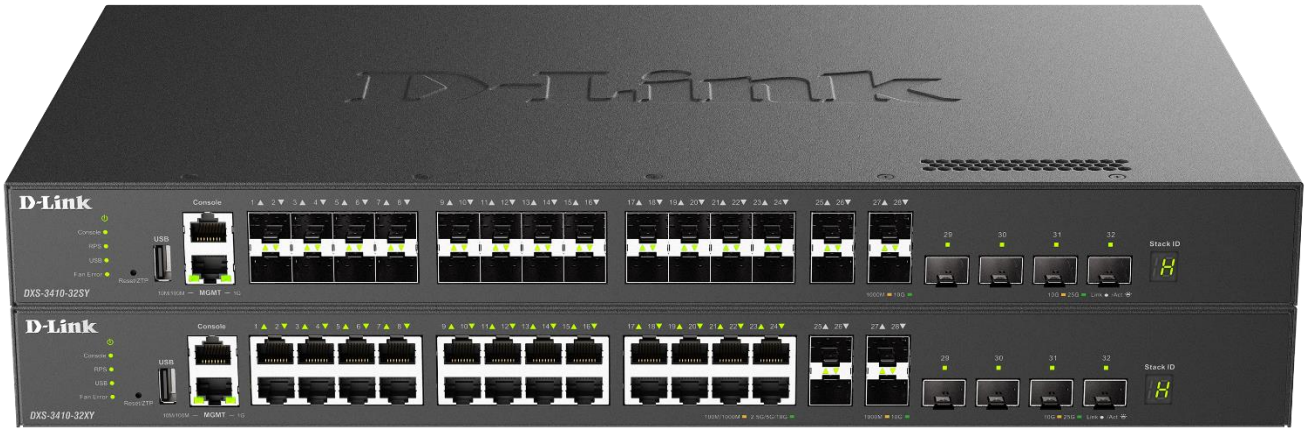
Version 1.00 | 2023/12/15



Web UI Reference Guide

Layer 3 Stackable Managed Switch

DXS-3410 Series

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE Mark Warning

This equipment is compliant with Class A of CISPR 32. In a residential environment, this equipment may cause radio interference.

Avertissement Concernant la Marque CE

Cet équipement est conforme à la classe A de la norme CISPR 32. Dans un environnement résidentiel, cet équipement peut provoquer des interférences radio.

VCCI Warning

この装置は、クラス A 機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

BSMI Notice

警告: 為避免電磁干擾，本產品不應安裝或使用於住宅環境。

Safety Compliance

Warning: Class 1 Laser Product: When using a fiber optic media expansion module, never look at the transmit laser while it is powered on. In addition, never look directly at the fiber TX port and fiber cable ends when they are powered on.

Avertissement: Produit Laser de Classe 1: Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Transmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

Table of Contents

1. Introduction

Audience

The *Web UI Reference Guide* is intended for network administrators and other IT networking professionals responsible for managing the Switch by using the Web User Interface (Web UI). The Web UI is the secondary management interface to the switches in the DXS-3410 Series, which will be generally be referred to simply as the '*Switch*' within this manual. This manual is written in a way that assumes readers already have the experience and knowledge of Ethernet and modern networking principles for Local Area Networks (LANs).

Other Documentation

The documents below are a further source of information in regards to configuring and troubleshooting the Switch. All the documents are available either from the D-Link website. Other documents related to this Switch are:

- *DXS-3410 Series Hardware Installation Guide*
- *DXS-3410 Series CLI Reference Guide*

Typographical Conventions

Boldface Font	Indicates a button, a toolbar icon, menu, or menu item. For example, Open the **File** menu and choose **Cancel**. Used for emphasis. May also indicate system messages or prompts appearing on screen. For example, **You have mail**. Used to represent filenames, program names, and commands. For example, use the **copy** command.
Initial capital letter	Indicates a window name. Names of keys on the keyboard have initial capitals. For example, Click Enter.
Menu Name > Menu Option	Indicates the menu structure. **Device > Port > Port Properties** means the **Port Properties** menu option under the **Port** menu option that is located under the **Device** menu.
Blue Courier Font	Used to represent an example of a screen console display including example entries of CLI command input with the corresponding output.

Notes and Cautions

NOTE: A note indicates important information that helps you make better use of your device.

CAUTION: A caution indicates a potential for property damage, personal injury, or death.

ATTENTION : Une précaution indique un risque de dommage matériel, de blessure corporelle ou de mort.

2. Web User Interface (Web UI)

The Web UI, which offers a more graphical interface, grants access to the majority of the software features present on the Switch. These features can be enabled, configured, disabled, or monitored through any standard web browser, such as Microsoft's Internet Explorer, Mozilla Firefox, Google Chrome, or Safari. The LAN ports provide an in-band connection to the Web UI using HTTP or HTTPS (SSL).

The Web UI examples in this guide was capture using the **Microsoft Edge** browser.

Connecting to the Web UI

By default, **Secure HTTP (https)** access is available to the Switch. To access the Web UI, open a standard web browser and enter **https://** followed by the IP address of the Switch into the address bar of the browser. Press the **Enter** key. For example, **https://10.90.90.90**.

NOTE: The default IP address of the Switch is ***10.90.90.90*** (subnet mask *255.0.0.0*).
The default username and password is ***admin***.

Logging into the Web UI

Enter the **User Name** and **Password** and click the **Login** button.

Figure 2-1 Web UI Login Window

Smart Wizard

After successfully logging into the web UI, the Smart Wizard embedded Web Utility will be launched.

Step 1 - Web Mode

The Switch supports two modes: **Standard Mode** and **Surveillance Mode**.

- The **Standard Mode** is used to configure, manage, and monitor most of the software features on the Switch.
- The **Surveillance Mode** is an additional web mode specifically designed to assist the user with surveillance features supported by the Switch.

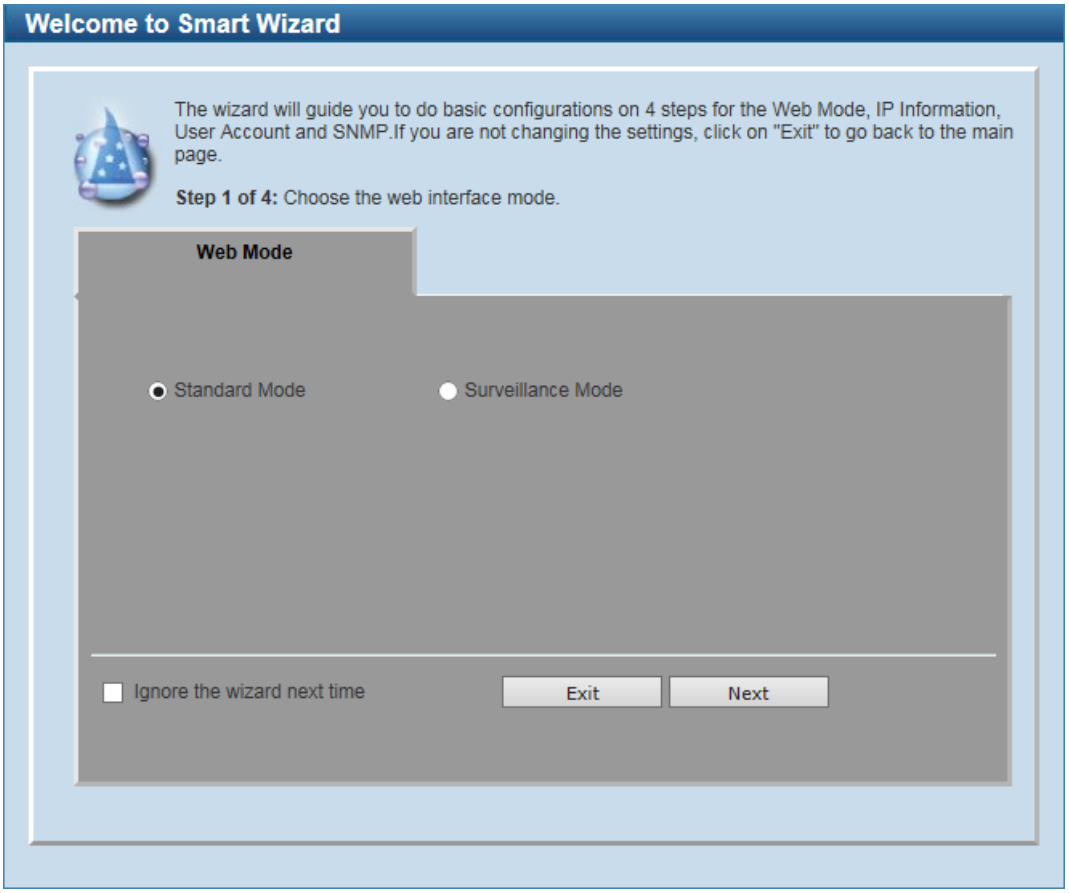


Figure 2-2 Web Mode Window

The fields that can be configured are described below:

Parameter	Description
Standard Mode	Select this option to access the Standard Mode after the Smart Wizard was completed.
Surveillance Mode	Select this option to access the Surveillance Mode after the Smart Wizard was completed.

Tick the **Ignore the wizard next time** option to skip the Smart Wizard on the next login.

Click the **Exit** button to discard the changes made, exit the Smart Wizard, and continue to the Web UI.

Click the **Next** button to accept the changes made and continue to the next step.

Step 2 - System IP Information

In this step, we can configure System IP Information.

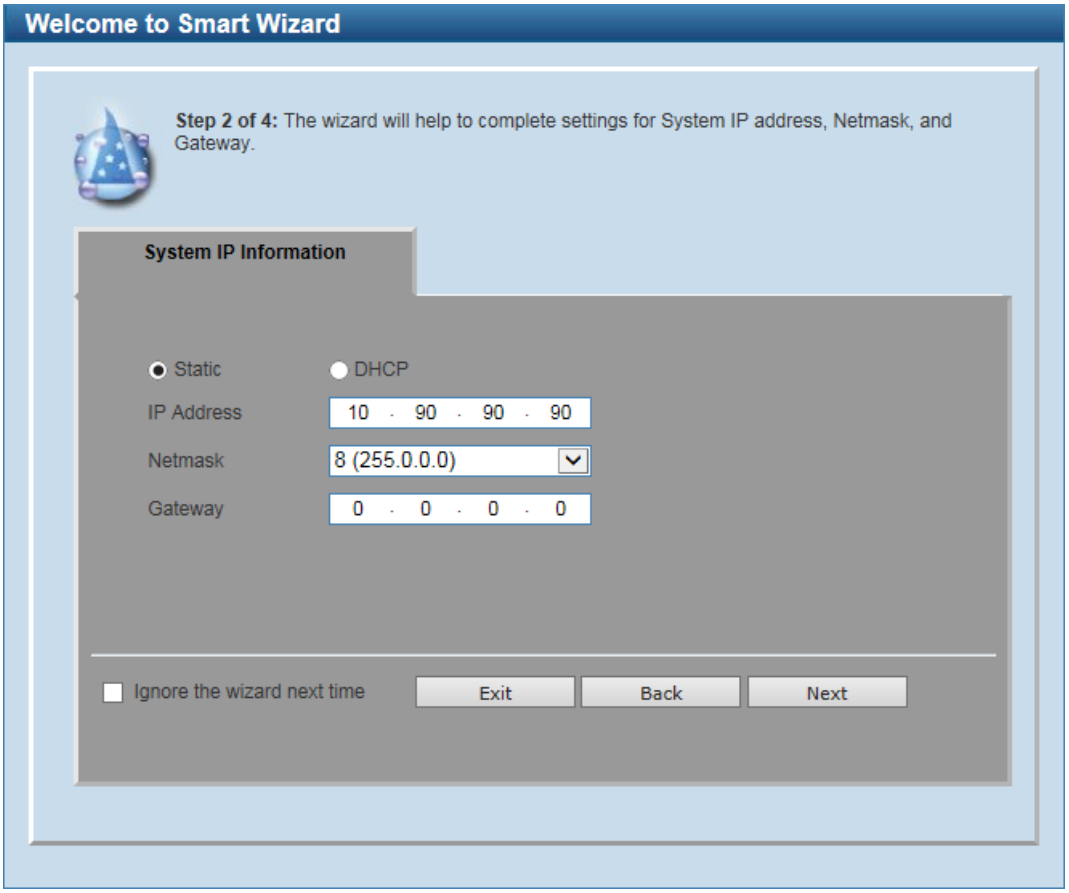


Figure 2-3 System IP Information Window

The fields that can be configured are described below:

Parameter	Description
Static	Select this option to manually assign and configure the IP address settings for the Switch. After selecting this option, the following parameters can be configured: • **IP Address** - Enter the IP address of the Switch here. • **Netmask** - Select the Netmask option here. • **Gateway** - Enter the IP address of the default gateway here.
DHCP	Select this option to obtain IP address settings automatically from a DHCP server for the Switch.

Tick the **Ignore the wizard next time** option to skip the Smart Wizard on the next login.

Click the **Exit** button to discard the changes made, exit the Smart Wizard, and continue to the Web UI.

Click the **Next** button to accept the changes made and continue to the next step.

Step 3 - User Accounts Settings

In this step, we can configure the user account settings. This step can only be modified by a user account with the privilege level of 15.

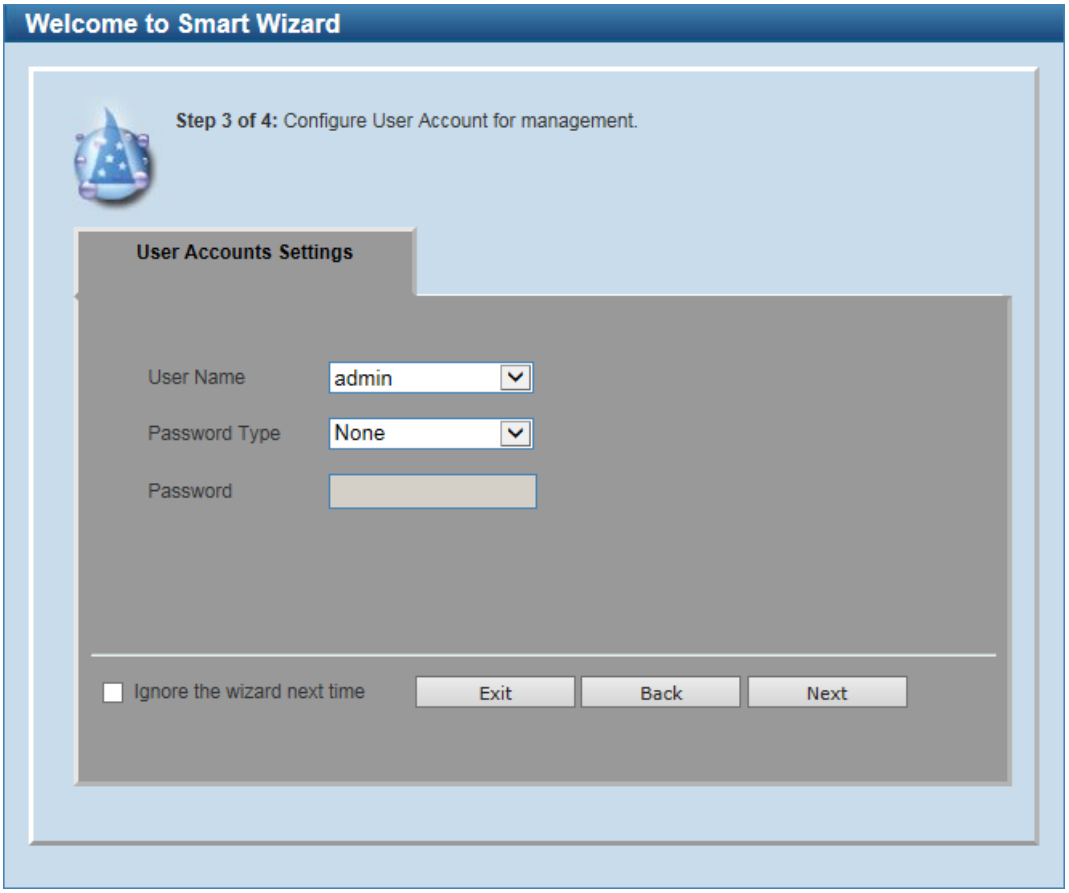


Figure 2-4 User Accounts Settings Window

The fields that can be configured are described below:

Parameter	Description
User Name	Select the user name here. This is normally an administrator-level account with the privilege level of 15.
Password Type	Select the password type here. Options to choose from are: • **None** - Specifies that no password will be configured for this user account. • **Plain Text** - Specifies that the password for this user account will be in the plain text form. • **Encrypted-SHA1** - Specifies that the password for this user account will be in the encrypted form using the SHA1 encryption method. • **Encrypted-MD5** - Specifies that the password for this user account will be in the encrypted form using the MD5 encryption method.
Password	Enter the password for the user account either in the plain text format or the encrypted format here based on the previous selection made. In the encrypted format, the password will not be encrypted from plain text to the encrypted format. Instead, the encrypted password must be entered.

Tick the **Ignore the wizard next time** option to skip the Smart Wizard on the next login.

Click the **Exit** button to discard the changes made, exit the Smart Wizard, and continue to the Web UI.

Click the **Next** button to accept the changes made and continue to the next step.

Step 4 - SNMP Settings

In this step, we can enable or disable the SNMP feature.

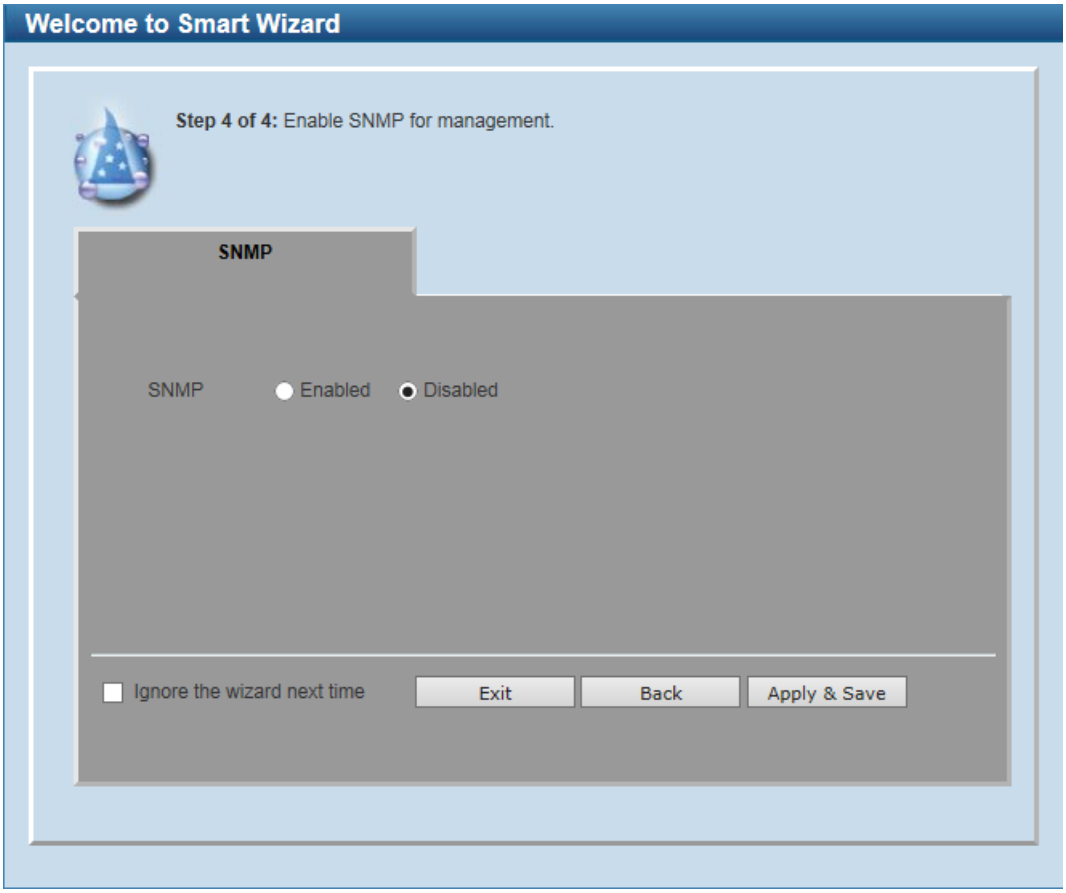


Figure 2-5 SNMP Window

The fields that can be configured are described below:

Parameter	Description
SNMP	Select to enable or disable the SNMP feature here.

Tick the **Ignore the wizard next time option** to skip the Smart Wizard on the next login.

Click the **Exit** button to discard the changes made, exit the Smart Wizard, and continue to the Web UI.

Click the **Back** button to discard the changes made and return to the previous step.

Click the **Apply & Save** button to accept the changes made and continue to the Web UI.

Web Interface Navigation

After accessing the Web UI, the following will be displayed:

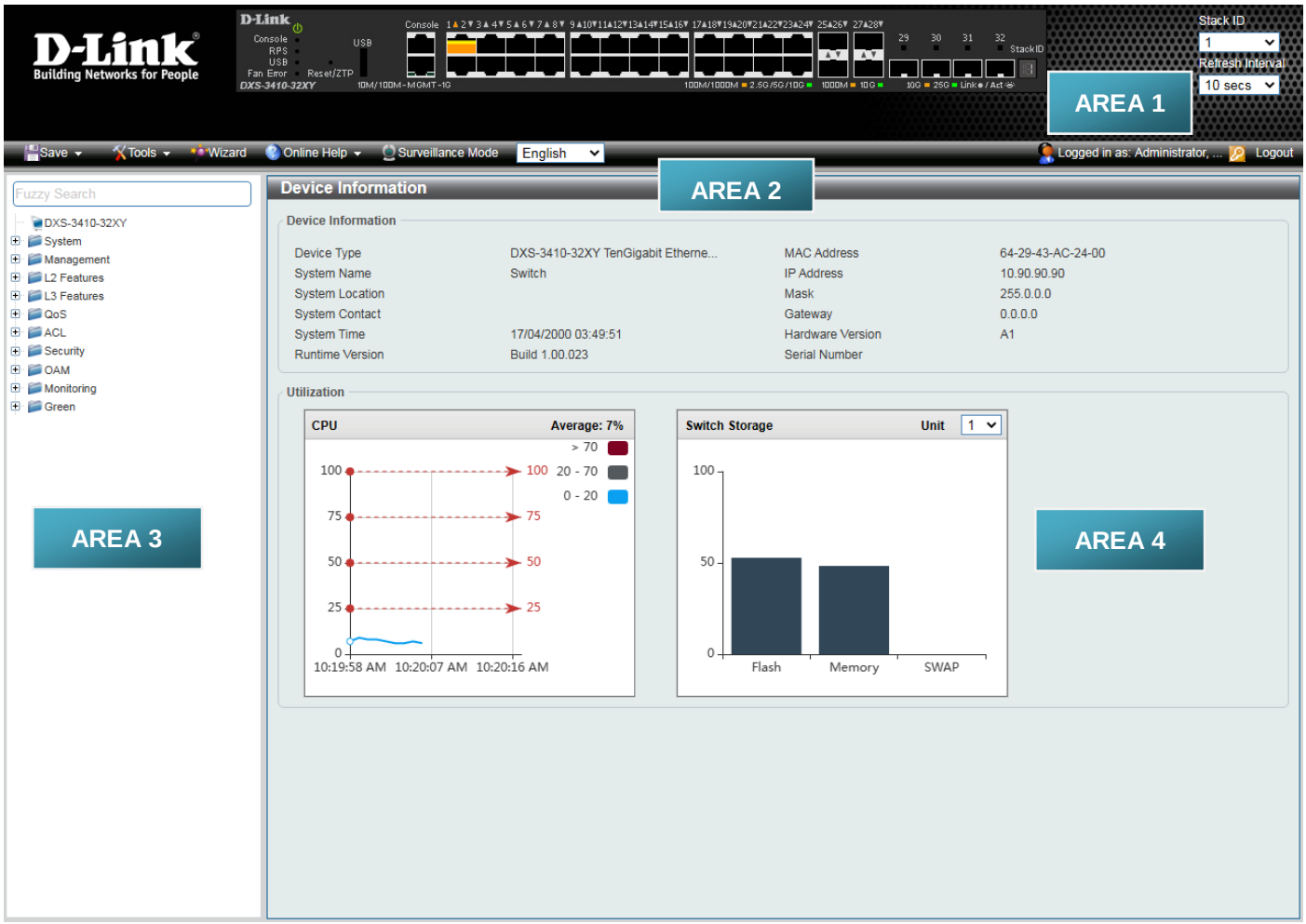


Figure 2-6 Web User Interface Areas

Area Number	Description
AREA 1	In this area, a graphical near real-time image of the front panel of the Switch is displayed with ports and expansion modules. Some management functions like port monitoring are also accessible here. Click the D-Link logo to go to the D-Link website.
AREA 2	In this area, a toolbar is used to access functions like **Save**, **Tools**, **Wizard**, **Online Help**, accessing the Web UI in the **Surveillance Mode**, customized **Language** preference, and a **Logout** option. Click the **Surveillance Mode** option to change the switch mode from Standard Mode to Surveillance Mode. The user account and IP address, currently accessing the Web UI, is displayed on the right in this toolbar.
AREA 3	In this area, the software features available in the Web UI are grouped into folders containing hyperlinks that will open window frames in Area 4. There is also a search option in this area that can be used to search for specific feature keywords in the Web UI to easily find the link to the set of features.
AREA 4	In this area, configuration and monitoring window frames are available based on the selections made in Area 3.

NOTE: The best screen resolution for viewing the Web UI is 1280 x 1024 pixels.

3. System

Device Information

In the Device Information section, the user can view a list of basic information regarding the Switch. It appears automatically when you log on to the Switch.

To return to the Device Information window after viewing other windows, click the **DXS-3410-32XY** link.

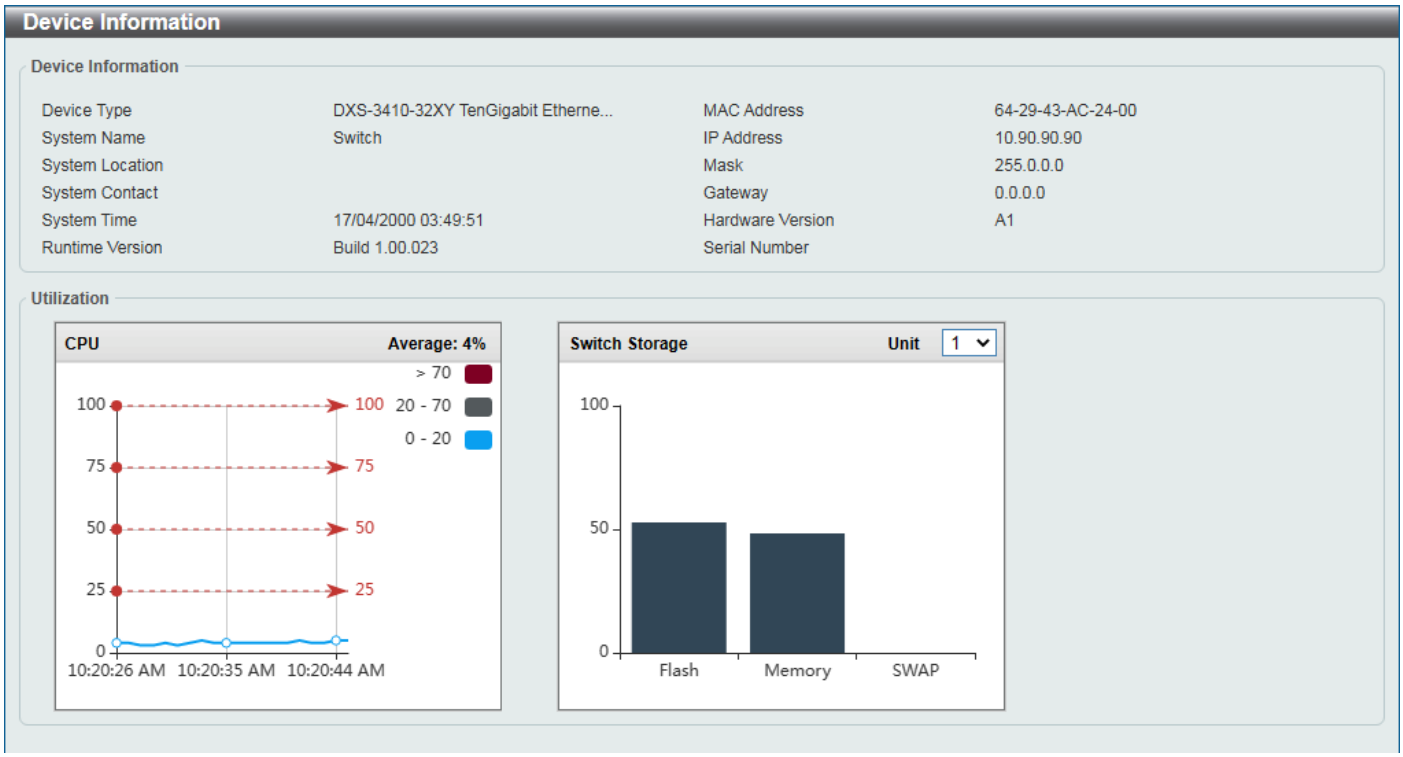


Figure 3-1 Device Information Window

System Information Settings

This window is used to display and configure the system information settings and management interface configuration settings.

To view the following window, click **System > System Information Settings**, as shown below:

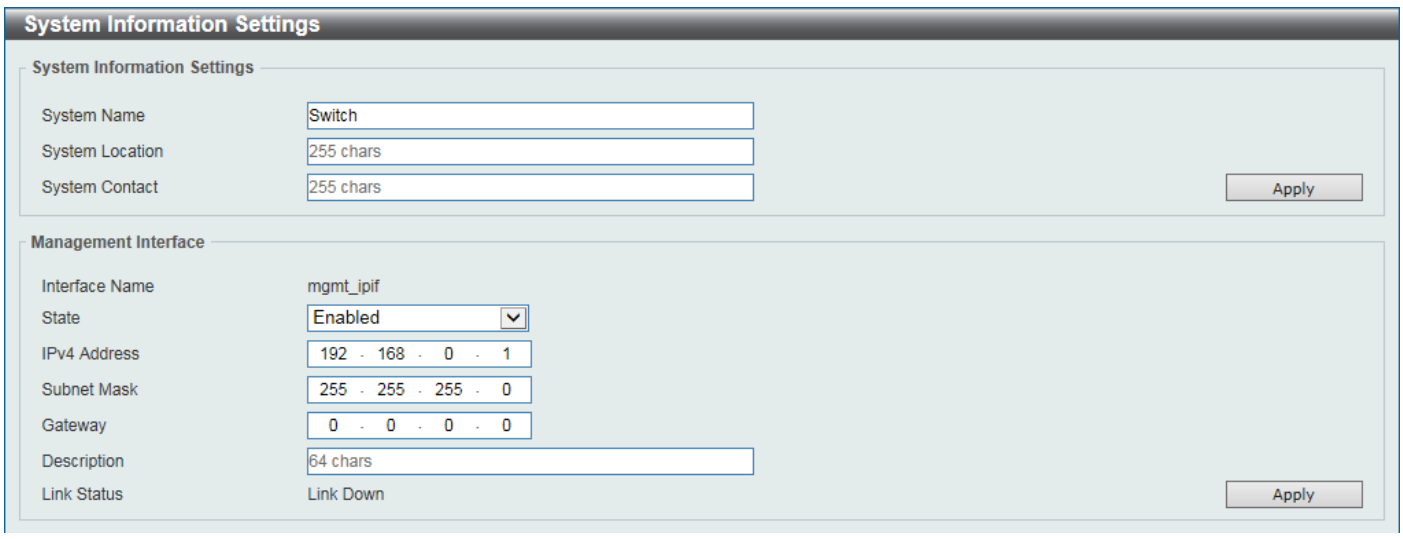


Figure 3-2 System Information Settings Window

The fields that can be configured in **System Information Settings** are described below:

Parameter	Description
System Name	Enter a system name for the Switch, if so desired. This name will identify it in the Switch network.
System Location	Enter the location of the Switch, if so desired.
System Contact	Enter a contact name for the Switch, if so desired.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Management Interface** are described below:

Parameter	Description
State	Select to enable or disable the state of the management interface here.
IPv4 Address	Enter the IPv4 address for this interface here.
Subnet Mask	Enter the subnet mask for this interface here.
Gateway	Enter the gateway IPv4 address for this interface here.
Description	Enter the description for the management interface here. This can be up to 64 characters long.

Click the **Apply** button to accept the changes made.

Peripheral Settings

This window is used to display and configure the environment trap settings and environment temperature threshold settings.

To view the following window, click **System > Peripheral Settings**, as shown below:

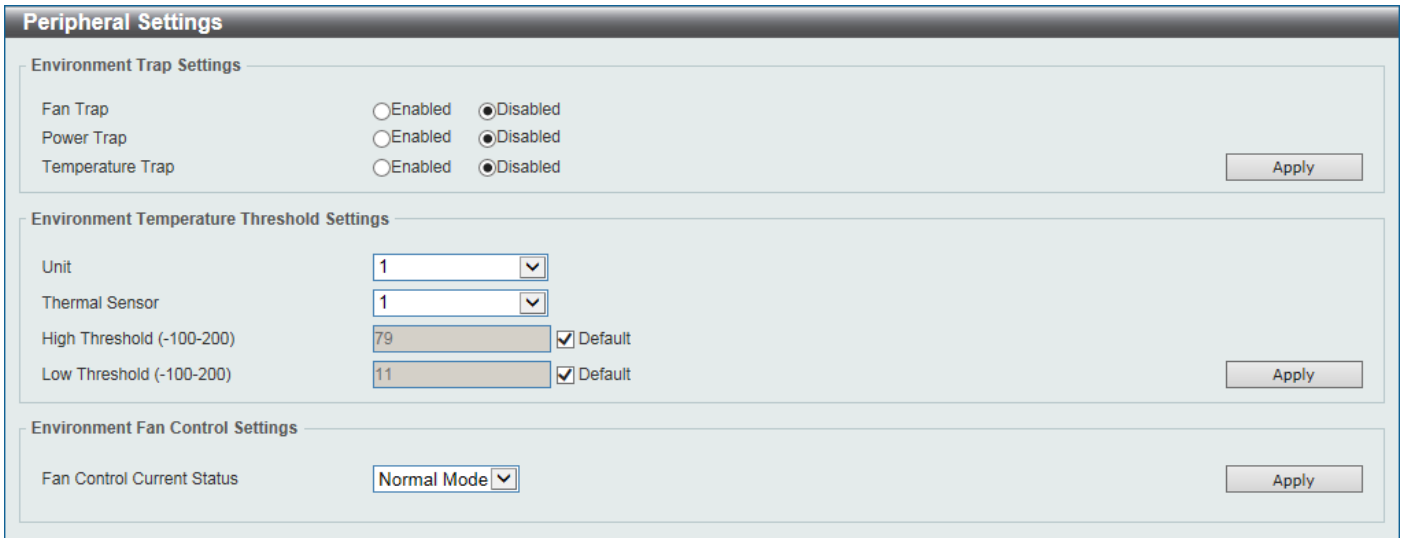


Figure 3-3 Peripheral Settings Window

The fields that can be configured in **Environment Trap Settings** are described below:

Parameter	Description
Fan Trap	Select to enable or disable the fan trap state for warning fan event (fan failed or fan recover).

Parameter	Description
Power Trap	Select to enable or disable the power trap state for warning power event (power failed or power recover).
Temperature Trap	Select to enable or disable the temperature trap state for warning temperature event (temperature thresholds exceeded or temperature recover).

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Environment Temperature Threshold Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Thermal	Select the thermal sensor ID.
High Threshold	Enter the high threshold value of the warning temperature setting. The range is from -100 to 200 degrees Celsius. Select the **Default** option to use the default value.
Low Threshold	Enter the low threshold value of the warning temperature setting. The range is from -100 to 200 degrees Celsius. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Environment Fan Control Settings** are described below:

Parameter	Description
Fan Control Current State	Select the state for the fan. Options to choose from are **Normal Mode** and **Quiet Mode**.

Click the **Apply** button to accept the changes made.

Port Configuration

Port Settings

This window is used to display and configure the Switch's port settings.

To view the following window, click **System > Port Configuration > Port Settings**, as shown below:

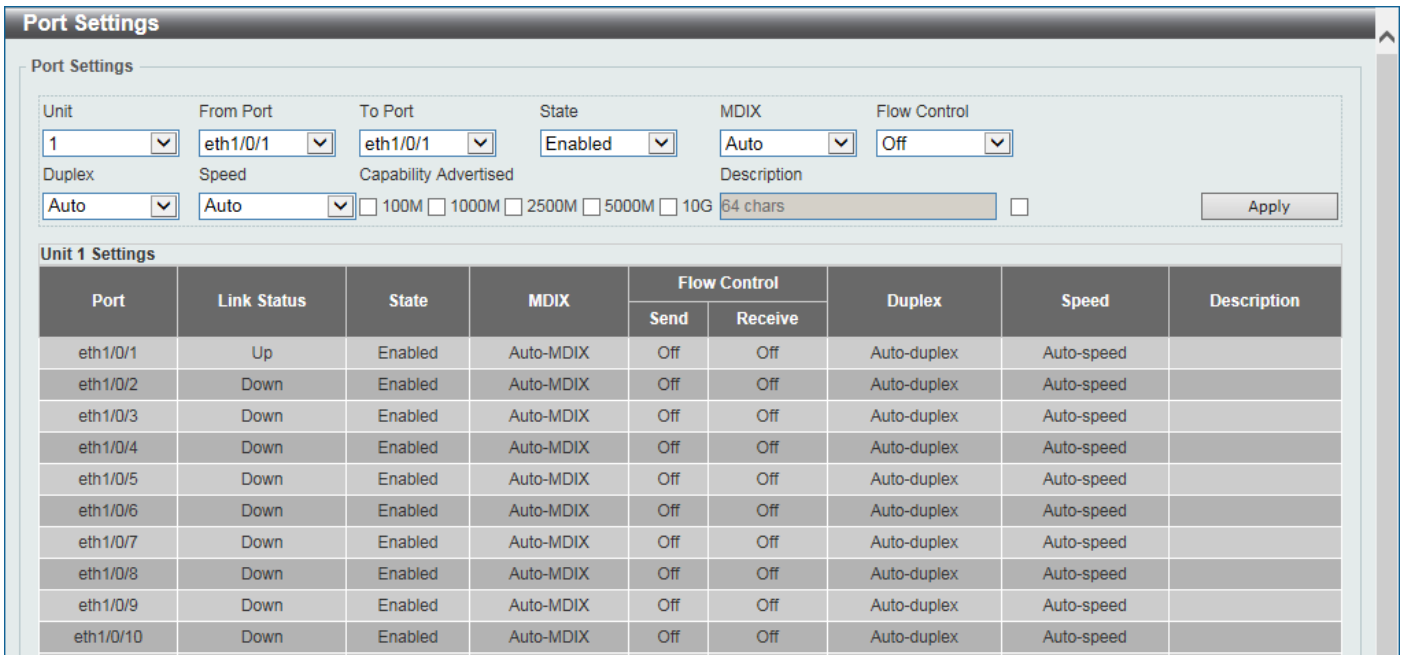


Figure 3-4 Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be configured here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the physical port state here.
MDIX	Select the Medium Dependent Interface Crossover (MDIX) option here. Options to choose from are: • **Auto -** Select this option for auto-sensing of the optimal type of cabling. • **Normal -** Select this option for normal cabling. If this option is selected, the port is in the MDIX mode and can be connected to a PC NIC using a straight-through cable or a port (in the MDI mode) on another Switch through a crossover cable. • **Cross -** Select this option for crossover cabling. If this option is selected, the port is in the MDI mode and can be connected to a port (in the MDIX mode) on another Switch through a straight cable.
Flow Control	Select to turn flow control **On** or **Off** here. This feature will not work through Switches that are physically stacked.
Duplex	Select the duplex mode used here. Options to choose from are **Auto** and **Full**.
Speed	Select the port speed option here. This option will manually force the connection speed on the selected port to connect at the specified speed only. The **Master** setting will allow the port to advertise capabilities related to duplex, speed, and physical layer type. The master setting will also determine the master and slave relationship between the two connected physical layers. This relationship is necessary for establishing the timing control between the two

Parameter	Description
	physical layers. The timing control is set on a master physical layer by a local source. The **Slave** setting uses loop timing, where the timing comes from a data stream received from the master. If one connection is set for master, the other side of the connection must be set for slave. Any other configuration will result in a 'link down' status for both ports. Options to choose from are: • **Auto -** Specifies that for copper ports, auto-negotiation will start to negotiate the speed and flow control with its link partner. For fiber ports, auto-negotiation will start to negotiate the clock and flow control with its link partner. • **1000M -** Specifies to force the port speed to 1 Gbps. • **1000M Master -** Specifies to force the port speed to 1 Gbps and operates as the master, to facilitate the timing of transmit and receive operations. • **1000M Slave -** Specifies to force the port speed to 1 Gbps and operates as the slave, to facilitate the timing of transmit and receive operations. • **2500M -** Specifies to force the port speed to 2.5 Gbps. • **5000M -** Specifies to force the port speed to 5 Gbps. • **10G -** Specifies to force the port speed to 10 Gbps. • **25G -** Specifies to force the port speed to 25 Gbps.
Capability Advertised	When the **Speed** is set to **Auto**, select capabilities that are advertised during auto-negotiation.
Description	Select the checkbox and enter the description for the corresponding port here. This can be up to 64 characters long.

Click the **Apply** button to accept the changes made.

Port Status

This window is used to view the Switch's physical port status and settings.

To view the following window, click **System > Port Configuration > Port Status**, as shown below:

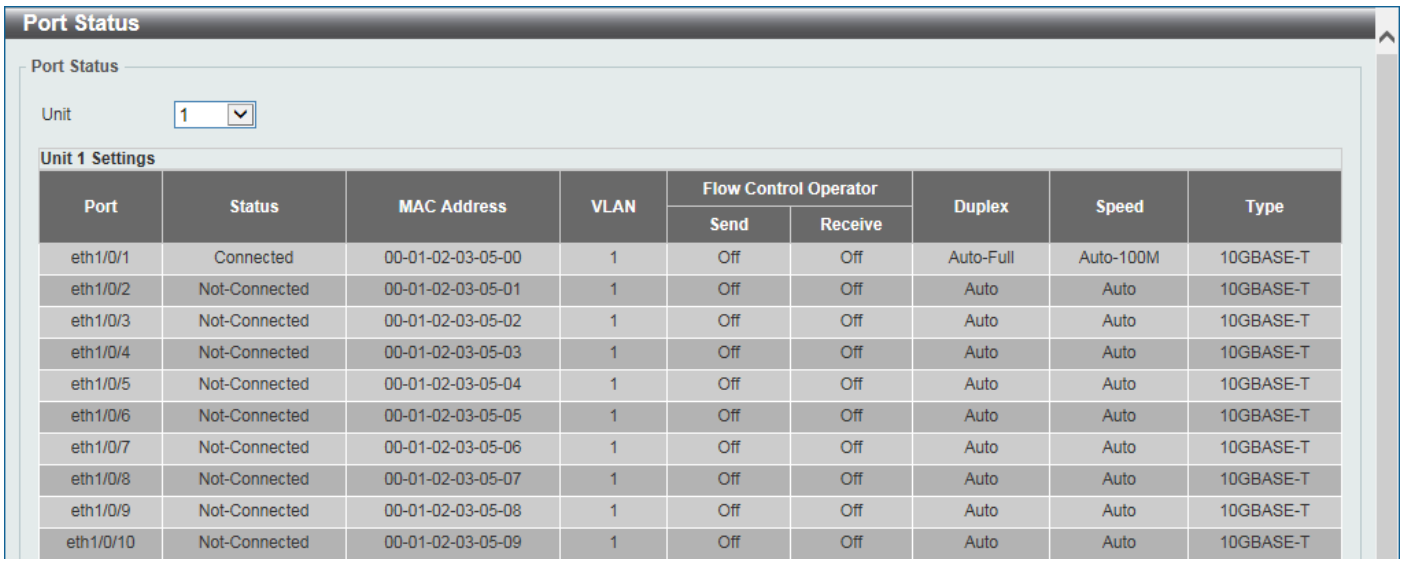


Figure 3-5 Port Status Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be displayed here.

Port GBIC

This window is used to view active GBIC information found on each applicable physical port of this Switch.

To view the following window, click **System > Port Configuration > Port GBIC**, as shown below:

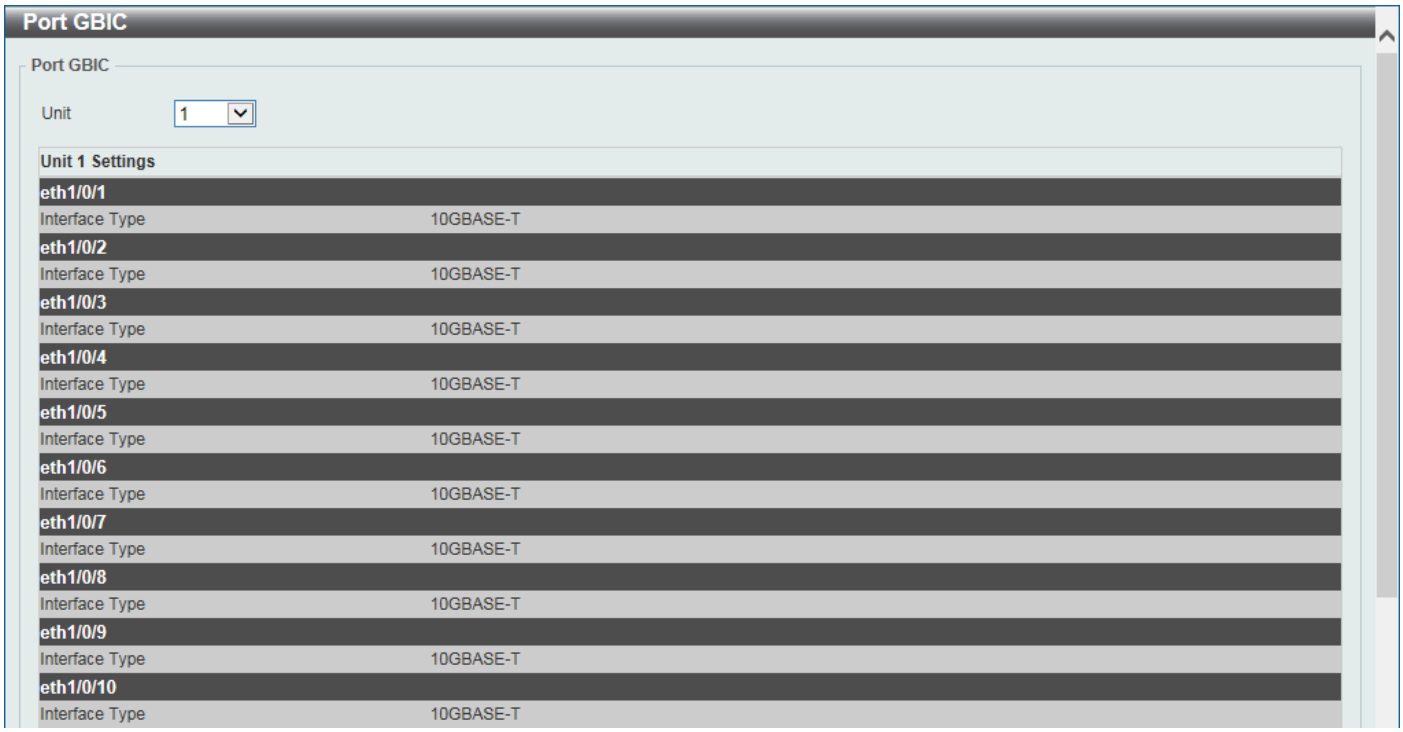


Figure 3-6 Port GBIC Window

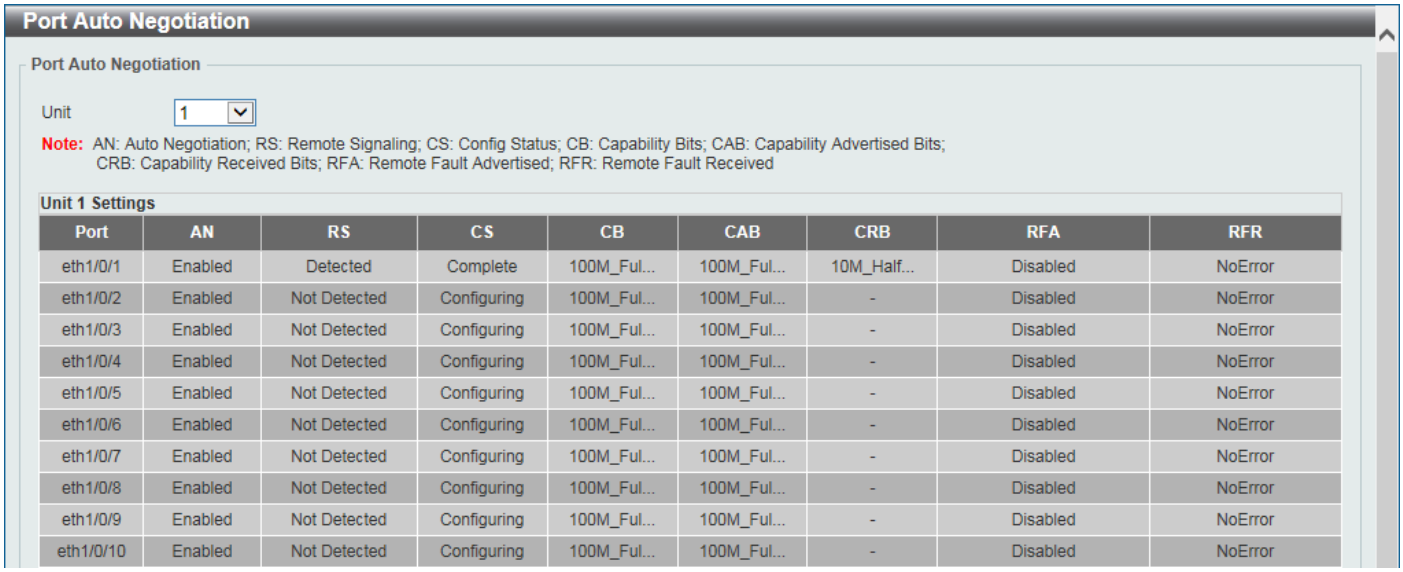
The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this display here.

Port Auto Negotiation

This window is used to view detailed port auto-negotiation information.

To view the following window, click **System > Port Configuration > Port Auto Negotiation**, as shown below:



Port	AN	RS	CS	CB	CAB	CRB	RFA	RFR
eth1/0/1	Enabled	Detected	Complete	100M_Ful...	100M_Ful...	10M_Half...	Disabled	NoError
eth1/0/2	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/3	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/4	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/5	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/6	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/7	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/8	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/9	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError
eth1/0/10	Enabled	Not Detected	Configuring	100M_Ful...	100M_Ful...	-	Disabled	NoError

Figure 3-7 Port Auto Negotiation Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be displayed here.

Error Disable Settings

This window is used to display and configure the recovery from the Error Disable causes and to configure the recovery interval.

To view the following window, click **System > Port Configuration > Error Disable Settings**, as shown below:

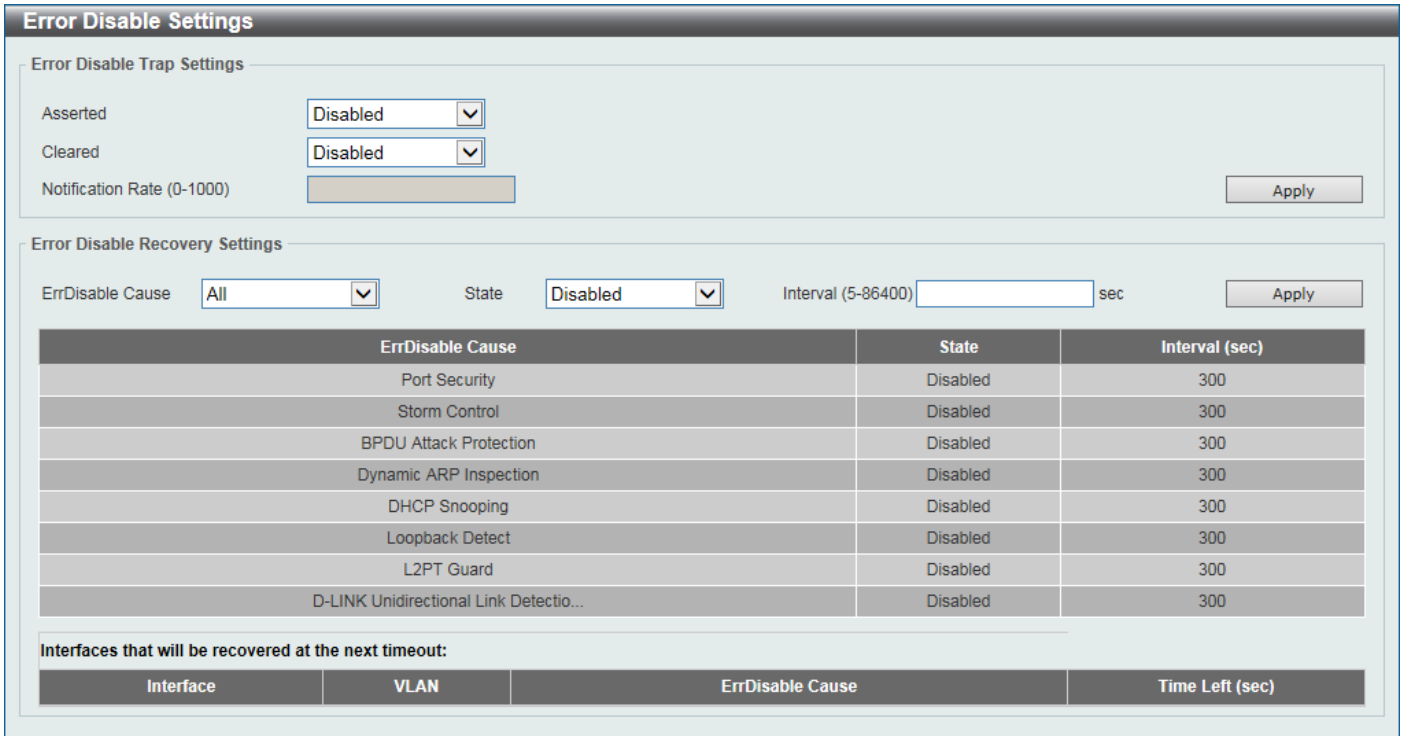


Figure 3-8 Error Disable Settings Window

The fields that can be configured for **Error Disable Trap Settings** are described below:

Parameter	Description
Asserted	Specifies to enable or disable notifications for entering into the error-disabled state.
Cleared	Specifies to enable or disable notifications for exiting from the error-disabled state.
Notification Rate	Enter the notification rate value here. This sets the number of traps per minute. The packets that exceed the rate will be dropped. The range is from 0 to 1000. The default value (0) indicates that an SNMP trap will be generated for every change of the error disabled state.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Error Disable Recovery Settings** are described below:

Parameter	Description
ErrDisable Cause	Select the error disabled cause here. Options to choose from are **Port Security**, **Storm Control**, **BPDU Attack Protection**, **Dynamic ARP Inspection**, **DHCP Snooping**, **Loopback Detect**, **L2PT Guard**, and **DULD**.
State	Select to enable or disable the error disabled recovery feature here.
Interval	Enter the time, in seconds, to recover the port from the error state caused by the specified module. The range is from 5 to 86400 seconds. By default, this value is 300 seconds.

Click the **Apply** button to accept the changes made.

Jumbo Frame

This window is used to display and configure the jumbo frame size and settings. The Switch supports jumbo frames. Jumbo frames are Ethernet frames with more than 1518 bytes of payload. The Switch supports jumbo frames with a maximum frame size of up to 9216 bytes.

To view the following window, click **System > Port Configuration > Jumbo Frame**, as shown below:

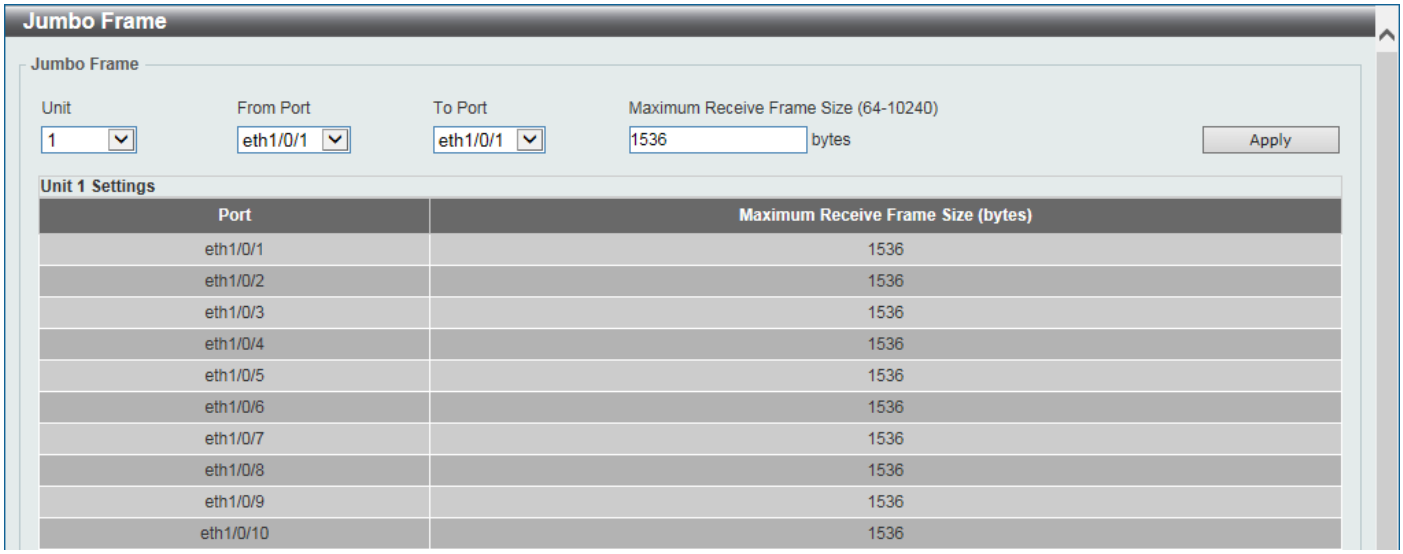


Figure 3-9 Jumbo Frame Window

The fields that can be configured for **Jumbo Frame** are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be configured here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Maximum Receive Frame Size	Enter the maximum receive frame size value here. The range is from 64 to 10240 bytes. By default, this value is 1536 bytes.

Click the **Apply** button to accept the changes made.

Interface Description

This window is used to display the status, administrative status, and description of each port on the Switch.

To view the following window, click **System > Interface Description**, as shown below:

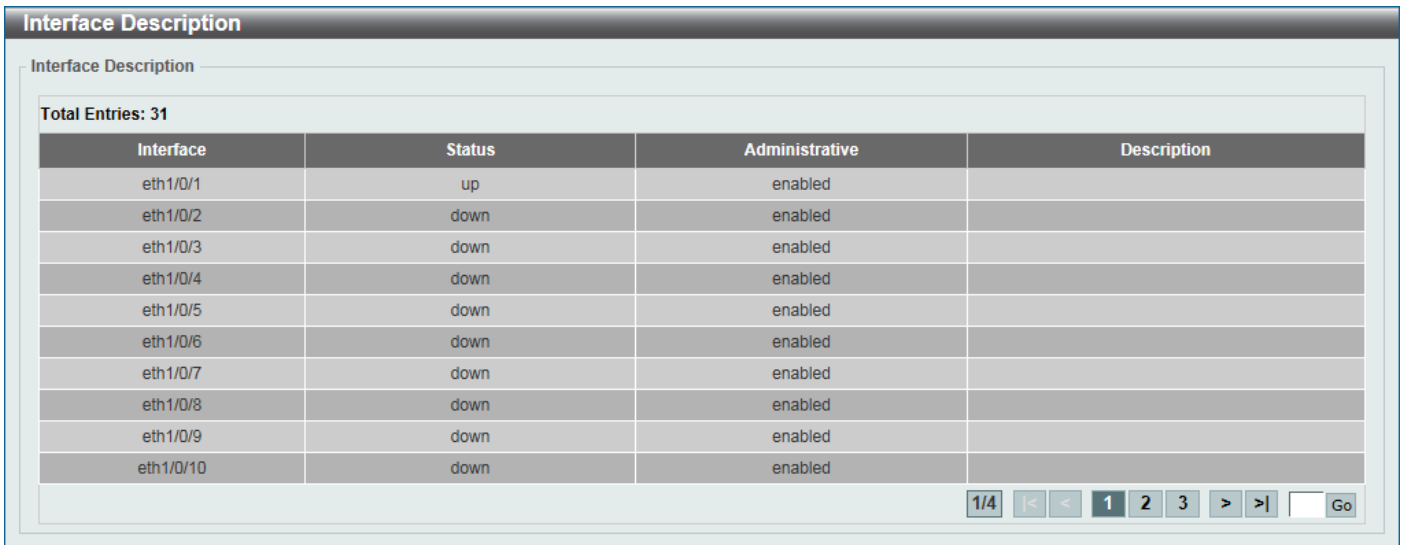


Figure 3-10 Interface Description Window

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Loopback Test

This window is used to display and configure the loopback settings of the physical port interfaces and to perform loopback tests.

To view the following window, click **System > Loopback Test**, as shown below:

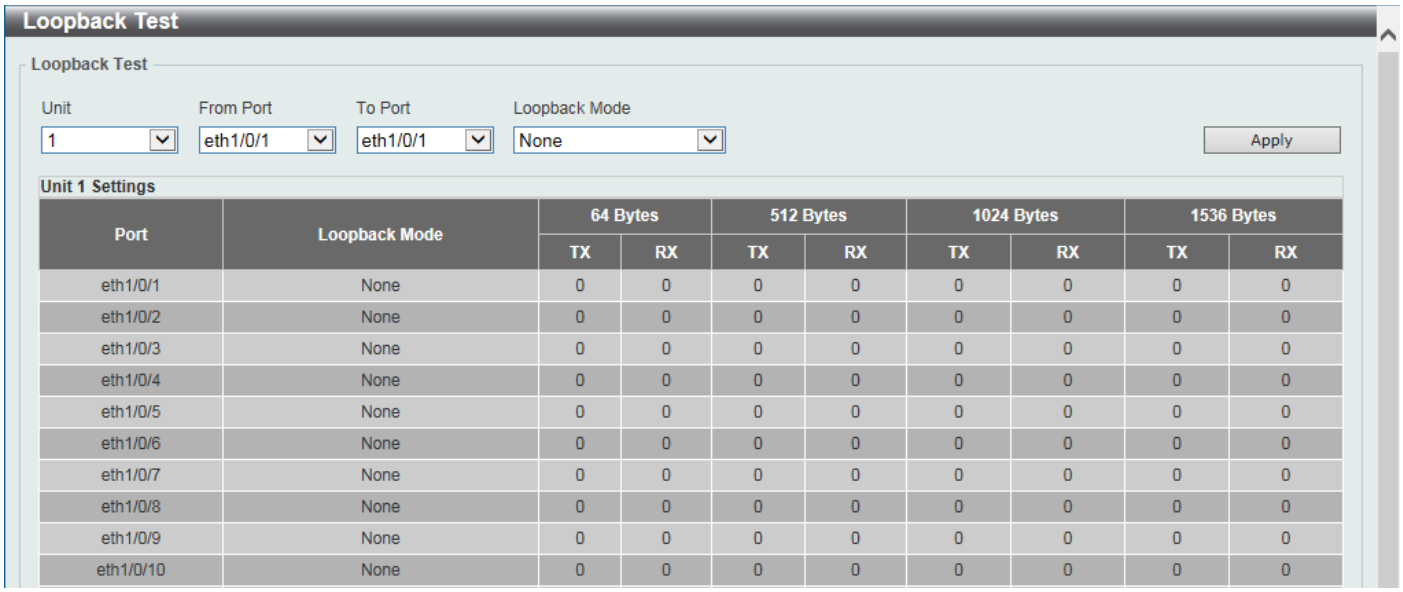


Figure 3-11 Loopback Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Loopback Mode	Select the loopback mode here. Options to choose from are: • **None -** Specifies not to enable the loopback mode. • **Internal MAC -** Specifies the internal loopback mode at the MAC layer. • **Internal PHY Default -** Specifies the internal loopback mode at the PHY layer to test the default medium. • **Internal PHY Copper -** Specifies the internal loopback mode at the PHY layer to test the copper medium. • **Internal PHY Fiber -** Specifies the internal loopback mode at the PHY layer to test the fiber medium. • **External PHY Default -** Specifies the external loopback mode at the PHY layer to test the default medium. • **External PHY Copper -** Specifies the external loopback mode at the PHY layer to test the copper medium. • **External PHY Fiber -** Specifies the external loopback mode at the PHY layer to test the fiber medium.

Click the **Apply** button to accept the changes made.

System Log

System Log Settings

This window is used to display and configure the system log settings.

To view the following window, click **System > System Log > System Log Settings**, as shown below:

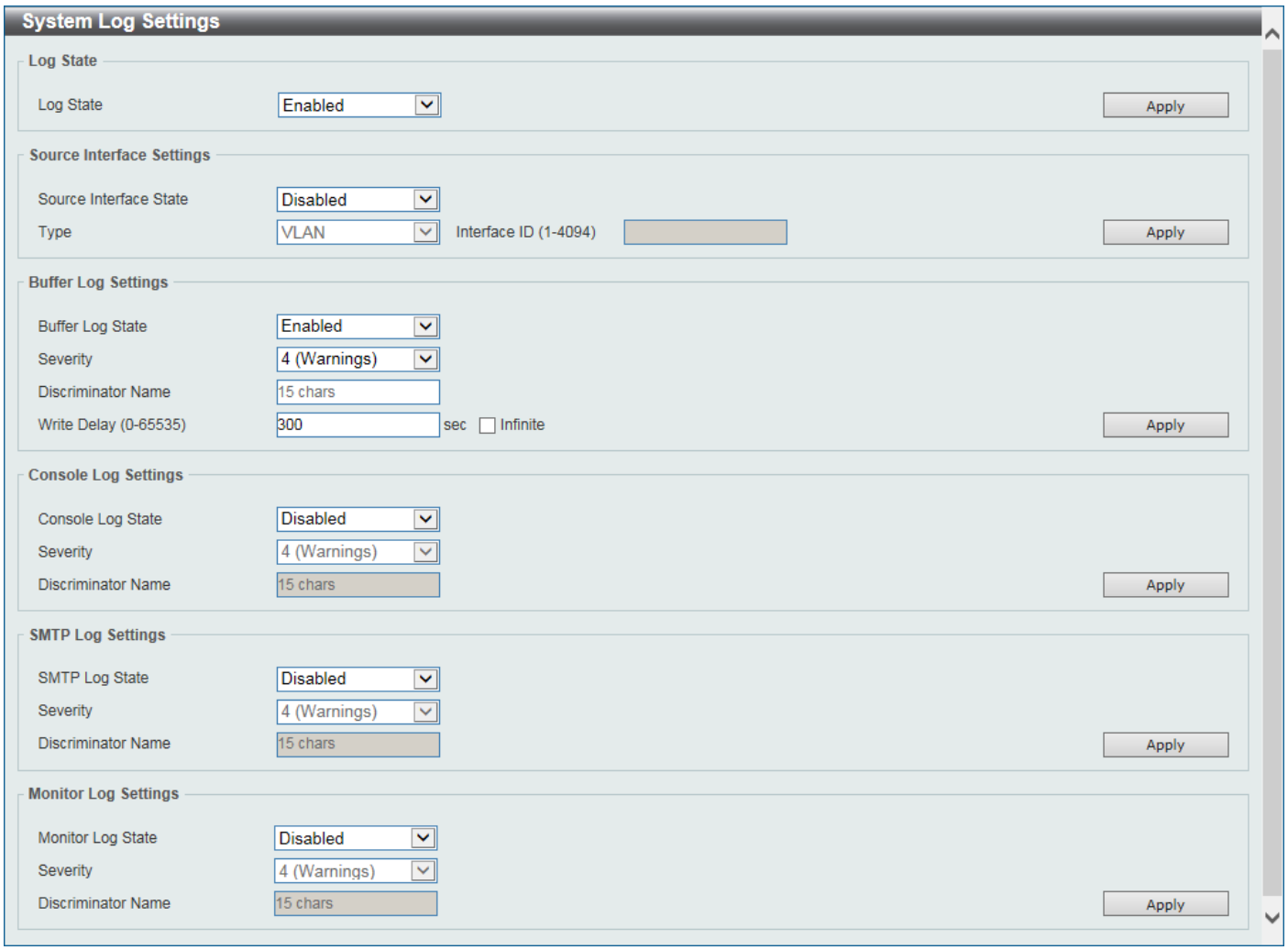


Figure 3-12 System Log Settings Window

The fields that can be configured for **Log State** are described below:

Parameter	Description
Log State	Select the enable or disable the global system log state here.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Source Interface Settings** are described below:

Parameter	Description
Source Interface State	Select this option to enable or disable the global source interface state.
Type	Select the type of interface that will be used. Options to choose from are **Loopback**, **MGMT**, and **VLAN**.
VID	Enter the VLAN ID here. For **loopback**, the range is from 1 to 8. For **MGMT**, this value is always 0. For **VLAN**, the range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Buffer Log Settings** are described below:

Parameter	Description
Buffer Log State	Select to globally enable or disable the buffer log state here. Options to choose from are **Enable**, **Disabled**, and **Default**. When selecting the **Default** option, the global buffer log state will follow the default behavior.
Severity	Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**.
Discriminator Name	Enter the discriminator name used here. This name can be up to 15 characters long. This specifies the name of the discriminator profile that will be used to filter buffer log messages based on the filtering criteria specified within that profile.
Write Delay	Enter the log write delay value here. The range is from 0 to 65535 seconds. By default, this value is 300 seconds. Select the **Infinite** option, to disable the write delay feature.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Console Log Settings** are described below:

Parameter	Description
Console Log State	Select to globally enable or disable the console log state here.
Severity	Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**.
Discriminator Name	Enter the discriminator name used here. This name can be up to 15 characters long. This specifies the name of the discriminator profile that will be used to filter console log messages based on the filtering criteria specified within that profile.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **SMTP Log Settings** are described below:

Parameter	Description
SMTP Log State	Select to globally enable or disable the SMTP log state here.
Severity	Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**.
Discriminator Name	Enter the discriminator name used here. This name can be up to 15 characters long. This specifies the name of the discriminator profile that will be used to filter SMTP log messages based on the filtering criteria specified within that profile.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Monitor Log Settings** are described below:

Parameter	Description
Monitor Log State	Select to globally enable or disable the monitor log state here.
Severity	Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**.

Parameter	Description
Discriminator Name	Enter the discriminator name used here. This name can be up to 15 characters long. This specifies the name of the discriminator profile that will be used to filter monitor log messages based on the filtering criteria specified within that profile.

Click the **Apply** button to accept the changes made.

System Log Discriminator Settings

This window is used to display and configure the system log discriminator settings.

To view the following window, click **System > System Log > System Log Discriminator Settings**, as shown below:

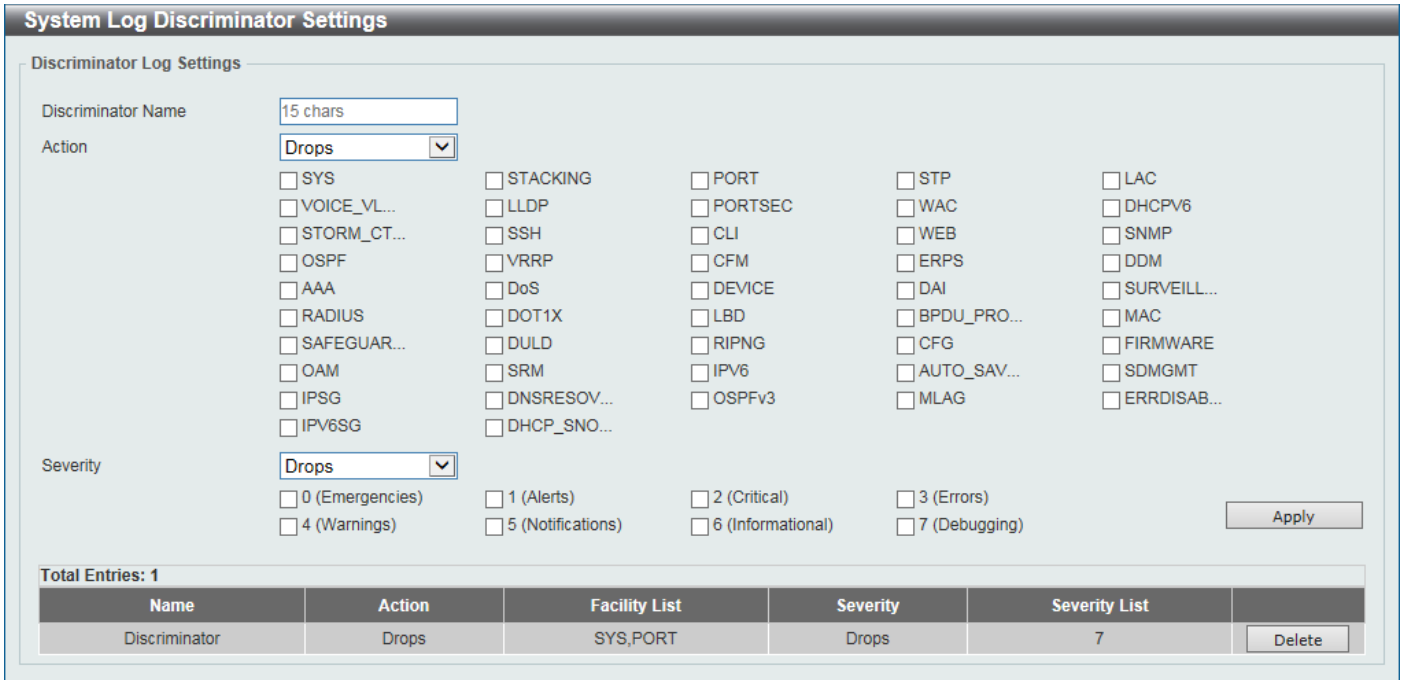


Figure 3-13 System Log Discriminator Settings Window

The fields that can be configured are described below:

Parameter	Description
Discriminator Name	Enter the name of the discriminator profile here. This name can be up to 15 characters long.
Action	Select the facility behavior option and the type of facility that will be associated with the selected behavior here. Behavior options to choose from are **Drops** and **Includes**.
Severity	Select the severity behavior option and the value of the type of information that will be logged. Behavior options to choose from are **Drops** and **Includes**. Severity value options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

System Log Server Settings

This window is used to display and configure the system log server settings.

To view the following window, click **System > System Log > System Log Server Settings**, as shown below:

Figure 3-14 System Log Server Settings Window

The fields that can be configured are described below:

Parameter	Description
Host IPv4 Address	Enter the system log server IPv4 address here.
Host IPv6 Address	Enter the system log server IPv6 address here.
UDP Port	Enter the system log server UDP port number here. This value must be either 514 or from 1024 to 65535. By default, this value is 514.
Severity	Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**.
Facility	Select the facility number that will be logged here. The range is from **0** to **23**. Each facility number is associated with a specific facility. See the table below:

Number	Name	Description
0	kern	Kernel messages
1	user	User-level messages
2	mail	Mail system
3	daemon	System daemons
4	auth1	Security/authorization messages
5	syslog	Messages generated internally by the SYSLOG
6	lpr	Line printer sub-system
7	news	Network news sub-system
8	uucp	UUCP sub-system
9	clock1	Clock daemon
10	auth2	Security/authorization messages
11	ftp	FTP daemon
12	ntp	NTP subsystem
13	logaudit	Log audit
14	logalert	Log alert
15	clock2	Clock daemon

Parameter	Description		
	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)
Discriminator Name	Enter the name of the discriminator that will be used to filter messages sent to the log server here. This name can be up to 15 characters long.		

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

System Log

This window is used to view and clear the system log.

To view the following window, click **System > System Log > System Log**, as shown below:

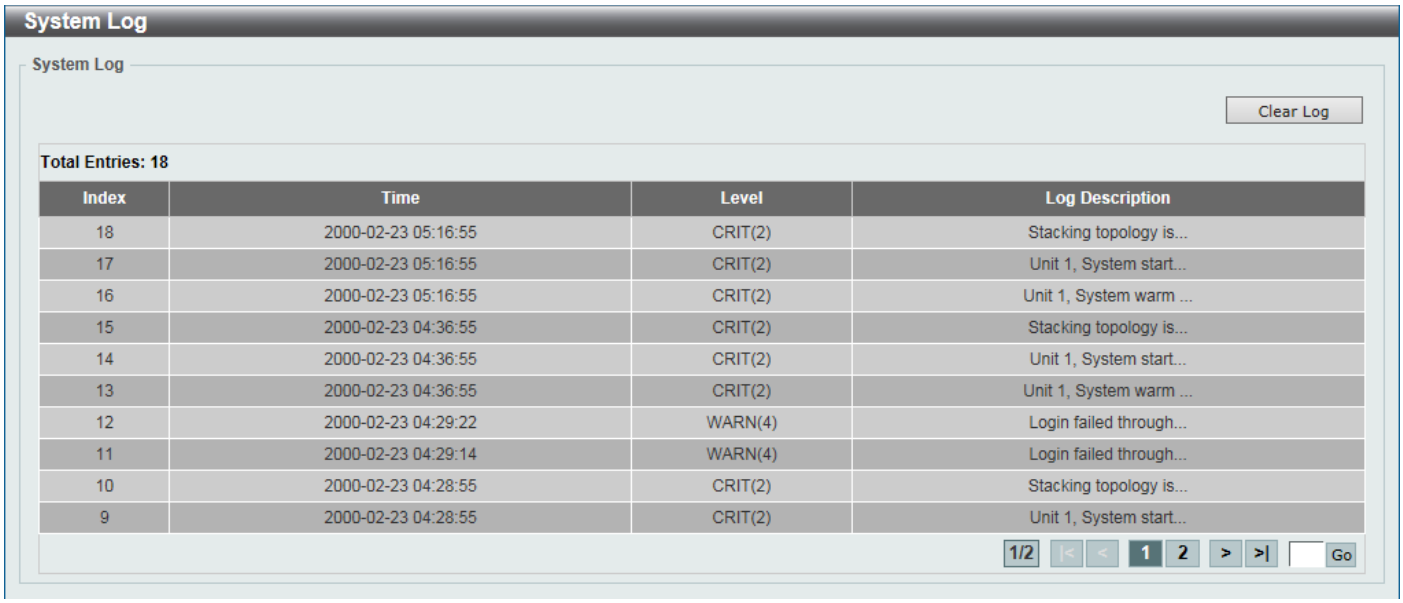


Figure 3-15 System Log Window

Click the **Clear Log** button to clear the system log entries displayed in the table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

System Attack Log

This window is used to view and clear the system attack log.

To view the following window, click **System > System Log > System Attack Log**, as shown below:

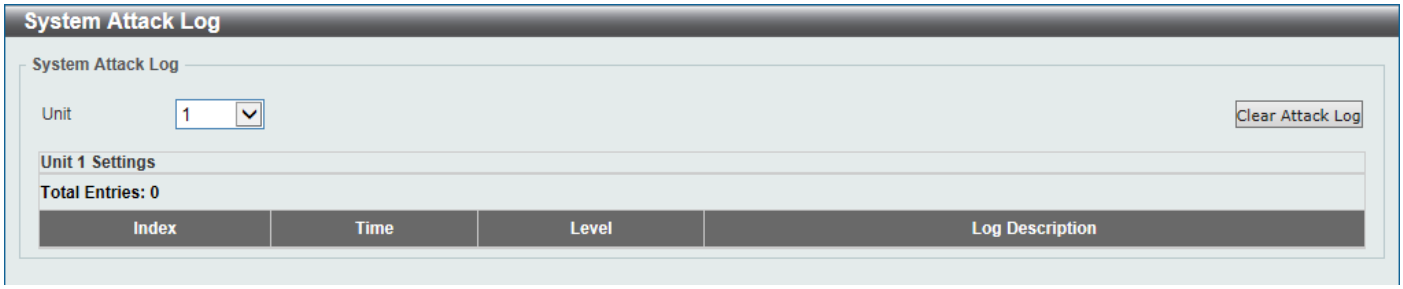


Figure 3-16 System Attack Log Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be displayed here.

Click the **Clear Attack Log** button to clear the system attack log entries displayed in the table.

Time and SNTP

Clock Settings

This window is used to display and configure the time settings for the Switch.

To view the following window, click **System > Time and SNTP > Clock Settings**, as shown below:

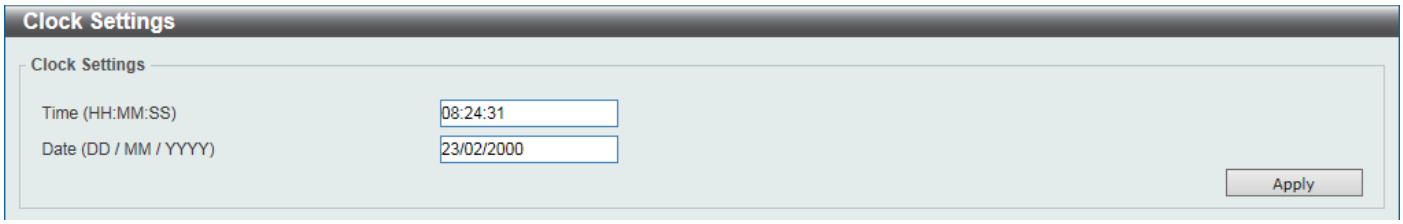


Figure 3-17 Clock Settings Window

The fields that can be configured are described below:

Parameter	Description
Time	Enter the current time in hours (HH), minutes (MM), and seconds (SS) here. For example, 18:30:30.
Date	Enter the current day (DD), month (MM), and year (YYYY) here. For example, 30/04/2015.

Click the **Apply** button to accept the changes made.

Time Zone Settings

This window is used to display and configure time zones and Daylight Savings Time settings for SNTP.

To view the following window, click **System > Time and SNTP > Time Zone Settings**, as shown below:

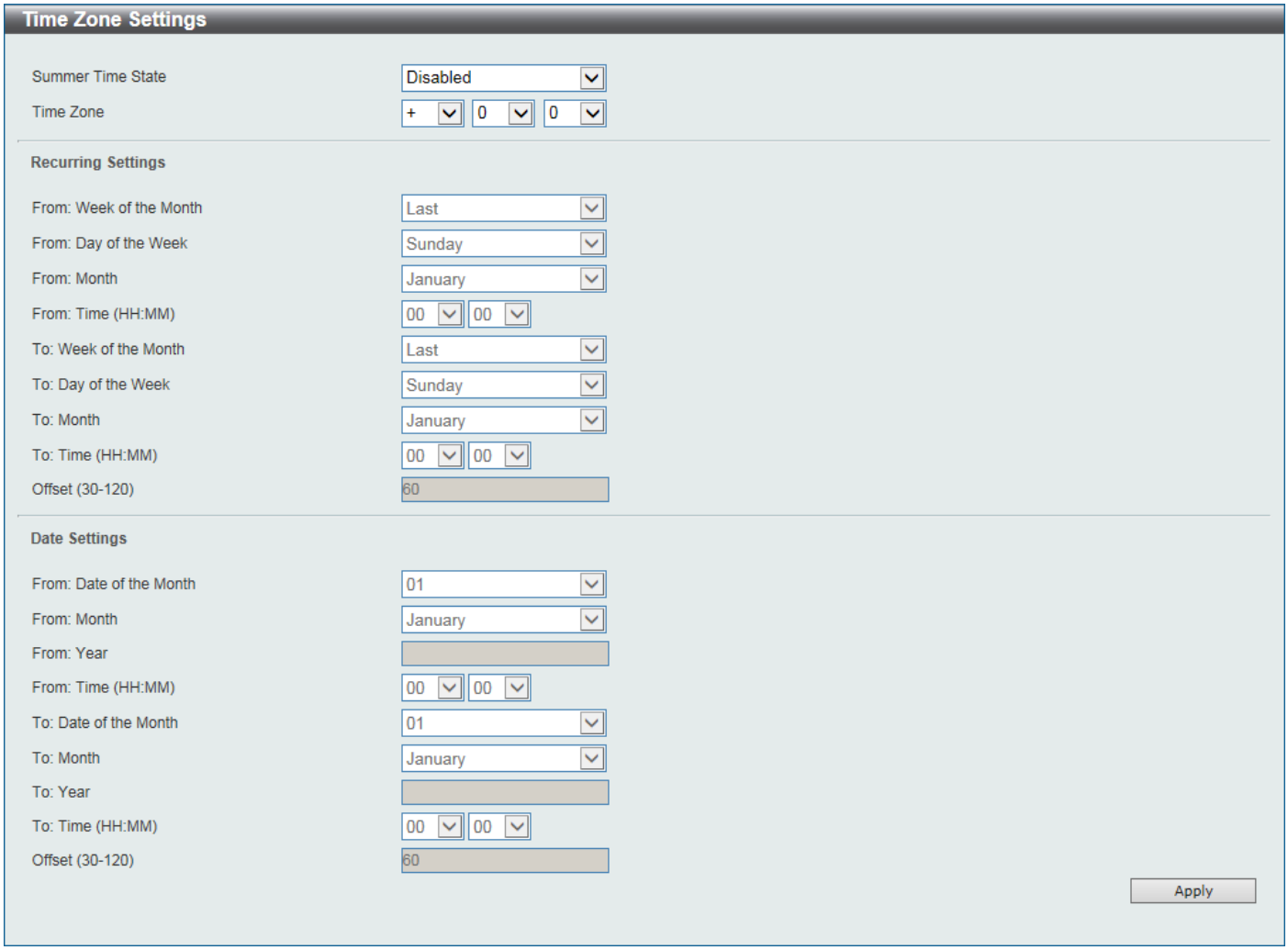


Figure 3-18 Time Zone Settings Window

The fields that can be configured are described below:

Parameter	Description
Summer Time State	Select the summer time setting. Options to choose from are: • **Disabled -** Select to disable the summer time setting. • **Recurring Settings -** Select to configure the summer time that should start and end on the specified weekday of the specified month. • **Date Settings -** Select to configure the summer time that should start and end on the specified date of the specified month.
Time Zone	Select to specify your local time zone offset from Coordinated Universal Time (UTC).

The fields that can be configured in **Recurring Settings** are described below:

Parameter	Description
From: Week of the Month	Select week of the month that summer time will start.
From: Day of the Week	Select the day of the week that summer time will start.

Parameter	Description
From: Month	Select the month that summer time will start.
From: Time	Select the time of the day that summer time will start.
To: Week of the Month	Select week of the month that summer time will end.
To: Day of the Week	Select the day of the week that summer time will end.
To: Month	Select the month that summer time will end.
To: Time	Select the time of the day that summer time will end.
Offset	Enter the number of minutes to add during summer time. The range is from 30 to 120. By default, this value is 60.

The fields that can be configured in **Date Settings** are described below:

Parameter	Description
From: Date of the Month	Select date of the month that summer time will start.
From: Month	Select the month that summer time will start.
From: Year	Enter the year that the summer time will start.
From: Time	Select the time of the day that summer time will start.
To: Date of the Month	Select date of the month that summer time will end.
To: Month	Select the month that summer time will end.
To: Year	Enter the year that the summer time will end.
To: Time	Select the time of the day that summer time will end.
Offset	Enter the number of minutes to add during summer time. The range is from 30 to 120. By default, this value is 60.

Click the **Apply** button to accept the changes made.

SNTP Settings

The Simple Network Time Protocol (SNTP) is a protocol for synchronizing computer clocks through the Internet. It provides comprehensive mechanisms to access national time and frequency dissemination services, coordinate the SNTP subnet of servers and clients, and adjust the system clock on each participant.

This window is used to display and configure the SNTP settings for the Switch.

To view the following window, click **System > Time and SNTP > SNTP Settings**, as shown below:

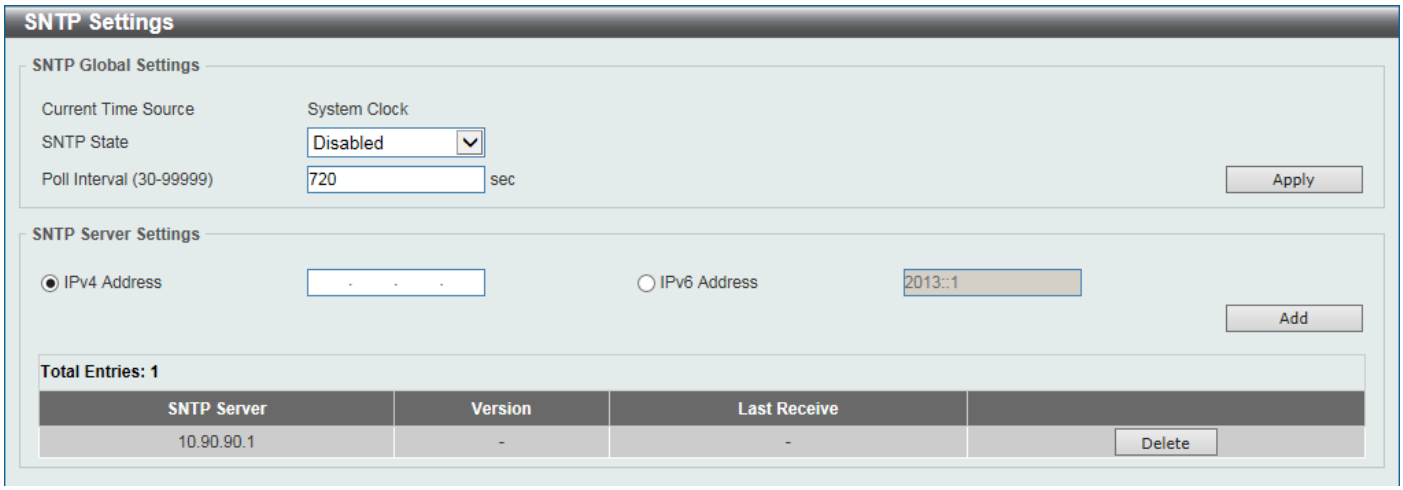


Figure 3-19 SNTP Settings Window

The fields that can be configured in **SNTP Global Settings** are described below:

Parameter	Description
SNTP State	Select this option to enable or disable SNTP.
Poll Interval	Enter the synchronizing interval in seconds. The value is from 30 to 99999 seconds. By default, this value is 720 seconds.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SNTP Server Settings** are described below:

Parameter	Description
IPv4 Address	Enter the IPv4 address of the SNTP server, which provides the SNTP reference.
IPv6 Address	Enter the IPv6 address of the SNTP server, which provides the SNTP reference.

Click the **Add** button to add the SNTP server.

Click the **Delete** button to remove the specified entry.

Time Range

This window is used to display and configure the time profile settings.

To view the following window, click **System > Time Range**, as shown below:

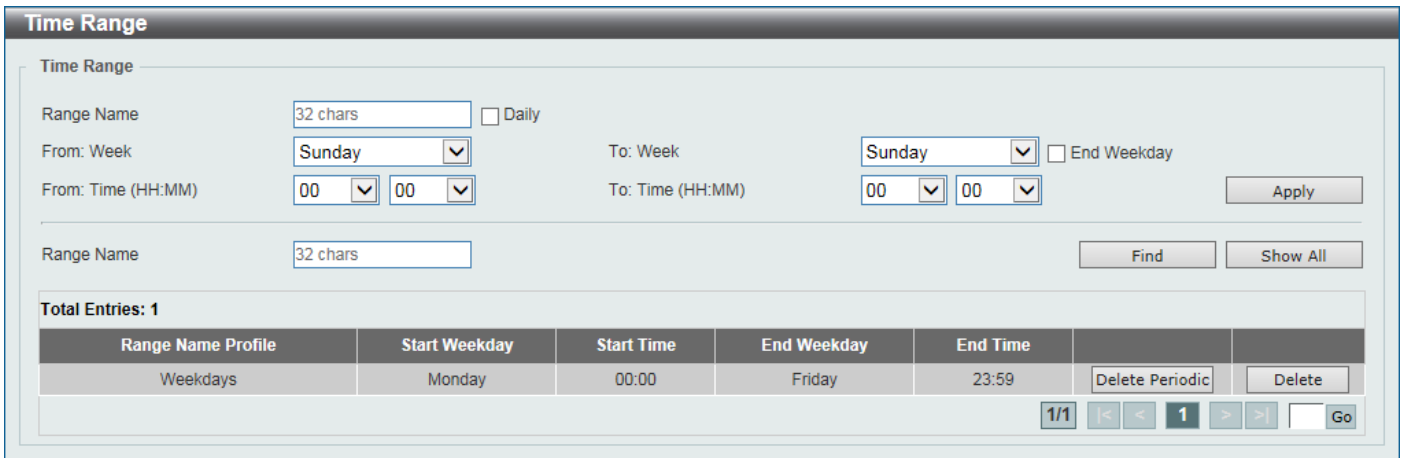


Figure 3-20 Time Range Window

The fields that can be configured are described below:

Parameter	Description
Range Name	Enter the name of the time range profile here. This can be up to 32 characters long.
From Week ~ To Week	Select the starting and ending days of the week that will be used for this time range profile. Select the **Daily** option to use this time range profile every day. Select the **End Week Day** option to use this time range profile for a week.
From Time ~ To Time	Select the starting and ending time of the day that will be used for this time range profile. The first drop-down menu selects the hour and the second drop-down menu selects the minute.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

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

Click the **Delete** button to delete the specified entry.

PTP (Precise Time Protocol)

The Precision Time Protocol (PTP) system is able to synchronize the distributed clocks with an accuracy of less than 1 microsecond via Ethernet networks.

PTP is a technology that enables precise synchronization of clocks in network systems. PTP is applicable to systems communicating by Local Area Networks supporting multicast messaging including Ethernet and UDP. PTP enables heterogeneous systems that include clocks of various inherent precision, resolution and stability to synchronize to a grandmaster clock.

The synchronization is divided into two processes. The Best Master Clock (BMC) algorithm determines the PTP status (master/slave) of all local ports. The synchronization algorithm computes the clock offset between the master and slave clock. There are two mechanisms, Delay Request-response Mechanism and Peer Delay Mechanism, for measuring the propagation time of an event message.

The PTP system has three types of PTP devices, boundary clock, end-to-end transparent clock, and peer-to-peer transparent clock. Only the boundary clock can participate in the selection of the best master clock.

When the stacking mode is enabled and the member ports of a trunk group exists in different stack units, the PTP function will:

- Execute normally when the sending and receiving of PTP messages are to member ports that are on the same stack unit.
- Execute abnormally, when the sending and receiving of PTP messages are to member ports that are on different stack units.

PTP Global Settings

This window is used to display and configure the global Precise Time Protocol (PTP) settings.

To view the following window, click **System > PTP (Precise Time Protocol) > PTP Global Settings**, as shown below:

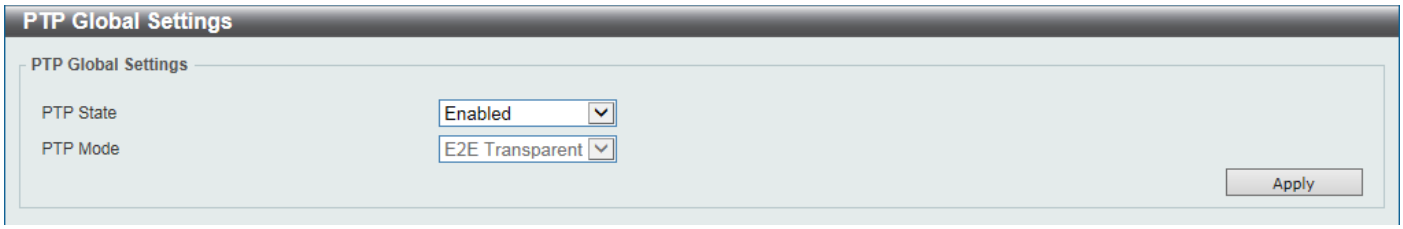


Figure 3-21 PTP Global Settings Window

The fields that can be configured are described below:

Parameter	Description
PTP State	Select to enable or disable the PTP feature here. When the PTP function is enabled, the Switch port will add residence time to correct the field. When the PTP function is disabled, all Switch ports will forward the PTP packets according to the multicast filtering configuration.

Click the **Apply** button to accept the changes made.

When the stacking mode is enabled and the member ports of the trunk group exist in different stack units, the PTP function may not function properly.

For example:

- The PTP feature will function properly when the member ports receive and send PTP messages on the same stacked unit.
- The PTP feature will not function properly when the member ports receive and send PTP messages on different stacked units.

Therefore, it is recommended not to enable the PTP feature on a trunk group that exists in different stack units.

PTP Port Global Settings

This window is used to display and configure the PTP interface settings.

To view the following window, click **System > PTP (Precise Time Protocol) > PTP Port Global Settings**, as shown below:

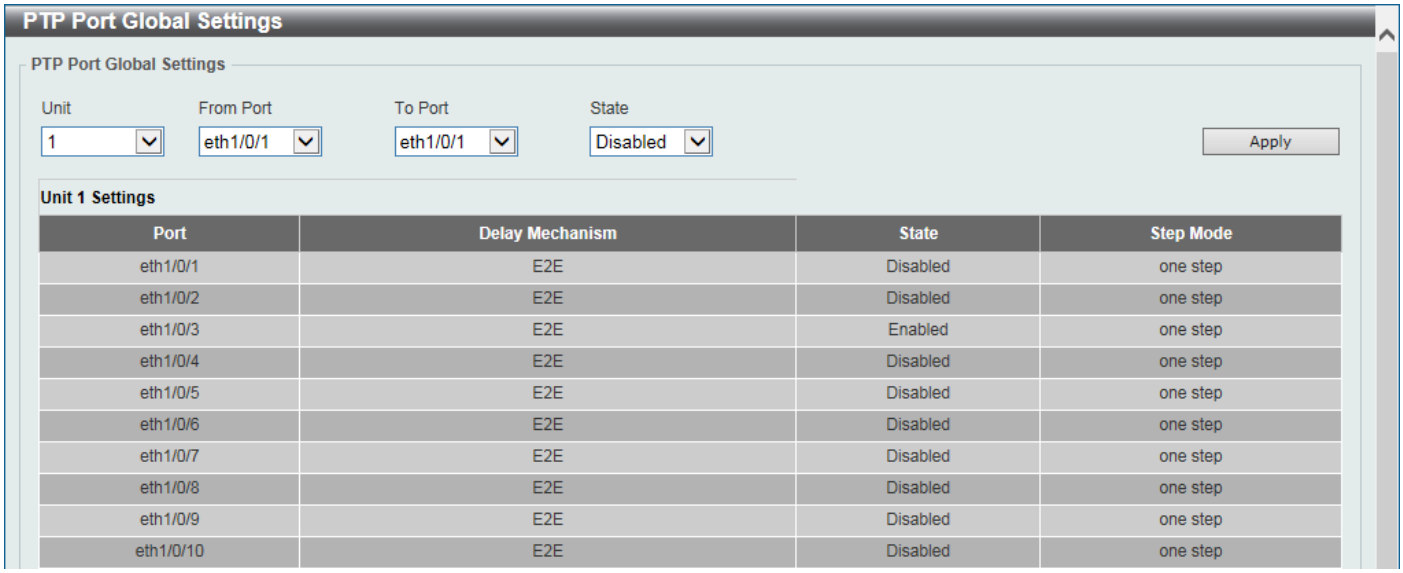


Figure 3-22 PTP Port Global Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the PTP feature on the port(s) specified here.

Click the **Apply** button to accept the changes made.

Reset Button Settings

This window is used to configure the actions when pressing the reset button on the Switch.

To view the following window, click **System > Reset Button Settings**, as shown below:

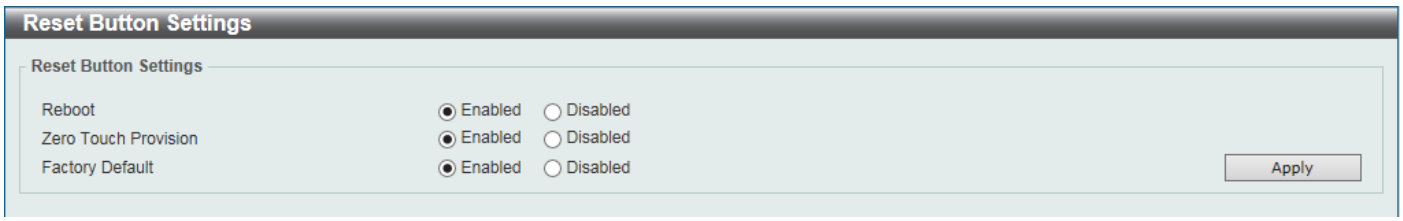


Figure 3-23 Reset Button Settings Window

The fields that can be configured are described below:

Parameter	Description
Reboot	Select to enable or disable the rebooting action. When enabled and the reset button on the Switch is pressed and held less than 5 seconds, the DUT will reboot.
Zero Touch Provision	Select to enable or disable the ZTP action. When enabled and the reset button on the Switch is pressed and held between 5 and 10 seconds, the DUT will start the ZTP function.
Factory Default	Select to enable or disable the factory reset action. When enabled and the reset button on the Switch is pressed and held more than 10 seconds, the Switch will reboot and reset the system to its factory defaults.

Click the **Apply** button to accept the changes made.

4. Management

Command Logging

This window is used to display and configure the command logging function. The command logging function is used to log the commands that have successfully been configured on the Switch via the command line interface. The command, along with information about the user that entered the command, is included in the system log. Commands that do not cause a change in the Switch configuration or operation (such as 'show' commands) are not logged.

To view the following window, click **Management > Command Logging**, as shown below:

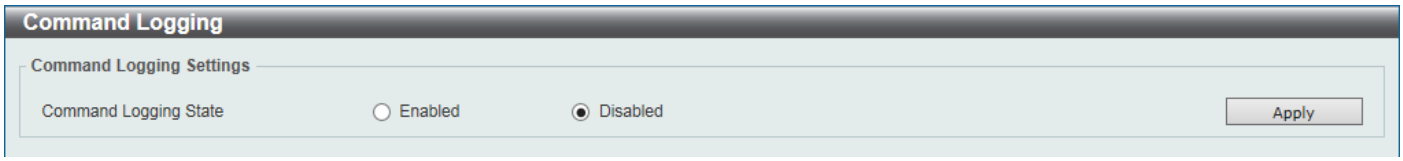


Figure 4-1 Command Logging Window

The fields that can be configured are described below:

Parameter	Description
Command Logging State	Select to enable or disable the command logging function here.

Click the **Apply** button to accept the changes made.

User Accounts Settings

On this page, user accounts can be created and updated. Active user account sessions can also be viewed on this page. There are several configuration options available in the Web User Interface (Web UI). The set of configuration options available to the user depends on the account's **Privilege Level**.

To view the following window, click **Management > User Accounts Settings**, as shown below:

After selecting the **User Management Settings** tab, the following page will appear.

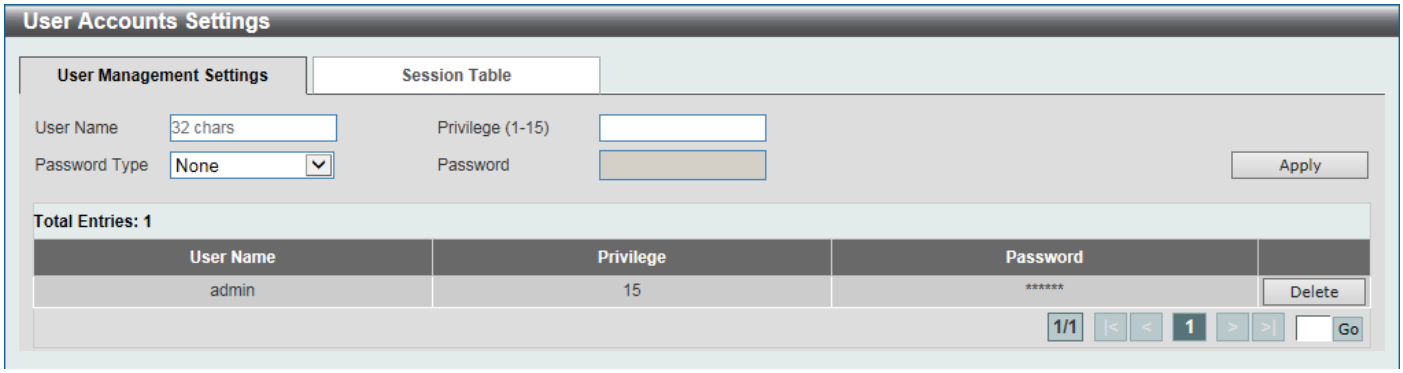


Figure 4-2 User Accounts Settings Window

The fields that can be configured are described below:

Parameter	Description
User Name	Enter the user account name here. This name can be up to 32 characters long.
Privilege	Enter the privilege level for this account here. The range is from 1 to 15.
Password Type	Select the password type for this user account here. Options to choose from are **None**, **Plain Text**, **Encrypted-SHA1**, and **Encrypted-MD5**.

Parameter	Description
Password	After selecting **Plain Text**, **Encrypted-SHA1**, or **Encrypted-MD5** as the password type, enter the password for this user account here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified user account entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After selecting the **Session Table** tab, the following page will appear.

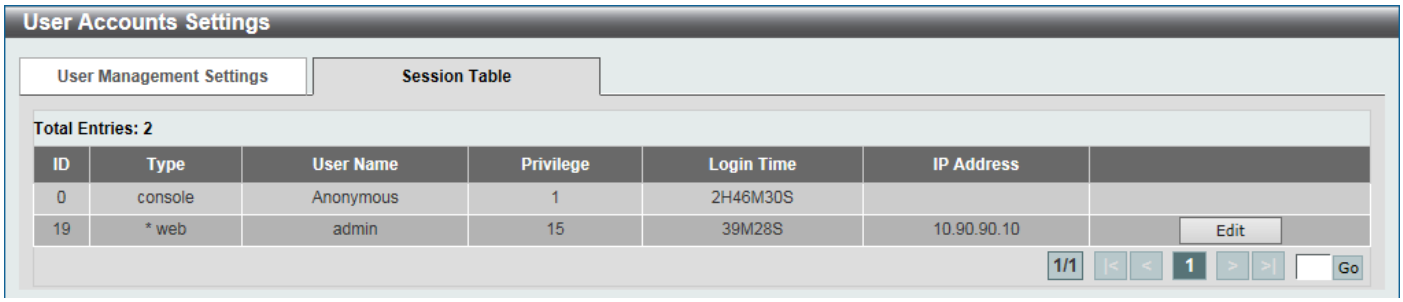


Figure 4-3 Session Table Window

On this page, a list of active user account session will be displayed.

Click the **Edit** button to access and configure the User Privilege settings.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After selecting the **Edit** button, the following page will appear.

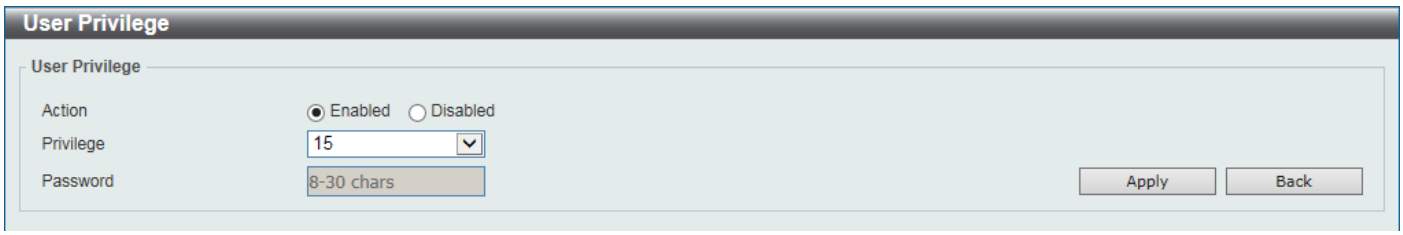


Figure 4-4 User Privilege Window

The fields that can be configured are described below:

Parameter	Description
Action	Select to enable or disable user level security.
Privilege	Select the privilege level here. The range is from 1 to 15.
Password	Enter the password here. The minimum strength of the password: • Must contain 8 to 30 UTF-8 characters (Unicode hex range 0x0021–0x007e) • Must include at least one uppercase and one lowercase alphabetical letter • Must have at least one numerical digit • Must include at least one special symbol • Must consist of non-consecutive characters • Must not be the same as the username • Must not include the default login account and default IP address

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous page.

Password Encryption

This window is used to display and configure whether to save the encryption of the password in the configuration file.

To view the following window, click **Management > Password Encryption**, as shown below:

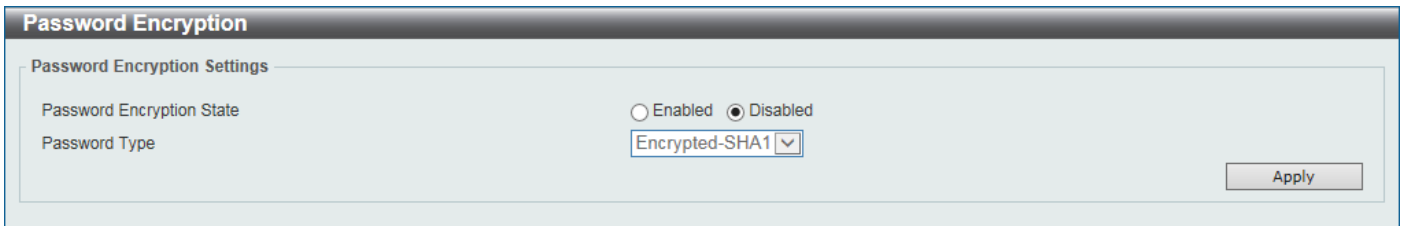


Figure 4-5 Password Encryption Window

The fields that can be configured are described below:

Parameter	Description
Password Encryption State	Select this option to enable or disable the encryption of the password before being stored in the configuration file.
Password Type	When the state is enabled, select the password encryption type here. Options to choose from are: • **Encrypted-SHA1 -** Specifies that the password is encrypted using SHA-1. • **Encrypted-MD5 -** Specifies that the password is encrypted using MD5.

Click the **Apply** button to accept the changes made.

Password Recovery

This window is used to display and configure the password recovery settings. For example, the administrator may need to update a user account because the password has been forgotten.

To view the following window, click **Management > Password Recovery**, as shown below:

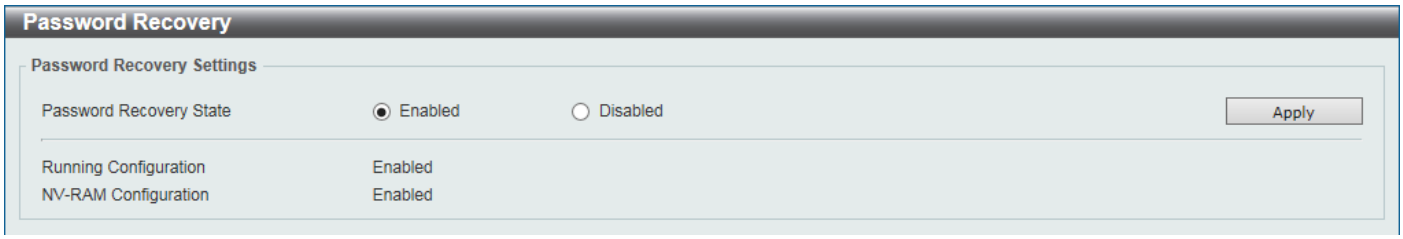


Figure 4-6 Password Recovery Window

The fields that can be configured are described below:

Parameter	Description
Password Recovery State	Select to enable or disable the password recovery feature here. Enabling this feature allows access to the reset configuration mode in the CLI. From the reset configuration mode, user accounts can be updated, the enable password feature can be updated for administrator privilege levels, and the AAA feature can be disabled to allow local authentication. The running configuration can then be saved as the startup configuration. A reboot is required.

Click the **Apply** button to accept the changes made.

Login Method

This window is used to display and configure the login method for each management interface that is supported by the Switch.

To view the following window, click **Management > Login Method**, as shown below:

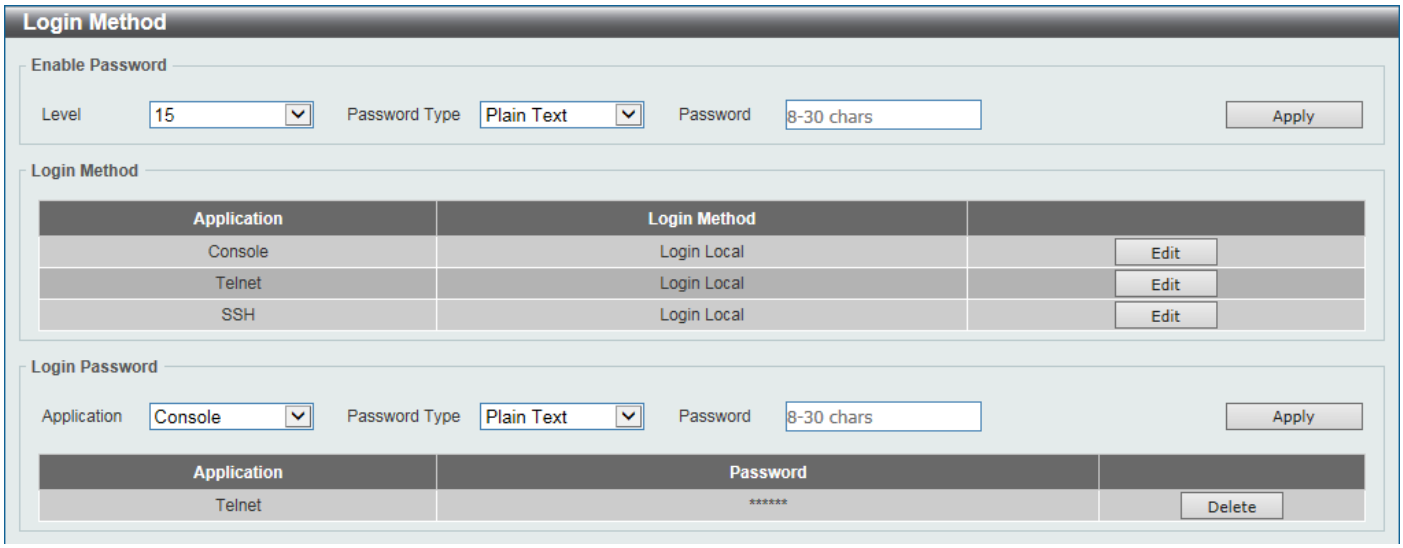


Figure 4-7 Login Method Window

The fields that can be configured in **Enable Password** are described below:

Parameter	Description
Level	Select the privilege level for the user here. The range is from 1 to 15.
Password Type	Select the password type for the user here. Options to choose from are: • **Plain Text** - Specifies that the password will be in plain text. • **Encrypted-SHA1** - Specifies that the password will be encrypted based on SHA-1. • **Encrypted-MD5** - Specifies that the password will be encrypted based on MD5. By default, the **Plain Text** option is used.
Password	Enter the password for the user account here. In the plain-text form, the minimum strength of the password: • Must contain 8 to 30 UTF-8 characters (Unicode hex range 0x0021–0x007e) • Must include at least one uppercase and one lowercase alphabetical letter • Must have at least one numerical digit • Must include at least one special symbol • Must consist of non-consecutive characters • Must not be the same as the username • Must not include the default login account and default IP address In the encrypted form, the password must be 35 bytes long and is case-sensitive. In the encrypted MD5 form, the password must be 31 bytes long and is case-sensitive.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specified entry.

The fields that can be configured in **Login Method** are described below:

Parameter	Description
Login Method	After clicking the **Edit** button, this parameter can be configured. Select the login method for the specified application here. Options to choose from are: • **No Login** requires no login authentication to access the specified application. • **Login** will require the user to at least enter a password when trying to access the application specified. • **Login Local** requires the user to enter a username and a password to access the specified application.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Login Password** are described below:

Parameter	Description
Application	Select the application that will be configured here. Options to choose from are **Console**, **Telnet** and **SSH**.
Password Type	Select the password encryption type that will be used here. Options to choose from are **Plain Text**, **Encrypted-SHA1**, and **Encrypted-MD5**.
Password	Enter the password for the selected application here. This password will be used when the **Login Method** for the specified application is set as **Login**. In the plain-text form, the minimum strength of the password: • Must contain 8 to 30 UTF-8 characters (Unicode hex range 0x0021–0x007e) • Must include at least one uppercase and one lowercase alphabetical letter • Must have at least one numerical digit • Must include at least one special symbol • Must consist of non-consecutive characters • Must not be the same as the username • Must not include the default login account and default IP address In the encrypted form, the password must be 35 bytes long and is case-sensitive. In the encrypted MD5 form, the password must be 31 bytes long and is case-sensitive.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the password from the specified application.

SNMP

Simple Network Management Protocol (SNMP) is an OSI Layer 7 (Application Layer) designed specifically for managing and monitoring network devices. SNMP enables network management stations to read and modify the settings of gateways, routers, switches, and other network devices. Use SNMP to configure system features, monitor performance, and detect potential problems with the Switch, switch group, or network.

Managed devices that support SNMP include software (referred to as an agent) which runs locally on the device. A defined set of variables (managed objects) is maintained by the SNMP agent and used to manage the device. These objects are defined in a Management Information Base (MIB), which provides a standard presentation of the information controlled by the on-board SNMP agent. SNMP defines both the format of the MIB specifications and the protocol used to access this information over the network.

The Switch supports the SNMP versions 1, 2c, and 3. The three versions of SNMP vary in the level of security provided between the management station and the network device.

In SNMPv1 and SNMPv2c, user authentication is accomplished using 'community strings', which function like passwords. The remote user SNMP application and the Switch SNMP must use the same community string. SNMP packets from any station that has not been authenticated are ignored (dropped). The default community strings for the Switch used for SNMPv1 and SNMPv2c management access are:

- **public** - Allows authorized management stations to retrieve MIB objects.
- **private** - Allows authorized management stations to retrieve and modify MIB objects.

The SNMPv3 protocol uses a more sophisticated authentication process that is separated into two parts. The first part maintains a list of users and their attributes that are allowed to act as SNMP managers. The second part describes what each user in that list can do as an SNMP manager. The SNMPv3 protocol also provides an additional layer of security that can be used to encrypt SNMP messages.

The Switch allows groups of users to be listed and configured with a shared set of privileges. The SNMP version may also be set for a listed group of SNMP managers. Thus, you may create a group of SNMP managers that are allowed to view read-only information or receive traps using SNMPv1 while assigning a higher level of security to another group, granting read/write privileges using SNMPv3.

Using SNMPv3, users or groups can be allowed or be prevented from performing specific SNMP management functions. These are defined using the Object Identifier (OID) associated with a specific MIB.

MIBs

A Management Information Base (MIB) stores management and counter information. The Switch uses the standard MIB-II Management Information Base module, and so values for MIB objects can be retrieved using any SNMP-based network management software. In addition to the standard MIB-II, the Switch also supports its own proprietary enterprise MIB as an extended Management Information Base. Specifying the MIB Object Identifier may also retrieve the proprietary MIB. MIB values can be either read-only or read-write.

The Switch incorporates a flexible SNMP management system, which can be customized to suit the needs of the networks and the preferences of the network administrator. The three versions of SNMP vary in the level of security provided between the management station and the network device. SNMP settings are configured using the menus located in the **SNMP** folder of the Web UI.

Traps

Traps are messages that alert network personnel of events that occur on the Switch. The events can be as serious as a reboot (someone accidentally turned the Switch off/unplugged the Switch), or less serious like a port status change. The Switch generates traps and sends them to the trap recipient (or network manager). Typical traps include trap messages for Authentication Failure, Topology Change, and Broadcast/Multicast Storm.

SNMP Global Settings

This window is used to display and configure the global SNMP and trap settings.

To view the following window, click **Management > SNMP > SNMP Global Settings**, as shown below:

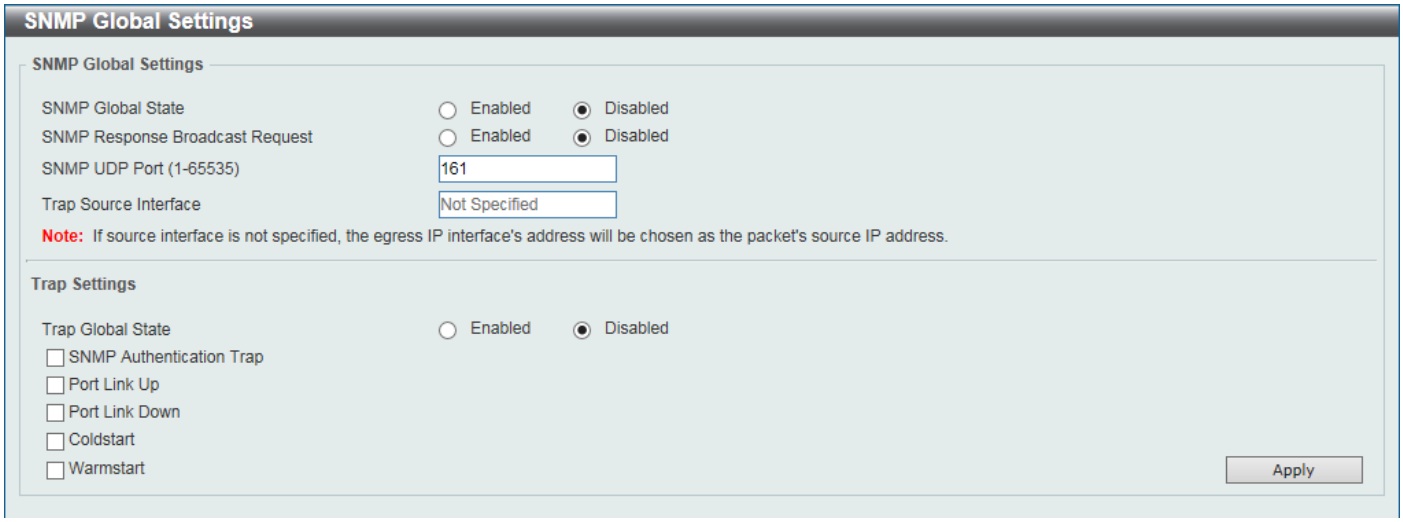


Figure 4-8 SNMP Global Settings Window

The fields that can be configured in **SNMP Global Settings** are described below:

Parameter	Description
SNMP Global State	Select this option to enable or disable the SNMP feature.
SNMP Response Broadcast Request	Select this option to enable or disable the server to response to broadcast SNMP GetRequest packets.
SNMP UDP Port	Enter the SNMP UDP port number.
Trap Source Interface	Enter the interface whose IP address will be used as the source address for sending the SNMP trap packet.

The fields that can be configured in **Trap Settings** are described below:

Parameter	Description
Trap Global State	Select this option to enable or disable the sending of all or specific SNMP notifications.
SNMP Authentication Trap	Tick this option to control the sending of SNMP authentication failure notifications. An *authenticationFailuretrap* trap is generated when the device receives an SNMP message that is not properly authenticated. The authentication method depends on the version of SNMP being used. For SNMPv1 or SNMPv2c, authentication failure occurs if packets are formed with an incorrect community string.
Port Link Up	Tick this option to control the sending of port link up notifications. A *linkUp* trap is generated when the device recognizes that one of the communication links has come up.
Port Link Down	Tick this option to control the sending of port link down notifications. A *linkDown* trap is generated when the device recognizes that a one of the communication links is down.
Coldstart	Tick this option to control the sending of SNMP *coldStart* notifications.
Warmstart	Tick this option to control the sending of SNMP *warmStart* notifications.

Click the **Apply** button to accept the changes made.

SNMP Linkchange Trap Settings

This window is used to display and configure the SNMP link change trap settings.

