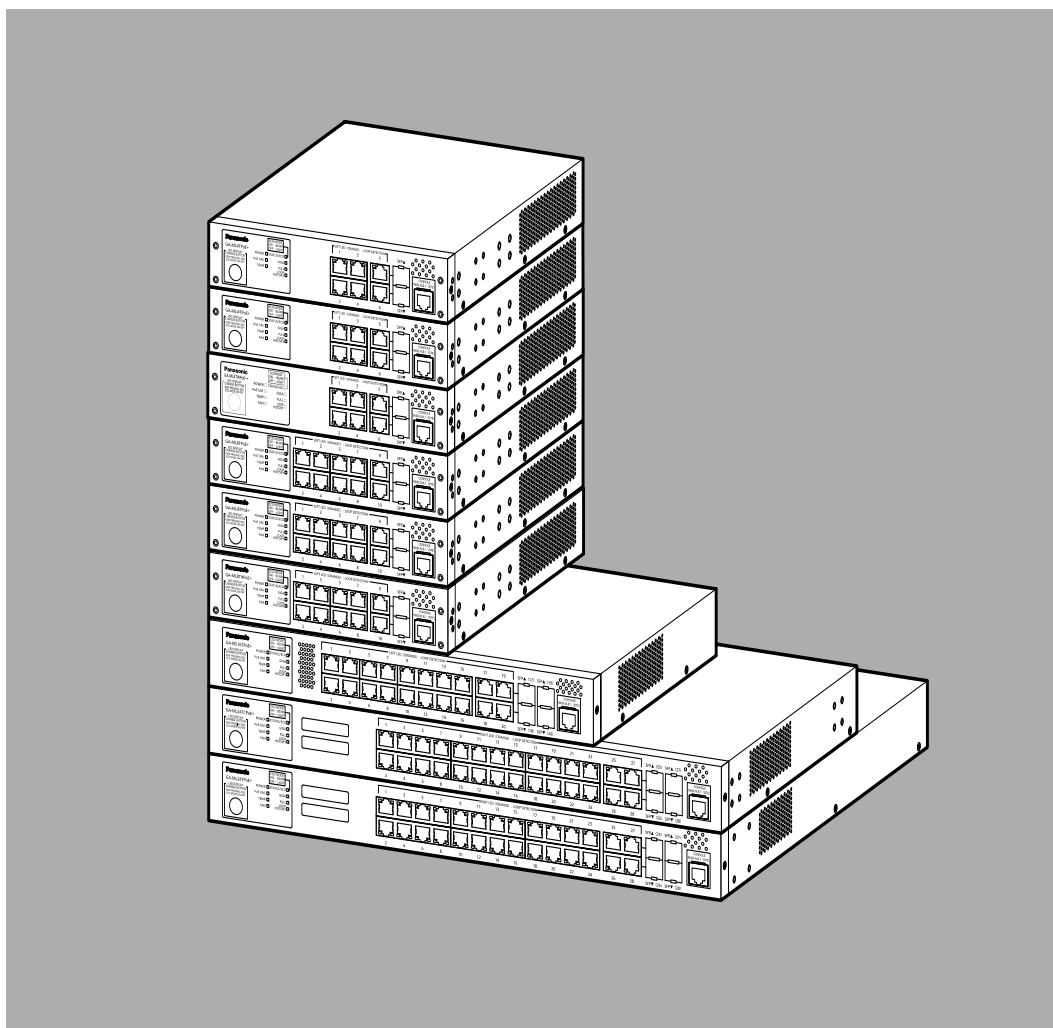




## GA-ML Series

**WEB Reference**

Model Number PN260493N/PN260493H/PN260496/  
PN260893/PN260893H/PN260894/  
PN261693/PN262492/PN262493



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The target model for this WEB reference is as follows

Model name	Model number	Firmware version
GA-ML4TPoE+	PN260493N	3.1.0.05 and above
GA-MLi4TPoE+	PN260493H	3.1.0.05 and above
GA-ML4TWPoE++	PN260496	3.1.0.05 and above
GA-ML8TPoE+	PN260893	3.1.0.05 and above
GA-MLi8TPoE+	PN260893H	3.1.0.05 and above
GA-ML8THPoE+	PN260894	3.1.0.05 and above
GA-ML16TPoE+	PN261693	3.1.0.05 and above
GA-ML24TCPoE+	PN262492	3.1.0.05 and above
GA-ML24TPoE+	PN262493	3.1.0.05 and above

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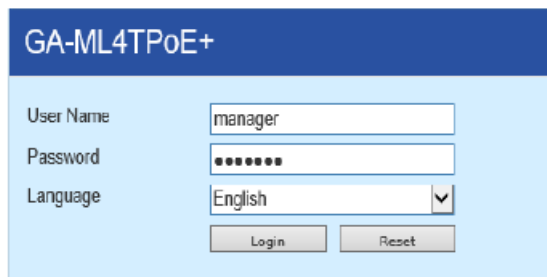
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# 1 Introduction

The GA-ML series can be programmed using the web.

- To enable the web, you need to program ① and ② using the CLI.
  - ① Assign an IP address to this system. (192.168.0.101 is an example.)  
GA-ML#configure terminal  
GA-ML(config)#interface vlan 1  
GA-ML(config-if)#ip address 192.168.0.101 255.255.255.0
  - ② Enable the http server function.  
GA-ML(config)#ip http server
- To log in to this device, enter the IP address on the web browser, and then enter the user name and password. The default username and password is "manager".



The screenshot shows the web interface for a GA-ML4TPoE+ device. The title bar is dark blue with the text "GA-ML4TPoE+" in white. Below the title bar, there is a light blue background with three input fields: "User Name" with the text "manager", "Password" with seven dots, and "Language" with a dropdown menu showing "English". At the bottom of the form are two buttons: "Login" and "Reset".

- The example settings screens used in this reference may differ from the actual screens.
- Some screens are not described in this reference. It can be used according to the actual screen display.

# 2 System

## 2.1 Device Information

Use the following window to display general switch information and utilization (or usage). As you log-into the Web UI of the switch, the window is displayed from the beginning.

Click the **GA-MLxxT** link (in Frame A) to display the following window.



Figure 2-1 Device Information

## 2.2 System Information Settings

Use the following window to implement the system information settings and display its settings.

Choose **System > System Information Settings** to display the following window.

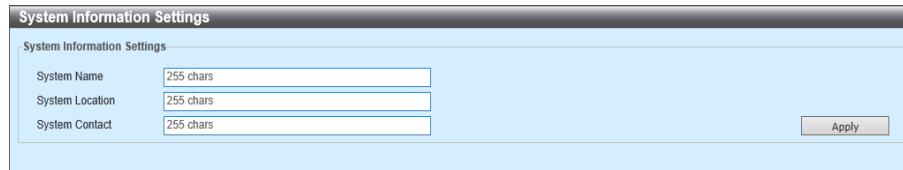


Figure 2-2 System Information Settings

In the section of **System Information Settings**, you can configure the following parameters.

Parameter	Overview
<b>System Name</b>	Enter the system name of a switch. Use the name to identify the switch in the network.
<b>System Location</b>	Enter and describe an overview of the switch location.
<b>System Contact</b>	Enter the name of the PIC for a switch. In general, this means the name of the person or company in charge of configuring and maintaining the switch.

Click **Apply** to reflect the change made.

## 2.3 Port Settings

### 2.3.1 Port Settings

Use the following window, and then implement the port settings on the switch to display its settings.

Choose **System > Port Configuration > Port Settings** to display the following window.

Port	Link Status	Medium	State	MDIX	Flow Control		Duplex	Speed	Description
					Send	Receive			
Gi1/0/1	Down	Enabled	Enabled	Auto	OFF	OFF	Auto	Auto	
Gi1/0/2	Down	Enabled	Enabled	Auto	OFF	OFF	Auto	Auto	
Gi1/0/3	Down	Enabled	Enabled	Auto	OFF	OFF	Auto	Auto	
Gi1/0/4	Down	Enabled	Enabled	Auto	OFF	OFF	Auto	Auto	
Gi1/0/5	Down	Enabled	Enabled	Normal	OFF	OFF	Auto	Auto	
Gi1/0/6	Down	Enabled	Enabled	Normal	OFF	OFF	Auto	Auto	

Figure 2-3 Port Settings

In the **Port Settings** section, you can configure the following parameters.

Parameter	Overview
<b>From port - To Port</b>	Choose the port you use.
<b>Selecting a Media</b>	Choose a media type for ports. The options available are <b>Automatic</b> , <b>RJ45</b> and <b>SFP</b> . SFP stands for Small Form-Factor Pluggable.
<b>Media Type</b>	Choose a media type for ports. The options available are <b>RJ45</b> and <b>SFP</b> .
<b>State</b>	This parameter enables or disables a physical port.

Parameter	Overview
<b>MDIX</b>	<p>Choose an object of MDIX (Medium Dependent Interface Crossover). The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Auto</b> - This value automatically senses an optimum type of cables.</li> <li>• <b>Normal</b> - Choose this for normal cables. Selecting it makes a port to become the MDIX mode, and that allows a straight-through cable to connect to a PC LAN adapter. Or, employ a cross-over cable to connect it to a port of a different switch (MDI mode).</li> <li>• <b>Cross</b> - Choose this for employing a cross-over cable. Selecting this option allows a port to become the MDI mode, and that allows a straight-cable to connect to a port of the different switch (MDIX mode).</li> </ul>
<b>Flow Control</b>	<p>Set the flow control to <b>ON</b> or <b>OFF</b>. On the port where it is set to full duplex, use the flow control of 802.3x, and use the one (of two), which is automatically selected on an <b>Automatic</b> port.</p>
<b>Duplex</b>	<p>Choose the duplex mode you use. The options available are <b>Automatic</b> and <b>Full</b>.</p>
<b>Speed</b>	<p>Choose the option of a port speed. This option allows you to implement the forced settings manually for the connection-speed on the port, which is selected for connecting with the speed specified. If <b>Master Configurations</b> are implemented, you can advertise the functions, which are related to types of duplex communication, the speed and physical layer, on ports. Also, this action determines the relationship between a master and a slave on the joint where two physical layers exist (or contact each other). The relationship is necessary for establishing a timing-control between the two physical layers above. The timing-control is configured on a physical layer of the master by a local source. A loop timing is used for the slave settings. In this case, the timing is obtained from the data stream received from the master. If one connection is set to the master, the other connection must be set to the slave. If other configurations are implemented, the condition of a "link-down" occurs on both ports.</p>

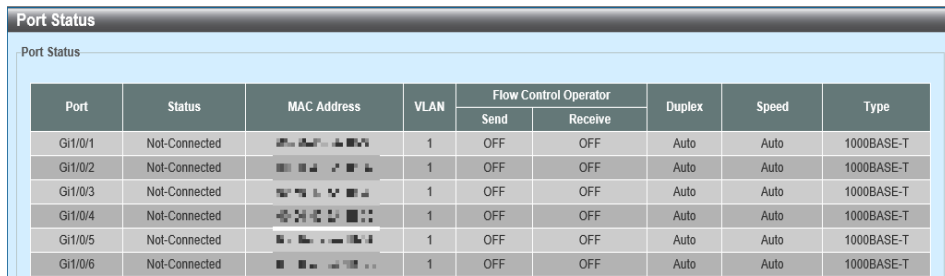
Parameter	Overview
<b>Speed</b>	<p>The following options are available to choose.</p> <ul style="list-style-type: none"> <li>• <b>Automatic</b> - In the case of a copper-port, an auto negotiation starts, and then it allows the speed and flow control to negotiate with its link-partner. In the case of fiber-ports, the auto negotiation starts, and then it allows the clock and full-control to negotiate with its link-partner.</li> <li>• <b>10M</b> - This value sets the port speed to 10 Mbps, forcefully. This option is available for 10 Mbps copper-cable connection, only.</li> <li>• <b>100M</b> - This value sets to the port speed to 100Mbps, forcefully. This option is available for 100Mbps copper-cable connection, only.</li> <li>• <b>1000M</b> - This value sets the port speed to 1Gbps, forcefully. This option is available for 1Gbps fiber-connection, only.</li> <li>• <b>1000M Master</b> - This value sets the port speed to 1Gbps forcefully, and functions as the master, and facilitates the timing of an operation for sending and receiving. This option is available for 1Gbps copper-cable connection, only.</li> <li>• <b>1000M Slave</b> - This value sets the port speed to 1Gbps forcefully, and also functions as the slave to facilitate the timing of an operation for sending and receiving. This option is only available for 1Gbps copper-cable connection.</li> </ul>
<b>Capability Advertised</b>	If you set the <b>Speed</b> to <b>Auto</b> , these functions are advertised during the <b>Auto Negotiation</b> .
<b>Description</b>	Describe an overview of the corresponding ports. The number of characters can be up to 64.

Click **Apply** to reflect the change made.

## 2.3.2 Port Status

Use the following window to display the physical port-status and settings of the switch.

Choose **System > Port Configuration > Port Status** to display the following window.



The screenshot shows a window titled "Port Status" with a sub-header "Port Status". Below the header is a table with the following columns: Port, Status, MAC Address, VLAN, Flow Control Operator (subdivided into Send and Receive), Duplex, Speed, and Type. The table contains six rows of data, all with a status of "Not-Connected".

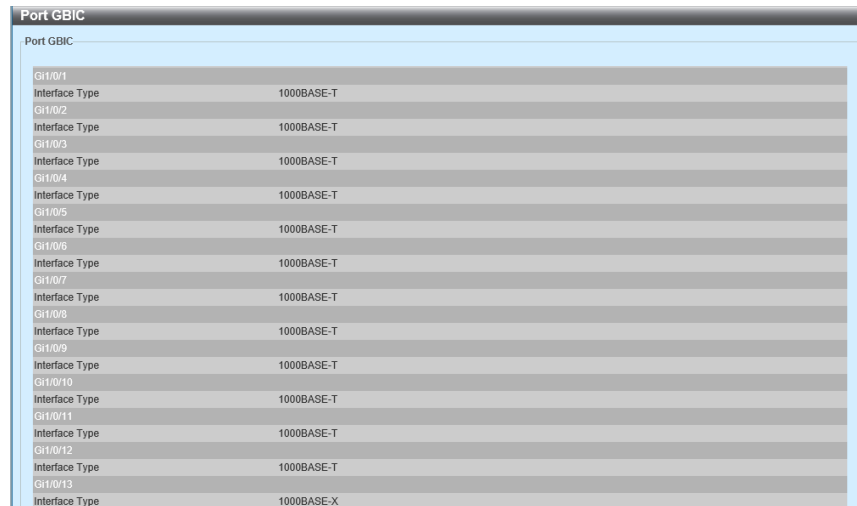
Port	Status	MAC Address	VLAN	Flow Control Operator		Duplex	Speed	Type
				Send	Receive			
Gi1/0/1	Not-Connected	00:00:00:00:00:00	1	OFF	OFF	Auto	Auto	1000BASE-T
Gi1/0/2	Not-Connected	00:00:00:00:00:00	1	OFF	OFF	Auto	Auto	1000BASE-T
Gi1/0/3	Not-Connected	00:00:00:00:00:00	1	OFF	OFF	Auto	Auto	1000BASE-T
Gi1/0/4	Not-Connected	00:00:00:00:00:00	1	OFF	OFF	Auto	Auto	1000BASE-T
Gi1/0/5	Not-Connected	00:00:00:00:00:00	1	OFF	OFF	Auto	Auto	1000BASE-T
Gi1/0/6	Not-Connected	00:00:00:00:00:00	1	OFF	OFF	Auto	Auto	1000BASE-T

Figure 2-4 Port Status

## 2.3.3 Port GBIC

Use the following window to display the information about the transceiver plugged into a physical port of the switch. GBIC stands for Gigabit Interface Converter.

Choose **System > Port Settings > Port GBIC** to display the following window.



The screenshot shows a window titled "Port GBIC" with a table of interface configurations. The table has two columns: the interface name and the interface type. The interface names range from Gi1/0/1 to Gi1/0/13. The interface types are mostly 1000BASE-T, with the last one (Gi1/0/13) being 1000BASE-X.

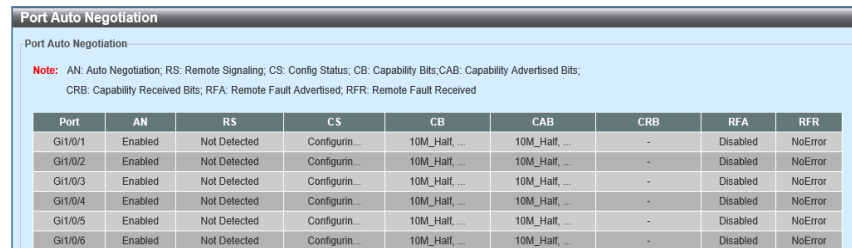
Interface	Interface Type
Gi1/0/1	1000BASE-T
Gi1/0/2	1000BASE-T
Gi1/0/3	1000BASE-T
Gi1/0/4	1000BASE-T
Gi1/0/5	1000BASE-T
Gi1/0/6	1000BASE-T
Gi1/0/7	1000BASE-T
Gi1/0/8	1000BASE-T
Gi1/0/9	1000BASE-T
Gi1/0/10	1000BASE-T
Gi1/0/11	1000BASE-T
Gi1/0/12	1000BASE-T
Gi1/0/13	1000BASE-X

Figure 2-5 Port GBIC

## 2.3.4 Port Auto Negotiation

Use the following window to display an Auto Negotiation table of a port and its information.

Choose **System > Port Configuration > Port Auto Negotiation** to display the following window.



**Port Auto Negotiation**

Port Auto Negotiation

**Note:** AN: Auto Negotiation; RS: Remote Signaling; CS: Config Status; CB: Capability Bits; CAB: Capability Advertised Bits; CRB: Capability Received Bits; RFA: Remote Fault Advertised; RFR: Remote Fault Received

Port	AN	RS	CS	CB	CAB	CRB	RFA	RFR
Gi1/0/1	Enabled	Not Detected	Configurin...	10M_Half, ...	10M_Half, ...	-	Disabled	NoError
Gi1/0/2	Enabled	Not Detected	Configurin...	10M_Half, ...	10M_Half, ...	-	Disabled	NoError
Gi1/0/3	Enabled	Not Detected	Configurin...	10M_Half, ...	10M_Half, ...	-	Disabled	NoError
Gi1/0/4	Enabled	Not Detected	Configurin...	10M_Half, ...	10M_Half, ...	-	Disabled	NoError
Gi1/0/5	Enabled	Not Detected	Configurin...	10M_Half, ...	10M_Half, ...	-	Disabled	NoError
Gi1/0/6	Enabled	Not Detected	Configurin...	10M_Half, ...	10M_Half, ...	-	Disabled	NoError

Figure 2-6 Port Auto Negotiation

## 2.3.5 Error Disable Settings

Use the following window, and then implement the settings on the error disable feature to display its settings.

Choose **System > Port Configuration > Error Disable Settings** to display the following window.

Figure 2-7 Error Disable Settings

In the section of the configuration of **Error Disable Recovery**, you can configure the following parameters.

Parameter	Overview
<b>ErrDisable Cause</b>	Choose the cause of the error-disabled condition. The options available are <b>All</b> , <b>Port Security</b> , <b>Storm Control</b> , <b>BPDU Attack Protection</b> , <b>Dynamic ARP Inspection</b> , <b>DHCP Snooping</b> and <b>L2PT Guard</b> .
<b>Condition</b>	This parameter enables or disables the feature of the error-disable recovery.
<b>Interval</b>	Enter the time (seconds) needed for recovering ports from the error condition, which is caused by the module specified; the range is from 5 to 86,400.

Click **Apply** to reflect the change.

## 2.3.6 Jumbo Frame

Use the following window, and then configure the jumbo frame to display its settings. The jumbo frame is the Ethernet frame, which consists of the payload, and its size is more than 1,518 (bytes).

Choose **System > Port Configuration > Jumbo Frame** to display the following window.

Port	Maximum Receive Frame Size (bytes)
Gi1/0/1	1518
Gi1/0/2	1518
Gi1/0/3	1518
Gi1/0/4	1518
Gi1/0/5	1518
Gi1/0/6	1518

Figure 2-8 Jumbo Frame

In the **Jumbo Frame** section, you can configure the following parameters.

Parameter	Overview
<b>From Port - To Port</b>	Choose the port you use.
<b>Maximum Receive Frame Size</b>	Enter the maximum value of a frame size for receiving. The range is from 64 to 9,216 (bytes). By default, the value is 1,518 (bytes).

Click **Apply** to reflect the change.

## 2.3.7 Port Grouping Configuration

Use the following window to configure the port-grouping and display its settings.

Choose **System > Port Configuration > Port Grouping Configuration** to display the following window.

Figure 2-9 Port Grouping Configuration

In the section of **Port Grouping Configuration**, you can configure the following parameters.

Parameter	Overview
<b>From Port - To Port</b>	Choose the range of the port-number.
<b>Port Group ID (1-256)</b>	Configure a port-group ID.
<b>Name of a Port Group</b>	Configure the name of a port-group.
<b>State</b>	Enable or disable the port-grouping configuration.

Click **Apply** to add a new entry based on the information specified.

## 2.4 System Log

### 2.4.1 System Log Settings

Use the following window to implement the settings on system logs and display its settings.

Choose **System > System Log > System Log Settings** to display the following window.

The screenshot shows the 'System Log Settings' window with the following configurations:

- Log State:** Log State is set to 'Enabled'.
- Buffer Log Settings:** Buffer Log State is 'Enabled', Severity is '6(Informational)', Discriminator Name is '15 chars', and Write Delay is '300' sec.
- Console Log Settings:** Console Log State is 'Disabled', Severity is '4(Warnings)', and Discriminator Name is '15 chars'.
- SMTP Log Settings:** SMTP Log State is 'Disabled', Severity is '4(Warnings)', and Discriminator Name is '15 chars'.

Figure 2-10 System Log Settings

In the section of the **Log State**, you can configure the following parameter.

Parameter	Overview
<b>Log State</b>	This parameter enables or disables the status of a global system log.

Click **Apply** to reflect the change.

In the section of **Buffer-log Settings**, you can configure the following parameters.

Parameter	Overview
<b>Buffer Log State</b>	This parameter enables or disables the state of a global buffer-log. The options available are enable, disable and default. If you choose <b>Default</b> , the state of a global buffer log complies with the default operation.
<b>Severity</b>	Choose the severity of the information type to be logged. The values to choose: <b>0 (Emergencies)</b> , <b>1 (Alerts)</b> , <b>2 (Critical)</b> , <b>3 (Errors)</b> , <b>4 (Warnings)</b> , <b>5 (Notifications)</b> , <b>6 (Information)</b> , and <b>7 (Debugging)</b> .

Parameter	Overview
<b>Identification Name</b>	Enter the identification name you use. The number of characters can be used up to 15. Specify the name of a discriminator profile. Based on the filtering standard stipulated on this profile, buffer-log messages will be filtered.
<b>Write Delay</b>	Enter the delay value of a log. The range is from 0 to 65,535 (seconds). By default, the value is set to 300 (seconds). If you click <b>Infinite</b> , a function of write-delay (or delayed writing) becomes disabled.

Click **Apply** to reflect the change.

In the section of the **Console Log** settings, you can configure the following parameters.

Parameter	Overview
<b>Console-log State</b>	This parameter enables or disables the state of a global console-log.
<b>Severity</b>	Choose the severity of the information type, which is logged. The values to choose: <b>0 (Emergencies), 1 (Alerts), 2 (Critical), 3 (Errors), 4 (Warnings), 5 (Notifications), 6 (Information)</b> and <b>7 (Debugging)</b> .
<b>Identification Name</b>	Enter an identification name to use it. the number of characters can be used up to 15. Specify the name of a discriminator profile. Based on the filtering standard stipulated on this profile, console-log messages will be filtered.

Click **Apply** to reflect the change.

In the section of the **SMTP Log** settings, you can configure the following parameters.

Parameter	Overview
<b>SMTP Log State</b>	This parameter enables or disables the log state of a global SMTP (Simple Mail Transfer Protocol).
<b>Severity</b>	Choose the severity of the information type, which is logged. The values to choose: <b>0 (Emergencies), 1 (Alerts), 2 (Critical), 3 (Errors), 4 (Warnings), 5 (Notifications), 6 (Information)</b> , and <b>7 (Debugging)</b> .

Parameter	Overview
<b>Identification Name</b>	Enter an identification name to use it. The number of characters can be used up to 15. Specify the name of a discriminator profile. Based on the filtering standard stipulated on this profile, SMTP log messages will be filtered.

Click **Apply** to reflect the change made.

## 2.4.2 System Log Discriminator Settings

Use the following window to implement the settings on a discriminator and display its settings.

Choose **System > System Log > System Log Discriminator Settings** to display the following window.

Figure 2-11 System Log Discriminator Settings

In the section of the **Discriminator Log Settings**, you can configure the following parameters.

Parameter	Overview
<b>Discriminator Name</b>	Enter the name of a discriminator profile. The number of characters can be up to 15.
<b>Action</b>	Choose the facility operation option and a facility type to associate them with an operation selected. The options available as an operation are dispose (or discard) and include.
<b>Severity</b>	Choose the operation option and the severity of the information type, which is logged. The options available as an operation are dispose and include. The values to choose severity: <b>0(Emergencies)</b> , <b>1(Alerts)</b> , <b>2(Critical)</b> , <b>3(Errors)</b> , <b>4(Warnings)</b> , <b>5(Notification)</b> , <b>6(Information)</b> and <b>7(Debugging)</b> .

Click **Apply** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

## 2.4.3 System Log Server Settings

Use the following window to implement the settings on the server, which is used on the system-log, and to display its settings.

Choose **System > System Log > System Log Server Settings** to display the following window.

Figure 2-12 System Log Server Settings

In the section of **Log Server**, you can configure the following parameters.

Parameter	Overview
<b>Host IPv4 Address</b>	Enter an IPv4 address of a system-log server.
<b>Host IPv6 Address</b>	Enter an IPv6 address of a system-log server.
<b>UDP Port</b>	Enter the port-number of UDP (User Datagram Protocol) of a system-log server. Set the number (or value) to 514, or specify the value within the range from 1,024 to 65,535. By default, the value is set to 514.
<b>Severity</b>	Choose the severity of the information type, which is logged. The values to choose: <b>0 (Emergencies)</b> , <b>1 (Alerts)</b> , <b>2 (Critical)</b> , <b>3 (Errors)</b> , <b>4 (Warnings)</b> , <b>5 (Notifications)</b> , <b>6 (Information)</b> and <b>7 (Debugging)</b> .

Parameter	Overview		
<b>Facility</b>	Choose the facility number that are logged. The range is from 0 to 23. Each facility-number is associated with the specific facility below. See the following table.		
	Facility-Number	Facility Name	Facility Description
	1	user	User-level messages
	2	mail	Mail System
	3	daemon	System daemons
	4	auth1	Security/ Authentication messages
	5	syslog	Messages generated by the SYSLOG, internally
	6	lpr	Line printer sub-system
	7	news	Network news sub-system
	8	uucp	UUCP sub-system
	9	clock1	Clock daemon
	10	auth2	Security / Authentication messages
	11	ftp	FTP daemon
	12	ntp	NTP sub-system
	13	logaudit	Log audit
	14	logalert	Log alert
	15	clock2	Clock daemon
	16	local0	Local use 0 (local0)
	17	local1	Local use 1 (local1)
	18	local2	Local use 2 (local2)
	19	local3	Local use 3 (local3)
	20	local4	Local use 4 (local4)
	21	local5	Local use 5 (local5)
22	local6	Local use 6 (local6)	
23	local7	Local use 7 (local7)	
<b>Discriminator Name</b>	Enter a discriminator-name to be used for filtering messages that are sent to a log-server. The number of characters for the name can be up to 15.		

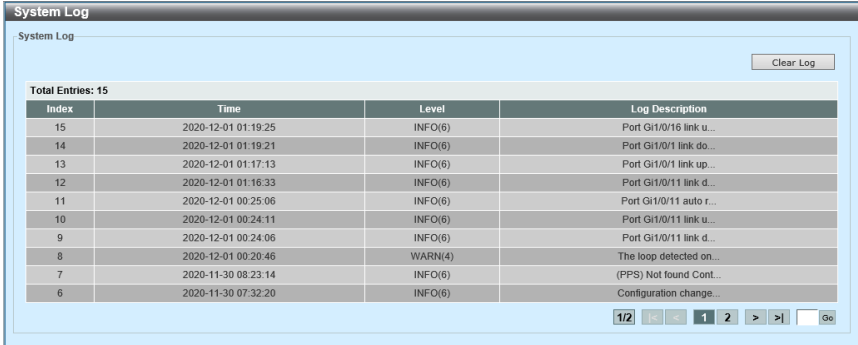
Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

## 2.4.4 System Log

Use the following window to display and clear system logs.

Choose **System > System Log > System Log Settings** to display the following window.



The screenshot shows a window titled "System Log" with a "Clear Log" button in the top right. Below the button, it says "Total Entries: 15". A table displays the log entries with the following data:

Index	Time	Level	Log Description
15	2020-12-01 01:19:25	INFO(6)	Port Gi1/0/16 link u...
14	2020-12-01 01:19:21	INFO(6)	Port Gi1/0/1 link do...
13	2020-12-01 01:17:13	INFO(6)	Port Gi1/0/1 link up...
12	2020-12-01 01:16:33	INFO(6)	Port Gi1/0/11 link d...
11	2020-12-01 00:25:06	INFO(6)	Port Gi1/0/11 auto r...
10	2020-12-01 00:24:11	INFO(6)	Port Gi1/0/11 link u...
9	2020-12-01 00:24:06	INFO(6)	Port Gi1/0/11 link d...
8	2020-12-01 00:20:46	WARN(4)	The loop detected on...
7	2020-11-30 08:23:14	INFO(6)	(PPS) Not found Cont...
6	2020-11-30 07:32:20	INFO(6)	Configuration change...

At the bottom right of the table, there are navigation controls: a page indicator "1/2", navigation arrows, a page number "1", a page number "2", and a "Go" button.

Figure 2-13 System Log

Click the **Clear Log** button to clear the log-entry from the table above.

If two or more pages exist, enter their page number. Then click **Go** to move to a specific page.

## 2.4.5 System Attack Log

Use the following window to display and clear the system attack log.

Choose **System > System Log > System Attack Log** to display the following window.

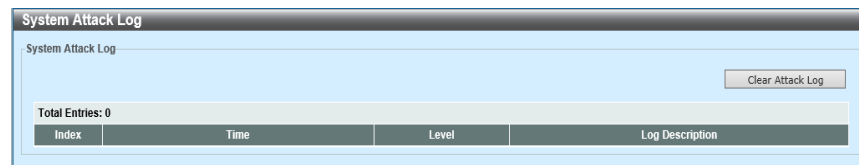


Figure 2-14 System Attack Log

Click the **Clear Attack Log** button to clear the entry of attack logs from a table.

## 2.4.6 System Authentication Log

Use the following window to implement the settings on a system authentication log and display its settings.

Choose **System > System Log > System Authentication Log** to display the following window.

Figure 2-15 System Authentication Log

In the section of **System Authentication Log**, you can configure the following parameters.

Parameter	Overview
<b>Authentication Log State</b>	This parameter enables or disables an authentication log.
<b>Write Delay for Authentication Logs</b>	Enter the write-delay value of the authentication log. The range is from 1 to 1,440 (minutes).
<b>Tail</b>	Enter the number of the latest authentication log-entries to be displayed. The range is from 1 to 256.

Click **Apply** to reflect the change.

Click **Find** to search the entry in a table based on the search condition specified.

Click **Show All** to search all the entries available for displaying them.

Click the **Clear Log** button to clear the log entry from a table.

## 2.5 Time and SNTP (Simple Network Time Protocol)

### 2.5.1 Clock Settings

Use the following window to implement the settings on time and date, which is used on the time-dependent features of the switch, and to display its settings.

Choose **System > Time and SNTP > Clock Settings** to display the following window.

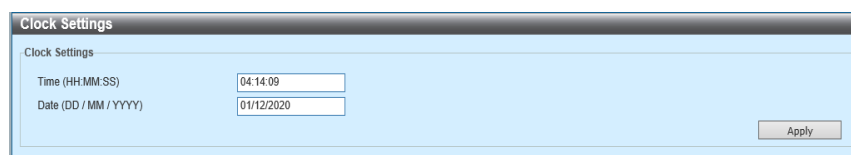


Figure 2-16 Clock Settings

In the section of **Clock Settings**, you can configure the following parameters.

Parameter	Overview
<b>Time</b>	Enter the current time by using (HH), (MM), and (SS) (e.g. 19:20:20).
<b>Date (DD / MM / YYYY)</b>	Enter the current day (DD), month (MM) and year (YY) (e.g. 25/04/2017).

Click **Apply** to reflect the change.

## 2.5.2 Time Zone Settings

Use the following window to implement the settings on DST (Summer-time) and time zone to display its settings.

Choose **System > Time and SNTP > Time Zone Settings** to display the following window.

Figure 2-17 Time Zone Settings

In the first section, you can configure the following parameters.

Parameter	Overview
<b>Summer-Time State</b>	<p>Choose the summer-time settings. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Disable</b> - Disables the summer-time settings.</li> <li>• <b>Recurring Setting</b> - Configure so as the summer-time starts and ends on the date and month specified.</li> <li>• <b>Date Settings</b> - Configure so as the summer-time starts and ends on the date and month specified.</li> </ul>
<b>Timezone</b>	<p>Specifies the offset of a local time zone from Universal Coordinated Time (UTC).</p>

In the section of **Recurring Settings**, you can configure the following parameters.

Parameter	Overview
<b>From: Week of the Month</b>	Select the week when summer-time starts.
<b>From: Day of the Week</b>	Select the day when summer-time starts.
<b>From: Month</b>	Select the month when summer-time starts.
<b>From: Time</b>	Select the time when summer-time starts.
<b>To: Week of the Month</b>	Select the week when summer-time ends.
<b>To: Week and date</b>	Select the day when summer-time ends.
<b>To: Month</b>	Select the month when summer-time ends.
<b>To:Time</b>	Select the time when summer-time ends.
<b>Offset</b>	Enter the time to add on the summer-time period. The default value is 60, and the range of this offset is 30, 60, 90 and 120.

In the section of **Date Settings**, you can configure the following parameters.

Parameter	Overview
<b>From: Date of Month</b>	Select the date when summer-time starts.
<b>From: Month</b>	Select the month when summer-time starts.
<b>From: Year</b>	Enter the year when summer-time starts.
<b>From: Time</b>	Select the time when summer-time starts.
<b>To: Date of the Month</b>	Select the date when summer-time ends.
<b>To: Month</b>	Select the month when summer-time ends.
<b>To: Year</b>	Enter the year when summer-time ends.
<b>To: Hour</b>	Select the time when summer-time ends.
<b>Offset</b>	Enter the time to add on the summer-time period. The default value is 60, and the range of this offset is 30, 60, 90 and 120.

Click **Apply** to reflect the change.

## 2.5.3 SNTP Settings

Use the following window to implement the settings on SNTP (Simple Network Time Protocol) and display its settings. Use the SNTP, and then obtain a synchronization automatically and periodically between the configuration of time and date for a switch and the settings hosted by an SNTP server.

Choose **System > Time and SNTP > SNTP Settings** to display the following window.

Figure 2-18 SNTP Settings

In the section of **SNTP Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>SNTP State</b>	This parameter enables or disables SNTP, globally.
<b>Poll Interval</b>	Enter the synchronization-interval, in seconds. The range of values is from 30 and 99,999 (seconds). The default interval is 720 (seconds).

Click **Apply** to reflect the change.

In the section of **SNTP Server Settings**, you can configure the following parameters.

Parameter	Overview
<b>IPv4 Address</b>	Enter an IPv4 address of an SNTP server.
<b>IPv6 Address</b>	Enter an IPv6 address of an SNTP server.

Click **Add** to add the new entry based on the information specified.

Click **Delete** to delete an entry.

## 2.6 Time Range

Use the following window to implement the settings on a time range profile and display its settings.

Choose **System > Time Range** to display the following window.

Figure 2-19 Time Range

In the section of **Time Range**, you can configure the following parameters.

Parameters	Overview
<b>Range Name</b>	Enter the name of a time range profile. The number of characters for the name can be up to 32.
<b>From Week - To Week</b>	Select the starting and ending days of the week that will be used for this time profile. If you set the <b>Daily</b> option to on, the time profile is used for all days. When the option of a final week is set to ON, this time profile is used from the beginning of a week to the end of it.
<b>From Starting Time (HH:MM) to Ending Time (HH:MM)</b>	Choose the starting and ending time that will be used for this time profile. The first (left-side) drop-down menu allows you to choose the time. You can choose the minute on the second (right-side) drop-down menu.

Click **Apply** to add a new entry based on the information specified.

Click **Find** to search the entry in a table based on the search condition specified for displaying.

Click **Show All** to find and display all the entries available.

Click the **Delete Periodic** button to delete the periodic entry.

Click **Delete** to delete the entries.

If two or more pages exist, enter the page number. Then click **Go** to move to the specific page.

## 2.7 PoE Configuration

### 2.7.1 PoE Global Configuration

Use the following window to implement the common configuration on a device regarding PoE and to display its settings.

Choose **System > PoE Configuration > PoE Global Configuration** to display the following window.

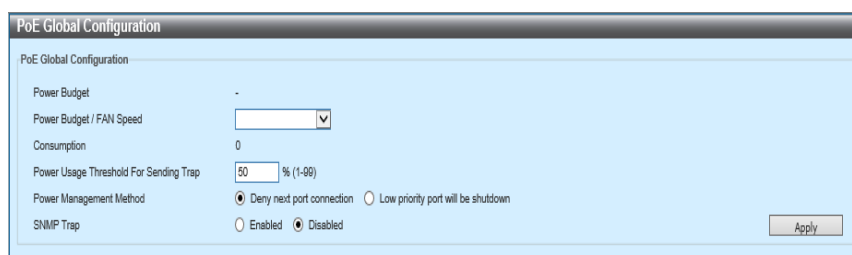


Figure 2-20 PoE Global Configuration

In the section of the **PoE Global Configuration**, you can configure the following parameters.

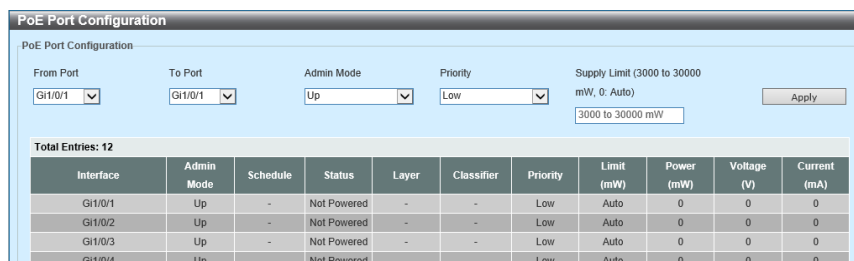
Parameter	Overview	
<b>Power Budget/ Fan Speed</b>	This parameter chooses the power supply and fan speed, which can be supplied by this device.	
<b>Power Usage Threshold for Sending Traps</b>	This parameter displays the threshold of the power supply for sending traps. The factory default settings is "50%".	
<b>Power Management Method</b>	The method of power supply is displayed; when the power supply exceeds the power budget. The factory default settings is set to "denying (or rejecting) the next port connection".	
	<b>Denying the Next Port Connection</b>	This option allows you to stop the power for the port, which is connected right before exceeding the power budget.
	<b>Low-priority Port Becomes Shutdown</b>	The power supply for the port with the lowest priority becomes stopped. If the priority is the same, the power supply for the port with the larger port-number becomes stopped.
<b>SNMP Traps</b>	This parameter configures the PoE power supply traps. The factory default settings is set to "disabled".	

Click **Apply** to reflect the change.

## 2.7.2 PoE Port Configuration

Use the following window to implement the settings on the power-supply per port.

Choose **System > PoE Configuration > PoE Port Configuration** to display the following window.



Interface	Admin Mode	Schedule	Status	Layer	Classifier	Priority	Limit (mW)	Power (mW)	Voltage (V)	Current (mA)
Gi1/0/1	Up	-	Not Powered	-	-	Low	Auto	0	0	0
Gi1/0/2	Up	-	Not Powered	-	-	Low	Auto	0	0	0
Gi1/0/3	Up	-	Not Powered	-	-	Low	Auto	0	0	0
Gi1/0/4	Up	-	Not Powered	-	-	Low	Auto	0	0	0

Figure 2-21 PoE Port Configuration

In the section of **PoE Port Configuration**, you can configure the following parameters.

Parameter	Overview
<b>From Port - To Port</b>	Choose a port to configure.
<b>Administrator Mode</b>	This parameter enables or disables the power-supply for a port. The options available are Up and Down. The factory default settings is set to "Up".
<b>Priority</b>	This parameter configures the priority for the power-supply. The options available are Crit., High and Low. The factory default settings is set to "Low".
<b>Supply Limit</b>	This parameter configures the upper-limit of the electricity of power supply (unit: 200mW). The factory default settings is set to "Auto".

Click **Apply** to reflect a change.

## 2.7.3 PoE Schedule Configuration

Use the following window to implement the settings on the PoE scheduler and display the schedule information.

Choose **System > PoE Configuration > PoE Global Settings** to display the following window.

Figure 2-22 PoE Schedule Configuration

In the section of the **PoE Schedule Configuration**, you can configure the following parameters.

Parameter	Overview
<b>PoE Schedule Global Status</b>	This parameter enables or disables the global settings of the PoE scheduler.
<b>Index</b>	This parameter configures the index number of the PoE scheduler.
<b>State</b>	This parameter enables or disables the state of a function of the PoE schedule per index.
<b>Name</b>	This parameter configures the PoE schedule-name.
<b>Classifier</b>	This parameter configures the class of the PoE schedule. The options available are <b>Daily</b> , <b>Weekly</b> , <b>Monthly</b> and <b>Datelist</b> .
<b>Time</b>	This parameter configures the time when the PoE schedule is conducted.
<b>Date</b>	This parameter configures the date and day when the PoE schedule is conducted.
<b>Port List Index</b>	This parameter configures the port-list number where the PoE schedule is conducted.

Parameter	Overview
<b>Date List Index</b>	This parameter displays the number regarding the date list where the PoE schedule is conducted.
<b>PoE Action</b>	This parameter displays an action of the PoE schedule. The options available are <b>OFF</b> , <b>ON</b> and <b>OFF/ON</b> .
<b>Order By</b>	This parameter configures the sequence of displaying the PoE schedule. The options available are <b>Index</b> and <b>Next Execution Time</b> .
<b>Filter by Interface</b>	This parameter filters with the interface where displaying the PoE scheduler is selected.

Click **Apply** to reflect the change.

## 2.7.4 PoE Schedule Port List Configuration

Use the following window, and then implement the settings on the port-list of a PoE scheduler to display the port-list information.

Choose **System > PoE Configuration > PoE Schedule Port List Configuration** to display the following window.

Figure 2-23 PoE Schedule Port List Configuration

In the section of the **PoE Schedule Port-list Configuration**, you can configure the following parameters.

Parameter	Overview
<b>Index</b>	This parameter configures the index-number of the port-list regarding the PoE scheduler.
<b>Port List</b>	This parameter configures the port, which operates the PoE scheduler.

Click **Apply** to reflect a change.

## 2.7.5 PoE Date List Configuration

Use the following window, and then implement the settings on the date list of the PoE scheduler to display its settings.

Choose **System > PoE Configuration > PoE Date List Configuration** to display the following window.

Figure 2-24 PoE Date List Configuration

In the section of **PoE Date List Configuration**, you can configure the following parameters.

Parameter	Overview
<b>Index</b>	This parameter configures the index number of the date list regarding the PoE scheduler.
<b>Name</b>	This parameter configures the name of the date list regarding the PoE scheduler.
<b>Year</b>	This parameter configures the year when the date list is conducted.
<b>Day</b>	This parameter configures the date when the date list is conducted per month.

Click **Apply** to reflect a change.

## 2.7.6 PoE Auto-Reboot Settings

Use the following window to configure the PoE auto-reboot.

Choose **System > PoE Configuration > PoE Auto Reboot** to display the following window.

**PoE Auto Reboot Configuration**

**PoE Auto Reboot Ping Configuration**

Ping Interval (1-86400)  sec

Ping Time out (1-30)  sec

Ping Error Retry (1-10)

**PoE Auto Reboot LLDP Configuration**

LLDP Time out (1-180)  sec

LLDP Error Retry (1-10)

**PoE Auto Reboot Traffic Configuration**

Traffic Average (1-80)  sec

Traffic Interval (1-80)  sec

Traffic Error Retry (1-10)

**PoE Auto Reboot Configuration**

PoE Auto Reboot Global Status

PoE Auto Reboot SMTP Mail Subject

PoE Auto Reboot SMTP Mail Content

From Port  To Port  Ping IP Address  LLDP Monitor  Traffic Judge Condition

Traffic Threshold Unit  Traffic Threshold  Judge Condition  Send Email  SNMP Trap

PoE OFF/ON  PoE OFF/ON Interval  PoE OFF/ON Repeat  Repeat Interval

**Total Entries: 4**

Port	Ping IP Address	LLDP Monitor	Traffic Judge Condition	Traffic Threshold	Judge Condition	Send Email	SNMP Trap	PoE OFF/ON	PoE OFF/ON Interval	PoE OFF/ON Repeat	Repeat Interval
Gi1/0/1		Disabled	None	0	Or	Disabled	Disabled	Enabled	3	Disabled	600
Gi1/0/2		Disabled	None	0	Or	Disabled	Disabled	Enabled	3	Disabled	600
Gi1/0/3		Disabled	None	0	Or	Disabled	Disabled	Enabled	3	Disabled	600
Gi1/0/4		Disabled	None	0	Or	Disabled	Disabled	Enabled	3	Disabled	600

Figure 2-25 PoE Auto-Reboot Settings

Parameter	Overview
<b>Ping Interval (1-86400)</b>	This parameter configures the interval with seconds (as a unit) for monitoring the Ping, which is used for PoE auto-reboot (factory default settings: 60).
<b>Ping Time-out (1-30)</b>	This parameter configures the time-out with seconds (as a unit) for monitoring the Ping, which is used for PoE auto-reboot (factory default settings: 5).
<b>Number of Ping Error Retries (1-10)</b>	This parameter configures the number of retrials during errors of monitoring the Ping, which is used for PoE auto-reboot (factory default settings: 3).
<b>LLDP Time-out (1-180)</b>	This parameter configures the time-out with seconds as a unit for monitoring the auto-reboot LLDP, which is used for the PoE auto-reboot (factory default settings: 65).

Parameter	Overview
<b>Number of LLDP Error Retries (1-10)</b>	This parameter configures the number of retrials during errors as for monitoring the auto-reboot LLDP, which is used for the PoE auto-reboot (factory default settings: 3).
<b>Average Traffics (1-60)</b>	This parameter configures the interval for calculating the average value of traffics, which exist in a device (factory default settings: 5).
<b>Traffic Interval (1-60)</b>	This parameter configures the interval for monitoring traffics with seconds, as a unit (factory default settings: 5).
<b>Number of Retries during Traffic Errors (1-10)</b>	This parameter configures the number of retrials during traffic errors (factory default Settings: 3).
<b>Global Status of PoE Auto Reboot</b>	This parameter enables or disables the global settings for PoE auto-reboot.
<b>Subject of SMTP Mails regarding PoE Auto-reboot</b>	This parameter sets a subject when you notify via emails, which are done (or sent) by an SMTP of PoE auto-reboot.
<b>Contents of SMTP Emails regarding PoE Auto-reboot</b>	This parameter configures the content when notifying via emails, which are done (or sent) by an SMTP of PoE auto-reboot.
<b>From Port / To Port</b>	Choose the range of the port-number.
<b>Ping IP Address</b>	This parameter configures an IP address of the Ping, which is used for the PoE auto-reboot.
<b>LLDP Monitor</b>	This parameter enables or disables the settings for monitoring LLDP of PoE auto-reboot.
<b>Condition of Determining Traffics</b>	This parameter configures the determination regarding an abnormality of PoE terminal because of the communication-fee. The options available are <b>None</b> , <b>Below</b> and <b>Over</b> .
<b>Unit of Threshold regarding Traffics</b>	This parameter configures the unit of the traffic-threshold.
<b>Threshold for Traffics</b>	This parameter configures the threshold of traffics.
<b>Condition of Determination</b>	This parameter configures the condition of determining an abnormality of the monitoring-methods (e.g. Ping, LLDP and traffics). The options available are <b>Or</b> and <b>And</b> .
<b>Sending Emails</b>	This parameter enables or disables the settings for sending e-mails regarding the PoE auto-reboot.
<b>SNMP Traps</b>	This parameter enables or disables the settings for SNMP traps regarding the PoE auto-reboot.
<b>PoE OFF/ON</b>	This parameter enables or disables the execution of PoE OFF/ON when your switch determines an abnormality of the PoE auto-reboot.

Parameter	Overview
<b>PoE OFF/ON Interval</b>	This parameter configures the interval of PoE power-supply OFF/ON when your switch determines an abnormality of the PoE auto-reboot.
<b>PoE OFF/ON Repeat</b>	This parameter enables or disables the repeat-execution of PoE power-supply OFF/ON when your switch determines an abnormality of PoE auto-reboot.
<b>PoE OFF/ON Repeat Interval</b>	This parameter configures the PoE OFF/ON repeat-interval when your switch determines an abnormality of the PoE auto-reboot.

Click **Apply** to reflect the change.

## 2.8 PTP (Precision Time Protocol)

PTP (Precision Time Protocol) is a function that realizes highly accurate time synchronization in microseconds (one millionth of a second).

Using this function, it is possible to synchronize the time on a packet-based network.

### Caution

- Only End to End (E2E) Transparent Clock (TC) mode is supported.
- To use PTP function, Both the PTP setting in global configuration mode and the PTP setting in interface configuration mode should be enabled.
- The PTP function guarantees the time synchronization required for the terminal in cooperation with other devices in the system.  
Time synchronization of the system is not guaranteed only by this model and this function. It is necessary to verify end to end synchronization of the system in advance.

## 2.8.1 PTP Settings

Use this window to set the PTP function and display the settings.

Choose **System > PTP Settings** to display the following window.

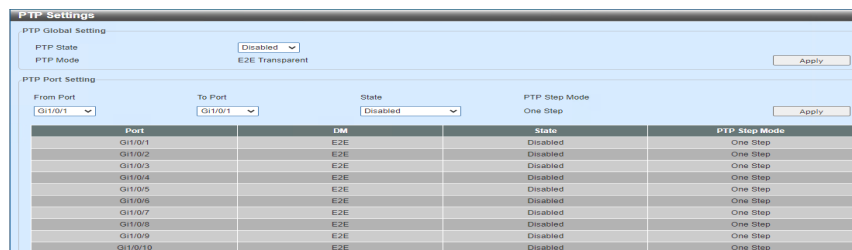


Figure 2-26 PTP Settings

In the section of the **PTP Global Setting**, you can configure the following parameters.

Parameter	Overview
<b>PTP State</b>	Enable or Disable the PTP setting.

Click **Apply** to reflect the change.

In the section of the **PTP Port Setting** you can configure the following parameters.

Parameter	Overview
<b>From Port / To Port</b>	Choose the range of the port-number.
<b>State</b>	Enable or Disable the PTP port setting.

Click **Apply** to reflect the change.

# 3 Management

## 3.1 User Accounts Encryption

Use the following window to enable or disable the user accounts encryption.

Choose **Management > User Accounts Encryption** to view the following window.

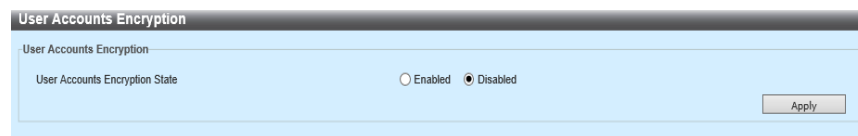


Figure 3-1 User Accounts Encryption

In the section of **User Accounts Encryption**, you can configure the following parameter.

Parameter	Overview
<b>User Accounts Encryption State</b>	This parameter enables or disables the user-account encryption.

Click **Apply** to reflect the change.

## 3.2 Login Method

Use the following window to implement the settings on and display the log-in method for each log-in application, which is supported on the switch.

Choose **Management > Login Method** to display the following window.

Figure 3-2 Login Method

In the section of **Enable Password**, you can configure the following parameters.

Parameter	Overview
<b>Level</b>	Choose the privilege level of user accounts. The range is from 1 to 15.
<b>Password Type</b>	Choose the password type for users. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Plain Text</b> - Choosing this makes a password to become a plain-text form. This is the default option.</li> <li>• <b>Encrypted</b> - Choose this to encrypt a password based on SHA-1.</li> </ul>
<b>Password</b>	Enters a password for user accounts. <ul style="list-style-type: none"> <li>- The number of characters for a password of the plain-text form can be up to 32. The password can be case-sensitive and include spaces.</li> <li>- In the encrypted form, the number of characters for its password can be up to 35 (maximum byte) and case-sensitive.</li> </ul>

Click **Apply** to reflect the change.

Click **Edit** to edit the entry-settings.

In the section of **Login Method**, you can configure the following parameter.

Parameter	Overview
<b>Log-in Method</b>	<p>Click <b>Edit</b>, and then this parameter becomes configurable. Choose the log-in method for the application specified. The options available are as follows.</p> <p><b>No</b> - Log-in authentication to access the application specified is not needed.</p> <p><b>Log-in</b> - You need to enter a password when accessing the application specified.</p> <p><b>Log-in Local</b> - You need to enter a user-name and a password to access the application specified.</p>

In the section of **Login Password**, you can configure the following parameters.

Parameter	Overview
<b>Application</b>	Choose an application to configure. The options available are <b>Console</b> , <b>Telnet</b> and <b>Secure Shell (SSH)</b> .
<b>Password Type</b>	Choose a password-encryption type to use. The options available are <b>Plain Text</b> and <b>Encrypted</b> .
<b>Password</b>	<p>Enter a password of the application selected. This password is used when the login method of the application specified is set to login.</p> <ul style="list-style-type: none"> <li>• In the plain-text form, the number of characters for a password can be up to 32. The password is case-sensitive and can contain spaces.</li> <li>• In the encrypted form, the number of characters for its password can be up to 35, as the maximum bytes, and be case-sensitive.</li> </ul>

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

## 3.3 IP Setup

### 4.3.1 IP Setup Protocol Settings

Use the following window to enable or disable a function of an IP setup interface.

Choose **Management > IP Setup > IP Setup Protocol Settings** to display the following window.



Figure 3-3 IP Setup Protocol Settings

In the section of **IP Setup Protocol State**, you can configure the following parameter.

Parameter	Overview
<b>IP Setup Interface</b>	This parameter enables or disables an IP setup interface.

Click **Apply** to reflect the change.

## 3.4 SNMP

### 3.4.1 SNMP Group Table Settings

Use the following window to implement the settings on the SNMP group table settings and display its settings. The SNMP group maps SNMP users to SNMP view.

Choose **Management > SNMP > SNMP Group Table Settings** to display the following window.

Group Name	Read View Name	Write View Name	Notify View Name	Security Model	Security Level	IP Access-List Name	Delete
public	CommunityView		CommunityView	v1			Delete
public	CommunityView		CommunityView	v2c			Delete
initial	restricted		restricted	v3	NoAuthNoPriv		Delete
private	CommunityView	CommunityView	CommunityView	v1			Delete
private	CommunityView	CommunityView	CommunityView	v2c			Delete

Figure 3-4 SNMP Group Table Settings

In the section of **SNMP Group Settings**, you can configure the following parameters.

Parameter	Overview
<b>Group Name</b>	Enter the name of an SNMP group. The number of characters can be up to 32 for the name. Do not use any spaces for that.
<b>Lead View Name</b>	Enter the lead-view name, which allows group-users to access.
<b>User-base Security Model</b>	Choose a security model below. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>SNMPv1</b> - This allows you to use the SNMPv1 security model for a group.</li> <li>• <b>SNMPv2c</b> - This allows you to use the SNMPv2c security model for a group.</li> <li>• <b>SNMPv3</b> - This allows you to use the SNMPv3 security model for a group.</li> </ul>
<b>Write View Name</b>	Enter a write view name so as group-users can access.

Parameter	Overview
<b>Security Level</b>	<p>Choose the security level after choosing <b>SNMPv3</b> to use from <b>User-base Security Model</b>. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>NoAuthNoPriv</b> - An authentication is not implemented, and encrypting packets, which are transmitted between a switch and a remote SNMP manager, is not performed.</li> <li>• <b>AuthNoPriv</b> - An authentication is necessary, but encrypting packets, which are transmitted between a switch and a remote SNMP manager, is not implemented.</li> <li>• <b>AuthPriv</b> - An authentication is necessary, and encrypting packets, which are transmitted between a switch and a remote SNMP manager, will be implemented.</li> </ul>
<b>Notification View Name</b>	Enter the notification-view name, which allows group-users to access. The notification view describes objects, which can be reported to group-users about the state through trap-packets.
<b>IP Address List Name</b>	Enter the standard IP ACL (Access Control List) to associate with groups.

Click **Add** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

## 3.4.2 SNMP Engine ID Local Settings

Use the following window to implement the settings and display a local SNMP engine ID. The engine ID is unique to a switch and is used for implementing SNMPv3 (SNMP version 3).

Choose **Management > SNMP > SNMP Engine ID Local Settings** to display the following window.

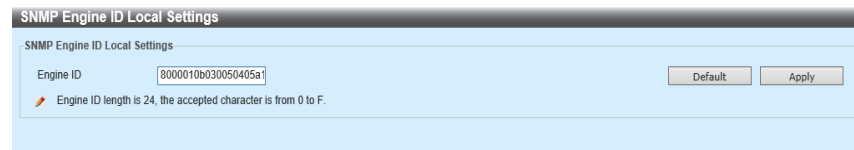


Figure 3-5 SNMP Engine ID Local Settings

In the section of **SNMP Engine ID Local Settings**, you can configure the following parameter.

Parameter	Overview
<b>Engine ID</b>	Enter the character strings of SNMP engine ID. The number of characters for this strings can be up to 24.

Click the **Default** button to use the default engine ID.

Click **Apply** to reflect the change.

### 3.4.3 SNMP User Table Settings

Use this window to implement the SNMP user settings and display its settings.

Choose **Management > SNMP > SNMP User Table Settings** to display the following window.

User Name	Group Name	Security Model	Authentication Protocol	Privacy Protocol	Engine ID	IP Access-List Name	
initial	initial	V3	None	None	800010b03...		Delete

Figure 3-6 SNMP User Table Settings

In the section of **SNMP User Settings**, you can configure the following parameters.

Parameter	Overview
<b>User Name</b>	Enter an SNMP user-name. Use this user-name to identify the SNMP user. The number of characters can be up to 32 for the user-name.
<b>Group Name</b>	Enter the name of SNMP group of users. The number of characters can be up to 32 for the group name. Do not use any spaces.
<b>SNMP Version</b>	Choose an SNMP version. The values to choose are <b>v1</b> , <b>v2c</b> and <b>v3</b> .
<b>SNMP V3 Encryption</b>	After choosing <b>v3</b> from <b>SNMP version</b> , choose the encryption type for <b>SNMPv3</b> . The options available are <b>None</b> , <b>Password</b> and <b>Key</b> .
<b>Password-Authentication Protocol</b>	After choosing <b>v3</b> from <b>SNMP version</b> and <b>Password</b> from <b>SNMP V3 Encryption</b> , choose the password authentication protocol. After choosing <b>Password</b> from <b>SNMP V3 Encryption</b> , choose a password authentication protocol. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>MD5</b> - Use an authentication level of HMAC-MD5-96. You need to enter a password or a key in the field.</li> <li>• <b>SHA</b> - Use an authentication protocol of HMAC-SHA.</li> <li>• You need to enter a password or a key in the field.</li> </ul>

Parameter	Overview
<b>Password</b>	Enter the password for an authentication protocol. <ul style="list-style-type: none"> <li>The number of characters for the MD5-password must be between 8 and 16.</li> <li>The number of characters for the SHA-password must be between 8 and 20.</li> </ul>
<b>Priv-Protocol by Password</b>	After choosing <b>v3</b> from <b>SNMP Version</b> and <b>Password</b> from <b>SNMP V3 Encryption</b> , choose a private protocol of the password. The options available are as follows. <ul style="list-style-type: none"> <li><b>None</b> - An authentication protocol is not used.</li> <li><b>DES56</b> - Use the 56-bit encryption of Data Encryption Standard (DES), based on the standard of CBC-DES (DES-56).</li> <li>You need to enter a password or a key in this field.</li> </ul>
<b>Password</b>	Enter the password of a private protocol. <ul style="list-style-type: none"> <li>If you choose <b>None</b>, this field becomes disabled.</li> <li>The number of characters must be between 8 and 16 for the DES56 password.</li> </ul>
<b>Key Authentication - Protocol</b>	After choosing <b>v3</b> from <b>SNMP version</b> , and <b>Key</b> from <b>SNMP Version</b> , choose a <b>Key Authentication Protocol</b> . The options available are as follows. <ul style="list-style-type: none"> <li><b>MD5</b> - Use an authentication level of HMAC-MD5-96. You need to enter a password or a key in this field.</li> <li><b>SHA</b> - Use an authentication protocol of HMAC-SHA. You need to enter a password or a key in this field.</li> </ul>
<b>Key</b>	Enter the key of an authentication protocol. <ul style="list-style-type: none"> <li>The number of characters for the MD5 key must be 32.</li> <li>The number of characters for an SHA key must be 40.</li> </ul>
<b>Priv-Protocol by Key</b>	After choosing <b>v3</b> from <b>SNMP version</b> and <b>Key</b> from <b>SNMP V3 Encryption</b> , choose a key private protocol. After choosing a key for <b>SNMP V3 encryption</b> , choose a private protocol. The options available are as follows. <ul style="list-style-type: none"> <li><b>None</b> - An authentication protocol is not used.</li> <li><b>DES56</b> - Use the 56-bit encryption of Data Encryption Standard (DES), based on the standard of CBC-DES (DES-56). Then, you need to enter a password or key in this field.</li> </ul>
<b>Key</b>	Enter a key for a private protocol. <ul style="list-style-type: none"> <li>If you choose <b>None</b>, this field is disabled.</li> <li>The number of characters for a DES56 key must be 32.</li> </ul>
<b>IP Address List Name</b>	Enter the standard IP ACL to associate with users.

Click **Add** to add new entries based on the information specified.

Click **Delete** to delete the entries.

### 3.4.4 SNMP Host Table Settings

Use the following window to implement the settings on an SNMP host and display its settings.

Choose **Management > SNMP > SNMP Host Table Settings** to display the following window.

Figure 3-7 SNMP Host-table Settings

In the section of **SNMP Host Settings**, you can configure the following parameters.

Parameter	Overview
<b>Host IPv4 Address</b>	Enter an IPv4 address of an SNMP notification host.
<b>Host IPv6 Address</b>	Enter an IPv6 address of an SNMP notification host.
<b>User-based Security Model</b>	Choose a security model. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>SNMPv1</b> - this option allows group-users to use the SNMPv1 security model.</li> <li>• <b>SNMPv2c</b> - this option allows the group-users to use the SNMPv2c security model.</li> <li>• <b>SNMPv3</b> - this option allows the group-users to use the SNMPv3 security model.</li> </ul>
<b>Security Level</b>	After choosing <b>SNMPv3</b> from the user-based security model, choose the security level. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>NoAuthNoPriv</b> - an authentication is not implemented, and encrypting the packets, which are transmitted between a switch and a remote SNMP manager, is not operated (or done).</li> <li>• <b>AuthNoPriv</b> - an authentication is needed, and encrypting packets, which are transmitted between a switch and a remote SNMP manager, is not implemented.</li> <li>• <b>AuthPriv</b> - an authentication is needed, and encrypting packets, which are transmitted between a switch and a remote SNMP manager, is operated.</li> </ul>

Parameter	Overview
<b>UDP Port</b>	Enter the UDP port-number. The default port-number is 162, and the range is from 1 to 65,535. Some port-numbers may conflict with other protocols.
<b>Community Character String / SNMPv3 User Name</b>	Enter the community character strings to be transmitted with the notification packets.

Click **Add** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

## 3.5 RMON (Remote Monitoring)

### 3.5.1 RMON Global Settings

Use the following window to enable or disable the trap state on RMON rising alarm and RMON falling alarm.

Choose **Management > RMON > RMON Global Settings** to display the following window.

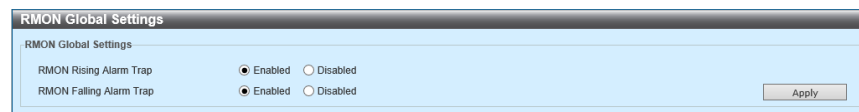


Figure 3-8 RMON Global Settings

In the section of **RMON Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>RMON Rising Alarm Trap</b>	This parameter enables or disables a function of an RMON rising alarm trap.
<b>RMON Falling Alarm Trap</b>	This parameter enables or disables a function of an RMON falling alarm trap.

Click **Apply** to reflect the change.

## 3.5.2 RMON Statistics Settings

Use the following window to implement the settings on the RMON statistics for the port specified and display its settings.

Choose **Management > RMON > RMON Statistics Settings** to display the following window.

Figure 3-9 RMON Statistics Settings

In the section of **RMON Statistics Settings**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Index</b>	Enter the RMON table index. The range of value is from 1 to 65,535.
<b>Owner</b>	Enter the owner character strings; the number of character strings can be up to 127.

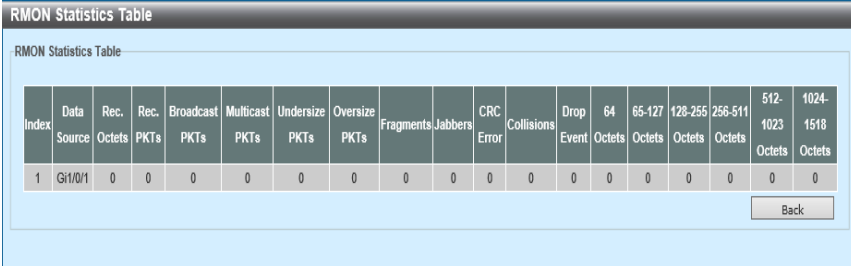
Click **Add** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

Click **Show Detail** to display details on the entry.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

Click **Show Detail** to display the following window.



