 server ::10.10.132.20
64 bytes from ::10.10.132.20: icmp_seq=0, time=0ms
64 bytes from ::10.10.132.20: icmp_seq=1, time=0ms
64 bytes from ::10.10.132.20: icmp_seq=2, time=0ms
64 bytes from ::10.10.132.20: icmp_seq=3, time=0ms
64 bytes from ::10.10.132.20: icmp_seq=4, time=0ms
Sent 5 packets, received 5 OK, 0 bad

You can configure the following properties of the issued ICMP packets:

Label	Description
IP Address	The destination IP Address
Ping Size	The payload size of the ICMP packet. Values range from 8 to 1400 bytes.

1.11.8 Ping(IPv6)



PING6 server ::192.168.10.1

sendto

sendto

sendto

sendto

sendto

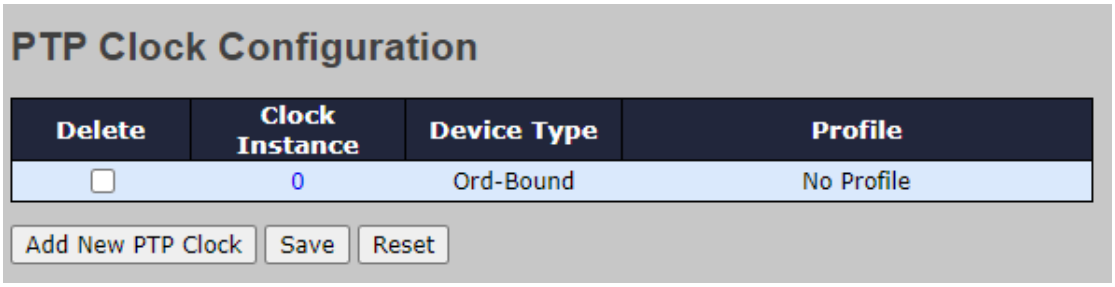
Sent 5 packets, received 0 OK, 0 bad

1.12 Synchronization (only for P-Series Model)

PTP is an acronym for Precision Time Protocol, a network protocol for synchronizing the clocks of computer systems.

PTP-Configuration

This page allows the user to configure and inspect the current PTP clock settings.



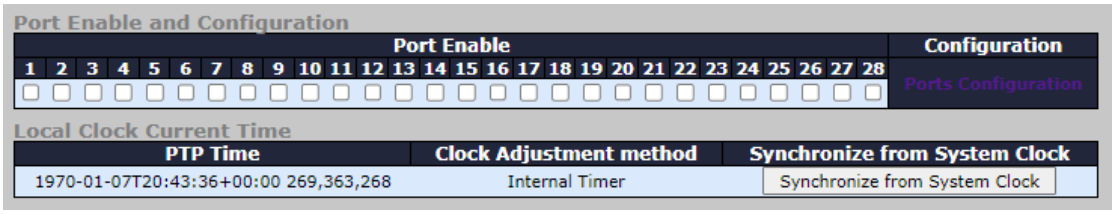
Label	Description
Delete	Check this box and click on 'Save' to delete the clock instance.
Clock Instance	Indicates the Instance of a particular Clock Instance [0..3]. Click on the Clock Instance number to edit the Clock details.
Devcie Type	Indicates the Clock domain used by the Instance of a particular Clock Instance [0..3]. More instances may use the same clock domain, e.g. a Boundary clock and a Transparent clock. Only one Slave or Boundary clock is allowed within the same Clock domain.
Profile	Indicates the Type of the Clock Instance. There are five Device Types.

	1. Ord-Bound - clock's Device Type is Ordinary-Boundary Clock. **2. P2p Transp -** clock's Device Type is Peer to Peer Transparent Clock. **3. E2e Transp -** clock's Device Type is End to End Transparent Clock. **4. Master Only -** clock's Device Type is Master Only. **5. Slave Only -** clock's Device Type is Slave Only.

PTP Clock Instance

This page allows the user to inspect and configure the current PTP clock settings

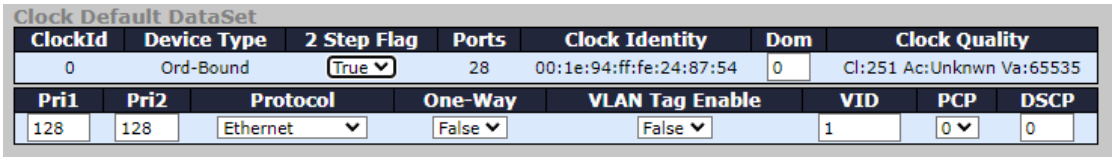
Lock Current Time



Label	Description
PTP Time	Shows the actual PTP time with nanosecond resolution.
Clock Adjustment Method	Shows the actual clock adjustment method. The method depends on the available hardware.
Synchronize from System Clock	Activate this button to synchronize the System Clock to PTP Time.
Ports Configuration	Click to edit the port data set for the ports assigned to this clock instance.

Clock Default Dataset

The clock default data set is defined in the IEEE 1588 Standard. It holds three groups of data: the static members defined at clock creation time, the Dynamic members defined by the system, and the configurable members which can be set here.



Label	Description
Clock ID	An internal instance id (0..3)
Device Type	Indicates the Type of the Clock Instance. There are five Device Types. **1. Ord-Bound -** Clock's Device Type is Ordinary-Boundary Clock. **2. P2p Transp -** Clock's Device Type is Peer to Peer Transparent Clock.

	3. E2e Transp - Clock's Device Type is End to End Transparent Clock. **4. Master Only -** Clock's Device Type is Master Only. **5. Slave Only -** Clock's Device Type is Slave Only.
2 Step Flag	True if two-step Sync events and Pdelay_Resp events are used
Ports	The total number of physical ports in the node
Clock Identity	It shows unique clock identifier
Dom	Clock domain [0..127].
Clock Quality	The clock quality is determined by the system, and holds 3 parts: Clock Class, Clock Accuracy and OffsetScaledLog Variance as defined in IEEE1588. The Clock Accuracy values are defined in IEEE1588 table 6 (Currently the clock Accuracy is set to 'Unknown' as default).
Pri 1	Clock priority 1 [0..255] used by the BMC master select algorithm.
Pri 2	Clock priority 2 [0..255] used by the BMC master select algorithm.
Protocol	Transport protocol used by the PTP protocol engine Ethernet PTP over Ethernet multicast EthernetMixed PTP using a combination of Ethernet multicast and unicast IPv4Multi PTP over IPv4 multicast IPv4Mixed PTP using a combination of IPv4 multicast and unicast IPv4Uni PTP over IPv4 unicast
One-Way	If true, one way measurements are used. This parameter applies only to a slave. In one-way mode no delay measurements are performed, i.e. this is applicable only if frequency synchronization is needed. The master always responds to delay requests.
VLAN Tag Enable	The VLAN Tag Enable parameter is ignored, because the tagging is controlled by the VLAN configuration.
VID	VLAN Identifier used for tagging the VLAN packets.
PCP	Priority Code Point value used for PTP frames.

Clock Current Data Set

The clock current data set is defined in the IEEE 1588 Standard. The current data set is dynamic

Label	Description
stpRm	Steps Removed : It is the number of PTP clocks traversed from the grandmaster to the local slave clock.
Offset form master	Time difference between the master clock and the local slave clock, measured in ns.
Mean Path Delay	The mean propagation time for the link between the master and

	the local slave

Clock Parent Data Set

The clock parent data set is defined in the IEEE 1588 standard. The parent data set is dynamic.