To view the following window, click **Management > SNMP > SNMP Linkchange Trap Settings**, as shown below:

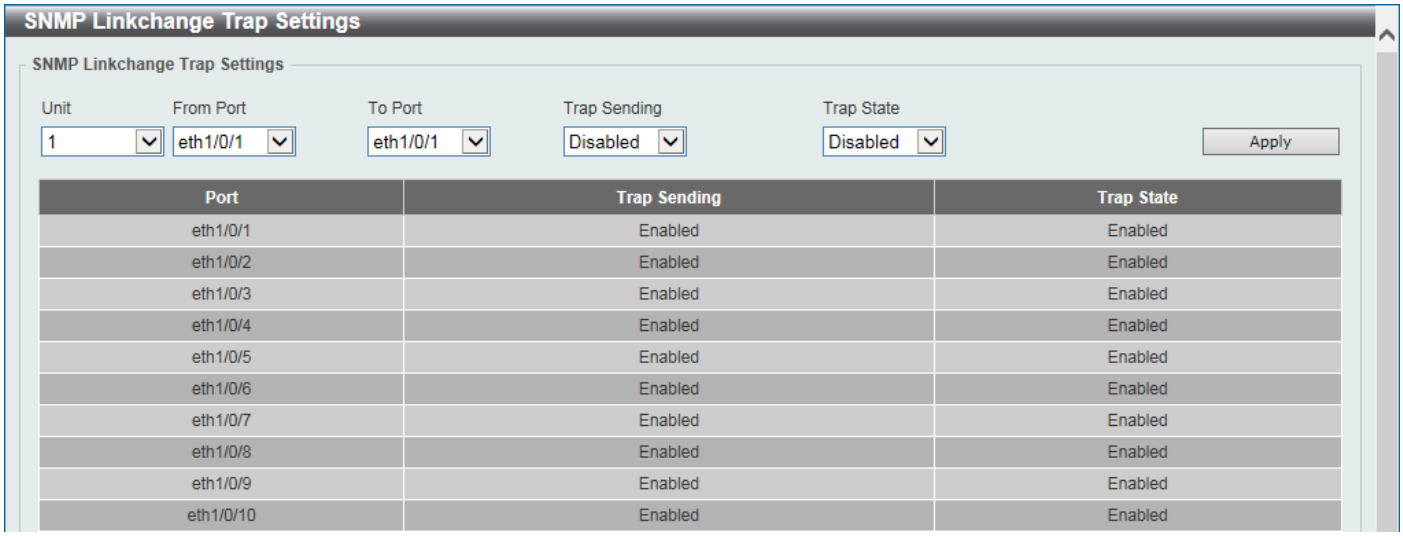


Figure 4-9 SNMP Linkchange Trap Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Trap Sending	Select this option to enable or disable the sending of the SNMP notification traps that are generated by the system.
Trap State	Select this option to enable or disable the SNMP *linkChange* trap.

Click the **Apply** button to accept the changes made.

SNMP View Table Settings

This window is used to assign views to community strings that define which MIB objects can be accessed by a remote SNMP manager. The SNMP sub-tree OID created with this table maps SNMP users to the views created in the **SNMP User Table Settings** window.

To view the following window, click **Management > SNMP > SNMP View Table Settings**, as shown below:

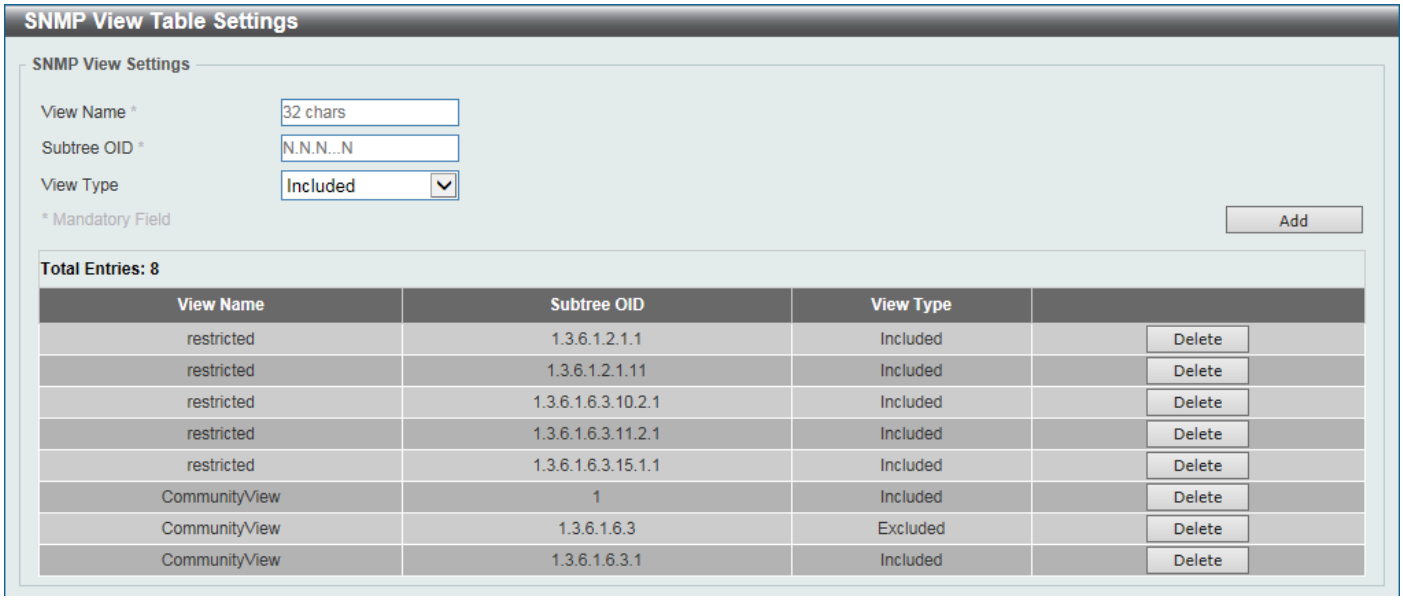


Figure 4-10 SNMP View Table Settings Window

The fields that can be configured are described below:

Parameter	Description
View Name	Type an alphanumeric string of up to 32 characters. This is used to identify the new SNMP view being created.
Subtree OID	Type the Object Identifier (OID) sub-tree for the view. The OID identifies an object tree (MIB tree) that will be included or excluded from access by an SNMP manager.
View Type	Select the view type here. Options to choose from are: • **Included** - Select to include this object in the list of objects that an SNMP manager can access. • **Excluded** - Select to exclude this object from the list of objects that an SNMP manager can access.

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

Click the **Delete** button to remove the specified entry.

SNMP Community Table Settings

This window is used to create an SNMP community string to define the relationship between the SNMP manager and an agent. The community string acts like a password to permit access to the agent on the Switch. One or more of the following characteristics can be associated with the community string:

- An access list containing IP addresses of SNMP managers that are permitted to use the community string to gain access to the Switch's SNMP agent.
- Any MIB view that defines the subset of MIB objects that will be accessible to the SNMP community.
- Read-write or read-only level permissions for the MIB objects accessible to the SNMP community.

To view the following window, click **Management > SNMP > SNMP Community Table Settings**, as shown below:

Figure 4-11 SNMP Community Table Settings Window

The fields that can be configured are described below:

Parameter	Description
Key Type	Select the key type for the SNMP community. Options to choose from are **Plain Text**, and **Encrypted**.
Community Name	Enter an alphanumeric string of up to 32 characters that is used to identify members of an SNMP community. This string is used like a password to give remote SNMP managers access to MIB objects in the Switch's SNMP agent.
View Name	Enter an alphanumeric string of up to 32 characters that is used to identify the group of MIB objects that a remote SNMP manager is allowed to access on the Switch. The view name must exist in the SNMP View Table.
Access Right	Select the access right here. Options to choose from are: • **Read Only** - SNMP community members using the community string created can only read the contents of the MIBs on the Switch. • **Read Write** - SNMP community members using the community string created can read from, and write to the contents of the MIBs on the Switch.
IP Access-List Name	Enter the name of the standard access list to restrict the users that can use this community string to access to the SNMP agent.
Context Name	Enter the context name here. This name can be up to 32 characters long.

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

Click the **Delete** button to remove the specified entry.

SNMP Group Table Settings

An SNMP group created with this table maps SNMP users to the views created in the **SNMP View Table Settings** window.

To view the following window, click **Management > SNMP > SNMP Group Table Settings**, as shown below:

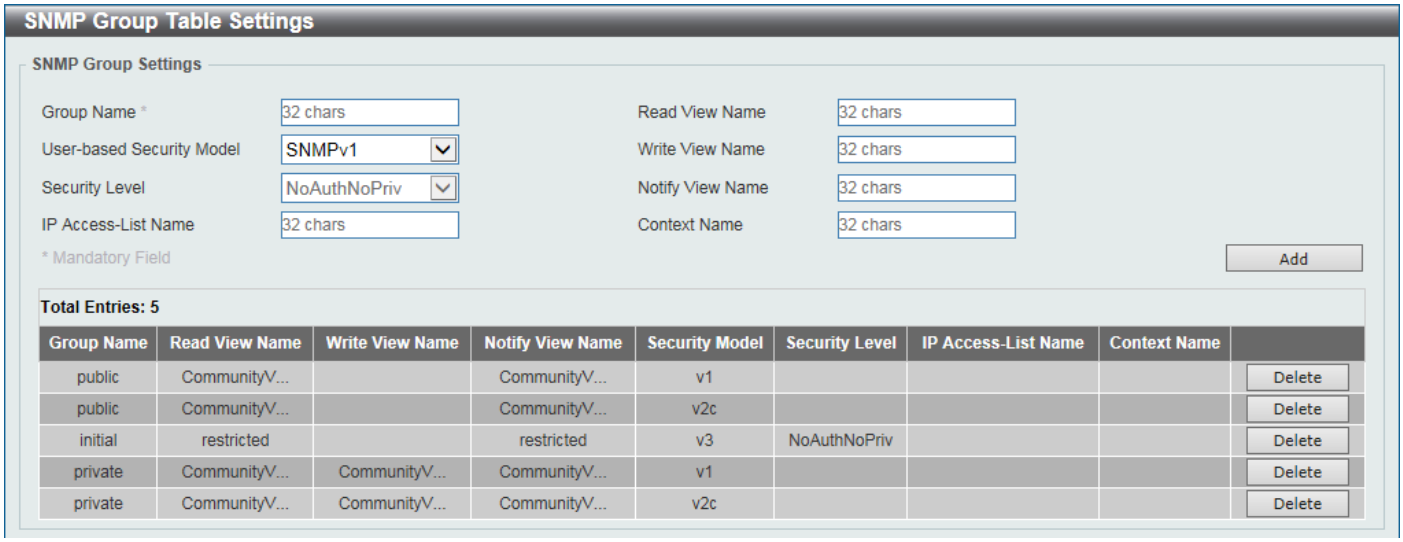


Figure 4-12 SNMP Group Table Settings Window

The fields that can be configured are described below:

Parameter	Description
Group Name	Enter the SNMP group name here. This name can be up to 32 characters long. Spaces are not allowed.
Read View Name	Enter the read view name that users of the group can access.
User-based Security Model	Select the security model here. Options to choose from are: • **SNMPv1** - Select to allow the group to use the SNMPv1 security model. • **SNMPv2c** - Select to allow the group to use the SNMPv2c security model. • **SNMPv3** - Select to allow the group to use the SNMPv3 security model.
Write View Name	Enter the write view name that the users of the group can access.
Security Level	When selecting **SNMPv3** in the **User-based Security Model** drop-down list, this option is available. • **NoAuthNoPriv** - Specify that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager. • **AuthNoPriv** - Specify that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager. • **AuthPriv** - Specify that authorization will be required, and that packets sent between the Switch and a remote SNMP manger will be encrypted.
Notify View Name	Enter the notify view name that users of the group can access. The notify view describes the object that can be reported its status via trap packets to the group user.
IP Access-List Name	Enter the standard IP access control list (ACL) to associate with the group.
Context Name	Enter the context name here. This name can be up to 32 characters long.

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

Click the **Delete** button to remove the specified entry.

SNMP Engine ID Local Settings

The Engine ID is a unique identifier used for SNMPv3 implementations on the Switch.

To view the following window, click **Management > SNMP > SNMP Engine ID Local Settings**, as shown below:

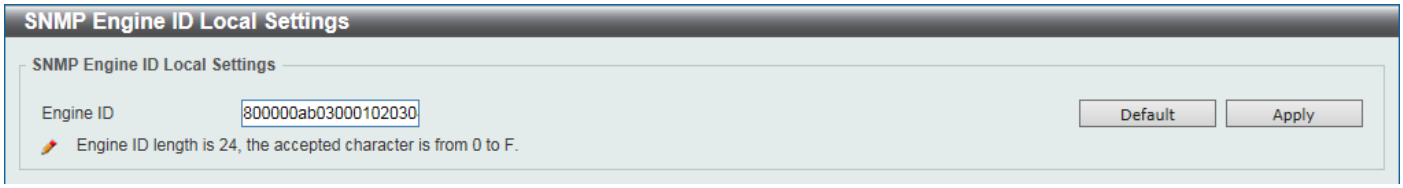


Figure 4-13 SNMP Engine ID Local Settings Window

The fields that can be configured are described below:

Parameter	Description
Engine ID	Enter the SNMP engine ID string here. This string can be up to 24 characters long.

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

Click the **Apply** button to accept the changes made.

SNMP User Table Settings

This window is used to display and configure the SNMP users that are currently configured on the Switch.

To view the following window, click **Management > SNMP > SNMP User Table Settings**, as shown below:

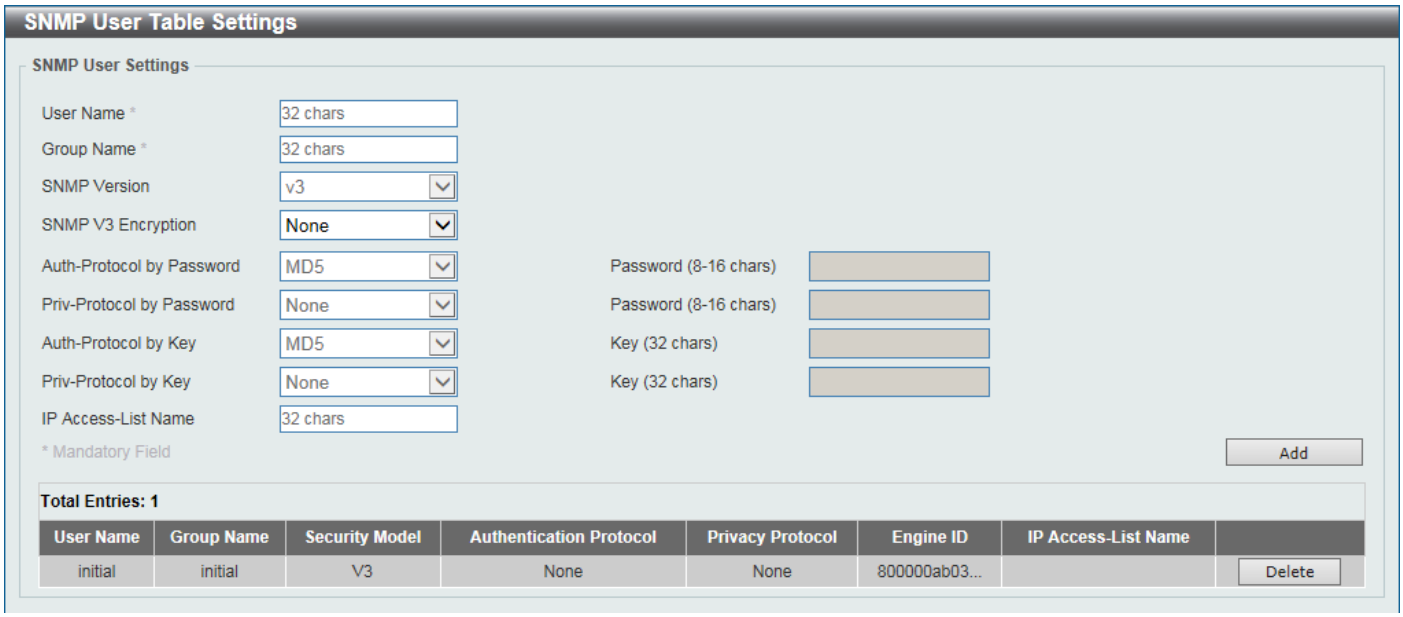


Figure 4-14 SNMP User Table Settings Window

The fields that can be configured are described below:

Parameter	Description
User Name	Enter SNMP user name here. This name can be up to 32 characters long. This is used to identify the SNMP user.
Group Name	Enter the SNMP group name to which the user belongs. This name can be up to 32 characters long. Spaces are not allowed.

Parameter	Description
SNMP Version	Specifies that SNMP version 3 (SNMPv3) is used.
SNMP V3 Encryption	Select the SNMPv3 encryption type here. Options to choose from are **None**, **Password**, and **Key**.
Auth-Protocol by Password	After selecting the **Password** encryption type, select the authentication protocol here. Options to choose from are: • **MD5** - Specifies to use the HMAC-MD5-96 authentication protocol. Enter the password in the **Password** textbox. The password can be from 8 to 16 characters long. • **SHA** - Specifies to use the HMAC-SHA authentication protocol. Enter the password in the **Password** textbox. The password can be from 8 to 20 characters long.
Priv-Protocol by Password	After selecting the **Password** encryption type, select the private protocol here. Options to choose from are: • **None** - Specifies to use no authorization protocol. • **DES56** - Specifies to use DES 56-bit encryption based on the CBC-DES (DES-56) standard. Enter the password in the **Password** textbox. The password can be from 8 to 16 characters long. • **AES** - Specifies to use Advanced Encryption Standard (AES) encryption. Enter the password in the **Password** textbox. The password can be from 8 to 16 characters long.
Auth-Protocol by Key	After selecting the **Key** encryption type, select the authentication protocol here. Options to choose from are: • **MD5** - Specifies to use the HMAC-MD5-96 authentication protocol. Enter the key in the **Key** textbox. The key must be 32 characters long. • **SHA** - Specifies to use the HMAC-SHA authentication protocol. Enter the key in the **Key** textbox. The key must be 40 characters long.
Priv-Protocol by Key	After selecting the **Key** encryption type, select the private protocol here. Options to choose from are: • **None** - Specifies to use no authorization protocol. • **DES56** - Specifies to use DES 56-bit encryption, based on the CBC-DES (DES-56) standard. Enter the key in the **Key** textbox. The key must be 32 characters long. • **AES** - Specifies to use AES encryption. Enter the key in the **Key** textbox. The key must be 32 characters long.
IP Access-List Name	Enter the standard IP access control list to associate with the user.

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

Click the **Delete** button to remove the specified entry.

SNMP Host Table Settings

This window is used to display and configure the recipient of the SNMP notification.

To view the following window, click **Management > SNMP > SNMP Host Table Settings**, as shown below:

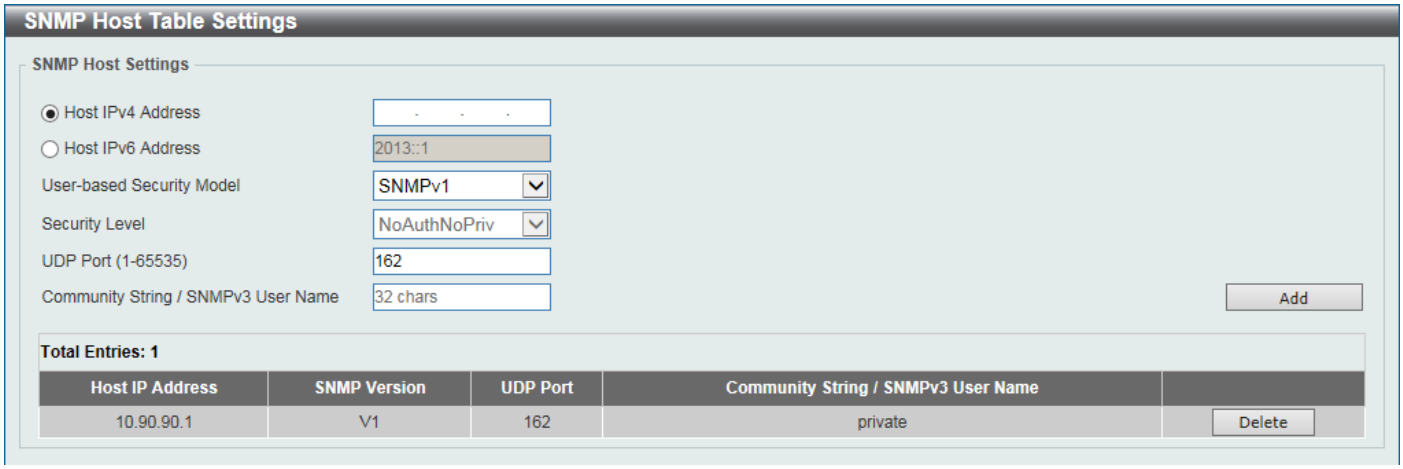


Figure 4-15 SNMP Host Table Settings Window

The fields that can be configured are described below:

Parameter	Description
Host IPv4 Address	Enter the IPv4 address of the SNMP notification host.
Host IPv6 Address	Enter the IPv6 address of the SNMP notification host.
User-based Security Model	Select the security model here. Options to choose from are: • **SNMPv1** - Select to allow the group user to use the SNMPv1 security model. • **SNMPv2c** - Select to allow the group user to use the SNMPv2c security model. • **SNMPv3** - Select to allow the group user to use the SNMPv3 security model.
Security Level	When selecting **SNMPv3** in the **User-based Security Model** drop-down list, this option is available. • **NoAuthNoPriv** - Specify that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager. • **AuthNoPriv** - Specify that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager. • **AuthPriv** - Specify that authorization will be required, and that packets sent between the Switch and a remote SNMP manger will be encrypted.
UDP Port	Enter the UDP port number. The range of UDP port numbers is from 1 to 65535. Some port numbers may conflict with other protocols. By default, this value is 162.
Community String / SNMPv3 User Name	Enter the community string or SNMPv3 user name to be sent with the notification packet.

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

Click the **Delete** button to remove the specified entry.

SNMP Context Mapping Table Settings

This window is used to display and configure the SNMP context mapping table settings.

To view the following window, click **Management > SNMP > SNMP Context Mapping Table Settings**, as shown below:

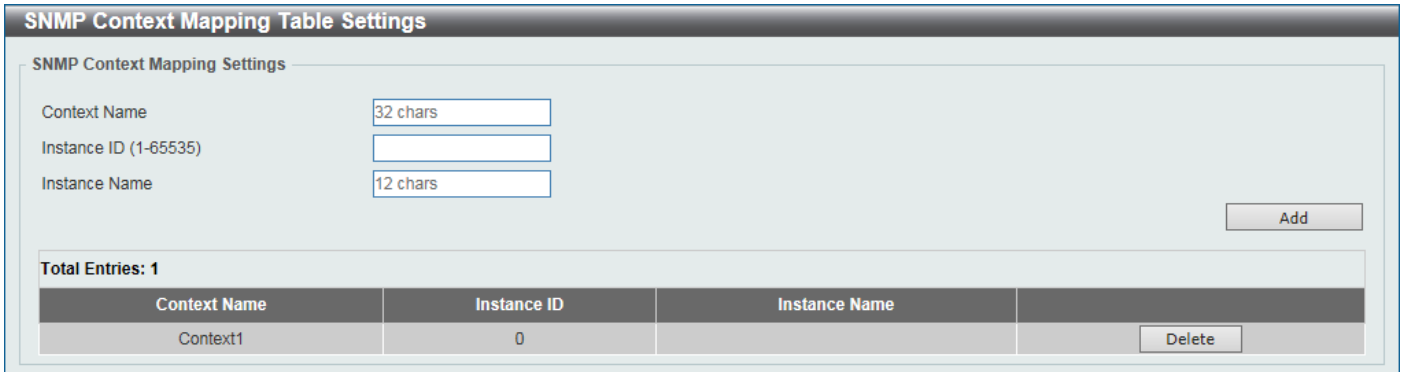


Figure 4-16 SNMP Context Mapping Table Settings Window

The fields that can be configured are described below:

Parameter	Description
Context Name	Enter the SNMP View-based Access Control Model (VACM) context name here. This name can be up to 32 characters long. The name must start with a letter and end with a letter or digit. Interior characters can be letters, digits, and hyphens.
Instance ID	Enter the ID of the instance here. The range is from 1 to 65535.
Instance Name	Enter the name of the instance here. This can be up to 12 characters long.

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

Click the **Delete** button to remove the specified entry.

RMON

RMON Global Settings

This window is used to enable or disable remote monitoring (RMON) for the rising and falling alarm trap feature for the SNMP function on the Switch.

To view the following window, click **Management > RMON > RMON Global Settings**, as shown below:

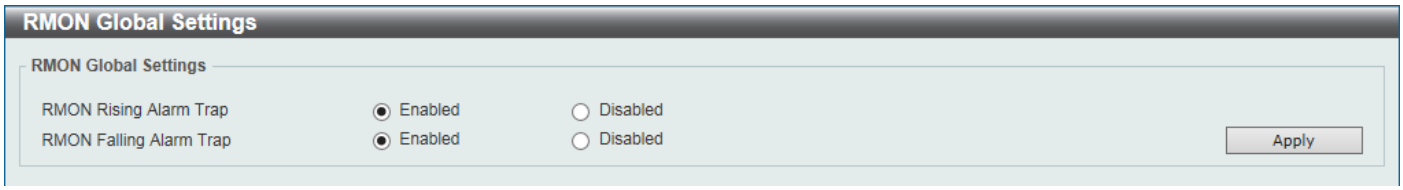


Figure 4-17 RMON Global Settings Window

The fields that can be configured are described below:

Parameter	Description
RMON Rising Alarm Trap	Select this option to enable or disable the RMON Rising Alarm Trap Feature.
RMON Falling Alarm Trap	Select this option to enable or disable the RMON Falling Alarm Trap Feature.

Click the **Apply** button to accept the changes made.

RMON Statistics Settings

This window is used to display and configure the RMON statistics on the specified port.

To view the following window, click **Management > RMON > RMON Statistics Settings**, as shown below:

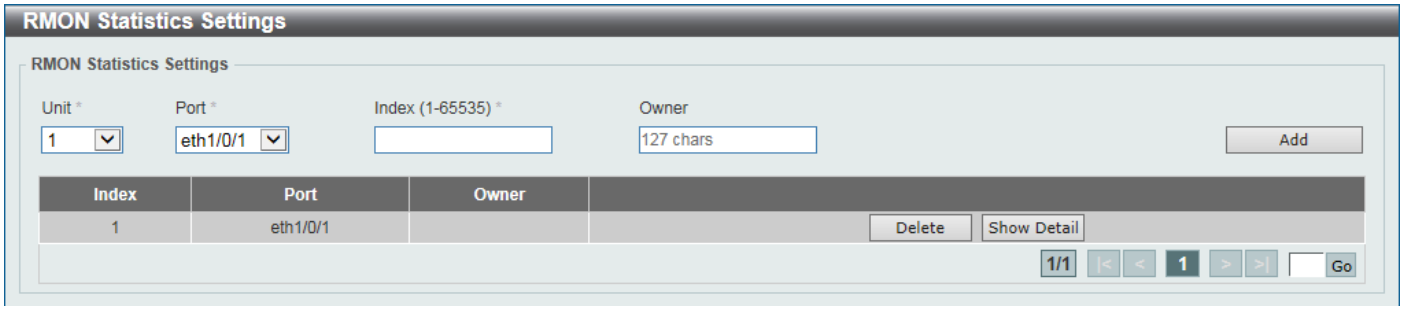


Figure 4-18 RMON Statistics Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select to choose the port.
Index	Enter the RMON table index. The value is from 1 to 65535.
Owner	Enter the owner string. The string can be up to 127 characters.

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

Click the **Delete** button to remove the specified entry.

Click the **Show Detail** button to see the detail information of the specific port.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

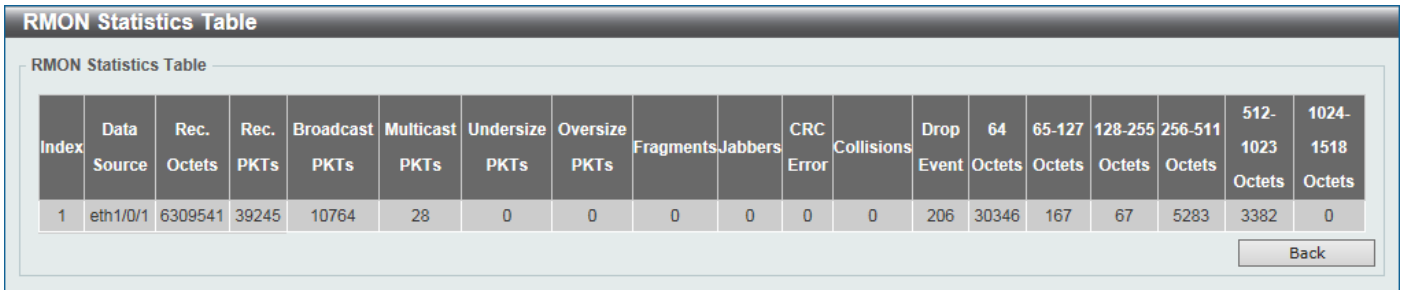


Figure 4-19 RMON Statistics Settings (Show Detail) Window

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

RMON History Settings

This window is used to display and configure RMON MIB history statistics gathered on the specified port.

To view the following window, click **Management > RMON > RMON History Settings**, as shown below:

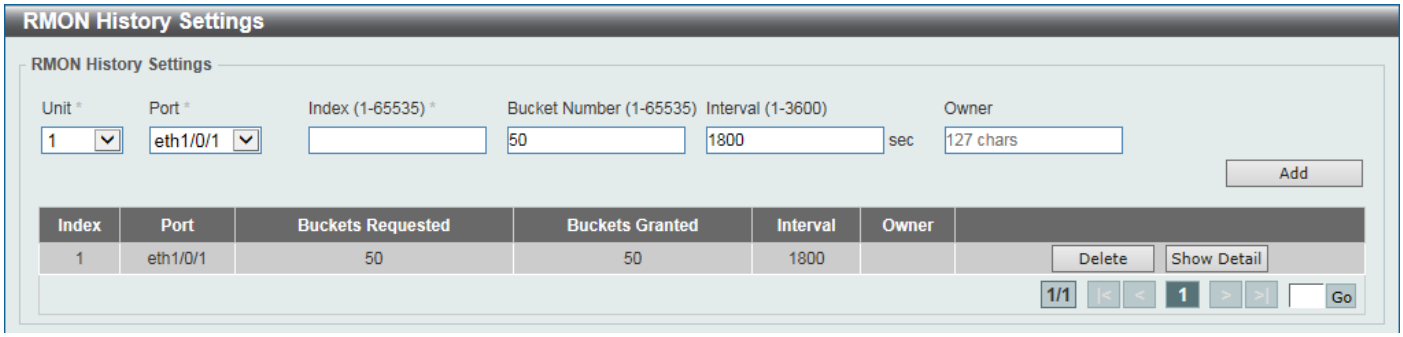


Figure 4-20 RMON History Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the port that will be used here.
Index	Enter the history group table index. The value is from 1 to 65535.
Bucket Number	Enter the number of buckets specified for the RMON collection history group of statistics. The range is from 1 to 65535. By default, this value is 50.
Interval	Enter the time in seconds in each polling cycle. The range is from 1 to 3600.
Owner	Enter the owner string. The string can be up to 127 characters.

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

Click the **Delete** button to remove the specified entry.

Click the **Show Detail** button to see the detail information of the specific port.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

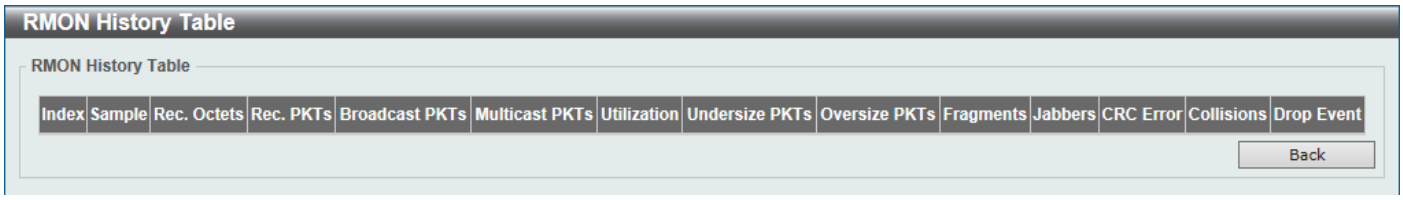


Figure 4-21 RMON History Settings (Show Detail) Window

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

RMON Alarm Settings

This window is used to display and configure alarm entries to monitor an interface.

To view the following window, click **Management > RMON > RMON Alarm Settings**, as shown below:

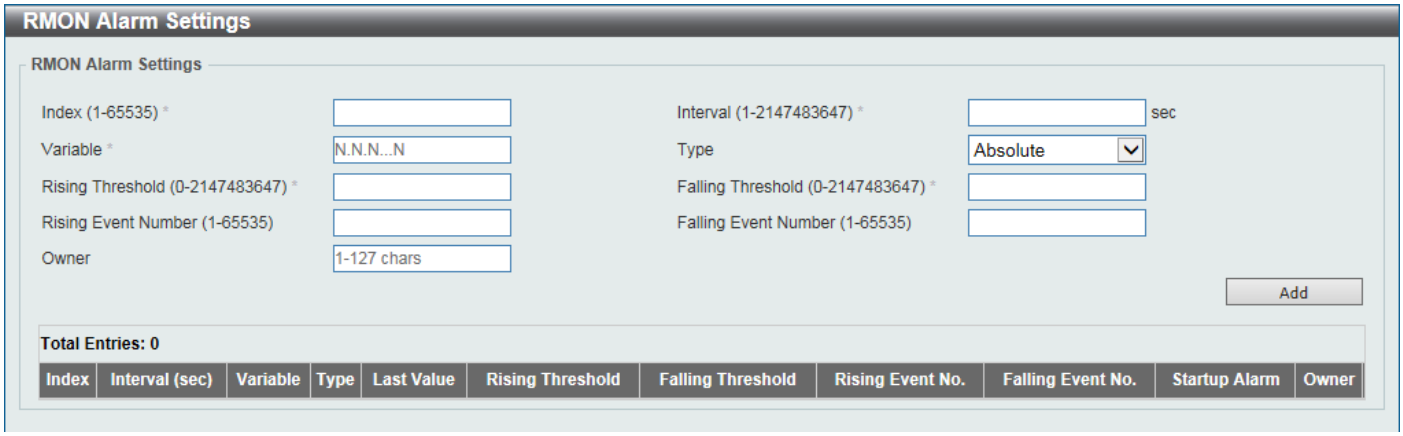


Figure 4-22 RMON Alarm Settings Window

The fields that can be configured are described below:

Parameter	Description
Index	Enter the alarm index. The range is from 1 to 65535.
Interval	Enter the interval in seconds for the sampling of the variable and checking against the threshold. The range is from 1 to 2147483647 seconds.
Variable	Enter the object identifier of the variable to be sampled.
Type	Select the monitoring type. Options to choose from are **Absolute** and **Delta**.
Rising Threshold	Enter the rising threshold value here. The range is from 0 to 2147483647.
Falling Threshold	Enter the falling threshold value here. The range is from 0 to 2147483647.
Rising Event Number	Enter the index of the event entry that is used to notify the rising threshold-crossing event. The range is from 1 to 65535. If not specified, no action is taken while crossing the ringing threshold.
Falling Event Number	Enter the index of the event entry that is used to notify the falling threshold-crossing event. The range is from 1 to 65535. If not specified, no action is taken while crossing the falling threshold.
Owner	Enter the owner string up to 127 characters.

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

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

RMON Event Settings

This window is used to display and configure event entries.

To view the following window, click **Management > RMON > RMON Event Settings**, as shown below:

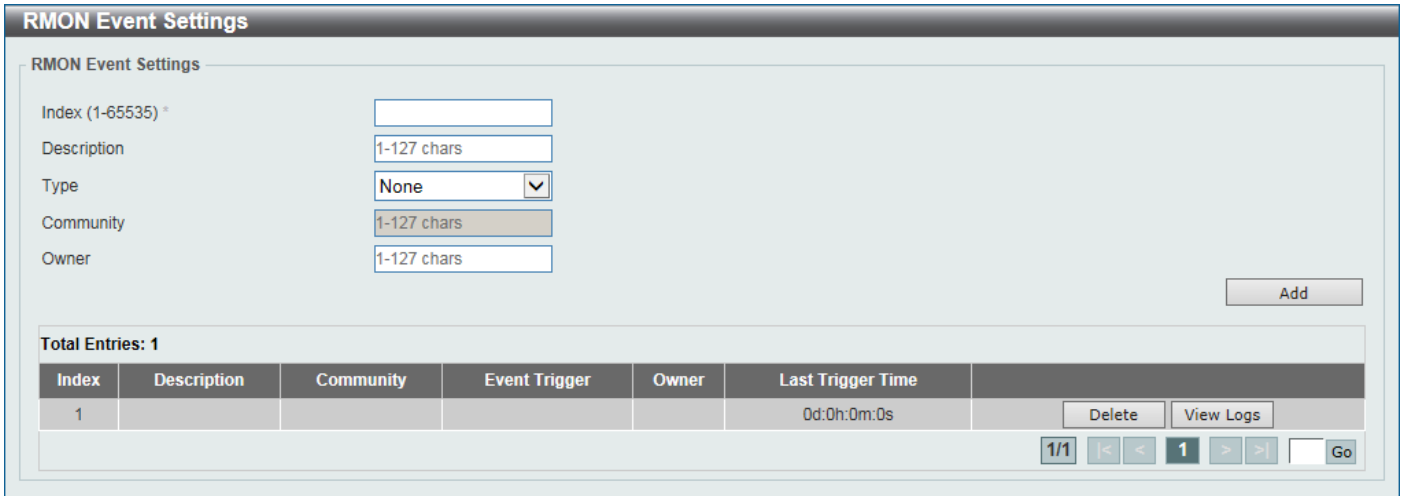


Figure 4-23 RMON Event Settings Window

The fields that can be configured are described below:

Parameter	Description
Index	Enter the index value of the alarm entry here. The range is from 1 to 65535.
Description	Enter a description for the RMON event entry. The string is up to 127 characters long.
Type	Select the RMON event entry type. Options to choose from are **None**, **Log**, **Trap**, and **Log and Trap**.
Community	Enter the community string. The string can be up to 127 characters.
Owner	Enter the owner string. The string can be up to 127 characters.

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

Click the **Delete** button to remove the specified entry.

Click the **View Logs** button to see the detail information of the specific port.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **View Logs** button, the following window will appear.

Figure 4-24 RMON Event Settings (View Logs) Window

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

Telnet/Web

This window is used to display and configure Telnet and Web settings on the Switch.

To view the following window, click **Management > Telnet/Web**, as shown below:

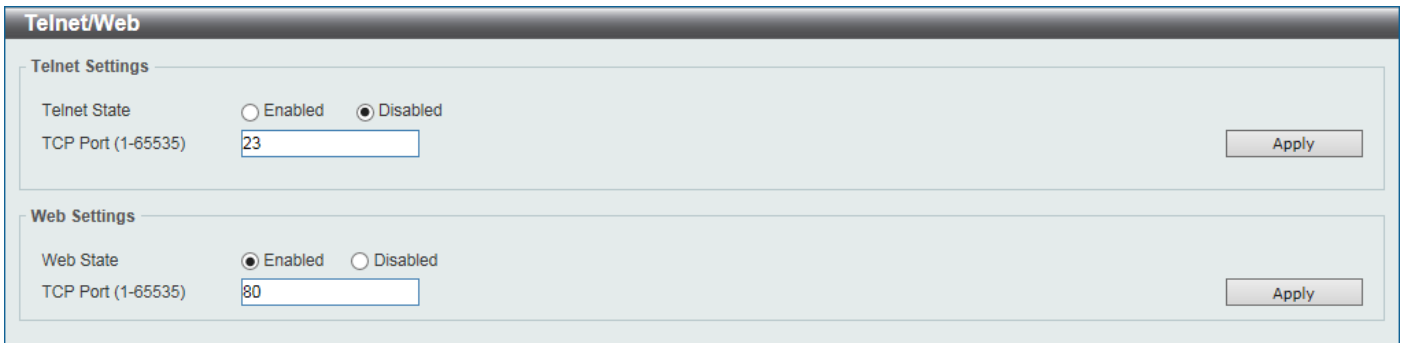


Figure 4-25 Telnet/Web Window

The fields that can be configured in **Telnet Settings** are described below:

Parameter	Description
Telnet State	Select to enable or disable the Telnet server feature here.
Port	Enter the TCP port number used for Telnet management of the Switch. The well-known TCP port for the Telnet protocol is 23.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Web Settings** are described below:

Parameter	Description
Web State	Select this option to enable or disable the configuration through the web.
Port	Enter the TCP port number used for Web management of the Switch. The well-known TCP port for the Web protocol is 80.

Click the **Apply** button to accept the changes made.

Session Timeout

This window is used to display and configure the session timeout settings. The outgoing session timeout values are used for Console/Telnet/SSH connections through the CLI of the Switch to the Telnet interface of another switch.

To view the following window, click **Management > Session Timeout**, as shown below:

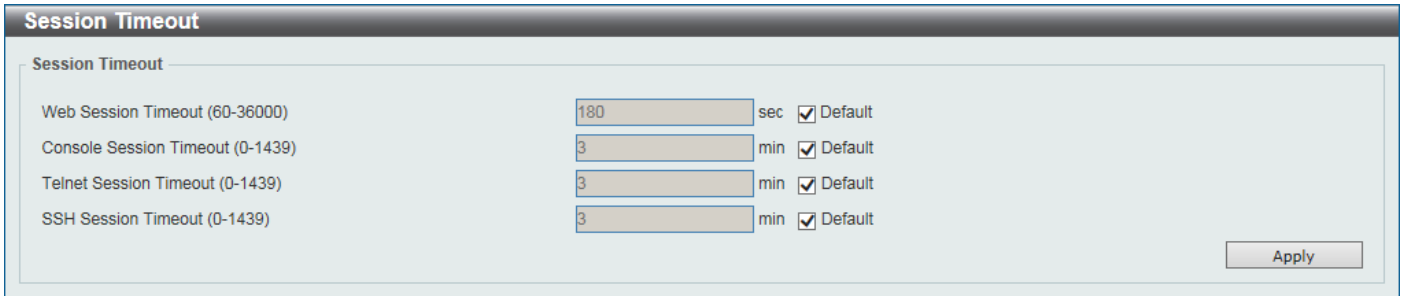


Figure 4-26 Session Timeout Window

The fields that can be configured are described below:

Parameter	Description
Web Session Timeout	Enter the web session timeout value here. The range is from 60 to 36000 seconds. By default, this value is 180 seconds. Select the **Default** option to use the default value.
Console Session Timeout	Enter the console session timeout value here. The range is from 0 to 1439 minutes. Enter 0 to disable the timeout. By default, this value is 3 minutes. Select the **Default** option to use the default value.
Telnet Session Timeout	Enter the Telnet session timeout value here. The range is from 0 to 1439 minutes. Enter 0 to disable the timeout. By default, this value is 3 minutes. Select the **Default** option to use the default value.
SSH Session Timeout	Enter the SSH session timeout value here. The range is from 0 to 1439 minutes. Enter 0 to disable the timeout. By default, this value is 3 minutes. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

DHCP

Service DHCP

This window is used to display and configure the DHCP service on the Switch.

To view the following window, click **Management > DHCP > Service DHCP**, as shown below:

Figure 4-27 Service DHCP Window

The fields that can be configured in **Service DHCP** are described below:

Parameter	Description
Service DHCP State	Select this option to enable or disable the DHCP service.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Service IPv6 DHCP** are described below:

Parameter	Description
Service IPv6 DHCP State	Select this option to enable or disable the IPv6 DHCP service.

Click the **Apply** button to accept the changes made.

DHCP Class Settings

This window is used to display and configure the DHCP class and the DHCP option-matching pattern for the DHCP class.

To view the following window, click **Management > DHCP > DHCP Class Settings**, as shown below:

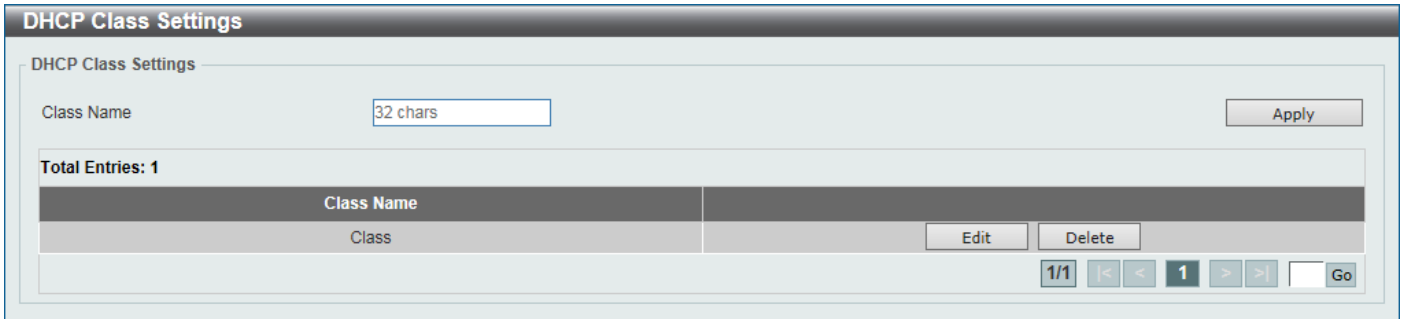


Figure 4-28 DHCP Class Settings Window

The fields that can be configured are described below:

Parameter	Description
Class Name	Enter the DHCP class name with a maximum of 32 characters.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the DHCP option-matching pattern for the corresponding DCHP class.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following window will appear.

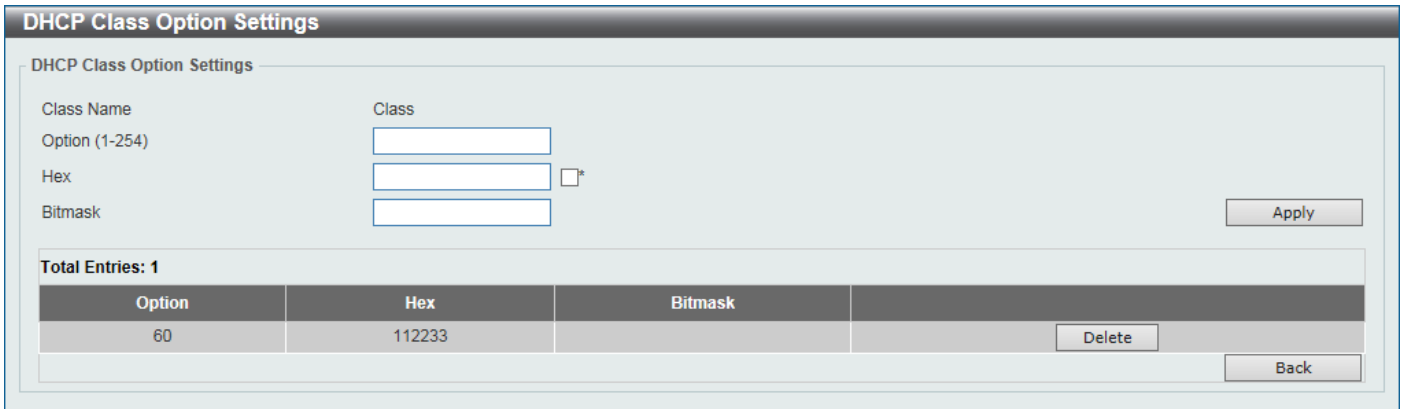


Figure 4-29 DHCP Class Option Settings Window

The fields that can be configured are described below:

Parameter	Description
Option	Enter the DHCP option number. The range is from 1 to 254.
Hex	Enter the hex pattern of the specified DHCP option. Select the ***** check box not to match the remaining bits of the option.
Bitmask	Enter the hex bit mask for masking of the pattern. The masked pattern bits will be matched. If not specified, all bits entered in the **Hex** field will be checked.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

DHCP Pool Settings

This window is used to display and configure the DHCP pool settings

To view the following window, click **Management > DHCP > DHCP Pool Settings**, as shown below:

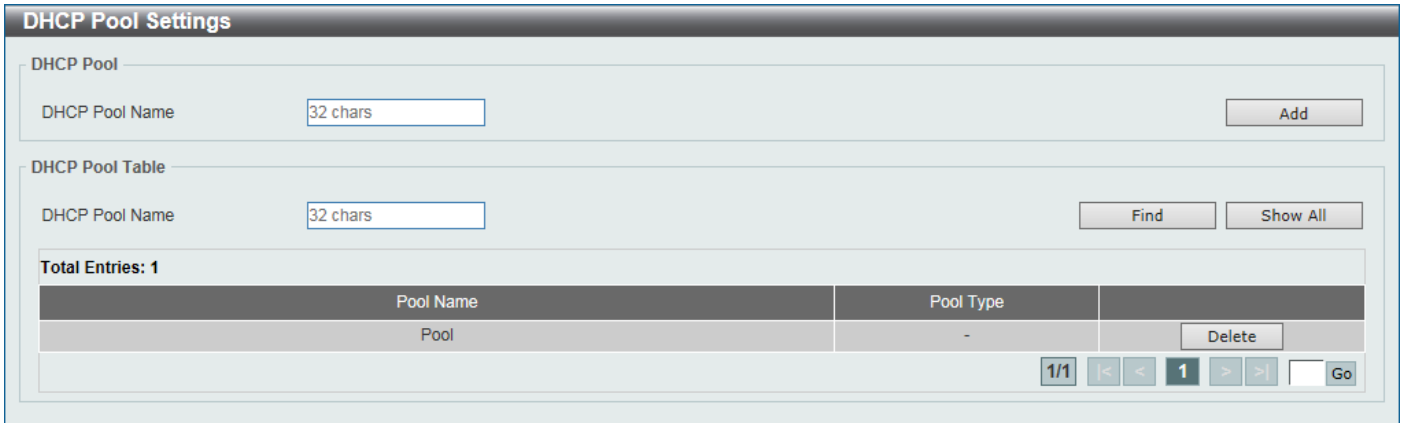


Figure 4-30 DHCP Pool Settings Window

The fields that can be configured are described below:

Parameter	Description
DHCP Pool Name	Enter the name of the DHCP pool here. This can be up to 32 characters long.

Click the **Add** button to add a new DHCP pool.

Click the **Find** button to find and display the DHCP pool in the table.

Click the **Show All** button to display all the DHCP pools in the table.

Click the **Delete** button to delete the specified DHCP pool.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCP Server

The Dynamic Host Configuration Protocol (DHCP) allows the Switch to designate IP addresses, subnet masks, default gateways and other IP parameters to devices that request this information. This occurs when a DHCP enabled device is booted on or attached to the locally attached network. This device is known as the DHCP client and when enabled, it will emit query messages on the network before any IP parameters are set. When the DHCP server receives this request, it will allocate an IP address to the client. The DHCP client may be then utilize the IP address allocated by the DHCP server as its local configuration.

The user can configure many DHCP related parameters that it will utilize on its locally attached network, to control and limit the IP settings of clients desiring an automatic IP configuration, such as the lease time of the allocated IP address, the range of IP addresses that will be allowed in its DHCP pool, the ability to exclude various IP addresses within the range so as not to make identical entries on its network, or to assign the IP address of an important device (such as a DNS server or the IP address of the default route) to another device on the network.

Users also have the ability to bind IP addresses within the DHCP pool to specific MAC addresses in order to assign the same IP addresses to important devices.

DHCP Server Global Settings

This window is used to display and configure the global DHCP server parameters.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Global Settings**, as shown below:

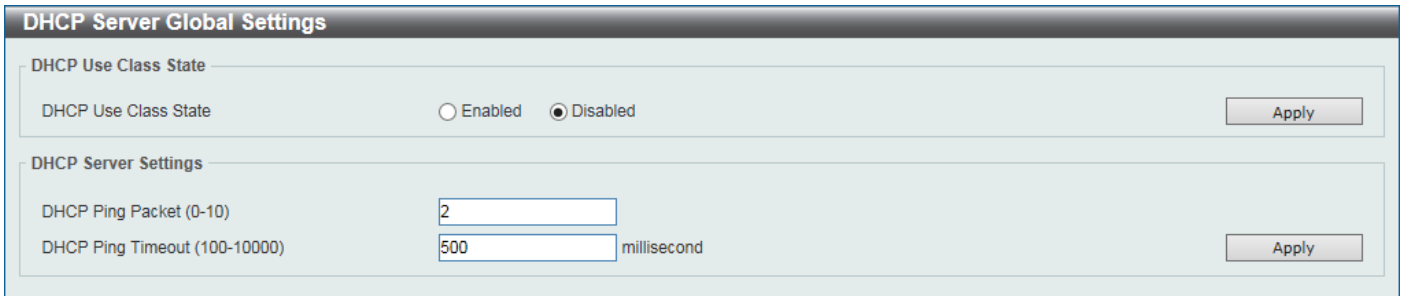


Figure 4-31 DHCP Server Global Settings Window

The fields that can be configured in **DHCP Use Class State** are described below:

Parameter	Description
DHCP Use Class State	Select to enable or disable the DHCP Use Class State here. When enabled, the DHCP server will use DHCP classes for address allocation.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DHCP Server Settings** are described below:

Parameter	Description
DHCP Ping Packet	Enter the number of ping packets that the Switch will send out on the network containing the IP address to be allotted. If the ping request is not returned, the IP address is considered unique to the local network and then allotted to the requesting client. A value of 0 means there is no ping test. The range is from 0 to 10. By default, this value is 2.
DHCP Ping Timeout	Enter the amount of time the DHCP server must wait before timing out a ping packet. The range is from 100 to 10000 milliseconds. By default, this value is 500 milliseconds.

Click the **Apply** button to accept the changes made.

DHCP Server Pool Settings

This window is used to display and configure the DHCP server pool settings.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Pool Settings**, as shown below:

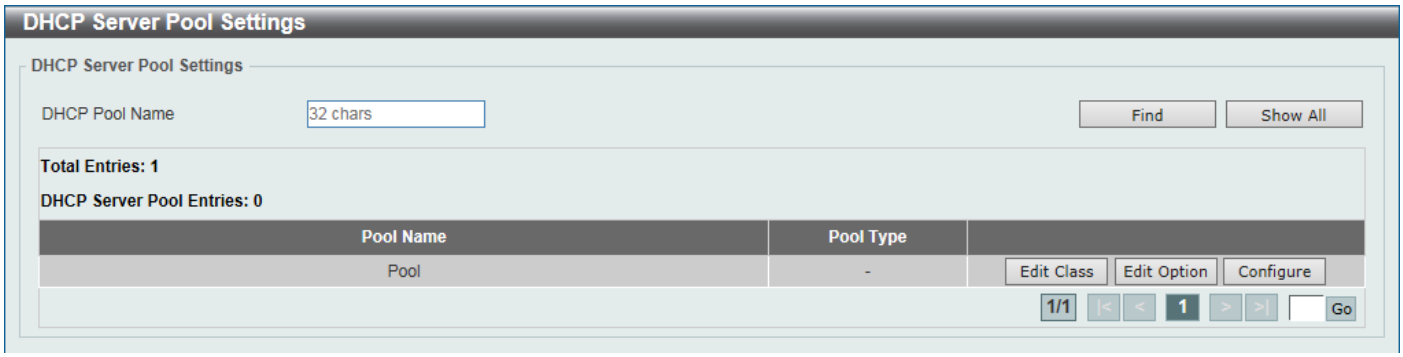


Figure 4-32 DHCP Server Pool Settings Window

The fields that can be configured are described below:

Parameter	Description
DHCP Pool Name	Enter the DHCP server pool name here. This name can be up to 32 characters long.

Click the **Find** button to find and display the DHCP pool in the table.

Click the **Show All** button to display all the DHCP pools in the table.

Click the **Edit Class** button to configure the DHCP class.

Click the **Edit Option** button to configure the DHCP server pool option settings.

Click the **Configure** button to configure the DHCP server pool settings.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit Class** button, the following page will appear.

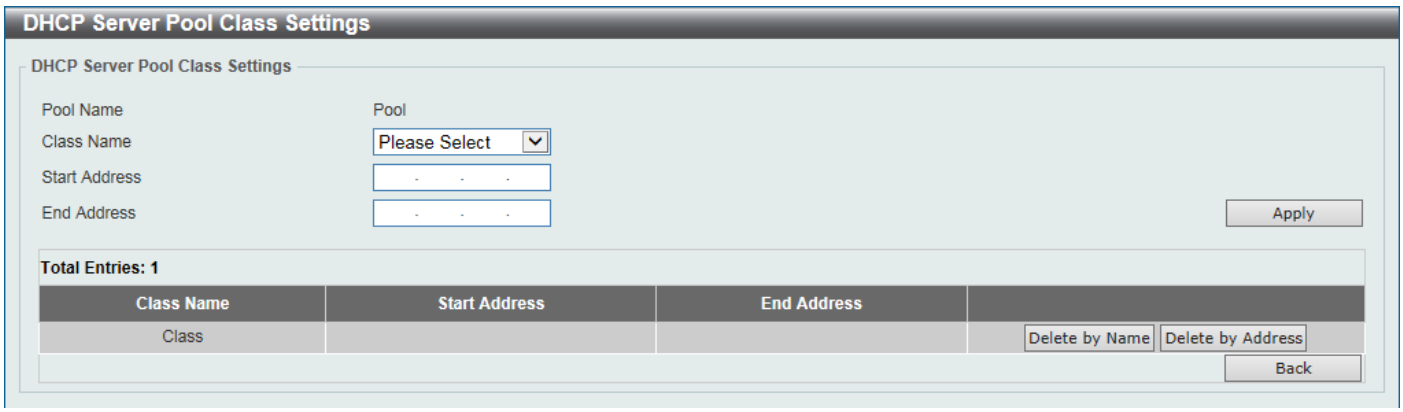


Figure 4-33 DHCP Server Pool Class Settings Window

The fields that can be configured are described below:

Parameter	Description
Class Name	Select an existing DHCP class name here that will be associated with this DHCP pool.
Start Address	Enter the starting IPv4 address that will be associated with the DHCP class in the DHCP pool here.

Parameter	Description
End Address	Enter the ending IPv4 address that will be associated with the DHCP class in the DHCP pool here.

Click the **Apply** button to accept the changes made.

Click the **Delete by Name** button to remove the DHCP class association by name.

Click the **Delete by Address** button to remove the DHCP class association by address.

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

After clicking the **Edit Option** button, the following page will appear.

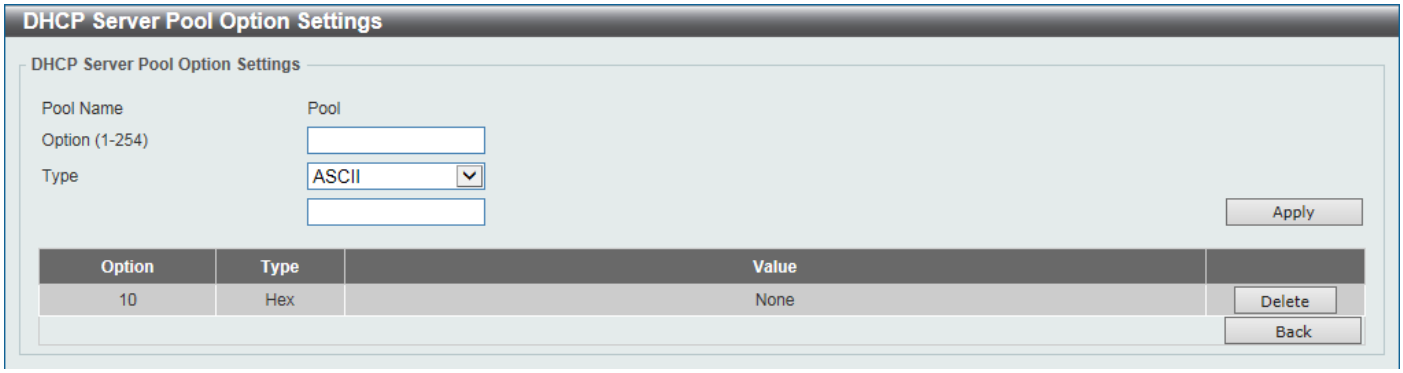


Figure 4-34 DHCP Server Pool Option Settings Window

The fields that can be configured are described below:

Parameter	Description
Option	Enter the DHCP option number here. The range is from 1 to 254.
Type	Select the DHCP option type here. Options to choose from are: • **ASCII** - Enter the **ASCII** string in the space provided. This string can be up to 255 characters long. • **Hex** - Enter the hexadecimal string in the space provided. This string can be up to 254 characters long. • Select the **None** option to specify a zero-length hexadecimal string. • **IP** - Enter the IPv4 address in the space provided. Up to 8 IPv4 addresses can be entered.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

After clicking the **Configure** button, the following page will appear.

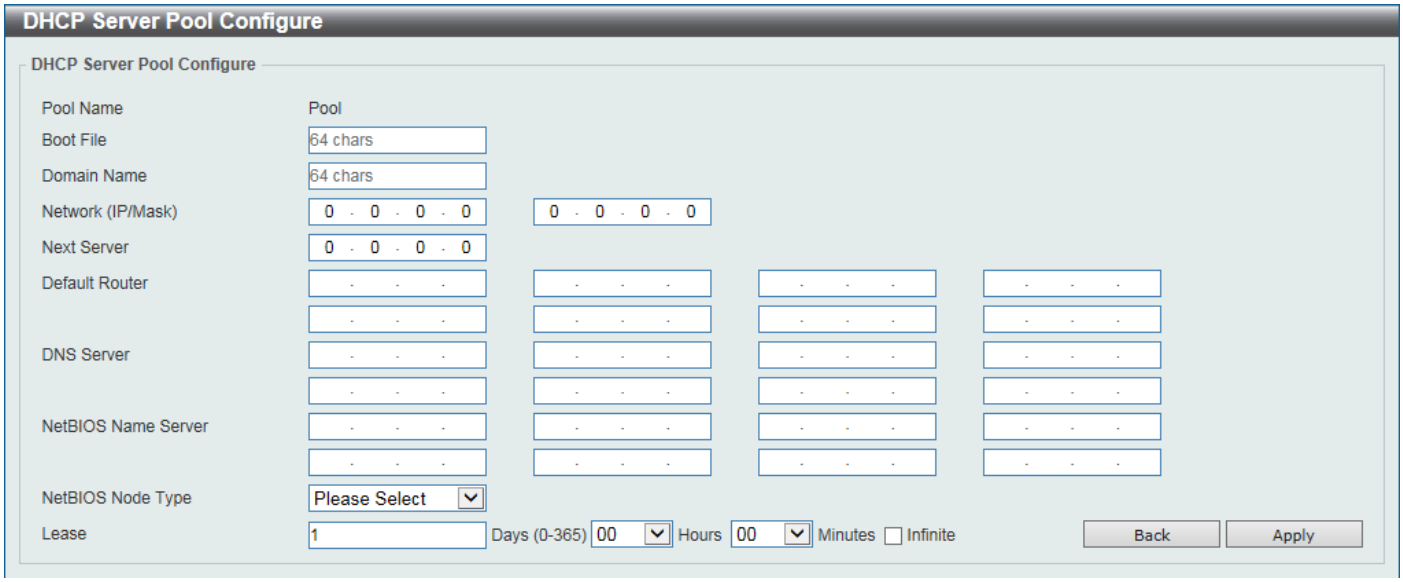


Figure 4-35 DHCP Server Pool Configure Window

The fields that can be configured are described below:

Parameter	Description
Boot File	Enter the boot file name here. This can be up to 64 characters long.
Domain Name	Enter the domain name for the DHCP client here. This can be up to 64 characters long.
Network (IP/Mask)	Enter the network IPv4 address and subnet mask for the DHCP client here.
Next Server	Enter the next server IPv4 address here. The boot image file is stored on this server and can be retrieved by DHCP clients using this IP address. The server is typically a TFTP server. Only one next server IP address can be specified.
Default Router	Enter the IPv4 address of the default router for the DHCP client here. Up to 8 IPv4 address can be entered here. The IP address of the router should be on the same subnet as the client's subnet. Routers are listed in the order of preference. If default routers are already configured, the default routers configured later will be added to the default interface list.
DNS Server	Enter the IPv4 address to be used by the DHCP client as the DNS server here. Up to 8 IPv4 address can be entered here. Servers are listed in the order of preference. If DNS servers are already configured, the DNS servers configured later will be added to the DNS server list.
NetBIOS Name Server	Enter the WINS name server IPv4 address for the DHCP client here. Up to 8 IPv4 address can be entered here. Servers are listed in the order of preference. If name servers are already configured, the name server configured later will be added to the default interface list.
NetBIOS Node Type	Select the NetBIOS node type for Microsoft DHCP clients here. The node type determines the method that NetBIOS uses to register and resolve names. Options to choose from are: • **Broadcast** - This system uses broadcasts. • **Peer-to-Peer** - This system (p-node) uses only point-to-point name queries to a name server (WINS). • **Mixed** - This system (m-node) broadcasts first, and then queries the name server. • **Hybrid** - This system (h-node) queries the name server first, and then broadcasts. This is the recommended type.
Lease	Enter and select the lease time for an IPv4 address that is assigned from the address pool here. Enter the **Days** in the range from 0 to 365. Select the **Hours**

Parameter	Description
	and **Minutes** from the drop-down menus. Alternatively, the **Infinite** option can be selected to specify that the lease time is unlimited.

Click the **Apply** button to accept the changes made.

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

DHCP Server Exclude Address

This window is used to view and exclude a range of IPv4 addresses from being allocated to the DHCP client. The DHCP server automatically allocates addresses in DHCP address pools to DHCP clients. All the addresses except the interface's IP address on the router and the excluded address(es) specified here are available for allocation. Multiple ranges of addresses can be excluded. To remove a range of excluded addresses, administrators must specify the exact range of addresses previously configured.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Exclude Address**, as shown below:

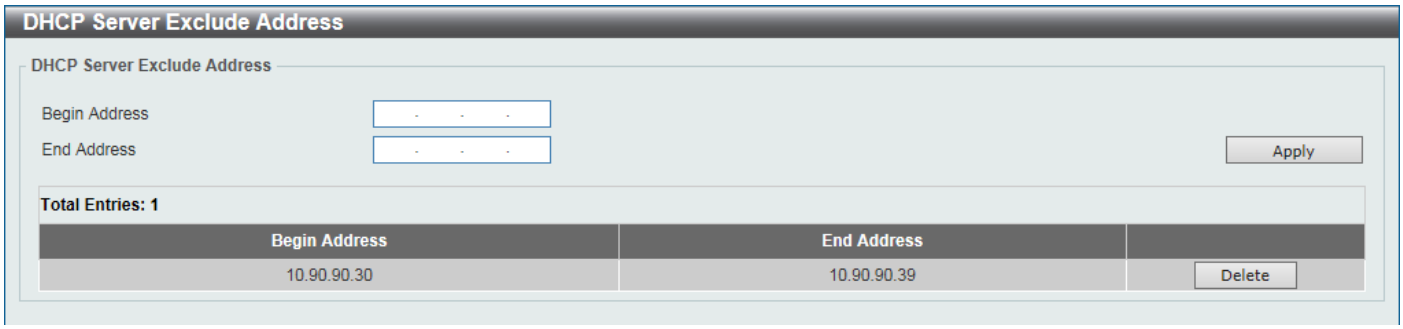


Figure 4-36 DHCP Server Exclude Address Window

The fields that can be configured are described below:

Parameter	Description
Begin Address	Enter the first IPv4 address of a range of addresses to be excluded here.
End Address	Enter the last IPv4 address of a range of addresses to be excluded here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

DHCP Server Manual Binding

This window is used to display and configure the extended DHCP server manual binding settings. With a manual binding entry, the IP address can be bound with a client-identifier or bound with the hardware address of the host.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Manual Binding**, as shown below:

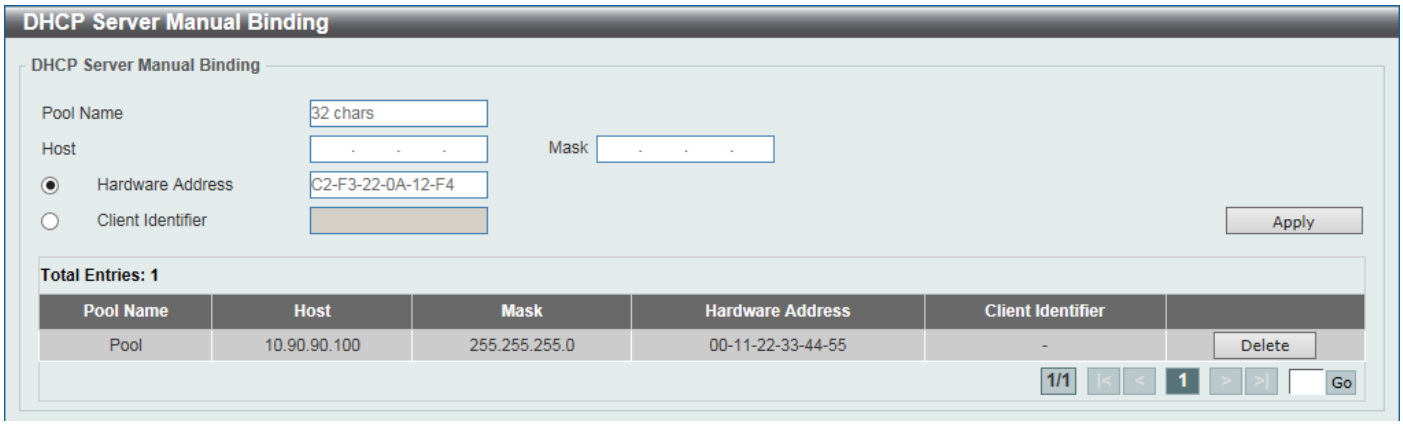


Figure 4-37 DHCP Server Manual Binding Window

The fields that can be configured are described below:

Parameter	Description
Pool Name	Enter the DHCP server pool name here. This name can be up to 32 characters long.
Host	Enter the DHCP host IPv4 address here.
Mask	Enter the DHCP host network subnet mask here.
Hardware Address	Enter the DHCP host MAC address here.
Client Identifier	Enter the DHCP host identifier in hexadecimal notation here. The client identifier is formatted by the media type and the MAC address.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCP Server Dynamic Binding

This window is used to view and clear the DHCP server dynamic binding entries.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Dynamic Binding**, as shown below:

Figure 4-38 DHCP Server Dynamic Binding Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Enter the binding entry IPv4 address here.
Pool Name	Enter the DHCP server pool name here. This name can be up to 32 characters long. Select the **All** option to clear the binding entries for all pools.
Binding IP Address	Enter the binding IP address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

DHCP Server IP Conflict

This window is used to view and clear the DHCP conflict entries from the DHCP server database.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server IP Conflict**, as shown below:

Figure 4-39 DHCP Server IP Conflict Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Enter the IPv4 address of the conflict entry to be located or cleared.

Parameter	Description
Pool Name	Enter the DHCP server pool name here. This name can be up to 32 characters long. Select the **All** option to clear the conflict entries for all pools.
Conflict IP Address	Enter the conflict IP address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

DHCP Server Statistic

This window is used to display DHCP server statistics.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Statistic**, as shown below:

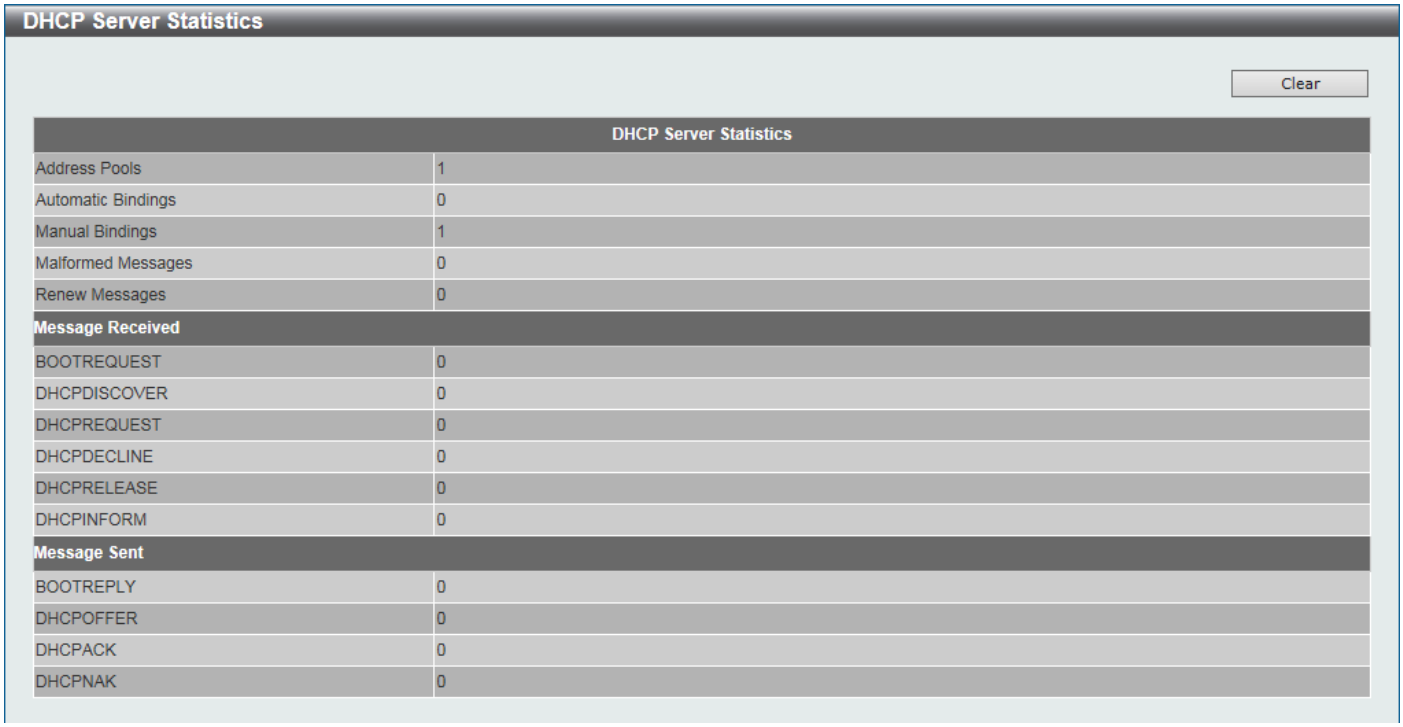


Figure 4-40 DHCP Server Statistic Window

Click the **Clear** button to clear the statistics information displayed here.

DHCPv6 Server

DHCPv6 Server Pool Settings

This window is used to display and configure the DHCPv6 server pool settings.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Pool Settings**, as shown below:

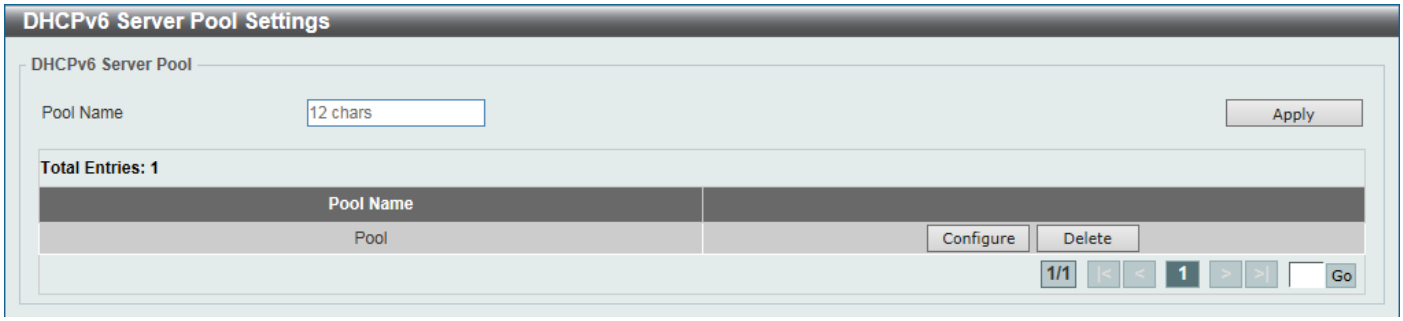


Figure 4-41 DHCPv6 Server Pool Settings Window

The fields that can be configured are described below:

Parameter	Description
Pool Name	Enter the DHCPv6 server pool name here. This name can be up to 12 characters long.

Click the **Apply** button to accept the changes made.

Click the **Configure** button to configure the DHCPv6 server pool settings.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Configure** button, the following page will appear.

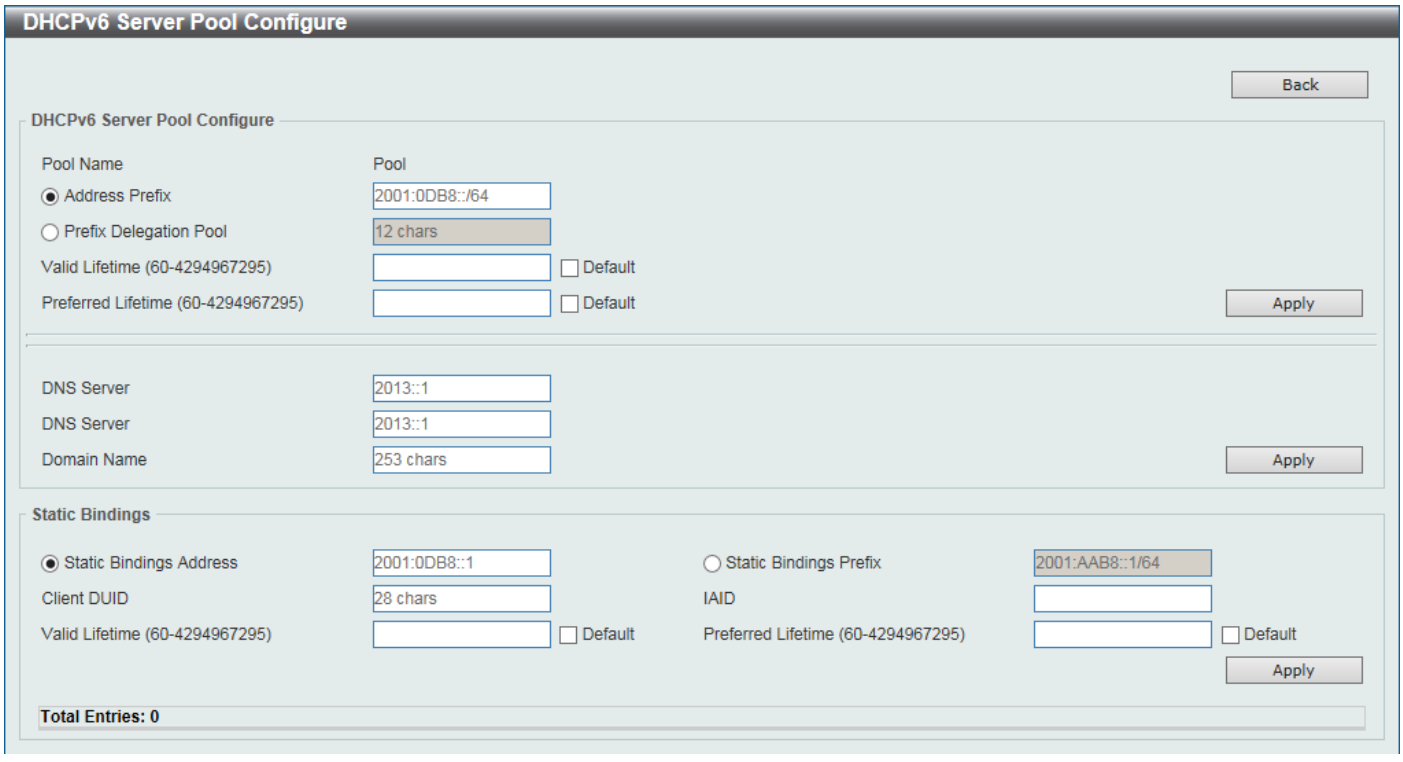


Figure 4-42 DHCPv6 Server Pool Configure Window

The fields that can be configured in **DHCPv6 Server Pool Configure** are described below:

Parameter	Description
Address Prefix	Select and enter the DHCPv6 server pool IPv6 network address and prefix length here. For example, 2015::0/64.
Prefix Delegation Pool	Select and enter the DHCPv6 server pool prefix delegation name here. This name can be up to 12 characters long.
Valid Lifetime	Enter the valid lifetime value here. The valid lifetime should be greater than preferred lifetime. The range is from 60 to 4294967295 seconds. By default, this value is 2592000 seconds (30 days). Select **Default** to use the default value.
Preferred Lifetime	Enter the preferred lifetime value here. The range is from 60 to 4294967295 seconds. By default, this value is 604800 seconds (7 days). Select **Default** to use the default value.

Click the **Apply** button to accept the changes made.

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

The fields that can be configured in **Configure DNS/Domain Name** are described below:

Parameter	Description
DNS Server	Enter the DNS server IPv6 address to be assigned to requesting DHCPv6 clients here. Up to two DNS server can be configured.
Domain Name	Enter the domain name to be assigned to requesting DHCPv6 clients here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Static Bindings** are described below:

Parameter	Description
Static Bindings Address	Enter the static binding IPv6 address assign to the specific client here.
Static Bindings Prefix	Enter the static binding IPv6 network address and prefix length here.
Client DUID	Enter the client DHCP Unique Identifier (DUID) here. This string can be up to 28 characters long.
IAID	Enter the Identity Association Identifier (IAID) here. The IAID here uniquely identifies a collection of non-temporary addresses (IANA) assigned on the client.
Valid Lifetime	Enter the valid lifetime value here. The valid lifetime should be greater than the preferred lifetime. The range is from 60 to 4294967295 seconds. By default, this value is 2592000 seconds (30 days). Select **Default** to use the default value.
Preferred Lifetime	Enter the preferred lifetime value here. The range is from 60 to 4294967295 seconds. By default, this value is 604800 seconds (7 days). Select **Default** to use the default value.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

DHCPv6 Server Local Pool Settings

This window is used to display and configure the DHCPv6 server local pool settings.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Local Pool Settings**, as shown below:

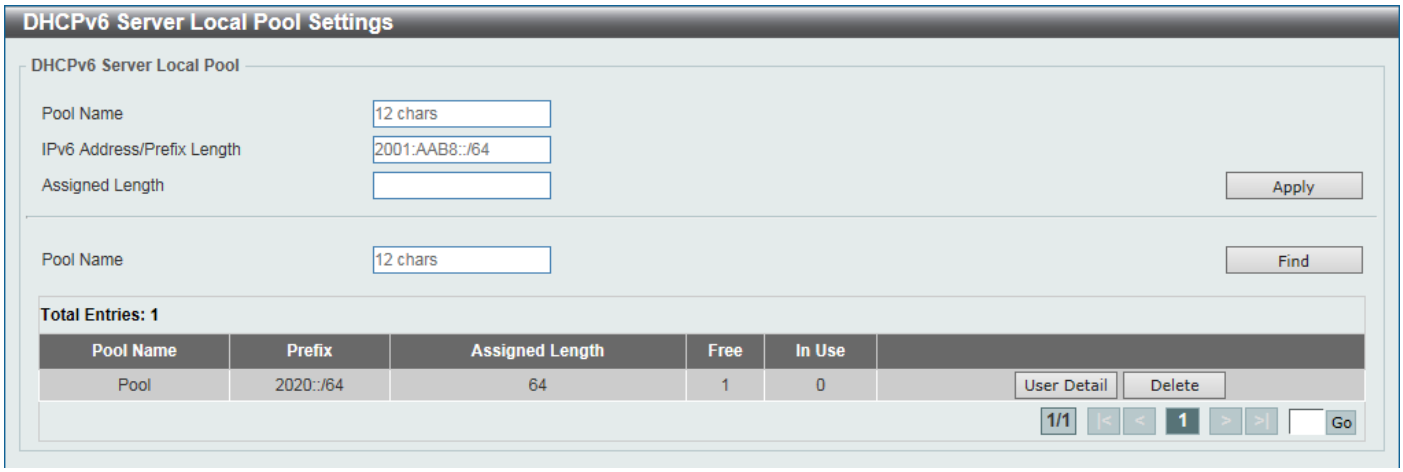


Figure 4-43 DHCPv6 Server Local Pool Settings Window

The fields that can be configured are described below:

Parameter	Description
Pool Name	Enter the DHCPv6 local pool name here. This name can be up to 12 characters long.
IPv6 Address / Prefix Length	Enter the IPv6 prefix address and prefix length of the local pool here.
Assigned Length	Enter the prefix length to be delegated to the user from the pool here. The value of the assigned length cannot be less than the value of the prefix length.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **User Detail** button to view the user information displayed in the lower table.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **User Detail** button, the following window is displayed:

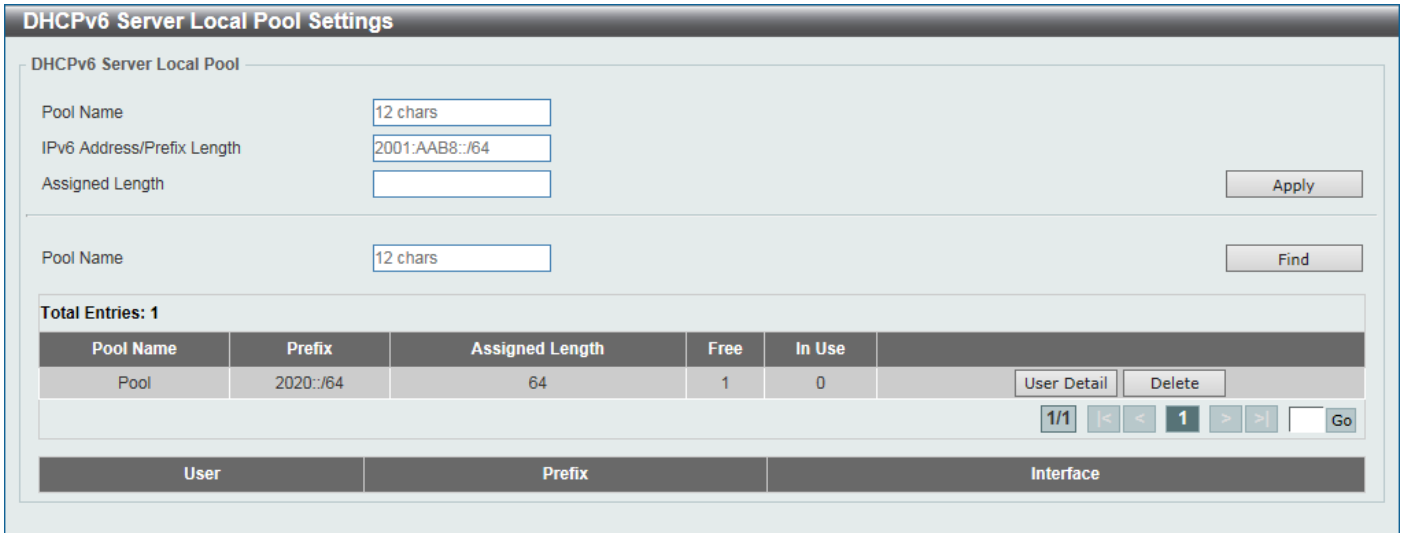


Figure 4-44 DHCPv6 Server Local Pool Settings (User Detail) Window

DHCPv6 Server Exclude Address

This window is used to specify IPv6 addresses that a DHCPv6 server should not assign to DHCPv6 clients. The DHCPv6 server assumes that all addresses (excluding the Switch's IPv6 address) can be assigned to clients. Use this window to exclude a single IPv6 address or a range of IPv6 addresses. The excluded addresses are only applied to the pool(s) for address assignment.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Exclude Address**, as shown below:

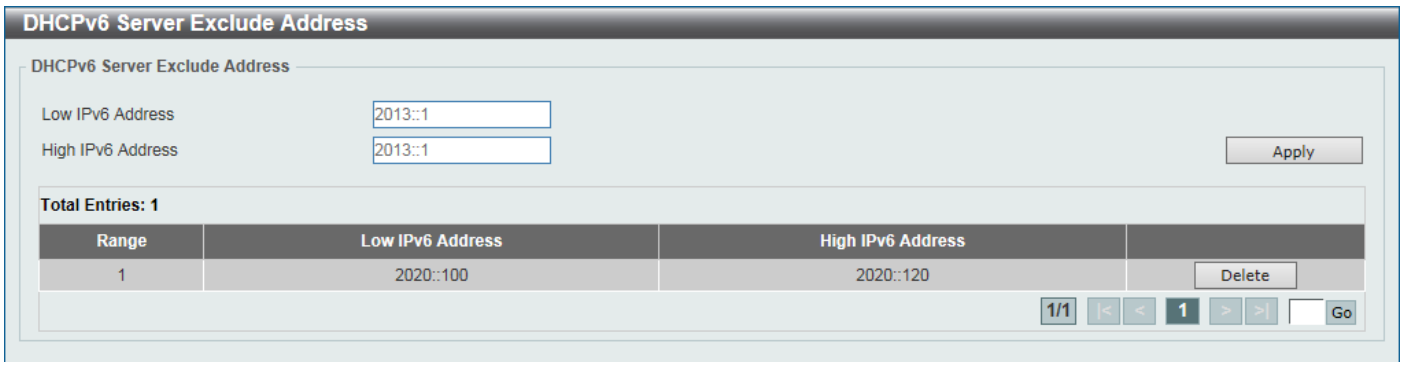


Figure 4-45 DHCPv6 Server Exclude Address Window

The fields that can be configured are described below:

Parameter	Description
Low IPv6 Address	Enter the excluded IPv6 address or first IPv6 address in the excluded address range here.
High IPv6 Address	Enter the last IPv6 address in the excluded address range here (optional).

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCPv6 Server Binding

This window is used to view and clear the DHCPv6 server binding entries.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Binding**, as shown below:

Figure 4-46 DHCPv6 Server Binding Window

The fields that can be configured are described below:

Parameter	Description
IPv6 Address	Enter the binding entry IPv6 address to be displayed or cleared here. Select **All** to display or clear all DHCPv6 client prefix bindings in or from the binding table.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

DHCPv6 Server Interface Settings

This window is used to display and configure the DHCPv6 server interface settings.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Interface Settings**, as shown below:

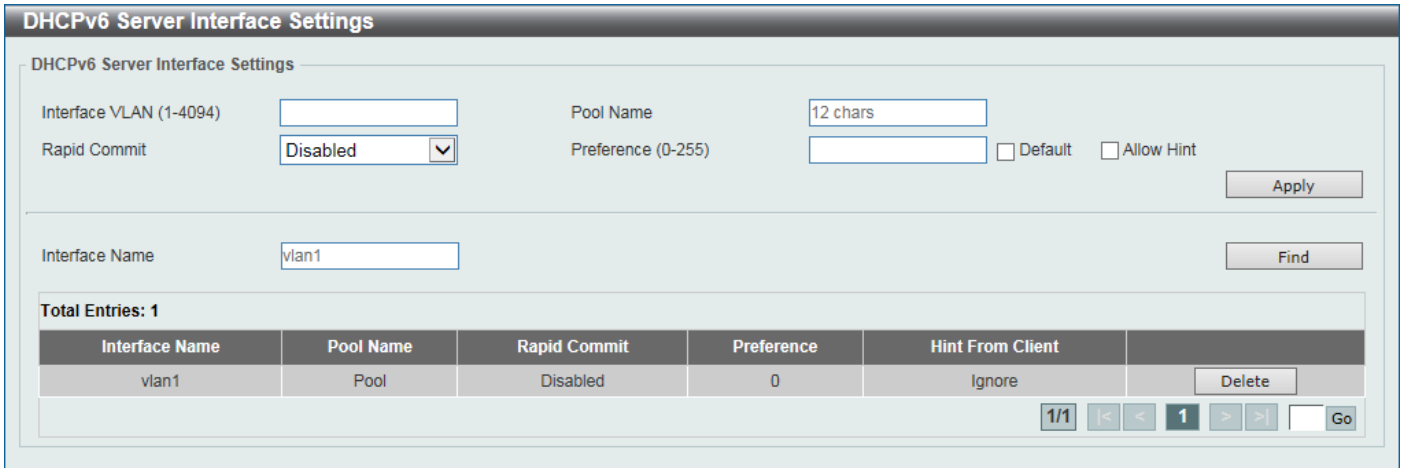


Figure 4-47 DHCPv6 Server Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the interface VLAN ID here. The range is from 1 to 4094.
Pool Name	Enter the DHCPv6 server pool name here. This name can be up to 12 characters long.

Parameter	Description
Rapid Commit	Select to enable or disable two-message exchange here. By default, two-message exchange is not allowed.
Preference	Enter the preference value here. The range is from 0 to 255. Select the **Allow Hint** option to allow hints. Select **Default** to use the default value.
Interface Name	Enter the interface name here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCPv6 Server Operational Information

This window is used to display the DHCPv6 server operational information.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Operational Information**, as shown below:

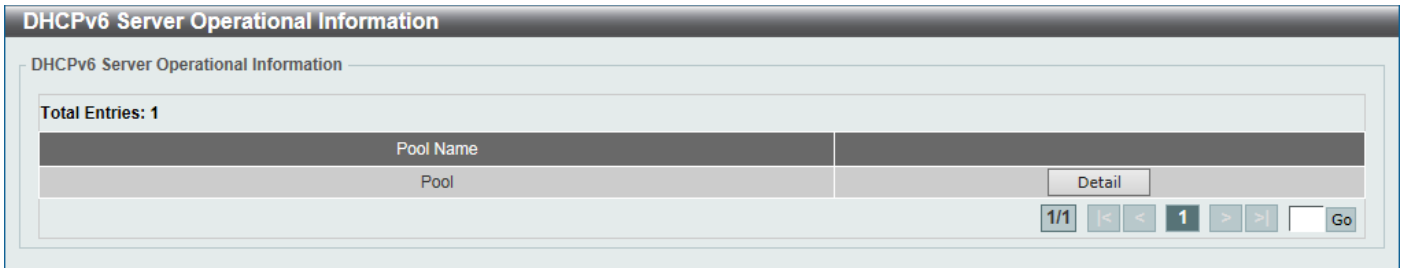


Figure 4-48 DHCPv6 Server Operational Information Window

Click the **Detail** button to view detailed DHCPv6 operational information.

After clicking the **Detail** button, the following window will appear.

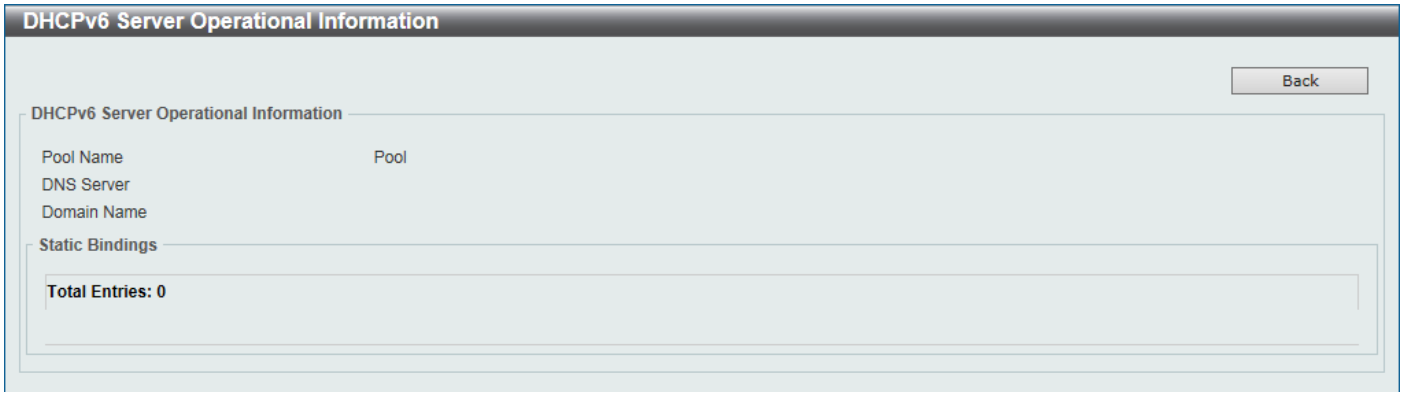


Figure 4-49 DHCPv6 Server Operational Information (Detail) Window

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

DHCP Relay

DHCP Relay Global Settings

This window is used to display and configure the global DHCP relay settings.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Global Settings**, as shown below:

Figure 4-50 DHCP Relay Global Settings Window

The fields that can be configured in **DHCP Relay Global Settings** are described below:

Parameter	Description
DHCP Smart Relay State	Select to enable or disable the smart relay of the DHCP relay agent.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DHCP Relay Unicast State** are described below:

Parameter	Description
DHCP Relay Unicast State	Select to globally enable or disable the DHCP relay unicast state here.

Click the **Apply** button to accept the changes made.

DHCP Relay Pool Settings

This window is used to display and configure the DHCP relay pool on a DHCP relay agent.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Pool Settings**, as shown below:

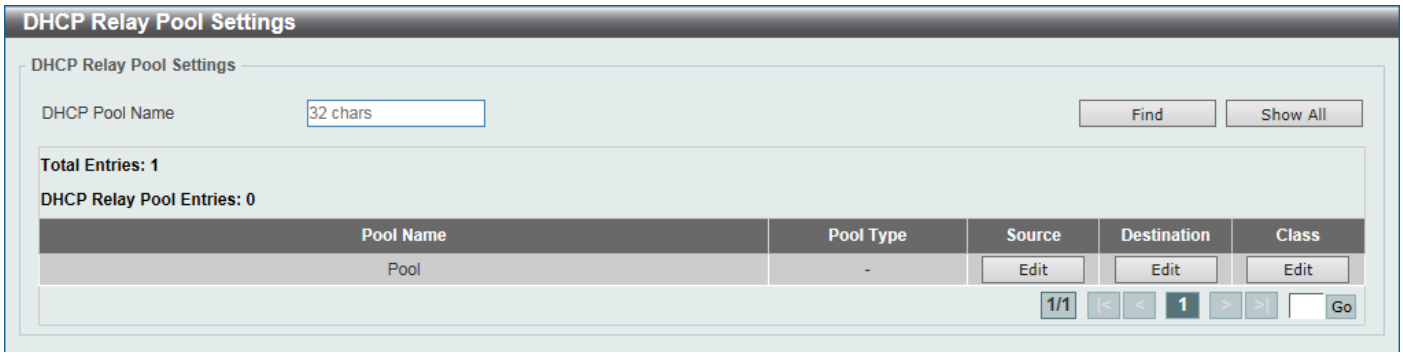


Figure 4-51 DHCP Relay Pool Settings Window

The fields that can be configured are described below:

Parameter	Description
DHCP Pool Name	Enter the name of the DHCP pool here. This name can be up to 32 characters long.

Click the **Find** button to find and display the DHCP pool in the table.

Click the **Show All** button to display all the DHCP pools in the table.

Click the **Edit** button to modify the corresponding information of the specific DHCP pool.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button under **Source**, the following window will appear.

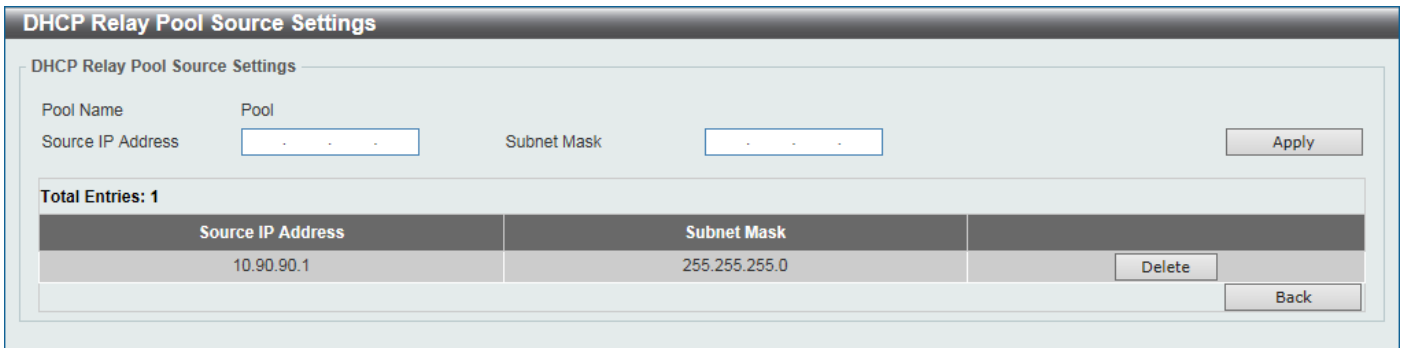


Figure 4-52 DHCP Relay Pool Source Settings Window

The fields that can be configured are described below:

Parameter	Description
Source IP Address	Enter the source subnet of client packets.
Subnet Mask	Enter the network mask of the source subnet.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

After clicking the **Edit** button under **Destination**, the following window will appear.

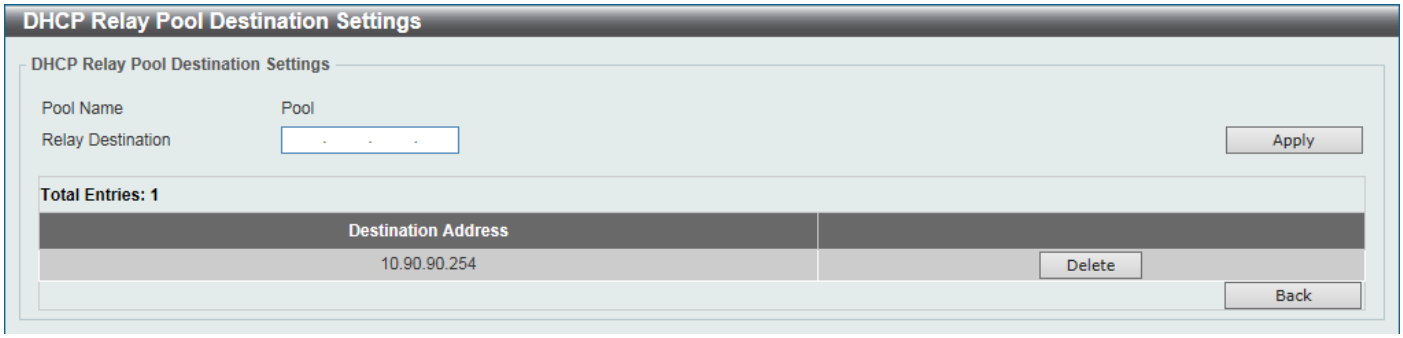


Figure 4-53 DHCP Relay Pool Destination Settings Window

The fields that can be configured are described below:

Parameter	Description
Relay Destination	Enter the relay destination DHCP server IP address.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

After clicking the **Edit** button under **Class**, the following window will appear.

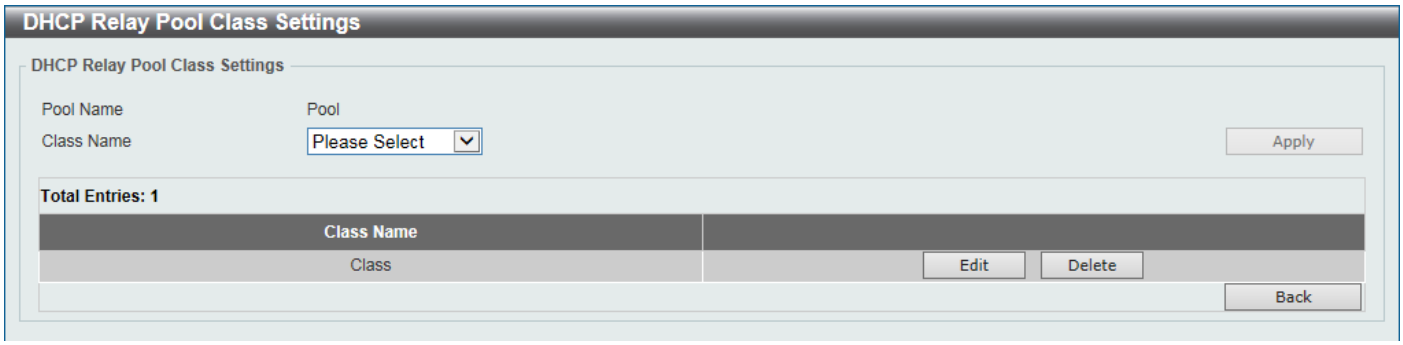


Figure 4-54 DHCP Relay Pool Class Settings Window

The fields that can be configured are described below:

Parameter	Description
Class Name	Select the DHCP class name.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to edit more information.

Click the **Delete** button to remove the specified entry.

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

After clicking the **Edit** button, the following window will appear.

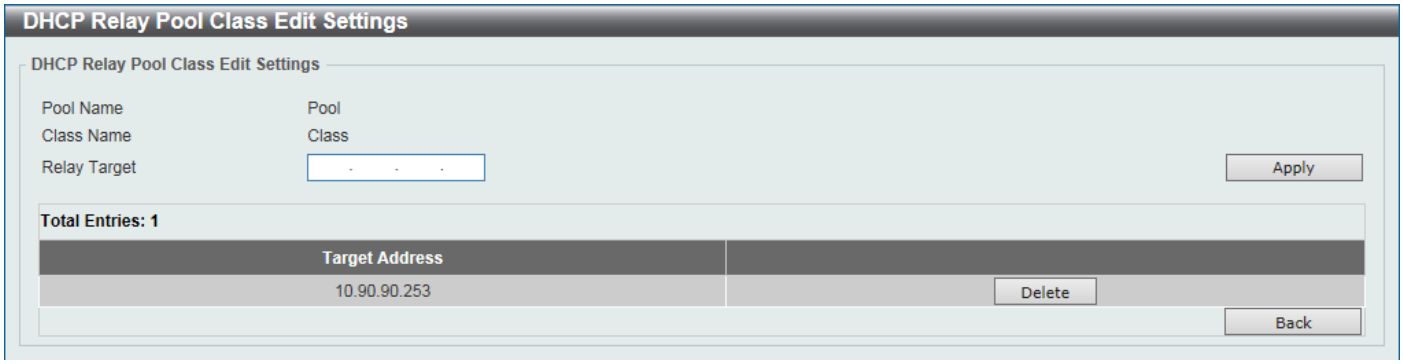


Figure 4-55 DHCP Relay Pool Class Edit Settings Window

The fields that can be configured are described below:

Parameter	Description
Relay Target	Enter the DHCP relay target for relaying packets that matches the value pattern of the option defined in the DHCP class.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

DHCP Relay Information Settings

This window is used to display and configure the DHCP relay information.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Information Settings**, as shown below:

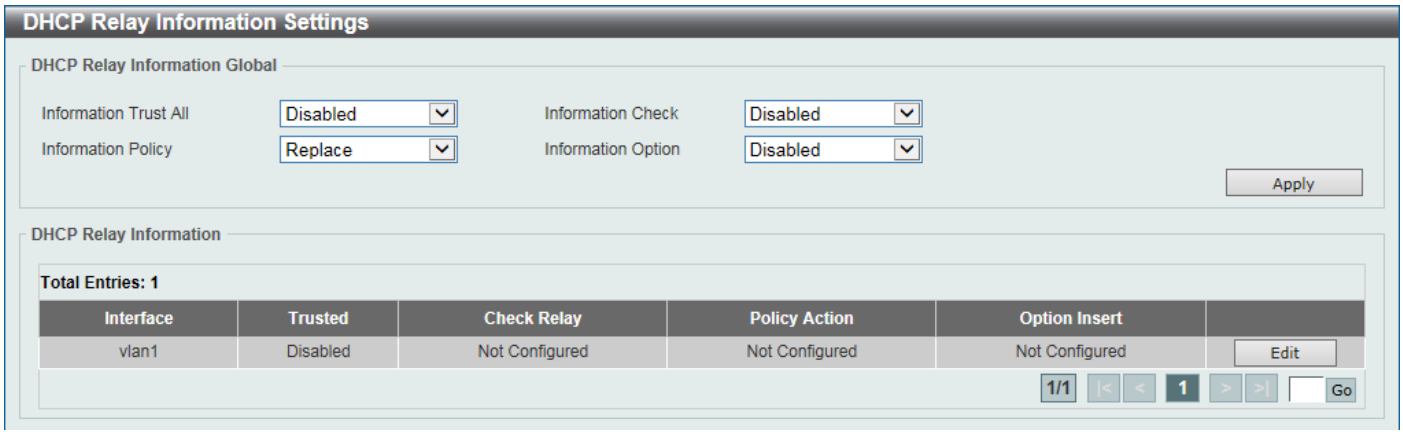


Figure 4-56 DHCP Relay Information Settings Window

The fields that can be configured are described below:

Parameter	Description
Information Trust All	Select this option to enable or disable the DHCP relay agent to trust the IP DHCP relay information for all interfaces.
Information Check	Select this option to enable or disable the DHCP relay agent to validate and remove the relay agent information option in the received DHCP reply packet.
Information Policy	Select the Option 82 re-forwarding policy for the DHCP relay agent. Options to choose from are: • **Keep** - Select to keep the packet that already has the relay option. The packet is left unchanged and directly relayed to the DHCP server. • **Drop** - Select to discard the packet that already has the relay option. • **Replace** - Select to replace the packet that already has the relay option. The packet will be replaced with a new option.
Information Option	Select this option to enable or disable the insertion of relay agent information (Option 82) during the relay of DHCP request packets.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the corresponding interface.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCP Relay Information Option Format Settings

This window is used to display and configure the DHCP information format.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Information Option Format Settings**, as shown below:

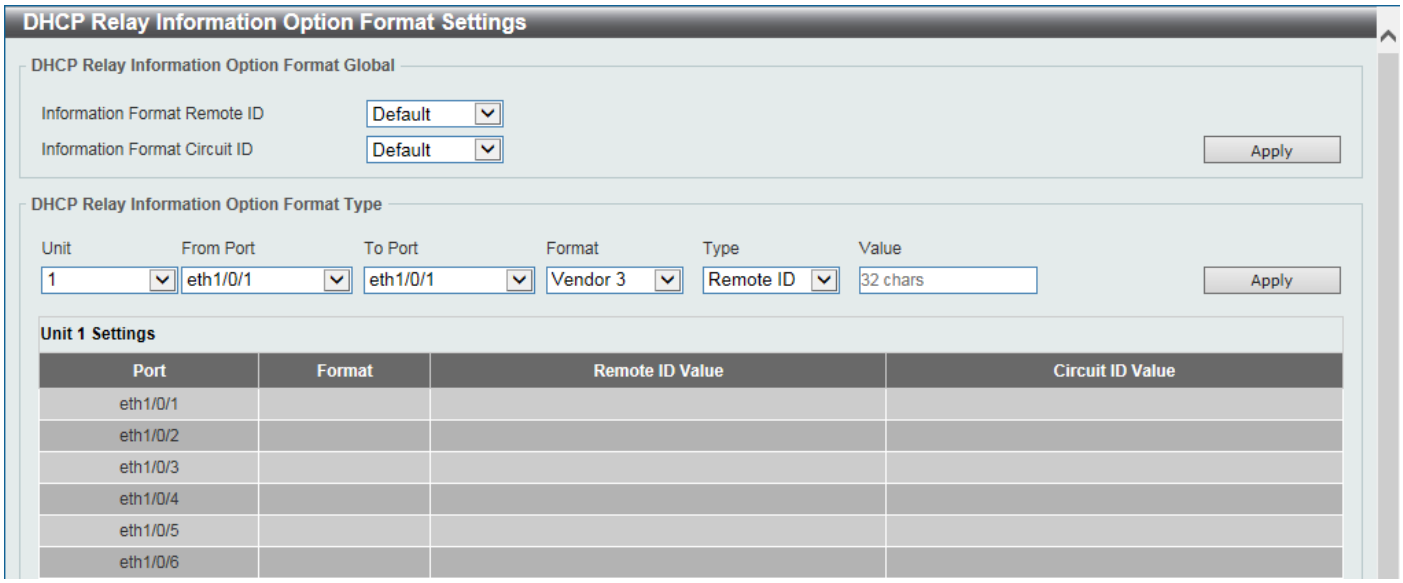


Figure 4-57 DHCP Relay Information Option Format Settings Window

The fields that can be configured in **DHCP Relay Information Option Format Global** are described below:

Parameter	Description
Information Format Remote ID	Select the DHCP information remote ID sub-option. Options to choose from are: • **Default** - Select to use the Switch's system MAC address as the remote ID. • **User Define** - Select to use a user-defined remote ID. ○ Enter the user-defined string in the text box. This can be up to 32 characters long. • **Vendor 2** - Select to use vendor 2 as the remote ID. • **Vendor 3** - Select to use vendor 3 as the remote ID.
Information Format Circuit ID	Select the DHCP information circuit ID sub-option. Options to choose from are: • **Default** - Select to use the default circuit ID sub-option. • **User Define** - Select to use a user-defined circuit ID. ○ Enter the user-defined string in the text box. This can be up to 32 characters long. • **Vendor 1** - Select to use vendor 1 as the circuit ID. • **Vendor 2** - Select to use vendor 2 as the circuit ID. • **Vendor 3** - Select to use vendor 3 as the circuit ID. • **Vendor 4** - Select to use vendor 4 as the circuit ID. • **Vendor 5** - Select to use vendor 5 as the circuit ID. • **Vendor 6** - Select to use vendor 6 as the circuit ID.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DHCP Relay Information Option Format Global** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Parameter	Description
From Port - To Port	Select the range of ports that will be used for this configuration here.
Format	Displays the format that will be used.
Type	Select to use the **Remote ID** type or **Circuit ID** type here.
Value	Enter the vendor-defined string for Option 82 information in the remote/circuit ID sub-option here. This string can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

DHCP Relay Port Settings

This window is used to display and configure the DHCP relay port settings.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Port Settings**, as shown below:

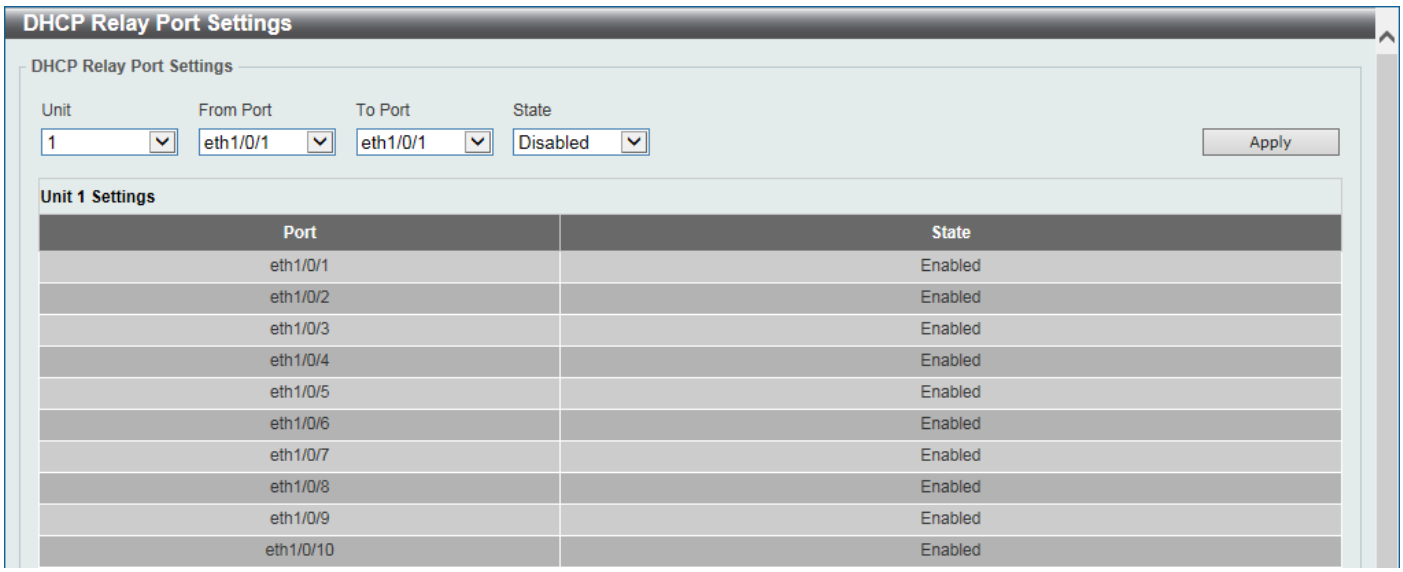


Figure 4-58 DHCP Relay Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the DHCP Relay feature.

Click the **Apply** button to accept the changes made.

DHCP Local Relay VLAN

This window is used to display and configure local relay on a VLAN or a group of VLANs.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Local Relay VLAN**, as shown below:

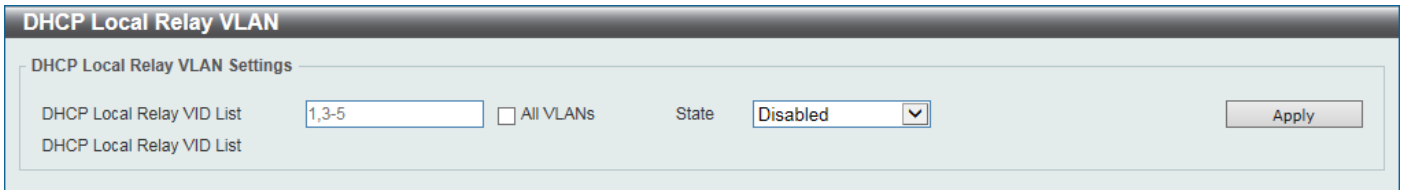


Figure 4-59 DHCP Local Relay VLAN Window

The fields that can be configured are described below:

Parameter	Description
DHCP Local Relay VID List	Enter the VLAN ID for DHCP local relay. Select the **All VLANs** check box to select all VLANs.
State	Select this option to enable or disable the DHCP local relay on the specific VLAN(s).

Click the **Apply** button to accept the changes made.

NOTE: When the state of the DHCP relay port is disabled, the port will not relay or locally relay received DHCP packets.

DHCPv6 Relay

DHCPv6 Relay Global Settings

This window is used to display and configure the DHCPv6 Relay remote ID settings.

To view the following window, click **Management > DHCP > DHCPv6 Relay > DHCPv6 Relay Global Settings**, as shown below:

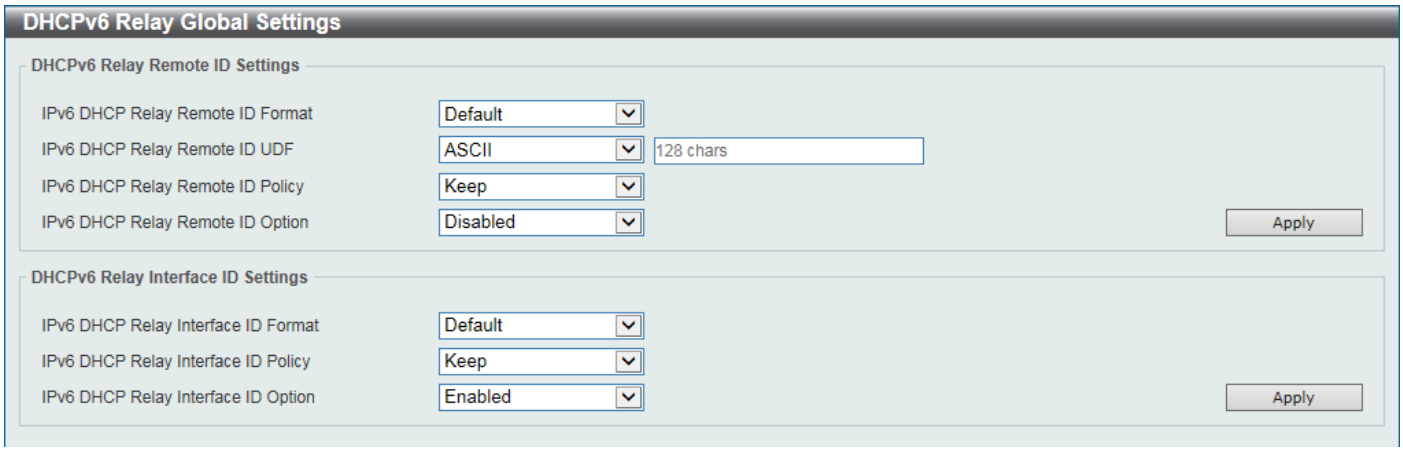


Figure 4-60 DHCPv6 Relay Global Settings Window

The fields that can be configured in **DHCPv6 Relay Remote ID Settings** are described below:

Parameter	Description
IPv6 DHCP Relay Remote ID Format	Select the IPv6 DHCP Relay remote ID format that will be used here. Options to choose from are **Default**, **CID with User Define**, and **User Define**.
IPv6 DHCP Relay Remote ID UDF	Select to choose the User Define Field (UDF) for the remote ID. Options to choose from are: • **None** - Specifies to keep the UDF empty for the remote ID. • **ASCII** - Select to enter the ASCII string with a maximum of 128 characters in the text box. • **HEX** - Select to enter the hexadecimal string with a maximum of 256 characters in the text box.
IPv6 DHCP Relay Remote ID Policy	Select to choose Option 37 forwarding policy for the DHCPv6 relay agent. Options to choose from are: • **Keep** - Select that the DHCPv6 request packet that already has the relay agent Remote-ID option is left unchanged and directly relayed to the DHCPv6 server. • **Drop** - Select to discard the packet that already has the relay agent Remote-ID Option 37.
IPv6 DHCP Relay Remote ID Option	Select this option to enable or disable the insertion of the relay agent remote ID Option 37 during the relay of DHCP for IPv6 request packets.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DHCPv6 Relay Interface ID Settings** are described below:

Parameter	Description
IPv6 DHCP Relay Interface ID Format	Select the IPv6 DHCP relay interface ID format that will be used here. Options to choose from are **Default**, **CID**, and **Vendor 1**.
IPv6 DHCP Relay Interface ID Policy	Select the Option 18 re-forwarding policy for the DHCPv6 relay agent here. Options to choose from are: • **Keep** - Specifies that the DHCPv6 request packets that already contain the relay agent interface ID option are left unchanged and directly relay to the DHCPv6 server. • **Drop** - Specifies to discard the packets that already contain the relay agent interface ID Option 18.
IPv6 DHCP Relay Interface ID Option	Select to enable or disable the insertion of the relay agent interface ID Option 18 during the relay of DHCP for IPv6 request packets.

Click the **Apply** button to accept the changes made.

DHCPv6 Relay Interface Settings

This window is used to display and configure the DHCPv6 relay interface settings.

To view the following window, click **Management > DHCP > DHCPv6 Relay > DHCPv6 Relay Interface Settings**, as shown below:

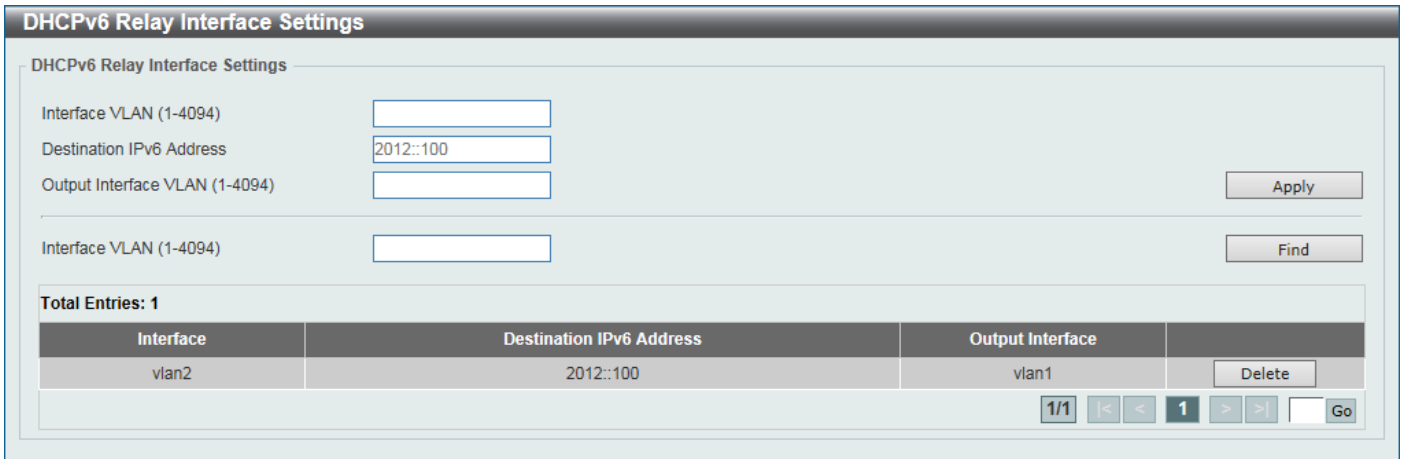


Figure 4-61 DHCPv6 Relay Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the interface VLAN ID used in the DHCPv6 relay here. The range is from 1 to 4094.
Destination IPv6 Address	Enter the DHCPv6 relay destination address.
Output Interface VLAN	Enter the output interface VLAN ID for the relay destination here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCPv6 Relay Port Settings

This window is used to display and configure the DHCPv6 relay port settings.