RMON Statistics Table

RMON Statistics Table

Index	Data Source	Rec. Octets	Rec. PKTs	Broadcast PKTs	Multicast PKTs	Undersize PKTs	Oversize PKTs	Fragments	Jabbers	CRC Error	Collisions	Drop Event	64 Octets	65-127 Octets	128-255 Octets	256-511 Octets	512-1023 Octets	1024-1518 Octets
1	Gi1/0/1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Back

Figure 3-10 RMON Statistics Settings (Show Detail.)

Click **Back** to return to the previous window.

### 3.5.3 RMON History Settings

Use the following window to implement the RMON history settings on the port specified and display its settings.

Choose **Management > RMON > RMON History Settings** to display the following window.

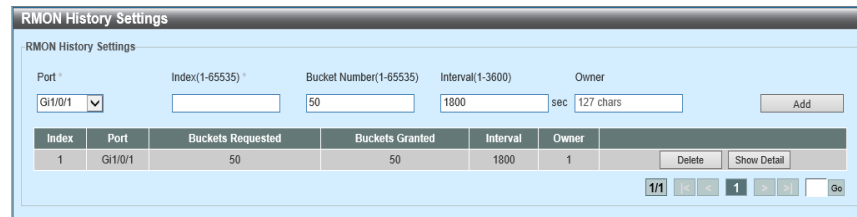


Figure 3-11 RMON History Settings

In the section of **RMON History Settings**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Index</b>	Enter the index number of entries for a history group table. The range is from 1 to 65,535.
<b>Number of Buckets</b>	Enter the number of packets, which are specified for a RMON collecting history group of the statistics. The range is from 1 to 65,535. The default value is 50.
<b>Interval</b>	Enter the interval-time for the cycle of each polling. The range is from 1 to 3,600 (seconds).
<b>Owner</b>	Enter the owner character strings; the number of characters for the strings can be up to 127.

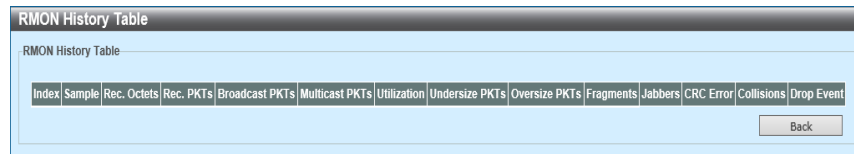
Click **Add** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

Click **Show Detail** to display details on the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Show Detail** to display the following window.



The screenshot shows a window titled "RMON History Table". Inside the window, there is a table with 13 columns. The columns are: Index, Sample, Rec. Octets, Rec. PKTs, Broadcast PKTs, Multicast PKTs, Utilization, Undersize PKTs, Oversize PKTs, Fragments, Jabbers, CRC Error, Collisions, and Drop Event. Below the table, there is a "Back" button.

Index	Sample	Rec. Octets	Rec. PKTs	Broadcast PKTs	Multicast PKTs	Utilization	Undersize PKTs	Oversize PKTs	Fragments	Jabbers	CRC Error	Collisions	Drop Event
-------	--------	-------------	-----------	----------------	----------------	-------------	----------------	---------------	-----------	---------	-----------	------------	------------

Figure 3-12 RMON History Table (Show Detail.)

Click **Back** to return to the previous window.

### 3.5.4 RMON Alarm Settings

Choose **Management > RMON > RMON Alarm Settings** to display the following window.

Figure 3-13 RMON Alarm Settings

In the section of **RMON Alarm Settings**, you can configure the following parameters.

Parameter	Overview
<b>Index</b>	Enter the alarm index. The range is from 1 to 65,535.
<b>Interval</b>	Enter the interval of the cross-checking between a variable sampling and the threshold as the second-unit. The valid range is from 1 to 2,147,483,648.
<b>Variables</b>	Enter an object ID of variables for sampling.
<b>Type</b>	Choose a monitoring type. The options available are <b>Absolute</b> and <b>Delta</b> .
<b>Rising Threshold</b>	Enter the rising threshold within the range from 0 to 2,147,483,647.
<b>Falling Threshold</b>	Enter the falling threshold within the range from 0 to 2,147,483,647.
<b>Rising Event Number</b>	Enter the index of an event entry to use for notifying the events, which exceed the rising threshold. The valid range is from 1 to 65,535. If not specified, no actions are necessary when the value exceeds the rising threshold.
<b>Falling Event Number</b>	Enter the event-entry index to use for notifying the events, which exceed the falling threshold. The valid range is from 1 to 65,535. If not specified, no actions are necessary when the value exceeds the falling threshold.
<b>Owner</b>	Enter the owner character strings; the maximum number of the strings can be up to 127.

Click **Add** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

### 3.5.5 RMON Event Settings

Use the following window to implement the RMON event settings and display its settings.

Choose **Management > RMON > RMON Event Settings** to display the following window.

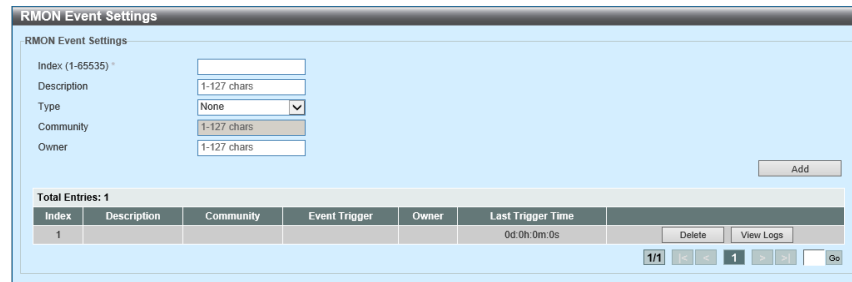


Figure 3-14 RMON Event Settings

In the section of **RMON Event Settings**, you can configure the following parameters.

Parameter	Overview
<b>Index</b>	Enter the index value of an alarm entry. The range is from 1 to 65,535.
<b>Description</b>	Enter the overview and description of the RMON event entries. The number of characters in character strings can be up to 127.
<b>Type</b>	Choose the type of the RMON event entries. The options available are <b>None</b> , <b>Logs</b> , <b>Traps</b> and <b>Logs and Traps</b> .
<b>Community</b>	Enter the community character strings. The number of characters for the character strings can be up to 127.
<b>Owner</b>	Enter the owner character strings. The number of characters for the character strings can be up to 127.

Click **Add** to add a new entry based on the information specified.

Click **Delete** to delete the entry.

Click **View Log** to display the log entry, which is associated with the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **View-log** to display the following window.

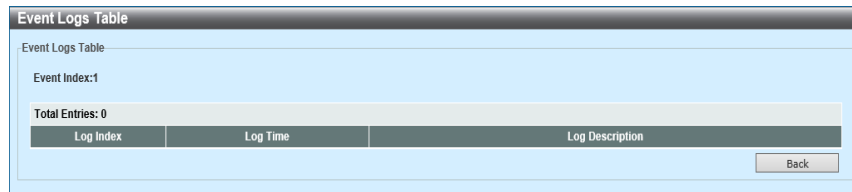


Figure 3-15 RMON Event Settings (View Log)

Click **Back** to return to the previous window.

## 3.6 Telnet/Web

Use the following window to implement the settings on Telnet and Web of the switch and display its settings.

Choose **Management > Telnet/Web** to display the following window.

Figure 3-16 Telnet/Web

In the section of the **Telnet Settings**, you can configure the following parameters.

Parameter	Overview
<b>Telnet State</b>	This parameter enables or disables a function of a Telnet server.
<b>Port</b>	Enter the TCP port-number to use for Telnet management of a device. (TCP stands for Transmission Control Protocol.) The TCP port, which is typically used for Telnet protocol is 23.

Click **Apply** to reflect the change.

In the section of the **Web Settings**, you can configure the following parameters.

Parameter	Overview
<b>Web State</b>	This parameter enables or disables the configuration via (or on the) Web.
<b>Port</b>	Enter the TCP port-number to use for Telnet management of a device. The TCP port typically used for Telnet protocol is 80.

Click **Apply** to reflect the change.

## 3.7 Session Time-out

Use the following window to implement the settings on Web, Console, Telnet and the session time-out of the SSH connection and to display its settings.

Choose **Management > Session Time-out** to display the following window.

Figure 3-17 Session Time-out

In the section of **Session Time-out**, you can configure the following parameters.

Parameter	Overview
<b>Web Session Time-out</b>	Enter the time for Web session time-out with the second-unit. If the <b>default</b> check-box is set to on, the value is returned to the default value. The range of values is from 60 to 36,000 (seconds), and the default value is set to 3 (minutes).
<b>Console Session Time-out</b>	Enter the time for console session time-out with the minute-unit. If the default check-box is set to on, the value returns to the default value. The range of values is from 0 to 1,439 (minutes). If you enter 0, the time-out becomes disabled. The default value is set to 3 (minutes).
<b>Telnet Session Time-out</b>	Enter the time for Telnet session time-out with the minute-unit. If the default check-box is set to on, the value returns to the default value. The range of values is from 0 to 1,439 (minutes). If you enter 0, the time-out becomes disabled. The default value is set to 3 (minutes).
<b>SSH Session Time-out</b>	Enter the time for SSH session time-out with the minute-unit. If the default check-box is set to on, the value returns to the default value. The range of values is from 0 to 1,439 (minutes). If you enter 0, the time-out becomes disabled. The default value is 3 (minutes).

Click **Apply** to reflect the change.

## 3.8 DHCP Auto Configuration

Use the following window to enable or disable a function of the DHCP auto configuration.

Choose **Management > DHCP Auto Configuration** to display the following window.

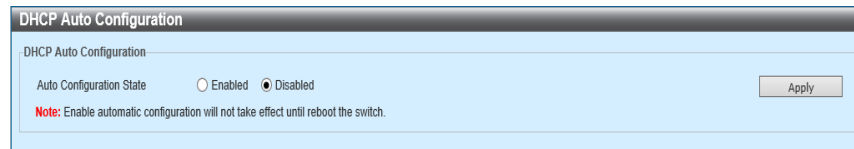


Figure 3-18 DHCP Auto Configuration

In the section of **DHCP Auto Configuration**, you can configure the following parameter.

Parameter	Overview
<b>Auto Configuration State</b>	This parameter enables or disables a function of the DHCP auto configuration.

Click **Apply** to reflect the change.

## 3.9 DNS (Domain Name System)

### 3.9.1 DNS Global Settings

Use the following window to implement the global DNS settings and display its settings.

Choose **Management> DNS> DNS Global Settings** to display the following window.

Parameter	Value
IP DNS Lookup Static State	Enabled
IP DNS Lookup Cache State	Enabled
IP Domain Lookup	Disabled
IP Name Server Timeout (1-60)	3 sec
IP DNS Server	Disabled

Figure 3-19 DNS Global Settings

In the section of **DNS Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>Static State for Searching IP DNS</b>	This parameter enables or disables the static state for searching IP DNS.
<b>Cache Condition for Searching IP DNS</b>	This parameter enables or disables the cache condition for searching IP DNS.
<b>Searching IP Domains</b>	This parameter enables or disables the condition for searching IP domains.
<b>IP-name Server Timeout</b>	Enter the maximum time (value) to wait for the response from the name-server specified. Specify the value within the range from 1 to 60.
<b>IP DNS Servers</b>	This parameter enables or disables to set the DNS-server function to global.

Click **Apply** to reflect the change.

## 3.9.2 DNS Name Server Settings

Use the following window to implement the settings on a DNS name server and display its settings.

Choose **Management > DNS > DNS Name Server Settings** to display the following window.

Figure 3-20 DNS Name Server Settings

In the section of the **DNS Name Server Settings**, you can configure the following parameters.

Parameter	Overview
<b>IPv4 Name Server</b>	Choose and enter an IPv4 address of a DNS server.
<b>IPv6 Name Server</b>	Choose and enter an IPv6 address of a DNS server.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

### 3.9.3 DNS Host Settings

Use the following window to implement the DNS host settings and display its settings.

Choose **Management > DNS > DNS Host Settings** to display the following window.

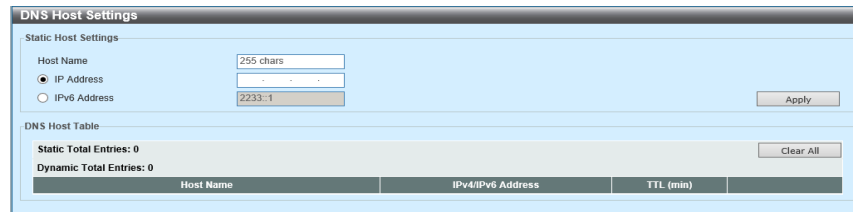


Figure 3-21 DNS Host Settings

In the section of **Static Host Settings**, you can configure the following parameters.

Parameter	Overview
<b>Host Name</b>	Enter the name of a DNS host.
<b>IP Address</b>	Choose and enter an IPv4 address of a DNS host.
<b>IPv6 Address</b>	Choose and enter an IPv6 address of a DNS host.

Click **Apply** to add new entries based on the information specified.

Click **Clear All** to clear all the dynamic entries from a table.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

## 3.10 File System

Use the following window to implement the settings on a file system of a switch and display its settings.

Choose **Management > File System** to display the following window.

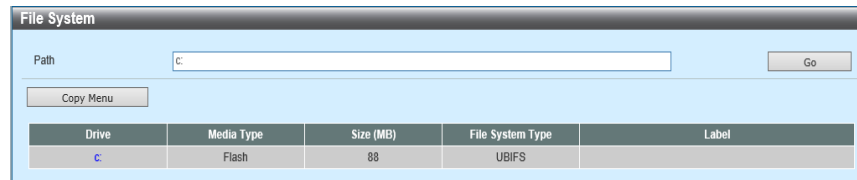


Figure 3-22 File System

You can configure the following parameter.

Parameter	Overview
<b>Path</b>	Enter the character strings of a path.

Click **Go** to move to a path entered.

Click **Copy** to copy a specific file on the File System.

Click (c:) of a drive-link to move to C: drive.

Click (c:) of a drive-link to display the following window.

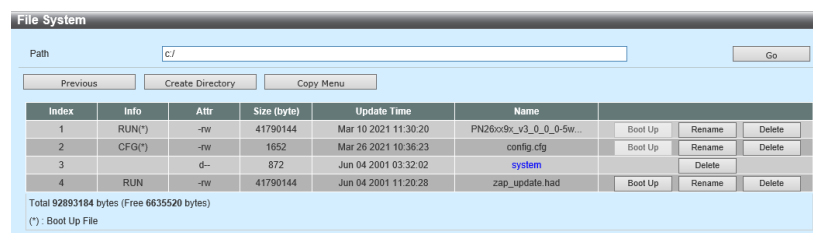


Figure 3-23 File System (c:)

Click **Back** to return to the previous window.

Click **Create a Directory** to create a new directory on the file system.

Click **Boot Up** to use the files in the boot-up sequence.

Only a configuration file and a firmware file can be used in the boot-up sequence.

Click **Rename** to rename a specific file-name.

Click **Delete** to delete a file or folder from the file system.

Click **Copy** to display the following window.

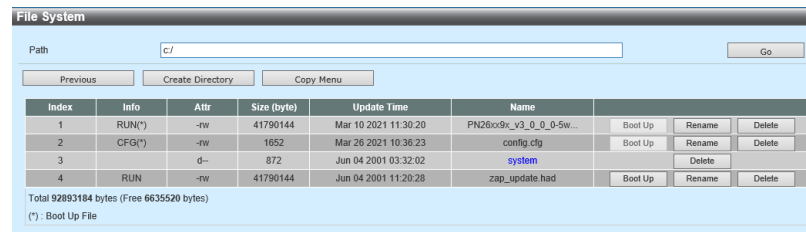


Figure 3-24 File System (Copy)

You can configure the following parameters.

Parameter	Overview
<b>Source</b>	Choose the file type of a source. The options available are <b>startup-config</b> and <b>Source File</b> . Only when you choose the <b>Source File</b> option, you can the source file path and filename be entered in the space provided.
<b>Destination</b>	Choose the file type of a destination (of a copy). The options available are <b>startup-config</b> , <b>running-config</b> and <b>Destination File</b> . Only when you choose the <b>Destination File</b> option, you can enter the destination-path and file-name in the entry-field displayed. Select the <b>Replace</b> check-box to replace the current running configuration with the configuration file, which is displayed.

Click **Apply** to copy to copy the source configuration/file to the destination configuration/file.

Click **Cancel** to cancel the copy.

## 3.11 SMTP Settings

Use the following window to implement the SMTP (Simple Mail Transfer Protocol) settings and display its settings.

Choose **Management > SMTP Settings** to display the following window.

Figure 3-25 SMTP Settings

In the section of the **SMTP Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>SMTP IP</b>	Choose an IP address type of an SMTP server. The options available are <b>IPv4</b> and <b>IPv6</b> .
<b>SMTP IPv4 Server Address</b>	Choose <b>IPv4</b> from <b>SMTP IP</b> , and then enter an IPv4 address of an SMTP server.
<b>SMTP IPv6 Server Address</b>	Choose <b>IPv6</b> from <b>SMTP IP</b> , and then enter an IPv6 address of an SMTP server.
<b>SMTP IPv4 Server Port</b>	Choose <b>IPv4</b> from <b>SMTP IP</b> , and then enter the port-number (value) of an SMTP server. The range is from 1 to 65,535. By default, the value is set to 25.
<b>SMTP IPv6 Server Port</b>	Choose <b>IPv6</b> from <b>SMTP IP</b> , and then enter the port-number (value) of an SMTP server. The range is from 1 to 65,535. By default, the value is set to 25.
<b>Your Email Address</b>	Enter the email address, which indicates a switch. The number of characters for this character strings can be up to 254.
<b>Transmission Interval</b>	Enter the value of a transmission interval. The range is from 0 to 65,535 (minutes). By default, the value is set to 30 minutes.

Click **Apply** to reflect the change.

In the section of **SMTP Email Receiver Address**, you can configure the following parameter.

Parameter	Overview
<b>Adding an Email Receiver</b>	Enter the email address of a receiver. The number of characters for this character strings can be up to 254.

In the section of **Send a Test-mail to All**, you can configure the following parameters.

Parameter	Overview
<b>Subject</b>	Enter the subject of an email. The number of characters for this character strings can be up to 128.
<b>Contents</b>	Enter the text of an email. The number of characters for this character strings can be up to 512.

Click **Add** to add a new entry based on the information specified.

Click **Apply** to reflect the change.

Click **Delete All** to delete every receiver email address from all the entries.

Click **Delete** to delete a receiver email address from the entry specified.

## 3.12 NLB FDB Settings

Use the following window to implement the settings on NLB (Network Load Balancing) and FDB (File Database) of the port specified and to display its settings.

Choose **Management > NLB FDB Settings** to display the following window.

Figure 3-26 NLB FDB Settings

In the section of **NLB FDB Settings**, you can configure the following parameters.

Parameter	Overview
<b>NLB Type</b>	Choose the NLB type. The options available are <b>Unicast</b> and <b>Multicast</b> .
<b>VID</b>	Choose <b>Multicast</b> from <b>NLB type</b> , and then enter the VLAN ID you use. The range is from 1 to 4,094.
<b>MAC Address</b>	Enter the <b>Unicast</b> of entries or <b>Multicast</b> MAC address. If the destination MAC address of packets, which are received, corresponds with the MAC address specified, the packets are transferred to the interface specified.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

Click **Delete All** to delete all the entries.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

# 4 L2 Features

## 4.1 FDB (Forwarding Database)

### 4.1.1 Static FDB

#### 4.1.1.1 Unicast Static FDB

Use the following window to implement the settings on a static-unicast forwarding and display its settings.

Choose **L2 Features > FDB > Static FDB > Unicast Static FDB** to display the following window.

Figure 4-1 Unicast Static FDB

In the section of **Unicast Static FDB**, you can configure the following parameters.

Parameter	Overview
<b>Port/Disposal</b>	When choosing <b>Port</b> , apply the port where a MAC address entered exists. When choosing <b>Disposal</b> , drop the MAC address from <b>Unicast Static FDB</b> .
<b>Port Number</b>	Choose the port you use.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>MAC Address</b>	Enter the MAC address where packets are transferred to static. Specify a Unicast MAC address for this address.

Click **Apply** to add new entries based on the information specified.

Click **Delete All** to delete all the entries.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

### 4.1.1.2 Multicast Static FDB

Use the following window to implement the settings on Multicast static FDB and display its settings.

Choose **L2 Features > FDB > Static FDB > Multicast Static FDB** to display the following window.

Figure 4-2 Multicast Static FDB

In the section of **Multicast Static FDB**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>MAC Address</b>	Enter a MAC address of the static destination for Multicast packets. Specify the Multicast MAC address for this address.

Click **Apply** to add new entries based on the information specified.

Click **Delete all** to delete all the entries.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

## 4.1.2 MAC Address Table Settings

Use the following window to implement the settings on a MAC address table and display its settings.

Choose **L2 Features > FDB > MAC Address Table Settings** to display the following window.

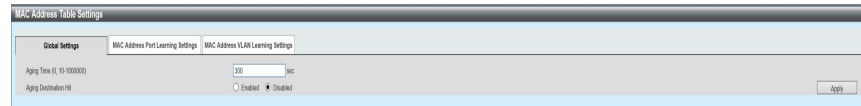


Figure 4-3 MAC Address Table Settings (Global Settings)

In the section of the **Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>Aging Time</b>	Enter the aging time (value) of a MAC address table. The range is from 10 to 1,000,000 (seconds). If you enter 0, the MAC address aging becomes disabled. By default, the value is set to 300 (seconds).
<b>Aging Destination Hit</b>	This parameter enables or disables a function of the aging destination hit.

Click **Apply** to reflect the change.

Click the tab of **MAC Address Port Learning Settings** to display the following window.

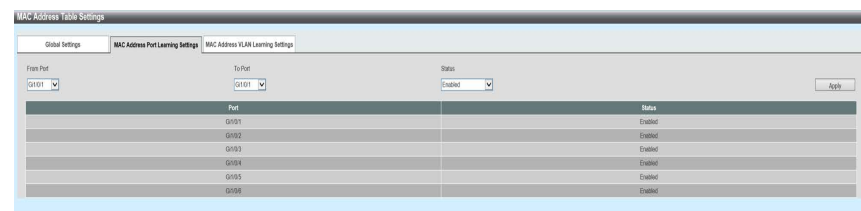


Figure 4-4 MAC Address Table Settings (MAC Address Port Learning Settings)

In the section of **MAC Address Port Learning Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables a function of a learning MAC address of the port specified.

Click **Apply** to reflect the change.

Click the tab of **MAC Address Port Learning Settings** to display the following window.

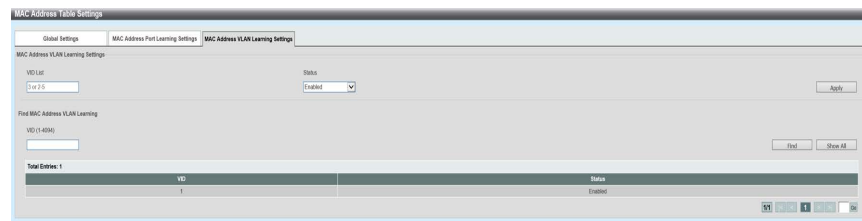


Figure 4-5 MAC Address Table Settings (MAC Address VLAN Learning Settings)

In the section of **MAC Address VLAN Learning Settings**, you can configure the following parameters.

Parameter	Overview
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>State</b>	This parameter enables or disables a function of learning a MAC address of the VLAN specified.

Click **Apply** to add new entries based on the information specified.

In the section of a **MAC Address for Searching VLAN Learning**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

If two or more pages exist, enter the page numbers.  
Then click **Go** to move to a specific page.

### 4.1.3 MAC Address Table

Use the following window to display and clear the entry of a MAC address table.

Choose **L2 Features > FDB > MAC Address Table** to display the following window.

Figure 4-6 MAC Address Table

In the section of the **MAC Address Table**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port-number to configure.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>MAC Address</b>	Enter a MAC address to use for this settings.

Click the **Clear Dynamic by Port** button to clear all the dynamic MAC addresses associated with the port specified.

Click the **Clear Dynamic by VLAN** button to clear all the dynamic MAC addresses associated with the VLAN specified.

Click the **Clear Dynamic by MAC** button to clear the dynamic MAC address specified from a table.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **Clear All** to clear all the entries from a table.

Click **See All** to search and display all the entries available.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.1.4 MAC Notification

Use the following window to implement the settings on a global MAC notification and MAC notification of the port specified and display its settings.

Choose **L2 Features > FDB > MAC Notification** to display the following window.

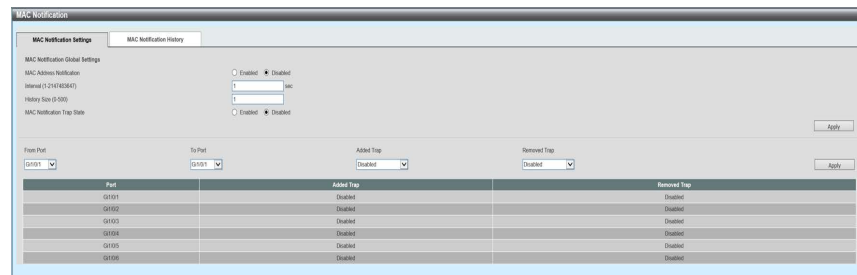


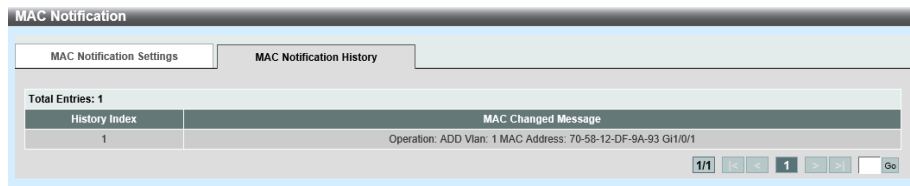
Figure 4-7 MAC Notification (MAC Notification Settings)

In the section of **MAC Notification Global-Settings**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address Notification</b>	This parameter enables or disables to set the MAC notification to global, on the switch.
<b>Interval</b>	Enter the time (value) needed for the notification interval whose range is from 1 to 2,147,483,647 (seconds). By default, the value is set to 1 (second).
<b>History Size</b>	Enter the maximum number (value) of the entries to display a list for the history-log, which is used for the notification. The range is from 0 to 500. By default, the value is set to 1.
<b>State of MAC Notification Trap</b>	This parameter enables or disables the state of MAC notification-traps.
<b>From Port/ To Port</b>	Choose the port you use.
<b>Adding Traps</b>	This parameter enables or disables to add traps on the port selected.
<b>Removing Traps</b>	This parameter enables or disables to remove traps from the port selected.

Click **Apply** to reflect the change.

Choose the **MAC Notification History** tab to display the following window.



The screenshot displays the 'MAC Notification History' section of a network management interface. It features a table with one entry and a pagination control at the bottom right.

MAC Notification History	
History Index	MAC Changed Message
1	Operation: ADD Vlan: 1 MAC Address: 70-58-12-DF-9A-93 Gi1/0/1

1/1 [Previous] [Next] 1 [Go]

Figure 4-8 MAC Notification (MAC Notification History)

## 4.2 VLAN (Virtual Local Area Network)

### 4.2.1 802.1Q VLAN

Use the following window to implement the settings on IEEE 802.1Q VLAN and display its settings.

Choose **L2 Features > VLAN > 802.1Q VLAN** to display the following window.

Figure 4-9 802.1Q VLAN

In the section of **802.1Q VLAN**, you can configure the following parameter.

Parameter	Overview
<b>VID List</b>	Enter a VLAN ID to create or delete it. You can enter its consecutive VLAN IDs, which are delimited by a comma. Or you can enter the range of VLAN IDs, which are delimited by a hyphen. The range is from 1 to 4,094.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete entries based on the information specified.

In the section of **Searching VLAN**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display the entries in the table based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Edit** to edit the entry-settings.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.2.2 802.1v Protocol VLAN

### 4.2.2.1 Protocol VLAN Profile

Use the following window to implement the settings on IEEE 802.1v protocol VLAN and display its settings. Two or more VLANs are supported on each protocol. Untagged-ports can be configured for different protocols on the same physical port.

Choose **L2 Features > VLAN > 802.1v Protocol VLAN > Protocol VLAN Profile** to display the following window.

Figure 4-10 Protocol VLAN Profile

In the section of **Adding Protocol VLAN Profile**, you can configure the following parameters.

Parameter	Overview
<b>Profile ID</b>	Enter the profile ID for 802.1v protocol VLAN. The range is from 1 to 16.
<b>Frame Type</b>	Choose an option of a frame type. This function allows you to investigate a type-octet in the packet header, and searches for the protocol type, which is associated. Doing so maps packets to VLAN for the protocol definition. The options available are <b>Ethernet 2, SNAP and LLC</b> . SNAP stands for Sub-network Access Protocol, and LLC for Logical Link Control.

Parameter	Overview
<b>Ether-type</b>	<p>Enter the Ethernet-type value of a group. Use the protocol value to identify a protocol of the frame-type specified. The range is from 0x0 to 0xFFFF. The octet character strings includes one of the following values, depending on a frame-type.</p> <ul style="list-style-type: none"><li>• Regarding Ethernet 2, it is the hex value (or hexadecimal number) of 16 bits (2 octets).</li><li>• Set IPv4 to 0800, IPv6 to 86DD, and ARP to 0806.</li><li>• Regarding IEEE802.3 SNAP, it is the hex value of 16 bits (2 octets).</li><li>• Regarding IEEE802.3 LLC, it is a pair of IEEE 802.2 LSAP (Link Service Access Point) of 2 octets.</li><li>• The first octet is DSAP (Destination Service Access Point) and the second octet is source.</li></ul>

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

### 4.2.2.2 Protocol VLAN Profile Interface

Use the following window to implement the settings on an interface of a protocol VLAN profile and display its settings.

Choose **L2 Features > VLAN > 802.1v Protocol VLAN > Protocol VLAN Profile Interface** to display the following window.

Figure 4-11 Protocol VLAN Profile Interface

In the section of **Adding a New Protocol VLAN Interface**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port-number of a switch you configure.
<b>Profile ID</b>	Choose the profile ID of 802.1v protocol VLAN.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Priority</b>	Choose the priority value you use. Specify the value within the range from 0 to 7. Specify this parameter to rewrite (or transcribe) 802.1p default-priority, which is configured on the switch beforehand. This priority determines the CoS (Class of Service) queue, which is the destination of transferring packets. After specifying this field, if a switch receives packets, which correspond to this priority, the packets are transferred to the CoS queue configured in advance.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

## 4.2.3 GVRP

### 4.2.3.1 GVRP Global

Use the following window to implement the global settings on GVRP (GARP VLAN Registration Protocol) and display its settings. GARP stands for Generic Attribute Registration Protocol.

Choose **L2 Features > VLAN > GVRP > GVRP Global** to display the following window.

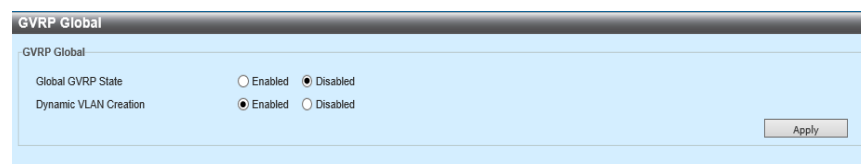


Figure 4-12 GVRP Global

In the section of **GVRP Global**, you can configure the following parameters.

Parameter	Overview
<b>Global GVRP State</b>	This parameter enables or disables the global GVRP state.
<b>Creating Dynamic VLAN</b>	This parameter enables or disables a function of creating a dynamic VLAN.

Click **Apply** to reflect the change.

### 4.2.3.2 GVRP Port

Use the following window to implement the settings on GVRP Port and display its settings.

Choose **L2 Features > VLAN > GVRP > GVRP Port** to display the following window.

Port	GVRP Status	Join Time	Leave Time	Leave All Time
G11/0/1	Disabled	20	60	1000
G11/0/2	Disabled	20	60	1000
G11/0/3	Disabled	20	60	1000
G11/0/4	Disabled	20	60	1000
G11/0/5	Disabled	20	60	1000
G11/0/6	Disabled	20	60	1000

Figure 4-13 GVRP Port

In the section of **GVRP Port**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>GVRP State</b>	This parameter enables or disables the GVRP port state. Doing so allows a port to become a VLAN member, dynamically. By default, this option is disabled.
<b>Join Time</b>	Enter the value of a join-time. The range is from 10 to 10,000 (centiseconds). By default, the value is set to 20 centiseconds.
<b>Leave Time</b>	Enter the value for leave time; the range is from 10 to 10,000 centi-seconds. Enter the value of leave time. The range is from 10 to 10,000 (centiseconds). By default, the value is set to 60 centiseconds.
<b>Leave All Time</b>	Enter the value for Leave All time. The range is from 10 to 10,000 (centiseconds). By default, the value is set to 1,000 (centiseconds).

Click **Apply** to reflect the change.

### 4.2.3.3 GVRP Advertise VLAN

Use the following window to implement the settings on GVRP advertise VLAN and display its settings.

Choose **L2 Features > VLAN > GVRP > GVRP Advertise VLAN** to display the following window.

Figure 4-14 GVRP Advertise VLAN

In the section of **GVRP Advertise VLAN**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Action</b>	Choose the advertise VLAN to use for a port mapping action. The options available are <b>All</b> , <b>Add</b> , <b>Delete</b> and <b>Replace</b> . If you choose <b>All</b> , all the advertise VLANs are used.
<b>Advertise VID List</b>	Enter a VLAN ID to advertise it. You can enter its consecutive VLAN IDs by delimiting with a comma. Or, you can enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

### 4.2.3.4 GVRP Forbidden VLAN

Use the following window to implement the settings on GVRP forbidden VLAN and display its settings.

Choose **L2 Features > VLAN > GVRP > GVRP Forbidden VLAN** to display the following window.

Figure 4-15 GVRP Forbidden VLAN

In the section of **GVRP Forbidden VLAN**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Action</b>	Choose the forbidden VLAN to use for a port mapping action. The value to choose are <b>All</b> , <b>Add</b> , <b>Delete</b> and <b>Replace</b> . Click <b>All</b> , and then all the forbidden VLANS are used.
<b>Forbidden VID List</b>	Enter a VLAN ID to forbid it. You can enter its consecutive VLAN IDs, by delimiting with a comma, or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

### 4.2.3.5 GVRP Statistics Table

Use the following window to display and clear the GVRP statistics.

Choose **L2 Features > VLAN > GVRP > GVRP Statistics Table** to display the following window.

Port		JoinEmpty	JoinIn	LeaveEmpty	LeaveOut	LeaveAll	Empty
Gi1/0/1	RX	0	0	0	0	0	0
	TX	0	0	0	0	0	0
Gi1/0/2	RX	0	0	0	0	0	0
	TX	0	0	0	0	0	0
Gi1/0/3	RX	0	0	0	0	0	0
	TX	0	0	0	0	0	0
Gi1/0/4	RX	0	0	0	0	0	0
	TX	0	0	0	0	0	0
Gi1/0/5	RX	0	0	0	0	0	0
	TX	0	0	0	0	0	0
Gi1/0/6	RX	0	0	0	0	0	0
	TX	0	0	0	0	0	0

Figure 4-16 GVRP Statistics Table

In the section of **GVRP Statistics Table**, you can configure the following parameter.

Parameter	Overview
<b>Port</b>	Choose the port you use.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **Clear** to clear the statistics information from the port specified.

Click **See All** to search and display all the entries available.

Click **Clear All** to clear all the statistics information from all the ports.

## 4.2.4 Asymmetric VLAN

Use the following window to implement the settings on an asymmetric VLAN and display its settings.

Choose **L2 Features > VLAN > Asymmetric VLAN** to display the following window.

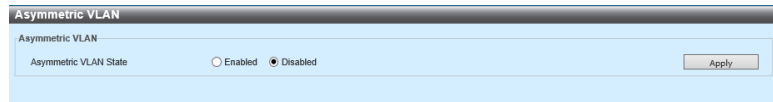


Figure 4-17 Asymmetric VLAN

In the section of the **Asymmetric VLAN**, you can configure the following parameter.

Parameter	Overview
<b>Asymmetric VLAN State</b>	This parameter enables or disables a function of the asymmetric VLAN.

Click **Apply** to reflect the change.

## 4.2.5 MAC VLAN

Use the following window to implement the settings on a MAC based VLAN. Then, a static MAC based VLAN entry is configured. If this is associated with a port, the VLAN operating on the port becomes changed.

Choose **L2 Features > VLAN > MAC VLAN** to display the following window.

Figure 4-18 MAC VLAN

In the section of **MAC VLAN**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address</b>	Enter the Unicast MAC address.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Priority</b>	Choose the priority (value) to allocate for untagged-packets. You can specify the value within the range from 0 to 7.

Click **Apply** to add new entries based on the information specified.

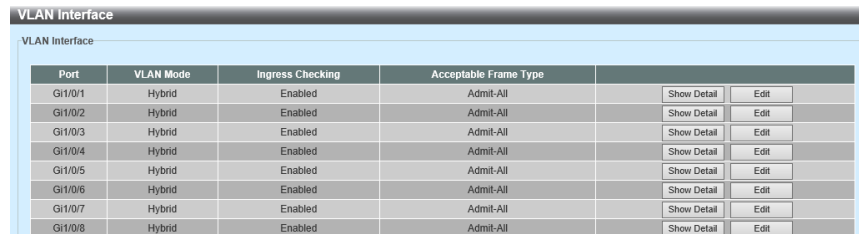
Click **Delete** to delete the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.2.6 VLAN Interface

Use the following window to implement the settings on the VLAN interface and display its settings.

Choose **L2 Features > VLAN > VLAN Interface** to display the following window.



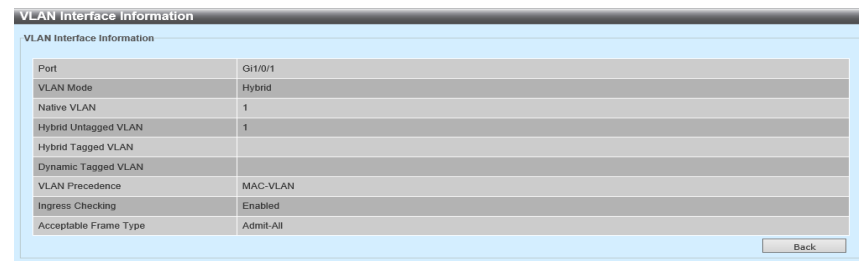
Port	VLAN Mode	Ingress Checking	Acceptable Frame Type	Show Detail	Edit
Gi1/0/1	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/2	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/3	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/4	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/5	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/6	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/7	Hybrid	Enabled	Admit-All	Show Detail	Edit
Gi1/0/8	Hybrid	Enabled	Admit-All	Show Detail	Edit

Figure 4-19 VLAN Interface

Click **Show Detail** to display details on the entry.

Click **Edit** to edit the entry-settings.

Click **Show Detail** to display the following window.

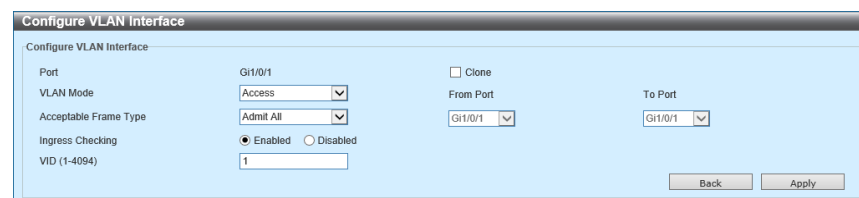


VLAN Interface Information	
Port	Gi1/0/1
VLAN Mode	Hybrid
Native VLAN	1
Hybrid Untagged VLAN	1
Hybrid Tagged VLAN	
Dynamic Tagged VLAN	
VLAN Precedence	MAC-VLAN
Ingress Checking	Enabled
Acceptable Frame Type	Admit-All

Figure 4-20 VLAN Interface (Show Detail.)

Click **Back** to return to the previous window.

Click **Edit** to display the following window.



Configure VLAN Interface			
Port	Gi1/0/1	<input type="checkbox"/> Clone	
VLAN Mode	Access	From Port	To Port
Acceptable Frame Type	Admit All	Gi1/0/1	Gi1/0/1
Ingress Checking	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled		
VID (1-4094)	1		

Figure 4-21 VLAN Interface (Edit and Access)

In the section of **VLAN Interface Settings**, you can configure the following parameters.

Parameter	Overview
<b>VLAN Mode</b>	Choose the option of VLAN mode. The options available are <b>Access</b> , <b>Hybrid</b> , <b>Trunk</b> , <b>Promiscuous</b> and <b>Host</b> .
<b>Acceptable Frames</b>	Choose an operating option for acceptable frames. The options available are <b>Tagged only</b> , <b>Untagged only</b> and <b>Admit All</b> .
<b>Checking Ingress</b>	This parameter enables or disables a function of checking ingress.
<b>VLAN ID</b>	Enter the VLAN ID you use for this configuration. The range is from 1 to 4,094.
<b>Clone</b>	If you choose this option, you need to enable a clone function.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

Click **Back** to return to the previous window.

Choose **Hybrid** from **VLAN Mode** to display the following window.

The screenshot shows the 'Configure VLAN Interface' window with the following settings:

- Port: G11/0/1
- VLAN Mode: Hybrid
- Acceptable Frame Type: Admit All
- Ingress Checking: Enabled (radio button selected)
- VLAN Precedence: MAC-Based VLAN
- Native VLAN:  Native VLAN
- VID (1-4094): 1
- Action: None
- Allowed VLAN Range: (empty text box)
- Current Hybrid untagged VLAN Range: 1
- Current Hybrid tagged VLAN Range: (empty text box)
- Clone:  Clone
- From Port: G11/0/1
- To Port: G11/0/1

Buttons for 'Back' and 'Apply' are visible at the bottom right.

Figure 4-22 VLAN Interface (Edit and Hybrid)

In the section of **VLAN Interface Settings**, you can configure the following parameters.

Parameter	Overview
<b>VLAN Mode</b>	Choose the option of VLAN mode. The options available are <b>Access</b> , <b>Hybrid</b> , <b>Trunk</b> , <b>Promiscuous</b> and <b>Host</b> .
<b>Acceptable Frames</b>	Choose an operating option for acceptable frames. The options available are <b>Tagged only</b> , <b>Untagged only</b> and <b>Admit All</b> .
<b>Checking Ingress</b>	This parameter enables or disables a function of checking Ingress.
<b>VLAN Precedence</b>	Choose an option for VLAN Precedence. The options available are <b>MAC based VLAN</b> and <b>Subnet based VLAN</b> .
<b>Native VLAN</b>	If you set this option to on, the native VLAN function becomes enabled.
<b>VID</b>	This parameter becomes available if <b>Native VLAN</b> option is set to on. Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Action</b>	Choose the action you perform (or execute). The options available are <b>Nothing</b> , <b>Add</b> , <b>Delete</b> , <b>Tag</b> and <b>Untag</b> .
<b>Adding Mode</b>	Choose to add one of these parameters: untagged and tagged.
<b>VLAN Range Allowed</b>	Enter the VLAN range allowed.
<b>Clone</b>	If you choose this option, you need to enable the clone function.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

Click **Back** to return to the previous window.

Choose **Trunk** on the **VLAN Mode** to display the following window.

The screenshot shows the 'Configure VLAN Interface' window with the following settings:

- Port: Gi1/0/1
- VLAN Mode: Trunk
- Acceptable Frame Type: Admit All
- Ingress Checking:  Enabled  Disabled
- Native VLAN:  Native VLAN  Untagged  Tagged
- VID (1-4094): 1
- Action: None
- Allowed VLAN Range: (empty text box)
- Allowed VLAN Range: (empty text box)
- Clone:  Clone
- From Port: Gi1/0/1
- To Port: Gi1/0/1

Buttons for 'Back' and 'Apply' are visible at the bottom right.

Figure 4-23 VLAN Interface (Edit and Trunk)

In the section of **VLAN Interface Settings**, you can configure the following parameters.

Parameter	Overview
<b>VLAN Mode</b>	Choose the option of VLAN mode. The options available are <b>Access</b> , <b>Hybrid</b> , <b>Trunk</b> , <b>Promiscuous</b> and <b>Host</b> .
<b>Acceptable Frames</b>	Choose an operating option for acceptable frames. The options available are <b>Tagged only</b> , <b>Untagged only</b> and <b>Admit All</b> .
<b>Checking Ingress</b>	This parameter becomes available if you choose <b>Trunk</b> from <b>VLAN Mode</b> . This action enables or disables a function of checking Ingress.
<b>Native VLAN</b>	If you set this option to on, the native VLAN function becomes enabled. In addition, choose <b>Untagged</b> or <b>Tagged</b> as the frame to support on this VLAN.
<b>VID</b>	This parameter will be available if the <b>Native VLAN</b> option is set to on. Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Action</b>	Choose the action you perform. The options available are <b>Nothing</b> , <b>All</b> , <b>Add</b> , <b>Delete</b> , <b>Except</b> and <b>Replace</b> .
<b>VLAN Range Allowed</b>	Enter the VLAN range allowed.
<b>Clone</b>	If you choose this option, you need to enable the clone function.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

Click **Back** to return to the previous window.

Choose **Promiscuous** from **VLAN Mode** to display the following window.

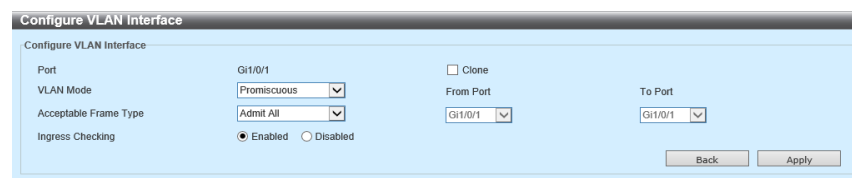


Figure 4-24 VLAN Interface (Edit and Promiscuous)

In the section of **VLAN Interface Settings**, you can configure the following parameters.

Parameter	Overview
<b>VLAN Mode</b>	Choose an option of VLAN mode. The options available are <b>Access</b> , <b>Hybrid</b> , <b>Trunk</b> , <b>Promiscuous</b> and <b>Host</b> .

Parameter	Overview
<b>Acceptable Frames</b>	Choose an operating option for acceptable frames. The options available are <b>Tagged only</b> , <b>Untagged only</b> and <b>Admit All</b> .
<b>Checking Ingress</b>	This parameter enables or disables a function of checking ingress.
<b>Clone</b>	If you choose this option, you need to enable the clone function.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

Click **Back** to return to the previous window.

Choose **Host** from **VLAN Mode** to display the following window.

Figure 4-25 VLAN Interface (Edit and Host)

In the section of **VLAN Interface Settings**, you can configure the following parameters.

Parameter	Overview
<b>VLAN Mode</b>	Choose the option of VLAN mode. The options available are <b>Access</b> , <b>Hybrid</b> , <b>Trunk</b> , <b>Promiscuous</b> and <b>Host</b> .
<b>Acceptable Frames</b>	Choose an operating option for acceptable frames. The options available are <b>Tagged only</b> , <b>Untagged only</b> and <b>Admit All</b> .
<b>Checking Ingress</b>	This parameter enables or disables a function of checking ingress.
<b>Clone</b>	If you choose this option, you need to enable a clone function.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

Click **Back** to return to the previous window.

## 4.2.7 Subnet VLAN

Use the following window to implement the settings on a subnet VLAN and display its settings. Configure the subnet VLAN. If you receive untagged IP packets or priority tag IP packets through a port, both of them are cross-checked (along) with the subnet VLAN entry by using the source IP address. If the source IP is included in the entry subnet, the packets are grouped (or classified) into the VLAN, which is defined on the subnet.

Choose **L2 Features > VLAN > Subnet VLAN** to display the following window.

Figure 4-26 Subnet VLAN

In the section of the **Subnet VLAN**, you can configure the following parameters.

Parameter	Overview
<b>IPv4 Network Prefix / Prefix Length</b>	Choose and enter the value of an IPv4 address of the subnet VLAN and its prefix-length.
<b>IPv6 Network Prefix / Prefix Length</b>	Choose and enter the value of an IPv6 address of the subnet VLAN and its prefix length.
<b>VID</b>	Enter a subnet VLAN ID to use. The range is from 1 to 4,094.
<b>Priority</b>	Choose the priority value to use. You can specify the value within the range from 0 to 7. The lower the value, the higher its priority will be.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.2.8 Voice VLAN

### 4.2.8.1 Voice VLAN Global

Use the following window to implement the settings on a global voice VLAN. Enable or disable to set a voice VLAN function to global, and then specify the voice VLAN of a switch. The number of voice VLANs to specify for the switch is one, only.

Choose **L2 Features > VLAN > Voice VLAN > Voice VLAN Global** to display the following window.

Figure 4-27 Voice VLAN Global

In the section of the **Voice VLAN Global**, you can configure the following parameters.

Parameter	Overview
<b>Voice VLAN State</b>	This parameter enables or disables to set the voice VLAN function to global.
<b>Voice VLAN ID</b>	Enter a VLAN ID for the voice VLAN. Before the settings, the VLAN specified as the voice VLAN must exist beforehand, and the range is from 2 to 4,094.
<b>Voice VLAN CoS</b>	Enter CoS of the voice VLAN. The range is from 0 to 7. The voice packets arriving at the voice VLAN corresponding-ports are marked as the CoS specified. You can distinguish between voice VLAN traffics and data traffics of QoS (Quality of Service) by including annotations for CoS packets.
<b>Aging-Time</b>	Enter the aging-time. This parameter configures the aging-time and voice VLAN information to age out the voice device, which automatically learned. If the last voice device, which is connected to a port, stops transmitting traffics and a MAC address of the voice device ages out from FDB, the aging-timer of the voice VLAN activates. If the deadline of the voice VLAN aging-timer expires, ports are removed from the voice VLAN. If the voice traffics restart during the aging-time, the aging-timer is canceled. The range is from 1 to 65,535 (minutes). The port becomes removed from the voice VLAN after the expiration of the voice VLAN aging-timer.

Click **Apply** to reflect the change.

### 4.2.8.2 Voice VLAN Port

Use the following window to implement the settings on a voice VLAN interface and display its settings.

Choose **L2 Features > VLAN > Voice VLAN > Voice VLAN Port** to display the following window.

Port	State	Mode
Gi1/0/1	Disabled	Auto/Untag
Gi1/0/2	Disabled	Auto/Untag
Gi1/0/3	Disabled	Auto/Untag
Gi1/0/4	Disabled	Auto/Untag
Gi1/0/5	Disabled	Auto/Untag
Gi1/0/6	Disabled	Auto/Untag
Gi1/0/7	Disabled	Auto/Untag

Figure 4-28 Voice VLAN Port

In the section of **Audio VLAN Port**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables a voice VLAN function of the port specified. If you enable a voice LAN on the port, the voice packets received are transferred by the voice VLAN. Packets received are determined (or evaluated) as voice packets when a source MAC address of the packets complies with an OUI address.

Parameter	Overview
<b>Mode</b>	<p>Chooses a mode. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Auto Untagged</b> - the untagged membership of the voice VLAN is automatically learned.</li> <li>• <b>Auto-Tag</b> - the tagged membership regarding the voice VLAN is learned automatically.</li> <li>• <b>Manual</b> - This configures the voice VLAN membership, manually.</li> </ul> <p>If the automatic learning is enabled, ports are automatically learned as the voice VLAN member. This membership ages out, automatically. If a port operates as the auto-tagged mode and captures the voice device through the device OUI, the port automatically participates in the voice VLAN as the tagged member. If the voice device transmits tagged packets, the switch changes its priority. If the voice device transmits untagged packets, they are transferred by PVID (Port VLAN ID). If a port operates as the auto-untagged mode and captures the voice device through the device OUI, the port automatically participates in the voice VLAN as the untagged member. If the voice device transmits tagged packets, the switch changes its priority. If the voice device transmits untagged packets, they are transferred through the voice VLAN. If the switch receives LLDP-MED (LLDP Media Endpoint Discovery) packets, it checks the priority-flag. Switches follow the tagged flag and the priority settings.</p>

Click **Apply** to reflect the change.

### 4.2.8.3 Voice VLAN OUI

Use the following window to implement the settings on voice VLAN OUI and display its settings. You can associate the OUI of a user definition with the voice VLAN. If a source MAC address of packets received corresponds with an optional OUI pattern, the packets received are evaluated as voice packets. The default OUI cannot be either deleted or specified because of the duplication.

Choose **L2 Features > VLAN > Voice VLAN > Voice VLAN OUI** to display the following window.

Figure 4-29 Voice VLAN OUI

In the section of **Voice VLAN OUI**, you can configure the following parameters.

Parameter	Overview
<b>OUI Address</b>	Enter one MAC address for voice VLAN OUI.
<b>Mask</b>	Enter the bit mask, which corresponds with a MAC address of voice VLAN OUI.
<b>Description</b>	Fill out an overview for describing a MAC address of user-definition OUI. The number of character strings can be up to 32.

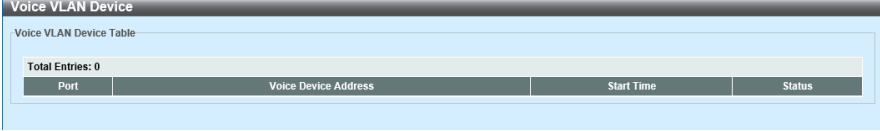
Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entry.

#### 4.2.8.4 Voice LAN Device

Use the following window to display a table of the voice VLAN device and its information.

Choose **L2 Features > VLAN > Voice VLAN > Voice VLAN Device** to display the following window.



The screenshot shows a window titled "Voice VLAN Device". Inside, there is a section labeled "Voice VLAN Device Table". Below this, it states "Total Entries: 0". A table with four columns is visible: "Port", "Voice Device Address", "Start Time", and "Status".

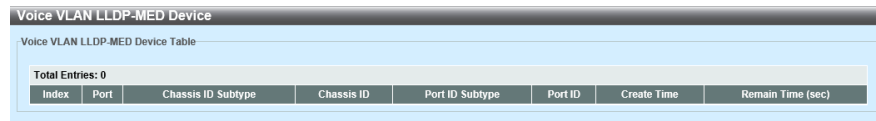
Port	Voice Device Address	Start Time	Status
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Figure 4-30 Voice VLAN Device

### 4.2.8.5 Voice VLAN LLDP-MED Device

Use the following window to display a table of the voice VLAN LLDP-MED device and its information.

Choose **L2 Features > VLAN > Voice VLAN > Voice VLAN LLDP-MED Device** to display the following window.



The screenshot shows a window titled "Voice VLAN LLDP-MED Device". Inside, there is a section labeled "Voice VLAN LLDP-MED Device Table" with a sub-label "Total Entries: 0". Below this is a table with the following columns: Index, Port, Chassis ID Subtype, Chassis ID, Port ID Subtype, Port ID, Create Time, and Remain Time (sec). The table is currently empty.

Index	Port	Chassis ID Subtype	Chassis ID	Port ID Subtype	Port ID	Create Time	Remain Time (sec)
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Figure 4-31 Voice VLAN LLDP-MED Device

## 4.2.9 Private VLAN

Use the following window to implement the settings on a private VLAN and display its settings.

Choose **L2 Features > VLAN > Private VLAN** to display the following window.

Figure 4-32 Private VLAN

In the section of the **Private VLAN**, you can configure the following parameters.

Parameter	Overview
<b>VID List</b>	Enter a private VLAN ID to use. You can enter its consecutive VLAN IDs, by delimiting with a comma, or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>State</b>	This parameter enables or disables the private VLAN state.
<b>Type</b>	Choose a private VLAN type to create. The options available are <b>Community</b> , <b>Isolated</b> and <b>Primary</b> .

Click **Apply** to reflect the change.

In the section of **Private VLAN Association**, you can configure the following parameters.

Parameter	Overview
<b>VID List</b>	Enter the private VLAN ID you use. You can enter its consecutive VLAN IDs, by delimiting with a comma, or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>Action</b>	Choose an action to execute on the private VLAN. The options available are <b>Add</b> , <b>Delete</b> and <b>Disable</b> .
<b>Secondary VID List</b>	Enter a secondary private VLAN ID to use it. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

In the section of the **Private VLAN Host Association**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Primary VID</b>	Enter the primary VLAN ID you use. The range is from 1 to 4,094.
<b>Secondary VID</b>	Enter the secondary VLAN ID you use. The range is from 1 to 4,094. If the option of <b>Remove Association</b> is set to on, this settings does not become enabled.

Click **Apply** to reflect the change.

In the section of the **Private VLAN Mapping**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Primary VID</b>	Enter the primary VLAN ID you use. The range is from 1 to 4,094.
<b>Action</b>	Click <b>Add</b> to add a new entry based on the information entered. Click <b>Remove</b> to remove an entry based on the information entered.
<b>Secondary VID List</b>	Enter the secondary VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094. If an option of <b>Remove Mapping</b> is set to on, this configuration does not become enabled.

Click **Apply** to reflect the change.

## 4.3 STP (Spanning Tree Protocol)

### 4.3.1 STP Global Settings

Use the following window to implement the settings on global STP and display its settings.

Choose **L2 Features > STP > STP Global Settings** to display the following window.

Figure 4-33 STP Global Settings

In the section of the **STP State**, you can configure the following parameter.

Parameter	Overview
<b>STP State</b>	This parameter enables or disables the global STP state.

Click **Apply** to reflect the change.

In the section of an **STP Mode**, you can configure the following parameter.

Parameter	Overview
<b>STP Mode</b>	Choose the STP mode you use. The options available are <b>MSTP</b> , <b>RSTP</b> and <b>STP</b> . MSTP stands for Multiple Spanning Tree Protocol, RSTP for Rapid Spanning Tree Protocol, and STP for Spanning Tree Protocol.

Click **Apply** to reflect the change.

In the section of an **STP Priority**, you can configure the following parameter.

Parameter	Overview
<b>Priority</b>	Choose the value of an STP priority. You can specify the value within the range from 0 to 61,440. By default, the value is 32,768. The lower the value, the higher priority will be.

Click **Apply** to reflect the change.

In the section of an **STP Configuration**, you can configure the following parameters.

Parameter	Overview
<b>Bridge Max Age</b>	Enter the value of bridge-maximum age. The range is from 6 to 40 (seconds). By default, the value is 20 (seconds). Set the value of the maximum age to ensure that old information does not circulate limitlessly through redundant paths in the network; the effective propagation of new information is not prevented. As the value is set to a root bridge, it is useful to evaluate that the settings of a spanning tree of the switch is the same with other devices of a bridge VLAN.
<b>Bridge Hello Time</b>	This parameter becomes available if you choose <b>RSTP</b> or <b>STP</b> on the <b>STP Mode</b> . Enter the value of hello time for a bridge. The range is from 1 to 2 (seconds). By default, the value is 2 (seconds). This is the interval for transmitting BPDU (Bridge Protocol Data Unit) packets whose root bridge is twice, to inform that it is a root bridge on all of other switches. This field is displayed when you choose an STP or RSTP (Rapid Spanning Tree Protocol) as the STP version. In the case of an MSTP, the hello-time needs to be configured as a port-unit.
<b>Bridge Forward Time</b>	Enter the value of bridge-forward time. The range is from 4 to 30 (seconds). By default, the value is 15 (seconds). This means the time for listening condition when all the ports of a switch migrate (or move) from the blocking state to a forwarding state.
<b>TX Hold Count</b>	Enter the value of a transmission hold count. The range is from 1 to 10 (times). By default, the value is 6 (times). Use the value to configure the maximum number of hello packets, which are transmitted with the predetermined interval.

Parameter	Overview
<b>Max Hops</b>	Enter the maximum number (value) of hops to allow. The range is from 6 to 40 (hops). By default, the value is equal to 20 (hops). Use the value to configure the number of hops between devices existing in a domain of a spanning tree before removing BPDU packets, which are transmitted by a switch. Hop-counting decreases one by one every time a switch passes until the value reaches 0. After that, the switch deletes the BPDU packets, and then the information (or data) retained in the port ages out.

Click **Apply** to reflect the change.

## 4.3.2 STP Port Settings

Use the following window to implement the settings on STP ports and display its settings.

Choose **L2 Features > STP > STP Port Settings** to display the following window.

Port	State	Cost	Guard Root	Link Type	Port Fast	TCN Filter	BPDU Forward	Priority
Gi1/0/1	Enabled	0/200000	Disabled	Auto/P2P	Auto/Non-Edge	Disabled	Disabled	128
Gi1/0/2	Enabled	0/200000	Disabled	Auto/P2P	Auto/Non-Edge	Disabled	Disabled	128
Gi1/0/3	Enabled	0/200000	Disabled	Auto/P2P	Auto/Non-Edge	Disabled	Disabled	128
Gi1/0/4	Enabled	0/200000	Disabled	Auto/P2P	Auto/Non-Edge	Disabled	Disabled	128
Gi1/0/5	Enabled	0/200000	Disabled	Auto/P2P	Auto/Non-Edge	Disabled	Disabled	128
Gi1/0/6	Enabled	0/200000	Disabled	Auto/P2P	Auto/Non-Edge	Disabled	Disabled	128

Figure 4-34 STP Port Settings

In the section of **STP Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port Ports to apply</b>	Choose the port you use.
<b>Cost</b>	Enter the cost value. The range is from 1 to 200,000,000. the value defines the metric, which indicates a relative cost of a forwarding packets to the port list specified. The port cost can be set as the metric value or automatically. The default value is [0] (automatic). If you set 0 to the external cost, the speed of forwarding packets to the specified port is automatically set on a list of the optimal efficiency. The default port of 100Mbps port costs 200,000, and it costs 20,000 for a Gigabit port. The lower the numerical value, the higher possibility of transferring packets (from the port) will be.
<b>State</b>	This parameter enables or disables an STP port state.
<b>Guard Route</b>	This parameter enables or disables a guard route function.

Parameter	Overview
<b>Link Type</b>	Choose the link type option. The options available are <b>Auto</b> , <b>P2P</b> and <b>Share</b> . A full-duplex port is considered to have a Point-to-Point (P2P) connection. On the other hand, a half-duplex port is considered to have a shared connection. The port cannot migrate to the forwarding state promptly by setting the link type to <b>Shared</b> . By default, this option is set to <b>Auto</b> .
<b>Port-Fast</b>	Choose the port-fast option. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Network</b> - The port keeps remain in the non-port-fast state for three seconds. If no BPDU is received, the port becomes the port-fast state, and then its state becomes changed to the forwarding state. If the port receives the BPDU later, the port becomes changed to the non-port-fast state.</li> <li>• <b>Disabled</b> - Always, the port keeps the non-port-fast state. Always, it waits until the forwarding state. After that, the forward-time delay occurs.</li> <li>• <b>Edge</b> - If a link-up occurs, the port directly transits to the state of spanning-tree forwarding without waiting for the forward time delay.</li> <li>• If the interface receives the BPDU later, its operation state changes to the non-port-fast state. By default, this option is set to Network.</li> </ul>
<b>TCN Filtering</b>	This parameter enables or disables an option of Topology Change Notification (TCN) filtering. If a port is set to the TCN filtering mode, TC events received by a port are ignored. By default , this option is set to disabled.
<b>BPDU Forwarding</b>	This parameter enables or disables BPDU forwarding. If enabled, the STP BPDU received are transferred to all the VLAN member ports with the untagged form. By default, this option is set to disabled.
<b>Priority</b>	Choose the priority value. The range of values to choose is from 0 to 240. By default, this option is set to 128. The lower the value, the higher priority will be.
<b>Hello Time</b>	Enter the value of hello time. The range is from <b>1</b> to <b>2</b> (seconds). the value specifies an interval for a representative port to wait during periodic transmissions of each configuration message.

Click **Apply** to reflect the change.

### 4.3.3 MST Configuration Identification

Use the following window to implement the settings on an MST configuration ID and display its settings. This configuration allows you to identify the Multiple Spanning Tree Instance (MSTI), which is configured on a switch.

The default of Common Internal Spanning Tree (CIST) can be changed, but cannot be deleted. In addition, the MSTI ID cannot be changed.

Choose **L2 Features > STP > MST Configuration Identification** to display the following window.

Figure 4-35 MST Configuration Identification

In the section of **MST Configuration Identification**, you can configure the following parameters.

Parameter	Overview
<b>Configuration Name</b>	Enter an MST. This name identifies an MSTI uniquely. If you do not configure a configuration name, a MAC address for the device, which executes an MSTP, is displayed in this field.
<b>Revision Level</b>	Enter the value of a revision level. The range is from 0 to 65,535. By default, the value is set to 0. The value identifies the MSTP domain, which is configured on a switch along with the configuration name.

Click **Apply** to reflect the change.

In the section of the **Instance ID Settings**, you can configure the following parameters.

Parameter	Overview
<b>Instance ID</b>	Enter an Instance ID. The range is from 1 to 64.
<b>Action</b>	Choose the action you perform. The options available are <b>Adding VID</b> and <b>Deleting VID</b> .
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma. Or, you can enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

Click **Edit** to edit the entry-settings.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.3.4 STP Instance

Use the following window to implement the settings on an STP instance. and display its settings.

Choose **L2 Features > STP > STP Instance** to display the following window.

Total Entries: 1	
Instance	Instance State
CIST	Disabled

Instance CIST	
	CIST Global Info [Mode RSTP]
Bridge Address	00-50-40-56-D7-53
Designated Root Address / Priority	00-00-00-00-00-00 / 0
Regional Root Bridge Address / Priority	00-00-00-00-00-00 / 0
Designated Bridge Address / Priority	00-00-00-00-00-00 / 0

Figure 4-36 STP Instance

In the section of the **STP Instance**, you can configure the following parameter.

Parameter	Overview
<b>Instance Priority</b>	After you click <b>Edit</b> , enter the value of the instance priority. The range is from 0 to 61,440.

Click **Edit** to edit the entry-settings to move to a specific page

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

## 4.3.5 MSTP Port Information

Use the following window to implement the settings and display MSTP port information.

Choose **L2 Features > STP > MSTP Port Information** to display the following window.