Clock Parent DataSet

Parent Port ID	Port	PStat	Var	Rate	GrandMaster ID	GrandMaster Clock Quality	Pri1	Pri2
00:1e:94:ff:fe:24:87:54	0	False	0	0	00:1e:94:ff:fe:24:87:54	Cl:251 Ac:Unknwn Va:65535	128	128

Label	Description
Parent Port Identity	Clock identity for the parent clock, if the local clock is not a slave, the value is the clocks own id.
Port	Port Id for the parent master port
P Stat	Parents Stats (always false).
Var	It is observed parent offset scaled log variance
Change Rate	Observed Parent Clock Phase Change Rate. i.e. the slave clocks rate offset compared to the master. (unit = ns per s).
Grand Master Identity	Clock identity for the grand master clock, if the local clock is not a slave, the value is the clocks own id.
Grand Master Clock Quality	The clock quality announced by the grand master (See description of Clock Default DataSet:Clock Quality)
Pri 1	Clock priority 1 announced by the grand master
Pri 2	Clock priority 2 announced by the grand master.

Clock Time Properties Data Set

The clock time properties data set is defined in the IEEE 1588 Standard. The data set is both configurable and dynamic, i.e. the parameters can be configured for a grandmaster. In a slave clock the parameters are overwritten by the grandmasters timing properties. The parameters are not used in the current PTP implementation.

The valid values for the Time Source parameter are:

Clock Time Properties DataSet

UtcOffset	Valid	leap59	leap61	Time Trac	Freq Trac	ptp Time Scale	Time Source
0	False	False	False	False	False	True	160

Address	Description
16 (0x10)	ATOMIC_CLOCK
32 (0x20)	GPS
48 (0x30)	TERRESTRIAL_RADIO
64 (0x40)	PTP
80 (0x50)	NTP
96 (0x60)	HAND_SET
144 (0x90)	OTHER
160 (0xA0)	INTERNAL_OSCILLATOR

Servo Parameters

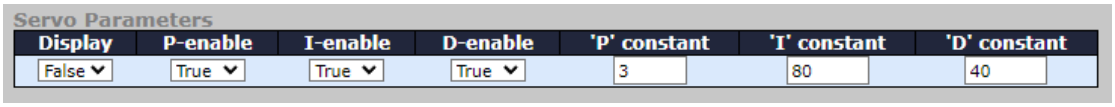
The default clock servo uses a PID regulator to calculate the current clock rate. i.e.

clockAdjustment =

OffsetFromMaster/ P constant +

Integral(OffsetFromMaster)/ I constant +

Differential OffsetFromMaster)/ D constant



Label	Description
Display	If true then Offset From Master, MeanPathDelay and clockAdjustment are logged on the debug terminal
P-enable	If true the P part of the algorithm is included
I-enable	If true the I part of the algorithm is included
D-enable	If true the D part of the algorithm is included
'P' constant	[1..1000] see above
'I' constant	[1..10000] see above
'D' constant	[1..10000] see above

Filter Parameters

The default delay filter is a low pass filter, with a time constant of 2**DelayFilter*DelayRequestRate.

If the DelayFilter parameter is set to 0, the delay filter uses the same algorithm as the offset filter.

The default offset filter uses a minimum offset or a mean filter method

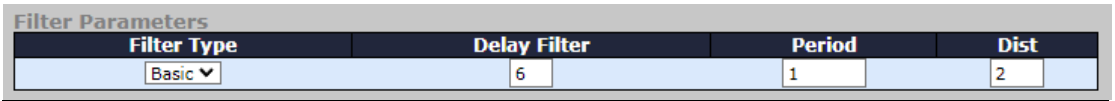
i.e. The minimum measured offset during Period samples is used in the calculation.

The distance between two calculations is Dist periods.

Note: In configurations with Timestamp enabled PHYs, the period is automatically increased, if (period*dist < SyncPackets pr sec/4), i.e. max 4 adjustments are made pr sec.

If Dist is 1 the offset is averaged over the Period,

If Dist is >1 the offset is calculated using 'min' offset.

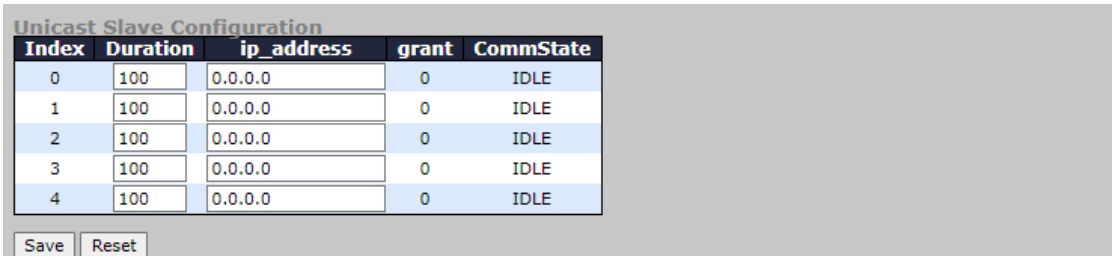


Label	Description
Delay Filter	See above
Filter Type	Shows the filter type used which can be either the basic filter or an advanced filter that can be configured to use only a fraction of the packets received (i.e. the packets that have experienced the least latency).
Period	See above
Dist	See above
Height	The height of the sample window measured in microseconds (only applicable to advanced offset filter).
Percentage	The percentage of sync packets (with smallest delay) used by the offset filter (only applicable to advanced offset filter).
Reset Threshold	The threshold in micro seconds at which the offset filter will be

	reset and the slave clock synchronized to the master.

Unicast Slave Configuration

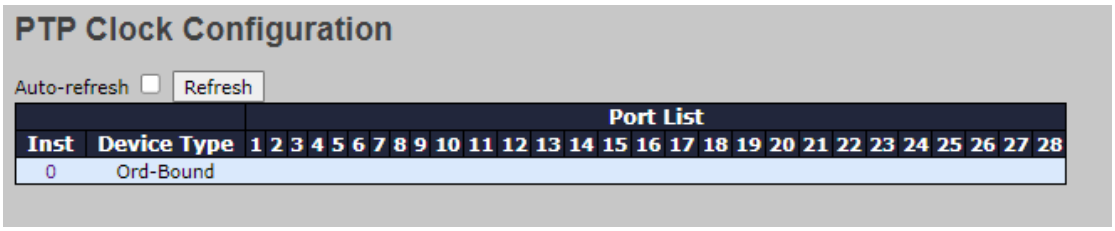
When operating in IPv4 Unicast mode, the slave is configured up to 5 master IP addresses. The slave then requests Announce messages from all the configured masters. The slave uses the BMC algorithm to select one as master clock, the slave then request Sync messages from the selected master.



Label	Description
Duration	The number of seconds a master is requested to send Announce/Sync messages. The request is repeated from the slave each Duration/4 seconds.
IP_address	IPv4 Address of the Master clock
Grant	The granted repetition period for the sync message
Comm State	The state of the communication with the master, possible values are: **IDLE :** The entry is not in use. **INIT :** Announce is sent to the master (Waiting for a response). **CONN :** The master has responded. **SELL :** The assigned master is selected as current master. **SYNC :** The master is sending Sync messages.

PTP Status

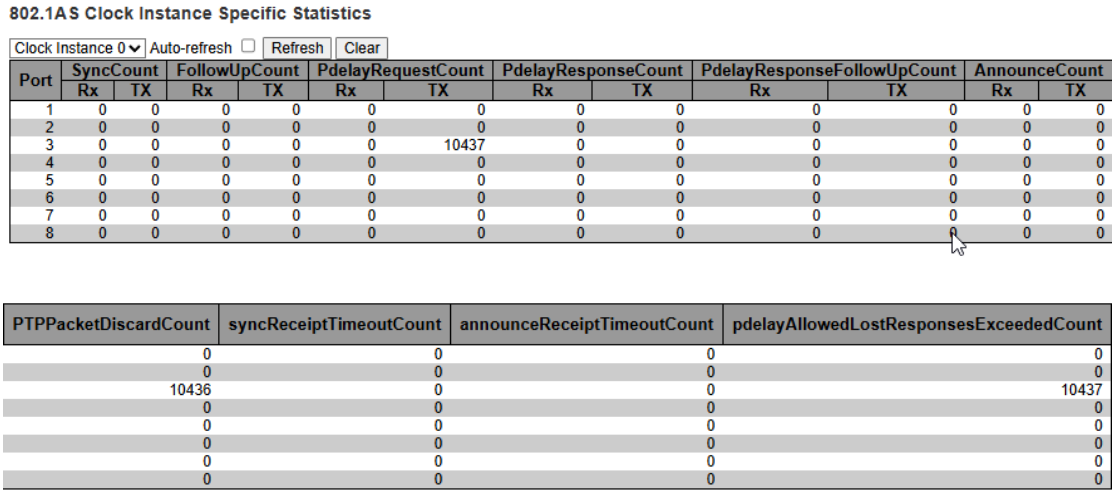
This page allows the user to inspect the current PTP clock settings.