To view the following window, click **Management > DHCP > DHCPv6 Relay > DHCPv6 Relay Port Settings**, as shown below:

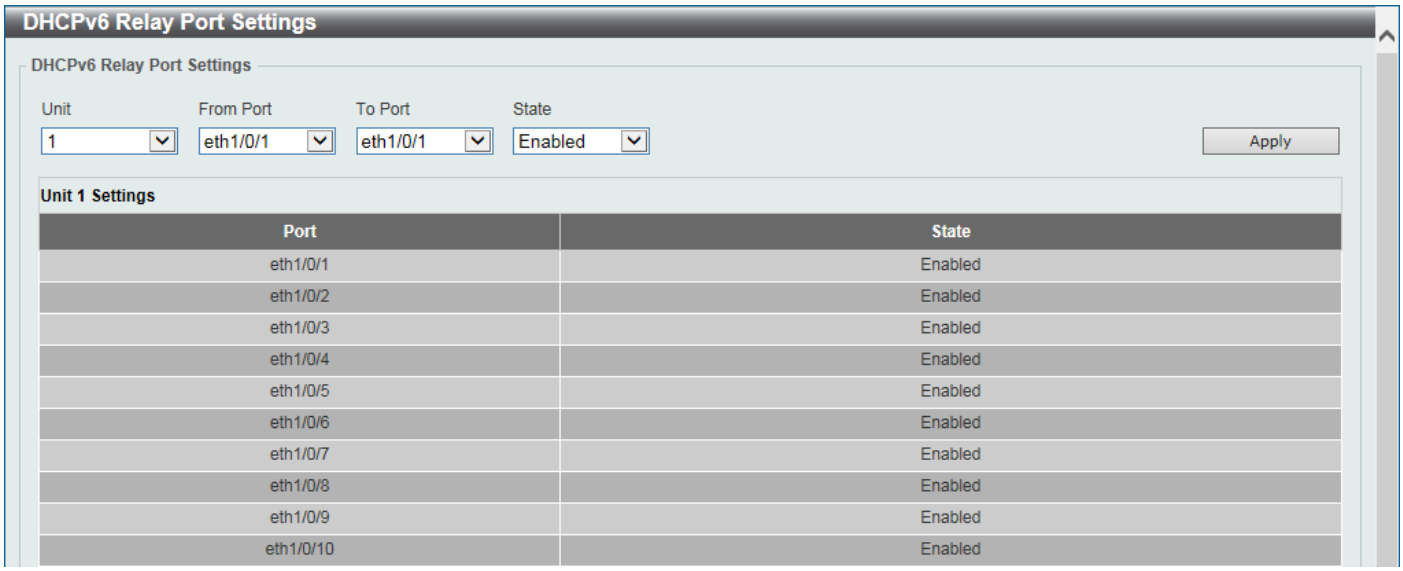


Figure 4-62 DHCPv6 Relay Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the DHCPv6 relay port feature.

Click the **Apply** button to accept the changes made.

DHCPv6 Local Relay VLAN

This window is used to display and configure the DHCPv6 local relay VLAN settings. When DHCPv6 local relay is enabled, it will add Option 37 and Option 18 to the request packets from the client. If the check state of Option 37 is enabled, it will check the request packet from the client and drop the packet if it contains the Option 37 DHCPv6 relay function. If disabled, the local relay function will always add Option 37 to request packets, whether the state of Option 37 is enabled or disabled. The DHCPv6 local relay function will directly forward the packet from the server to the client.

To view the following window, click **Management > DHCP > DHCPv6 Relay > DHCPv6 Local Relay VLAN**, as shown below:

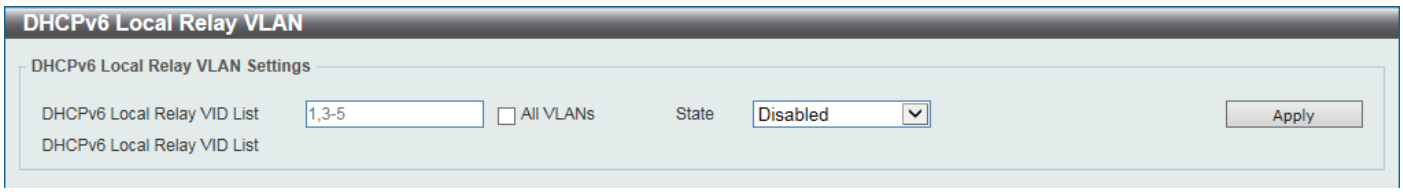


Figure 4-63 DHCPv6 Local Relay VLAN Window

The fields that can be configured are described below:

Parameter	Description
DHCPv6 Local Relay VID List	Enter the DHCPv6 local relay VLAN ID(s) here. More than one VLAN ID can be entered here. Select the **All VLANs** option to apply this setting on all configured VLANs on this Switch.
State	Select to enable or disable the DHCPv6 local relay feature on the specified VLAN(s) here.

Click the **Apply** button to accept the changes made.

NOTE: When the state of the DHCPv6 relay port is disabled, the port will not relay or locally relay received DHCPv6 packets.

DHCPv6 LDRA

DHCPv6 LDRA Global Settings

This window is used to configure the Lightweight DHCPv6 Relay Agent (LDRA) functionality on an access node.

To view the following window, click **Management > DHCP > DHCPv6 LDRA > DHCPv6 LDRA Global Settings**, as shown below:

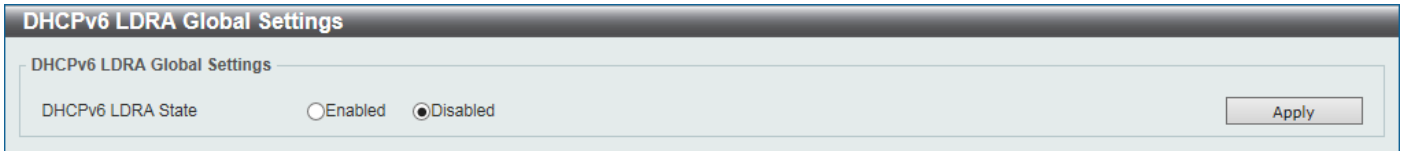


Figure 4-64 DHCPv6 LDRA Global Settings Window

The fields that can be configured in **DHCP Use Class State** are described below:

Parameter	Description
DHCPv6 LDRA State	Select to enable or disable the DHCPv6 LDRA State here.

Click the **Apply** button to accept the changes made.

DHCPv6 LDRA Port Settings

This window is used to configure the attach policy settings on ports.

To view the following window, click **Management > DHCP > DHCPv6 LDRA > DHCPv6 LDRA Port Settings**, as shown below:

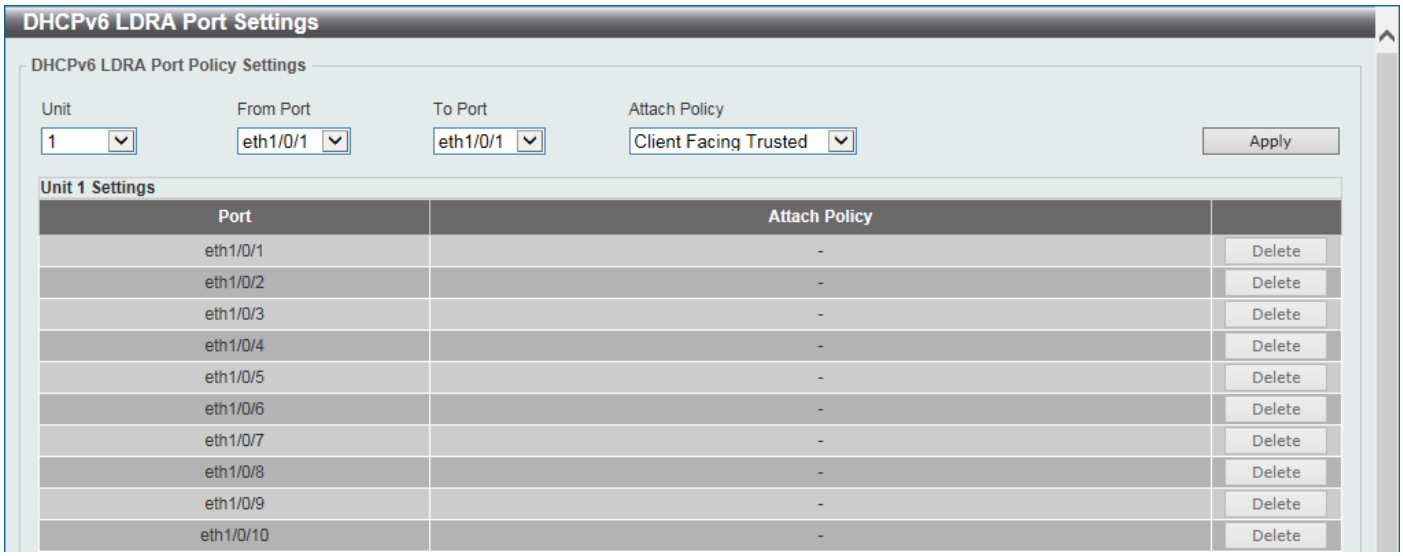


Figure 4-65 DHCPv6 LDRA Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Attach Policy	Select the attach policy to be used for the specified port(s). Options to choose from are **Client Facing Trusted**, **Client Facing Untrusted**, **Client Facing Disable**, and **Server Facing**.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the attach policy of the specified port.

DHCPv6 LDRA VLAN Settings

This window is used to configure the attach policy settings on VLAN.

To view the following window, click **Management > DHCP > DHCPv6 LDRA > DHCPv6 LDRA VLAN Settings**, as shown below:

Figure 4-66 DHCPv6 LDRA VLAN Settings Window

The fields that can be configured are described below:

Parameter	Description
DHCPv6 LDRA VID List	Select the Switch unit that will be used for this configuration here.
Attach Policy	Select the attach policy to be used for the specified port(s). Options to choose from are **Client Facing Trusted** and **Client Facing Untrusted**.

Click the **Apply** button to accept the changes made.

Click the **Find** button to find and display the DHCPv6 LDRA VLAN in the table.

Click the **Show All** button to display all the DHCPv6 LDRA VLANs in the table.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCP Auto Configuration

This window is used to display and configure the DHCP auto-configuration function.

To view the following window, click **Management > DHCP Auto Configuration**, as shown below:

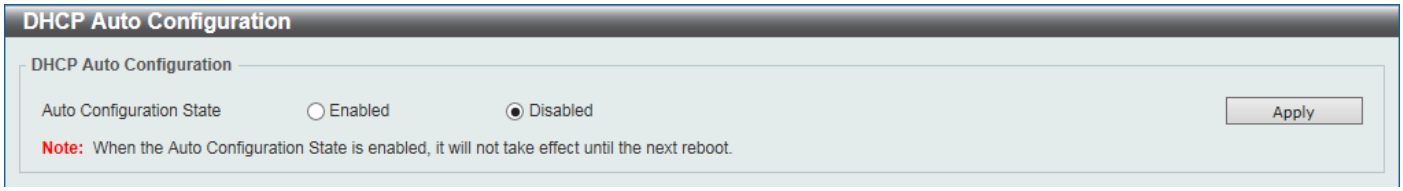


Figure 4-67 DHCP Auto Configuration Window

The fields that can be configured are described below:

Parameter	Description
Auto Configuration State	Select this option to enable or disable the auto-configuration function.

Click the **Apply** button to accept the changes made.

DHCP Auto Image Settings

This window is used to display and configure the DHCP auto-image settings. During the start-up time of a Switch, this function provides the capability of obtaining the image file form an external TFTP server whose IP address and file name is carried in the *DHCP OFFER* message received from the DHCP server. The system then uses this image file as the boot-up image. When the system boots up and the auto-image function is enabled, the Switch becomes a DHCP client automatically.

The DHCP client will be activated to get the network settings from the DHCP server and the DHCP server includes the TFTP server IP address and image filename with the message. The Switch then receives this information and triggers the TFTP downloading function from the specified TFTP server. At this stage, the system will display the download configuration parameters on the console. The layout is the same as using the **download firmware** command. After the firmware download was completed, the Switch will then reboot immediately.

If both the auto-configuration and auto-image features are enabled at the same time, system will download the image file first and then download the configuration. After this, the Switch will then save the configuration and reboot.

The Switch will always check the downloaded firmware. If the version is the same as the current running firmware, the Switch will terminate the auto-image process. The downloaded configuration, however, will still be executed if the auto-configuration feature is also enabled.

This function is similar to the auto-configuration function. Both the image file and the configuration file must be placed on the same TFTP server, as the DHCP option fields are not only used in the auto-image feature, but also in the auto-configuration feature. The TFTP server IP address is still placed in the DHCP *siaddr* fields Option 66 or Option 150. If Option 66, Option 150 and the *siaddr* fields exist in the DHCP response message at the same time, the Option 150 will be resolved first. If the system fails to connect to the TFTP server, then the system will resolve the Option 66, and if the system still fails to connect the TFTP server, the *siaddr* field is the last choice.

When the Switch uses Option 66 to get the TFTP server name, it resolves Option 6 first to get the DNS server IP address. If the Switch fails to connect to the DNS server or Option 6 does not exist in the response message, the Switch will try to connect the DNS server already configured in the system manually.

Option 67 is used to identify the boot file when the 'file' field in the DHCP header has been used for DHCP options. This can only be used in the DHCP auto-configuration mode and not the DHCP auto-image mode. For more information, refer to RFC 2132. When specifying the image file name, the DHCP Option 125 (RFC 3925) must be used. The Switch needs to check the *enterprise-number1* field. If the value is not the D-Link vendor ID (171), the Switch will stop the process. If the Option contains more than one field, only the first entry *enterprise-number1* will be used.

To view the following window, click **Management > DHCP Auto Image Settings**, as shown below:

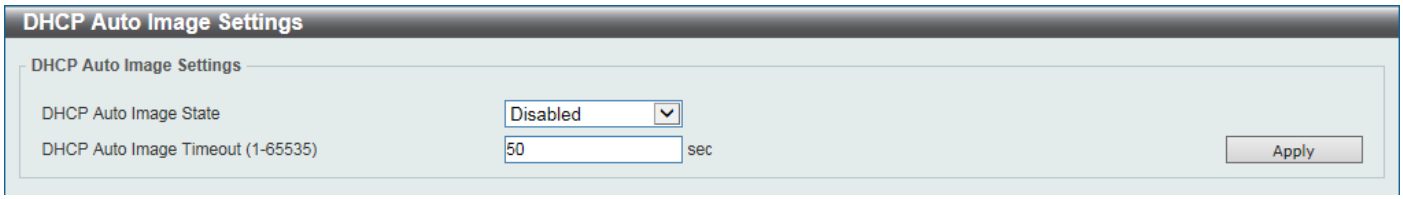


Figure 4-68 DHCP Auto Image Settings Window

The fields that can be configured are described below:

Parameter	Description
DHCP Auto Image State	Select to enable or disable the DHCP auto-image feature here.

Parameter	Description
DHCP Auto Image Timeout	Enter the timeout value of the DHCP auto-image feature here. The range is from 1 to 65535 seconds.

Click the **Apply** button to accept the changes made.

DNS

The Domain Name System (DNS) is used to map human-readable domain names to the IP addresses used by computers to communicate. A DNS server performs name-to-address translation, and may need to contact several name servers to translate a domain to an address. The address of the machine that supplies domain name service is often supplied by a DHCP or BOOTP server, or can be entered manually and configured into the operating system at startup.

DNS Global Settings

This window is used to display and configure the global DNS settings.

To view the following window, click **Management > DNS > DNS Global Settings**, as shown below:

Figure 4-69 DNS Global Settings Window

The fields that can be configured are described below:

Parameter	Description
IP DNS Lookup Static State	Select to enable or disable the IP DNS lookup static state here.
IP DNS Lookup Cache State	Select to enable or disable the IP DNS lookup cache state here.
IP Domain Lookup	Select to enable or disable the IP domain lookup state here.
IP Name Server Timeout	Enter the maximum time to wait for a response from a specified name server. The range is from 1 to 60 seconds.
IP DNS Server	Select to globally enable or disable the DNS server feature here.

Click the **Apply** button to accept the changes made.

DNS Name Server Settings

This window is used to display and configure the IP address of a domain name server.

To view the following window, click **Management > DNS > DNS Name Server Settings**, as shown below:

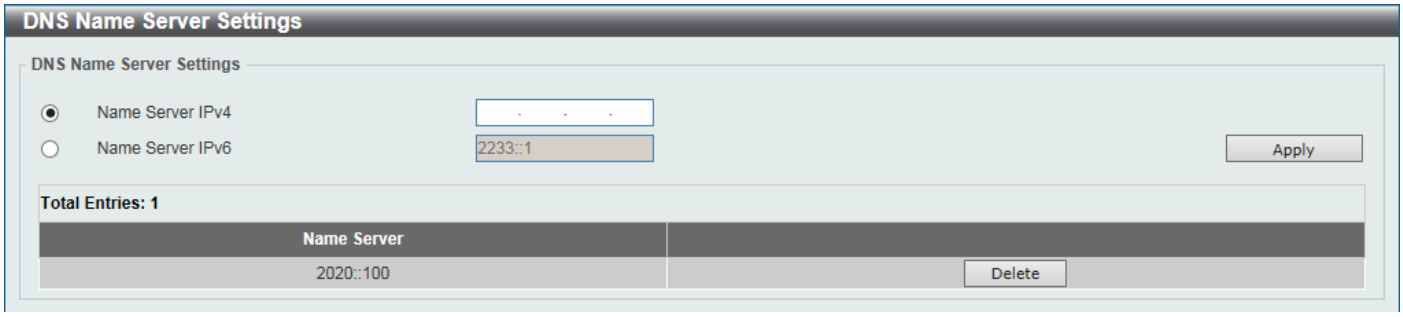


Figure 4-70 DNS Name Server Settings Window

The fields that can be configured are described below:

Parameter	Description
Name Server IPv4	Select and enter the IPv4 address of the DNS server.
Name Server IPv6	Select and enter the IPv6 address of the DNS server.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

DNS Host Settings

This window is used to display and configure the static mapping entry for the host name and the IP address in the host table.

To view the following window, click **Management > DNS > DNS Host Settings**, as shown below:

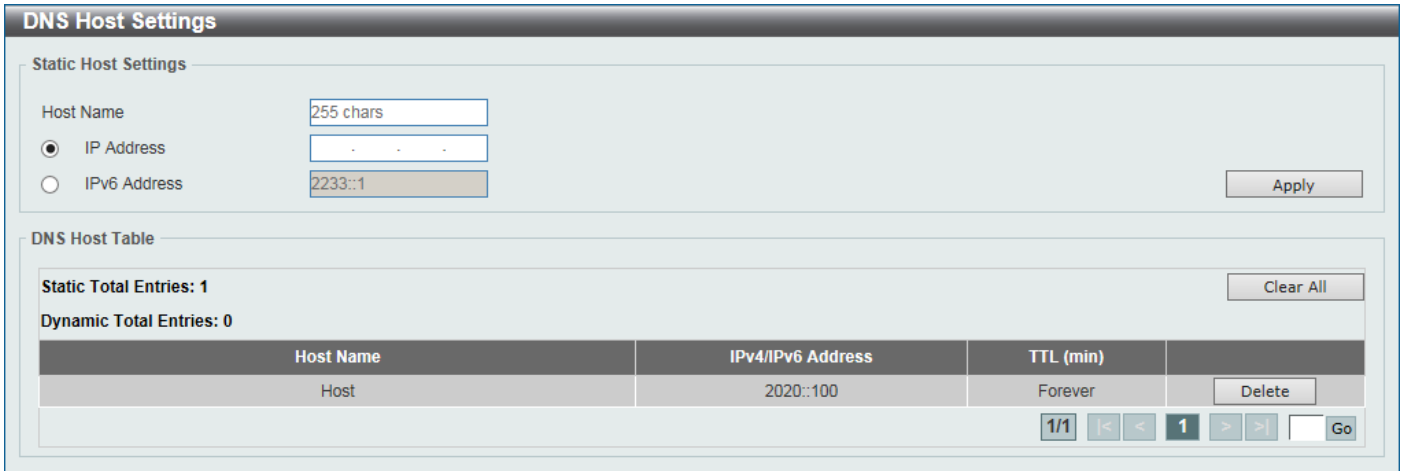


Figure 4-71 DNS Host Settings Window

The fields that can be configured are described below:

Parameter	Description
Host Name	Enter the host name of the equipment.
IP Address	Select and enter the IPv4 address of the equipment.

Parameter	Description
IPv6 Address	Select and enter the IPv6 address of the equipment.

Click the **Apply** button to accept the changes made.

Click the **Clear All** button to clear the information entered in all the fields on this page.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

NTP

NTP Global Settings

This window is used to display and configure the global Network Time Protocol (NTP) settings.

To view the following window, click **Management > NTP > NTP Global Settings**, as shown below:

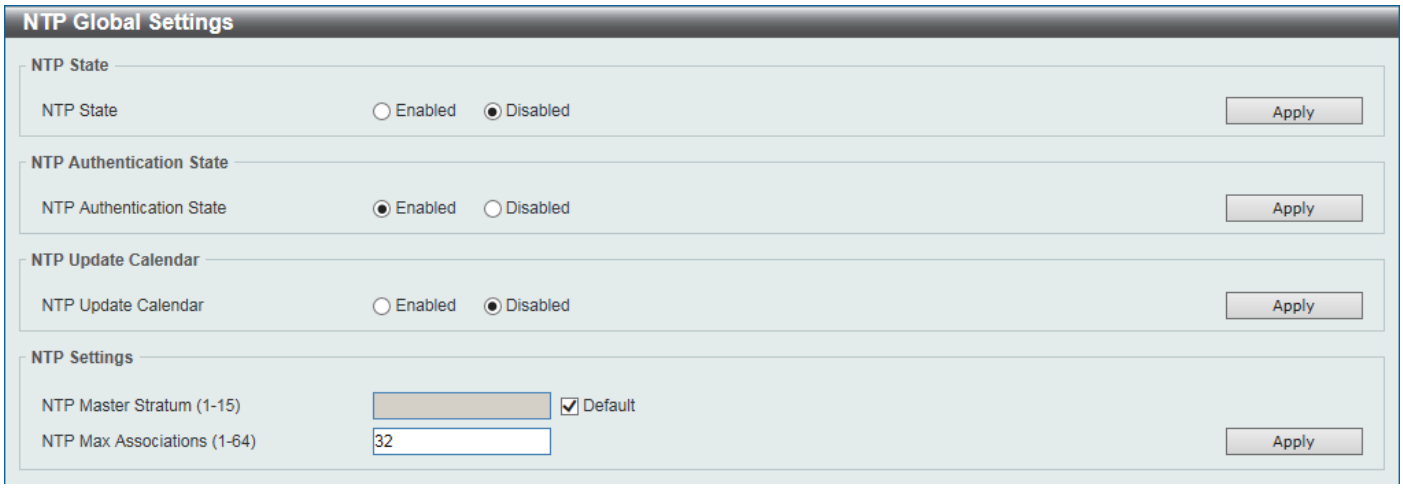


Figure 4-72 NTP Global Settings Window

The fields that can be configured in **NTP State** are described below:

Parameter	Description
NTP State	Select to globally enable or disable the NTP feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **NTP Authentication State** are described below:

Parameter	Description
NTP Authentication State	Select to enable or disable the NTP authentication state here. When this feature is enabled, networking nodes will not synchronize with the Switch unless it carries one of the authentication keys.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **NTP Update Calendar** are described below:

Parameter	Description
NTP Update Calendar	Select to enable or disable the NTP update calendar feature here. This is used to periodically update the hardware clock from an NTP source.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **NTP Settings** are described below:

Parameter	Description
NTP Master Stratum	Enter the NTP master stratum value here. This is used to configure the Real-Time Clock (RTC) as an NTP master clock when an external NTP is not available. The range is from 1 to 15. Select the **Default** option to use the default value.
NTP Max Associations	Enter the NTP maximum association value here. This is used to configure the maximum number of NTP peers and clients on the Switch. The range is from 1 to 64.

Click the **Apply** button to accept the changes made.

NTP Server Settings

This window is used to display and configure the NTP server settings. This is used to enable the Switch to synchronize time with an NTP server.

To view the following window, click **Management > NTP > NTP Server Settings**, as shown below:

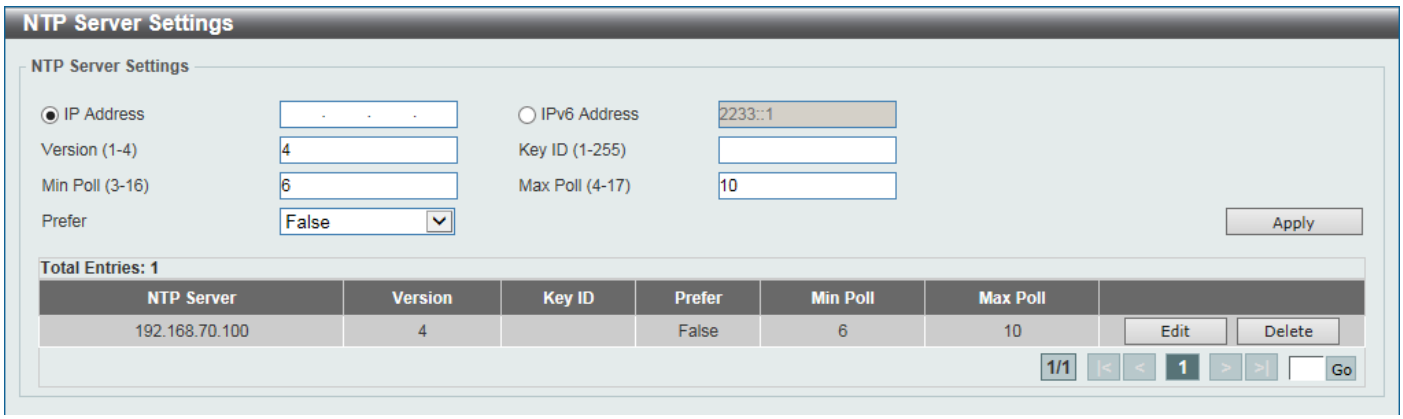


Figure 4-73 NTP Server Settings Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Select and enter the IPv4 address of the NTP server here.
IPv6 Address	Select and enter the IPv6 address of the NTP server here.
Version	Enter the NTP version number here. The range is from 1 to 4.
Key ID	Enter the authentication key ID here. The range is from 1 to 255.
Min Poll	Enter the minimum poll value here. This specifies the minimum poll interval for NTP messages. This value is calculated as 2 to the power of the minimum poll interval value specified. For example, if the value specified here is 6, the minimum poll interval that will be used is 64 seconds (2^6=64). The range is from 3 to 16.
Max Poll	Enter the maximum poll value here. This specifies the maximum poll interval for NTP messages. This value is calculated as 2 to the power of the maximum poll interval value specified. For example, if the value specified here is 6, the maximum poll interval that will be used is 64 seconds (2^6=64). The range is from 4 to 17.

Parameter	Description
Prefer	Select whether or not this entry will be the preferred server for synchronization. Options to choose from are **True** and **False**.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

NTP Peer Settings

This window is used to display and configure the NTP peer settings.

To view the following window, click **Management > NTP > NTP Peer Settings**, as shown below:

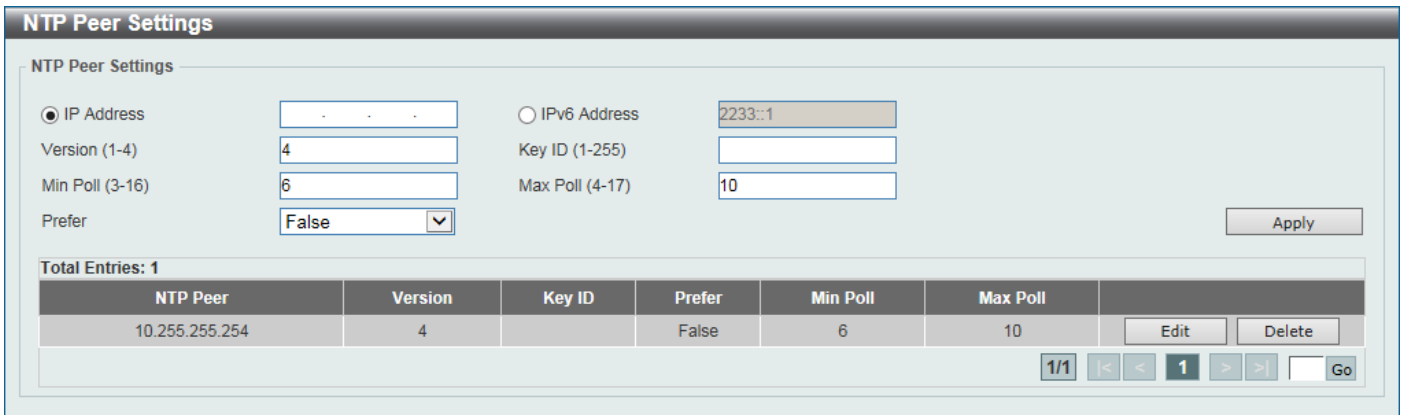


Figure 4-74 NTP Peer Settings Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Select and enter the IPv4 address of the NTP peer here.
IPv6 Address	Select and enter the IPv6 address of the NTP peer here.
Version	Enter the NTP version number here. The range is from 1 to 4.
Key ID	Enter the authentication key ID here. The range is from 1 to 255.
Min Poll	Enter the minimum poll value here. This specifies the minimum poll interval for NTP messages. This value is calculated as 2 to the power of the minimum poll interval value specified. For example, if the value specified here is 6, the minimum poll interval that will be used is 64 seconds (2^6=64). The range is from 3 to 16.
Max Poll	Enter the maximum poll value here. This specifies the maximum poll interval for NTP messages. This value is calculated as 2 to the power of the maximum poll interval value specified. For example, if the value specified here is 6, the maximum poll interval that will be used is 64 seconds (2^6=64). The range is from 4 to 17.
Prefer	Select whether or not this entry will be the preferred peer for synchronization. Options to choose from are **True** and **False**.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

NTP Access Group Settings

This window is used to display and configure the NTP access group settings. The NTP implements a general purpose Access Control List (ACL) containing address/match entries sorted first by increasing address values and then by increasing mask values. A match occurs when the bitwise AND of the mask and the packet source address is equal to the bitwise AND of the mask and address in the list. The list is searched in order with the last match found defining the restriction flags associated with the entry.

To view the following window, click **Management > NTP > NTP Access Group Settings**, as shown below:

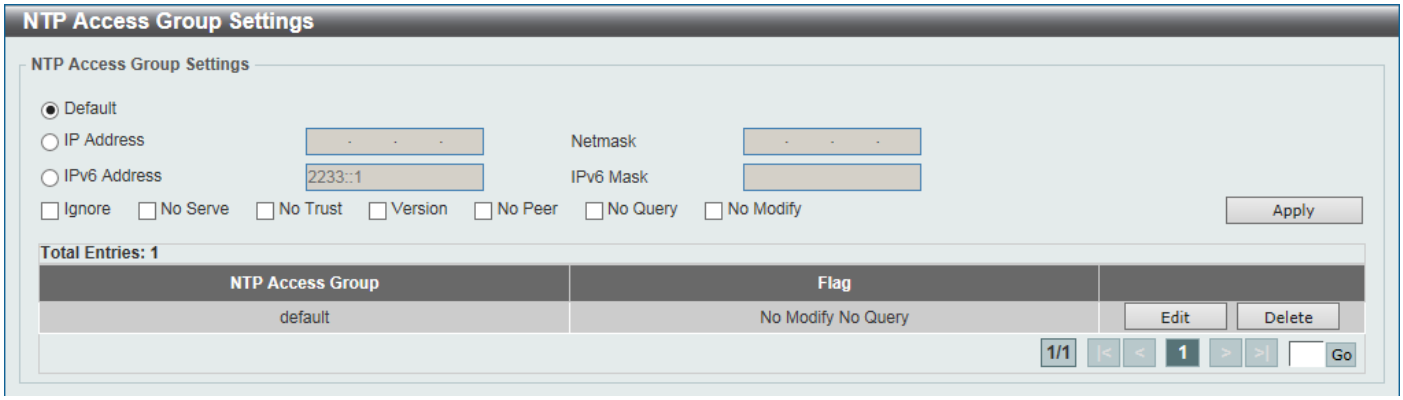


Figure 4-75 NTP Access Group Settings Window

The fields that can be configured are described below:

Parameter	Description
Default	Select this option to specify to use the default IPv4 (0.0.0.0/0.0.0.0) or IPv6 (::/::) address. The default IP address is always included with the lowest priority in the list.
IP Address	Select and enter the host IPv4 address here.
Netmask	Enter the IPv4 netmask of the host network here.
IPv6 Address	Select and enter the host IPv6 address here.
IPv6 Mask	Enter the IPv6 prefix length of the host network here.
Ignore	Select this option to deny all packets, including NTP control queries.
No Serve	Select this option to deny all packets except NTP control queries.
No Trust	Select this option to deny packets that are not cryptographically authenticated.
Version	Select this option to deny packets that mismatch the current NTP version.
No Peer	Select this option to deny packets that might mobilize an association unless authenticated. The packets include broadcast, symmetric-active and many cast server packets when a configured association does not exist. Note that this flag does not apply to packets that do not attempt to mobilize an association.
No Query	Select this option to deny all NTP control queries.
No Modify	Select this option to deny the NTP control queries that attempt to modify the state of the server.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

NTP Key Settings

This window is used to display and configure the NTP key settings.

To view the following window, click **Management > NTP > NTP Key Settings**, as shown below:

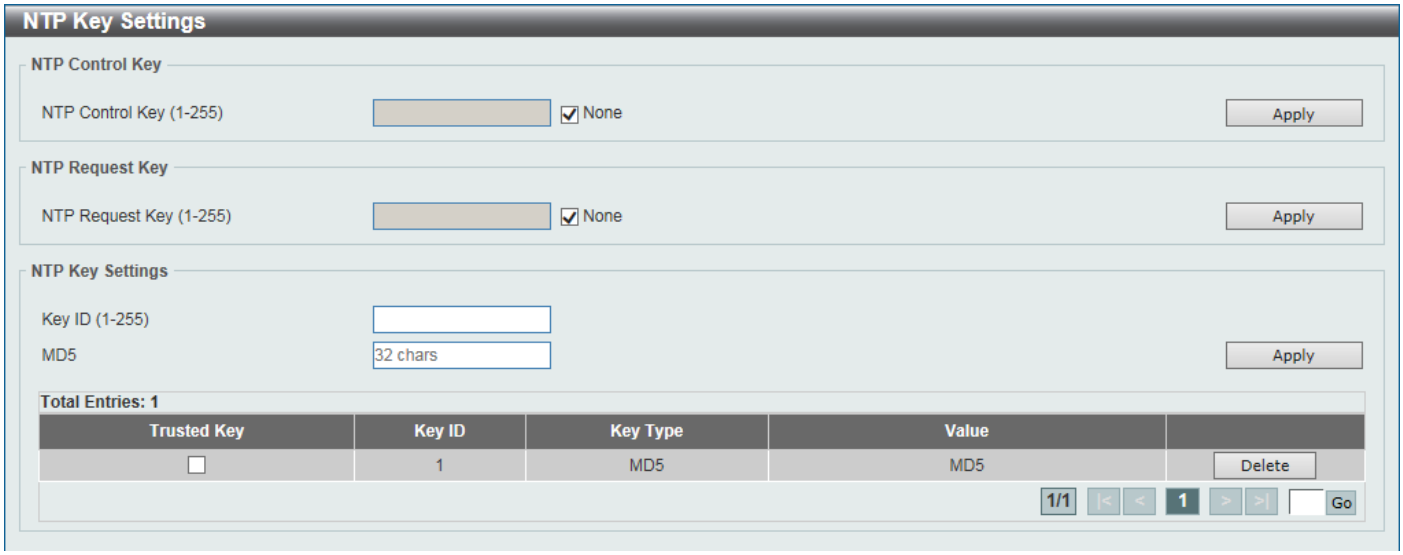


Figure 4-76 NTP Key Settings Window

The fields that can be configured in **NTP Control Key** are described below:

Parameter	Description
NTP Control Key	Enter the NTP control key here. This is used to define the key ID for the NTP control messages. The range is from 1 to 255. Select the **None** option to disable this feature.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **NTP Request Key** are described below:

Parameter	Description
NTP Request Key	Enter the NTP request key here. This is used to define the key ID for NTP mode 7 packets, used by the *ntpdc* utility program. The range is from 1 to 255. Select the **None** option to disable this feature.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **NTP Key Settings** are described below:

Parameter	Description
Key ID	Enter the NTP key ID here. The range is from 1 to 255.
MD5	Enter the MD5 authentication key string here. This string can be up to 32 characters long.
Trusted Key	Select this option to specify that the key for a peer NTP system is trusted for authentication.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

NTP Interface Settings

This window is used to display and configure the NTP interface settings. This is used to either prevent or allow an interface from receiving NTP packets.

To view the following window, click **Management > NTP > NTP Interface Settings**, as shown below:

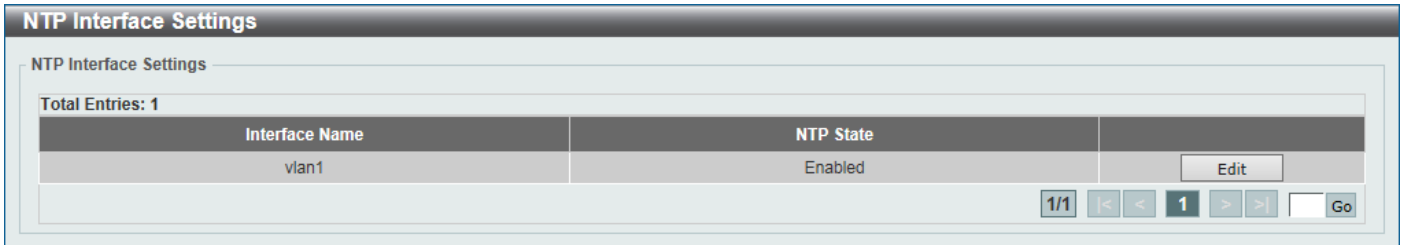


Figure 4-77 NTP Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
NTP State	After click the **Edit** button, select to enable or disable the NTP state for the specified VLAN interface here.

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

NTP Associations

This window is used to view NTP association information.

To view the following window, click **Management > NTP > NTP Associations**, as shown below:

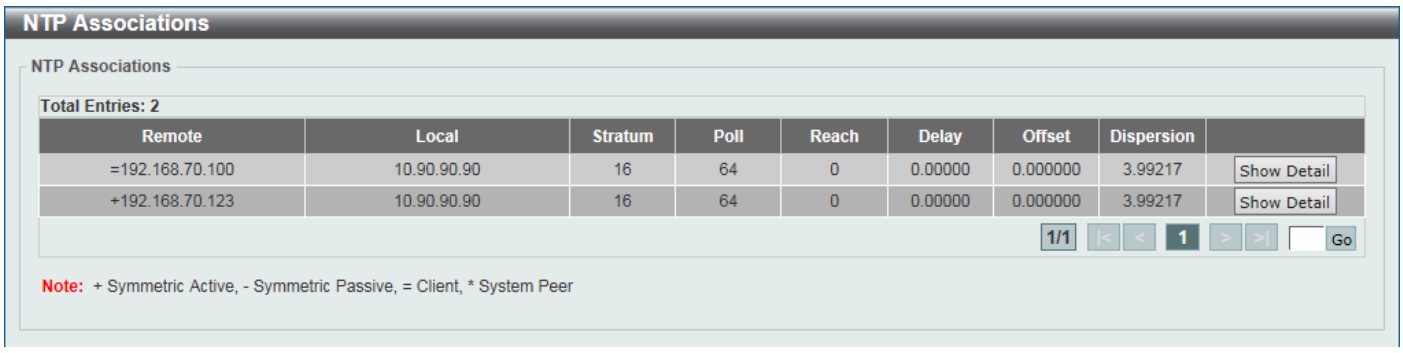


Figure 4-78 NTP Associations Window

Click the **Show Detail** button to view more detailed information about the entry.

After clicking the **Show Detail** button, the following window will appear:

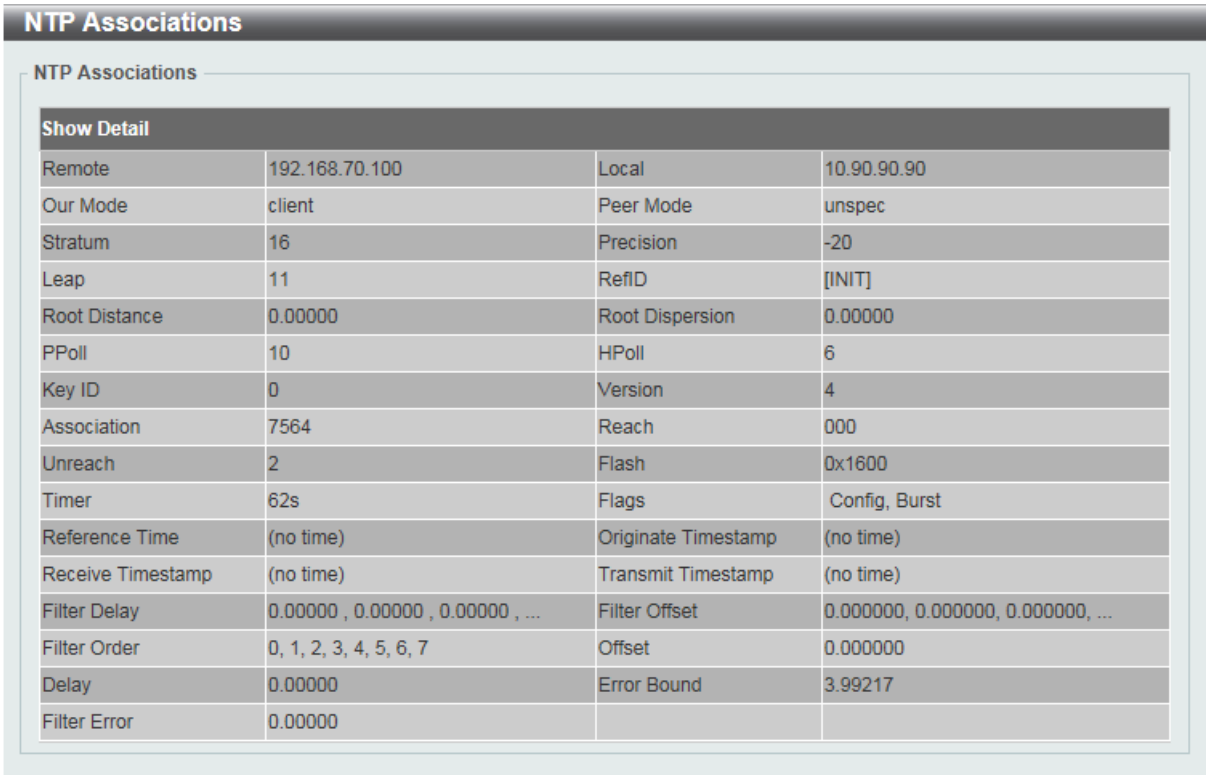


Figure 4-79 NTP Associations (Show Detail) Window

NTP Status

This window is used to view NTP status information.

To view the following window, click **Management > NTP > NTP Status**, as shown below:

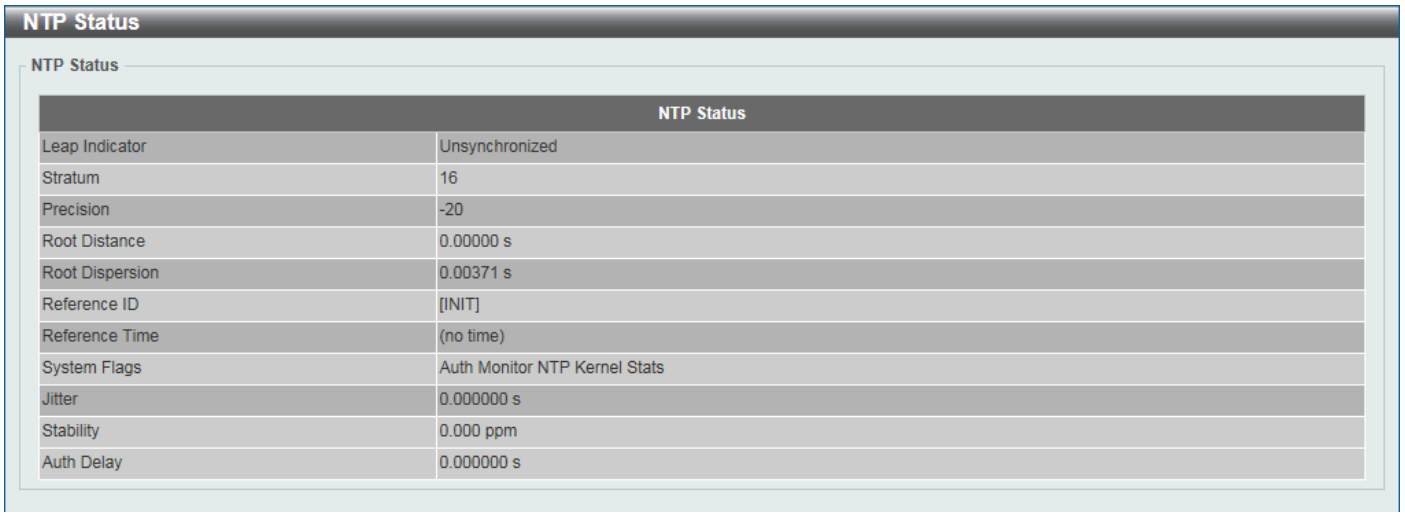


Figure 4-80 NTP Status Window

IP Source Interface

This window is used to display and configure the IP source interface settings.

To view the following window, click **Management > IP Source Interface**, as shown below:

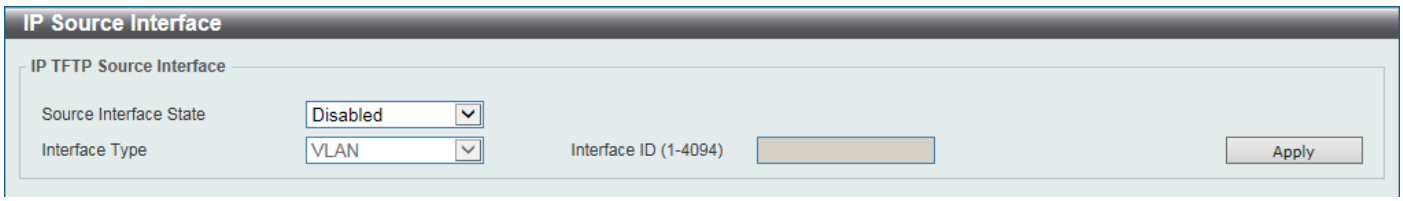


Figure 4-81 IP Source Interface Window

The fields that can be configured are described below:

Parameter	Description
Source Interface State	Select to enable or disable the IP TFTP source interface state here.
Interface Type	After enabling the **Source Interface State** option, select the interface type here. Options to choose from are **Loopback**, **MGMT**, and **VLAN**.
Interface ID	Enter the interface ID here. For loopback interfaces, this value is from 1 to 8. For the management interface (MGMT), this value can only be 0. For VLAN interfaces, this value is from 1 to 4094.

Click the **Apply** button to accept the changes made.

File System

This window is used to view, manage, and configure the Switch file system.

To view the following window, click **Management > File System**, as shown below:

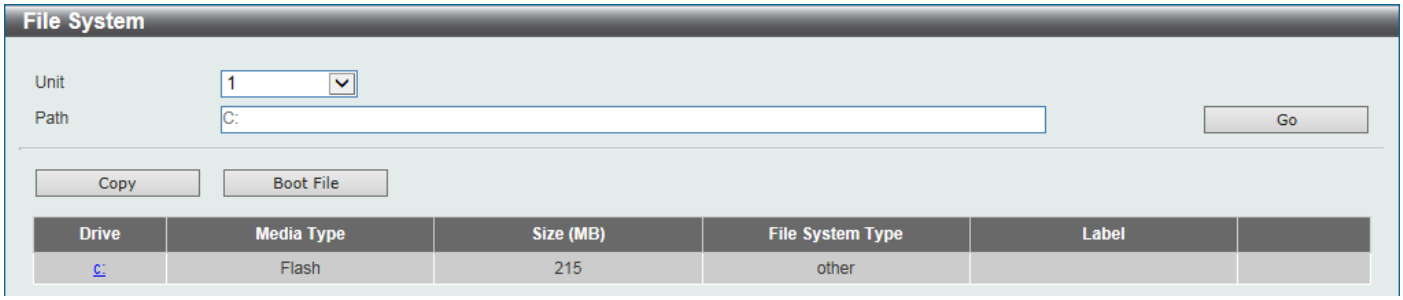


Figure 4-82 File System Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Path	Enter the path string.

Click the **Go** button to navigate to the path entered.

Click the **Copy** button to copy a specific file to the Switch.

Click the **Boot File** button to specify which boot image and configuration to use.

Click the **c:** hyperlink to navigate the C: drive

After clicking the **c:** hyperlink, the following window will appear:

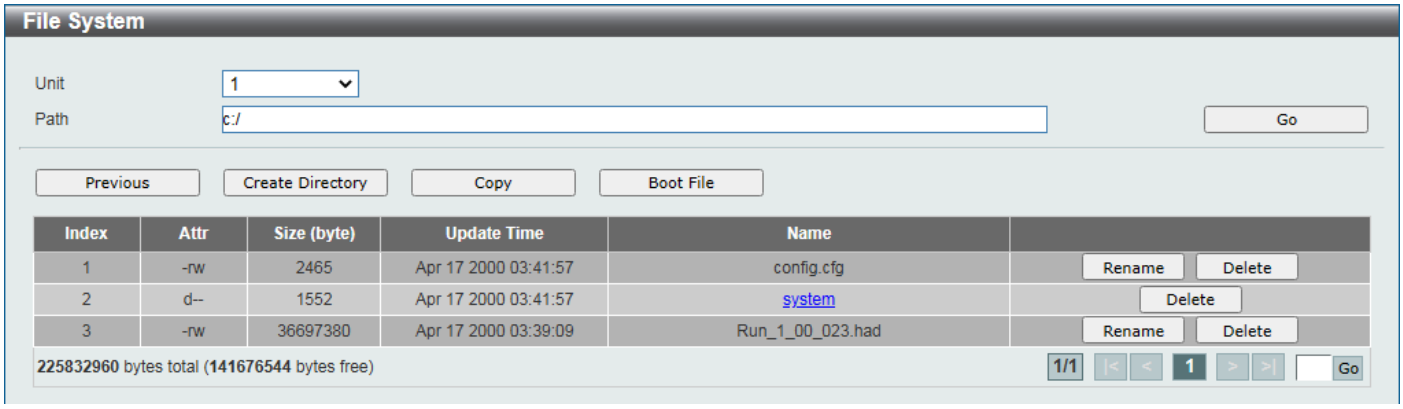


Figure 4-83 File System (Drive) Window

Click the **Go** button to navigate to the path entered.

Click the **Previous** button to return to the previous window.

Click the **Create Directory** to create a new directory within the file system of the Switch.

Click the **Copy** button to copy a specific file to the Switch.

Click the **Boot File** button to specify which boot image and configuration to use.

Click the **Rename** button to rename a specific file name.

Click the **Delete** button to remove a specific file from the file system.

Click the **Copy** button to see the following window.

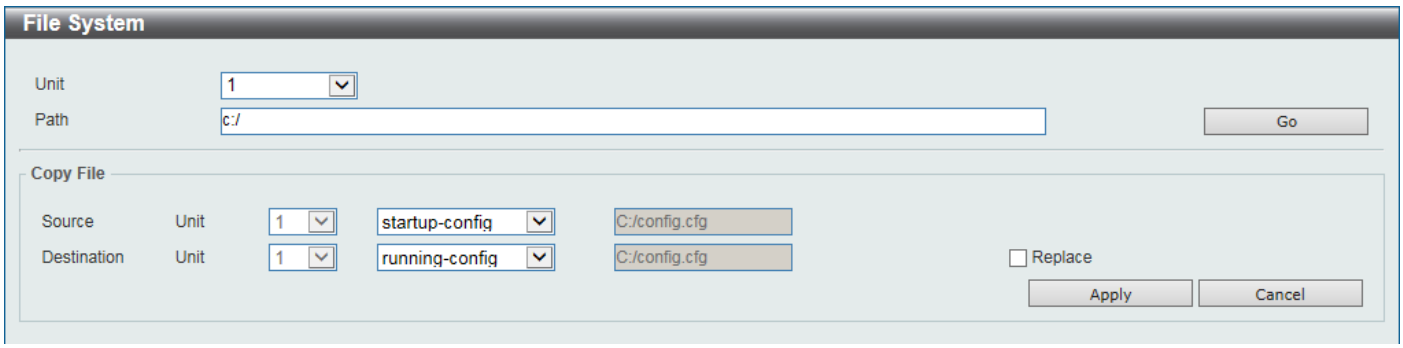


Figure 4-84 File System (Copy) Window

The fields that can be configured in **Copy File** are described below:

Parameter	Description
Source	Select the source Switch **Unit** ID and type of source file that will be copied here. Options to choose from are **startup-config** and **Source File**. Only after selecting the **Source File** option can the source file path and filename be entered in the space provided.
Destination	Select the destination Switch **Unit** ID and type of destination file that will be copied here. Options to choose from are **running-config**, **startup-config**, and **Destination File**. Only after selecting the **Destination File** option can the destination file path and filename be entered in the space provided. Select the **Replace** check box to replace the current running configuration with the indicated configuration file.

Click the **Apply** button to initiate the copy.

Click the **Cancel** button the discard the process.

After clicking the **Boot File** button, the following window will appear.

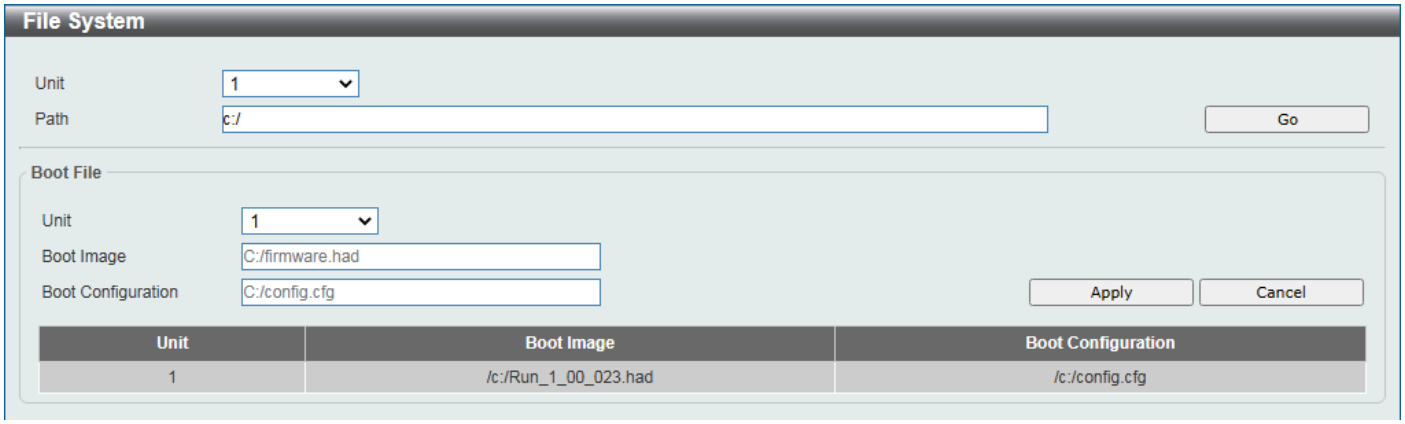


Figure 4-85 File System (Boot File) Window

The fields that can be configured in **Boot File** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Boot Image	Enter the path to the boot image file here.
Boot Configuration	Enter the path to the boot configuration file here.

Click the **Apply** button to accept the changes made.

Click the **Cancel** button the discard the changes made.

Stacking

Switches in the series can be physically stacked by utilizing the last four ports on the front panel of the Switch. It is possible to stack up to nine Switches, which can then be managed through a single connection to any of the LAN ports using Telnet, the Web UI, and SNMP. This cost-effective Switch presents an economical solution for administrators aiming to upgrade their networks, leveraging the stacking ports for scaling and stacking purposes. This ultimately enhances overall reliability, serviceability, and availability.

The Switch supports the following stacking topologies:

- **Duplex Chain** - This topology interconnects Switches in a chain-link format, enabling data transfer in one direction only. A disruption in the chain will impact data transfer.
- **Duplex Ring** - In this topology, Switches form a ring or circle, allowing data transfer in two directions. It is highly robust, as even if the ring is broken, data can still be transmitted via the stacking cables between Switches using an alternative route.

In the following diagram, Switches are stacked in the **Duplex Chain** topology.

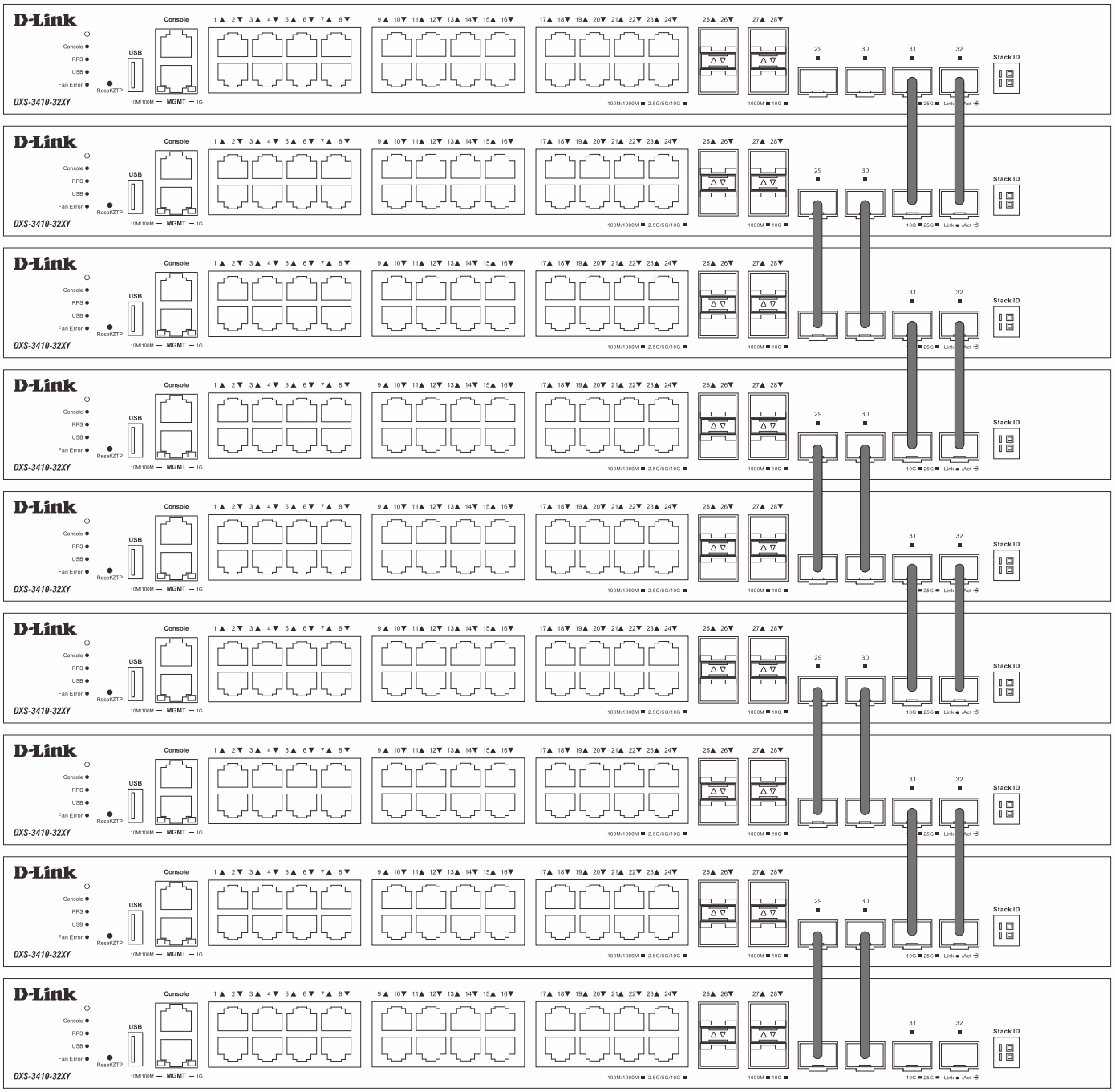


Figure 4-86 Duplex Chain Stacking Topology

In the following diagram, Switches are stacked in the **Duplex Ring** topology.

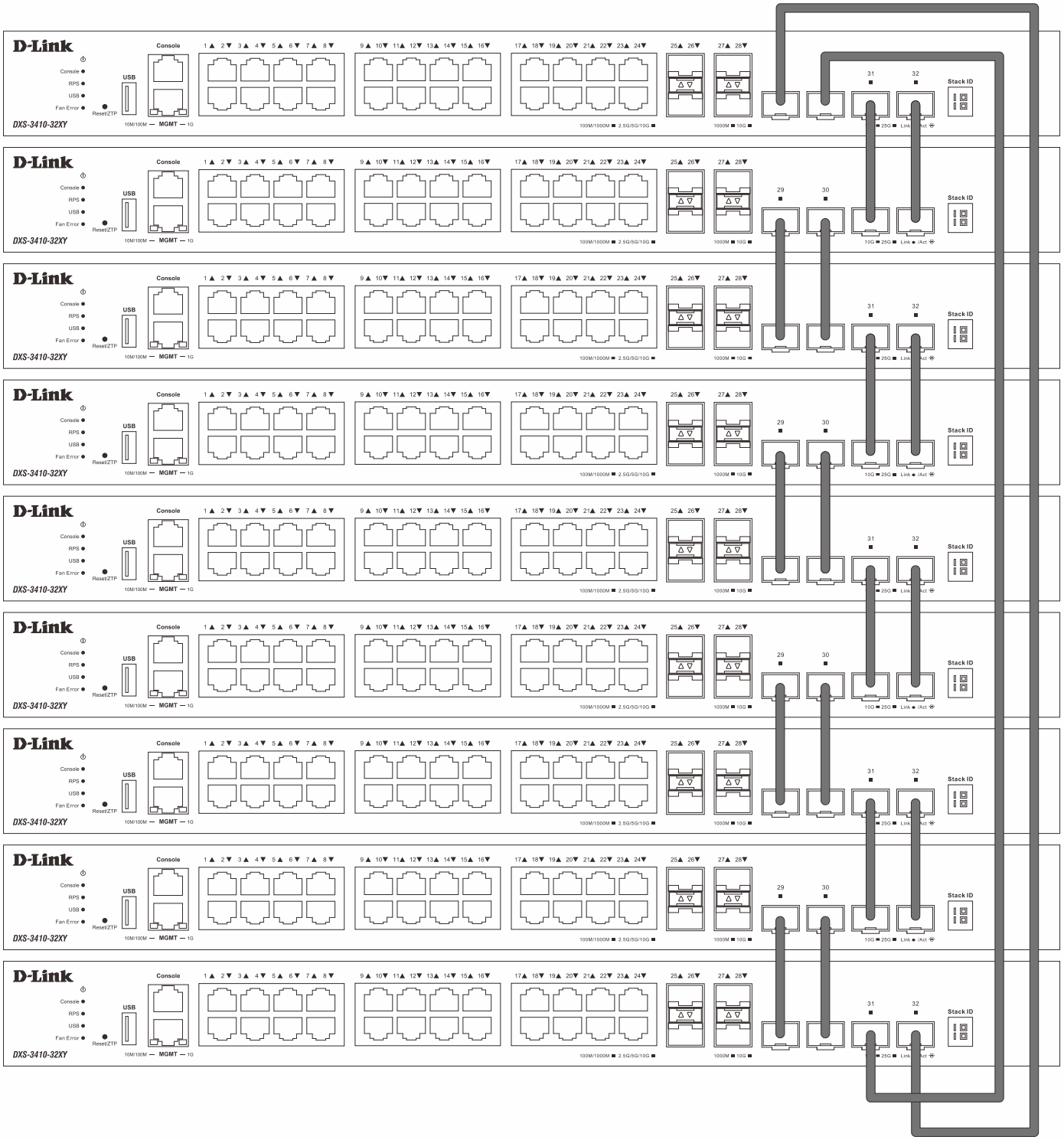


Figure 4-87 Duplex Ring Stacking Topology

Switch Roles in a Stack

Within each of these topologies, each Switch plays a role in the Switch stack. These roles can be set by the user per individual Switch, or if desired, can be automatically determined by the Switch stack.

Three possible roles exist when stacking with the Switch.

- **Primary Master** - The Primary Master is the leader of the stack. It will maintain normal operations, monitor operations and the running topology of the Stack. This Switch will also assign Stack Unit IDs, synchronize configurations, and transmit commands to remaining Switches in the Switch stack. The Primary Master can be manually set by assigning this Switch the highest priority (a lower number denotes a higher priority) before physically assembling the stack, or it can be determined automatically by the stack through an election process.

This determines the lowest MAC address and then will assign that Switch as the Primary Master if all priorities are the same.

- **Backup Master** - The Backup Master is the backup to the Primary Master, and will take over the functions of the Primary Master if the Primary Master fails or is removed from the Stack. It also monitors the status of neighboring Switches in the stack, will perform commands assigned to it by the Primary Master and will monitor the running status of the Primary Master. The Backup Master can be set by the user by assigning this Switch the second highest priority (a lower number denotes a higher priority) before physically assembling the stack, or it can be determined automatically by the stack through an election process. This determines the second lowest MAC address and then will assign that Switch as the Backup Master if all priorities are the same.
- **Slave** - Slave Switches constitute the rest of the Switch stack and although not Primary or Backup Masters, they can be placed into these roles when these other two roles fail or are removed from the stack. Slave Switches perform operations requested by the master, monitor the status of the stack topology, and adhere to the Backup Master's commands once it becomes Primary Master. Slave Switches will do a self-check to determine if they are to become the Backup Master if the Backup Master is promoted to the Primary Master, or if the Backup Master fails or is removed from the Switch stack. If both Primary and Backup masters fail, or are removed from the Switch stack, the Switch will determine if it is to become the Primary Master. These roles will be determined by priority and if this is the same, by the lowest MAC address.

Once Switches have been assembled in the topology desired by the user and powered on, the stack will undergo three processes until it reaches a functioning state.

- **Initialization State** - This is the first state of the stack, where the runtime codes are set and initialized and the system conducts a peripheral diagnosis to determine each individual Switch is functioning properly.
- **Master Election State** - Once the runtime codes are loaded and initialized, the stack will undergo the Master Election State where it will discover the type of topology used, elect a Primary Master and then a Backup Master.
- **Synchronization State** - Once the Primary Master and the Backup Master have been established, the Primary Master will assign Stacking Unit IDs to Switches in the stack, synchronize configurations for all Switches and then transmit commands to the rest of the Switches based on the configuration of the Primary Master.

Once these steps have been completed, the Switch stack will enter a normal operating mode.

Stack Switch Swapping

The stacking feature of the Switch supports hot swapping of Switches in and out of the running stack. Users may remove or add Switches to the stack without powering down or largely affecting the transfer of data between Switches in the stack, as long as some basic rules are adhered to.

When Switches are 'hot inserted' into the running stack, the new Switch may take on the Primary Master, Backup Master or Slave role, depending on configuration set on the newly added Switch, such as priority or MAC address. Yet, if adding two stacks together that have both previously undergone the election process, and therefore both have a Primary Master and a Backup master, a new Primary Master will be elected from one of the already existing Primary Masters, based on priority or MAC address. This Primary Master will take over all of the Primary Master's roles for all new Switches that were hot inserted. This process is done using discovery packets that circulate through the Switch stack every 1.5 seconds until the discovery process has been completed.

The 'hot remove' action means removing a device from the stack while the stack is still running. The hot removal is detected by the stack when it fails to receive heartbeat packets during its specified interval from a device, or when one of the stacking ports links is down. Once the device has been removed, the remaining Switches will update their stacking topology database to reflect the change. Any one of the three roles, Primary Master, Backup Master, or Slave, may be removed from the stack, yet a different process occurs for each specific device removal.

If a Slave device has been removed, the Primary Master will inform other Switches of the hot remove of this device through the use of unit leave messages. Switches in the stack will clear the configuration of the unit removed, and dynamically learned databases, such as ARP, will also be cleared.

If the Backup Master has been hot removed, a new Backup Master will be chosen through the election process previously described. Switches in the stack will clear the configuration of the unit removed, and dynamically learned

databases, such as ARP, will also be cleared. Then the Backup Master will begin backing up the Primary Master when the database synchronization has been completed by the stack.

If the Primary Master is removed, the Backup Master will assume the Primary Master's role and a new Backup Master will be chosen using the election process. Switches in the stack will clear the configuration of the unit removed, and dynamically learned databases, such as ARP, will also be cleared. The new Primary Master will inherit the MAC and IP address of the previous Primary Master to avoid conflict within the stack and the network itself.

If both the Primary Master and the Backup Master are removed, the election process is immediately initiated, and a new Primary Master and Backup Master are elected. Switches in the stack will clear the configuration of the units that have been removed, and dynamically learned databases, such as ARP, will also be cleared. Static Switch configuration still remains in the database of the remaining Switches in the stack and those functions will not be affected.

NOTE: If there is a Box ID conflict when the stack is in the discovery phase, the device will enter a special standalone topology mode. Users can only get device information, configure Box IDs, save and reboot. All stacking ports will be disabled and an error message will be produced on the local console port of each device in the stack. Users must reconfigure Box IDs and reboot the stack to rectify the problem.

Physical Stacking

This window is used to display and configure the physical stacking settings.

To view the following window, click **Management > Stacking > Physical Stacking**, as shown below:

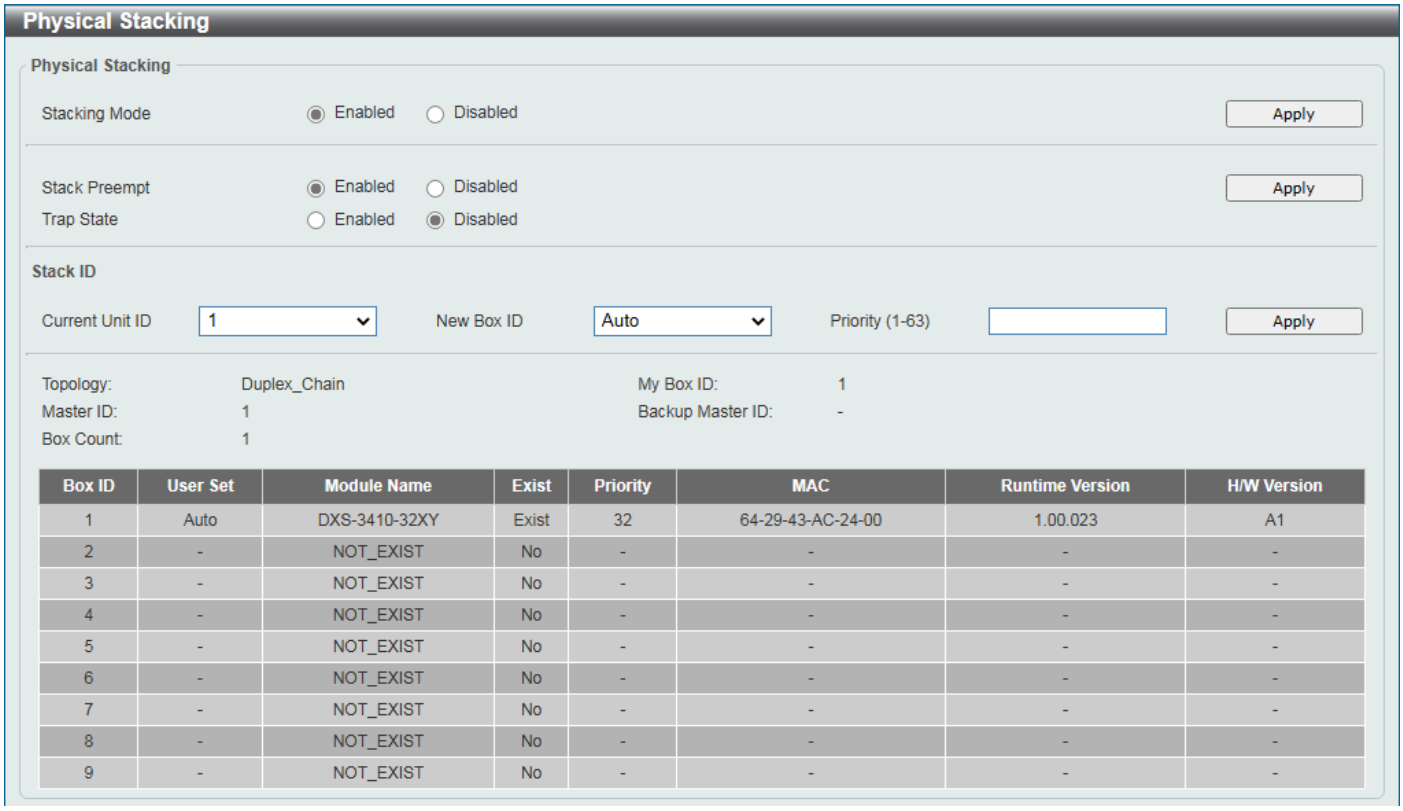


Figure 4-88 Physical Stacking Window

The fields that can be configured in **Physical Stacking** are described below:

Parameter	Description
Stacking Mode	Select this option to enable or disable the stacking mode.
Stack Preempt	Select this option to enable or disable preemption of the master role when a unit with a higher priority is added to the Switch.
Trap State	Select this option to enable or disable stacking related SNMP traps.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Stack ID** are described below:

Parameter	Description
Current Unit ID	Select the unit ID of the Switch in the stack.
New Box ID	Select the new box ID for the Switch that is selected in the **Current Unit ID** field. The range is from 1 to 9. **Auto** will automatically assign a box number to the Switch in the Switch stack.
Priority	Enter the priority of the Switch stacking unit. The range is from 1 to 63.

Click the **Apply** button to accept the changes made.

Virtual Stacking (SIM)

D-Link Single IP Management (SIM) is a concept that will stack Switches together over Ethernet instead of using stacking ports or modules. There are some advantages in implementing the Single IP Management feature:

- SIM can simplify management of small workgroups or wiring closets while scaling the network to handle increased bandwidth demand.
- SIM can reduce the number of IP address needed in your network.
- SIM can eliminate any specialized cables for stacking connectivity and remove the distance barriers that typically limit your topology options when using other stacking technology.

Switches using D-Link Single IP Management (labeled here as SIM) must conform to the following rules:

- SIM is an optional feature on the Switch and can easily be enabled or disabled through the Command Line Interface or Web Interface. SIM grouping has no effect on the normal operation of the Switch in the network.
- There are three classifications for Switches using SIM. The **Commander Switch (CS)**, which is the master Switch of the group, **Member Switch (MS)**, which is a Switch that is recognized by the CS a member of a SIM group, and a **Candidate Switch (CaS)**, which is a Switch that has a physical link to the SIM group but has not been recognized by the CS as a member of the SIM group.
- A SIM group can only have one Commander Switch (CS).
- A SIM group accepts up to 32 Switches (numbered 1-32), not including the Commander Switch (numbered 0).
- Members of a SIM group must be in the same Layer 2 network.
- There is no limit to the number of SIM groups in the same IP subnet (broadcast domain); however, a single Switch can only belong to one group.
- If multiple VLANs are configured, the SIM group will only utilize the management VLAN on any Switch.
- SIM allows intermediate devices that do not support SIM. This enables the user to manage Switches that are more than one hop away from the CS.

The SIM group is a group of Switches that are managed as a single entity. The Switch may take on three different roles:

- **Commander Switch (CS)** - This is a Switch that has been manually configured as the controlling device for a group, and takes on the following characteristics:
    - It has an IP Address.

    - It is not a CS or member Switch of another SIM group.
    - It is connected to the member Switches through its management VLAN.
- **Member Switch (MS)** - This is a Switch that has joined a SIM group and is accessible from the CS, and it takes on the following characteristics:
    - It is not a CS or MS of another SIM group.
    - It is connected to the CS through the CS management VLAN.
- **Candidate Switch (CaS)** - This is a Switch that is ready to join a SIM group but is not yet a member of the SIM group. The Candidate Switch may join the SIM group of the Switch by manually configuring it to be a MS of a SIM group. A Switch configured as a CaS is not a member of a SIM group and will take on the following characteristics:
    - It is not a CS or MS of another Single IP group.
    - It is connected to the CS through the CS management VLAN

The following rules also apply to the above roles:

- Each device begins in a CaS state.
- A CS must change its role to CaS and then to MS, to become a MS of a SIM group. Thus, the CS cannot directly be converted to a MS.
- The user can manually configure a CS to become a CaS.
- A MS can become a CaS by:
    - Being configured as a CaS through the CS.
    - If report packets from the CS to the MS time out.
- The user can manually configure a CaS to become a CS
- The CaS can be configured through the CS to become a MS.

After configuring one Switch to operate as the CS of a SIM group, additional Switches may join the group by manually configuring the Switch to be a MS. The CS will then serve as the in-band entry point for access to the MS. The CS's IP address will become the path to all MSs in the group and the CS's administrator password, and/or authentication will control access to all MSs in the SIM group.

With SIM enabled, the applications in the CS will redirect the packets instead of executing packets. The applications will decode the packet from the administrator, modify some data, and then send it to the MS. After execution, the CS may receive a response packet from the MS, which it will encode and send it back to the administrator.

When a CaS becomes a MS, it automatically becomes a member of the first SNMP community (includes read/write and read only) to which the CS belongs. However, if a MS has its own IP address, it can belong to SNMP communities to which other switches in the group, including the CS, do not belong.

Upgrade to v1.61

To better improve SIM management, the Switches have been upgraded to SIM version 1.61. Many improvements have been made, including the Commander Switch (CS) now having the capability to automatically rediscover member switches that have left the SIM group, either through a reboot or web malfunction. This is accomplished through the use of Discover packets and Maintenance packets that previously configured SIM members will send and receive after a reboot. Once a MS has had its MAC address and password saved to the CS's database, if a reboot occurs in the MS, the CS will keep this MS information in its database and when a MS has been rediscovered, it will add the MS back into the SIM tree automatically. No configuration will be necessary to rediscover these switches.

There are some instances where pre-saved MS Switches cannot be rediscovered. For example, if the Switch is still powered down, if it has become the member of another group, or if it has been configured to be a Commander Switch, the rediscovery process cannot occur.

The topology map now includes new features for connections that are a member of a port trunking group. It will display the speed and number of Ethernet connections creating this port trunk group.

This version will support Switch upload and downloads for firmware, configuration files, and log files, as follows:

- **Firmware** - The Switch now supports MS firmware downloads from a TFTP server.
- **Configuration Files** - This Switch now supports the downloading and uploading of configuration files both to (for configuration restoration) and from (for configuration backup) MSs, using a TFTP server.
- **Log** - The Switch now supports uploading MS log files to a TFTP server.

The user may zoom in and zoom out when utilizing the topology window to get a better, more defined view of the configuration.

NOTE: When the **SIM State** is enabled and the **Role State** of the Switch is **Commander**, the **Topology**, **Firmware Upgrade**, **Configuration File Backup/Restore**, and **Upload Log File** windows will be available.

Single IP Settings

This window is used to display and configure the SIM settings. The Switch is set as a Candidate (CaS) as the factory default configuration and Single IP Management is disabled.

To view the following window, click **Management > Virtual Stacking (SIM) > Single IP Settings**, as shown below:

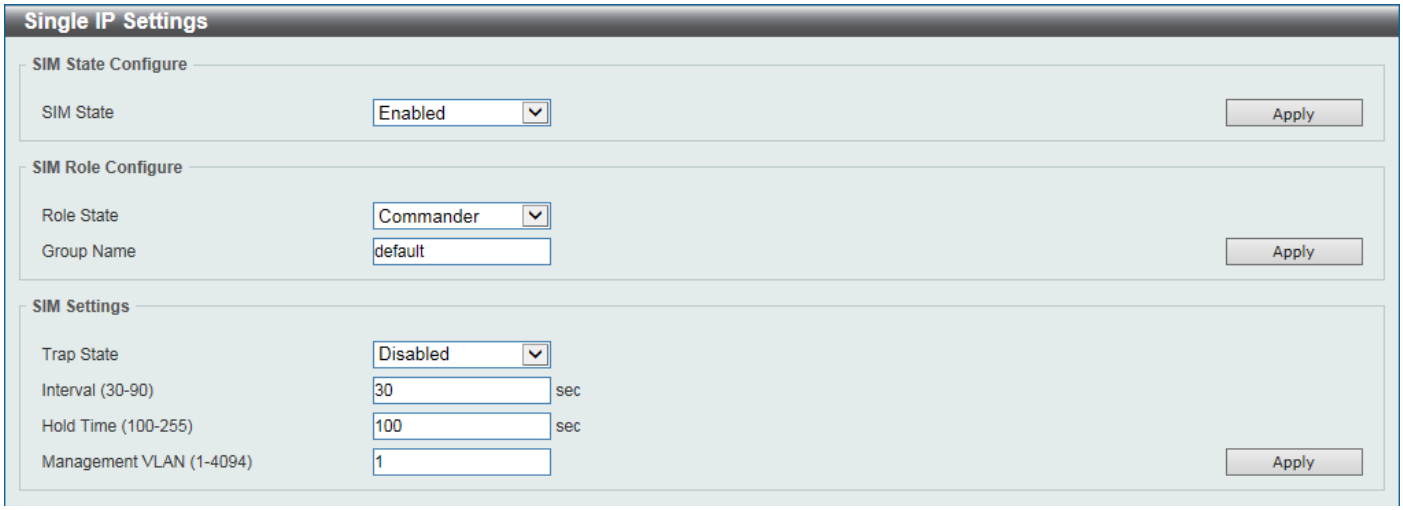


Figure 4-89 Single IP Settings Window

The fields that can be configured in **SIM State Configure** are described below:

Parameter	Description
SIM State	Select this option to enable or disable the SIM state on the Switch. Select **Disabled** to disable SIM on the Switch.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SIM Role Configure** are described below:

Parameter	Description
Role State	Select to change the SIM role of the Switch. Options to choose from are: • **Candidate** - A Candidate Switch (CaS) is not the member of a SIM group but is connected to a Commander Switch. • **Commander** - Select to make the Switch a Commander Switch (CS). The user may join other Switches to this Switch, over Ethernet, to be part of the

Parameter	Description
	SIM group. Choosing this option will also enable the Switch to be configured for SIM. By default, the **Candidate** option is used.
Group Name	Enter a group name. This is optional. This name is used to segment Switches into different SIM groups.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SIM Settings** are described below:

Parameter	Description
Trap State	Select to enable or disable the SIM trap state here.
Interval	Enter the interval in seconds. The range is from 30 to 90.
Hold Time	Enter the hold-time in seconds. The range is from 100 to 255.
Management VLAN	Enter the single IP management message VLAN ID.

Click the **Apply** button to accept the changes made.

After enabling the Switch to be a Commander Switch (CS), the **Single IP Management** folder will then contain four added links to aid in configuring SIM through the Web UI, including **Topology**, **Firmware Upgrade**, **Configuration File Backup/Restore**, and **Upload Log File**.

Topology

This window is used to view, manage, and configure the Switch within the SIM group and requires Java script to function properly on your computer.

To view the following window, click **Management > Virtual Stacking (SIM) > Topology**, as shown below:

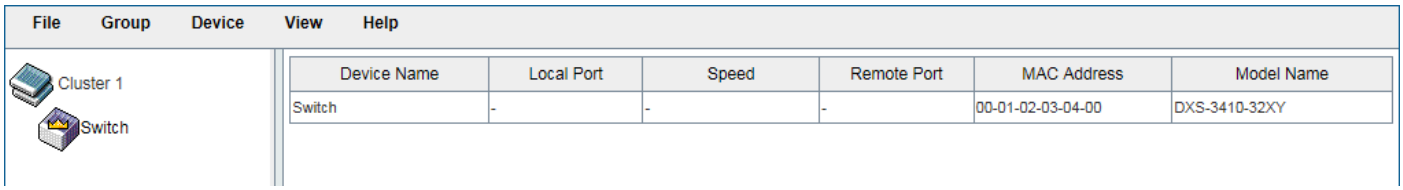


Figure 4-90 Topology Window

There is a menu bar at the top of the window containing **File**, **Group**, **Device**, **View**, and **Help**.

File

Print Topology

Select this option to print the SIM topology map to any of the printers configured on the PC accessing the Web UI.

Preference

Select this option to configure the display properties for the SIM topology map.

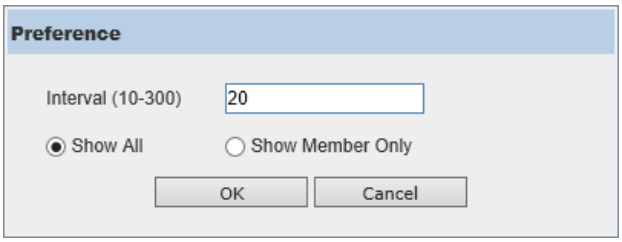


Figure 4-91 Preference

The fields that can be configured are described below:

Parameter	Description
Interval	Enter the SIM topology display refresh interval value here. The range is from 10 to 300.
Show All	Select this option to display all available SIM devices in the topology.
Show Member Only	Select this option to only display SIM member devices in the topology.

Click the **OK** button to accept the changes made.

Click the **Cancel** button to discard the changes made.

Group

Add to Group

Select a Candidate Switch (CaS) from the list and then select this option (**Add to Group**) to add the selected CaS to the SIM group. Password authentication is required when a CaS is added to the SIM group.

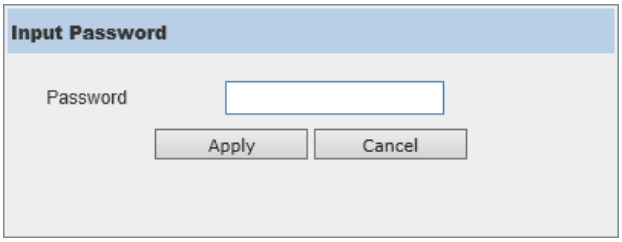


Figure 4-92 Add to Group (Input Password)

Enter the **Password** and click the **Apply** button to add the CaS to the SIM group.

Click the **Cancel** button to discard the addition and return to the Topology window.

Remove from Group

Select a Member Switch (MS) from the list and then select this option (**Remove from Group**) to remove the selected MS from the SIM group.

Device

Configure

Select a device from the list and then select this option (**Configure**) to connect to the Web User Interface (if available) on the selected device.

View

Refresh

Select this option to refresh the items displayed in the page.

Topology

Under **View**, select **Topology** to view the following:

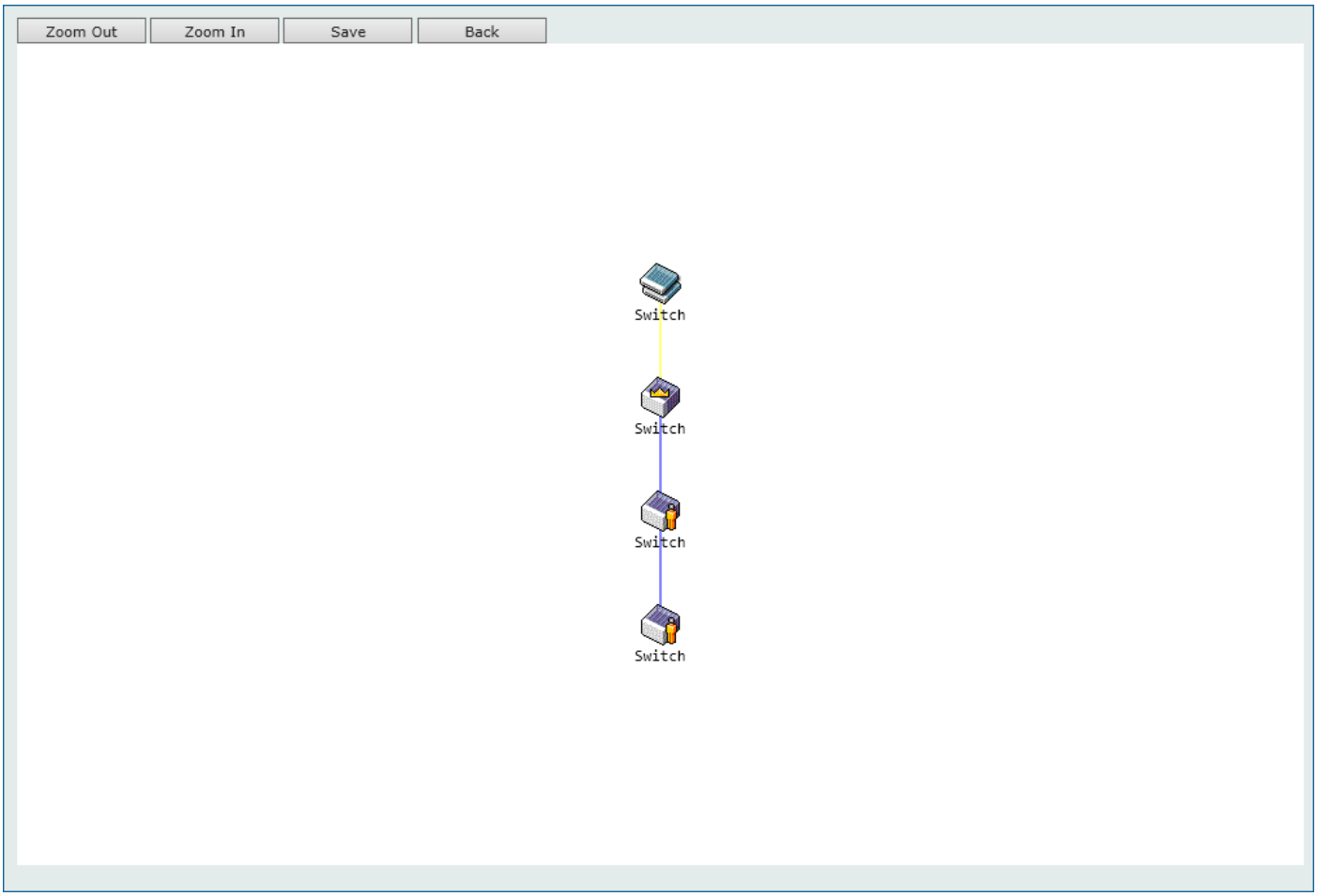


Figure 4-93 View > Topology

Click the **Zoom In** button enlarge the size of the displayed items.

Click the **Zoom Out** button reduce the size of the displayed items.

Click the **Save** button to save the display.

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

This window will display how the devices within the SIM Group connect to other groups and devices. Possible icons on this window are as follows:

Icon	Description	Icon	Description
	Group		Layer 3 Member Switch
	Layer 2 Commander Switch		Member Switch of other group
	Layer 3 Commander Switch		Layer 2 Candidate Switch
	Commander Switch of other group		Layer 3 Candidate Switch
	Layer 2 Member Switch		Unknown device
	Non-SIM devices		

Tool Tips

In the Topology view window, the mouse plays an important role in configuration and in viewing device information. Hover the mouse pointer over a specific device in the Topology window to display more information about the device

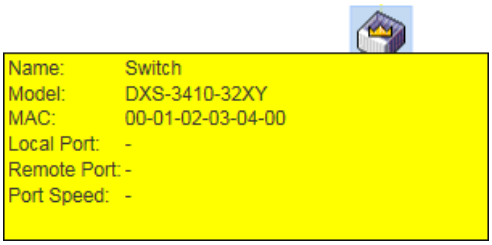


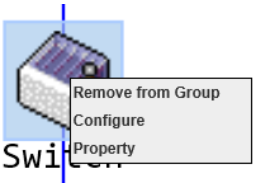
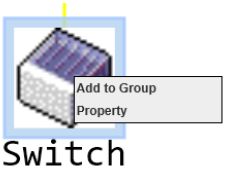
Figure 4-94 Device Information Utilizing the Tool Tip

Hover the mouse pointer over a line between two devices to display the **connection speed** between the two devices.

Figure 4-95 Port Speed Utilizing the Tool Tip

Right-Click

Right-click on a device to allow the user to perform various functions, depending on the role of the Switch in the SIM group and the icon associated with it.

Group	Commander Switch	Member Switch	Candidate Switch
			

The fields that can be configured are described below:

Parameter	Description
Property	Specifies to display more information about the device.
Configure	(Member Switch Only) Specifies to connect to the Web User Interface (if available) on the selected device.
Add to Group	(Candidate Switch Only) Specifies to add the selected CaS to the SIM group. Password authentication is required when a CaS is added to the SIM group.
Remove from Group	(Member Switch Only) Specifies to remove the selected MS from the SIM group.

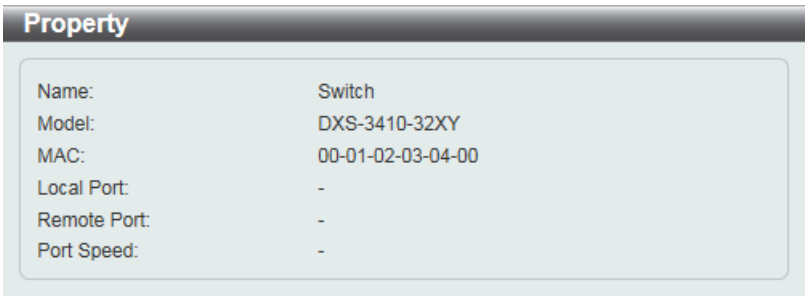


Figure 4-96 Property

The fields displayed are described below:

Parameter	Description
Name	Displays the device name of the Switch in the SIM group.
Module	Displays the full module name of the Switch.
MAC Address	Displays the MAC address of the Switch.
Local Port	Displays the number of the physical port on the CS that the MS or CaS is connected to. The CS will have no entry in this field.
Remote Port	Displays the number of the physical port on the MS or CaS that the CS is connected to. The CS will have no entry in this field.
Port Speed	Displays the connection speed between the CS and the MS or CaS.

Help

About

Select this option to display the SIM Copyright information and release date.

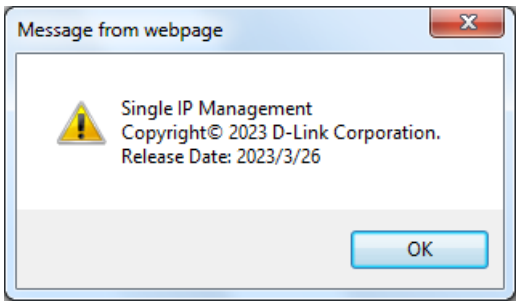


Figure 4-97 About Window

Firmware Upgrade

This window is used to view and upgrade firmware from the Commander Switch to the Member Switch. Member Switches will be listed in the table.

To view the following window, click **Management > Virtual Stacking (SIM) > Firmware Upgrade**, as shown below:

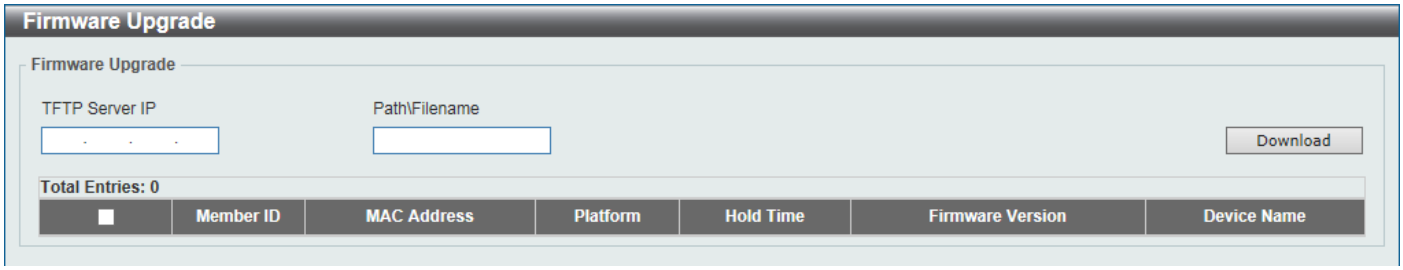


Figure 4-98 Firmware Upgrade Window

The fields that can be configured are described below:

Parameter	Description
TFTP Server IP	Enter the TFTP server IP address.
Path \ Filename	Enter the path and file name.

Click the **Download** button to update the firmware.

To specify a certain Switch for firmware download, tick its corresponding check box.

Configuration File Backup/Restore

This window is used to view and upgrade configuration files from the Commander Switch to the Member Switch using a TFTP server. Member Switches will be listed in the table.

To view the following window, click **Management > Virtual Stacking (SIM) > Configuration File Backup/Restore**, as shown below:

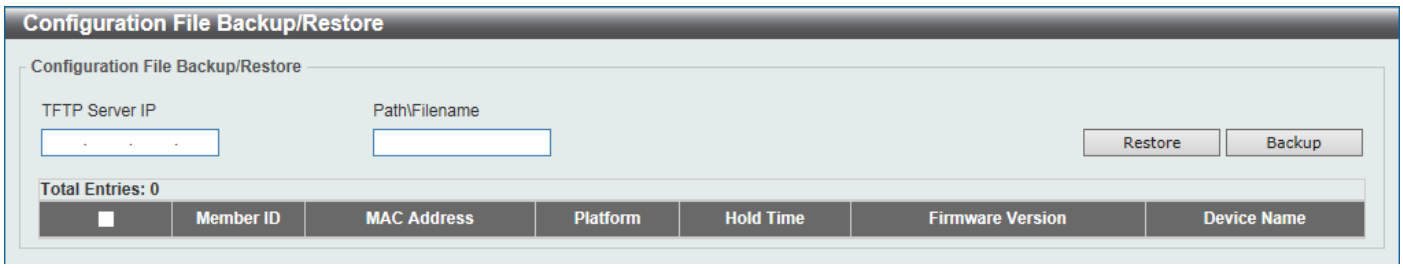


Figure 4-99 Configuration File Backup/Restore Window

The fields that can be configured are described below:

Parameter	Description
TFTP Server IP	Enter the TFTP server IP address.
Path \ Filename	Enter the path and file name.

Click the **Restore** button to update the configuration from a TFTP server to the member Switch.

Click the **Backup** button to back up the configuration file to a TFTP server.

Upload Log File

This window is used to view and upload log files from SIM member Switches to a specified PC.

To view the following window, click **Management > Virtual Stacking (SIM) > Upload Log File**, as shown below:

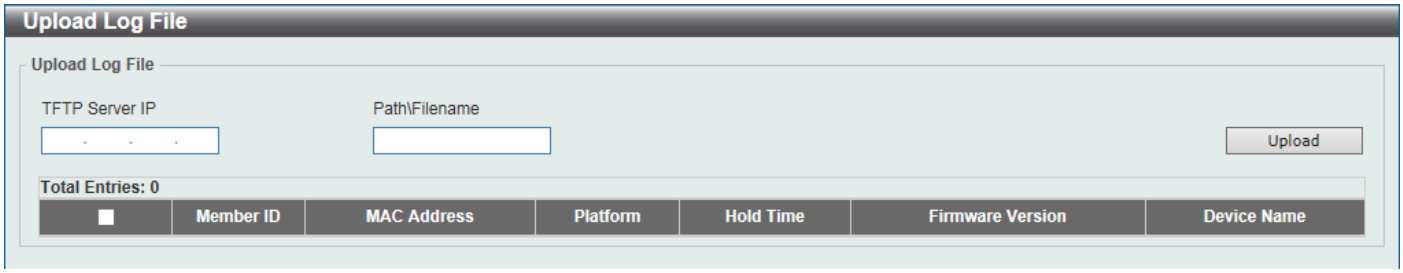


Figure 4-100 Upload Log File Window

The fields that can be configured are described below:

Parameter	Description
TFTP Server IP	Enter the TFTP server IP address.
Path \ Filename	Enter the path and file name.

Click the **Upload** button to initiate the file transfer.

D-Link Discovery Protocol

DDP Settings

This window is used to display and configure the D-Link Discovery Protocol (DDP) settings.

To view the following window, click **Management > D-Link Discovery Protocol > DDP Settings**, as shown below:

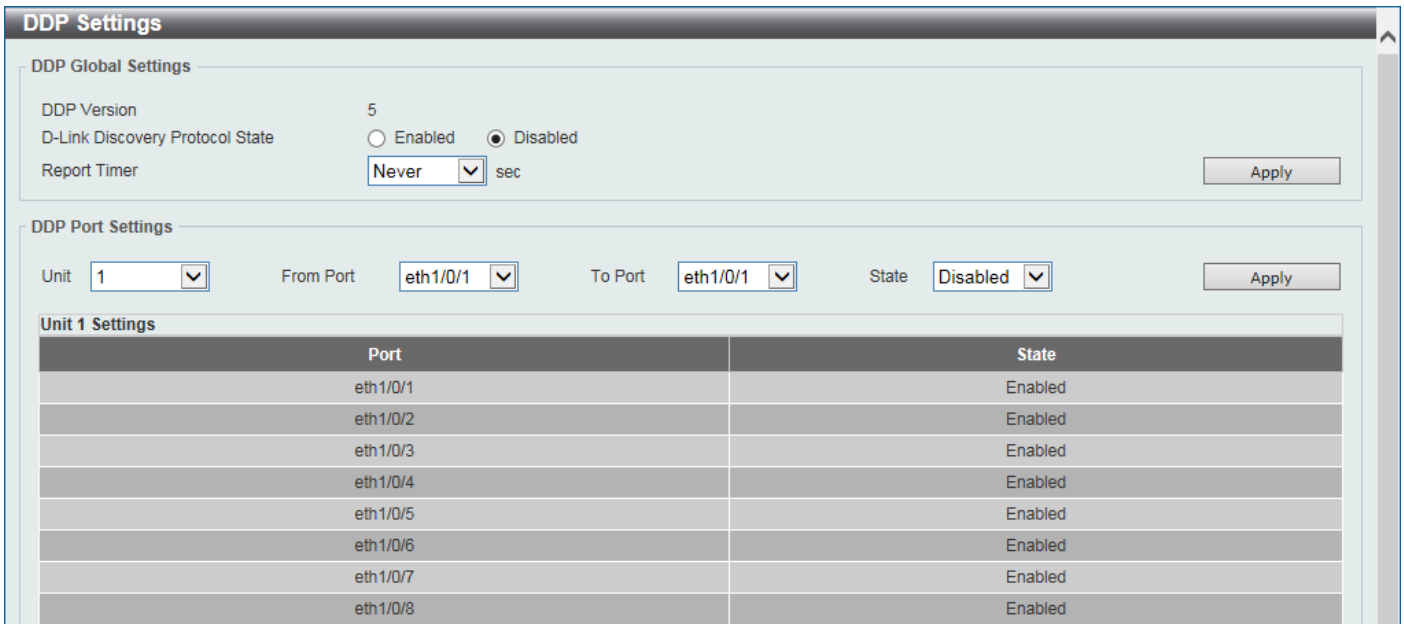


Figure 4-101 DDP Settings Window

The fields that can be configured in **DDP Global Settings** are described below:

Parameter	Description
D-Link Discovery Protocol State	Select to globally enable or disable the DDP feature here.
Report Timer	Select the report timer value here. This is used to configure interval between two consecutive DDP report messages. Options to choose from are **30**, **60**, **90**, **120** seconds, or **Never**. Selecting **Never** instructs the Switch to stop sending report messages.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DDP Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the DDP feature.

Click the **Apply** button to accept the changes made.

DDP Neighbors

This window is used to display the DDP neighbors.

To view the following window, click **Management > D-Link Discovery Protocol > DDP Neighbors**, as shown below:

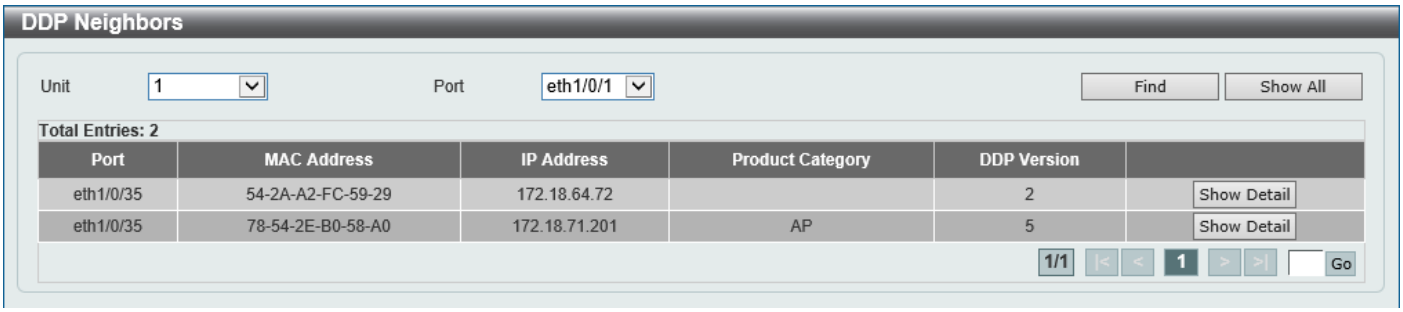


Figure 4-102 DDP Neighbors Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used here.
Port	Select the port that will be used here.

Click the **Find** button to display the DDP neighbors connecting through the specified port.

Click the **Show All** button to display all DDP neighbors connecting to and through the Switch.

Click the **Show Detail** button to view detailed information associated with the entry.

After clicking the **Show Detail** button, the following window will appear.

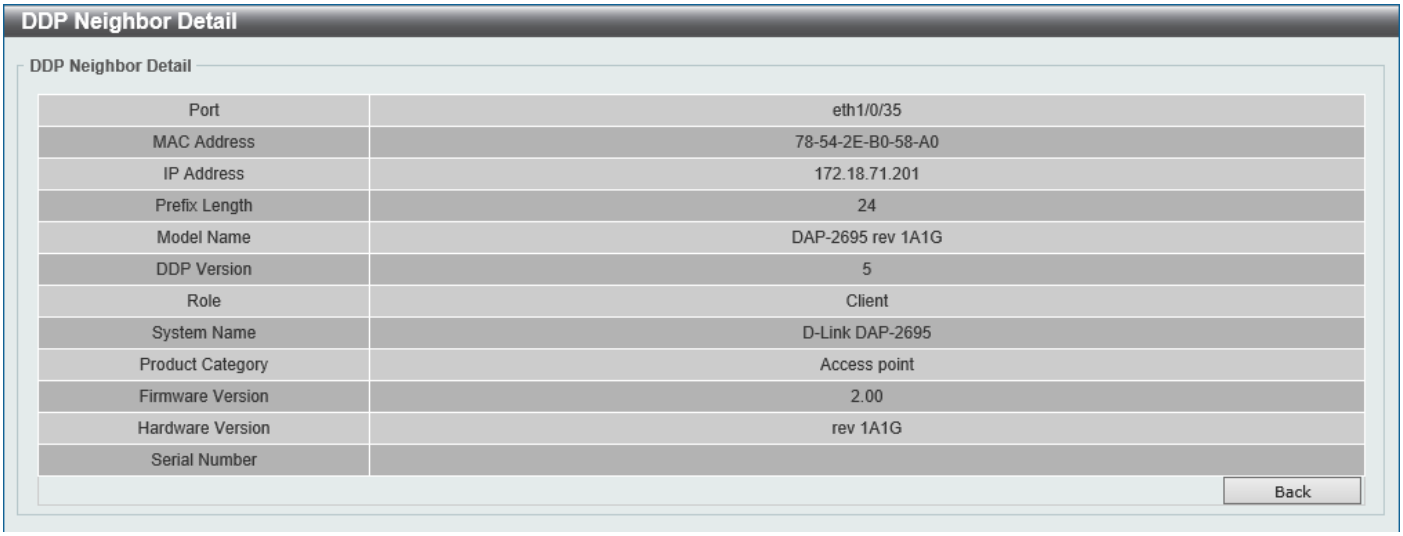


Figure 4-103 DDP Neighbors Detail Window

Click the **Back** button to return to the previous page.

SMTP Settings

This window is used to display and configure the Simple Mail Transfer Protocol (SMTP) settings.

To view the following window, click **Management > SMTP Settings**, as shown below:

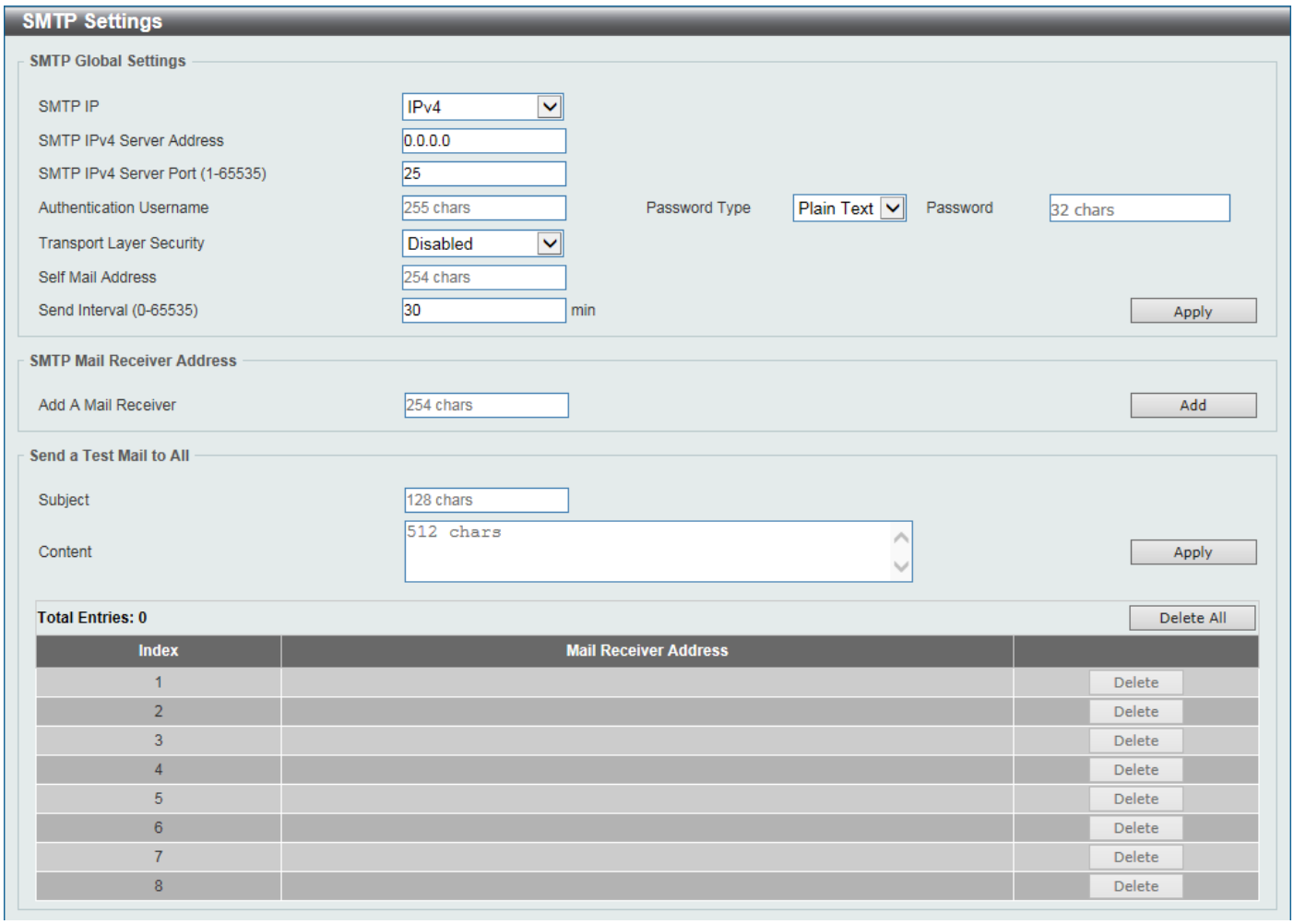


Figure 4-104 SMTP Settings Window

The fields that can be configured in **SMTP Global Settings** are described below:

Parameter	Description
SMTP IP	Select the SMTP server IP address type here. Options to choose from are **IPv4** and **IPv6**.
SMTP IPv4 Server Address	After selecting **IPv4** as the SMTP IP type, enter the SMTP server IPv4 address here.
SMTP IPv6 Server Address	After selecting **IPv6** as the SMTP IP type, enter the SMTP server IPv6 address here.
SMTP IPv4 Server Port	After selecting **IPv4** as the SMTP IP type, enter the SMTP server port number here. The range is from 1 to 65535. By default, this value is 25.
SMTP IPv6 Server Port	After selecting **IPv6** as the SMTP IP type, enter the SMTP server port number here. The range is from 1 to 65535. By default, this value is 25.
Authentication User Name	Enter the authentication user name. This can be up to 255 characters long.
Password Type	Select the password type here. Options to choose from are: • **Plain Text** - Specifies that the password for this user account will be in the plain text form. This can be up to 32 characters long.

Parameter	Description
	• **Encrypted** - Specifies that the password for this user account will be in the encrypted form using the SHA1 encryption method. This can be up to 35 characters long.
Password	Enter the password for the user account.
Transport Layer Security	Select to enable or disable the transport layer security function.
Self Mail Address	Enter the email address that represents the Switch here. This string can be up to 254 characters long.
Send Interval	Enter the sending interval value here. The range is from 0 to 65535 minutes. By default, this value is 30 minutes.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SMTP Mail Receiver Address** are described below:

Parameter	Description
Add a Mail Receiver	Enter the email address of the receiver here. This string can be up to 254 characters long.

Click the **Add** button to add a new SMTP email recipient.

The fields that can be configured in **Send a Test Mail to All** are described below:

Parameter	Description
Subject	Enter the subject of the email here. This string can be up to 128 characters long.
Content	Enter the content of the email here. This string can be up to 512 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

NLB FDB Settings

This window is used to display and configure the Network Load Balancing (NLB) FDB settings. The NLB function is used to support the Microsoft server load balancing application where multiple servers can share the same IP address and MAC address. The requests from clients will be forwarded to all the servers, but will only be processed by one of them. The server can work in two different modes:

- **Unicast mode:** The client uses a unicast MAC address as the destination MAC address to reach the server.
- **Multicast mode:** The client uses a multicast MAC address as the destination MAC address to reach the server.

This destination MAC address is called the shared MAC address. However, the server uses its own MAC address (rather than the shared MAC address) as the source MAC address in the reply packet. In other words, a NLB unicast address is usually not the source MAC address of a packet.

When the received packet contains a destination MAC address that matches the configured unicast MAC address, it will be forwarded to those configured ports, regardless of the VLAN membership configuration.

Administrators cannot configure a static address of the MAC address table as a NLB address. However, if a MAC address is created as a NLB MAC address entry, the same MAC address can be still dynamically learnt in the Layer 2 MAC address table. In this situation, the NLB has higher priority; the dynamically learnt FDB entry won't take effect.

NOTE: Link Aggregation cannot be configured across multiple Switch units in the stack when the NLB feature is enabled.

To view the following window, click **Management > NLB FDB Settings**, as shown below:

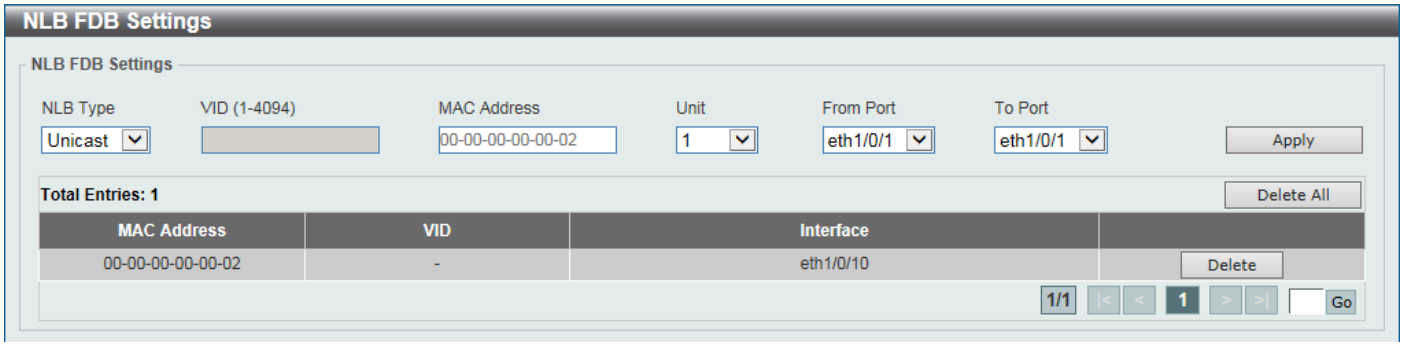


Figure 4-105 NLB FDB Settings Window

The fields that can be configured are described below:

Parameter	Description
NLB Type	Select the NLB type here. Options to choose from are **Unicast** and **Multicast**.
VID	After selecting **Multicast** as the NLB type, enter the VLAN ID used in this configuration here.
MAC Address	Enter the unicast or multicast MAC address of the entry here. If a received packet contains a destination MAC address that matches the specified MAC address, it will be forwarded to the specified interface.
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the port range that will be used here.

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

PPPoE Circuit ID Insertion Settings

This window is used to configure the PPPoE circuit ID insertion function.

To view this window, click **Management > PPPoE Circuit ID Insertion Settings** as shown below:

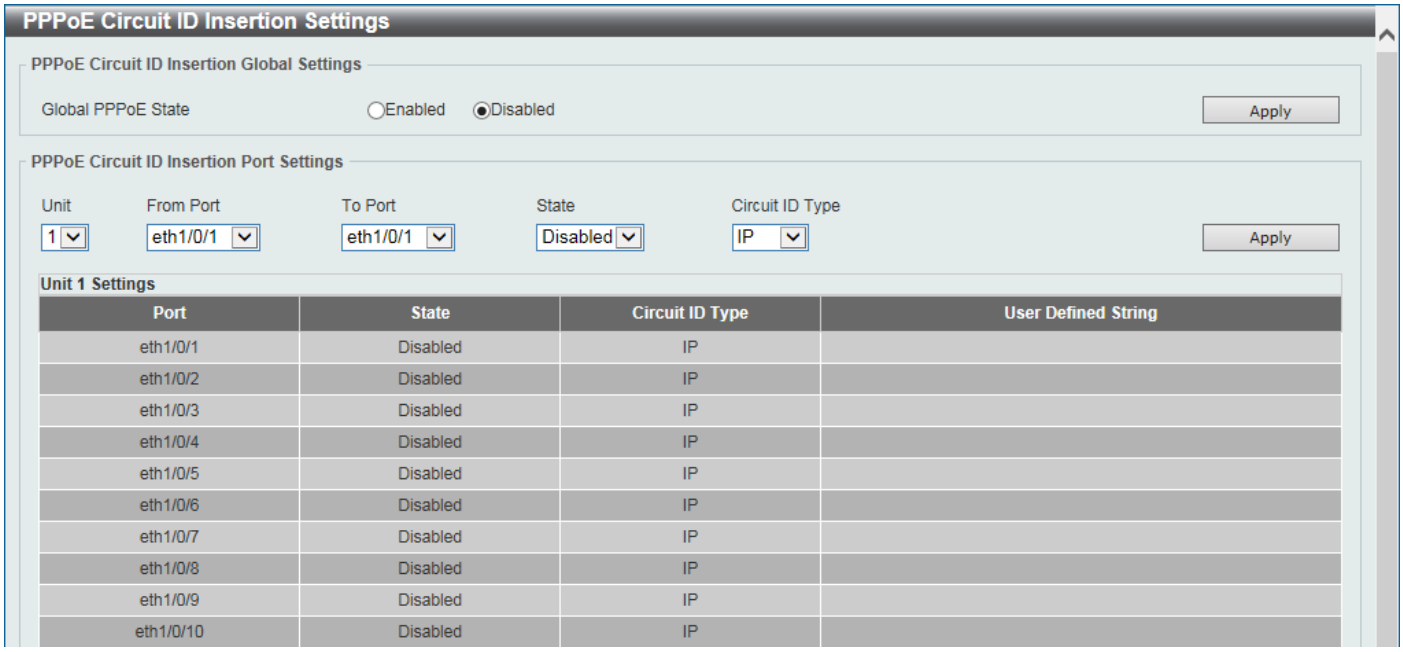


Figure 4-106 PPPoE Circuit ID Insertion Settings Window

The fields that can be configured in **PPPoE Circuit ID Insertion Global Settings** are described below:

Parameter	Description
Global PPPoE State	Click to enable or disable the PPPoE circuit ID insertion on the Switch.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **PPPoE Circuit ID Insertion Ports Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the PPPoE circuit ID insertion on the specified port(s).
Circuit ID Type	Select the device ID part for encoding of the circuit ID option. Options to choose from are **IP**, **MAC**, and **UDF**.

Click the **Apply** button to accept the changes made.

SD Card Management

This section refers to the configuration associated with removable devices which includes USB driver storage.

SD Card Backup Settings

This window is used to display and configure the SD card backup settings. This is used to create or modify an SD card management backup schedule entry.

To view the following window, click **Management > SD Card Management > SD Card Backup Settings**, as shown below:

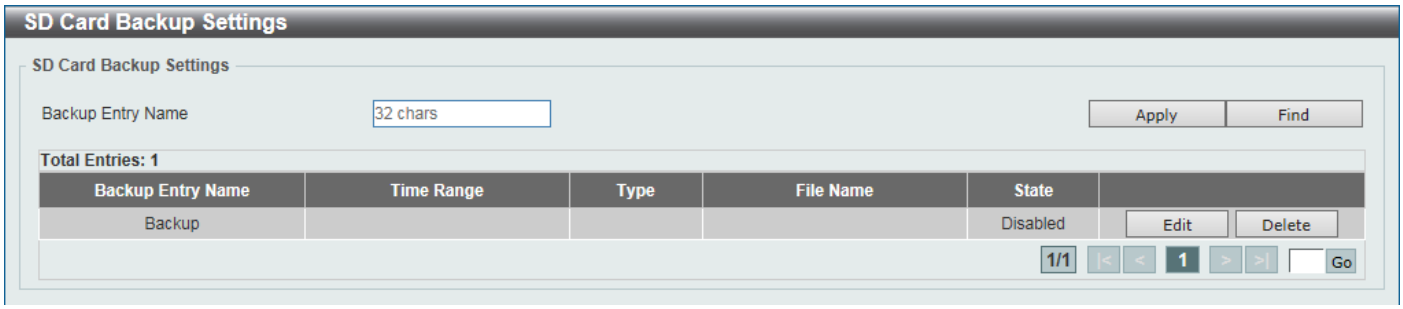


Figure 4-107 SD Card Backup Settings Window

The fields that can be configured are described below:

Parameter	Description
Backup Entry Name	Enter the name of the SD card management backup schedule here. This string can be up to 32 characters long.
Time Range	After clicking the **Edit** button, enter the time range schedule that will be used here.
Type	After clicking the **Edit** button, select the backup type here. Options to choose from are: • **Configuration** - Specifies that this schedule is used to back up the configuration. • **Log** - Specifies that this schedule is used to back up the system log.
File Name	After clicking the **Edit** button, enter the destination filename and path here.
State	After clicking the **Edit** button, select to enable or disable this schedule here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

SD Card Execute Settings

This window is used to display and configure the SD card execution settings. This is used to execute the configuration from the SD card to the Switch file system manually.