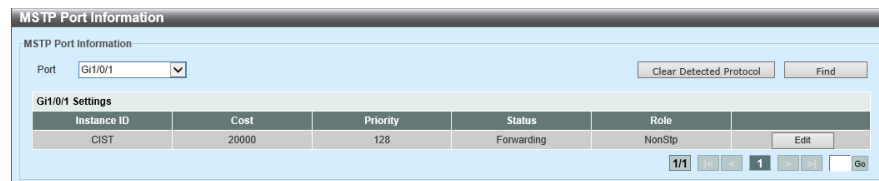


Figure 4-37 MSTP Port Information

In the section of **MSTP Port Information**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Cost</b>	Click <b>Edit</b> , and then enter the cost value. The range is from 1 to 200,000,000.
<b>Priority</b>	Click <b>Edit</b> , and then enter the priority value. The range of values to choose is from <b>0</b> to <b>240</b> . By default, this option is set to 128. The lower the value, the higher priority will be.

Click the **Clear Detection Protocol** button to delete the association of the protocol detected from the port specified.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **Edit** to edit the entry-settings.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.4 Loop Detection Configuration

### 4.4.1 Detecting and Blocking the Loop Settings

Use the following window to implement the settings on detecting and blocking loops and display its settings.

Choose **L2 Features > Detecting and Blocking Loops > Detecting and Blocking Loops Settings** to display the following window.

Port	Link	State	Loop Detect	Mode	Recovery	Recovery Time
Gi1/0/1	Up	Forwarding	Enabled	Block	Enabled	60
Gi1/0/2	Up	Forwarding	Enabled	Block	Enabled	60
Gi1/0/3	Up	Forwarding	Enabled	Block	Enabled	60
Gi1/0/4	Up	Forwarding	Enabled	Block	Enabled	60
Gi1/0/5	Up	Forwarding	Enabled	Block	Enabled	60
Gi1/0/6	Up	Forwarding	Enabled	Block	Enabled	60

Figure 4-38 Loop Detection Configuration

In the section of **Detecting and Blocking the Loop Settings**, you can configure the following parameters.

Parameter	Overview
<b>Global State</b>	This parameter enables or disables to set a function of detecting and blocking a loop.
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables a function of a line loop-back of the port specified.
<b>Mode</b>	Choose the mode of detecting and blocking a loop to use on the port specified. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Shutdown</b> - First, set a port to the shutdown condition when a loop occurs. Then set it to the blocking state.</li> <li>• <b>Block</b> - This allows you to set a port to the blocking state when a loop occurs.</li> </ul>

Parameter	Overview
<b>Recovering Loops</b>	This parameter enables or disables a function of recovering loops. If the function is set to enabled, ports become recovered to a normal condition after the value of time-out expires. Enter the entry field where the time-out value is displayed. The range is from 60 to 86,400 (seconds).

Click **Apply** to reflect the change.

## 4.4.2 Loop History Log

Use the following window to display and clear a loop history log.

Choose **L2 Features > Detecting and Blocking Loops > Loop History Log** to display the following window.

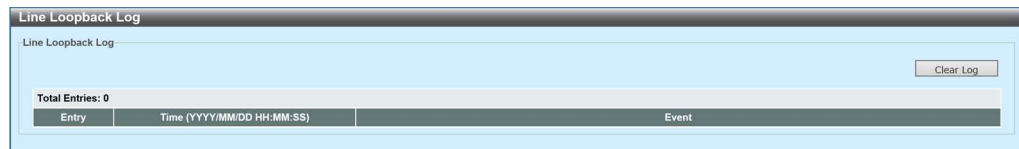


Figure 4-39 Loop History Log

Click the **Clear Log** button to clear log entries from a table.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 4.5 Link Aggregation

Use the following window to implement the settings on a link aggregation and display its settings.

Choose **L2 Features > Link Aggregation** to display the following window.

Figure 4-40 Link Aggregation

In the first section, you can configure the following parameters.

Parameter	Overview
<b>System Priority</b>	Enter the value of a system priority to use. The range is from 1 to 65,535. By default, the value is set to 32,768. The system priority determines the port, which enables a port to participate in a port-channel and to become the standalone mode. The lower the value, the higher priority will be. If there are two or more ports with the same priority, the priority is determined depending on the port-number.
<b>Load Balance Algorithm</b>	Choose a load balance algorithm to use. The value to choose are <b>Source MAC</b> , <b>Destination MAC</b> , <b>Source Destination MAC</b> , <b>Source IP</b> , <b>Destination IP</b> , <b>Source Destination IP</b> , <b>Source L4 Port</b> , <b>Destination L4 Port</b> and <b>Source Destination L4 Port</b> . By default, this option is set to <b>Source Destination MAC</b> .

Click **Apply** to reflect the change.

In the section of **Channel Group Information**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Parameter	Overview
<b>Group ID</b>	Enter the channel-group number. The range is from 1 to 32. If a physical port participates in a channel group for the first time, the port-channel is automatically created. One interface can participate in one channel group, only.
<b>Mode</b>	Choose the mode option. The options available are <b>Static</b> , <b>Active</b> and <b>Passive</b> . If the <b>Static</b> mode is specified, the channel group type is static. If the <b>Active</b> or <b>Passive</b> mode is specified, the channel group type is the Link Aggregation Control Protocol (LACP). A channel group consists of static members or LACP members. As the type of channel group is determined, other types of interfaces cannot participate in its channel group.

Click **Add** to add a new entry based on the information specified.

Click **Delete Member Ports** to delete the member ports from the port-channel specified.

Click **Delete Channels** to delete entries.

Click **Show Detail** to display details on the entry.

Click **Show Detail** to display the following window.

The screenshot shows a web-based configuration interface for a Port Channel. It is titled 'Port Channel' and contains the following sections:

- Port Channel Information:** Port Channel 1, Protocol Static.
- Port Channel Detail Information:** A table with columns: Port, LACP Timeout, Working Mode, LACP State, Port Priority, Port Number, and an Edit button.
 

Port	LACP Timeout	Working Mode	LACP State	Port Priority	Port Number	
Gi1/0/1	None	None	bndl	None	None	Edit
Gi1/0/2	None	None	down	None	None	Edit
- Port Channel Neighbor Information:** A table with columns: Port, Partner System ID, Partner Port No., Partner LACP Timeout, Partner Working Mode, and Partner Port Priority.
 

Port	Partner System ID	Partner Port No.	Partner LACP Timeout	Partner Working Mode	Partner Port Priority
Gi1/0/1	None	None	None	None	None
Gi1/0/2	None	None	None	None	None
- Note:** LACP State: bndl: Port is attached to an aggregator and bundled with other ports. hot-sby: Port is in a hot-standby state. down: Port is down. A Back button is located at the bottom right.

Figure 4-41 Link Aggregation (Show Detail.)

Click **Edit** to edit the entry settings.

Click **Back** to return to the previous window.

## 4.6 L2 Protocol Tunnel

Use the following window to implement the settings on layer 2 protocol tunnel and display its settings.

Choose **L2 Features > L2 Protocol Tunnel** to display the following window.

The screenshot shows the 'L2 Protocol Tunnel' configuration window. It has two tabs: 'L2 Protocol Tunnel Global Settings' (selected) and 'L2 Protocol Tunnel Port Settings'. Under 'Global Settings', there are two input fields: 'CoS for Encapsulated Packets' with a value of 5 and a 'Default' checkbox, and 'Drop Threshold (100-20000)' with a value of 0 and a checked 'Default' checkbox. Below these is an 'Action' dropdown set to 'Add', a 'Tunneled Protocol' dropdown set to 'GVRP', a 'Protocol MAC' dropdown set to '01-00-0C-CC-CC-CC', and a 'MAC Address' input field. A table below shows the current configuration:

Protocol	Drop Counter	Tunneling Address
GVRP	0	00-C0-8F-04-92-C1
STP	0	00-C0-8F-04-92-C0
01-00-0C-CC-CC-CC	0	00-C0-8F-04-92-C2
01-00-0C-CC-CC-CD	0	00-C0-8F-04-92-C3

Figure 4-42 L2 Protocol Tunnel (L2 Protocol Tunnel Global Settings)

In the section of the **L2 Protocol Tunnel Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>CoS for Encapsulated Packets</b>	Choose the CoS value for encapsulated packets. Specify the value within the range from 0 to 7. When you choose <b>Default</b> , use the default value.
<b>Drop Threshold</b>	Enter the drop threshold. The range is from 100 to 20,000. By default, the value is set to 0. The tunneling of the layer 2 protocol packets consumes the throughput (capacity) for encrypting, decoding and transferring packets. Use this option to limit the consumption of CPU processing bandwidth. Specify the threshold for the number of all the layer 2 protocol packets, which can be processed through the system. The protocol packets, which exceed the maximum number of packets, will be removed. When you choose <b>Default</b> , use the default value.
<b>Action</b>	Choose the action you perform. The options available are <b>Add</b> or <b>Delete</b> . This option allows you to add the address of a Layer 2 Protocol Tunneling (L2PT) Multicast on the protocol specified. Or, the option allows you to delete the address above from the protocol specified.

Parameter	Overview
<b>Tunneled Protocol</b>	Choose a tunneled protocol. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>GVRP</b> - GVRP packets are tunneled to the address, which is configured already.</li> <li>• <b>STP</b> - STP packets are tunneled to the address, which is configured already.</li> <li>• <b>MAC</b> - Protocol packets with the specific destination address are tunneled to the address configured.</li> <li>• <b>All</b> - All packets are tunneled to the address, which is configured already.</li> </ul>
<b>Protocol MAC</b>	After choosing the <b>MAC</b> option as a <b>Tunneled Protocol</b> , choose the destination address, which is tunneled on the address configured. The options available are <b>01-00-0C-CC-CC-CC</b> and <b>01-00-0C-CC-CC-CD</b> .
<b>MAC Address</b>	Enter a MAC address as the tunneling destination for the protocol specified. For this MAC address, you cannot specify the address, which is reserved or used by other protocols.

Click **Apply** to reflect the change.

Choose the **L2 Protocol Tunnel Port Settings** tab to display the following window.

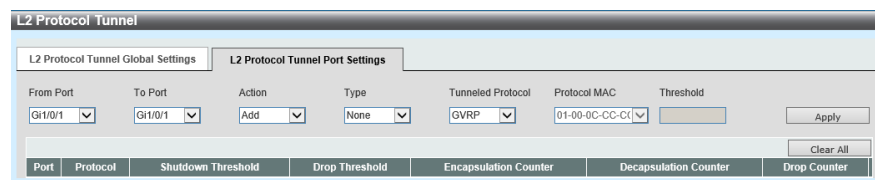


Figure 4-43 L2 Protocol Tunnel (L2 Protocol Tunnel Port Settings)

In the section of **L2 Protocol Tunnel Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Action</b>	Click <b>Add</b> to add a new entry based on the information entered. Click <b>Delete</b> to delete an entry based on the information entered.
<b>Type</b>	Choose the type option. The options available are <b>None</b> , <b>Shutdown</b> and <b>Drop</b> .
<b>Tunneled Protocol</b>	Choose the tunneled protocol option. The options available are <b>GVRP</b> , <b>STP</b> , <b>Protocol MAC</b> and <b>ALL</b> .

Parameter	Overview
<b>Protocol MAC</b>	After choosing <b>Protocol MAC</b> as the <b>Tunneled Protocol</b> , the following options are available. Choose <b>Protocol MAC</b> from it. The options available are <b>01-00-0C-CC-CC-CC</b> and <b>01-00-0C-CC-CC-CD</b> .
<b>Threshold</b>	If you choose <b>Shutdown</b> or <b>Removal</b> in the <b>Type</b> field, this parameter becomes available. Enter the threshold value. The range is from 1 to 4,096.

Click **Apply** to add new entries based on the information specified.

Click **Clear All** to clear information from all the entries.

Click **Clear** to clear information from the entry.

## 4.7 L2 Multicast Control

### 4.7.1 IGMP Snooping

#### 4.7.1.1 IGMP Snooping Settings

Use the following window to implement the settings on IGMP (Internet Group Management Protocol) Snooping and display its settings.

Choose **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Settings** to display the following window.

Figure 4-44 IGMP Snooping Settings

In the section of **Global Settings**, you can configure the following parameter.

Parameter	Overview
<b>Global State</b>	This parameter enables or disables to set IGMP Snooping to global.

Click **Apply** to reflect the change.

In the section of **VLAN State Settings**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Apply** to add new entries based on the information specified.

In the section of a table of **IGMP Snooping**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Show Detail** to display details on the entry.

Click **Edit** to edit the entry-settings.

If two or more pages exist, enter the page numbers. Click **Go** to move to a specific page.

Click **Show Detail** to display the following window.



Figure 4-45 IGMP Snooping Settings (Show Detail.)

Click **Edit** to edit the settings.

Choose **Edit** or **Revise** to display the following window.

Figure 4-46 IGMP Snooping Settings (Edit and Revise)

In the section of **IGMP Snooping VLAN Settings**, you can configure the following parameters.

Parameter	Overview
<b>Fast Leave</b>	This parameter enables or disables a function of an IGMP Snooping fast leave. If it is enabled and the IGMP leave messages are received, that makes members leave immediately.
<b>Querier State</b>	This parameter enables or disables the querier state.
<b>Query Version</b>	Choose the general query-packet version transmitted by an IGMP Snooping querier. The values to choose are <b>1</b> , <b>2</b> and <b>3</b> .
<b>Query Interval</b>	Enter the interval for an IGMP Snooping querier periodically to transmit general query messages of IGMP. The range is from 1 to 31,744.
<b>Maximum Response Time</b>	Enter the maximum response time (in second), which is advertised by an IGMP Snooping query. The range is from 1 to 25.
<b>Robustness Variable</b>	Enter the robustness variable to use it for IGMP Snooping. The range is from 1 to 7.
<b>Final Member Query Interval</b>	Enter the transmission interval of (channel) query messages of IGMP group unique or group source unique. The range is from 1 to 25.
<b>Proxy Reporting</b>	This parameter enables or disables a function of proxy reporting.
<b>Source Address</b>	Enter a source IP address of the proxy reporting. This option becomes enabled if you choose <b>Enabled</b> from <b>Proxy Reporting</b> .
<b>Rate Limiting (or Band Limiting)</b>	Enter the value of a band limiting. The range is from 1 to 1,000. If you set <b>No Limitation</b> to on, a band limiting is not applied for this profile.

Click **Apply** to reflect the change.

### 4.7.1.2 IGMP Snooping Group Settings

Use the following window to implement the settings on an IGMP Snooping group and display its settings.

Choose **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Group Settings** to display the following window.

Figure 4-47 IGMP Snooping Group Settings

In the section of **Static Group Settings on IGMP Snooping**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Enter VLAN IDs to use. The range is from 1 to 4,094.
<b>Group Address</b>	Enter a group address of IP Multicast.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete the entries based on the information specified.

In the section of **IGMP Snooping Static Group Table**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Choose and enter VLAN IDs to use. The range is from 1 to 4,094.
<b>Group Address</b>	Click the radio button, and then enter an address of an IP Multicast group.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

In the section of the **IGMP Snooping Group Table**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Choose and enter VLAN IDs to use. The range is from 1 to 4,094.
<b>Group Address</b>	Click the radio button, and then enter an address of an IP Multicast group.
<b>Details</b>	This parameter displays details for an IGMP group.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

### 4.7.1.3 IGMP Snooping Filter Settings

Use the following window to implement the settings on the IGMP Snooping filtering and display its settings.

Choose **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Filter Settings** to display the following window.

The screenshot shows the 'IGMP Snooping Filter Settings' window. It contains the following sections:

- IGMP Snooping Rate Limit Settings:** Includes 'From Port' (G1/0/1), 'To Port' (G1/0/1), 'Limit Number (1-1000)' (input field), and a 'No Limit' checkbox. An 'Apply' button is present.
- IGMP Snooping Limit Settings:** Includes 'From Port' (G1/0/1), 'To Port' (G1/0/1), 'Limit Number (1-1024)' (input field), 'Exceed Action' (Default), 'Except ACL Name' (32 chars), 'Please Select' button, and 'VID (1-4094)' (input field). An 'Apply' button is present.
- Access Group Settings:** Includes 'From Port' (G1/0/1), 'To Port' (G1/0/1), 'Action' (Add), 'ACL Name' (32 chars), 'Please Select' button, and 'VID (1-4094)' (input field). An 'Apply' button is present.
- IGMP Snooping Filter Table:** Includes 'From Port' (G1/0/1), 'To Port' (G1/0/1), 'Find', and 'Show All' buttons. Below the table, it shows 'Total Entries: 0' and a table header with columns 'Port' and 'Rate Limit'. The table content is empty, displaying 'No data to display.'

Figure 4-48 IGMP Snooping Filter Settings

In the section of the settings on **IGMP Snooping Bandwidth Limit**, you can configure the following parameters.

Parameter	Overview
<b>From Port to Port: from the Beginning to the End</b>	Choose the port you use. This is available only if you choose the port option for the following action.
<b>Number of Limitations</b>	Enter the number of limitations. Configure the rate of IGMP control packets, which can be processed on a specific interface by a switch. The range is from 1 to 1,000 (packets/per second). If you choose <b>No Limitation</b> , the limitation is removed.

Click **Apply** to reflect the change.

In the section of the settings on **IGMP Snooping Limitation**, you can configure the following parameters.

Parameter	Overview
<b>From Port to Port: from the Beginning to the End</b>	Choose the port you use.
<b>Number of Limitations</b>	Enter the number of limitations. Use this parameter to limit the number of IGMP cash-entries, which can be created. The range is from 1 to 4,096.
<b>Exceed Action</b>	Choose an exceed action. Use this parameter to specify the operation to process the group, which is newly recognized when exceeding the limitation. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Default</b> - The default action is executed.</li> <li>• <b>Drop</b> - A new group is dropped.</li> <li>• <b>Replace</b> - A new group is replaced to the oldest group.</li> </ul>
<b>Except ACL Name</b>	Enter the name of the standard IP access-list. The group (*,G) or channel (S,G), which are allowed based on the access list, are excluded from the limitation. To authorize a channel (S,G), specify "S" in the field of source-address of the access-list entry and "G" in the destination-address field. To authorize a group (*,G), specify "any" in the source-address field of the access-list entry and "G" in the destination-address field. The number of characters for the name can be up to 32. Or, click <b>Please Choose</b> to search and choose the existing access list, which is configured by a switch, for using this configuration.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete entries based on the information specified.

In the section of the settings on **Access Group**, you can configure the following parameters.

Parameter	Overview
<b>From Port to Port: from the Beginning to the End</b>	Choose the port you use.
<b>Action</b>	Click <b>Add</b> to add a new entry based on the information entered. Click <b>Delete</b> to delete an entry based on the information entered.
<b>ACL Name</b>	Enter the name of the standard IP access-list. Specify "any" in the source-address field of the access-list entry and "G" in the destination-address field. The number of characters for the name can be up to 32. Or, choose <b>Please Select</b> to search and choose the existing access list, which is configured by a switch for using this configuration.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

In the section of a table of **IGMP Snooping Filter**, you can configure the following parameter.

Parameter	Overview
<b>From Port to Port: from the Beginning to the End</b>	Choose the port you use.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Show Detail** to display details on the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Show Detail** to display the following window.

IGMP Snooping Detail Filter Table

IGMP Snooping Detail Filter Table

Total Entries: 1

Port: G1/0/1

VID	Access Group	Groups/Channel Limit
	Not Configured	Not Configured

1/1 | < << 1 >> > | Go

Back

Figure 4-49 IGMP Snooping Filter Settings (Show Detail.)

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Back** to return to the previous window.

#### 4.7.1.4 IGMP Snooping Multicast Router Information

Use the following window to implement the settings on an IGMP Snooping Multicast router and display its settings.

Choose **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Multicast Router Information** to display the following window.



Figure 4-50 IGMP Snooping Multicast Router Information

In the section of the settings on **IGMP Snooping Multicast Router Port**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Configuration</b>	Choose a port configuration. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Port</b> - Makes the port configured become a static Multicast router port.</li> <li>• <b>Forbidden-Port</b> - Does not allow the ports configured to become a Multicast router port.</li> </ul>
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete entries based on the information specified.

In the section of a port table of **IGMP Snooping Multicast Router**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

### 4.7.1.5 IGMP Snooping Statistics Settings

Use the following window to display and clear the IGMP Snooping statistics.

Choose **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Statistics Settings** to display the following window.

Figure 4-51 IGMP Snooping Statistics Settings

In the section of the **IGMP Snooping Statistics Settings**, you can configure the following parameters.

Parameter	Overview
<b>Statistics</b>	Choose an interface. The options available are <b>All</b> , <b>VLAN</b> and <b>Port</b> .
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094. This option is available if you choose <b>VLAN</b> from the <b>Statistics</b> drop-down list.
<b>From Port/ To Port</b>	Choose the port you use. This option is available if you choose <b>Port</b> from the <b>Statistics</b> drop-down list.

Click **Clear** to clear the statistics information based on the condition specified.

In the section of a table regarding the **IGMP Snooping Statistics**, you can configure the following parameters.

Parameter	Overview
<b>Search Type</b>	Choose the interface type. The options available are <b>VLAN</b> and <b>Port</b> .
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094. This option is available if you choose <b>VLAN</b> from the <b>Search Type</b> drop-down list
<b>From Port/ To Port</b>	Choose the port you use. This option is available if you choose <b>Port</b> from the <b>Search Type</b> drop-down list.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

## 4.7.2 MLD Snooping

### 4.7.2.1 MLD Snooping Settings

Use the following window to implement the settings on MLD Snooping (Multicast Listener Discovery Snooping) and display its settings.

Choose **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Settings** to display the following window.

Figure 4-52 MLD Snooping Settings

In the section of **Global Settings**, you can configure the following parameter.

Parameter	Overview
<b>Global State</b>	This parameter enables or disables the global state of MLD Snooping.

Click **Apply** to reflect the change.

In the section of **VLAN State Settings**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Apply** to add new entries based on the information specified.

In the section of **MLD Snooping Table**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Show Detail** to display details on the entry.

Click **Edit** to edit the entry-settings.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Show Detail** to display the following window.

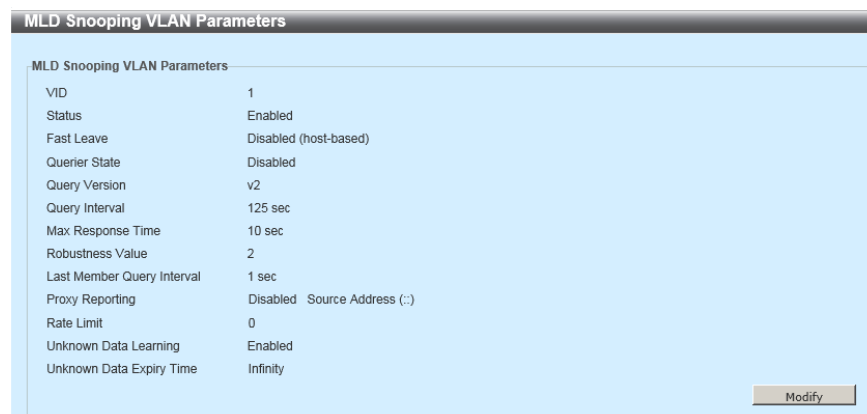


Figure 4-53 MLD Snooping Settings (Show Detail.)

Click **Edit** to edit the settings.

Click **Edit** or **Revise** to display the following window.

The screenshot shows the 'MLD Snooping VLAN Settings' configuration window. The settings are as follows:

Parameter	Value
VID (1-4094)	1
Status	Enabled
Fast Leave	Disabled
Querier State	Disabled
Query Version	2
Query Interval (1-31744)	125 sec
Max Response Time (1-25)	10 sec
Robustness Value (1-7)	2
Last Member Query Interval (1-25)	1 sec
Proxy Reporting	Disabled
Rate Limit (1-1000)	No Limit
Unknown Data Learning	Enabled
Unknown Data Expiry Time (1-65535)	Infinity

An 'Apply' button is located at the bottom right of the window.

Figure 4-54 MLD Snooping Settings (Edit and Revise)

In the section of **IGMP Snooping VLAN Settings**, you can configure the following parameters.

Parameter	Overview
<b>Fast Leave</b>	This parameter enables or disables a function of MLD Snooping fast-leave. If enabled, the membership is immediately removed when the system receives the MLD leave messages.
<b>Proxy Reporting</b>	This parameter enables or disables a function of the proxy reporting.
<b>Source Address</b>	Enter one source IP address of a proxy reporting. This option is enabled if you choose <b>Enabled</b> from <b>Proxy Reporting</b> .
<b>Querier State</b>	This parameter enables or disables the querier state.
<b>Query Version</b>	Choose the general query packet version transmitted by the MLD Snooping querier. The values to choose are <b>1</b> and <b>2</b> .
<b>Query Interval</b>	Enter the interval at which the MLD Snooping querier periodically sends general MLD query messages. The range is from 1 to 31,744.
<b>Maximum Response Time</b>	Enter the maximum response time (in seconds), advertised in MLD Snooping queries. The range is from 1 to 25.
<b>Robustness Value</b>	Enter the robustness variable to use it for MLD Snooping. The range is from 1 to 7.
<b>Final Listener Query Interval</b>	Enter the transmission interval of query-messages which are unique to MLD group or group source (channel) due to the MLD Snooping querier. The range is from 1 to 25.
<b>Band Limitation (or Rate Limitation)</b>	Enter the value of the band limitation (or rate limitation). The range is from 1 to 1,000. If you set <b>No Limitation</b> to on, no band limitation is applied for this profile.

Click **Apply** to reflect the change.

### 4.7.2.2 MLD Snooping Group Settings

Use the following window to implement the settings on an MLD Snooping group and display its settings.

Choose **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Group Settings** to display the following window.

Figure 4-55 MLD Snooping Group Settings

In the section of the settings on **MLD Snooping Static Group**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Group Address</b>	Enter a group address for IPv6 Multicast.
<b>From Port to Port: from the Beginning to the End</b>	Choose the port you use.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete entries based on the information specified.

In the section of a table of **MLD Snooping Static Group**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Choose and enter VLAN IDs to use. The range is from 1 to 4,094.
<b>Group Address</b>	Click the <b>Radio</b> button, and then enter an address of an IPv6 Multicast Group.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

In the section of **MLD Snooping Group Table**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Choose and enter VLAN IDs to use. The range is from 1 to 4,094.
<b>Group Address</b>	Click the <b>Radio</b> button, and then enter an address of an IPv6 Multicast Group.
<b>Details</b>	If you choose this option, the details on MLD group are displayed.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

### 4.7.2.3 MLD Snooping Filter Settings

Use the following window to implement the settings on the MLD Snooping filtering and display its settings.

Choose **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Filtering Settings** to display the following window.

Figure 4-56 MLD Snooping Filter Settings

In the section of the settings on **MLD Snooping Band Limitation**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use. This is available only if you select the <b>Port</b> option as the following action.
<b>Number of Limitations</b>	Enter the number of limitations. Use the number of limitations to configure the rate of MLD control packets, which can be processed by the Switch on a specific interface. The range is from 1 to 1,000 (packets/per second). If you choose <b>No Limitation</b> , the limitation is removed (or deleted).

Click **Apply** to reflect the change.

In the section of the settings on **MLD Snooping Limitation**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Number of Limitations</b>	Enter the number of limitations. Use this parameter to limit the number of MLD cash entries, which can be created. The range is from 1 to 2,048.
<b>Exceed Action</b>	Choose an exceed action. Use this parameter to specify the operation to process the group, which is newly recognized when exceeding the limitation. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Default</b> - The default action is executed.</li> <li>• <b>Drop</b> - A new group is dropped.</li> <li>• <b>Replace</b> - A new group is replaced to the oldest group.</li> </ul>
<b>Except ACL Name</b>	Enter the name of the standard IP access-list. The group (*,G) or channel (S,G), which are allowed based on the access list, are excluded from the limitation. To authorize a channel (S,G), specify "S" in the field of source-address of the access-list entry and "G" in the destination- address field. To authorize a group (*,G), specify "any" in the source-address field of the access-list entry and "G" in the destination-address field. The number of characters for the name can be up to 32. Alternatively, click <b>Please Select</b> to search and choose the existing access list, which is configured on the switch (to be used for this configuration).
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete entries based on the information specified.

In the section of **Access Group Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Action</b>	Click <b>Add</b> to add a new entry based on the information entered. Click <b>Delete</b> to delete an entry based on the information entered.

Parameter	Overview
<b>ACL Name</b>	Enter the name of the standard IP access-list. Use this parameter to allow users to participate in the group (*, G). To authorize a group (*,G), specify "any" in the source-address field of the access-list entry and "G" in the destination-address field. The number of characters for the name can be up to 32. Or, click <b>Please Click</b> to retrieve the existing access list, which is configured by a switch for using this configuration, and then choose the list.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

In the section of a table of **MLD Snooping Filter**, you can configure the following parameter.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Show Detail** to display details on the entry.

If two or more pages exist, enter the page numbers. Click **Go** to move to a specific page.

Click **Show Detail** to display the following window.

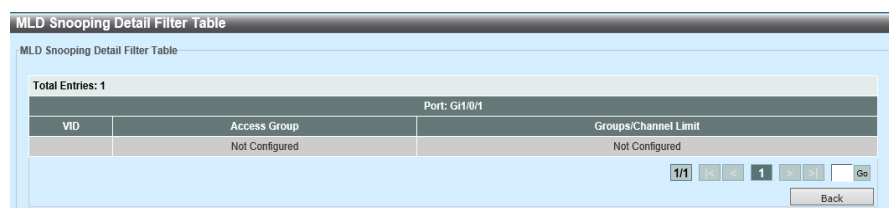


Figure 4-57 MLD Snooping Filter Settings (Show Detail.)

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Back** to return to the previous window.

### 4.7.2.4 MLD Snooping Multicast Router Information

Use the following window to implement the settings on an MLD Snooping Multicast router and display its settings.

Choose **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Multicast Router Information** to display the following window.

Figure 4-58 MLD Snooping Multicast Router Information

In the section of the port settings on **MLD Snooping Multicast Router**, you can configure the following parameters.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Configuration</b>	Choose a port configuration. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Port</b> - Ports configured are connected to a Multicast corresponding router.</li> <li>• <b>Forbidden Port</b> - Ports, which are configured, are not connected to a Multicast corresponding router.</li> </ul>
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to add new entries based on the information specified.

Click **Delete** to delete entries based on the information specified.

In the section of a port table for **MLD Snooping Multicast Router**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

### 4.7.2.5 MLD Snooping Statistics Settings

Use the following window to display and clear the MLD Snooping statistics.

Choose **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Statistics Settings** to display the following window.

Figure 4-59 MLD Snooping Statistics Settings

In the section of **MLD Snooping Statistics Settings**, you can configure the following parameters.

Parameter	Overview
<b>Statistics</b>	Choose an interface. The options available are <b>All</b> , <b>VLAN</b> and <b>Port</b> .
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094. This option is available when choosing <b>VLAN</b> from the <b>Statistics</b> drop-down list.
<b>From Port/ To Port</b>	Choose the port you use. This option is available when you choose <b>Port</b> from the <b>Statistics</b> drop-down list.

Click **Clear** to clear the statistics information based on the condition specified.

In the section of **MLD Snooping Statistics Table**, you can configure the following parameters.

Parameter	Overview
<b>Search Type</b>	Choose an interface type. The options available are <b>VLAN</b> and <b>Port</b> .
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094. This option is available when you choose <b>VLAN</b> from the <b>Search Type</b> drop-down list.
<b>From Port/ To Port</b>	Choose the port you use. This option is available when you choose <b>Port</b> from the <b>Search Type</b> drop-down list.

Click **Find** to search and display the entries in a table based on the search condition specified.

Click **See All** to search and display all the entries available.

### 4.7.3 Multicast Filtering Mode

Use the following window to implement the settings on the Multicast filtering mode and display its settings.

Choose **L2 Features > L2 Multicast Control > Multicast Filtering Mode** to display the following window.

Figure 4-60 Multicast Filtering Mode

In the section of the **Multicast Filtering Mode**, you can configure the following parameters.

Parameter	Overview
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma, or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>Multicast Filtering Mode</b>	Choose the Multicast filtering mode. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Forward Unregistered</b> - Registered Multicast packets are forwarded based on a forwarding table, and then all unregistered Multicast packets are flooded based on a VLAN domain.</li> <li>• <b>Forward All</b> - All Multicast packets are flooded based on a VLAN domain.</li> <li>• <b>Filter Unregistered</b> - Registered packets are forwarded based on a forwarding table, and then all unregistered Multicast packets are filtered.</li> </ul>

Click **Apply** to add new entries based on the information specified.

## 4.8 LLDP (Link Layer Discovery Protocol)

### 4.8.1 LLDP Global Settings

Use the following window to implement the global LLDP settings and display its settings.

Choose **L2 Features > LLDP > LLDP Global Settings** to display the following window.

The screenshot shows the 'LLDP Global Settings' configuration window. It is organized into five main sections:

- LLDP Global Settings:** Contains four radio button options: 'LLDP State', 'LLDP Forward State', 'LLDP Trap State', and 'LLDP-MED Trap State'. All are currently set to 'Disabled'. An 'Apply' button is on the right.
- LLDP-MED Configuration:** Contains a 'Fast Start Repeat Count (1-10)' field set to '4' times. An 'Apply' button is on the right.
- LLDP Configurations:** Contains four fields: 'Message TX Interval (5-32768)' set to '30' sec, 'Message TX Hold Multiplier (2-10)' set to '4' sec, 'Retmit Delay (1-10)' set to '2' sec, and 'TX Delay (1-8192)' set to '2' sec. Each has a 'Default' checkbox. An 'Apply' button is on the right.
- LLDP System Information:** A read-only section showing: Chassis ID Subtype (MAC Address), Chassis ID (00-50-40-5C-2B-AC), System Name, System Description (Gigabit Ethernet Switch), System Capabilities Supported (Repeater, Bridge), and System Capabilities Enabled (Repeater, Bridge).
- LLDP-MED System Information:** A read-only section showing: Device Class (Network Connectivity Device), Hardware Revision (ES3), Firmware Revision (V0 1.0.3), Software Revision (V3.0.0.00), Serial Number (93E9B000009), Manufacturer Name (Panasonic), Model Name (GA-ML24TCPoE+), and Asset ID.

Figure 4-61 LLDP Global Settings

In the section of **LLDP Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>LLDP State</b>	This parameter enables or disables an LLDP function.
<b>LLDP Forward State</b>	This parameter enables or disables the LLDP forward state. If you disable the <b>LLDP State</b> and enable the <b>LLDP Forward State</b> , the LLDP Data Unit (LLDPDU) Packets, which have been received, are transferred.
<b>LLDP Trap State</b>	This parameter enables or disables the LLDP trap state.
<b>LLDP-MED Trap State</b>	This parameter enables or disables the trap state of LLDP Media Endpoint Discovery (LLDP-MED).

Click **Apply** to reflect the change.

In the section of **LLDP-MED Configuration**, you can configure the following parameter.

Parameter	Overview
<b>Number of Transmissions for Fast Start</b>	Enter the value, which is equal to the number of transmissions regarding the LLDP-MED fast start. The range is from 1 to 10. When you choose <b>Default</b> , use the default value.

Click **Apply** to reflect the change.

In the section of **LLDP Configuration**, you can configure the following parameters.

Parameter	Overview
<b>Transmission Interval for Messages</b>	Enter the transmission-interval for consecutive LLDP advertisements on each physical interface. The range is from 5 to 32,768 (seconds). When you choose <b>Default</b> , use (or apply) the default value.
<b>Message TX Hold Multiplier</b>	Enter the multiplier of the LLDPDU transmission-interval to use for calculating the value of Time-To-Live (TTL) of LLDPDU. The range is from 2 to 10. When you choose <b>Default</b> , use the default value.
<b>Reinit Delay</b>	Enter the lag time (or retarded time) regarding the LLDP initialization of an interface. The range is from 1 to 10 (seconds). When you choose <b>Default</b> , use the default value.
<b>TX Delay</b>	Enter the lag time for the transmission of consecutive LLDPDUs on an interface. The range of valid (or enabled) values is from 1 to 8,192 (seconds). The value above must not exceed one-fourth of the value of the transmission-interval timer. When you choose <b>Default</b> , use the default value.

Click **Apply** to reflect the change.

## 4.8.2 LLDP Port Settings

Use the following window to implement the settings on an LLDP port and display its settings.

Choose **L2 Features > LLDP > LLDP Port Settings** to display the following window.

Port	Notification	Subtype	Admin State	IPv4/IPv6 Address
Gi1/0/1	Disabled	Local	TX and RX	
Gi1/0/2	Disabled	Local	TX and RX	
Gi1/0/3	Disabled	Local	TX and RX	
Gi1/0/4	Disabled	Local	TX and RX	
Gi1/0/5	Disabled	Local	TX and RX	
Gi1/0/6	Disabled	Local	TX and RX	
Gi1/0/7	Disabled	Local	TX and RX	
Gi1/0/8	Disabled	Local	TX and RX	
Gi1/0/9	Disabled	Local	TX and RX	
Gi1/0/10	Disabled	Local	TX and RX	
Gi1/0/11	Disabled	Local	TX and RX	
Gi1/0/12	Disabled	Local	TX and RX	
Gi1/0/13	Disabled	Local	TX and RX	
Gi1/0/14	Disabled	Local	TX and RX	
Gi1/0/15	Disabled	Local	TX and RX	
Gi1/0/16	Disabled	Local	TX and RX	
Gi1/0/17	Disabled	Local	TX and RX	
Gi1/0/18	Disabled	Local	TX and RX	
Gi1/0/19	Disabled	Local	TX and RX	
Gi1/0/20	Disabled	Local	TX and RX	
Gi1/0/21	Disabled	Local	TX and RX	
Gi1/0/22	Disabled	Local	TX and RX	
Gi1/0/23	Disabled	Local	TX and RX	
Gi1/0/24	Disabled	Local	TX and RX	
Gi1/0/25	Disabled	Local	TX and RX	
Gi1/0/26	Disabled	Local	TX and RX	
Gi1/0/27	Disabled	Local	TX and RX	
Gi1/0/28	Disabled	Local	TX and RX	

Figure 4-62 LLDP Port Settings

In the section of **LLDP Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Notification</b>	This enables or disables a notification function.
<b>Sub-type</b>	Choose the sub-type of LLDP TLV (Type-Length-Value). The options available are <b>MAC Address</b> and <b>Local</b> .

Parameter	Overview
<b>Management State</b>	<p>Choose the local LLDP agent to allow you to transmit and receive LLDP frames on the port. The options available are as follows.</p> <ul style="list-style-type: none"><li>• <b>TX</b> - The local LLDP agent can transmit LLDP frames, only.</li><li>• <b>RX</b> - The local LLDP agent can receive LLDP frames, only.</li><li>• <b>TX and RX</b> - The local LLDP agent can transmit and receive LLDP frames.</li><li>• <b>Disabled</b> - The local LLDP agent cannot transmit or receive LLDP frames.</li></ul> <p>The default option is set to <b>TX</b> and <b>RX</b>.</p>
<b>IP Sub-type</b>	<p>Choose the information type for the IP address to transmit. The options available are <b>Default</b>, <b>IPv4</b> and <b>IPv6</b>.</p>
<b>Action</b>	<p>Choose the action you perform. The options available are <b>Delete</b> and <b>Add</b>.</p>
<b>Address</b>	<p>Enter an IP address to be transmitted.</p>

Click **Apply** to reflect the change.

### 4.8.3 LLDP Management Address List

Use the following window to display the LLDP management address list and its information.

Choose **L2 Features > LLDP > LLDP Management Address List** to display the following window.

Subtype	Address	IF Type	OID	Advertising Ports
IPv4	172.16.1.4(default)	Ifindex		-
IPv4	172.16.1.4	Ifindex		-

Figure 4-63 LLDP Management Address List

You can configure the following parameter.

Parameter	Overview
<b>Sub-type</b>	<p>Enter a sub type. The options available are <b>All</b>, <b>IPv4</b> and <b>IPv6</b>.</p> <ul style="list-style-type: none"> <li>• After you choose <b>IPv4</b>, enter it in the entry field where an IPv4 address is displayed.</li> <li>• After you choose <b>IPv6</b>, enter it in the entry field where an IPv6 address is displayed.</li> </ul>

Click **Find** to search and display the entries in a table based on the search condition specified.

## 4.8.4 LLDP Basic TLVs Settings

Use the following window to implement the basic settings on LLDP TLV and display its settings.

Choose **L2 Features > LLDP > LLDP Basic TLVs Settings** to display the following window.

From Port	To Port	Port Description	System Name	System Description	System Capabilities
G1/0/1	G1/0/1	Disabled	Disabled	Disabled	Disabled
G1/0/2		Disabled	Disabled	Disabled	Disabled
G1/0/3		Disabled	Disabled	Disabled	Disabled
G1/0/4		Disabled	Disabled	Disabled	Disabled
G1/0/5		Disabled	Disabled	Disabled	Disabled
G1/0/6		Disabled	Disabled	Disabled	Disabled
G1/0/7		Disabled	Disabled	Disabled	Disabled
G1/0/8		Disabled	Disabled	Disabled	Disabled
G1/0/9		Disabled	Disabled	Disabled	Disabled
G1/0/10		Disabled	Disabled	Disabled	Disabled
G1/0/11		Disabled	Disabled	Disabled	Disabled
G1/0/12		Disabled	Disabled	Disabled	Disabled
G1/0/13		Disabled	Disabled	Disabled	Disabled
G1/0/14		Disabled	Disabled	Disabled	Disabled
G1/0/15		Disabled	Disabled	Disabled	Disabled
G1/0/16		Disabled	Disabled	Disabled	Disabled
G1/0/17		Disabled	Disabled	Disabled	Disabled
G1/0/18		Disabled	Disabled	Disabled	Disabled
G1/0/19		Disabled	Disabled	Disabled	Disabled
G1/0/20		Disabled	Disabled	Disabled	Disabled
G1/0/21		Disabled	Disabled	Disabled	Disabled
G1/0/22		Disabled	Disabled	Disabled	Disabled
G1/0/23		Disabled	Disabled	Disabled	Disabled
G1/0/24		Disabled	Disabled	Disabled	Disabled
G1/0/25		Disabled	Disabled	Disabled	Disabled
G1/0/26		Disabled	Disabled	Disabled	Disabled
G1/0/27		Disabled	Disabled	Disabled	Disabled
G1/0/28		Disabled	Disabled	Disabled	Disabled

Figure 4-64 LLDP Basic TLVs Settings

In the section of the **LLDP Basic TLVs Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Description of Ports</b>	This parameter enables or disables the transmission of port description TLV.
<b>System Name</b>	This parameter enables or disables the transmission of system name TLV.
<b>Description of Systems</b>	This parameter enables or disables the transmission of system description TLV.
<b>System Capability</b>	This parameter enables or disables the transmission of system capability TLV.

Click **Apply** to reflect the change.

## 4.8.5 LLDP Dot1 TLV Settings

Use the following window to implement the settings on IEEE 802.1 LLDP TLV and display its settings.

Choose **L2 Features > LLDP > LLDP Dot1 TLV Settings** to display the following window.

Port	Port VLAN ID	Enabled Port and Protocol VID	Enabled VLAN Name	Enabled Protocol Identity
G1/0/1	Disabled			
G1/0/2	Disabled			
G1/0/3	Disabled			
G1/0/4	Disabled			
G1/0/5	Disabled			
G1/0/6	Disabled			
G1/0/7	Disabled			
G1/0/8	Disabled			
G1/0/9	Disabled			
G1/0/10	Disabled			
G1/0/11	Disabled			
G1/0/12	Disabled			
G1/0/13	Disabled			
G1/0/14	Disabled			
G1/0/15	Disabled			
G1/0/16	Disabled			
G1/0/17	Disabled			
G1/0/18	Disabled			
G1/0/19	Disabled			
G1/0/20	Disabled			
G1/0/21	Disabled			
G1/0/22	Disabled			
G1/0/23	Disabled			
G1/0/24	Disabled			
G1/0/25	Disabled			
G1/0/26	Disabled			
G1/0/27	Disabled			
G1/0/28	Disabled			

Figure 4-65 LLDP Dot1 TLV Settings

In the section of **LLDP Dot1 TLV Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Port VLAN</b>	This parameter enables or disables to transmit Port VLAN ID TLV.
<b>Protocol VLAN</b>	This parameter enables or disables to transmit the port and protocol VLAN ID (PPVID) TLV. Enter the ID in the entry field provided.
<b>VLAN Name</b>	This parameter enables or disables to transmit the TLV of a VLAN name. Enter a VLAN ID in the entry field provided.
<b>Protocol Identity</b>	This parameter enables or disables to transmit the protocol identity TLV. The options available are <b>None</b> , <b>EAPOL</b> , <b>LACP</b> , <b>GVRP</b> , <b>STP</b> and <b>All</b> , as a protocol name

Click **Apply** to reflect the change.

## 4.8.6 LLDP Dot3 TLV Settings

Use the following window to implement the settings on IEEE 802.3 LLDP TLV and display its settings.

Choose **L2 Features > LLDP > LLDP Dot3 TLV Settings** to display the following window.

Port	MAC/PHY Configuration/Status	Link Aggregation	Maximum Frame Size	Power Via MDI
G1/0/1	Disabled	Disabled	Disabled	Enabled
G1/0/2	Disabled	Disabled	Disabled	Enabled
G1/0/3	Disabled	Disabled	Disabled	Enabled
G1/0/4	Disabled	Disabled	Disabled	Enabled
G1/0/5	Disabled	Disabled	Disabled	Enabled
G1/0/6	Disabled	Disabled	Disabled	Enabled
G1/0/7	Disabled	Disabled	Disabled	Enabled
G1/0/8	Disabled	Disabled	Disabled	Enabled
G1/0/9	Disabled	Disabled	Disabled	Enabled
G1/0/10	Disabled	Disabled	Disabled	Enabled
G1/0/11	Disabled	Disabled	Disabled	Enabled
G1/0/12	Disabled	Disabled	Disabled	Enabled
G1/0/13	Disabled	Disabled	Disabled	Enabled
G1/0/14	Disabled	Disabled	Disabled	Enabled
G1/0/15	Disabled	Disabled	Disabled	Enabled
G1/0/16	Disabled	Disabled	Disabled	Enabled
G1/0/17	Disabled	Disabled	Disabled	Enabled
G1/0/18	Disabled	Disabled	Disabled	Enabled
G1/0/19	Disabled	Disabled	Disabled	Enabled
G1/0/20	Disabled	Disabled	Disabled	Enabled
G1/0/21	Disabled	Disabled	Disabled	Enabled
G1/0/22	Disabled	Disabled	Disabled	Enabled
G1/0/23	Disabled	Disabled	Disabled	Enabled
G1/0/24	Disabled	Disabled	Disabled	Enabled
G1/0/25	Disabled	Disabled	Disabled	Enabled
G1/0/26	Disabled	Disabled	Disabled	Enabled
G1/0/27	Disabled	Disabled	Disabled	Enabled
G1/0/28	Disabled	Disabled	Disabled	Enabled

Figure 4-66 LLDP Dot3 TLV Settings

In the section of **LLDP Dot3 TLV Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>MAC/PHY Config./ State</b>	This parameter enables or disables to transmit the MAC/PHY config./state TLV.
<b>Link Aggregation</b>	This parameter enables or disables to transmit the link aggregation TLV.
<b>Maximum Frame Size</b>	This parameter enables or disables to transmit the maximum frame-size TLV.

Click **Apply** to reflect the change.

## 4.8.7 LLDP-MED Port Settings

Use the following window to implement the settings on an LLDP-MED port and display its settings.

Choose **L2 Features > LLDP > LLDP-MED Port Settings** to display the following window.

Port	Notification	Capabilities	Inventory	Network Policy
G1/0/1	Disabled	Disabled	Disabled	Disabled
G1/0/2	Disabled	Disabled	Disabled	Disabled
G1/0/3	Disabled	Disabled	Disabled	Disabled
G1/0/4	Disabled	Disabled	Disabled	Disabled
G1/0/5	Disabled	Disabled	Disabled	Disabled
G1/0/6	Disabled	Disabled	Disabled	Disabled
G1/0/7	Disabled	Disabled	Disabled	Disabled
G1/0/8	Disabled	Disabled	Disabled	Disabled
G1/0/9	Disabled	Disabled	Disabled	Disabled
G1/0/10	Disabled	Disabled	Disabled	Disabled
G1/0/11	Disabled	Disabled	Disabled	Disabled
G1/0/12	Disabled	Disabled	Disabled	Disabled
G1/0/13	Disabled	Disabled	Disabled	Disabled
G1/0/14	Disabled	Disabled	Disabled	Disabled
G1/0/15	Disabled	Disabled	Disabled	Disabled
G1/0/16	Disabled	Disabled	Disabled	Disabled
G1/0/17	Disabled	Disabled	Disabled	Disabled
G1/0/18	Disabled	Disabled	Disabled	Disabled
G1/0/19	Disabled	Disabled	Disabled	Disabled
G1/0/20	Disabled	Disabled	Disabled	Disabled
G1/0/21	Disabled	Disabled	Disabled	Disabled
G1/0/22	Disabled	Disabled	Disabled	Disabled
G1/0/23	Disabled	Disabled	Disabled	Disabled
G1/0/24	Disabled	Disabled	Disabled	Disabled
G1/0/25	Disabled	Disabled	Disabled	Disabled
G1/0/26	Disabled	Disabled	Disabled	Disabled
G1/0/27	Disabled	Disabled	Disabled	Disabled
G1/0/28	Disabled	Disabled	Disabled	Disabled

Figure 4-67 LLDP-MED Port Settings

In the section of the **LLDP-MED Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Notification</b>	This parameter enables or disables the transmission of LLDP-MED notification TLV.
<b>Capability</b>	This parameter enables or disables the transmission of LLDP-MED capability TLV.
<b>Assets</b>	This parameter enables or disables the transmission of LLDP-MED asset management TLV.
<b>Network Policy</b>	This parameter enables or disables the transmission of LLDP-MED network policy TLV.

Click **Apply** to reflect the change.

## 4.8.8 LLDP Statistics Information

Use the following window to display and clear the LLDP statistics.

Choose **L2 Features > LLDP > LLDP Statistics Information** to display the following window.

Port	Total Transmits	Total Discards	Total Errors	Total Receives	Total TLV Discards	Total TLV Unknowns	Total Ageouts
Gi1/0/1	0	0	0	0	0	0	0
Gi1/0/2	0	0	0	0	0	0	0
Gi1/0/3	0	0	0	0	0	0	0
Gi1/0/4	0	0	0	0	0	0	0
Gi1/0/5	0	0	0	0	0	0	0
Gi1/0/6	0	0	0	0	0	0	0
Gi1/0/7	0	0	0	0	0	0	0
Gi1/0/8	0	0	0	0	0	0	0

Figure 4-68 LLDP Statistics Information

In the section of **LLDP Port Statistics Port Statistics**, you can configure the following parameter.

Parameter	Overview
<b>Port</b>	Choose the port you use.


Click **Clear** to clear the counter information.

Click **Clear All** to clear the counter information on all the ports.

## 4.8.9 LLDP Local Port Information

Use the following window to display local LLDP port information and its information.

Choose **L2 Features > LLDP > LLDP Local Port Information** to display the following window.



The screenshot shows a window titled "LLDP Local Port Information" with a sub-header "LLDP Local Port Brief Table". Below the sub-header is a "Port" dropdown menu set to "G11/0/1", a "Find" button, and a "Show Detail" button. The main content is a table with the following data:

Port	Port ID Subtype	Port ID	Port Description
G11/0/1	Local	G11/0/1	Panasonic GA-ML24TCPoE+ HW ES3...
G11/0/2	Local	G11/0/2	Panasonic GA-ML24TCPoE+ HW ES3...
G11/0/3	Local	G11/0/3	Panasonic GA-ML24TCPoE+ HW ES3...
G11/0/4	Local	G11/0/4	Panasonic GA-ML24TCPoE+ HW ES3...
G11/0/5	Local	G11/0/5	Panasonic GA-ML24TCPoE+ HW ES3...
G11/0/6	Local	G11/0/6	Panasonic GA-ML24TCPoE+ HW ES3...

Figure 4-69 LLDP Local Port Information

In the section of the **LLDP Local Port Summary Table**, you can configure the following parameter.

Parameter	Overview
<b>Port</b>	Choose the port you use.

Click **Find** to search the LLDP local port information, which is associated with the port specified.

Click **Show Detail** to display details on the LLDP local port, which is associated with the port specified.

Click **Show Detail** to display the following window.



LLDP Local Port Information	
LLDP Local Information Table	
Port	Gi1/0/1
Port ID Subtype	Local
Port ID	Gi1/0/1
Port Description	Panasonic GA-ML24TCPoE+ HW ES3 firmware V3.0.0.00 Port 1 on Unit 1
Port PVID	1
Management Address Count	3
PPVID Entries	0
VLAN Name Entries Count	1
Protocol Identity Entries Count	1
MAC/PHY Configuration/Status	<a href="#">Show Detail</a>
Link Aggregation	<a href="#">Show Detail</a>
Maximum Frame Size	1518
LLDP-MED Capabilities	<a href="#">Show Detail</a>
Network Policy	<a href="#">Show Detail</a>

Figure 4-70 LLDP Local Port Information (Show Detail.)

Click **Individual Link** to display the details, which are associated with the function specified, on the related table above.

Click **Back** to return to the previous window.

## 4.8.10 LLDP Neighbor Port Information

Use the following window to display the LLDP port information on neighbor.

Choose **L2 Features > LLDP > LLDP Neighbor Port Information** to display the following window.

Figure 4-71 LLDP Neighbor Port Information

In the section of a **LLDP Neighbor Port Summary Table**, you can configure the following parameter.

Parameter	Overview
<b>Port</b>	Choose the port you use.

Click **Find** to search the information on the LLDP Neighbor Port, which is associated with the port specified.

Click **Clear** to clear the information on the LLDP Neighbor Port, which is associated with the port specified.

Click **Clear All** to clear information on all the LLDP Neighbor Port.

## 4.9 RRP (Ring Redundant Protocol)

Use the following window to implement the RRP settings and display its settings.

Choose **L2 Features > RRP** to display the following window.

Figure 4-72 RRP

In the section of **RRP Global State**, you can configure the following parameter.

Parameter	Overview
<b>RRP State</b>	This parameter enables or disables an RRP function.

Click **Apply** to reflect the change.

In the section of the **RRP Domain State**, you can configure the following parameter.

Parameter	Overview
<b>Domain Name</b>	Enter the name of an RRP domain. The number the character strings to specify can be up to 25. This domain indicates a physical ring.

Click **Create** to create a new RRP domain.

Click **Show Detail** to display details on the entry.

Click **Delete** to delete the entry.

Click **Show Detail** to display the following window.

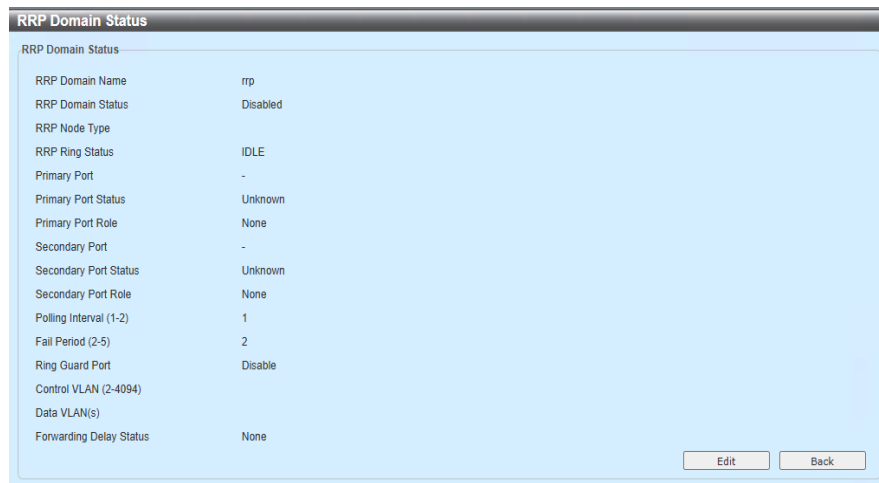


Figure 4-73 RRP (Show Detail)

Click **Edit** to edit the settings.

Click **Back** to return to the previous window.

Click **Edit** to display the following window.

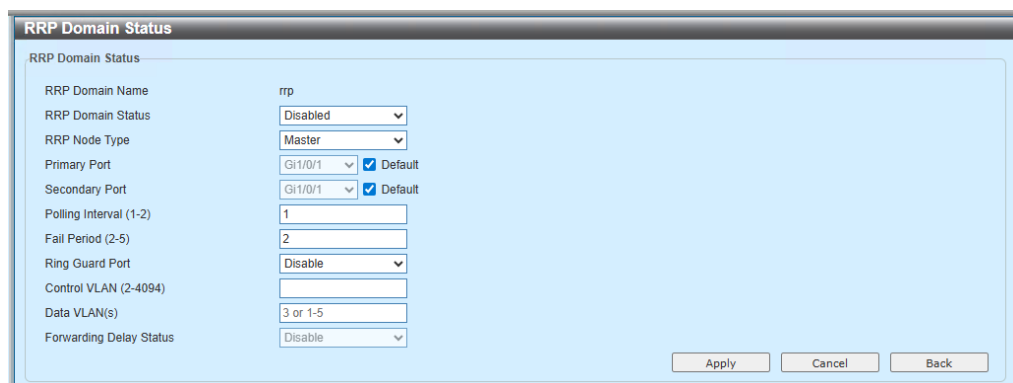


Figure 4-74 RRP (Edition)

In the section of **RRP Domain Settings**, you can configure the following parameters.

Parameter	Overview
<b>RRP Domain State</b>	Choose to enable or disable an RRP domain.

Parameter	Overview
<b>RRP Node Type</b>	Choose the type for RRP-node. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Master</b> - Specifies the node as the master node in the domain. Only one master-node can specified in one RRP domain. Roles of the master-node include ring-polling and ring-restoration.</li> <li>• <b>Transit</b> - Specifies the node as a transit node in the domain. Many transit-nodes can be specified in one RRP domain. Responsibilities of a transit-node include link-down alerts.</li> </ul>
<b>Primary Port</b>	Choose a primary port. This port will be the first port in the RRP domain. If you choose the <b>Default</b> option, the current settings is cleared.
<b>Secondary Port</b>	Choose a secondary port. This port becomes the second port in the RRP domain. If you choose the default option, the current settings is cleared. If you choose the <b>Default</b> option, the current settings is cleared.
<b>Polling Interval</b>	Enter the polling interval of hello-packets. The range is from 1 to 2 (seconds). The polling interval should be shorter than the failure period.
<b>Failure Period</b>	Enter the disorder period. The range is from 2 to 5 (seconds). The failure period should be longer than the polling interval.
<b>Ring-Guard Port</b>	Choose the port state of RRP ring-guard. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Primary</b> - This specifies a primary port as the port corresponding with a ring guard.</li> <li>• <b>Secondary</b> - This specifies a secondary port as the port corresponding with a ring-guard.</li> <li>• <b>Both</b> - This specifies for both primary and secondary ports as the port, which corresponds with the ring-guard.</li> <li>• <b>Disabled</b> - Disables this function.</li> </ul>
<b>Control VLAN</b>	Enter an ID of the control VLAN. The range is from 2 to 4,094.
<b>Data VLAN</b>	Enter an ID of the data VLAN. The range is from 1 to 4,094.
<b>Port-Status Forwarding-Delay</b>	Displays the status of the Port Status Forwarding Delay. <p><b>Enable</b> : Port Status Forwarding Delay is Enable.</p> <p><b>Disable</b> : Port Status Forwarding Delay is Disable. (factory default settings)</p>

Click **Apply** to reflect the change.

Click **Cancel** to delete the change.

Click **Back** to return to the previous window.

# 5 L3 Features

## 5.1 ARP (Address Resolution Protocol)

### 5.1.1 ARP Aging Time

Use the following window to implement the settings on ARP aging time and display its settings.

Choose **L3 Features > ARP > ARP Aging Time** to display the following window.

Figure 5-1 ARP Aging Time

In the section of **Searching for ARP Aging Time**, the following parameters can be configured.

Parameter	Overview
<b>Interface VLAN</b>	Enter a VLAN ID. The range is from 1 to 4,094.
<b>Time-out</b>	After you click <b>Edit</b> , enter the time-out value. The range is from 0 to 65,535 (minutes).

Click **Find** to search and display the entries based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Edit** to edit the entry-settings.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

## 5.1.2 Static ARP

Use the following window to implement the settings on the static ARP and display its settings.

Choose **L3 Features > ARP > Static ARP** to display the following window.

Figure 5-2 Static ARP

In the section of the **Static ARP Settings**, you can configure the following parameters.

Parameter	Overview
<b>IP Address</b>	Enter an IP address to associate with a MAC address.
<b>Hardware Address</b>	Enter a MAC address to associate with an IP Address.

Click **Apply** to add a new Static ARP entry.

In the section of **Searching for Static ARP**, you can configure the following parameters.

Parameter	Overview
<b>IP Address</b>	Choose and enter an IP address of an entry.
<b>IP Network Mask</b>	Choose and enter a subnet mask of an IP address.
<b>Hardware Address</b>	Choose and enter a MAC address of an entry.
<b>Interface VLAN</b>	Choose and enter a VLAN ID. The range is from 1 to 4,094.

Click **Find** to search and display the entries based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Edit** to edit the entry-settings.

Click **Delete** to delete the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 5.1.3 ARP Table

Use the following window to display and clear the ARP entries in a table

Choose **L3 Features > ARP > ARP Table** to display the following window.

Figure 5-3 ARP Table

In the section of **Searching for ARP**, you can configure the following parameters.

Parameter	Overview
<b>Interface VLAN</b>	Choose and enter a VLAN ID of an interface. The range is from 1 to 4,094.
<b>IP Address</b>	Choose and enter an IP address to be displayed.
<b>Mask</b>	Choose and enter a subnet-mask of an IP address.
<b>Hardware Address</b>	Choose and enter a MAC address to be displayed.
<b>Type</b>	Choose the <b>Type</b> option. The options available are <b>All</b> and <b>Dynamic</b> .

Click **Find** to search and display the entries based on the search condition specified.

Click **Clear All** to clear all the entries from a table.

Click **Clear** to delete entries specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 5.2 Gratuitous ARP

Use the following window to implement the settings on gratuitous ARP and display its settings. Gratuitous ARP request packets are the ARP request packets whose destination MAC address is a broadcast address; an IP address of the source and destination for gratuitous ARP packets is configured on an IP address of a transmission device. The device uses ARP request packets to accurately check if the IP address has duplications with other hosts. Alternatively, the device reconfigures or loads the ARP cache entries of the host connected to an interface, in advance.

Choose **L3 Features > Gratuitous ARP** to display the following window.

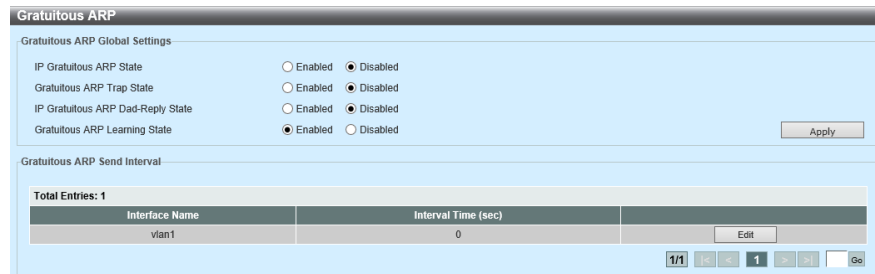


Figure 5-4 Gratuitous ARP

In the section of **Gratuitous ARP Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>IP Gratuitous ARP State</b>	This parameter enables or disables to transmit gratuitous ARP request packets.
<b>Gratuitous ARP Trap State</b>	This parameter enables or disables the trap state of a gratuitous ARP function.
<b>IP Gratuitous ARP Dad-Reply State</b>	This parameter enables or disables the IP gratuitous ARP Dad-Reply state.
<b>Gratuitous ARP Learning State</b>	This parameter enables or disables the gratuitous ARP learning state. Normally, this system learns the ARP entries, only, from the normal ARP-request packets, which require a MAC address and an IP address of the ARP entry from ARP request packets or a switch. Use this option to enable or disable to learn the ARP entries based on the gratuitous ARP packets received. A source IP address transmits gratuitous ARP packets to become the same with the IP address where packets are (on) the queried state.

Click **Apply** to reflect the change.

In the section of **Gratuitous ARP Transmission Interval**, you can configure the following parameter.

Parameter	Overview
<b>Interval Time</b>	After you click <b>Edit</b> , enter the time for gratuitous ARP transmission-interval (seconds).

Click **Edit** to edit the entry-settings.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 5.3 IPv6 Neighbor

Use the following window to implement the settings on IPv6 neighbor and display its settings.

Choose **L3 Features > IPv6 Neighbor** to display the following window.

Figure 5-5 IPv6 Neighbor

In the section of **IPv6 Neighbor Settings**, you can configure the following parameters.

Parameter	Overview
<b>Interface VLAN</b>	Enter a VLAN interface ID.
<b>IPv6 Address</b>	Enter an IPv6 address.
<b>MAC Address</b>	Enter a MAC address.

Click **Apply** to add a new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **Clear** to clear the information based on the condition specified.

Click **Clear All** to clear all the dynamic entries.

Click **Delete** to delete the entry specified.

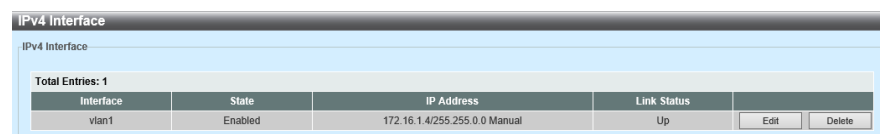
If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 5.4 Interface

### 5.4.1 IPv4 Interface

Use the following window to implement the settings on IPv4 interface and display its settings.

Choose **L3 Features > Interface > IPv4 Interface** to display the following window.



The screenshot shows a window titled 'IPv4 Interface'. Inside, there is a table with the following data:

Total Entries: 1				
Interface	State	IP Address	Link Status	
vlan1	Enabled	172.16.1.4/255.255.0.0 Manual	Up	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Figure 5-6 IPv4 Interface

In the section of **IPv4 Interface**, you can configure the following parameter.

Parameter	Overview
<b>Interface VLAN</b>	Enter an Interface VLAN ID. The range is from 1 to 4,094.

Click **Apply** to add the new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **Edit** to edit the configuration of the entry specified.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Edit** to display the following window.

Figure 5-7 IPv4 Interface (Edit and IPv4 Interface Settings)

In the section of **Settings**, you can configure the following parameters.