Label	Description
Inst	Indicates the Instance of a particular Clock Instance [0..3]. Click on the Clock Instance number to monitor the Clock details.
Device Type	Indicates the Type of the Clock Instance. There are five Device Types. **1. Ord-Bound -** Clock's Device Type is Ordinary-Boundary Clock. **2. P2p Transp -** Clock's Device Type is Peer to Peer Transparent Clock. **3. E2e Transp -** Clock's Device Type is End to End Transparent

	Clock. **4. Master Only -** Clock's Device Type is Master Only. **5. Slave Only -** Clock's Device Type is Slave Only.
Port List	Shows the ports configured for that Clock Instance.

802.1AS Statistics

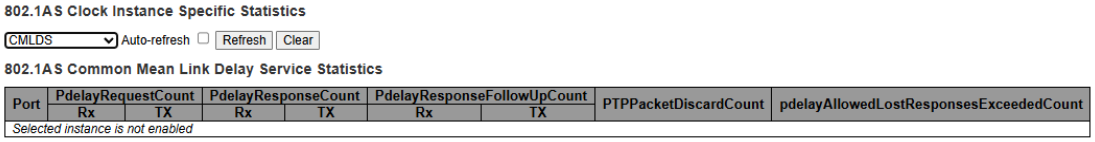

802.1AS Clock Instance Specific Statistics

Clock Instance 0 Auto-refresh Refresh Clear

Port	SyncCount		FollowUpCount		PdelayRequestCount		PdelayResponseCount		PdelayResponseFollowUpCount		AnnounceCount	
	Rx	TX	Rx	TX	Rx	TX	Rx	TX	Rx	TX	Rx	TX
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	10437	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0

PTPPacketDiscardCount	syncReceiptTimeoutCount	announceReceiptTimeoutCount	pdelayAllowedLostResponsesExceededCount
0	0	0	0
0	0	0	0
10436	0	0	10437
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Label	Description
SyncCount	A counter that increments every time when synchronization information is received.
FollowUpCount	A counter that increments every time when a Follow Up message is received.
PdelayRequestCount	A counter that increments every time when a Pdelay_Req message is received.
PdelayResponseCount	A counter that increments every time when a Pdelay_Resp message is received.
PdelayResponseFollowUpCount	A counter that increments every time when a Pdelay_Resp_Follow_Up message is received.
AnnounceCount	A counter that increments every time when an Announce message is received.
PTPPacketDiscardCount	A counter that increments every time when a PTP message is discarded.
syncReceiptTimeoutCount	A counter that increments every time when sync receipt timeout occurs.
announceReceiptTimeoutCount	A counter that increments every time when announce receipt timeout occurs.
pdelayAllowedLostResponsesExceededCount	A counter that increments everytime the value of the variable lostResponses exceeds the value of the variable allowedLostResponses.

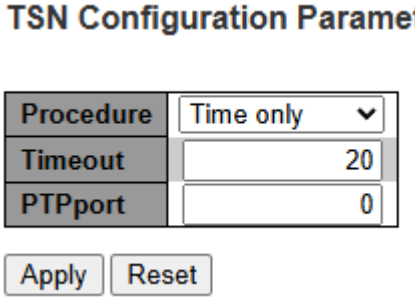


Label	Description
SyncCount	A counter that increments every time synchronization information is transmitted.
FollowUpCount	A counter that increments every time a Follow_Up message is transmitted.
PdelayRequestCount	A counter that increments every time a Pdelay_Req message is transmitted.
PdelayResponseCount	A counter that increments every time a Pdelay_Resp message is transmitted.
PdelayResponseFollowUpCount	A counter that increments every time a Pdelay_Resp_Follow_Up message is transmitted.
AnnounceCount	A counter that increments every time an Announce message is transmitted.

1.13 TSN

When using TAS and PSFP between network elements, it is required to have a common global time reference provided by PTP. When booting the device, it will take some time for a configured PTP application to get locked to the common time reference. It may cause malfunctioning of TAS and PSFP if config-change is issued before PTP time is in a Locked or Locking state. A function which can delay the issue of config-change until PTP is Locked/Locking or a configurable time has passed, can be configured here.

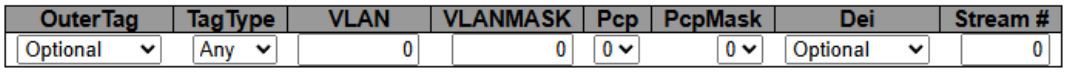
PTP Check



Label	Description
Procedure	Select how to ensure PTP state.
Timeout	Specify the maximal number of seconds to wait before config_change is issued.
PTP Port	Specify the PTP port to use for sensing PTP status

Stream – Outer Tag

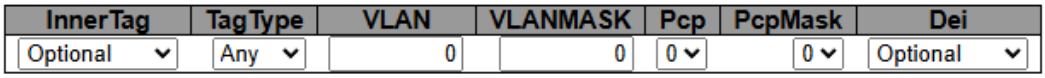
Outer Tag



Label	Description
Outer Tag	Can be set to Optional, Required, Not Allowed. When set to Optional or Not Allowed, no further specification of OuterTag is possible.
Tag Type	Can be set to Any, C-tag, S-tag. This field only applies when OuterTag is Required.
VLAN	VLAN number to use with VLANMASK [1-4095]. This field only applies when OuterTag is Required.
VLAN MASK	Used to mask value of VLAN [0-4095]. This field only applies when OuterTag is Required.
Pcp	Pcp value to use with PcpMask. [0-7]. This field only applies when OuterTag is Required.
PcpMask	Mask to use with Pcp. [0-7]. This field only applies when OuterTag is Required.
Dei	Can be set to Required, Optional, Not Allowed. This field only applies when OuterTag is Required.

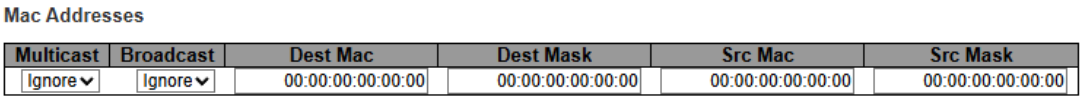
Stream – Inner-Tag

Inner Tag



Label	Description
InnerTag	Can be set to Optional, Required, Not Allowed. When set to Optional or Not Allowed, no further specification of InnerTag is possible.
Tag Type	Can be set to Any, C-tag, S-tag. This field only applies when InnerTag is Required.
VLAN	VLAN number to use with VLANMASK [1-4095]. This field only applies when InnerTag is Required.
VLAN MASK	Used to mask value of VLAN [0-4095]. This field only applies when InnerTag is Required.
Pcp	Pcp value to use with PcpMask. [0-7]. This field only applies when InnerTag is Required.
PcpMask	Mask to use with Pcp. [0-7]. This field only applies when InnerTag is Required.
Dei	Can be set to Required, Optional, Not Allowed. This field only applies when InnerTag is Required.