To view the following window, click **Management > SD Card Management > SD Card Execute Settings**, as shown below:

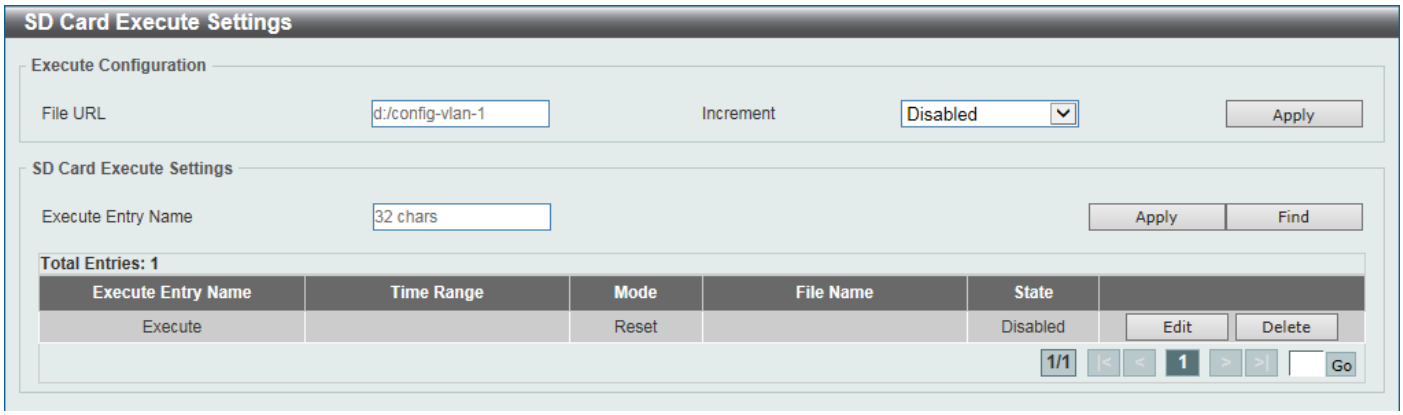


Figure 4-108 SD Card Execute Settings Window

The fields that can be configured in **Execute Configuration** are described below:

Parameter	Description
File URL	Enter the URL of the file here. If the current directory is not the directory of SD card file system, then the full file path must be entered.
Increment	Select to enable or disable the increment feature here. When enabled, the current configuration will not be cleared before executing the configuration. When disabled, the current configuration will be cleared before executing the configuration.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SD Card Execute Settings** are described below:

Parameter	Description
Execute Entry Name	Enter the name of the execution entry here. This string can be up to 32 characters long.
Time Range	After clicking the **Edit** button, enter the time range schedule that will be used here.
Mode	After clicking the **Edit** button, select the mode here. Options to choose from are: • **Increase** - Specifies that the current configuration will not be cleared before executing the configuration. • **Reset** - Specifies that the current configuration will be cleared before executing the configuration.
File Name	After clicking the **Edit** button, enter the source filename and path that will be executed here.
State	After clicking the **Edit** button, select to enable or disable this schedule here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

5. Layer 2 Features

FDB

Static FDB

Unicast Static FDB

This window is used to display and configure the static unicast forwarding settings on the Switch.

To view the following window, click **L2 Features > FDB > Static FDB > Unicast Static FDB**, as shown below:

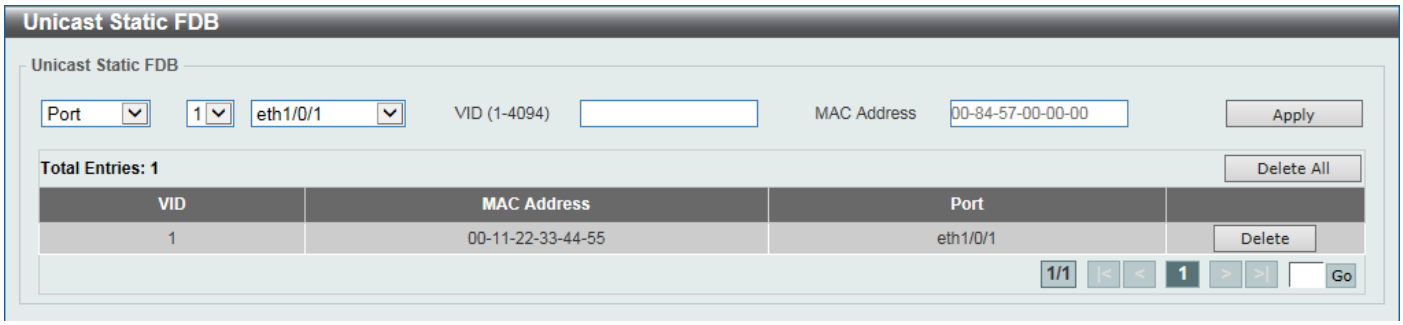


Figure 5-1 Unicast Static FDB Window

The fields that can be configured are described below:

Parameter	Description
Port/Drop	Allows the selection of the port number on which the MAC address entered resides. This option could also drop the MAC address from the unicast static FDB. Select the port number when selecting the **Port**.
Unit	Select the stacking unit ID of the Switch that will be configured here.
Port Number	After selecting the **Port** option, select the port number used here.
VID	Enter the VLAN ID on which the associated unicast MAC address resides.
MAC Address	Enter the MAC address to which packets will be statically forwarded. This must be a unicast MAC address.

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Multicast Static FDB

This window is used to display and configure the multicast static FDB settings.

To view the following window, click **L2 Features > FDB > Static FDB > Multicast Static FDB**, as shown below:

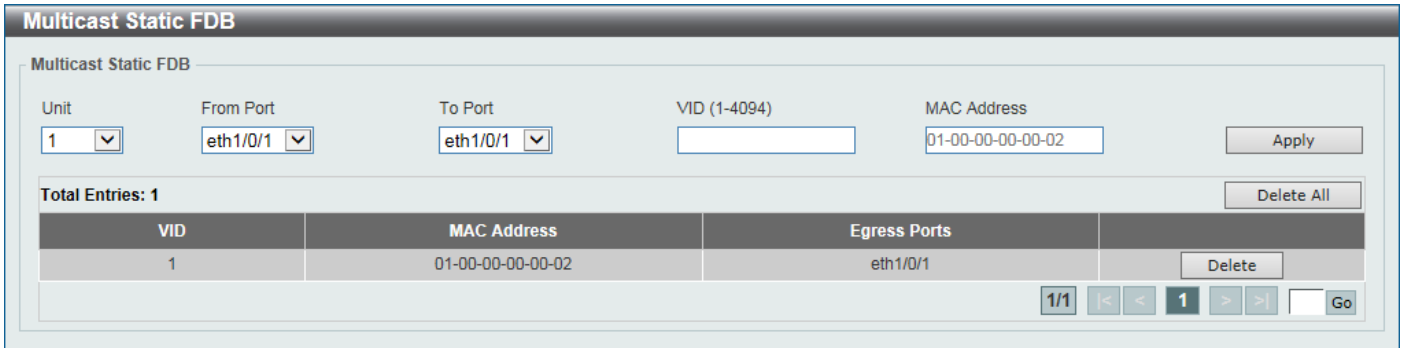


Figure 5-2 Multicast Static FDB Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be configured here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
VID	Enter the VLAN ID of the VLAN the corresponding MAC address belongs to.
MAC Address	Enter the static destination MAC address of the multicast packets. This must be a multicast MAC address.

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to remove all the entries.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MAC Address Table Settings

This window is used to display and configure the global MAC address table settings.

To view the following window, click **L2 Features > FDB > MAC Address Table Settings**, as shown below:

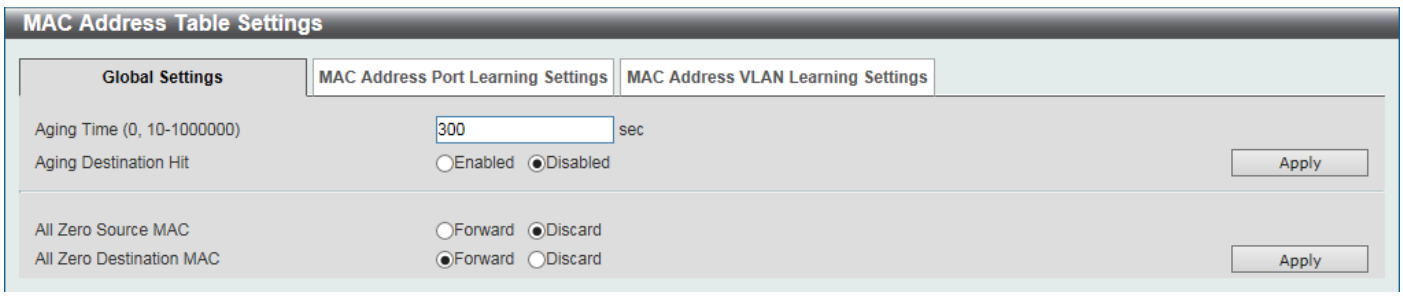


Figure 5-3 MAC Address Table Settings (Global Settings) Window

The fields that can be configured are described below:

Parameter	Description
Aging Time	Enter the MAC address table aging time here. The range is from 10 to 1000000 seconds. Entering 0 will disable MAC address aging. By default, this value is 300 seconds.
Aging Destination Hit	Select to enable or disable the aging destination hit function.
All Zero Source MAC	Select to forward or discard packets with an all zero source MAC address.
All Zero Destination MAC	Select to forward or discard packets with an all zero destination MAC address.

Click the **Apply** button to accept the changes made.

After selecting the **MAC Address Port Learning Settings** tab option, at the top of the page, the following page will be available.

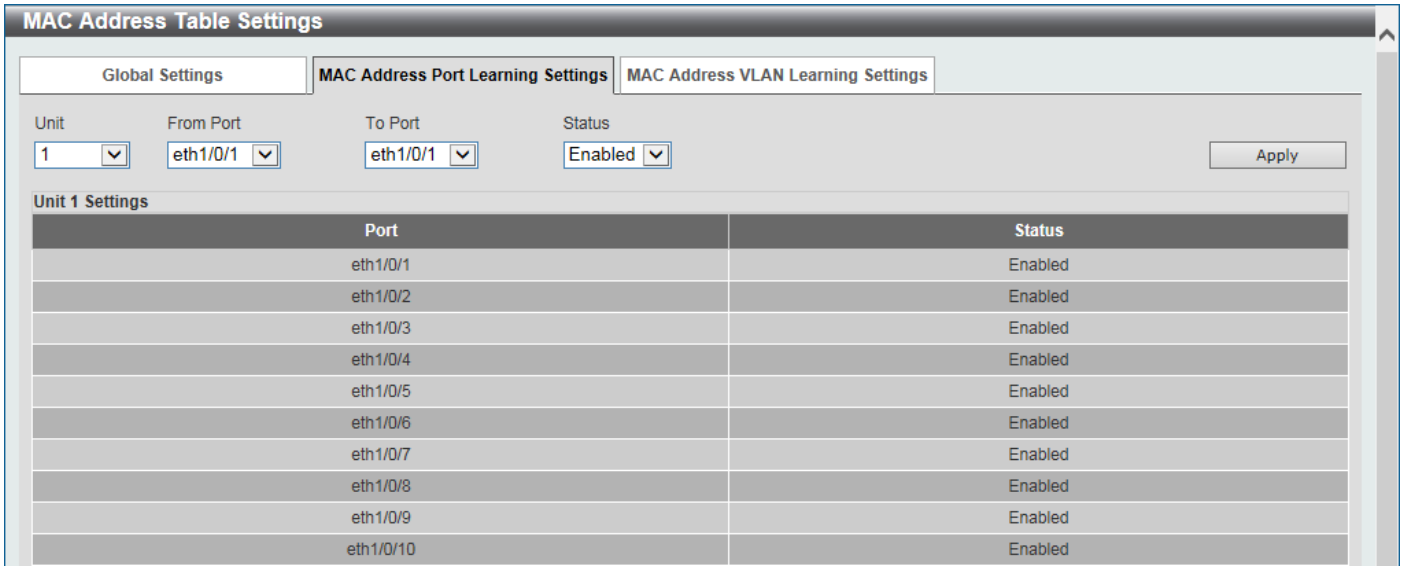


Figure 5-4 MAC Address Table Settings (MAC Address Port Learning Settings) Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be configured here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Status	Select to enable or disable the MAC address learning function on the ports specified here.

Click the **Apply** button to accept the changes made.

After selecting the **MAC Address VLAN Learning Settings** tab option, at the top of the page, the following page will be available.

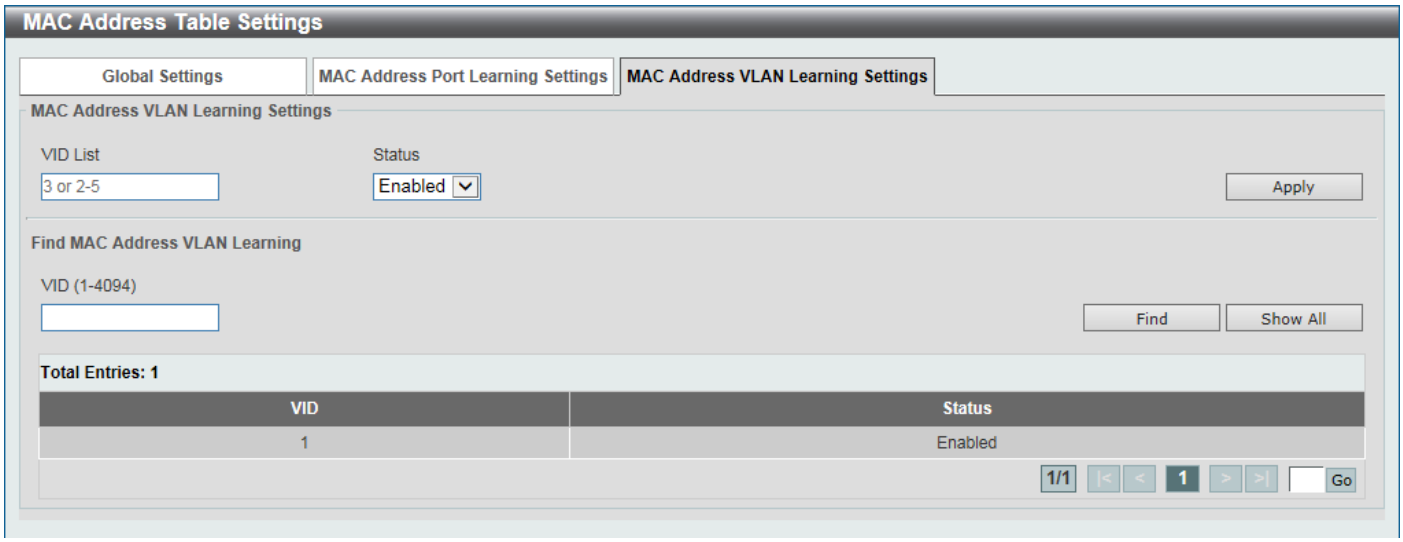


Figure 5-5 MAC Address Table Settings (MAC Address VLAN Learning Settings) Window

The fields that can be configured are described below:

Parameter	Description
VID List	Enter the VLAN ID(s) that will be used in this configuration or display here. A series of VLAN IDs can be entered separated by commas or a range of VLAN IDs can be entered separated by a hyphen.
Status	Select to enable or disable the MAC address learning function on the VLAN(s) specified here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the available entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MAC Address Table

This window is used to view the entries listed in the MAC address table.

To view the following window, click **L2 Features > FDB > MAC Address Table**, as shown below:

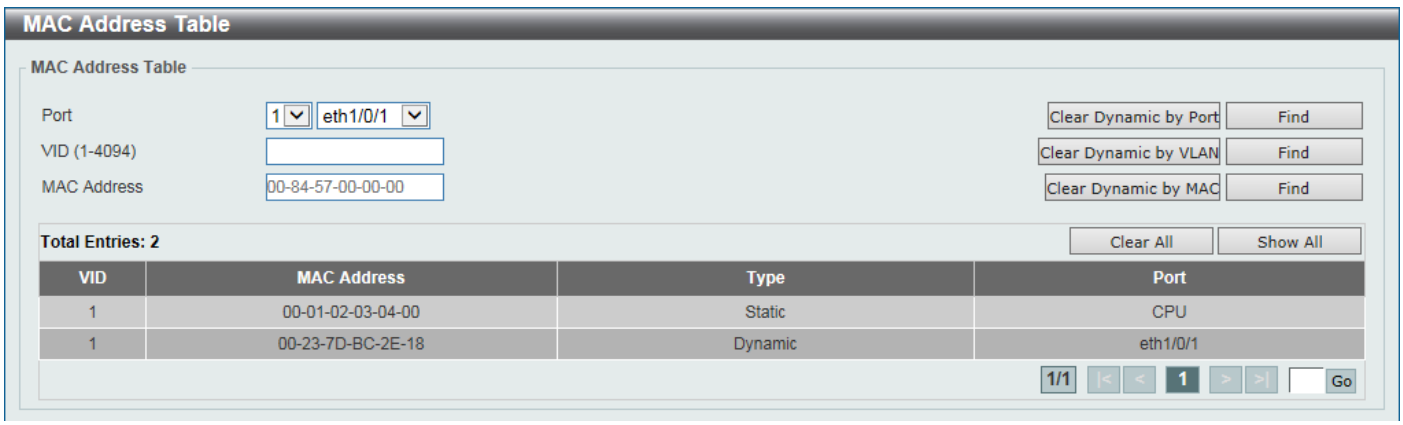


Figure 5-6 MAC Address Table Window

The fields that can be configured are described below:

Parameter	Description
Port	Select the stacking unit ID and the port number of the Switch that will be configured here.
VID	Enter the VLAN ID that will be used for this configuration here.
MAC Address	Enter the MAC address that will be used for this configuration here.

Click the **Clear Dynamic by Port** button to clear the dynamic MAC address listed on the corresponding port.

Click the **Clear Dynamic by VLAN** button to clear the dynamic MAC address listed on the corresponding VLAN.

Click the **Clear Dynamic by MAC** button to clear the dynamic MAC address entered.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear all dynamic MAC addresses.

Click the **Show All** button to display all the MAC addresses recorded in the MAC address table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MAC Notification

This window is used to display and configure MAC notification.

To view the following window, click **L2 Features > FDB > MAC Notification**, as shown below:

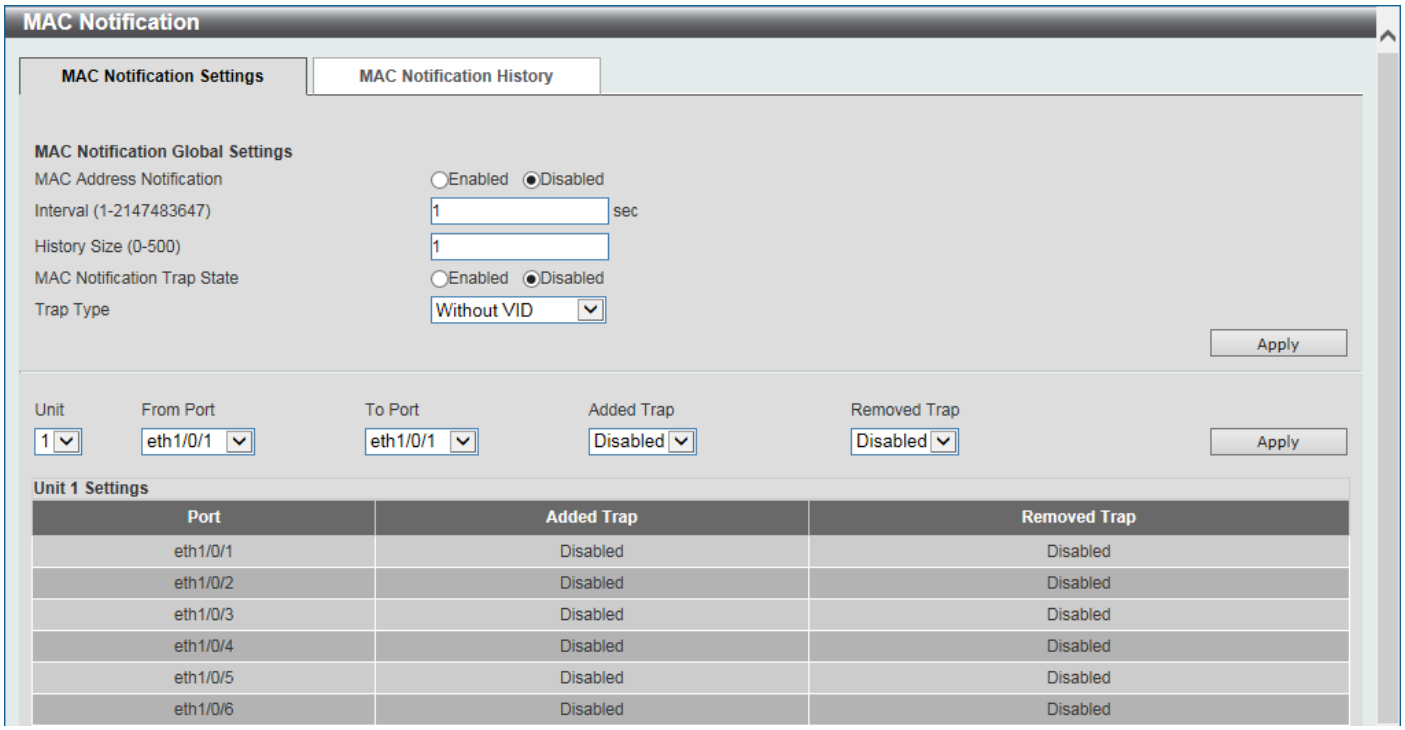


Figure 5-7 MAC Notification (MAC Notification Settings) Window

The fields that can be configured are described below:

Parameter	Description
MAC Address Notification	Select to enable or disable MAC notification globally on the Switch
Interval	Enter the time value between notifications. The range is from 1 to 2147483647 seconds. By default, this value is 1 second.
History Size	Enter the maximum number of entries listed in the history log used for notification. The range is from 0 to 500. By default, this value is 1.

Parameter	Description
MAC Notification Trap State	Select to enable or disable the MAC notification trap state.
Trap Type	Select the trap type here. Options to choose from are: • **Without VID** - Specifies the trap information without the VLAN ID. • **With VID** - Specifies the trap information with the VLAN ID.
Unit	Select the stacking unit ID of the Switch that will be configured here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Added Trap	Select to enable or disable the added trap.
Removed Trap	Select to enable or disable the removed trap.

Click the **Apply** button to accept the changes made for each individual section.

After selecting the **MAC Notification History** tab, at the top of the page, the following page will be available.

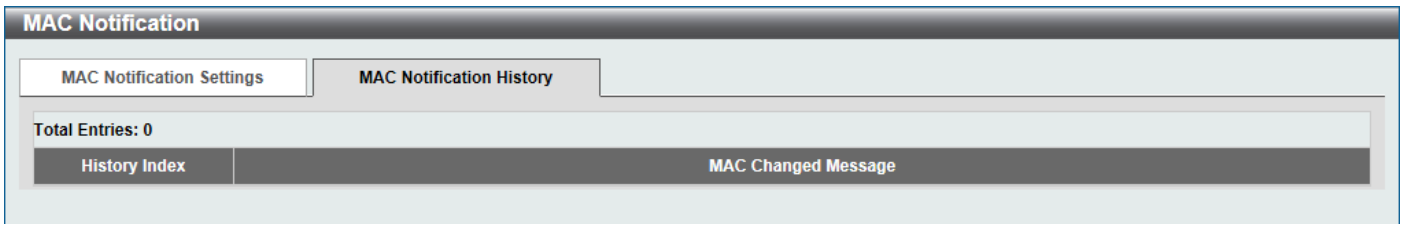


Figure 5-8 MAC Notification (MAC Notification History) Window

On this page, a list of MAC notification messages will be displayed.

VLAN

VLAN Configuration Wizard

This window is used to start the VLAN configuration wizard.

Create/Configure VLAN

To view the following window, click **L2 Features > VLAN > VLAN Configuration Wizard**, as shown below:

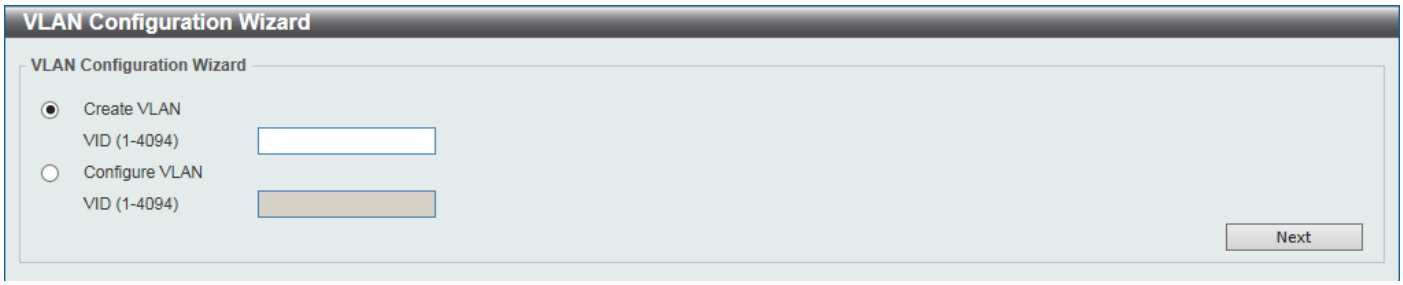


Figure 5-9 VLAN Configuration Wizard (Step 1) Window

The fields that can be configured are described below:

Parameter	Description
Create VLAN	Select this option to create a new VLAN. • **VID** - Enter the VLAN ID here. The range is from 1 to 4094.
Configure VLAN	Select this option to configure an existing VLAN. • **VID** - Enter the VLAN ID here. The range is from 1 to 4094.

Click the **Next** button to continue to the next step.

Create VLAN

After selecting the **Create VLAN** option and clicking the **Next** button, the following window will appear.

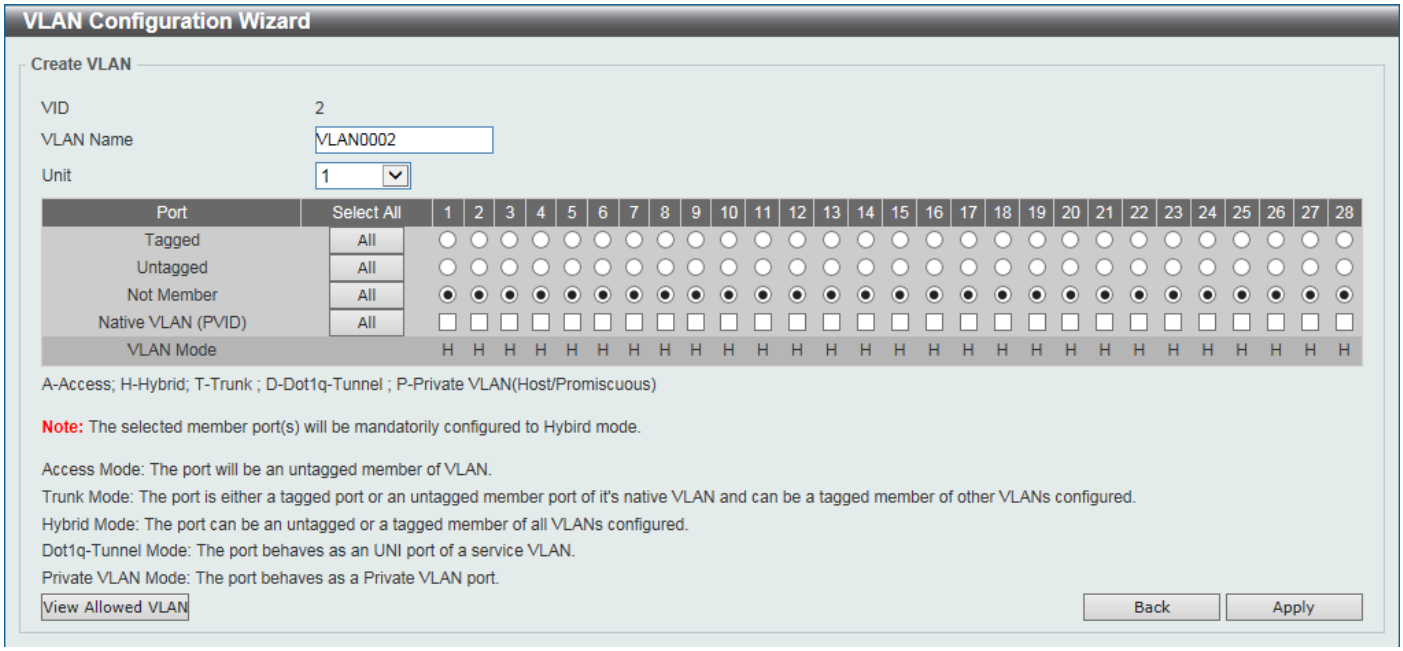


Figure 5-10 VLAN Configuration Wizard (Create VLAN) Window

The fields that can be configured are described below:

Parameter	Description
VLAN Name	Enter the name for the VLAN here.
Unit	Select the Switch unit that will be used for this configuration here.
Tagged	Select the switch ports that are tagged members of this VLAN here.
Untagged	Select the switch ports that are untagged members of this VLAN here.
Not Member	Select the switch ports that are not members of this VLAN here.
Native VLAN (PVID)	Select the switch ports that support the native VLAN here.

Click the **View Allowed VLAN** button view the allowed VLAN settings.

Click the **Back** button to return to the previous step.

Click the **Apply** button to accept the changes made.

After clicking the **View Allowed VLAN** button, the following window will appear.

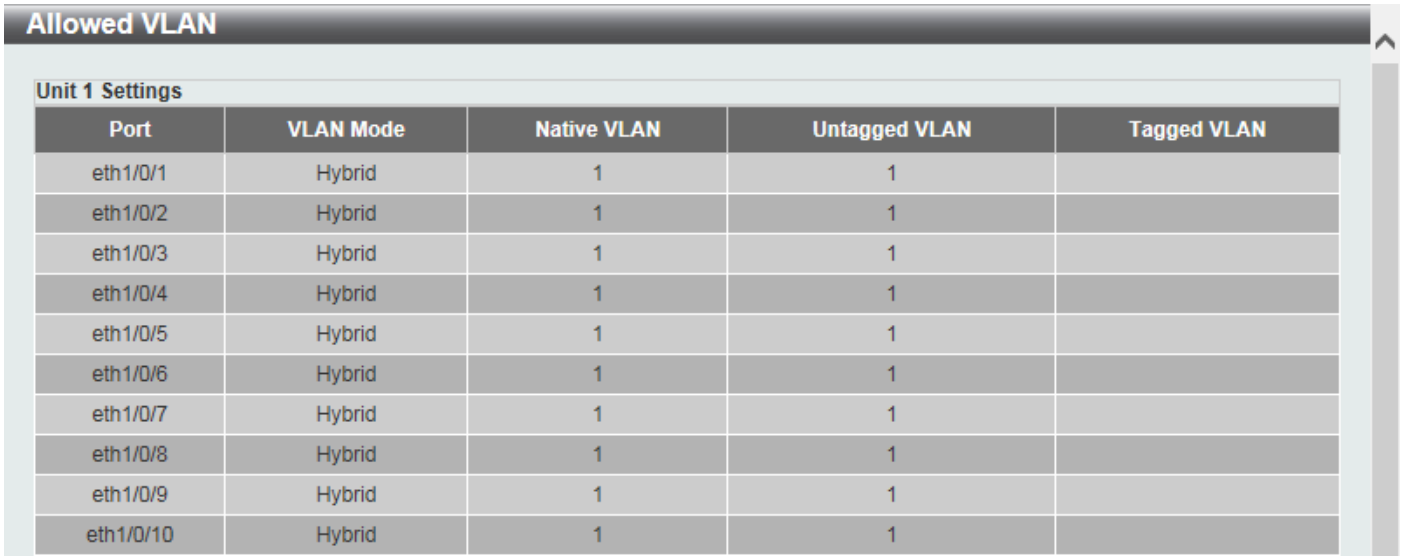


Figure 5-11 Allowed VLAN Window

Configure VLAN

After selecting the **Configure VLAN** option and clicking the **Next** button, the following window will appear.

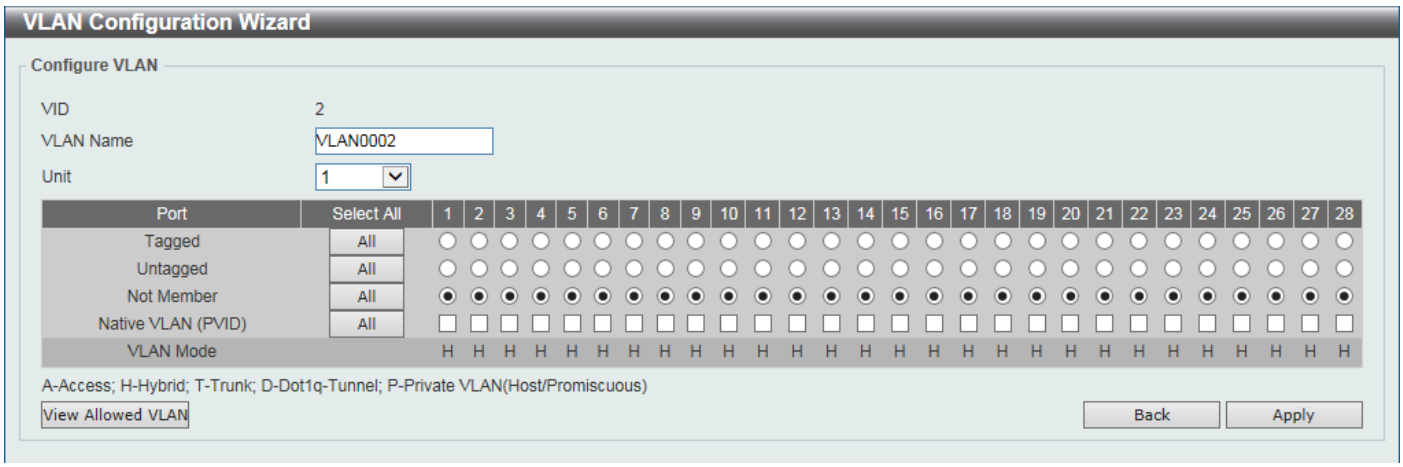


Figure 5-12 VLAN Configuration Wizard (Configure VLAN) Window

The fields that can be configured are described below:

Parameter	Description
VLAN Name	Enter the name for the VLAN here.
Unit	Select the Switch unit that will be used for this configuration here.
Tagged	Select the switch ports that are tagged members of this VLAN here.
Untagged	Select the switch ports that are untagged members of this VLAN here.
Not Member	Select the switch ports that are not members of this VLAN here.
Native VLAN (PVID)	Select the switch ports that support the native VLAN here.

Click the **View Allowed VLAN** button view the allowed VLAN settings.

Click the **Back** button to return to the previous step.

Click the **Apply** button to accept the changes made.

After clicking the **View Allowed VLAN** button, the following window will appear.

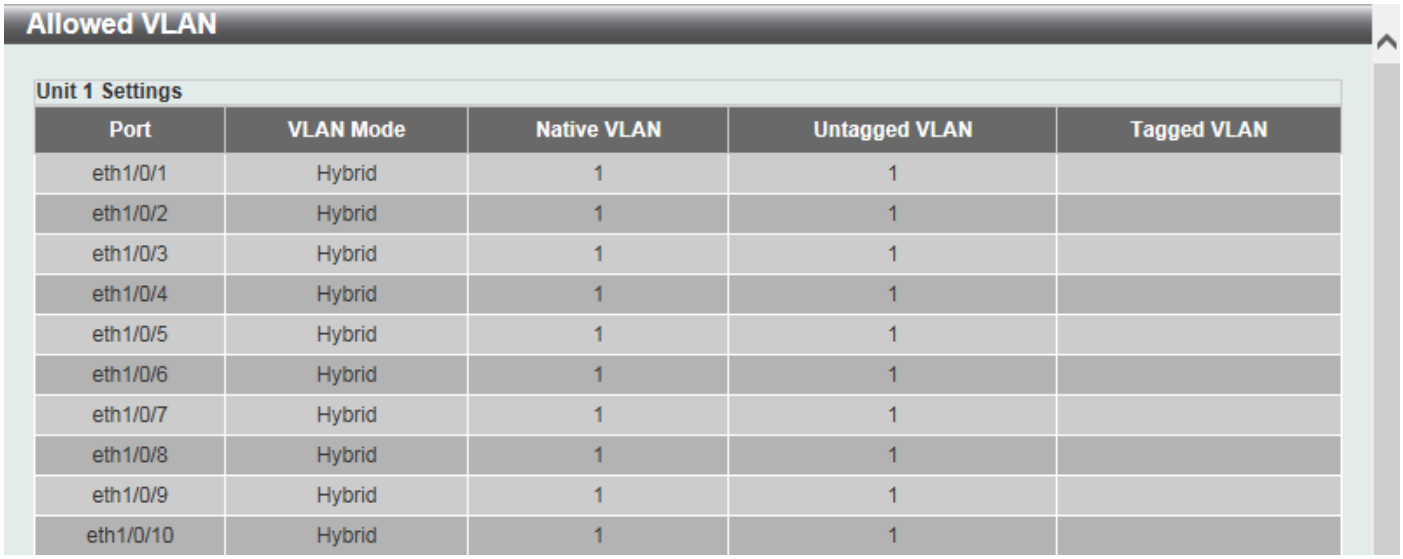


Figure 5-13 Allowed VLAN Window

802.1Q VLAN

This window is used to display and configure the VLAN settings on this Switch.

To view the following window, click **L2 Features > VLAN > 802.1Q VLAN**, as shown below:

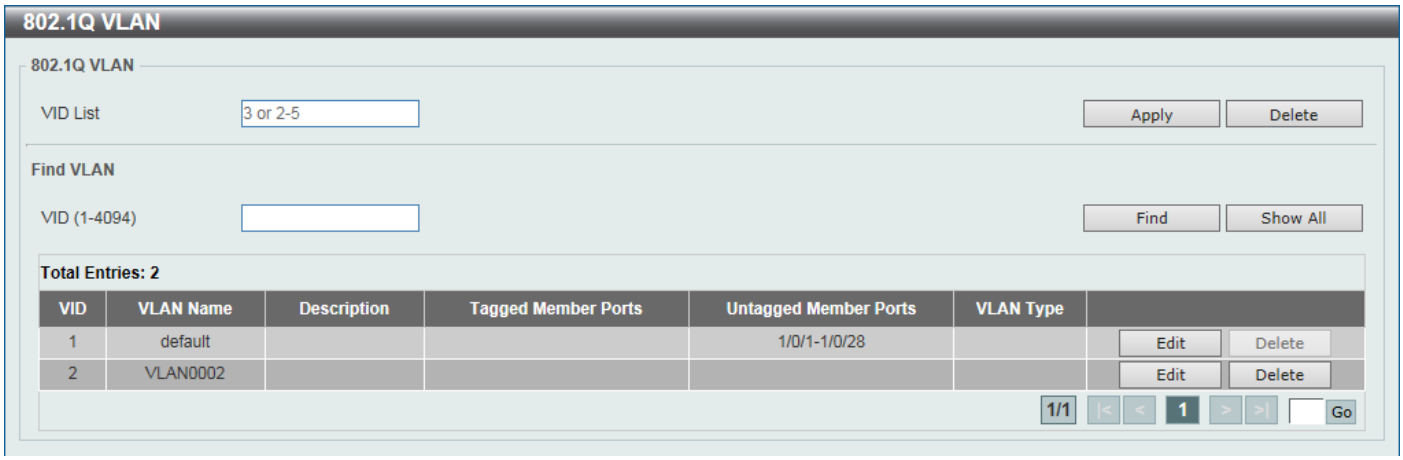


Figure 5-14 802.1Q VLAN Window

The fields that can be configured in **802.1Q VLAN** are described below:

Parameter	Description
VID List	Enter the VLAN ID list that will be created here.

Click the **Apply** button to create a new 802.1Q VLAN.

Click the **Delete** button to remove the 802.1Q VLAN specified.

The fields that can be configured in **Find VLAN** are described below:

Parameter	Description
VID	Enter the VLAN ID that will be displayed here.
VLAN Name	After clicking the **Edit** button, enter the name of the VLAN here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to locate all the entries.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

VLAN Interface

This window is used to display and configure the VLAN interface settings.

To view the following window, click **L2 Features > VLAN > VLAN Interface** and select the **VLAN Interface Settings** tab, as shown below:

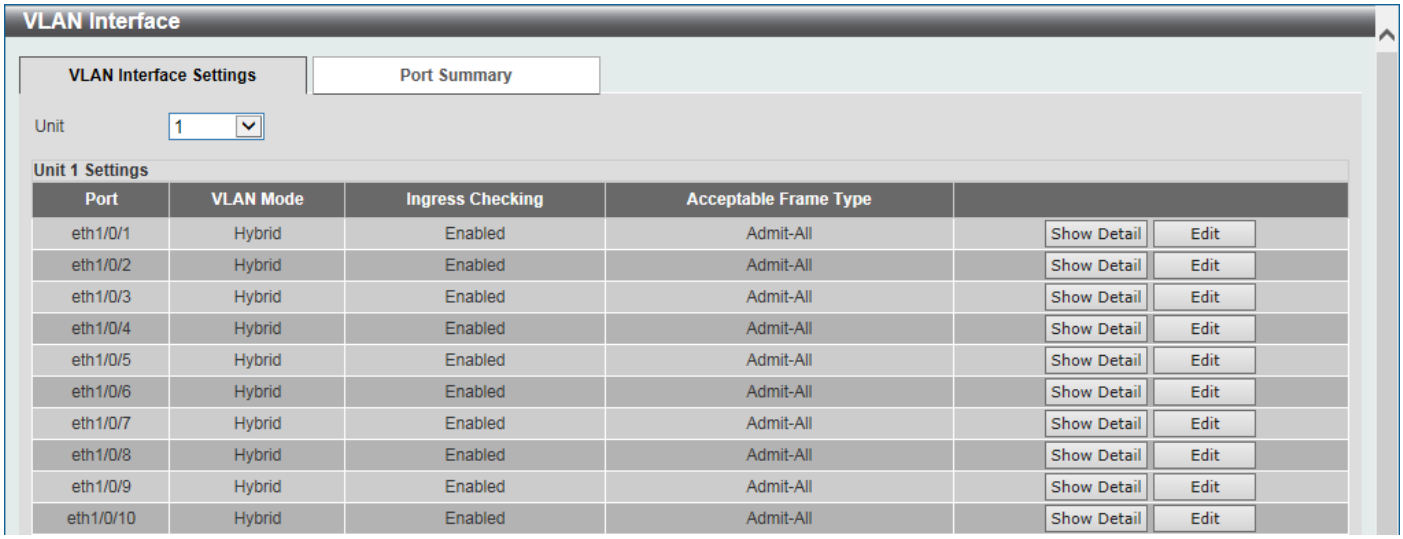


Figure 5-15 VLAN Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Click the **Show Detail** button to view detailed information about the VLAN on the specific interface.

Click the **Edit** button to re-configure the specific entry.

After clicking the **Show Detail** button, the following page will appear.

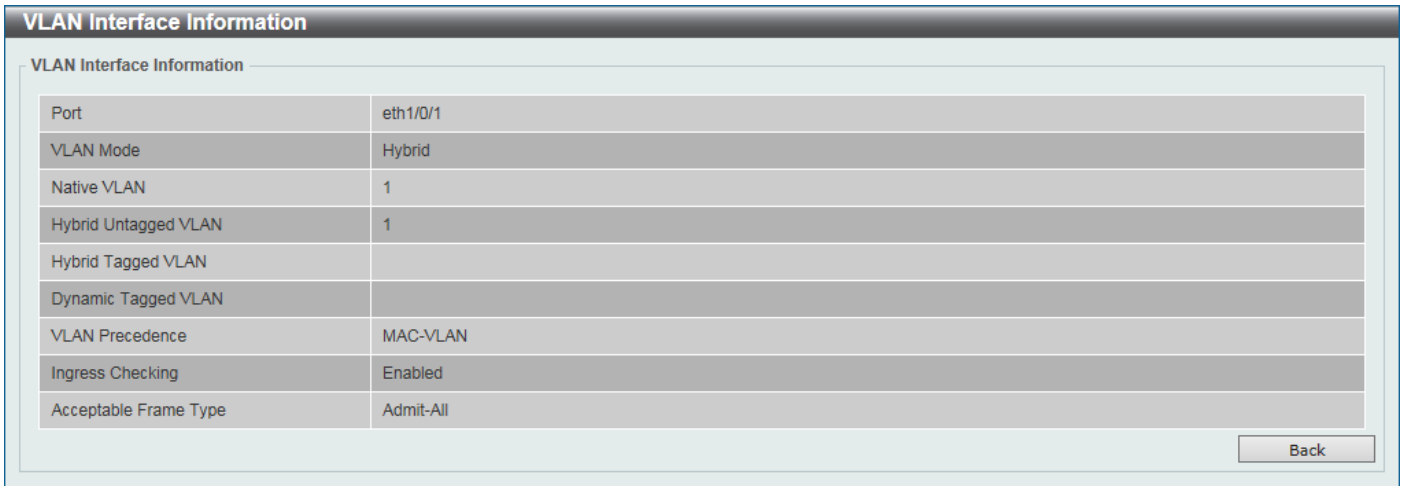


Figure 5-16 VLAN Interface (VLAN Detail) Window

On this page, detailed information about the VLAN of the specific interface is displayed.

Click the **Back** button to return to the previous page.

After click the **Edit** button, the following page will appear. This is a dynamic page that will change when a different **VLAN Mode** is selected.

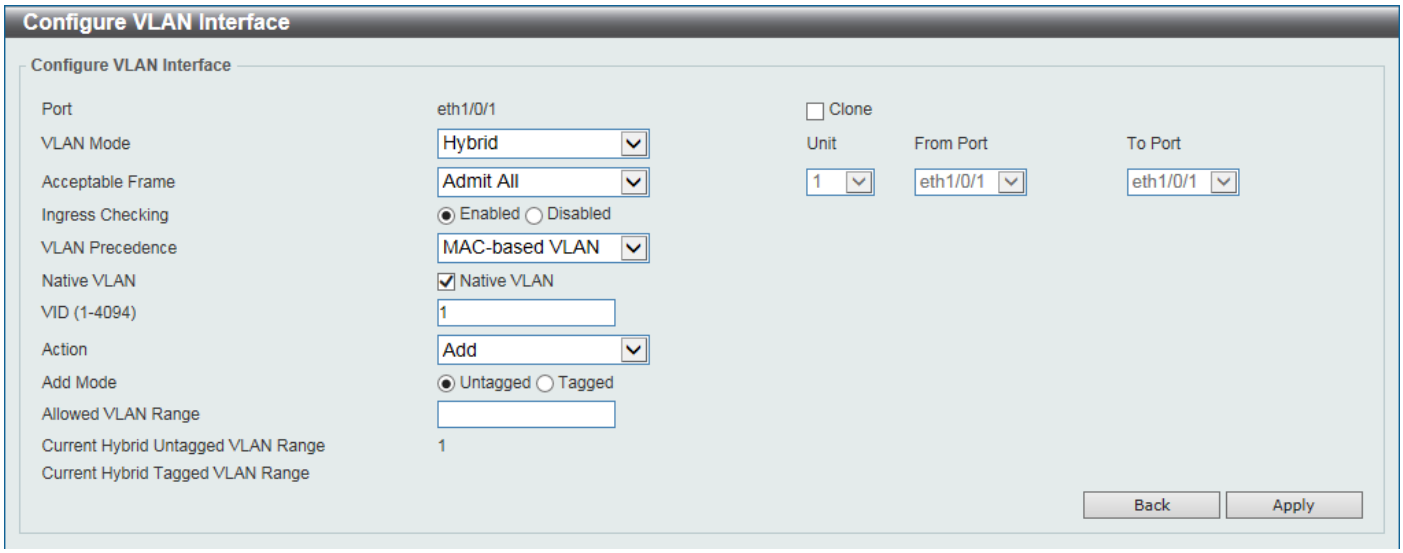


Figure 5-17 VLAN Interface Window

The fields that can be configured are described below:

Parameter	Description
VLAN Mode	Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **Dot1q-Tunnel**, **Promiscuous**, and **Host**.
Acceptable Frame	Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**.
Ingress Checking	Select to enable or disable the ingress checking function.
VLAN Precedence	After selecting **Hybrid** or **Dot1q-Tunnel** under **VLAN Mode**, select the VLAN precedence option here. Options to choose from are **Mac-based VLAN** and **Subnet-based VLAN**.
Native VLAN	After selecting **Hybrid** or **Trunk** under **VLAN Mode**, select this option to enable the native VLAN function.
VID	After selecting **Access**, **Hybrid**, **Trunk**, or **Dot1q-Tunnel** under **VLAN Mode** and selecting the **Native VLAN** option, enter the VLAN ID here. The range is from 1 to 4094.
Action	After selecting **Hybrid**, **Trunk**, or **Dot1q-Tunnel** under **VLAN Mode**, select the action that will be taken here. Options to choose from are **Add**, **Remove**, **Tagged**, and **Untagged**.
Add Mode	After selecting **Hybrid** or **Dot1q-Tunnel** under **VLAN Mode**, select **Untagged** or **Tagged** here.
Allowed VLAN Range	After selecting **Hybrid**, **Trunk**, or **Dot1q-Tunnel** under **VLAN Mode**, enter the allowed VLAN range here.
Clone	Select this option to enable the clone feature.
Unit	Select the unit ID of the Switch in the stack here.
From Port - To Port	Select the range of ports that will be used in the clone feature here.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To view the following window, select the **Port Summary** tab, as shown below:

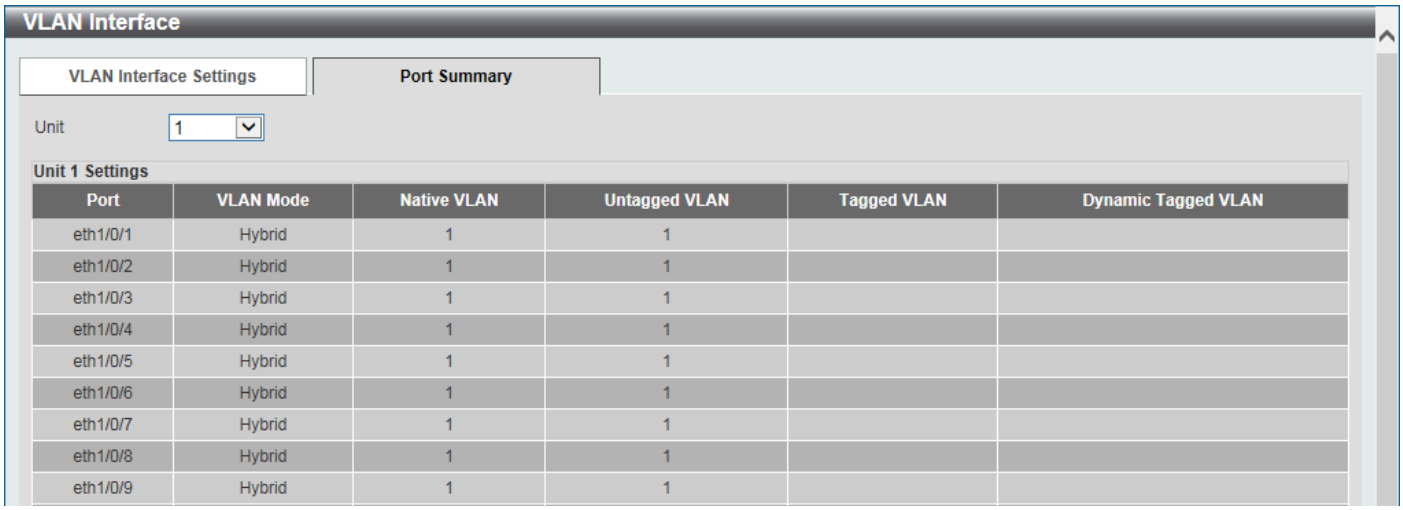


Figure 5-18 Port Summary Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

802.1v Protocol VLAN

Protocol VLAN Profile

This window is used to display and configure 802.1v protocol VLAN profiles. The 802.1v Protocol VLAN group settings support multiple VLANs for each protocol and allow the user to configure untagged ports of different protocols on the same physical port. For example, it allows the user to configure an 802.1Q and 802.1v untagged port on the same physical port.

To view the following window, click **L2 Features > VLAN > 802.1v Protocol VLAN > Protocol VLAN Profile**, as shown below:

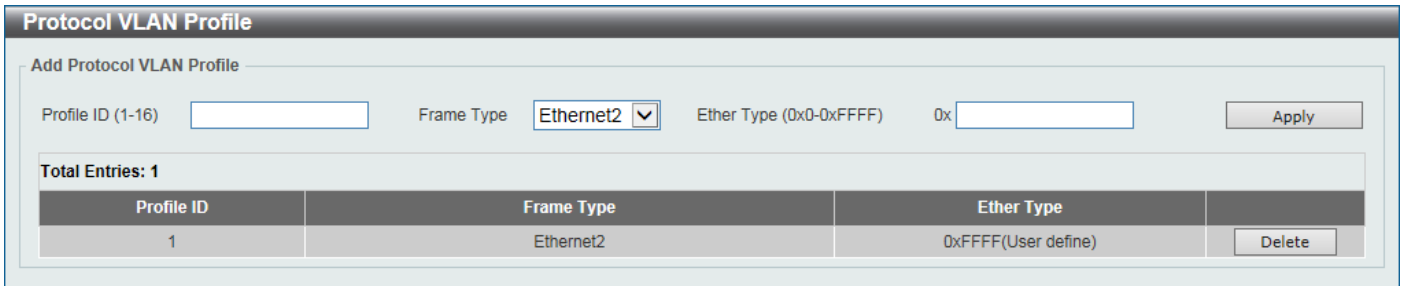


Figure 5-19 Protocol VLAN Profile Window

The fields that can be configured are described below:

Parameter	Description
Profile ID	Enter the 802.1v protocol VLAN profile ID here. The range is from 1 to 16.
Frame Type	Select the frame type option here. This function maps packets to protocol-defined VLANs by examining the type octet within the packet header to discover the type of protocol associated with it. Options to choose from are **Ethernet 2**, **SNAP**, and **LLC**.

Parameter	Description
Ether Type	Enter the Ethernet type value for the group here. The protocol value is used to identify a protocol of the frame type specified. The range is from 0x0 to 0xFFFF. Depending on the frame type, the octet string will have one of the following values: • For **Ethernet2**, this is a 16-bit (2-octet) hex value. For example, IPv4 is 0800, IPv6 is 86DD, ARP is 0806, etc. • For IEEE802.3 **SNAP**, this is a 16-bit (2-octet) hex value. • For IEEE802.3 **LLC**, this is a 2-octet IEEE 802.2 Link Service Access Point (LSAP) pair. The first octet is for Destination Service Access Point (DSAP) and the second octet is for Source.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Protocol VLAN Profile Interface

This window is used to display and configure the protocol VLAN profile interface settings.

To view the following window, click **L2 Features > VLAN > 802.1v Protocol VLAN > Protocol VLAN Profile Interface**, as shown below:

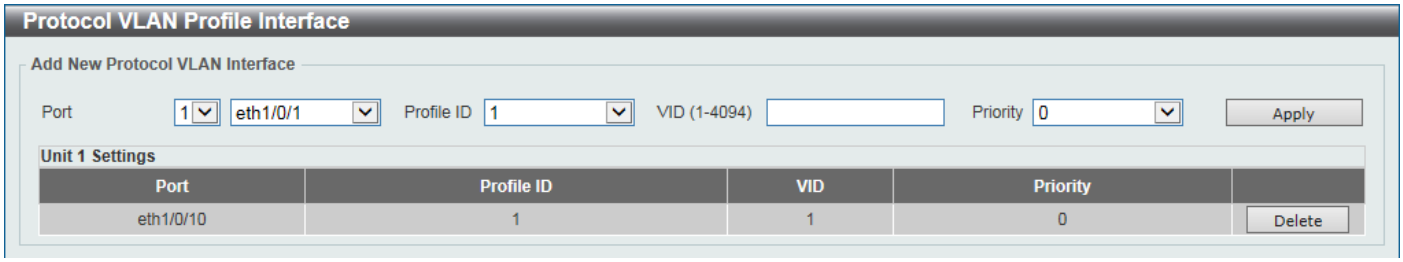


Figure 5-20 Protocol VLAN Profile Interface Window

The fields that can be configured are described below:

Parameter	Description
Port	Select the stacking unit ID and the port number of the Switch that will be configured here.
Profile ID	Select the 802.1v protocol VLAN profile ID here.
VID	Enter the VLAN ID used here.
Priority	Select the priority value used here. The range is from 0 to 7. This parameter is specified to rewrite the 802.1p default priority previously set in the Switch, which is used to determine the CoS queue that packets are forwarded to. Once this field is specified, packets accepted by the Switch that match this priority are forwarded to the CoS queue specified previously.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

GVRP

GVRP Global

This window is used to display and configure the global GARP VLAN Registration Protocol (GVRP) settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Global**, as shown below:

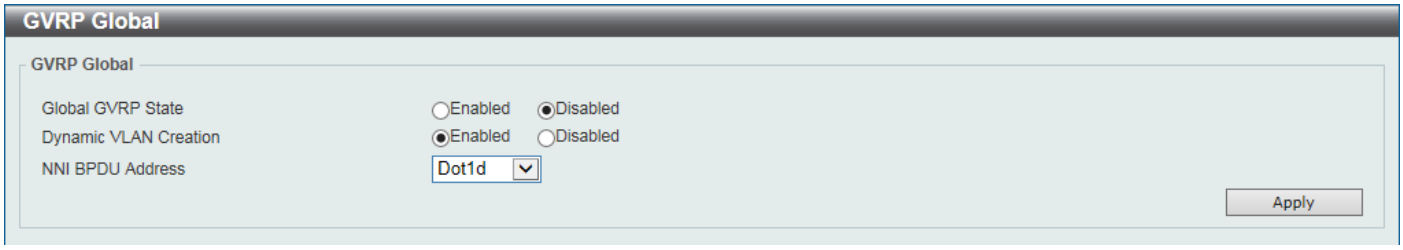


Figure 5-21 GVRP Global Window

The fields that can be configured are described below:

Parameter	Description
Global GVRP State	Select to enable or disable the global GVRP state here.
Dynamic VLAN Creation	Select to enable or disable the dynamic VLAN creation function here.
NNI BPDU Address	Select the NNI BPDU address option here. This option is used to determine the BPDU protocol address for GVRP in customer networks. It can use 802.1d GVRP address or 802.1ad service provider GVRP address. Options to choose from are **Dot1d** and **Dot1ad**.

Click the **Apply** button to accept the changes made.

GVRP Port

This window is used to display and configure the GVRP port settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Port**, as shown below:

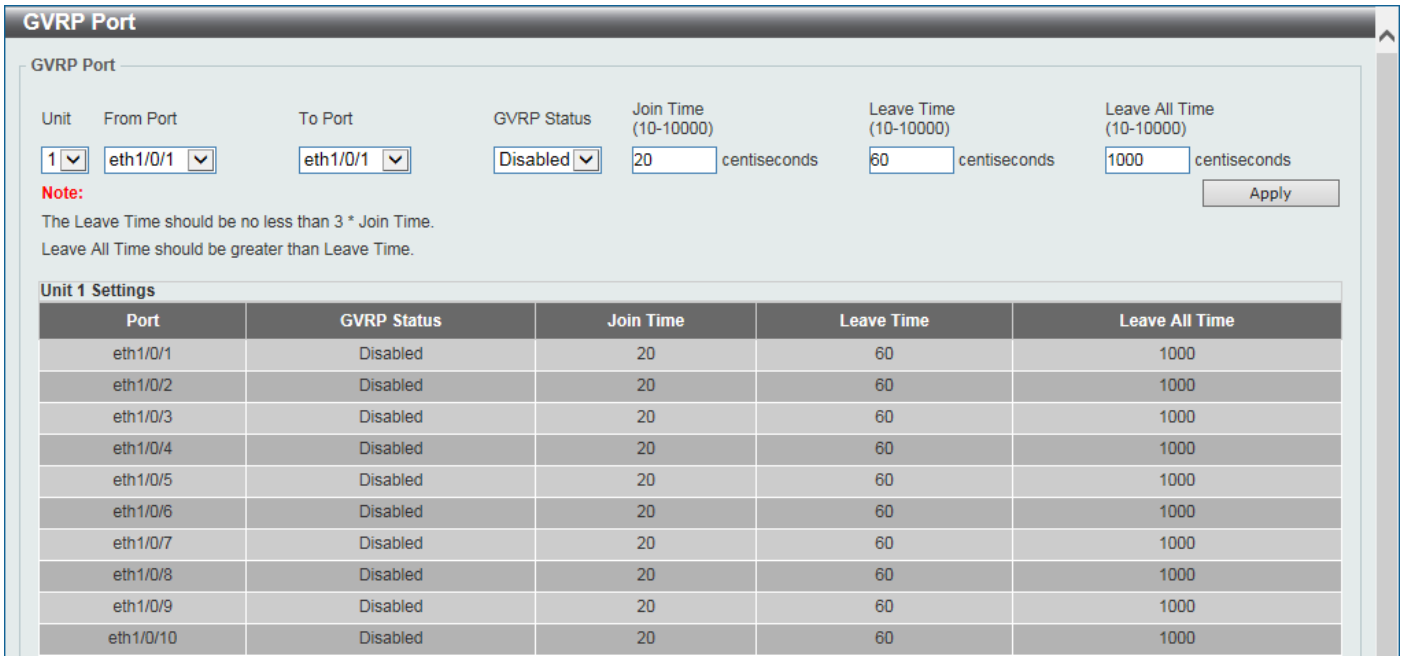


Figure 5-22 GVRP Port Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
GVRP Status	Select the enable or disable the GVRP port status. This enables the port to dynamically become a member of a VLAN. By default, this option is disabled.
Join Time	Enter the Join Time value in centiseconds. The range is from 10 to 10000 centiseconds. By default, this value is 20 centiseconds.
Leave Time	Enter the Leave Time value in centiseconds. The range is from 10 to 10000 centiseconds. By default, this value is 60 centiseconds.
Leave All Time	Enter the Leave All Time value in centiseconds. The range is from 10 to 10000 centiseconds. By default, this value is 1000 centiseconds.

Click the **Apply** button to accept the changes made.

GVRP Advertise VLAN

This window is used to display and configure the GVRP Advertise VLAN settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Advertise VLAN**, as shown below:

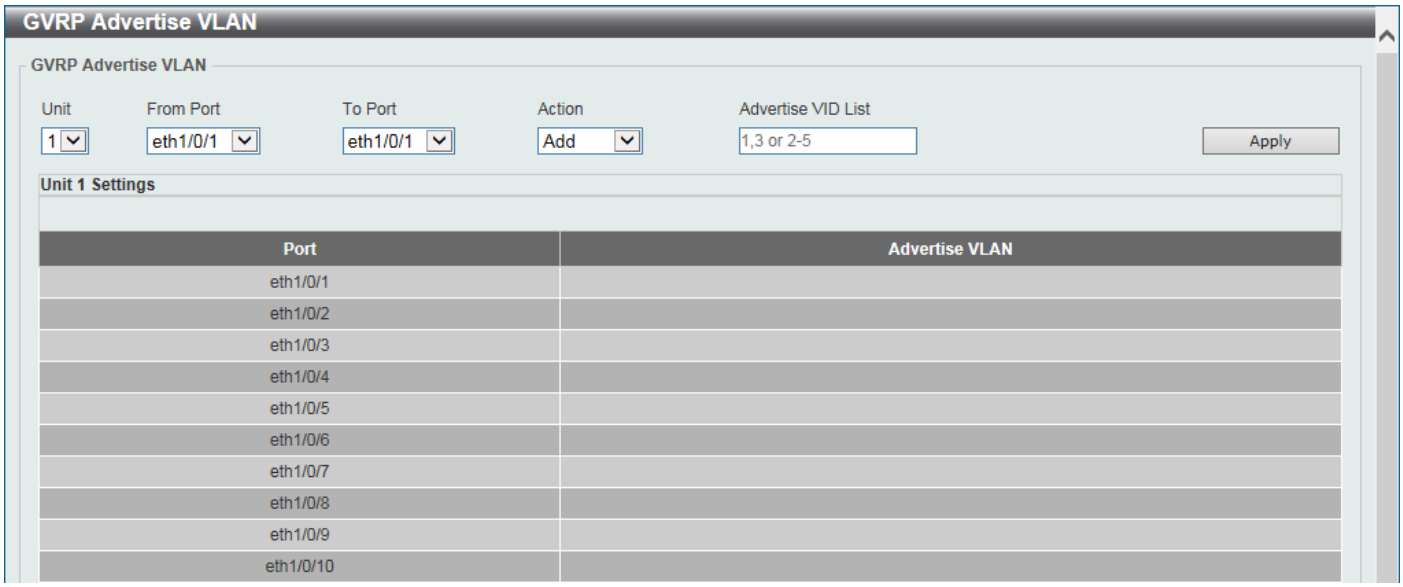


Figure 5-23 GVRP Advertise VLAN Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Action	Select the advertised VLAN to port mapping action here. Options to choose from are **All**, **Add**, **Remove**, and **Replace**. When selecting **All**, all the advertised VLANs will be used.
Advertise VID List	Enter the advertised VLAN ID list here.

Click the **Apply** button to accept the changes made.

GVRP Forbidden VLAN

This window is used to display and configure the GVRP forbidden VLAN settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Forbidden VLAN**, as shown below:

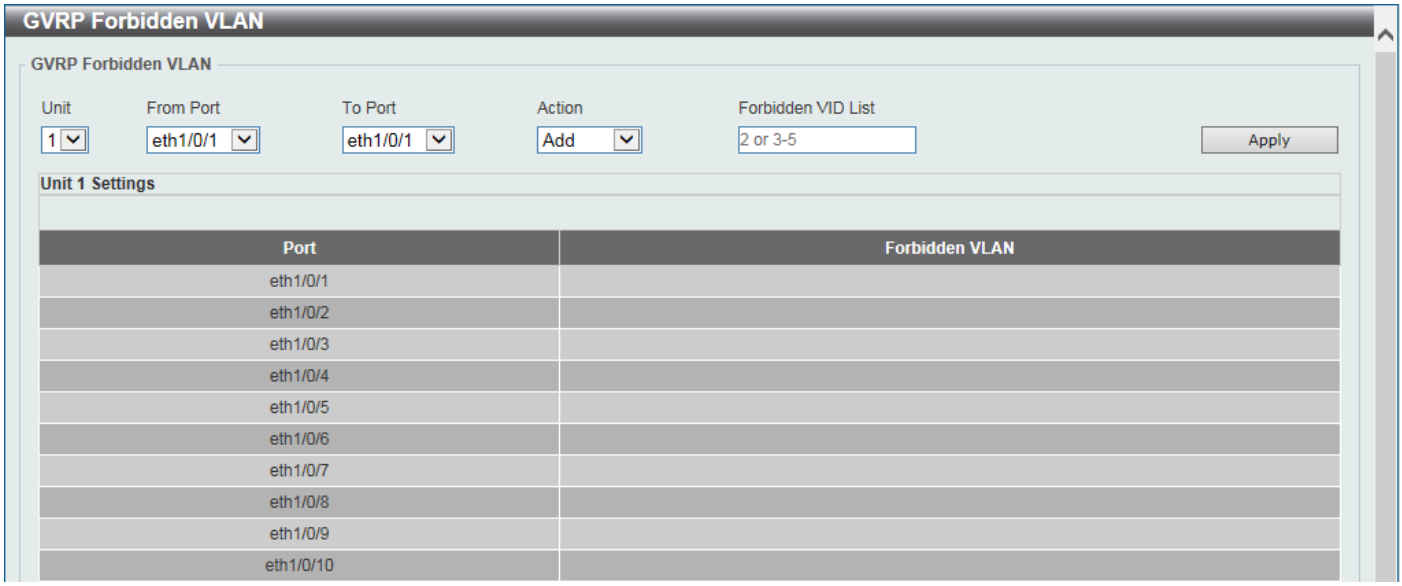


Figure 5-24 GVRP Forbidden VLAN Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Action	Select the forbidden VLAN to port mapping action that will be taken here. Options to choose from are **All**, **Add**, **Remove**, and **Replace**. When selecting **All**, all the forbidden VLANs will be used.
Forbidden VID List	Enter the forbidden VLAN ID list here.

Click the **Apply** button to accept the changes made.

GVRP Statistics Table

This window is used to view GVRP statistics information.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Statistics Table**, as shown below:

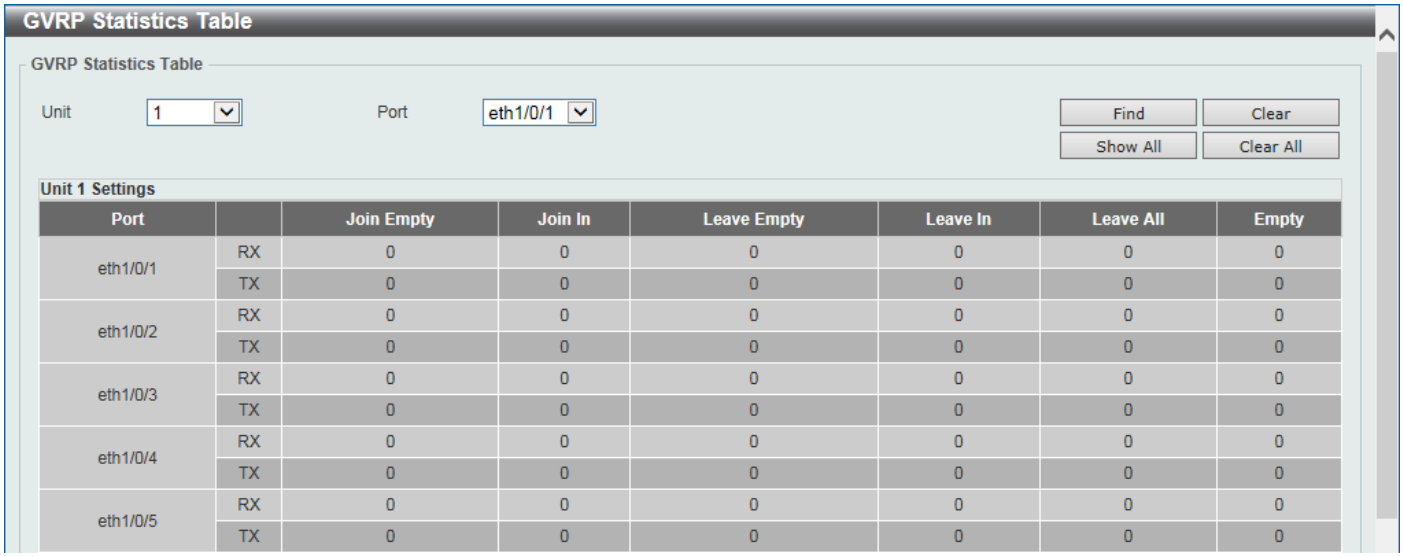


Figure 5-25 GVRP Statistics Table Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit to be displayed here.
Port	Select the port number to display GVRP statistic information for here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear all the information for the specific port.

Click the **Show All** button to view all GVRP statistic information.

Click the **Clear All** button to clear all the information in this table.

Asymmetric VLAN

This window is used to display and configure the asymmetric VLAN settings.

To view the following window, click **L2 Features > VLAN > Asymmetric VLAN**, as shown below:

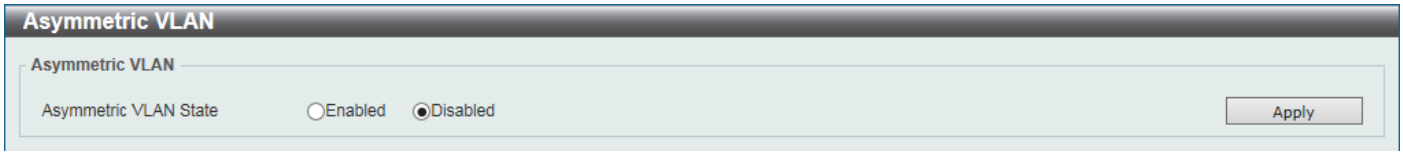


Figure 5-26 Asymmetric VLAN Window

The fields that can be configured are described below:

Parameter	Description
Asymmetric VLAN State	Select to enable or disable the asymmetric VLAN feature here.

Click the **Apply** button to accept the changes made.

MAC VLAN

This window is used to display and configure the MAC-based VLAN information. When a static MAC-based VLAN entry is configured, the VLAN operating on the port will be changed.

To view the following window, click **L2 Features > VLAN > MAC VLAN**, as shown below:

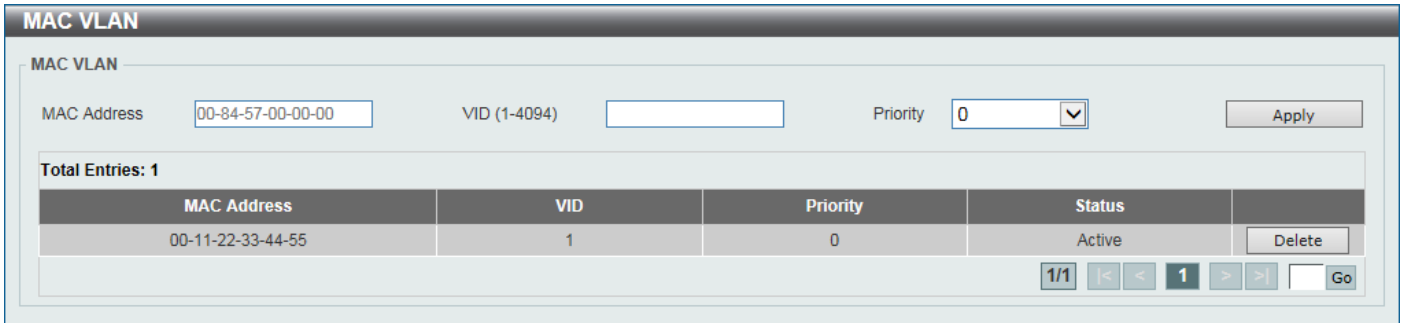


Figure 5-27 MAC VLAN Window

The fields that can be configured are described below:

Parameter	Description
MAC Address	Enter the unicast MAC address.
VID	Enter the VLAN ID that will be used.
Priority	Select the priority that is assigned to untagged packets. The range is from 0 to 7.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

L2VLAN Interface Description

This window is used to display and configure the Layer 2 VLAN interface description.

To view the following window, click **L2 Features > VLAN > L2VLAN Interface Description**, as shown below:

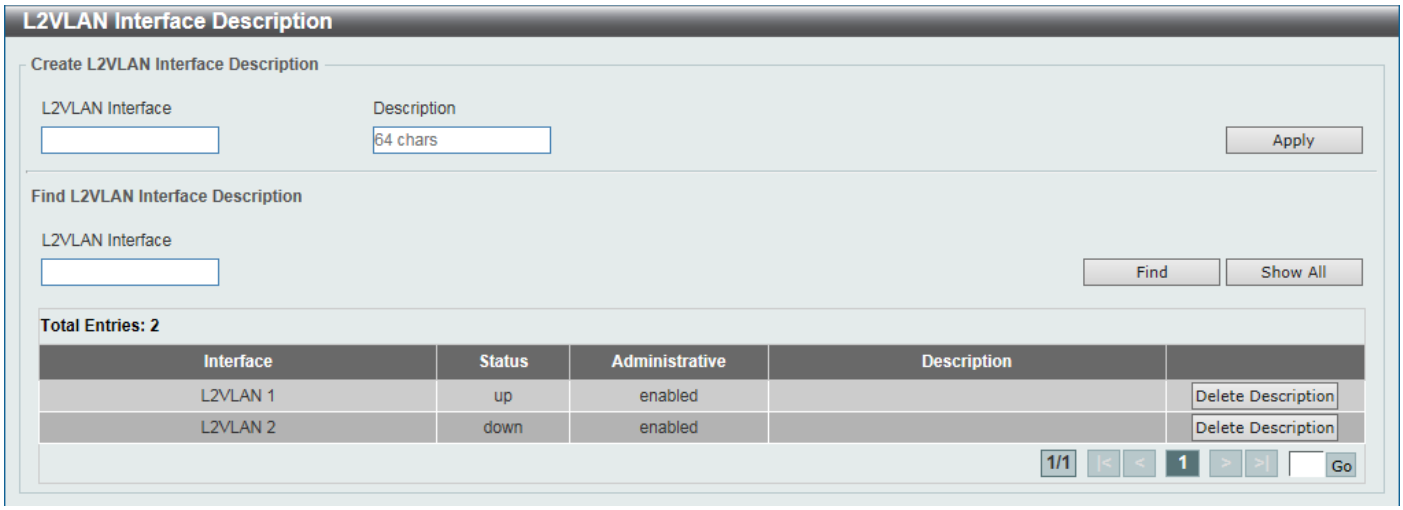


Figure 5-28 L2VLAN Interface Description Window

The fields that can be configured are described below:

Parameter	Description
L2VLAN Interface	Enter the Layer 2 VLAN interface ID here.
Description	Enter the Layer 2 VLAN interface description here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to generate the display based on the information entered.

Click the **Show All** button to display all the available entries.

Click the **Delete Description** button to remove the description from the specified Layer 2 VLAN.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Subnet VLAN

This window is used to display and configure the subnet VLAN settings. A subnet VLAN entry is an IP subnet-based VLAN classification rule. If an untagged or priority-tagged IP packet is received on a port, its source IP address will be used to match the subnet VLAN entries. If the source IP is in the subnet of an entry, the packet will be classified to the VLAN defined for this subnet.

To view the following window, click **L2 Features > VLAN > Subnet VLAN**, as shown below:

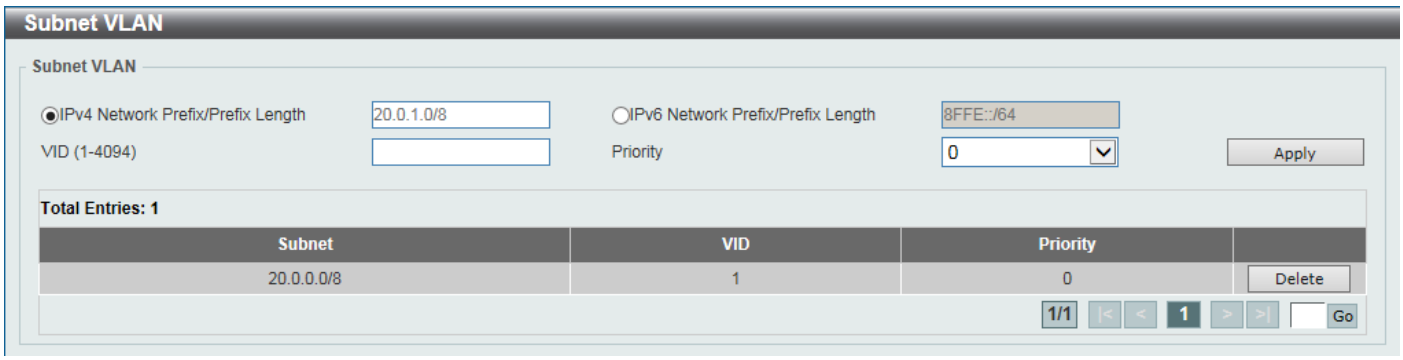


Figure 5-29 Subnet VLAN Window

The fields that can be configured are described below:

Parameter	Description
IPv4 Network Prefix / Prefix Length	Select and enter the IPv4 address and prefix length value for the subnet VLAN here.
IPv6 Network Prefix / Prefix Length	Select and enter the IPv6 address and prefix length value for the subnet VLAN here.
VID	Enter the VLAN ID for the subnet VLAN here.
Priority	Select the priority value used here. The range is from 0 to 7. A higher value takes higher priority.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Super VLAN

This window is used to display and configure the super VLAN settings. This is used to specify a VLAN as a super VLAN. Super VLANs are used to aggregate multiple sub-VLANs (Layer 2 broadcast domains) into an IP subnet. A

super VLAN cannot have any physical member port. A super VLAN cannot be a sub-VLAN at the same time. Once an IP interface is bound to a super VLAN, the proxy ARP will be enabled automatically on the interface for communication between its sub-VLANs. Multiple super VLANs can be configured and each super VLAN can consist of multiple sub-VLANs.

Private VLAN and super VLAN are mutually exclusive. A private VLAN cannot be configured as a super VLAN. Layer 3 routing protocols, multicast protocols, and the IPv6 protocol cannot run on a super VLAN interface.

To view the following window, click **L2 Features > VLAN > Super VLAN**, as shown below:

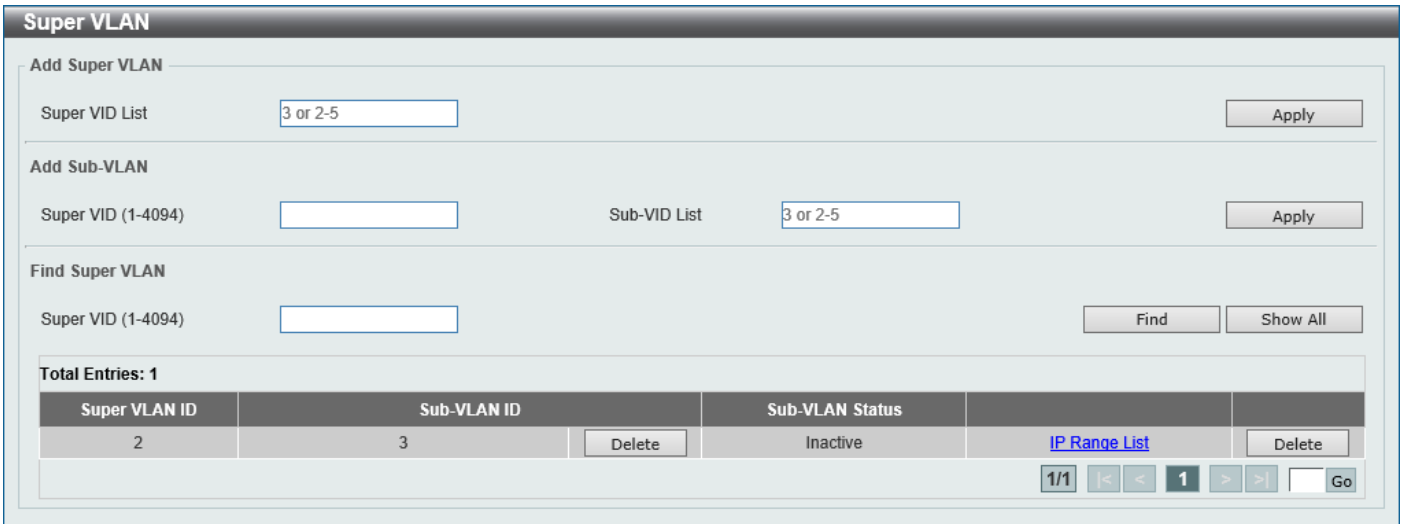


Figure 5-30 Super VLAN Window

The fields that can be configured in **Add Super VLAN** are described below:

Parameter	Description
Super VID List	Enter the super VLAN ID(s) that will be created here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Add Sub VLAN** are described below:

Parameter	Description
Super VID	Enter the super VLAN ID that will be associated with the sub-VLAN(s) here. The range is from 1 to 4094.
Sub-VID List	Enter the sub-VLAN ID(s) that will be associated with the super VLAN here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find Super VLAN** are described below:

Parameter	Description
Super VID	Enter the super VLAN ID that will be displayed here. The range is from 1 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the available entries.

Click the **Delete** button to remove the specific entry or to remove the sub-VLAN from the super VLAN.

Click the IP Range List link to add an IP range to the sub-VLAN.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the IP Range List link, the following page will be available.

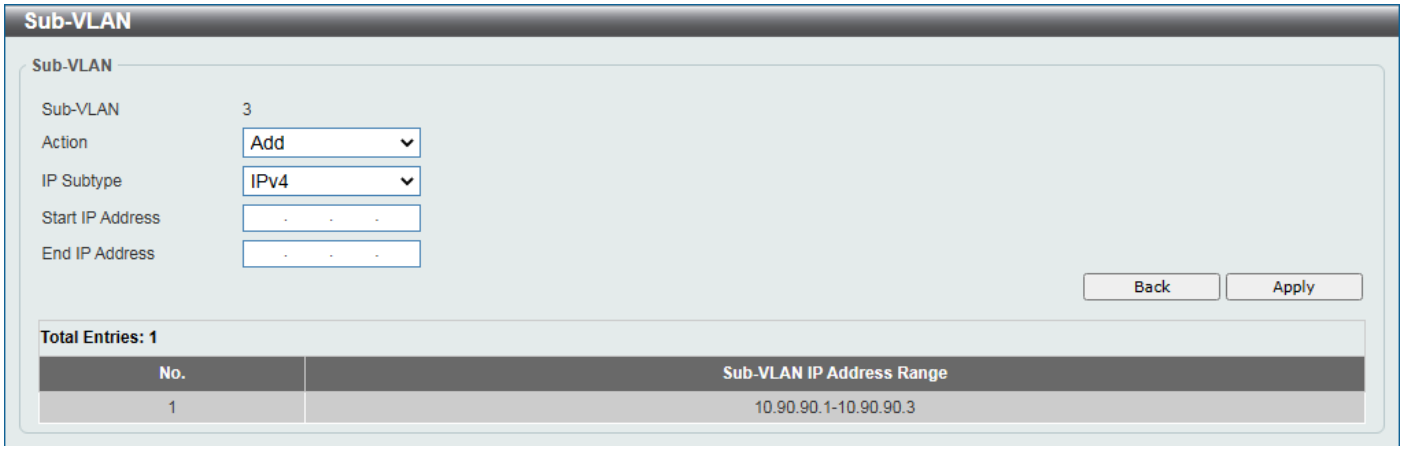


Figure 5-31 Super VLAN (IP Range List) Window

The fields that can be configured are described below:

Parameter	Description
Action	Select the action that will be taken here. Options to choose from are **Add** and **Remove**.
IP Subtype	Select the IP address type here. Options to choose from are **IPv4** and **IPv6**.
Start IP Address	Enter the starting IP address in the range of this sub-VLAN here.
End IP Address	Enter the ending IP address in the range of this sub-VLAN here.

Click the **Back** button to return to the previous page.

Click the **Apply** button to accept the changes made.

Auto Surveillance VLAN

Auto Surveillance Properties

This window is used to display and configure the auto surveillance VLAN properties.

To view the following window, click **L2 Features > VLAN > Auto Surveillance VLAN > Auto Surveillance Properties**, as shown below:

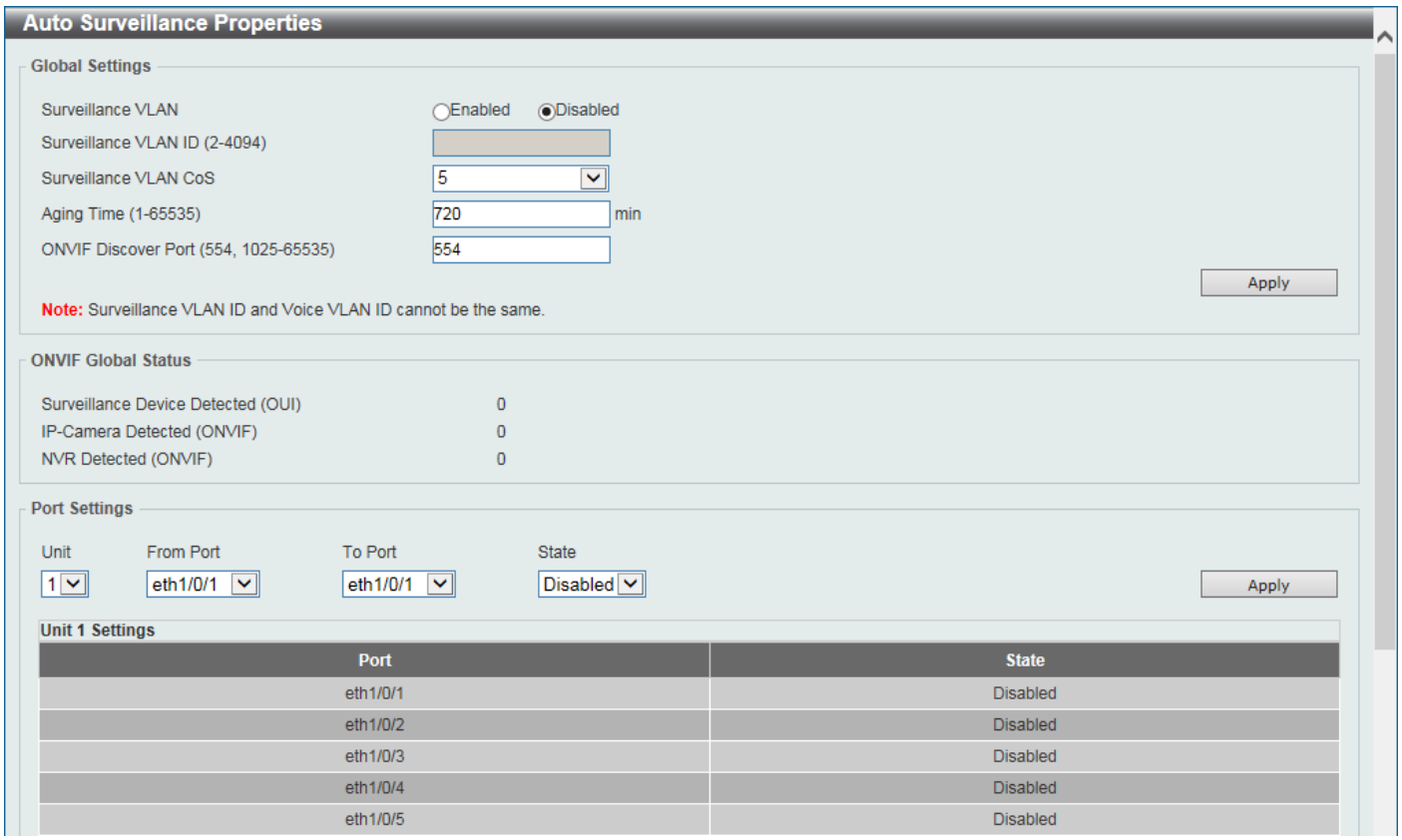


Figure 5-32 Auto Surveillance Properties Window

The fields that can be configured in **Global Settings** are described below:

Parameter	Description
Surveillance VLAN	Select to enable or disable the surveillance VLAN feature here.
Surveillance VLAN ID	Enter the VLAN ID of the surveillance VLAN here. The range is from 2 to 4094. A normal VLAN needs to be created before assigning the VLAN as a surveillance VLAN.
Surveillance VLAN CoS	Enter the Class of Service (CoS) value for the surveillance VLAN here. The surveillance packets arriving at the surveillance VLAN enabled port are marked with the CoS specified here. The remarking of CoS allows the surveillance VLAN traffic to be distinguished from data traffic in quality of service. The range is from 0 to 7.
Aging Time	Enter the aging time value here. This is used to configure the aging time for aging out the surveillance VLAN dynamic member ports. The range is from 1 to 65535 minutes. When the last surveillance device connected to the port stops sending traffic and the MAC address of this surveillance device is aged out, the surveillance VLAN aging timer will be started. The port will be removed from the surveillance VLAN after expiration of surveillance VLAN aging timer. If the surveillance traffic resumes during the aging time, the aging timer will be cancelled.

Parameter	Description
ONVIF Discover Port	Enter the TCP/UDP port number for RTSP stream snooping. The range is 554, or from 1025 to 65535.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the surveillance VLAN feature. When surveillance VLAN is enabled for a port, the port will automatically be learned as an untagged surveillance VLAN member and the received untagged surveillance packets will be forwarded to the surveillance VLAN. The received packets are determined as surveillance packets if the source MAC addresses of the packets comply with the Organizationally Unique Identifier (OUI) addresses.

Click the **Apply** button to accept the changes made.

MAC Settings and Surveillance Device

This window is used to display and configure surveillance devices and their MAC settings.

To view the following window, click **L2 Features > VLAN > Auto Surveillance VLAN > MAC Settings and Surveillance Device** and select the **User-defined MAC Settings** tab, as shown below:

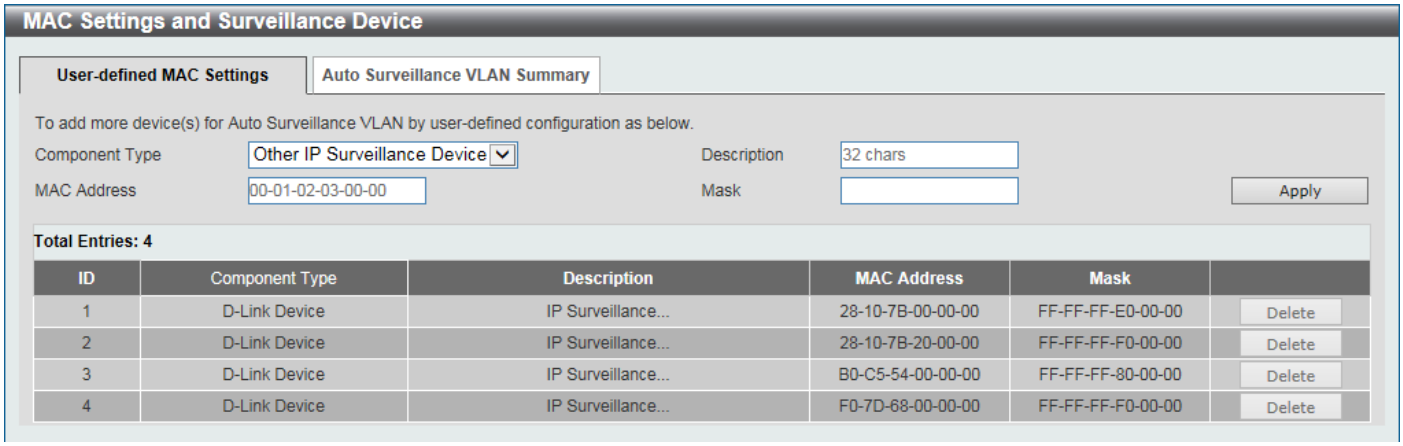


Figure 5-33 MAC Settings and Surveillance Device Window

The fields that can be configured are described below:

Parameter	Description
Component Type	Select the component type here. Option to choose from are: • **Video Management server** - Specifies the surveillance device type as Video Management Server (VMS). • **VMS Client/Remote Viewer** - Specifies the surveillance device type as VMS client. • **Video Encoder** - Specifies the surveillance device type as Video Encoder. • **Network Storage** - Specifies the surveillance device type as Network Storage. • **Other IP Surveillance Device** - Specifies the surveillance device type as other IP Surveillance Devices.

Parameter	Description
Description	Enter the description for the user-defined OUI here. This string can be up to 32 characters long.
MAC Address	Enter the OUI MAC address here. If the source MAC addresses of the received packet matches any of the OUI pattern, the received packet is determined as a surveillance packet.
Mask	Enter the matching bitmask for the OUI MAC address here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

To view the following window, select the **Auto Surveillance VLAN Summary** tab, as shown below:

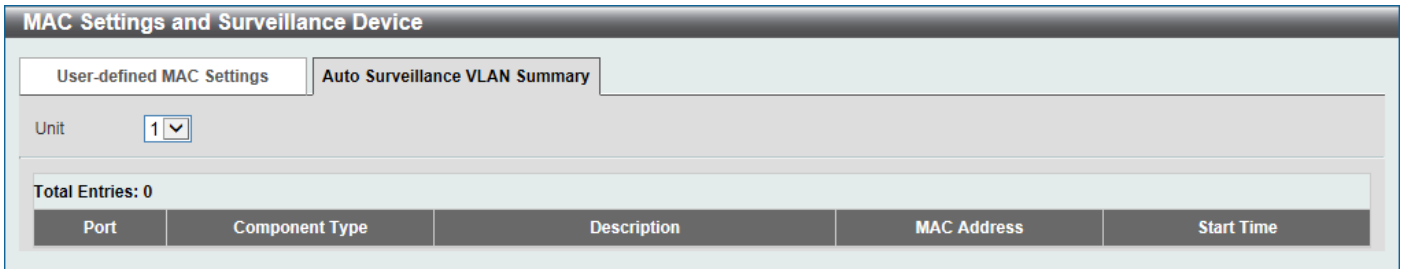


Figure 5-34 MAC Settings and Surveillance Device (Auto Surveillance VLAN Summary) Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be used in this display here.

ONVIF NVR IP-Camera Information

This window is used to display and configure the ONVIF IP camera information.

To view the following window, click **L2 Features > VLAN > Auto Surveillance VLAN > ONVIF IP-Camera Information**, as shown below:

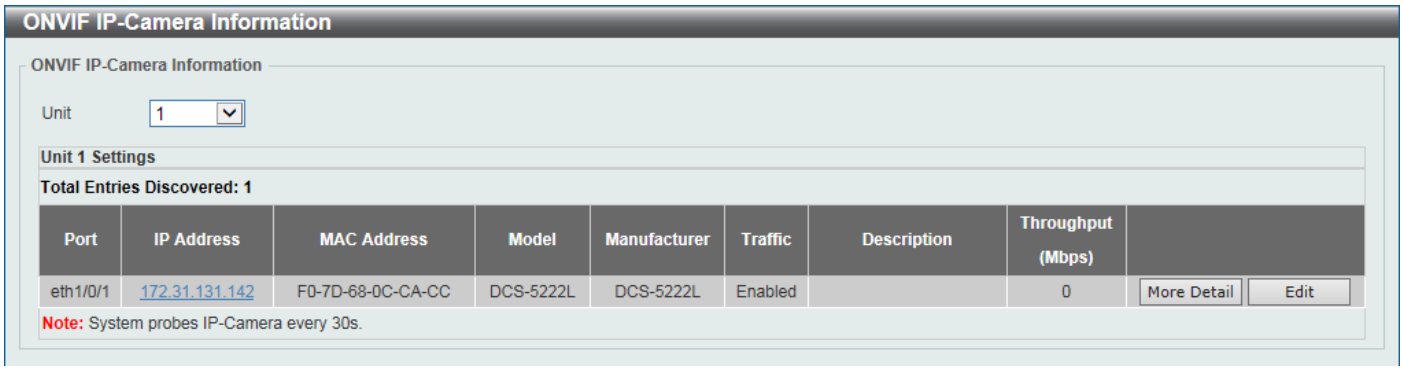


Figure 5-35 ONVIF IP-Camera Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be used in this display here.

Click the IP address hyperlink to connect to the Web Interface of the NVR.

Click the **More Detail** button to view more detailed information about the specified IP camera.

Click the **Edit** button to configure the description of the NVR.

After click the **More Detail** button, the following window will appear.

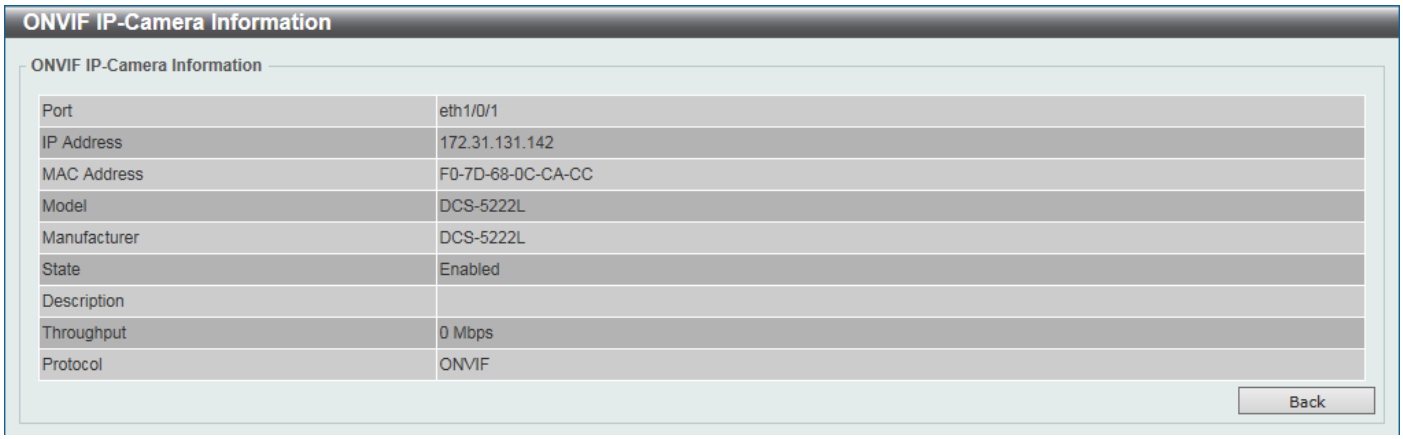


Figure 5-36 ONVIF IP-Camera Information (More Detail) Window

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

After click the **Edit** button, the following window will appear.

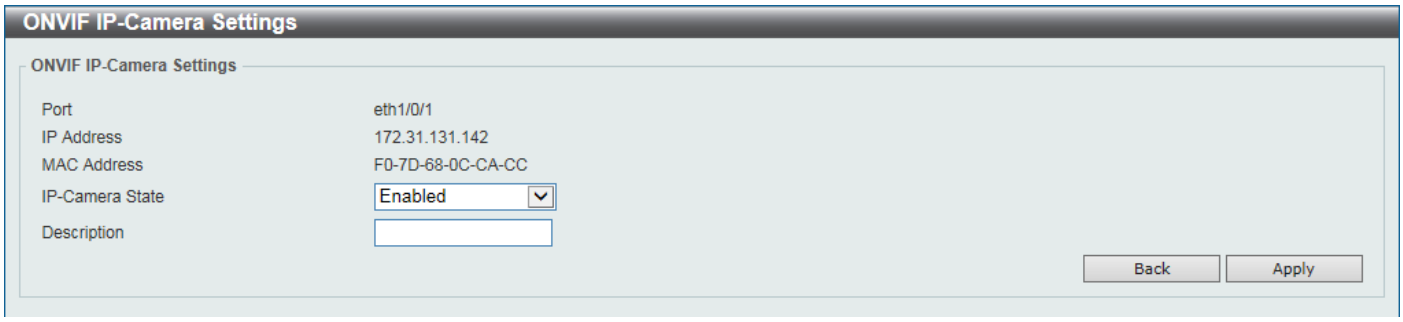


Figure 5-37ONVIF IP-Camera Information (Edit) Window

The fields that can be configured are described below:

Parameter	Description
IP-Camera State	Select to enable or disable the IP camera.
Description	Enter the description for the IP camera.

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

Click the **Apply** button to accept the changes made.

ONVIF NVR Information

This window is used to display and configure the ONVIF Network Video Recorder (NVR) information.

To view the following window, click **L2 Features > VLAN > Auto Surveillance VLAN > ONVIF NVR Information**, as shown below:

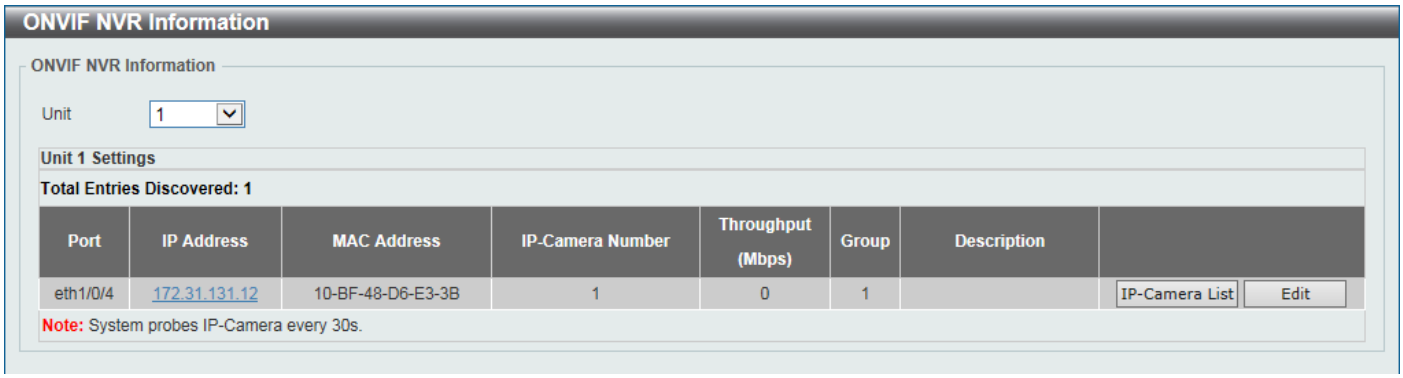


Figure 5-38 ONVIF NVR Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the stacking unit ID of the Switch that will be configured here.

Click the IP address hyperlink to connect to the Web Interface of the NVR.

Click the **IP-Camera List** button to view the list of IP cameras that are connected to the NVR.

Click the **Edit** button to configure the description of the NVR.

After click the **IP-Camera List** button, the following window will appear.

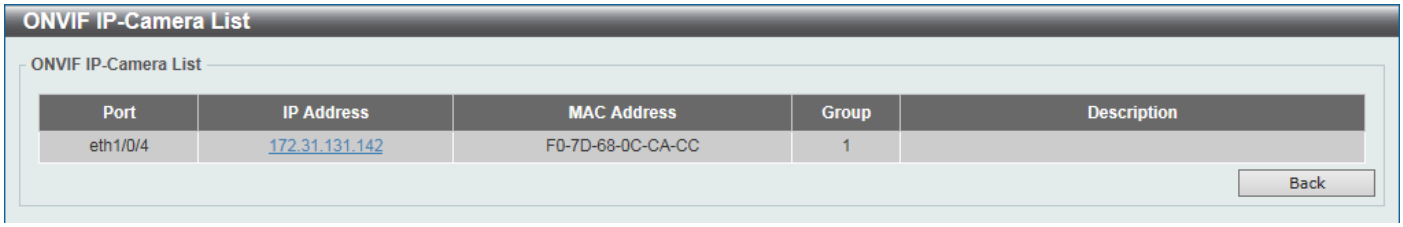


Figure 5-39 ONVIF NVR Information (IP-Cameral List) Window

Click the IP address hyperlink to connect to the Web Interface of the IP camera.

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

After click the **Edit** button, the following window will appear.

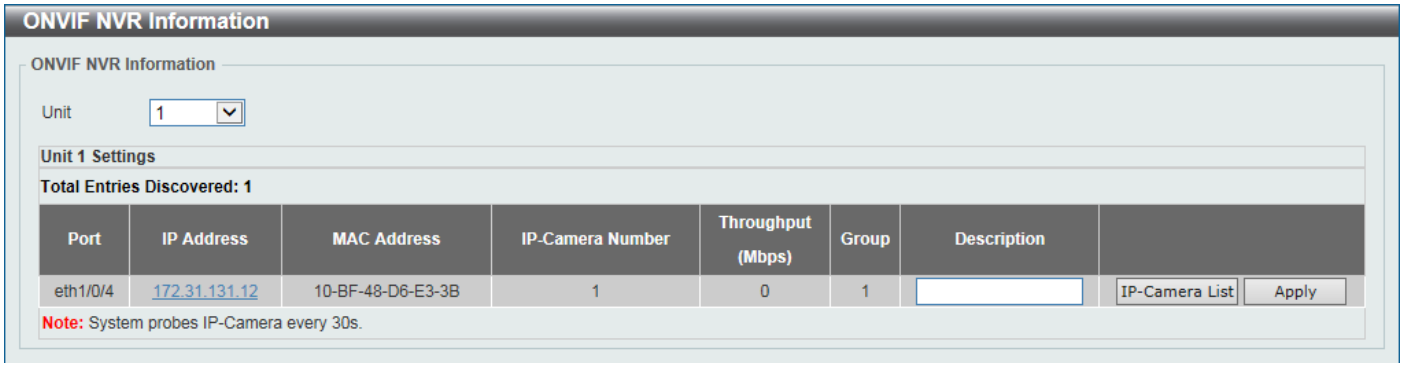


Figure 5-40 ONVIF NVR Information (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Description	Enter the description for this NVR here.

Click the **Apply** button to accept the changes made.

Voice VLAN

Voice VLAN Global

This window is used to display and configure the global voice VLAN settings. This is used to enable the global voice VLAN function and to specify the voice VLAN on the Switch. The Switch has only one voice VLAN.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN Global**, as shown below:

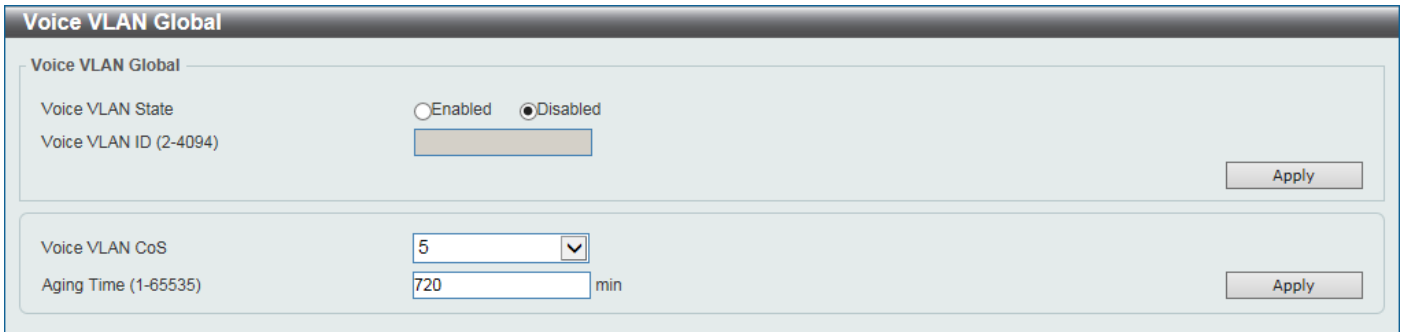


Figure 5-41 Voice VLAN Global Window

The fields that can be configured are described below:

Parameter	Description
Voice VLAN State	Select to globally enable or disable the voice VLAN feature here.
Voice VLAN ID	Enter the VLAN ID of the voice VLAN here. The VLAN to be specified as the voice VLAN needs to pre-exist before configuration. The range is from 2 to 4094.
Voice VLAN CoS	Select the CoS of the voice VLAN here. The range is from 0 to 7. The voice packets arriving at the voice VLAN enabled port are marked as the CoS specified here. The remarking of CoS packets allow the voice VLAN traffic to be distinguished from data traffic in Quality of Service.
Aging Time	Enter the aging time value here. This is used to configure the aging time for aging out the automatically learned voice device and voice VLAN information. When the last voice device connected to the port stops sending traffic and the MAC address of this voice device is aged out from FDB, the voice VLAN aging timer will be started. The port will be removed from the voice VLAN after the expiration of the voice VLAN aging timer. If voice traffic resumes during the aging time, the aging timer will be cancelled. The range is from 1 to 65535 minutes.

Click the **Apply** button to accept the changes made.

Voice VLAN Port

This window is used to display and configure the voice VLAN interface settings.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN Port**, as shown below:

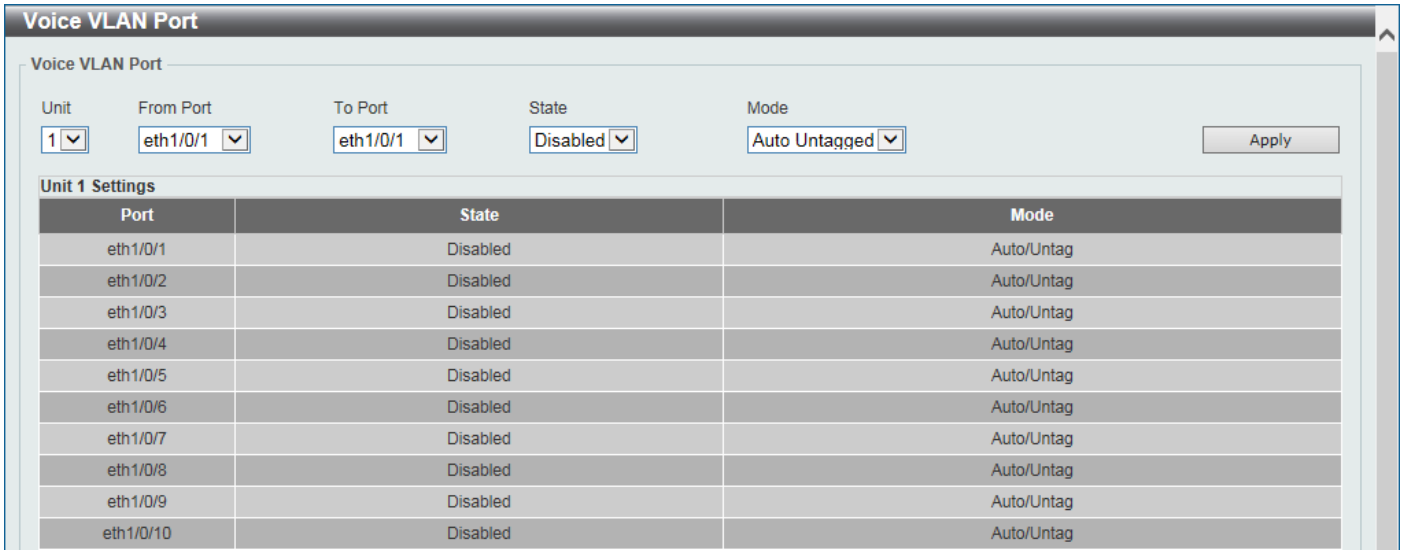


Figure 5-42 Voice VLAN Port Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
State	Select to enable or disable the voice VLAN feature. When the voice VLAN is enabled for a port, the received voice packets will be forwarded in the voice VLAN. The received packets are determined as voice packets if the source MAC addresses of packets comply with the OUI addresses.
Mode	Select the mode here. Options to choose from are: • **Auto Untagged** - Specifies that voice VLAN untagged membership will be automatically learned. • **Auto Tagged** - Specifies that voice VLAN tagged membership will be automatically learned. • **Manual** - Specifies that voice VLAN membership will be manually configured. If auto-learning is enabled, the port will automatically be learned as a voice VLAN member. This membership will automatically be aged out. When the port is working in the auto-tagged mode and the port captures a voice device through the device's OUI, it will join the voice VLAN as a tagged member automatically. When the voice device sends tagged packets, the Switch will change its priority. When the voice device sends untagged packets, it will forward them in the Port VLAN ID (PVID). When the port is working in auto-untagged mode, and the port captures a voice device through the device's OUI, it will join the voice VLAN as an untagged member automatically. When the voice device sends tagged packets, the Switch will change its priority. When the voice device sends untagged packets, it will forward them in the voice VLAN. When the Switch receives LLDP-MED packets, it checks the VLAN ID, tagged flag, and priority flag. The Switch should follow the tagged flag and priority setting.

Click the **Apply** button to accept the changes made.

Voice VLAN OUI

This window is used to display and configure the voice VLAN OUI settings. Use this window to add a user-defined OUI for the voice VLAN. The OUI for the voice VLAN is used to identify the voice traffic by using the voice VLAN function. If the source MAC address of the received packet matches any of the OUI patterns, the received packet is determined as a voice packet.

The user-defined OUI cannot be the same as the default OUI. The default OUI cannot be deleted.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN OUI**, as shown below:

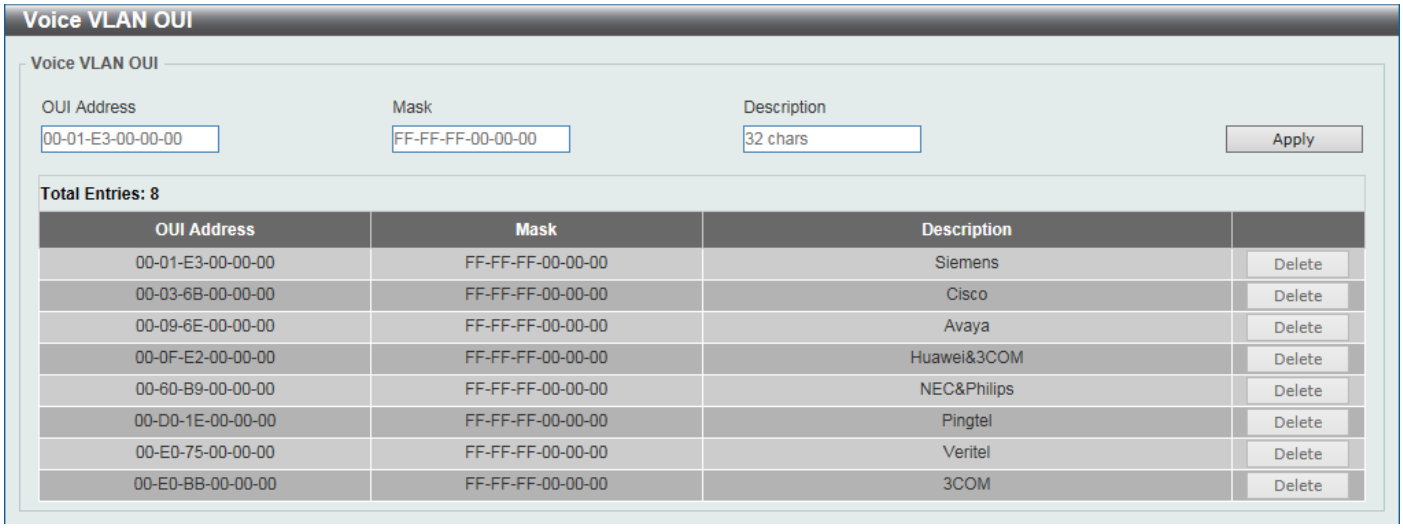


Figure 5-43 Voice VLAN OUI Window

The fields that can be configured are described below:

Parameter	Description
OUI Address	Enter the voice VLAN OUI MAC address here.
Mask	Enter the matching bitmask for the voice VLAN OUI MAC address here.
Description	Enter the description for the user-defined OUI MAC address here. This string can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Voice VLAN Device

This window is used to view the voice VLAN device table.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN Device**, as shown below:

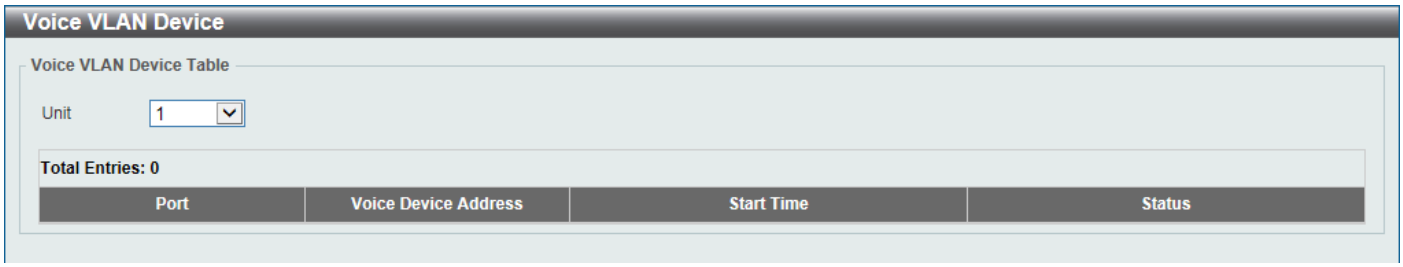


Figure 5-44 Voice VLAN Device Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used in this display here.

Voice VLAN LLDP-MED Device

This window is used to view the voice VLAN LLDP-MED device table.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN LLDP-MED Device**, as shown below:

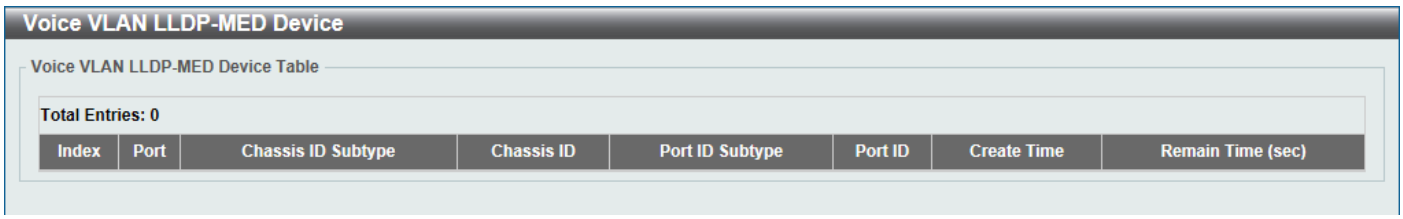


Figure 5-45 Voice VLAN LLDP-MED Device Window

Private VLAN

This window is used to display and configure the private VLAN settings.

To view the following window, click **L2 Features > VLAN > Private VLAN**, as shown below:

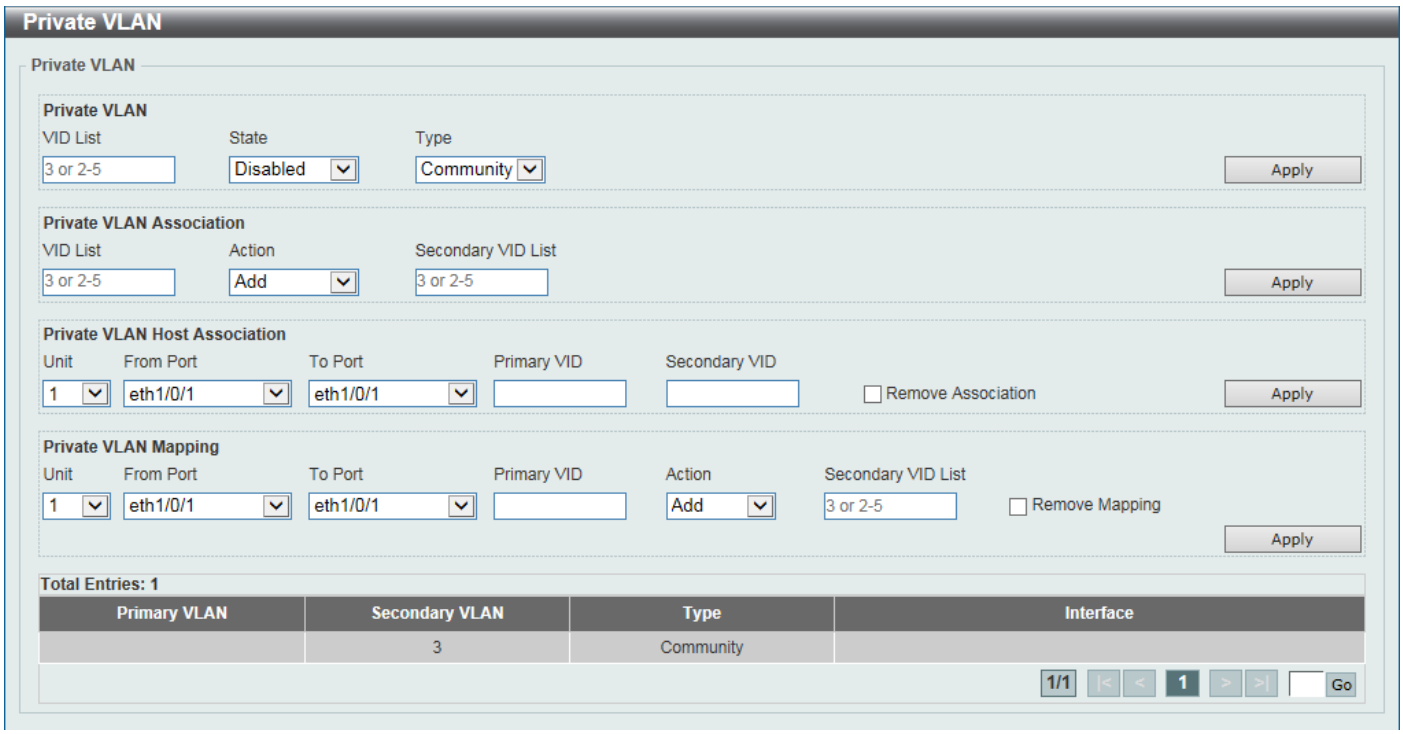


Figure 5-46 Private VLAN Window

The fields that can be configured for **Private VLAN** are described below:

Parameter	Description
VID List	Enter the private VLAN ID list here.
State	Select to enable or disable the private VLAN state here.

Parameter	Description
Type	Select the type of private VLAN that will be created here. Options to choose from are **Community**, **Isolated**, and **Primary**.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Private VLAN Association** are described below:

Parameter	Description
VID List	Enter the private VLAN ID list here.
Action	Select the action that will be taken for the private VLAN here. Options to choose from are **Add**, **Remove**, and **Disabled**.
Secondary VID List	Enter the secondary private VLAN ID here.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Private VLAN Host Association** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Primary VID	Enter the primary private VLAN ID here.
Secondary VID	Enter the secondary private VLAN ID here. When ticking the **Remove Association** option, specifies that this configuration will not be enabled.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Private VLAN Mapping** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Primary VID	Enter the primary private VLAN ID here.
Action	Select **Add** to add a new entry based in the information entered. Select **Remove** to remove an entry based in the information entered.
Secondary VID List	Enter the secondary private VLAN ID here. When ticking the **Remove Mapping** option, this specifies that this configuration will not be enabled.

Click the **Apply** button to accept the changes made.

VLAN Tunnel

Dot1q Tunnel

This window is used to display and configure the 802.1Q VLAN tunnel settings.

An 802.1Q tunnel port behaves as a User Network Interface (UNI) port of a service VLAN. The trunk ports, which are tagged members of the service VLAN, behave as the Network Node Interface (NNI) ports of the service VLAN.

Only configure the 802.1Q tunneling Ethernet type on ports that are connected to the provider bridge network, which receives and transmits the service VLAN tagged frames. If the tunnel Ethernet type is configured, the specified value

will be the Tag Protocol ID (TPID) in the outer VLAN tag of the transmitted frames of the port. The specified TPID is also used to identify the service VLAN tag for the received frame on this port.