Parameter	Overview
<b>State</b>	This parameter enables or disables the global state of an IPv4 interface.
<b>IP MTU</b>	Enter the value of Maximum Transmission Unit (MTU). The range is from 512 to 16,383 (bytes). By default, the value is set to 1,500 (bytes).
<b>IP Directed Broadcast</b>	This parameter enables or disables a function of an IP directed broadcast. Use this parameter to enable or disable the conversion to a physical broadcast of the IP directed broadcast, which is received on an interface when the destination network is directly connected to a switch.

Click **Back** to return to the previous window.

Click **Apply** to reflect the change.

In the section of **IP Settings**, you can configure the following parameters.

Parameter	Overview
<b>Method of Obtaining IP</b>	Choose a method of obtaining an IP address. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Static</b> - Enter an IPv4 address configuration of this interface in the entry field provided, manually.</li> <li>• <b>DHCP</b> - This interface automatically obtains the IPv4 settings from DHCP servers existing in a local network.</li> </ul>
<b>IP Address</b>	Enter an IPv4 address of this interface.
<b>Mask</b>	Enter an IPv4 subnet mask of this interface.
<b>Secondary</b>	If you set this option to on, use an IPv4 address and mask secondary as the interface settings.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click the **DHCP Client** tab to display the following window.

Figure 5-8 IPv4 Interface (Edit and DHCP Clients)

In the section of **DHCP Client**, you can configure the following parameters.

Parameter	Overview
<b>DHCP Client Client ID</b>	Enter an ID of a DHCP client. The range is from 1 to 4,094. Use this parameter to specify the VLAN interface, which uses the hex notation of the MAC address as a client ID for sending discover messages.

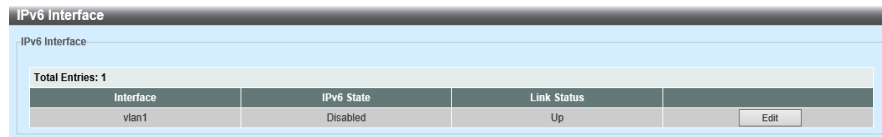
Parameter	Overview
<b>Class ID Character Strings</b>	Enter the character strings of a class ID. The number of character strings can be up to 32. If you choose the hex notation, enter the character strings of the class ID as the hex notation. The number of character strings can be up to 64. Use this parameter to specify the vendor class ID to use as the value of Option 60 of DHCP discovery messages.
<b>Host Name</b>	Enter a host-name. The number of character strings can be up to 64. Use this parameter to specify the value of the host-name option, which transmits with DHCP discovery messages.
<b>Lease</b>	Enter the lease period for a DHCP client. You can choose that, if necessary. Enter the number of days for the lease period in a text-box. The range is from 0 to 10,000 (days). If necessary, you can choose <b>Time</b> and <b>Minute</b> .

Click **Apply** to reflect the change.

## 5.4.2 IPv6 Interface

Use the following window to implement the settings on IPv6 interface and display its settings.

Choose **L3 Features > Interface > IPv6 Interface** to display the following window.



IPv6 Interface			
IPv6 Interface			
Total Entries: 1			
Interface	IPv6 State	Link Status	
vlan1	Disabled	Up	<input type="button" value="Edit"/>

Figure 5-9 IPv6 Interface

In the section of **IPv6 Interface**, you can configure the following parameter.

Parameter	Overview
<b>Interface VLAN</b>	Enter an VLAN interface ID to be associated with the IPv6 entry.

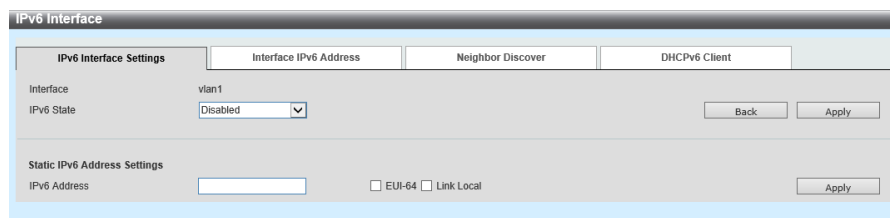
Click **Apply** to add a new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **Show Detail** to display details on the entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Show Detail** to display the following window.



IPv6 Interface			
IPv6 Interface Settings			
Interface IPv6 Address	Neighbor Discover	DHCPv6 Client	
Interface	vlan1		
IPv6 State	Disabled	<input type="button" value="Back"/>	<input type="button" value="Apply"/>
Static IPv6 Address Settings			
IPv6 Address	<input type="text"/>	<input type="checkbox"/> EUI-64	<input type="checkbox"/> Link Local
			<input type="button" value="Apply"/>

Figure 5-10 IPv6 Interface (Show Detail and IPv6 Interface Settings)

In the section of **IPv6 Interface Settings**, you can configure the following parameters.

Parameter	Overview
<b>IPv6 MTU</b>	Enter the value of IPv6 MTU. The range is from 1,280 to 65,534 (bytes). By default, the value is set to 1,500 (bytes). Use this parameter to configure MTU, which can be advertised by a router advertise (RA) message.
<b>IPv6 State</b>	This parameter enables or disables the global state for IPv6 Interface.

Click **Back** to return to the previous window.

Click **Apply** to reflect the change.

In the section of the **Static IPv6 Address Settings**, you can configure the following parameter.

Parameter	Overview
<b>IPv6 Address</b>	Enter an IPv6 address of this IPv6 Interface. <ul style="list-style-type: none"> <li>If you choose Extended Unique Identifier 64-bit (<b>EUI-64</b>), you can configure the IPv6 address on an interface that uses EUI-64 Interface ID.</li> <li>If you choose <b>Link Local</b>, you can configure its link local address of the IPv6 interface.</li> </ul>

Click **Apply** to reflect the change.

Click the **Interface IPv6 Address** tab to display the following window.



Figure 5-11 IPv6 Interface (Show Detail and Interface IPv6 Address)

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Choose the **Neighbor Discover** tab to display the following window.



Figure 5-12 IPv6 Interface (Show Detail and Neighbor Discover)

In the section of **ND Settings**, you can configure the following parameters.

Parameter	Overview
<b>Management Configuration Flag</b>	Set the management configuration flag option to <b>ON</b> or <b>OFF</b> . If a neighbor host receives <b>RA</b> with the flag, which is set to on, the host needs to obtain an IPv6 address with the stateful configuration protocol.
<b>Other Config Flag</b>	Set <b>Other Config</b> flag-option to <b>ON</b> or <b>OFF</b> . If you set other configuration flags to on, use the stateful configuration protocol to command the host connected to obtain the auto-configuration information except an IPv6 address.
<b>RA Minimum-Interval</b>	Enter the minimum value of the RA interval-time. The range is from 3 to 1,350 (seconds). The value must be smaller than the value, equivalent to 75% of the maximum value.
<b>RA Maximum-Interval</b>	Enter the maximum value of the RA interval-time whose range is from 4 to 1,800 (seconds).
<b>RA Lifetime</b>	Enter the value of an RA lifetime. The range is from 0 to 9,000 (seconds). The lifetime value of RA conveys the value, which regards a router as a default router on the host where RA is received.
<b>RA Control</b>	This parameter enables or disables a function of the RA control.
<b>Reachable Time</b>	Enter the reachable time. The range is from 0 to 3,600,000 (milli-seconds). If the time specified is 0, a router spends 1,200 (seconds) on an interface to advertise 1,200 (unspecified) for RA messages. The reachable time is used to determine the possibility of reaching a neighbor node due to an IPv6 node.
<b>NS Interval</b>	Enter the value of the <b>Neighbor Solicitation (NS)</b> interval. The range is from 0 to 3,600,000 milli-seconds (the factor of 1,000). If the time specified is 0, a router spends for one second.
<b>Hop Limit</b>	Enter the value of the hop limit. The range is from 0 to 255. IPv6 packets created by a system uses the value as the initial hop limit.

Click **Apply** to add a new entry.

Click **Edit** to edit the configuration of the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Choose the **DHCPv6 Client** tab to display the following window.

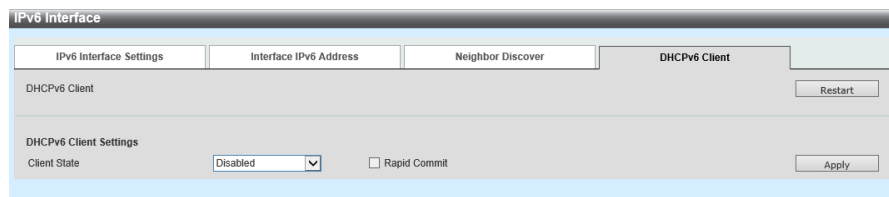


Figure 5-13 IPv6 Interface (Show Detail, DHCPv6 Client)

Click **Restart** to restart a function of DHCPv6 Client.

In the section of **DHCPv6 Client Settings**, you can configure the following parameter.

Parameter	Overview
<b>Client State</b>	This parameter enables or disables DHCPv6 client services. If you choose <b>Rapid Commit</b> , exchanging two messages for address delegation continues. The high-speed commit option is included in solicit messages, and two-message handshake is required.

In the section of **DHCPv6 Client PD Settings**, you can configure the following parameters.

Parameter	Overview
<b>Client PD State</b>	This parameter enables or disables the DHCPv6 client process that requires PD (Prefix Delegation) through the interface specified. If you choose the <b>Rapid Commit</b> option, exchanging two messages for the prefix delegation continues. The rapid commit option is included in solicit message, and two-messages handshake is required.
<b>General Prefix Name</b>	Enter the name of IPv6 general-prefix. The number of characters for the name can be up to 12.
<b>IPv6 DHCP Client PD Hint</b>	Enter an IPv6 prefix to transmit it as a hint with messages.

Click **Apply** to reflect the change.

## 5.5 IPv4 Default Route

Use the following window to implement the settings on an IPv4 default route and display its settings.

Choose **L3 Features > IPv4 Default Route** to display the following window.

Figure 5-14 IPv4 Default Route

In these section of **IPv4 Default Route**, you can configure the following parameter.

Parameter	Overview
<b>Gateway</b>	Enter a gateway address of this route.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 5.6 IPv6 Default Route

Use the following window to implement the settings on an IPv6 default route and display its settings.

Choose **L3 Features > IPv6 Default Route** to display the following window.

Figure 5-15 IPv6 Default Route

In the section of **IPv6 Default Route**, you can configure the following parameters.

Parameter	Overview
<b>IPv6 Address/ Prefix Length</b>	Enter an IPv6 address and prefix-length for this route. If you set <b>Default Route</b> to on, use this route for a default route.
<b>Interface Name</b>	Enter an interface name to be associated with this route.
<b>Next Hop IPv6 Address</b>	Enter an IPv6 address of the next hop.
<b>Distance</b>	Enter the distance for the static route management. The range is from 1 to 254. The lower the value, the better route will be. If not specified, the distance becomes 1 for managing a static-route (by default).

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 5.7 IPv6 General Prefix

Use the following window to implement the settings on the IPv6 general prefix and display its settings.

Choose **L3 Features > IPv6 General Prefix** to display the following window.

Figure 5-16 IPv6 General Prefix

In the section of the **IPv6 General Prefix**, you can configure the following parameters.

Parameter	Overview
<b>Interface VLAN</b>	Enter a VLAN interface ID to use. The range is from 1 to 4,094.
<b>Prefix Name</b>	Enter the name of an IPv6 general prefix-entry. The number of characters for the name can be up to 12.
<b>IPv6 Address</b>	Enter an IPv6 address and a prefix-length. The prefix-length of the IPv6 address can also be the local subnet of a VLAN interface.

Click **Apply** to add a new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **See All** to search and display all the entries available.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

# 6 QoS (Quality of Service)

## 6.1 Basic Settings

### 6.1.1 Port Default CoS

Use the following window to implement the settings on the default class of service (CoS) per port-interface and display its settings.

Choose **QoS > Basic Settings > Port Default CoS** to display the following window.

Port	Default CoS	Override
Gi1/0/1	0	No
Gi1/0/2	0	No
Gi1/0/3	0	No
Gi1/0/4	0	No
Gi1/0/5	0	No
Gi1/0/6	0	No
Gi1/0/7	0	No
Gi1/0/8	0	No

Figure 6-1 Port Default CoS

In the section of the **Port Default CoS**, you can configure the following parameter.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Default CoS</b>	<p>Choose the default CoS option of the port to be specified. The range of values to choose is from 0 to 7.</p> <ul style="list-style-type: none"> <li>If you choose <b>Override</b>, the CoS of packets is ignored. The default CoS is applied to all the incoming packets (tagged/untagged), which are received by ports.</li> <li>If you select <b>None</b> and packets are tagged, Cos of the packets becomes the Cos of packets, or if packets are not tagged, the default Cos of a ports becomes the CoS of the packets.</li> </ul>

Click **Apply** to check the content changed.

## 6.1.2 Port Scheduler Method

Use the following window to implement the settings on the method for a scheduler function and display its settings.

Choose **QoS > Basic Settings > Port Scheduler Method** to display the following window.

From Port	To Port	Scheduler Method	Apply
Gi1/0/1	Gi1/0/1	Weighted Round Robin	
Port	Scheduler Method		
Gi1/0/1	WRR		
Gi1/0/2	WRR		
Gi1/0/3	WRR		
Gi1/0/4	WRR		
Gi1/0/5	WRR		
Gi1/0/6	WRR		
Gi1/0/7	WRR		
Gi1/0/8	WRR		
Gi1/0/9	WRR		

Figure 6-2 Port Scheduler Method

In the section of the **Port Scheduler Method**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Parameter	Overview
<b>Scheduler Method</b>	<p>Choose the scheduler method, which is applied to the port specified. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Strict-Priority (SP)</b> - This uses the strict-priority scheduling on all the queues. This is a strict-priority access that executes queues; the range is from the highest CoS queue to the lowest queue.</li> <li>• <b>Round Robin (RR)</b> - All the queues use and need a round robin scheduling. This is the fair access, which allows you to move to the next queue after providing one packet with services on each queue.</li> <li>• <b>Weighted Round Robin (WRR)</b> - This operates by transmitting permitted packets to the transmission queue in a sequential order of the round robin. At the beginning, each queue sets the weight to a configurable weighting. Every time packets coming from CoS queues with a higher priority are transmitted, the corresponding weights is subtracted by one. Then, the packets in the lower CoS queues receive services. If the weight of CoS queues reaches zero (0), the queue services stop until the queue is replenished. If the weight of all the CoS queues reaches 0, it becomes replenished at the time. This is the default option.</li> <li>• <b>Weight Deficit Round Robin (WDRR)</b> - Service are provided to the unprocessed credit, which is accumulated on the transmission-queue, in a sequential order of the round robin. At the beginning, each queue sets a credit counter to the value of configurable quantum.</li> <li>• Every time packets are transmitted from the CoS queue, the service right is provided to the next lower CoS queue.</li> <li>• If the value of a credit counter is less than 0, queue services stop before the credit is replenished. If the credit counter of all the CoS queues reaches 0, then it is replenished. The credit counter becomes 0 or minus, and then services are provided to all the packets before transmitting the last packet completely. If this occurs, the credit is replenished.</li> <li>• After that, the credit quantum is added to a credit counter of each CoS queue. The quantum of each CoS queue may differ depending on a user configuration. To set the specific CoS queue to the SP mode, all the CoS queues whose priorities are higher than it must be the strict-priority mode.</li> </ul>

Click **Apply** to check the content changed.

## 6.1.3 Queue Settings

Use the following window to implement the settings on a QoS queue and display the settings.

Choose **QoS > Basic Settings > Queue Settings** to display the following window.

The screenshot shows the 'Queue Settings' window with the following configuration fields at the top: From Port (G1/0/1), To Port (G1/0/1), Queue ID (0), WRR Weight (0-127), and WDRR Quantum (0-127). Below these fields is a table with the following data:

Port	Queue ID	WRR Weight	WDRR Quantum
G1/0/1	0	1	1
	1	1	1
	2	1	1
	3	1	1
	4	1	1
	5	1	1
	6	1	1
	7	0	1
G1/0/2	0	1	1
	1	1	1
	2	1	1
	3	1	1
	4	1	1
	5	1	1
	6	1	1
	7	0	1
G1/0/3	0	1	1
	1	1	1
	2	1	1
	3	1	1
	4	1	1
	5	1	1
	6	1	1
	7	0	1
G1/0/4	0	1	1
	1	1	1
	2	1	1
	3	1	1
	4	1	1
	5	1	1
	6	1	1
	7	0	1
G1/0/5	0	1	1
	1	1	1
	2	1	1
	3	1	1
	4	1	1
	5	1	1
	6	1	1
	7	0	1
G1/0/6	0	1	1
	1	1	1
	2	1	1
	3	1	1
	4	1	1
	5	1	1
	6	1	1
	7	0	1

Figure 6-3 Queue Settings

In the section of **Queue Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Queue ID</b>	Enter the value of queue ID. The range is from 0 to 7.

Parameter	Overview
<b>WRR Weight</b>	Enter the value of WRR weight. The range is from 0 to 127. To satisfy the operating requirements of Expedited Forwarding (EF), always choose the highest queue with Per-hop Behavior (PHB) EF. In addition, you need to designate the schedule mode of this queue as a strict priority scheduling. As long as a differentiate service is available to get supports, the weight of last queue must be 0.
<b>WDRR Quantum</b>	Enter the value of WDRR quantum. The range is from 0 to 127.

Click **Apply** to check the content changed.

## 6.1.4 CoS to Queue Mapping

Use the following window to implement the settings on CoS (transmission) to queue mapping and display its settings.

Choose **QoS > Basic Settings > CoS to Queue Mapping** to display the following window.

CoS	Queue ID
0	2
1	0
2	1
3	3
4	4
5	5
6	6
7	7

Apply

Figure 6-4 CoS to Queue Mapping

You can configure the following parameter.

Parameter	Overview
<b>Queue ID</b>	Choose a Queue ID to map the corresponding CoS-value. The range of the values is from 0 to 7.

Click **Apply** to check the content changed.

## 6.1.5 Port Rate Limiting

Use the following window to implement the settings on limiting port band frequency and display its settings.

Choose **QoS > Basic Settings > Port Rate Limiting** to display the following window.

Port	Input		Output	
	Rate	Burst	Rate	Burst
Gi1/0/1	No Limit	No Limit	No Limit	No Limit
Gi1/0/2	No Limit	No Limit	No Limit	No Limit
Gi1/0/3	No Limit	No Limit	No Limit	No Limit
Gi1/0/4	No Limit	No Limit	No Limit	No Limit
Gi1/0/5	No Limit	No Limit	No Limit	No Limit
Gi1/0/6	No Limit	No Limit	No Limit	No Limit
Gi1/0/7	No Limit	No Limit	No Limit	No Limit
Gi1/0/8	No Limit	No Limit	No Limit	No Limit

Figure 6-5 Port Rate Limiting

In the section of **Port Rate Limiting**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Direction</b>	Choose a direction option. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Input</b> - This configures to limit the bandwidth regarding the entry packets.</li> <li>• <b>Output</b> - This configures to limit the bandwidth regarding exit packets.</li> </ul>

Parameter	Overview
<b>Limiting a Band Frequency</b>	<p>Choose and enter the value of limiting a bandwidth.</p> <ul style="list-style-type: none"><li>• If you choose <b>Bandwidth</b>, enter the input/output bandwidth to use in the entry field displayed.</li><li>• The range is from 8 to 40,000,000 (Kbps). Enter the <b>Burst-size value</b> in the entry field displayed. The range is from 0 to 128,000 (kilo-bytes).</li><li>• If you select <b>Percent</b>, enter the input/output bandwidth using the unit as a percentage. The range is from 1 to 100 (percent). Enter the <b>Burst-size</b> value in the entry field displayed. The range is from 0 to 128,000 (kilo-bytes).</li><li>• If you select <b>None</b>, limiting a band frequency on the specified port is removed. The specified limitation cannot exceed the maximum speed of the interface specified. In the case of the ingress bandwidth limitation, the ingress sends pause frames or flow control frames when the received traffics exceed the limitation.</li></ul>

Click **Apply** to check the content changed.

## 6.1.6 Queue Rate Limiting

Use the following window to implement the settings on limiting queue bandwidth and display its settings.

Choose **QoS > Basic Settings > Queue Rate Limiting** to display the following window.

Port Rate Limiting

Port Rate Limiting

From Port: Gi1/0/1 To Port: Gi1/0/1 Direction: Input

Rate Limit:  Bandwidth (64-1000000)  Kbps  Burst Size (0-128000)  KByte  
 Percent (1-100)  %  Burst Size (0-128000)  KByte  
 None

Port	Input		Output	
	Rate	Burst	Rate	Burst
Gi1/0/1	No Limit	No Limit	No Limit	No Limit
Gi1/0/2	No Limit	No Limit	No Limit	No Limit
Gi1/0/3	No Limit	No Limit	No Limit	No Limit
Gi1/0/4	No Limit	No Limit	No Limit	No Limit
Gi1/0/5	No Limit	No Limit	No Limit	No Limit
Gi1/0/6	No Limit	No Limit	No Limit	No Limit

Figure 6-6 Queue Rate Limiting

In the section of **Limiting Queue Bandwidth**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Queue ID</b>	Choose a queue ID to be configured. The range of values to choose is from 0 to 7.
<b>Rate Limit (or Bandwidth Limitation)</b>	<p>Choose and enter the configuration of limiting queue band. If you choose <b>Minimum Bandwidth</b>, enter it in the entry field where the minimum bandwidth for bandwidth-limitation is displayed.</p> <ul style="list-style-type: none"> <li>• The range is from 8 to 40,000,000 (Kbps).</li> <li>• Enter the number in the entry field where the maximum bandwidth for bandwidth limitation is displayed. The range is from 8 to 40,000,000 (Kbps). If you configure the minimum bandwidth, packets transmitted from the queue are guaranteed (or assured). If you configure the maximum bandwidth, packets transmitted from the queues do not exceed the maximum bandwidth. If you configure the minimum bandwidth, the aggregation of the minimum bandwidth to be configured must be less than 75% of the interface bandwidth. Doing so ensures the minimum bandwidth (to be configured). You do not need to configure the minimally guaranteed bandwidth for the strict priority queue. The reason is this; if the minimum bandwidth of all the queues is satisfied, services are provided with this queue traffic first. The configuration of this command is attached to the physical port only, but is not attached to a port channel. This is the minimally guaranteed bandwidth of one CoS, so it cannot be used across the whole physical port(s).</li> <li>• If you choose the <b>Minimum Percent</b> option, enter the percent-value of the minimum bandwidth in the entry field provided. The range is from 1 to 100%. Enter the value of the <b>Maximum Percent</b> in the entry field provided.</li> <li>• If you choose <b>None</b>, the bandwidth limitation is not assigned to the port specified.</li> </ul>

Click **Apply** to check the content changed.

## 6.2 Advanced Settings

### 6.2.1 DSCP Mutation Map

Use the following window to implement the settings on DSCP (Differentiated Services Code Point) mutation map and display its settings.

Choose **QoS > Advanced Settings > DSCP Mutation Map** to display the following window.

Figure 6-7 DSCP Mutation Map

In the section of a **DSCP Mutation Map**, you can configure the following parameters.

Parameter	Overview
<b>Mutation Name</b>	Enter the name of the DSCP mutation map. The number of characters for the name can be up to 32.
<b>Input DSCP List</b>	Enter the value of input DSCP list. The range is from 0 to 63.
<b>Output DSCP List</b>	Enter the value of output DSCP. The range is from 0 to 63.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 6.2.2 Port Trust State and Mutation Binding

Use the following window to implement the settings on **Port Trust State and Mutation Binding** and display its settings.

Choose **QoS > Advanced Settings > Port Trust State and Port Trust State Mutation Binding** to display the following window.

Port	Trust State	DSCP Mutation Map
Gi1/0/1	Trust CoS	
Gi1/0/2	Trust CoS	
Gi1/0/3	Trust CoS	
Gi1/0/4	Trust CoS	
Gi1/0/5	Trust CoS	
Gi1/0/6	Trust CoS	

Figure 6-8 Port Trust State and Mutation Binding

In the section of **Port Trust State and Mutation Binding**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Trust State</b>	Choose the port trust state. The options available are <b>CoS</b> and <b>DSCP</b> . The options available are <b>CoS</b> and <b>DSCP</b> .
<b>DSCP Conversion Map</b>	Choose and enter the name of a DSCP conversion map to use. The number of characters for the name can be up to 32. If you choose <b>None</b> , a DSCP conversion map is not assigned to a port.

Click **Apply** to check the content changed.

## 6.2.3 DSCP CoS Mapping

Use the following window to implement the settings on a DSCP CoS mapping and display its settings.

Choose **QoS > Advanced Settings > DSCP CoS Mapping** to display the following window.

Port	CoS	DSCP List
Gi1/0/1	0	0-7
	1	8-15
	2	16-23
	3	24-31
	4	32-39
	5	40-47
	6	48-55

Figure 6-9 DSCP CoS Mapping

In the section of the **DSCP CoS Mapping**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>CoS</b>	Enter the CoS value for mapping the DSCP list. The range of the value to choose is from 0 to 7.
<b>DSCP List</b>	Enter the DSCP list value to map the CoS value. The range is from 0 to 63.

Click **Apply** to check the content changed.

## 6.2.4 CoS Color Mapping

Use the following window to implement the settings on a CoS color mapping and display its settings.

Choose **QoS > Advanced Settings > CoS Color Mapping** to display the following window.

Port	Color	CoS List
Gi1/0/1	Green	0-7
	Yellow	
	Red	
Gi1/0/2	Green	0-7
	Yellow	
	Red	
Gi1/0/3	Green	0-7
	Yellow	
	Red	
Gi1/0/4	Green	0-7
	Yellow	
	Red	

Figure 6-10 CoS Color Mapping

In the section of **CoS Color Mapping**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>CoS List</b>	Enter the CoS value to map colors. The range is from 0 to 7.
<b>Color</b>	Choose the color option to map the CoS value. The options available are <b>Green</b> , <b>Yellow</b> and <b>Red</b> .

Click **Apply** to check the content changed.

## 6.2.5 DSCP Color Mapping

Use the following window to implement the settings on DSCP color mapping and display its settings.

Choose **QoS > Advanced Settings > DSCP Color Mapping** to display the following window.

Port	Color	DSCP List
Gi1/0/1	Green	0-63
	Yellow	
	Red	
Gi1/0/2	Green	0-63
	Yellow	
	Red	
Gi1/0/3	Green	0-63
	Yellow	
	Red	
Gi1/0/4	Green	0-63
	Yellow	
	Red	

Figure 6-11 DSCP Color Mapping

In the section of the **DSCP Color Mapping**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>DSCP List</b>	Enter the value of DSCP list to map colors. The range is from 0 to 63.
<b>Color</b>	Choose the color option to map the DSCP value. The options available are <b>Green</b> , <b>Yellow</b> and <b>Red</b> .

Click **Apply** to check the content changed.

## 6.2.6 Class Map

Use the following window to configure a class map and display its settings.

Choose **QoS > Advanced Settings > Class Map** to display the following window.

Figure 6-12 Class Map

You can configure the following parameters.

Parameter	Overview
<b>Class Map Name</b>	Enter the name of a class map. The number of characters for the name can be up to 32.
<b>Multiple Match Criteria</b>	Choose <b>Multiple Match Criteria</b> from options. The options available are <b>Match All</b> and <b>Match Any</b> .

Click **Apply** to add a new entry.

Click **Match** to configure the match rule of the entry specified.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Match** to display the following window.

Figure 6-13 Class Map (Match)

You can configure the following parameters.

Parameter	Overview
<b>None</b>	If you choose this option, nothing is matched with this class map.
<b>Specify</b>	If you choose this option, one of the following parameters is matched with this class map.
<b>ACL Name</b>	Choose and enter the name of the access list to be matched with this class map. The number of characters for the name can be up to 32.
<b>CoS List</b>	Choose and enter the value of CoS list to be matched with this class map. The range is from 0 to 7.
<b>DSCP List</b>	Choose and enter the value of DSCP list to be matched with this class map. The range is from 0 to 63. If you set <b>IPv4</b> to on, only IPv4 packets are matched. If not specified, the reconciliation (or cross-check) targets for both IPv4 and IPv6 packets.
<b>Precedence List</b>	Choose and enter the value of a precedence list that matches with this class map. The range is from 0 to 7. If you set the <b>IPv4</b> option to on, IPv4 packets are matched, only. If not specified, the reconciliation targets for both IPv4 and IPv6 packets. In the case of IPv6 packets, the top three-bits of traffic class for the IPv6 header can be the precedence. The range is from 0 to 7.
<b>Protocol Name</b>	Choose a protocol name to match it with this class map. The options available are <b>ARP, BGP, DHCP, DNS, EGP, FTP, IPv4, IPv6, NetBIOS, NFS, NTP, OSPF, PPPOE, RIP, RTSP, SSH, Telnet</b> and <b>TFTP</b> .
<b>VID List</b>	Choose and enter a VLAN ID to match it with the class map. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of the VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.

Click **Apply** to check the content changed.

Click **Back** to return to the previous window.

## 6.2.7 Aggregate Policer

Use the following window to implement the settings on the aggregate policer and display its settings.

Choose **QoS > Advanced Settings > Aggregate Policer** to display the following window.

The screenshot shows the 'Aggregate Policer' configuration window with the 'Single Rate Settings' tab selected. The window contains the following fields and controls:

- Aggregate Policer Name \***: Text input field.
- Average Rate \***: Text input field with unit 'Kbps' and range '(0-10000000)'.
- Normal Burst Size (0-16384)**: Text input field with unit 'Kbyte'.
- Maximum Burst Size (0-16384)**: Text input field with unit 'Kbyte'.
- Conform Action**: Dropdown menu with 'Transmit' selected.
- Exceed Action**: Dropdown menu with 'Transmit' selected.
- Violate Action**: Dropdown menu with 'None' selected.
- Color Aware**: Dropdown menu with 'Disabled' selected.
- Apply**: Button.
- Total Entries: 0**: Summary text.
- Table Headers**: Name, Average Rate, Normal Burst Size, Max. Burst Size, Conform Action, Exceed Action, Violate Action, Color Aware.

Figure 6-14 Aggregate Policer (Single Rate Settings)

In the section of the **Single Rate Settings**, you can configure the following parameters.

Parameter	Overview
<b>Aggregate Policer Name</b>	Enter the name of the aggregate policer.
<b>Average Rate</b>	Enter the value of the average rate. The range is from 0 to 10,000,000 (Kbps).
<b>Normal Burst Size</b>	Enter the value of a normal burst size. The range is from 0 to 16,384 (Kbyte).
<b>Maximum Burst Size</b>	Enter the value of the maximum burst size. The range is from 0 to 16,384 (Kbyte).

Parameter	Overview
<b>Confirm Action</b>	<p>Choose a confirm action. The action specifies the action to execute for green colored packets. If the action is not specified, the default action is to <b>Transmit</b>. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - If you choose this option, packets are transmitted without switching them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the value of new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>
<b>Exceed Action</b>	<p>Choose the exceed action. The action specifies the action needed on the packets, which exceed the bandwidth-limitation. Regarding a two-rate policer, if the exceed action is not specified, the default action is <b>Drop</b>. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of IEEE 802.1p to packets. Enter the value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without switching them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the value of new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>

Parameter	Overview
<b>Violate Action</b>	<p>Choose the violate-action. The action specifies the action to be taken on the packets, which violate the normal and maximum burst sizes for single-rate policing. Specify the action you take on the packets which conform to neither CIR nor PIR.</p> <ul style="list-style-type: none"> <li>• Regarding a single-rate policer, if the violate action is not specified, a single-rate two-color policer is created.</li> <li>• Regarding a two-rate policer, if the violation action is not specified, the default action becomes the exceed action.</li> </ul> <p>The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Nothing</b> - No action is taken.</li> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without switching them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>
<b>Color Aware</b>	<p>This parameter enables or disables a function of the color aware.</p> <ul style="list-style-type: none"> <li>• If the color aware is <b>Enabled</b>, the policer operates as the color aware mode.</li> <li>• If the color aware is <b>Disabled</b>, the policer operates as the color blind mode.</li> </ul>

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click the **2 Rate Settings** tab to display the following window.

Figure 6-15 Aggregate Policer (2 Rate Settings)

In the section of **2 Rate Settings**, you can configure the following parameters.

Parameter	Overview
<b>Name of Aggregate Policer</b>	Enter the name of an aggregate policer.
<b>CIR</b>	Enter the value of CIR (Committed Information Rate). The range is from 0 to 10,000,000 (Kbps). The certified packet rate is the first token bucket for the two-rate metering.
<b>Burst Confirmation</b>	Enter the value of a burst confirmation. The range is from 0 to 16,384 (Kbyte). The value of the confirmation specifies the burst size for the first token bucket in kbps.
<b>PIR</b>	Enter the value of PIR (Peak Information Rate). The range is from 0 to 10,000,000 (Kbps). The rate is the second token bucket for the 2 rate metering.
<b>Peak Burst</b>	Enter the value of the peak burst. The range is from 0 to 16,384 (Kbyte). This is the burst size of the second token bucket (kilo-bytes).

Parameter	Overview
<b>Confirm Action</b>	<p>Choose the confirm action. The action specifies the action to be taken for green colored packets. If the action is not specified, the default action is <b>Transmit</b>.</p> <p>The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the space provided.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without switching them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the value of new DSCP and IEEE 802.1p to packets. Enter the values of DSCP and IEEE 802.1p in the space provided.</li> </ul>
<b>Exceed Action</b>	<p>Choose the exceed action. The exceed action specifies an action to be taken on the packets, which exceed the rate limit. For a two-rate policer, if the exceed action is not specified, the default action is <b>Drop</b>.</p> <p>The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without switching them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the valufe of new DSCP and IEEE 802.1p to packets.</li> <li>• Enter the values of DSCP and IEEE 802.1p in the entry field provided.</li> </ul>

Parameter	Overview
<b>Violate Action</b>	<p>Choose the violate action. The action specifies the action you take on the packets, which violate the normal and maximum burst size for a single rate policing. It specifies the action you take on the packets, which conform to neither CIR nor PIR.</p> <ul style="list-style-type: none"> <li>• Regarding a single rate policer, if the violate action is not specified, a single-rate two-color policer is created.</li> <li>• Regarding a two-rate policer, if the violation action is not specified, the default action becomes the exceed action.</li> </ul> <p>The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b>- This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without switching them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure the values of DSCP and IEEE 802.1p in packets to transmit them.</li> <li>• Enter the values of DSCP and IEEE 802.1p in the entry field displayed.</li> </ul>
<b>Color Aware</b>	<p>This parameter enables or disables a function of the color aware.</p> <ul style="list-style-type: none"> <li>• If the color aware is <b>Enabled</b>, a policer operates with the color aware mode.</li> <li>• If the color aware is <b>Disabled</b>, the policer operates with the color blind mode.</li> </ul>

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 6.2.8 Policy Map

Use the following window to implement the settings on a policy map and display its settings.

Choose **QoS > Advanced Settings > Policy Map** to display the following window.

Figure 6-16 Policy Map

In the section of **Create/Delete Policy Map**, you can configure the following parameter.

Parameter	Overview
<b>Name of a Policy Map</b>	Enter the name of a policy map to create or delete. The number of characters for the name can be up to 32.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

In the section of **Traffic Policy**, you can configure the following parameters.

Parameter	Overview
<b>Name of a Policy Map</b>	Enter the name of a policy map. The number of characters for the name can be up to 32.
<b>Name of a Class Map</b>	Enter the name of a class map. The number of characters for the name can be up to 32.

Click **Apply** to add a new entry.

Click **Set Action** to configure the action of the entries specified.

Click **Policer** to configure the police action for the entry specified.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Set Action** to display the following window.

Figure 6-17 Policy Map (Action Settings)

In the section of **Set Action**, you can configure the following parameters.

Parameter	Overview
<b>None</b>	If you choose this option, no action is taken.
<b>Specify</b>	If you choose this option, an action needs to be taken based on a configuration.
<b>New Precedence</b>	Choose the value of the new precedence for packets. The range is from 0 to 7. If you choose the <b>IPv4 Only</b> option, the IPv4 precedence is marked. If you do not choose it, the precedence for both IPv4 and IPv6 is marked. In the case of IPv6 packets, the top (three-bits) traffic class for the IPv6 header can be the precedence.
<b>New DSCP</b>	Choose the value of new DSCP for packets. The range is from 0 to 63. If you choose <b>IPv4 Only</b> , the IPv4 DSCP is marked. If you do not choose it, DSCP for both IPv4 and IPv6 is marked.
<b>New CoS</b>	Choose the value of new CoS for packets. The range is from 0 to 7.
<b>New CoS Queue</b>	Choose the value of a new CoS queue for packets. Doing so overwrites the original CoS queue selection. If the policy map is applied to the exit-flow of an interface, the settings on the CoS queue does not become enabled.

Click **Apply** to check the content changed.

Click **Back** to return to the previous window.

Click **Policer** and then specify **Police** as a police action to display the following window.

Figure 6-18 Policy Map (Policer and Police)

In the section of **Police Action**, you can configure the following parameters.

Parameter	Overview
<b>None</b>	If you choose this option, a policer is not configured on this entry.
<b>Specify</b>	If you choose this option, the following policer configuration is applied on this entry.
<b>Average Rate</b>	Enter a value of the average rate. The range is from 0 to 10,000,000 (Kbps).
<b>Normal Burst Size</b>	Enter the value of a normal burst size. The range is from 0 to 16,384 (Kbps).
<b>Maximum Burst Size</b>	Enter the value of the maximum burst size. The range is from 0 to 16,384 (Kbps).

Parameter	Overview
<b>Conform Traffic Action</b>	<p>Choose the conform-traffic action to be taken. Perform the action on green colored packets. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without changing them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of a new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>
<b>Exceed Action</b>	<p>Choose the exceed-action to be taken. This action is taken on the yellow colored packets, which exceed the bandwidth limitation. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without changing them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of a new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>

Parameter	Overview
<b>Violate Action</b>	<p>Choose the violate action to perform it. This action is performed on red colored packets. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>None</b> - No violate action is taken.</li> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without changing them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of a new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>
<b>Color Aware</b>	<p>This parameter enables or disables a function of the color aware.</p> <ul style="list-style-type: none"> <li>• If enabled, the policer operates as the color aware mode.</li> <li>• If disabled, the policer operates as the color blind mode.</li> </ul>

Click **Apply** to check the content changed.

Click **Back** to return to the previous window.

Click the **Policer** button, and then specify the **Police CIR** as a police action to display the following window.

Figure 6-19 Policy Map (Policer, Police CIR)

In the section of **Police Action**, you can configure the following parameters.

Parameter	Overview
<b>None</b>	If you choose this option, a policer is not configured in this entry.
<b>Specify</b>	If you choose this option, the following policer configuration is applied in this entry.
<b>CIR</b>	Enter the value of CIR (Committed Information Rate). This is the first token bucket for two-rate metering. The range is from 0 to 10,000,000 (Kbps).
<b>Confirm Burst</b>	Enter the value of a burst confirmation. This is the size of the first token bucket. The range is from 0 to 16,384 (kilo-bytes).
<b>PIR</b>	Enter the value of PIR (Peak Information Rate). This is the second token bucket for two-rate metering. The range is from 0 to 10,000,000.
<b>Peak Burst</b>	Enter the value of the peak burst. This is the size of the second token bucket. The range is from 0 to 16,384 (kilo-bytes).
<b>Conform Traffic Action</b>	<p>Choose the conform traffic action to execute. This action is performed on green colored packets. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without changing them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of a new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>

Parameter	Overview
<b>Exceed Action</b>	<p>Choose the exceed-action to be taken. This action is taken on the yellow colored packets, which exceed the bandwidth limitation. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without changing them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of a new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>
<b>Violate Action</b>	<p>Choose a violate action to be taken. This action is executed for the red colored packets. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>None</b> - No violate action is taken.</li> <li>• <b>Drop</b> - This option allows you to drop the packets.</li> <li>• <b>Set-DSCP-Transmit</b> - This option allows you to configure and transmit the value of new DSCP to packets. Enter the DSCP value in the entry field displayed.</li> <li>• <b>Set-1P-Transmit</b> - This option allows you to configure and transmit the value of new IEEE 802.1p to packets. Enter the IEEE 802.1p value in the entry field displayed.</li> <li>• <b>Transmission</b> - This option allows you to transmit packets without changing them.</li> <li>• <b>DSCP-1P Configuration</b> - This option allows you to configure and transmit the values of a new DSCP and IEEE 802.1p to packets. Enter the values in the entry field displayed.</li> </ul>
<b>Color Aware</b>	<p>This parameter enables or disables a function of the color aware.</p> <ul style="list-style-type: none"> <li>• If enabled, the policer operates as the Color Aware mode.</li> <li>• If disabled, the policer operates as the color blind mode.</li> </ul>

Click **Apply** to check the content changed.

Click **Back** to return to the previous window.

Click the **Policer** button, and then specify the **Police Aggregate** as **Police Action** to display the following window.

Figure 6-20 Policy Map (Policer and Police Aggregate)

In the section of **Police Action**, you can configure the following parameters.

Parameter	Overview
<b>None</b>	If you choose this option, a policer is not configured on this entry.
<b>Specify</b>	If you choose this option, the following policer configuration is applied on this entry.
<b>Aggregate Policer Name</b>	Enter the name of an aggregate policing rule. The number of characters for the name can be up to 32.

Click **Apply** to check the content changed.

Click **Back** to return to the previous window.

## 6.2.9 Policy Binding

Use the following window to implement the settings on a policy binding and display its settings.

Choose **QoS > Advanced Settings > Policy Binding** to display the following window.

Figure 6-21 Policy Binding

In the section of the settings on a **Policy Binding**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Direction</b>	Choose a direction option. The options available are <b>Input</b> and <b>Output</b> . Specify the entry traffic for <b>Input</b> and exit traffic for <b>Output</b> , respectively.
<b>Name of a Policy Map</b>	Enter the name of a policy map. The number of characters for the name can be up to 32. <ul style="list-style-type: none"> <li>If you choose <b>None</b>, a policy map is not associated with this entry.</li> </ul>

Click **Apply** to check the content changed.

## 6.3 Egress Buffer Settings

### 6.3.1 Egress Buffer Settings

Use the following window to configure the threshold of output buffering and display the threshold specified. Regarding the threshold of output buffering, operating with the default configuration is recommended. Egress Buffer changes the status to "High" regarding the environment where the traffics instantaneously exceeding the maximum quantity of communications for a port occur frequently.

Choose **QoS > Egress Buffer Settings** to display the following window.



Figure 6-22 Egress Buffer Settings

In the section of **Egress Buffer Settings**, you can configure the following parameter.

Parameter	Overview
<b>Threshold Settings for Egress Buffer</b>	Choose the threshold of an output buffering. The options (values) available are <b>Mid</b> and <b>High</b> . If the value is configured in advance, the threshold is displayed. The default (or initial) value is <b>Mid</b> .

Click **Apply** to reflect the change.

# 7 ACL (Access Control List)

## 7.1 ACL Configuration Wizard

Use the following window to configure new and existing ACLs on the ALC configuration wizard.

Choose **ACL > ACL Configuration Wizard** to display the following window.

The screenshot shows the 'ACL Configuration Wizard' window. At the top, it says 'ACL Configuration Wizard' and 'ACL Configuration Wizard'. Below that, it says 'Access-List Assignment >> Select Packet Type >> Add Rule >> Apply Port'. The main question is 'Do you want to create a new ACL access-list or update an existing access-list?'. There are two radio buttons: 'Create' (selected) and 'Update'. Below 'Create' is a text box for 'ACL Name' with '32 chars' next to it. Below 'Update' is a 'Next' button. At the bottom, there is a note: 'Note: The first character of ACL name must be a letter.'

Figure 7-1 ACL Configuration Wizard (Create)

Click **Update** to display the following window.

The screenshot shows the 'ACL Configuration Wizard' window. At the top, it says 'ACL Configuration Wizard' and 'ACL Configuration Wizard'. Below that, it says 'Access-List Assignment >> Select Packet Type >> Add Rule >> Apply Port'. The main question is 'Do you want to create a new ACL access-list or update an existing access-list?'. There are two radio buttons: 'Create' and 'Update' (selected). Below 'Update' is a text box for 'ACL Name' with '32 chars' next to it. Below 'Update' is a 'Next' button. At the bottom, there is a note: 'Note: The first character of ACL name must be a letter.'

Total Entries: 1

	ACL Name	ACL Type	Total Rules
<input checked="" type="radio"/>	aaa	Extended MAC ACL	0

1/1 [Back] [Forward] 1 [Go]

Figure 7-2 ACL Configuration Wizard (Update)

You can configure the following parameters.

Parameter	Overview
<b>Create</b>	Choose this option to create a new ALC access list using the configuration wizard.
<b>ACL Name</b>	Enter a new ACL name. The number of characters for the name can be up to 32.
<b>Update</b>	Choose this option to update an existing ACL access list. Choose the existing ACL in a table to be updated.

Click **Next** to proceed to the next step in the wizard.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

If you click **Create ACL** and **Next** from the **Create** option, the following window is displayed.

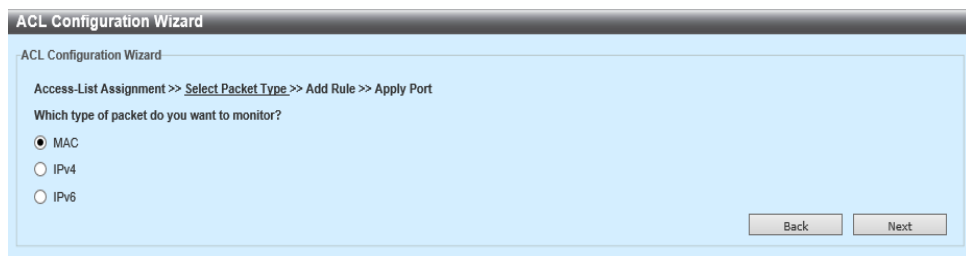


Figure 7-3 ACL Configuration Wizard (Choose ACL Type)

You can configure the following parameters.

Parameter	Overview
<b>MAC</b>	If you choose this option, MAC ACL is created.
<b>IPv4</b>	If you choose this option, IPv4 ACL is created.
<b>IPv6</b>	If you choose this option, IPv6 ACL is created.

Click **Next** to proceed to the next step in the wizard.

Click **Back** to return to the previous step in the wizard.

## 7.1.1 MAC ACL

After you choose **Create/Update** from **MAC ACL**, the following window is displayed.

The screenshot shows the 'ACL Configuration Wizard' window. The title bar reads 'ACL Configuration Wizard'. Below the title bar, the progress indicator shows 'Access-List Assignment >> Select Packet Type >> Add Rule >> Apply Port'. The main content area is titled 'Please assign a sequence number to create a new rule.' and has two radio buttons: 'Sequence No. (1-65535)' (selected) and 'Auto Assign'. Below this is the 'Assign Rule Criteria' section with three tabs: 'MAC Address', 'Ethernet Type', and '802.1Q VLAN'. The 'MAC Address' tab is active. It contains two columns for 'Source' and 'Destination'. Each column has three radio buttons: 'Any' (selected), 'Host', and 'MAC'. Below these are three text input fields for 'Wildcard' values, each containing '11-DF-36-4B-A7-CC'. The 'Ethernet Type' section has a 'Specify Ethernet Type' dropdown menu (set to 'Please Select'), and two text input fields for 'Ethernet Type (0x0-0xFFFF)' and 'Ethernet Type Mask (0x0-0xFFFF)'. The '802.1Q VLAN' section has a 'CoS' dropdown menu (set to 'Please Select'), a 'VID (1-4094)' text input field, and two text input fields for 'Mask (0x0-0x7)' and 'Mask (0x0-0xFF)'. At the bottom, there is a 'Time Range' text input field (set to '32 chars') and an 'Action' section with 'Permit' (selected) and 'Deny' radio buttons. 'Back' and 'Next' buttons are located at the bottom right.

Figure 7-4 ACL Configuration Wizard (Configuration of MAC ACL)

You can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. Choose <b>Auto Assign</b> to automatically generate the ACL rule number for this entry.
<b>Source</b>	Choose and enter the source MAC address information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Enter a source-host MAC address.</li> <li>• <b>MAC</b> - Enter a source MAC address and the <b>Wildcard</b> value in the entry field displayed.</li> </ul>
<b>Destination</b>	Choose and enter the destination MAC address information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates an optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Enter a destination-host MAC address.</li> <li>• <b>MAC</b> - Enter a destination MAC address and the <b>Wildcard</b> value in the entry field displayed.</li> </ul>
<b>Specify Ethernet Type</b>	Choose the Ethernet-type option. The options available are <b>aarp</b> , <b>appletalk</b> , <b>decent-iv</b> , <b>etype-6000</b> , <b>etype-8042</b> , <b>lat</b> , <b>lavc-sca</b> , <b>mop-console</b> , <b>mop-dump</b> , <b>vines-echo</b> , <b>vines-ip</b> , <b>xns-idp</b> and <b>arp</b> .

Parameter	Overview
<b>Ethernet Type</b>	Enter the Ethernet-type with hexadecimal-value. The range is from 0x600 to 0xFFFF. If you choose an optional Ethernet-type profile from the <b>Specify Ethernet Type</b> drop-down list, the appropriate hexadecimal-value is automatically displayed.
<b>Ethernet Type Mask</b>	Enter the Ethernet-type mask with hexadecimal-value. The range is from 0x0 to 0xFFFF. If you choose an optional Ethernet-type profile from the <b>Specify Ethernet Type</b> drop-down list, the appropriate hexadecimal-value is automatically displayed.
<b>CoS</b>	Choose the CoS-value you use. The range is from 0 to 7. <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enter the CoS mask value. The range is from 0x0 to 0x7.</li> </ul>
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094. <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enter the value of VLAN ID mask. The range is from 0x0 to 0xFFF.</li> </ul>
<b>Time Range</b>	Enter the name of the time-range profile, which is used in this ACL rule. The number of characters for the name can be up to 32.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> , <b>Reject</b> , and <b>Reject CPU</b> .

Click **Next** to proceed to the next step in the wizard.

Click **Back** to return to the previous step in the wizard.

After you click **Next** (in the previous step), the following window is displayed.

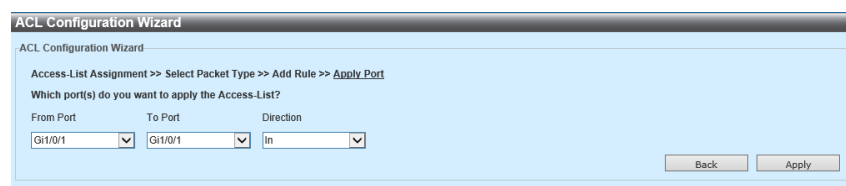


Figure 7-5 ACL Configuration Wizard (Choosing a port and direction)

You can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Direction</b>	Choose a direction. The options available are <b>In</b> and <b>Out</b> .

Click **Apply** to check the changes made and return to the **ACL Configuration Wizard** window.

Click **Back** to return to the previous step in the wizard.

## 7.1.2 IPv4

If you choose **Update** from the standard IP ACL, the following window is displayed.

The screenshot shows the 'ACL Configuration Wizard' window. At the top, it indicates the current step: 'Access-List Assignment >> Select Packet Type >> Add Rule >> Apply Port'. Below this, it prompts the user to 'Please assign a sequence number to create a new rule.' There are two radio buttons: 'Sequence No. (1-65535)' (selected) and 'Auto Assign'. The main section is titled 'Assign Rule Criteria' and has a tab labeled 'IPv4 Address'. Under this tab, there are two columns for 'Source' and 'Destination'. Each column has three radio buttons: 'Any' (selected), 'Host', and 'IP'. Below these are input fields for IP addresses and wildcards. There is also a 'Time Range' field with '32 chars' and an 'Action' section with 'Permit' (selected) and 'Deny' radio buttons. 'Back' and 'Next' buttons are at the bottom right.

Figure 7-6 ACL Configuration Wizard (Configuration of a Standard IP ACL)

If you choose **Update an Extended IP ACL** or **Create an IPv4 ACL**, the following window is displayed.

The screenshot shows the 'ACL Configuration Wizard' window for an extended IP ACL. The steps are the same: 'Access-List Assignment >> Select Packet Type >> Add Rule >> Apply Port'. The 'Please assign a sequence number...' section is identical. Below, the 'Assign Rule Criteria' section has four tabs: 'IPv4 Address', 'Port', 'IPv4 DSCP', and 'TCP Flag'. The 'IPv4 Address' tab is active. It has the same 'Source' and 'Destination' radio buttons and input fields as Figure 7-6. The 'Port' section has 'Source' and 'Destination Port' fields, each with a 'Please Select' dropdown and two input fields for values and masks. The 'IPv4 DSCP' section has three radio buttons: 'IP Precedence' (selected), 'ToS', and 'DSCP (0-63)'. Each has a 'Please Select' dropdown and two input fields for values and masks. The 'TCP Flag' section has checkboxes for 'ack', 'fin', 'psh', 'rst', 'syn', and 'urg'. There is also a 'Time Range' field and 'Action' radio buttons ('Permit' selected). 'Back' and 'Next' buttons are at the bottom right.

Figure 7-7 ACL Configuration Wizard (Configuration of an Extended IP ACL)

You can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. If you choose <b>Auto Allocation</b> , the ACL rule number regarding this entry is automatically generated.
<b>Protocol Type</b>	Choose the protocol type option. The options available are <b>TCP</b> , <b>UDP</b> , <b>ICMP</b> , <b>EIGRP</b> (88), <b>ESP</b> (50), <b>GRE</b> (47), <b>IGMP</b> (2), <b>OSPF</b> (89), <b>PIM</b> (103), <b>VRRP</b> (112), <b>IP-in-IP</b> (94), <b>PCP</b> (108), <b>Protocol ID</b> and <b>None</b> . <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the protocol ID, manually. The range is from 0 to 255.</li> <li>• <b>Mask</b> - After choosing the <b>Protocol ID</b> option, enter the value of the protocol mask, manually. The range is from 0x0 to 0xFF.</li> <li>• <b>Fragment</b> - If you choose this option, the packet fragment filtering is included.</li> </ul>
<b>Source</b>	Choose and enter the source information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates optional source traffics according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters an IP address of source host.</li> <li>• <b>IP</b> - Use the bit-map of <b>Wildcard</b>, and then use and enter a group of the source IP address. The bit corresponding to the bit-value of 1 is ignored, but the bit corresponding to the bit-value of 0 is checked.</li> </ul>
<b>Destination</b>	Choose and enter the destination information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters an IP address of a destination host.</li> <li>• <b>IP</b> - Use the bit-map of <b>Wildcard</b>, and then use and enter a group of the destination IP address. The bit corresponding to the bit value of 1 is ignored, but the bit corresponding to the bit value of 0 is checked.</li> </ul>

Parameter	Overview
<b>Source Port</b>	<p>Choose and enter the value of the source port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - ACL uses the port-number specified, only.</li> <li>• &gt; - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• &lt; - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• ≠ - ACL uses all the ports except the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF.</li> </ul> <p>This parameter is available when you select <b>TCP or UDP</b> as the protocol type.</p>
<b>Destination Port</b>	<p>Choose and enter the value of the destination port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - ACL uses the port-number specified, only.</li> <li>• &gt; - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• &lt; - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• ≠ - ACL uses all the ports except the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF.</li> </ul> <p>This parameter is available when you select <b>TCP or UDP</b> as the protocol type.</p>
<b>Specify ICMP Message Type</b>	<p>Choose the <b>ICMP Message Type</b> you use. This parameter is available when you select <b>ICMP</b> as the protocol type.</p>
<b>ICMP Message Type</b>	<p>If you do not choose the <b>Specify ICMP Message</b> type, enter the numerical value of the <b>ICMP Message Type</b> you use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b>, the numerical value of the message type is automatically entered. This parameter is available when you select <b>ICMP</b> as the protocol type.</p>

Parameter	Overview
<b>Message Code</b>	If you do not choose the <b>Specify ICMP Message</b> type, enter the numerical value of a message code you use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b> , the numerical value of the message type is automatically entered. This parameter is available when you select <b>ICMP</b> as the protocol type.
<b>IP Precedence</b>	Choose the value of IP precedence you use. The options available are <b>routine</b> (0), <b>priority</b> (1), <b>immediate</b> (2), <b>flash</b> (3), <b>flash-override</b> (4), <b>critical</b> (5), <b>Internet</b> (6) and <b>network</b> (7). <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the value of the IP precedence, manually. The range is from 0 to 7.</li> <li>• <b>Mask</b> - Enter the value of an IP precedence mask. The range is from 0x0 to 0x7.</li> </ul>
<b>ToS</b>	Choose the value of Type-of-Service (ToS). The options available are <b>normal</b> (0), <b>min-monetary-cost</b> (1), <b>max-reliability</b> (2), <b>max-throughput</b> (4) and <b>min-delay</b> (8). <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the ToS value, manually. The range is from 0 to 15.</li> <li>• <b>Mask</b> - Enter the ToS mask value. The range is from 0x0 to 0xF.</li> </ul>
<b>DSCP</b>	Choose the DSCP value. The options available are <b>default</b> (0), <b>af11</b> (10), <b>af12</b> (12), <b>af13</b> (14), <b>af21</b> (18), <b>af22</b> (20), <b>af23</b> (22), <b>af31</b> (26), <b>af32</b> (28), <b>af33</b> (30), <b>af41</b> (34), <b>af42</b> (36), <b>af43</b> (38), <b>cs1</b> (8), <b>cs2</b> (16), <b>cs3</b> (24), <b>cs4</b> (32), <b>cs5</b> (40), <b>cs6</b> (48), <b>cs7</b> (56) and <b>ef</b> (46). <ul style="list-style-type: none"> <li>• <b>Value</b> - You can manually enter the DSCP value. The range is from 0 to 63.</li> <li>• <b>Mask</b> - Enter the value of DSCP mask. The range is from 0x0 to 0x3F.</li> </ul>
<b>TCP Flag</b>	Choose the TCP flag to evaluate for this ACL. The options available are <b>ack</b> , <b>fin</b> , <b>psh</b> , <b>rst</b> , <b>syn</b> and <b>urg</b> . This parameter is available only if you choose <b>TCP</b> from the <b>Protocol Type</b> .
<b>Time-Range</b>	Enter the name of the time-range profile used in this ACL rule. The number of characters for the name can be up to 32.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit and Reject</b> .

Click **Next** to proceed to the next step in the wizard.

Click **Back** to return to the previous step in the wizard.

After you click **Next** (in the previous step), the following window is displayed.

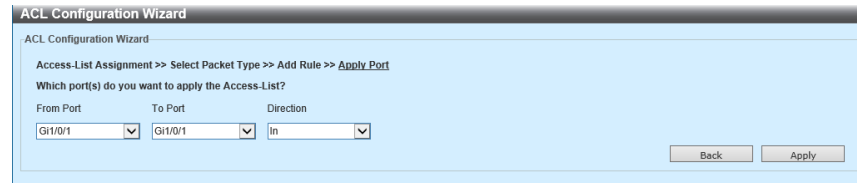


Figure 7-8 ACL Configuration Wizard (IPv4, Step 3)

You can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Direction</b>	Choose a direction. The options available are <b>In</b> and <b>Out</b> .

Click **Apply** to check the content changed and return to the **ACL Configuration Wizard** window.

Click **Back** to return to the previous step in the wizard.

## 7.1.3 IPv6

If you choose to update the **Standard IPv6 ACL**, the following window is displayed.

Figure 7-9 ACL Configuration Wizard (Configuration of Standard IPv6 ACL)

If you choose **Update an Extended IPv6 ACL** or **Create an IPv6 ACL**, the following window is displayed.

Figure 7-10 ACL Configuration Wizard (Configuration of an Extended IPv6 ACL)

You can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. If you choose <b>Auto Allocation</b> , the ACL rule-number regarding this entry is automatically generated.

Parameter	Overview
<b>Protocol Type</b>	<p>Choose the protocol type option. The options available are <b>TCP</b>, <b>UDP</b>, <b>ICMP</b>, <b>Protocol ID</b>, <b>ESP</b> (50), <b>PCP</b> (108), <b>SCTP</b> (132) and <b>None</b>.</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the protocol ID, manually. The range is from 0 to 255.</li> <li>• <b>Mask</b> - After choosing the <b>Protocol ID</b> option, enter the value of the protocol mask, manually. The range is from 0x0 to 0xFF.</li> <li>• <b>Fragment</b> - If you choose this option, the packet fragment filtering is included.</li> </ul>
<b>Source</b>	<p>Choose and enter the source information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters a source host IPv6 address.</li> <li>• <b>IPv6</b> - Enter the source IPv6 address and the value of <b>Prefix-length</b> in the entry field displayed.</li> </ul>
<b>Destination</b>	<p>Choose and enter the destination information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters an IPv6 address of a destination host.</li> <li>• <b>IPv6</b> - Enter the destination IPv6 address and the value of <b>Prefix-length</b> in the entry field displayed.</li> </ul>
<b>Source Port</b>	<p>Choose and enter the value of the source port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>=</b> - ACL uses the port-number specified, only.</li> <li>• <b>&gt;</b> - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• <b>&lt;</b> - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• <b>≠</b> - ACL uses all the ports except the port-number specified.</li> <li>• <b>Range</b> - ACL uses the specified port within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF.</li> </ul> <p>This parameter is available when you select <b>TCP</b> or <b>UDP</b> as the protocol type.</p>

Parameter	Overview
<b>Destination</b>	<p>Choose and enter the value of the destination port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - ACL uses the port-number specified, only.</li> <li>• &gt; - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• &lt; - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• ≠ - ACL uses all the ports except the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF. This parameter is available when you select <b>TCP or UDP</b> as the protocol type.</li> </ul>
<b>Specify ICMP Message Type</b>	Choose the <b>ICMP Message Type</b> you use. This parameter is available when you select <b>ICMP</b> as the protocol type.
<b>ICMP Message Type</b>	If you do not choose the <b>Specify ICMP Message</b> type, enter the numerical value of an <b>ICMP Message Type</b> . The range is from 0 to 255. If you choose the <b>ICMP Message Type</b> , the numerical value of the message type is automatically entered. This parameter is available when you select <b>ICMP</b> as the protocol type.
<b>Message Code</b>	If you do not choose the <b>Specify ICMP Message</b> type, enter the numerical value of a message code to use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b> , the numerical value of the message type is automatically entered. This parameter is available when you select <b>ICMP</b> as the protocol type.
<b>DSCP</b>	<p>Choose the DSCP value you use. The options available are <b>default</b> (0), <b>af11</b> (10), <b>af12</b> (12), <b>af13</b> (14), <b>af21</b> (18), <b>af22</b> (20), <b>af23</b> (22), <b>af31</b> (26), <b>af32</b> (28), <b>af33</b> (30), <b>af41</b> (34), <b>af42</b> (36), <b>af43</b> (38), <b>cs1</b> (8), <b>cs2</b> (16), <b>cs3</b> (24), <b>cs4</b> (32), <b>cs5</b> (40), <b>cs6</b> (48), <b>cs7</b> (56), and <b>ef</b> (46).</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the DSCP value, manually. The range is from 0 to 63.</li> <li>• <b>Mask</b> - Enter the value of DSCP mask. The range is from 0x0 to 0x3F.</li> </ul>
<b>Traffic Class</b>	<p>Choose and enter the value of a traffic class. The range is from 0 to 255.</p> <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enters the value of a traffic-class mask. The range is from 0x0 to 0xFF.</li> </ul>

Parameter	Overview
<b>TCP Flag</b>	Choose the <b>TCP</b> flag to evaluate for this ACL. The options available are <b>ack</b> , <b>fin</b> , <b>psh</b> , <b>rst</b> , <b>syn</b> and <b>urg</b> . This parameter is available only if you choose <b>TCP</b> from the <b>Protocol Type</b> .
<b>Flow Label</b>	Enter the value of a flow label. The range is from 0 to 1,048,575. <ul style="list-style-type: none"><li>• <b>Mask</b> - Enter the flow label mask. The range is from 0x0 to 0xFFFFF.</li></ul>
<b>Time Range</b>	Enter the name of the time range profile used in this ACL rule. The number of characters for the name can be up to 32.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> and <b>Deny</b> .

Click **Next** to proceed to the next step in the wizard.

Click **Back** to return to the previous step in the wizard.

After you click **Next** (in the previous step), the following window is displayed.




Figure 7-11 ACL Configuration Wizard (IPv6, Step 3)

You can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Direction</b>	Choose a direction. The options available are <b>In</b> and <b>Out</b> .

Click **Apply** to check the content changed and return to the **ACL Configuration Wizard** window.

Click **Next** to return to the previous step in the wizard.

## 7.2 ACL Access List

Use the following window to implement the settings on ACL and ACL rules and to display their settings.

Choose **ACL > ACL Access List** to display the following window.

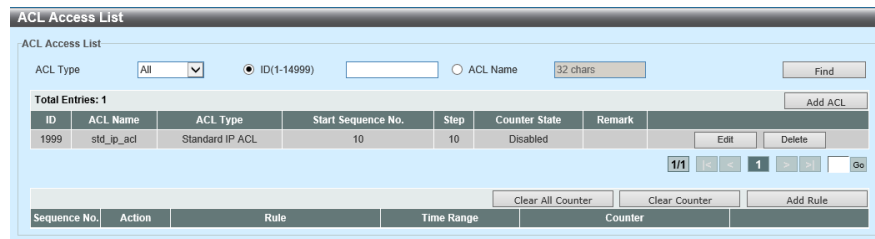


Figure 7-12 ACL Access List

In the section of **ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose an ACL type to search. The options available are <b>All</b> , <b>IP ACL</b> , <b>IPv6 ACL</b> , <b>MAC ACL</b> and <b>Expert ACL</b> .
<b>ID</b>	Choose and enter an access list ID whose range is from 1 to 14,999.
<b>ACL Name</b>	Choose and enter the name of an access list. The number of characters for the name can be up to 32.

Click **Find** to search and display the entries based on the search condition specified.

Click **Add ACL** to add a new ACL profile entry.

Click **Edit** to edit the configuration of the entry specified.

Click **Delete** to delete the entry specified.

Click **Clear All Counters** to clear all the counter information.

Click **Clear a Counter** to clear the counter information, which is related to an ACL profile selected.

Click **Add Rules** to add a new ACL rule entry on the ACL profile selected.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Edit** to display the following window.