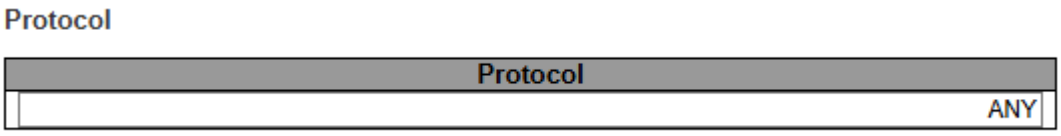
Stream – Mac Address



Label	Description
Multicast	Destination multicast. Can be set to Clear, Set, Ignore.
Broadcast	Destination broadcast. Can be set to Clear, Set, Ignore.
Dest Mac	Destination mac address to be used with Dest Mask.
Dest Mask	Mask to be used with Dest Mac.
Src Mac	Source Mac address to be used with Src Mask.
Src Mask	Mask to be used with Src Mac.

Stream – Configuration Protocol

String describing the Protocol encapsulation. The string has two parts separated by a space. The first part specifies the encapsulation type and the output can be either ANY, ETH2, LLC, SNAP, IPV4 or IPV6. The second part specifies the encapsulation parameters and its format depends on the selected encapsulation type:



Label	Description
ANY	any
ETH2	A hex ranging from 0600 to ffff indicating the protocol type, e.g. 0800 for IP. Example : ETH2 0800
LLC	**DSAP**:xxx **SSAP**:yyy Each of these two fields can range from 0 to 255. Example : LLC DSAP:AA SSAP:BB
SNAP	OUI:xx-xx-xx PID:xxxx The OID can range from 00-00-00 to ff-ff-ff and the PID from 0000 to ffff. Special case is when OID is 00-00-00; then PID can only range from 0600 to ffff. Example : SNAP OUI:CC-CC-CC PID:111
IPV4	**fragment**:['yes'|'no'|'any'] **options**:['yes'|'no'|'any'] **DSCP**:[{uint6'/'uint6} | '['{uint6'-'uint6}']' | ']'{uint6'-'uint6}'['] **proto**:uint8/uint8 **sip**:uint8.uint8.uint8.uint8/uint8.uint8.uint8.uint8 **dip**:uint8.uint8.uint8.uint8/uint8.uint8.uint8.uint8 **port**:[{uint16'/'uint16} | '['{uint16'-'uint16}']' | ']'{uint16'-'uint16}'['] where uint6 can range from 0-63, uint8 can range from 0-255 and uint16 can range from 0-65535. Example:

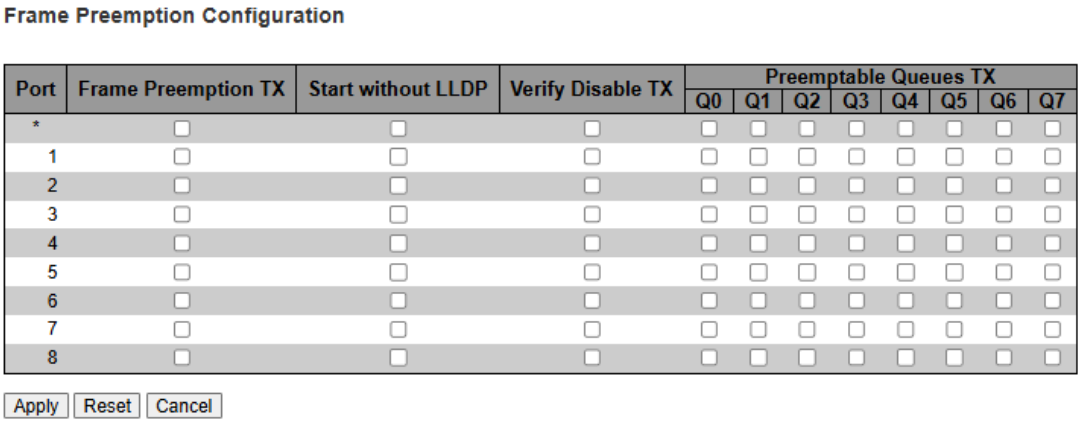
	IPV4 frag:any options:any DSCP:19/63 proto:34/255 sip:20.21.22.23/255.255.0.0 dip:10.11.12.13/255.255.255.0 dport:10/65535
IPV6	**DSCP**: [{uint6'/'uint6} | '['{uint6'-'uint6}']' | ']'{uint6'-'uint6}'['] **proto**:uint8/uint8 **sip**: Source IP address with mask in CIDR notation. **dip**: Destination IP address mask in CIDR notation. **port**: [{uint16'/'uint16} | '['{uint16'-'uint16}']' | ']'{uint16'-'uint16}'['] where uint6 can range from 0-63, uint8 can range from 0-255 and uint16 can range from 0-65535. Example: IPV6 DSCP:34/63 proto:12/255 sip:1:4001:5001::1/ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff dip:2001::1/ffff:ffff:ffff:ffff:: dport:100/65535

Stream – Port Members

Check the ports on which this filter is applied to. By default no ports are included.

Frame Preemption-Conifuration

This page provides an overview of TSN Egress Port Frame Preemption Configuration.

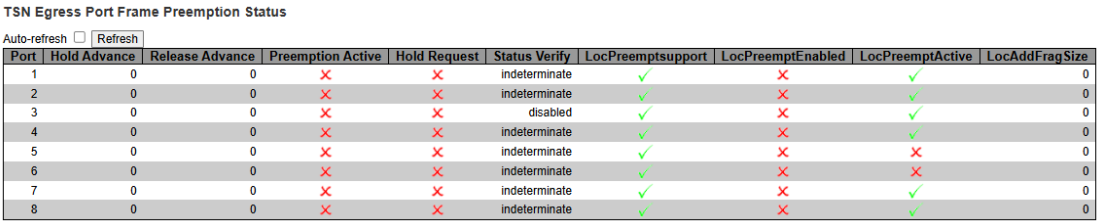


Label	Description
Port	The logical port for the settings contained in the same row. Please note that Frame Preemption is not supported on ports with maximum speed 25 Gigabit/sec and is also not supported on 10G Gigabit/sec Aquantia Copper port.

Frame Preemption TX	The value of the 802.3br aMACMergeEnableTx parameter for the port. This value determines whether frame preemption is enabled (TRUE) or disabled (FALSE) in the MAC Merge sublayer in the transmit direction.
Start Without LLDP	When this field is checked, Frame Preemption will be active when Frame Preemption TX is checked.
Verify Disable TX	The value of the 802.3br aMACMergeVerifyDisableTx parameter for the port. This value determines whether the verify function is disabled (TRUE) or enabled (FALSE) in the MAC Merge sublayer in the transmit direction.
Preemptable Queues	This parameter is the administrative value of the preemption status for the priority. If checked, it takes value preemptable if frames queued for the priority are to be transmitted using the preemptable service for the Port. If not checked, it takes value express if frames queued for the priority are to be transmitted using the express service for the Port and preemption is enabled for the Port.

Frame Preemption-Status

This page provides an overview of TSN Egress Port Frame Preemption Status all switch ports.