To view the following window, click **L2 Features > VLAN Tunnel > Dot1q Tunnel** and select the **TPID Settings** tab, as shown below:

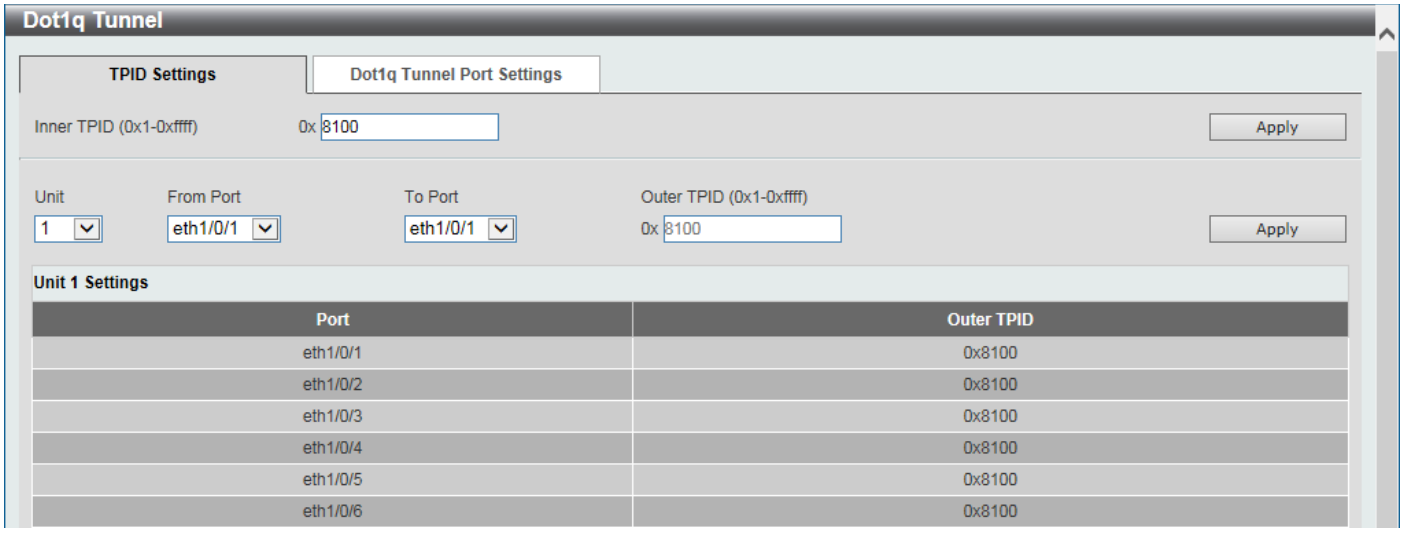


Figure 5-47 Dot1q Tunnel Window

The fields that can be configured are described below:

Parameter	Description
Inner TPID	Enter the inner TPID value here. This value is in the hexadecimal form. The range is from 0x1 to 0xFFFF. The inner TPID is used to decide if the ingress packet is C-tagged. The inner TPID can be configured per system.
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the port range that will be used here.
Outer TPID	Enter the outer TPID value here. This value is in the hexadecimal form. The range is from 0x1 to 0xFFFF.

Click the **Apply** button to accept the changes made.

To view the following window, select the **Dot1q Tunnel Port Settings** tab, as shown below:

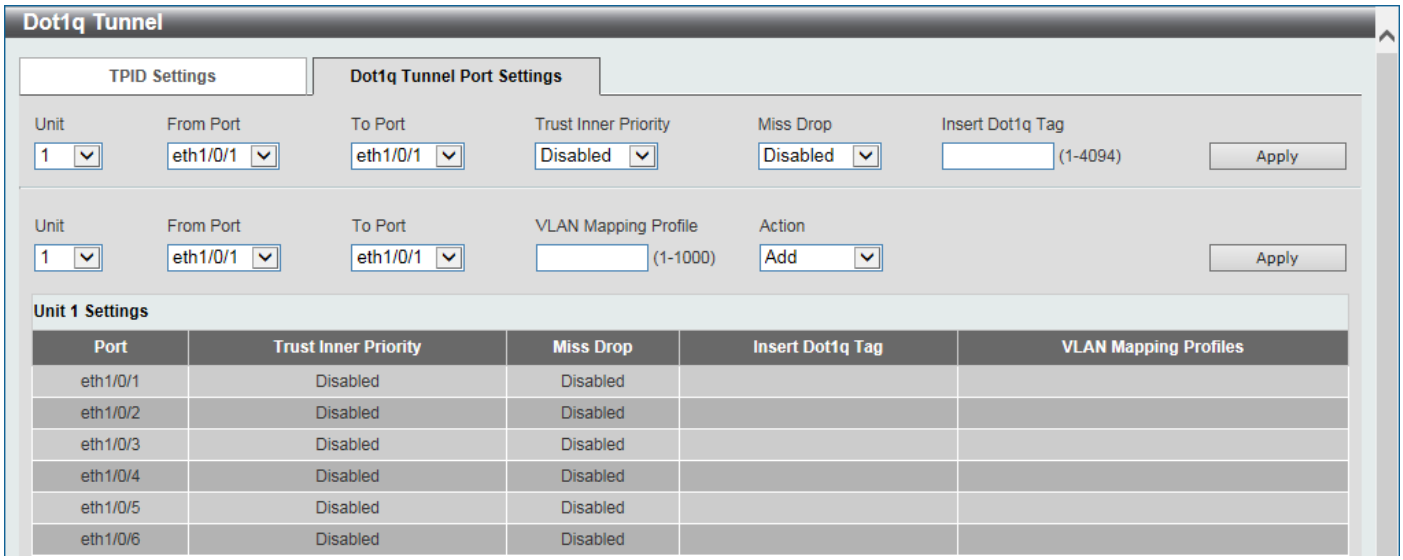


Figure 5-48 Dot1q Tunnel Settings (Dot1q Tunnel Port Settings) Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the port range that will be used here.
Trust Inner Priority	Select to enable or disable the 802.1Q Inner Trust Priority feature here. When the trusting priority option is enabled on an 802.1Q tunnel port, the priority of the VLAN tag in the received packets will be copied to the service VLAN tag.
Miss Drop	Select to enable or disable the Miss Drop feature here. If the VLAN mapping Miss Drop option is enabled on the receiving port, when the original VLAN of the received packets cannot match the VLAN mapping entries or rules on this port, the received packets will be dropped.
Insert Dot1q Tag	Enter the 802.1Q VLAN ID that is inserted to the untagged packets, which are received, on the 802.1Q tunnel port(s) here. The range is from 1 to 4094.
VLAN Mapping Profile	Enter the ID of the VLAN mapping profile here. In each Profile type, a lower ID value has higher priority. The range is from 1 to 1000.
Action	Select **Add** to add a new entry based in the information entered. Select **Remove** to remove an entry based in the information entered.

Click the **Apply** button to accept the changes made.

VLAN Mapping

This window is used to display and configure the VLAN mapping settings. If a profile is applied on an interface, the Switch matches the incoming packets according to the rules of the profile. If the packet matches a rule, the action of the rule will be taken. This action may be adding or replacing the outer-VID, specifying the priority of the new outer-TAG or specifying the packet's new inner-VID.

The match order depends on the sequence number of the rule in the profile and stops when matched first. If the sequence number is not specified, it will be allocated automatically. The sequence number begins from 10 and increments 10. Multiple different types of profiles can be configured on one interface.

To view the following window, click **L2 Features > VLAN Tunnel > VLAN Mapping**, as shown below:

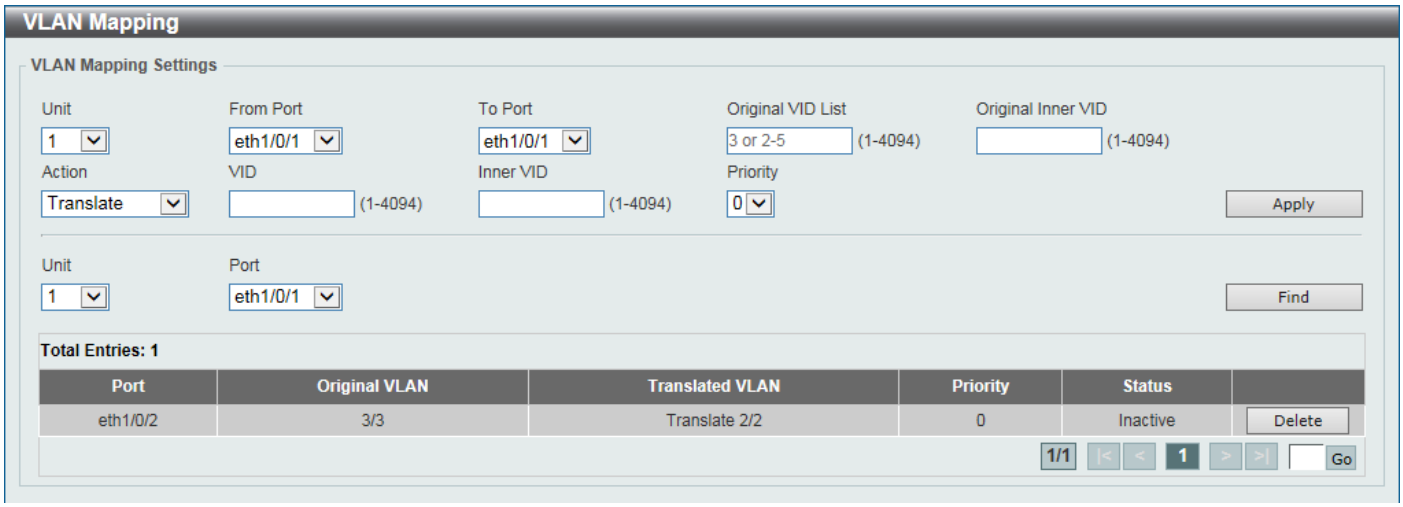


Figure 5-49 VLAN Mapping Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.

Parameter	Description
From Port - To Port	Select the port range that will be used here.
Port	Select the port that will be used for the search here.
Original VID List	Enter the original VLAN ID list here. The range is from 1 to 4094.
Original Inner VID	Enter the original inner VLAN ID here. The range is from 1 to 4094.
Action	Select the action that will be taken here. Options to choose from are: • **Translate** - Specifies that the outer-VID will replace the outer-VID of the matched packets. • **Dot1q-tunnel** - Specifies that the outer-VID will be added for matched packets.
VID	Enter the VLAN ID here. The range is from 1 to 4094.
Inner VID	Enter the inner VLAN ID here. The range is from 1 to 4094.
Priority	Select the 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

VLAN Mapping Profile

This window is used to display and configure the VLAN mapping profile settings.

To view the following window, click **L2 Features > VLAN Tunnel > VLAN Mapping Profile**, as shown below:

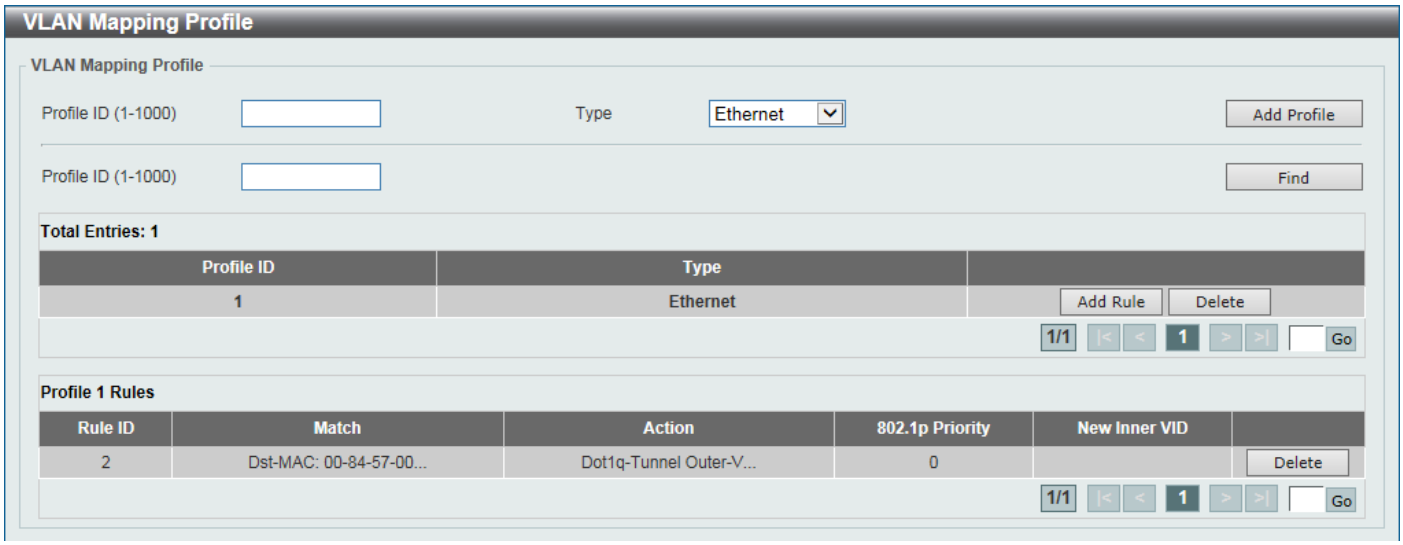


Figure 5-50 VLAN Mapping Profile Window

The fields that can be configured are described below:

Parameter	Description
Profile ID	Enter the ID of the VLAN mapping profile here. In each Profile type, a lower ID value has higher priority. The ID range is from 1 to 1000.
Type	Select the profile type here. Different profiles can match different fields. Options to choose from are: • **Ethernet** - The profile can match Layer 2 fields.

Parameter	Description
	• **IP** - The profile can match Layer 3 IP fields. • **IPv6** - The profile can match IPv6 destination or source addresses. • **Ethernet-IP** - The profile can match Layer 2 and Layer 3 IP fields.

Click the **Add Profile** button to add a new VLAN mapping profile.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Add Rule** button to create a new rule.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Add Rule** button next to an **Ethernet** type profile, the following page will appear.

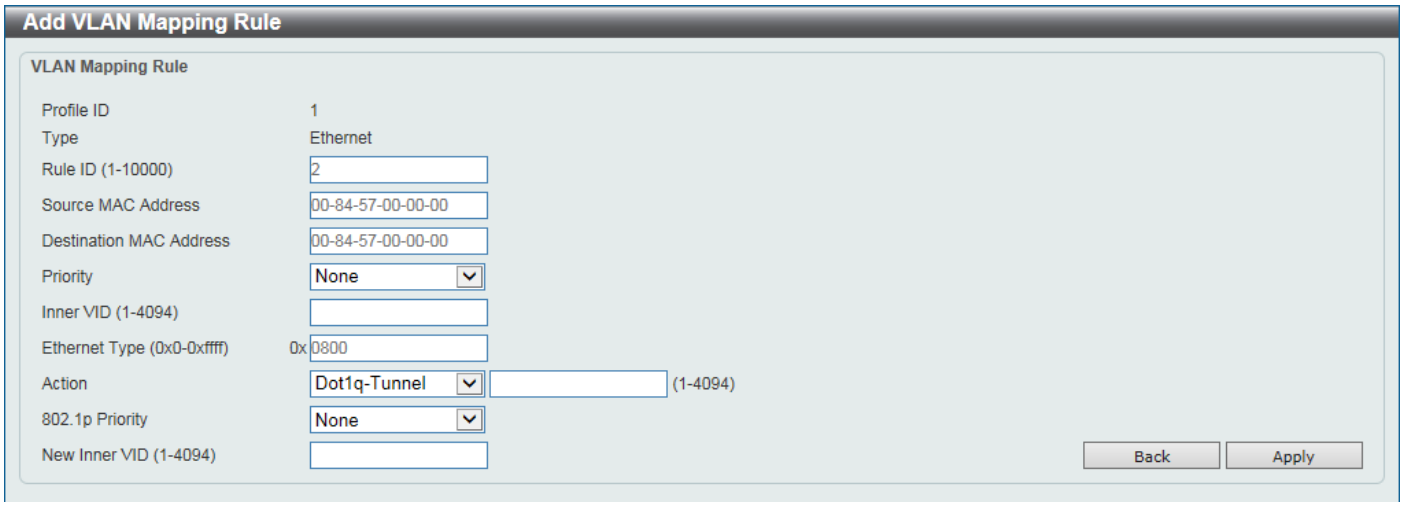


Figure 5-51 VLAN Mapping Profile (Ethernet, Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Rule ID	Enter the VLAN mapping rule ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000.
Source MAC Address	Enter the source MAC address here.
Destination MAC Address	Enter the destination MAC address here.
Priority	Select the 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.
Inner VID	Enter the inner VLAN ID here. The range is from 1 to 4094.
Ethernet Type	Enter the Ethernet type value here. The range is from 0x0 to 0xFFFF.
Action	Select the action that will be taken here. Options to choose from are: • **Dot1q-Tunnel** - Specifies that the outer-VID will be added for matched packets. • **Translate** - Specifies that the outer-VID will replace the outer-VID of the matched packets.
802.1p Priority	Select the 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.
New Inner VID	After selecting **Dot1q-Tunnel** as the action, enter the new inner VLAN ID here. The range is from 1 to 4094.

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

Click the **Apply** button to accept the changes made.

After clicking the **Add Rule** button next to an **IP** type profile, the following page will appear.

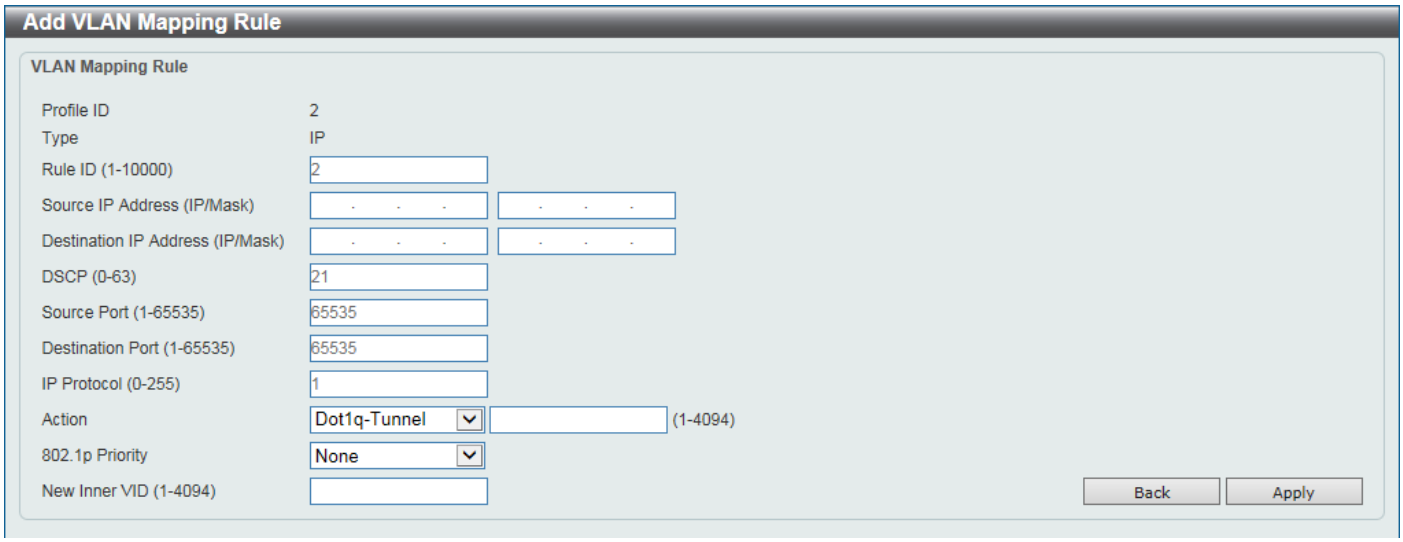


Figure 5-52 VLAN Mapping Profile (IP, Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Rule ID	Enter the VLAN mapping rule ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000
Source IP Address (IP/Mask)	Enter the source IPv4 address and subnet mask here.
Destination IP Address (IP/Mask)	Enter the destination IPv4 address and subnet mask here.
DSCP	Enter the DSCP value here. The range is from 0 to 63.
Source Port	Enter the source TCP/UDP port number here. The range is from 1 to 65535.
Destination Port	Enter the destination TCP/UDP port number here. The range is from 1 to 65535.
IP Protocol	Enter the Layer 3 IP protocol value here. The range is from 0 to 255.
Action	Select the action that will be taken here. Options to choose from are: • **Dot1q-Tunnel** - Specifies that the outer-VID will be added for matched packets. • **Translate** - Specifies that the outer-VID will replace the outer-VID of the matched packets.
802.1p Priority	Select the 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.
New Inner VID	After selecting **Dot1q-Tunnel** as the action, enter the new inner VLAN ID here. The range is from 1 to 4094.

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

Click the **Apply** button to accept the changes made.

After clicking the **Add Rule** button next to an **IPv6** type profile, the following page will appear.

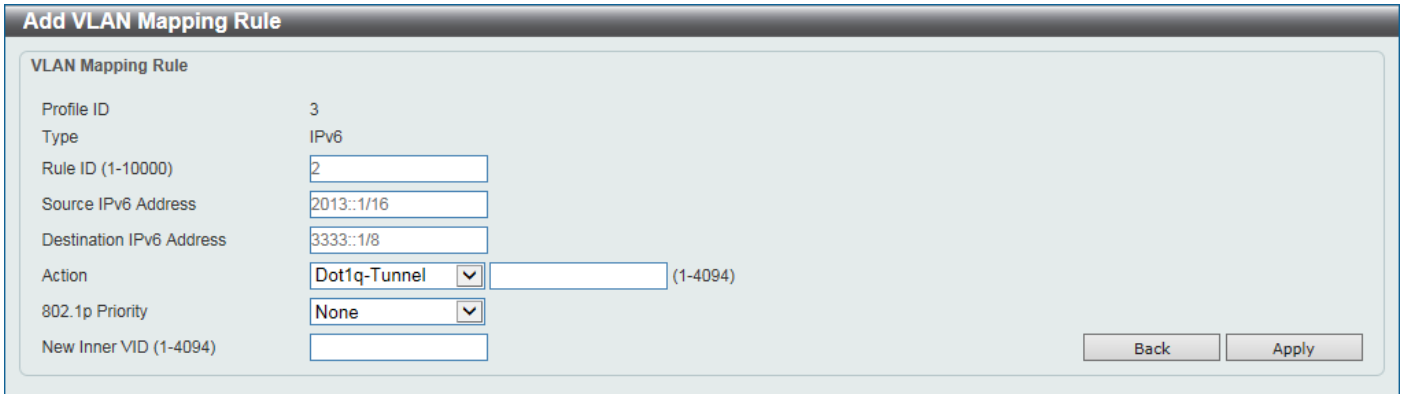


Figure 5-53 VLAN Mapping Profile (IPv6, Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Rule ID	Enter the VLAN mapping rule ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000
Source IPv6 Address	Enter the source IPv6 address and prefix length here.
Destination IPv6 Address	Enter the destination IPv6 address and prefix length here.
Action	Select the action that will be taken here. Options to choose from are: • **Dot1q-Tunnel** - Specifies that the outer-VID will be added for matched packets. • **Translate** - Specifies that the outer-VID will replace the outer-VID of the matched packets.
802.1p Priority	Select the 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.
New Inner VID	After selecting **Dot1q-Tunnel** as the action, enter the new inner VLAN ID here. The range is from 1 to 4094.

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

Click the **Apply** button to accept the changes made.

After clicking the **Add Rule** button next to an **Ethernet-IP** type profile, the following page will appear.

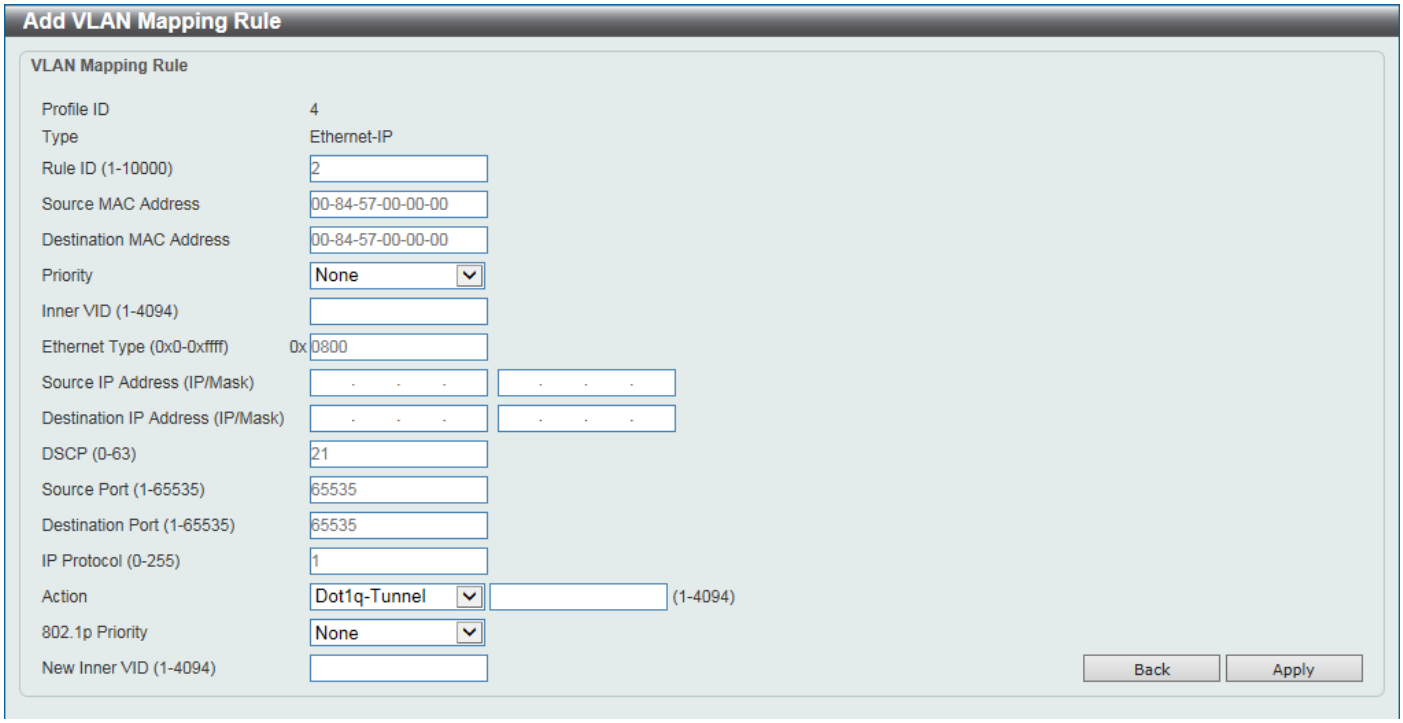


Figure 5-54 VLAN Mapping Profile (Ethernet-IP, Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Rule ID	Enter the VLAN mapping rule ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000
Source MAC Address	Enter the source MAC address here.
Destination MAC Address	Enter the destination MAC address here.
Priority	Select the 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.
Inner VID	Enter the inner VLAN ID here. The range is from 1 to 4094.
Ethernet Type	Enter the Ethernet type value here. The range is from 0x0 to 0xFFFF.
Source IP Address	Enter the source IPv4 address and subnet mask here.
Destination IP Address	Enter the destination IPv4 address and subnet mask here.
DSCP	Enter the DSCP value here. The range is from 0 to 63.
Source Port	Enter the source TCP/UDP port number here. The range is from 1 to 65535.
Destination Port	Enter the destination TCP/UDP port number here. The range is from 1 to 65535.
IP Protocol	Enter the Layer 3 IP protocol value here. The range is from 0 to 255.
Action	Select the action that will be taken here. Options to choose from are: • **Dot1q-Tunnel** - Specifies that the outer-VID will be added for matched packets. • **Translate** - Specifies that the outer-VID will replace the outer-VID of the matched packets.
802.1p Priority	Select the IEEE 802.1p priority value here. The range is from 0 to 7. A higher value has a higher priority.
New Inner VID	After selecting **Dot1q-Tunnel** as the action, enter the new inner VLAN ID here. The range is from 1 to 4094.

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

Click the **Apply** button to accept the changes made.

STP

This Switch supports three versions of the Spanning Tree Protocol (STP): IEEE 802.1D-1998 STP, IEEE 802.1D-2004 Rapid STP, and IEEE 802.1Q-2005 MSTP. The IEEE 802.1D-1998 STP standard will be familiar to most networking professionals. However, as IEEE 802.1D-2004 RSTP and IEEE 802.1Q-2005 MSTP have been recently introduced to D-Link managed Ethernet Switches, a brief introduction to the technology is provided below followed by a description of how to set up IEEE 802.1D-1998 STP, IEEE 802.1D-2004 RSTP, and IEEE 802.1Q-2005 MSTP.

802.1Q-2005 MSTP

The Multiple Spanning Tree Protocol (MSTP) is a standard defined by the IEEE community that allows multiple VLANs to be mapped to a single spanning tree instance, which will provide multiple pathways across the network. Therefore, these MSTP configurations will balance the traffic load, preventing wide scale disruptions when a single spanning tree instance fails. This will allow for faster convergences of new topologies for the failed instance.

Frames designated for these VLANs will be processed quickly and completely throughout interconnected bridges utilizing any of the three spanning tree protocols (STP, RSTP, or MSTP).

A Multiple Spanning Tree Instance (MSTI) ID will classify these instances. MSTP will connect multiple spanning trees with a Common and Internal Spanning Tree (CIST). The CIST will automatically determine each MSTP region, its maximum possible extent and will appear as one virtual bridge that runs a single spanning tree instance. Frames assigned to different VLANs will follow different data routes within administratively established regions on the network, continuing to allow simple and full processing of frames, regardless of administrative errors in defining VLANs and their respective spanning trees.

Each Switch utilizing the MSTP on a network will share a single MSTP configuration that will have the following three attributes:

- A configuration name defined by an alphanumeric string of up to 32 characters (defined in the **MST Configuration Identification** window in the **Configuration Name** field).
- A configuration revision number (named here as a **Revision Level** and found in the **MST Configuration Identification** window)
- A 4094-element table (defined here as a VID List in the **MST Configuration Identification** window), which will associate each of the possible 4094 VLANs supported by the Switch for a given instance.

To utilize the MSTP function on the Switch, three steps need to be taken:

- The Switch must be set to the MSTP setting (found in the **STP Global Settings** window in the **STP Mode** field).
- The correct spanning tree priority for the MSTP instance must be entered (defined here as a **Priority** in the **MSTP Port Information** window when configuring MSTI ID settings).
- VLANs that will be shared must be added to the MSTP Instance ID (defined here as a **VID List** in the **MST Configuration Identification** window when configuring an MSTI ID settings).

802.1D-2004 Rapid Spanning Tree

The Switch implements three versions of the Spanning Tree Protocol, the Multiple Spanning Tree Protocol (MSTP) as defined by IEEE 802.1Q-2005, the Rapid Spanning Tree Protocol (RSTP) as defined by IEEE 802.1D-2004 and a version compatible with IEEE 802.1D-1998. RSTP can operate with legacy equipment implementing IEEE 802.1D-1998; however, the advantages of using RSTP will be lost. This section introduces some new Spanning Tree concepts and illustrates the main differences between the two protocols.

Port Transition States

An essential difference between the three protocols is in the way ports transition to a forwarding state and in the way, this transition relates to the role of the port (forwarding or not forwarding) in the topology. MSTP and RSTP combine

the transition states Disabled, Blocking, and Listening used in 802.1D-1998 and create a single state called Discarding. In either case, ports do not forward packets. In the STP port transition states Disabled, Blocking, or Listening or in the RSTP/MSTP port state Discarding, there is no functional difference, the port is not active in the network topology. The table below compares how the three protocols differ regarding the port state transition.

All three protocols calculate a stable topology in the same way. Every segment will have a single path to the root bridge. All bridges listen for BPDU packets. However, BPDU packets are sent more frequently, with every Hello packet. BPDU packets are sent even if a BPDU packet was not received. Therefore, each link between bridges is sensitive to the status of the link. Ultimately, this difference results in faster detection of failed links, and therefore faster topology adjustment. A drawback of IEEE 802.1D-1998 is this absence of immediate feedback from adjacent bridges.

802.1Q-2005 MSTP	802.1D-2004 RSTP	802.1D-1998 STP	Forwarding	Learning
Disabled	Disabled	Disabled	No	No
Discarding	*Discarding*	*Blocking*	No	No
Discarding	*Discarding*	*Listening*	No	No
Learning	*Learning*	*Learning*	No	**Yes**
Forwarding	**Forwarding**	**Forwarding**	**Yes**	**Yes**

RSTP is capable of a more rapid transition to the Forwarding state. RSTP no longer relies on timer configurations and RSTP-compliant bridges are sensitive to feedback from other RSTP-compliant bridge links. Ports do not need to wait for the topology to stabilize before transitioning to a Forwarding state. In order to allow this rapid transition, the protocol introduces two new variables: the Edge Port and the Point-to-Point (P2P) port.

Edge Port

A port can be configured as an Edge Port if it is directly connected to a segment where a loop cannot be created. An example would be a port connected directly to a single workstation. Ports that are designated as edge ports transition to a forwarding state immediately without going through the Listening and Learning states. An Edge Port loses its status if it receives a BPDU packet, after which it immediately becomes a normal spanning tree port.

P2P Port

A P2P port is also capable of rapid transition. P2P ports may be used to connect to other bridges. Under RSTP/MSTP, all ports operating in full-duplex mode are considered to be P2P ports unless manually overridden through configuration.

802.1D-1998/802.1D-2004/802.1Q-2005 Compatibility

MSTP or RSTP can interoperate with legacy equipment and are capable of automatically adjusting BPDU packets to 802.1D-1998 format when necessary. However, any segment using 802.1D-1998 STP will not benefit from the rapid transition and rapid topology change detection of MSTP or RSTP. The protocol also includes a variable used for migration in the event that legacy equipment on a segment is updated to use RSTP or MSTP.

The Spanning Tree Protocol (STP) operates on two levels:

- On the Switch level, the settings are globally implemented.
- On the port level, the settings are implemented on a user-defined group of ports.

STP Global Settings

This window is used to display and configure the global STP settings.

To view the following window, click **L2 Features > STP > STP Global Settings**, as shown below:

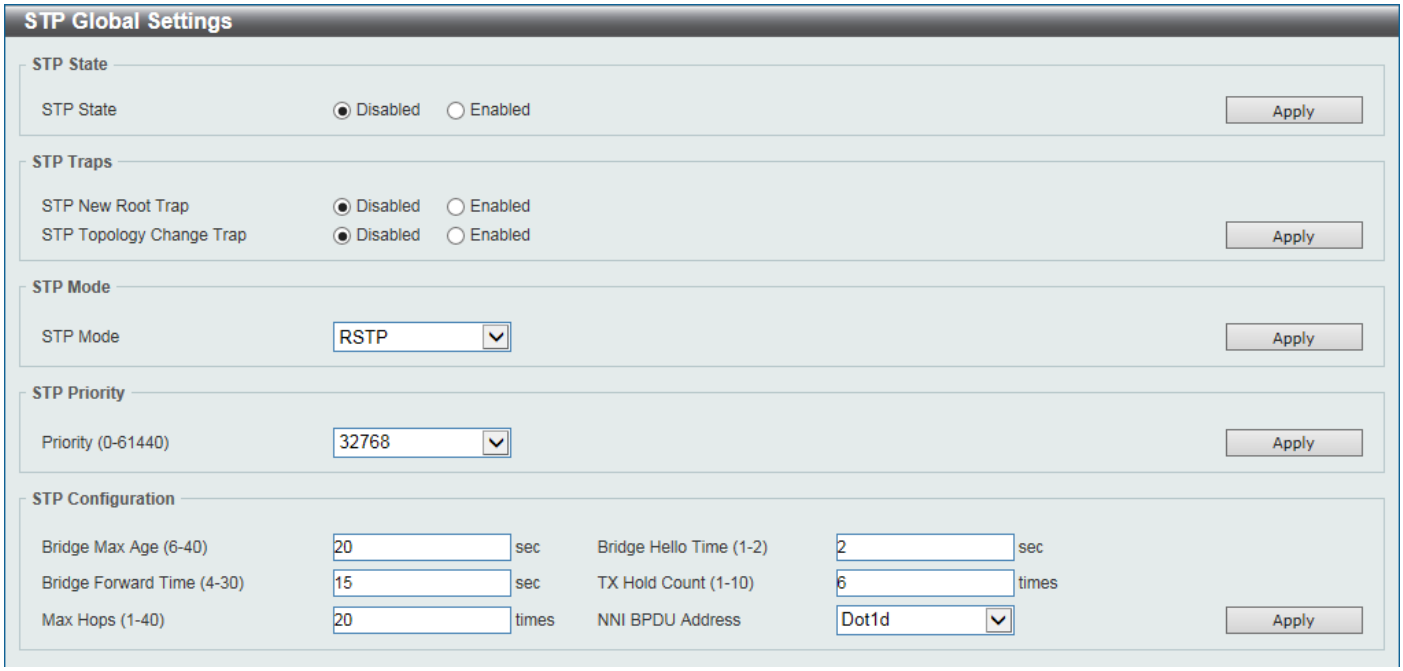


Figure 5-55 STP Global Settings Window

The field that can be configured for **STP State** is described below:

Parameter	Description
STP State	Select to enable or disable the global STP state here.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Traps** are described below:

Parameter	Description
STP New Root Trap	Select to enable or disable the STP New Root Trap option here.
STP Topology Change Trap	Select to enable or disable the STP Topology Change Trap option here.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Mode** are described below:

Parameter	Description
STP Mode	Select the STP mode used here. Options to choose from are **MSTP**, **RSTP**, and **STP**.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Priority** are described below:

Parameter	Description
Priority	Select the STP priority value here. The range is from 0 to 61440. By default, this value is 32768. The lower the value, the higher the priority.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Configuration** are described below:

Parameter	Description
Bridge Max Age	Enter the bridge Maximum Age value here. The range is from 6 to 40 seconds. By default, this value is 20 seconds. The Maximum Age value may be set to ensure that old information does not endlessly circulate through redundant paths in the network, preventing the effective propagation of the new information. Set by the Root Bridge, this value will aid in determining that the Switch has spanning tree configuration values consistent with other devices on the bridged LAN.
Bridge Hello Time	After selecting **RSTP/STP** as the **Spanning Tree Mode**, this parameter will be available. Enter the bridge Hello Time value here. The range is from 1 to 2 seconds. By default, this value is 2 seconds. This is the interval between two transmissions of BPDU packets sent by the Root Bridge to tell all other switches that it is indeed the Root Bridge. This field will only appear here when STP or RSTP is selected for the STP version. For MSTP, the Hello Time must be set on a port per-port basis.
Bridge Forward Time	Enter the bridge Forwarding Time value here. The range is from 4 to 30 seconds. By default, this value is 15 seconds. Every port on the Switch spends this time in the Listening state while moving from the Blocking state to the Forwarding state.
TX Hold Count	Enter the Transmit Hold Count value here. The range is from 1 to 10 times. By default, this value is 6 times. This value is used to set the maximum number of Hello packets transmitted per interval.
Max Hops	Enter the maximum number of hops that are allowed. The range is from 1 to 40 hops. By default, this value is 20 hops. This value is used to set the number of hops between devices in a spanning tree region before the Bridge Protocol Data Unit (BPDU) packet sent by the Switch will be discarded. Each Switch on the hop count will reduce the hop count by one until the value reaches zero. The Switch will then discard the BDPU packet and the information held for the port will age out.
NNI BPDU Address	Select the NNI BPDU Address option here. Options to choose from are **Dot1d** and **Dot1ad**. This parameter is used to determine the BPDU protocol address for STP in the service provider network. It can use an 802.1d STP address and an 802.1ad service provider STP address. By default, the **Dot1d** option is used.

Click the **Apply** button to accept the changes made.

STP Port Settings

This window is used to display and configure the STP port settings.

To view the following window, click **L2 Features > STP > STP Port Settings**, as shown below:

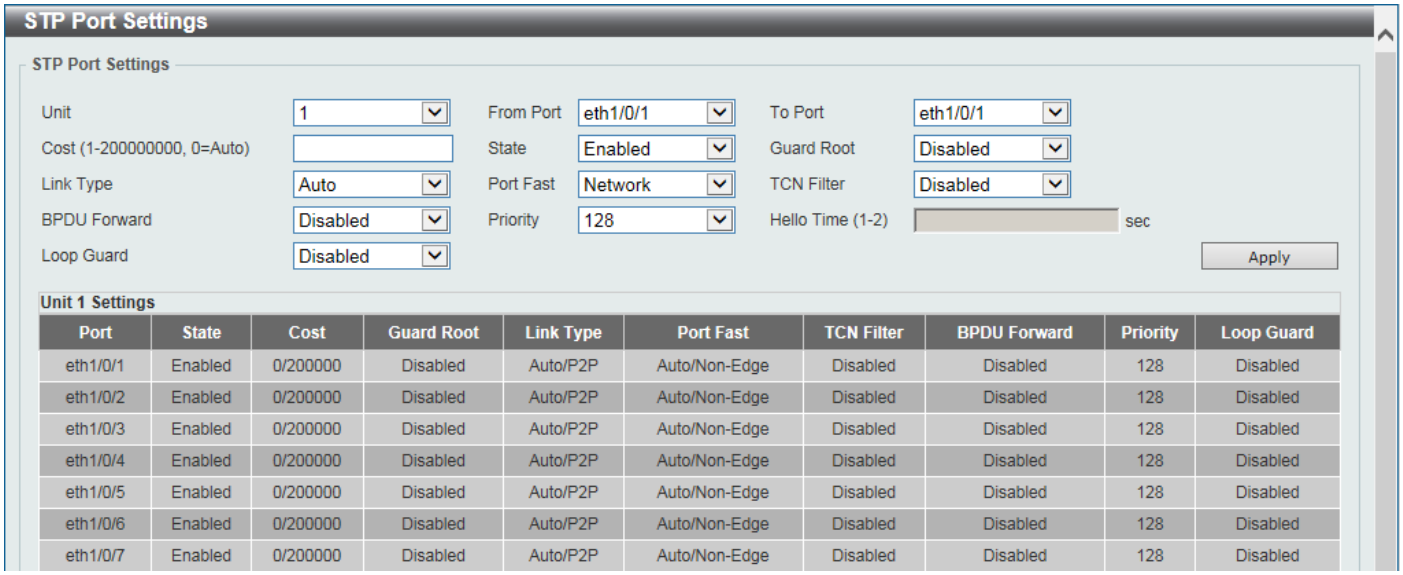


Figure 5-56 STP Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Cost	Enter the cost value here. The range is from 1 to 200000000. This value defines a metric that indicates the relative cost of forwarding packets to the specified port list. Port cost can be set automatically or as a metric value. By default, this value is 0 (auto). Setting 0 for the external cost will automatically set the speed for forwarding packets to the specified port(s) in the list for optimal efficiency. By default, port cost for 10 Mbps is 2000000, 100 Mbps is 200000, 1Gbps is 20000, 2.5Gbps is 8000, and 10Gbps is 2000. The lower the number, the greater the probability the port will be chosen to forward packets.
State	Select to enable or disable the STP port state.
Guard Root	Select to enable or disable the Guard Root function.
Link Type	Select the link type here. Options to choose from are **Auto**, **P2P**, and **Shared**. A full-duplex port is considered to have a Point-to-Point (**P2P**) connection. The port cannot transit into the forwarding state rapidly by setting the link type to **Shared**. By default, the **Auto** option is used.
Port Fast	Select the Port Fast option here. Options to choose from are: • **Network** - The port will remain in the non-port-fast state for three seconds. The port will change to the port-fast state if no BPDU is received and changes to the forwarding state. If the port received the BPDU later, it will change to the non-port-fast state. • **Disable** - The port will always be in the non-port-fast state. It will always wait for the forward-time delay to change to the forwarding state. • **Edge** - The port will directly change to the spanning-tree forwarding state when a link-up occurs without waiting for the forward-time delay. If the interface receives a BPDU later, its operation state changes to the non-port-fast state.

Parameter	Description
TCN Filter	Select to enable or disable the TCN Filter option. When a port is set to the TCN filter mode, the TC event received by the port will be ignored. By default, this option is disabled.
BPDU Forward	Select to enable or disable BPDU forwarding. If enabled, the received STP BPDU will be forwarded to all VLAN member ports in the untagged form. By default, this option is disabled.
Priority	Select the priority value here. Options to choose from are 0 to 240. By default, this value is 128. A lower value has higher priority.
Hello Time	Enter the hello time value here. The range is from 1 to 2 seconds. This value specifies the interval that a designated port will wait between the periodic transmissions of each configuration message.
Loop Guard	Select to enable or disable the Loop Guard feature. The STP Loop Guard feature provides additional protection against Layer 2 forwarding loops (STP loops). An STP loop is created when an STP blocking port in a redundant topology erroneously transitions to the Forwarding state. This usually happens because one of the ports in a physically redundant topology (not necessarily the STP blocking port) no longer receives STP BPDUs. In its operation, STP relies on continuous reception or transmission of BPDUs based on the port role. The designated port transmits BPDUs, and the non-designated port receives BPDUs. When one of the ports in a physically redundant topology no longer receives BPDUs, the STP considers the topology to be loop free. Eventually, an alternate port that was previously a Blocking or Backup port becomes Designated and moves to a Forwarding state. This situation creates a loop.

Click the **Apply** button to accept the changes made.

MST Configuration Identification

This window is used to display and configure the MST configuration identification settings. These settings will uniquely identify an MSTI configured on the Switch. The Switch initially possesses one Common Internal Spanning Tree (CIST) of which the user may modify the parameters for but cannot change or delete the MSTI ID.

To view the following window, click **L2 Features > STP > MST Configuration Identification**, as shown below:

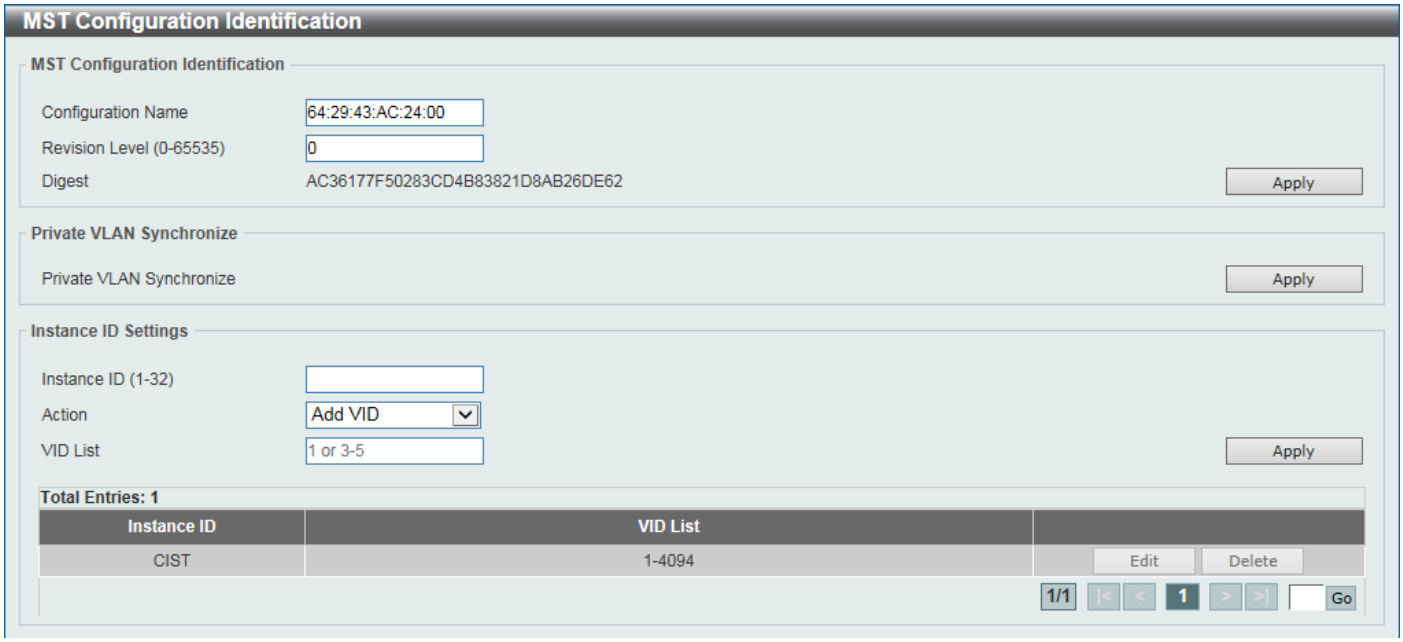


Figure 5-57 MST Configuration Identification Window

The fields that can be configured for **MST Configuration Identification** are described below:

Parameter	Description
Configuration Name	Enter the MST. This name uniquely identifies the MSTI (Multiple Spanning Tree Instance). If a Configuration Name is not set, this field will show the MAC address to the device running MSTP.
Revision Level	Enter the revision level value here. The range is from 0 to 65535. By default, this value is 0. This value, along with the Configuration Name, identifies the MSTP region configured on the Switch.

Click the **Apply** button to accept the changes made.

In the **Private VLAN Synchronize** section, the user can click the **Apply** button to synchronize the private VLANs.

The fields that can be configured for **Instance ID Settings** are described below:

Parameter	Description
Instance ID	Enter the instance ID here. The range is from 1 to 64.
Action	Select the action that will be taken here. Options to choose from are **Add VID** and **Remove VID**.
VID List	Enter the VID list value here. This field is used to specify the VID range from configured VLANs set on the Switch.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

STP Instance

This window is used to display and configure the STP instance settings.

To view the following window, click **L2 Features > STP > STP Instance**, as shown below:

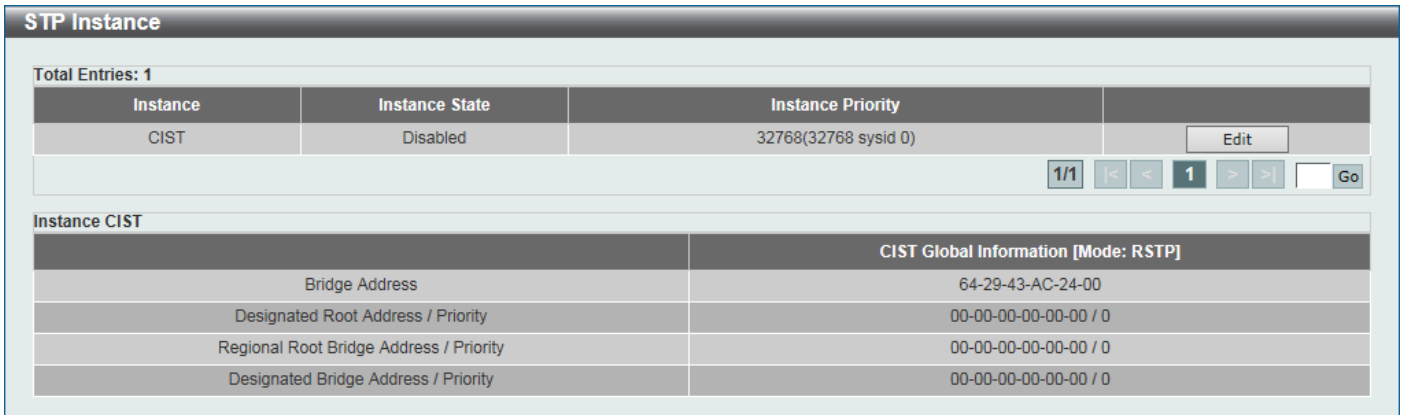


Figure 5-58 STP Instance Window

The fields that can be configured are described below:

Parameter	Description
Instance Priority	After clicking the **Edit** button, enter the Instance Priority value here. The range is from 0 to 61440.

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MSTP Port Information

This window is used to display and configure the MSTP port information settings.

To view the following window, click **L2 Features > STP > MSTP Port Information**, as shown below:

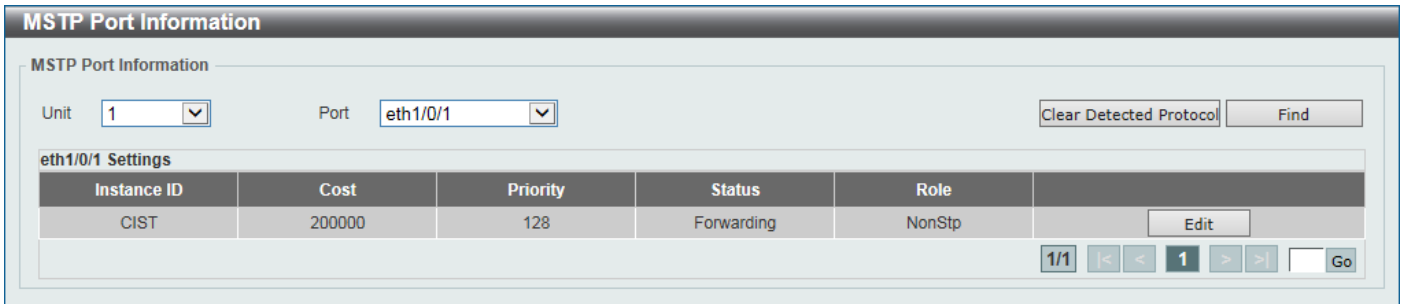


Figure 5-59 MSTP Port Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this display here.
Port	Select the port number that will be cleared here.
Cost	After clicking the **Edit** button, enter the cost value here. The range is from 1 to 200000000.
Priority	After clicking the **Edit** button, select the priority value here. Options to choose from are 0 to 240. By default, this value is 128. A lower value has higher priority.

Click the **Clear Detected Protocol** button to clear the detected protocol settings for the port selected.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

ERPS (G.8032)

Ethernet Ring Protection Switching (ERPS) (ITU-T G.8032) integrates mature Ethernet Operations, Administration, and Maintenance (OAM) functions and a simple Automatic Protection Switching (APS) protocol to provide protection for Ethernet traffic in a ring topology. It ensures that there are no loops formed at the Ethernet layer.

One link within a ring will be blocked to avoid a Loop (RPL, Ring Protection Link). When the failure happens, protection switching blocks the failed link and unblocks the RPL. When the failure clears, protection switching blocks the RPL again and unblocks the link on which the failure is cleared.

ERPS

This window is used to display and configure the Ethernet Ring Protection Switching (ERPS) settings. STP and Loopback Detection (LBD) should be disabled on the ring ports before enabling ERPS. The ERPS cannot be enabled before the R-APS VLAN ring ports, RPL port, and RPL owner are configured.

NOTE: Be aware that changing the ERPS version will lead to the restart of the running protocol.

To view the following window, click **L2 Features > ERPS (G.8032) > ERPS** and select the **ERPS Status** tab, as shown below:

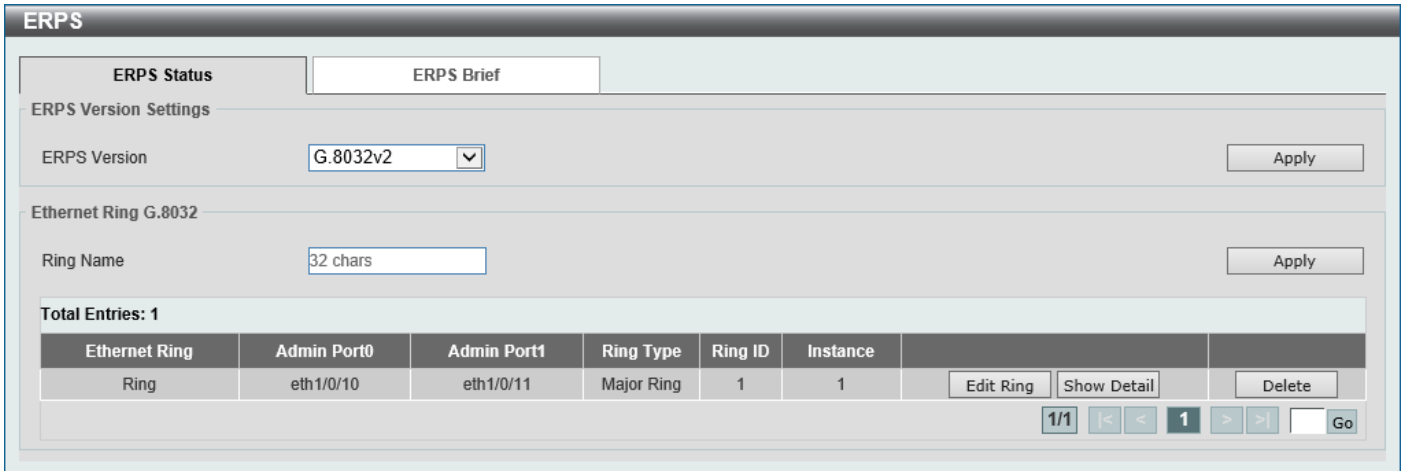


Figure 5-60 ERPS Window

The fields that can be configured in **ERPS Version Settings** are described below:

Parameter	Description
ERPS Version	Select the ERPS version here. Options to choose from are **G.8032v1** and **G.8032v2**. G.8032v2 provides the following functions: • Supports multi-instance in a physical ring. • Supports operation commands: manual, force, and clear. • Supports to configure the sending of the R-APS PDU destination address with the RING-ID of the physical ring. Before specifying G.8032v1 for a G.8032v2-running device, delete all ERPS configurations that G.8032v1 does not support. Otherwise, the version cannot be changed. Changing the ERPS version will lead to the restart of the running protocol. The following configurations will check when to change from G.8032v2 to G.8032v1: • Manual switch or force switch command will be cleared. • The major ring instance and sub-ring instance of the interconnection node must have different R-APS VLAN IDs. • In a physical ring, only one instance is supported. If Ethernet ring nodes running ITU-T G.8032v1 and ITU-T G.8032v2 co-exist on an Ethernet ring, the following configurations should be made on the G.8032v2 device: • All physical ring IDs must have the default value of 1. • The major ring instance and sub-ring instance of the interconnection node must have different R-APS VLAN IDs. • Manual switch or force switch command must not exist. • The physical ring must have only one instance.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet Ring G.8032** are described below:

Parameter	Description
Ring Name	Enter the Ethernet Ring Protection (ERP) instance name here. This name can be up to 32 characters long.

Click the **Apply** button to create an ITU-T G.8032 ERP physical ring.

Click the **Edit Ring** button to modify an ITU-T G.8032 ERP physical ring.

Click the **Show Detail** button to view the ITU-T G.8032 ERP physical ring status information.

Click the **Delete** button to delete the specified ITU-T G.8032 ERP physical ring.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After click the **Edit Ring** button, the following window will appear.

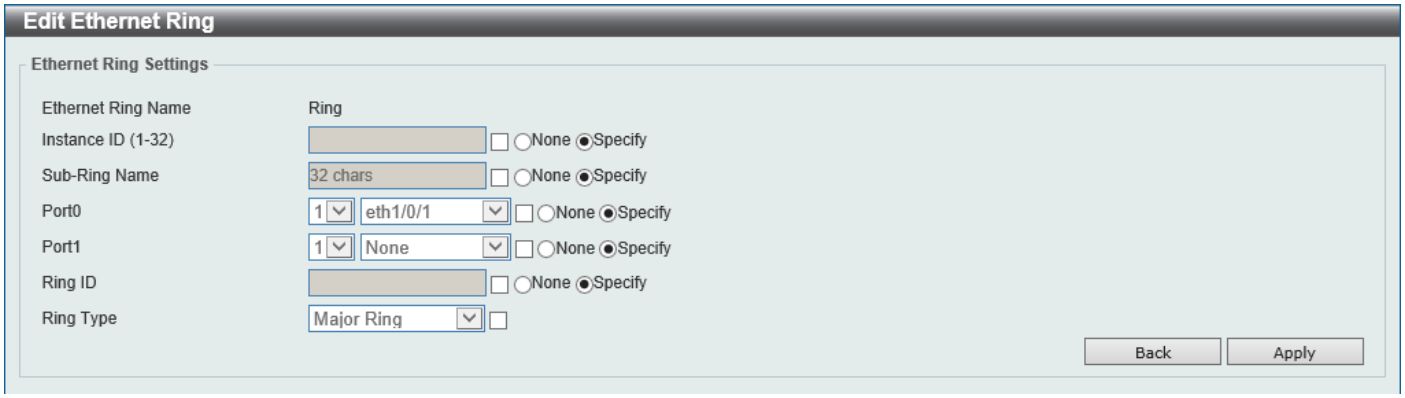


Figure 5-61 ERPS (Edit Ring) Window

The fields that can be configured are described below:

Parameter	Description
Instance ID	Select the checkbox and enter the ERP instance number here. The range is from 1 to 32. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Sub Ring Name	Select the checkbox and enter the physical ring's sub-ring name here. This name can be up to 32 characters long. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Port0	Select the checkbox and then select the Switch unit ID and the port number that will be the first ring port of the physical ring. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Port1	Select the checkbox and then select the Switch unit ID and the port number that will be the second ring port of the physical ring. Select the **None** option, from the drop-down menu, specifies that the inter-connected node is a local node endpoint of an open ring. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Ring ID	Select the checkbox and enter the ring ID here. The range is from 1 to 239. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Ring Type	Select the checkbox and then select the ring type here. Options to choose from are **Major Ring** and **Sub-Ring**.

Click the **Back** button to discard the changes made and return to the previous window.

Click the **Apply** button to accept the changes made.

After click the **Show Detail** button, the following window will appear.

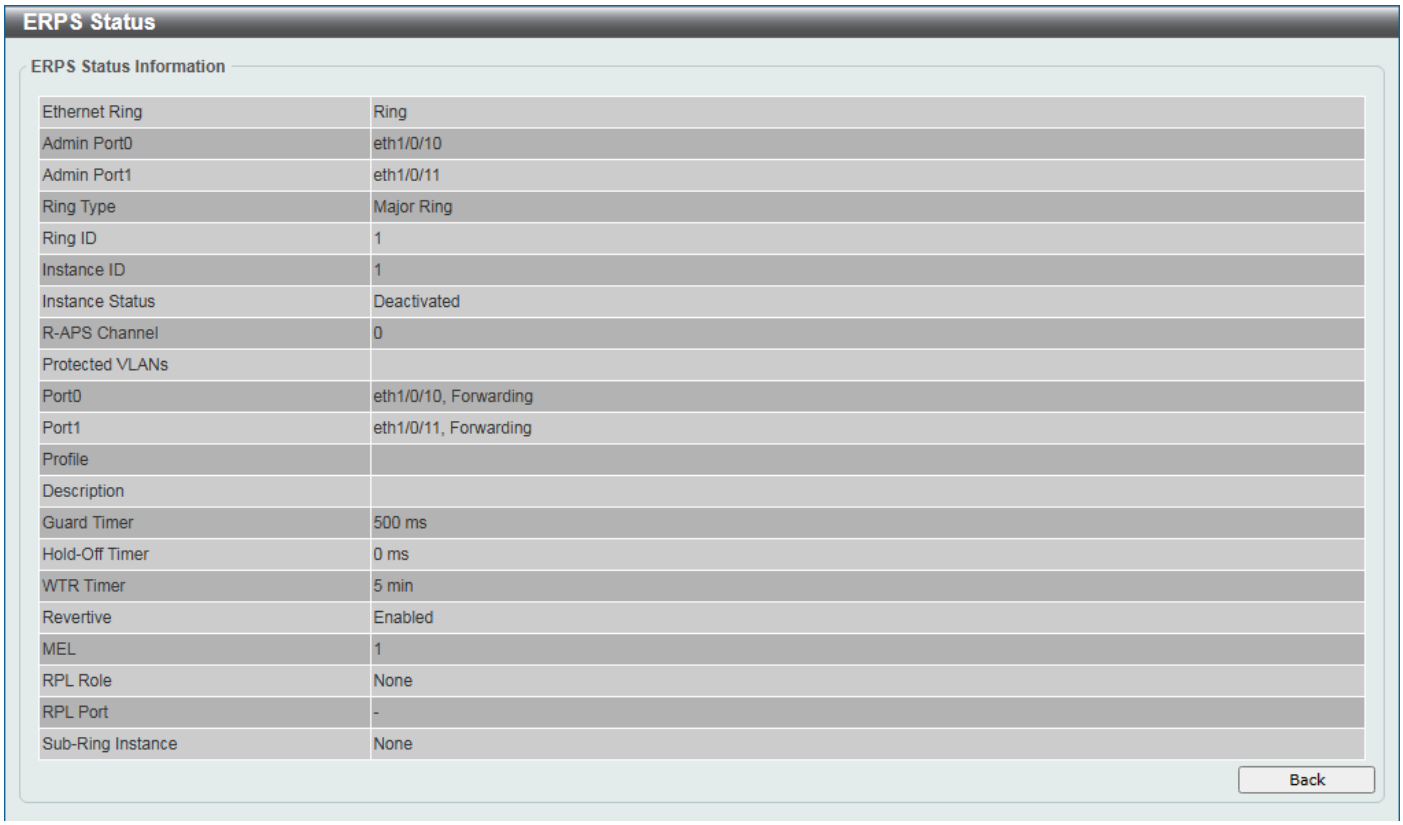


Figure 5-62 ERPS (View Detail) Window

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

To view the following window, select the **ERPS Brief** tab, as shown below:

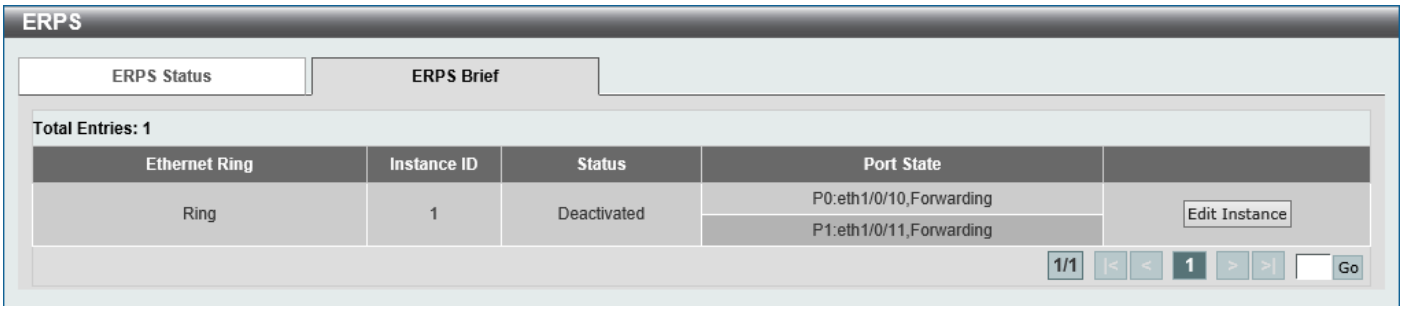


Figure 5-63 ERPS (ERPS Brief) Window

Click the **Edit Instance** button to configure the ERP instance.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After click the **Edit Instance** button, the following window will appear.

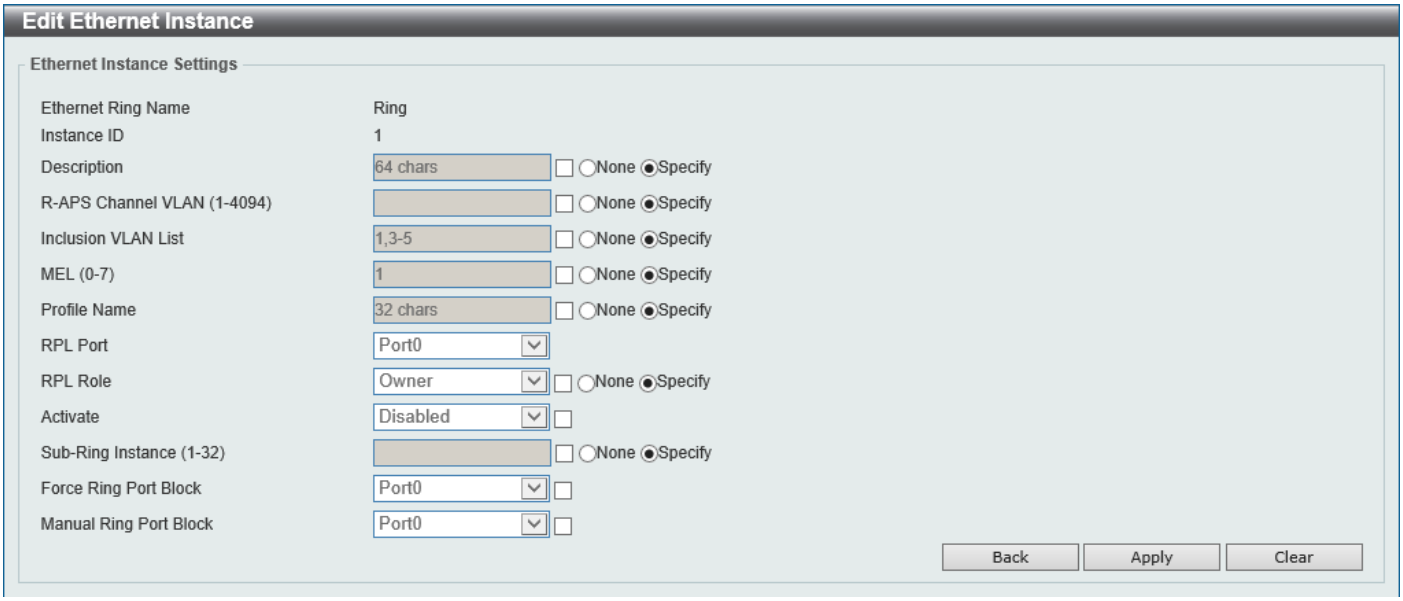


Figure 5-64 ERPS (ERPS Brief, Edit Instance) Window

The fields that can be configured are described below:

Parameter	Description
Description	Select the checkbox and enter the ERP instance description here. This description can be up to 64 characters long. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
R-APS Channel VLAN	Select the checkbox and enter the R-APS channel VLAN ID for the ERP instance here. The APS channel VLAN of a sub-ring instance is also the virtual channel of the sub-ring. The range is from 1 to 4094. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as per normal.
Inclusion VLAN List	Select the checkbox and enter the inclusion VLAN list here. A range is identified when a hyphen (-) is used. For example, VLANs 1 to 5 can be entered as 1-5. A list is identified when commas (,) are used. For example, use VLANs 1,3,5. The VLANs specified here will be protected by the ERP mechanism. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
MEL	Select the checkbox and enter the ring MEL value of the ERP instance here. The range is from 0 to 7. The configured MEL value of all ring nodes that participate in the same ERP instance should be identical. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Profile Name	Select the checkbox and enter the G.8032 profile name here that will be associated with this ERP instance. Multiple ERP instances can be associated with the same G.8032 profile. The instances associated with the same profile protect the same set of VLANs, or the VLANs protected by one instance are a subset of LANs protected by another instance. This name can be up to 32 characters long. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
RPL Port	Select the checkbox and then select the RPL port option here. Options to choose from are **Port0** and **Port1**. The option selected will be configured as the RPL port.
RPL Role	Select the checkbox and then select whether this node is the RPL owner or neighbor. Options to choose from are **Owner** and **Neighbor**. Select the **None** radio button to revert this parameter to the default setting.

Parameter	Description
	Select the **Specify** radio button to configure this parameter as normal.
Activate	Select the checkbox and then select whether or not to active this ERP instance. Options to choose from are **Enabled** and **Disabled**. Enabling this option will active this ERP instance.
Sub Ring Instance	Select the checkbox and enter the identifier of the ERP instance here. This is used to specify the sub-ring instance of a physical ring instance. The range is from 1 to 32. Select the **None** radio button to revert this parameter to the default setting. Select the **Specify** radio button to configure this parameter as normal.
Force Ring Port Block	Select the checkbox and select the ERP instance port that will be blocked here. This forcibly blocks an instance port immediately after force is configured, irrespective of whether link failures have occurred. Options to choose from are **Port0** and **Port1**.
Manual Ring Port Block	Select the checkbox and select the ERP instance port that will be blocked here. This forcibly blocks a port on which MS is configured when link failures and FS conditions are absent. Options to choose from are **Port0** and **Port1**.

Click the **Back** button to discard the changes made and return to the previous window.

Click the **Apply** button to accept the changes made.

Click the **Clear** button to clear the forced or manual configuration associated with this entry.

ERPS Profile

This window is used to display and configure the Ethernet Ring G.8032 Profile settings.

To view the following window, click **L2 Features > ERPS (G.8032) > ERPS Profile**, as shown below:

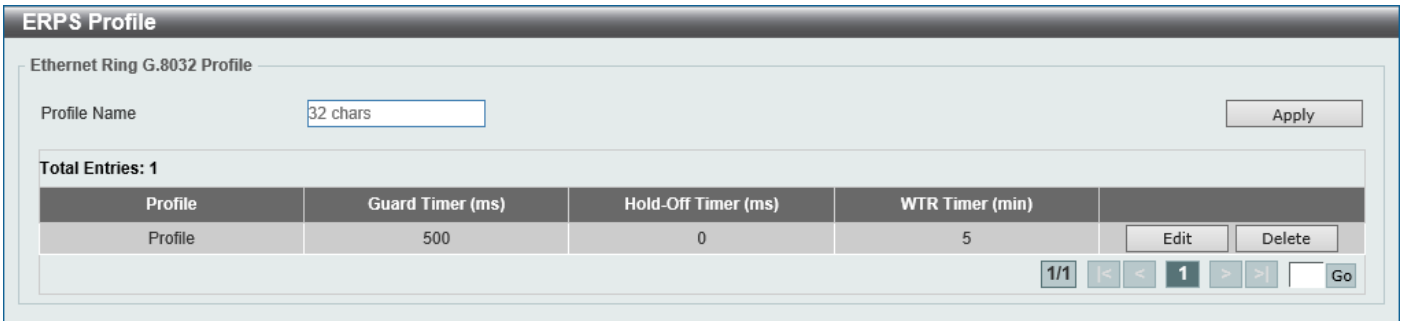


Figure 5-65 ERPS Profile Window

The fields that can be configured are described below:

Parameter	Description
Profile Name	Enter the G.8032 profile name here. This name can be up to 32 characters long. Multiple ERP instances can be associated with the same G.8032 profile. The instances associated with the same profile protect the same set of VLANs, or the VLANs protected by one instance are a subset of LANs protected by another instance.

Click the **Apply** button to associate the G.8032 profile with the ERP instance created.

Click the **Edit** button to modify the specified G.8032 profile.

Click the **Delete** button to disassociate the G.8032 profile.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After click the **Edit** button, the following window will appear.

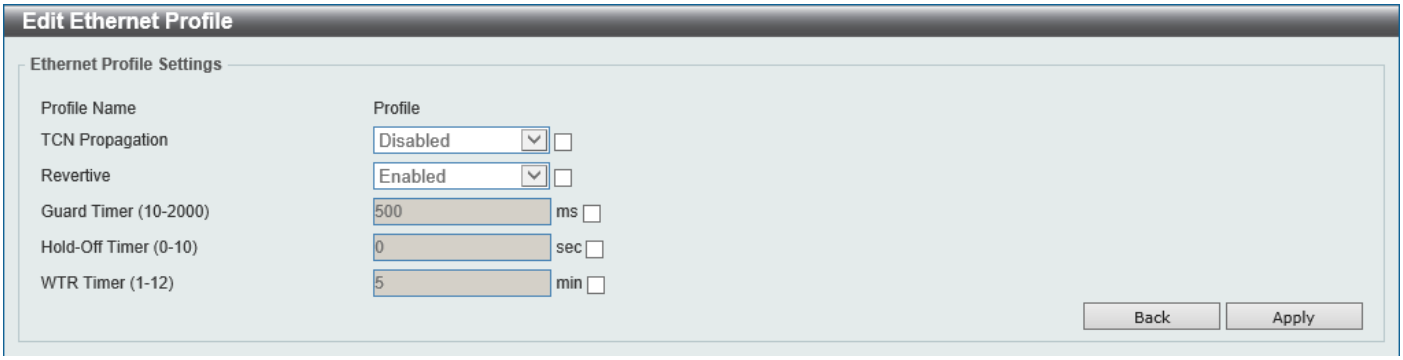


Figure 5-66 ERPS Profile (Edit) Window

The fields that can be configured are described below:

Parameter	Description
TCN Propagation	Select the checkbox and then select the TCN propagation state. Options to choose from are **Enable** and **Disabled**. This function is used to enable the propagation of the topology change notifications from the sub-ERP instance to the major instance.
Revertive	Select the checkbox and then select the revertive state. Options to choose from are **Enable** and **Disabled**. This function is used to revert back to the working transport entity, for example, when the RPL is blocked.
Guard Timer	Select the checkbox and enter the guard timer value here. The range is from 10 to 2000 milliseconds. By default, this value is 500 milliseconds.
Hold-Off Timer	Select the checkbox and enter hold-off timer value here. The range is from 0 to 10 seconds. By default, this value is 0 seconds.
WTR Timer	Select the checkbox and enter the Wait To Restore (WTR) timer value here. The range is from 1 to 12 minutes. By default, this value is 5 minutes.

Click the **Back** button to discard the changes made and return to the previous window.

Click the **Apply** button to accept the changes made.

Loopback Detection

The Loopback Detection (LBD) function is used to detect the loop created by a specific port. This feature is used to temporarily shut down a port on the Switch when a CTP (Configuration Testing Protocol) packet has been looped back to the Switch. When the Switch detects CTP packets received from a port or a VLAN, this signifies a loop on the network. The Switch will automatically block the port or the VLAN and send an alert to the administrator. The Loopback Detection port will restart (change to normal state) when the Loopback Detection Recover Time times out.

The Loopback Detection function can be implemented on a range of ports at a time. The user may enable or disable this function using the drop-down menu.

To view the following window, click **L2 Features > Loopback Detection**, as shown below:

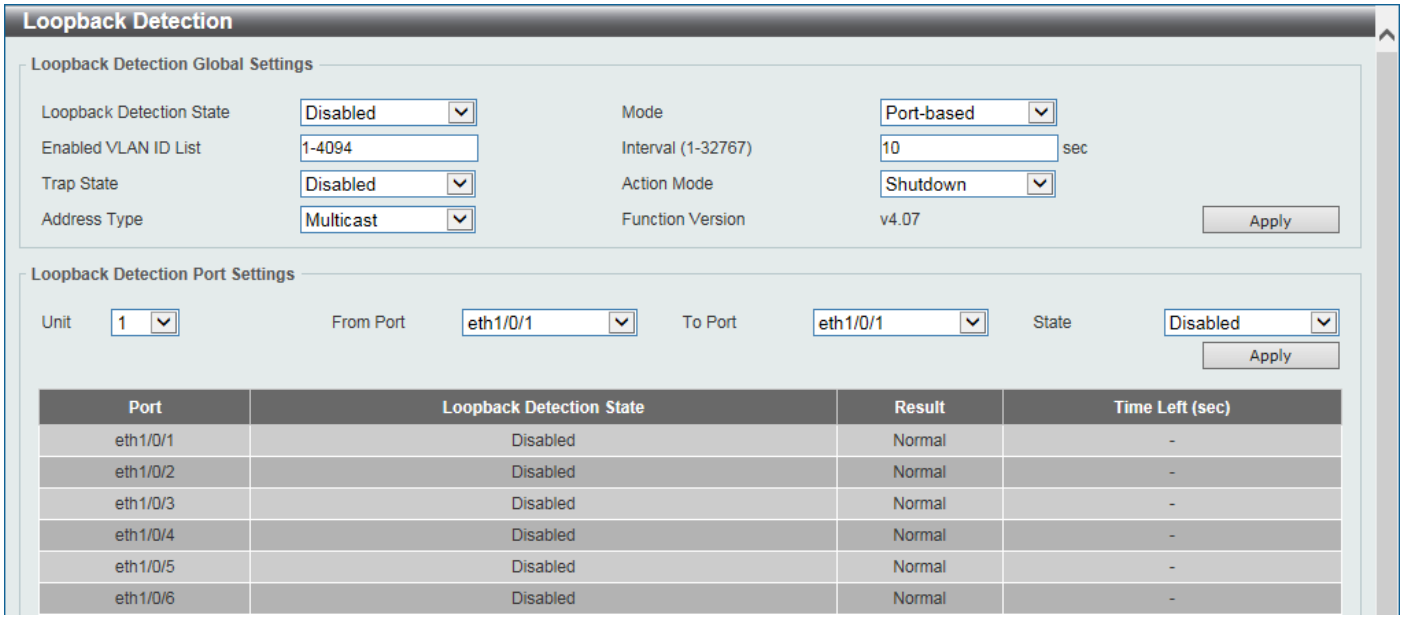


Figure 5-67 Loopback Detection Window

The fields that can be configured in **Loopback Detection Global Settings** are described below:

Parameter	Description
Loopback Detection State	Select to enable or disable loopback detection. By default, this option is disabled.
Mode	Select the loopback detection mode. Options to choose from are **Port-based** and **VLAN-based**.
Enabled VLAN ID List	Enter the VLAN ID for loop detection. This only takes effect when **VLAN-based** is selected in the **Mode** drop-down list.
Interval	Enter the interval in seconds that the device will use to transmit Configuration Test Protocol (CTP) packets to detect a loopback event. The range is from 1 to 32767 seconds. By default, this value is 10 seconds.
Trap State	Select to enable or disable the loopback detection trap state.
Action Mode	Select the action mode here. Option to choose from are: • **Shutdown** - Specifies to shut down the port in the port-based mode or block traffic on the specific VLAN in the VLAN-based mode when a loop has been detected. • **None** - Specifies not to shut down the port in the port-based mode or block traffic on the specific VLAN in the VLAN-based mode when a loop has been detected.
Address Type	Select the address type here. Options to choose from are **Multicast** and **Broadcast**.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Loopback Detection Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select this option to enable or disable the state of the port.

Click the **Apply** button to accept the changes made.

Link Aggregation

Understanding Port Trunk Groups

Port trunk groups are used to combine a number of ports together to make a single high-bandwidth data pipeline. The Switch supports up to 32 port trunk groups with up to 12 ports in each group.

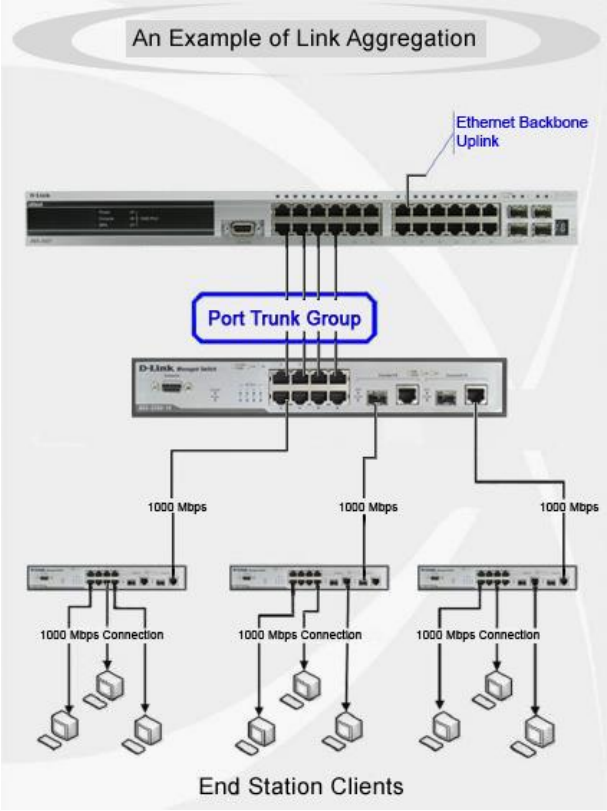


Figure 5-68 Example of Port Trunk Group

The Switch treats all ports in a trunk group as a single port. Data transmitted to a specific host (destination address) will always be transmitted over the same port in a trunk group. This allows packets in a data stream to arrive in the same order they were sent.

Link aggregation allows several ports to be grouped together and to act as a single link. This results in a bandwidth that is a multiple of a single link's bandwidth. Link aggregation is most commonly used to link bandwidth intensive network devices, such as servers, to the backbone of a network.

The Switch allows the creation of up to 32 link aggregation groups, each group consisting of up to 12 links (ports). Each port can only belong to a single link aggregation group. Load balancing is automatically applied to the ports in the aggregated group, and a link failure within the group causes the network traffic to be directed to the remaining links in the group.

The Spanning Tree Protocol will treat a link aggregation group as a single link. If two redundant link aggregation groups are configured on the Switch, STP will block one entire group; in the same way, STP will block a single port that has a redundant link.

NOTE: If any ports within the trunk group become disconnected, packets intended for the disconnected port will be load shared among the other linked ports of the link aggregation group.

This window is used to display and configure the link aggregation settings. To view the following window, click **L2 Features > Link Aggregation**, as shown below:

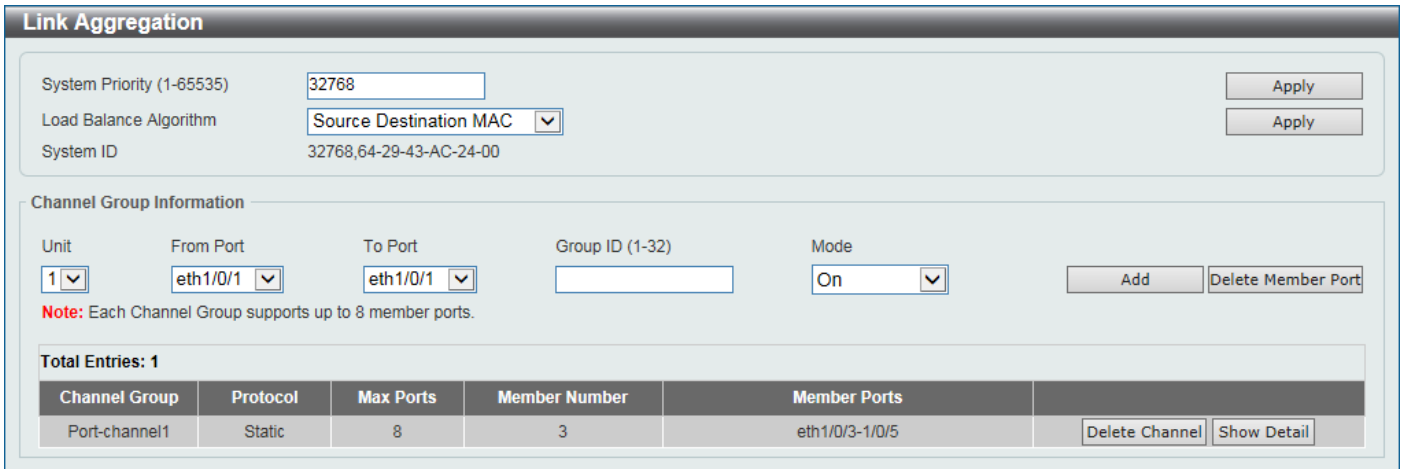


Figure 5-69 Link Aggregation Window

The fields that can be configured for **Link Aggregation** are described below:

Parameter	Description
System Priority	Enter the system priority value used here. The range is from 1 to 65535. By default, this value is 32768. The system priority determines which ports can join a port-channel and which ports are put in the stand-alone mode. The lower value has a higher priority. If two or more ports have the same priority, the port number determines the priority.
Load Balance Algorithm	Select the load-balancing algorithm that will be used here. Options to choose from are **Source MAC**, **Destination MAC**, **Source Destination MAC**, **Source IP**, **Destination IP**, **Source Destination IP**, **Source L4 Port**, **Destination L4 Port**, and **Source Destination L4 Port**. By default, the **Source Destination MAC** option is used.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Channel Group Information** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the list of ports that will be associated with this configuration here.
Group ID	Enter the channel group number here. The range is from 1 to **32**. The system will automatically create the port-channel when a physical port first joins a channel group. An interface can only join one channel-group.
Mode	Select the mode option here. Options to choose from are **On**, **Active**, and **Passive**. If the mode **On** is specified, the channel group type is static. If the mode **Active** or **Passive** is specified, the channel group type is LACP. A channel group can only consist of either static members or LACP members. Once the type of channel group has been determined, other types of interfaces cannot join the channel group.

Click the **Add** button to add a new channel group.

Click the **Delete Member Port** button, to delete the member port(s) specified from the group.

Click the **Delete Channel** button to delete the specified channel group.

Click the **Show Detail** button to view detailed information about the channel.

After clicking the **Show Detail** button, the following page will be available.

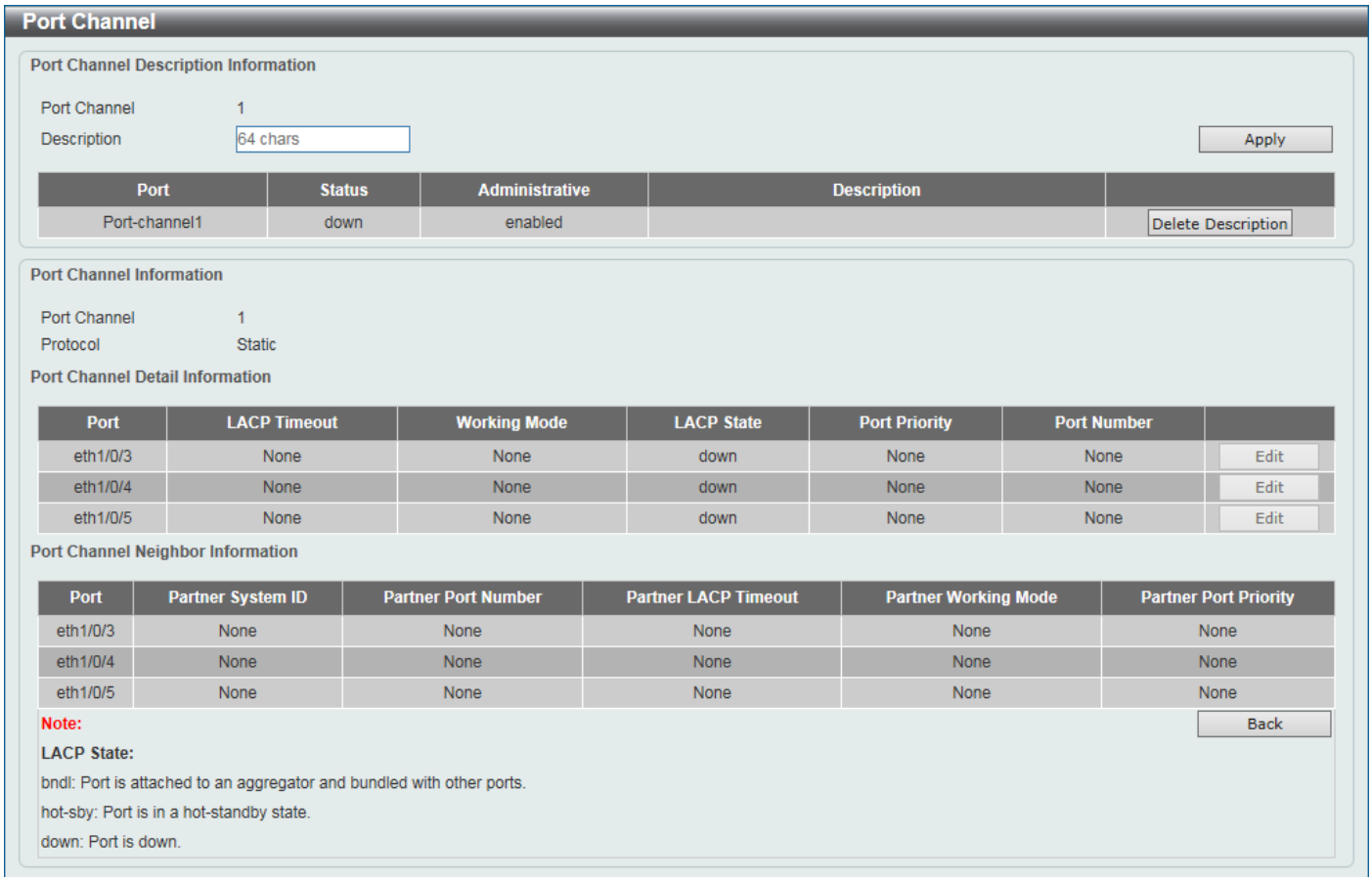


Figure 5-70 Link Aggregation (Channel Detail) Window

The fields that can be configured are described below:

Parameter	Description
Description	Enter the description for the port channel here. This string can be up to 64 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete Description** button to delete the description for the port channel.

Click the **Edit** button to re-configure the specific entry.

Click the **Back** button to return to the previous page.

After clicking the **Edit** button, the fields that can be configured are described below:

Parameter	Description
LACP Timeout	Select the LACP timeout here. Options to choose from are **Short** and **Long**.
Working Mode	Select the working mode here. Options to choose from are **Active** and **Passive**.
Port Priority	Enter the port priority value here.

Click the **Apply** button to accept the changes made.

MLAG

Multi-Chassis Link Aggregation Group (MLAG) can be used to increase bandwidth to switches in the network, prevent port blocking and unnecessary re-convergence delays, and provide a reliable fail-over solution in the event that a switch or a cable connection fails.

An MLAG peer Switch can connect to another MLAG peer Switch, in the same MLAG domain, through Peer-Link ports configured on them. MLAG partner switches, connected to the MLAG peer Switches, will perceive the two MLAG peer switches as a single MLAG switch in the network. The two MLAG peer switches will operate as two separate stand-alone Switches except for all MLAG functions. Data traffic can be carried by all links in the MLAG across many physically diverse topologies.

Two identical Switches running on the same firmware version must be used to create the MLAG peer connection. The following settings must be identical on MLAG peer switches to prevent instability: Link Aggregation, MLAG Port-channel, Interface, and VLAN settings.

MLAG peer switches must be stand-alone switches with the physical stacking feature disabled.

MLAG Settings

This window is used to display and configure the MLAG settings. The MLAG settings must be configured on the Switch before connecting to another MLAG peer Switch. The configuration only takes effect after the Switch was rebooted. All switches in the group must run the same MLAG version.

To view the following window, click **L2 Features > MLAG > MLAG Settings**, as shown below:

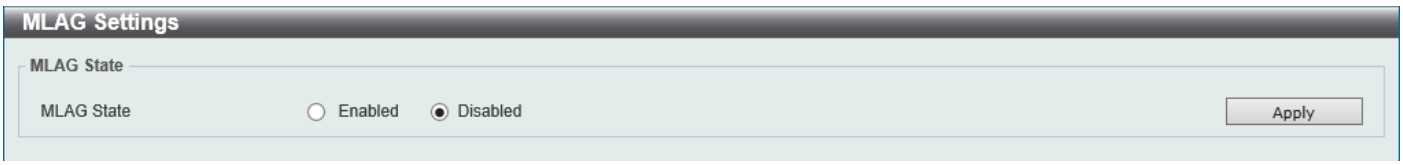


Figure 5-71 MLAG Settings (Disabled) Window

The fields that can be configured are described below:

Parameter	Description
MLAG State	Select to enable or disable the MLAG function here.

Click the **Apply** button to accept the changes made.

After MLAG was enabled and the Switch was rebooted, the following page will appear.

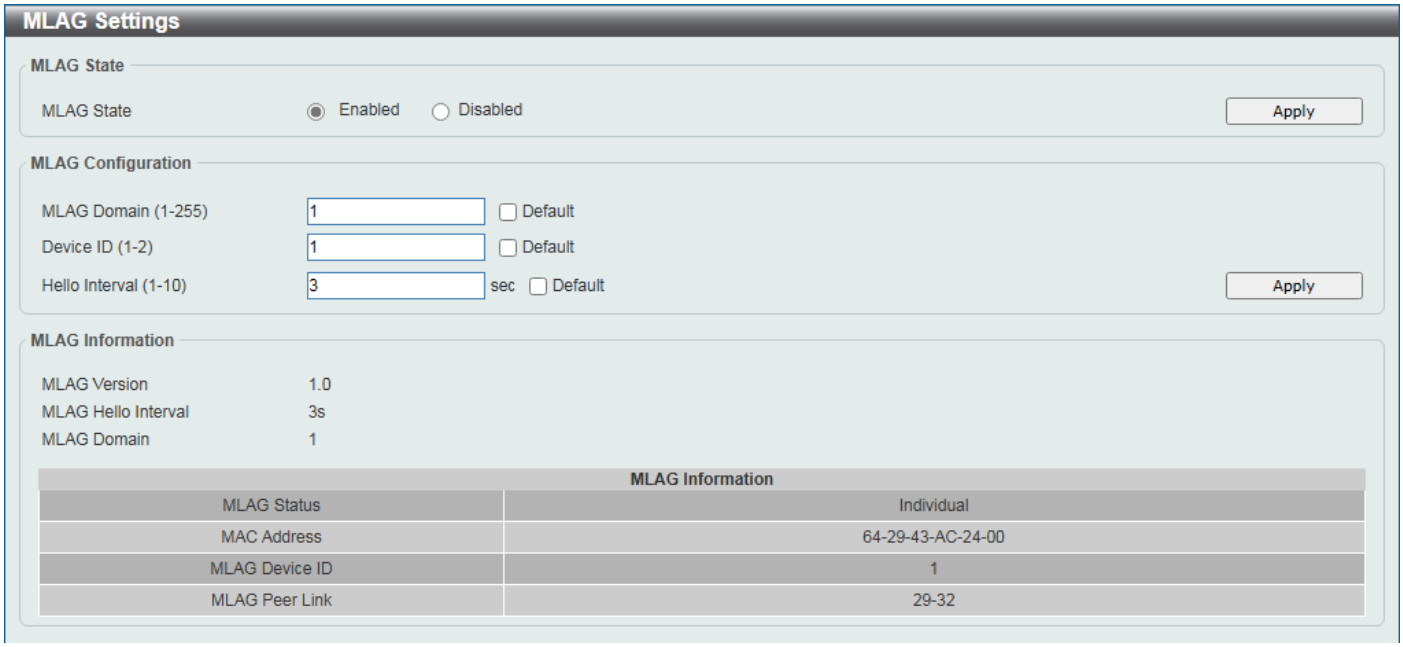


Figure 5-72 MLAG Settings (Enabled) Window

The fields that can be configured in **MLAG State** are described below:

Parameter	Description
MLAG State	Select to enable or disable the MLAG function here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLAG Configuration** are described below:

Parameter	Description
Domain	Enter the MLAG domain ID here. The range is from 1 to 255. Select the **Default** option to use the default value which is 1.
Device ID	Enter the MLAG device ID for the Switch here. The range is from 1 to 2. Select the **Default** option to use the default value which is 1.
Hello Interval	Enter the MLAG hello interval here. This is the time that elapses between MLAG hello message transmissions. The range is from 1 to 10 seconds. Select the **Default** option to use the default value which is 3 seconds.

Click the **Apply** button to accept the changes made.

MLAG Group

This window is used to display the MLAG group information.

To view the following window, click **L2 Features > MLAG > MLAG Group**, as shown below:

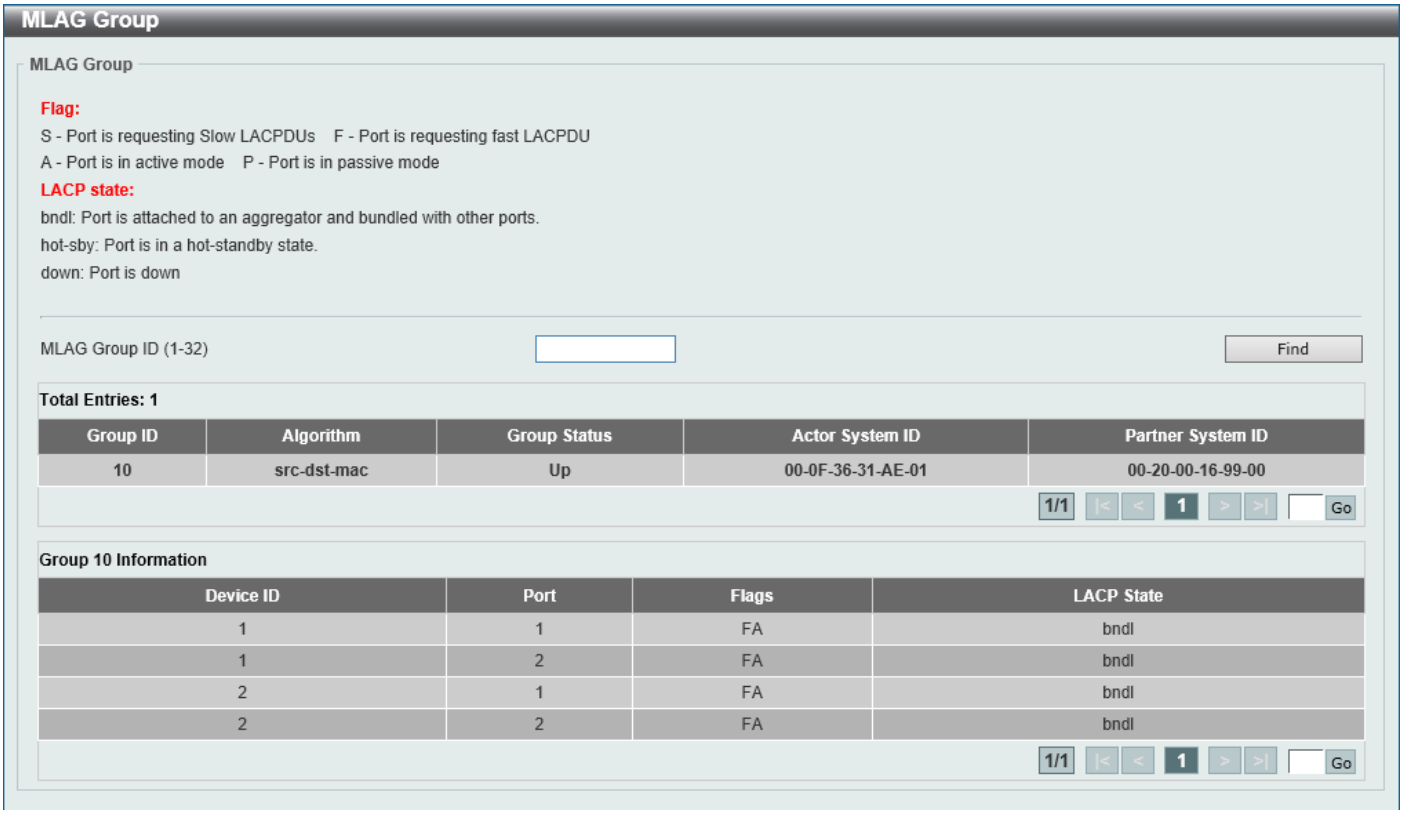


Figure 5-73 MLAG Group Window

The fields that can be configured are described below:

Parameter	Description
MLAG Group ID	Enter the MLAG group ID here. The range is from 1 to 32.

Click the **Find** button to find and display MLAG group information based on the MLAG Group ID entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Flex Links

This window is used to display and configure the Flex Link feature. Flex Links belong to a pair of Layer 2 interfaces where one interface is configured to act as a backup to the other. Flex Links provide link-level redundancy as an alternative to STP and LBD.

To view the following window, click **L2 Features > Flex Links**, as shown below:

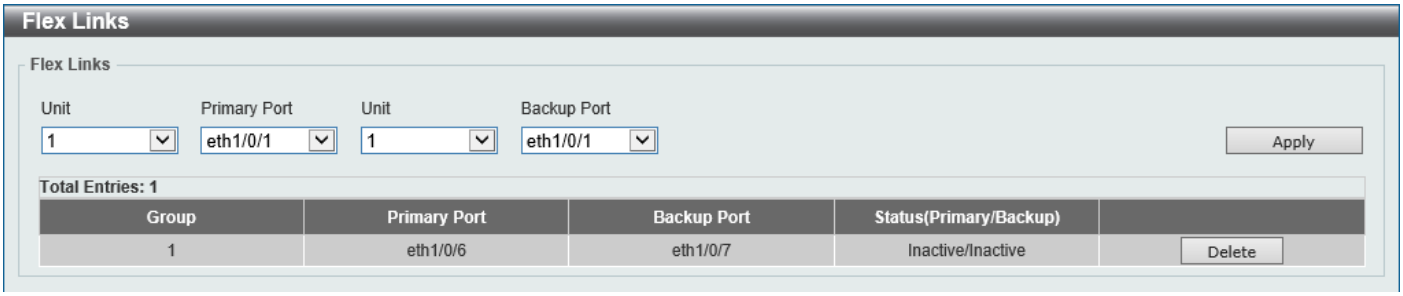


Figure 5-74 L2 Flex Links Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit of the primary port here.
Primary Port	Select the primary port here.
Unit	Select the Switch unit of the backup port here.
Backup Port	Select the backup port here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

NOTE: Flex Link and STP, ERPS and LBD are mutually exclusive.

L2 Protocol Tunnel

This window is used to display and configure the Layer 2 protocol tunnel settings.

To view the following window, click **L2 Features > L2 Protocol Tunnel** and select the **L2 Protocol Tunnel Global Settings** tab, as shown below:

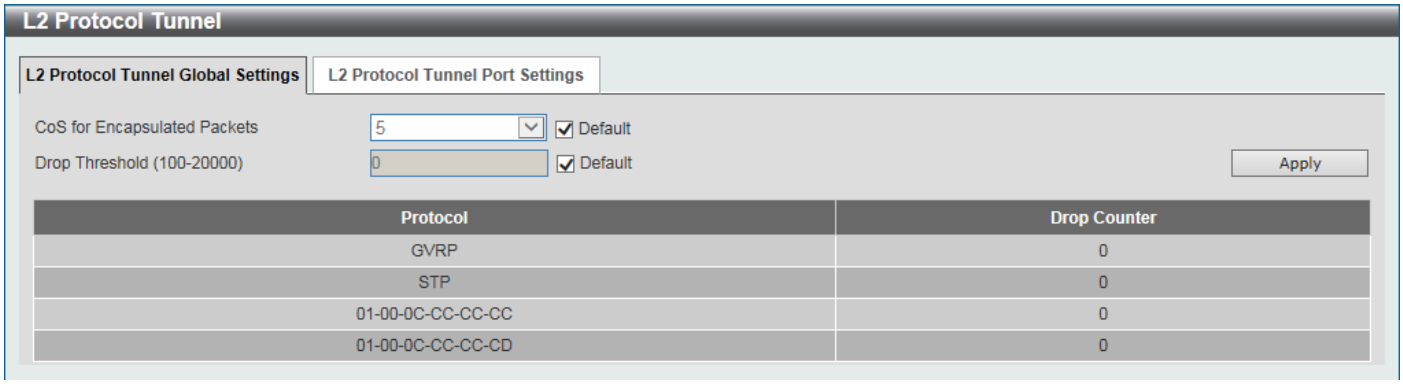


Figure 5-75 L2 Protocol Tunnel (L2 Protocol Tunnel Global Setting) Window

The fields that can be configured are described below:

Parameter	Description
CoS for Encapsulated Packets	Select the CoS value for encapsulated packets here. This value is between 0 and 7. Select the **Default** option to use the default value.
Drop Threshold	Enter the drop threshold value here. This value must be between 100 and 20000. By default, this value is 0. The tunneling of the Layer 2 protocol packets will consume CPU processing power in encapsulating, decapsulating, and forwarding of the packet. Use this option to restrict the CPU processing bandwidth consumed by specifying a threshold on the number of all Layer 2 protocol packets that can be processed by the system. When the maximum number of packets is exceeded, the excessive protocol packets are dropped. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

To view the following window, select the **L2 Protocol Tunnel Port Setting** tab, as shown below:

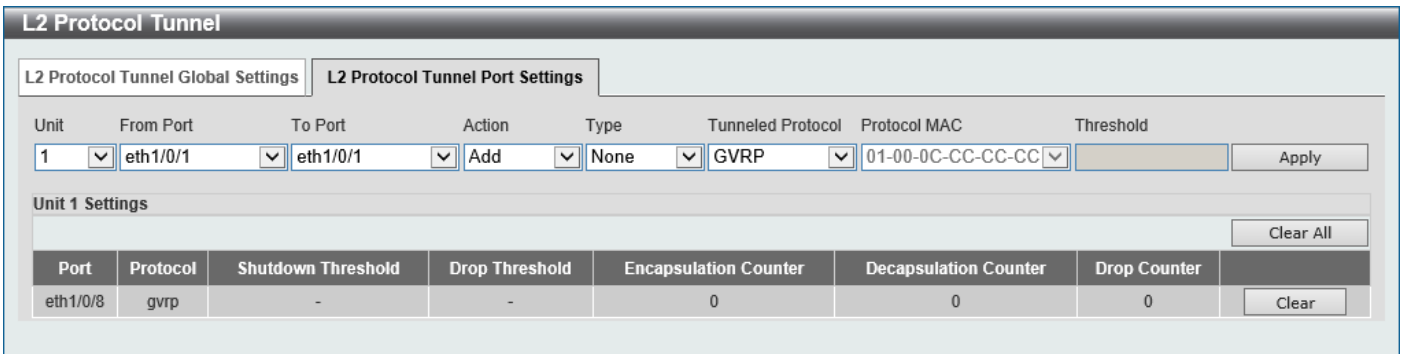


Figure 5-76 L2 Protocol Tunnel (L2 Protocol Tunnel Port Setting) Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
Type	Select the type option here. Options to choose from are **None**, **Shutdown**, and **Drop**.
Tunneled Protocol	Select the tunneled protocol option here. Options to choose from are **GVRP**, **STP**, **Protocol MAC**, and **All**.
Protocol MAC	After selecting the **Protocol MAC** option as the **Tunneled Protocol**, the following option will be available. Select the protocol MAC option here. Options to choose from are **01-00-0C-CC-CC-CC** and **01-00-0C-CC-CC-CD**.
Threshold	After selecting the **Shutdown** or **Drop** option in the **Type** field, the following parameter will be available. Enter the threshold value here. The range is from 1 to 4096.

Click the **Apply** button to accept the changes made.

Click the **Clear All** button to clear all the counter information.

Click the **Clear** button to clear all the counter information of the specific entry.

L2 Multicast Control

IGMP Snooping

Internet Group Management Protocol (IGMP) snooping allows the Switch to recognize IGMP queries and reports sent between network stations or devices and an IGMP host.

IGMP Snooping Settings

In order to use IGMP Snooping it must first be enabled for the entire Switch under IGMP **Global Settings** at the top of the window. You may then fine-tune the settings for each VLAN by clicking the corresponding **Edit** button. When enabled for IGMP snooping, the Switch can open or close a port to a specific multicast group member based on IGMP messages sent from the device to the IGMP host or vice versa. The Switch monitors IGMP messages and discontinues forwarding multicast packets when there are no longer hosts requesting that they continue.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Settings**, as shown below:

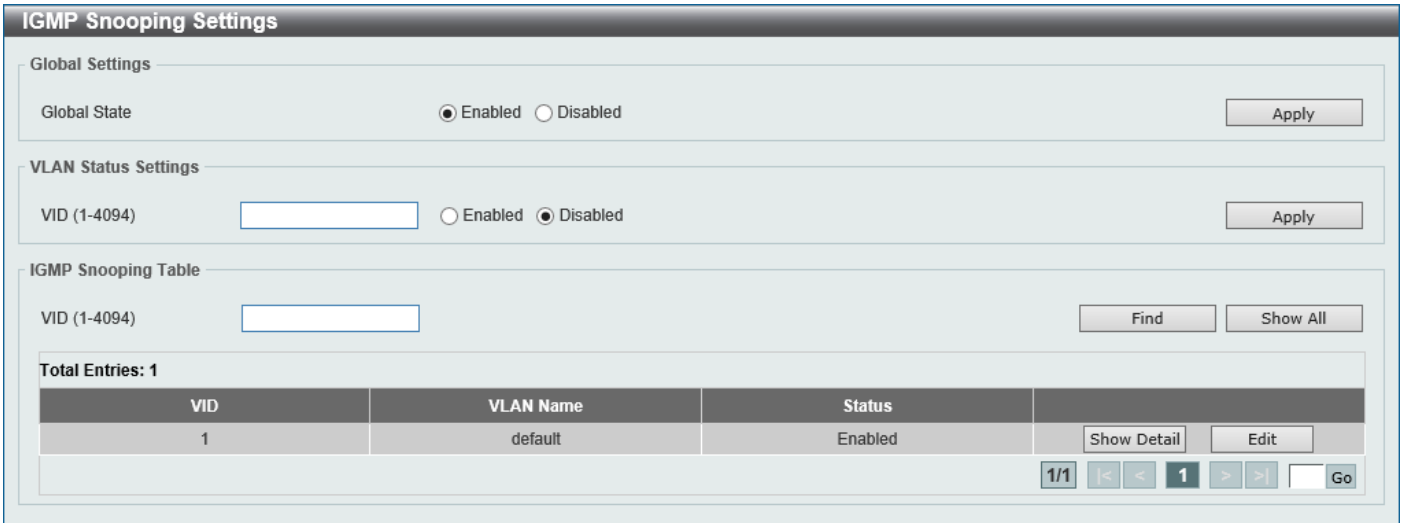


Figure 5-77 IGMP Snooping Settings Window

The fields that can be configured in **Global Settings** are described below:

Parameter	Description
Global State	Select this option to globally enable or disable IGMP snooping.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VLAN Status Settings** are described below:

Parameter	Description
VID	Enter a VLAN ID from 1 to 4094, and select to enable or disable IGMP snooping on the VLAN.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping Table** are described below:

Parameter	Description
VID	Enter a VLAN ID from 1 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Click the **Show Detail** button to see the detail information of the specific VLAN.

Click the **Edit** button to re-configure the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

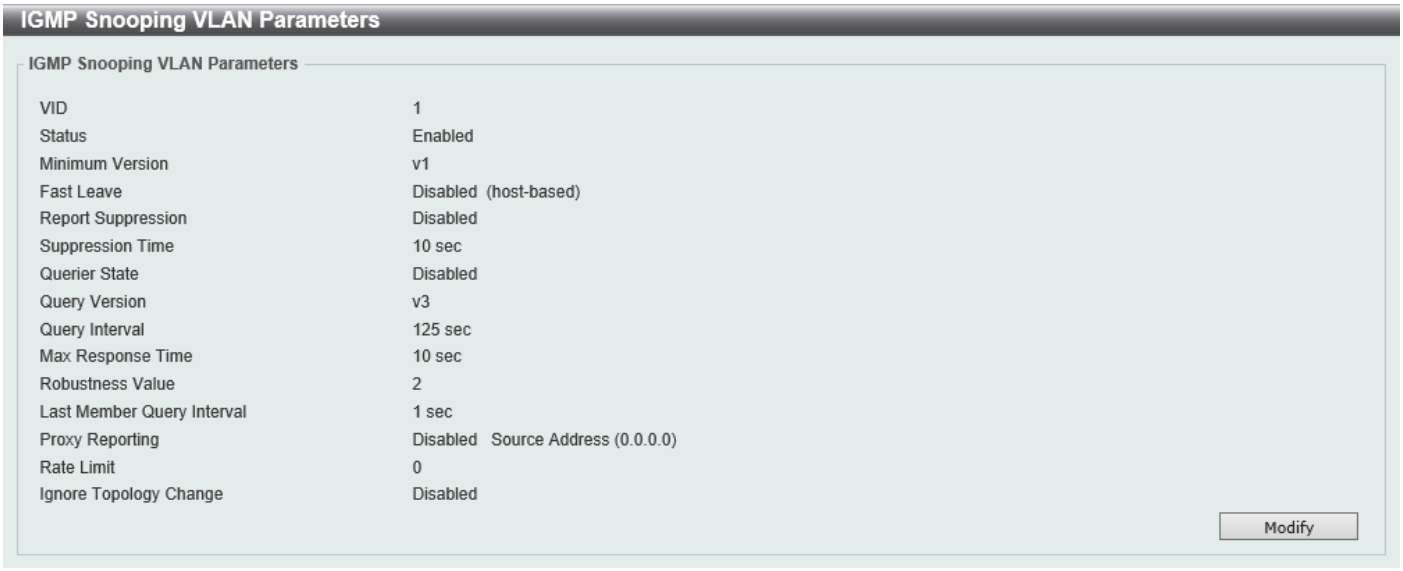


Figure 5-78 IGMP Snooping Settings (Show Detail) Window

The window displays the detail information about IGMP snooping VLAN.

Click the **Modify** button to edit the information in the following window.

After clicking the **Modify** or **Edit** button in IGMP Snooping Settings window, the following window will appear.

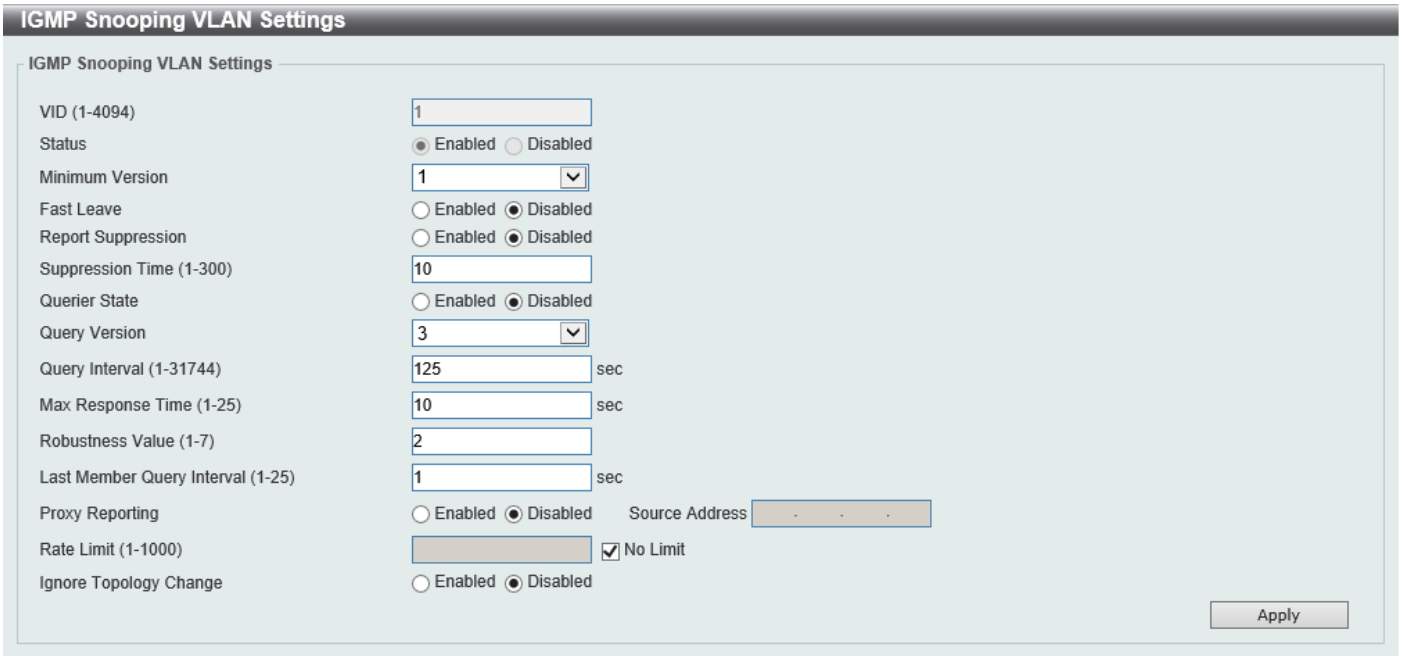


Figure 5-79 IGMP Snooping Settings (Modify, Edit) Window

The fields that can be configured are described below:

Parameter	Description
Minimum Version	Select the minimum IGMP host version that is allowed on the VLAN. Options to choose from are **1**, **2**, and **3**.
Fast Leave	Select this option to enable or disable the IGMP snooping Fast Leave function. If enabled, the membership is immediately removed when the system receives the IGMP done message from the last member. When fast leave is enabled, the Switch will not generate specific queries. When fast leave is disabled, the Switch will generate specific queries.
Report Suppression	Select this option to enable or disable the report suppression. The report suppression function only works for IGMPv1 and IGMPv2 traffic. When report suppression is enabled, the Switch suppresses the duplicate reports sent by hosts. The suppression for the same group report or leave will continue until the suppression time expires. For report or leave messages to the same group, only one report or leave message is forwarded. The remaining report and leave messages are suppressed.
Suppression Time	Enter the interval of suppressing duplicate IGMP reports or leaves. The range is from 1 to 300.
Querier State	Select this option to enable or disable the querier state.
Query Version	Select the general query packet version sent by the IGMP snooping querier. Options to choose from are **1**, **2**, and **3**.
Query Interval	Enter the interval at which the IGMP snooping querier sends IGMP general query messages periodically. The range is from 1 to 31744.
Max Response Time	Enter the maximum response time, in seconds, advertised in IGMP snooping queries. The range is from 1 to 25.
Robustness Value	Enter the robustness variable used in IGMP snooping. The range is from 1 to 7.
Last Member Query Interval	Enter the interval at which the IGMP snooping querier sends IGMP group-specific or group-source-specific (channel) query messages. The range is from 1 to 25.
Proxy Reporting	Select this option to enable or disable the proxy-reporting function.
Source Address	Enter the source IP of proxy reporting. This is available when **Enabled** is selected in **Proxy Reporting**.
Rate Limit	Enter the rate limit value here. The range is from 1 to 1000. Select the **No Limit** option to apply no rate limit on this profile.
Ignore Topology Change	Select to enable or disable the Ignore Topology Change feature here.

Click the **Apply** button to accept the changes made.

IGMP Snooping AAA Settings

This window is used to display and configure the IGMP snooping AAA settings.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping AAA Settings**, as shown below:

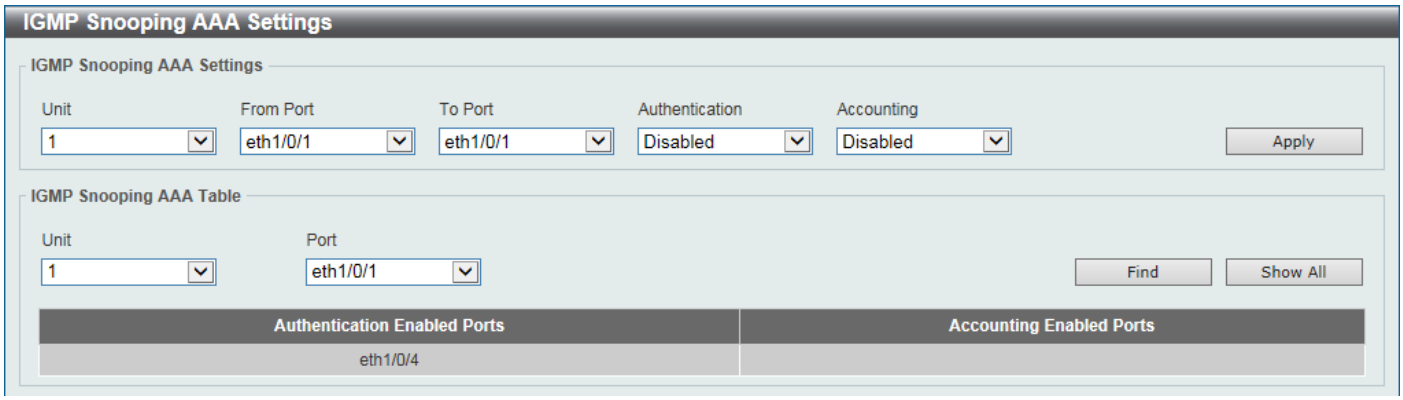


Figure 5-80 IGMP Snooping AAA Settings Window

The fields that can be configured in **IGMP Snooping AAA Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Authentication	Select to enable or disable authentication function for IGMP join messages.
Accounting	Select to enable or disable accounting when a listener joining an IGMP group.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping AAA Table** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select to choose the port.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

IGMP Snooping Groups Settings

This window is used to display and configure the IGMP snooping static group, and view IGMP snooping group.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Groups Settings**, as shown below:

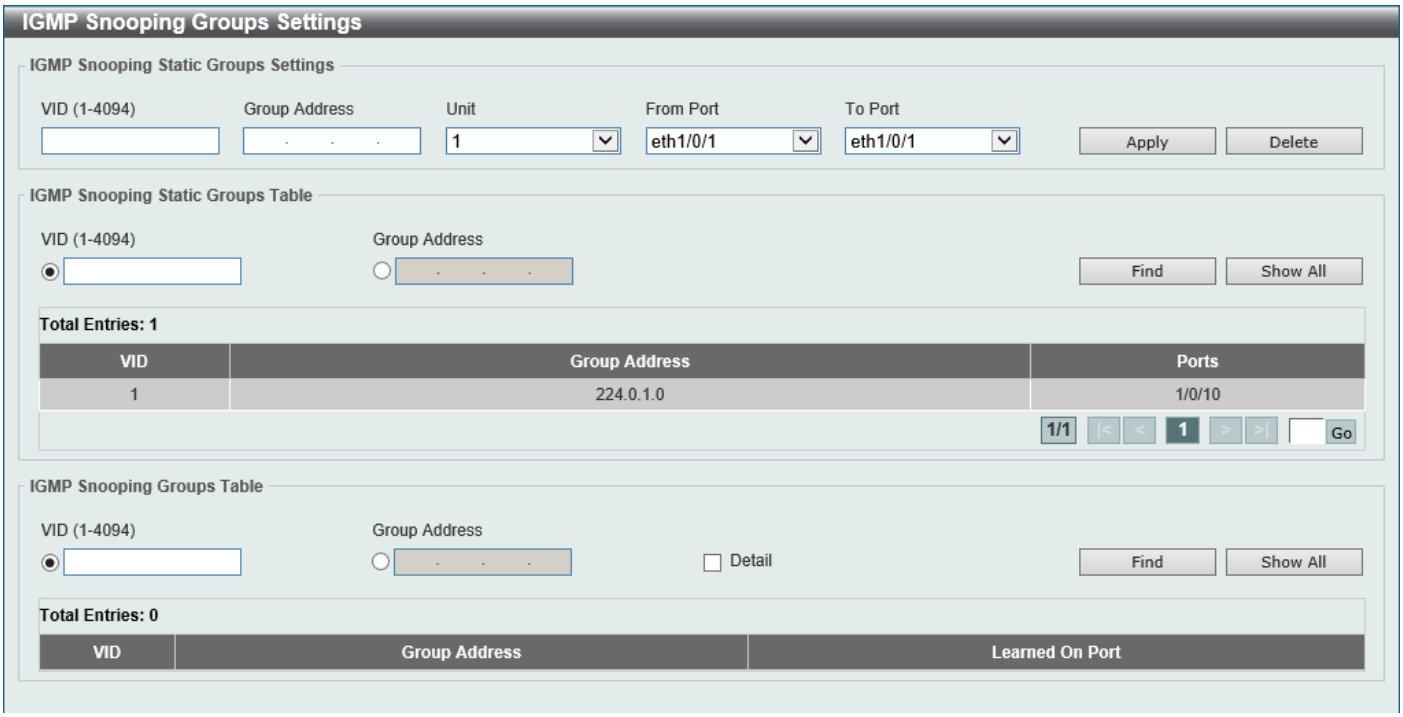


Figure 5-81 IGMP Snooping Groups Settings Window

The fields that can be configured in **IGMP Snooping Static Groups Settings/Table** are described below:

Parameter	Description
VID	Enter a VLAN ID of the multicast group. The range is from 1 to 4094.
Group Address	Enter an IP multicast group address.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
VID	Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094.
Group Address	Click the radio button and enter an IP multicast group address.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **IGMP Snooping Groups Table** are described below:

Parameter	Description
VID	Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094.
Group Address	Click the radio button and enter an IP multicast group address.