Figure 7-13 ACL Access List (Edit)

In the section of **ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>Starting Sequence Number</b>	Enter the starting sequence number.
<b>Step</b>	Enter the step of sequence numbers. The range of step is from 1 to 32. This specifies the number of steps for the sequence number. The default value is 10. For example, if the increment (step) value is 5 and the starting sequence number is 20, the following sequence numbers become 25, 30, 35 and 40.
<b>Counter State</b>	This parameter enables or disables the counter state option.
<b>Annotation</b>	Enter (or insert) an annotation for the option to associate with this ACL.

Click **Apply** to check the content changed.

## 7.2.1 Standard IP ACL

Click **Add ACL** (the **ACL Access List** window) to display the following window.

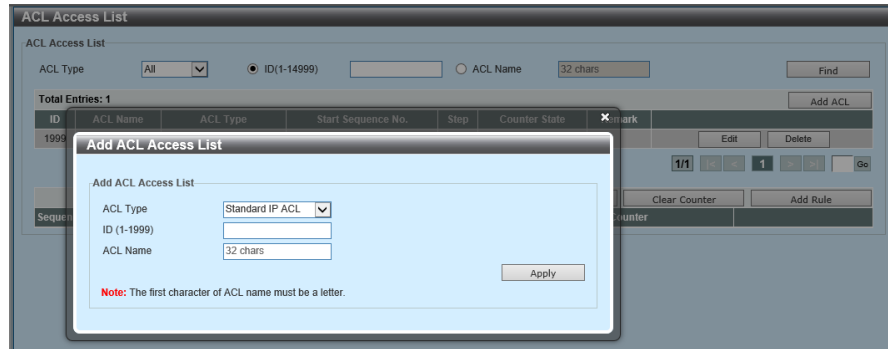


Figure 7-14 ACL Access List (Add ACL, standard IP ACL)

In the section of **Add an ACL Access-list**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose an ACL type to create. The options available are <b>Standard IP ACL</b> , <b>Extended IP ACL</b> , <b>Standard IPv6 ACL</b> , <b>Extended IPv6 ACL</b> , <b>Extended MAC ACL</b> and <b>Extended Expert ACL</b> . This section describes how to configure the standard IP ACL.
<b>ID</b>	Enter an ID of the standard IP ACL. The range is from 1 to 1,999.
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL profile.

Choose the **Standard IP ACL** profile and then click the **Add Rules (ACL Access-list)** window to display the following window.

The screenshot shows the 'Add ACL Rule' configuration interface. It includes the following fields and options:

- ID:** 1
- ACL Name:** std
- ACL Type:** Standard IP ACL
- Sequence No. (1-65535):** (If it isn't specified, the system automatically assigns.)
- Action:**  Permit  Deny
- Match IP Address:**
  - Source:**  Any,  Host,  IP,  Wildcard
  - Destination:**  Any,  Host,  IP,  Wildcard
- Time Range:** 32 chars
- Buttons:** Back, Apply

Figure 7-15 ACL Access List (Add Rules, a standard IP ACL)

In the section of **Adding ACL Rules**, you can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. If you do not specify the number, it is automatically generated.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> and <b>Deny</b> .
<b>Source</b>	Choose and enter the source information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters a source host IP address.</li> <li>• <b>IP</b> - Uses and enters a group of source IP addresses by using a <b>Wildcard</b> bitmap. The bit corresponding to the bit value of 1 is ignored, but the bit corresponding to the bit value of 0 is checked.</li> </ul>
<b>Destination</b>	Choose and enter the destination information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters an IP address of the destination host.</li> <li>• <b>IP</b> - Uses and enters a group of a destination IP addresses by using a <b>Wildcard</b> bitmap. The bit corresponding to the bit value of 1 is ignored. The bit corresponding to the bit value of 0 is checked.</li> </ul>
<b>Time Range</b>	Enter the name of the time-range profile to be used in this ACL rule. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL rule.

Click **Back** to return to the ACL access list window.

## 7.2.2 Extended IP ACL

Click **Add ACL** (in the **ACL Access List** window) to to display the following window.

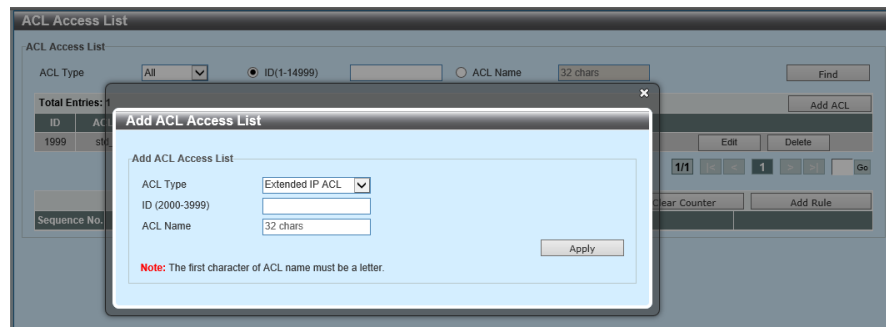


Figure 7-16 ACL Access List (Add ACL, Extended IP ACL)

In the section of **Add ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose the ACL type to create. The options available are <b>Standard IP ACL</b> , <b>Extended IP ACL</b> , <b>Standard IPv6 ACL</b> , <b>Extended IPv6 ACL</b> , <b>Extended MAC ACL</b> and <b>Extended Expert ACL</b> . This section describes how to configure <b>Extended IP ACL</b> .
<b>ID</b>	Enter an ID of the extended IP ACL. The range is from 2,000 to 3,999.
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL profile.

Choose the **Extended IP ACL** profile, and then click **Add Rules (ACL Access List window)** to display the following window.

Figure 7-17 ACL Access List (Add Rules, Extended IP ACL)

In the section of **Adding ACL Rules**, you can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. The number is automatically generated if you do not specify it.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> and <b>Reject</b> .
<b>Protocol Type</b>	Choose a protocol type option. The options available are <b>TCP</b> , <b>UDP</b> , <b>ICMP</b> , <b>EIGRP (88)</b> , <b>ESP (50)</b> , <b>GRE (47)</b> , <b>IGMP (2)</b> , <b>OSPF (89)</b> , <b>PIM (103)</b> , <b>VRRP (112)</b> , <b>IP-in-IP (94)</b> , <b>PCP (108)</b> , <b>Protocol ID</b> and <b>None</b> . <ul style="list-style-type: none"> <li>• <b>Value</b> - Enter the protocol ID, manually. The range is from 0 to 255.</li> <li>• <b>Mask</b> - If you choose the <b>Protocol IDs</b> option, enter the protocol-mask value, manually. The range is from 0x0 to 0xFF.</li> <li>• <b>Fragment</b> - If you choose this option, the packet fragment filtering is included.</li> </ul>

Parameter	Overview
<b>Source</b>	<p>Choose and enter the source information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters a source host IP address.</li> <li>• <b>IP</b> - Uses and enters a group of source IP addresses using the <b>Wildcard</b> bitmap. The bit corresponding to the bit value 1 is ignored, but the bit corresponding to 0 as the bit value is checked.</li> </ul>
<b>Destination</b>	<p>Choose and enter the destination information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters a destination host IP address.</li> <li>• <b>IP</b> - Uses and enters a group of destination IP addresses using the <b>Wildcard</b> bitmap.</li> <li>• The bit corresponding to 1 as the bit value is ignored,</li> <li>• but the bit corresponding to 0 as the bit value is checked.</li> </ul>
<b>Source Port</b>	<p>Choose and enter the value of source port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>=</b> - ACL uses the port-number specified, only.</li> <li>• <b>&gt;</b> - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• <b>&lt;</b> - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• <b>≠</b> - ACL uses all the ports except the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF.</li> </ul> <p>This parameter is available when you select <b>TCP</b> or <b>UDP</b> from the <b>Protocol Type</b>.</p>

Parameter	Overview
<b>Destination Ports</b>	<p>Choose and enter the value of a destination port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - ACL uses the port-number specified, only.</li> <li>• &gt; - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• &lt; - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• ≠ - ACL uses all the ports except for the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF</li> <li>• This parameter is available when you select <b>TCP or UDP</b> from the <b>Protocol Type</b>.</li> </ul>
<b>TCP Flag</b>	<p>Choose a TCP flag, which is evaluated in this ACL. The options available are <b>ack, fin, psh, rst, syn</b> and <b>urg</b>. This parameter is available when you select <b>TCP</b> from the <b>Protocol Type</b>.</p>
<b>Specify ICMP Message Type</b>	<p>Choose an <b>ICMP Message Type</b> to use. This parameter is available when you select <b>ICMP</b> from the <b>Protocol Type</b>.</p>
<b>ICMP Message Type</b>	<p>If you do not choose <b>Specify ICMP Message Type</b>, enter the numerical value of an <b>ICMP Message Type</b> to use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b>, the numerical value of the message type is automatically entered. This parameter is available when you select <b>ICMP</b> from the <b>Protocol Type</b>.</p>
<b>Message Code</b>	<p>If you do not choose <b>Specify ICMP Message Type</b>, enter the numerical value of a message code to use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b>, the numerical value of the message type is automatically entered. This parameter is available when you select <b>ICMP</b> from the <b>Protocol Type</b>.</p>
<b>IP Precedence</b>	<p>Choose the value of IP precedence to use. The options available are <b>routine</b> (0), <b>priority</b> (1), <b>immediate</b> (2), <b>flash</b> (3), <b>flash-override</b> (4), <b>critical</b> (5), <b>internet</b> (6) and <b>network</b> (7).</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the value of IP precedence, manually. The range is from 0 to 7.</li> <li>• <b>Mask</b> - Enter the value of IP precedence mask. The range is from 0x0 to 0x7.</li> </ul>

Parameter	Overview
<b>ToS</b>	<p>Choose the value of Type-of-Service (ToS) to use. The options available are <b>normal</b> (0), <b>min-monetary-cost</b> (1), <b>max-reliability</b> (2), <b>max-throughput</b> (4) and <b>min-delay</b> (8).</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the ToS value, manually. The range is from 0 to 15.</li> <li>• <b>Mask</b> - Enter the value of ToS mask. The range is from 0x0 to 0xF.</li> </ul>
<b>DSCP</b>	<p>Choose the DSCP value to use. The options available are <b>default</b> (0), <b>af11</b> (10), <b>af12</b> (12), <b>af13</b> (14), <b>af21</b> (18), <b>af22</b> (20), <b>af23</b> (22), <b>af31</b> (26), <b>af32</b> (28), <b>af33</b> (30), <b>af41</b> (34), <b>af42</b> (36), <b>af43</b> (38), <b>cs1</b> (8), <b>cs2</b> (16), <b>cs3</b> (24), <b>cs4</b> (32), <b>cs5</b> (40), <b>cs6</b> (48), <b>cs7</b> (56) and <b>ef</b> (46).</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the DSCP value, manually. The range is from 0 to 63.</li> <li>• <b>Mask</b> - Enter the value of DSCP mask. The range is from 0x0 to 0x3F.</li> </ul>
<b>Time Range</b>	<p>Enter the name of the time-range profile to use in this ACL rule. The number of characters for the name can be up to 32.</p>

Click **Apply** to add a new ACL rule.

Click **Back** to return to the ACL access list window.

## 7.2.3 Standard IPv6 ACL

Click **Add ACL** (ACL Access window) to display the following window.

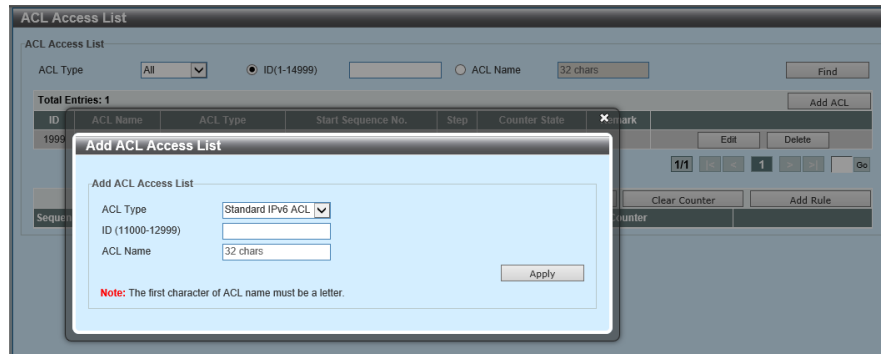


Figure 7-18 ACL Access List (Adding ACL/Standard IPv6 ACL)

In the section of **Add ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose the ACL type to create. The options available are <b>Standard IP ACL</b> , <b>Extended IP ACL</b> , <b>Standard IPv6 ACL</b> , <b>Extended IPv6 ACL</b> , <b>Extended MAC ACL</b> and <b>Extended Expert ACL</b> . This section describes how to implement the settings on the standard IPv6 ACL
<b>ID</b>	Enter one ID of the standard IPv6 ACL. The range is from 11,000 to 12,999.
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL profile.

Choose the **standard IPv6 ACL** profile, and then click **Add Rules (ACL Access List Window)** to display the following window.

The screenshot shows a configuration window titled "Add ACL Rule". The fields are as follows:

- ID: 11000
- ACL Name: stdv6
- ACL Type: Standard IPv6 ACL
- Sequence No. (1-65535): [Empty field] (If it isn't specified, the system automatically assigns.)
- Action:  Permit  Deny
- Match IPv6 Address section:
  - Source:  Any,  Host,  IPv6. Host and IPv6 options have input fields containing "2012:1".
  - Destination:  Any,  Host,  IPv6. Host and IPv6 options have input fields containing "2012:1".
  - Prefix Length: [Empty field] for both Source and Destination.
- Time Range: 32 chars

Buttons: Back, Apply

Figure 7-19 ACL Access List (Adding Rules, Standard IPv6 ACL)v

In the section of **Add ACL Rule**, you can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter an ACL rule-number. The range is from 1 to 65,535. If you do not specify the number, it is automatically generated.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> and <b>Reject</b> .
<b>Source</b>	Choose and enter the source information. The options available are as follows. <ul style="list-style-type: none"><li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li><li>• <b>Host</b> - Uses and enters a source host IPv6 address.</li><li>• <b>IPv6</b> - Enter the value of a source IPv6 address and prefix-length in the entry field displayed.</li></ul>
<b>Destination</b>	Choose and enter the destination information. The options available are as follows. <ul style="list-style-type: none"><li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li><li>• <b>Host</b> - Uses and enters an IPv6 address of the destination host.</li><li>• <b>IPv6</b> - Enter the value of a destination IPv6 address and prefix-length in the entry field displayed.</li></ul>
<b>Time Range</b>	Enter the name of the time-range profile to use in this ACL rule. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL rule.

Click **Back** to return to the **ACL Access List** window.

## 7.2.4 Extended IPv6 ACL

Click **Add ACL** (ACL Access List window) to display the following window.

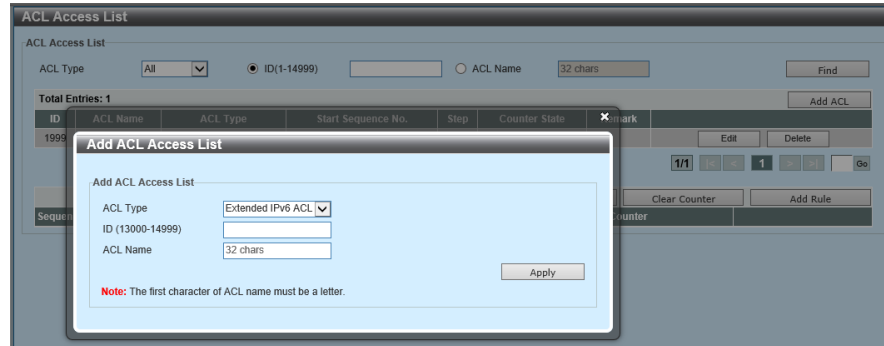


Figure 7-20 ACL Access List (Add ACL, Extended IPv6 ACL)

In the section of **Add an ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose the ACL type to create. The options available are <b>Standard IP ACL</b> , <b>Extended IP ACL</b> , <b>Standard IPv6 ACL</b> , <b>Extended IPv6 ACL</b> , <b>Extended MAC ACL</b> and <b>extended Expert ACL</b> . This section describes how to configure <b>Extended IPv6 ACL</b> .
<b>ID</b>	Enter the ID of the extended IPv6 ACL. The range is from 13,000 to 14,999.
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL profile.

Choose the **Extended IPv6 ACL** profile and then click **Add Rule** (in the **ACL Access List** window) to display the following window.

Figure 7-21 ACL Access List (Add Rule, Extended IPv6 ACL)

In the section of **Add ACL Rule**, you can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. This number is automatically generated if not specified.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit and Reject</b> .
<b>Protocol Type</b>	Choose the protocol type option. The options available are <b>TCP, UDP, ICMP, Protocol ID, ESP (50), PCP (108), SCTP (132)</b> and <b>None</b> . <ul style="list-style-type: none"> <li><b>Value</b> - The protocol ID can also manually be entered. The range is from 0 to 255.</li> <li><b>Mask</b> - After selecting the <b>Protocol ID</b> option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF.</li> <li><b>Fragments</b> - Select this option and then the packet fragment filtering is included.</li> </ul>

Parameter	Overview
<b>Source</b>	<p>Choose and enter the source information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates an optional source traffics based on this rule condition.</li> <li>• <b>Host</b> - Use and enter an IPv6 address of the source host.</li> <li>• <b>IPv6</b> - Specifies and enter the source IPv6 address and <b>Prefix Length</b> value in the spaces provided.</li> </ul>
<b>Destination</b>	<p>Choose and enter the destination information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Specifies that any destination traffic is evaluated according to the conditions of this rule.</li> <li>• <b>Host</b> - Specifies and enters the destination host IPv6 address.</li> <li>• <b>IPv6</b> - Specifies and enter the destination IPv6 address and prefix-length value in the spaces provided.</li> </ul>
<b>Source Port</b>	<p>Choose and enter the source-port value. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>=</b> - The ACL uses the port-number specified.</li> <li>• <b>&gt;</b> - The ACL uses all the ports, which are greater than the port number specified.</li> <li>• <b>&lt;</b> - The ACL uses all the ports, which are smaller than the port number specified.</li> <li>• <b>≠</b> - The ACL uses all the ports except for the port-number.</li> <li>• <b>Range</b> - The ACL uses the ports specified, within the range.</li> <li>• <b>Mask</b> - The ACL uses the ports, within the range of the mask specified. Enter the port mask value in the space provided. The range is from 0x0 to 0xFFFF.</li> <li>• This parameter is available when you select <b>TCP</b> or <b>UDP</b> as the protocol type.</li> </ul>

Parameter	Overview
<b>Destination Port</b>	<p>Choose and enter the destination-port value. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - The ACL uses the port-number specified.</li> <li>• &gt; - The ACL uses all the ports, which are greater than the port number specified.</li> <li>• &lt; - The ACL uses all the ports, which are smaller than the port number specified.</li> <li>• ≠ - The ACL uses all the ports except for the port-number.</li> <li>• <b>Range</b> - The ACL uses the ports specified, within the range.</li> <li>• <b>Mask</b> - The ACL uses the ports, within the range of the mask specified. Enter the port mask value in the space provided. The range is from 0x0 to 0xFFFF.</li> <li>• This parameter is available when you select <b>TCP</b> or <b>UDP</b> as the protocol type.</li> </ul>
<b>TCP Flag</b>	<p>Select the TCP flag, which is evaluated in this ACL. The options available are <b>ack, fin, psh, rst, syn</b> and <b>urg</b>. This parameter is available when you select <b>TCP</b> as the protocol type.</p>
<b>Specify ICMP Message Type</b>	<p>Choose the <b>ICMP Message Type</b> to use. This parameter is available when you select <b>ICMP</b> as the protocol type.</p>
<b>ICMP Message Type</b>	<p>When the <b>ICMP Message Type</b> is not specified, enter the ICMP message type numerical-value used here. The range is from 0 to 255. When you select the <b>ICMP Message Type</b>, this numerical value is automatically entered. This parameter is available when you select <b>ICMP</b> as the protocol type.</p>
<b>Message Code</b>	<p>When the <b>ICMP Message Type</b> is not selected, enter the message code numerical-value (to use). The range is from 0 to 255. When you select the <b>ICMP Message Type</b>, the value is automatically entered. This parameter is available when you select <b>ICMP</b> as the protocol type.</p>

Parameter	Overview
<b>DSCP</b>	<p>Choose the DSCP value. The options available are: <b>default</b> (0), <b>af11</b> (10), <b>af12</b> (12), <b>af13</b> (14), <b>af21</b> (18), <b>af22</b> (20), <b>af23</b> (22), <b>af31</b> (26), <b>af32</b> (28), <b>af33</b> (30), <b>af41</b> (34), <b>af42</b> (36), <b>af43</b> (38), <b>cs1</b> (8), <b>cs2</b> (16), <b>cs3</b> (24), <b>cs4</b> (32), <b>cs5</b> (40), <b>cs6</b> (48), <b>cs7</b> (56) and <b>ef</b> (46).</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - The DSCP value can be manually entered. The range is from 0 to 63.</li> <li>• <b>Mask</b> - Enter the DSCP mask value. The range is from 0x0 to 0x3F.</li> </ul>
<b>Traffic Class</b>	<p>Choose and enter the traffic class value. The range is from 0 to 255.</p> <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enter the value of traffic class mask. The range is from 0x0 to 0xFF.</li> </ul>
<b>Flow Label</b>	<p>Enter the flow label value. The range is from 0 to 1,048,575.</p> <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enter the flow label mask. The range is from 0x0 to 0xFFFFF.</li> </ul>
<b>Time Range</b>	<p>Enter the name of the time range profile to use in this ACL rule. The number of characters for the name can be up to 32.</p>

Click **Apply** to add a new ACL rule.

Click **Back** to return to the **ACL Access List** window.

## 7.2.5 Extended Expert ACL

Click **Add ACL** (in the **ACL Access List** window) to display the following window.

The screenshot shows the 'Add ACL Rule' configuration window. The ID is set to 6000 and the ACL Name is 'exmac'. The ACL Type is 'Extended MAC ACL'. The Action is set to 'Permit'. The Match MAC Address section has 'Any' selected for both Source and Destination. The Match Ethernet Type section has 'Please Select' in the dropdown. There are also input fields for VID, CoS, and Time Range.

Figure 7-22 ACL Access List (Add ACL, Extended Expert ACL)

In the section of **Add ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose the ACL type to create. The options available are <b>Standard IP ACL</b> , <b>Extended IP ACL</b> , <b>Standard IPv6 ACL</b> , <b>Extended IPv6 ACL</b> , <b>Extended MAC ACL</b> and <b>Extended Expert ACL</b> . This section describes how to configure <b>Extended Expert ACL</b> .
<b>ID</b>	Enter an ID of the Extended Expert ACL. The range is from 8,000 to 9,999.
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL profile.

Choose the **Extended Expert ACL** profile and click **Add Rules (ACL Access List window)** to display the following window.

Figure 7-23 ACL Access List (Add Rules, Extended Expert ACL)

In the section of **Add ACL Rules**, you can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. If not specified, the number is automatically generated.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> and <b>Reject</b> .

Parameter	Overview
<b>Protocol Type</b>	<p>Choose the protocol type option. The options available are <b>TCP</b>, <b>UDP</b>, <b>ICMP</b>, <b>EIGRP</b> (88), <b>ESP</b> (50), <b>GRE</b> (47), <b>IGMP</b> (2), <b>OSPF</b> (89), <b>PIM</b> (103), <b>VRRP</b> (112), <b>IP-in-IP</b> (94), <b>PCP</b> (108), <b>Protocol ID</b> and <b>None</b>.</p> <ul style="list-style-type: none"> <li>• <b>Value</b> - You can manually enter the protocol ID whose range is from 0 to 255.</li> <li>• <b>Mask</b> - After you choose the protocol ID option, enter the value of protocol mask, manually.</li> <li>• The range is from 0x0 to 0xFF.</li> <li>• <b>Fragment</b> - If you choose this, a packet fragment filtering is included.</li> </ul>
<b>Source (IP Address)</b>	<p>Choose and enter the source information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters a source host IP Address.</li> <li>• <b>IP</b> - Use the bit map of <b>Wildcard</b> and enter a group of the source IP address. The bit corresponding with 1 of the bit value is ignored, but the bit corresponding to 0 as the bit value is checked.</li> </ul>
<b>Destination (IP Address)</b>	<p>Choose and enter the destination information. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Uses and enters a destination host IP Address</li> <li>• <b>IP</b> - Use the bit map of <b>Wildcard</b> and enter the group of the destination IP address. The bit corresponding with 1 of the bit value is ignored, but the bit corresponding to 0 as the bit value is checked.</li> </ul>
<b>Source (MAC Address)</b>	<p>Choose and enter the information on a source MAC address. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Enter a source-host MAC address.</li> <li>• <b>MAC</b> - Enter a source MAC address and the <b>Wildcard value</b> in the entry field displayed.</li> </ul>
<b>Destination (MAC Address)</b>	<p>Choose and enter the information on a destination MAC address. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Enter a destination-host MAC address.</li> <li>• <b>MAC</b> - Enter a destination MAC address and the <b>Wildcard value</b> in the entry field displayed</li> </ul>

Parameter	Overview
<b>Source Port</b>	<p>Choose and enter the source-port value. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - ACL uses the port-number specified, only.</li> <li>• &gt; - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• &lt; - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• ≠ - ACL uses all the ports except for the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF.</li> </ul> <p>This parameter is available when you select <b>TCP</b> or <b>UDP</b> from the <b>Protocol Type</b>.</p>
<b>Destination Port</b>	<p>Choose and enter the value of a destination port. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• = - ACL uses the port number specified, only.</li> <li>• &gt; - ACL uses all the ports, which are greater than the port-number specified.</li> <li>• &lt; - ACL uses all the ports, which are smaller than the port-number specified.</li> <li>• ≠ - ACL uses all the ports except for the port-number specified.</li> <li>• <b>Range</b> - ACL uses the port, which is specified within the range.</li> <li>• <b>Mask</b> - ACL uses the port within the range of the mask specified. Enter the value of a port-mask in the entry field displayed. The range is from 0x0 to 0xFFFF.</li> </ul> <p>This parameter is available when you select <b>TCP</b> or <b>UDP</b> from the <b>Protocol Type</b>.</p>
<b>Specify ICMP Message Type</b>	<p>Choose the <b>ICMP Message Type</b> to use. This parameter is available when you select <b>ICMP</b> from the <b>Protocol Type</b>.</p>
<b>ICMP Message Type</b>	<p>If you do not choose the <b>Specify ICMP Message Type</b>, enter the numerical value of the ICMP message type to use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b>, the numerical value of message type is automatically entered. This parameter is available when you select <b>ICMP</b> from the <b>Protocol Type</b>.</p>

Parameter	Overview
<b>Message Code</b>	If you do not choose the <b>Specify ICMP Message Type</b> , enter the numerical value of message code to use. The range is from 0 to 255. If you choose the <b>ICMP Message Type</b> , the numerical value of a message type is automatically entered. This parameter is available when you select <b>ICMP</b> from the <b>Protocol Type</b> .
<b>IP Precedence</b>	Choose the value of IP Precedence to use. The options available are <b>routine</b> (0), <b>priority</b> (1), <b>immediate</b> (2), <b>flash</b> (3), <b>flash-override</b> (4), <b>critical</b> (5), <b>internet</b> (6) and <b>network</b> (7). <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the value of IP Precedence, manually. The range is from 0 to 7.</li> <li>• <b>Mask</b> - Enter the value of IP Precedence mask. The range is from 0x0 to 0x7.</li> </ul>
<b>ToS</b>	Choose the value of Type-of-Service (ToS) to use. The options available are <b>normal</b> (0), <b>min-monetary-cost</b> (1), <b>max-reliability</b> (2), <b>max-throughput</b> (4) and <b>min-delay</b> (8). <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the ToS value, manually. The range is from 0 to 15.</li> <li>• <b>Mask</b> - Enter the ToS mask value. The range is from 0x0 to 0xF.</li> </ul>
<b>DSCP</b>	Choose the DSCP value to use. The options available are: <b>default</b> (0) <b>af11</b> (10), <b>af12</b> (12), <b>af13</b> (14), <b>af21</b> (18), <b>af22</b> (20), <b>af23</b> (22), <b>af31</b> (26), <b>af32</b> (28), <b>af33</b> (30), <b>af41</b> (34), <b>af42</b> (36), <b>af43</b> (38), <b>cs1</b> (8), <b>cs2</b> (16), <b>cs3</b> (24), <b>cs4</b> (32), <b>cs5</b> (40), <b>cs6</b> (48), <b>cs7</b> (56) and <b>ef</b> (46). <ul style="list-style-type: none"> <li>• <b>Value</b> - You can enter the DSCP value, manually. The range is from 0 to 63.</li> <li>• <b>Mask</b> - Enter the DSCP mask value. The range is from 0x0 to 0x3F.</li> </ul>
<b>TCP Flag</b>	Choose the TCP flag to evaluate for this ACL. The options available are <b>ack</b> , <b>fin</b> , <b>psh</b> , <b>rst</b> , <b>syn</b> , and <b>urg</b> . This parameter is available when you select <b>TCP</b> from the <b>Protocol Type</b> .
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094. <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enter the value of VLAN ID mask. The range is from 0x0 to 0xFFFF.</li> </ul>
<b>CoS Apply</b>	Choose the CoS-value to use. The range is from 0 to 7. <ul style="list-style-type: none"> <li>• <b>Mask</b> - Enter the CoS-mask value. The range is from 0x0 to 0x7.</li> </ul>

Parameter	Overview
<b>Time Range</b>	Enter the name of the time range profile to use in this ACL rule. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL rule.

Click **Back** to return to the ACL access list window.

## 7.2.6 Extended MAC ACL

Click **Add ACL** (the **ACL Access List** window) to display the following window.

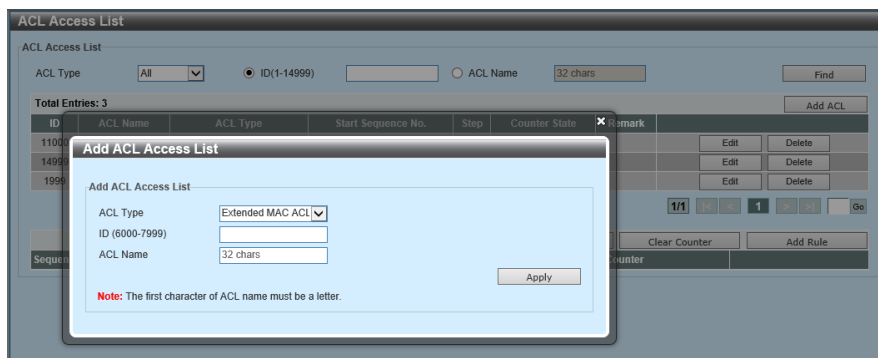


Figure 7-24 ACL Access List (Adding ACL, Extended MAC ACL)

In the section of **Add ACL Access List**, you can configure the following parameters.

Parameter	Overview
<b>ACL Type</b>	Choose the ACL type to create. The options available are <b>Standard IP ACL</b> , <b>Extended IP ACL</b> , <b>Standard IPv6 ACL</b> , <b>Extended IPv6 ACL</b> , <b>Extended MAC ACL</b> and <b>Extended Expert ACL</b> . This section describes how to configure <b>Extended MAC ACL</b> .
<b>ID</b>	Enter an ID of extended MAC ACL. The range is from 6 to 7,999.
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL profile.

Click **Extended MAC ACL** profile and **Add Rules** (in the **ACL Access List** window) to display the following window.

Figure 7-25 ACL Access List (Adding Rules, Extended MAC ACL)

In the section of **Add ACL Rules**, you can configure the following parameters.

Parameter	Overview
<b>Sequence Number</b>	Enter the ACL rule number. The range is from 1 to 65,535. If not specified, this number is automatically generated.
<b>Action</b>	Choose an action to execute with this rule. The options available are <b>Permit</b> and <b>Reject</b> .
<b>Source</b>	Choose and enter the information on a source MAC address. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional source traffic according to this rule condition.</li> <li>• <b>Host</b> - Enter a source-host MAC address.</li> <li>• <b>MAC</b> - Enter the source MAC address and the <b>Wildcard</b> value in the entry fields provided</li> </ul>
<b>Destination</b>	Choose and enter the destination MAC address information. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Optional</b> - Evaluates the optional destination traffic according to this rule condition.</li> <li>• <b>Host</b> - Enter a destination host MAC address.</li> <li>• <b>MAC</b> - Enter a destination MAC address and the <b>Wildcard</b> value in the entry field displayed.</li> </ul>
<b>Specify Ethernet Type</b>	Choose the Ethernet type option. The options available are <b>aarp</b> , <b>appletalk</b> , <b>decent-iv</b> , <b>etype-6000</b> , <b>etype-8042</b> , <b>lat</b> , <b>lavc-sca</b> , <b>mop-console</b> , <b>mop-dump</b> , <b>vines-echo</b> , <b>vines-ip</b> , <b>xns-idp</b> and <b>arp</b> .

Parameter	Overview
<b>Ethernet Type</b>	Enter the Ethernet type as the hexadecimal value. The range is from 0x600 to 0xFFFF. If you choose the optional Ethernet type profile from the drop-down list of <b>Specify Ethernet Type</b> , the appropriate hexadecimal-value is automatically displayed.
<b>Ethernet Type Mask</b>	Enter the Ethernet type mask as the hexadecimal value. The range is from 0x0 to 0xFFFF. If you choose an optional Ethernet type profile from the drop-down list of <b>Specify Ethernet Type</b> , the appropriate hexadecimal-value is automatically displayed.
<b>CoS</b>	Choose the CoS-value; the range is from 0 to 7. <ul style="list-style-type: none"><li>• <b>Mask</b> - Enter the value of CoS mask. The range is from 0x0 to 0x7.</li></ul>
<b>VID</b>	Enter one VLAN ID to use. The range is from 1 to 4,094. <ul style="list-style-type: none"><li>• <b>Mask</b> - Enter the value of VLAN ID mask. The range is from 0x0 to 0xFFF.</li></ul>
<b>Time Range</b>	Enter the name of the time range profile to use in this ACL rule. The number of characters for the name can be up to 32.

Click **Apply** to add a new ACL rule.

Click **Back** to return to the ACL access list window.

## 7.3 ACL Interface Access Group

Use the following window to implement the settings on an ACL access group of the port specified and display its settings.

Choose **ACL > ACL Interface Access Group** to display the following window.

Figure 7-26 ACL Interface Access Group

In the section of **ACL Interface Access Group**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Direction</b>	Choose a direction. The options available are <b>In</b> and <b>Out</b> .
<b>Action</b>	Choose the action you perform. The options available are <b>Add</b> and <b>Delete</b> .
<b>Type</b>	Choose an ACL type. The options available are <b>IP ACL</b> , <b>IPv6 ACL</b> , <b>MAC ACL</b> and <b>Expert ACL</b> .
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32. Then click <b>ACL Name</b> to choose an existing ACL from a list.

Click **Apply** to check the content changed.

Click **Please Select** to display the access control list configured already and use it in this window.

Click **Please Select** to display the following window.

ACL Interface Access Group

ACL Interface Access Group

From Port: Gi1/0/1 To Port: Gi1/0/1 Direction: In Action: Add Type: IP ACL ACL Name:  Please Select

Port	In				Out			
	IP ACL	IPv6 ACL	MAC ACL	Expert ACL	IP ACL	IPv6 ACL	MAC ACL	Expert ACL
Gi1/0/1			aaa (ID. 7...					
Gi1/0/2								
Gi1/0/3								
Gi1/0/4								
Gi1/0/5								
Gi1/0/6								

Figure 7-27 ACL Interface Access Group (Please select.)

Click **OK** to use the access-control list selected.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 7.4 ACL VLAN Access Map

Use the following window to implement the settings on an ACL VLAN access map and display its settings.

Choose **ACL > ACL VLAN Access Map** to display the following window.

Figure 7-28 ACL VLAN Access Map

In the section of **ACL VLAN Access Map**, you can configure the following parameters.

Parameter	Overview
<b>Access Map Name</b>	Enter the name of an access-map. The number of characters for the name can be up to 32.
<b>Sub Map Number</b>	Enter the sub map number. The range is from 1 to 65,535.
<b>Action</b>	Choose the action you perform. The options available are <b>Forward</b> , <b>Drop</b> and <b>Redirect</b> . If you choose the <b>Redirect</b> option, choose the redirect-destination interface from the drop-down list.
<b>Counter State</b>	This parameter enables or disables the counter state.

Click **Apply** to add a new entry.

Click **Clear All Counters** to clear all the counter information.

Click **Clear Counters** to clear the counter information about the specified access map.

Click **Find** to search and display the entries based on the search condition specified.

Click the **Binding** button to configure the binding for the specified entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

Click the **Binding** button to display the following window.

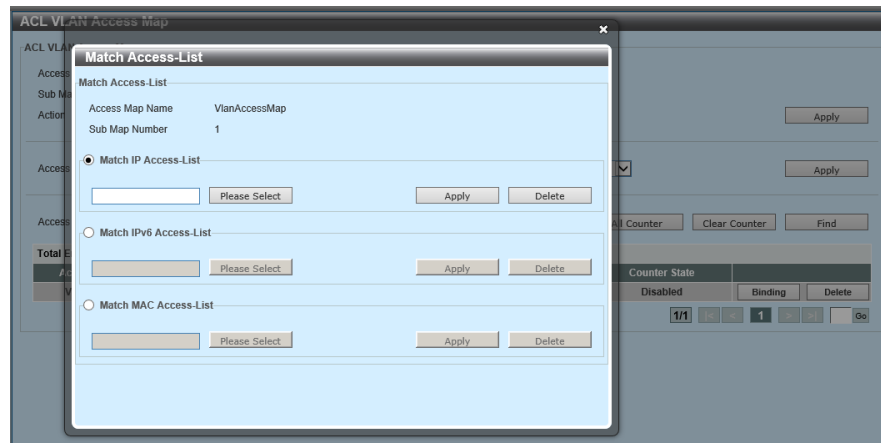


Figure 7-29 ACL VLAN Access Map (Binding)

In the section of **Match Access List**, you can configure the following parameters.

Parameter	Overview
<b>Match IP Access-List</b>	The IP access list (to be matched) is displayed.
<b>Match IPv6 Access-List</b>	The IPv6 access list (to be matched) is displayed.
<b>Match MAC Access-List</b>	The MAC access list (to be matched) is displayed.

Click **Please Select** to display the configured access-control list, which can be used in this window.

Click **Apply** to check the content changed.

Click **Delete** to delete the binding specified.

Click **Please Select** to display the following window.

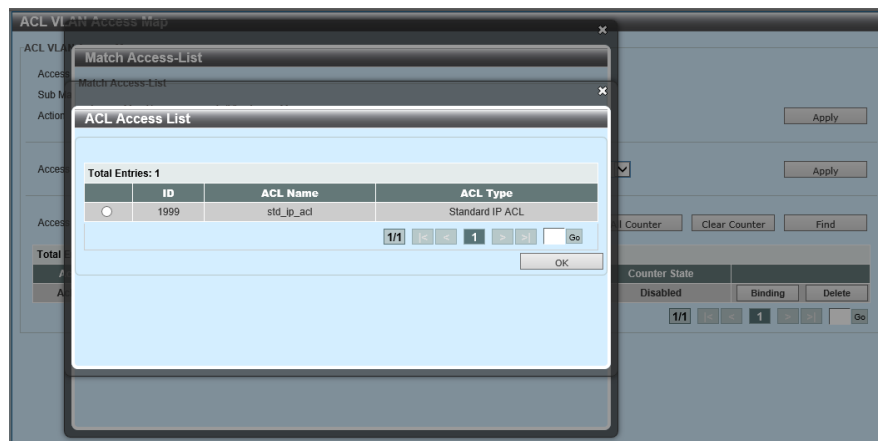


Figure 7-30 ACL VLAN Access Map (Please choose a binding.)

Click **OK** to use the access control list selected.

Click **Go** to move a specific page.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

## 7.5 ACL VLAN Filter

Use the following window to implement the settings on the ACL VLAN filtering and display its settings.

Choose **ACL > ACL VLAN Filter** to display the following window.

parameters.

Parameter	Overview
<b>Access Map Name</b>	Enter an access-map name. The number of characters for the name can be up to 32.
<b>Action</b>	Choose the action you perform. The options available are <b>Add</b> and <b>Delete</b> .
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094. If you choose <b>All VLANs</b> , this configuration is applied to all the VLANs, which are configured on this switch.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page-numbers. Then click **Go** to move to a specific page.

# 8 Security

## 8.1 Port Security

### 8.1.1 Port Security Global Settings

Use the following window to implement the settings on a global port security and display its settings.

Choose **Security > Port Security > Port Security Global Settings** to display the following window.

VID	Max Learning Address	Current No.
1	No Limit	0

Figure 8-1 Port Security Global Settings

In the section of **Port Security System Settings**, you can configure the following parameter.

Parameter	Overview
<b>Maximum Address of a System</b>	Enter the maximum number of secure MAC addresses to be allowed (or permitted). If not specified, the default value is No Restriction. The valid range is from 1 to 3,328. If you choose <b>No Restriction</b> , the maximum number of secure MAC addresses is permitted.

Click **Apply** to check the content changed.

In the section of **Port Security VLAN Settings**, you can configure the following parameters.

Parameter	Overview
<b>VID list</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>VLAN Maximum Learning Address</b>	Enter the maximum number of MAC addresses to be allowed (or permitted), which can be learned with the VLAN specified. The range is from 1 to 3,328. If you choose <b>No Restriction</b> , the maximum number of secure MAC addresses is allowed.

Click **Apply** to add new entries based on the information specified.

In the section of **Searching VLAN**, you can configure the following parameter.

Parameter	Overview
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Find** to search and display entries based on the search condition specified.

## 8.1.2 Port Security Port Settings

Use the following window to implement the port-security settings on the port specified and display its settings.

Choose **Security > Port Security > Port Security Port Settings** to display the following window.

Port	Maximum	Current No.	Violation Action	Violation Count	Security Mode	Admin State	Current State	Aging Time	Aging Type
Gi1/0/1	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/2	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/3	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/4	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/5	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/6	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/7	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute
Gi1/0/8	32	0	Protect	-	Delete-on-Timeout	Disabled	-	0	Absolute

Figure 8-2 Port Security Port Settings

In the section of **Port Security Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables a port-security function on the port specified.
<b>Maximum</b>	Enter the maximum number of secure MAC addresses to permit on the port (s) specified. The range is from 0 to 3,328. By default, the value is set to 32.
<b>Violation Action</b>	Choose the violation action to conduct. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Protect</b> - Although all the packets are deleted from the host, which is insecure as the port security process level, the security-violation count is not increased.</li> <li>• <b>Restrict</b> - All the packets coming from the host, which is insecure as the port-security-process level, are deleted. The security-violation count is increased to be recorded on the system log.</li> <li>• <b>Shutdown</b> - If a security-violation occurs, the port becomes shut down to be recorded on the system-log.</li> </ul>

Parameter	Overview
<b>Security Mode</b>	Choose the security mode option. The options available are as follows. <ul style="list-style-type: none"><li>• <b>Permanent</b> - All the MAC addresses learned are not cleared except for the cases which users manually deleted entries.</li><li>• <b>Delete-On-Timeout</b> - All the learned MAC addresses become cleared if an entry ages out, or if the users manually delete these entries.</li></ul>
<b>Aging Time</b>	Enter the aging-time value to use it for the secure dynamic address, which automatically learned on the port specified. The range is from 0 to 1,440 (minutes).
<b>Aging Type</b>	Choose the aging type. The options available are as follows. <ul style="list-style-type: none"><li>• <b>Absolute</b> - All the secure addresses on this port become age-out immediately if the specified time passes, and they are deleted from a list of the addresses. This is the default type.</li><li>• <b>Inactivity</b> - The secure address on this port becomes age-out only if there are no data-traffics coming from the secure-source address, during the period specified.</li></ul>

Click **Apply** to check the content changed.

### 8.1.3 Port Security Address Entries

Use the following window to implement the settings on the MAC address entry of the port security and display its settings.

Choose **Security > Port Security > Port Security Address Entries** to display the following window.

Figure 8-3 Port Security Address Entries

In the section of **Port Security Address Entries**, the following parameters can be configured.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>MAC Address</b>	Enter a MAC address. If you choose the <b>Permanent</b> option, all the MAC addresses learned are not cleared except for the case that users delete an entry, manually.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.

Click **Add** to add new entries.

Click **Delete** to delete the entry specified.

Click the **Clear by Port** button to delete all the secure MAC addresses for the port specified.

Click the **Clear by Mac** button to delete the address specified among the secure MAC addresses on the optional port.

Click **Clear All** to clear and delete all the secure MAC addresses for a port.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.2 802.1X

### 8.2.1 802.1X Global Settings

Use the following window to implement the settings on the global IEEE 802.1X and display its settings.

Choose **Security > 802.1X > 802.1X Global Settings** to display the following window.

Figure 8-4 802.1X Global Settings

In the section of **802.1X Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>System Authentication Control</b>	This parameter enables or disables the system authentication control. This function controls the network access coming from unauthorized hosts.
<b>NAS ID</b>	Enter an ID regarding Network Access Server (NAS).
<b>EAP Request Interval</b>	Enter the request interval of the Extensible Authentication Protocol (EAP). The range is from 1 to 3,600 (seconds).

Click **Apply** to check the content changed.

In the section of **802.1X Authentication Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>Authentication Port Mode</b>	Choose the authentication mode to use (it) on the port specified. The options available are <b>Port Based</b> and <b>Mac-Based</b> .
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to check the content changed.

## 8.2.2 802.1X Forced Authorized MAC Settings

Use the following window to implement the settings on IEEE 802.1X forced authorized MAC and display its settings.

Choose **Security > 802.1X > 802.1X Forced Authorized MAC Settings** to display the following window.

Figure 8-5 802.1X Forced Authorized MAC Settings

In the section of **Forced Authorized MAC Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>MAC Address</b>	Enter a MAC address of supplicant.
<b>Mask Length</b>	Enter the MAC mask bit-length. The range is from 0 to 48.
<b>Authentication Status</b>	Choose the authentication status. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Authorized</b> - Choose this option to force the authorized status.</li> <li>• <b>Unauthorized</b> - Choose this to force the unauthorized status.</li> </ul>

Click **Apply** to add a new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.2.3 802.1X Unauthorized MAC Settings

Use the following window to implement the settings on IEEE 802.1X unauthorized MAC and display its settings.

Choose **Security > 802.1X > 802.1X Unauthorized MAC Settings** to display the following window.

Figure 8-6 802.1X Unauthorized MAC Settings

In the section of **Unauthorized MAC Address Settings**, you can configure the following parameters.

Parameter	Overview
<b>Age-Out Time</b>	Enter the value of age-out time. The time is used for aging out a static unauthorized host. The range is from 0 to 65,535 (seconds).
<b>From Port/ To Port</b>	Choose the port you use.
<b>MAC Address</b>	Enter a MAC address of an unauthorized host.
<b>Find By MAC</b>	Choose this option to find the configured dynamic host, which is unauthorized, and display in a sequential order of MAC addresses.
<b>Find By Port</b>	Choose this to find and display the configured dynamic host, which is unauthorized, on the port specified. <ul style="list-style-type: none"> <li>• <b>From Port / To Port</b> - Choose the port you use.</li> </ul>

Click **Apply** to check the content changed.

Click **Find** to search and display the entries based on the search condition specified.

## 8.2.4 802.1X Ports Settings

Use the following window to implement the settings on IEEE 802.1X port-based/MAC based access-control on the port specified and display its settings.

Choose **Security > 802.1X > 802.1X Ports Settings** to display the following window.

The screenshot shows the '802.1X Ports Settings' window with the 'Port-Based Access Control' tab selected. The 'Port-Based Authentication Ports' are set to 'Gi1/0/1-1/0/28'. The configuration is split into two columns for 'From Port' and 'To Port', both set to 'Gi1/0/1'. The 'Port Control' is set to 'Force Authorized'. The 'AdminControlDirection' is set to 'Both'. The 'Quiet Period (1-65535)' is 60 seconds, 'Transmission Period (1-65535)' is 30 seconds, 'Supplicant Timeout (1-65535)' is 30 seconds, 'Server Timeout (1-65535)' is 30 seconds, 'Re-authentication Period (1-65535)' is 3600 seconds, and 'Maximum Request (1-10)' is 2. 'Per-Port Re-authentication' and 'Re-authentication Time Local' are both set to 'Disabled'. There are 'Apply', 'Show', 'Init', and 'Re-authenticate' buttons at the bottom.

Figure 8-7 802.1X Ports Settings (Port-Based Access Control)

In the section of **Port Based Access Control**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Port Control</b>	Choose an authentication state of a port. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Auto</b> - Enables the IEEE 802.1X authentication.</li> <li>• <b>Force Authorized</b> - Sets a port to an authorized state, forcefully.</li> <li>• <b>Force Unauthorized</b> - Sets a port to the unauthorized state, forcefully.</li> </ul>
<b>Admin Control Direction</b>	Choose the control direction of traffics on the port(s). The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Both</b> - Controls traffics in both directions.</li> <li>• <b>In</b> - Controls traffics in an inbound direction, only.</li> </ul>
<b>Quiet Period</b>	Enter the quiet (or silent) period. This is the number of seconds needed, for a switch, to maintain the quiet state after failing an authentication process. The range is from 1 to 65,535 (seconds).
<b>Transmission Period</b>	Enter a transmission period. This is the number of seconds needed, for a switch, to wait for the EAP requests/identity-frames coming from supplicants. When passing the period, a request is retransmitted. The range is from 1 to 65,535 (seconds).

Parameter	Overview
<b>Supplicant Time-out</b>	Enter the value of a supplicant time-out. This is the number of seconds needed to wait for the response coming from the supplicant. If this period passes, the supplicant message becomes time-out. This is not applied to the EAP request ID. The range is from 1 to 65,535 (seconds).
<b>Server Time-out</b>	Enter the value of a server time-out. This is the number of seconds needed to wait for the response coming from an authentication server. When passing this period, the connection becomes time-out. The range is from 1 to 65,535 (seconds).
<b>Re-authentication Period</b>	Enter the re-authentication period. This is the number of seconds needed for an interval of re-authentication trials. The range is from 1 to 65,535 (seconds).
<b>Maximum Request</b>	Enter the maximum number of EAP requests that are allowed from a back-end authentication machine. When exceeding this, an authentication process restarts. The range is from 1 to 10.
<b>Per-Port Re-authentication</b>	This parameter enables or disables the regular re-authentication for the port specified.
<b>Re-authentication Time Local</b>	This parameter enables or disables usage for the local settings on the session re-authentication, which is done by a timer.

Click **Apply** to check the content changed.

Click **Show** to display the settings on the port-based access control, which is associated with the specified port(s).

Click **Init** to initiate the settings on the port-based access control on the specified port(s).

Click **Re-authenticate** to re-authenticate all the connections to the specified port(s).

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click the **MAC-Based Access Control** tab to display the following window.

The screenshot shows the '802.1X Ports Settings' window with the 'MAC-Based Access Control' tab selected. The configuration is as follows:

Parameter	Value	Unit
From Port	Gi1/0/1	
To Port	Gi1/0/1	
Number of Supplicant (1-512)	512	
AdminControlDirection	Both	
Quiet Period (1-65535)	60	sec
Transmission Period (1-65535)	30	sec
Supplicant Timeout (1-65535)	30	sec
Server Timeout (1-65535)	30	sec
Re-authentication Period (1-65535)	3600	sec
Maximum Request (1-10)	2	
Re-authentication Time Local	Disabled	
Per-Port Re-authentication	Disabled	
Force Authentication Timeout (0-65535)	3600	sec

At the bottom, there is a 'Port' dropdown set to 'Gi1/0/1' and three buttons: 'Show', 'Init', and 'Re-authenticate'. An 'Apply' button is also present in the top right corner.

Figure 8-8 802.1X Ports Settings (MAC-Based Access Control)

In the section of **MAC-Based Access Control**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Number of Supplicants</b>	Enter the maximum number of authenticated users who are allowed on the port(s). The range is from 1 to 512.
<b>Admin Control Direction</b>	Choose the control direction of traffics on the port(s). The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Both</b> - controls traffics in both directions</li> <li>• <b>In</b> - controls traffics in Inbound direction, only.</li> </ul>
<b>Quiet Period</b>	Enter the quiet period. This is the number of seconds, for a switch, to maintain the quiet state after failing an authentication process. The range is from 1 to 65,535 (seconds).
<b>Transmission Period</b>	Enter the transmission period. This is the number of seconds needed, for a switch, to wait for the EAP requests/identity-frames, which come from supplicants. When passing the period, requests are re-transmitted. The range is from 1 to 65,535 (seconds).
<b>Supplicant Timeout</b>	Enter the value of the supplicant timeout. This is the number of seconds needed to wait for the response coming from the supplicant. If this period passes, the supplicant message becomes time-out. This is not applied to EAP request ID. The range is from 1 to 65,535 (seconds).

Parameter	Overview
<b>Server Time-out</b>	Enter the value of the server time-out. This is the number of seconds needed to wait for the response coming from an authentication server. If this period passes, the connection becomes time-out. The range is from 1 to 65,535 (seconds).
<b>Re-authentication Period</b>	Enter the re-authentication period. This is the number of seconds for the interval of re-authentication attempts. The range is from 1 to 65,535 (seconds).
<b>Maximum Request</b>	Enter the maximum number of EAP requests, which are allowed from a back-end authentication machine. When exceeding this, an authentication process restarts. The range is from 1 to 10.
<b>Re-authentication Time Local</b>	This parameter enables or disables the use of the local settings for the session re-authentication done by a timer.
<b>Per-Port Re-authentication</b>	This parameter enables or disables the regular re-authentication on the port(s) specified.
<b>Forced Authentication Timeout</b>	Enter the value of the forced authentication timeout. This is the number of seconds for a switch to wait for the migration to forced authentication/un-authorization. If this period passes, the migration becomes time-out. The range is from 0 to 65,535 (seconds). To avoid that the migration becomes time-out, enter 0 for it.

Click **Apply** to check the content changed.

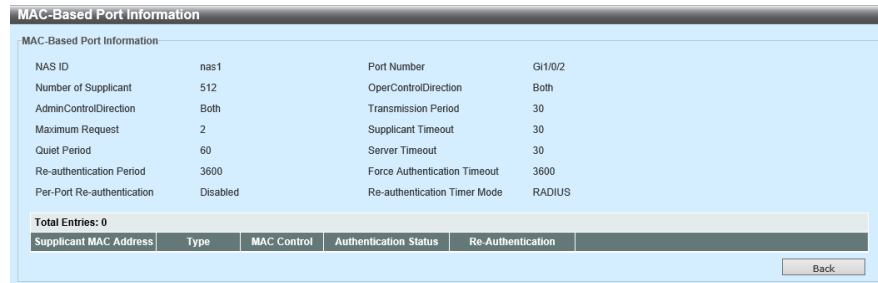
Click **Show** to display the settings on MAC-based access control, which is associated with the specified port(s).

Click **Init** to initiate the settings on Mac-based access control on the specified port(s).

Click **Re-authenticate** to re-authenticate all the connections to the specified port(s).

Click **Show Detail** to display details on the entry.

Click **Show Detail** to display the following window.



The screenshot shows a window titled "MAC-Based Port Information" with a sub-header "MAC-Based Port Information". It displays a list of configuration parameters for a port. Below the list, it shows "Total Entries: 0" and a table with columns for "Supplicant MAC Address", "Type", "MAC Control", "Authentication Status", and "Re-Authentication". A "Back" button is located at the bottom right of the window.

MAC-Based Port Information			
NAS ID	nas1	Port Number	Gi1/0/2
Number of Supplicant	512	OperControlDirection	Both
AdminControlDirection	Both	Transmission Period	30
Maximum Request	2	Supplicant Timeout	30
Quiet Period	60	Server Timeout	30
Re-authentication Period	3600	Force Authentication Timeout	3600
Per-Port Re-authentication	Disabled	Re-authentication Timer Mode	RADIUS

Total Entries: 0

Supplicant MAC Address	Type	MAC Control	Authentication Status	Re-Authentication
------------------------	------	-------------	-----------------------	-------------------

Back

Figure 8-9 802.1X Ports Settings (MAC Based Access Control, Show Detail)

Click **Edit** to enable or disable the re-authentication function.

Click **Initiate** to initiate the settings on the MAC-based access control on the port specified.

Click **Re-authenticate** to re-authenticate the MAC address connections of the supplicant specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Back** to return to the previous window.

## 8.2.5 EAP Port Config

Use the following window to implement the EAP settings on the port specified and display its settings.

Choose **Security > 802.1X > EAP Port Config** to display the following window.

Figure 8-10 EAP Port Config

You can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>EAP Request</b>	This parameter enables or disables a function of EAP requests on the port specified.
<b>EAP Forward</b>	This parameter enables or disables a function of EAP forward on the port specified. You can use it to enable or disable the forwarding of IEEE 802.1X Protocol Data Units (PDU).

Click **Apply** to check the content changed.

## 8.2.6 802.1X Authentication Statistics Information

Use the following command to display and clear the statistics information about the IEEE 802.1X authentication of the port specified.

Choose **Security > 802.1X > 802.1X Authentication Statistics Information** to display the following window.

Port	Elapsed Time Since Reset	000:05:18:21
TxReqId	0	
TxReq	0	
TxTotal	0	
RxStart	0	
RxLogoff	0	
RxRespId	0	
RxResp	0	
RxInvalid	0	
RxLenError	0	
RxTotal	0	
RxVersion	0	
LastRxSrcMac	00-00-00-00-00-00	

Figure 8-11 802.1X Authentication Statistics Information

In the section of **Statistics**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Since</b>	Choose the time range. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Since-Reset</b> - displays the statistics, which has been recorded since the last switch reset.</li> <li>• <b>Since-Up</b> - displays the statistics, which has been recorded since the last switch boot-up.</li> </ul>

Click **Find** to display the information based on the search condition specified.

Click **Reset All** to reset all the statistics information.

## 8.2.7 802.1X Supplicant Global Settings

In the following screen, you can configure a user-name and a password to operate a switching hub as a supplicant. With the supplicant function of 802.1X, you can connect this device to the port, which configures the IEEE802.1X function (port-based authentication) on a upper switching-hub. Doing so enhances the security or countermeasure against unauthorized-accesses.

Choose **Security > 802.1X > 802.1X Supplicant Global Settings** to display the following window.

Figure 8-12 802.1X Supplicant Global Settings

In the section of **802.1X Supplicant Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>User-name</b>	Configure a user-name of the supplicant.
<b>Password</b>	Configure a supplicant-password.
<b>Encrypting Password</b>	Use the encrypted password when configuring it.
<b>Authentication Method</b>	Choose an authentication method. The options available are as follows. <ul style="list-style-type: none"> <li>md5- Set an authentication method to md5.</li> <li>peap-mschapv2 - Set an authentication method to peap-mschapv2.</li> </ul>

Click **Apply** to reflect the change.

## 8.2.8 802.1X Supplicant Port Settings

The following window displays the configuration and state regarding the function of IEEE 802.1X supplicant of the port specified.

Choose **Security > 802.1X > 802.1X Supplicant Port Settings** to display the following window.

Port	Held Period	Authentication Period	Start Period	Max Start	State
Gi1/0/1	60	30	30	3	Disabled
Gi1/0/2	60	30	30	3	Disabled
Gi1/0/3	60	30	30	3	Disabled
Gi1/0/4	60	30	30	3	Disabled
Gi1/0/5	60	30	30	3	Disabled
Gi1/0/6	60	30	30	3	Disabled
Gi1/0/7	60	30	30	3	Disabled
Gi1/0/8	60	30	30	3	Disabled

Figure 8-13 802.1X Supplicant Port Settings

In the section of **802.1X Supplicant Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose a port to be configured.
<b>Held Period</b>	This parameter configures the necessary time for waiting the next authentication when the supplicant fails to authenticate. The range is from 0 to 65,535. The default is 60 (seconds).
<b>Authentication Period</b>	This parameter configures the necessary time for waiting the request from an authenticator. The range is from 1 to 65,535. The default is 30 (seconds).
<b>Start Period</b>	This parameter configures the transmission interval of EAPOL when starting an authentication. The range is from 1 to 65,535. The default is 30 (seconds).
<b>Max Start</b>	This parameter configures the maximum number of EAPOL-Start packets transmissions. The range is from 1 to 65,535. The default is three times.
<b>State</b>	This parameter configures to enable or disable a function of a port supplicant. <ul style="list-style-type: none"> <li>• <b>Disabled</b> - Displays the statics since the reset of the last switch (default value).</li> <li>• <b>Enabled</b> - Displays the statistics since the boot-up of the last switch.</li> </ul>

Click **Apply** to reflect the change.

## 8.2.9 802.1X Supplicant Statistics Information

The following window displays the IEEE 802.1X supplicant statistics information on the port specified.

Choose **Security > 802.1X > 802.1X Supplicant Statistics** to display the following window.

Counter Name	Total
TX EAPOL Start	0
TX EAPOL Logoff	0
TX EAP Response ID	0
TX EAP Response	0
TX EAP Total	0
RX EAP Request ID	0
RX EAP Request	0
RX EAP Invalid	0
RX EAP Length Error	0
RX EAP Total	0
RX EAP Version	0
Last RX Source Mac Address	00-00-00-00-00-00

Figure 8-14 802.1X Supplicant Statistics Information

In the section of **802.1X Supplicant Statistics**, you can configure the following parameter.

Parameter	Overview
<b>Port</b>	Choose a port to be configured.

Click **Retrieve** to display information on the port specified.

## 8.3 AAA (Authentication, Authorization, and Accounting)

### 8.3.1 AAA Global Settings

Use the following window to enable or disable to set an AAA function to global.

Choose **Security > AAA > AAA Global Settings** to display the following window.



Figure 8-15 AAA Global Settings

In the section of **AAA Condition Settings**, you can configure the following parameter.

Parameter	Overview
<b>AAA Condition</b>	Enables or disables to set an AAA function to global.

Click **Apply** to check the content changed.

## 8.3.2 AAA Authentication Settings

Use the following window to implement the settings on the AAA authentication and display its settings.

Choose **Security > AAA > AAA Authentication Settings** to display the following window.

The screenshot shows the 'AAA Authentication Settings' configuration window. It is divided into three sections:

- AAA Web Authentication Settings:** Primary Database is set to 'Local', Secondary Database is 'None', and Authentication Fail Action is 'Secondary-DB'. The Authentication Fail Block Time is 60 seconds.
- AAA MAC Authentication Settings:** Primary Database is 'Local', Secondary Database is 'None', and Authentication Fail Action is 'Secondary-DB'. The Authentication Fail Block Time is 60 seconds.
- AAA 802.1X Authentication Settings:** Primary Database is 'Local', Secondary Database is 'None', and Authentication Fail Action is 'Stop'.

Figure 8-16 AAA Authentication Settings

In the section of **AAA Web Authentication Settings**, you can configure the following parameters.

Parameter	Overview
<b>Primary Database</b>	Choose a primary database to use for Web authentication. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>RADIUS</b> - Uses the database on a RADIUS server as the primary database.</li> <li>• <b>Local</b> - Uses the local database on a switch as the primary database.</li> </ul>
<b>Secondary Database</b>	Choose a secondary database to use for Web authentication. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>None</b> - The authentication feature does not apply regardless of the result of the primary database.</li> <li>• <b>RADIUS</b> - Uses the database on a RADIUS server as the secondary database.</li> <li>• <b>Local</b> - Uses the local database on a switch as the secondary database.</li> </ul>
<b>Authentication Fail Action</b>	Choose an action to do if a Web authentication becomes failed. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Stop</b> - Uses a primary database to stop the authentication if the Web authentication becomes failed.</li> <li>• <b>Secondary DB</b> - Uses a primary database to start its authentication by using a secondary database in case of the Web authentication failure.</li> </ul>

Parameter	Overview
<b>Authentication Fail Block Time</b>	Enter the number of seconds (needed) to block a host in case of the Web authentication failure. The range is from 1 to 65,535 (seconds).

Click **Apply** to check the content changed.

In the section of **AAA MAC Authentication Settings**, you can configure the following parameters.

Parameter	Overview
<b>Primary Database</b>	Choose a primary database to use for a MAC authentication. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>RADIUS</b> - Uses the database on a RADIUS server as the primary database.</li> <li>• <b>Local</b> - Uses the local database on a switch as the primary database.</li> </ul>
<b>Secondary Database</b>	Choose a secondary database to use for a MAC authentication. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>None</b> - The authentication feature does not apply regardless of the result of the primary database.</li> <li>• <b>RADIUS</b> - Uses the database on a RADIUS server as the secondary database.</li> <li>• <b>Local</b> - Uses the local database on a switch as the secondary database.</li> </ul>
<b>Authentication Fail Action</b>	Choose an action to execute in case of MAC authentication failure. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Stop</b> - Uses a primary database to stop an authentication in case of the MAC authentication failure.</li> <li>• <b>Secondary DB</b> - Uses a primary database to start an authentication by using the secondary database in case of the MAC authentication failure.</li> </ul>
<b>Authentication Failure Block-time</b>	Enter the number of seconds to block a host in case of the MAC authentication failure. The range is from 1 to 65,535 (seconds).

Click **Apply** to check the content changed.

In the section of **AAA 802.1X Authentication Settings**, you can configure the following parameters.

Parameter	Overview
<b>Primary Database</b>	Choose a primary database to use for IEEE 802.1X authentication. The options available are as follows. <ul style="list-style-type: none"><li>• <b>RADIUS</b> - Uses the database on a RADIUS server as the primary database.</li><li>• <b>Local</b> - Uses the local database on a switch as the primary database.</li></ul>
<b>Secondary Database</b>	Choose a secondary database to use for IEEE 802.1X authentication. The options available are as follows. <ul style="list-style-type: none"><li>• <b>None</b> - Does not use the secondary database.</li><li>• <b>Local</b> - Uses the local database on a switch as the secondary database.</li></ul>

Click **Apply** to check the content changed.

### 8.3.3 AAA Authentication User Settings

Use the following window to implement the settings on AAA authentication users and display its settings.

Choose **Security > AAA > AAA Authentication User Settings** to display the following window.

Figure 8-17 AAA Authentication User Settings

In the section of **AAA Authentication User Settings**, you can configure the following parameters.