TSN Egress Port Frame Preemption Status

Auto-refresh ☐ Refresh

Port	Hold Advance	Release Advance	Preemption Active	Hold Request	Status Verify	LocPreemptsupport	LocPreemptEnabled	LocPreemptActive	LocAddFragSize
1	0	0	✗	✗	indeterminate	✓	✗	✓	0
2	0	0	✗	✗	indeterminate	✓	✗	✓	0
3	0	0	✗	✗	disabled	✓	✗	✓	0
4	0	0	✗	✗	indeterminate	✓	✗	✓	0
5	0	0	✗	✗	indeterminate	✓	✗	✗	0
6	0	0	✗	✗	indeterminate	✓	✗	✗	0
7	0	0	✗	✗	indeterminate	✓	✗	✓	0
8	0	0	✗	✗	indeterminate	✓	✗	✓	0

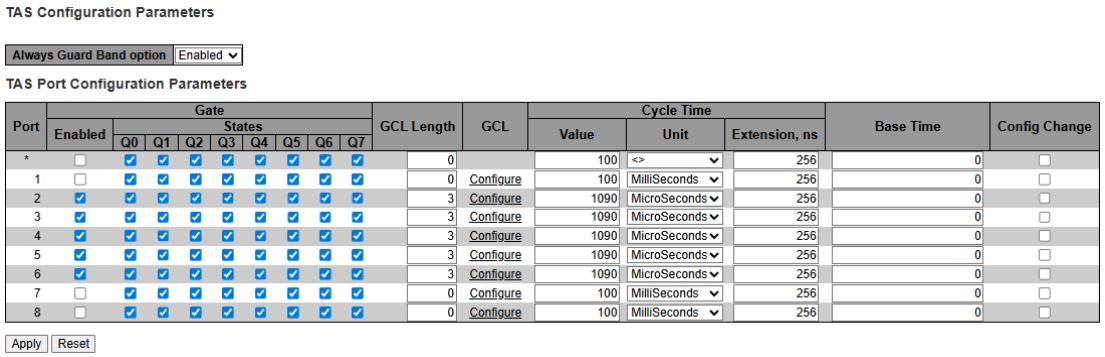
Label	Description
Port	The logical port for the settings contained in the same row.
Hold Advance	The value of the holdAdvance parameter for the Port in nanoseconds. There is no default value; the holdAdvance is a property of the underlying MAC.
Release Advance	The value of the releaseAdvance parameter for the Port in nanoseconds. There is no default value; the releaseAdvance is a property of the underlying MAC.
Preemption Active	The value is active (TRUE) when preemption is operationally active for the Port, and idle (FALSE) otherwise.
Hold Request	The value is hold (TRUE) when the sequence of gate operations for the Port has executed a Set-And-Hold-MAC operation, and release (FALSE) when the sequence of gate operations has executed a Set-And-Release-MAC operation. The value of this

	object is release (FALSE) on system initialization.
Status Verify	The status of the MAC Merge sublayer verification for the given device. The possible values are: initial Verification process is initializing idle The verification process is ongoing send The verification process is ongoing wait The verification process is ongoing succeeded The verification process is completed and frame pree failed The verification process is completed and frame pree disabled Frame preemption is disabled indetermina te The verification process is completed but it cannot be partner supports frame preemption
LocPreemptsupport	The value is TRUE when preemption is supported on the port, and FALSE otherwise.
LocPreemptEnabled	The value is TRUE when preemption is enabled on the port, and FALSE otherwise.
LocPreemptActive	The value is TRUE when preemption is operationally active on the port, and FALSE otherwise.
LocAddFragSize	The value of the 802.3br LocAddFragSize parameter for the port. The minimum size of non-final fragments supported by the receiver on the local port. This value is expressed in units of 64 octets of additional fragment length. The minimum non-final fragment size is: (LocAddFragSize + 1) * 64 octets.

TAS

TAS is an acronym for Time Aware Shaper. 802.1Qbv: This amendment specifies time-aware queue-draining procedures, managed objects and extensions to existing protocols that enable bridges and end stations to schedule the transmission of frames based on timing derived from IEEE Std 802.1AS.

TAS- Ports Configuration



Label	Description
Always Guard Band	The Always Guard Band option defines how the guard band

	values are calculated. If a Gate Control List do not contain SetAndHold and/or SetAndRelease operations the Always Guard Band option has no effect. If a Gate Control List do contain SetAndHold and SetAndRelease operations then: • When Always Guard Band is Enabled, a guard band is implemented on all queues, both Express and Preemptible queues. • When Always Guard Band is Disabled, a guard band is only implemented on Preemptible queues.
Port	Port number of the switch.
Gate Enabled	The Enabled parameter determines whether traffic scheduling is active (true) or inactive (false).
Gate States	The initial value of the port open states that is used when no Gate Control List is active on the Port.
GCL Length	The Admin Gate Control List length parameter for the Port. Valid range is 0-256. The integer value indicates the number of entries Gate Control Elements in the Gate Control List. If you change the value, press the Save button before configuring the Gate Control List by pressing the GCL link.
GCL	A link to the Gate Control List parameter configuration.
Cycle Time	The Admin value of the gating cycle for the Port. The Admin Cycle Time variable is a rational number of seconds, defined by value and a unit.
Cycle Time Value	The Admin Cycle Time is defined by this number of units defined in the Unit field. The Admin Cycle Time is a value in the range 1-999999999, and combined with the Cycle Time Unit the value shall be in the range 256-999999999 nanoseconds. The default value is 100 milliseconds.
Cycle Time Unit	The Admin Cycle Time unit. May be milliseconds, microseconds or nanoseconds.
Cycle Time Extension	An integer number of nanoseconds in the range 256-999999999, defining the maximum amount of time by which the gating cycle for the Port is permitted to be extended when a new cycle configuration is installed. The default value is 256 nanoseconds.
Base Time	The Admin value of base time, expressed as an IEEE 1588 precision time protocol (PTP) timescale.
Config Change	The Configuration Change parameter signals the start of a configuration change. After a successfull configuration change,

	the configured Admin values will become the Oper values, which are displayed in the Monitor/TSN/TAS web page If the value of parameter Base Time is in the future, the configuration change will be executed at Base Time. If Base Time is in the past, the configuration change will be executed as soon as possible. In practice it will be within approx 2 seconds, at a time which is an integral number of Cycle Time ahead of the configured value of Base Time. This way, the synchronisation between schedules in elements across a sceduled network can be maintained.

TAS - MAX SDU

TAS SDU Configuration

Port	Max SDU Size							
	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7
*	1536	1536	1536	1536	1536	1536	1536	1536
1	1536	1536	1536	1536	1536	1536	1536	1536
2	1536	1536	1536	1536	1536	1536	1536	1536
3	1536	1536	1536	1536	1536	1536	1536	1536
4	1536	1536	1536	1536	1536	1536	1536	1536
5	1536	1536	1536	1536	1536	1536	1536	1536
6	1536	1536	1536	1536	1536	1536	1536	1536
7	1536	1536	1536	1536	1536	1536	1536	1536
8	1536	1536	1536	1536	1536	1536	1536	1536

Apply Reset

Label	Description
Port	Port number of the switch.
Maximum SDU	The value of the Maximum SDU size parameter for the traffic class supported by the port. This value is represented as an unsigned integer in the range 0-10240. A value of 0 is interpreted as the Maximum SDU size supported by the underlying MAC: 10240. The default value of the Maximum SDU parameter is 1536. The Maximum SDU size parameter is used to calculate the guard band time = Maximum SDU * 8 / LINK_SPEED (sec) If frame preemption is enabled and a gate operaton is SetAndHold, the guard band time in preemptable queues is automatically selected as the frame preemption minimum fragment size plus 64 bytes. A queue is said to be preemptible, if frame preemption is enabled, and if this queue is not opened in a SetAndHold gate operation