Parameter	Description
Detail	Select this option to display the IGMP snooping group detail information.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IGMP Snooping Filter Settings

This window is used to display and configure the IGMP snooping filter settings.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Filter Settings**, as shown below:

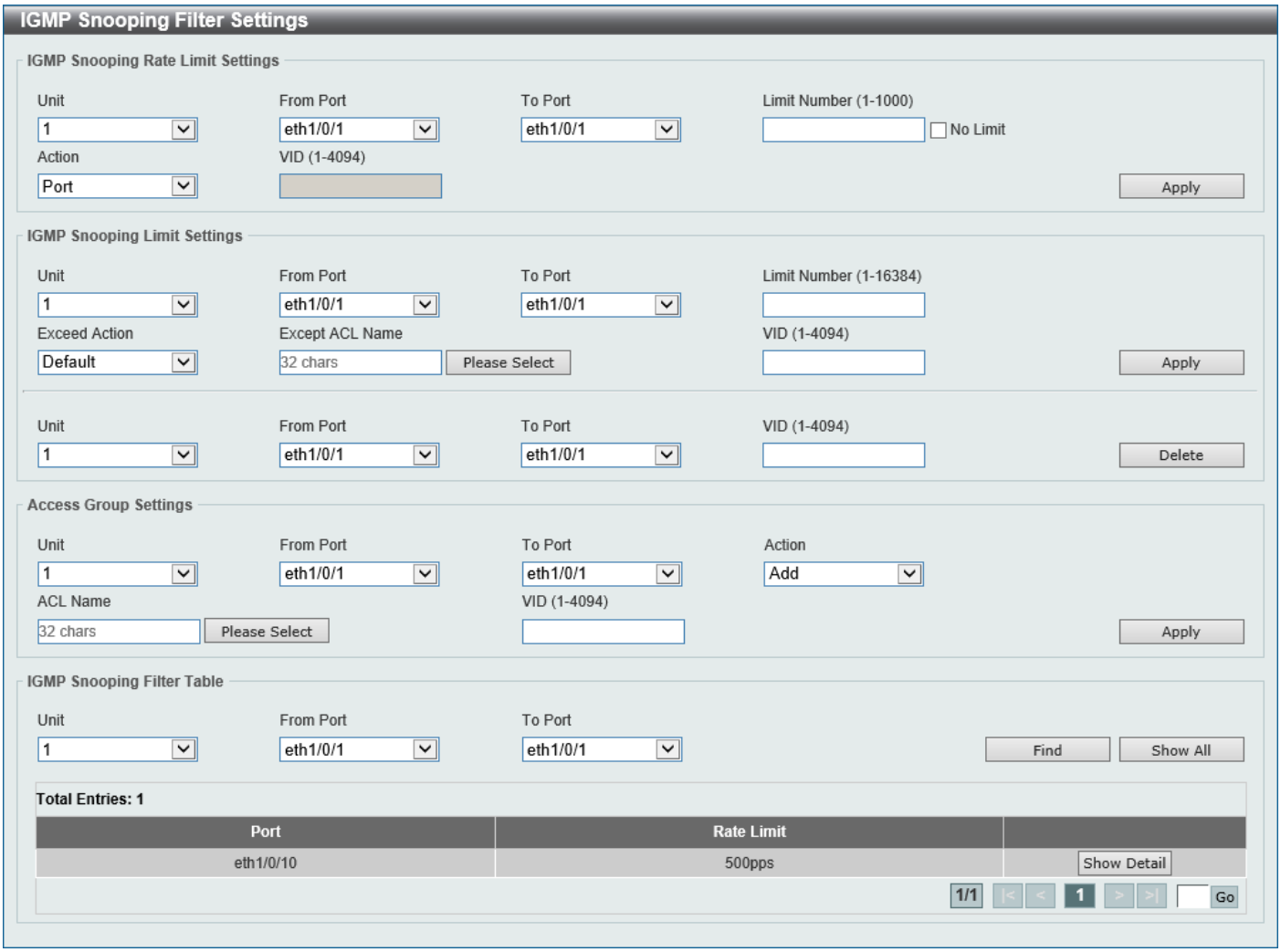


Figure 5-82 IGMP Snooping Filter Settings Window

The fields that can be configured in **IGMP Snooping Rate Limit Settings** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
Limit Number	Enter the limit number here. This is to configure the rate of IGMP control packets that the Switch can process on a specific interface. The range is from 1 to 1000 packets per second.

Parameter	Description
	Select the **No Limit** option to remove the limitation.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping Limit Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Limit Number	Enter the limit number here. This is used to set the limitation on the number of IGMP cache entries that can be created. The range is from 1 to 16384.
Exceed Action	Select the exceed action here. This parameter specifies the action for handling newly learned groups when the limitation is exceeded. Options to choose from are: • **Default** - Specifies that the default action will be taken. • **Drop** - Specifies that the new group will be dropped. • **Replace** - Specifies that the new group will replace the oldest group.
Except ACL Name	Enter the standard IP access list name here. The group (*,G) permitted by the access list will be excluded from the limit. To permit a group (*,G), specify "any" in the source address field and G in the destination address field of the access list entry. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration.
VID	Enter the Layer 2 VLAN ID here. This applies the filter to packets that arrive on that VLAN. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **Access Group Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
ACL Name	Enter the standard IP access list name here. This is used to permit users to join a group (*, G), specify "any" in source address field and G in destination address field of the access list entry. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration.
VID	Enter the VLAN ID used for this configuration here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping Filter Table** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Show Detail** button to view detailed information associated with the entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Please Select** button, the following page will appear.

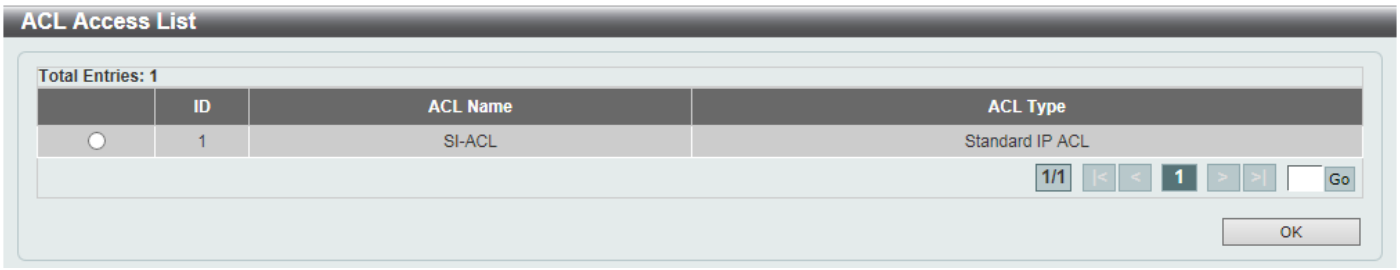


Figure 5-83 IGMP Snooping Filter Settings (Please Select) Window

Select the ACL and click the **OK** button to use the selected access list.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

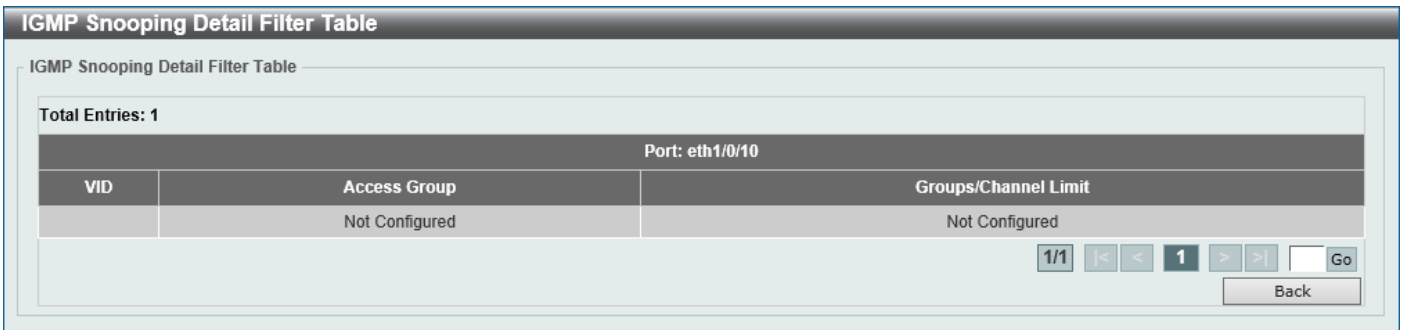


Figure 5-84 IGMP Snooping Filter Settings (Show Detail) Window

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

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IGMP Snooping Mrouter Settings

This window is used to display and configure the IGMP Snooping Multicast Router settings.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Mrouter Settings**, as shown below:

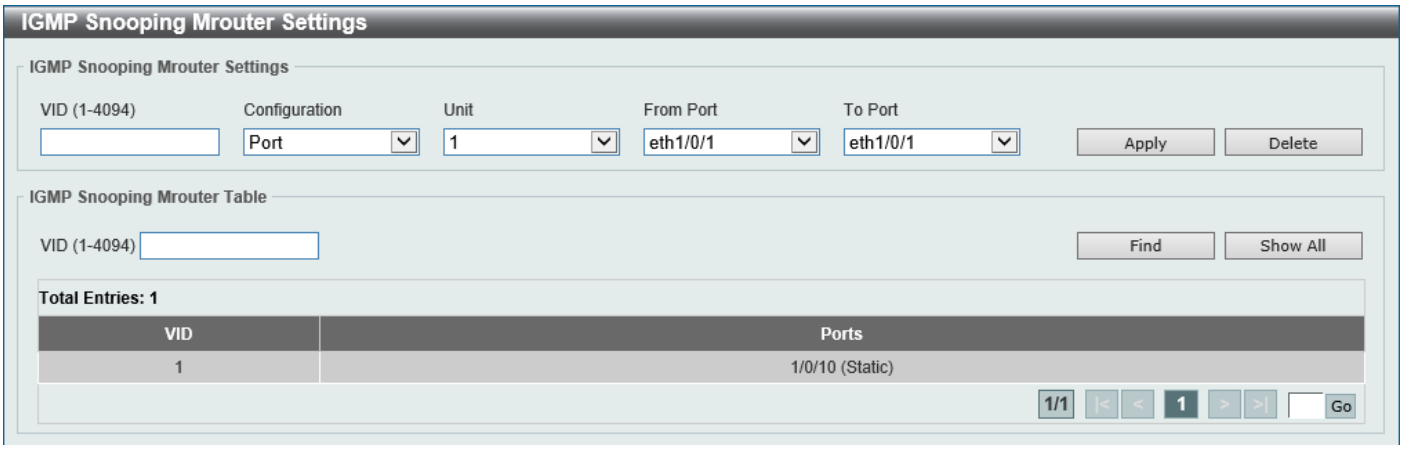


Figure 5-85 IGMP Snooping Mrouter Settings Window

The fields that can be configured in **IGMP Snooping Mrouter Settings** are described below:

Parameter	Description
VID	Enter the VLAN ID used here. The range is from 1 to 4094.
Configuration	Select the port configuration. Options to choose from are: • **Port** - Select to have the configured ports to be static multicast router ports. • **Forbidden Port** - Select to have the configured ports not to be multicast router ports.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

The fields that can be configured in **IGMP Snooping Mrouter Table** are described below:

Parameter	Description
VID	Enter the VLAN ID used here. The range is from 1 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IGMP Snooping Statistics Settings

This window is used to view and clear the IGMP snooping related statistics.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Statistics Settings**, as shown below:

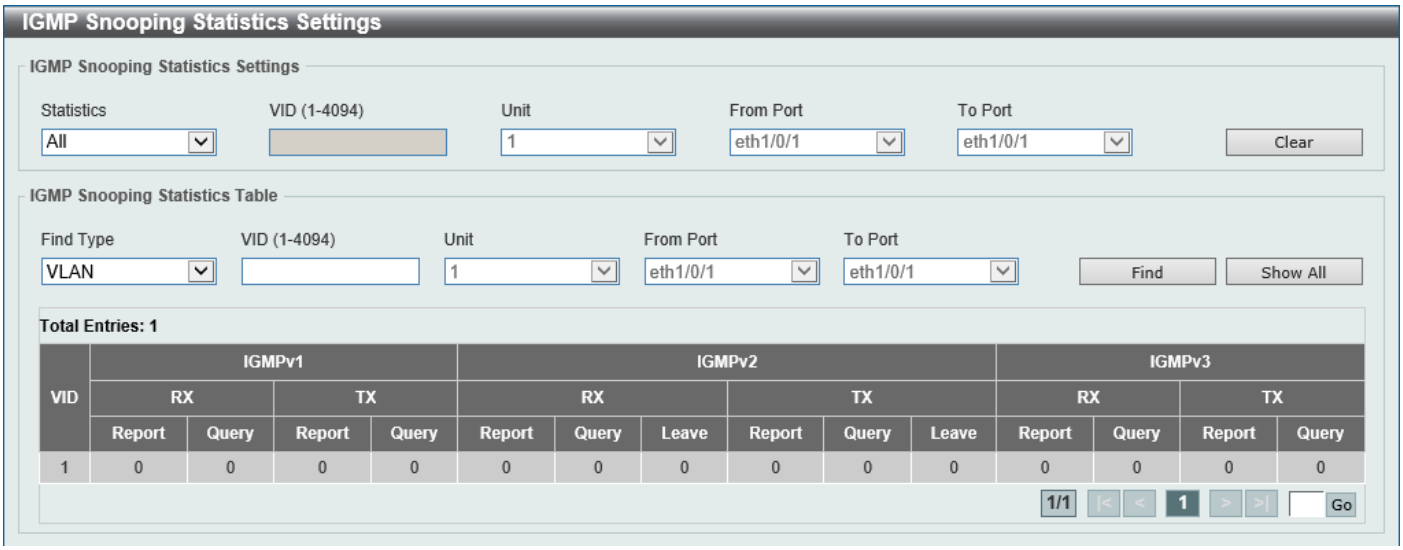


Figure 5-86 IGMP Snooping Statistics Settings Window

The fields that can be configured in **IGMP Snooping Statistics Settings** are described below:

Parameter	Description
Statistics	Select the interface here. Options to choose from are **All**, **VLAN**, and **Port**.
VID	Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Statistics** drop-down list.
Unit	Select the Switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Statistics** drop-down list.
From Port - To Port	Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Statistics** drop-down list.

Click the **Clear** button to clear the IGMP snooping related statistics.

The fields that can be configured in **IGMP Snooping Statistics Table** are described below:

Parameter	Description
Find Type	Select the interface type. Options to choose from are **VLAN**, and **Port**.
VID	Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Find Type** drop-down list.
Unit	Select the Switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Find Type** drop-down list.
From Port - To Port	Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Find Type** drop-down list.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MLD Snooping

Multicast Listener Discovery (MLD) Snooping is an IPv6 function used similarly to IGMP snooping in IPv4. It is used to discover ports on a VLAN that are requesting multicast data. Instead of flooding all ports on a selected VLAN with multicast traffic, MLD snooping will only forward multicast data to ports that wish to receive this data through the use of queries and reports produced by the requesting ports and the source of the multicast traffic.

MLD snooping is accomplished through the examination of the layer 3 part of an MLD control packet transferred between end nodes and an MLD router. When the Switch discovers that this route is requesting multicast traffic, it adds the port directly attached to it into the correct IPv6 multicast table, and begins the process of forwarding multicast traffic to that port. This entry in the multicast routing table records the port, the VLAN ID, and the associated multicast IPv6 multicast group address, and then considers this port to be an active listening port. The active listening ports are the only ones to receive multicast group data.

MLD Control Messages

These types of messages are transferred between devices using MLD snooping. These messages are all defined by four ICMPv6 packet headers, labeled 130, 131, 132, and 143.

- **Multicast Listener Query** - Similar to the IGMPv2 Host Membership Query for IPv4, and labeled as 130 in the ICMPv6 packet header, this message is sent by the router to ask if any link is requesting multicast data. There are two types of MLD query messages emitted by the router: the General Query, which is used to advertise all multicast addresses that are ready to send multicast data to all listening ports, and the Multicast Specific query, which is used to advertise a specific multicast address that is also ready. These two types of messages are distinguished by a multicast destination address located in the IPv6 header and a multicast address in the Multicast Listener Query Message.
- **Multicast Listener Report, Version 1** - Comparable to the Host Membership Report in IGMPv2, and labeled as 131 in the ICMP packet header, this message is sent by the listening port to the Switch stating that it is interested in receiving multicast data from a multicast address in response to the Multicast Listener Query message.
- **Multicast Listener Done** - Similar to the Leave Group Message in IGMPv2, and labeled as 132 in the ICMPv6 packet header, this message is sent by the multicast listening port stating that it is no longer interested in receiving multicast data from a specific multicast group address, therefore stating that it is "done" with the multicast data from this address. Once this message is received by the Switch, it will no longer forward multicast traffic from a specific multicast group address to this listening port.
- **Multicast Listener Report, Version 2** - Comparable to the Host Membership Report in IGMPv3, and labeled as 143 in the ICMP packet header, this message is sent by the listening port to the Switch stating that it is interested in receiving multicast data from a multicast address in response to the Multicast Listener Query message.

MLD Snooping Settings

This window is used to display and configure the MLD snooping settings.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Settings**, as shown below:

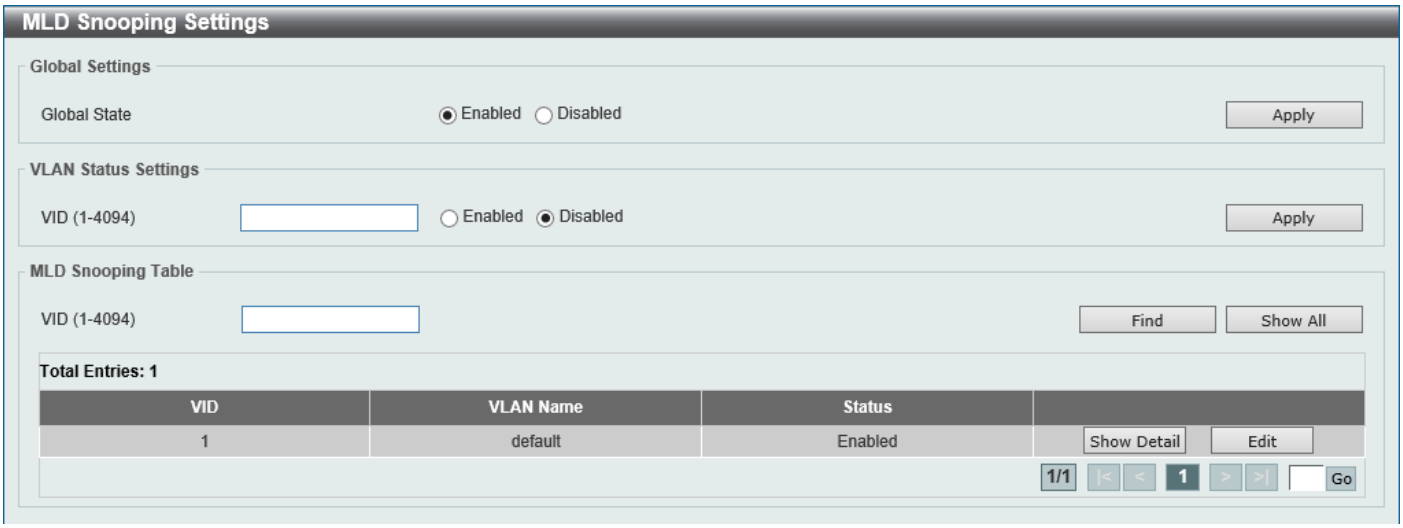


Figure 5-87 MLD Snooping Settings Window

The fields that can be configured in **Global Settings** are described below:

Parameter	Description
Global State	Select this option to enable or disable the global MLD snooping state.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VLAN Status Settings** are described below:

Parameter	Description
VID	Enter a VLAN ID from 1 to 4094, and select to enable or disable MLD snooping on the VLAN.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Snooping Table** are described below:

Parameter	Description
VID	Enter a VLAN ID from 1 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Click the **Show Detail** button to see the detail information of the specific VLAN.

Click the **Edit** button to re-configure the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

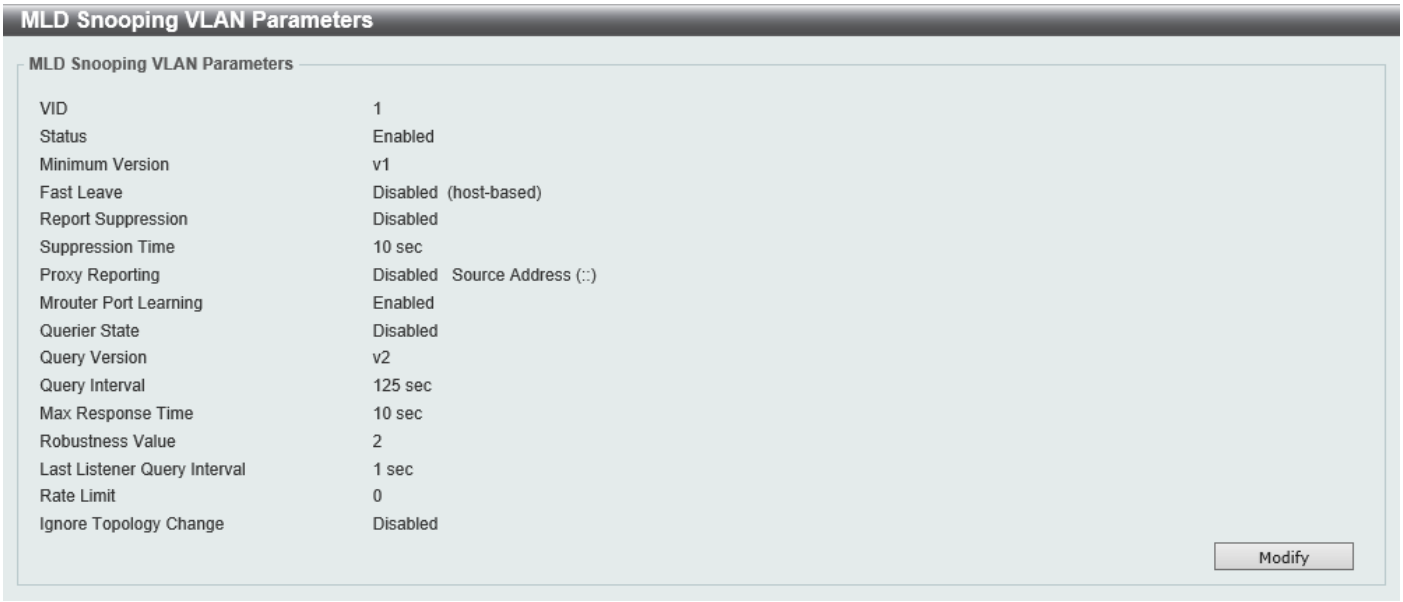


Figure 5-88 MLD Snooping Settings (Show Detail) Window

The window displays the detail information about MLD snooping VLAN.

Click the **Modify** button to edit the information in the following window.

After clicking the **Modify** or **Edit** button in MLD Snooping Settings window, the following window will appear.

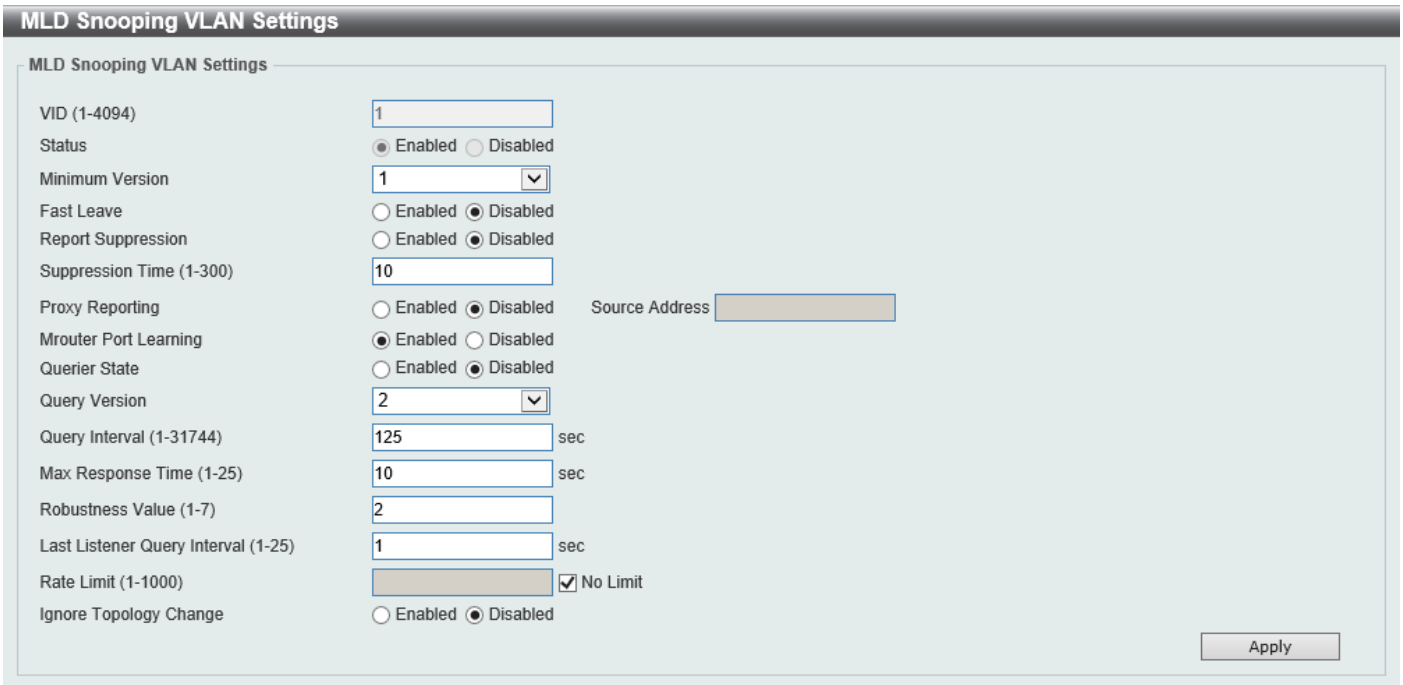


Figure 5-89 MLD Snooping Settings (Modify, Edit) Window

The fields that can be configured are described below:

Parameter	Description
Minimum Version	Select the minimum version of MLD hosts that is allowed on the VLAN. Options to choose from are **1** and **2**.
Fast Leave	Select this option to enable or disable the MLD snooping Fast Leave function. If enabled, the membership is immediately removed when the system receives the MLD done message from the last member.

Parameter	Description
Report Suppression	Select this option to enable or disable the report suppression.
Suppression Time	Enter the interval of suppressing duplicate MLD reports or leaves. The range is from 1 to 300.
Proxy Reporting	Select this option to enable or disable the proxy-reporting function.
Mrouter Port Learning	Select to enable or disable the Mrouter port learning function here.
Source Address	Enter the source IPv6 address of proxy reporting. This is available when **Enabled** is selected in **Proxy Reporting**.
Querier State	Select this option to enable or disable the querier state.
Query Version	Select the general query packet version sent by the MLD snooping querier. Options to choose from are **1** and **2**.
Query Interval	Enter the interval at which the MLD snooping querier sends MLD general query messages periodically. The range is from 1 to 31744.
Max Response Time	Enter the maximum response time, in seconds, advertised in MLD snooping queries. The range is from 1 to 25.
Robustness Value	Enter the robustness variable used in MLD snooping. The range is from 1 to 7.
Last Listener Query Interval	Enter the interval at which the MLD snooping querier sends MLD group-specific or group-source-specific (channel) query messages. The range is from 1 to 25.
Rate Limit	Enter the rate limit value here. The range is from 1 to 1000. Select the **No Limit** option to apply no rate limit on this profile.
Ignore Topology Change	Select to enable or disable the Ignore Topology Change feature here.

Click the **Apply** button to accept the changes made.

MLD Snooping Groups Settings

This window is used to display and configure the MLD snooping static group, and view MLD snooping group.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Groups Settings**, as shown below:

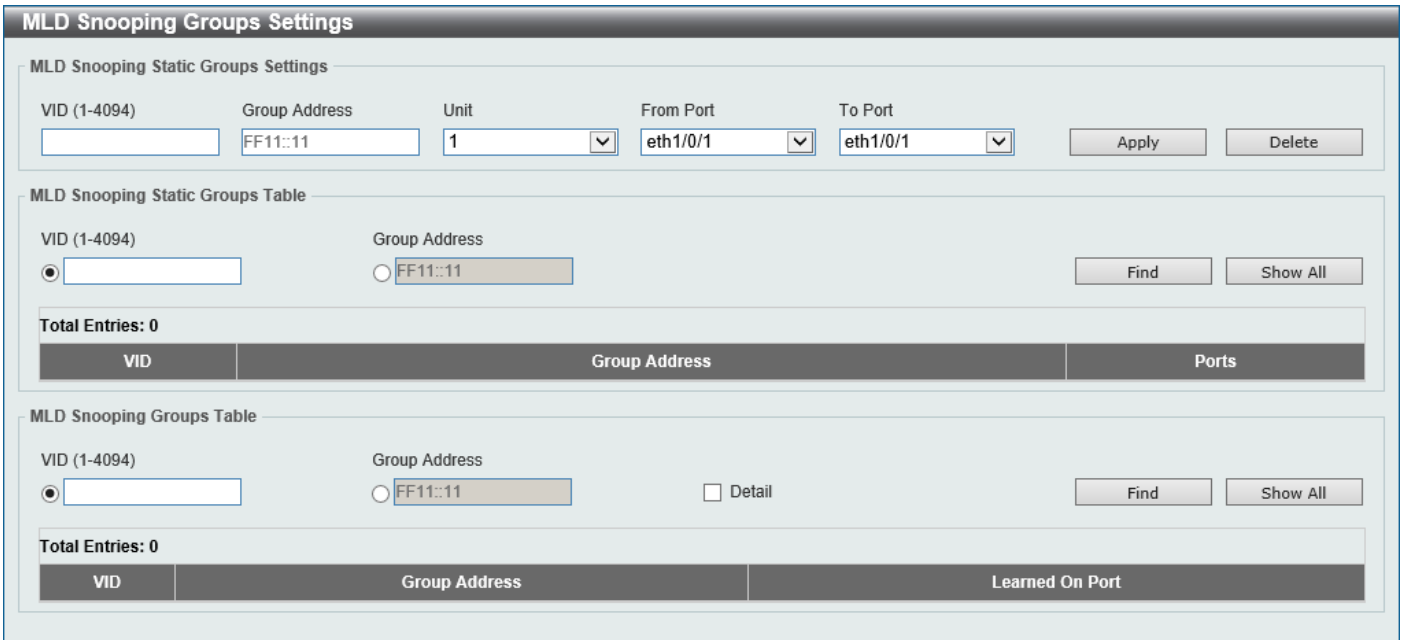


Figure 5-90 MLD Snooping Groups Settings Window

The fields that can be configured in **MLD Snooping Static Groups Settings/Table** are described below:

Parameter	Description
VID	Enter the VLAN ID of the multicast group here. The range is from 1 to 4094.
Group Address	Enter the IPv6 multicast group address here.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
VID	Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094.
Group Address	Click the radio button and enter an IPv6 multicast group address.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **MLD Snooping Groups Table** are described below:

Parameter	Description
VID	Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094.
Group Address	Click the radio button and enter an IPv6 multicast group address.
Detail	Select this option to display the MLD snooping group detail information.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

MLD Snooping Filter Settings

This window is used to display and configure the MLD snooping filter settings.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Filter Settings**, as shown below:

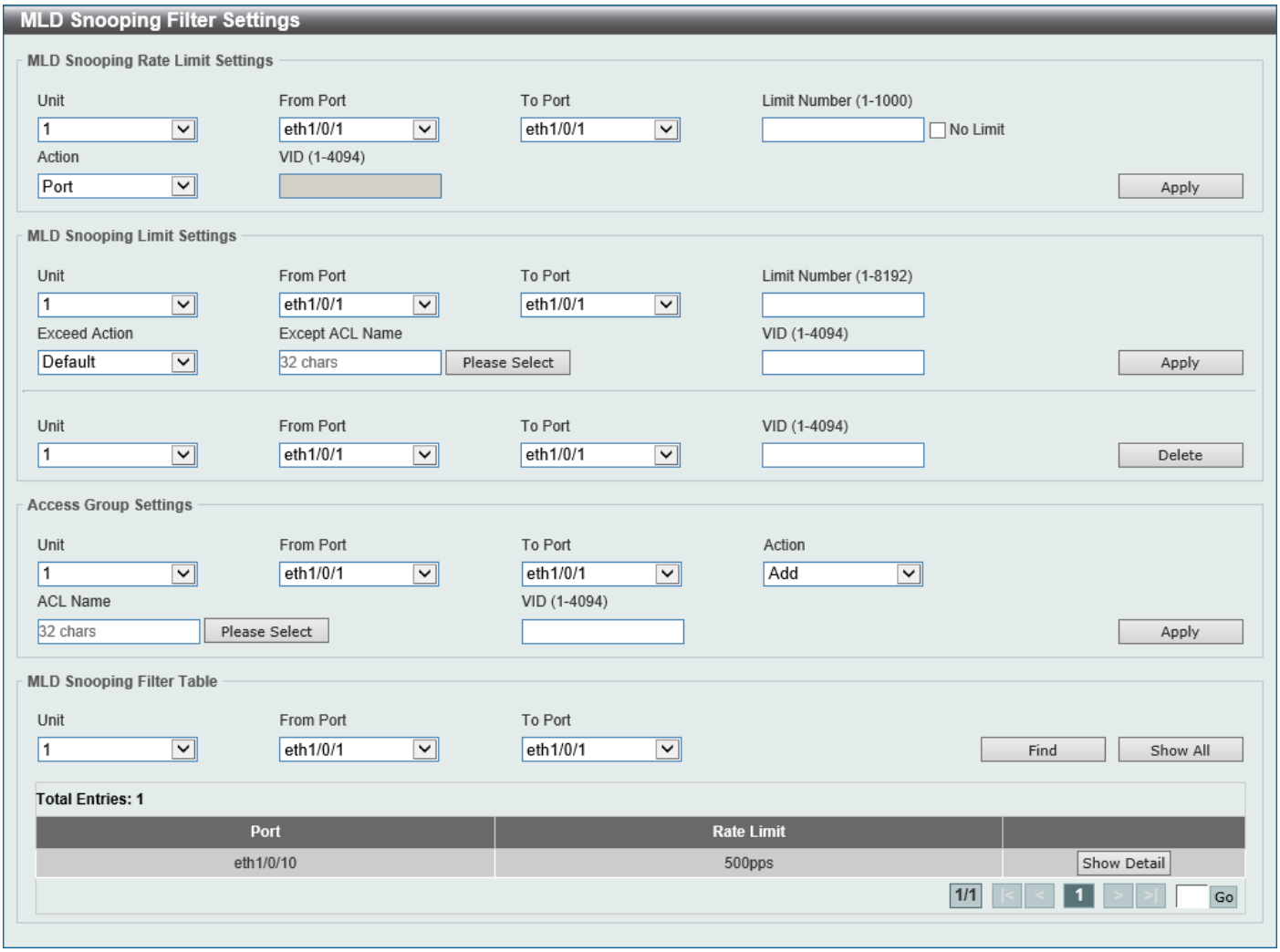


Figure 5-91 MLD Snooping Filter Settings Window

The fields that can be configured in **MLD Snooping Rate Limit Settings** are described below:

Parameter	Description
Unit	When **Port** is selected as the **Action**, select the Switch unit ID that will be used here.
From Port - To Port	When **Port** is selected as the **Action**, select the Switch port range that will be used here.
Limit Number	Enter the limit number here. This is to configure the rate of MLD control packets that the Switch can process on a specific interface. The range is from 1 to 1000 packets per second. Select the **No Limit** option to remove the limitation.
Action	Select the action here. Options to choose from are **Port** and **VLAN**.
VID	When **VLAN** is selected as the **Action**, enter the VLAN ID here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Snooping Limit Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Limit Number	Enter the limit number here. This is used to set the limitation on the number of MLD cache entries that can be created. The range is from 1 to 8192.
Exceed Action	Select the exceed action here. This parameter specifies the action for handling newly learned groups when the limitation is exceeded. Options to choose from are: • **Default** - Specifies that the default action will be taken. • **Drop** - Specifies that the new group will be dropped. • **Replace** - Specifies that the new group will replace the oldest group.
Except ACL Name	Enter the standard IP access list name here. The group (*,G) permitted by the access list will be excluded from the limit. To permit a group (*,G), specify "any" in the source address field and G in the destination address field of the access list entry. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration.
VID	Enter the Layer 2 VLAN ID here. This applies the filter to packets that arrive on that VLAN. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **Access Group Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
ACL Name	Enter the standard IP access list name here. This is used to permit users to join a group (*, G), specify "any" in source address field and G in destination address field of the access list entry. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration.
VID	Enter the VLAN ID used for this configuration here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Snooping Filter Table** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Show Detail** button to view detailed information about the entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Please Select** button, the following page will appear.

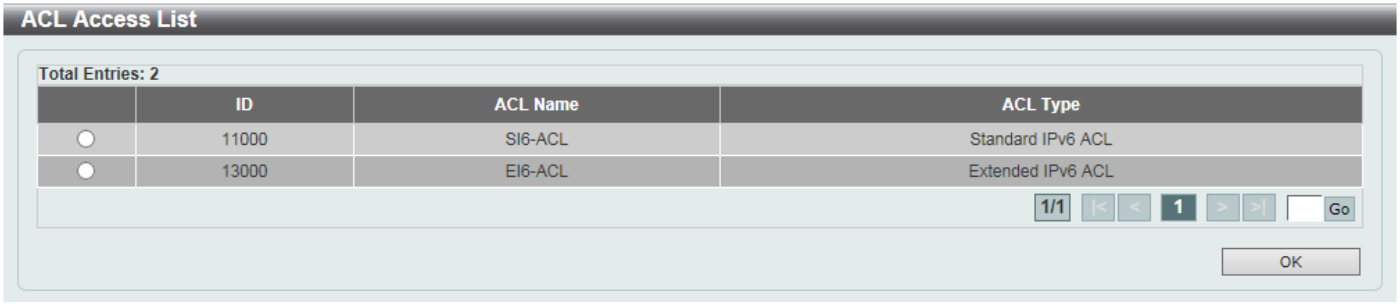


Figure 5-92 MLD Snooping Filter Settings (Please Select) Window

Select the ACL and click the **OK** button to use the selected access list.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

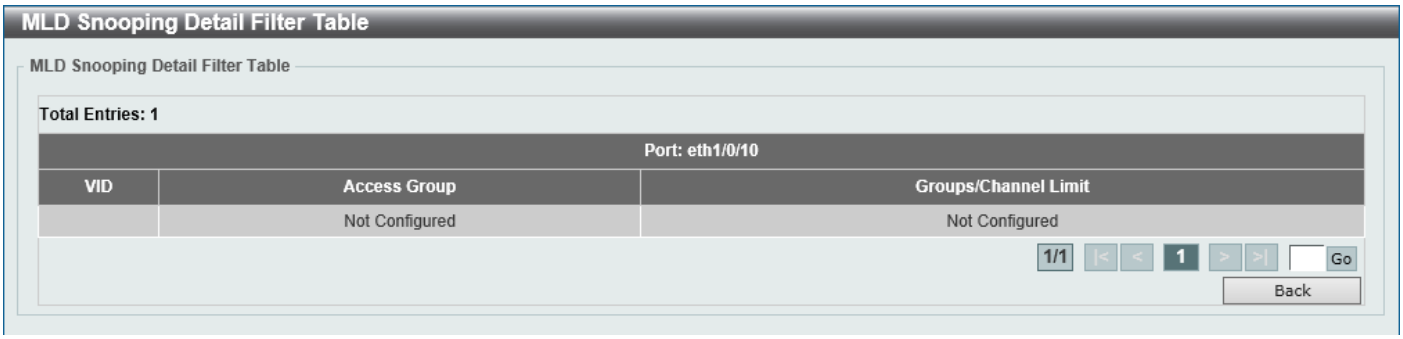


Figure 5-93 MLD Snooping Filter Settings (Show Detail) Window

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

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MLD Snooping Mrouter Settings

This window is used to display and configure the MLD Snooping Multicast Router settings.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Mrouter Settings**, as shown below:

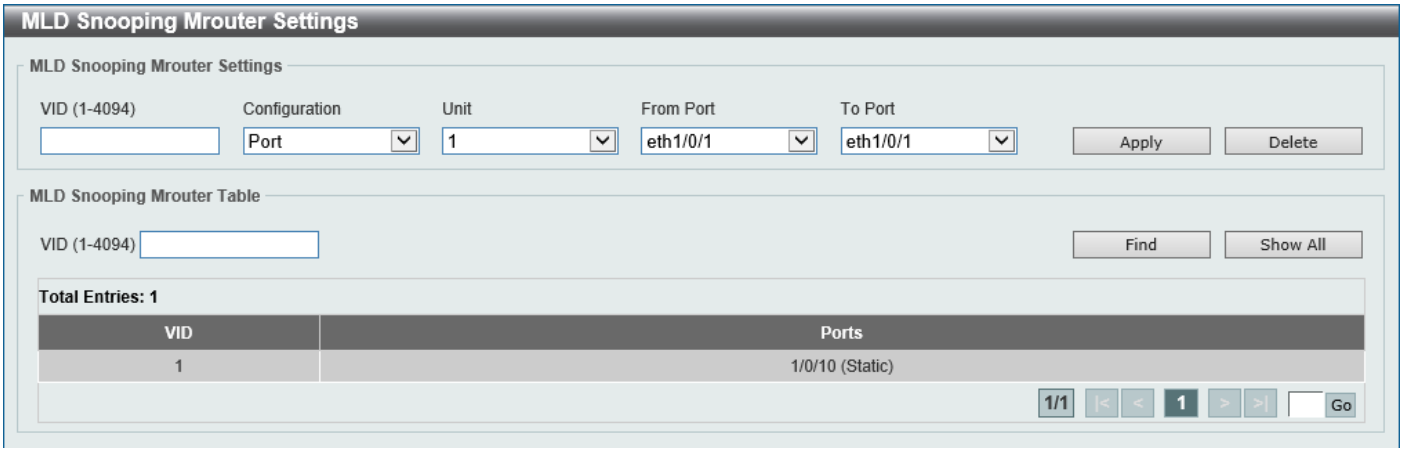


Figure 5-94 MLD Snooping Mrouter Settings Window

The fields that can be configured in **MLD Snooping Mrouter Settings** are described below:

Parameter	Description
VID	Enter a VLAN ID between 1 and 4094.
Configuration	Select the port configuration. Options to choose from are: • **Port** - Select to have the configured ports as being connected to multicast-enabled routers. • **Forbidden Port** - Select to have the configured ports as being not connected to multicast-enabled routers. • **Learn pimv6** - Select to enable dynamic learning of multicast router port.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

The fields that can be configured in **MLD Snooping Mrouter Table** are described below:

Parameter	Description
VID	Enter a VLAN ID between 1 and 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MLD Snooping Statistics Settings

This window is used to view and clear the MLD snooping related statistics.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Statistics Settings**, as shown below:

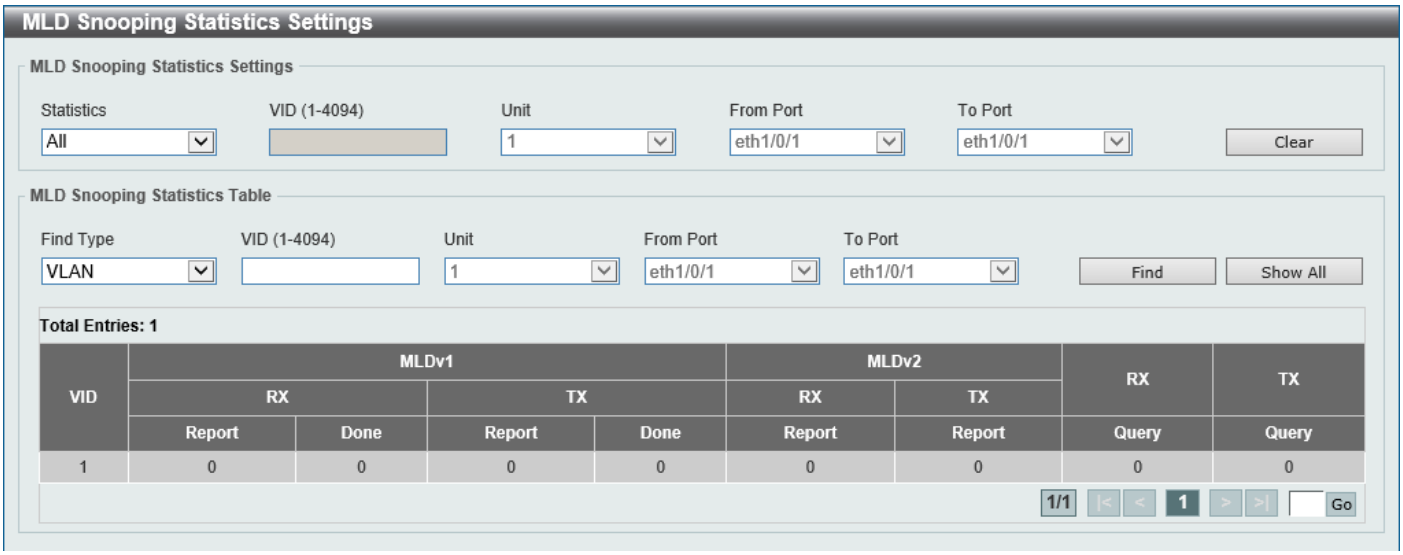


Figure 5-95 MLD Snooping Statistics Settings Window

The fields that can be configured in **MLD Snooping Statistics Settings** are described below:

Parameter	Description
Statistics	Select the interface here. Options to choose from are **All**, **VLAN**, and **Port**.

Parameter	Description
VID	Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Statistics** drop-down list.
Unit	Select the Switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Statistics** drop-down list.
From Port - To Port	Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Statistics** drop-down list.

Click the **Clear** button to clear the MLD snooping related statistics.

The fields that can be configured in **MLD Snooping Statistics Table** are described below:

Parameter	Description
Find Type	Select the interface type. Options to choose from are **VLAN**, and **Port**.
VID	Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Find Type** drop-down list.
Unit	Select the Switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Find Type** drop-down list.
From Port - To Port	Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Find Type** drop-down list.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Multicast VLAN

Multicast VLAN Settings

This window is used to display and configure the multicast VLAN settings.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > Multicast VLAN Settings**, as shown below:

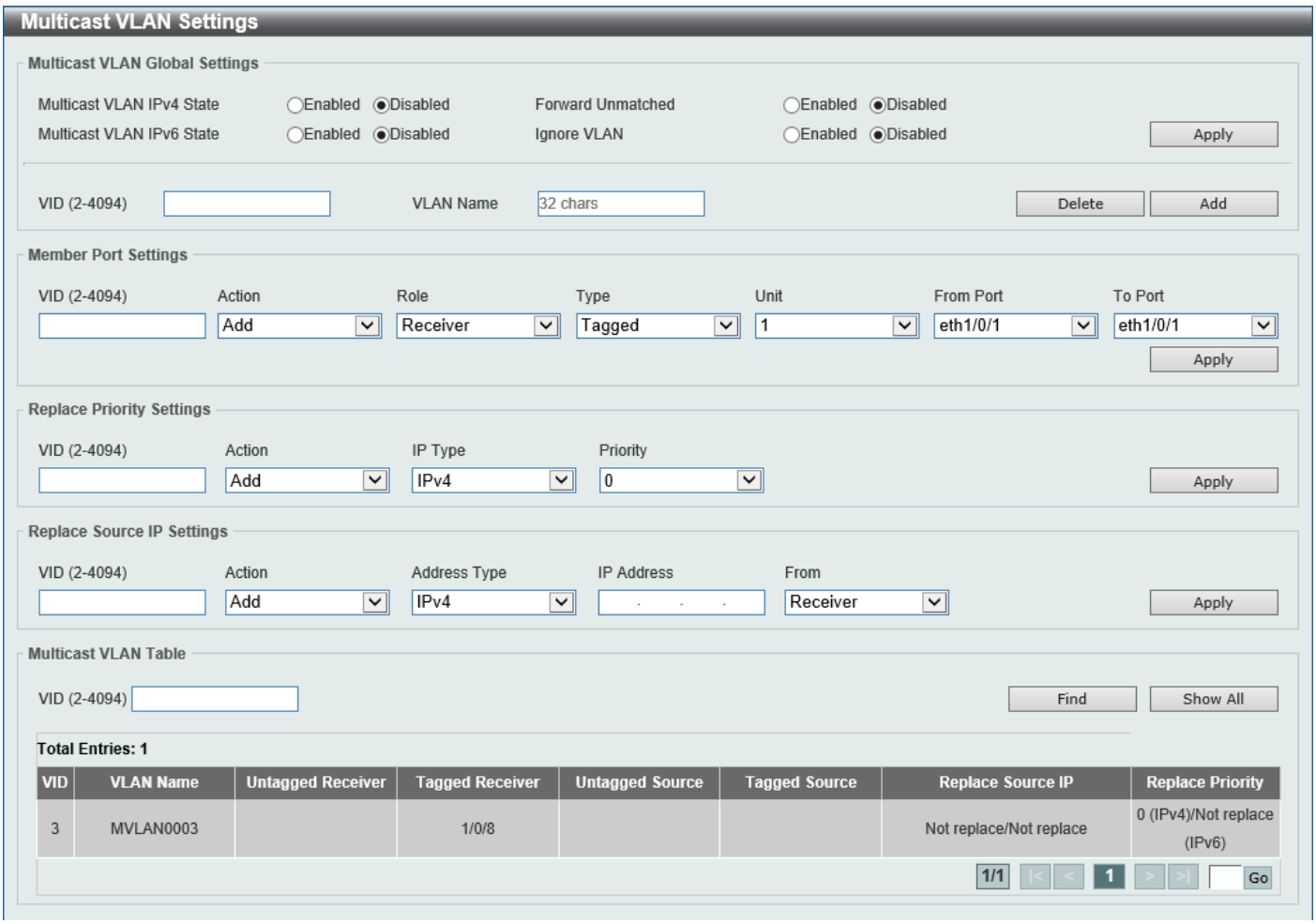


Figure 5-96 Multicast VLAN Settings Window

The fields that can be configured in **Multicast VLAN Global Settings** are described below:

Parameter	Description
Multicast VLAN IPv4 State	Select to enable or disable the IPv4 IGMP control packet process in multicast VLANs.
Forward Unmatched	Select the enable or disable the Forward Unmatched feature here. This specifies that if the received IGMP or MLD control packet is untagged, does not match any profile, and the associated default VLAN is a multicast VLAN, or is tagged with a multicast VLAN, but does not match the associated profile, then the packet will be forwarded or dropped based on this setting. By default, the packet will be dropped.
Multicast VLAN IPv6 State	Select to enable or disable the IPv6 MLD control packet process in multicast VLANs.
Ignore VLAN	Select the enable or disable the ignore VLAN feature here. This specifies the setting for tagged IGMP or MLD control packets. If enabled, then the packet's VLAN is ignored and taken to match the profile to find its multicast VLAN. When this option is enabled, the Switch will ignore the VLAN of the receiving IGMP or MLD control packet and try to find a match profile.

Parameter	Description
VID	Enter the VLAN ID of the multicast VLAN here. The range is 2 to 4094.
VLAN Name	Enter the VLAN name of the multicast VLAN here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

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

The fields that can be configured in **Member Port Settings** are described below:

Parameter	Description
VID	Enter the multicast VLAN ID that will be used here. The range is 2 to 4094.
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
Role	Select the role here. Options to choose from are: • **Receiver** - Specifies to configure the port as a subscriber port that can only receive multicast data in the multicast VLAN. • **Source** - Specifies to configure the port as an uplink port that can send multicast data in the multicast VLAN.
Type	Select the type here. Options to choose from are: • **Tagged** - Specifies that if a port is a tagged member, the packets sent from the port are tagged with the Multicast VLAN ID. • **Untagged** - Specifies that if the port is an untagged member, then the packets will be forwarded in the untagged form.
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Replace Priority Settings** are described below:

Parameter	Description
VID	Enter the multicast VLAN ID that will be used here. The range is 2 to 4094.
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
IP Type	Select the IP type here. Options to choose from are: • **IPv4** - Specifies to the remap priority for IPv4 multicast packets forwarded on the multicast VLAN. • **IPv6** - Specifies to the remap priority for IPv6 multicast packets forwarded on the multicast VLAN.
Priority	Select the priority value here. The range is from 0 to 7.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Replace Source IP Settings** are described below:

Parameter	Description
VID	Enter the multicast VLAN ID that will be used here. The range is 2 to 4094.
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
Address Type	Select the address type here. Options to choose from are:

Parameter	Description
	• **IPv4** - Specifies to enter the source IPv4 address for IGMP control packet reporting up to routers. • **IPv6** - Specifies to enter the source IPv6 address for MLD control packet reporting up to routers.
IP Address	Enter the IPv4/IPv6 address here.
From	Select the "from" option here. Options to choose from are: • **Receiver** - Specifies that the source IPv4/IPv6 address of the IGMP/MLD report/leave packet received on any multicast VLAN receiver port will be replaced. • **Source** - Specifies that the source IPv4/IPv6 address of the IGMP/MLD report/leave packet received on any multicast VLAN source port will be replaced. • **Both** - Specifies that the source IPv4/IPv6 address of the IGMP/MLD report/leave packet received on any port in the multicast VLAN will be replaced.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Multicast VLAN Table** are described below:

Parameter	Description
VID	Enter the multicast VLAN ID that will be used here. The range is 2 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Multicast VLAN Group Settings

This window is used to view and configure the multicast VLAN group settings.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > Multicast VLAN Group Settings**, as shown below:

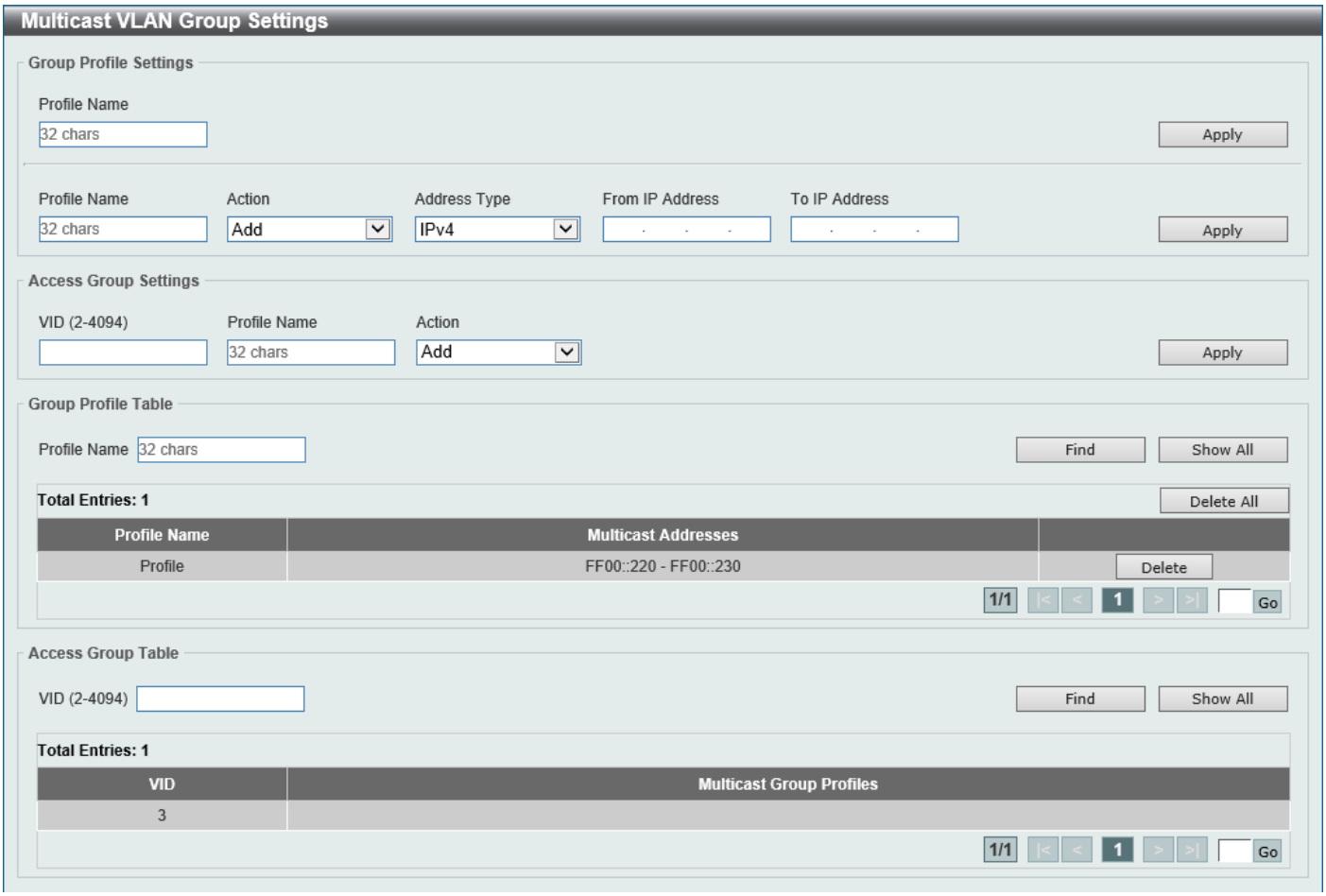


Figure 5-97 Multicast VLAN Group Settings Window

The fields that can be configured in **Group Profile Settings** are described below:

Parameter	Description
Profile Name	Enter the group profile name for the multicast VLAN feature here. This name can be up to 32 characters long.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**. Multiple ranges can be added to a multicast VLAN profile. The IP address ranges, specified in a single profile, must be of the same address family.
Address Type	Select the address type here. Options to choose from are: • **IPv4** - Specifies to use IPv4 multicast addresses in the range. • **IPv6** - Specifies to use IPv6 multicast addresses in the range.
From IP Address	Enter the start IPv4/IPv6 address here.
To IP Address	Enter the end IPv4/IPv6 address here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Access Group Settings** are described below:

Parameter	Description
VID	Enter the multicast VLAN ID that will be used here. The range is 2 to 4094.
Profile Name	Enter the group profile name for the multicast VLAN feature here. This name can be up to 32 characters long.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**. This is to add or delete the multicast group entirely.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Group Profile Table** are described below:

Parameter	Description
Profile Name	Enter the group profile name for the multicast VLAN feature here. This name can be up to 32 characters long.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **Access Group Table** are described below:

Parameter	Description
VID	Enter the multicast VLAN ID that will be used here. The range is 2 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

PIM Snooping

PIM Snooping Global Settings

This window is used to display and configure the global Protocol Independent Multicast (PIM) snooping settings.

To view the following window, click **L2 Features > L2 Multicast Control > PIM Snooping > PIM Snooping Global Settings**, as shown below:

Figure 5-98 PIM Snooping Global Settings Window

The fields that can be configured in **Global Settings** are described below:

Parameter	Description
Global State	Select to globally enable or disable the PIM snooping feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VLAN Status Settings** are described below:

Parameter	Description
VID	Enter the VLAN ID on which the PIM snooping feature will be used here. The range is from 1 to 4094. Select to enable or disable the PIM snooping feature on the specified VLAN here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **PIM Snooping Table** are described below:

Parameter	Description
VID	Enter the VLAN ID that will be used in the display here. The range is from 1 to 4094.

Click the **Find** button to generate the display based on the information entered.

PIM Snooping Neighbor Table

This window is used to view the PIM snooping neighbor table.

To view the following window, click **L2 Features > L2 Multicast Control > PIM Snooping > PIM Snooping Neighbor Table**, as shown below:

Figure 5-99 PIM Snooping Neighbor Table Window

The fields that can be configured are described below:

Parameter	Description
VID	Enter the VLAN ID that will be used in this display here. The range is from 1 to 4094.

Click the **Find** button to generate the display based on the information entered.

PIM Snooping Multicast Route Table

This window is used to view the PIM snooping multicast route table.

To view the following window, click **L2 Features > L2 Multicast Control > PIM Snooping > PIM Snooping Multicast Route Table**, as shown below:

Figure 5-100 PIM Snooping Multicast Route Table Window

The fields that can be configured are described below:

Parameter	Description
VID	Select and enter the VLAN ID that will be used in this display here. The range is from 1 to 4094.
Group Address	Select and enter the group address here.

Click the **Find** button to generate the display based on the information entered.

PIM Snooping Statistics Table

This window is used to view and clear the PIM snooping statistics table.

To view the following window, click **L2 Features > L2 Multicast Control > PIM Snooping > PIM Snooping Statistics Table**, as shown below:

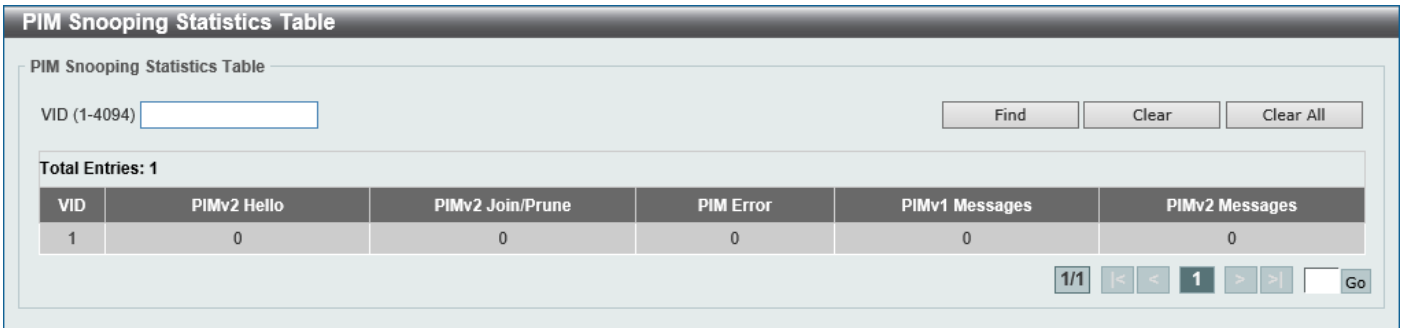


Figure 5-101 PIM Snooping Statistics Table Window

The fields that can be configured are described below:

Parameter	Description
VID	Select and enter the VLAN ID that will be used here. The range is from 1 to 4094.

Click the **Find** button to generate the display based on the information entered.

Click the **Clear** button to clear the statistics information related to the specified VLAN.

Click the **Clear All** button to clear all the statistics information displayed in the table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Multicast Filtering Mode

This window is used to display and configure the Layer 2 multicast filtering settings.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast Filtering Mode**, as shown below:

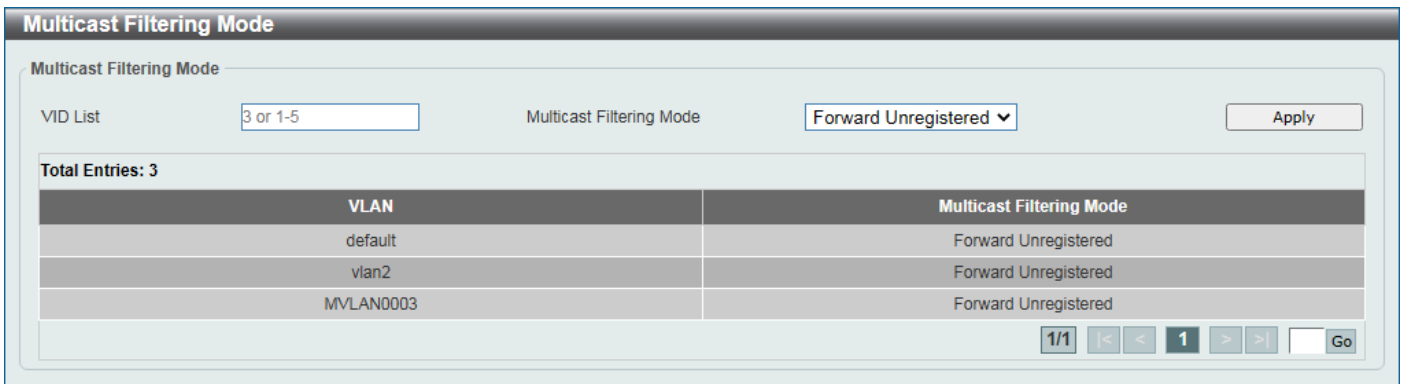


Figure 5-102 Multicast Filtering Mode Window

The fields that can be configured are described below:

Parameter	Description
VID List	Enter the VLAN ID list that will be used for this configuration here.
Multicast Filtering Mode	Select the multicast filtering mode here. Options to choose from are:

Parameter	Description
	• **Forward Unregistered** - Registered multicast packets will be forwarded based on the forwarding table and all unregistered multicast packets will be flooded based on the VLAN domain. • **Forward All** - All multicast packets will be flooded based on the VLAN domain. • **Filter Unregistered** - Registered packets will be forwarded based on the forwarding table and all unregistered multicast packets will be filtered.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

LLDP

LLDP Global Settings

This window is used to display and configure the global LLDP settings.

To view the following window, click **L2 Features > LLDP > LLDP Global Settings**, as shown below:

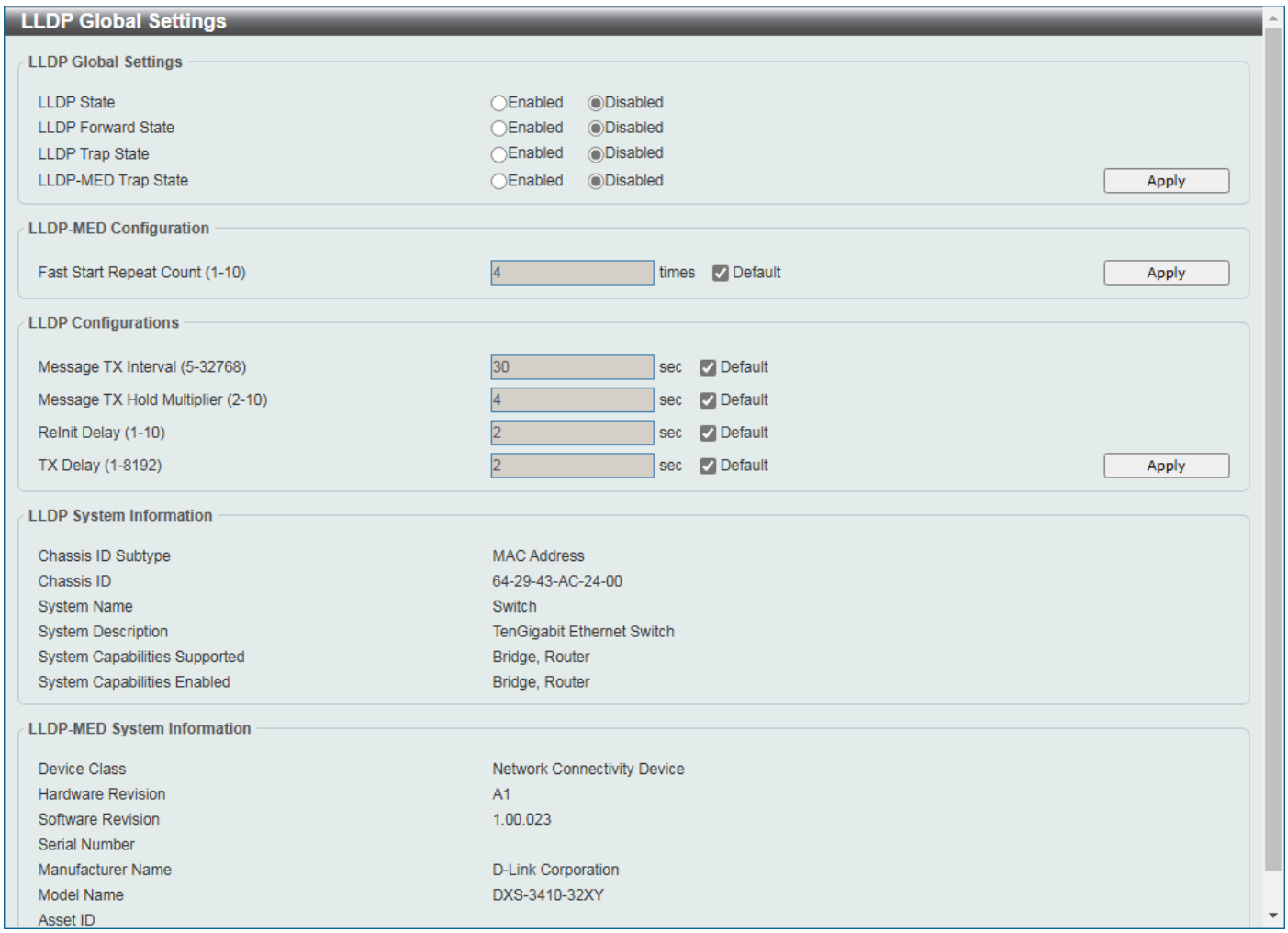


Figure 5-103 LLDP Global Settings Window

The fields that can be configured in **LLDP Global Settings** are described below:

Parameter	Description
LLDP State	Select this option to enable or disable the LLDP feature
LLDP Forward State	Select this option to enable or disable LLDP forward state. When the **LLDP State** is disabled and **LLDP Forward Sate** is enabled, the received LLDPDU packet will be forwarded.
LLDP Trap State	Select this option to enable or disable the LLDP trap state.
LLDP-MED Trap State	Select this option to enable or disable the LLDP-MED trap state.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **LLDP-MED Settings** are described below:

Parameter	Description
Fast Start Repeat Count	Enter the LLDP-MED fast start repeat count value. The range is from 1 to 10.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **LLDP Configurations** are described below:

Parameter	Description
Message TX Interval	Enter the interval between consecutive transmissions of LLDP advertisements on each physical interface. The range is from 5 to 32768 seconds.
Message TX Hold Multiplier	Enter the multiplier on the LLDPDUs transmission interval that used to calculate the TTL value of an LLDPDU. This value must be between 2 and 10.
ReInit Delay	Enter the delay value for LLDP initialization on an interface. The range is from 1 to 10 seconds.
TX Delay	Enter the delay value for sending successive LLDPDUs on an interface. The valid values are from 1 to 8192 seconds and should not be greater than one-fourth of the transmission interval timer.

Click the **Apply** button to accept the changes made.

LLDP Port Settings

This window is used to display and configure the LLDP port settings.

To view the following window, click **L2 Features > LLDP > LLDP Port Settings**, as shown below:

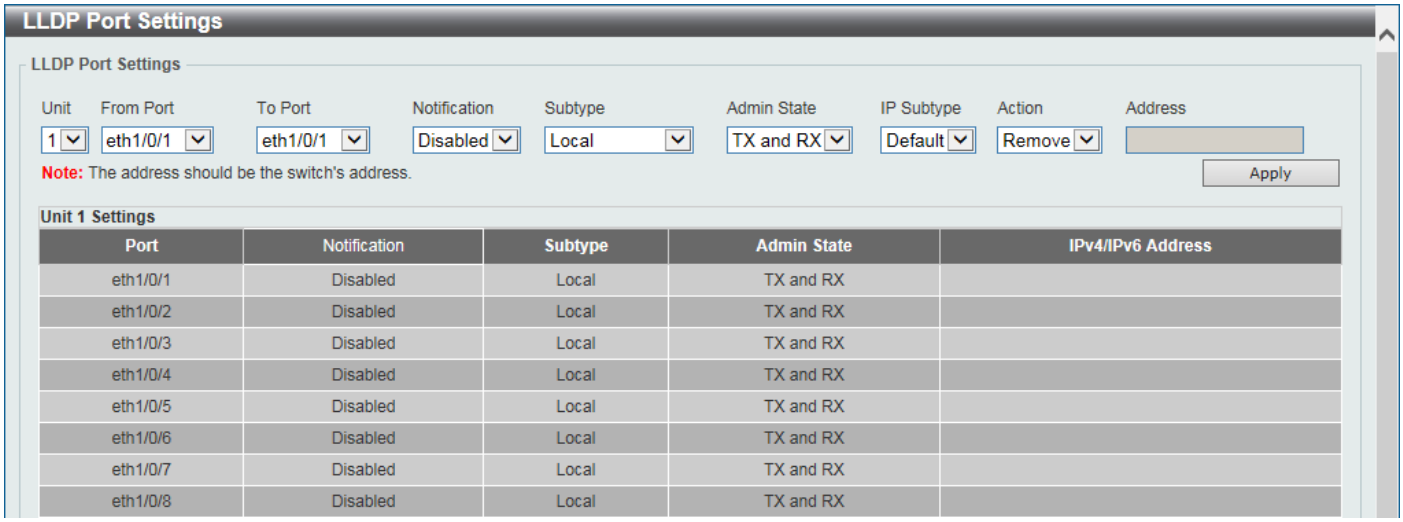


Figure 5-104 LLDP Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Notification	Select to enable or disable the notification feature here.
Subtype	Select the subtype of LLDP TLV(s). Options to choose from are **MAC Address**, and **Local**.
Admin State	Select the local LLDP agent and allow it to send and receive LLDP frames on the port. Options to choose from are: • **TX** - The local LLDP agent can only transmit LLDP frames. • **RX** - The local LLDP agent can only receive LLDP frames. • **TX and RX** - The local LLDP agent can both transmit and receive LLDP frames. • **Disabled** - The local LLDP agent can neither transmit nor receive LLDP frames. By default, the **TX and RX** option is used.
IP Subtype	Select the type of the IP address information to be sent. Options to choose from are **Default**, **IPv4**, and **IPv6**.
Action	Select the action that will be taken here. Options to choose from are **Remove** and **Add**.
Address	Enter the IP address that will be sent.

Click the **Apply** button to accept the changes made.

NOTE: The IPv4 or IPv6 address entered here should be an existing LLDP management IP address.

LLDP Management Address List

This window is used to view the LLDP management address list.

To view the following window, click **L2 Features > LLDP > LLDP Management Address List**, as shown below:

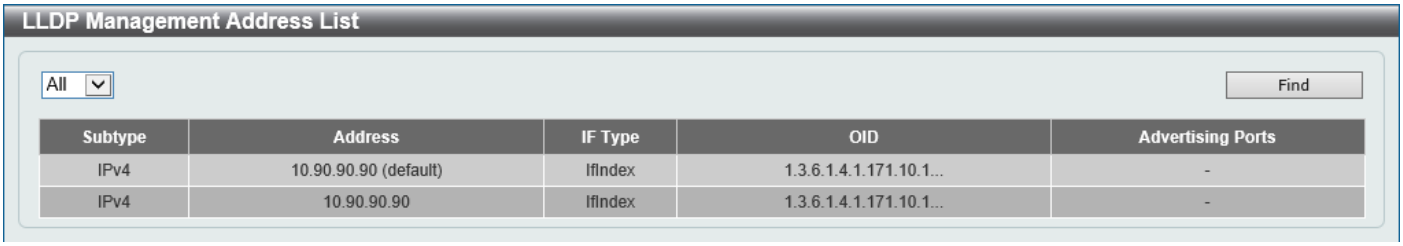


Figure 5-105 LLDP Management Address List Window

The fields that can be configured are described below:

Parameter	Description
Subtype	Select the subtype. Options to choose from are: • **All** - Specifies to display all entries. • **IPv4** - Enter the IPv4 address in the space provided. • **IPv6** - Enter the IPv6 address in the space provided.

Click the **Find** button to locate a specific entry based on the selection made.

LLDP Basic TLVs Settings

The Type-Length-Value (TLV) field allows specific information to be sent within LLDP packets. This window is used to configure basic TLV settings. An active LLDP port on the Switch always includes mandatory data in its outbound advertisements. There are four optional data types that can be configured to exclude one or more of these data types from outbound LLDP advertisements. The mandatory data type includes four basic types of TLVs: end of LLDPDU TLV, chassis ID TLV, port ID TLV, and TTL TLV. The mandatory data types cannot be disabled. There are also four data types, which can be optionally selected. These include Port Description, System Name, System Description, and System Capability.

To view the following window, click **L2 Features > LLDP > LLDP Basic TLVs Settings**, as shown below:

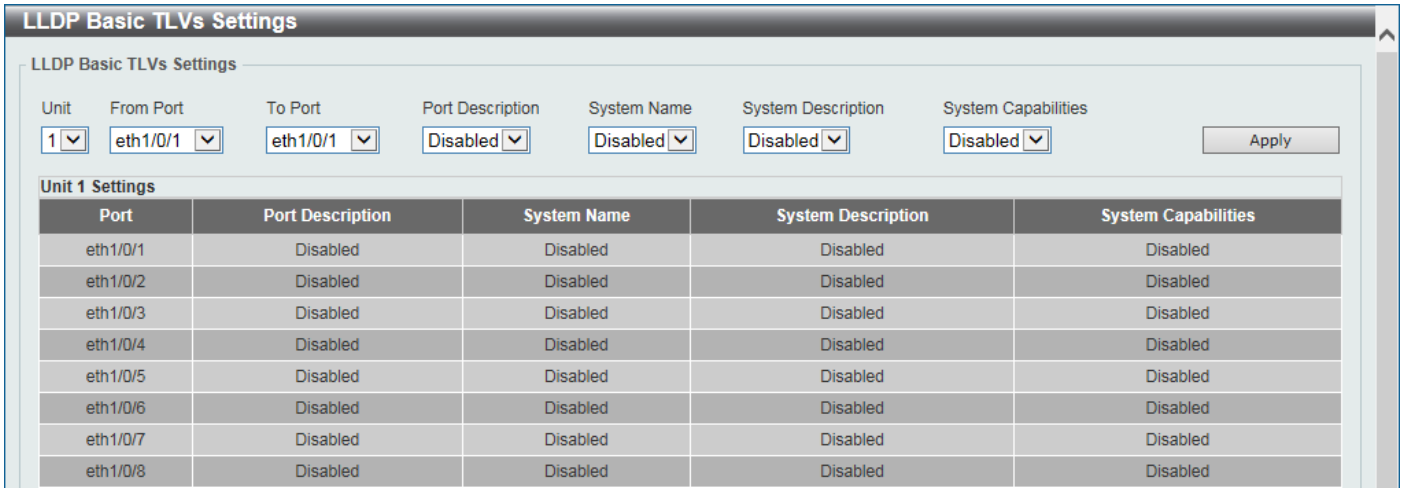


Figure 5-106 LLDP Basic TLVs Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Port Description	Select this option to enable or disable the Port Description option.
System Name	Select this option to enable or disable the System Name option.
System Description	Select this option to enable or disable the System Description option.
System Capabilities	Select this option to enable or disable the System Capabilities option.

Click the **Apply** button to accept the changes made.

LLDP Dot1 TLVs Settings

The LLDP Dot1 TLVs Settings page is used to enable or disable outbound LLDP advertisements for IEEE 802.1 organizationally unique port VLAN ID TLVs.

To view the following window, click **L2 Features > LLDP > LLDP Dot1 TLVs Settings**, as shown below:

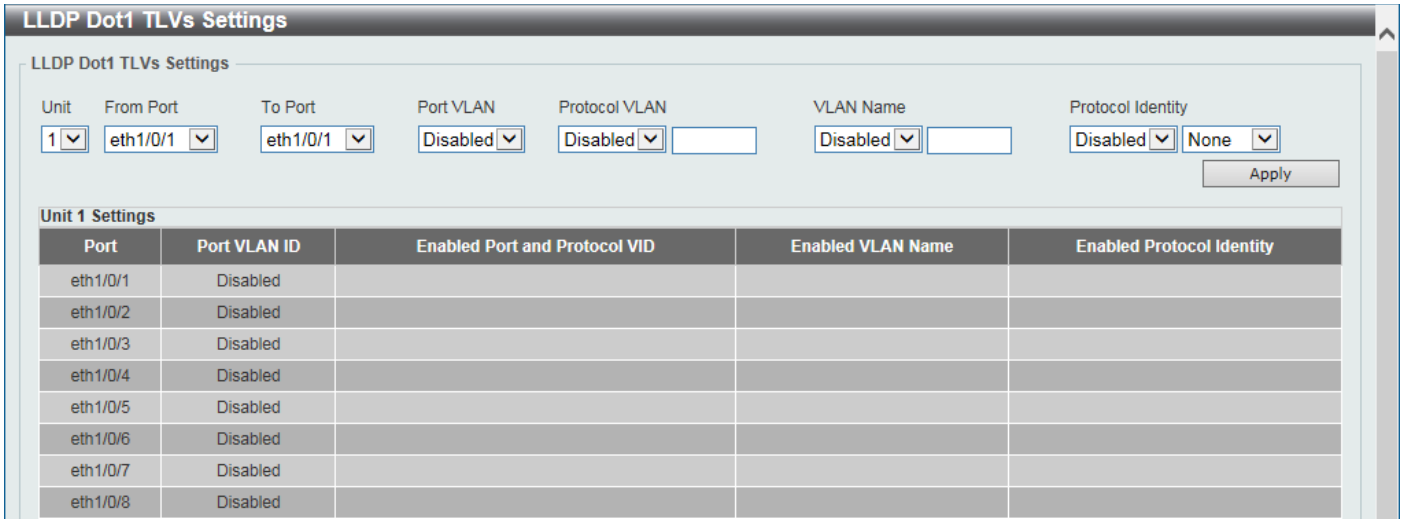


Figure 5-107 LLDP Dot1 TLVs Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Port VLAN	Select this option to enable or disable sending the port VLAN ID TLV. The Port VLAN ID TLV is an optional fixed length TLV that allows a VLAN bridge port to advertise the port VLAN ID (PVID) that will be associated with untagged or priority tagged frames.
Protocol VLAN	Select this option to enable or disable sending the Port and Protocol VLAN ID (PPVID) TLV. Enter the VLAN ID in PPVID TLV.
VLAN Name	Select this option to enable or disable sending the VLAN name TLV. Enter the ID of the VLAN in the VLAN name TLV.
Protocol Identity	Select this option to enable or disable sending the Protocol Identity TLV and the protocol name. Options for protocol name to choose from are **None**, **EAPOL**, **LACP**, **GVRP**, **STP**, and **All**.

Click the **Apply** button to accept the changes made.

LLDP Dot3 TLVs Settings

The LLDP Dot3 TLVs Settings page is used to enable or disable outbound LLDP advertisements for IEEE 802.3 organizationally unique TLVs.

To view the following window, click **L2 Features > LLDP > LLDP Dot3 TLVs Settings**, as shown below:

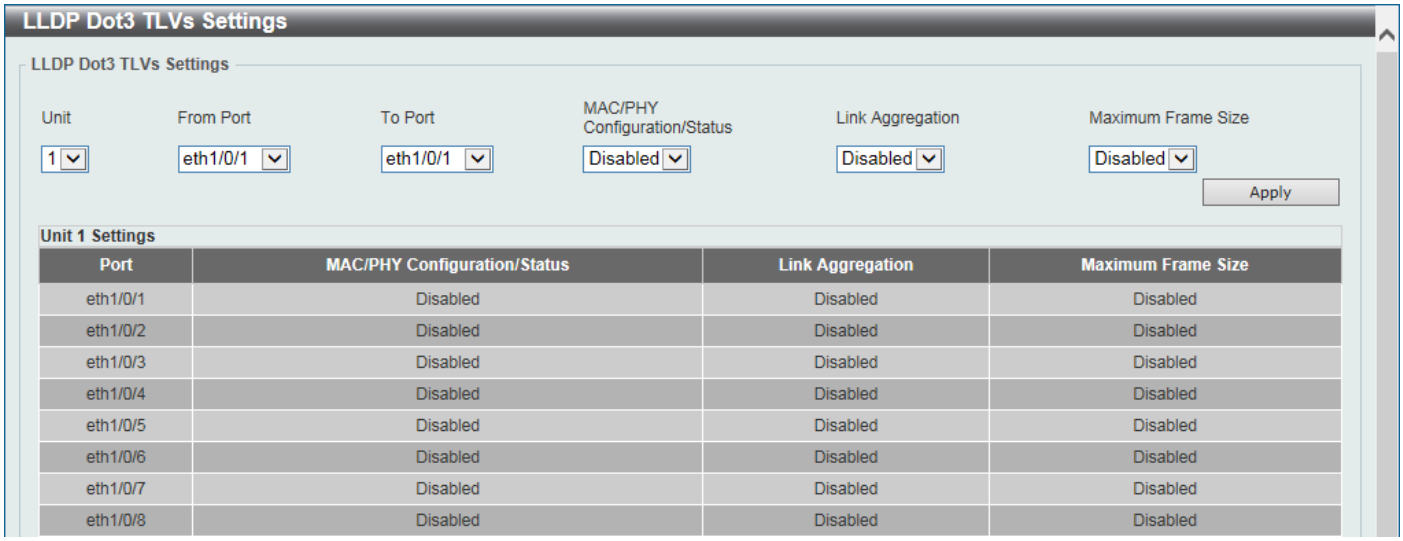


Figure 5-108 LLDP Dot3 TLVs Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
MAC/PHY Configuration/Status	Select this option to enable or disable the MAC/PHY Configuration/Status TLV to send. The MAC/PHY Configuration/Status TLV is an optional TLV that identifies (1) the duplex and bit-rate capability of the sending IEEE 802.3 LAN node, and (2) the current duplex and bit-rate settings of the sending IEEE 802.3 LAN node.
Link Aggregation	Select this option to enable or disable the Link Aggregation TLV to send. The Link Aggregation TLV indicates contains the following information. Whether the link is capable of being aggregated, whether the link is currently in an aggregation, and the aggregated port channel ID of the port. If the port is not aggregated, then the ID is 0.
Maximum Frame Size	Select this option to enable or disable the Maximum Frame Size TLV to send. The Maximum Frame Size TLV indicates the maximum frame size capability of the implemented MAC and PHY.

Click the **Apply** button to accept the changes made.

LLDP-MED Port Settings

The LLDP-MED Port Settings page is used to enable or disable outbound LLDP advertisements for LLDP-MED TLVs.

To view the following window, click **L2 Features > LLDP > LLDP-MED Port Settings**, as shown below:

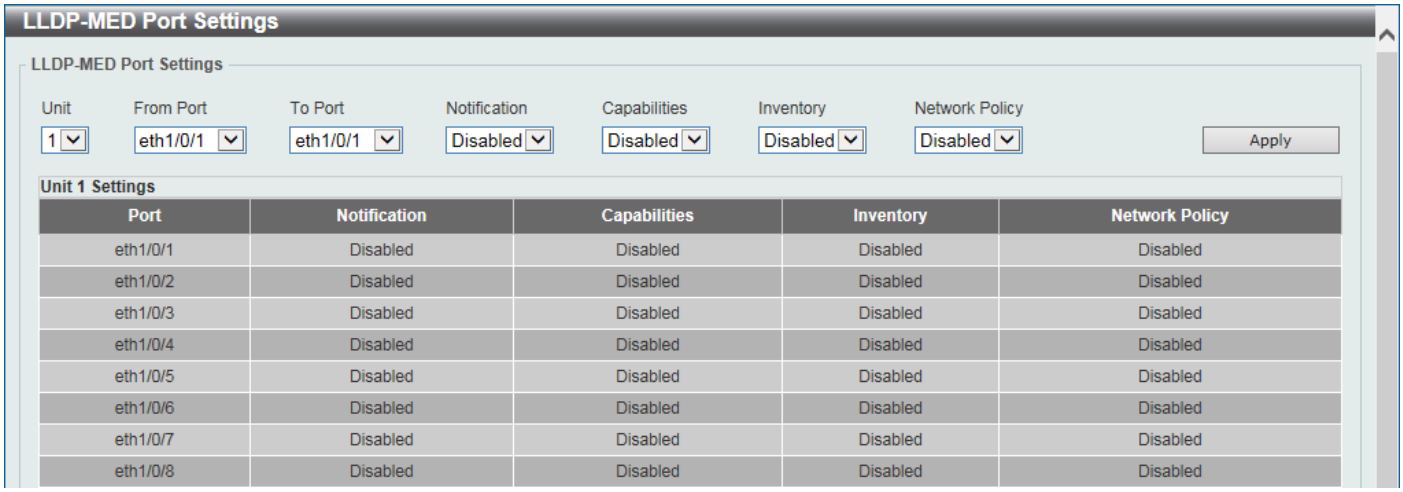


Figure 5-109 LLDP-MED Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Notification	Select this option to enable or disable transmitting the LLDP-MED notification TLV.
Capabilities	Select this option to enable or disable transmitting the LLDP-MED capabilities TLV.
Inventory	Select this option to enable or disable transmitting the LLDP-MED inventory management TLV.
Network Policy	Select this option to enable or disable transmitting the LLDP-MED network policy TLV.

Click the **Apply** button to accept the changes made.

LLDP Statistics Information

This window is used to view the neighbor detection activity, LLDP Statistics, and the settings for individual ports on the Switch.

To view the following window, click **L2 Features > LLDP > LLDP Statistics Information**, as shown below:

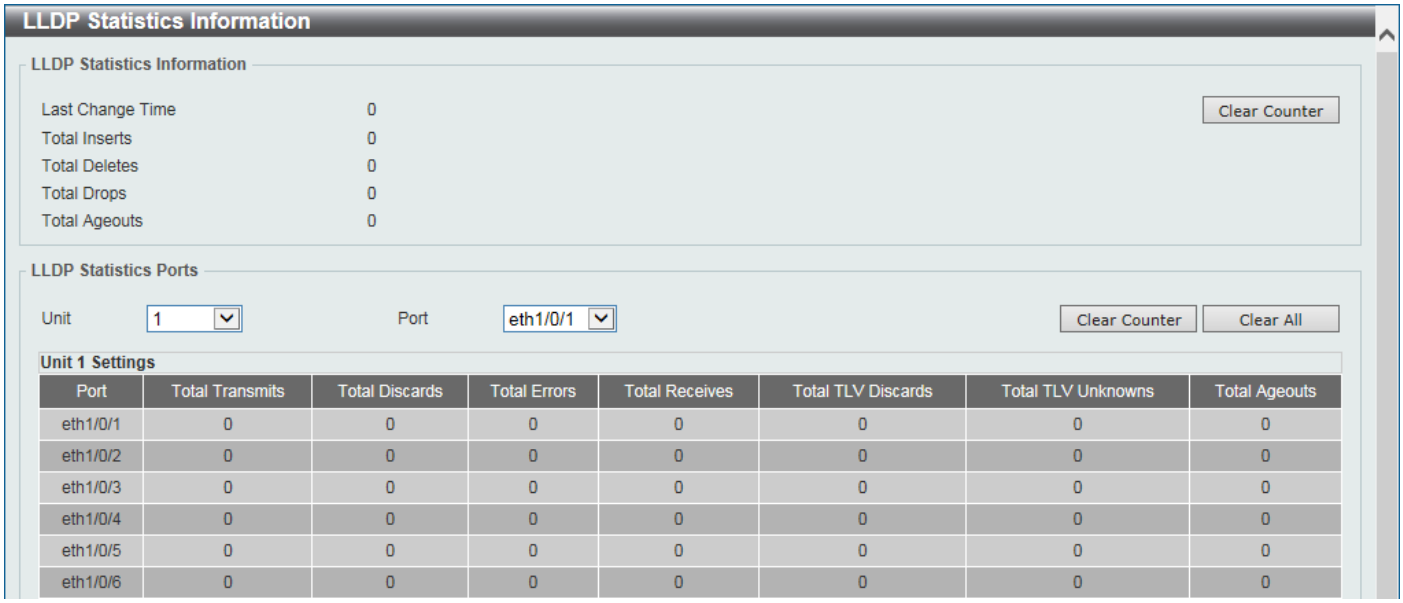


Figure 5-110 LLDP Statistics Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used here.
Port	Select the port number that will be used here.

Click the **Clear Counter** button to clear the counter information for the statistics displayed.

Click the **Clear All** button to clear all the counter information displayed.

LLDP Local Port Information

This window is used to display the information currently available for populating outbound LLDP advertisements.

To view the following window, click **L2 Features > LLDP > LLDP Local Port Information**, as shown below:

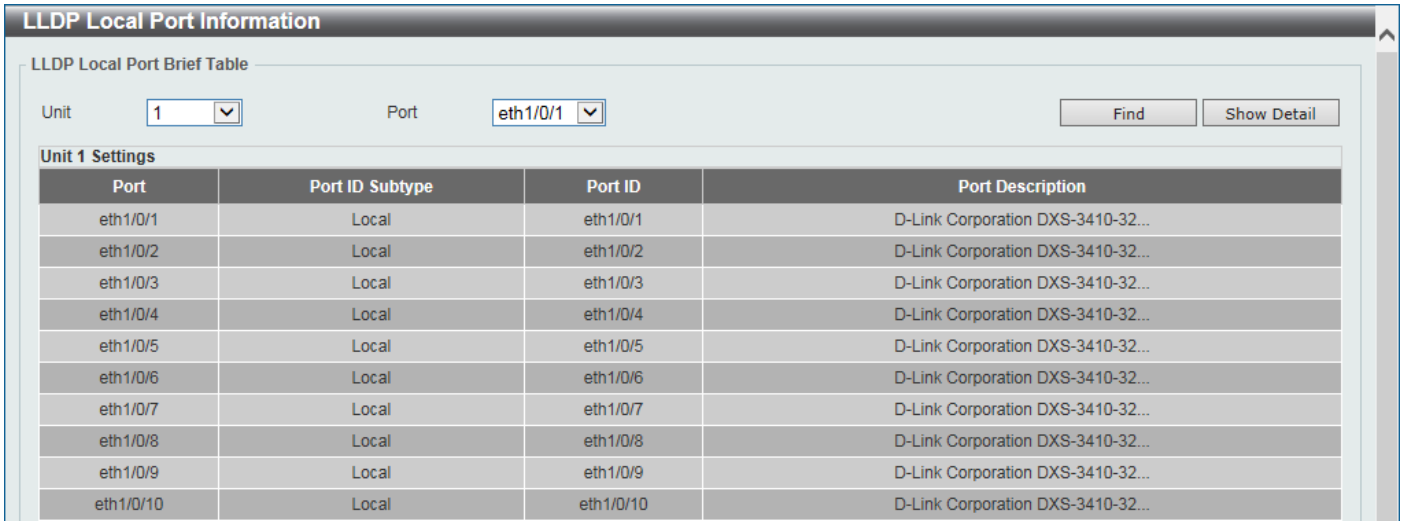


Figure 5-111 LLDP Local Port Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be displayed.
Port	Select the port number that will be displayed.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information of the specific port.

After clicking the **Show Detail** button, the following window will appear.

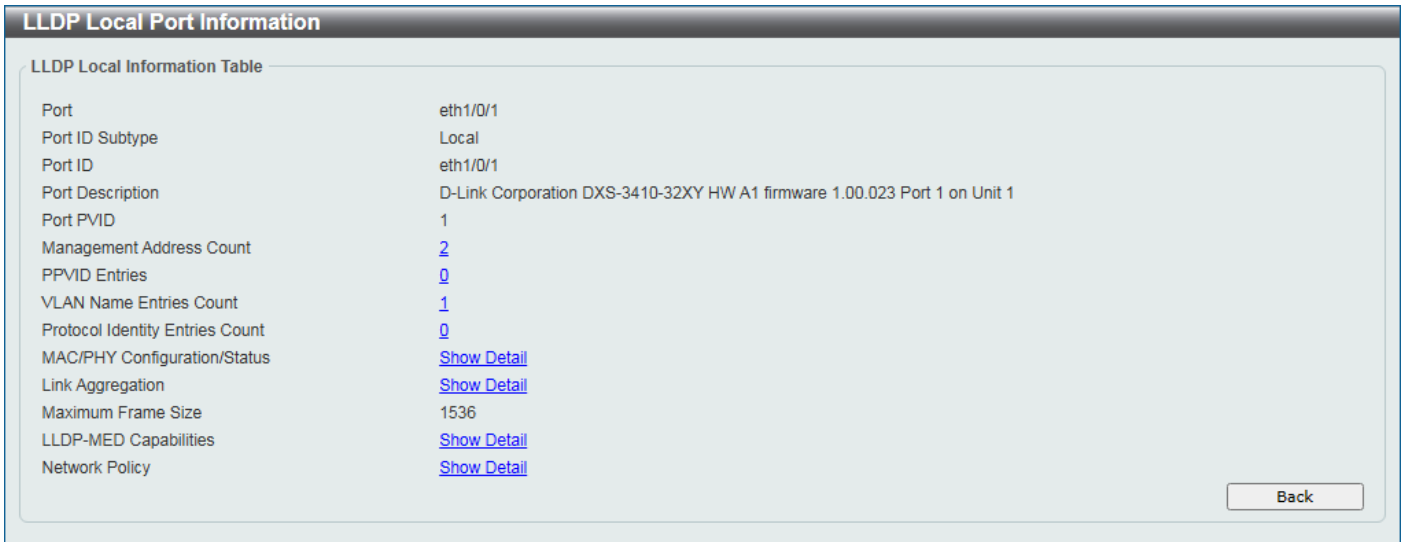


Figure 5-112 LLDP Local Port Information (Show Detail) Window

To view more details about, for example, the **MAC/PHY Configuration/Status**, click the Show Detail hyperlink.

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

After clicking the Show Detail hyperlink, a new section will appear at the bottom of the window.

Figure 5-113 LLDP Local Port Information (Show Detail) Window

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

LLDP Neighbor Port Information

This window is used to display the LLDP information learned from neighboring switches. The Switch receives packets from a remote station but is able to store the information locally.

To view the following window, click **L2 Features > LLDP > LLDP Neighbor Port Information**, as shown below:

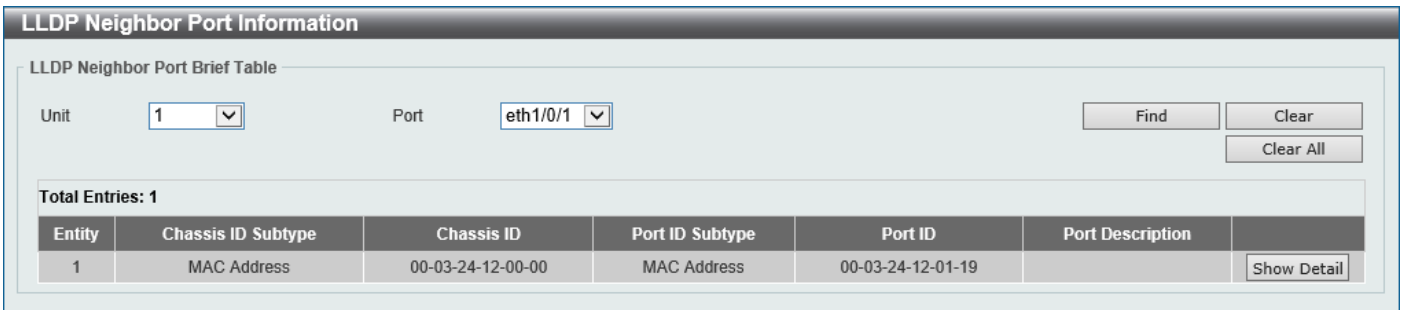


Figure 5-114 LLDP Neighbor Port Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be displayed.
Port	Select the port number that will be displayed.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the specific port information.

Click the **Clear All** button to clear all the port information displayed.

Click the **Show Detail** button to view detailed information of the specific port.

After clicking the **Show Detail** button, the following window will appear.

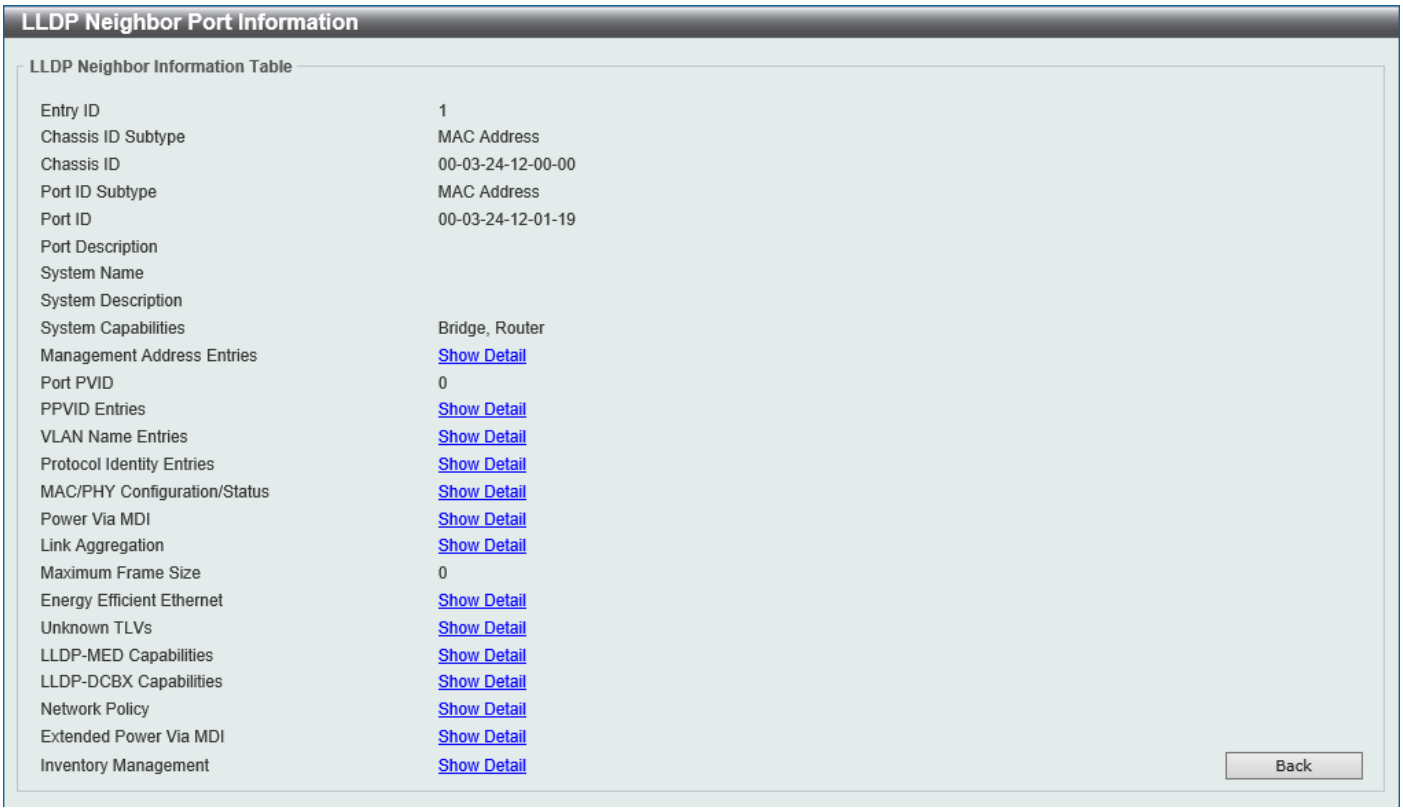


Figure 5-115 LLDP Neighbor Port Information (Show Detail) Window

To view more details about, for example, the **MAC/PHY Configuration/Status**, click the Show Detail hyperlink.

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

After clicking the Show Detail hyperlink, a new section will appear at the bottom of the window.

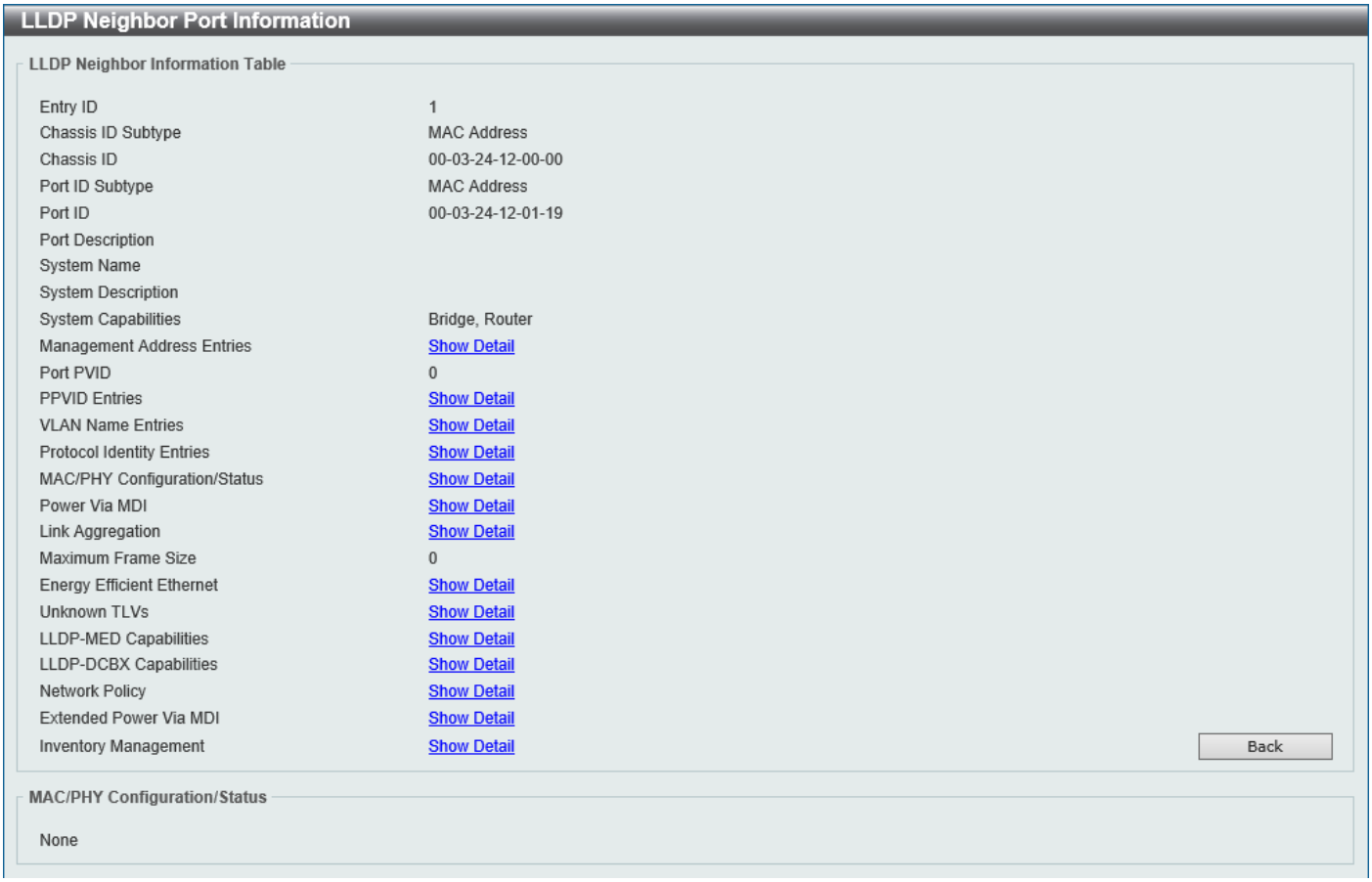


Figure 5-116 LLDP Neighbor Port Information (Show Detail) Window

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

6. Layer 3 Features

ARP

ARP Aging Time

This window is used to display and configure the ARP aging time settings.

To view the following window, click **L3 Features > ARP > ARP Aging Time**, as shown below:

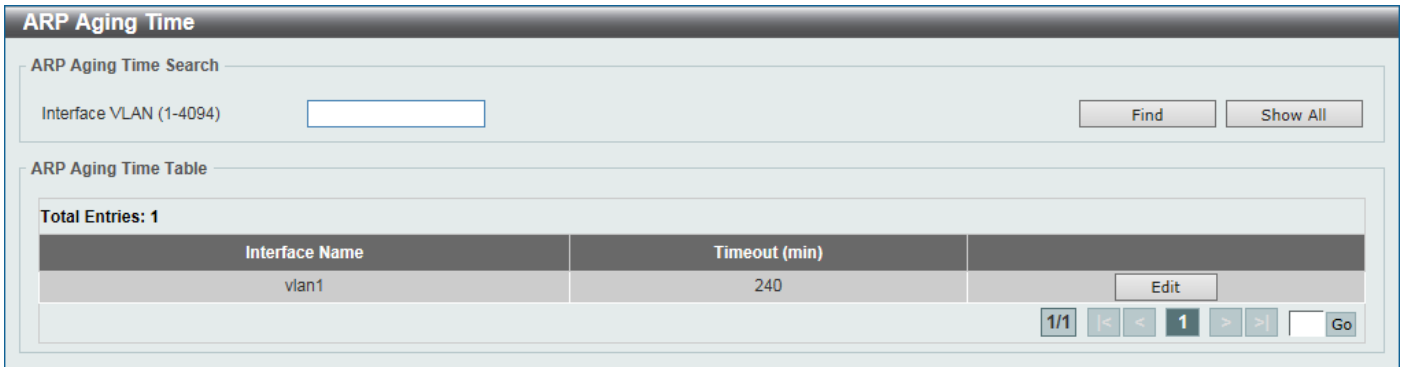


Figure 6-1 ARP Aging Time Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the interface VLAN ID here. The range is from 1 to 4094.
Timeout	After click the **Edit** button, enter the ARP aging timeout value here.

Click the **Find** button to find and display the entries, based on the information entered, in the **ARP Aging Time Table**.

Click the **Show All** button to display all the ARP aging time entries in the **ARP Aging Time Table**.

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Static ARP

This window is used to display and configure the static ARP settings.

To view the following window, click **L3 Features > ARP > Static ARP**, as shown below:

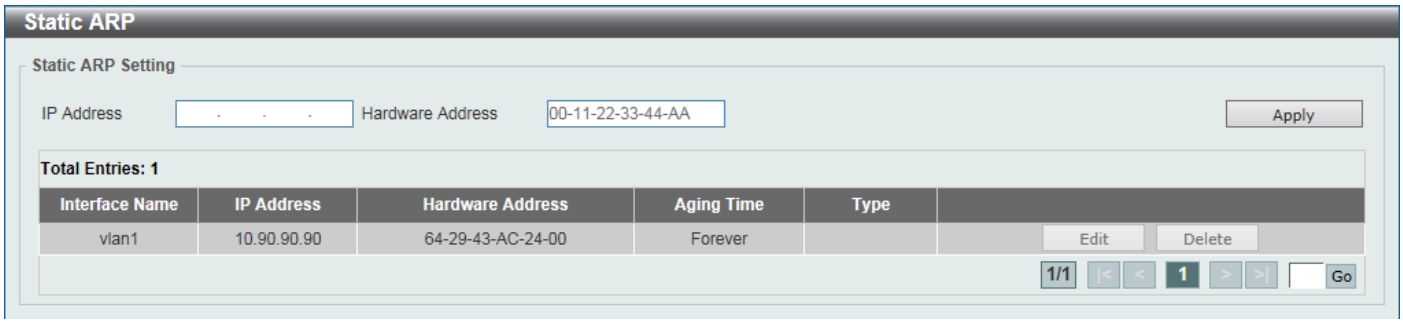


Figure 6-2 Static ARP Window

The fields that can be configured in the **Static ARP Setting** section are described below:

Parameter	Description
IP Address	Enter the IP address that will be associated with the MAC address here.
Hardware Address	Enter the MAC address that will be associated with the IP address here.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Proxy ARP

This window is used to display and configure the Proxy ARP settings. The Proxy ARP feature will allow the Switch to reply to ARP requests destined for another device by faking its identity (IP and MAC Address) as the original ARP responder. Therefore, the Switch can then route packets to the intended destination without configuring static routing or a default gateway. The host, usually a Layer 3 Switch, will respond to packets destined for another device.

To view the following window, click **L3 Features > ARP > Proxy ARP**, as shown below:

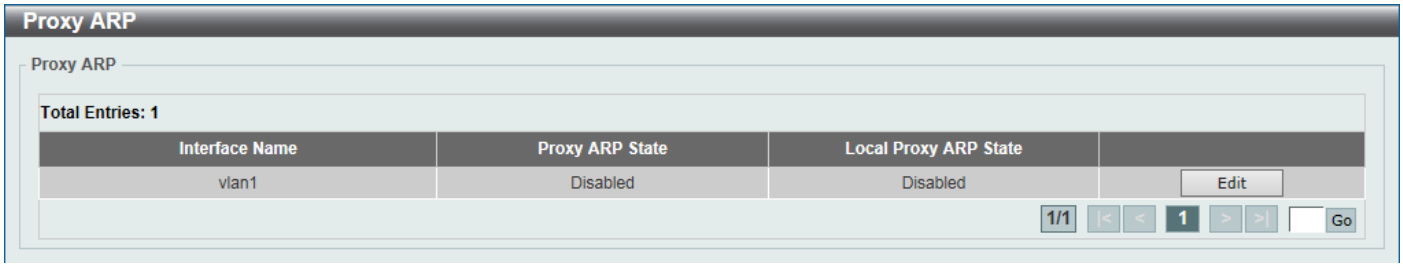


Figure 6-3 Proxy ARP Window

After clicking the **Edit** button, the fields that can be configured are described below:

Parameter	Description
Proxy ARP State	Select to enable or disable the Proxy ARP state here.
Local Proxy ARP State	Select to enable or disable the local Proxy ARP state here. This local Proxy ARP function allows the Switch to respond to the Proxy ARP, if the source IP and destination IP are in the same interface.

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

ARP Table

This window is used to display and configure the ARP table settings.

To view the following window, click **L3 Features > ARP > ARP Table**, as shown below:

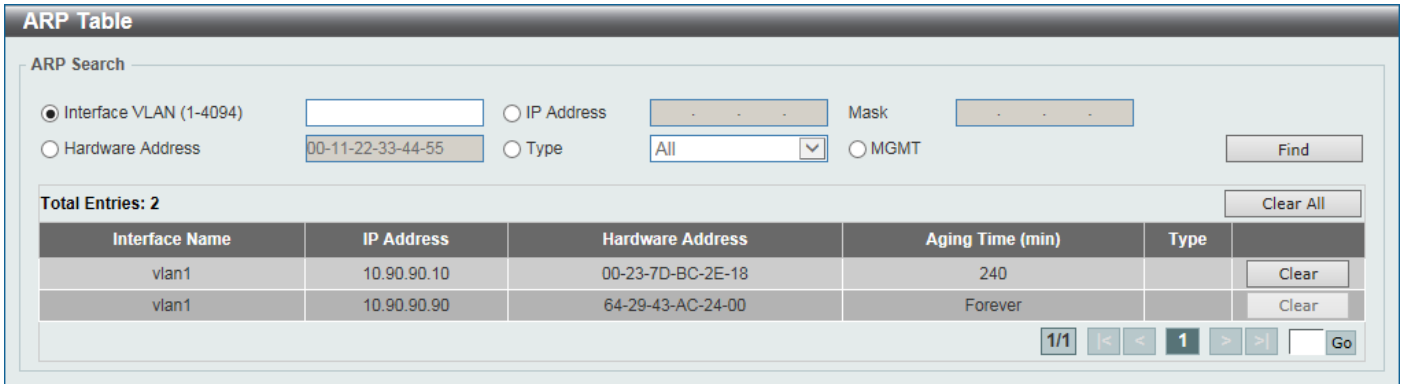


Figure 6-4 ARP Table Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the interface VLAN ID used here. The range is from 1 to 4094.
IP Address	Select and enter the IP address to display here.
Mask	After the **IP Address** option was selected, enter the mask address for the IP address here.
Hardware Address	Select and enter the MAC address to display here.
Type	Select the Type option here. Options to choose from are **All** and **Dynamic**.
MGMT	Select this option to display the Management port information.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear all dynamic ARP cache.

Click the **Clear** button to clear the dynamic ARP cache associated with the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Gratuitous ARP

This window is used to display and configure the gratuitous ARP settings. A gratuitous ARP request packet is an ARP request packet where the source and the destination IP address are both set to the IP address of the sending device and the destination MAC address is the broadcast address.

Generally, a device uses the gratuitous ARP request packet to discover whether the IP address is duplicated by other hosts or to preload or reconfigure the ARP cache entry of hosts connected to the interface.

To view the following window, click **L3 Features > Gratuitous ARP**, as shown below:

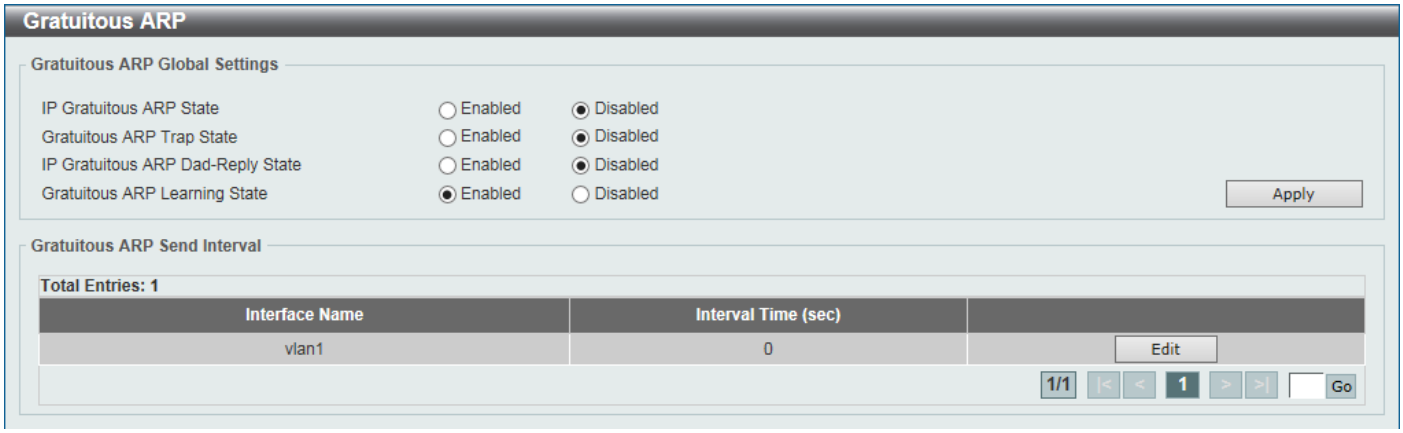


Figure 6-5 Gratuitous ARP Window

The fields that can be configured are described below:

Parameter	Description
IP Gratuitous ARP State	Select to enable or disable the learning of gratuitous ARP packets in the ARP cache table.
Gratuitous ARP Trap State	Select to enable or disable the gratuitous ARP feature trap state here.
IP Gratuitous ARP Dad-Reply State	Select to enable or disable the IP gratuitous ARP Dad-reply state.
Gratuitous ARP Learning State	Select to enable or disable the gratuitous ARP learning state. Normally, the system will only learn ARP entries from ARP reply packets or a normal ARP request packet that asks for the MAC address of the Switch IP address. This option used to enable or disable the learning of ARP entries based on received gratuitous ARP packets. The gratuitous ARP packet is sent by a source IP address and is identical to the IP that the packet is querying.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the field that can be configured for **Gratuitous ARP Send Interval** is described below:

Parameter	Description
Interval Time	Enter the gratuitous ARP sending interval time, in seconds, here.

Click the **Apply** button to accept the changes made.

IPv6 Neighbor

This window is used to display and configure the IPv6 neighbor settings.

To view the following window, click **L3 Features > IPv6 Neighbor**, as shown below:

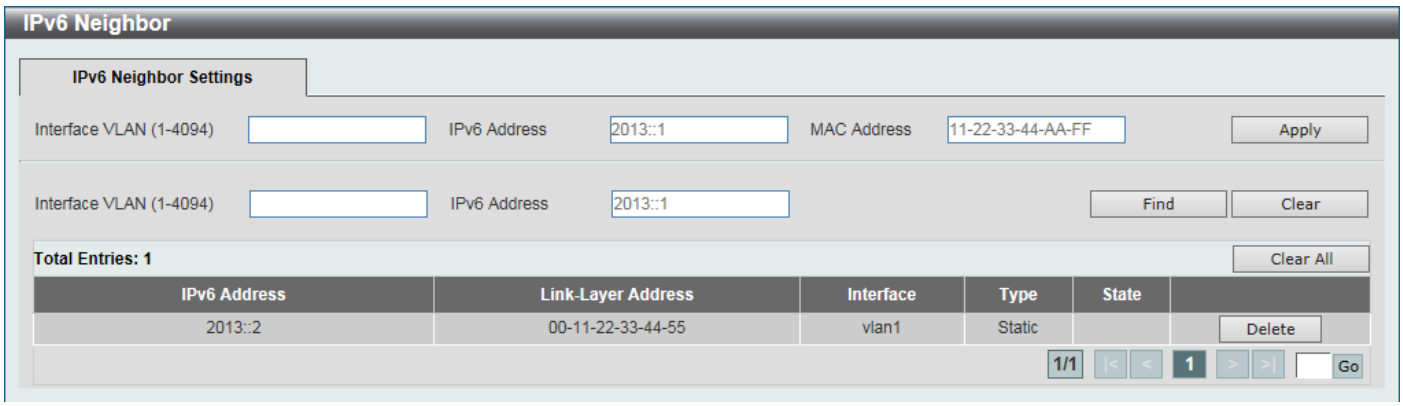


Figure 6-6 IPv6 Neighbor Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here.
IPv6 Address	Enter the IPv6 address.
MAC Address	Enter the MAC address.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear all the dynamic information for the specific interface.

Click the **Clear All** button to clear all the dynamic IPv6 neighbor information in this table.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Interface

IPv4 Interface

This window is used to display and configure the IPv4 interface settings.