Parameter	Description
<b>User Name</b>	Enter the user-name of a local authentication account. The number of characters for the name can be up to 32.
<b>VLAN ID</b>	Enter a target VLAN ID for a local authentication account. The range is from 1 to 4,094.
<b>Password</b>	Choose and enter the clear-text password for the local authentication account. Choose the <b>Encrypt</b> option to enable password encryption for this account. The clear-text password is saved as the encrypted form on the switch.
<b>Encrypted Password</b>	Choose and enter the encrypted password for the local authentication account.
<b>Authentication Type</b>	Choose the authentication type. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Both</b> - Uses a local authentication account for IEEE 802.1X and Web authentication.</li> <li>• <b>Web</b> - Uses a local authentication account for the Web authentication, only.</li> <li>• <b>Dot1X</b> - Uses the local authentication account for IEEE 802.1X authentication, only</li> </ul>
<b>2-Step Authentication</b>	This parameter enables or disables the 2-step authentication.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.3.4 AAA Authentication MAC Settings

Use the following window to implement the settings on AAA authentication MAC and display its settings.

Choose **Security > AAA > AAA Authentication MAC Settings** to display the following window.

Figure 8-18 AAA Authentication MAC Settings

In the section of the **AAA Authentication MAC Settings**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address</b>	Enter a MAC address of a local authentication account. This is used for a MAC authentication.
<b>VLAN ID</b>	Enter the target VLAN ID of a local authentication account. The range is from 1 to 4,094.
<b>2 Steps Authentication</b>	This parameter enables or disables the 2 steps authentication. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>No</b> - Disables the 2 step authentication of a local authentication account.</li> <li>• <b>Web</b> - Enables the 2 step authentication to use the Web authentication as the second authentication method.</li> <li>• <b>802.1X</b> - Enables the 2 step authentication to use the IEEE 802.1X authentication as the second authentication method.</li> <li>• <b>Optional</b> - Enables the 2 step authentication to use the IEEE 802.1X authentication and Web authentication as the second authentication method.</li> </ul>

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.3.5 Application Authentication Settings

Use the following window to implement the settings on the application authentication and display its settings.

Choose **Security > AAA > Application Authentication Settings** to display the following window.

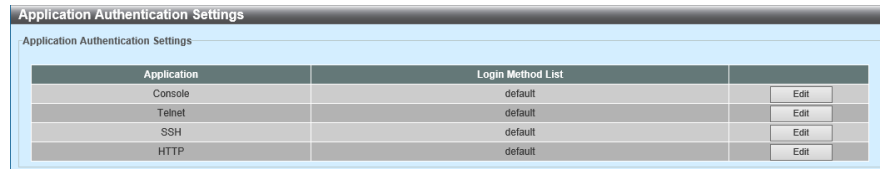


Figure 8-19 Application Authentication Settings

Click **Edit** to display the following window.

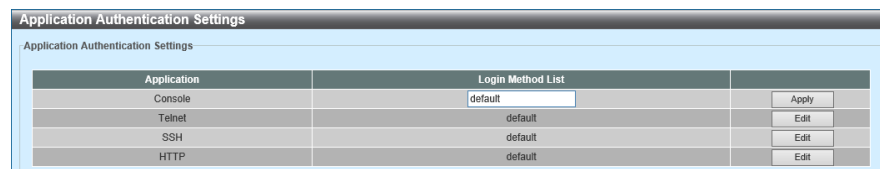


Figure 8-20 Application Authentication Settings (Edition)

In the section of **Application Authentication Settings**, you can configure the following parameters.

Parameter	Overview
<b>Login Method List</b>	Enter the name of the login method list.

Click **Edit** to edit the configuration of the entry specified.

Click **Apply** to check the content changed.

## 8.3.6 Application Accounting Settings

Use the following window to implement the settings on an application accounting and display its settings.

Choose **Security > AAA > Application Accounting Settings** to display the following window.

The screenshot shows the 'Application Accounting Settings' window. It is divided into two main sections: 'Application Accounting Exec Method List' and 'Application Accounting Commands Method List'.  
 The 'Application Accounting Exec Method List' section contains a table with the following data:

Application	Exec Method List	
Console		Edit
Telnet		Edit
SSH		Edit
HTTP		Edit

The 'Application Accounting Commands Method List' section includes a form with the following fields:  
 Application: Console (dropdown)  
 Level: 1 (dropdown)  
 Commands Method List: 32 chars (text field)  
 An 'Apply' button is located to the right of the 'Commands Method List' field.  
 Below the form, it shows 'Total Entries: 0' and a table header for 'Application', 'Level', and 'Commands Method List'.

Figure 8-21 Application Accounting Settings

Click **Edit** to display the following window.

This screenshot shows the 'Application Accounting Settings' window in edit mode. The 'Application Accounting Exec Method List' section now has a text input field in the 'Exec Method List' column for the 'Console' application. The 'Apply' button is now visible in the right column of this row.  
 The 'Application Accounting Commands Method List' section remains the same as in Figure 8-21, with 'Application' set to 'Console', 'Level' set to '1', and 'Commands Method List' set to '32 chars'.

Figure 8-22 Application Accounting Settings (Edition)

In the section of **Application Accounting Exec Method List**, you can configure the following parameter.

Parameter	Overview
<b>Exec Method List</b>	Enter the name of the exec method list.

Click **Apply** to check the content changed.

In the section of the **Application Accounting Command Method List**, you can configure the following parameters.

Parameter	Overview
<b>Application</b>	Choose the application you use. The options available are <b>Console</b> , <b>Telnet</b> and <b>SSH</b> .
<b>Level</b>	Choose the privilege level you use. The range of values to choose is from 1 to 15.
<b>Command Method List</b>	Enter the name of the command method list you use.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.3.7 Authentication EXEC Settings

Use the following window to implement the settings on the authentication EXEC and display its settings.

Choose **Security > AAA > Authentication EXEC Settings** to display the following window.

Figure 8-23 Authentication EXEC Settings

In the section of **AAA Authentication Enable**, you can configure the following parameters.

Parameter	Overview
<b>Status</b>	This parameter enables or disables the enabled state regarding the AAA authentication.
<b>Method 1 - Method 4</b>	<p>Choose the method list to use for this configuration. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>None</b> - This method specifies as the last method of a list. Users are authenticated if (the step for) the authentication of the previous method is not denied. Usually, the method specifies as the last method of a list.</li> <li>• <b>Enable</b> - Uses the local enable password for an authentication.</li> <li>• <b>Group</b> - Uses the server groups, which are defined by using the AAA group server command. Enter the name of the AAA group server in the entry field displayed. The number of characters for this string can be up to 32.</li> <li>• <b>RADIUS</b> - Uses the server, which is defined by using the RADIUS server host command.</li> <li>• <b>TACACS+</b> - Uses the server, which is defined by using the tacacs+ server host command.</li> </ul>

Click **Apply** to check the content changed.

In the section of **AAA Authentication Login**, you can configure the following parameters.

Parameter	Overview
<b>List Name</b>	Enter the method-list name, which is used in the <b>AAA Authentication Login</b> option.
<b>Method 1 - Method 4</b>	<p>Choose the method lists, which are used for this configuration. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>None</b> - Users are authenticated if (the step for) the authentication of the previous method is not denied. Usually, the method specifies as the last method of a list.</li> <li>• <b>Local</b> - Uses the local database for authentication.</li> <li>• <b>Group</b> - Uses the server group, which is defined by using the AAA group server command.</li> <li>• Enter the name of the AAA group server in the entry field displayed. The number of characters for this character strings can be up to 32.</li> <li>• <b>RADIUS</b> - Uses the server, which is defined by using the RADIUS server host command.</li> <li>• <b>TACACS+</b> - Uses the server, which is defined by using the TACACS+ server host command.</li> </ul>

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

## 8.3.8 Accounting Settings

Use the following window to implement the settings on AAA account and display its settings.

Choose **Security > AAA > Accounting Settings** to display the following window.

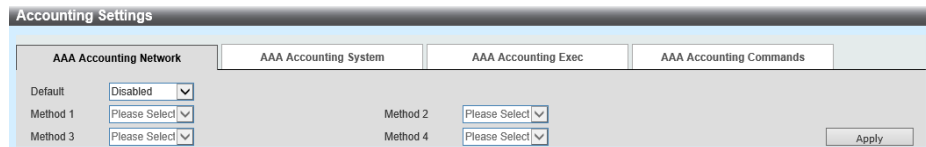


Figure 8-24 Accounting Settings (AAA Accounting Network)

In the section of **AAA Accounting Network**, you can configure the following parameters.

Parameter	Overview
<b>Default</b>	This parameter enables or disables the default method list.
<b>Method 1 - Method 4</b>	Choose the method list to use for this configuration. The options available are <b>None</b> , <b>Group</b> , <b>RADIUS</b> and <b>TACACS+</b> . The <b>None</b> option is available for the method 1.

Click **Apply** to check the content changed.

Click the **AAA Accounting System** tab to display the following window.

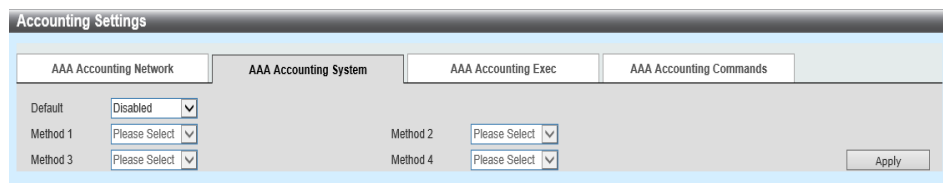


Figure 8-25 Accounting Settings (AAA Accounting System)

In the section of **AAA Accounting System**, you can configure the following parameters.

Parameter	Overview
<b>Default</b>	This parameter enables or disables the default method list.

Parameter	Overview
<b>Method 1 - Method 4</b>	Choose the method list to use for this configuration. The options available are <b>None</b> , <b>Group</b> , <b>RADIUS</b> and <b>TACACS+</b> . The <b>None</b> option is available for the method 1.

Click **Apply** to check the content changed.

Click **AAA Accounting Exec** tab to display the following window.

Figure 8-26 Accounting Settings (AAA Accounting Exec)

In the section of **AAA Accounting Exec**, you can configure the following parameters.

Parameter	Overview
<b>List Name</b>	Enter a method-list name to use in the <b>AAA Accounting Exec</b> option.
<b>Method 1 - Method 4</b>	Choose a method list to use for this configuration. The options available are <b>None</b> , <b>Group</b> , <b>RADIUS</b> and <b>TACACS+</b> . The <b>None</b> option is available for the method 1, only.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

Click the **AAA Accounting Command** tab to display the following window.

Figure 8-27 Accounting Settings (AAA Accounting Command)

In the section of **AAA Accounting Command**, you can configure the following parameters.

Parameter	Overview
<b>Level</b>	Choose the privilege level you use. The range of values to choose is from 1 to 15 (level).
<b>List Name</b>	Enter the method list name to use in the <b>AAA Accounting Command</b> option.
<b>Method 1 - Method 4</b>	Choose the method list to use for this configuration. The options available are <b>None</b> , <b>Group</b> and <b>TACACS+</b> . The <b>None</b> option is available for the method 1, only.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.4 Authentication

### 8.4.1 Authentication Dynamic VLAN Settings

Use the following window to implement the dynamic VLAN settings, which is used for an authentication, and display its settings.

Choose **Security > Authentication > Authentication Dynamic VLAN Settings** to display the following window.

Port	Current PVID	Authentication Status	Guest VLAN	Default VLAN
Gi1/0/1	1	Authorized	---	---
Gi1/0/2	1	Unauthorized	---	---
Gi1/0/3	1	Authorized	---	---
Gi1/0/4	1	Authorized	---	---
Gi1/0/5	1	Authorized	---	---
Gi1/0/6	1	Authorized	---	---
Gi1/0/7	1	Authorized	---	---
Gi1/0/8	1	Authorized	---	---

Figure 8-28 Authentication Dynamic VLAN Settings

In the section of **Authentication Dynamic VLAN Settings**, you can configure the following parameters.

Parameter	Overview
<b>Accept RADIUS Attribute</b>	This parameter enables or disables the acceptance of the RADIUS attribute.
<b>From Port/ To Port</b>	Choose the port you use.
<b>Guest VLAN</b>	This parameter enables or disables a Guest VLAN. If this is enabled, hosts are allowed to access to the guest VLAN without any authentication.
<b>Guest VLAN ID</b>	Enter the guest VLAN ID whose range is from 1 to 4,094.
<b>Default VLAN</b>	This parameter enables or disables the default VLAN. The hosts, which are accurately authenticated, are allocated to the default VLAN if a dynamic VLAN function is disabled or a host target VLAN is disabled (or invalid).
<b>Default VLAN ID</b>	Enter a default VLAN ID. The range is from 1 to 4,094.

Click **Apply** to check the content changed.

## 8.4.2 Authentication Status Table

Use the following window to display an authentication state table and its information. In addition, the authentication aging time can be configured in this window.

Choose **Security > Authentication > Authentication Status Table** to display the following window.

Figure 8-29 Authentication Status Table

In the section of **Authentication Status Table**, you can configure the following parameters.

Parameter	Overview
<b>Authentication Aging Time</b>	Enter the value of time-out of the MAC/Web authentication session. The range is from 0 to 65,535 (minutes).
<b>Sort By - MAC</b>	If you choose this option, an authentication session is displayed in a sequential order of MAC addresses.
<b>Sort By - Port</b>	If you choose this option, an authentication session of the port specified is displayed. <ul style="list-style-type: none"> <li>• <b>From Port/ To Port</b> - Choose the port you use.</li> </ul>

Click **Apply** to check the content changed.

Click **Find** to search and display the entries based on the search condition specified.

### 8.4.3 2-Step Authentication Settings

Use the following window to implement the settings on the 2 step authentication of the port specified and display its settings.

Choose **Security > Authentication > 2-Step Authentication Settings** to display the following window.

Figure 8-30 2-Step Authentication Settings

In the section of **2-Step Authentication Settings**, you can configure the following parameters.

Parameter	Overview
<b>2 Step Authentication Timeout</b>	Enter the time-out value. If this time passes, the second step of an authentication is tried (or attempted). The range is from 0 to 65,535 (minutes).
<b>From Port/ To Port</b>	Choose the port you use.
<b>2 Step Authentication Mode</b>	Choose the 2 step authentication mode. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>MAC-Web</b> - Both MAC and WEB authentication are used in the first step of the two-step authentication method.</li> <li>• <b>MAC-Dot1X</b> - Both MAC and IEEE802.11X authentication are used in the first step of the two-step authentication method.</li> <li>• <b>Dot1X-Web</b> - Both IEEE 802.1X and WEB authentication are used in the first step of the two-step authentication method.</li> </ul>

Click **Apply** to check the content changed.

Click **Clear** to clear the information based on the condition specified.

## 8.5 RADIUS (Remote Authentication Dial-In User Service)

### 8.5.1 RADIUS Global Settings

Use the following window to implement the global settings, which is associated with the RADIUS function, and display its settings.

Choose **Security > RADIUS > RADIUS Global Settings** to display the following window.

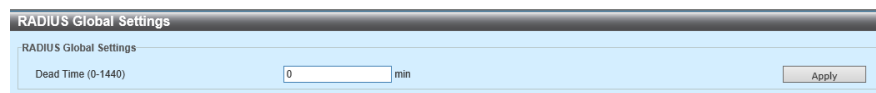


Figure 8-31 RADIUS Global Settings

In the section of **RADIUS Global Settings**, you can configure the following parameter.

Parameter	Overview
<b>Dead Time</b>	Enter the dead-time value. If the system implements an authentication by using an authentication server, it attempts a server one by one. If the server does not respond, the system attempts the next server. If the system finds a server that does not respond, it marks the server as a down server to start the dead time timer. The server on this state is skipped until the dead time passes in the following request authentication. The range is from 1 to 1440 (minutes). By default, this value is set to 0 (minute). If this option is 0, the unresponsive server is not marked as dead. Use this settings to shorten the time needed for an authentication processing by configuring the dead time to skip the unresponsive server host-entry.

Click **Apply** to reflect the change.

In the section of **RADIUS Global IPv4 Source Interface**, you can configure the following parameter.

Parameter	Overview
<b>IPv4 RADIUS Source Interface Name</b>	Enter the name of the IPv4 RADIUS source interface.

Click **Apply** to reflect the change.

In the section of **RADIUS Global IPv6 Source Interface**, you can configure the following parameter.

Parameter	Overview
<b>IPv6 RADIUS Source Interface Name</b>	Enter the name of the IPv6 RADIUS source interface.

Click **Apply** to reflect the change.

## 8.5.2 RADIUS Server Settings

Use the following window to implement the settings on a RADIUS server and display its settings.

Choose **Security > RADIUS > RADIUS Server Settings** to display the following window.

Figure 8-32 RADIUS Server Settings

In the section of the **RADIUS Server Settings**, you can configure the following parameters.

Parameter	Overview
<b>IP Address</b>	Enter an IPv4 address of a RADIUS server.
<b>IPv6 Address</b>	Enter an IPv6 address of a RADIUS server.
<b>Authentication Port</b>	Enter the authentication port-number (value) you use. The range is from 0 to 65,535. By default, the value is set to 1,812. If no authentication is used, use the value of 0.
<b>Accounting Port</b>	Enter the accounting port-number (value) you use. The range is from 0 to 65,535. By default, the value is set to 1,813. If no accounting is used, use the value of 0.
<b>Retransmission</b>	Enter the value regarding the number of retransmissions. The range is from 0 to 20. By default, the value is set to 3. To disable this option, enter the value of 0.
<b>Timeout</b>	Enter the timeout value you use. The range is from 1 to 255 seconds. By default, the value is set to 5 seconds.
<b>Key Type</b>	Choose the key type you use. The options available are <b>Plain Text</b> and <b>Encrypted</b> .
<b>Key</b>	Enter the key, which is used to communicate with a RADIUS server. The number of characters for the key can be up to 32.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

## 8.5.3 RADIUS Group Server Settings

Use the following window to implement the settings on and display its settings.

Choose **Security > RADIUS > RADIUS Group Server Settings** to display the following window.

Figure 8-33 RADIUS Group Server Settings

In the section of **RADIUS Group Server Settings**, you can configure the following parameters.

Parameter	Overview
<b>Group Server Name</b>	Enter the name of a RADIUS group server. The number of characters for the name can be up to 32.
<b>IP Address</b>	Enter an IPv4 address of a RADIUS group server.
<b>IPv6 Address</b>	Enter an IPv6 address of a RADIUS group server.

Click **Add** to add new entries.

Click **Show Detail** to display details on the entry.

Click **Delete** to delete the entry specified.

Click **Show Detail** to display the following window.

Figure 8-34 RADIUS Group Server Settings (Show Detail.)

You can configure the following parameters.

Parameter	Overview
<b>IPv4 RADIUS Source Interface Name</b>	Enter the name of the IPv4 RADIUS source-interface.
<b>IPv6 RADIUS Source Interface Name</b>	Enter the name of the IPv6 RADIUS source-interface.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

Click **Back** to return to the previous window.

## 8.5.4 RADIUS Statistics

Use the following window to display and clear the RADIUS statistics information.

Choose **Security > RADIUS > RADIUS Statistics** to display the following window.

The screenshot shows a web interface titled "RADIUS Statistic". At the top, there is a "Group Server Name" dropdown menu with "Please Select" and two buttons: "Clear" and "Clear All". Below this, it says "Total Entries: 1" and shows a table with the following data:

RADIUS Server Address	Authentication Port	Accounting Port	State
172.16.230.10	1812	1813	Up

Below the table, there is a pagination control showing "1/1" and a "Go" button. Underneath, there is a section for "RADIUS Server Address: 172.16.230.10" with a "Clear" button. This section contains a table of statistics:

Parameter	Authentication Port	Accounting Port
Round Trip Time	0	0
Access Requests	0	NA
Access Accepts	0	NA
Access Rejects	0	NA
Access Challenges	0	NA
Acct Request	NA	0
Acct Response	NA	0
Retransmissions	0	0
Malformed Responses	0	0
Bad Authenticators	0	0
Pending Requests	0	0
Timeouts	0	0
Unknown Types	0	0
Packets Dropped	0	0

Figure 8-35 RADIUS Statistics

In the section of **RADIUS Statistics**, you can configure the following parameter.

Parameter	Overview
<b>Group Server Name</b>	Choose the name of a RADIUS group server from this list.

Click **Clear**, the first one, to clear the statistics information based on the condition specified.

Click **Clear All** to clear all the statistics information.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **Clear** (the second one) to clear the statistics information on a table.

## 8.6 TACACS+ (Terminal Access Controller Access-Control System Plus)

### 8.6.1 TACACS+ Global Settings

Use the following window to implement the global settings, which is associated with the TACACS+ function, and display its settings.

Choose **Security > TACACS+ > TACACS+ Global Settings** to display the following window.

画像なし

Figure 8-36 TACACS+ Global Settings

In the section of **TACACS+ Global IPv4 Source Interface**, you can configure the following parameter.

Parameter	Overview
<b>IPv4 TACACS+ Source Interface Name</b>	Enter the name of an IPv4 TACACS+ source interface.

Click **Apply** to reflect the change.

## 8.6.2 TACACS+ Server Settings

Use the following window to implement the settings on a TACACS+ server and display its settings.

Choose **Security > TACACS+ > TACACS+ Server Settings** to display the following window.

Figure 8-37 TACACS+ Server Settings

In the section of **TACACS+ Server Settings**, you can configure the following parameters.

Parameter	Overview
<b>IP Address</b>	Enter an IPv4 address of a TACACS+ server.
<b>Port</b>	Enter the port-number (value) you use. The range is from 1 to 65,535. By default, the value is set to 49.
<b>Time-out</b>	Enter the value of time-out. The range is from 1 to 255 (seconds). By default, the value is set to 5 seconds.
<b>Key Type</b>	Choose the key type you use. The options available are <b>Plain-text</b> and <b>Encryption</b> .
<b>Key</b>	Enter a key to use for the communication with a TACACS+ server. The number of characters for the key can be up to 254.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

## 8.6.3 TACACS+Group Servers Settings

Use the following window to implement the settings on and display its settings.

Choose **Security > TACACS+ > TACACS+Group Servers Settings** to display the following window.

Group Server Name	IPv4 Address
tacacs+	- - - - -

Figure 8-38 TACACS+Group Servers Settings

In the section of the **TACACS+Group Servers Settings**, you can configure the following parameters.

Parameter	Overview
<b>Name of Group Servers</b>	Enter the name of a TACACS+Group server. The number of characters for the name can be up to 32.
<b>IPv4 IP Address</b>	Enter an IPv4 address of a TACACS+Group server.

Click **Add** to add new entries.

Click **Show Detail** to display details on the entry.

Click **Delete** to delete the entry specified.

Click **Show Detail** to display the following window.

IPv4 Address
1.1.1.1

Figure 8-39 TACACS+Group Servers Settings (Show Detail.)

In the section of **TACACS+Settings on Group Servers**, you can configure the following parameter.

Parameter	Overview
<b>IPv4 TACACS+Source Interface Name</b>	Enter the name of an IPv4 TACACS+source interface.

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

Click **Back** to return to the previous window.

## 8.6.4 TACACS+Statistics

Use the following window to display and clear TACACS+statistics information.

Choose **Security > TACACS+ > TACACS+Statistics** to display the following window.

TACACS+ Server Address	State	Socket Opens	Socket Closes	Total Packets Sent	Total Packets Recv	Reference Count
1.1.1.1/49	Up	0	0	0	0	0

Figure 8-40 TACACS+Statistics

In the section of the **TACACS+Statistics**, you can configure the following parameter.

Parameter	Overview
<b>Name of Group Servers</b>	Choose the name of a TACACS+group server from this list.

Click the first **Clear** button to clear the statistics information based on the condition specified.

Click **Clear All** to clear all the statistics information.

Click the second **Clear** button to clear the statistics information on the specified entry.

## 8.7 SAVI (Source Address Validation Improvements)

### 8.7.1 IPv4

#### 8.7.1.1 DHCPv4 Snooping

##### 8.7.1.1.1 DHCP Snooping Global Settings

Use the following window to implement the global settings, which is associated with a DHCP Snooping function, and display its settings.

Choose **Security > SAVI > IPv4 > DHCPv4 Snooping > DHCP Snooping Global Settings** to display the following window.

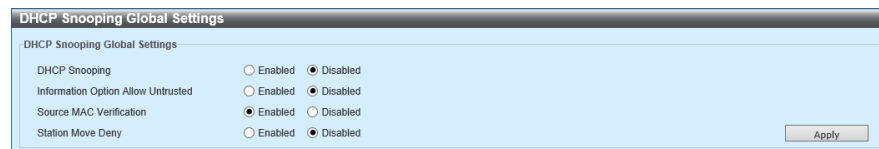


Figure 8-41 DHCP Snooping Global Settings

In the section of **DHCP Snooping Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>DHCP Snooping</b>	This parameter enables or disables to set DHCP Snooping to global.
<b>Information Option Allow Untrusted</b>	This parameter enables or disables the option globally to allow DHCP packets where the relay option 82 is configured on the untrusted interface.
<b>Source MAC Verification</b>	This parameter enables or disables a verification; a source MAC address of DHCP packets matches with a client hardware address.
<b>Station Move Deny</b>	This parameter enables or disables the state of the DHCP Snooping station move. If the DHCP Snooping station move is enabled, the dynamic DHCP Snooping binding entry, including the same VLAN ID and MAC address on the specific port, can be moved to the other port. If you detect a new DHCP process that uses the same VLAN ID and MAC address.

Click **Apply** to reflect the change.

### 8.7.1.1.2 DHCP Snooping Port Settings

Use the following window to implement the settings on the DHCP Snooping and display its settings.

Choose **Security > SAVI > IPv4 > DHCPv4 Snooping > DHCP Snooping Port Settings** to display the following window.

Port	Trusted	Rate Limit	Entry Limit
G11/0/1	No	No Limit	No Limit
G11/0/2	No	No Limit	No Limit
G11/0/3	No	No Limit	No Limit
G11/0/4	No	No Limit	No Limit
G11/0/5	No	No Limit	No Limit
G11/0/6	No	No Limit	No Limit
G11/0/7	No	No Limit	No Limit
G11/0/8	No	No Limit	No Limit

Figure 8-42 DHCP Snooping Port Settings

In the section of **DHCP Snooping Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Entry Limit</b>	Enter the entry limit value. The range is from 0 to 508. If you set <b>No Limit</b> to on, the function becomes disabled.
<b>Bandwidth Limit (Rate Limit)</b>	Enter the value of bandwidth limitation. The range is from 1 to 300. If you set <b>No Limit</b> to on, the function becomes disabled.
<b>Trusted</b>	Choose the trusted option. The options available are <b>No</b> and <b>Yes</b> . The port connected to a DHCP server or other switches must be configured as a trusted interface. The ports connected to a DHCP client must be configured as an untrusted interface. DHCP Snooping operates as a firewall between an untrusted interface and a DHCP server.

Click **Apply** to reflect the change.

### 8.7.1.1.3 DHCP Snooping VLAN Settings

Use the following window to implement the settings on DHCP Snooping of the VLAN specified and display its settings.

Choose **Security > SAVI > IPv4 > DHCPv4 Snooping > DHCP Snooping VLAN Settings** to display the following window.

Figure 8-43 DHCP Snooping VLAN Settings

In the section of **DHCP Snooping VLAN Settings**, you can configure the following parameters.

Parameter	Overview
<b>VID List</b>	Enter a VLAN ID to use it. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>State</b>	This parameter enables or disables the settings on a DHCP Snooping VLAN.

Click **Apply** to reflect the change.

### 8.7.1.1.4 DHCP Snooping Database

Use the following window to implement the settings on the DHCP Snooping database and display its settings.

Choose **Security > SAVI > IPv4 > DHCPv4 Snooping > DHCP Snooping Database** to display the following window.

Figure 8-44 DHCP Snooping Database

In the section of **DHCP Snooping Database**, you can configure the following parameter.

Parameter	Overview
<b>Write Delay</b>	Enter the write-delay time (value). The range is from 60 to 86,400 (seconds). By default, the value is set to 300 (seconds).

Click **Reset** to reset the DHCP Snooping database.

Click **Apply** to reflect the change.

In the section of **Store DHCP Snooping Database**, you can configure the following parameter.

Parameter	Overview
<b>URL</b>	Choose a location from the drop-down list and then enter the URL for storing the DHCP Snooping database. The locations to choose are <b>TFTP</b> , <b>FTP</b> and <b>Local</b> .

Click **Reset** to reset the stored DHCP Snooping database.

Click **Apply** to store (or save) the DHCP Snooping database.

In the section of **Load DHCP Snooping Database**, you can configure the following parameter.

Parameter	Overview
<b>URL</b>	Choose a location from the drop-down list and enter the URL for loading the DHCP Snooping database. The locations to choose are <b>TFTP</b> , <b>FTP</b> and <b>Local</b> .

Click **Apply** to load the DHCP Snooping database.

Click **Clear** to clear the counter information.

### 8.7.1.1.5 DHCP Snooping Binding Entry

Use the following window to implement the settings on the DHCP Snooping binding entry and display its settings.

Choose **Security > SAVI > IPv4 > DHCPv4 Snooping > DHCP Snooping Binding Entry** to display the following window.

Figure 8-45 DHCP Snooping Binding Entry

In the section of **DHCP Snooping Manual Binding**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address</b>	Enter a MAC address of the DHCP Snooping binding entry.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>IP Address</b>	Enter an IP address of the DHCP Snooping binding entry.
<b>Port</b>	Choose the port you use.
<b>Expiry</b>	Enter the value of the valid deadline to use. The range is from 60 to 4,294,967,295 (seconds).

Click **Add** to add new entries.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.7.1.2 Dynamic ARP Inspection

### 8.7.1.2.1 ARP Access List

Use the following window to implement the settings on the ARP access list and display its settings.

Choose **Security > SAVI > IPv4 > Dynamic ARP Inspection > ARP Access List** to display the following window.

Figure 8-46 ARP Access List

In the section of the **ARP Access List**, you can configure the following parameter.

Parameter	Overview
<b>ARP Access List Name</b>	Enter the name of the ARP access list you use. The number of characters for the name can be up to 32.

Click **Add** to add new entries.

Click **Edit** to edit the configuration of the entry specified.

Click **Delete** to delete the entry specified.

Click **Edit** to display the following window.

Figure 8-47 ARP Access List (Edit)

You can configure the following parameters.

Parameter	Overview
<b>Action</b>	Choose the action you perform. The options available are <b>Permit</b> and <b>Deny</b> .
<b>IP</b>	Choose the type of the sender IP address you use. The options available are <b>Any</b> , <b>Host</b> and <b>IP and Mask</b>
<b>Sender IP</b>	If you choose <b>Host</b> or <b>IP and Mask</b> as the <b>IP</b> type, enter a sender IP address.
<b>Sender IP Mask</b>	If you choose the <b>IP and Mask</b> option as the <b>IP</b> type, enter a sender IP mask.
<b>MAC</b>	Choose the sender MAC address type you use. The options available are <b>Optional</b> , <b>Host</b> , and <b>MAC and Mask</b> .
<b>Sender MAC</b>	If you choose <b>Host</b> or <b>MAC and Mask</b> as the <b>MAC</b> type, enter a sender MAC address.
<b>Sender MAC Mask</b>	If you choose <b>MAC and Mask</b> as the <b>MAC</b> type, enter the sender MAC mask you use.

Click **Apply** to add a new entry.

Click **Back** to return to the previous window.

Click **Delete** to delete the entry specified.

### 8.7.1.2.2 ARP Inspection Settings

Use the following window to implement the settings on ARP inspections and display its settings.

Choose **Security > SAVI > IPv4 > Dynamic ARP Inspection > ARP Inspection Settings** to display the following window.

Figure 8-48 ARP Inspection Settings

In the section of **ARP Inspection Items**, you can configure the following parameters.

Parameter	Overview
<b>Src-MAC</b>	This parameter enables or disables the source MAC option. The option checks ARP requests, response packets and the consistency between a source MAC address in the Ethernet header and a sender MAC address of the ARP payload.
<b>Dst-MAC</b>	This parameter enables or disables the destination MAC option. The option checks ARP response packets and the consistency between a destination MAC address in the Ethernet header and a target MAC address in the ARP payload.

Parameter	Overview
<b>IP</b>	This parameter enables or disables the IP option. The parameter checks a disabled IP address and an unexpected IP address on the ARP body. In addition, the parameter checks the validity of an IP address of the ARP payload. The sender IP in both the ARP request and response and the target IP of the ARP response are verified. Packets whose destinations are these IP addresses (e.g. 0.0.0.0 and 255.255.255.255) and all the IP multicast addresses are dropped. The sender IP addresses are checked by all the ARP requests and responses. Target IP addresses are checked by ARP responses.

Click **Apply** to reflect the change.

In the section of **ARP Inspection VLAN Logging**, you can configure the following parameters.

Parameter	Overview
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>State</b>	This parameter enables or disables ARP inspection VLAN logging of the VLAN specified.

Click **Apply** to add a new entry.

Click **Edit** to edit the configuration of the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

In the section of **ARP Inspection Filtering**, you can configure the following parameters.

Parameter	Overview
<b>ARP Access List Name</b>	Enter the name of the ARP access list to use. The number of characters for the name can be up to 32.
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.
<b>Static ACL</b>	Click <b>Yes</b> or <b>No</b> if you need to use a static ACL.

Click **Add** to add new entries.

Click **Delete** to delete entries based on the information specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

### 8.7.1.2.3 ARP Inspection Port Settings

Use the following window to implement the settings on the ARP inspection port settings and display its settings.

Choose **Security > SAVI > IPv4 > Dynamic ARP Inspection > ARP Inspection Port Settings** to display the following window.

Port	Trust State	Rate Limit (pps)	Burst Interval
Gi1/0/1	Untrusted	15	1
Gi1/0/2	Untrusted	15	1
Gi1/0/3	Untrusted	15	1
Gi1/0/4	Untrusted	15	1
Gi1/0/5	Untrusted	15	1
Gi1/0/6	Untrusted	15	1
Gi1/0/7	Untrusted	15	1
Gi1/0/8	Untrusted	15	1

Figure 8-49 ARP Inspection Port Settings

You can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Rate Limit</b>	Enter the value of rate limit. The range is from 1 to 150 (packets), per second.
<b>Burst Interval</b>	Enter the value of a burst-interval. The range is from 1 to 15. If you set <b>None</b> to on, the option becomes disabled.
<b>Trust State</b>	This parameter enables or disables the trust state.

Click **Apply** to reflect the change.

Click **Default Configuration** to set the trust state to the default settings.

### 8.7.1.2.4 ARP Inspection Statistics Information

Use the following window to display and clear the statistics information on the dynamic ARP inspection.

Choose **Security > SAVI > IPv4 > Dynamic ARP Inspection > ARP Inspection Statistics Information** to display the following window.

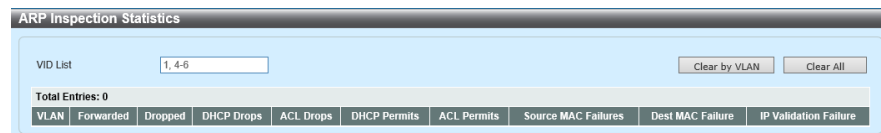


Figure 8-50 ARP Inspection Statistics Information

You can configure the following parameter.

Parameter	Overview
<b>VID List</b>	Enter the VLAN ID you use. You can enter its consecutive VLAN IDs by delimiting with a comma or enter the range of VLAN IDs by delimiting with a hyphen. The range is from 1 to 4,094.

Click **Clear by VLAN** to clear the statistics information about the VLAN specified.

Click **Clear All** to clear all the statistics information.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

### 8.7.1.2.5 ARP Inspection Log

Use the following window to display and clear the information on dynamic ARP inspection log. In addition, you can configure the log-buffer value in the window.

Choose **Security > SAVI > IPv4 > Dynamic ARP Inspection > ARP Inspection Log** to display the following window.

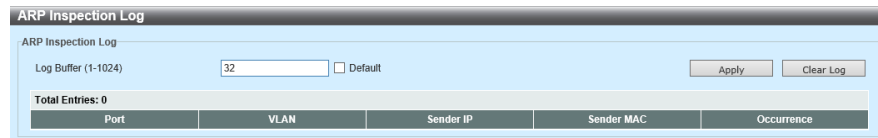


Figure 8-51 ARP Inspection Log

In the section of **ARP Inspection Log**, you can configure the following parameter.

Parameter	Overview
<b>Log Buffer</b>	Enter the log-buffer size (value). The range is from 1 to 1,024. By default, the value is set to 32. When you choose Default, use the default value.

Click **Apply** to reflect the change.

Click **Clear Log** to clear the ARP inspection log.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

### 8.7.1.3 IP Source Guard

#### 8.7.1.3.1 IP Source Guard Port Settings

Use the following window to implement the settings on an IP source guard of the port specified and display its settings.

Choose **Security > SAVI > IPv4 > IP Source Guard > IP Source Guard Port Settings** to display the following window.

Figure 8-52 IP Source Guard Port Settings

You can configure the following parameters.

Parameter	Overview
<b>From Port to Port: from the Beginning to the End</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables the state of the IP source guard for the port specified.
<b>Verification</b>	Choose a verification method of using. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>IP</b> - checks the IP address of the received packets.</li> <li>• <b>IP-MAC</b> - checks the IP address and MAC address of the received packets</li> </ul>

Click **Apply** to add a new entry.

### 8.7.1.3.2 IP Source Guard Binding

Use the following window to implement the settings on an IP source guard binding and display its settings.

Choose **Security > SAVI > IPv4 > IP Source Guard > IP Source Guard Binding** to display the following window.

Figure 8-53 IP Source Guard Binding

In the section of the settings on **IP Source Binding**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address</b>	Enter a MAC address of the binding entry.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>IP Address</b>	Enter an IP address of the binding entry.
<b>From Port/ To Port</b>	Choose the port you use.

Click **Apply** to reflect the change.

In the section of **IP Source Binding Entry**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>IP Address</b>	Enter an IP address of the binding entry.
<b>MAC Address</b>	Enter a MAC address of the binding entry.
<b>VID</b>	Enter the VLAN ID you use. The range is from 1 to 4,094.
<b>Type</b>	Choose a type of binding entries for searching. The options available are as follows. <ul style="list-style-type: none"><li>• <b>All</b> - displays all the DHCP binding entries.</li><li>• <b>DHCP Snooping</b> - displays the IP-source guard binding entry learned by DHCP binding snooping.</li><li>• <b>Static</b> - displays the IP source guard binding entry, which is manually configured.</li></ul>

Click **Find** to search and display the entries based on the search condition specified.

Click **Delete** to delete the entry specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

### 8.7.1.3.3 IP Source Guard HW Entry

Use the following window to display the IP source guard HW entry and its information.

Choose **Security > SAVI > IPv4 > IP Source Guard > IP Source Guard HW Entry** to display the following window.

Figure 8-54 IP Source Guard HW Entry

You can configure the following parameter.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Find** to search and display the entries based on the search condition specified.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.8 BPDU Guard

Use the following window to implement the settings on the state of a BPDU guard function on the port specified and display its settings.

Choose **Security > BPDU Guard** to display the following window.

Port	State	Mode	Status
Gi1/0/1	Disabled	Shutdown	Normal
Gi1/0/2	Disabled	Shutdown	-
Gi1/0/3	Disabled	Shutdown	Normal
Gi1/0/4	Disabled	Shutdown	Normal
Gi1/0/5	Disabled	Shutdown	Normal
Gi1/0/6	Disabled	Shutdown	Normal
Port-channel1	Disabled	Shutdown	Normal

Figure 8-55 BPDU Guard

In the section of **BPDU Guard Settings**, you can configure the following parameters.

Parameter	Overview
<b>BPDU Guard State</b>	This parameter enables or disables to set a BPDU guard function to global.
<b>BPDU Guard Trap State</b>	This parameter enables or disables the BPDU guard trap state.

Click **Apply** to reflect the change.

In the section of **BPDU Guard Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables the BPDU guard on the port specified.
<b>Mode</b>	Choose the BPDU guard mode to be applied to the port specified. The options available are as follows. <ul style="list-style-type: none"><li>• <b>Drop</b> - drops all the received BPDU packets when detecting attacks on the port.</li><li>• <b>Block</b> - drops all the packets, including BPDU and normal packets, when detecting attacks on the port.</li><li>• <b>Shutdown</b> - shut-downs the port when a network device detects attacks on the port.</li></ul>

Click **Apply** to reflect the change.

## 8.9 NetBIOS Filtering

Use the following window to implement the settings on the NetBIOS filtering of the port specified and display its settings.

Choose **Security > NetBIOS Filtering** to display the following window.

Port	NetBIOS Filtering State	Extensive NetBIOS Filtering State
G11/0/1	Disabled	Disabled
G11/0/2	Disabled	Disabled
G11/0/3	Disabled	Disabled
G11/0/4	Disabled	Disabled
G11/0/5	Disabled	Disabled
G11/0/6	Disabled	Disabled

Figure 8-56 NetBIOS Filtering

In the section of **NetBIOS Filtering**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>NetBIOS Filtering State</b>	This parameter enables or disables the NetBios filtering state on the port specified. Use this to permit or deny NetBIOS packets on the physical port.
<b>Extensive NetBIOS Filtering State</b>	This parameter enables or disables the state of the extensive NetBIOS filtering on the port specified. Use this to permit or deny the NetBIOS packets through the 802.3 frame on the physical port.

Click **Apply** to reflect the change.

## 8.10 MAC Authentication

Use the following window to implement the settings on the MAC authentication and display its settings.

Choose **Security > MAC Authentication** to display the following window.

Figure 8-57 MAC Authentication

In the section of the **MAC Authentication Settings**, you can configure the following parameter.

Parameter	Overview
<b>MAC Authentication State</b>	This parameter enables or disables to set a function of MAC authentication to global.

Click **Apply** to reflect the change.

In the section of **MAC Format Settings**, you can configure the following parameters.

Parameter	Overview
<b>Case</b>	Choose the format of characters to use for a MAC address. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Capital Letters</b> - Uses the format of capital letters for a MAC address (e.g. AA-BB-CC-DD-EE-FF).</li> <li>• <b>Small Letters</b> - Uses the format of small letters for a MAC address (e.g. aa-bb-cc-dd-ee-ff).</li> </ul>

Parameter	Overview
<b>Delimiter</b>	Choose the type of a delimiter to use for a MAC address. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Hyphen</b> - Uses a hyphen as a delimiter for a MAC address (e.g. AA-BB-CC-DD-EE-FF).</li> <li>• <b>Colon</b> - Uses a colon as a delimiter for a MAC address (e.g. AA:BB:CC:DD:EE:FF).</li> <li>• <b>Dot</b> - Uses a dot as a delimiter for a MAC address (e.g. AA.BB.CC.DD.EE.FF).</li> <li>• <b>None</b> - does not use a delimiter for a MAC address (e.g. AABCCDDEEFF).</li> </ul>
<b>Delimiter Characters</b>	Choose the number of delimiters to use for a MAC address. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>2</b> - uses one delimiter for a MAC address (e.g. AABCCDDEEFF).</li> <li>• <b>4</b> - uses two delimiters for a MAC address (e.g. AAB-CCDD-EEFF).</li> <li>• <b>6</b> - uses five delimiters for a MAC address (e.g. AA-BB-CC-DD-EE-FF).</li> </ul>

Click **Apply** to reflect the change.

In the section of **MAC Authentication Password Settings**, you can configure the following parameters.

Parameter	Overview
<b>RADIUS Password Type</b>	Choose the RADIUS password type. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>MAC Address</b> - Enter a MAC address as a RADIUS password.</li> <li>• <b>Manual</b> - Uses the manual character-strings as a RADIUS password.</li> </ul>
<b>Manual</b>	Enter a RADIUS password of a MAC authentication account.

Click **Apply** to reflect the change.

In the section of **MAC Authentication Port**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables the MAC authentication on the port(s) specified.

Click **Apply** to reflect the change.

## 8.11 Web Authentication

### 8.11.1 Web Authentication Settings

Use the following window to implement the settings on Web authentication and display its settings.

Choose **Security > Web Authentication > Web Authentication Settings** to display the following window.

Figure 8-58 Web Authentication Settings

In the section of **Global Settings**, you can configure the following parameter.

Parameter	Overview
<b>Authentication State</b>	This parameter enables or disables to set a Web authentication function to global.

Click **Apply** to reflect the change.

In the section of **Authentication Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables a function of Web authentication of the port specified.

Click **Apply** to reflect the change.

In the section of **Authentication Settings**, you can configure the following parameters.

Parameter	Overview
<b>Virtual</b>	Enter a virtual IPv4 address to use. All the Web authentication processes communicate with the virtual IP address, and the virtual IP does not respond to ICMP packets or ARQ requests. The IPv4 address for a virtual IPv4 address and a switch needs to use a different subnet. The virtual IPv4 address is an indispensable component for the normal operation of the Web authentication.
<b>HTTP Port-Number</b>	Enter the port-number (value) of HTTP TCP/UDP. The range is from 1 to 65,535. By default, the value is set to 80. HTTP stands for Hypertext Transfer Protocol.
<b>Redirect URL</b>	Enter the redirect URL. The number of characters for this can be up to 64.

Click **Apply** to reflect the change.

## 8.11.2 Web Page Contents Settings

Use the following window to implement the settings on Web page contents and display the settings.

Choose **Security > Web Authentication > Web Page Contents Settings** to display the following window.

Figure 8-59 Web Page Contents Settings

In the section of **Web Page Contents Settings**, you can configure the following parameters.

Parameter	Overview
<b>Choosing a Logo Data File</b>	Click <b>See</b> to move to the location where image files (JPG/GIF/PNG) to be uploaded exist.
<b>Logo Data</b>	An image file (in the progress of using) being uploaded is displayed. The file can be transferred up to 512KB. Click <b>Delete Logo</b> to delete an existing image-file.
<b>Page Title</b>	Enter the page title-message of a custom. The number of characters can be up to 64 for that. You can type Japanese on it.
<b>User Name String</b>	Enter the user-name title of a custom. The number of characters can be up to 32 for that. You can type Japanese on it.
<b>Password Character Strings</b>	Enter the custom password-title. The number of characters can be up to 32 for that. You can type Japanese on it.
<b>Message</b>	Enter the custom-message, which can be up to 256 characters. Both Japanese-typing and the following HTML tag are available. <a> <b> <i> <u> <center> <right> <left> <font> <h1> ~ <h5> <div> <span>   <p>

Parameter	Overview
<b>Description</b>	Enter a description message of a custom. The number of characters can be up to 256 for it. Either Japanese-typing or the following HTML tag is available. <a> <b> <i> <u> <center> <right> <left> <font> <h1> ~ <h5> <div> <span>   <p>

Click **Upload** to upload a new logo.

Click **Apply** to reflect the change.

## 8.12 Trusted Host

Use the following window to implement the settings on the trusted host and display its settings.

Choose **Security > Trusted Host** to display the following window.

Figure 8-60 Trusted Host

In the section of the **Trusted Host**, you can configure the following parameters.

Parameter	Overview
<b>ACL Name</b>	Enter the name of ACL. The number of characters for the name can be up to 32.
<b>Type</b>	Enter the type of the trusted host. The options available are <b>Telnet</b> , <b>SSH</b> , <b>Ping</b> , <b>HTTP</b> and <b>HTTPS</b> (Hyper Text Transfer Protocol Secure).

Click **Apply** to add a new entry.

Click **Delete** to delete the entry specified.

## 8.13 Storm Control

Use the following window to implement the storm-control settings and display its settings.

Choose **Security > Storm Control** to display the following window.

Port	Storm	Action	Threshold	Current	State
G11/0/1	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
G11/0/2	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
G11/0/3	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
G11/0/4	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
G11/0/5	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
G11/0/6	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive

Figure 8-61 Storm Control (Level Type and PPS)

In the section of **Storm Control Polling Settings**, you can configure the following parameters.

Parameter	Overview
<b>Polling Interval</b>	Enter the value regarding a polling interval to use. The range is from 5 to 600 (seconds). By default, the value is 5 (seconds).
<b>Shutdown Retries</b>	Enter the value regarding the number of shutdown-retrials. The range is from 0 to 360. By default, the value is 3. If you set the <b>Unlimited</b> option to on, this function becomes disabled.

Click **Apply** to reflect the change.

In the section of **Storm Control Port Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Type</b>	Choose the storm-attack type to control it. The options available are <b>Broadcast</b> , <b>Multicast</b> and <b>Unicast</b> . If you configure <b>Shutdown</b> as an action, unicast refers to (or means) both known and unknown unicast packets. If the number of known and unknown unicast packets reaches the threshold specified, the port becomes shutdown. Other than that, unicast refers to unknown unicast packets.
<b>Action</b>	Choose an action to do. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>None</b> - Does not filter storm packets.</li> <li>• <b>Shutdown</b> - Shutdowns a port when reaching the value, which is specified for the rising threshold.</li> <li>• <b>Drop</b> - Drops the packets, which exceed the high threshold.</li> </ul>
<b>Level Type</b>	Choose the level-type option. The options available are <b>PPS</b> (Packets Per Second), <b>Kbps</b> and <b>Level</b> .
<b>PPS Rise</b>	Enter the value of PPS rise. This option specifies the upper rate of the packet count per second. The range is from 1 to 255,000 (packets) per second. If you do not specify the value of PPS low, the value equivalent to 80% of the rising-PPS specified becomes the default value.
<b>PPS Low</b>	Enter the value of PPS low. This option specifies the low rate of the packet-count per second. The range is from 1 to 255,000 (packets). If you do not specify the value of PPS low, the value equivalent to 80% of the rising-PPS specified becomes the default value.

Click **Apply** to reflect the change.

If you choose **Kbps** from **Level Type**, the following window is displayed.

Port	Storm	Action	Threshold	Current	State
Gi1/0/1	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/2	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/3	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/4	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/5	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/6	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive

Figure 8-62 Storm Control (Level Type, Kbps)

You can configure the following additional parameters.

Parameter	Overview
<b>KBPS Rise</b>	Enter the value of Kbps rise. This option specifies the rising-threshold with the rate (the number of kilo-bits per second). The rate receives traffics on the port. The range is from 1 to 2,147,483,647 (Kbps).
<b>KBPS Low</b>	Enter the value of Kbps low. This option specifies the low threshold on the rate (the number of kilo-bits per second). The rate receives traffics on the port. The range is from 1 to 2,147,483,647 (Kbps). If you do not specify the value of Kbps low, the value equivalent to 80% of the rising Kbps specified becomes the default value.

Click **Apply** to reflect the change.

If you choose **Level** from **Level Type**, the following window is displayed.

**Storm Control**

Storm Control Trap Settings  
 Trap State:

Storm Control Polling Settings  
 Polling Interval (5-600):  sec Shutdown Retries (0-360):  times  Infinite

Storm Control Port Settings  
 From Port:  To Port:  Type:  Action:  Level Type:  Level Rise (0-100):  % Level Low (0-100):  %

Total Entries: 18

Port	Storm	Action	Threshold	Current	State
Gi1/0/1	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/2	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/3	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/4	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/5	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive
Gi1/0/6	Broadcast	Drop	-	-	Inactive
	Multicast		-	-	Inactive
	Unicast		-	-	Inactive

Figure 8-63 Storm Control (Level Type, Level)

You can configure the following additional parameters.

Parameter	Overview
<b>Level Rise</b>	Enter the value of level rise. This option specifies the rising threshold (with a percent) to all the bandwidth per port, which receives traffics. The range is from 1 to 100 (%).
<b>Level Low</b>	Enter the value of level low. This option specifies the low threshold (with a percent) to all the bandwidth per port, which receives traffics. The range is from 1 to 100 (%). If you do not specify the value of level low, the value equivalent to 80% of the specified rising-level becomes the default value.

Click **Apply** to reflect the change.

## 8.14 SSH (Secure Shell)

### 8.14.1 SSH Global Settings

Use the following window to implement the global settings, which is associated with an SSH function, and display its settings.

Choose **Security > SSH > SSH Global Settings** to display the following window.

Figure 8-64 SSH Global Settings

In the section of **SSH Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>IP SSH Server State</b>	This parameter enables or disables to set an SSH server to global.
<b>IP SSH Service Port</b>	Enter the SSH service port-number (value) to use. The range is from 1 to 65,535. By default, the value is set to 22.
<b>Authentication Timeout</b>	Enter the value of an authentication time-out. The range is from 30 to 600 (seconds). By default, the value is set to 120 (seconds).
<b>Number of Authentication Retries</b>	Enter the value regarding the number of authentication-retries. The range is from 1 to 32. By default, the value is set to 3.

Click **Apply** to reflect the change.

## 8.14.2 Host Key

Use the following window to implement the settings on SSH host key and display its settings.

Choose **Security > SSH > Host Key** to display the following window.

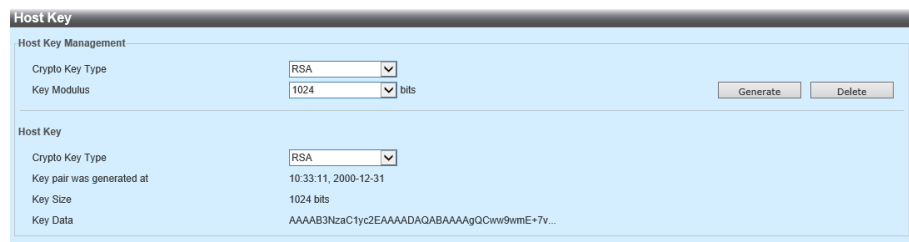


Figure 8-65 Host Key

In the section of **Host Key Management**, you can configure the following parameters.

Parameter	Overview
<b>Encryption Type</b>	Choose the encryption-key type to use. The options available are <b>RSA</b> (Rivest Shamir Adleman) key-type and <b>DSA</b> (Digital Signature Algorithm) key type.
<b>Key Module</b>	Choose the value of a key module. The values to choose are those bits: <b>360, 512, 768, 1024</b> and <b>2048</b> . Choose the value of the key module.

Click **Generate** to generate a host key based on the content selected.

Click **Delete** to delete a host key based on the content selected.

In the section of **Host key**, you can configure the following parameter.

Parameter	Overview
<b>Encryption Key Type</b>	Choose the encryption-key type you use. The options available are <b>RSA</b> and <b>DSA</b> .

### 8.14.3 SSH Server Connection

Use the following window to display the SSH server connection table and its information.

Choose **Security > SSH > SSH Server Connection** to display the following window.



The screenshot shows a window titled "SSH Server Connection". Inside the window, there is a section labeled "SSH Table". Below this label, it says "Total Entries: 0". Underneath, there is a table with five columns: "Session ID", "Version", "Cipher", "User ID", and "Client IP Address". The table is currently empty.

Session ID	Version	Cipher	User ID	Client IP Address
------------	---------	--------	---------	-------------------

Figure 8-66 SSH Server Connection

## 8.14.4 SSH User Settings

Use the following window to implement the SSH user settings and display its settings.

Choose **Security > SSH > SSH User Settings** to display the following window.

Figure 8-67 SSH User Settings

In the section of the **SSH User Settings**, you can configure the following parameters.

Parameter	Overview
<b>User Name</b>	Enter the user-name of an SSH user account. The number of characters for this can be up to 32.
<b>Authentication Method</b>	Choose the SSH authentication method. The options available are <b>Password</b> , <b>Public Key</b> and <b>Host-based</b> .
<b>Key File</b>	If you choose <b>Public Key</b> or <b>Host-based</b> , enter the public key. The number of characters for this can be up to 779.
<b>Host Name</b>	If you choose a host-based, enter its host-name. The number of characters can be up to 255 for the name.
<b>IPv4 Address</b>	If you choose a host-based, enter an IPv4 address of an SSH user-account.
<b>IPv6 Address</b>	If you choose a host-based, enter an IPv6 address of an SSH user-account.

Click **Apply** to add a new entry.

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

## 8.15 SSL (Secure Sockets Layer)

### 8.15.1 SSL Global Settings

Use the following window to implement the global settings, which is associated with an SSL function and to display its settings.

Choose **Security > SSL > SSL Global Settings** to display the following window.

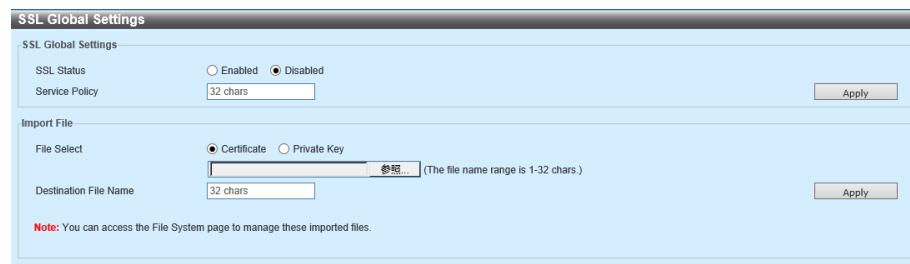


Figure 8-68 SSL Global Settings

In the section of **SSL Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>SSL Status</b>	This parameter enables or disables to set the SSL function to global.
<b>Service Policy</b>	Enter the name of the service policy. The number of characters for the name can be up to 32.

Click **Apply** to reflect the change.

In the section of **Import File**, you can configure the following parameters.

Parameter	Overview
<b>File Select</b>	Select a file type to upload. The options available are <b>Certificate</b> and <b>Private Key</b> . After you select the file type, browse the file located on a local computer by clicking the <b>Browser</b> button.
<b>Destination File Name</b>	Enter the destination file-name you use. The number of characters for the name can be up to 32.

Click **Apply** to import an SSL file.

## 8.15.2 Crypto PKI Trustpoint

Use the following window to implement the settings on the SSL encrypted PKI trustpoint and display its settings. PKI stands for Public Key Infrastructure.

Choose **Security > SSL > Crypto PKI Trustpoint** to display the following window.

Figure 8-69 Crypto PKI Trustpoint

In the section of **Crypto PKI Trustpoint**, you can configure the following parameters.

Parameter	Overview
<b>Trustpoint</b>	Enter the name of the trustpoint, which is associated with a certificate and key-pair imported. The number of characters for the name can be up to 32.
<b>File System Path</b>	Enter a file system path of a certificate and a key pair.
<b>Password</b>	Enter an encrypted password-phrase to use for decrypting when a private key is imported. The number of characters for the password-phrase can be up to 64. If you do not specify the password phrase, the null character-string must be used.
<b>TFTP Server Path</b>	Enter a TFTP server path.
<b>Type</b>	Choose a certificate type to be imported. The options available are as follows. <ul style="list-style-type: none"> <li>• <b>Both</b> - Imports a CA certificate, a local certificate, and a key pair; CA stands for certificate authority.</li> <li>• <b>CA</b> - Imports CA certificate.</li> <li>• <b>Local</b> - Imports a local certificate and a key pair.</li> </ul>

Click **Apply** to add a new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **Delete** to delete the entry specified.

### 8.15.3 SSL Service Policy

Use the following window to implement the settings on the SSL service policy and display its settings.

Choose **Security > SSL > SSL Service Policy** to display the following window.

Figure 8-70 SSL Service Policy

In the section of the **SSL Service Policy**, you can configure the following parameters.

Parameter	Overview
<b>Policy Name</b>	Enter the name of the SSL service policy. The number of characters for the name can be up to 32.
<b>Version</b>	Choose a version of Transport Layer Security (TLC). The options available are <b>TLS 1.0</b> , <b>TLS 1.1</b> and <b>TLS 1.2</b> .
<b>Session Cache Time-out</b>	Enter the time-out value of a session cache. The range is from 60 to 86,400 (seconds). By default, the value is set to 600 (seconds).
<b>Secure Trust Point</b>	Enter the name of the secure trust point. The number of characters for the name can be up to 32.
<b>Encryption Sweet</b>	Choose the cipher suite to associate with this profile.

Click **Apply** to add a new entry.

Click **Find** to search and display the entries based on the search condition specified.

Click **Edit** to edit the configuration of the entry specified.

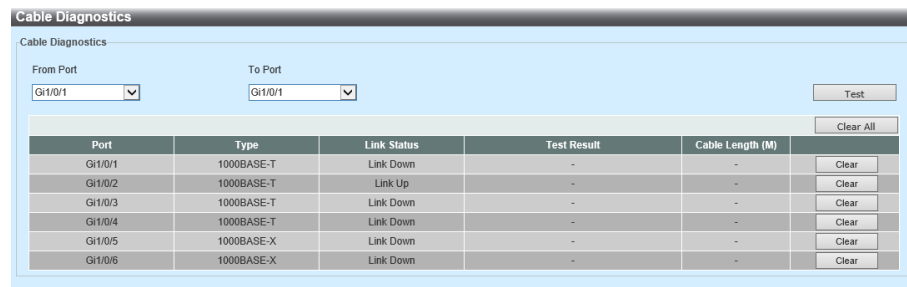
Click **Delete** to delete the entry specified.

# 9 OAM (Operations, Administration & Management)

## 9.1 Cable Diagnostics

Use the following window to start the cable diagnostic test for the port specified and display the result.

Choose **OAM > Cable Diagnostics** to display the following window.



The screenshot shows the 'Cable Diagnostics' window. At the top, there are two dropdown menus for 'From Port' and 'To Port', both set to 'Gi1/0/1'. A 'Test' button is located to the right of the 'To Port' dropdown. Below these is a 'Clear All' button. The main part of the window is a table with the following data:

Port	Type	Link Status	Test Result	Cable Length (M)	
Gi1/0/1	1000BASE-T	Link Down	-	-	Clear
Gi1/0/2	1000BASE-T	Link Up	-	-	Clear
Gi1/0/3	1000BASE-T	Link Down	-	-	Clear
Gi1/0/4	1000BASE-T	Link Down	-	-	Clear
Gi1/0/5	1000BASE-X	Link Down	-	-	Clear
Gi1/0/6	1000BASE-X	Link Down	-	-	Clear

Figure 9-1 Cable Diagnostics

In the section of **Cable Diagnostics**, you can configure the following parameter.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Test** to start the cable diagnostic test on the port(s) specified.

Click **Clear All** to clear all the results regarding the cable diagnostic.

Click **Clear** to clear the result for the cable-diagnostic of the port specified.

## 9.2 DDM (Digital Diagnostic Monitoring)

### 9.2.1 DDM Settings

Use the following window to implement the settings on the global settings (which is associated with a DDM function) and DDM shutdown of the port specified, and to display the settings.

Choose **DDM > DDM Settings** to display the following window.

Figure 9-2 DDM Settings

In the section of **DDM Global Settings**, you can configure the following parameters.

Parameter	Overview
<b>Transceiver Monitoring Traps Alarm</b>	This parameter enables and disables the transmission of the transceiver monitoring traps alarm.
<b>Transceiver Monitoring Traps Warning</b>	This parameter enables and disables the transmission of the transceiver monitoring traps warning.

Click **Apply** to reflect the change.

In the section of **DDM Shutdown Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables a DDM function on the port specified.
<b>Shutdown</b>	Choose the shutdown operation. The value and option to choose are as follows. <ul style="list-style-type: none"><li>• <b>Alarm</b> - This option allows you to shutdown a port when the value exceeds the range of the alarm threshold configured.</li><li>• <b>Warning</b> - This option allows you to shutdown a port when the value exceeds the range of the warning threshold configured.</li><li>• <b>None</b> - This option does not make a port shutdown regardless of when the value exceeds the threshold-range. This is the default option.</li></ul>

Click **Apply** to reflect the change.

## 9.2.2 DDM Temperature Threshold Settings

Use the following window to implement the settings on the DDM temperature threshold of the port specified and display its settings.

Choose **DDM > DDM Temperature Threshold Settings** to display the following window.

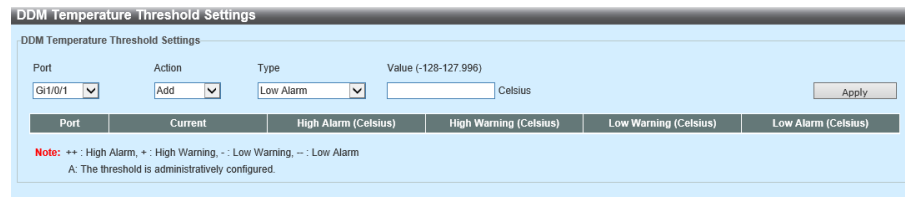


Figure 9-3 DDM Temperature Threshold Settings

In the section of **DDM Temperature Threshold Settings**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Action</b>	Choose an action to execute. The options available are <b>Add</b> and <b>Delete</b> .
<b>Type</b>	Choose the type of the temperature threshold. The options available are <b>Low Alarm</b> , <b>Low Warning</b> , <b>High Alarm</b> , and <b>High Warning</b> .
<b>Value</b>	Enter the threshold. The range is from -128 to 127.996.

Click **Apply** to reflect the change.

## 9.2.3 DDM Voltage Threshold Settings

Use the following window to implement the DDM voltage threshold settings on the port specified and display its settings.

Choose **DDM > DDM Voltage Threshold Settings** to display the following window.

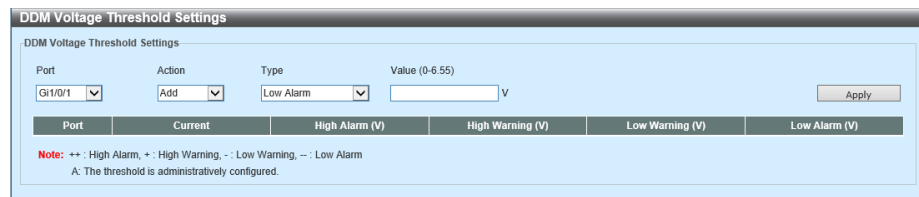


Figure 9-4 DDM Voltage Threshold Settings

In the section of **DDM Voltage Threshold Settings**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Action</b>	Choose an action to execute. The options available are <b>Add</b> and <b>Delete</b> .
<b>Type</b>	Choose the type of the voltage threshold. The options available are <b>Low Alarm</b> , <b>Low Warning</b> , <b>High Alarm</b> and <b>High Warning</b> .
<b>Value</b>	Enter the threshold; its range is from 0 to 6.55 (volts).

Click **Apply** to reflect the change.

## 9.2.4 DDM Bias Current Threshold Settings

Use the following window to implement the settings on the DDM bias current threshold of the port specified and display its settings.

Choose **DDM > DDM Bias Current Threshold Settings** to display the following window.