TAS - Status

TAS Status Parameters

Auto-refresh ☐ Refresh

Port	Oper Gate									Cycle Time			Time		Config Change		Tick Granularity	Config Pending	Gate Control List	
	Enabled	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Value	Unit	Extension, ns	Base	Current	Time	Error			Length	GCL
1	✗	✓	✓	✓	✓	✓	✓	✓	✓	100	MilliSeconds	256	0	4092	0	0	1	false	0	Status
2	✓	✓	✓	✓	✓	✓	✓	✗	✗	1090	MicroSeconds	256	0	4092	17.156600000	1	1	false	3	Status
3	✓	✗	✗	✗	✗	✗	✗	✗	✓	1090	MicroSeconds	256	0	4092	17.157690000	1	1	false	3	Status
4	✓	✗	✗	✗	✗	✗	✗	✗	✓	1090	MicroSeconds	256	0	4092	17.158780000	1	1	false	3	Status
5	✓	✗	✗	✗	✗	✗	✗	✗	✓	1090	MicroSeconds	256	0	4092	17.160960000	1	1	false	3	Status
6	✓	✓	✓	✓	✓	✓	✓	✗	✗	1090	MicroSeconds	256	0	4092	17.162050000	1	1	false	3	Status
7	✗	✓	✓	✓	✓	✓	✓	✓	✓	100	MilliSeconds	256	0	4092	0	0	1	false	0	Status
8	✗	✓	✓	✓	✓	✓	✓	✓	✓	100	MilliSeconds	256	0	4092	0	0	1	false	0	Status

Label	Description
Port	Port number of the switch.
Oper Gate Enabled	The Enabled parameter shows whether traffic scheduling is active (true) or inactive (false).
Oper Gate States	The current state of the gate associated with each queue for the Port.
Cycle Time Value	The operational value of the gating cycle for the Port. The Cycle Time variable is a rational number of seconds, defined by value and a unit.
Cycle Time Unit	The operational Cycle Time unit. May be milliseconds, microseconds or nanoseconds.
Cycle Time Extension	An integer number of nanoseconds, defining the maximum amount of time by which the gating cycle for the Port is permitted to be extended when a new cycle configuration is installed.
Base Time	The operational value of base time, expressed as an IEEE 1588 precision time protocol (PTP) timescale.
Current Time	The current time, in PTPtime, as maintained by the local system. The value is a representation of a PTPtime value, consisting of a 48-bit integer number of seconds and a 32-bit integer number of nanoseconds. Only the seconds are displayed.
Config Change Time	The PTPtime at which the next config change is scheduled to occur. The value is a representation of a PTPtime value, consisting of a 48-bit integer number of seconds and a 32-bit integer number of nanoseconds.
Config Change Error	A counter of the number of times that a re-configuration of the traffic schedule has been requested with the old schedule still running and the requested base time was in the past.
Tick Granularity	The granularity of the cycle time clock, represented as an unsigned number of tenths of nanoseconds.
Config Pending	The value of the ConfigPending state machine variable. The value is TRUE if a configuration change is in progress but has not yet completed.
GCL Length	The operational value of the gate control list length parameter for the Port. The integer value indicates the number of entries (TLVs) in the operational gate control list.

GCL	A link to the GCL parameter status.

PSFP

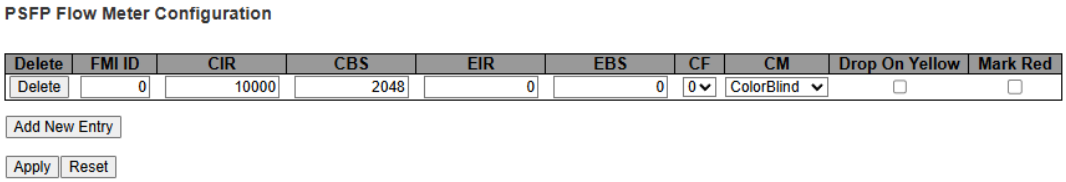
PSFP is an acronym for Per Stream Filtering and Policing.

PSFP functions allow filtering and policing decisions, and subsequent frame queuing decisions on a per-stream basis.

PSFP is supported by a table of stream filters that determine the filtering and policing actions that are to be applied to frames received on ingress ports.

PSFP – Flow Meter

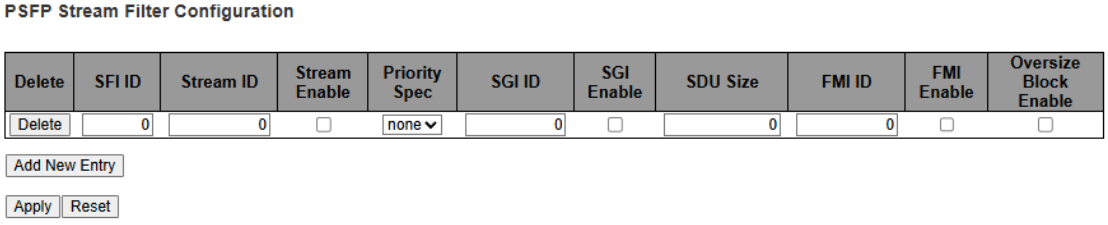
This page allows the user to inspect the current PSFP configurations, and possibly change them as well.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
FMI ID	The FlowMeterInstance parameter is an index into the FlowMeterTable.
CIR	The FlowMeterCIR parameter contains an integer value that represents the CIR value for the flow meter, in bit/s.
CBS	The FlowMeterCBS parameter contains an integer value that represents the CBS value for the flow meter, in octets.
Mark RED Enable	The FlowMeterMarkAllFramesRedEnable parameter contains a Boolean value that indicates whether the MarkAllFramesRed function is enabled (TRUE) or disabled (FALSE).
Mark RED	The FlowMeterMarkAllFramesRed parameter contains a Boolean value that indicates whether, if the MarkAllFramesRed function is enabled, all frames are to be discarded (TRUE) or not (FALSE).

PSFP – Stream Filter

This page allows the user to inspect the current PSFP configurations, and possibly change them as well.

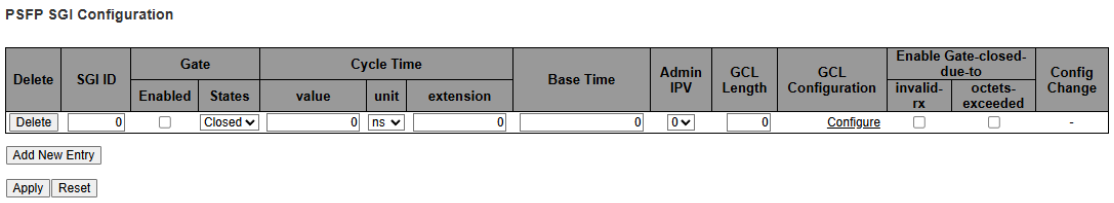


Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
SFI ID	The Stream Filter Instance parameter is an index into the StreamFilterTable.

Stream ID	The Stream Handle Spec parameter contains a stream identifier specification value. A value of -1 denotes the wild card value; all positive values denote stream identifier values.
Priority Spec	The Priority Spec parameter contains a priority specification value. A value of -1 denotes the wild card value; zero or positive values denote priority values.
Interface Spec	The InterfaceSpec parameter contains an interface specification value. A value of VTSS_IFINDEX_NONE denotes the wild card value.
SGI ID	The Stream Gate Instance parameter contains the index of an entry in the Stream Gate Table.
SDU Size	The MaximumSDUSize parameter specifies the maximum allowed frame size for the stream. Any frame exceeding this value will be dropped. A value of 0 denote that the MaximumSDUSize filter is disabled for this stream.
FMI ID	The FlowMeterInstanceID parameter contains the index of an entry in the Flow Meter Table. A value of -1 denotes that no flow meter is assigned; zero or positive values denote flow meter IDs.
Block Oversize Enable	The StreamBlockedDueToOversizeFrameEnable object contains a Boolean value that indicates whether the StreamBlockedDueToOversizeFrame function is enabled (TRUE) or disabled (FALSE).
Block Oversize	The StreamBlockedDueToOversizeFrame object contains a Boolean value that indicates whether, if the StreamBlockedDueToOversizeFrame function is enabled, all frames are to be discarded (TRUE) or not (FALSE).

PSFP – Stream Gate

This page allows the user to inspect the current PSFP configurations, and possibly change them as well.