To view the following window, click **L3 Features > Interface > IPv4 Interface**, as shown below:

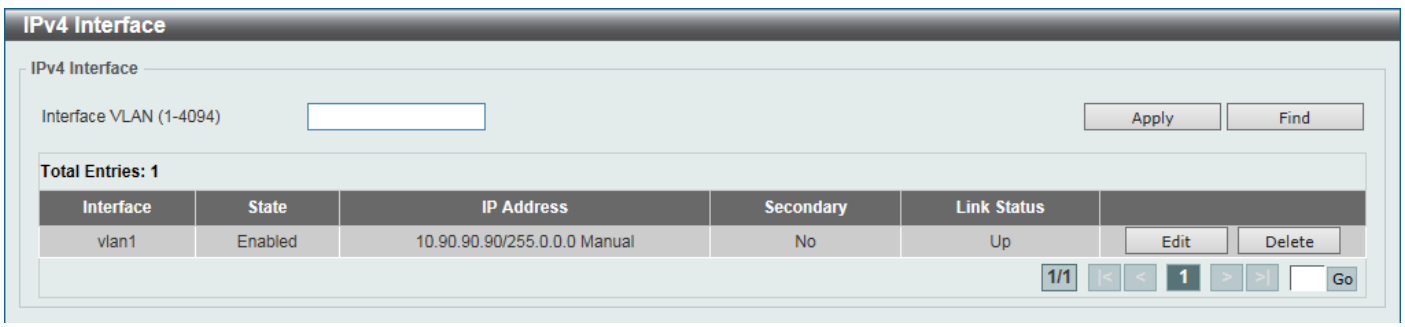


Figure 6-7 IPv4 Interface Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the interface VLAN ID here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will be available.

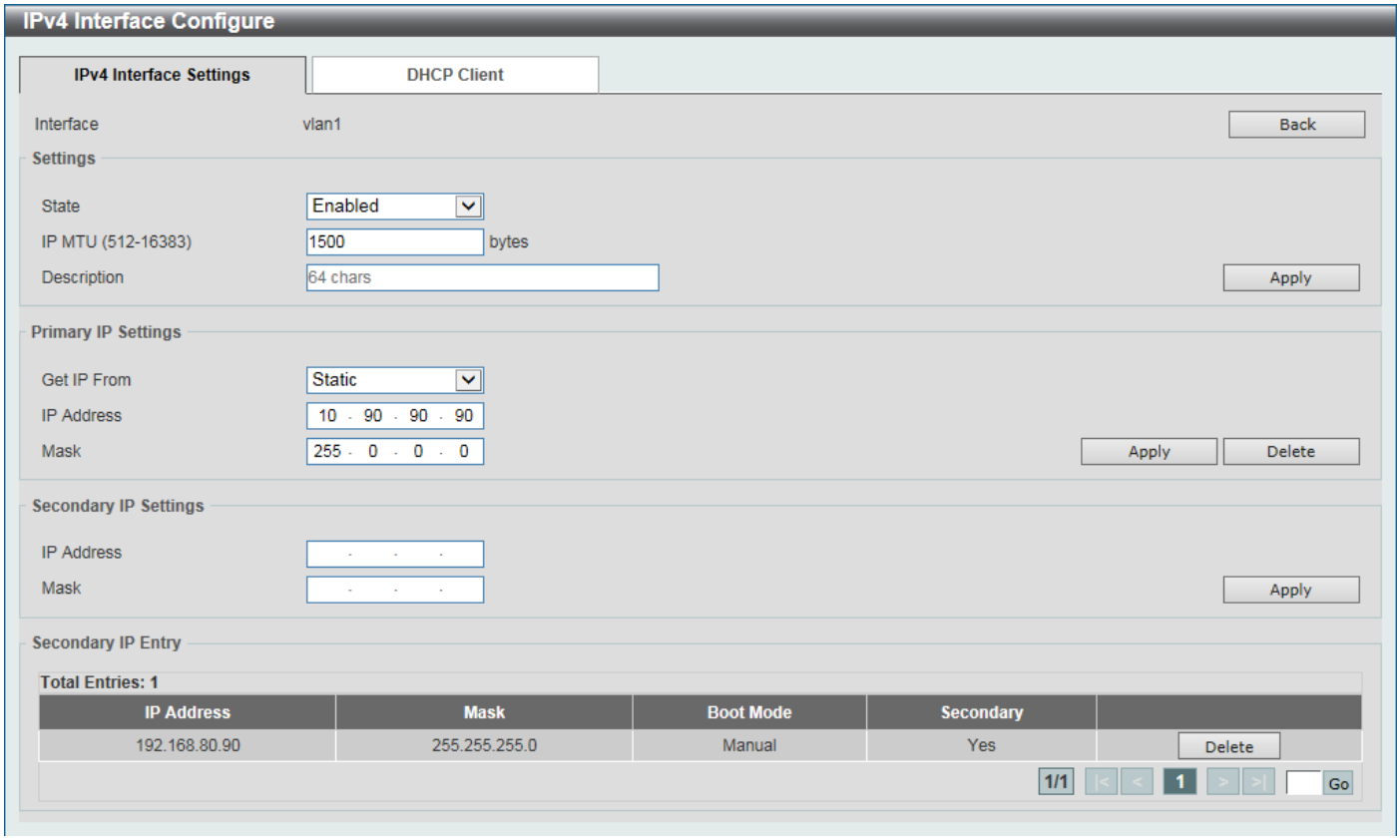


Figure 6-8 IPv4 Interface (Edit) Window

The fields that can be configured in the **Settings** section are described below:

Parameter	Description
State	Select to enable or disable the IPv4 interface global state.
IP MTU	Enter the MTU value here. The range is from 512 to 16383 bytes. By default, this value is 1500 bytes.
Description	Enter the description for this entry here. This string can be up to 64 characters long.

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

Click the **Apply** button to accept the changes made.

The fields that can be configured in the **Primary IP Settings** section are described below:

Parameter	Description
Get IP From	Select the get IP from option here. Options to choose from are: • **Static** - Enter the IPv4 address of this interface manually in the fields provided. • **DHCP** - This interface will obtain IPv4 information automatically from the DHCP server located on the local network.
IP Address	Enter the primary IPv4 address for this interface here.
Mask	Enter the primary IPv4 subnet mask for this interface here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

The fields that can be configured in the **Secondary IP Settings** section are described below:

Parameter	Description
IP Address	Enter the secondary IPv4 address for this interface here.
Mask	Enter the secondary IPv4 subnet mask for this interface here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After selecting the **DHCP Client** tab, the following page will appear.

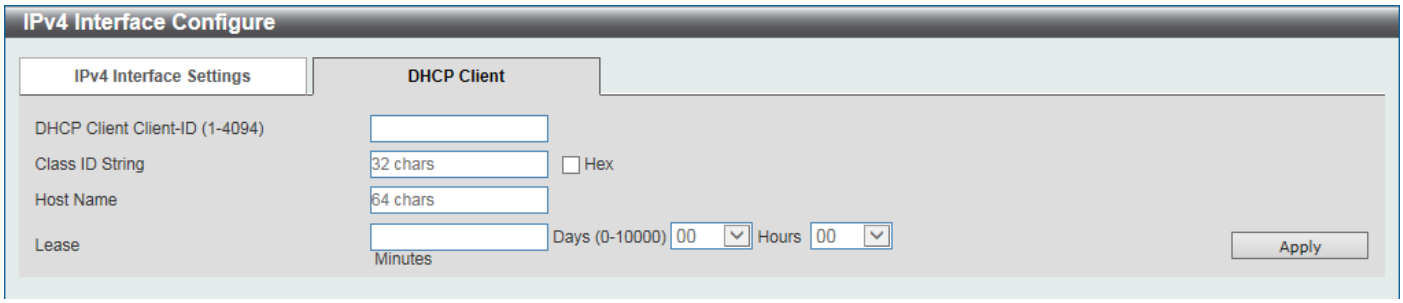


Figure 6-9 IPv4 Interface (Edit, DHCP Client) Window

The fields that can be configured are described below:

Parameter	Description
DHCP Client Client-ID	Enter the DHCP Client ID here. The range is from 1 to 4094. This parameter is used to specify the VLAN interface whose hexadecimal MAC address will be used as the client ID sent with the discover message.
Class ID String	Enter the class ID string here. This string can be up to 32 characters long. Select the **Hex** option to enter the Class ID string in the hexadecimal format. This string can be up to 64 characters long. This parameter is used to specify the vendor class identifier used as the value of Option 60 in the DHCP discover message.
Host Name	Enter the host name here. This string can be up to 64 characters long. This parameter is used to specify the value of the host name option to be sent with the DHCP discover message.
Lease	Enter and optionally select the DHCP client lease time here. In the textbox, the lease time, in days, can be entered. The range is from 0 to 10000 days. **Hours** and **Minutes** can also be selected optionally.

Click the **Apply** button to accept the changes made.

IPv6 Interface

This window is used to display and configure the IPv6 interface settings.

To view the following window, click **L3 Features > Interface > IPv6 Interface**, as shown below:

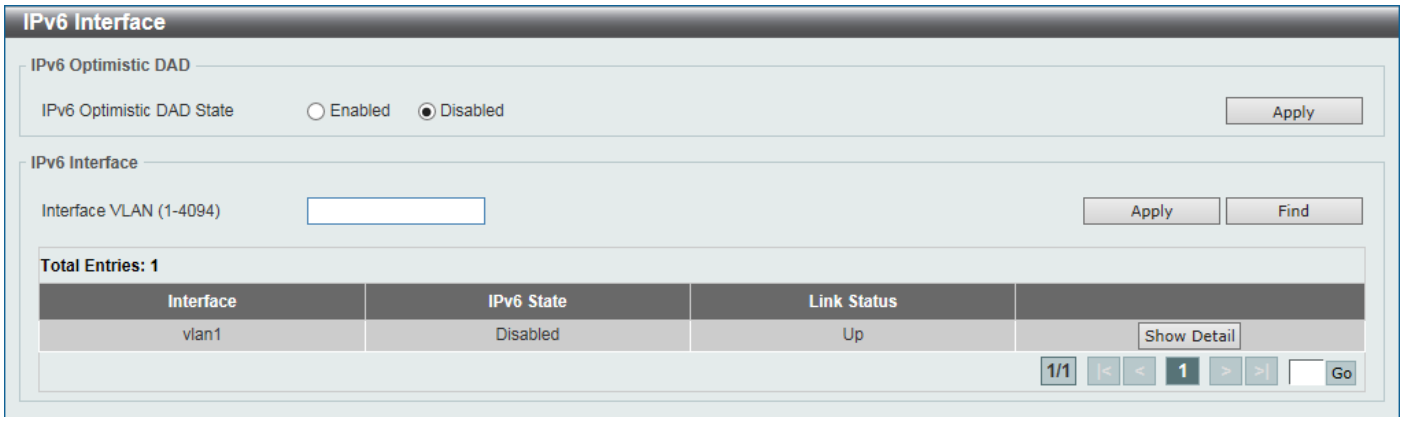


Figure 6-10 IPv6 Interface Window

The fields that can be configured in **IPv6 Optimistic DAD** are described below:

Parameter	Description
IPv6 Optimistic DAD State	Select to enable or disable the IPv6 Optimistic Duplicate Address Detection (DAD) state here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Interface** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID that will be associated with the IPv6 entry.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view and configure detailed settings for the IPv6 interface entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will be available.

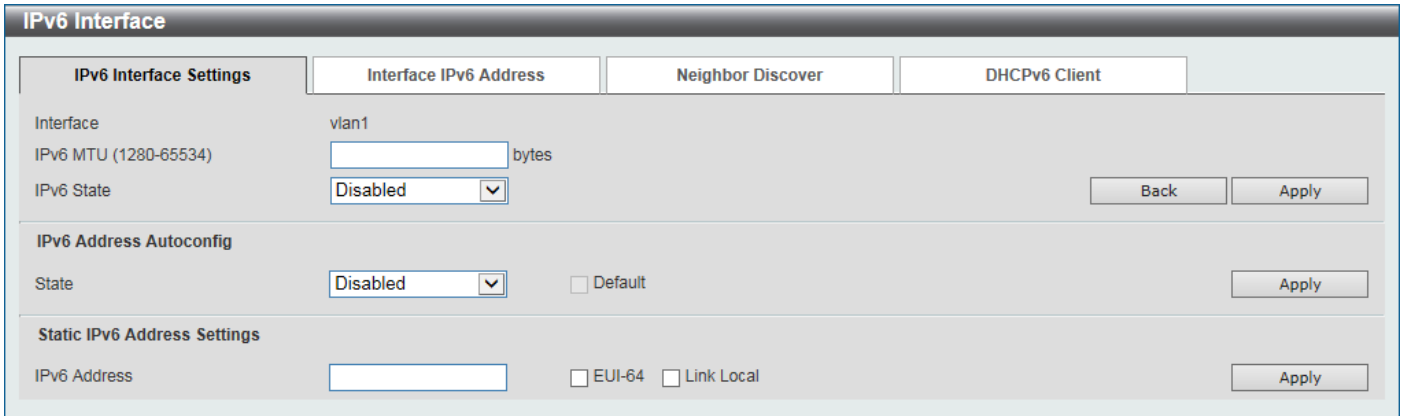


Figure 6-11 IPv6 Interface (Detail, IPv6 Interface Settings) Window

The fields that can be configured are described below:

Parameter	Description
IPv6 MTU	Enter the IPv6 MTU value here. This is used to configure the MTU to be advertised in RA messages. The range is from 1280 to 65534 bytes. By default, this value is 1500 bytes.
IPv6 State	Select to enable or disable the IPv6 interface global state here.

Click the **Back** button to discard the changes made and return to the previous page.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **IPv6 Address Autoconfig** are described below:

Parameter	Description
State	Select to enable or disable the automatic configuration of the IPv6 address using stateless auto-configuration here. Select the **Default** option to specify that if the default router is selected on this interface, a default route will be installed using that default router. This option can only be specified on one interface.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Static IPv6 Address Settings** are described below:

Parameter	Description
IPv6 Address	Enter the IPv6 address for this IPv6 interface here. Select the **EUI-64** option to configure an IPv6 address on the interface using the EUI-64 interface ID. Select the **Link Local** option to configure a link-local address for the IPv6 interface.

Click the **Apply** button to accept the changes made.

After selecting the **Interface IPv6 Address** tab option, at the top of the page, the following page will be available.

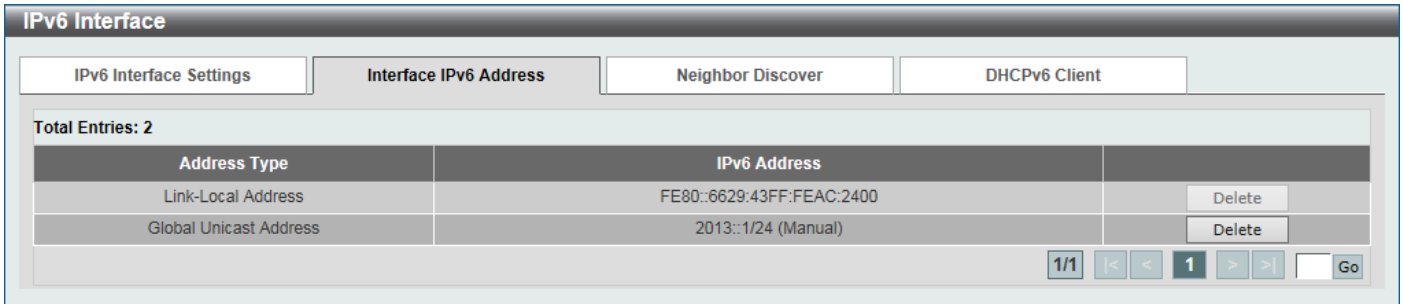


Figure 6-12 IPv6 Interface (Detail, Interface IPv6 Address) Window

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After selecting the **Neighbor Discover** tab option, at the top of the page, the following page will be available.

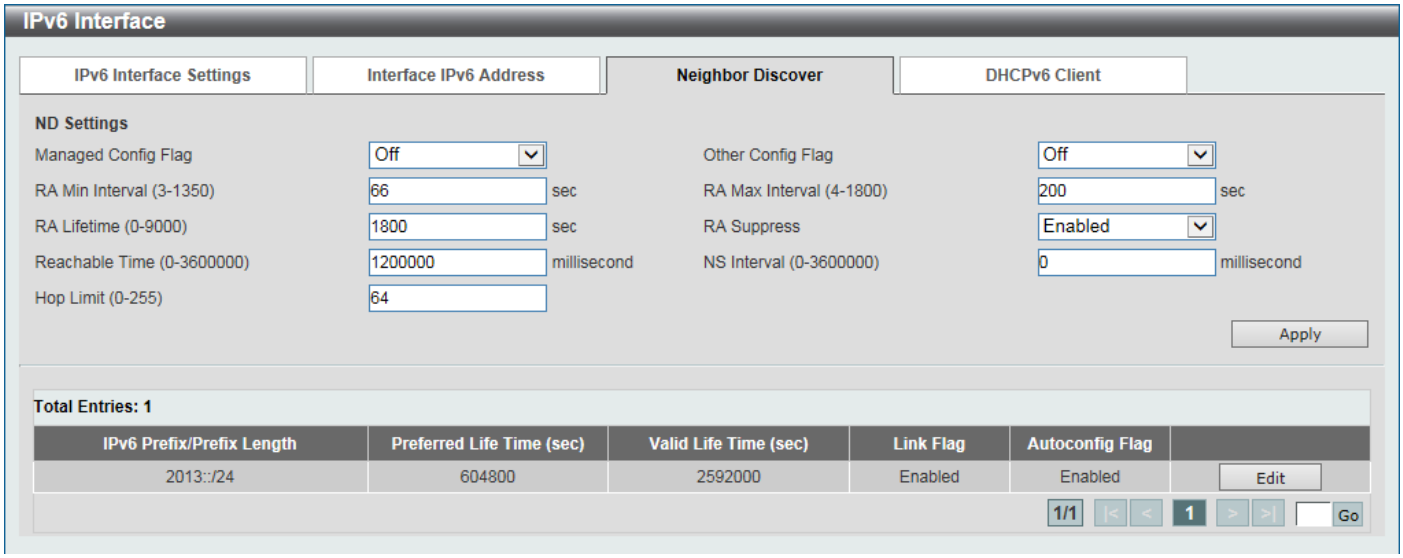


Figure 6-13 IPv6 Interface (Detail, Neighbor Discover) Window

The fields that can be configured for **ND Settings** are described below:

Parameter	Description
Managed Config Flag	Turn the Managed Config Flag option **On** or **Off** here. When the neighbor host receives the RA which has flag turned on, the host should use a stateful configuration protocol to obtain IPv6 addresses.
Other Config Flag	Turn the Other Config Flag option **On** or **Off** here. By setting the other configuration flag on, the router instructs the connected hosts to use a stateful configuration protocol to obtain auto-configuration information other than the IPv6 address.
RA Min Interval	Enter the minimum RA interval time value here. The range is from 3 to 1350 seconds. This value must be smaller than 0.75 times the maximum value.
RA Max Interval	Enter the maximum RA interval time value here. The range is from 4 to 1800 seconds.
RA Lifetime	Enter the RA lifetime value here. The range is from 0 to 9000 seconds. The lifetime value in RA instructs the received host the lifetime value for taking the router as the default router.
RA Suppress	Select to enable or disable the RA suppress feature here.
Reachable Time	Enter the Reachable Time here. The range is from 0 to 3600000 milliseconds. If the specified time is 0, the router will use 1200 seconds on the interface and advertise 0 (unspecified) in the RA message. The Reachable Time is used by the IPv6 node in determining the reachability of the neighbor nodes.
NS Interval	Enter the Neighbor Solicitation (NS) interval value here. The range is from 0 to 3600000 milliseconds, in multiples of 1000. If the specified time is 0, the router will use 1 second on the interface and advertise 0 (unspecified) in the Router Advertisement (RA) message.
Hop Limit	Enter the hop limit value here. The range is from 0 to 255. The IPv6 packet originated by the system will also use this value as the initial hop limit.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the settings in the specified entry.

After clicking the **Edit** button, the fields that can be configured in the table are described below:

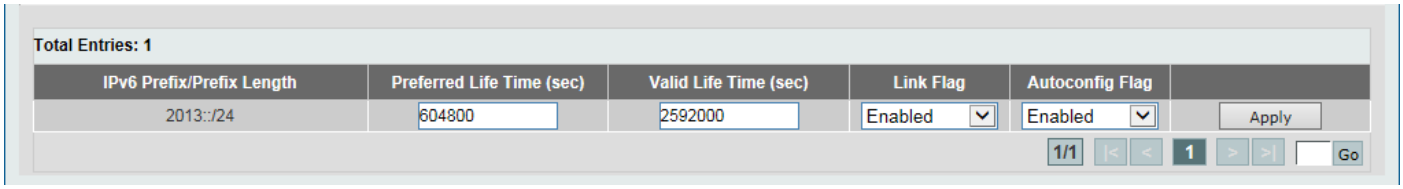


Figure 6-14 IPv6 Interface (Detail, Neighbor Discover, Edit) Window

After clicking the **Edit** button the following can be configured:

Parameter	Description
Preferred Life Time	Enter the preferred lifetime value here. The range is from 0 to 4294967295 seconds.
Valid Life Time	Enter the valid lifetime value here. The range is from 0 to 4294967295 seconds.
Link Flag	Select to enable or disable the link flag function here.
Autoconfig Flag	Select to enable or disable the auto-configure flag function here.

Click the **Apply** button to accept the changes made.

After selecting the **DHCPv6 Client** tab option, at the top of the page, the following page will be available.

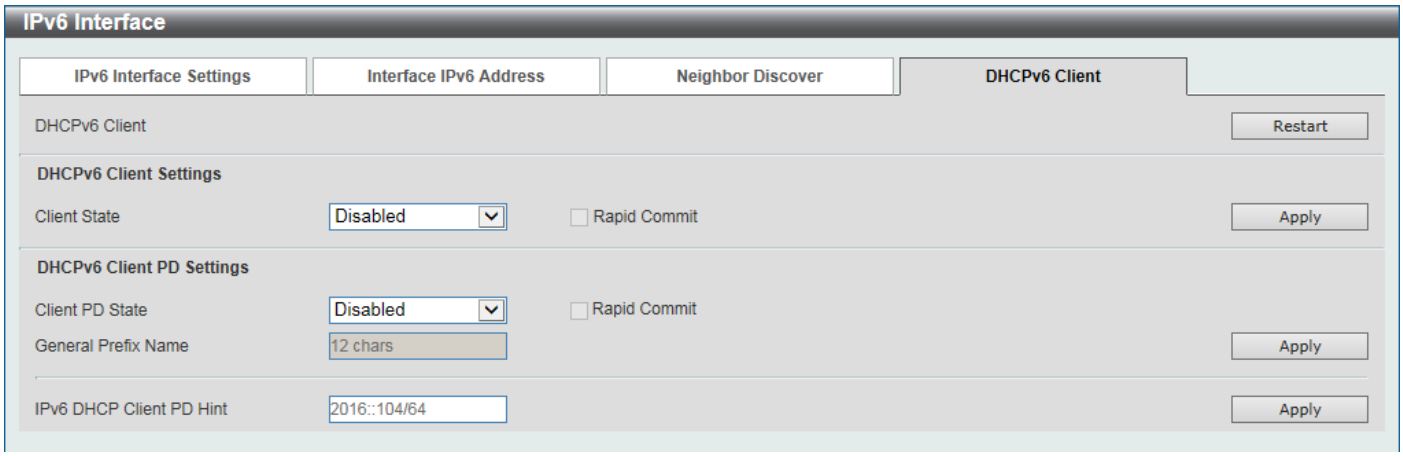


Figure 6-15 IPv6 Interface (Detail, DHCPv6 Client) Window

Click the **Restart** button to restart the DHCPv6 client service.

The fields that can be configured for **DHCPv6 Client Settings** are described below:

Parameter	Description
Client State	Select to enable or disable the DHCPv6 client service here. Select the **Rapid Commit** option to proceed with two-message exchange for address delegation. The rapid-commit option will be included in the Solicit message to request a two-message handshake.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **DHCPv6 Client PD Settings** are described below:

Parameter	Description
Client PD State	Select to enable or disable the DHCPv6 client process that requests a Prefix Delegation (PD) through a specified interface.

Parameter	Description
	Select the **Rapid Commit** option to proceed with two-message exchange for prefix delegation. The rapid-commit option will be included in the Solicit message to request a two-message handshake.
General Prefix Name	Enter the IPv6 general prefix name here. This name can be up to 12 characters long.
IPv6 DHCP Client PD Hint	Enter the IPv6 prefix to be sent in the message as a hint here.

Click the **Apply** button to accept the changes made.

Loopback Interface

This window is used to display and configure the loopback interface settings. A loopback interface is a software only interface, which always stays in the up status

To view the following window, click **L3 Features > Interface > Loopback Interface**, as shown below:

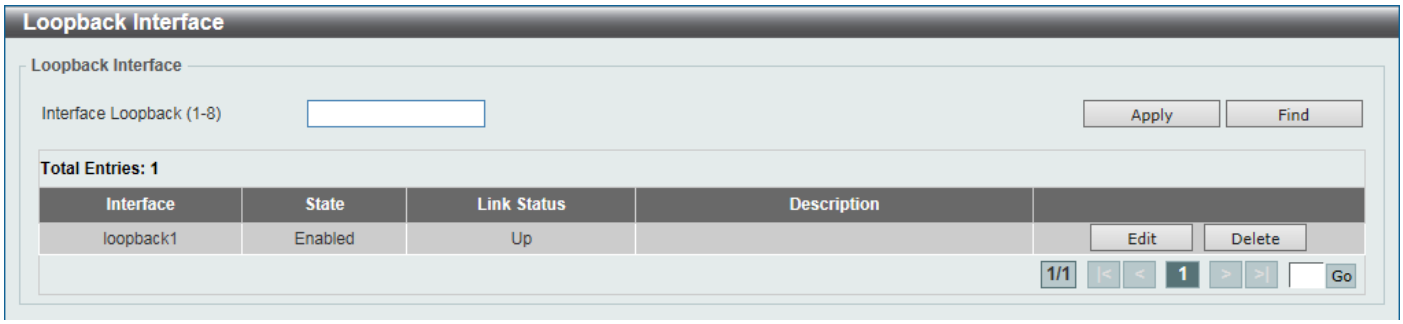


Figure 6-16 Loopback Interface Window

The fields that can be configured are described below:

Parameter	Description
Interface Loopback	Enter the loopback interface ID here. The range is from 1 to 8.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

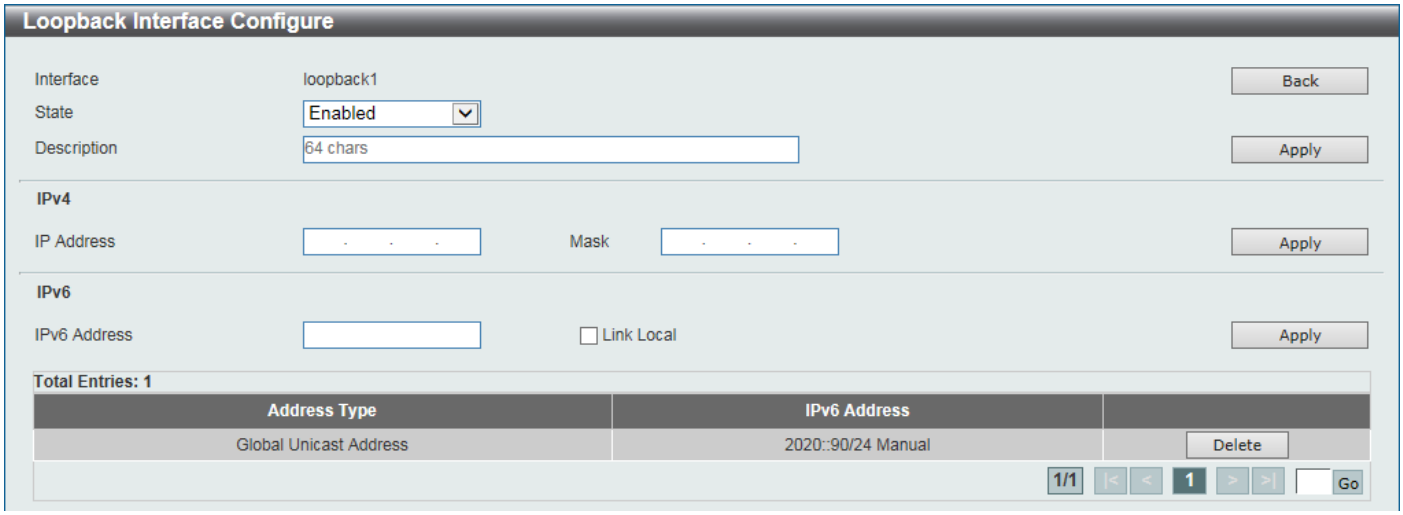


Figure 6-17 Loopback Interface (Edit) Window

The fields that can be configured are described below:

Parameter	Description
State	Select to enable or disable the loopback interface here.
Description	Enter the description for the loopback interface here. This string can be up to 64 characters long.
IP Address	Enter the IPv4 address associated with this loopback interface here.
Mask	Enter the IPv4 subnet mask associated with this loopback interface here.
IPv6 Address	Enter the IPv6 address associated with this loopback interface here.
Link Local	Select this option to specify that the IPv6 address entered is the link-local IPv6 address.

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

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Null Interface

This window is used to display and configure the Null interface settings.

To view the following window, click **L3 Features > Interface > Null Interface**, as shown below:

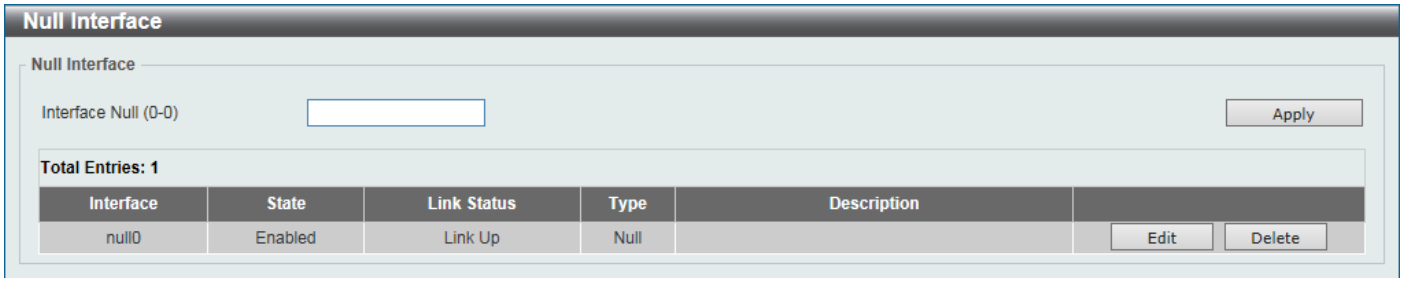


Figure 6-18 Null Interface Window

The fields that can be configured are described below:

Parameter	Description
Interface Null	Enter the Null interface ID here. This value can only be 0.
Description	After clicking the **Edit** button, enter the description for the Null interface here. This string can be up to 64 characters long.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the description for the Null interface.

Click the **Delete** button to delete the specified entry.

UDP Helper

IP Forward Protocol

This window is used to display and configure the IP forward protocol settings. This feature is used to enable the forwarding of a specific UDP service type of packets.

To view the following window, click **L3 Features > UDP Helper > IP Forward Protocol**, as shown below:

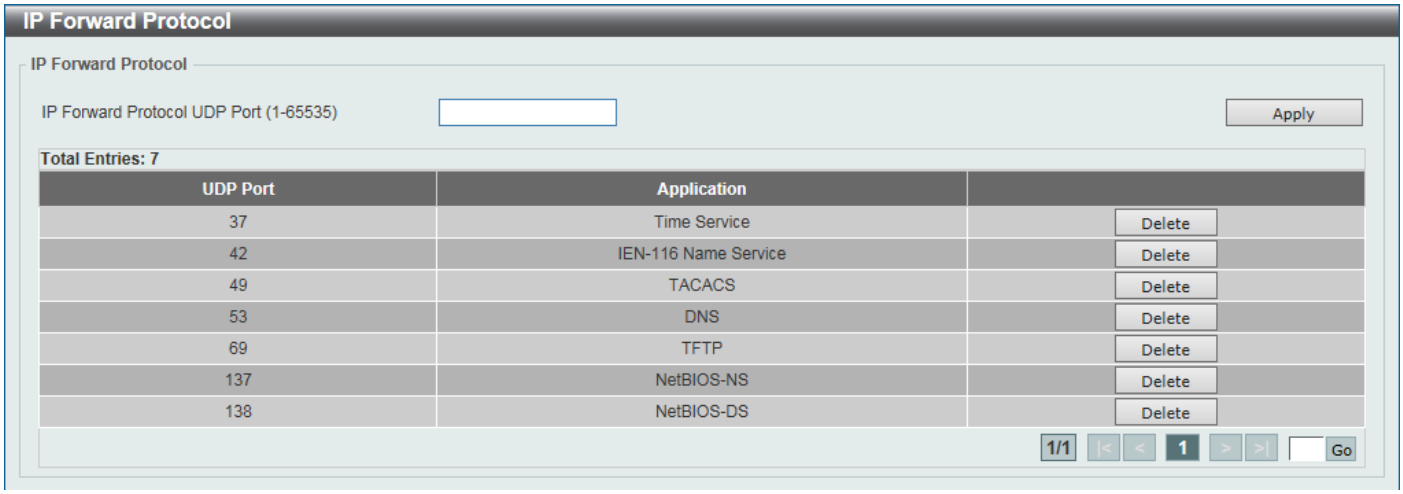


Figure 6-19 IP Forward Protocol Window

The fields that can be configured are described below:

Parameter	Description
IP Forward Protocol UDP Port	Enter the destination port of the UDP service to be forwarded here. The range is from 1 to 65535.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IP Helper Address

This window is used to add or remove a target address for the forwarding of UDP broadcast packets. This feature takes effect only when the received interface has an IP address assigned.

The system only forwards packets that satisfy the following restrictions:

- The destination MAC address must be a broadcast address.
- The destination IP address must be an all-one broadcast.
- The packets are IPv4 UDP packets.
- The IP TTL value must be greater than or equal to 2.

To view the following window, click **L3 Features > UDP Helper > IP Helper Address**, as shown below:

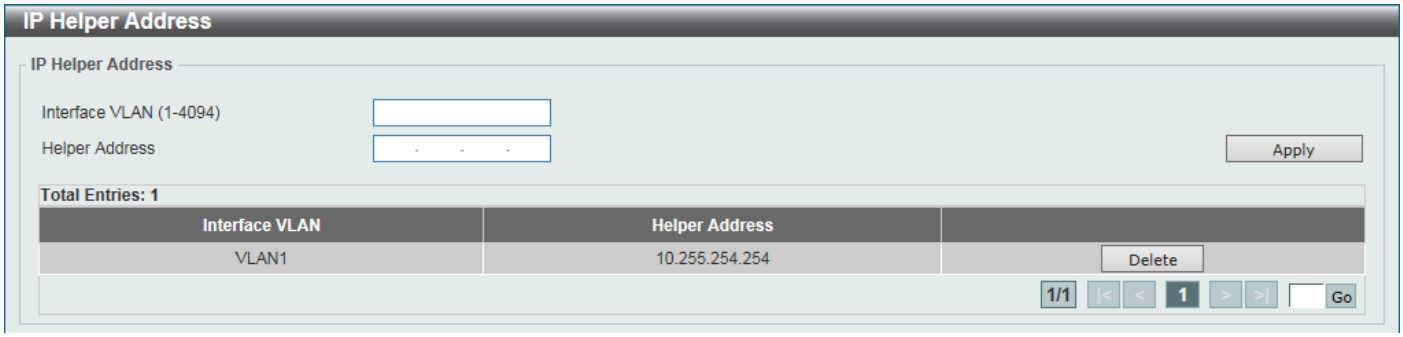


Figure 6-20 IP Helper Address Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID used here. The range is from 1 to 4094.
Helper Address	Enter the target IPv4 address for the forwarding of the UDP broadcast packet here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPv4 Static/Default Route

This window is used to display and configure the IPv4 static and default route settings. The Switch supports static routing for IPv4 formatted addressing. When an IPv4 static route is defined, the Switch will send an ARP request packet to the next hop router. When the ARP response is retrieved by the Switch from that next hop, the route becomes enabled. However, if the ARP entry already exists, an ARP request will not be sent.

The Switch also supports a floating static route, which means that the user may create an alternative static route with a different next hop. This secondary next hop device route is considered as a backup static route when the primary static route is down. If the primary route is lost, the backup route will become active and begin forwarding traffic.

Entries into the Switch's forwarding table can be made using an IP address, subnet mask, and gateway.

To view the following window, click **L3 Features > IPv4 Static/Default Route**, as shown below:

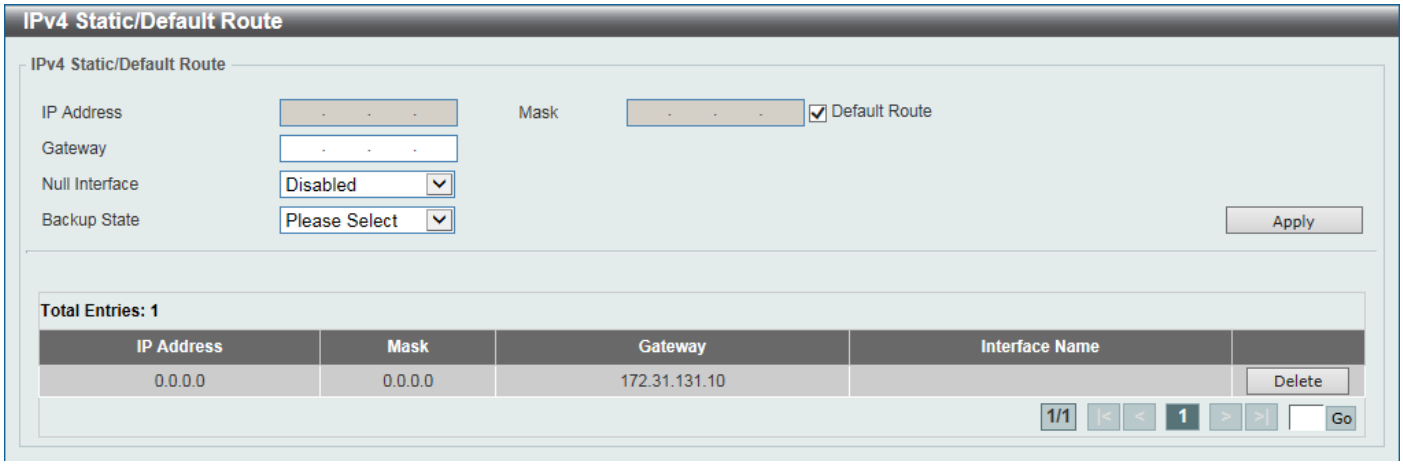


Figure 6-21 IPv4 Static/Default Route Window

The fields that can be configured are described below:

Parameter	Description
IP Address	When **Default Route** is not selected, enter the IPv4 address for this route here.
Mask	When **Default Route** is not selected, enter the IPv4 network mask for this route here.
Default Route	Select this option to use the default route as the IPv4 address.
Gateway	Enter the gateway address for this route here.
Null Interface	Select to enable or disable the NULL interface here.
Backup State	Select the backup state option here. Options to choose from are: • **Primary** - Specifies the route as the primary route to the destination. • **Backup** - Specifies the route as the backup route to the destination. • **Weight** - Specifies a weight number greater than zero, but less than the maximum paths number. This number is used to replicate identical route paths (multiple copies) in the routing table, so the paths get more chance of being hit for traffic routing. Enter the weight value in the space provided. The range is from 1 to 4.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPv4 Route Table

This window is used to display and configure the IPv4 route table settings.

To view the following window, click **L3 Features > IPv4 Route Table**, as shown below:

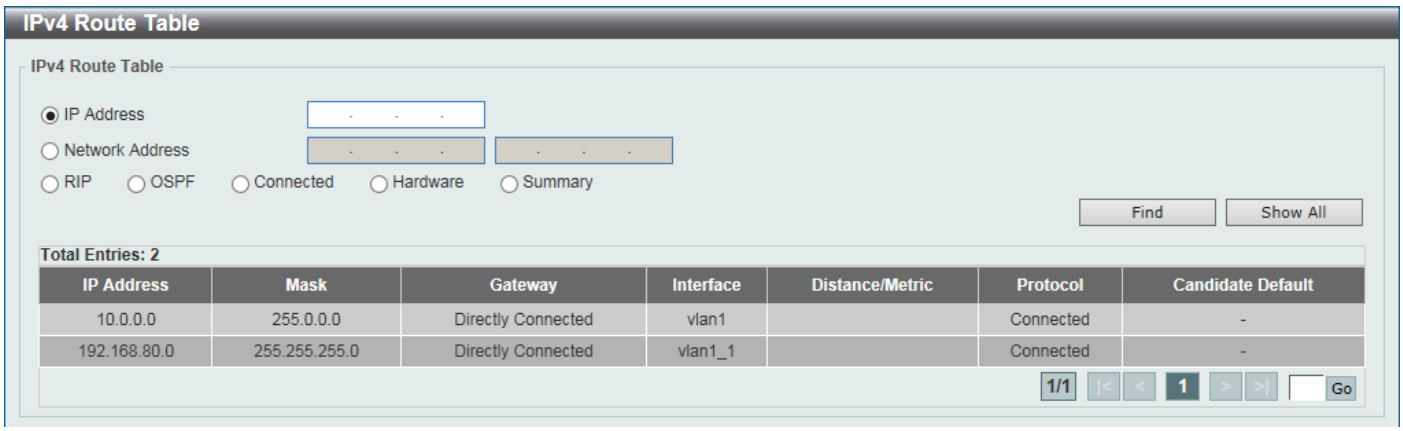


Figure 6-22 IPv4 Route Table Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Select and enter the single IPv4 address here.
Network Address	Select and enter the IPv4 network address here. In the first space enter the network prefix and in the second space enter the network mask.
RIP	Select this option to display only RIP routes.
OSPF	Select this option to display only OSPF routes.
Connected	Select this option to display only connected routes.
Hardware	Select this option to display only hardware routes. Hardware routes are routes that have been written into the hardware chip.
Summary	Select this option to display a summary and count of the route sources configured on this Switch.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries in the table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPv6 Static/Default Route

This window is used to display and configure the IPv6 static or default routes.

To view the following window, click **L3 Features > IPv6 Static/Default Route**, as shown below:

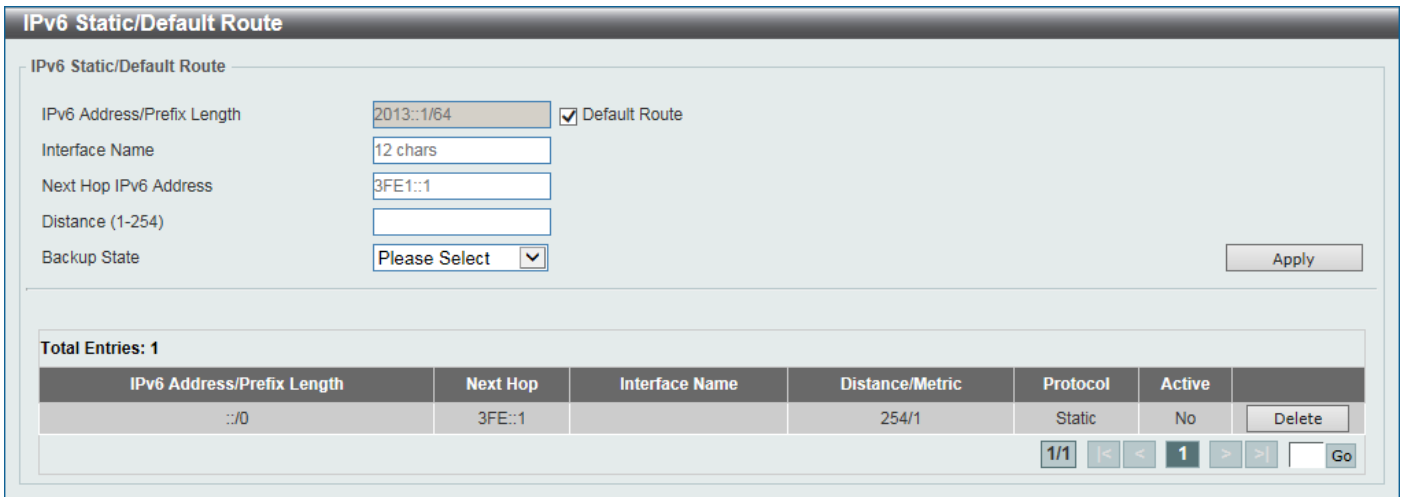


Figure 6-23 IPv6 Static/Default Route Window

The fields that can be configured are described below:

Parameter	Description
IPv6 Address/Prefix Length	Enter the IPv6 address and prefix length for this route here. Select **Default Route** to use this route as the default route.
Interface Name	Enter the name of the interface that will be associated with this route here.
Next Hop IPv6 Address	Enter the next hop IPv6 address here.
Distance	Enter the administrative distance of the static route here. The range is from 1 to 254. A lower value represents a better route. By default, this value is 1.
Backup State	Select the backup state option here. Options to choose from are: • **Primary** - The route is specified as the primary route to the destination. • **Backup** - The route is specified as the backup route to the destination.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPv6 Route Table

This window is used to display and configure the IPv6 route table.

To view the following window, click **L3 Features > IPv6 Route Table**, as shown below:

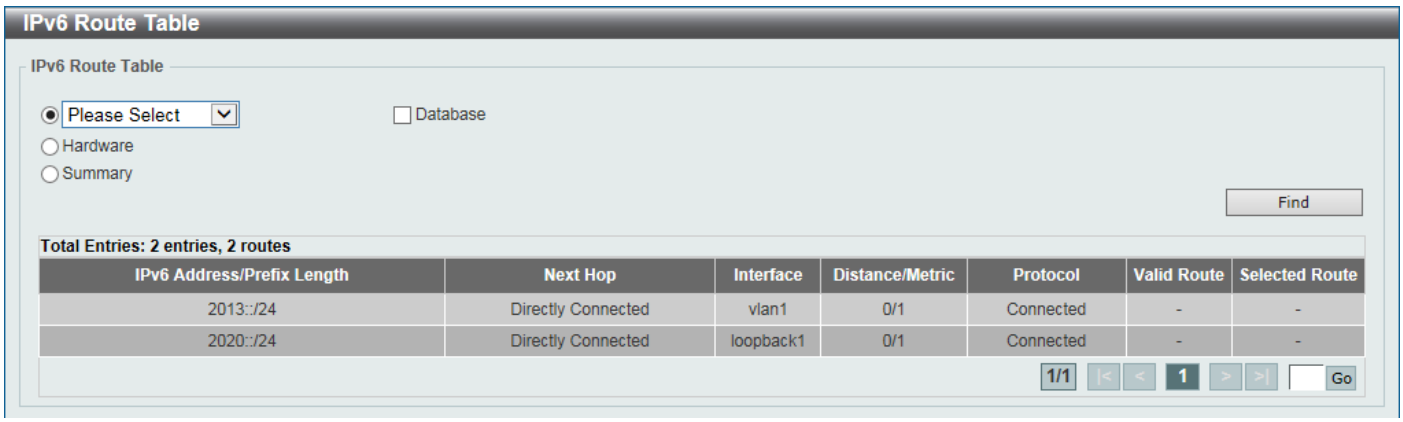


Figure 6-24 IPv6 Route Table Window

The fields that can be configured are described below:

Parameter	Description
IPv6 Address	Select and enter the IPv6 address to display here.
IPv6 Address/Prefix Length	Select and enter the IPv6 address and prefix length to display here. Select the **Longer Prefixes** option to display IPv6 routes with prefixes greater than and equal to the prefix length.
Interface Name	Select and enter the name of the interface to display here.
Connected	Select this option to display only connected routes.
RIPng	Select this option to display only RIPng routes.
OSPFv3	Select this option to display only OSPFv3 routes.
Database	Select this option to display all the related entries in the routing database instead of just the best route.
Hardware	Select this option to display only hardware routes. Hardware routes are routes that have been written into the hardware chip.
Summary	Select this option to display a summary and count of the route sources configured on this Switch.

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Route Preference

This window is used to display and configure the route preference settings. Use this window to configure the distance, which represents the route's trust rating. The route with a lower distance value is preferred over the route with a higher distance value.

To view the following window, click **L3 Features > Route Preference**, as shown below:

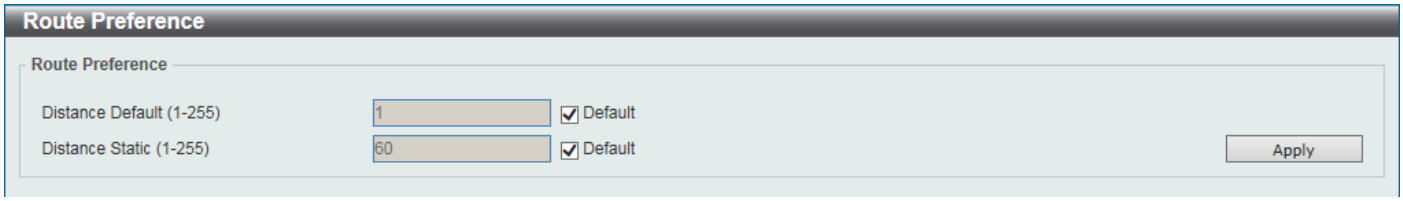


Figure 6-25 Route Preference Window

The fields that can be configured are described below:

Parameter	Description
Distance Default	Enter the administrative distance of default routes here. The range is from 1 to 255. By default, this value is 1.
Distance Static	Enter the administrative distance of static routes here. The range is from 1 to 255. By default, this value is 60.

Click the **Apply** button to accept the changes made.

ECMP Settings

This window is used to display and configure the Equal-Cost Multi-Path (ECMP) routing settings. This is used to configure the load balancing hash algorithm and used to determine the next hop entry for multiple paths destined for the same destination.

To view the following window, click **L3 Features > ECMP Settings**, as shown below:

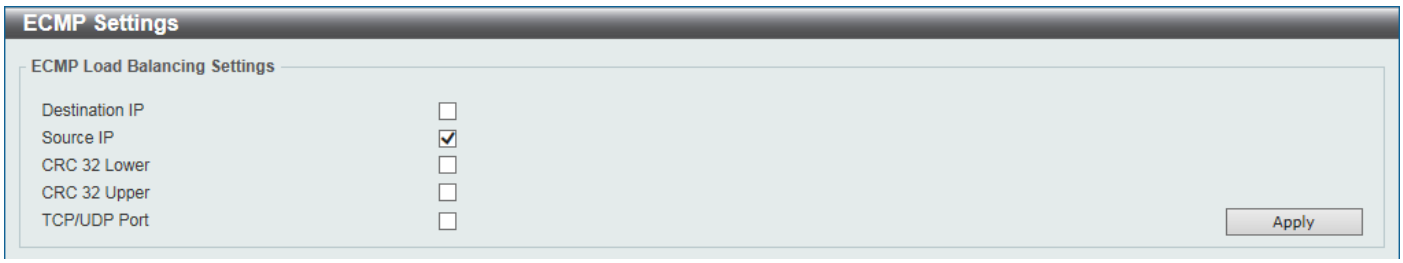


Figure 6-26 ECMP Settings Window

The fields that can be configured in **ECMP Load Balancing Settings** are described below:

Parameter	Description
Destination IP	Select this option to use the destination IP address as the ECMP hash key.
Source IP	Select this option to use the least significant bits of the source IP address as the ECMP hashing algorithm.
CRC 32 Lower	Select this option to use the lower bits of CRC-32 as the ECMP hashing algorithm.
CRC 32 Upper	Select this option to use the upper bits of CRC-32 as the ECMP hashing algorithm.
TCP/UDP Port	Select this option to use TCP/UDP port number as ECMP hash key.

Click the **Apply** button to accept the changes made.

IPv6 General Prefix

This window is used to display and configure the VLAN interface IPv6 general prefix settings.

To view the following window, click **L3 Features > IPv6 General Prefix**, as shown below:

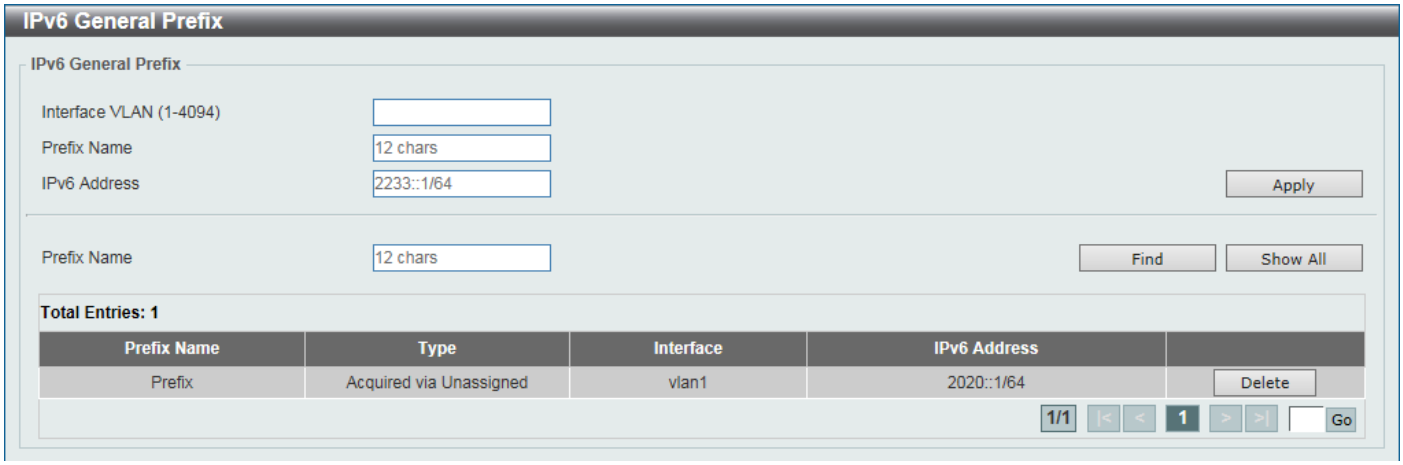


Figure 6-27 IPv6 General Prefix Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID used here. The range is from 1 to 4094.
Prefix Name	Enter the IPv6 general prefix entry name here. This name can be up to 12 characters long.
IPv6 Address	Enter the IPv6 address and prefix length here. The prefix length of the IPv6 address is also the local subnet on the VLAN interface.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the IPv6 general prefix entries in the table.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

RIP

RIP Settings

This window is used to display and configure Routing Information Protocol (RIP) settings.

To view the following window, click **L3 Features > RIP > RIP Settings**, as shown below:

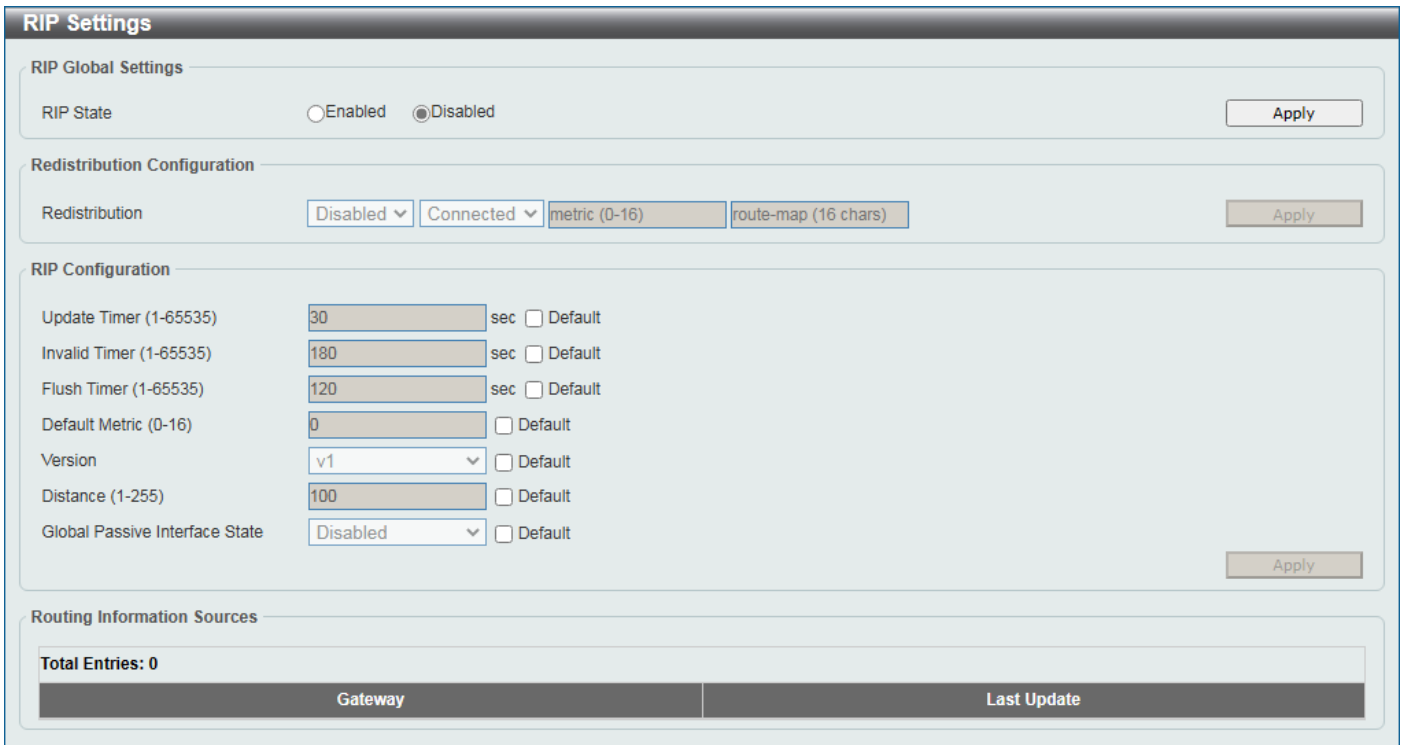


Figure 6-28 RIP Settings Window

The fields that can be configured in **RIP Global Settings** are described below:

Parameter	Description
RIP State	Select to globally enable or disable the Routing Information Protocol (RIP) feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Redistribution Configuration** are described below:

Parameter	Description
Redistribution	First, select to enable or disable the RIP redistribution feature here. Second, select the routing protocol (domain) that will be redistributed into RIP. Options to choose from are **Connected**, **OSPF**, and **Static**. The **Static** option means redistribute IP static routes. The **Connected** option refers to routes that are established automatically through configuring an IP address on an interface. Third, enter the value to be used as the metric for the redistributed route here. The range is from 0 to 16. Fourth, enter the Route Map name that is used in the filtering of the routes to be redistributed to the current routing protocol. If not specified, all routes are redistributed.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RIP Configuration** are described below:

Parameter	Description
Update Timer	Enter the update interval in seconds at which the update message is sent. The range is from 1 to 65535 seconds. By default, this value is 30 seconds. Select the **Default** option to use the default value here.
Invalid Timer	Enter the invalid time value in seconds here. The range is from 1 to 65535 seconds. By default, this value is 180 seconds. Select the **Default** option to use the default value here.
Flush Timer	Enter the flush timer value in seconds here. The range is from 1 to 65535 seconds. By default, this value is 120 seconds. Select the **Default** option to use the default value here.
Default Metric	Enter the default metric value here. The range is from 0 to 16. The default metric is used in redistributing routes from other routing protocols. The routes being redistributed are learned by other protocols and may have an incompatible metric to RIP. The specifying of the metric allows the metric to be synced. By default, this value is 0. Select the **Default** option to use the default metric value.
Version	Select the global RIP version that will be used as the default version for all interfaces here. Options to choose from are **v1** (RIPv1) and **v2** (RIPv2). Select the **Default** option to specify that this feature should use the default configuration. By default, RIPv1 and RIPv2 packets are received, but only RIPv1 packets are sent.
Distance	Enter the Administrative Distance for RIP here. The range is from 1 to 255. A lower value represents a better route. By default, this value is 100. Select the **Default** option to use the default Administrative Distance for RIP.
Global Passive Interface State	Select to enable or disable the sending of routing updated on the interface.

Click the **Apply** button to accept the changes made.

RIP Distribute List

This window is used to display and configure the RIP distribution list settings.

To view the following window, click **L3 Features > RIP > RIP Distribute List**, as shown below:

Figure 6-29 RIP Distribute List Window

The fields that can be configured are described below:

Parameter	Description
ACL Name	Enter the access list name that will be used here. This name can be up to 32 characters long.
Interface Name	Enter the interface name that will be used here. This name can be up to 12 characters long.

Click the **Apply** button to accept the changes made.

RIP Interface Settings

This window is used to display and configure the RIP interface settings.

To view the following window, click **L3 Features > RIP > RIP Interface Settings**, as shown below:

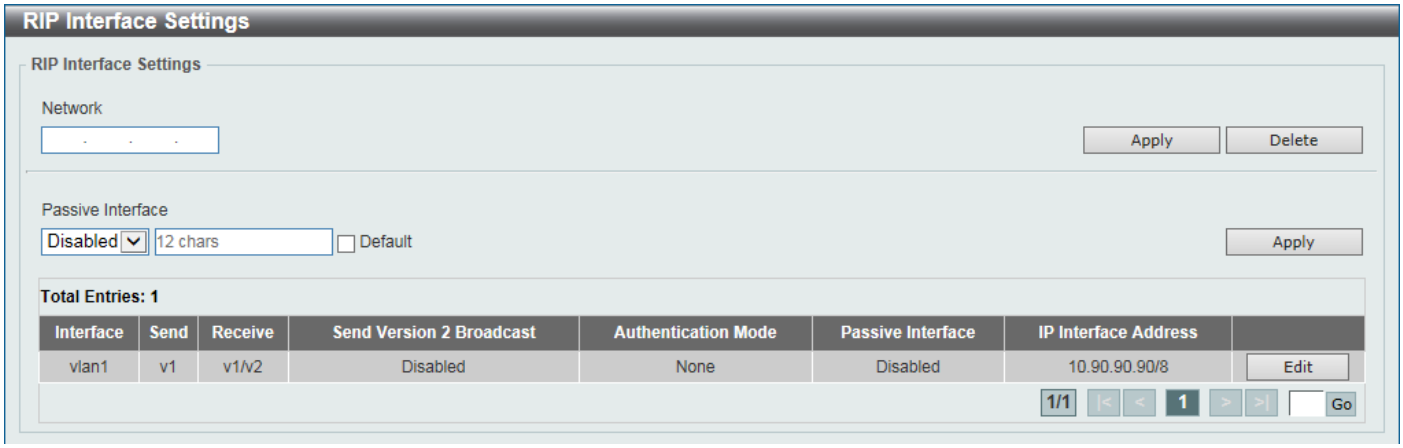


Figure 6-30 RIP Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Network	Enter the IPv4 network address used by RIP here. Interfaces that have a subnet belonging to the network specified here will be activated for RIP.
Passive Interface	Select to enable or disable the passive interface feature here. This feature is used to disable the sending and receiving of routing updates on an interface. However, RIP packets from other routers received on this interface will continue to be processed. Enter the name of the passive interface in the space provided. This name can be up to 12 characters long. Select the **Default** option to use this as the default for all interfaces.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

Click the **Edit** button to configure the RIP interface settings for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

Figure 6-31 RIP Interface Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Send Version	Select which version of RIP packets can be sent on the interface. Options to choose from are **v1** and **v2**.
Receive Version	Select which version of RIP packets can be received on the interface. Options to choose from are **v1**, and **v2**, and **v1/v2**.
Send Version 2 Broadcast	Select to enable or disable the sending of version 2 RIP update packets as broadcast packets instead of multicast packets.
Authentication Mode	Select to enable or disable the authentication mode here. Options to choose from are: • **Disabled** - Specifies to disable RIP authentication on the interface. • **Text** - Specifies to enable RIP authentication on the interface.
Authentication Text Password	After RIP authentication was enabled on the interface, select and enter the text password here. This can be up to 16 characters long. Select **None** to use an empty password.

Click the **Apply** button to accept the changes made.

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

RIP Database

This window is used to display the Routing Information Protocol (RIP) routing database. Summary address entries will appear in the database only if relevant child routes exist and are being summarized. When the last child route for a summary address becomes invalid, the summary address is also removed from the routing table.

To view the following window, click **L3 Features > RIP > RIP Database**, as shown below:

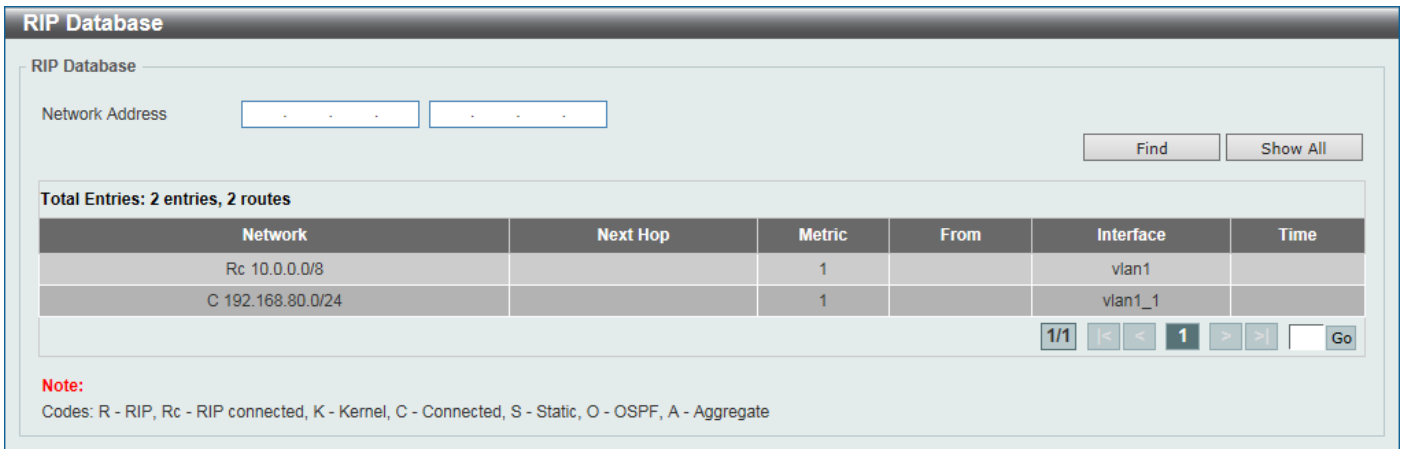


Figure 6-32 RIP Database Window

The fields that can be configured are described below:

Parameter	Description
Network Address	Enter the subnet prefix and the prefix length of the network(s) to be displayed here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

RIPng

RIPng Settings

This window is used to display and configure the Routing Information Protocol Next Generation (RIPng) settings, also known as IPv6 RIP.

To view the following window, click **L3 Features > RIPng > RIPng Settings**, as shown below:

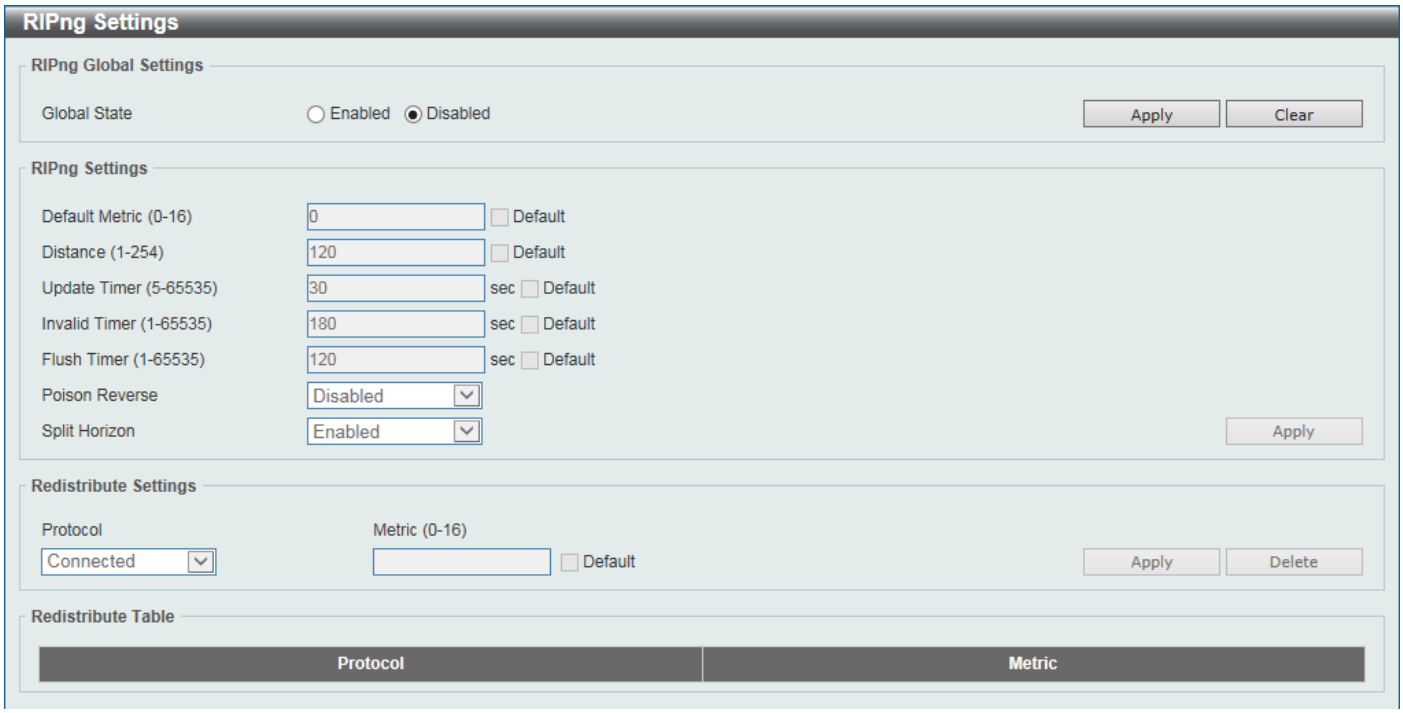


Figure 6-33 RIPng Settings Window

The fields that can be configured in **RIPng Global Settings** are described below:

Parameter	Description
Global State	Select to globally enable or disable the RIPng feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RIPng Settings** are described below:

Parameter	Description
Default Metric	Enter the default metric value here. The range is from 0 to 16. This value is used to specify the default metric for routes redistributed from other routing protocols. If the routes being redistributed are learned from other protocols, then they have an incompatible metric with IPv6 RIP. Re-specifying of metric allows the metric to be synced. By default, this value is 0. Select the **Default** option to use the default metric value.
Distance	Enter the administrative distance for RIPng here. The range is from 1 to 254. The distance value represents the trust rating of the route. The route with a lower distance value is preferred over the route with the higher distance value. By default, this value is 120. Select the **Default** option to use the default administrative distance for RIPng.
Update Timer	Enter the update interval value at which the update message is sent here. The range is from 5 to 65535 seconds. By default, this value is 30 seconds. Select the **Default** option to use the default value here.

Parameter	Description
Invalid Timer	Enter the invalidate timer value in seconds here. The range is from 1 to 65535 seconds. By default, this value is 180 seconds. Select the Default option to use the default value here.
Flush Timer	Enter the flush timer value in seconds here. The range is from 1 to 65535 seconds. By default, this value is 120 seconds. Select the **Default** option to use the default value here.
Poison Reverse	Select to enable or disable the Poison Reverse feature here. When Poison Reverse is enabled, the routes learned from an interface will be advertised out to the same interface with an unreachable metric.
Split Horizon	Select to enable or disable the Split Horizon feature here. When Split Horizon is enabled, the routes learned from an interface will be not advertised out to the same interface.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Redistribute Settings** are described below:

Parameter	Description
Protocol	Select the protocol whose routes are to be redistributed here. Options to choose from are **Connected**, **Static**, and **OSPF**. The **Static** option means to redistribute IPv6 static routes. The **Connected** option refers to routes that are established automatically by virtue of configuring IPv6 address on an interface.
Metric	Enter the value to be used as the metric for the redistributed routes here. The range is from 0 to 16. Select the **Default** option to use the default metric value.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

RIPng Interface Settings

This window is used to display and configure the RIPng interface settings.

To view the following window, click **L3 Features > RIPng > RIPng Interface Settings**, as shown below:

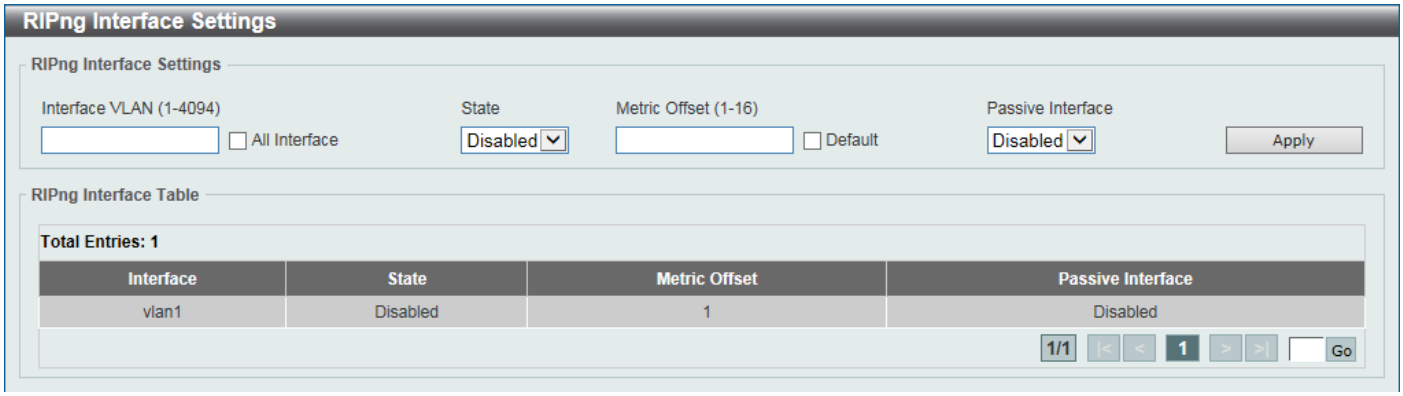


Figure 6-34 RIPng Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094. Select the **All Interface** option to use all available interfaces in this configuration.

Parameter	Description
State	Select to enable or disable the IPv6 RIP feature on the VLAN interface specified.
Metric Offset	Enter the value to be added to the metric of an IPv6 RIP route received on the configured interface here. The range is from 1 to 16. The metric refers to the hop count. By default, when receiving an IPv6 RIP route, a metric value of 1 is added to the route before it is inserted into the routing table. Use this option to influence the metric of routes received on different interfaces and influence the preference of the route. Select the **Default** option to use the default metric offset value.
Passive Interface	Select to enable or disable the passive interface feature here. If this option is disabled, the router will not send RIPng packets out through the interface. However, RIPng packets from other routers received on the interface will continue to be processed.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

RIPng Database

This window is used to display the RIPng routing database.

To view the following window, click **L3 Features > RIPng > RIPng Database**, as shown below:

Figure 6-35 RIPng Database Window

The fields that can be configured are described below:

Parameter	Description
IPv6 Address/Prefix Length	Enter the IPv6 address that will be used for these results here.

Click the **Find** button to locate a specific entry based on the information entered.

OSPF

OSPFv2

OSPFv2 Process Settings

This window is used to display and configure the OSPFv2 process settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Process Settings**, as shown below:

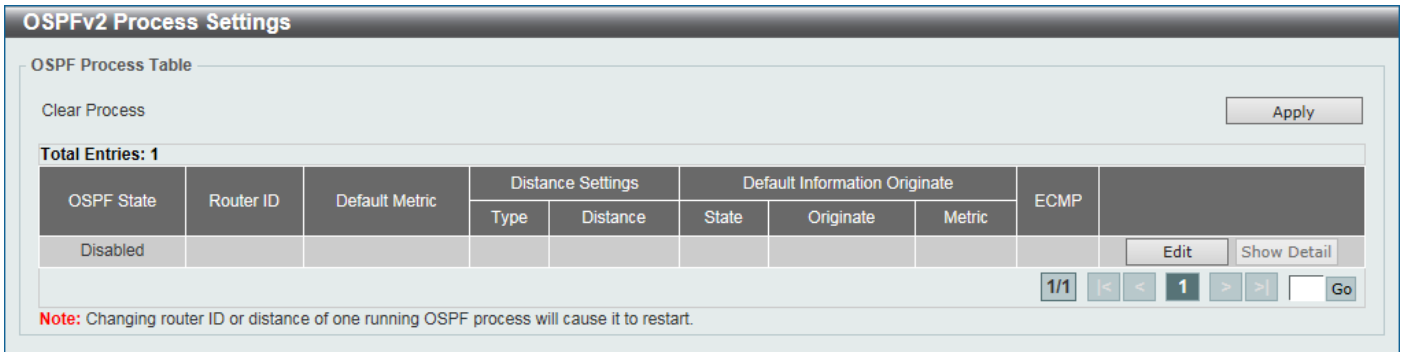


Figure 6-36 OSPFv2 Process Settings Window

Click the **Apply** button to clear the process.

Click the **Edit** button to modify the specified entry.

Click the **Show Detail** button to view detailed information associated with the entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the fields that can be configured in the table are described below:

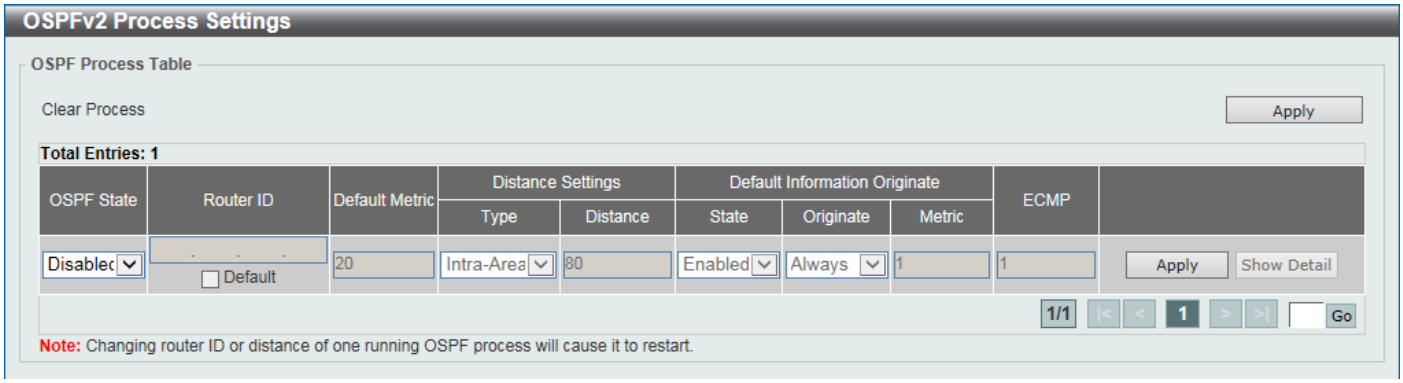


Figure 6-37 OSPFv2 Process Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
OSPF State	Select to enable or disable the OSPFv2 state.
Router ID	Enter the router ID in the IPv4 address format here. The router ID is a 32-bit number assigned to each router running the OSPF protocol. This number uniquely identifies the router within an AS. Each router has a unique router ID. Select the **Default** option to use the default router ID.
Default Metric	Enter the default metric value used here. The range is from 1 to 16777214.
Type	Select the distance setting type here. Options to choose from are:

Parameter	Description
	• **Inter-Area** - Specifies the distance for OSPF inter-area routes. • **Intra-Area** - Specifies the distance for OSPF intra-area routes. • **External-1** - Specifies the distance for OSPF external type-5 and type-7 routes with a type-1 metric. • **External-2** - Specifies the distance for OSPF external type-5 and type-7 routes with a type-2 metric.
Distance	Enter the administrative distance value here. The range is from 1 to 255.
State	Select to enable or disable the Default Originate Information state here. This feature is used to generate a default external route (type-5 LSA) network 0.0.0.0 to the AS.
Originate	Select the Originate option here. Options to choose from are **Always** and **None**. Selecting the **Always** option specifies to always generate the default route regardless of existence of a default route in the routing table.
Metric	Enter the cost value associated with the generated default route here. If not specified, the default metric cost is 1. The range is from 1 to 65535.
ECMP	Enter the ECMP value for this process here. The range is from 1 to 4.

Click the **Apply** button to accept the changes made.

After clicking the **Show Detail** button, the following page will appear.

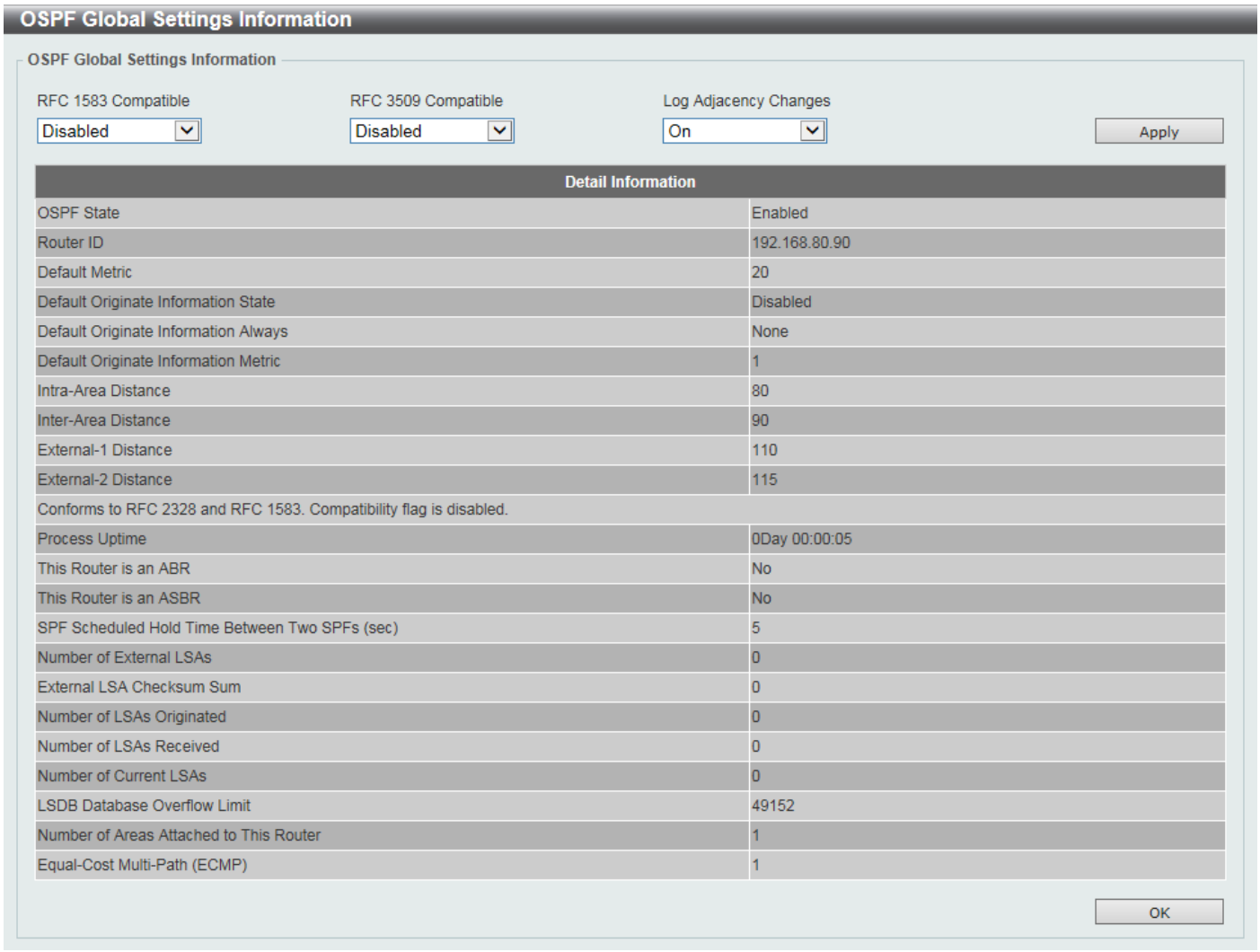


Figure 6-38 OSPFv2 Process Settings (Show Detail) Window

The fields that can be configured are described below:

Parameter	Description
RFC 1583 Compatible	Select to enable or disable the implementation of RFC 1583 here.
RFC 3509 Compatible	Select to enable or disable the implementation of RFC 3509 here.
Log Adjacency Changes	Select to enable or disable the sending of syslog messages when the OSPF neighbors go up or down. Select **Detail** to include more detailed information in the syslog messages.

Click the **Apply** button to accept the changes made.

Click the **OK** button to accept the changes made.

OSPFv2 Distribute List

This window is used the view and configure the OSPFv2 Distribute List settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Distribute List**, as shown below:

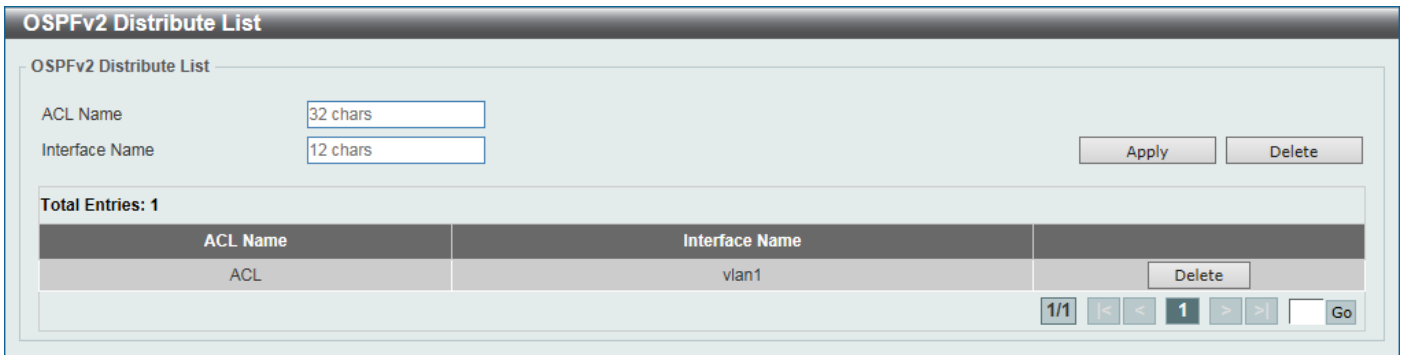


Figure 6-39 OSPFv2 Distribute List Window

The fields that can be configured are described below:

Parameter	Description
ACL Name	Enter the access list name that will be used here. This name can be up to 32 characters long.
Interface Name	Enter the interface name that will be used here. This name can be up to 12 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv2 GR Helper Settings

This window is used to display and configure the OSPFv2 graceful restart helper settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 GR Helper Settings**, as shown below:

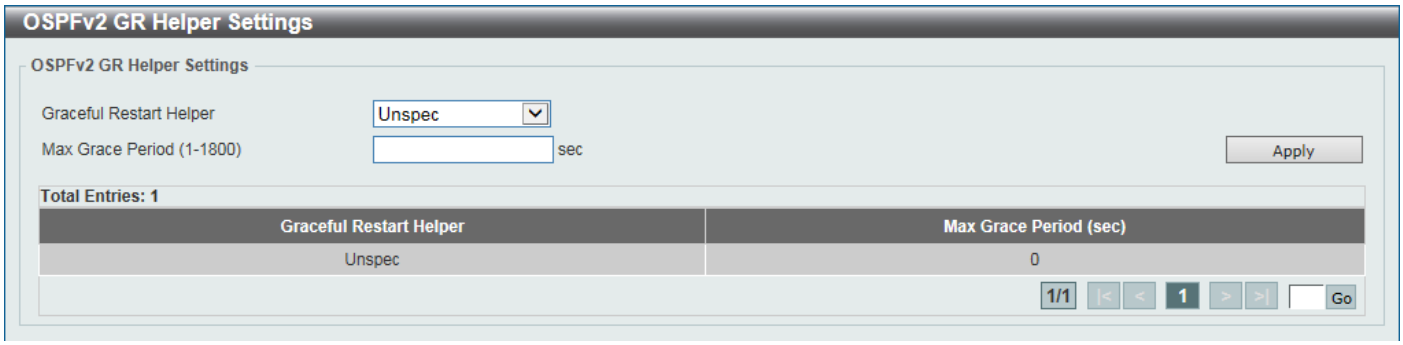


Figure 6-40 OSPFv2 GR Helper Settings Window

The fields that can be configured are described below:

Parameter	Description
Graceful Restart Helper	Select the graceful restart helper mode here. Options to choose from are: • **Unspec** - The OSPF graceful restart helper mode is unspecified. • **Never** - Specifies to not to allow the OSPF graceful restart helper mode. • **Only Reload** - Specifies to allow the OSPF graceful restart helper mode only for reload. • **Only Upgrade** - Specifies to allow the OSPF graceful restart helper mode only for upgrade.
Max Grace Period	Enter the maximum grace period value here. The range is from 1 to 1800 seconds.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv2 Passive Interface Settings

This window is used to display and configure the OSPFv2 passive interface settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Passive Interface Settings**, as shown below:

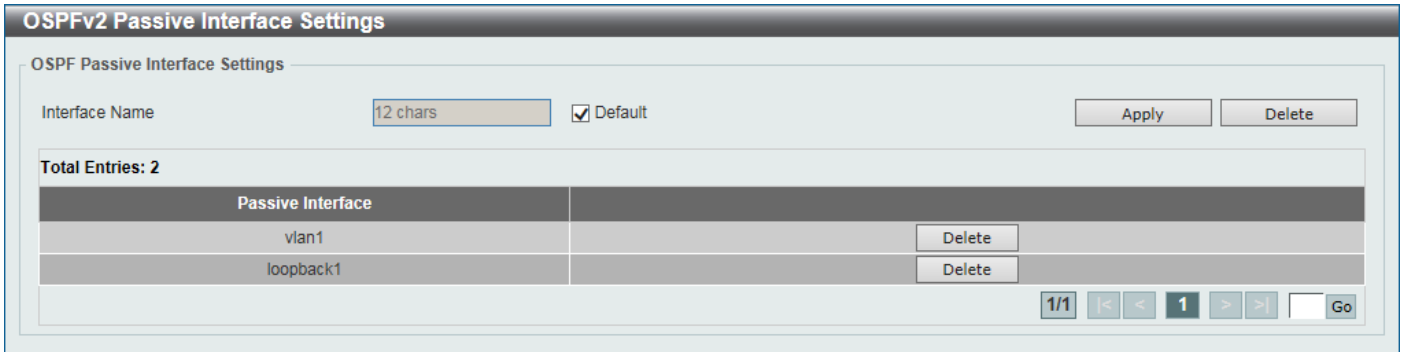


Figure 6-41 OSPFv2 Passive Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the interface name that will be used here. This name can be up to 12 characters long. Select the **Default** option to use all available interfaces here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv2 Area Settings

This window is used to display and configure the OSPFv2 area settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Area Settings**, as shown below:

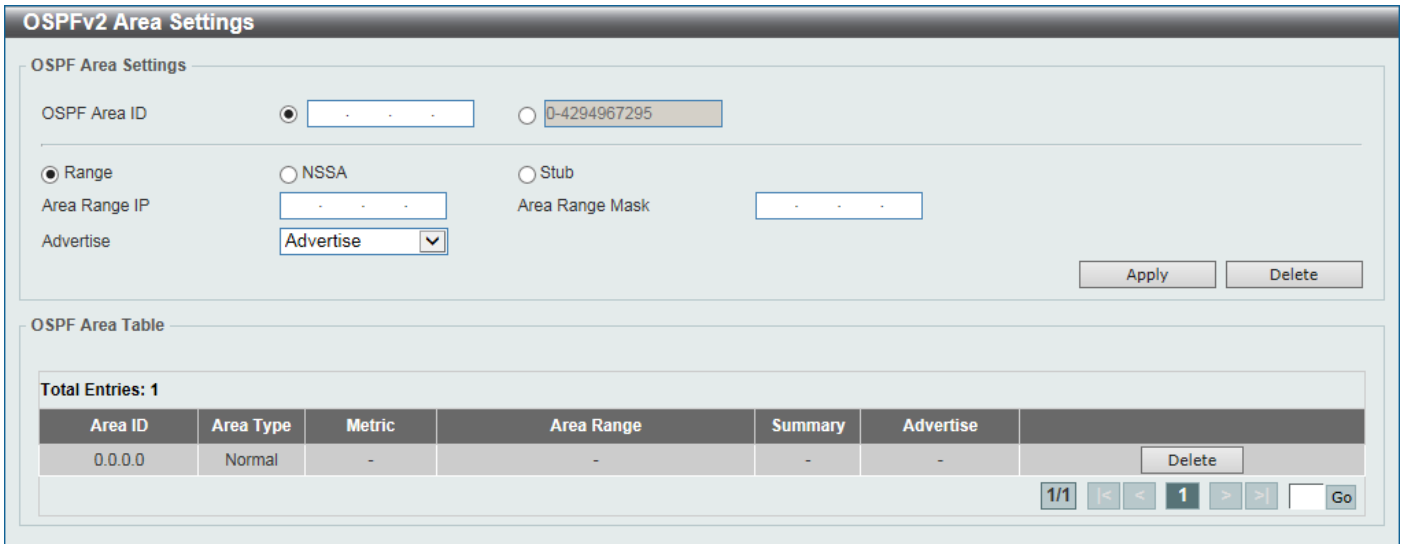


Figure 6-42 OSPFv2 Area Settings Window

The fields that can be configured in **OSPF Area Settings** are described below:

Parameter	Description
OSPF Area ID	Select and enter the OSPFv2 area ID here. This can be specified in the IP address format or in the decimal value format. The decimal range is from 0 to 4294967295. The area will be created on an interface if the subnet configured on the interface falls within the network range specified here.

Range	Select this option to summarize OSPF routes at an Area Border Router (ABR).
	• **Area Range IP** - Enter the OSPF area range IP address here.
	• **Area Range Mask** - Enter the OSPF area range subnet mask here.
	• **Advertise** - Select the advertise option here. Options to choose from are:
	  ○ **Advertise** - Specifies to advertise a Type-3 summary Link-State Advertisement (LSA) for the specified range of addresses.
	  ○ **No-Advertise** - Specifies to suppress the advertising of Type-3 summary LSAs. Component routes are still hidden behind it.

NSSA	Select this option to assign the OSPF area as a Not-So-Stubby Area (NSSA) area. • **Default Cost** - Enter the default cost value here. This is the cost associated with the Type-3 default route that will be injected into the stub area and not-so-stubby area. The range is from 0 to 65535.

Parameter	Description
	• **Default** - Select this option to use the default cost value. • **No Summary** - Select this option not to inject summary routes into this area.
Stub	Select this option to specify an OSPF area as a Stub Area. • **Default Cost** - Enter the default cost value here. This is the cost associated with the Type-3 default route that will be injected into the stub area and not-so-stubby area. The range is from 0 to 65535. • **Default** - Select this option to use the default cost value. • **No Summary** - Select this option not to inject summary routes into this area.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv2 Interface Settings

This window is used to display and configure the OSPFv2 interface settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Interface Settings**, as shown below:

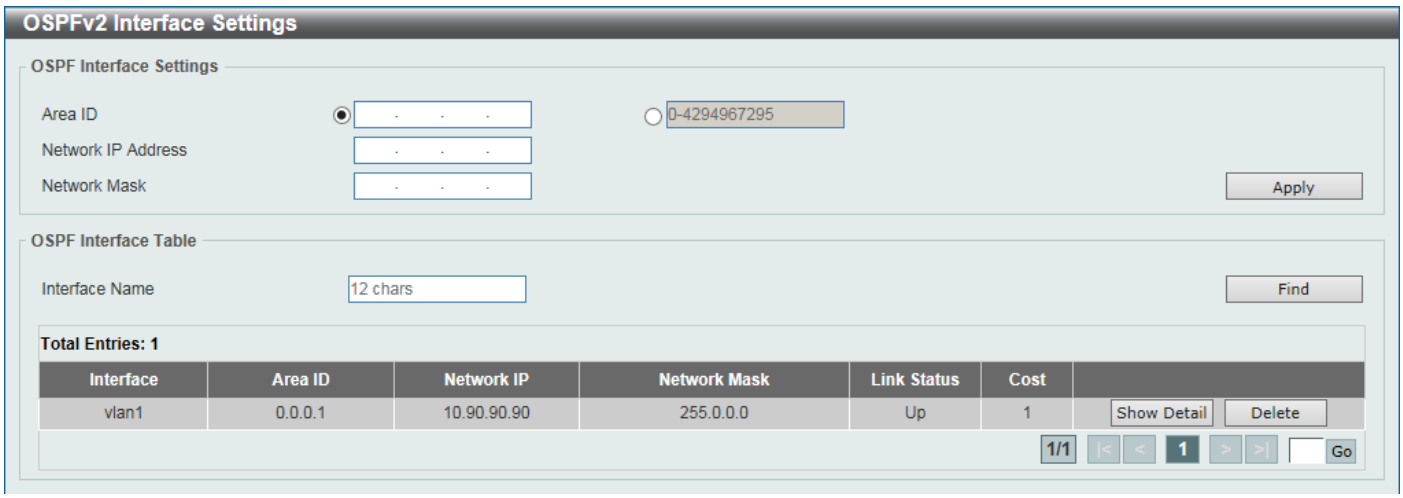


Figure 6-43 OSPFv2 Interface Settings Window

The fields that can be configured in **OSPF Interface Settings** are described below:

Parameter	Description
Area ID	Select and enter the OSPFv2 area ID here. This can be specified in the IP address format or in the decimal value format. The decimal range is from 0 to 4294967295.
Network IP Address	Enter the network IPv4 address here.
Network Mask	Enter the network IPv4 subnet mask here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Interface Table** are described below:

Parameter	Description
Interface Name	Enter the name of the interface to be displayed here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information about the entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

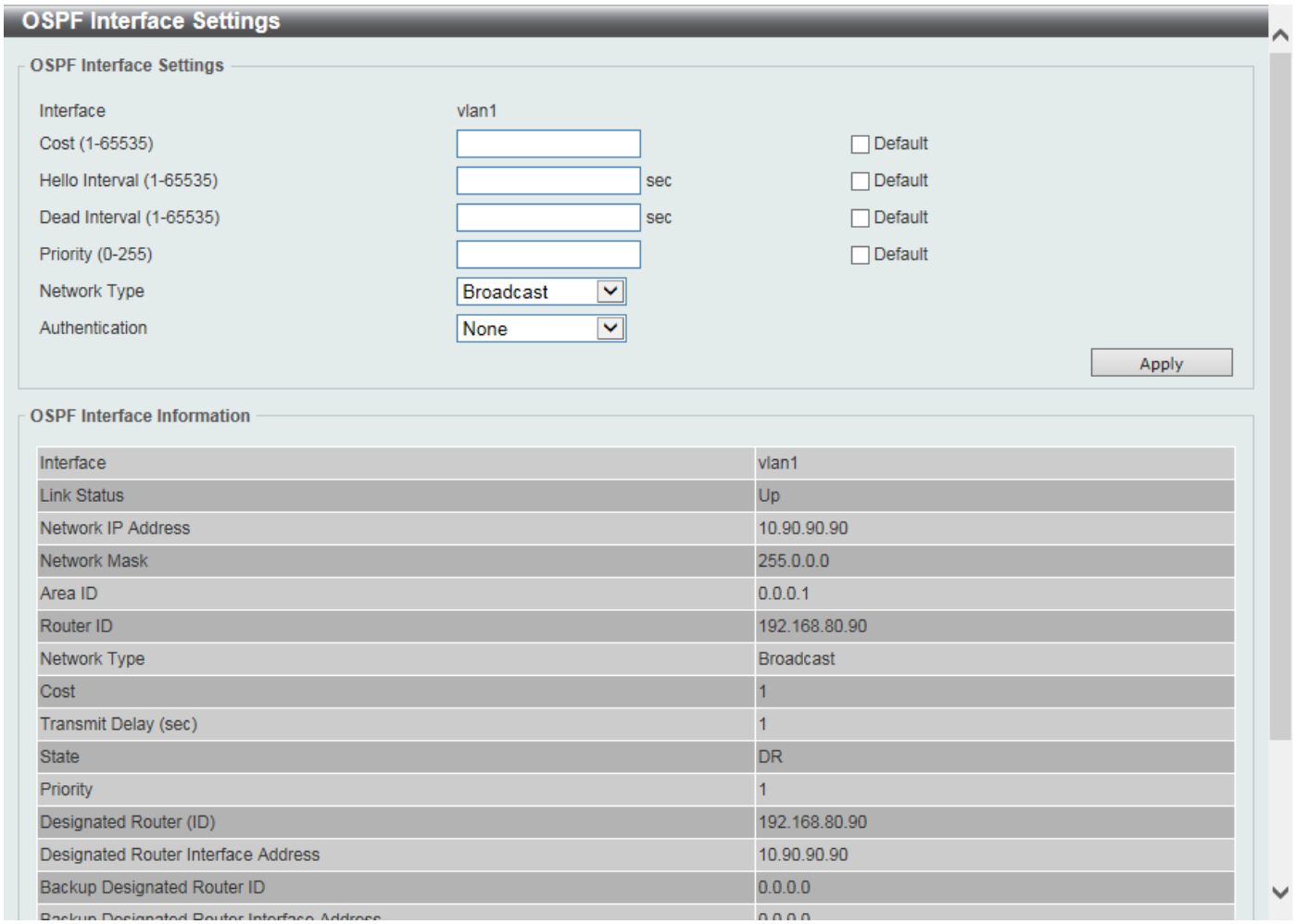


Figure 6-44 OSPFv2 Interface Settings (Show Detail) Window

The fields that can be configured are described below:

Parameter	Description
Cost	Enter the cost value here. The range is from 1 to 65535. The interface cost reflects the overhead for sending the packet across the interface. This cost is advertised as the link cost in the router link advertisement. By default, this value is 1. Select the **Default** option to use the default value.
Hello Interval	Enter the Hello Interval time value here. The range is from 1 to 65535 seconds. The Hello Interval is advertised in the hello packets. Configure the same hello-interval for all routers on a specific network. A shorter Hello Interval ensures faster detection of topological changes but generates more routing traffic and might cause routing instability. By default, this value is 10 seconds. Select the **Default** option to use the default value.
Dead Interval	Enter the Dead Interval time value here. The range is from 1 to 65535 seconds. The Dead Interval is the amount of time that the router waits to receive an OSPF hello packet from the neighbor before declaring the neighbor down. This value is advertised in the router's hello packets. It must be the same for all routers on a specific network. A smaller dead interval will ensure faster topology change detection but might cause routing instability. By default, this value is 40 seconds. Select the **Default** option to use the default value.

Parameter	Description
Priority	Enter the priority value here. The range is from 0 to 255. The OSPF router will determine a Designated Router (DR) for the multi-access network. This sets the priority used to determine the OSPF DR for a network. If two routers attempt to become the DR, the router with the higher router priority will be elected the DR. If the routers have the same priority, the router with the higher router ID takes precedence. Only routers with non-zero router priority values are eligible to become the DR or Backup Designated Router (BDR). By default, this value is 1. Select the **Default** option to use the default value.
Network Type	Select the OSPF network type here. Options to choose from are: • **Broadcast** - Specifies the network type as broadcast. On a broadcast network, only the designated router and backup designated router become adjacent neighbors of all other routers attached. • **Point-to-Point** - Specifies the network type as point-to-point. On point-to-point network, only two routers become adjacent if they can communicate.
Authentication	Select the authentication type that will be used here. Options to choose from are **None**, **Simple Password**, **MD5**, and **HMAC-SHA256**.
Password	After selecting the **Simple Password** option, enter the simple password here. This password can be up to 8 characters long. The syntax is general string that does not allow spaces. This creates a password (key) that is inserted into the OSPF header when the router originates routing protocol packets. Assign a separate password to each network for different interfaces. Routers on the same network must use the same password to be able to exchange OSPF routing data. Configure the routers in the same routing domain with the same password.
MD5 Key ID	After selecting the **MD5** option, enter the MD5 key ID for the password here. The range is from 1 to 255.
MD5	After selecting the **MD5** option, enter the MD5 key here. This key must be 16 characters long. The syntax is an alphanumeric string that does not allow spaces. In the MD5 mode, the OSPF message sender will compute a message digest based on the message digest key for the TX message. The message digest and the key ID will be encoded in the packet. The receiver of the packet will verify the digest in the message against the digest computed based on the locally defined message digest key corresponding to the same key ID. The same key ID on the neighboring router should be defined with the same key string. All the neighboring routers on the same interface must use the same key to exchange the OSPF packet with each other. Normally, all neighboring routers on the interface use the same key. With the MD5 digest mode, the user can roll over to a new key without disrupting the current message exchange using the new key. Supposing that a router is currently using an old key to exchange OSPF packets with the neighbor router, as the user configures a new key, the router will start the roll over process by sending duplicated packets for both of the old and the new key. The router will stop sending duplicated packets until it finds that all routers on the network have learned the new key. After the rollover process completed, the user should delete the old key to prevent the router from communicating with the router using the old key.
HMAC-SHA Key ID	After selecting the **HMAC-SHA256** option, enter the HMAC-SHA256 key ID for the password here. The range is from 1 to 255.
HMAC-SHA256 Key	Enter the OSPF HMAC-SHA256 authentication key. This key can be up to 16 characters long.

Click the **Apply** button to accept the changes made.

OSPFv2 Redistribute Settings

This window is used to display and configure the OSPFv2 redistribution settings. External routes can be redistributed to normal areas as Type-5 external routes and redistributed to NSSA stub areas as Type-7 external routes by the ASBR. If the redistributed external route is of Type-1, the metric represents the internal metric. If the redistributed external route is of Type-2, the metric represents the external metric. An internal metric will consider the cost of the route from itself to the redistributing router plus the advertised cost to reach the destination. An external metric only considers the advertised metric to reach the destination. If no metric value is specified by the default metric, routes redistributed from other protocols will get a metric value of 20.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Redistribute Settings**, as shown below:

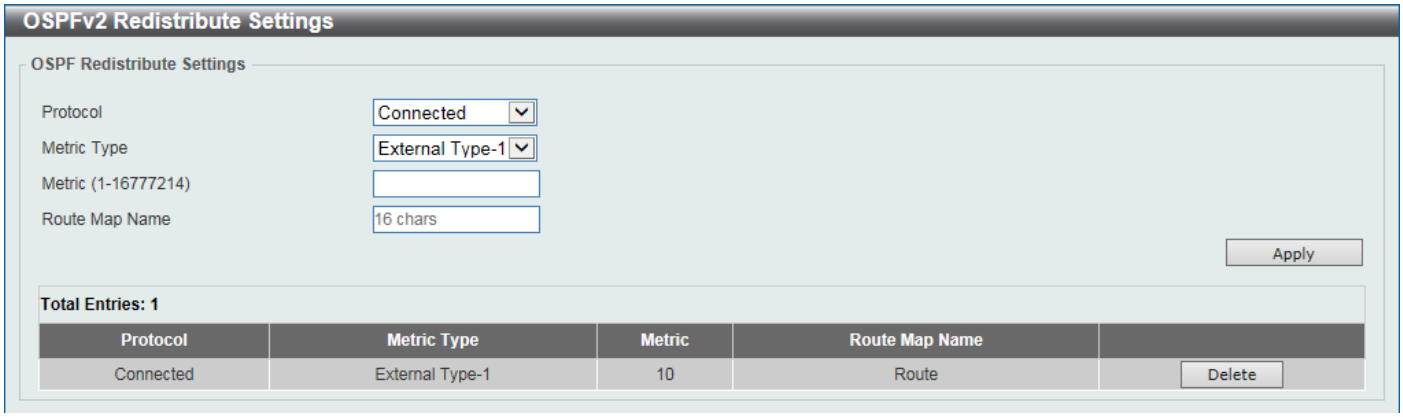


Figure 6-45 OSPFv2 Redistribute Settings Window

The fields that can be configured are described below:

Parameter	Description
Protocol	Select the source protocol that will be redistributed here. Options to choose from are **Connected**, **Static**, and **RIP**. For routing protocols like Open Shortest Path First (OSPF), these routes will be redistributed as external to the autonomous system.
Metric Type	Select the metric type here. Options to choose from are **External Type-1** and **External Type-2**. This specifies the external link type of the route being redistributed into the OSPF routing domain. If a metric type is not specified, the Switch will adopt a Type-2 external route.
Metric	Enter the metric value for the redistributed routes here. The range is from 1 to 16777214.
Router Map Name	Enter the route map name here that filters the imported routes from this source routing protocol. If not specified, all routes are redistributed.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

OSPFv2 Virtual Link Settings

This window is used to display and configure OSPFv2 virtual link settings. If a non-zero area is not physically connected to the zero area, it must be connected to the zero area via a virtual link. The virtual link is a point-to-point link. The router will send the OSPF message to the neighbor router as unicast IP packet.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Virtual Link Settings**, as shown below:

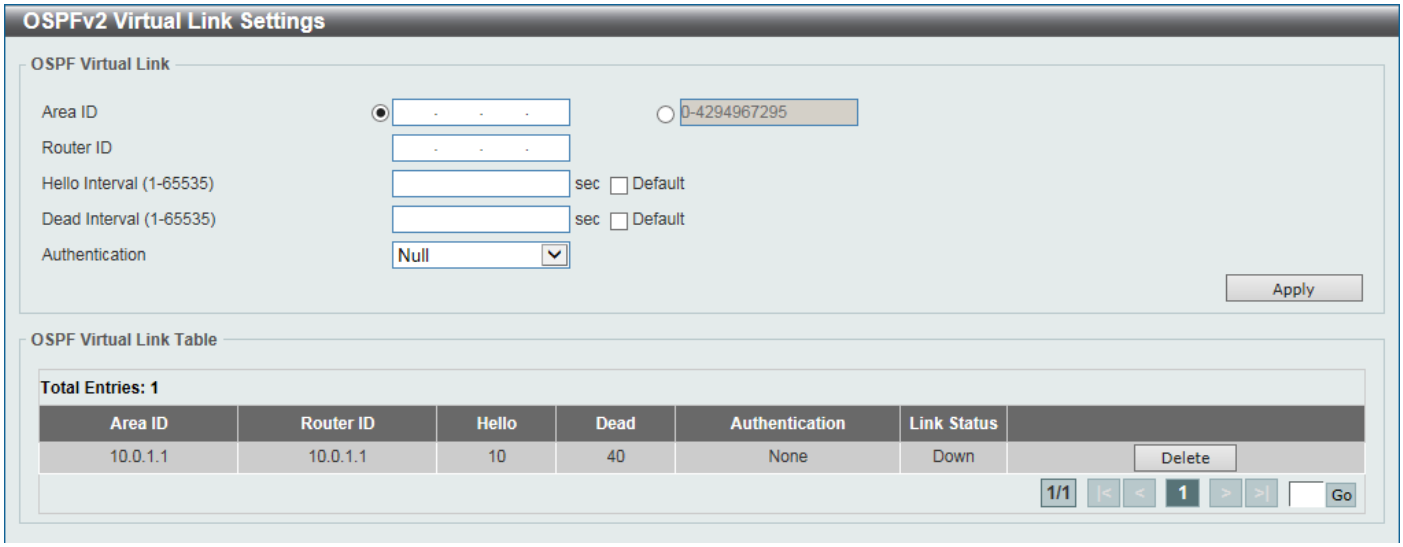


Figure 6-46 OSPFv2 Virtual Link Settings Window

The fields that can be configured in **OSPF Virtual Link** are described below:

Parameter	Description
Area ID	Select and enter the OSPFv2 area ID here. This can be specified in the IP address format or in the decimal value format. The decimal range is from 0 to 4294967295. This area will be used to establish the virtual link.
Router ID	Enter the router ID of the virtual link neighbor here.
Hello Interval	Enter the hello packet interval that the router sends on the virtual link here. The range is from 1 and 65535 seconds. By default, this value is 10 seconds. Select the **Default** option to use the default value.
Dead Interval	Enter the Dead Interval time after which a neighbor is regarded as offline if no hello packets are received within that time frame here. The range is from 1 and 65535 seconds. By default, this value is 40 seconds. Select the **Default** option to use the default value.
Authentication	Select the authentication type used here. Options to choose from are **Null**, **Simple Password**, **MD5**, and **HMAC-SHA256**.
Password	After selecting the **Simple Password** authentication type, enter the password to be used here. This password can be up to 8 characters long.
MD5 Key ID	After selecting the **MD5** authentication type, enter the MD5 authentication key ID here. The range is from 1 to 255.
MD5 Key	After selecting the **MD5** authentication type, enter the MD5 authentication key here. This key can be up to 16 characters long.
HMAC-SHA Key ID	After selecting the **HMAC-SHA256** authentication type, enter the HMAC-SHA256 key ID here. The range is from 1 to 255.
HMAC-SHA256 Key	After selecting the **HMAC-SHA256** authentication type, enter the OSPF HMAC-SHA256 authentication key. This key can be up to 16 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

OSPFv2 LSDB Table

This window is used to display the OSPFv2 LSDB table and information.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 LSDB Table**, as shown below:

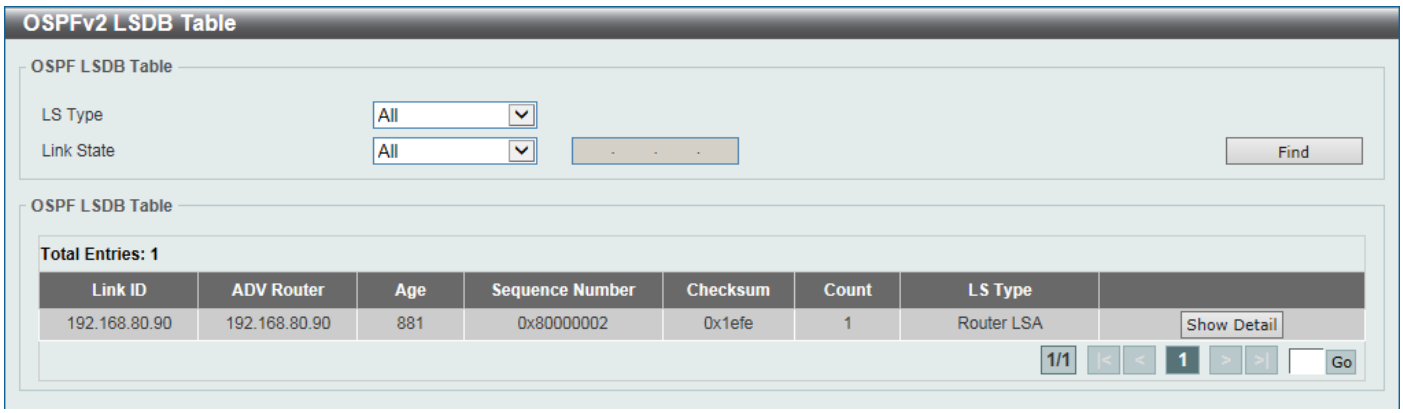


Figure 6-47 OSPFv2 LSDB Table Window

The fields that can be configured are described below:

Parameter	Description
LS Type	Select the LSDB type of information that will be displayed here. Options to choose from are **All**, **Router**, **Network**, **Summary**, **ASBR Summary**, **External**, **Stub**, and **NSSA External**.
Link State	Select the link-state information that will be displayed here. Options to choose from are: • **All** - Specifies to display all OSPFv2 link-state information. • **Link State ID** - Specifies to display information associated with the link-state ID. Enter the link state ID in the space provided here. • **Self-Originate** - Specifies to display LSAs generated by the local router. • **Adv Router** - Specifies to display all of the LSAs generated by the advertising router. Enter the advertising router ID in the space provided here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information about the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

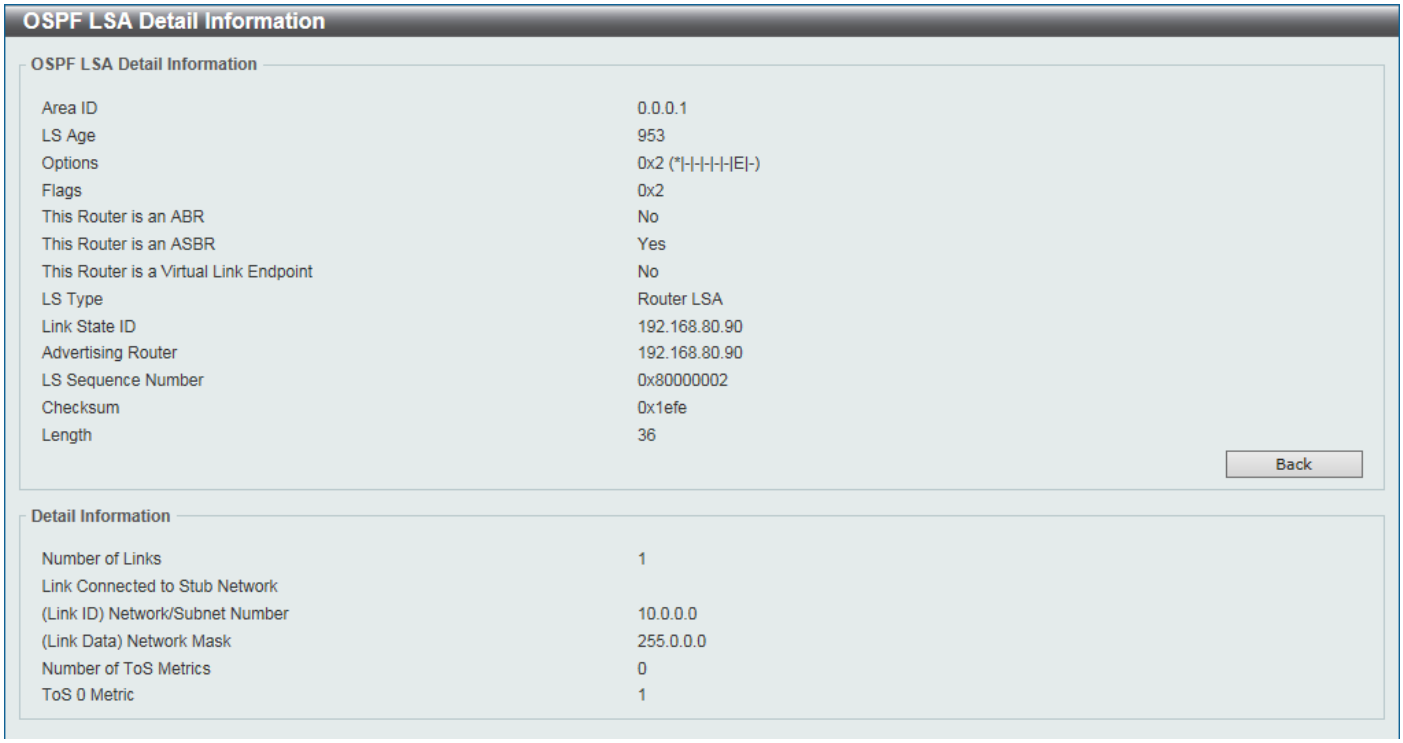


Figure 6-48 OSPFv2 LSDB Table (Show Detail) Window

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

OSPFv2 Neighbor Table

This window is used to display information on OSPF neighbors.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Neighbor Table**, as shown below:

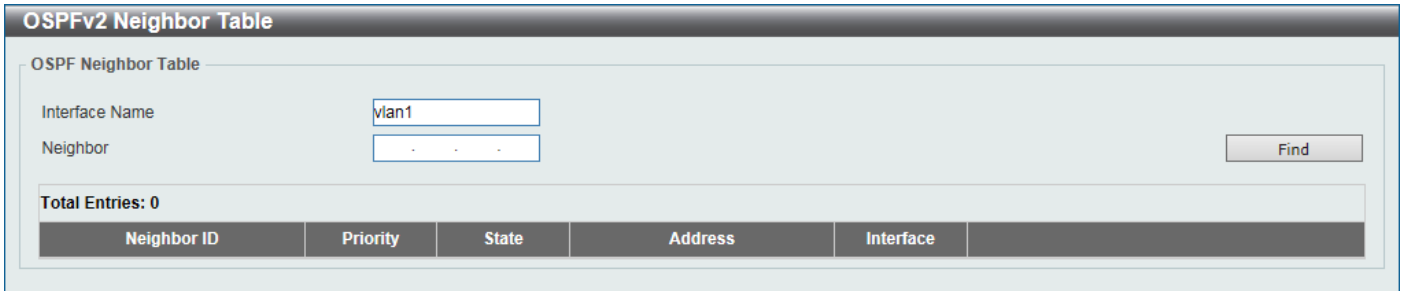


Figure 6-49 OSPFv2 Neighbor Table Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the name of the interface that will be used in the results here.
Neighbor	Enter the neighbor ID here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

Figure 6-50 OSPFv2 Neighbor Table (Show Detail) Window

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

OSPFv2 Host Route Settings

This window is used to display and configure the OSPFv2 host route settings. The router will advertise specific host routes as router LSAs for a stub link.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Host Route Settings**, as shown below:

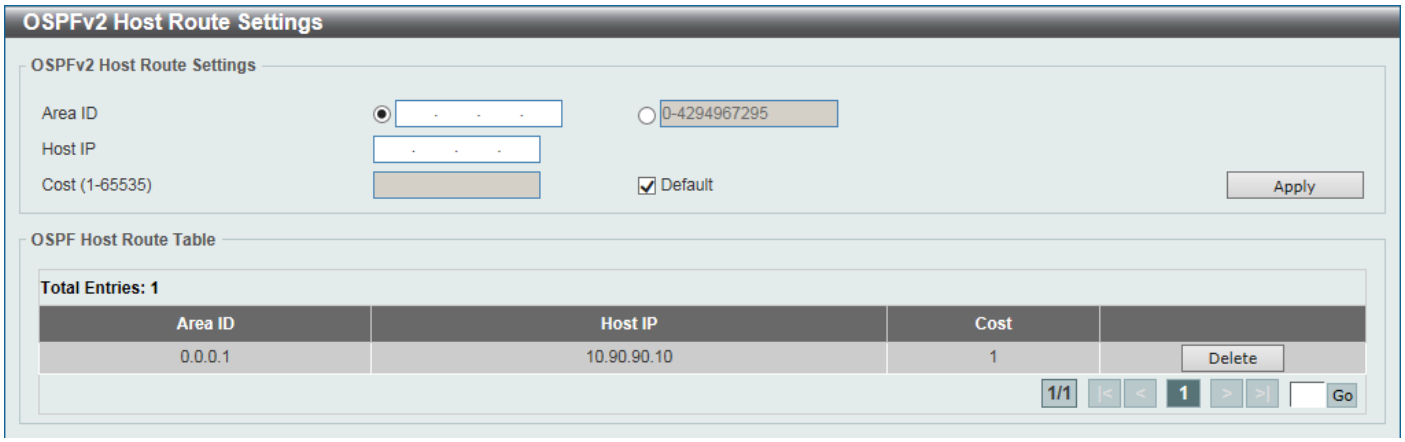


Figure 6-51 OSPFv2 Host Route Settings Window

The fields that can be configured in **OSPFv2 Host Route Settings** are described below:

Parameter	Description
Area ID	Select and enter the OSPFv2 area ID here. This can be specified in the IP address format or in the decimal value format. The decimal range is from 0 to 4294967295.
Host IP	Enter the host IPv4 address here.
Cost	Enter the cost value for the stub entry here. The range is from 1 to 65535. By default, this value is 1. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv3

OSPFv3 Process Settings

This window is used to display and configure OSPFv3 process settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Process Settings**, as shown below:

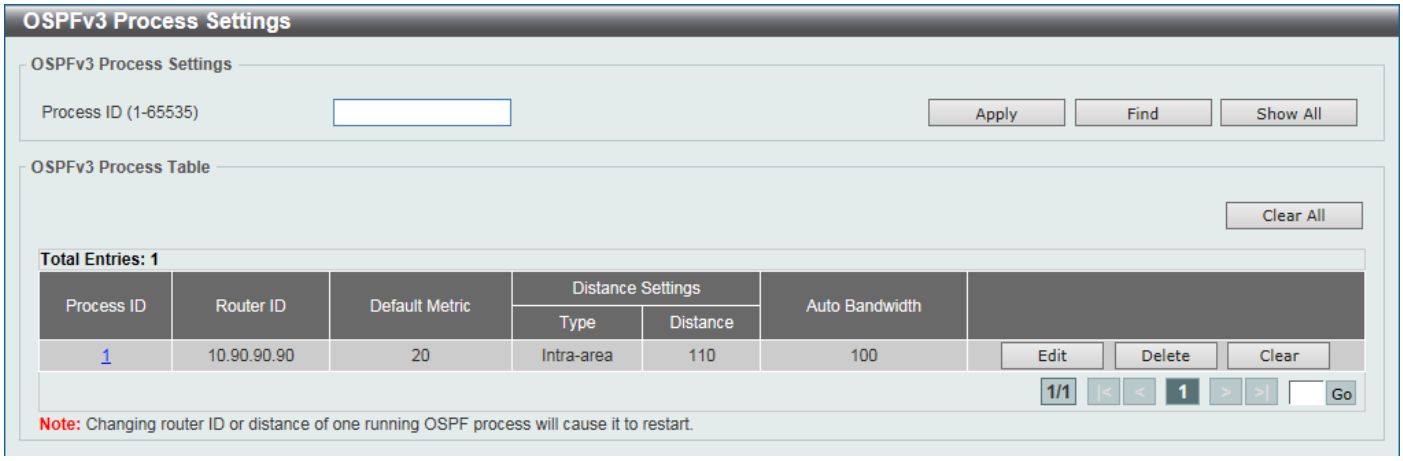


Figure 6-52 OSPFv3 Process Settings Window

The fields that can be configured are described below:

Parameter	Description
Process ID	Enter the OSPFv3 process ID here. The range is from 1 to 65535.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Clear All** button to restart all OSPFv3 processes.