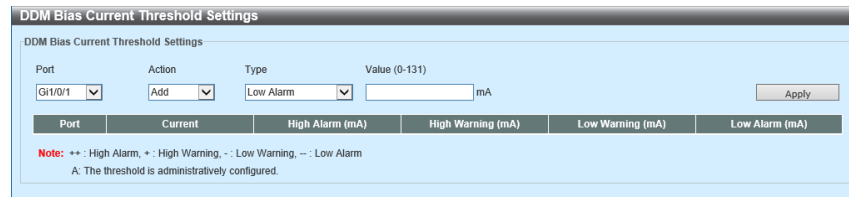


Figure 9-5 DDM Bias Current Threshold Settings

In the section of the settings on **DDM Bias Current Threshold**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Action</b>	Choose an action to execute. The options available are <b>Add</b> and <b>Delete</b> .
<b>Type</b>	Choose a type of a bias current threshold. The options available are <b>Alarm lower-limit</b> , <b>Alarm Upper-limit</b> and <b>Warning Upper-limit</b> .
<b>Value</b>	Enter the threshold; its range is from 0 to 131 (mA).

Click **Apply** to reflect the change.

## 9.2.5 DDM TX Power Threshold Settings

Use the following window to implement the settings on DDM TX power threshold of the port specified and display its settings.

Choose **DDM > DDM TX Power Threshold Settings** to display the following window.

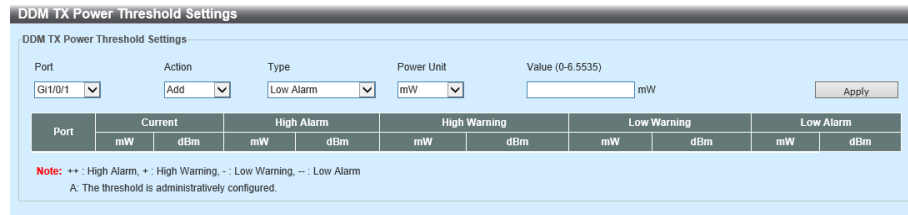


Figure 9-6 DDM TX Power Threshold Settings

In the section of **DDM TX Power Threshold Settings**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Action</b>	Choose the action you perform. The options available are <b>Add</b> and <b>Delete</b> .
<b>Type</b>	Choose the threshold type of a transmission power. The options available are <b>Low Alarm</b> , <b>Low Warning</b> , <b>High Alarm</b> and <b>High Warning</b> .
<b>Power Unit</b>	Choose the power unit. The options available are <b>mW</b> and <b>dBm</b> .
<b>Value</b>	Enter the threshold. <ul style="list-style-type: none"> <li>If you specify the threshold with <b>mW</b> unit, the range is from 0 to 6.5535 (mW).</li> <li>If you specify the threshold with <b>dBm</b> unit, the range is from -40 to 8.1647 (dBm).</li> </ul>

Click **Apply** to reflect the change.

## 9.2.6 DDM RX Power Threshold Settings

Use the following window to implement the settings on the DDM RX power threshold on the port specified and to display its settings.

Choose **DDM > DDM RX Power Threshold Settings** to display the following window.

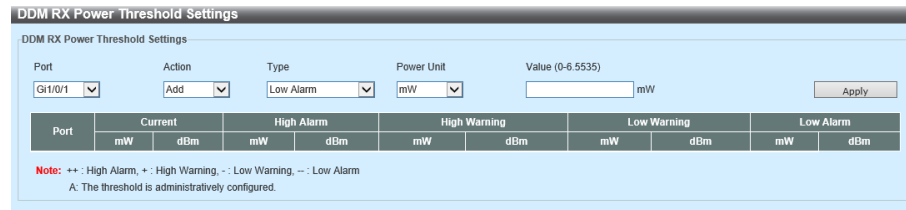


Figure 9-7 DDM RX Power Threshold Settings

In the section of **DDM RX Power Threshold Settings**, you can configure the following parameters.

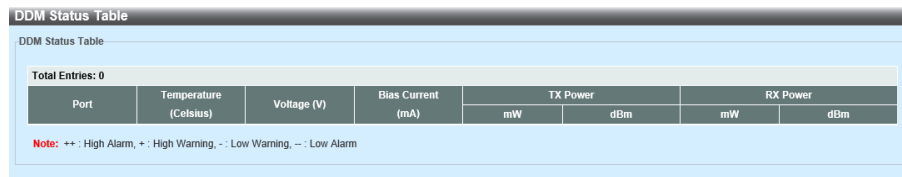
Parameter	Overview
<b>Port</b>	Choose the port you use.
<b>Action</b>	Choose an action to be executed. The options available are <b>Add</b> and <b>Delete</b> .
<b>Type</b>	Choose the type of RX power threshold. The options available are <b>Low Alarm</b> , <b>Low Warning</b> , <b>High Alarm</b> and <b>High Warning</b> .
<b>Power Unit</b>	Choose the power unit. The options available are <b>mW</b> and <b>dBm</b> .
<b>Value</b>	Enter the threshold. <ul style="list-style-type: none"> <li>When specifying the threshold in <b>mW</b>, the range is from 0 to 6.5535 (mW).</li> <li>When specifying the threshold in <b>dBm</b>, the range is from -40 to 8.1647 (dBm).</li> </ul>

Click **Apply** to reflect the change.

## 9.2.7 DDM Status Table

Use the following window to display the DDM status table and its information.

Choose **DDM > DDM Status Table** to display the following window.



DDM Status Table

DDM Status Table

Total Entries: 0

Port	Temperature (Celsius)	Voltage (V)	Bias Current (mA)	TX Power		RX Power	
				mW	dBm	mW	dBm

Note: ++: High Alarm, +: High Warning, -: Low Warning, --: Low Alarm

Figure 9-8 DDM Status Table

## 9.3 Ethernet OAM

### 9.3.1 Ethernet OAM Configuration

Use the following window to display the Ethernet OAM configuration.

Choose **OAM > Ethernet OAM > Ethernet OAM Configuration** to display the following window.

The screenshot shows the 'Ethernet OAM Configuration' window with the following sections:

- Ethernet OAM Configuration:** From Port: Gi1/0/1, To Port: Gi1/0/1, Status: Disabled, Mode: Active, PDU Max. Rate (1-10): 10 pps, PDU Min. Rate (1-10): 1 sec, Link Timeout (2-30): 5 sec, High-Threshold Action: None, Dying-gasp Action: None. [Apply]
- Remote Loopback Configuration:** From Port: Gi1/0/1, To Port: Gi1/0/1, Status: Not Supported, Timeout (1-10): 10 sec. [Apply]
- Link Monitoring Configuration:** From Port: Gi1/0/1, To Port: Gi1/0/1, Status: Supported, Frame Err. High Threshold (1-65535): [ ] frames, Frame Err. Low Threshold (0-65535): 1 frames, Frame Err. Window (10-600): 100 x 100 milliseconds, Frame Period Err. High Threshold (1-65535): [ ] frames, Frame Period Err. Low Threshold (0-65535): 1 frames, Frame Period Err. Window (1-65535): 1000 x 10000 frames, Recv-Frame CRC Err. High Threshold (1-65535): [ ] frames, Recv-Frame CRC Err. Low Threshold (0-65535): 10 frames, Recv-Frame CRC Err. Window (10-1800): 1000 x 100 milliseconds. [Apply]
- Ethernet OAM Status:** A table with columns: Port, Ethernet OAM, Remote Loopback, Link Monitoring, Remote Loopback (Start/Stop), and Detail.

Port	Ethernet OAM	Remote Loopback	Link Monitoring	Remote Loopback	Detail
Gi1/0/1	Disabled	Not Supported	Supported	Start Stop	Detail
Gi1/0/2	Disabled	Not Supported	Supported	Start Stop	Detail
Gi1/0/3	Disabled	Not Supported	Supported	Start Stop	Detail
Gi1/0/4	Disabled	Not Supported	Supported	Start Stop	Detail
Gi1/0/5	Disabled	Not Supported	Supported	Start Stop	Detail
Gi1/0/6	Disabled	Not Supported	Supported	Start Stop	Detail
Port-channel1	Disabled	Not Supported	Not Supported	Start Stop	Detail

Figure 9-9 Ethernet OAM Configuration

In the section of **Ethernet OAM Configuration**, you can configure the following parameters.

Parameter	Overview
<b>Threshold of CRC Errors for Receiving Frames (High)</b>	This parameter displays the upper-threshold of the threshold of error frames with CRC errors. The range is from 1 to 65,535. The default is none.

Parameter	Overview
<b>Threshold of CRC Errors for Receiving Frames (Low)</b>	This parameter displays the lower-threshold of the threshold of error frames with CRC errors exist. The range is from 0 to 65,535. The default is one.
<b>Window for the Threshold of CRC Errors for Receiving Frames</b>	This parameter displays the window size of the polling period. The range is from 10 to 1,800. The default is 100.

Click **Start** to start the remote loop-back.

Click **Stop** to stop the remote loop-back.

Click **Details** to display the configuration information on the Ethernet OAM.

### 9.3.2 Ethernet OAM (Discovery Information)

Use the following window to display the discovery information on the Ethernet OAM.

Choose **OAM > Ethernet OAM > Discovery Information** to display the following window.

Port	Ethernet OAM	Remote MAC Address	
Gi1/0/1	Disabled	-	Detail
Gi1/0/2	Disabled	-	Detail
Gi1/0/3	Disabled	-	Detail
Gi1/0/4	Disabled	-	Detail
Gi1/0/5	Disabled	-	Detail
Gi1/0/6	Disabled	-	Detail
Port-channel1	Disabled	-	Detail

Figure 9-10 Discovery Information

In the section of **Discovery Information**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	This parameter displays the port of the Internet OAM settings.
<b>Ethernet OAM</b>	This parameter displays if the Internet OAM settings is enabled or disabled.
<b>Remote MAC Address</b>	This parameter displays a remote MAC address of the Internet OAM settings.
<b>Port</b>	This parameter displays the port of the Internet OAM settings.
<b>Administrator Status</b>	This parameter displays if the Internet OAM settings is enabled or disabled.
<b>Mode</b>	This parameter displays if the Internet OAM mode is active or passive. The default is active.
<b>Remote Loop-back</b>	This parameter displays the beginning (support)/end (no support) of the remote loop-back.
<b>Remote Loop-back Status</b>	This parameter displays the state of the remote loop-back.
<b>Monitoring Link</b>	This parameter displays the beginning (support)/end (no support).
<b>PDU Revision</b>	This parameter describes about a PDU revision.
<b>MAC Address</b>	This parameter displays a MAC address of a remote client.

### 9.3.3 Ethernet OAM Statistics

Use the following window to display the statistics of the Ethernet OAM.

Choose **OAM > Ethernet OAM > Statistics** to display the following window.

Statistics Detail	
Statistics	
Port	Gi1/0/1
Counter	
Information OAMPDU TX	0
Information OAMPDU RX	0
Event Notification OAMPDU TX	0
Event Notification OAMPDU RX	0
Loopback Control OAMPDU TX	0
Loopback Control OAMPDU RX	0
Unsupported OAMPDU TX	0
Unsupported OAMPDU RX	0
Local Fault	
Link Fault Records	0
Dying Gasp Records	0
Remote Fault	
Link Fault Records	0
Dying Gasp Records	0
Local Event	
Errored Frame Records	0
Errored Frame Period Records	0
Errored CRC Records	0
Remote Event	
Errored Frame Records	0
Errored Frame Period Records	0
Errored CRC Records	0

Figure 9-11 Statistics

In the section of **Statistics**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	This parameter displays the port of the Internet OAM settings.
<b>OAMPDUTX</b>	This parameter displays the number of transmissions for OAM PDU.
<b>OAMPDURX</b>	This parameter displays the number of receptions for OAM PDU.
<b>Local Failure</b>	This parameter displays the number of failures to occur, regarding local-clients.
<b>Remote Failure</b>	This parameter displays the number of failures (to occur) of remote-clients.
<b>Local Event</b>	This parameter displays the number of local-client events to occur.
<b>Remote Event</b>	This parameter displays the number of remote-client events to occur.

Click **Clear All** to clear the statistics of each port.

Click **Details** to display the statistics information on the corresponding ports.

Click **Clear** to display the statistics information on the corresponding ports.

Statistics Detail	
Statistics	
Port	Gi1/0/1
Counter	
Information OAMPDU TX	0
Information OAMPDU RX	0
Event Notification OAMPDU TX	0
Event Notification OAMPDU RX	0
Loopback Control OAMPDU TX	0
Loopback Control OAMPDU RX	0
Unsupported OAMPDU TX	0
Unsupported OAMPDU RX	0
Local Fault	
Link Fault Records	0
Dying Gasp Records	0
Remote Fault	
Link Fault Records	0
Dying Gasp Records	0
Local Event	
Errored Frame Records	0
Errored Frame Period Records	0
Errored CRC Records	0
Remote Event	
Errored Frame Records	0
Errored Frame Period Records	0
Errored CRC Records	0

Figure 9-12 Statistics Details

In the section of **Statistics Detail**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	This parameter displays a port of the statistics details.
<b>OAMPDUTX Information</b>	This parameter displays the number of transmissions for information OAM PDU.
<b>OAMPDURX Information</b>	This parameter displays the number of receptions for information OAM PDU.
<b>OAM PDU TX Event Notification</b>	This parameter displays the number of transmissions for event notification PDU.
<b>OAM PDU RX Event Notification</b>	This parameter displays the number of receptions for event notification PDU.
<b>OAM PDU TX Loop-back Control</b>	This parameter displays the number of transmissions for loop-back PDU.
<b>OAM PDU RX Loop-back Control</b>	This parameter displays the number of receptions for loop-back PDU.

Parameter	Overview
<b>OAM PDU TX Unsupported</b>	This parameter displays the number of transmissions for unsupported PDU.
<b>OAM PDU RX: Unsupported</b>	This parameter displays the number of receptions for unsupported PDU.
<b>Link Failure Record</b>	This parameter displays the number of link-failures to occur.
<b>Serious Failure Record</b>	This parameter displays the number of dying gasps to occur.
<b>Error Frame Record</b>	This parameter displays the number of error frames.
<b>Error Frame Period Record</b>	This parameter displays a measurement interval of error frames.
<b>Frame Period Record</b>	This parameter displays the number of CRC error frames.

Click **Back** to close details on the statistics.

## 9.4 CFM

### 9.4.1 CFM Status

Use the following window to display the global settings on a CFM function.

Choose **CFM > CFM Status** to display the following window.

Figure 9-13 CFM Status Settings

In the section of **CFM Status**, you can configure the following parameters.

Parameter	Overview
<b>CFM Status</b>	This parameter displays if CFM is enabled or disabled.
<b>CFM Domain Table</b>	You can specify a domain-name (maintenance domain [MD]) using characters, within 43 characters.

Click **Apply/Create** to reflect the change.

## 9.4.2 CFM Maintenance Intermediate Point

Use the following window to display the definition of the CFM maintenance intermediate point (MIP).

Choose **CFM > CFM Maintenance Intermediate Point** to display the following window.

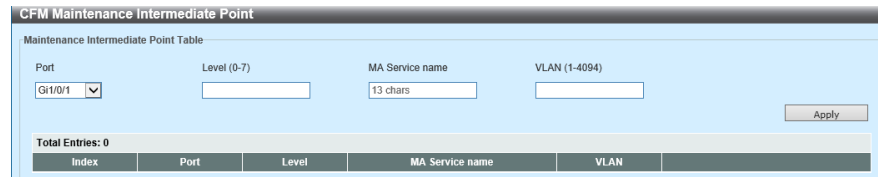


Figure 9-14 CFM Maintenance Intermediate Point

In the section of **CFM Maintenance Intermediate Point**, you can configure the following parameters.

Parameter	Overview
<b>Port</b>	This parameter displays a port.
<b>Level</b>	This parameter specifies an MD domain-level. The range is from 0 to 7.
<b>MA Service Name</b>	This parameter displays the name of MA (maintenance association): within 13 characters.
<b>VLAN</b>	This parameter displays a VLAN ID. The range is from 1 to 4,094.

Click **Apply** to reflect the change.

### 9.4.3 CFM Maintenance End Point

Use the following window to display the settings on CFM maintenance end point (MEP).

Choose **CFM > CFM Maintenance End Point** to display the following window.

Figure 9-15 CFM Maintenance End Point

In the section of **CFM Maintenance End Point**, you can configure the following parameters.

Parameter	Overview
<b>MEPID</b>	This parameter displays an ID of MEP (Maintenance End Point). The range is from 1 to 8191.
<b>Port</b>	This parameter displays a port.
<b>Level</b>	This parameter displays an MEP level. The range is from 0 to 7.
<b>MA Service</b>	This parameter displays a service-name.
<b>VLAN</b>	This parameter displays a VLAN.
<b>Direction</b>	This parameter displays an input direction of MEP (inward and outward).
<b>MEP Type</b>	This parameter displays the MEP type (remote MEP/ Local MEP).
<b>CC Status</b>	This parameter displays the status of CC (Continuity Check).

Click **Apply** to reflect the change.

## 9.4.4 CFM Maintenance Association

Use the following window to display the CFM maintenance association (MA).

Choose **CFM > CFM Maintenance Association** to display the following window.

Figure 9-16 CFM Maintenance Association

In the section of the **CFM Maintenance Association**, you can configure the following parameters.

Parameter	Overview
<b>Maintenance Domain Name</b>	This parameter displays the name of a maintenance domain.
<b>Level</b>	This parameter displays a maintenance level.
<b>Maintenance Association Name</b>	This parameter displays the name of maintenance association: within 12 characters.
<b>CC Interval</b>	This parameter displays the interval of CC (Continuity Check).
<b>Failure</b>	This parameter displays the state of failures.

Click **Create** to reflect the change.

## 9.4.5 CFM Loop-back

Use the following window to display the definition of CFM loop-back.

Choose **CFM > CFM Loop-back** to display the following window.

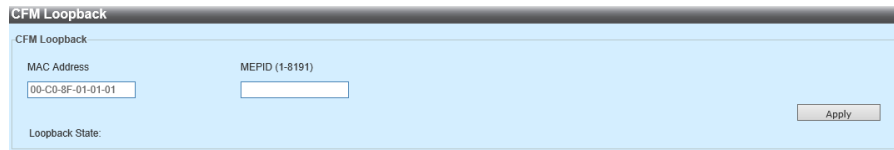


Figure 9-17 CFM Loop-back

In the section of **CFM Loop-back**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address</b>	This parameter displays a MAC address.
<b>MEPID</b>	This parameter displays MEPID. The range is from 1 to 8,191.

Click **Apply** to reflect the change.

## 9.4.6 CFM Linktrace

Use the following window to display the definition of the CFM linktrace.

Choose **CFM > CFM Linktrace** to display the following window.

Figure 9-18 CFM Linktrace Settings

In the section of **CFM Linktrace**, you can configure the following parameters.

Parameter	Overview
<b>MAC Address</b>	This parameter displays a MAC address.
<b>MEPID</b>	This parameter displays MEPID. The range is from 1 to 8,191.

Click **Apply** to reflect the change.

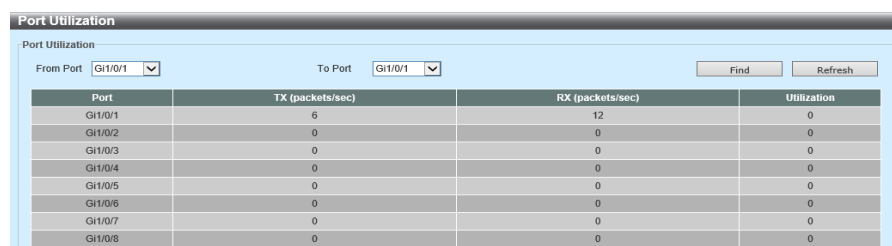
# 10 Monitoring

## 10.1 Utilization

### 11.1.1 Port Utilization

Use the following window to display a table of port-utilization and its information.

Choose **Monitoring > Utilization > Port Utilization** to display the following window.



Port	TX (packets/sec)	RX (packets/sec)	Utilization
Gi1/0/1	6	12	0
Gi1/0/2	0	0	0
Gi1/0/3	0	0	0
Gi1/0/4	0	0	0
Gi1/0/5	0	0	0
Gi1/0/6	0	0	0
Gi1/0/7	0	0	0
Gi1/0/8	0	0	0

Figure 10-1 Port Utilization

In the section of the **Port Utilization**, you can configure the following parameter.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Find** to display the port utilization information regarding the specified port(s).

Click **Refresh** to refresh the information displayed in the table above.

## 10.2 Statistics

### 10.2.1 Port

Use the following window to display the statistics for sending and receiving ports and its information.

Choose **Monitoring > Statistics > Port** to display the following window.

Port	RX				TX				Show Detail
	Rate		Total		Rate		Total		
	bytes/sec	packets/sec	bytes	packets	bytes/sec	packets/sec	bytes	packets	
Gi1/0/1	0	0	0	0	0	0	0	0	Show Detail
Gi1/0/2	0	0	34554114	226170	2352	37	37763711	102489	Show Detail
Gi1/0/3	0	0	94948	701	0	0	184864	2052	Show Detail
Gi1/0/4	0	0	0	0	0	0	0	0	Show Detail
Gi1/0/5	0	0	0	0	0	0	0	0	Show Detail
Gi1/0/6	0	0	0	0	0	0	0	0	Show Detail

Figure 10-2 Port

In the section of **Port**, you can configure the following parameter.

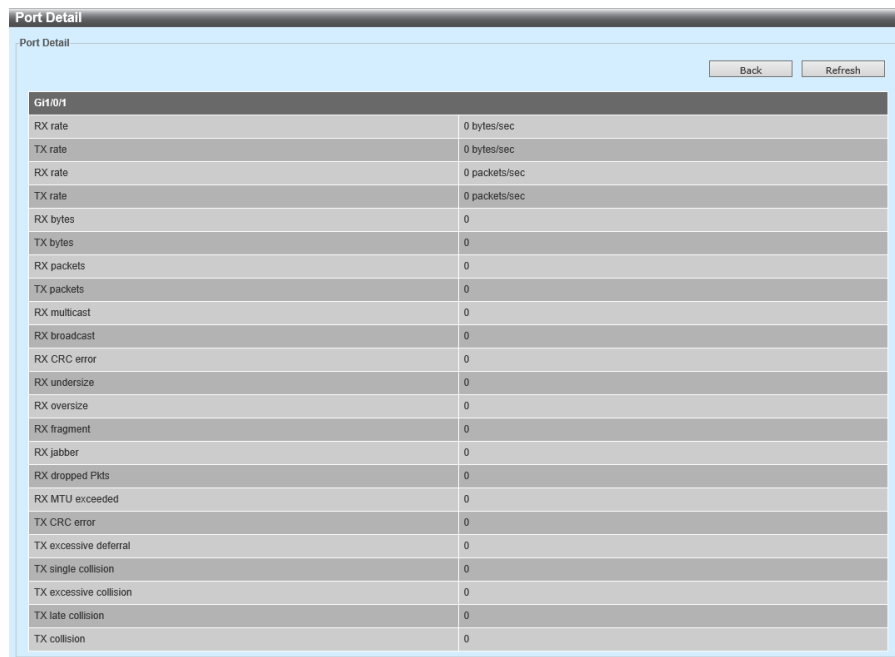
Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Find** to display the statistics information about the port specified.

Click **Refresh** to refresh the information displayed in a table.

Click **Show Detail** to display the details about the entry.

Click **Show Detail** to display the following window.



Port Detail	
Gif10/1	
RX rate	0 bytes/sec
TX rate	0 bytes/sec
RX rate	0 packets/sec
TX rate	0 packets/sec
RX bytes	0
TX bytes	0
RX packets	0
TX packets	0
RX multicast	0
RX broadcast	0
RX CRC error	0
RX undersize	0
RX oversize	0
RX fragment	0
RX jabber	0
RX dropped PKts	0
RX MTU exceeded	0
TX CRC error	0
TX excessive deferral	0
TX single collision	0
TX excessive collision	0
TX late collision	0
TX collision	0

Figure 10-3 Port (Show Detail.)

Click **Back** to return to the previous window.

Click **Refresh** to refresh the information displayed in a table.

## 10.2.2 Interface Counters

Use the following window to display the interface-counter statistics and its information.

Choose **Monitoring > Statistics > Interface Counters** to display the following window.

Port	InOctets	InUcastPkts	InMcastPkts	InBcastPkts	OutOctets	OutUcastPkts	OutMcastPkts	OutBcastPkts	Show Errors
Gi1/0/1	0	0	0	0	0	0	0	0	Show Errors
Gi1/0/2	34691217	111678	59974	55134	37855016	100117	2643	2	Show Errors
Gi1/0/3	94948	660	41	0	184864	944	180	928	Show Errors
Gi1/0/4	0	0	0	0	0	0	0	0	Show Errors
Gi1/0/5	0	0	0	0	0	0	0	0	Show Errors
Gi1/0/6	0	0	0	0	0	0	0	0	Show Errors

Figure 10-4 Interface Counters

In the section of the **Interface Counters**, you can configure the following parameter.

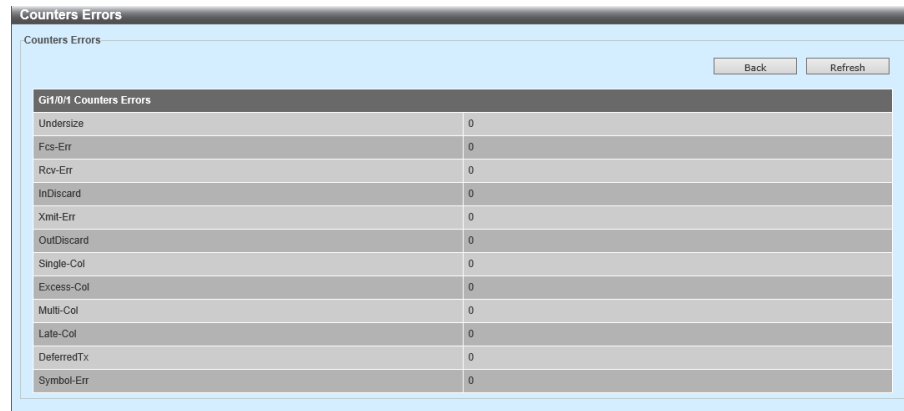
Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Find** to display the interface counter regarding the specified port(s).

Click **Refresh** to refresh the information displayed in a table.

Click **Show Errors** to display error details on this entry.

Click **Show Errors** to display the following window.



The screenshot shows a window titled "Counters Errors" with a light blue background. At the top right, there are two buttons: "Back" and "Refresh". Below the buttons is a table with the following data:

GIG/0/1 Counters Errors	
Undersize	0
Fcs-Err	0
Rcv-Err	0
InDiscard	0
Xmit-Err	0
OutDiscard	0
Single-Col	0
Excess-Col	0
Multi-Col	0
Late-Col	0
DeferredTx	0
Symbol-Err	0

Figure 10-5 Interface Counters (Show Errors.)

Click **Back** to return to the previous window.

Click **Refresh** to refresh the information displayed in a table.

## 10.2.3 Counters

Use the following window to display and clear the link-change counters of the port specified.

Choose **Monitoring > Statistics > Counters** to display the following window.

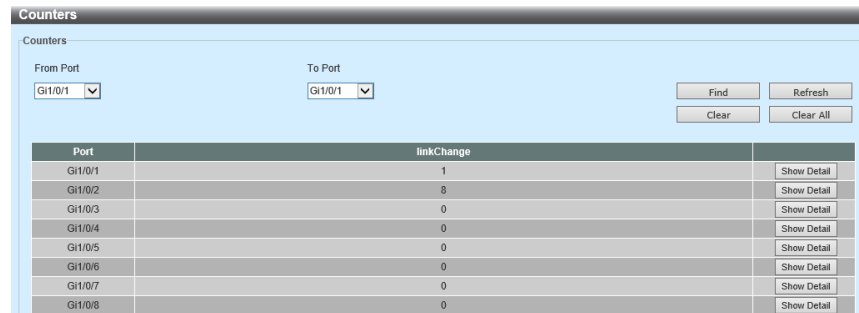


Figure 10-6 Counters

In the section of **Counters**, you can configure the following parameter.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.

Click **Find** to display the information on the link-change counters regarding the specified port(s).

Click **Refresh** to refresh the information displayed in the table above.

Click **Clear** to clear the information on the link-change counters regarding the specified port.

Click **Clear ALL** to clear information on all the link change counters.

Click **Show Detail** to display details on the entry.

Click **Show Detail** to display the following window.

The screenshot shows a window titled 'Port Counters Detail' with a 'Back' and 'Refresh' button in the top right corner. The main content is a table with two columns: the counter name and its value. The table is divided into sections: 'G11/01 Counters' and 'ifInErrors'.

G11/01 Counters	
rxHCTotalPkts	371673
txHCTotalPkts	263135
rxHCUnicastPkts	192069
txHCUnicastPkts	263130
rxHCMulticastPkts	173987
txHCMulticastPkts	1
rxHCBroadcastPkts	5617
txHCBroadcastPkts	4
rxHCOctets	56552356
txHCOctets	55376668
rxHCPk64Octets	134885
rxHCPk65to127Octets	150724
rxHCPk128to255Octets	9301
rxHCPk256to511Octets	40645
rxHCPk512to1023Octets	36010
rxHCPk1024to1518Octets	108
rxHCPk1519to1522Octets	0
rxHCPk1519to2047Octets	0
rxHCPk2048to4095Octets	0
rxHCPk4096to9216Octets	0
txHCPk64Octets	2474
txHCPk65to127Octets	89904
txHCPk128to255Octets	10
txHCPk256to511Octets	169620
txHCPk512to1023Octets	382
txHCPk1024to1518Octets	745
txHCPk1519to1522Octets	0
txHCPk1519to2047Octets	0
txHCPk2048to4095Octets	0
txHCPk4096to9216Octets	0
rxCRCErrors	0
rxUndersizedPkts	0
rxOversizedPkts	0
rxFragmentPkts	0
rxJabbers	0
rxSymbolErrors	0
txCollisions	0
ifInErrors	0
ifOutErrors	0
ifInDiscards	369021
ifOutDiscards	10
txCRC	0
dot3StatsSingleColFrames	0
dot3StatsMultiColFrames	0
dot3StatsDeferredTransmissions	0
dot3StatsLateCollisions	0
dot3StatsExcessiveCollisions	0
dot3StatsFrameTooLongs	0
linkChange	1

Figure 10-7 Counters (Show Detail.)

Click **Back** to return to the previous window.

Click **Refresh** to refresh the information displayed in the table above.

## 10.3 Mirror Settings

Use the following window to implement the settings on a port mirror and display its settings.

Choose **Monitoring > Mirror Settings** to display the following window.

Figure 10-8 Mirror Settings

In the section of **RSPAN VLAN Settings**, you can configure the following parameter.

Parameter	Overview
<b>VID List</b>	Enter the RSPAN VLAN ID you use. You can enter its consecutive VLAN IDs, by delimiting with a comma, or you can enter the range of VLAN IDs by delimiting with a hyphen. The range is from 2 to 4,094.

Click **Apply** to add the new entry.

Click **Delete** to delete entries based on the information specified.

In the section of **Mirror Settings**, you can configure the following parameters.

Parameter	Overview
<b>Session Number</b>	Choose the mirror-session number of this entry. The range of the number is from 1 to 4.
<b>Destination</b>	Choose and configure the destination settings on this port-mirror entry. Choose <b>Port</b> or <b>Remote VLAN</b> of the destination. <ul style="list-style-type: none"> <li>• <b>Port</b> - Choose the destination port-number.</li> <li>• <b>Remote VLAN</b> - Choose the destination port-number.</li> <li>• Enter <b>VID</b> in the entry field displayed. The range of VID is from 2 to 4,094.</li> </ul>
<b>Source</b>	Choose and configure the source settings on this port-mirror entry. Choose <b>Port</b> , <b>ACL</b> or <b>Remote VLAN</b> of the source. <ul style="list-style-type: none"> <li>• <b>Port</b> - Choose the range of the port-number by using <b>From Port</b> to <b>To Port</b>. Choose a <b>Frame Type</b>.</li> <li>• The options to choose from the frame-type is as follows. <ul style="list-style-type: none"> <li>o<b>Both</b> - Traffics of both reception and transmission direction are mirrored. Traffics in both incoming and outgoing directions are mirrored.</li> <li>o<b>Reception (RX)</b> - traffics in only the incoming direction are mirrored.</li> <li>o<b>Transmission (TX)</b> - traffics in only the outgoing direction are mirrored.</li> <li>o<b>CPU RX</b> - Monitors CPU RX traffics.</li> </ul> </li> <li>• <b>ACL</b> - Enter the <b>ACL Name</b> in the entry field displayed. The number of characters for the name can be up to 32.</li> <li>• <b>Remote VLAN</b> - Enter a remote VID in the entry field displayed. The range is from 2 to 4,094.</li> </ul>

Click **Apply** to add a new entry.

Click **Delete** to delete entries based on the information specified.

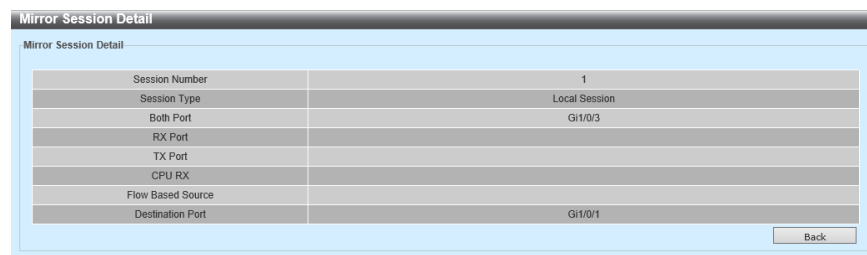
In the section of **Mirror Session Table**, you can configure the following parameter.

Parameter	Overview
<b>Session Type</b>	Choose the mirror-session type of information to be displayed. The options available are <b>All Sessions</b> , <b>Session Number</b> , <b>Remote Session</b> and <b>Local Session</b> . If you choose the <b>Session Number</b> option, choose the session number from the drop-down menu. The range is from 1 to 4.

Click **Find** to search and display the entries based on the search condition specified.

Click **Show Detail** to display details on the entry.

Click **Show Detail** to display the following window.



The screenshot shows a window titled "Mirror Session Detail" with a table of session parameters. The table has two columns: the parameter name and its value. The values are: Session Number (1), Session Type (Local Session), Both Port (Gi1/0/3), RX Port, TX Port, CPU RX, Flow Based Source, and Destination Port (Gi1/0/1). A "Back" button is located at the bottom right of the window.

Mirror Session Detail	
Session Number	1
Session Type	Local Session
Both Port	Gi1/0/3
RX Port	
TX Port	
CPU RX	
Flow Based Source	
Destination Port	Gi1/0/1

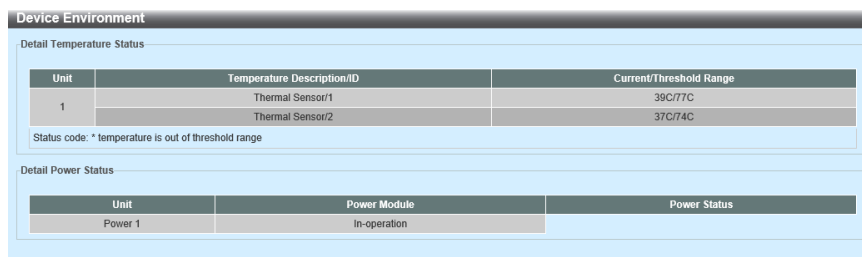
Figure 10-9 Mirror Session Detail (Show Detail.)

Click **Back** to return to the previous window.

## 10.4 Device

Use the following window to display the value of the current temperature measurement, fan condition and power-module state in a switch.

Choose **Monitoring > Device Environment** to display the following window.



The screenshot shows a window titled "Device Environment" with two main sections: "Detail Temperature Status" and "Detail Power Status".

**Detail Temperature Status**

Unit	Temperature Description/ID	Current/Threshold Range
1	Thermal Sensor/1	39C/77C
	Thermal Sensor/2	37C/74C

Status code: \* temperature is out of threshold range

**Detail Power Status**

Unit	Power Module	Power Status
Power 1	In-operation	

Figure 10-10 Device Environment

# 11 ECO Mode

## 11.1 Power-Saving

Use the following window to implement the settings on the power-saving and display its settings.

Choose **ECO Mode > Power-Saving** to display the following window.

Port	Link	Type	Mode	Power Saving Mode
Gi1/0/1	Down	1000T	Auto	Disabled
Gi1/0/2	Up	1000T	Auto(1GF)	Disabled
Gi1/0/3	Down	1000T	Auto	Disabled
Gi1/0/4	Down	1000T	Auto	Disabled
Gi1/0/5	Down	1000T	Auto	Disabled
Gi1/0/6	Down	1000T	Auto	Disabled

Figure 11-1 Power-Saving

In the section of **Power-Saving Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>Power-Saving Mode</b>	<p>Choose the power-saving mode to use on the port specified. The options available are as follows.</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b> - Disables the power-saving function.</li> <li>• <b>Full</b> - Uses the power-saving function, maximally.</li> <li>• <b>Half</b> - Uses half of the power-saving function.</li> <li>• This applies to all the cases; if the function is not used at all or is maximally used, normally.</li> </ul>

Click **Apply** to reflect the change.

## 11.2 EEE (Energy Efficient Ethernet)

Use the following window to implement the settings on EEE of the port specified and display its settings.

Choose **ECO Mode > EEE** to display the following window.

Port	State
G1/0/1	Disabled
G1/0/2	Disabled
G1/0/3	Disabled
G1/0/4	Disabled
G1/0/5	Disabled
G1/0/6	Disabled

Figure 11-2 EEE

In the section of **EEE Settings**, you can configure the following parameters.

Parameter	Overview
<b>From Port/ To Port</b>	Choose the port you use.
<b>State</b>	This parameter enables or disables an EEE function on the port specified.

Click **Apply** to reflect the change.

## 11.3 LED-Base Mode

Use the following window to display the settings on the LED-base mode.

Choose **OAM > Echo Mode > LED-Base Mode (State)** to display the following window.



Figure 11-3 LED-Base Mode

Click **Apply** to reflect the change.

# 12 sFlow

## 12.1 sFlow

### 12.1.1 sFlow Settings

Use the following window to display the definition of a sFlow collector.

Click **sFlow** to display the following window.

Figure 12-1 sFlow Settings

You can configure the following parameters.

Parameter	Overview
<b>Collector IP Status</b>	This parameter displays if the host IPv4 address (which is used as the sFlow collector) is valid or invalid.
<b>Collector IP</b>	This parameter displays the host IPv4 address, which is used as the sFlow collector.
<b>Collector UDP Port</b>	This parameter displays the port-number of sFlow messages. If not specified, the port-number is set to 6,343, as the default configuration. The range is from 1 to 65,535.
<b>Sampler Rate Status</b>	This parameter displays if the settings on the sampler rate is enabled or disabled.
<b>Sampler Rate</b>	This parameter displays the frequency of performing a sampling: the number of frames needed for the sFlow sampler rate. The sFlow sampler rate is calculated by $1/\text{rate}$ . The range is from 1,024 to 65,536.

Parameter	Overview
<b>Sampler Data Source Interface</b>	This parameter displays the port of sFlow sampler data source to enable it. The valid (or effective) interface is the physical interface.
<b>Sampler-Poller Interval Status</b>	This parameter displays if the settings on the sampler poller interval is enabled or disabled.
<b>Sampler-Poller interval</b>	This parameter displays the sampler-poller interval (unit: seconds). The range is from 0 to 86,400. If the number above is set to 0, the sFlow counter sample is not transmitted.
<b>Sampler-Poller Interface</b>	This parameter specifies the interface to enable the sFlow counter sampling. The valid (or effective) interface is the physical interface.

Click **Apply** to reflect the change.

# 13 Tool Bar

## 13.1 Save

### 13.1.1 Save Configuration

Use the following window to save the running configuration as the start-up configuration. Doing so prevents the loss of configuration during a power-failure.

Choose **Save > Save Configuration** in the tool-bar to display the following window.

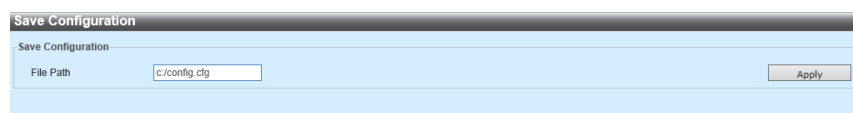


Figure 13-1 Save Configuration

In the section of **Save Configuration**, you can configure the following parameter.

Parameter	Overview
<b>File Path</b>	Enter a file-name and a path in the entry field displayed.

Click **Apply** to save the configuration.

## 13.2 Tool

### 13.2.1 Firmware Upgrade & Backup

#### 13.2.1.1 Firmware Upgrade from HTTP (Servers)

Use the following window to upgrade firmware in a switch by using HTTP from a local PC.

Choose **Tools > Firmware Upgrade & Backup > Firmware Upgrade from HTTP** from the tool-bar to display the following window.

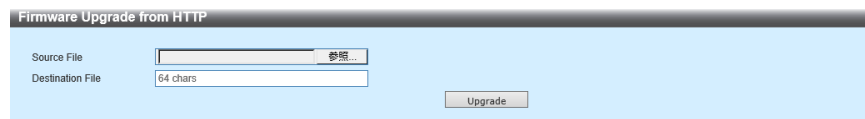


Figure 13-2 Firmware Upgrade from HTTP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>Source File</b>	Click <b>Browse</b> to navigate to the location where a firmware file exists (on the local PC) for this upgrade.
<b>Destination File</b>	Enter the destination path and location in the switch where new firmware is stored (or saved). The number of characters for this field can be up to 64.

Click **Upgrade** to start upgrading.

### 13.2.1.2 Firmware Upgrade from TFTP

Use the following window to upgrade firmware in a switch from a TFTP server.

Choose **Tool > Firmware Upgrade & Backup > Firmware Upgrade from TFTP (Servers)** to display the following window.

Figure 13-3 Firmware Upgrade from TFTP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>TFTP Server IP</b>	Enter an IP address of a TFTP server. <ul style="list-style-type: none"> <li>• <b>IPv4</b> - Choose and enter an IPv4 address of a TFTP server.</li> <li>• <b>IPv6</b> - Choose and enter an IPv6 address of a TFTP server.</li> <li>• <b>IPv6</b> - Choose and enter an IPv6 address of a TFTP server.</li> </ul>
<b>Source File</b>	Enter the source file-name and path of a firmware file in a TFTP server. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination path and location in the switch where new firmware is stored. The number of characters for this field can be up to 64.

Click **Upgrade** to start upgrading.

### 13.2.1.3 Firmware Upgrade from FTP Servers

Use the following window to upgrade firmware in a switch from an RCP server.

Choose **Tool >Firmware Upgrade & Backup > Firmware Upgrade from an FTP Server** on the tool-bar to display the following window.

Figure 13-4 Firmware Upgrade from the FTP Server

You can configure the following parameters.

Parameter	Overview
<b>FTP Server IP</b>	Enter an IP address of the FTP server.
<b>TCP Port (1-65535)</b>	Enter the TCP port of the FTP connection.
<b>Username</b>	Enter the user-name of the FTP connection. The number of characters for the name can be up to 32.
<b>Password</b>	Enter the password of the FTP connection. The number of characters for the name can be up to 15.
<b>Source File</b>	Enter the path and name of a source file of the firmware file existing in an FTP server. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination path and its location on the switch where new firmware is saved. The number of characters for this field can be up to 64.

Click **Upgrade** to start upgrading.

### 13.2.1.4 Firmware Upgrade from RCP

Use the following window to upgrade the firmware existing in a switch from an RCP server.

Choose **Tool > Firmware Upgrade and Backup > Firmware Upgrade from RCP (Servers)** to display the following window.

Figure 13-5 Firmware Upgrade from RCP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>RCP Server IP</b>	Enter an IP address of one RCP server.
<b>User Name</b>	Enter a user-name of the RCP connection. The number of characters for the name can be up to 32.
<b>Source File</b>	Enter a source file-name and path of a firmware file in an RCP server. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination path and location in the switch where new firmware is saved. The number of characters for this field can be up to 64.

Click **Upgrade** to start upgrading.

### 13.2.1.5 Firmware Backup to HTTP

Use the following window to save a backup copy of the firmware existing in a switch into a local PC with HTTP.

Choose **Tool > Firmware Upgrade & Backup > Firmware Backup to HTTP (Servers)** to display the following window.

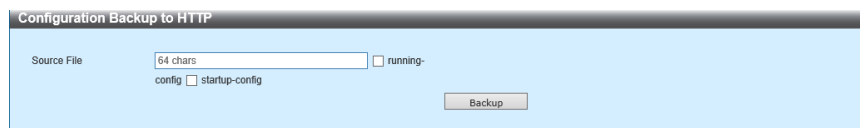


Figure 13-6 Firmware Backup to HTTP (Servers)

You can configure the following parameter.

Parameter	Overview
<b>Source File</b>	Enter the source file-name and path of a firmware file in a switch. The number of characters for this field can be up to 64.

Click the **Backup** button to start the backup.

### 13.2.1.6 Firmware Backup to TFTP

Use the following window to save the backup copy of firmware existing in a switch into a TFTP server.

Choose **Tool > Firmware Upgrade & Backup > Firmware Backup to TFTP (Servers)** on the tool-bar to display the following window.

Figure 13-7 Firmware Upgrade from TFTP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>TFTP Server IP</b>	Enter an IP address of a TFTP server. <ul style="list-style-type: none"> <li>• <b>IPv4</b> - Choose and enter an IPv4 address of a TFTP server.</li> <li>• <b>IPv6</b> - Choose and enter an IPv6 address of a TFTP server.</li> </ul>
<b>Source File</b>	Enter the source file-name and path of a firmware file in a switch. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination file-name and path of a firmware file to be backed up into a TFTP server. The number of characters for this field can be up to 64.

Click **Backup** to start performing a backup.

### 13.2.1.7 Firmware Backup to FTP Servers

Use the following window to save a backup copy of firmware in a switch into an RCP server.

Choose **Tool > Firmware Upgrade & Backup > Firmware Backup to an FTP Server** on the tool-bar to display the following window.

Figure 13-8 Firmware Backup to the FTP Server

You can configure the following parameters.

Parameter	Overview
<b>FTP Server IP</b>	Enter an IP address of an FTP server.
<b>TCP Port (1-65535)</b>	Enter the TCP port of the FTP connection.
<b>Username</b>	Enter the user-name of the FTP connection. The number of characters for the name can be up to 32.
<b>Password</b>	Enter the password of the FTP connection. The number of characters for the name can be up to 15.
<b>Source File</b>	Enter the path and name of a source file of the firmware file existing in a switch. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination-file name and its path of a firmware file to be backed up into an FTP server. The number of characters for this field can be up to 64.

Click **Backup** to start making a backup.

### 13.2.1.8 Firmware Backup to RCP

Use the following window to save a backup copy of the firmware existing in a switch into an RCP server.

Choose **Tool > Firmware Upgrade & Backup > Firmware Backup to RCP (Servers)** on the tool-bar to display the following window.

Figure 13-9 Firmware Backup to RCP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>RCP Server IP</b>	Enter an IP address of the RCP server.
<b>User Name</b>	Enter the user-name of the RCP connection. The number of characters for the name can be up to 32.
<b>Source File</b>	Enter the source file-name and its path of a firmware file in a switch. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter a destination file-name and its path of a firmware file to be backed up into the RCP server. The number of characters for this field can be up to 64.

Click **Backup** to start performing a backup.

## 13.2.2 Configuration Restore & Backup

### 13.2.2.1 Configuration Restore from HTTP

Use the following window to restore the configuration in a switch by using HTTP from a local PC.

Choose **Tool > Configuration Restore & Backup > Configuration Restore from HTTP** from the tool-bar to display the following window.



Figure 13-10 Configuration Restore from HTTP

You can configure the following parameters.

Parameter	Overview
<b>Source File</b>	Click <b>Browse</b> to move to the location where a configuration file (on the local PC) exists for the purpose of this restoration.
<b>Destination File</b>	Enter a destination path and a location in the switch where a configuration file is saved. The number of characters for this field can be up to 64. <ul style="list-style-type: none"> <li>• If you choose the <b>running-config</b> option, the configuration file being executed in a switch is restored to be overwritten.</li> <li>• If you choose the <b>startup-config</b> option, a start-up configuration file in a switch is restored to be overwritten.</li> </ul>
<b>Replace</b>	If you choose this option, a configuration file in a switch is replaced by this file.

Click **Restore** to start restoring.

### 13.2.2.2 Configuration Restore from TFTP

Use the following window to recover the switch configuration from a TFTP server.

Choose **Tool > Configuration Recovery & Backup > Configuration Restore from TFTP (Servers)** to display the following window.

Figure 13-11 Configuration Restore from TFTP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>TFTP Server IP</b>	Enter an IP address of a TFTP server. <ul style="list-style-type: none"> <li>• <b>IPv4</b> - Choose and enter an IPv4 address of a TFTP server.</li> <li>• <b>IPv6</b> - Choose and enter an IPv6 address of a TFTP server.</li> </ul>
<b>Source File</b>	Enter the source file-name and path of a configuration file in a TFTP server. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter a destination path and a location in the switch where a configuration file is saved. The number of characters for this field can be up to 64. <ul style="list-style-type: none"> <li>• If you choose the <b>running-config</b> option, the configuration file being executed is restored to be overwritten.</li> <li>• If you choose the <b>startup-config</b> option, the start-up configuration file in a switch is restored to be overwritten.</li> </ul>
<b>Replace</b>	If you use choose this option, a configuration file in a switch is replaced by this file.

Click **Restore** to start restoring.

### 13.2.2.3 Configuration Recovery from FTP Servers

Use the following window to recover the configuration of a switch from an FTP server.

Choose **Tool > Configuration Recovery & Backup > Configuration Recovery from an FTP Server** on the tool-bar to display the following window.

Figure 13-12 Configuration Recovery from the FTP Server

You can configure the following parameters.

Parameter	Overview
<b>FTP Server IP</b>	Enter an IP address of an FTP server.
<b>TCP Port (1-65535)</b>	Enter the TCP port of the FTP connection.
<b>Username</b>	Enter the username of the FTP connection. The number of characters for the name can be up to 32.
<b>Password</b>	Enter the password of the FTP connection. The number of characters for the name can be up to 15.
<b>Source File</b>	Enter the path and name of a source file of a configuration file existing in an FTP server. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination path and its location on the switch where a configuration file is saved. The number of characters for this field can be up to 64. <ul style="list-style-type: none"> <li>If you choose the <b>running-config</b> option, the configuration file, which is in progress of being executed by a switch, is recovered and overwritten.</li> <li>If you choose <b>startup-config</b> option, the start-up configuration file on a switch is recovered and overwritten.</li> </ul>
<b>Replace</b>	If you choose this option, a configuration file on a switch is replaced using the file.

Click **Restore** to start restoring.

### 13.2.2.4 Configuration Restore from RCP

Use the following window to restore the configuration of a switch from an RCP server.

Choose **Tools > Configuration Restore & Backup > Configuration Restore from RCP (Servers)** from the tool-bar to display the following window.

Figure 13-13 Configuration Restore from RCP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>RCP Server IP</b>	Enter an IP address of the RCP server.
<b>User Name</b>	Enter the user-name of the RCP connection. The number of characters for the name can be up to 32.
<b>Source File</b>	Enter the source file-name and path of a configuration file in an RCP server. The number of characters for this field can be up to 64.
<b>Destination File</b>	Enter the destination path and location in a switch that saves a configuration file. The number of characters for this field can be up to 64. <ul style="list-style-type: none"> <li>If you choose the <b>running-config</b> option, the configuration file being executed in a switch is restored to be overwritten.</li> <li>If you choose the <b>startup-config</b> option, a start-up configuration file in a switch is restored to be overwritten.</li> </ul>
<b>Replace</b>	If you choose this option, a configuration file in a switch is replaced by this file.

Click **Restore** to start restoring.

### 13.2.2.5 Configuration Backup to HTTP

Use the following window to save a backup copy of a switch configuration into a local PC by using HTTP.

Choose **Tools > Configuration Restore & Backup > Configuration Backup to HTTP (Servers)** from the tool-bar to display the following window.

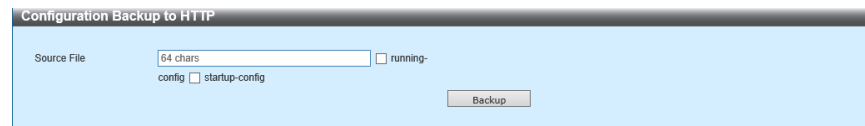


Figure 13-14 Configuration Backup to HTTP (Servers)

You can configure the following parameter.

Parameter	Overview
<b>Source File</b>	<p>Enter the source file-name and path of a configuration file in a switch. The number of characters for this field can be up to 64.</p> <ul style="list-style-type: none"> <li>If you choose the <b>running-config</b> option, the configuration file being executed in a switch is backed up.</li> <li>If you choose the <b>startup-config</b> option, a start-up configuration file in a switch is backed up.</li> </ul>

Click **Backup** to start performing a backup.

### 13.2.2.6 Configuration Backup to TFTP

Use the following window to save a backup copy of a switch configuration into a TFTP server.

Choose **Tool > Configuration Restore & Backup > Configuration Backup to TFTP (Servers)** from the tool-bar to display the following window.

Figure 13-15 Configuration Backup to TFTP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>TFTP Server IP</b>	Enter an IP address of a TFTP server. <ul style="list-style-type: none"> <li>• <b>IPv4</b> - Choose and enter an IPv4 address of a TFTP server.</li> <li>• <b>IPv6</b> - Choose and enter an IPv6 address of a TFTP server.</li> </ul>
<b>Source File</b>	Enter the source file-name and path of a configuration file in a switch. The number of characters for this field can be up to 64. <ul style="list-style-type: none"> <li>• If you choose the <b>running-config</b> option, a backup of the configuration file being executed in a switch is created.</li> <li>• If you choose the <b>startup-config</b> option, a startup configuration file in a switch is backed up.</li> </ul>
<b>Destination File</b>	Enter a destination path and a location on the TFTP server where a configuration file is saved. The number of characters for this field can be up to 64.

Click **Backup** to start performing a backup.

### 13.2.2.7 Configuration Backup to FTP Servers

Use the following window to save a backup copy of the switch configuration into an FTP server.

Choose **Tool > Configuration Recovery & Backup > Configuration Backup to an FTP Server** on the tool-bar to display the following window.

Figure 13-16 Configuration Backup to the FTP Server

You can configure the following parameters.

Parameter	Overview
<b>FTP Server IP</b>	Enter an IP address of an FTP server.
<b>TCP Port (1-65535)</b>	Enter the TCP port of the FTP connection.
<b>Username</b>	Enter the user-name of the FTP connection. The number of characters for the name can be up to 32.
<b>Password</b>	Enter the password of the FTP connection. The number of characters for the name can be up to 15.
<b>Source File</b>	Enter the source-file name and its path of a configuration file on a switch. The number of characters for this field can be up to 64. <ul style="list-style-type: none"> <li>If you choose the <b>running-config</b> option, the configuration file, which is in progress of being executed by a switch, is backed up.</li> <li>If you choose <b>startup-config</b> option, the start-up configuration file on a switch is backed up.</li> </ul>
<b>Destination File</b>	Enter the destination path and its location on the RCP server where a configuration file is saved. The number of characters for this field can be up to 64.

Click **Backup** to start making a backup.

### 13.2.2.8 Configuration Backup to RCP

Use the following window to save a backup copy of a switch configuration into an RCP server.

Choose **Tools > Configuration Restore & Backup > Configuration Backup to RCP** from the tool-bar to display the following window.

Figure 13-17 Configuration Backup to RCP

You can configure the following parameters.

Parameter	Overview
<b>RCP Server IP</b>	Enter an IP address of an RCP server.
<b>User Name</b>	Enter the user-name of the RCP connection. The number of characters for the name can be up to 32.
<b>Source File</b>	<p>Enter the source file-name and path of a configuration file in a switch. The number of characters for this field can be up to 64.</p> <ul style="list-style-type: none"> <li>If you choose the <b>running-config</b> option, a backup of the configuration file being executed in a switch is made.</li> <li>If you choose the <b>startup-config</b> option, a backup of a start-up configuration file in a switch is made.</li> </ul>
<b>Destination File</b>	Enter a destination path and a location on the RCP server, where a configuration file is saved. The number of characters for this field can be up to 64.

Click **Backup** to start the backup.

## 13.2.3 Log Backup

### 13.2.3.1 Log Backup to HTTP

Use the following window to save system-logs of a switch or a copy of attack-logs into a local PC by using HTTP.

Choose **Tool > Log Backup > Log Backup to HTTP** in the tool-bar to display the following window.

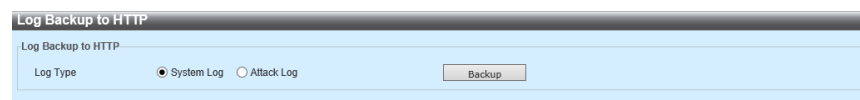


Figure 13-18 Log Backup to HTTP

You can configure the following parameter.

Parameter	Overview
<b>Log Type</b>	Choose the log-type, which is backed up to the local PC by using HTTP. <ul style="list-style-type: none"><li>• <b>System Log</b> - Ensures to back up system-logs.</li><li>• <b>Attack Log</b> - Ensures to back up attack-logs.</li></ul>

Click **Backup** to start performing a backup.

### 13.2.3.2 Log-backup to TFTP

Use the following window to save a copy of system-logs or attack-logs of a switch into a TFTP server.

Choose **Tools > Log Backup > Log Backup to TFTP (Servers)** from the tool-bar to display the following window.

Figure 13-19 Log Backup to TFTP (Servers)

You can configure the following parameters.

Parameter	Overview
<b>TFTP Server IP</b>	Enter an IP address of a TFTP server. <ul style="list-style-type: none"> <li>• <b>IPv4</b> - Choose and enter an IPv4 address of the TFTP server.</li> <li>• <b>IPv6</b> - Choose and enter an IPv6 address of the TFTP server.</li> </ul>
<b>Destination File</b>	Enter the destination path and location on the TFTP server where log files are saved. The number of characters for this field can be up to 64.
<b>Log Type</b>	Choose the log type, which is backed up to the TFTP server. <ul style="list-style-type: none"> <li>• <b>System Log</b> - The system log is backed up.</li> <li>• <b>Attack Log</b> - Ensures that the attack-logs are backed up.</li> </ul>

Click **Backup** to start performing a backup.

### 13.2.3.3 Log Backup to RCP

Use the following to save a copy of system-logs or attack-logs on the switch into an RCP server.

Choose **Tools > Log Backup > Log Backup to RCP** from the tool-bar to display the following window.

Figure 13-20 Log Backup to RCP

You can configure the following parameters.

Parameter	Overview
<b>RCP Server IP</b>	Enter an IP address of the RCP server.
<b>User Name</b>	Enter the user-name of the RCP connection. The number of characters for the name can be up to 32.
<b>Destination File</b>	Enter the destination path and location on the RCP server where a log-file is saved (or stored). The number of characters for this field can be up to 64.
<b>Log Type</b>	Choose the log type to save its backup into an RCP server. <ul style="list-style-type: none"> <li>• <b>System Log</b> - The system log is backed up.</li> <li>• <b>Attack Log</b> - The attack log is backed up.</li> </ul>

Click **Backup** to start performing a backup.

## 13.2.4 Ping

Use the following window to ping a destination IPv4/IPv6 address or a domain-name and to perform a test for the network connection. The access list can be applied to a ping request.

Choose **Tool > Ping** in the tool-bar to display the following window.

Figure 13-21 Ping

In the section of **Ping Access Class**, you can configure the following parameters.

Parameter	Overview
<b>ACL Name</b>	Enter the ACL name you use. The number of characters for the name can be up to 32. Click <b>Please Select</b> to choose the existing ACL from a related list.
<b>Action</b>	Choose the action you take. The options available are <b>Add</b> and <b>Clear</b> .

Click **Apply** to use the access control list selected.

In the section of **IPv4 Ping**, you can configure the following parameters.

Parameter	Overview
<b>Target IPv4 Address</b>	Choose and enter a destination IPv4 address.
<b>Domain Name</b>	Choose and enter the name of a destination domain. The number of characters for this can be up to 255.
<b>Number of Pings</b>	Enter the number of Ping-trials on the IPv4 address, which is configured in this window. The range is from 1 to 255. If you check (or tick) the <b>Unlimited</b> , keep transmitting ICMP echo packets to the IPv4 address specified until a program stops.
<b>Time-out</b>	Enter the time-out time of Ping messages. If packets cannot detect an IPv4 address within the time specified, Ping packets are dropped (or removed). The range is from 1 to 99 (seconds).
<b>Source IPv4 Address</b>	Enter a source IPv4 address. If two or more IPv4 addresses are allocated to a switch, you can enter one of them. The IPv4 address entered is used as the source IPv4 address of packets, which are transmitted to a remote host.

Click **Start** to start the IPv4 Ping.

In the section of **IPv6 Ping**, you can configure the following parameters.

Parameter	Overview
<b>Target IPv6 Address</b>	Choose and enter a destination IPv6 address.
<b>Domain Name</b>	Choose and enter the name of a destination domain. The number of characters for this can be up to 255.
<b>Number of Pings</b>	Enter the number of Ping-trials in the IPv6 address, which is configured in this window. The range is from 1 to 255. If you check (or tick) the <b>Unlimited</b> check-box, keep transmitting ICMP echo packets to the IPv6 address specified until a program stops.
<b>Time-out</b>	Enter the time-out time for a Ping message. If packets cannot detect an IPv6 address within the time specified, Ping packets are dropped (or removed). The range is from 1 to 99 (seconds).
<b>Source IPv6 Address</b>	Enter a source IPv6 address. If two or more IPv6 addresses are allocated to a switch, you can enter one of them. The IPv6 address entered is used as the source IPv6 address of packets, which are transmitted to a remote host.

Click **Start** to start the IPv6 Ping.

Choose and enter the **IPv4 Ping** parameter, and then click **Start** to display the following window.

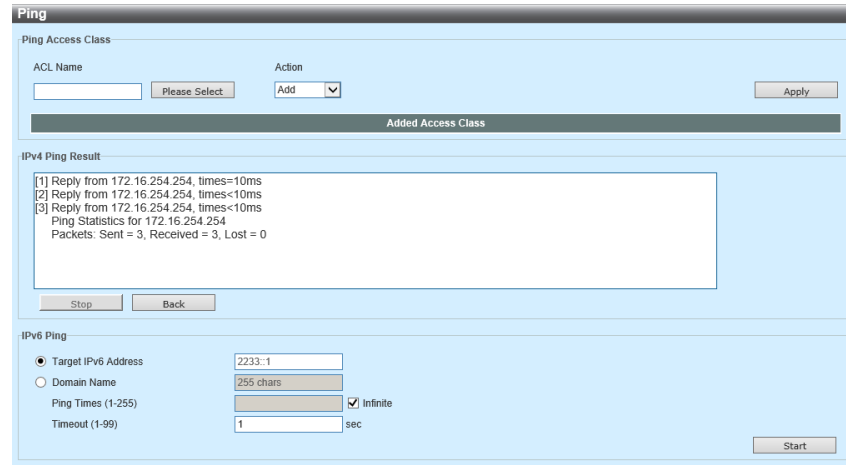


Figure 13-22 Ping (Result)

Click **Stop** to stop the ping process.

Click **Back** to return to the previous ping window.

Click **Please Select** to display the following window.

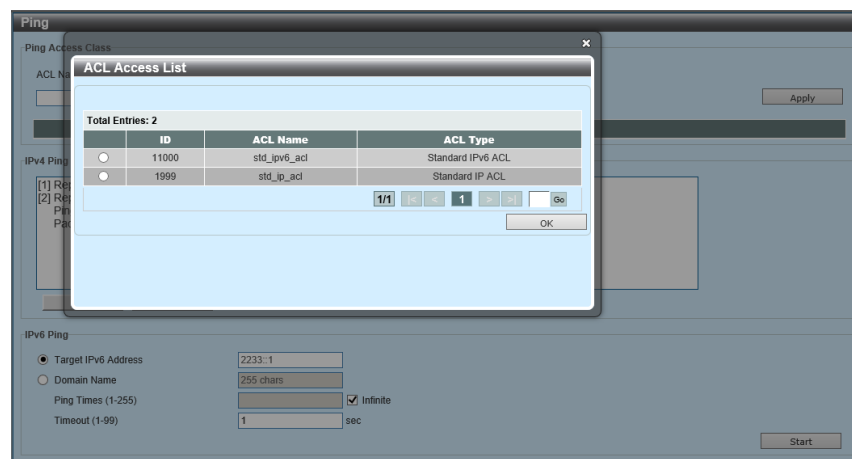


Figure 13-23 Ping (Please Select.)

If two or more pages exist, enter the page numbers. Then click **Go** to move to a specific page.

Click **OK** to use the access control list selected.

## 13.2.5 Trace Route

Use the following window to trace a route to either a destination IPv4/IPv6 address or a domain-name and to perform a test for the network connection.

Choose **Tools > Trace Route** from a tool-bar to display the following window.

The screenshot shows a window titled "Trace Route" with two sections: "IPv4 Trace Route" and "IPv6 Trace Route". Each section has radio buttons for "IPv4 Address" and "Domain Name", and input fields for "Max TTL (1-255)", "Port (1-65535)", "Timeout (1-65535) sec", and "Probe Number (1-1000)". A "Start" button is located at the bottom right of each section.

Figure 13-24 Trace Route

In the section of **IPv4 Trace Route**, you can configure the following parameters.

Parameter	Overview
<b>IPv4 Address</b>	Choose and enter a destination IPv4 address.
<b>Domain-Name</b>	Choose and enter the domain-name of a destination. The number of characters for it can be up to 255.
<b>Max TTL</b>	Enter the maximum value for Time-To-Live (TTL) of the trace route request. This is the maximum number of routers, which allow trace-route packets to pass (or flow). The trace-route option passes while investigating the network path between two devices. The range is from 1 to 255 (hops).
<b>Port</b>	Enter the port-number whose range is from 1 to 65,535.
<b>Time-out</b>	Enter the time-out period while waiting for a response coming from a remote device. The range is from 1 to 65,535 (seconds). The default value is 5 (seconds).
<b>Probe Number</b>	Enter the number of probe-times. The range is from 1 to 1,000. The default value is 1.

Click **Start** to start the IPv4 trace-route.

In the section of **IPv6 Trace Route**, you can configure the following parameters.