Label	Description
Delete	Check to delete the entry. It will be deleted during the next save.
SGI ID	The Stream Gate Instance parameter is an index into the Stream Gate Table
Gate Enabled	The Gate Enabled parameter determines whether the stream gate is active (true) or inactive (false).
Gate States	The administrative value of the GateStates parameter for the stream gate. The open value indicates that the gate is open, the

	closed value indicates that the gate is closed.
Cycle Time Value	The administrative value of the cycle time for the gate. The time may be specified in either milli seconds, micro seconds or nano seconds as defined by the field Cycle Time unit.
Cycle Time unit	The unit used for specifying the administrative cycle time. possible values are **ns**, **us** or **ms**.
Cycle Time Extension	The administrative value of the CycleTimeExtension parameter for the gate. The value is an unsigned integer number of nanoseconds.
Base Time	The administrative value of the BaseTime parameter for the gate. The value is a representation of a PTPtime value, consisting of decimal number of seconds since epoch. The time can be given with a resolution of nine decimals.
Admin IPV	The administrative value of the IPV parameter for the gate. A value of -1 denotes the null value.
GCL Length	The number of entries in the Gate Control List.
GCL Configuration	Configuration of the Gate Control List.
Enable Gate-closed-due-to invalid-rx	A Boolean value that indicates whether to close the gate if invalid data is received.
Enable Gate-closed-due-to octets-exceeded	A Boolean value that indicates whether to close the gate if too many octets are received
Config Change	The ConfigChange parameter signals the start of a configuration change for the gate when it is set to TRUE. This should only be done when the various administrative parameters are all set to appropriate values.

FRER

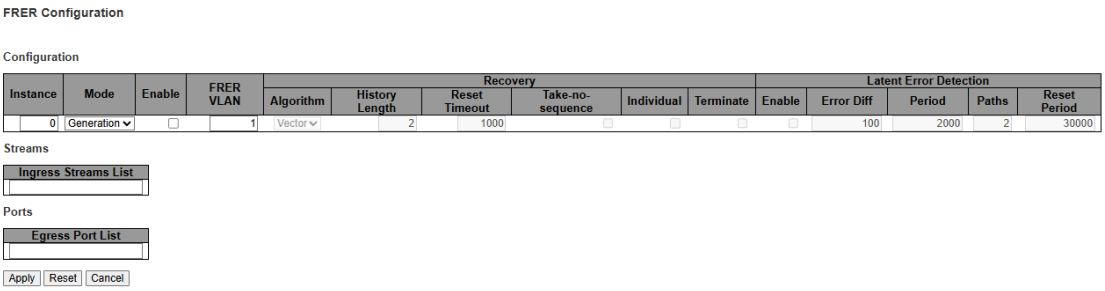
FRER is an acronym for Frame Replication and Elimination for Reliability.

Frame Replication and Elimination for Reliability is specified by the IEEE 802.1CB-2017 standard and provides increased reliability (reduced packet loss rates) for a stream.

This is achieved by:

1. Sequence numbering and replicating packets in the talker (source) end system and/or in relay systems in the network.
2. Eliminating those replicates in the listener (destination) end system and/or in other relay systems.

FRER - Configuration



Label	Description
Mode	Decides if this FRER instance shall run in generation or recovery mode. Default is generation.
Enable	Enable or disable a FRER instance.
FRER VLAN	Select the VLAN ID that ingress flows get classified to.
Algortihm	IEEE 802.1CB-2017 requires implementations to provide two different recovery function algorithms, match and vector. match is the simplest algorithm: It basically says: Discard all packets with a sequence number equal to the last sequence number seen. Accept all others. The algorithm also comes with a reset timer that - when it expires - causes the algorithm to accept any sequence number - even the same as the previous. The reset timer is restarted every time a packet is accepted. The match algorithm counts the number of times the reset timer has expired and the number of passed, discarded, and out-of-order packets. Out-of-order happens when the sequence number of a given packet is not one higher than the previous (and the timer has not expired). vector is somewhat more complicated. When a packet with a given sequence number arrives, it must be within the previous accepted packets sequence number +/- a configurable history length, or it will be discarded. If the packet is already seen (within the history length window), it is also discarded. Also this algorithm comes with a reset timer that - when it expires - causes the algorithm to accept any sequence number next time a packet arrives. The reset timer is restarted every time a packet is accepted. The vector algorithm counts the number of times the reset timer has expired and the number of passed, discarded, out-of-order, and so-called rogue packets. Out-of-order happens when the sequence number of a given packet is "older" than a previous packets (taking wrap-around into account), and the packet has

	not been accepted before. Out-of-order packets are accepted. Rogue packets are packets with a sequence number beyond the history length window. Rogue packets are also counted as discarded. Furthermore, the vector algorithm counts lost packets, that is, the number of unreceived sequence numbers when the history window moves. Both algorithms also counts the number of packets arriving without an R-tag. This is done with the tagless counter. By default, such packets will be discarded. A per-FRER instance parameter recovery take-no-sequence, however, allows such frames to pass through. Notice: The 802.1CB standard utilizes the frerSeqRcvyTakeNoSequence only in the vector algorithm, but the switches that the present guide is meant for also utilizes it in the match algorithm. Notice: This feature should only be used on terminating switches, because such tagless packets will be R-tagged (with sequence number 0) on their way out on non-terminating switches. The selected algorithm on a given FRER instance will be used in both compound and individual recovery functions. Default is the vector algorithm.
History Length	Configure the recvery functions history length. Valid range is 2-32 and default is 2.
Reset Timeout	Configure recovery function's reset timeout in milliseconds. Valid range is 1-4095 and default is 1000.
Take-no-sequence	Select this option to accept all frames whether they are R-tagged or not.
Individual	Individual recovery means that a member stream undergoes recovery before it reaches the compound recovery function. The compound recovery function sits on each and every egress port in the FRER instance. The one and only thing that individual recovery can do that compound recovery can not is to filter out member streams that keep presenting the same R-tag sequence number because of a defect transmitter. It goes like this: Suppose the transmitter of member stream 1 is working perfectly. It will send out frames with an increasing sequence number and wrap back to 0 after 65535 frames. Suppose the transmitter of member stream 2 is sending out the same frame with the same sequence number, X, over and over again. If we only had a

	compound recovery function, that function would at times be presented with frames with sequence number X from stream 1 and sequence number X from stream 2, and the first of these two frames would be sent to the egress port. So - depending on timing - sometimes the frame with sequence number X would come from stream 1 and sometimes it would come from the erroneous stream 2. The effect of enabling individual recovery is to have the individual recovery function for stream 2 filter out all identically numbered frames before they are presented to the compound recovery function. This is a very unlikely situation, and most network administrators will not need individual recovery. Moreover, individual recovery is very expensive in terms of hardware resources: Every ingress stream needs an individual recovery function per egress port. So if a FRER instance defines 8 ingress streams and 8 egress ports, the switch needs 64 individual recovery instances - just for this one FRER instance.
Terminate	Select this option to strip an R-Tag from a frame before presenting it on egress.
Latent Error Detection	The purpose of latent error detection is to raise a flag if the number of discarded packets is "relatively few" compared to the number of passed packets. The algorithm relies on four user inputs: Period, Reset period, Paths, Error difference. The reset function algorithm is as follows: Every Reset period milliseconds, read number of passed and discarded packet counters, and set a per-FRER instance variable, CurDiff, as follows: CurDiff = passed_packets * (paths - 1) - discarded_packets; The test function algorithm is as follows: Every timeout milliseconds, read the discarded and passed packet counters, and perform the following: diff = Abs(CurDiff - (passed_packets * (paths - 1) - discarded_packets));

	if (diff > difference) {
	raise_flag();
	}
	
	Basically, it says: If you expect N member streams to ingress this FRER instance, N-1 of these member streams are expected to be discarded, and only one is expected to pass. To allow for some slack due to random packet losses and the fact that counters are not neccessarily read simultaneously, set the difference to account for that. The reset function makes sure that CurDiff is updated to avoid that occassional packet losses do not accumulate forever.