Parameter	Overview
<b>IPv6 Address</b>	Choose and enter a destination IPv6 address.
<b>Domain Name</b>	Choose and enter a destination domain-name. The number of characters for it can be up to 255.
<b>Max TTL</b>	Enter the maximum value of TTL of a trace-route request. This is the maximum number of routers where trace-route packets can pass. The trace-route option passes when seeking the network path between two devices. The range is from 1 to 255 (hops).
<b>Port</b>	Enter the port-number whose range is from 1 to 65,535.
<b>Time-out</b>	Enter the time-out period (needed) when waiting for the response coming from a remote device. The range is from 1 to 65,535 (seconds). The default value is 5 seconds.
<b>Probe Number</b>	Enter the number of probe times. The range is from 1 to 1,000. The default value is 1 (second).

Click **Start** to start the IPv6 trace-route.

Choose and enter the **IPv4 Trace Route** parameter and click **Start** to display the following window.

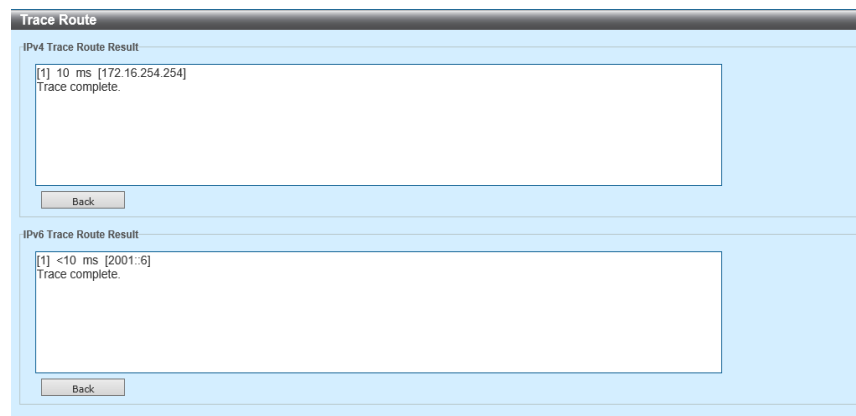


Figure 13-25 Trace Route (Result)

Click **Back** to return to the previous **Trace-Route** window.

## 13.2.6 Reset

Use the following window to reset the value (of a switch) to the value of a factory default settings on a switch software configuration.

Choose **Tools > Reset** from the tool-bar to display the following window.

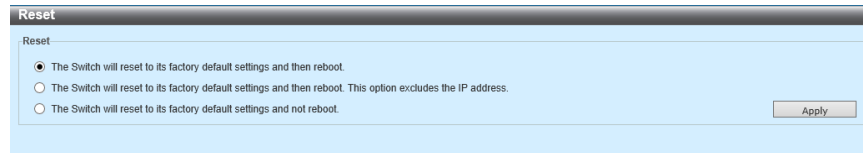


Figure 13-26 Reset

You can configure the following parameter.

Parameter	Overview
<b>Reset</b>	<p>Choose one of the following reset options.</p> <ul style="list-style-type: none"><li>• Your switch is reset to the factory default settings to restart.</li><li>• This option excludes an <b>IP Address</b> from the reset target.</li><li>• Your switch is reset to the factory default settings, but does not restart.</li></ul>

Click **Apply** to reset to the factory default settings.

## 13.2.7 Reboot System

Use the following window to reboot a switch. New configuration changes are made as the last (or previous) reboot or power-on becomes lost if the changes were not saved during the last time.

Choose **Tools > Reboot System** from the tool-bar to display the following window.

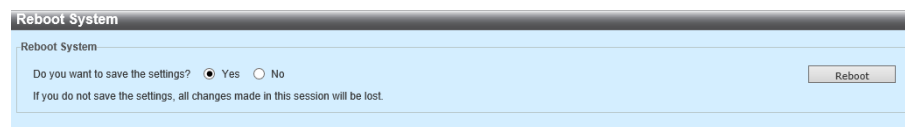


Figure 13-27 Reboot System

Click **Yes** to save the new configurations changed before rebooting.

Click **No** to discard the new configurations changed before rebooting.

Click **Reboot** to reboot the device.

## 13.3 Language

Choose a language of Web UI. By default, you can choose either English or Japanese.

Choose a language as illustrated in the screen below.



Figure 13-28 Language

## 13.4 Log Out

Click **Log Out** on the tool-bar to log out from Web UI of a switch.

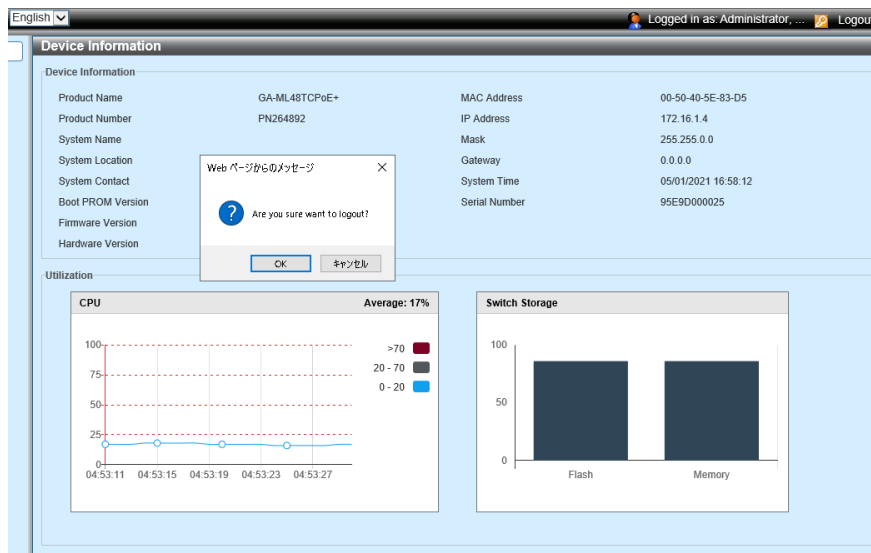


Figure 13-29 Log Out

# 14 Appendix - System Log Entries

## 14.1 802.1X

ID	Overview of Logs	Severity
1.	<p>Overview of events: 802.1X authentication is successful to implement.            Log message: 802.1X](&lt;method&gt;) Authorized user &lt;username&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt; to VLAN &lt;vid&gt;            Overview of parameters:            method: indicates either local or RADIUS.            username: the user to be authenticated            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch            vid: the VLAN ID to be allowed</p>	Information
2.	<p>Overview of events: a 802.1X authentication failure occurs.            Log message: 802.1X](&lt;method&gt;)Rejected user &lt;username&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt;            Overview of parameters:            method: indicates either local or RADIUS.            username: the user to be authenticated            macaddr: a MAC address of a device to be authenticated            portNum: the port-number of a switch</p>	Notice
3.	<p>Overview of events: as the 802.1X authentication table is full, a new address cannot be authenticated.            Log message: 802.1X]Rejected &lt;macaddr&gt; on Port &lt;portNum&gt; (auth table was full)            Overview of parameters:            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch</p>	Notice

## 14.2 AAA

ID	Overview of Logs	Severity
1.	<p>Overview of events: log-in is successful.</p> <p>Log message: successful login through &lt;Console   Telnet   SSH&gt;(Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;)</p> <p>Overview of parameters:</p> <p>ipaddr: indicates an IP address.</p> <p>username: indicates a user-name.</p> <p>ipv6address: indicates an IPv6 address.</p>	Information
2.	<p>Overview of events: log-in failed.</p> <p>Log message: log-in failed through &lt;Console   Telnet   SSH&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;)</p> <p>Overview of parameters:</p> <p>ipaddr: indicates an IP address.</p> <p>username: indicates a user-name.</p> <p>ipv6address: indicates an IPv6 address.</p>	Warning
3.	<p>Overview of events: log-out</p> <p>Log message: logout through &lt;Console   Telnet   SSH&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;)</p> <p>Overview of parameters:</p> <p>ipaddr: indicates an IP address.</p> <p>username: indicates a user-name.</p> <p>ipv6address: indicates an IPv6 address.</p>	Information
4.	<p>Overview of events: session timed out.</p> <p>Log message: &lt;Console   Telnet &gt; session timed out (Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;)</p> <p>Overview of parameters:</p> <p>ipaddr: indicates an IP address.</p> <p>username: indicates a user-name.</p> <p>ipv6address: indicates an IPv6 address.</p>	Information
5.	<p>Overview of events: an SSH server is enabled.</p> <p>Log message: SSH server is enabled.</p>	Information
6.	<p>Overview of events: an SSH server is disabled.</p> <p>Log message: SSH server is disabled</p>	Information
7.	<p>Overview of events: an authentication policy is enabled.</p> <p>Log message: authentication policy is enabled (Module: AAA).</p>	Information
8.	<p>Overview of events: an authentication policy is disabled.</p> <p>Log message: authentication policy is disabled (Module: AAA).</p>	Information
9.	<p>Overview of events: log-in failed because of the AAA server time-out or inaccurate configuration.</p> <p>Log message: login failed through &lt;Console   Telnet   SSH&gt; from &lt;ipaddr   ipv6address&gt; due to AAA server &lt;ipaddr   ipv6address&gt; timeout or improper configuration (Username: &lt;username&gt;)</p> <p>Overview of parameters:</p> <p>ipaddr: indicates an IP address.</p> <p>ipv6address: indicates an IPv6 address.</p> <p>username: indicates a user-name.</p>	Warning

ID	Overview of Logs	Severity
10.	<p>Overview of events: the migration of administrative privileges is successful with the AAA local authentication, the server authentication or without an authentication.</p> <p>Log message: Successful Enable Admin through &lt;Console   Telnet   SSH&gt; from &lt;ipaddr   ipv6address&gt; authenticated by AAA &lt;local   none   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:  local: migrates administrative privileges by the AAA local authentication.  none: migrates the administrative privileges without an AAA authentication.  server: migrates administrative privileges by an AAA server authentication.  ipaddr: indicates an IP address.  ipv6address: indicates an IPv6 address.  username: indicates a user-name.</p>	Information
11.	<p>Overview of events: migrating administrative privileges privilege failed because of the AAA server time-out or improper configuration.</p> <p>Log message: Enable Admin failed through &lt;Console   Telnet   SSH&gt; from &lt;ipaddr   ipv6address&gt; due to AAA server &lt;ipaddr   ipv6address&gt; timeout or improper configuration (Username: &lt;username&gt;)</p> <p>Overview of parameters:  ipaddr: indicates an IP address.  ipv6address: indicates an IPv6 address.  username: indicates a user-name.</p>	Warning
12.	<p>Overview of events: the migration of administrative privileges failed because of the AAA local authentication or AAA server authentication.</p> <p>Log message: Enable Admin failed through &lt;Console   Telnet   SSH&gt; from &lt;ipaddr   ipv6address&gt; authenticated by AAA &lt; local   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:  local: migrates administrative privileges with an AAA local authentication.  server: migrates administrative privileges with an AAA server authentication.  ipaddr: indicates an IP address.  ipv6address: indicates an IPv6 address.  username: indicates an user-name.</p>	Warning
13.	<p>Overview of events: log-in is successful with an AAA local authentication, sever authentication or without any authentication.</p> <p>Log message: successful login through &lt;Console   Telnet   SSH&gt; from &lt; ipaddr   ipv6address &gt; authenticated by AAA &lt;local   none   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:  local: specifies an AAA local authentication.  none: this specifies no authentication.  server: specifies an AAA server authentication.  ipaddr: indicates an IP address.  ipv6address: indicates an IPv6 address.  username: indicates a user-name.</p>	Information

ID	Overview of Logs	Severity
14.	<p>Overview of events: log-in failure occurs because of the authentication of either AAA local or AAA server.</p> <p>Log message: log-in failed through &lt;Console   Telnet   SSH&gt; from &lt;ipaddr   ipv6address&gt; authenticated by AAA &lt;local   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:</p> <p>local: specifies an AAA local authentication.</p> <p>server: specifies an AAA server authentication.</p> <p>ipaddr: indicates an IP address.</p> <p>ipv6address: indicates an IPv6 address.</p> <p>username: indicates a user-name.</p>	Warning

## 14.3 ARP

ID	Overview of Logs	Severity
1.	<p>Overview of events: duplicated IPs are detected in gratuitous ARP. Log message: a conflicting IP is detected with this device (IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Port &lt;portNum&gt;, Interface: &lt;ipif_name&gt;) Overview of parameters: ipaddr: duplicated IP addresses with the device (in the progress of) being used. macaddr: a MAC address of a device with an IP address that overlaps with the device in use. portNum: this indicates an integer and the logical port-number of a device. ipif_name: the interface name of a switch with a conflicting IP address.</p>	Warning

## 14.4 Authentication (2 Steps)

ID	Overview of Logs	Severity
1.	<p>Overview of events: 2-step authentication is successful.            Log message: &lt;step-mode&gt;] (&lt;method&gt;) Authorized user &lt;username&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt; to VLAN &lt;vid&gt;            Overview of parameters:            step-mode: indicates the 2-step authentication mode.            method: indicates either local or RADIUS.            username: the user that is being authenticated.            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch.            vid: indicates a VLAN ID to be authorized.</p>	Information
2.	<p>Overview of events: MAC WEB authenticaiton failures.            Log message: MAC-WEB] (&lt;method&gt;) Rejected at MAC auth &lt;macaddr&gt; on Port &lt;portNum&gt;            Overview of parameters:            method: indicates either local or RADIUS.            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch.</p>	Notice
3.	<p>Overview of events: failing to implement the MAC WEB authenticaiton            Log message: MAC-WEB] (&lt;method&gt;) Rejected at WEB auth user &lt;username&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt;            Overview of parameters:            method: indicates either local or RADIUS.            username: the user that is being rejected.            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch.</p>	Notice
4.	<p>Overview of events: MAC-802.1X authenticaiton failures.            Log message: MAC-802.1X] (&lt;method&gt;) Rejected at MAC auth &lt;macaddr&gt; on Port &lt;portNum&gt;            Overview of parameters:            method: indicates either local or RADIUS.            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch.</p>	Notice
5.	<p>Overview of events: failing to implement the MAC-802.1X authenticaiton            Log message: MAC-802.1X] (&lt;method&gt;) Rejected at 802.1X auth user &lt;username&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt;            Overview of parameters:            method: indicates either local or RADIUS.            username: indicates rejected users.            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch.</p>	Notice
6.	<p>Overview of events: 802.1X-WEB authentication failures.            Log message: 802.1X-WEB] (&lt;method&gt;) Rejected at 802.1X auth user &lt;username&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt;            Overview of parameters:            method: indicates either local or RADIUS.            username: indicates rejected users.            macaddr: a MAC address of a device to be authenticated.            portNum: the port-number of a switch.</p>	Notice

ID	Overview of Logs	Severity
7.	Overview of events: 802.1X-WEB authentication failures. Log message: 802.1X-WEB] (<method>) Rejected at WEB auth user <username> (<macaddr>) on Port <portNum> Overview of parameters: method: indicates either local or RADIUS. username: indicates rejected users. macaddr: a MAC address of a device to be authenticated. portNum: the port-number of a switch.	Notice

## 14.5 BPDU Guard

ID	Overview of Logs	Severity
1.	Overview of events: BPDU attacks have occurred. Log message: Port<portNum> enter BPDU under attacking state (mode: drop / block / shutdown) Overview of parameters: portNum: indicates the port-number. mode: the current condition regarding BPDU.	Information
2.	Overview of events: recovering from BPDU attacks automatically is successful. Log message: Port <portNum> recovers from BPDU under attacking state automatically. Overview of parameters: portNum: indicates the port-number.	Information
3.	Overview of events: recovering from BPDU attacks manually is successful. Log message: Port<portNum> recovers from BPDU under attacking state manually. Overview of parameters: portNum: indicates the port-number.	Information

## 14.6 Command

ID	Overview of Logs	Severity
1.	<p>Overview of events: command-logging. Log message: "&lt;command-str&gt;" executed by &lt;username&gt; from &lt;line&gt;, IP: &lt;ip-address&gt;]</p> <p>Overview of parameters:</p> <p>username: the account-name that has executed this command. command-str: the command strings, which is executed successfully and makes a change to a switch configuration. line: this parameter indicates the line mode, which executes these commands (e.g. console, telnet and SSH). ip-address: (optional) If you type the command from a remote terminal (e.g. telnet and SSH), this parameter is needed.</p>	Information

## 14.7 Configuration/Firmware

ID	Overview of Logs	Severity
1.	<p>Overview of events: upgrading firmware is successful.            Log message: irmware upgraded by &lt;session&gt; successfully (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)            Overview of parameters:            session: indicates a user-session.            username: indicates a current log-in user.            ipaddr: indicates a client IP address.            macaddr: indicates a client MAC address.            serverIP: indicates a server IP address.            pathFile: indicates a path and the name of a file on a server.</p>	Information
2.	<p>Overview of events: a failure of upgrading firmware occurs.            Log message: Firmware upgraded by &lt;session&gt; unsuccessfully (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)            Overview of parameters:            session: indicates a user-session.            username: indicates a current log-in user.            ipaddr: indicates a client IP address.            macaddr: indicates a client MAC address.            serverIP: indicates a server IP address.            pathFile: indicates a path and the name of a file on a server.</p>	Warning
3.	<p>Overview of events: uploading firmware is successful.            Log message: Firmware uploaded by &lt;session&gt; successfully (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)            Overview of parameters:            session: indicates a user-session.            username: indicates a current log-in user.            ipaddr: indicates a client IP address.            macaddr: indicates a client MAC address.            serverIP: indicates a server IP address.            pathFile: indicates a path and the name of a file on a server.</p>	Information
4.	<p>Overview of events: a failure of uploading firmware occurs.            Log message: Firmware uploaded by &lt;session&gt; unsuccessfully (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)            Overview of parameters:            session: indicates a user-session.            username: indicates a current log-in user.            ipaddr: indicates a client IP address.            macaddr: indicates a client MAC address.            serverIP: indicates a server IP address.            pathFile: indicates a path and the name of a file on a server.</p>	Warning

ID	Overview of Logs	Severity
5.	<p>Overview of events: downloading a configuration is successful.</p> <p>Log message: Configuration downloaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)</p> <p>Overview of parameters:</p> <p>session: indicates a user-session.</p> <p>username: indicates a current log-in user.</p> <p>ipaddr: indicates a client IP address.</p> <p>macaddr: indicates a client MAC address.</p> <p>serverIP: indicates a server IP address.</p> <p>pathFile: indicates a path and the name of a file on a server.</p>	Information
6.	<p>Overview of events: a failure of downloading a configuration occurs.</p> <p>Log message: Configuration downloaded by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)</p> <p>Overview of parameters:</p> <p>session: indicates a user-session.</p> <p>username: indicates a current log-in user.</p> <p>ipaddr: indicates a client IP address.</p> <p>macaddr: indicates a client MAC address.</p> <p>serverIP: indicates a server IP address.</p> <p>pathFile: indicates a path and the name of a file on a server.</p>	Warning
7.	<p>Overview of events: uploading a configuration is successful.</p> <p>Log message: Configuration uploaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)</p> <p>Overview of parameters:</p> <p>session: indicates a user-session.</p> <p>username: indicates a current log-in user.</p> <p>ipaddr: indicates a client IP address.</p> <p>macaddr: indicates a client MAC address.</p> <p>serverIP: indicates a server IP address.</p> <p>pathFile: indicates a path and the name of a file on a server.</p>	Information
8.	<p>Overview of events: a failure of uploading a configuration occurs</p> <p>Log message: Configuration uploaded by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)</p> <p>Overview of parameters:</p> <p>session: indicates a user-session.</p> <p>username: indicates a current log-in user.</p> <p>ipaddr: indicates a client IP address.</p> <p>macaddr: indicates a client MAC address.</p> <p>serverIP: indicates a server IP address.</p> <p>pathFile: indicates a path and the name of a file on a server.</p>	Warning
9.	<p>Overview of events: a failure of downloading a unknown type of files occurs.</p> <p>Log message: Downloaded by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;], Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt;)</p> <p>Overview of parameters:</p> <p>session: indicates a user-session.</p> <p>username: indicates a current log-in user.</p> <p>ipaddr: indicates a client IP address.</p> <p>macaddr: indicates a client MAC address.</p> <p>serverIP: indicates a server IP address.</p> <p>pathFile: indicates a path and the name of a file on a server.</p>	Warning

ID	Overview of Logs	Severity
10.	<p>Overview of events: uploading log-messages is successful. Log message: Log message uploaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;) Overview of parameters: session: indicates a user-session. username: indicates a current log-in user. ipaddr: indicates a client IP address. macaddr: indicates a client MAC address.</p>	Information
11.	<p>Overview of events: a failure of uploading log-messages occurs. Log message: Log message uploaded by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;) Overview of parameters: session: indicates a user-session. username: indicates a current log-in user. ipaddr: indicates a client IP address. macaddr: indicates a client MAC address.</p>	Information

## 14.8 DAD

ID	Overview of Logs	Severity
1.	Overview of events: as DUT receives Neighbor Solicitation (NS) messages with duplicated addresses during the DAD period, logs are added. Log message: duplicate address <ipv6address > on <interface-id> via receiving neighbor solicitation messages. Overview of parameters: ipv6address: indicates an IPv6 address in neighbor solicitation messages. interface-id: indicates a port-interface ID.	Warning
2.	Overview of events: as DUT receives Neighbor Advertisement (NA) messages with duplicated addresses during the DAD period, logs are added. Log message: duplicate address <ipv6address > on <interface-id> via receiving neighbor advertisement messages. Overview of parameters: ipv6address: indicates an IPv6 address in neighbor advertisement messages. interface-id: indicates a port-interface ID.	Warning

## 14.9 DDM

ID	Overview of Logs	Severity
1.	<p>Overview of events: the SFP parameter exceeding the warning threshold exists.</p> <p>Log message: optical transceiver &lt;interface-id&gt; &lt;component&gt; &lt;high-low&gt; warning threshold exceeded</p> <p>Overview of parameters:</p> <p>interface-id: indicates a port-interface ID.</p> <p>component: DDM-threshold type-one of the following can be this type.</p> <p>Temperature</p> <p>Supply voltage</p> <p>Bias current</p> <p>Transmission power</p> <p>Reception power</p> <p>high-low: indicates the high threshold or low threshold.</p>	Warning
2.	<p>Overview of events: the SFP parameter exceeding the alarm threshold exists.</p> <p>Log message: optical transceiver &lt;interface-id&gt; &lt;component&gt; &lt;high-low&gt; alarm threshold exceeded</p> <p>Overview of parameters:</p> <p>interface-id: indicates a port-interface ID.</p> <p>component: DDM threshold type - one of the following can be this type.</p> <p>Temperature</p> <p>Supply voltage</p> <p>Bias current</p> <p>Transmission power</p> <p>Reception power</p> <p>high-low: indicates the upper threshold or lower threshold.</p>	Critical
3.	<p>Overview of events: the SFP parameter, which has recovered from the warning threshold, exists.</p> <p>Log message: Optical transceiver &lt;interface-id&gt; &lt;component&gt; back to normal</p> <p>Overview of parameters:</p> <p>interface-id: indicates a port-interface ID.</p> <p>component: DDM threshold type - one of the following can be this type.</p> <p>Temperature</p> <p>Supply voltage</p> <p>Bias current</p> <p>Transmission power</p> <p>Reception power</p>	Warning

## 14.10 Debug Error

ID	Overview of Logs	Severity
1.	Overview of events: as a vital error of a system occurs, you need to restart the system. Log message: system re-start reason: system fatal error	Urgent
2.	Overview of events: as an exception of CPU occurs, you need to restart the system. Log message: system re-start reason: CPU exception	Urgent

## 14.11 DHCPv6 Client

ID	Overview of Logs	Severity
1.	Overview of events: the administrator state of a DHCPv6 client-interface becomes changed. Log message: a DHCPv6 client on interface <ipif-name> changed state to enabled   disabled] Overview of parameters: <ipif-name>: the name of the DHCPv6 client interface	Information
2.	Overview of events: a DHCPv6 client is obtained from a DHCPv6 server. Log message: a DHCPv6 client obtains an ipv6 address < ipv6address > on interface <ipif-name> Overview of parameters: ipv6address: the IPv6 address obtained from a DHCPv6 server ipif-name: the name of the DHCPv6 client interface	Information
3.	Overview of events: started to update the IPv6 address, which is obtained from a DHCPv6 server. Log message: an IPv6 address < ipv6address > on interface <ipif-name> starts renewing Overview of parameters: ipv6address: the IPv6 address obtained from a DHCPv6 server ipif-name: the name of the DHCPv6 client interface	Information
4.	Overview of events: updating the IPv6 address obtained from a DHCPv6 server is successful. Log message: an IPv6 address < ipv6address > on interface <ipif-name> renews success Overview of parameters: ipv6address: the IPv6 address obtained from a DHCPv6 server ipif-name: the name of the DHCPv6 client interface	Information
5.	Overview of events: started to rebind the IPv6 address, which is obtained from a DHCPv6 server. Log message: an IPv6 address < ipv6address > on interface <ipif-name> starts rebinding Overview of parameters: ipv6address: the IPv6 address obtained from a DHCPv6 server ipif-name: the name of the DHCPv6 client interface	Information
6.	Overview of events: rebinding the IPv6 address, which is obtained from a DHCPv6 server, is successful. Log message: an IPv6 address < ipv6address > on interface <ipif-name> rebinds success Overview of parameters: ipv6address: the IPv6 address obtained from a DHCPv6 server ipif-name: the name of the DHCPv6 client interface	Information
7.	Overview of events: the IPv6 address, which is obtained from a DHCPv6 server, is deleted. Log message: an IPv6 address < ipv6address > on interface <ipif-name> was deleted Overview of parameters: ipv6address: the IPv6 address obtained from a DHCPv6 server ipif-name: the name of the DHCPv6 client interface	Information

ID	Overview of Logs	Severity
8.	<p>Overview of events: the administrator state of the DHCPv6 client PD interface becomes changed.</p> <p>Log message: the DHCPv6 client PD on interface &lt;intf-name&gt; changed state to &lt;enabled   disabled&gt;</p> <p>Overview of parameters: intf-name: the name of the DHCPv6 client PD interface</p>	Information
9.	<p>Overview of events: the DHCPv6 client PD obtained an IPv6 prefix from a delegation router.</p> <p>Log message: the DHCPv6 client PD obtains an IPv6 prefix &lt;ipv6networkaddr&gt; on interface &lt;intf-name&gt;</p> <p>Overview of parameters: ipv6networkaddr: the IPv6 prefix obtained from a delegation router intf-name: the name of the DHCPv6 client PD interface</p>	Information
10.	<p>Overview of events: started to update the IPv6 prefix, which is obtained from a delegation router.</p> <p>Log message: an IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; starts renewing</p> <p>Overview of parameters: ipv6networkaddr: the IPv6 prefix obtained from a delegation router intf-name: the name of the DHCPv6 client PD interface</p>	Information
11.	<p>Overview of events: Updating the IPv6 prefix, which is obtained from a delegation router, is successful.</p> <p>Log message: an IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; renews success</p> <p>Overview of parameters: ipv6anetworkaddr: the IPv6 prefix obtained from a delegation router intf-name: the name of the DHCPv6 client PD interface</p>	Information
12.	<p>Overview of events: started to rebind the IPv6 prefix, which is obtained from a delegation router.</p> <p>Log message: an IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; starts rebinding</p> <p>Overview of parameters: ipv6address: the IPv6 prefix obtained from a delegation router intf-name: the name of the DHCPv6 client PD interface</p>	Information
13.	<p>Overview of events: rebinding the IPv6 prefix, which is obtained from a delegation router, is successful.</p> <p>Log message: an IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; rebinds success</p> <p>Overview of parameters: ipv6address: the IPv6 prefix obtained from a delegation router intf-name: the name of the DHCPv6 client PD interface</p>	Information
14.	<p>Overview of events: the IPv6 prefix, which is obtained from a delegation router, is deleted.</p> <p>Log message: an IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; was deleted</p> <p>Overview of parameters: ipv6address: the IPv6 prefix obtained from a delegation router intf-name: the name of the DHCPv6 client PD interface</p>	Information

## 14.12 Dynamic ARP

ID	Overview of Logs	Severity
1.	<p>Overview of events: this log is generated if ARP packets with disabled DAI are detected.</p> <p>Log message: Illegal ARP &lt;type&gt; packets (IP: &lt;ip-address&gt;, MAC: &lt;mac-address&gt;, VLAN &lt;vlan-id&gt;, on &lt;interface-id&gt;)</p> <p>Overview of parameters:</p> <p>type: ARP packet type. This indicates that the ARP packets are either ARP requests or ARP responses.</p> <p>ip-address: indicates an IP address.</p> <p>mac-address: indicates a MAC address.</p> <p>vlan-id: indicates a VLAN ID.</p> <p>interface-id: indicates the interface-number.</p>	Warning
2.	<p>Overview of events: this log is generated if ARP packets with enabled DAI are detected.</p> <p>Log message: Legal ARP &lt;type&gt; packets (IP: &lt;ip-address&gt;, MAC: &lt;mac-address&gt;, VLAN &lt;vlan-id&gt;, on &lt;interface-id&gt;)</p> <p>Overview of parameters:</p> <p>type: ARP packet type. This indicates that the ARP packets are either ARP requests or ARP responses.</p> <p>ip-address: indicates an IP address.</p> <p>mac-address: indicates a MAC address.</p> <p>vlan-id: indicates a VLAN ID.</p> <p>interface-id: indicates the interface-number.</p>	Information

## 14.13 Interface

ID	Overview of Logs	Severity
1.	Overview of events: the port becomes link-up. Log message: Port <port> link up, <nway> Overview of parameters: Port: indicates the logical port-number. nway: indicates the link-speed and duplex mode.	Information
2.	Overview of events: the port becomes link-down. Log message: Port <port> link down Overview of parameters: Port: indicates the logical port-number.	Information

## 14.14 PoE

ID	Overview of Logs	Severity
1.	Overview of Events: the power-supply for ports becomes ON. Log Message: Port-<port> Power OFF notification Overview of Parameters: port: indicates the logical port-number.	Information
2.	Overview of Events: the power-supply for ports becomes OFF. Log Message: Port-<port> Power On notification Overview of Parameters: port: indicates the logical port-number.	Information
3.	Overview of Events: the power-supply for PoE (has) exceeded the threshold. Log Message: Usage power is above the threshold	Information
4.	Overview of Events: the PoE power-supply becomes lowered to the value, which is less than the threshold after exceeding the threshold. Log Message: Usage power is below the threshold	Information
5.	Overview of Events: the initialization of PoE IC becomes failed. Log Message: PoE IC Reinit Fail	Information
6.	Overview of Events: PoE IC is reset. Log Message: PoE IC Reset	Information

## 14.15 PoE Scheduler

ID	Overview of Logs	Severity
1.	Overview of Events: the PoE scheduler (has) set a PoE power-supply to ON. Log Message: (PoE) PoE port is changed to ON by PoE Scheduler. Overview of Parameters : port: indicates the logical port-number.	Warning
2.	Overview of Events: the PoE scheduler (has) set the PoE power-supply to OFF. Log Message: (PoE) PoE port is changed to OFF by PoE Scheduler. Overview of Parameters: port: indicates the logical port-number.	Warning
3.	Overview of Events: the PoE scheduler (has) set the PoE power-supply to OFF/ON. Log Message: (PoE) PoE port is reset by PoE Scheduler.	Warning

## 14.16 PoE Auto Reboot

ID	Overview of Logs	Severity
1.	Overview of events: OFF/ON for a PoE power-supply is executed. Log Message: Execute PoE OFF/ON Port-<port> Overview of Parameters: port: indicates the logical port-number.	Information
2.	Overview of events: After monitoring Pings, an abnormality of a PoE terminal is detected. Log Message: Detect equipment failure by ICMP <IP> Overview of Parameters: IP: indicates an IP address.	Information
3.	Overview of events: After monitoring LLDP, an abnormality of a PoE terminal is detected. Log Message: Detect equipment failure by LLDP Port-<port> Overview of Parameters: port: indicates the logical port-number.	Information
4.	Overview of events: monitoring traffics After monitoring traffics, an abnormality of a PoE terminal is detected. Log Message: Detect equipment failure by Traffic Port-<port> Overview of Parameters: port: indicates the logical port-number.	Information

## 14.17 Verifying IP Source Guard

ID	Overview of Logs	Severity
1.	<p>Overview of events: this message indicates that hardware-rule resources for setting DHCP Snooping entry to an IPSG table do not exist.</p> <p>Log message: Failed to set IPSG entry due to no hardware-rule resources. (IP: &lt;IPADDR&gt;, MAC: &lt;MACADDR&gt;, VID: &lt;VLANID&gt;, Interface &lt;INTERFACE-ID&gt;)</p> <p>Overview of parameters:</p> <p>ipaddr: indicates an IP address.</p> <p>Macaddr: indicates a MAC address.</p> <p>VLANID: indicates a VLAN ID.</p> <p>INTERFACE-ID: indicates the interface-number.</p>	Warning

## 14.18 LLDP-MED

ID	Overview of Logs	Severity
1.	<p>Overview of events: a network device has detected a change in an LLDP-MED topology.</p> <p>Log message: an LLDP-MED topology change detected (on port &lt;portNum&gt;. chassis id: &lt;chassisType&gt;, &lt;chassisID&gt;, port id: &lt;portType&gt;, &lt;portID&gt;, device class: &lt;deviceClass&gt;)</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number.</p> <p>chassisType: indicates a sub-type of chassis.</p> <p>Value-list:</p> <ol style="list-style-type: none"> <li>1. chassisComponent (1)</li> <li>2. interfaceAlias (2)</li> <li>3. portComponent (3)</li> <li>4. macAddress (4)</li> <li>5. networkAddress (5)</li> <li>6. interfaceName (6)</li> <li>7. local (7)</li> </ol> <p>chassisID: indicates a chassis ID.</p> <p>portType: indicates the port ID sub-type.</p> <p>value-list:</p> <ol style="list-style-type: none"> <li>1. interfaceAlias (1)</li> <li>2. portComponent (2)</li> <li>3. macAddress (3)</li> <li>4. networkAddress (4)</li> <li>5. interfaceName (5)</li> <li>6. agentCircuitId (6)</li> <li>7. local (7)</li> </ol> <p>portID: indicates a port ID.</p> <p>deviceClass: indicates the LLDP-MED device-type.</p>	Notice

ID	Overview of Logs	Severity
2.	<p>Overview of events: a network device has detected the conflicting LLDP-MED device-type.</p> <p>Log message: the conflicting LLDP-MED device-type is detected (on port &lt;portNum &gt;, chassis id: &lt; chassisType&gt;, &lt;chassisID&gt;, port id: &lt; portType&gt;, &lt;portID&gt;, device class: &lt;deviceClass&gt;)</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number.</p> <p>chassisType: indicates a sub-type of chassis.</p> <p>Value-list:</p> <ol style="list-style-type: none"> <li>1. chassisComponent (1)</li> <li>2. interfaceAlias (2)</li> <li>3. portComponent (3)</li> <li>4. macAddress (4)</li> <li>5. networkAddress (5)</li> <li>6. interfaceName (6)</li> <li>7. local (7)</li> </ol> <p>chassisID: indicates a chassis ID.</p> <p>portType: indicates the port ID sub-type.</p> <p>Value-list:</p> <ol style="list-style-type: none"> <li>1. interfaceAlias (1)</li> <li>2. portComponent (2)</li> <li>3. macAddress (3)</li> <li>4. networkAddress (4)</li> <li>5. interfaceName (5)</li> <li>6. agentCircuitId (6)</li> <li>7. local (7)</li> </ol> <p>portID: indicates a port ID.</p> <p>deviceClass: indicates the LLDP-MED device-type.</p>	Notice
3.	<p>Overview of events: a network device has detected the incompatible LLDP-MED TLV set.</p> <p>Log message: the incompatible LLDP-MED TLV set is detected (on port &lt;portNum &gt;, chassis id: &lt; chassisType&gt;, &lt;chassisID&gt;, port id: &lt; portType&gt;, &lt;portID&gt;, device class: &lt;deviceClass&gt;)</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number.</p> <p>chassisType: indicates a sub-type of chassis.</p> <p>Value-list:</p> <ol style="list-style-type: none"> <li>1. chassisComponent (1)</li> <li>2. interfaceAlias (2)</li> <li>3. portComponent (3)</li> <li>4. macAddress (4)</li> <li>5. networkAddress (5)</li> <li>6. interfaceName (6)</li> <li>7. local (7)</li> </ol> <p>chassisID: indicates a chassis ID.</p> <p>portType: indicates the port ID sub-type.</p> <p>Value-list:</p> <ol style="list-style-type: none"> <li>1. interfaceAlias (1)</li> <li>2. portComponent (2)</li> <li>3. macAddress (3)</li> <li>4. networkAddress (4)</li> <li>5. interfaceName (5)</li> <li>6. agentCircuitId (6)</li> <li>7. local (7)</li> </ol> <p>portID: indicates a port ID.</p> <p>deviceClass: indicates the LLDP-MED device-type.</p>	Notice

## 14.19 LACP

ID	Overview of Logs	Severity
1.	Overview of events: a link-aggregation group becomes link-up. Log Message: Link Aggregation Group < group_id > link up Overview of Parameters: group_id: a group ID of an aggregation group that becomes link-up.	Information
2.	Overview of events: a link-aggregation group becomes link-down. Log Message: Link Aggregation Group < group_id > link down Overview of Parameters: group_id: a group ID of an aggregation group that becomes link-down.	Information
3.	Overview of events: a member-port belongs to a link-aggregation group. Log Message: <ifname> attach to Link Aggregation Group <group_id> Overview of Parameters: ifname: the interface-name of ports that belong to an aggregation-group. group_id: a group ID of the aggregation-group where a port belongs to.	Information
4.	Overview of events: a member-port (has) deactivated to belong to a link-aggregation group. Log Message: <ifname> detach from Link Aggregation Group <group_id> Overview of Parameters: ifname: the interface-name of ports that deactivate to belong to an aggregation-group. group_id: a group ID of an aggregation-group where a port deactivates to belong to.	Information

## 14.20 Detecting Loops

ID	Overview of Logs	Severity
1.	<p>Overview of events: a loop is detected between two ports or two LACP interfaces.</p> <p>Log message: the loop detected between port/port-channel &lt;portNum&gt; and &lt;portNum&gt;</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number or an LACP interface ID</p>	Warning
2.	<p>Overview of events: a loop is detected on one port or one LACP interface.</p> <p>Log message: the loop detected on port/port-channel &lt;portNum&gt;</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number or an LACP interface ID</p>	Warning
3.	<p>Overview of events: a loop is detected between a port and an LACP interface.</p> <p>Log message: the loop detected between port/port-channel &lt;portNum&gt; and port/port-channel &lt;portNum&gt;</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number or port-channel number</p>	Warning
4.	<p>Overview of events: the port being a loop or an LACP interface becomes recovered, automatically.</p> <p>Log message: Port/Port-channel &lt;portNum&gt; auto recovery</p> <p>Overview of parameters:</p> <p>portNum: indicates the port-number or an LACP interface ID</p>	Information

## 14.21 MAC-based Access Control

ID	Overview of Logs	Severity
1.	Overview of events: a MAC authentication is successful. Log message: MAC](<method>)Authorized <macaddr> on Port <portNum> to VLAN <vid> Overview of parameters: method: indicates either local or RADIUS. macaddr: indicates a MAC address of a device to be authenticated. portNum: indicates the port-number of a switch. vid: indicates the VLAN ID allowed.	Information
2.	Overview of events: a MAC authentication failed. Log message: MAC](<method>)Rejected <macaddr> on Port <portNum> Overview of parameters: method: indicates either local or RADIUS. macaddr: indicates a MAC address of a device to be authenticated. portNum: indicates the port-number of a switch.	Notice
3.	Overview of events: as a MAC authentication table is full, and a new address cannot be authenticated. Log message: MAC]Rejected <macaddr> on Port <portNum> (auth table was full) Overview of parameters: macaddr: indicates a MAC address of a device to be authenticated. portNum: indicates the port-number of a switch.	Notice

## 14.22 MSTP Debug Extension

ID	Overview of Logs	Severity
1.	<p>Overview of events: a topology becomes changed.            Log message: topology changed (Instance : &lt;Instance-id&gt;, &lt;interface-id&gt;, MAC:&lt;macaddr&gt; )            Overview of parameters:            Instance-id: indicates an instance ID.            interface-id: indicates a port ID.            Macaddr: indicates a MAC address.</p>	Notice
2.	<p>Overview of events: this is a new root bridge of a spanning-tree.            Log message: CIST   CIST Regional   MSTI Regional] New root bridge selected (Instance: &lt;Instance-id&gt;] MAC: &lt;macaddr&gt; Priority :&lt; priority&gt;)            Overview of parameters:            Instance-id: indicates an instance ID.            Macaddr: indicates a MAC address.            priority: indicates a priority value.</p>	Notice
3.	<p>Overview of events: a spanning-tree protocol becomes enabled.            Log message: Spanning Tree Protocol is enabled</p>	Information
4.	<p>Overview of events: a spanning-tree protocol becomes disabled.            Log message: Spanning Tree Protocol is disabled</p>	Information
5.	<p>Overview of events: this is a new root port.            Log message: new root port is selected (Instance:&lt;instance-id&gt;, &lt;interface-id &gt;)            Overview of parameters:            instance-id: indicates an instance ID.            interface-id: indicates a port ID.</p>	Notice
6.	<p>Overview of events: the state of a spanning-tree port becomes changed.            Log message: spanning tree port status change (Instance :&lt; instance-id&gt;, &lt;interface-id&gt;) &lt;old-status&gt; -&gt; &lt;new-status&gt;            Overview of parameters:            instance-id: indicates an instance ID.            interface-id: indicates a port ID.            old_status: the status before any changes are made.            new_status: the status after any changes are made.</p>	Notice
7.	<p>Overview of events: a spanning-tree port-roll becomes changed.            Log message: spanning tree port role change (Instance :&lt; instance-id&gt;, &lt;interface-id&gt;) &lt;old-role&gt; -&gt; &lt;new-role&gt;            Overview of parameters:            instance-id: indicates an instance ID.            interface-id: indicates a port ID.            old_role: the roll before any changes are made.            new_status: the roll after any changes are made.</p>	Information
8.	<p>Overview of events: a spanning-tree instance is created.            Log message: a spanning tree instance is created. (Instance :&lt; instance-id&gt;)            Overview of parameters:            instance-id: indicates an instance ID.</p>	Information
9.	<p>Overview of events: a spanning-tree instance is deleted.            Log message: a spanning tree instance is deleted. (Instance :&lt; instance-id &gt;)            Overview of parameters:            instance-id: indicates an instance ID.</p>	Information

ID	Overview of Logs	Severity
10.	Overview of events: a spanning-tree version becomes changed. Log message: spanning tree version change (new version :< new-version>) Overview of parameters: new_version: indicates an STP version with changes made.	Information
11.	Overview of events: the name of a spanning-tree MST configuration ID and a revision level become changed. Log message: spanning tree MST configuration ID name and revision level change (name :< name>, revision level <revision-level>) Overview of parameters: name: indicates a name with changes made. revision_level: indicates a revision level with changes made.	Information
12.	Overview of events: a VLAN mapping table of a spanning-tree MST configuration ID is deleted. Log message: spanning-tree MST configuration ID VLAN mapping table change (instance: < instance-id > delete vlan <startvlanid> - <endvlanid>]) Overview of parameters: instance-id: indicates an instance ID. startvlanid-endvlanid: indicates a VLAN list.	Information
13.	Overview of events: a VLAN mapping table of a spanning-tree MST configuration ID is added. Log message: spanning tree MST configuration ID VLAN mapping table change (instance: < instance-id > add vlan <startvlanid> - <endvlanid>]) Overview of parameters: instance-id: indicates an instance ID. startvlanid-endvlanid: indicates a VLAN list.	Information
14.	Overview of events: a spanning-tree roll becomes changed due to a guard root function. Log message: spanning tree port role change (Instance : < instance-id >, <interface-id>) to alternate port due to the guard root Overview of parameters: instance-id: indicates an instance ID. interface-id: indicates a port ID.	Information

## 14.23 Port Security

ID	Overview of Logs	Severity
1.	Overview of events: an address is full on a port. Log message: MAC address <mac-address> causes the port security violation on <interface-id> Overview of parameters: macaddr: indicates a violative MAC address. interface-id: the interface on which the violation occurs.	Warning
2.	Overview of events: an address is full on a system. Log message: limit on system entry number has been exceeded	Warning

## 14.24 RADIUS

ID	Overview of Logs	Severity
1.	<p>Overview of events: this log is generated if RADIUS allocates the VLAN ID attribute.</p> <p>Log message: RADIUS server &lt;server-ip&gt; assigned VID: &lt;vid&gt; to port &lt;interface-id&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:</p> <p>server-ip: indicates an IP address of a RADIUS server.</p> <p>vid: the VLAN ID allowed and allocated by a RADIUS server.</p> <p>interface-id: indicates the client port-number, which is authenticated.</p> <p>username: indicates a user-name to be authenticated.</p>	Information
2.	<p>Overview of events: this log is generated if RADIUS allocates the effective bandwidth attribute.</p> <p>Log message: RADIUS server &lt;server-ip&gt; assigned &lt;direction&gt; bandwidth: &lt;threshold&gt; to port &lt; interface-id&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:</p> <p>server-ip: indicates an IP address of a RADIUS server.</p> <p>direction: indicates a direction of a bandwidth control (entry or exit).</p> <p>threshold: the bandwidth thresholdNotice, which is permittedNotice and allocated Noticeby a RADIUS server Notice</p> <p>interface-id: indicates the client port-number, which is authenticated.</p> <p>username: indicates a user-name to be authenticated.</p>	Information
3.	<p>Overview of events: this log is generated if RADIUS allocates the effective priority attribute.</p> <p>Log message: RADIUS server &lt;server-ip&gt; assigned 802.1p default priority: &lt;priority&gt; to port &lt; interface-id&gt; (Username: &lt;username&gt;)</p> <p>Overview of parameters:</p> <p>server-ip: indicates an IP address of a RADIUS server.</p> <p>priority: the priority, which is allowed and allocated by a RADIUS server.</p> <p>interface-id: indicates the client port-number, which is authenticated.</p> <p>username: indicates a user-name to be authenticated.</p>	Information
4.	<p>Overview of events: this log is generated if RADIUS allocates an ACL script and then the script is not applied to a system because of having insufficient resources.</p> <p>Log message: RADIUS server &lt;server-ip&gt; assigns &lt;username&gt; ACL failure at port &lt; interface-id&gt; (&lt;acl-script&gt;)</p> <p>Overview of parameters:</p> <p>server-ip: indicates an IP address of a RADIUS server.</p> <p>username: indicates a user-name to be authenticated.</p> <p>interface-id: the client port-number, which is authenticated.</p> <p>acl-script: indicates the ACL scriptNotice, which is permittedNotice and allocatedNotice by a RADIUS serverNotice.</p>	Warning
5.	<p>Overview of events: this log is generated if you fail to allocate the access-list number.</p> <p>Log message: local assigns USERNAME] filter-id ID failure at port-interface-ID</p> <p>Overview of parameters:</p> <p>username: indicates the user-name to be authenticated.</p> <p>filter-id: indicates the access-list number.</p> <p>interface-id: the client port-number, which is authenticated.</p>	Warning

## 14.25 RRP

ID	Overview of Logs	Severity
1.	Overview of events: the state of a master-node becomes changed from "Failed" to "Complete". Log message: ring-topology was recovered to complete.	Notice
2.	Overview of events: the state of a master-node becomes changed from "Complete" to "Failed". Log message: ring-topology was failed.	Warning
3.	Overview of events: the master node or transit node flashes the forwarding database based on the RRP packets or state-machine. Log message: FDB was flushed.	Information
4.	Overview of events: the RRP state of a transit-node becomes changed to "Link-Up". Log message: RRP ring-status was changed to link-up.	Warning
5.	Overview of events: the RRP state of a transit-node becomes changed to "Link-Down". Log message: RRP ring-status was changed to link-down.	Notice
6.	Overview of events: the RRP state of a transit-node becomes changed to "Pre-Forwarding". Log message: RRP ring-status was changed to pre-forwarding.	Information
7.	Overview of events: a ring-guard function becomes enabled on a specific domain and port. Log message: ring-guard was activated on "<domain-name>" domain at port <port> Overview of parameters: <domain name>: a target domain-name <port num>: the target port-number whose ring-guard function becomes enabled.	Information

## 14.26 SNMP

ID	Overview of Logs	Severity
1.	Overview of events: an SNMP request, including the invalid community strings, is received. Log message: SNMP request received from <ipaddr> with invalid community string Overview of parameters: ipaddr: indicates an IP address.	Information

## 14.27 System

ID	Overview of Logs	Severity
1.	Overview of events: a system has started up. Log message: System started up.	Critical
2.	Overview of events: a current configuration is stored on a flash. Log message: Configuration saved to flash by console (Username: <username>). Overview of parameters: username: indicates a user-name.	Information
3.	Overview of events: a system configuration is stored, remotely. Log message: Configuration saved to flash (Username: <user-name>, IP: <ipaddr>) username: indicates a user-name. ipaddr: indicates an IP address.	Information
4.	Overview of events: as the power of a system turned on to start up. Log message: System cold start.	Critical
5.	Overview of events: a system restarts to start up. Log message: System warm start.	Critical

## 14.28 Telnet

ID	Overview of Logs	Severity
1.	Overview of events: logging in with Telnet is successful. Log message: successful login through Telnet (Username: <username>, IP: <ipaddr>) Overview of parameters: ipaddr: indicates an IP address of Telnet client. username: indicates the user-name, which is used to log into a Telnet server.	Information
2.	Overview of events: Logging in with Telnet is failed. Log message: login failed through Telnet (Username: <username>, IP: <ipaddr>) Overview of parameters: ipaddr: indicates an IP address of Telnet client. username: indicates the user-name, which is used to log into a Telnet server.	Warning
3.	Overview of events: logged out with Telnet. Log message: logout through Telnet (Username: <username>, IP: <ipaddr>) Overview of parameters: ipaddr: indicates an IP address of Telnet client. username: indicates the user-name, which is used to log into a Telnet server.	Information
4.	Overview of events: (Telnet) the session has become time-out. Log message: Telnet session timed out (Username: <username>, IP: <ipaddr>) Overview of parameters: ipaddr: indicates an IP address of Telnet client. username: indicates the user-name, which is used to log into a Telnet server.	Information

## 14.29 Temperature

ID	Overview of Logs	Severity
1.	Overview of events: a temperature sensor has migrated to the alarm state. Log message: Unit <unitID> Sensor:<sensorID> detects abnormal temperature <temperature> Overview of parameters: unitID: indicates a unit ID. sensorID: indicates a sensor ID. temperature: indicates a the current temperature of a sensor.	Critical
2.	Overview of events: the temperature has been recovered to a normal temperature. Log message: Unit <unitID> Sensor:<sensorID> temperature back to normal Overview of parameters: unitID: indicates a unit ID. sensorID: indicates a sensor ID. temperature: indicates the temperature.	Critical

## 14.30 Traffic Control

ID	Overview of Logs	Severity
1.	Overview of events: a storm of Broadcast, Multicast or Unicast occurs. Log message: Broadcast   Multicast   Unicast> storm is occurring on <interface-id>. Overview of parameters: interface-id: indicates the interface ID where a storm occurs.	Warning
2.	Overview of events: a storm of Broadcast, Multicast or Unicast storm is cleared. Log message: <Broadcast   Multicast   Unicast> storm is cleared on <interface-id>. Overview of parameters: interface-id: indicates the interface ID where a storm is cleared.	Information
3.	Overview of events: the port-shutdown has occurred because of a packet storm. Log message: <interface-id> is currently shut down due to the <Broadcast   Multicast   Unicast> storm. Overview of parameters: Interface-id: indicates the interface ID, which is migrated to error-disabled by a storm.	Warning

## 14.31 Voice VLAN

ID	Overview for Logs	Severity
1.	Overview of events: a new voice device is detected on an interface. Log message: New voice device detected (<interface-id>, MAC: < mac-address >). Overview of parameters: interface-id: indicates the name of an interface. mac-address: indicates a MAC address of a voice device.	Information
2.	Overview of events: the interface of the automatic voice VLAN mode participates in the voice VLAN. Log message: < interface-id > add into voice VLAN <vid >. Overview of parameters: interface-id: indicates the name of an interface. vid: indicates a VLAN ID.	Information
3.	Overview of events: this log message is sent if an interface leaves the voice VLAN and does not detect a voice device during the aging period of the interface. Log message: < interface-id > remove from voice VLAN <vid > Overview of parameters: interface-id: indicates the name of an interface. vid: indicates a LAN ID.	Information

## 14.32 WAC

ID	Overview of Logs	Severity
1.	<p>Overview of events: a client host fails to be authenticated. Log message: WEB](RADIUS/Local) Rejected user &lt;string&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt;.</p> <p>Overview of parameters: string: indicates a user-name. Macaddr: indicates a MAC address. portNum: indicates the port-number.</p>	Warning
2.	<p>Overview of events: a client host is authenticated, successfully. Log message: WEB](RADIUS/Local)Authorized user &lt;string&gt; (&lt;macaddr&gt;) on Port &lt;portNum&gt; to VLAN &lt;vlanNum&gt;.</p> <p>Overview of parameters: string: indicates a user-name. Macaddr: indicates a MAC address. portNum: indicates the port-number. vlanNum: indicates the VLAN-number.</p>	Information
3.	<p>Overview of events: a client table is full. Log message: WEB]Rejected &lt;macaddr&gt; on Port &lt;portNum&gt; (auth table was full).</p> <p>Overview of parameters: Macaddr: indicates a MAC address. portNum: indicates the port-number.</p>	Notice

## 14.33 Web

ID	Overview of Logs	Severity
1.	<p>Overview of events: log-in from Web is successful.            Log message: "Successful login through Web (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)"            Overview of parameters:            username: indicates a user-name.            ipaddr: indicates the IP address of the user who accessed to a switch from Web.</p>	Information
2.	<p>Overview of events: failing to log-in from Web.            Log message: Login failed through Web (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)"            Overview of parameters:            username: indicates a user-name.            ipaddr: indicates the IP address of users who accessed to a switch from Web.</p>	Warning
3.	<p>Overview of events: log-in from HTTPS is successful.            Log message: Successful login through Web(SSL) (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)            Overview of parameters:            username: indicates a user-name.            ipaddr: indicates the IP address of the user who accessed to a switch from secure Web.</p>	Information
4.	<p>Overview of Event: log-in from secure Web failed.            Log message: Login failed through Web(SSL) (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)            Overview of parameters:            username: indicates a user-name.            ipaddr: indicates the IP address of the user who accessed to a switch from secure Web.</p>	Warning
5.	<p>Overview of events: Uploading a log is successful.            Log message: Log message uploaded by WEB successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;ipaddr&gt;, File Name: &lt;filename&gt;)            Overview of parameters:            username: indicates a user-name.            ipaddr: indicates the IP address of the user who accessed to a switch.            macaddr: indicates a MAC address of a client.            server IP: indicates an IP address of a TFTP server.            filename: indicates the name of a log-file.</p>	Information
6.	<p>Overview of events: uploading a log failed.            Log message: Log message uploaded by WEB unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;ipaddr&gt;, File Name: &lt;filename&gt;)            Overview of parameters:            username: indicates a user-name.            ipaddr: indicates an access-source IP address of the user who accessed to a switch.            macaddr: indicates a MAC address of a client.            server IP: indicates an IP address of a TFTP server.            filename: indicates the name of a log-file.</p>	Information

# 15 Appendix - System Trap Entries

## 15.1 BPDU Guard

ID	Trap Name	Overview of Traps	OID
1.	mnoBpduProtectionUnderAttackingTrap	BPDU attacks occur, and then migrate to the drop/block / shutdown mode. Binding objects: mnoBpduProtectionPortIndex Port interface (2) mnoBpduProtectionPortMode drop/block/shutdown-mode	1.3.6.1.4.1.396. 5.5.3.4.0.1
2.	mnoBpduProtectionRecoveryTrap	Automatically recovered from BPDU attacks Binding objects: mnoBpduProtectionPortIndex Port interface mnoBpduProtectionRecoveryMethod Automatic /recovering manual	1.3.6.1.4.1.396. 5.5.3.4.0.2

## 15.2 DDM

ID	Trap Name	Overview of Traps	OID
1.	mnoDdmAlarmTrap	<p>If the parameter value exceeds the alarm threshold or recovers to the normal state, this trap is sent, depending on the configuration of a trap action.</p> <p>Binding objects:  mnoDdmPort  port-number  mnoDdmThresholdType  DDM threshold type  temperature/voltage/bias/txpower/rxpower  mnoDdmThresholdExceedType  Check if the exceeding-threshold is the threshold (value) of either high-threshold or alarm low-threshold.  (4) mnoDdmThresholdExceedOrRecover  Check if GBIC exceeds the DDM threshold or becomes recovered to the normal state.</p>	1.3.6.1.4.1.396.5.5.1.4.0.1
2.	mnoDdmWarningTrap	<p>If the parameter value exceeds the warning threshold or recovers to the normal state, this trap is sent depending on the configuration of a trap action.</p> <p>Binding objects:  mnoDdmPort  port-number  mnoDdmThresholdType  DDM threshold type  temperature/voltage/bias/txpower/rxpower  mnoDdmThresholdExceedType  Check if the exceeding-threshold is the threshold of either warning high-threshold or warning low-threshold.  (4) mnoDdmThresholdExceedOrRecover  Check if GBIC exceeds the DDM threshold or becomes recovered to the normal state.</p>	1.3.6.1.4.1.396.5.5.1.4.0.2

## 15.3 DHCP Server Protect

ID	Trap Name	Overview of Traps	OID
1.	mnoFilterDetectedTrap	<p>If unauthorized DHCP servers are detected, this trap is transmitted. An IP address of the unauthorized DHCP server detected is transmitted to a trap-receiver (once) during the unauthorized period of log-stopping.</p> <p>Binding objects: mnoFilterDetectedIP The IP addresses of unauthorized DHCP servers mnoFilterDetectedport Port interface</p>	1.3.6.1.4.1.396. 5.5.3.7.0.1

## 15.4 Gratuitous ARP

ID	Trap Name	Overview of Traps	OID
1.	mnoAgentGratuitousARPTrap	<p>Traps are sent if IP addresses conflict each other.</p> <p>Binding objects:</p> <ul style="list-style-type: none"><li>agentGratuitousARPIpAddr The conflicted IP address received in the gratuitous ARP</li><li>agentGratuitousARPMacAddr The sender's MAC address of the gratuitous ARP packets</li><li>agentGratuitousARPPortNumber This indicates the switch port-number, which received the gratuitous ARP packets.</li><li>agentGratuitousARPInterfaceName This indicates the IP interface-name of the switch, which received the Gratuitous ARP.</li></ul>	1.3.6.1.4.1.396.5.5.3.6.0.1

## 15.5 LLDP-MED

ID	Trap Name	Overview of Traps	OID
1.	IldpRemTablesChange	The IldpRemTablesChange notification is sent if the value of IldpStatsRemTableLastChangeTime becomes changed. Binding objects: (1) IldpStatsRemTablesInserts (2) IldpStatsRemTablesDeletes (3) IldpStatsRemTablesDrops (4) IldpStatsRemTablesAgeouts	1.0.8802.1.1.2.0.0.1
2.	IldpXMedTopologyChangeDetected	The notification indicates that a new remote device is connected to a local port after the generation done by a local device that detects a topology change. In addition, the notification indicates that a remote device is disconnected or the device moves among ports. Binding objects: (1) IldpRemChassisIdSubtype (2) IldpRemChassisId (3) IldpXMedRemDeviceClass	1.0.8808.1.1.2.1.5.4795.0.1

## 15.6 Detecting Loops

ID	Trap Name	Overview of Traps	OID
1.	mnoLoopDetectNotification	This indicates that a network group has occurred.	1.3.6.1.4.1.396.5.5.2.1
2.	mnoLoopRecoveryNotification	This indicates that a network group has been deleted (or removed).	1.3.6.1.4.1.396.5.5.2.2

## 15.7 MAC Based Access Control

ID	Trap Name	Overview of Traps	OID
1.	mnoMacBasedAccessControlLoggedSuccess	If you log into the MAC based access-control host successfully, this trap is sent. Binding objects: mnoMacBasedAuthInfoMacIndex Host MAC address mnoMacBasedAuthInfoPortIndex Port interface mnoMacBasedAuthVID VLAN ID	1.3.6.1.4.1.396.5.5.3.2.0.1
2.	mnoMacBasedAccessControlLoggedFail	If you fail to log into the MAC based access-control host, this trap is sent. Binding objects: mnoMacBasedAuthInfoMacIndex Host MAC address mnoMacBasedAuthInfoPortIndex Port interface mnoMacBasedAuthVID VLAN ID	1.3.6.1.4.1.396.5.5.3.2.0.2
3.	mnoMacBasedAccessControlAgesOut	If the MAC based access-control host ages out, this trap is sent. Binding objects: mnoMacBasedAuthInfoMacIndex Host MAC address (2) mnoMacBasedAuthInfoMacIndex Port interface (3) mnoMacBasedAuthVID VLAN ID	1.3.6.1.4.1.396.5.5.3.2.0.3

## 15.8 MAC Notification

ID	Trap Name	Overview of Traps	OID
1.	mnoL2macNotification	<p>This trap indicates that a change is made in a MAC address of an address table.</p> <p>Binding objects: mnoL2macNotifyInfo</p> <p>The changed information regarding a MAC address of a device. The details include the following contents.</p> <p>Operation Code + MAC address + Box ID + Interface ID + Zero.</p> <p>Operation code: 1, 2</p> <p>One (1) indicates that a new MAC address is learned.</p> <p>Two (2) indicates that an old MAC address is deleted.</p> <p>Box ID: The switch box ID</p> <p>Interface ID: The Interface ID learned or deleted on the box.</p> <p>Zero: Uses to delimit each message (operation code + MAC address + Box ID + Port Number).</p>	1.3.6.1.4.1.396 .5.5.3.1.0.1

## 15.9 MSTP

ID	Trap Name	Overview of Traps	OID
1.	<b>newRoot</b>	This trap indicates that a sending agent has become a new route of the spanning tree. A bridge sends this trap right after the trap is selected as a new root (e.g. after the expiration of the topology change timer, and immediately after choosing). The implementation of this trap is optional.	1,3,6,1,2,1,17.0 .1
2.	<b>topologyChange</b>	A bridge sends traps if one of the ports configured migrates from the learning state to forwarding state or from the forwarding state to blocking state. This trap is not sent if newRoot traps are sent in such a migration (as described above). The implementation of this trap is optional.	1,3,6,1,2,1,17.0 .2

## 15.10 Port Security

ID	Trap Name	Overview of Traps	OID
1.	mnoL2PortSecurityViolationTrap	<p>A new MAC address that violates the port-security configuration defined, in advance, triggers to send trap messages.</p> <p>Binding objects: mnoPortSecPortIndex Port interface mnoL2PortSecurityViolationMac Host MAC Address</p>	1.3.6.1.4.1.396. 5.5.3.3.0.1

## 15.11 Port

ID	Trap Name	Overview of Traps	OID
1.	linkUp	This notification is generated if a port becomes link-up. Binding objects: (1) ifIndex (2) if AdminStatus (3) ifOperStatus	1.3.6.1.6. 3.1.1.5.4
2.	linkDown	This notification is generated if a port becomes link-down. Binding objects: (1) ifIndex, (2) if AdminStatus (3) ifOperStatus	1.3.6.1.6. 3.1.1.5.3

## 15.12 RMON

ID	Trap Name	Overview of Traps	OID
1.	risingAlarm	SNMP traps are generated if an alarm entry exceeds the upper-threshold. Then the event, which is configured to send SNMP traps, is generated. Binding objects: (1) alarmIndex (2) alarmVariable (3) alarmSampleType (4) alarmValue (5) alarmRisingThreshold	1.3.6.1.2.1.16 .0.1
2.	fallingAlarm	SNMP traps are generated if an alarm entry exceeds the lower-threshold. Then the event, which is configured to send SNMP traps, is generated. Binding objects: (1) alarmIndex (2) alarmVariable (3) alarmSampleType (4) alarmValue (5) alarmFallingThreshold	1.3.6.1.2.1.16 .0.2

## 15.13 SNMP Authentication

ID	Trap Name	Overview of Traps	OID
1.	authenticationFailure	<p>authenticationFailure traps indicate that the SNMPv2 entity operating as an agent roll has received the protocol message, which is not accurately authenticated.</p> <p>A function of generating the traps is necessary for all the implementation of SNMPv2, but an object of snmpEnableAuthenTraps shows if the traps are generated.</p>	1.3.6.1.6. 3.1.1.5.5

## 15.14 System

ID	Trap Name	Overview of Traps	OID
1.	coldStart	coldStart traps indicate the possibility that the SNMPv2 entity operating with an agent-role becomes reinitialized and its configuration becomes changed.	1.3.6.1.6. 3.1.1.5.1
2.	warmStart	warmStart traps indicate that an SNMPv2 entity operating as the agent role becomes reinitialized so as its configuration does not become changed.	1.3.6.1.6. 3.1.1.5.2

## 15.15 Temperature

ID	Trap Name	Overview of Traps	OID
1.	mnoTemperatureRising Alarm	This notification is sent if the current temperature exceeds the upper-threshold.	1.3.6.1.4.1.396.5.5.1.2.1
2.	mnoTemperatureFalling Alarm	This notification is sent if the current temperature lowers from the upper-threshold.	1.3.6.1.4.1.396.5.5.1.2.2

## 15.16 Traffic Control

ID	Trap Name	Overview of Traps	OID
1.	mnoPktStormOccurred	If the packet-storm mechanism detects the packet storm, and if you shutdown as an action, the following is the related information. Binding objects: mnoPktStormCtrlPortIndex Port Interface	1.3.6.1.4.1.396. 5.5.3.5.0.1
2.	mnoPktStormCleared	If a packet storm is resolved, the following is the related information. Binding objects: mnoPktStormCtrlPortIndex Port interface	1.3.6.1.4.1.396. 5.5.3.5.0.2
3.	mnoPktStormDisablePort	If a port becomes disabled because of the packet storm mechanism, the following is the related information. Binding objects: mnoPktStormCtrlPortIndex Port interface	1.3.6.1.4.1.396. 5.5.3.5.0.3

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