Latent Error Detection, Enable	Enable/disable Latent error detection.
Latent Error Detection, Error Diff	The number of packets "allowed" to be in difference without raising the flag. Valid range is 0-10000000 and default is 100.
Latent Error Detection, Period	The number of milliseconds between invoking the test function. Valid range is 1000-86400000 and default is 2000.
Latent Error Detection, Paths	The number of member streams expected to ingress this FRER instance. Valid range is 2-4 and default is 2.
Latent Error Detection, Reset period	The number of milliseconds between invoking the reset function. Valid range is 1000-86400000 and default is 30000.
Ingress streams list	Specify the ingress streams that should map to this FRER instance. Only one stream ID can be specified in generator mode. There is a maximum limit of 8 ingress streams.
Egress port list	Specify the egress ports that this FRER instance will hit. There is a maximum of 8 egress ports per FRER instance.

FRER – Status

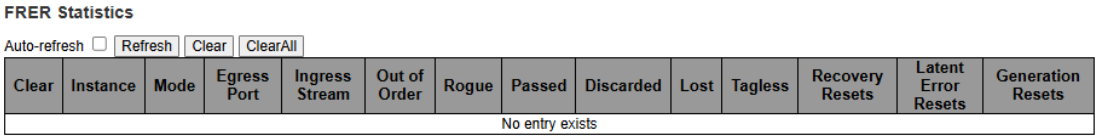
This page allows the user to inspect the current FRER status, and possible reset/clear them as well.

Label	Description
Instance	The id of the FRER instance.
Oper	The operational state of FRER instance. ●: Active. ●: Disabled or Internal error.
Warring	Operational warnings of FRER instance. ●: No warnings. ●: There are warnings, use tooltip to see.
Latent Error	●: No errors. ●: There are latent errors.

Statistics	Check to reset statistics counters.
Reset Function	Click to perform function reset. If this FRER instance is in generation mode, this is used to reset the sequence number of the sequence generator. If this FRER instance is in recovery mode, this is used to reset the recovery function. It resets both possible individual recovery functions and the compound recovery functions.
Reset Latent Error	Clich to clear a sticky latent error.

FRER - Statistics

This page allows the user to inspect the current FRER statistics counters, and possibly clear them as well.

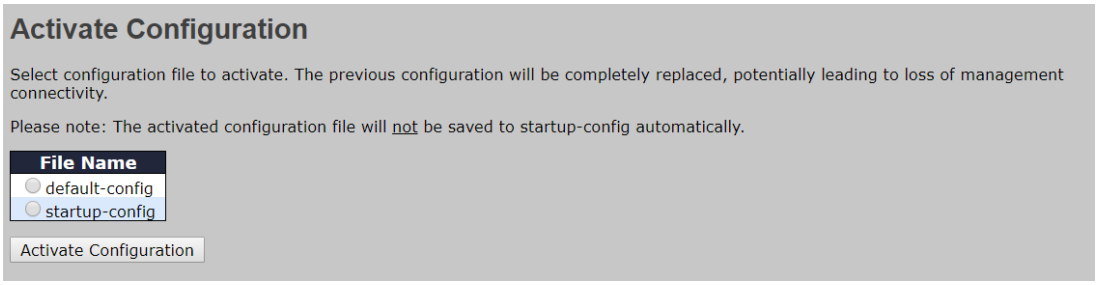


Label	Description
Clear	This box is used to mark an entry for clearance in next Clear operation.
Instance	The FRER instance id.
Mode	Mode of operation. Generation or Recovery.
Egress Port	List of egress port numbers. Only valid in Recovery mode.
Ingress Stream	List of Ingress stream IDs. Only valid in Recovery mode.
Out of Order	IEEE 802.1CB-2017: frerCpsSeqRcvyOutOfOrderPackets. Only valid in Recovery mode.
Rogue	IEEE 802.1CB-2017: frerCpsSeqRcvyRoguePackets. Only valid in Recovery mode.
Passed	IEEE 802.1CB-2017: frerCpsSeqRcvyPassedPackets. Only valid in Recovery mode.
Discarded	IEEE 802.1CB-2017: frerCpsSeqRcvyDiscardedPackets. Only valid in Recovery mode.
Lost	IEEE 802.1CB-2017: frerCpsSeqRcvyLostPackets. Only valid in Recovery mode.
Tagless	IEEE 802.1CB-2017: frerCpsSeqRcvyTaglessPackets. Only valid in Recovery mode.
Recovery Resets	IEEE 802.1CB-2017: frerCpsSeqRcvyResets. Only valid in Recovery mode.
Latent Error Resets	IEEE 802.1CB-2017: frerCpsSeqRcvyLatentErrorResets. Only valid in Recovery mode.
Generation Resets	IEEE 802.1CB-2017: frerCpsSeqGenResets. Only valid in Generation mode.

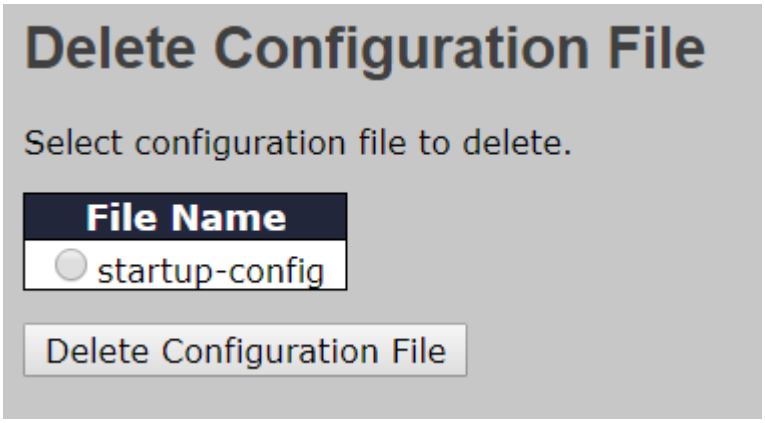
1.14 Configuration

This setting allows you to activate or delete configuration files. Simply select the files to be activated or deleted and press the button.

1.14.1 Activate



1.14.2 Delete



1.15 Save

You can save current configurations as a startup configuration file.

1.16Troubleshooting

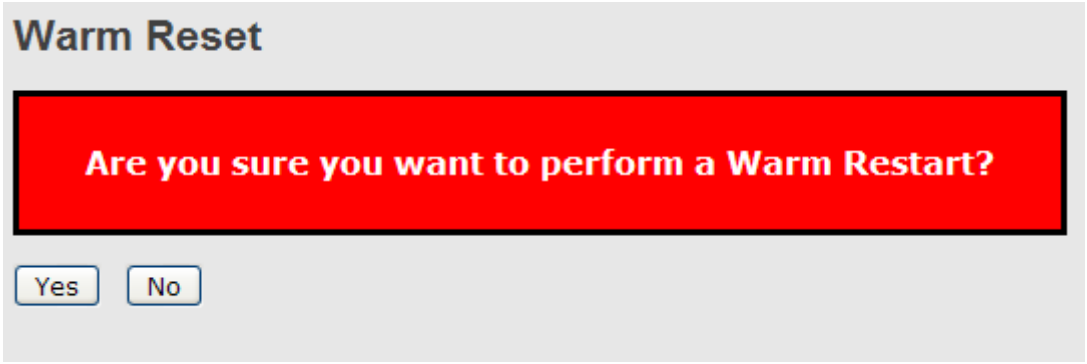
1.16.1 Factory Defaults

You can reset the configuration of the stack switch on this page. Only the IP configuration is retained.

Label	Description
Yes	Click to reset the configuration to factory defaults
No	Click to return to the Port State page without resetting

1.16.2 System Reboot

You can reset the stack switch on this page. After reset, the system will boot normally as if you have powered on the devices.



Label	Description
Yes	Click to reboot device
No	Click to return to the **Port State** page without rebooting