Click the **Process ID** link (1) to access and configure the specified OSPFv3 process.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Click the **Clear** button to restart the specified OSPFv3 process.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

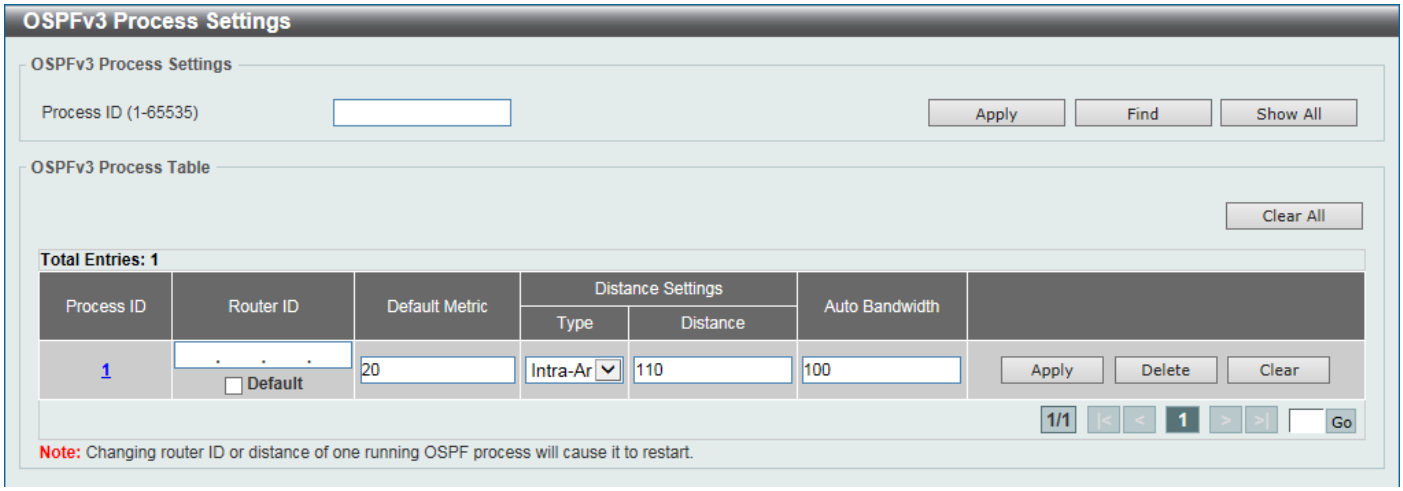


Figure 6-53 OSPFv3 Process Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Router ID	Enter the router ID for the OSPF process here. By default, the router ID is automatically selected. Select the **Default** option to use the default router ID.
Default Metric	Enter the default metric value for the OSPF process here. The range is from 1 to 16777214. By default, this value is 20. This value is used in conjunction with the OSPFv3 redistribution feature to enable the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics. Whenever the metrics don't convert directly, using a default metric provides a reasonable substitute and enables the redistribution to proceed.
Type	Select the distance type here. Options to choose from are: • **Intra-Area** - Specifies the distance for OSPF intra-area routes. • **Inter-Area** - Specifies the distance for OSPF inter-area routes. • **External** - Specifies the distance for OSPF external routes.
Distance	Enter the distance value for the OSPF process here. The range is from 1 to 254. By default, this value is 110 for all OSPF routes.
Auto Bandwidth	Enter the auto-bandwidth value here. This feature is used to control the reference value IPv6 OSPF uses when calculating metrics for interfaces. The range is from 1 to 4294967.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Process ID** link (1) in the table, the following page will appear.

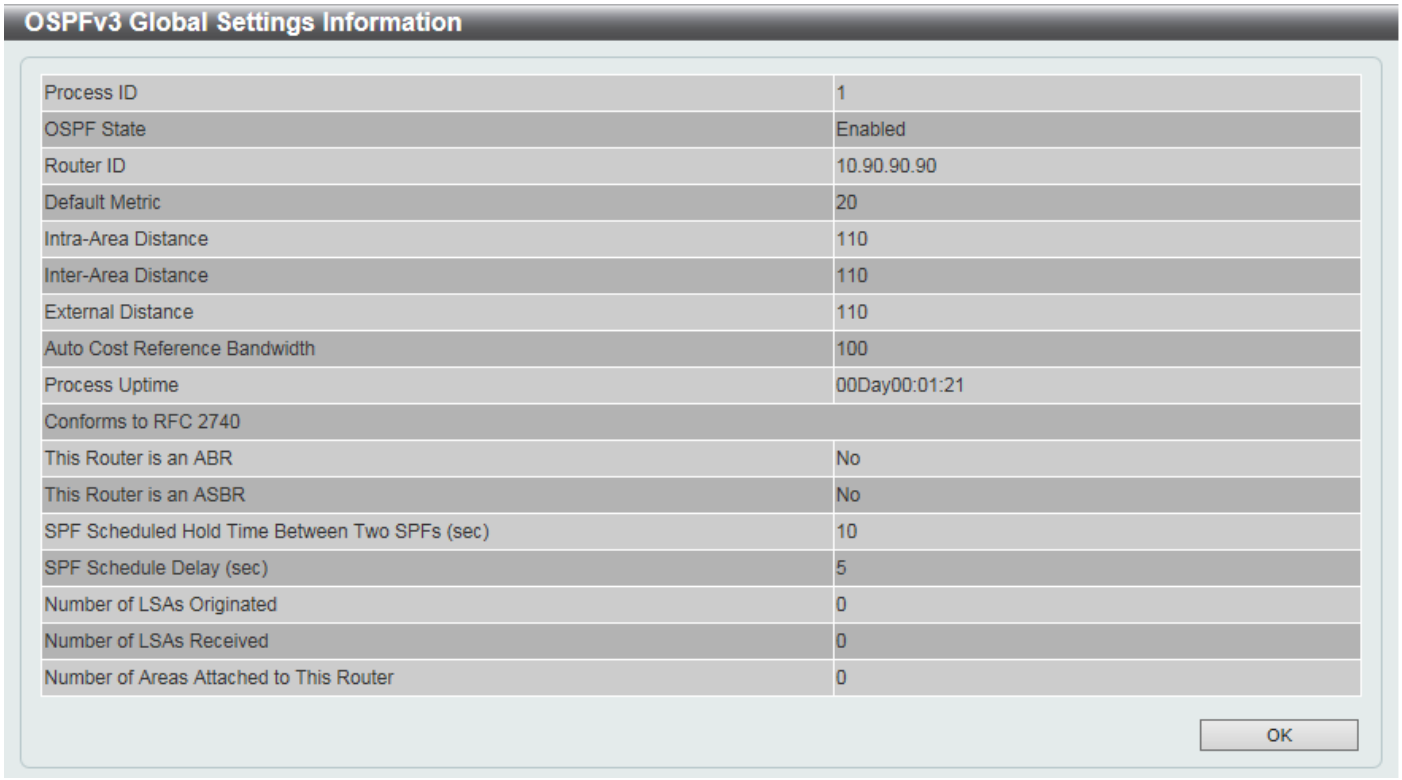


Figure 6-54 OSPFv3 Process Settings (Process ID) Window

Click the **OK** button to close the window and return to the previous window.

OSPFv3 Passive Interface Settings

This window is used to display and configure the OSPFv3 passive interface settings. If an interface is passive, the OSPF routing update packets are not sent or received through the specified interface.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Passive Interface Settings**, as shown below:

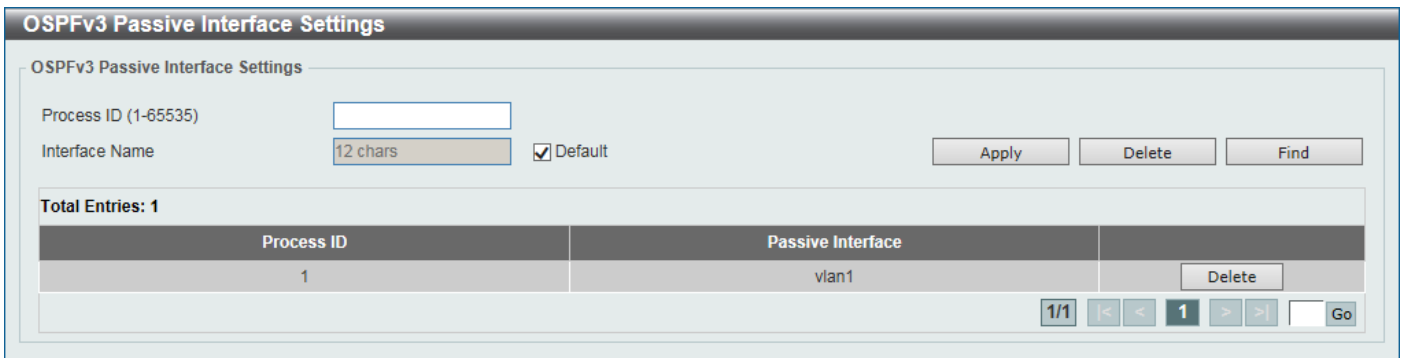


Figure 6-55 OSPFv3 Passive Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Process ID	Enter the OSPFv3 process ID here. The range is from 1 to 65535.
Interface Name	Enter the passive interface name here. This name can be up to 12 characters long. Select the **Default** option specify all the interfaces as passive interfaces.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv3 Area Settings

This window is used to display and configure the OSPFv3 area settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Area Settings**, as shown below:

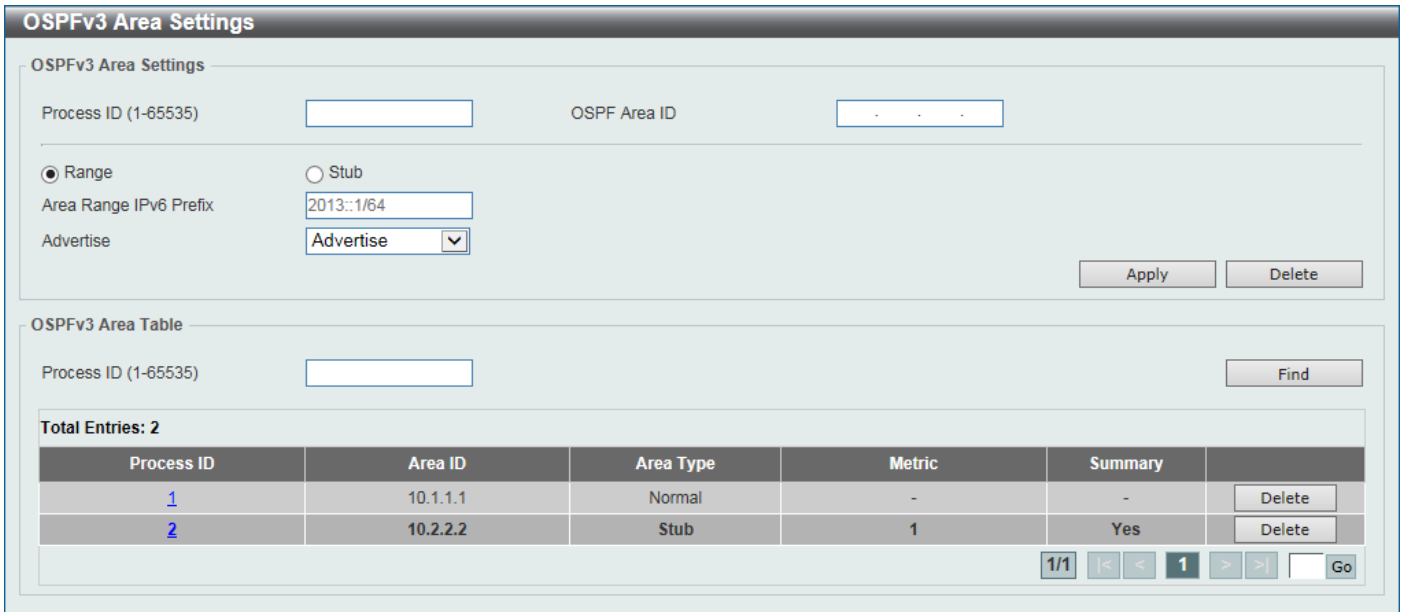


Figure 6-56 OSPFv3 Area Settings (Range) Window

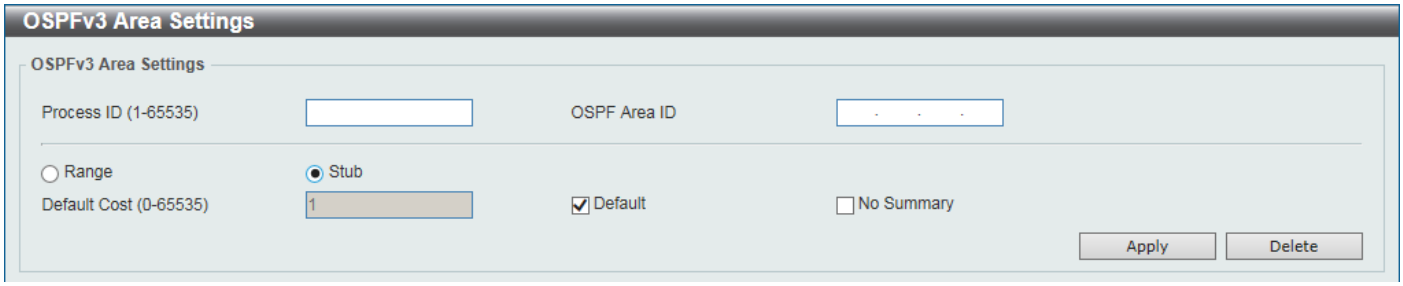


Figure 6-57 OSPFv3 Area Settings (Stub) Window

The fields that can be configured in **OSPFv3 Area Settings** are described below:

Parameter	Description
Process ID	Enter the process ID of the OSPF area used here. The range is from 1 to 65535.
OSPF Area ID	Enter the OSPF area ID used here. It can be specified as an IPv4 address.
Range	Select this option to consolidate and summarize routes at an area boundary. This feature is used only with ABRs. It is used to consolidate or summarize routes for an area. The result is that a single summary route is advertised to other areas by the ABR. Routing information is condensed at area boundaries. External to the area, a single route is advertised for each address range.
Stub	Select this option to define an area as a Stub area.
Area Range IPv6 Prefix	After selecting the **Range** option, enter the OSPF area range IPv6 prefix and prefix length here.

Parameter	Description
Advertise	After selecting the **Range** option, select the advertise option here. Options to choose from are: • **Advertise** - Specifies to advertise and generate an inter-area prefix LSA for the specified address range. • **No Advertise** - Specifies to set the status to Do-Not-Advertise for the specified address range. The inter-area prefix LSA is suppressed, and the component networks remain hidden from other networks.
Default Cost	After selecting the **Stub** option, enter the default cost value here. The range is from 0 to 65535. Select the **Default** option to use the default cost value for this area, which is 1.
No Summary	After selecting the **Stub** option, select this option to prevent an ABR from sending inter-area prefix LSAs into the stub area.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPFv3 Area Table** are described below:

Parameter	Description
Process ID	Enter the process ID of the OSPF area used here. The range is from 1 to 65535.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Process ID** link (1) to access and configure the specified OSPFv3 area.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking a **Stub** area the Process ID link (1) in the table, the following page will appear.

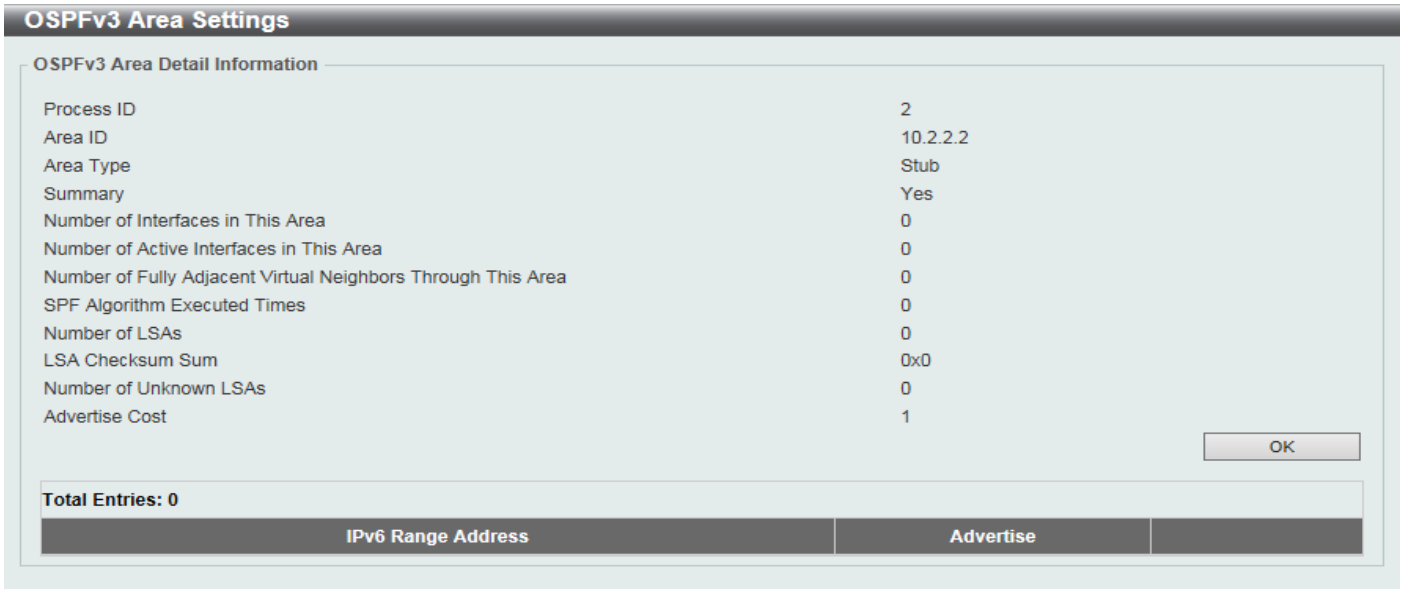


Figure 6-58 OSPFv3 Area Settings (Process ID, Stub) Window

Click the **OK** button to close the window and return to the previous window.

After clicking a **Normal** area the Process ID link (1) in the table, the following page will appear.

Figure 6-59 OSPFv3 Area Settings (Process ID, Normal) Window

Click the **OK** button to close the window and return to the previous window.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

OSPFv3 Interface Settings

This window is used to display and configure the OSPFv3 interface settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Interface Settings**, as shown below:

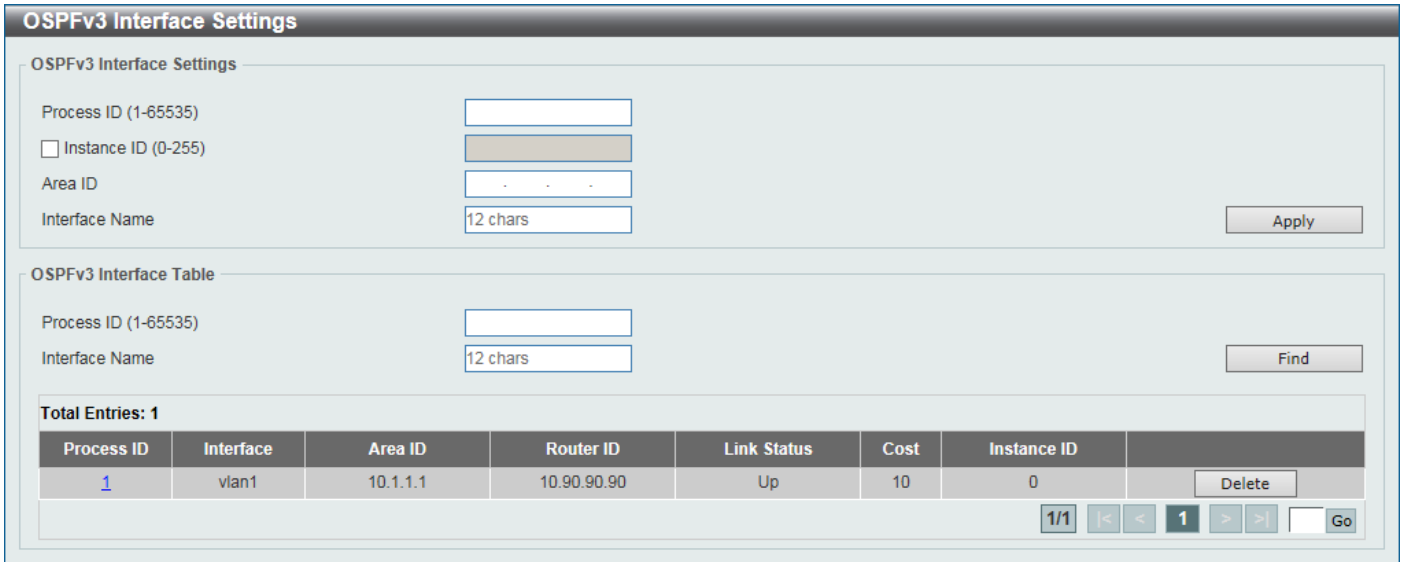


Figure 6-60 OSPFv3 Interface Settings Window

The fields that can be configured in **OSPFv3 Interface Settings** are described below:

Parameter	Description
Process ID	Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535.
Instance ID	Enter the instance identifier here. The range is from 0 to 255. By default, this value is 0.
Area ID	Enter the identifier of the area here. It can be specified as an IPv4 address.
Interface Name	Enter the name of the VLAN interface here. This name can be up to 12 characters long.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Interface Table** are described below:

Parameter	Description
Process ID	Enter the ID for an IPv6 OSPF routing process here. The range is from 1 to 65535.
Interface Name	Enter the name of the interface here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Process ID** link (1) to access and configure the specified OSPFv3 interface.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Process ID** link (1) button, the following page will appear.

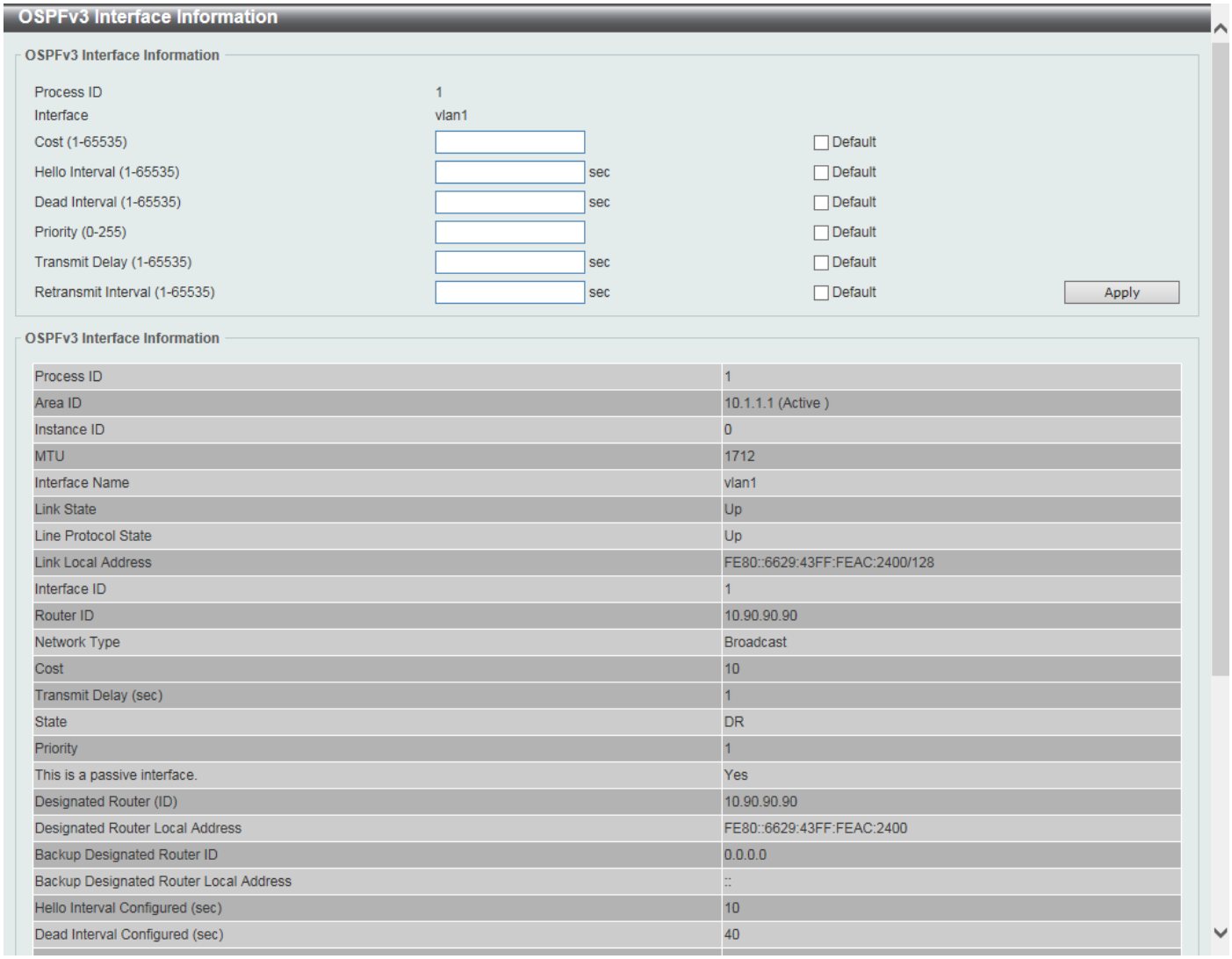


Figure 6-61 OSPFv3 Interface Settings (Process ID) Window

The fields that can be configured are described below:

Parameter	Description
Cost	Enter cost value here. It is an integer value expressed as the link-state metric. The range is from 1 to 65535. Select the **Default** option to use the default value.
Hello Interval	Enter the Hello Interval value, between the hello packets that the router sends on an interface here. This value is advertised in the hello packets. The shorter the Hello Interval, the earlier topological changes will be detected, but more routing traffic will ensue. This value must be the same for all routers and access servers on a specific network. The range is from 1 to 65535 seconds. By default, this value is 10 seconds. Select the **Default** option to use the default value.
Dead Interval	Enter the Dead Interval value here, during which no packets are received and after which a neighbor is regarded as offline. The interval is advertised in router hello packets. This value must be the same for all routers and access servers on a specific network. The range is from 1 to 65535 seconds. By default, this value is 40 seconds. Select the **Default** option to use the default value.
Priority	Enter the priority value of the router here. The range is from 0 to 255. Set the priority to help determine the OSPF Designated Router (DR) for a network. If two routers attempt to become the DR, the router with the higher router priority

Parameter	Description
	becomes the DR. If the router priority is the same for two routers, the router with the higher router ID takes precedence. Only routers with non-zero router priority values are eligible to become the designated or backup designated router. Configure router priority for multi-access networks (not point-to-point) only. By default, this value is 1. Select the **Default** option to use the default value.
Transmit Delay	Enter the Transmit Delay value here. The range is from 1 to 65535 seconds. Link-State Updates (LSUs) must have their ages incremented by the amount specified in the seconds argument before transmission. The value assigned should take into account the transmission and propagation delays for the interface. If the delay is not added before transmission over a link, the time in which the LSA propagates over the link is not considered. This setting has more significance on very low speed links. By default, this value is 1. Select the **Default** option to use the default value.
Retransmit Interval	Enter the Retransmit Interval value here. The range is from 1 to 65535 seconds. After sending an LSA to a neighbor, the router keeps the LSA until it receives an acknowledgement. If the router does not receive an acknowledgement during the set time (the Retransmit Interval value), it retransmits the LSA. Set the retransmission interval value conservatively to avoid unnecessary retransmission. The interval should be greater than the expected round-trip delay between two routers. By default, this value is 5 seconds. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

OSPFv3 Redistribute Settings

This window is used to display and configure the OSPFv3 redistribution settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Redistribute Settings**, as shown below:

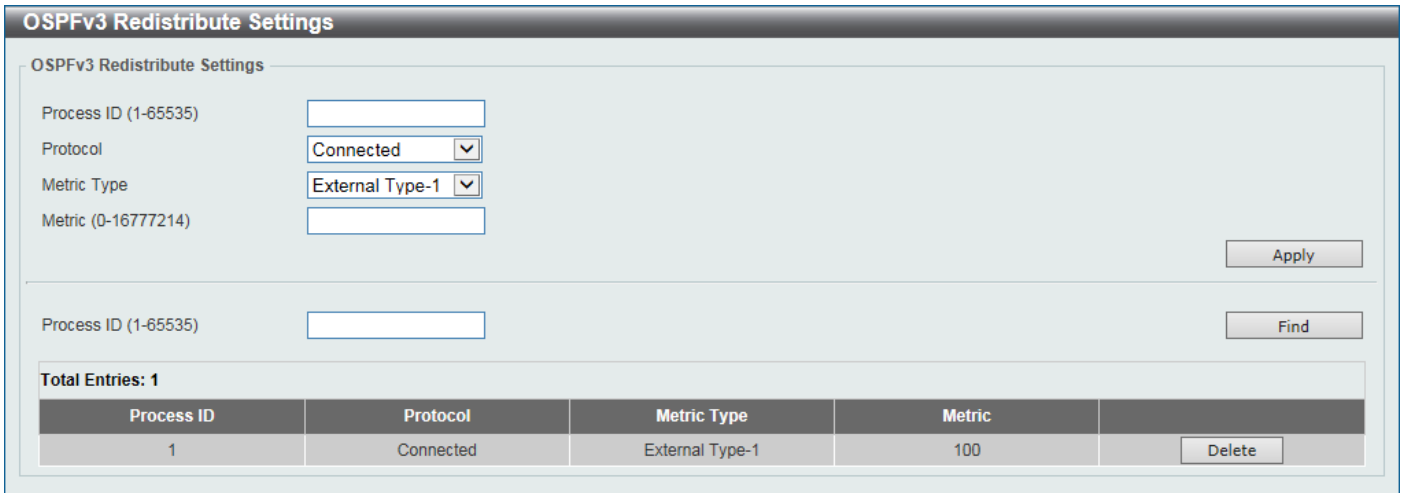


Figure 6-62 OSPFv3 Redistribute Settings Window

The fields that can be configured are described below:

Parameter	Description
Process ID	Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535.

Parameter	Description
Protocol	Select the source protocol from which routes will be redistributed here. Options to choose from are **Connected**, **Static**, and **RIPng**.
Metric Type	Select the external link type associated with the default route advertised into the IPv6 OSPF routing domain here. Options to choose from are **External Type-1** and **External Type-2**. If a metric type is not specified, the Switch adopts a Type-2 external route. This is only for IPv6 OSPF.
Metric	Enter the metric value here. This value is used when redistributing other processes to an IPv6 OSPF process. The range is from 0 to 16777214.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

OSPFv3 Virtual Link Settings

This window is used to display and configure the OSPFv3 virtual link settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Virtual Link Settings**, as shown below:

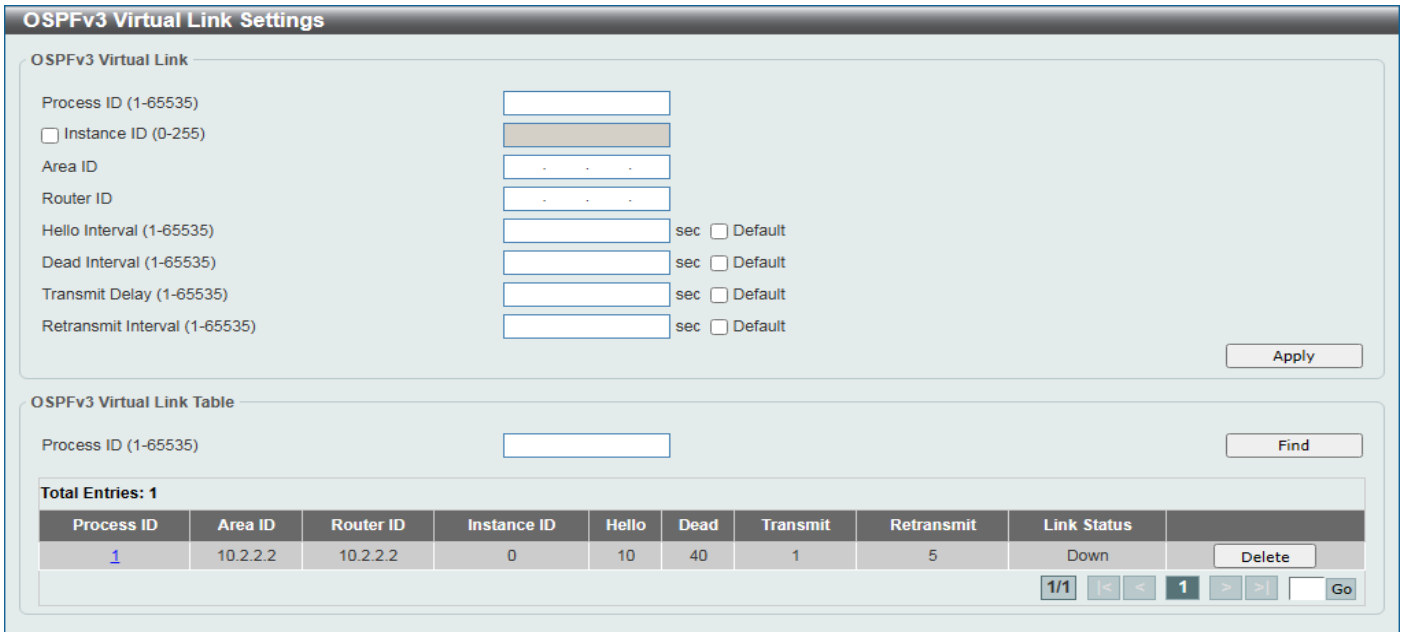


Figure 6-63 OSPFv3 Virtual Link Settings Window

The fields that can be configured in **OSPFv3 Virtual Link** are described below:

Parameter	Description
Process ID	Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535.
Instance ID	Select and enter the instance ID here. The range is from 0 to 255.
Area ID	Enter the OSPF area ID here. It can be specified as an IPv4 address.
Router ID	Enter the router ID here associated with the virtual link neighbor.
Hello Interval	Enter the Hello Interval value between the hello packets that the router sends on an interface here. The range is from 1 to 65535 seconds. By default, this value is 10 seconds.

Parameter	Description
	Select the **Default** option to use the default value.
Dead Interval	Enter the Dead Interval value, during which no packets are received and after which a neighbor is regarded as offline, here. The range is from 1 to 65535 seconds. By default, this value is 40 second. Select the **Default** option to use the default value.
Transmit Delay	Enter the transmit delay value here that the router uses to wait before it transmits a packet. The range is from 1 to 65535 seconds. By default, this value is 1 second. Select the **Default** option to use the default value.
Retransmit Interval	Enter the retransmit interval value here that the router uses to wait before it retransmits a packet. The range is from 1 to 65535 seconds. By default, this value is 5 seconds. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Virtual Link Table** are described below:

Parameter	Description
Process ID	Enter the ID for an IPv6 OSPF routing process here. The range is from 1 to 65535.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Process ID** link (1) to access and configure the specified OSPFv3 virtual link.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Process ID** link (1), the following page will appear.

Figure 6-64 OSPFv3 Virtual Link Settings (Process ID) Window

Click the **OK** button to close the window and return to the previous window.

OSPFv3 LSDB Table

This window is used to find and display the OSPFv3 LSDB information.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 LSDB Table**, as shown below:

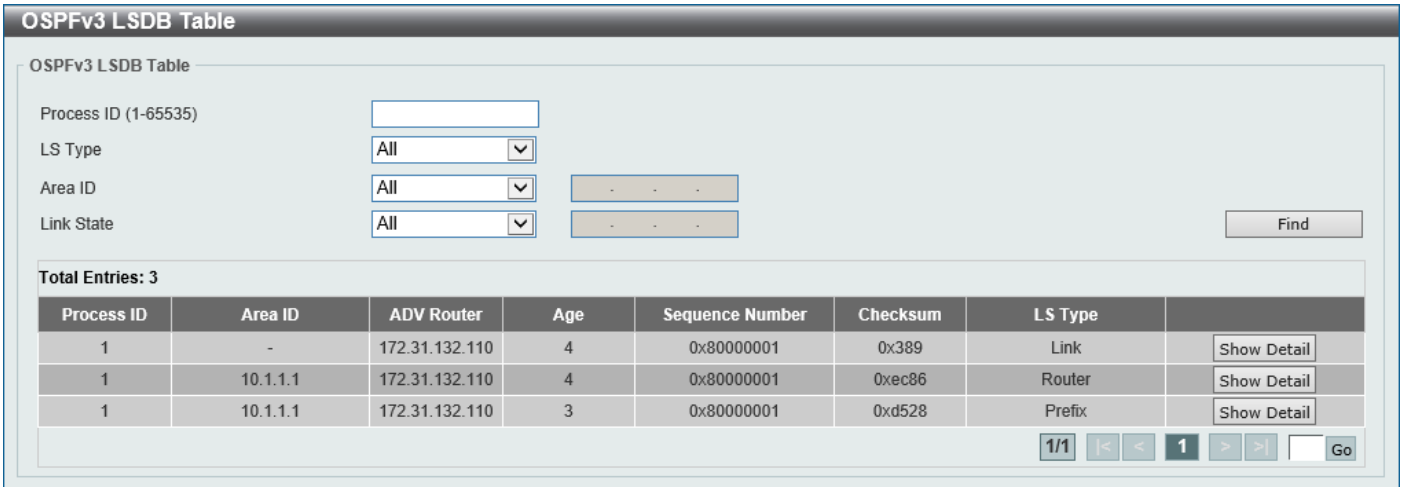


Figure 6-65 OSPFv3 LSDB Table Window

The fields that can be configured are described below:

Parameter	Description
Process ID	Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535.
LSDB Type	Select the LSDB display type here. Options to choose from are: • **All** - Specifies to display all types of LSDB information. • **Router LSA** - Specifies to display information only about the router LSAs. • **Network LSA** - Specifies to display information only about the network LSAs. • **Prefix** - Specifies to display information on the intra-area-prefix LSAs. • **Link LSA** - Specifies to display information about the link LSAs. • **Inter-Area Prefix LSA** - Specifies to display information only about LSAs based on inter-area prefix LSAs. • **Inter-Area Router LSA** - Specifies to display information only about LSAs based on inter-area router LSAs. • **AS-External-LSA** - Specifies to display information only about the external LSAs.
Area ID	Select the area ID option here. Options to choose from are **All** and **Area ID**. To display all the LSAs of the specified area, select the **Area ID** option and enter the OSPF area ID in the space provided. It can be specified as an IPv4 address.
Link State	Select the link state option here. Options to choose from are: • **All** - Specifies to display all the LSAs. • **Self-Originate** - Specifies to display only self-originated LSAs (from the local router). • **Adv Router** - Specifies to display all the LSAs of the advertising router. Enter the router ID in the space provided. The router ID can be specified as an IPv4 address.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

Figure 6-66 OSPFv3 LSDB Table (Show Detail) Window

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

OSPFv3 Neighbor Table

This window is used to find and display the OSPFv3 neighbor information.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Neighbor Table**, as shown below:

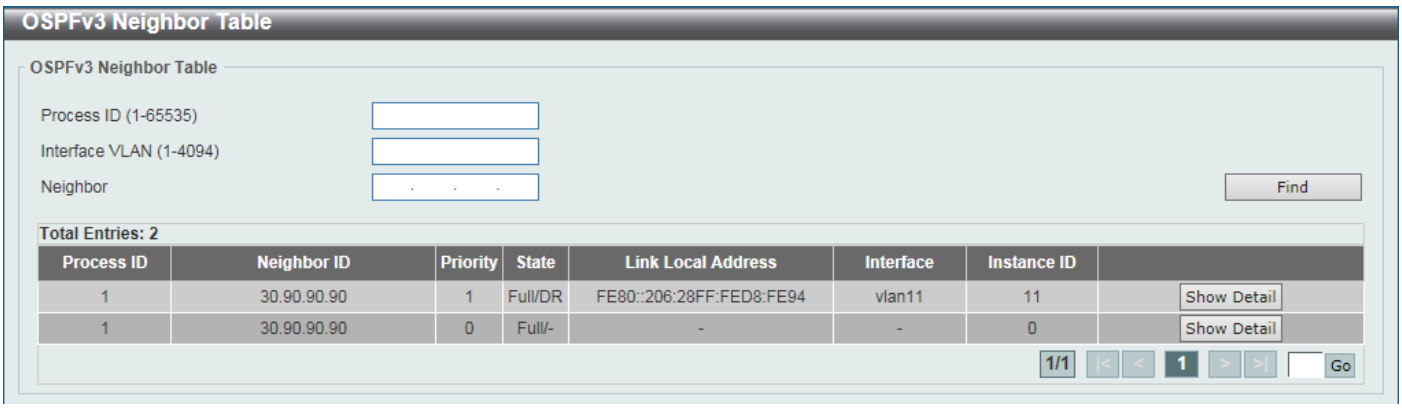


Figure 6-67 OSPFv3 Neighbor Table Window

The fields that can be configured are described below:

Parameter	Description
Process ID	Enter the OSPFv3 process ID to find here. The range is from 1 to 65535.
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Neighbor	Enter the OSPF neighbor ID here. It can be specified as an IPv4 address.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

Figure 6-68 OSPFv3 Neighbor Table (Show Detail) Window

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

OSPFv3 Border Router Table

This window is used to find and display the OSPFv3 border router information.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Border Router Table**, as shown below:

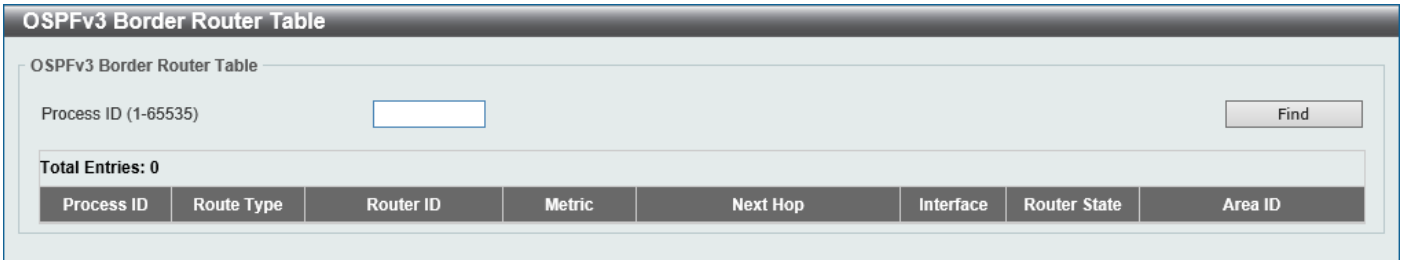


Figure 6-69 OSPFv3 Border Router Table Window

The fields that can be configured are described below:

Parameter	Description
Process ID	Enter the OSPFv3 process ID to search for here. The range is from 1 to 65535.

Click the **Find** button to locate a specific entry based on the information entered.

IP Multicast Routing Protocol

IGMP

IGMP Interface Settings

The window is used to find and display the Internet Group Management Protocol (IGMP) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP Interface Settings**, as shown below:

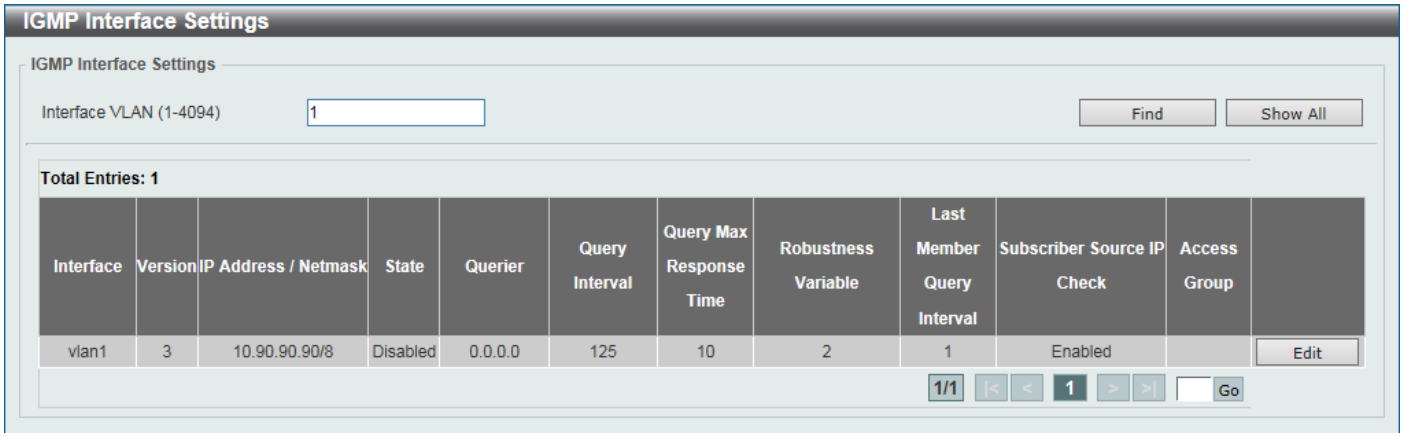


Figure 6-70 IGMP Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all IGMP interface entries.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

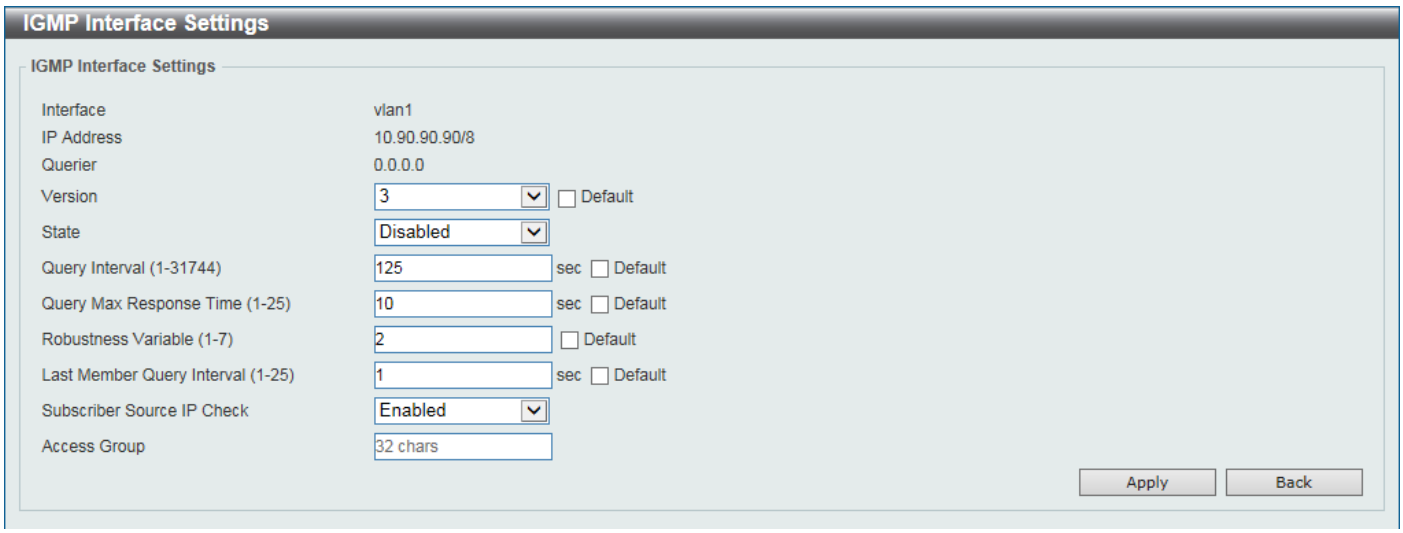


Figure 6-71 IGMP Interface Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Version	Select the IGMP version number here. The range is from 1 to 3. By default, this value is 3. Select the **Default** option to use the default version.
State	Select to enable or disable the IGMP state on this interface here.
Query Interval	Enter the query interval value here. The range is from 1 to 31744 seconds. The IGMP querier sends IGMP query messages at the interval specified here to discover the receivers attached to the interface interested in joining the multicast group. Hosts respond to the query with IGMP report messages to indicate the multicast group they are interested in joining. Select the **Default** option to use the default value.
Query Max Reponses Time	Enter the maximum query response time value here. The range is from 1 to 25 seconds. This configures the period of time, which the group member can respond to an IGMP query message before the router removes the membership. The group membership lifetime is equal to the query interval times the robustness plus the maximum response time. Select the **Default** option to use the default value.
Robustness Variable	Enter the robustness variable value here. The range is from 1 to 7. The robustness variable provides fine-tuning to allow for expected packet loss on an interface. Select the **Default** option to use the default value.
Last Member Query Interval	Enter the Last Member Query Interval value here. The range is from 1 to 25 seconds. When the router receives a leave message from a receiver to leave a group or a channel, the router will send the Group Specific Query or Group-Source Specific Query message to the receiver interface. The IGMP Last Member Query Interval will be advertised in the query message and conveyed to the receiver. This configures the period that the router will send the next group-specific query or group-source specific query message if there is no report from receiver for the specific group or specific channel. The router will retry for the last member query count. If no report messages are received after the retry count, the interface will remove the membership from the specific group or specific channel. Select the **Default** option to use the default value.
Subscriber Source IP Check	Select to enable or disable the subscriber source IP check feature here. By default, the IGMP report or leave messages received by the interface will be checked to determine whether its source IP is in the same network as the interface. If they are not in the same network, the message information won't be learned by the IGMP protocol.
Access Group	Enter a standard IP access list here.

Click the **Apply** button to accept the changes made.

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

IGMP Static Group Settings

This window is used to display and configure the IGMP static group settings. Use this window to create an IGMP static group in the case that the attached host does not support the IGMP protocol. Once configured, the group member entry is added to the IGMP cache.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP Static Group Settings**, as shown below:

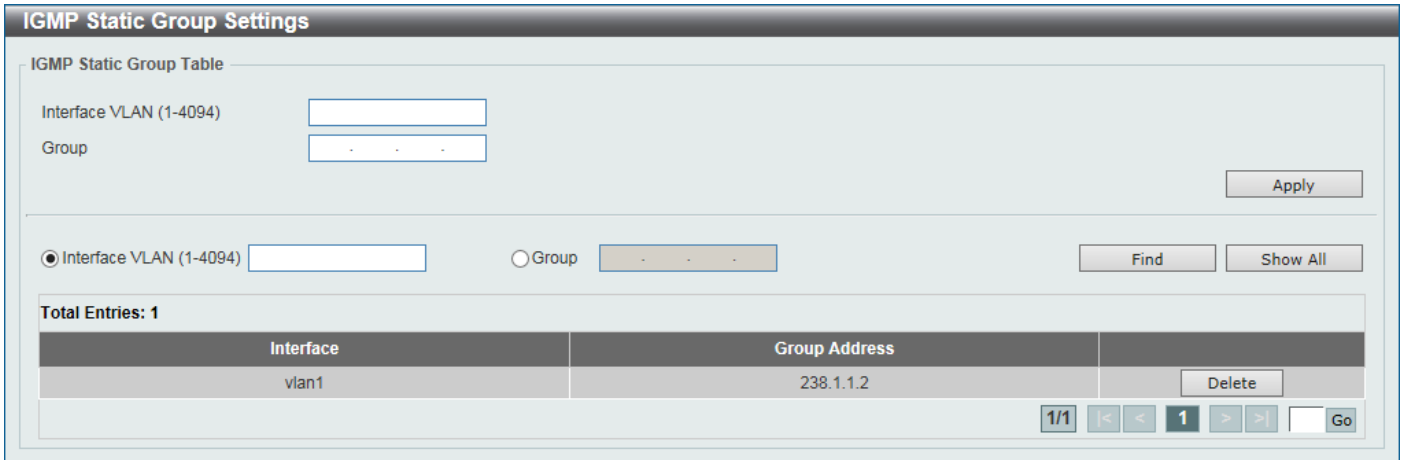


Figure 6-72 IGMP Static Group Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Group	Enter the IP multicast group address here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IGMP Dynamic Group Table

This window is used to find, clear and display IGMP dynamic group information. The IGMP buffer includes a list that contains the dynamic multicast groups that the hosts in the direct subnet join. Use this window to clear the dynamic group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP Dynamic Group Table**, as shown below:

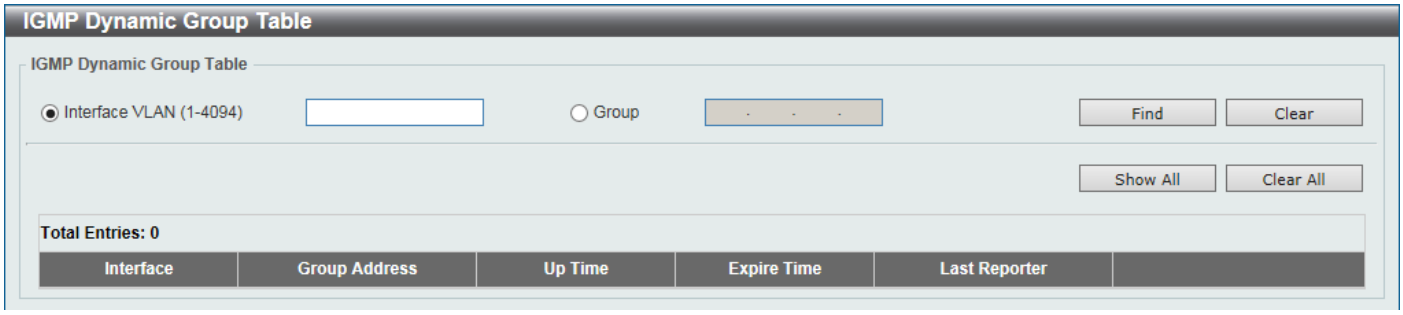


Figure 6-73 IGMP Dynamic Group Table Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Group	Enter the IP multicast group address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

Click the **Show All** button to display all the entries.

Click the **Clear All** button to clear all the entries.

IGMP SSM Mapping Settings

This window is used to display and configure the IGMP SSM mapping settings. The deployment of Source Specific Multicast (SSM) allows the network service provider to manage IP multicast addresses easily.

When SSM is enabled, the last hop router will establish a source-based tree for the channel (S, G) on receiving a (S, G) INCLUDE request that falls in the SSM range from the attached IGMPv3 hosts.

There are cases that the attached host is IGMPv1 or IGMPv2 hosts which only issue (*, G) requests. With the SSM mapping, if the multicast group being requested falls in the SSM range, the router is able to map the (*, G) to a (S, G) request based on the group address to source address mapping defined here. The router will then establish the source-based tree for the mapped (S, G). If multiple associations exist, the router will establish a (S, G) source-based tree for each S.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP SSM Mapping Settings**, as shown below:

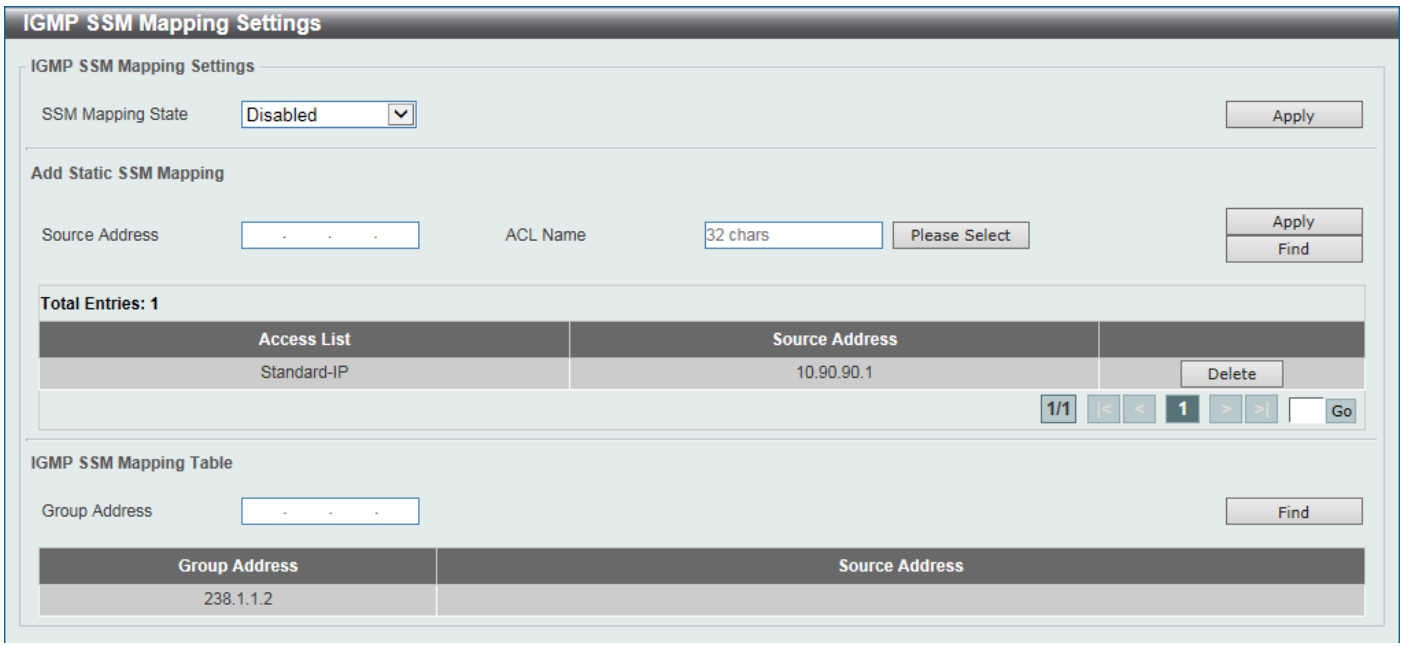


Figure 6-74 IGMP SSM Mapping Settings Window

The fields that can be configured in **IGMP SSM Mapping Settings** are described below:

Parameter	Description
SSM Mapping State	Select to enable or disable the SSM mapping feature for IGMPv1 or IGMPv2 hosts.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Add Static SSM Mapping** are described below:

Parameter	Description
Source Address	Enter the source address to be associated with the group defined in the access list here.
ACL Name	Enter the standard IP access list name that contains the multicast groups to be mapped. To permit a group, specify 'any' in source address field and specify the group address in destination address field of the access list entry. Alternatively, click the **Please Select** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **IGMP SSM Mapping Table** are described below:

Parameter	Description
Group Address	Enter the IGMP multicast group address here.

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Please Select** button, the following page will appear.

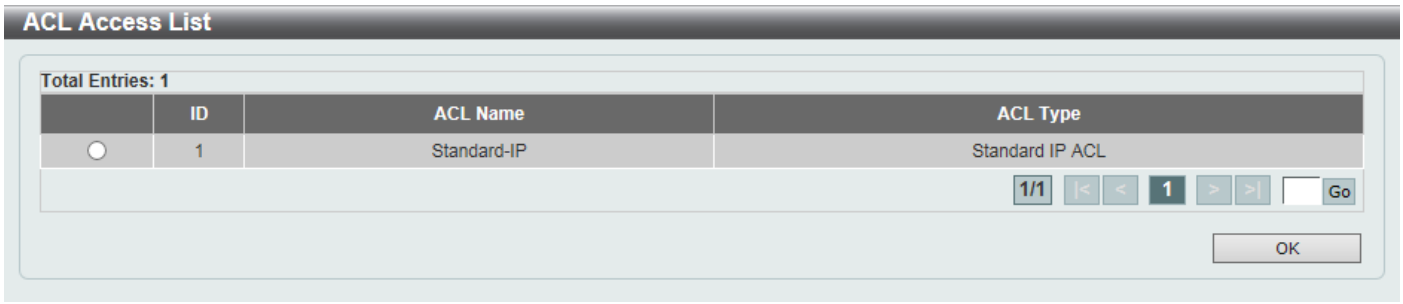


Figure 6-75 IGMP SSM Mapping Settings (Select) Window

Select the ACL and click the **OK** button to use the selected access list.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MLD

MLD Interface Settings

This window is used to display and configure the Multicast Listener Discovery (MLD) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD Interface Settings**, as shown below:

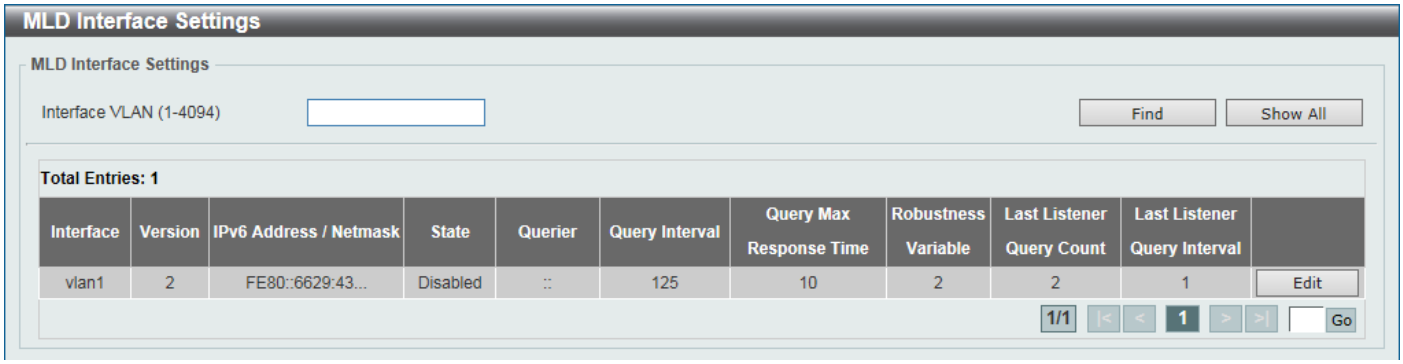


Figure 6-76 MLD Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the associated VLAN ID of the interface here. The range is from 1 to 4094.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

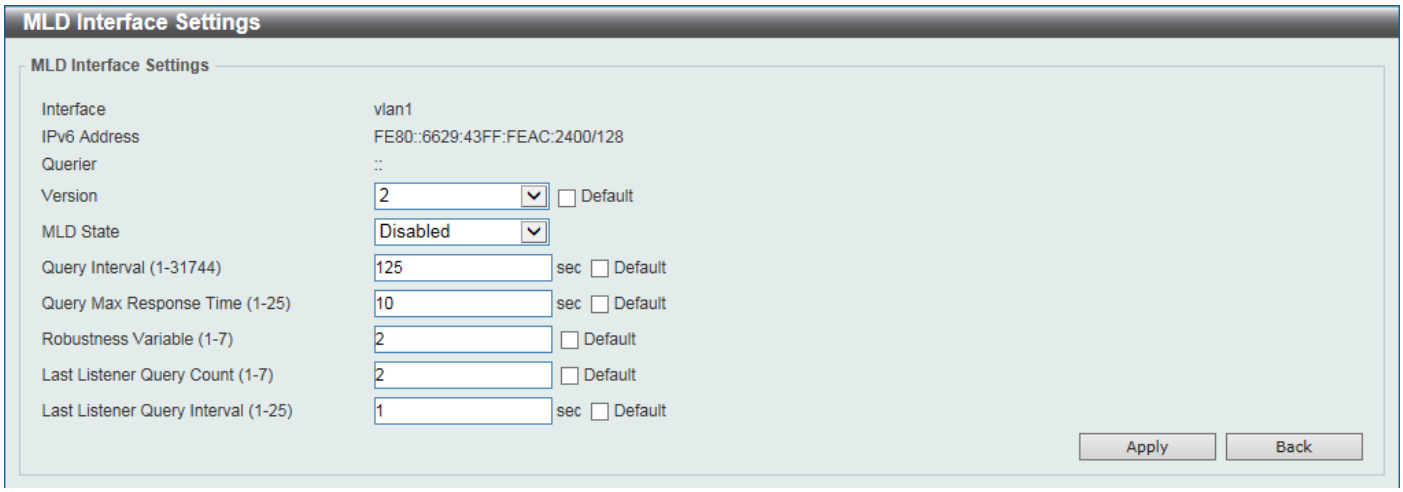


Figure 6-77 MLD Interface Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Version	Select the MLD version that will be used on the interface here. Options to choose from are 1 and 2. By default, this value is 2. Select the **Default** option to use the default version.

Parameter	Description
MLD State	Select to enable or disable the MLD feature on this interface here.
Query Interval	Enter the query interval here. This specifies the frequency at which the designated router sends MLD general-query messages. On receiving the general query, the MLD listener needs to respond the report packet to claim that it is interested in the specified multicast group. The range is from 1 to 31744 seconds. By default, this value is 125 seconds. Select the **Default** option to use the default value.
Query Max Response Time	Enter the maximum query response time value here. This specifies the maximum response time advertised in MLD queries. The range is from 1 to 25 seconds. By default, this value is 10 seconds. Select the **Default** option to use the default value.
Robustness Variable	Enter the robustness variable value here. The robustness variable provides fine-tuning to allow for expected packet loss on an interface. The range is from 1 to 7. By default, this value is 2. Select the **Default** option to use the default value.
Last Listener Query Count	Enter the last member query count value here. This is used to configure the number of group-specific or group-source specific queries sent before the router assumes there are no local members in a group. If the router does not receive reports from hosts within the timeout period, the router will stop sending the multicast group traffic to the interface. The range is from 1 to 7. By default, this value is 2. Select the **Default** option to use the default value.
Last Listener Query Interval	Enter the interval for the amount of time between group-specific or group-source-specific queries here. When an MLD querier receives a packet to leave the group or channel, it will send a group-specific query or group-source-specific query. The leave timer starts once the MLD querier receives the packet on an interface. If the interface does not receive the report packet before the leave timer expires, then the interface's membership will be removed from the group or channel that it is leaving. The value of the leave timer is the value of the Last Listener Query Interval times the Last Listener Query Count. The range is from 1 to 25 seconds. By default, this value is 1 second. Select the **Default** option to use the default value.

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

Click the **Apply** button to accept the changes made.

MLD Static Group Settings

This window is used to display and configure the MLD static group settings. Use this window to create an MLD static group in the case that the attached host does not support the MLD protocol. Once configured, the group member entry is added to the MLD cache.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD Static Group Settings**, as shown below:

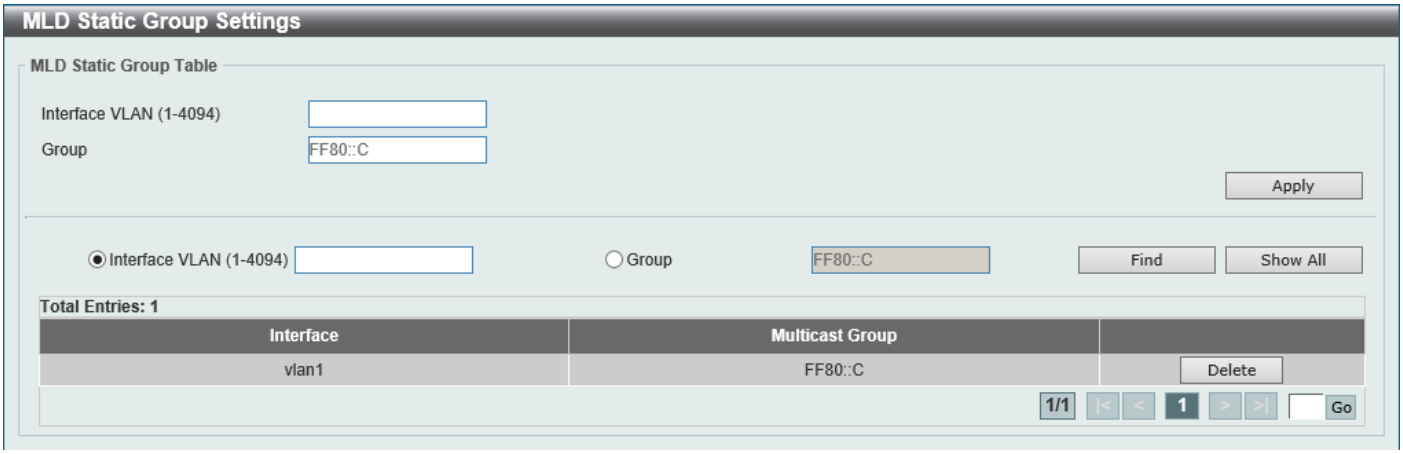


Figure 6-78 MLD Static Group Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Group	Enter the IPv6 multicast group address here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MLD Group Table

This window is used to find and display the MLD group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD Group Table**, as shown below:

Figure 6-79 MLD Group Table Window

The fields that can be configured are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Group	Enter the IPv6 multicast group address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

MLD SSM Mapping Settings

This window is used to display and configure the MLD Source Specific Multicast (SSM) mapping settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD SSM Mapping Settings**, as shown below:

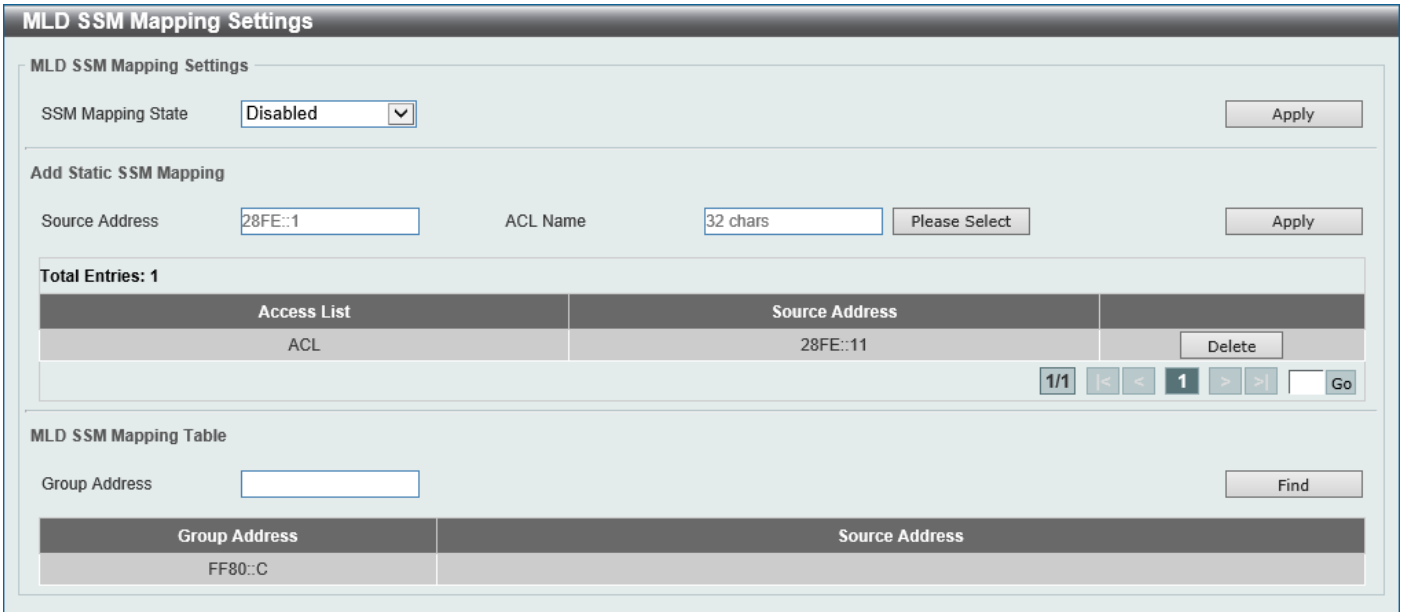


Figure 6-80 MLD SSM Mapping Settings Window

The fields that can be configured in **MLD SSM Mapping Settings** are described below:

Parameter	Description
SSM Mapping State	Select to enable or disable the MLD SSM mapping feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Add Static SSM Mapping** are described below:

Parameter	Description
Source Address	Enter the source address that will be associated with the MLD membership for a group here. This is identified by access list.
ACL Name	Enter the name of the standard IPv6 access list that will be used here. This name can be up to 32 characters long. Click the **Please Select** button to select a pre-configured access list to use here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **MLD SSM Mapping Table** are described below:

Parameter	Description
Group Address	Enter the group address of the IPv6 multicast group to be displayed here.

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Please Select** button, the following page will appear.

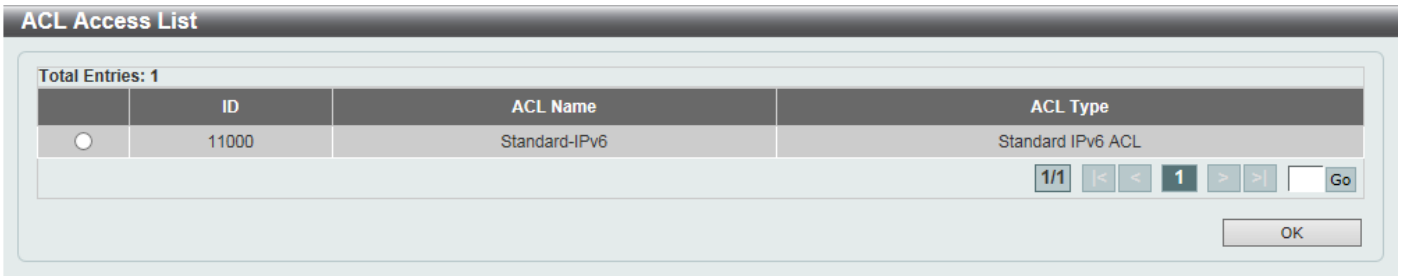


Figure 6-81 MLD SSM Mapping Settings (Please Select) Window

Select the ACL and click the **OK** button to use the selected access list.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IGMP Proxy

IGMP Proxy Settings

This window is used to display and configure the IGMP proxy settings. The IGMP proxy only works in a simple tree topology. Make sure that there are no other multicast routers except for the proxy devices in the simple tree topology. When receiving IGMP report packets from a downstream interface, IGMP proxy will update its membership database, which is generated by the merger of all subscriptions on any downstream interface. If the database is changed, the

proxy device will send unsolicited reports or leaves from the upstream interface. It can also send membership reports from the upstream interface when queried.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP Proxy > IGMP Proxy Settings**, as shown below:

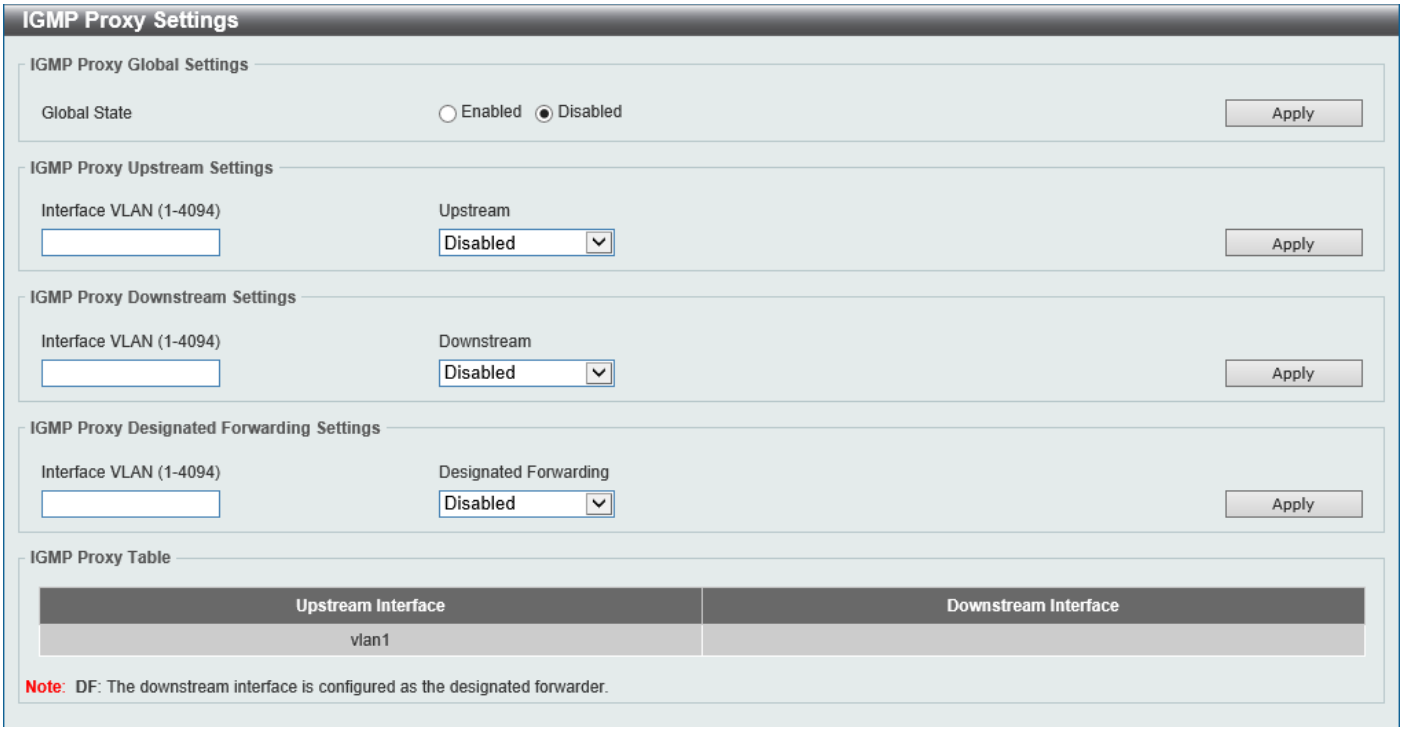


Figure 6-82 IGMP Proxy Settings Window

The fields that can be configured in **IGMP Proxy Global Settings** are described below:

Parameter	Description
Global State	Select to globally enable or disable the IGMP proxy feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Proxy Upstream Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Upstream	Select to enable or disable the interface as the upstream IGMP proxy here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Proxy Downstream Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Downstream	Select to enable or disable the interface as the downstream in IGMP proxy here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Proxy Designated Forwarding Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.

Parameter	Description
Designated Forwarding	Select to enable or disable designated forwarding on a non-querier IGMP proxy downstream interface here. To avoid local loops and redundant traffic for links that are considered downstream links by multiple IGMP-based forwarders, IGMP proxies use the IGMP querier election to elect a single forwarder on a LAN. Use this option to make a non-querier device a forwarder. The feature does not take effect if the interface is not set as the downstream interface or set as the upstream interface.

Click the **Apply** button to accept the changes made.

IGMP Proxy Group Table

This window is used to find and display IGMP proxy group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP Proxy > IGMP Proxy Group Table**, as shown below:

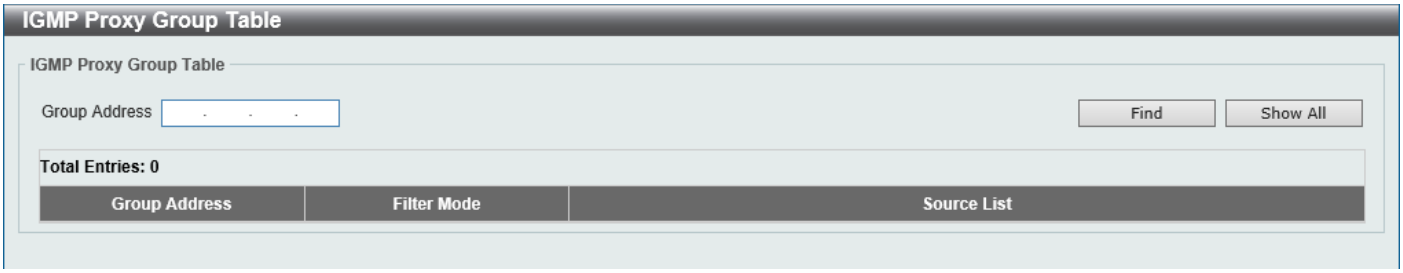


Figure 6-83 IGMP Proxy Group Table Window

The fields that can be configured are described below:

Parameter	Description
Group Address	Enter the IPv4 group multicast address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

IGMP Proxy Forwarding Table

This window is used to find and display IGMP proxy forwarding information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP Proxy > IGMP Proxy Forwarding Table**, as shown below:

Figure 6-84 IGMP Proxy Forwarding Table Window

The fields that can be configured are described below:

Parameter	Description
Group Address	Enter the IPv4 group multicast address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

MLD Proxy

MLD Proxy Settings

This window is used to display and configure the MLD proxy settings. The MLD proxy only works in a simple tree topology. Make sure there are no other multicast routers except for the proxy devices in the tree topology.

When receiving MLD report packet from a downstream interface, MLD proxy will update its membership database, which is generated by merging all subscriptions on any downstream interface. If the database changes the proxy device will send unsolicited reports or leaves from the upstream interface. It can also send membership reports from the upstream interface when queried.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD Proxy > MLD Proxy Settings**, as shown below:

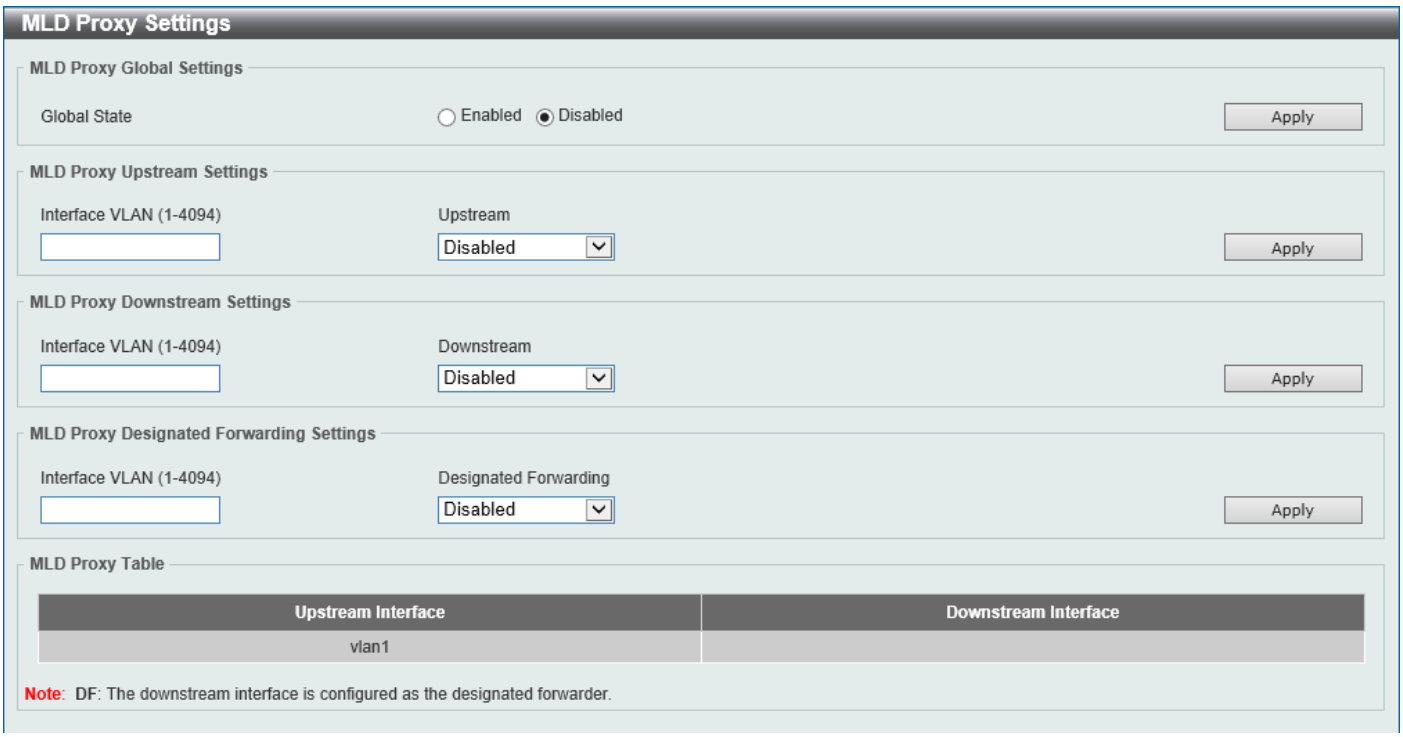


Figure 6-85 MLD Proxy Settings Window

The fields that can be configured in **MLD Proxy Global Settings** are described below:

Parameter	Description
Global State	Select to globally enable or disable the MLD proxy feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Proxy Upstream Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Upstream	Select to enable or disable the interface as the upstream MLD proxy here. This feature only takes effect if the interface has an IPv6 address configured. Only one upstream interface can exist on an MLD proxy device.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Proxy Downstream Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Downstream	Select to enable or disable the interface as the downstream MLD proxy here. This feature only takes effect when the interface has an IPv6 address configured. Multiple downstream interfaces can be configured on an MLD proxy device.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Proxy Designated Forwarding Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID here. The range is from 1 to 4094.
Designated Forwarding	Select to enable or disable designated forwarding on a non-querier MLD proxy downstream interface here. To avoid local loops and redundant traffic for links that are considered downstream links by multiple MLD-based forwarders, MLD proxies use the MLD querier election to elect a single forwarder on a LAN. Administrators can use this command to make a non-querier device a forwarder. This feature does not take effect if the interface is not set as the downstream interface or set as upstream interface.

Click the **Apply** button to accept the changes made.

MLD Proxy Group Table

This window is used to find and display MLD proxy group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD Proxy > MLD Proxy Group Table**, as shown below:

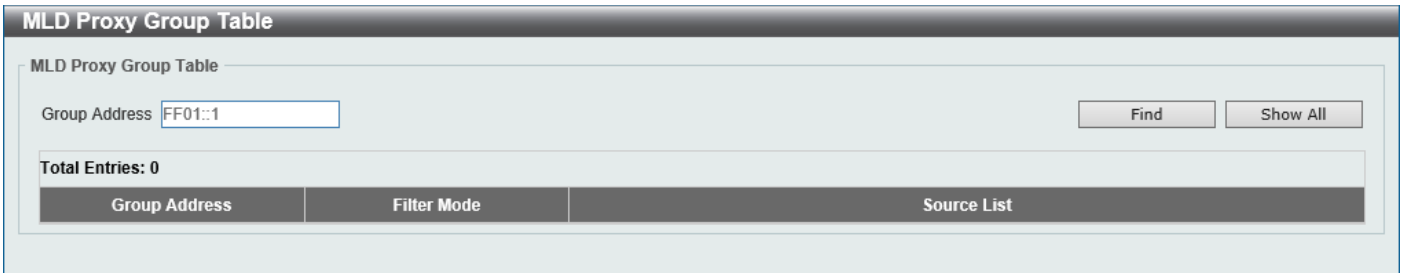


Figure 6-86 MLD Proxy Group Table Window

The fields that can be configured are described below:

Parameter	Description
Group Address	Enter the IPv6 group multicast address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

MLD Proxy Forwarding Table

This window is used to find and display MLD proxy forwarding information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD Proxy > MLD Proxy Forwarding Table**, as shown below:

Figure 6-87 MLD Proxy Forwarding Table Window

The fields that can be configured are described below:

Parameter	Description
Group Address	Enter the IPv6 group multicast address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

DVMRP

DVMRP Interface Settings

This window is used to display and configure the Distance Vector Multicast Routing Protocol (DVMRP) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > DVMRP > DVMRP Interface Settings**, as shown below:

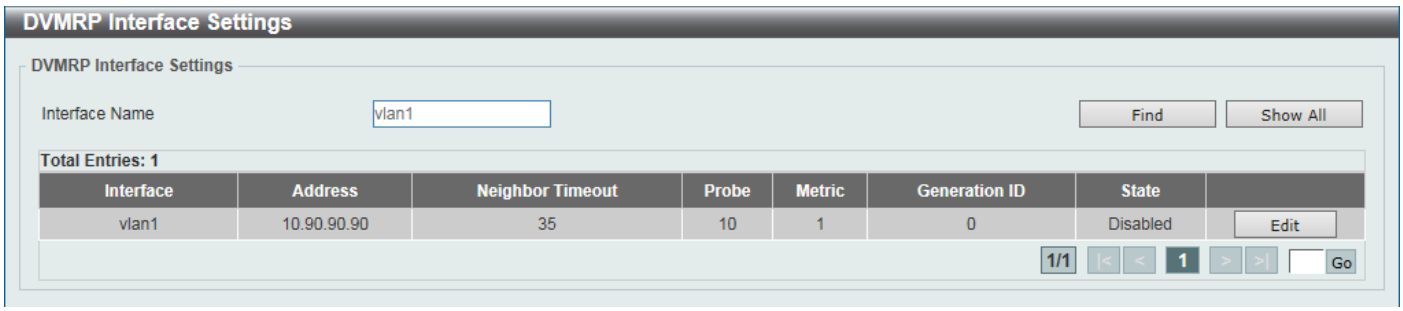


Figure 6-88 DVMRP Interface Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the VLAN interface name used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

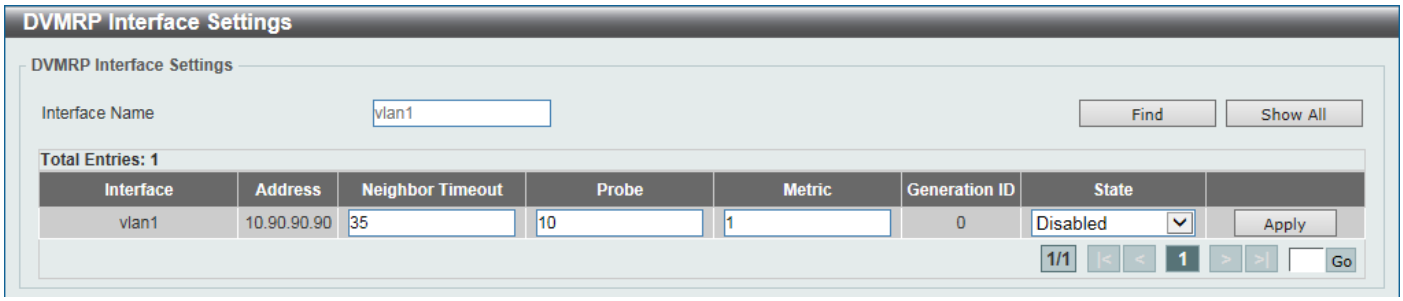


Figure 6-89 DVMRP Interface Settings (Edit) Window

The fields that can be configured in the table are described below:

Parameter	Description
Neighbor Timeout	Enter the neighbor lifetime value here. If the router has not received a probe message from a neighbor after the neighbor timeout interval, the neighbor is considered to be down. The range is from 1 to 65535 seconds. By default, this value is 35 seconds.
Probe	Enter the DVMRP probe interval value here. The range is from 1 to 65535 seconds. By default, this value is 10 seconds.
Metric	Enter the metric value here. The range is from 1 to 32. A value of 32 means it is unreachable. For each source network reported, a route metric is associated with the route being reported. The metric is the sum of the interface metrics between the router originating the report and the source network. For DVMRP, the metric with 32 means it is unreachable. This limits the breadth across the whole DVMRP network and is necessary to place an upper limit on the convergence time of the protocol.
State	Select to enable or disable the DVMRP feature on the selected interface.

Click the **Apply** button to accept the changes made.

DVMRP Routing Table

This window is used to find and display DVMRP routing information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > DVMRP > DVMRP Routing Table**, as shown below:

Figure 6-90 DVMRP Routing Table Window

The fields that can be configured are described below:

Parameter	Description
Source Network	Enter the source IPv4 network address and mask length here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

DVMRP Neighbor Table

This window is used to find and display DVMRP neighbor information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > DVMRP > DVMRP Neighbor Table**, as shown below:

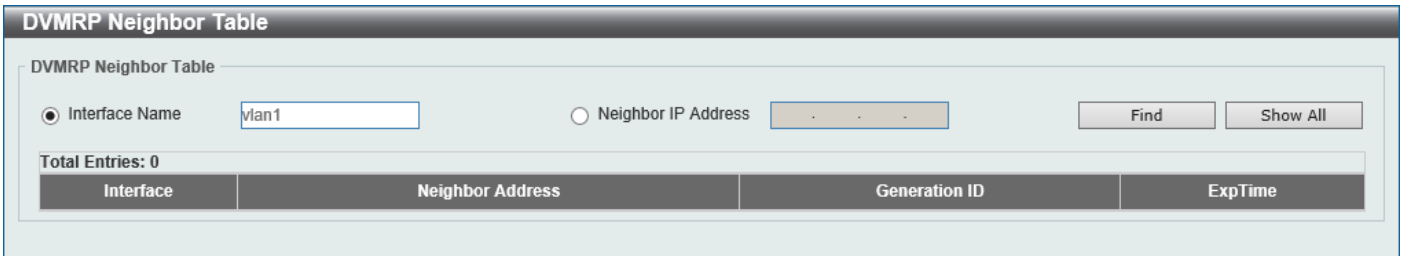


Figure 6-91 DVMRP Neighbor Table Window

The fields that can be configured are described below:

Parameter	Description
Interface name	Enter the VLAN interface name here.
Neighbor IP Address	Select and enter the IPv4 address of the neighbor here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

PIM

Protocol Independent Multicast (PIM) is a family of multicast routing protocols for Internet Protocol (IP) networks that provide one-to-many and many-to-many distribution of data over a LAN, WAN or the Internet. PIM is protocol-independent as it does not include its own topology discovery mechanism, but uses routing information supplied by other routing protocols, such as RIP or OSPF. The Switch supports four types of PIM, Dense Mode (PIM-DM), Sparse Mode (PIM-SM), PIM Source Specific multicast (PIM-SSM), and Sparse-Dense Mode (PIM-DM-SM).

PIM-SM

Protocol Independent Multicast - Sparse Mode (PIM-SM) is a multicast routing protocol that can use the underlying unicast routing information base or a separate multicast-capable routing information base. It builds unidirectional-shared trees rooted at a Rendezvous Point (RP) per group, and optionally creates shortest-path trees per source. Unlike most multicast routing protocols, which flood the network with multicast packets, PIM-SM will forward traffic to routers who are explicitly a part of the multicast group through the use of a Rendezvous Point (RP). This RP will take all requests from PIM-SM enabled routers, analyze the information, and then return multicast information it receives from the source to requesting routers within its configured network. Through this method, a distribution tree is created, with the RP as the root. This distribution tree holds all PIM-SM enabled routers within which information collected from these routers is stored by the RP.

When many routers are a part of a multiple access network, a Designated Router (DR) will be elected. The DR's primary function is to send Join/Prune messages to the RP. The router with the highest priority on the LAN will be selected as the DR. If there is a tie for the highest priority, the router with the higher IP address will be chosen.

The third type of router created in the PIM-SM configuration is the Boot Strap Router (BSR). The goal of the Boot Strap Router is to collect and relay RP information to PIM-SM enabled routers on the LAN. Although the RP can be statically set, the BSR mechanism can also determine the RP. Multiple Candidate BSRs (C-BSR) can be set on the network but only one BSR will be elected to process RP information. If it is not specified which C-BSR is to be the BSR, all C-BSRs will emit Boot Strap Messages (BSM) out on the PIM-SM enabled network to determine which C-BSR has the higher priority and once determined, will be elected as the BSR. Once determined, the BSR will collect RP data sent from candidate RPs on the PIM-SM network, compile it and then send it out on the LAN using periodic Boot Strap Messages (BSM). All PIM-SM Routers will get the RP information from the Boot Strap Mechanism and then store it in their database.

Discovering and Joining the Multicast Group

Although Hello packets discover PIM-SM routers, these routers can only join or be "pruned" from a multicast group through the use of Join/Prune Messages exchanged between the DR and RP. Join/Prune Messages are packets relayed between routers that effectively state which interfaces are, or are not to receive multicast data. The frequency at which these messages can be sent out on the network can be configured and are only valid to routers if a Hello packet has first been received. A Hello packet will simply state that the router is present and ready to become a part of the RP's distribution tree. Once a router has accepted a member of the IGMP group and it is PIM-SM enabled, the interested router will then send an explicit Join/Prune message to the RP, which will in turn route multicast data from the source to the interested router, resulting in a unidirectional distribution tree for the group. Multicast packets are then sent out to all nodes on this tree. Once a prune message has been received for a router that is a member of the RP's distribution tree, the router will drop the interface from its distribution tree.

Distribution Trees

Two types of distribution trees can exist within the PIM-SM protocol, a Rendezvous-Point Tree (RPT) and a Shortest Path Tree (SPT). The RP will send out specific multicast data that it receives from the source to all outgoing interfaces enabled to receive multicast data. Yet, once a router has determined the location of its source, an SPT can be created, eliminating hops between the source and the destination, such as the RP. This can be configured by the Switch administrator by setting the multicast data rate threshold. Once the threshold has been passed, the data path will switch to the SPT. Therefore, a closer link can be created between the source and destination, eliminating hops previously used and shortening the time a multicast packet is sent from the source to its final destination.

Register and Register-stop Messages

Multicast sources do not always join the intended receiver group. The first hop router (DR) can send multicast data without being the member of a group or having a designated source, which essentially means it has no information about how to relay this information to the RP distribution tree. This problem is alleviated through Register and Register-Stop messages. The first multicast packet received by the DR is encapsulated and sent on to the RP, which in turn removes the encapsulation and sends the packet down the RP distribution tree. When the route has been established, a SPT can be created to directly connect routers to the source, or the multicast traffic can flow from the DR to the RP. When the latter occurs, the same packet may be sent twice, one type encapsulated, one not. The RP will detect this flaw and then return a Register-stop message to the DR, requesting it to discontinue sending encapsulated packets.

Assert Messages

At times in the PIM-SM enabled network, parallel paths are created from source to receiver, meaning some receivers will receive the same multicast packets twice. To improve this situation, Assert messages are sent from the receiving device to both multicast sources to determine which single router will send the receiver the necessary multicast data. The source with the shortest metric (hop count) will be elected as the primary multicast source. This metric value is included within the Assert message.

PIM-SSM

The Source Specific Multicast (SSM) feature is an extension of IP multicast where datagram traffic is forwarded to receivers from only the multicast sources to which the receivers have explicitly joined. For multicast groups in the SSM range, only source-specific multicast distribution trees (no shared trees) can be created.

The Internet Assigned Numbers Authority (IANA) has reserved the address range from 232.0.0.0 to 232.255.255.255 for SSM applications and protocols. The Switch allows SSM configuration for an arbitrary subset of the IP multicast address range from 224.0.0.0 to 239.255.255.255.

PIM-DM

The Protocol Independent Multicast - Dense Mode (PIM-DM) protocol should be used in networks with a low delay (low latency) and high bandwidth, as PIM-DM is optimized to guarantee delivery of multicast packets and not to reduce overhead.

The PIM-DM multicast routing protocol is assumes that all downstream routers want to receive multicast messages and relies upon explicit prune messages from downstream routers to remove branches from the multicast delivery tree that do not contain multicast group members.

PIM-DM has no explicit Join messages. It relies upon periodic flooding of multicast messages to all interfaces and then either waiting for a timer to expire (the Join/Prune Interval), or for the downstream routers to transmit explicit Prune messages indicating that there are no multicast members on their respective branches. PIM-DM then removes these branches (Prunes them) from the multicast delivery tree.

As a member of a pruned branch of a multicast delivery tree may want to join a multicast delivery group (at some point in the future), the protocol periodically removes the 'prune' information from its database and floods multicast messages to all interfaces on that branch. The interval for removing 'prune' information is the Join/Prune Interval.

PIM-SM-DM

In the PIM-SM, RP is a key point for the first hop of the sender. If the first hop does not have RP information when the sender sends information out, it will drop the packet and do nothing. Sparse-Dense mode will be useful in this condition. In Sparse-Dense mode, the packets can be flooded to all the outgoing interfaces and pruning/joining (Prune/Graft) can be used to control the outgoing interface list if RP is not found. In other words, the PIM Sparse-Dense mode is treated in either the sparse mode or dense mode of the operation; it depends on which mode the multicast group operates. When an interface receives multicast traffic, if there is a known RP for the group, then the current operation mode on the interface is sparse mode, otherwise the current operation mode on the interface will be dense mode.

PIM for IPv4

PIM Interface

This window is used to display and configure the Protocol Independent Multicast (PIM) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM Interface**, as shown below:

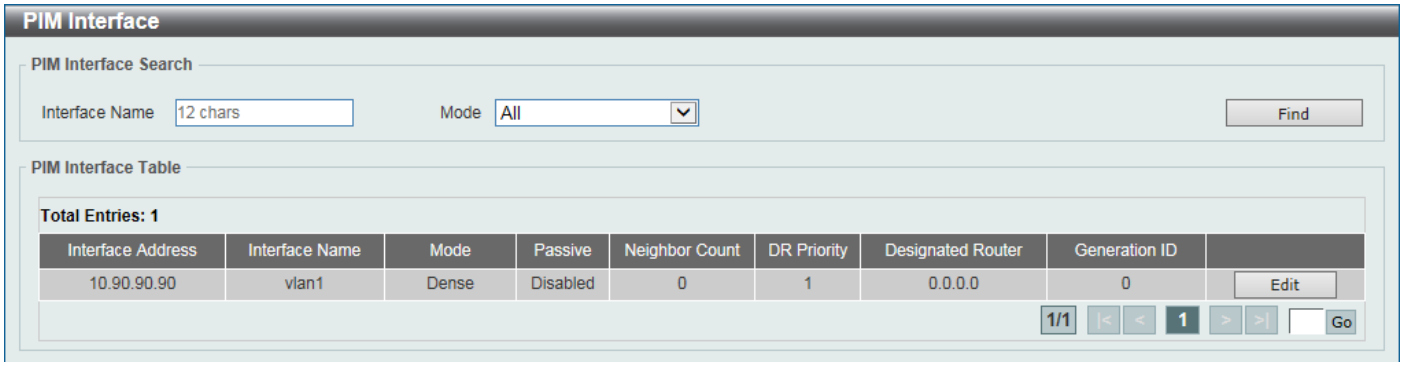


Figure 6-92 PIM Interface Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Select and enter the name of the interface here.
Mode	Select the operation mode of PIM entries used in this filtered search here. Options to choose from are **Dense Mode**, **Sparse Mode**, and **Sparse-Dense Mode**.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

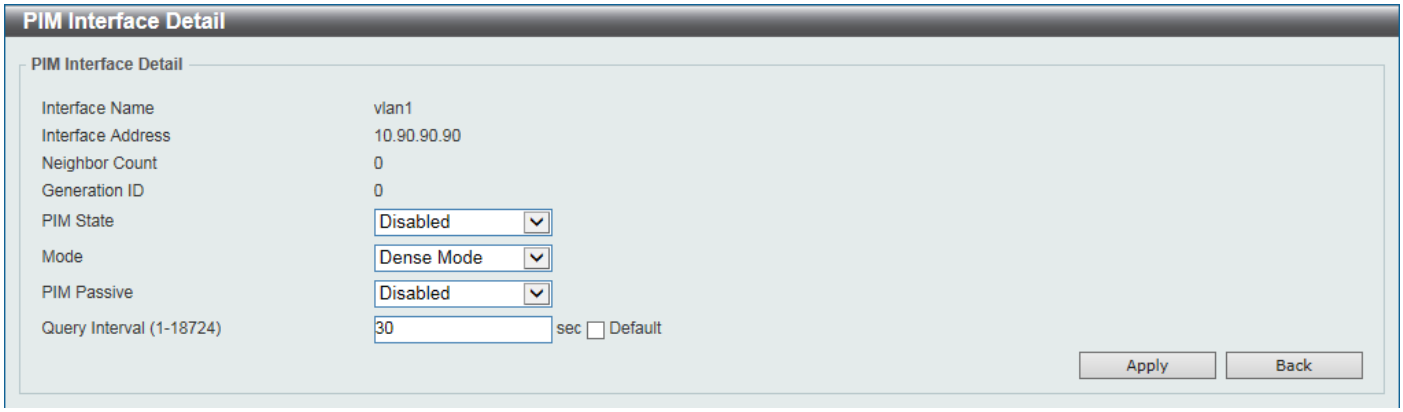


Figure 6-93 PIM Interface (Edit) Window

The fields that can be configured are described below:

Parameter	Description
PIM State	Select to enable or disable the PIM state on this interface here.
Mode	Select the PIM mode here. Options to choose from are: • **Dense Mode** - PIM-DM assumes that when a source starts sending, all downstream routers wants to receive the multicast data stream. Initially multicast data stream are flooded to all downstream routers and the interfaces that have group members. If there are no downstream routers or group members, the router will send prune message to indicate that the multicast data stream is not desired. • **Sparse Mode** - When multicast traffic is received on a sparse mode interface, the first hop router will encapsulate and send the register message to RP. If the router is not the first hop router, the traffic will be forwarded based on the Multicast Route entry. A sparse mode interface will only be populated as Multicast Route member interface if receive join message from the downstream router or if group member on a sparse mode interface, PIM join process will be triggered to create the shared tree or the source tree. • **Sparse-Dense Mode** - When interface is configured as PIM Sparse-Dense mode, a multicast group received by the interface can operate in either sparse mode or dense mode of operation. When the interface receives multicast traffic, if there is a known RP for the group, then this group will operate in sparse mode, otherwise this multicast group will operate in dense mode.
PIM Passive	Select to enable or disable the PIM passive feature here. When the passive mode is enabled, the interface will neither send PIM messages out nor accept PIM messages from this interface. The router will act as if it is the only PIM router on the network. Use this feature only when there is only one PIM router on the LAN.

Parameter	Description
Query Interval	Enter the interval at which hello messages are sent here. The range is from 1 to 18724 seconds. A PIMv2 router learns PIM neighbors via the PIM hello message. This feature configures the frequency of the hello message. Routers configured for IP multicasting send PIM hello messages to detect PIM routers. For SM, hello messages also determine the router to act as the designated router for each LAN segment. The configured query interval is also used as the value for hold time. By configuring a smaller period for the interval, the unresponsive neighbor can be discovered faster and thus the failover and recovery will become more efficient. By default, this value is 30 seconds. Select the **Default** option to use the default value.
DR Priority	After selecting to use the **Sparse Mode** or the **Sparse-Dense Mode**, this parameter will be available. Enter the Designated Router's (DR) priority value here. The range is from 0 to 4294967295. A larger value represents the higher priority. In the Dense Mode (DM), the DR priority option will not be carried in the hello message. The router with the highest priority value will be the DR. If multiple routers are with the same priority status, the router with the highest IP address will be the DR. If there is a router that does not support the DR priority in its hello message on the LAN, all routers on the LAN will ignore DR priority and only use IP address to elect DR. By default, this value is 1. Select the **Default** option to use the default value.
Join Prune Interval	After selecting to use the **Sparse Mode** or the **Sparse-Dense Mode**, this parameter will be available. Enter the Join/Prune message interval value here. The range is from 1 to 18000 seconds. When configuring the Join/Prune interval, consider the factors, such as the configured bandwidth and expected average number of multicast route entries for the attached network or link. For the Sparse Mode (SM), routers will periodically send join messages based on this interval. The hold-time in a Join/Prune message is 3.5 times the join-prune-interval. The receiving router will start a timer based on this hold-time, and prune the interface if no join message was received on this interface. By default, this value is 60 seconds. Select the **Default** option to use the default value.
BSR Domain Border	Select to enable or disable the Bootstrap Router (BSR) domain border feature here. The feature only takes effect when the interface is PIM enabled. Use this feature on the interface that border with another domain to avoid the exchange of BSR messages across two domains.

Click the **Apply** button to accept the changes made.

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

PIM BSR Candidate

This window is used to display and configure the PIM BSR candidate settings. This feature only takes effect when the interface has an IP address configured and is in the PIM sparse mode.

This feature causes the router to send bootstrap messages to announce the IP address of the designated interface as the CBSR address. The hash mask is used by all routers within a domain, to map a group to one of the Rendezvous Points (RP) from the matching set of group-range-to-RP maps (this set all have the same longest mask length and same highest priority). The algorithm takes as an input the group address and the addresses of the candidate RPs from the maps, and gives as an output one RP address to be used.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM BSR Candidate**, as shown below:

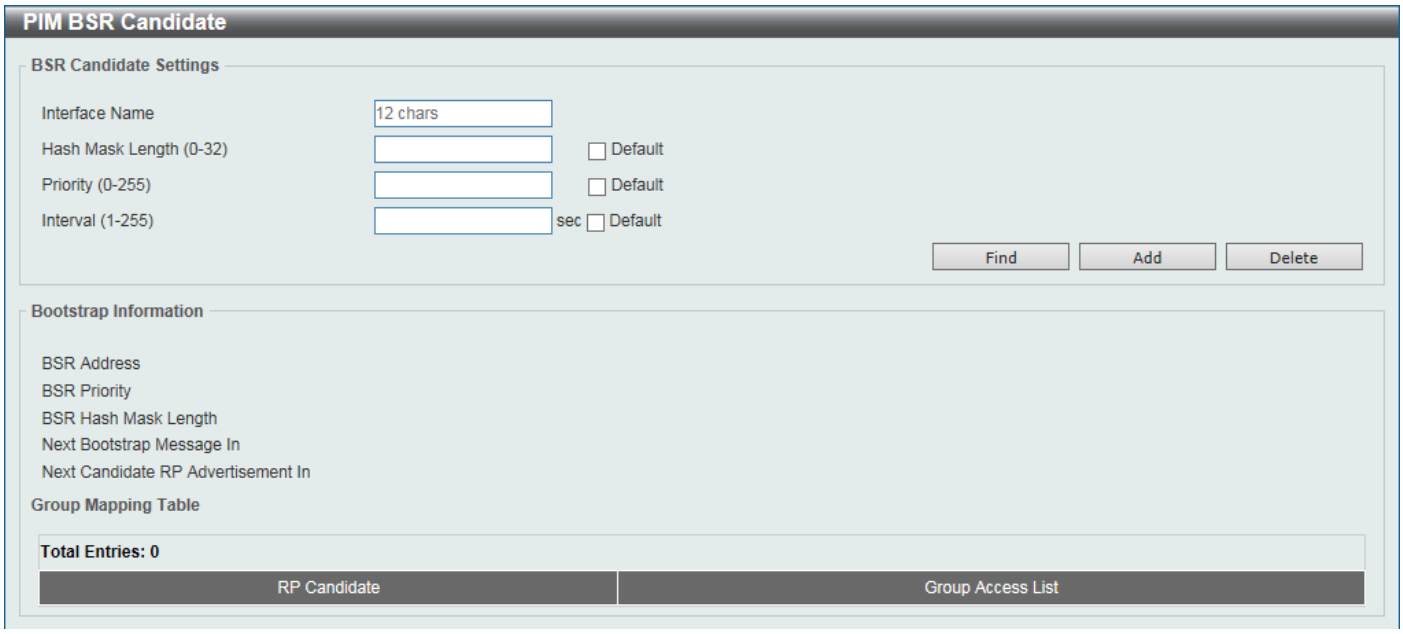


Figure 6-94 PIM BSR Candidate Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the name of the interface here.
Hash Mask Length	Enter the hash mask length for RP selection here. The range is from 0 to 32. By default, this value is 30. Select the **Default** option to use the default value.
Priority	Enter the Candidate Bootstrap Router (CBSR) priority value here. The candidate with the highest priority is preferred. If the priority values are the same, the router with the highest IP address is preferred. The range is from 0 to 255. By default, this value is 64. Select the **Default** option to use the default value.
Interval	Enter the interval value between originating bootstrap messages here. The range is from 1 to 255 seconds. By default, this value is 60 seconds. Select the **Default** option to use the default value.

Click the **Find** button to find and display the specified entries.

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

Click the **Delete** button to delete an entry based on the information entered.

PIM RP Address

This window is used to display and configure the static multicast groups to RP mapping. In a multicast domain, the static multicast group to RP mapping can be used together with BSR. All routers in a domain should have a consistent multicast group to RP mapping. The first hop router that initiates a register message will use the mapping entries to determine the RP for sending the PIM register message destined for a specific group. The last hop router that initiates a join message uses the mapping entries to determine the RP for sending the join and prune message for a specific group. When a router receives a join message, it will check the mapping entries for forwarding of the message. When a RP receives a register message, if the router is not the right RP for the multicast group, a register-stop message will be sent.

Multiple RPs can be defined, each with a single access list.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM RP Address**, as shown below:

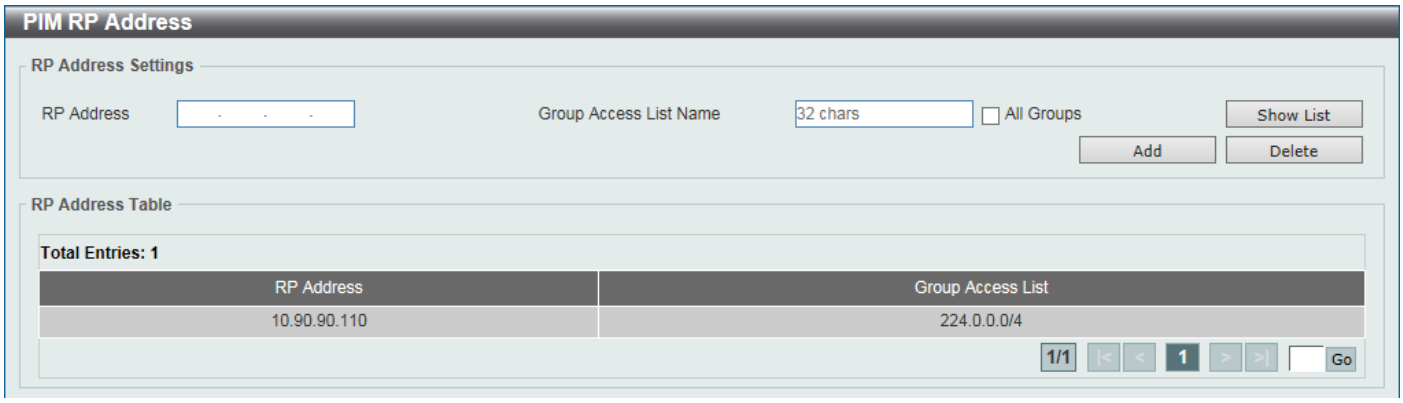


Figure 6-95 PIM RP Address Window

The fields that can be configured are described below:

Parameter	Description
RP Address	Enter the RP IPv4 address here.
Group Access List Name	Enter the standard access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting ACL configured on this Switch to be used in this configuration. Select the **All Groups** option to map the RP to all multicast groups.

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

Click the **Delete** button to delete an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

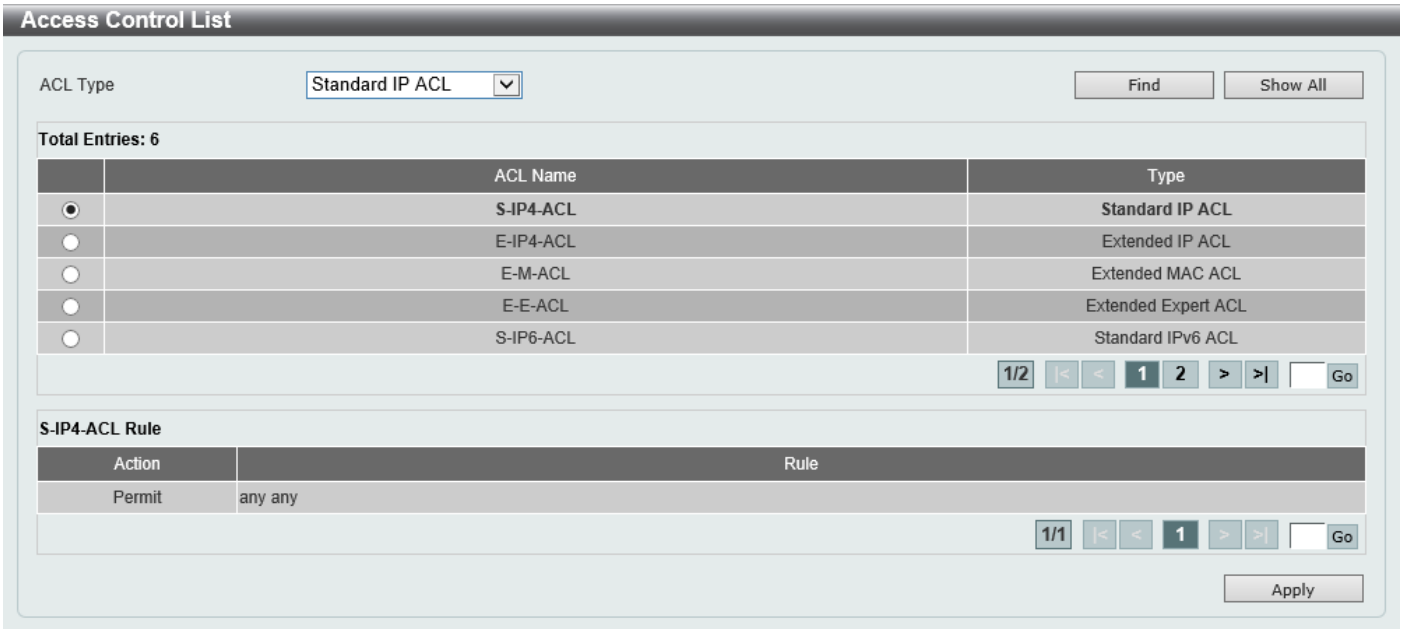


Figure 6-96 PIM RP Address (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**,

Parameter	Description
	Standard IPv6 ACL, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

PIM RP Candidate

This window is used to display and configure the PIM RP candidate settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM RP Candidate**, as shown below:

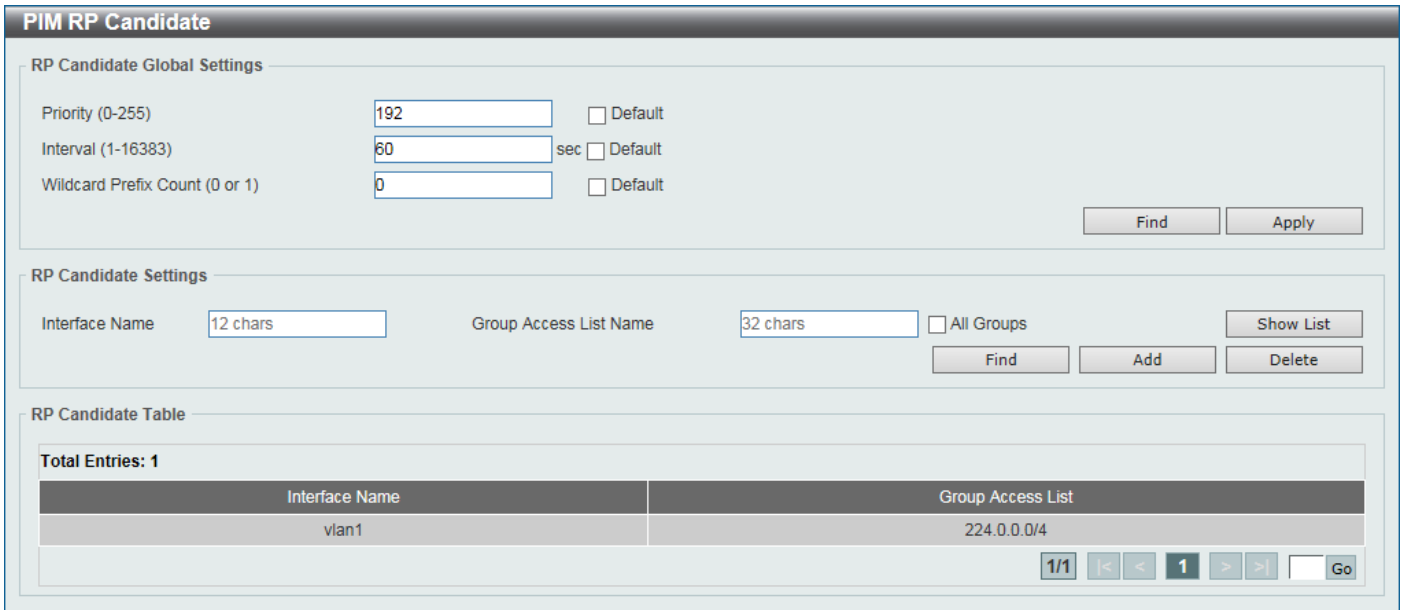


Figure 6-97 PIM RP Candidate Window

The fields that can be configured in **RP Candidate Global Settings** are described below:

Parameter	Description
Priority	Enter the candidate RP's priority value here. The range is from 0 to 255. By default, this value is 192. Select the **Default** option to use the default value.
Interval	Enter the candidate RP's advertisement interval value here. The range is from 1 to 16383 seconds. By default, this value is 60 seconds. Select the **Default** option to use the default value.
Wildcard Prefix Count	Enter the multicast group address wildcard (224.0.0.0/4) prefix count value in the C-RP message here. This value can either be 1 or 0. By default, this value is 0. Select the **Default** option to use the default value.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RP Candidate Settings** are described below:

Parameter	Description
Interface Name	Enter the name of the interface here.
Group Access List Name	Enter the standard access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration. Select the **All Groups** option to map the candidate RP to all multicast groups.

Click the **Find** button to display a list of access lists based on the selection made.

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

Click the **Delete** button to delete an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

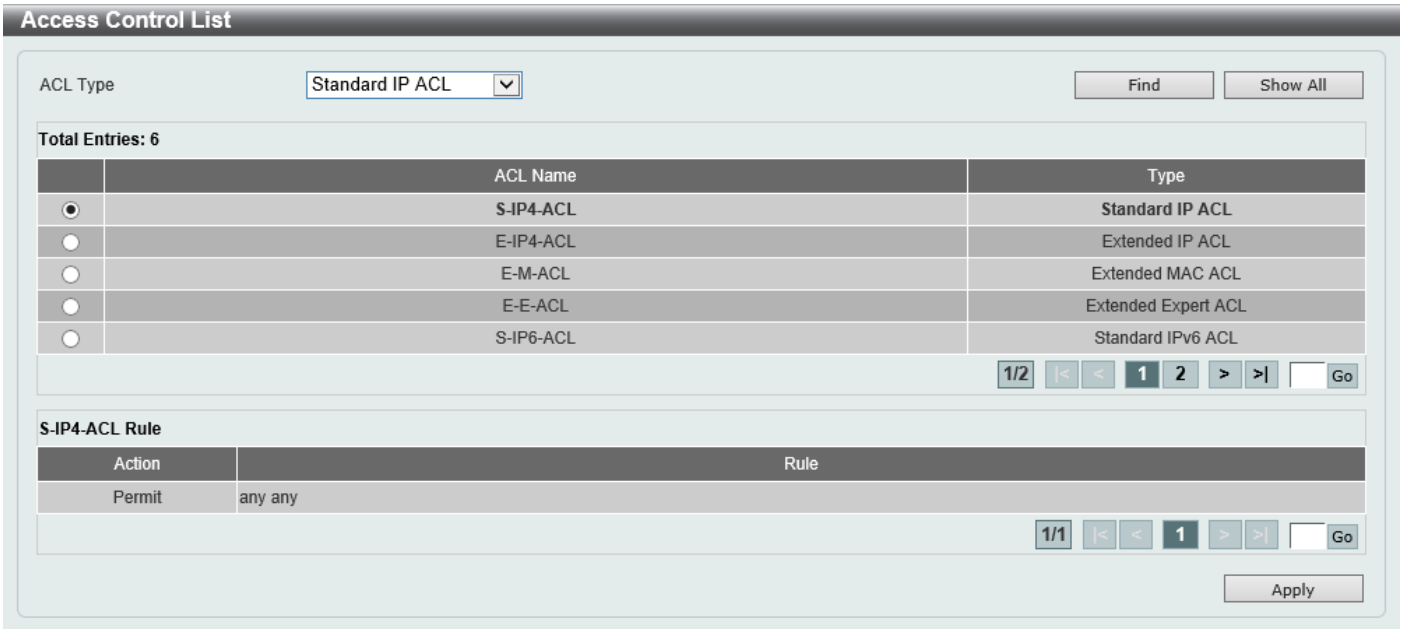


Figure 6-98 PIM RP Candidate (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

PIM RP Table

This window is used to find and display PIM RP information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM RP Table**, as shown below:

Figure 6-99 PIM RP Table Window

The fields that can be configured are described below:

Parameter	Description
RP Hash	Enter the IPv4 multicast group address here.

Click the **Find** button to display a list of access lists based on the selection made.

PIM Register Settings

This window is used to display and configure the PIM register settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM Register Settings**, as shown below:

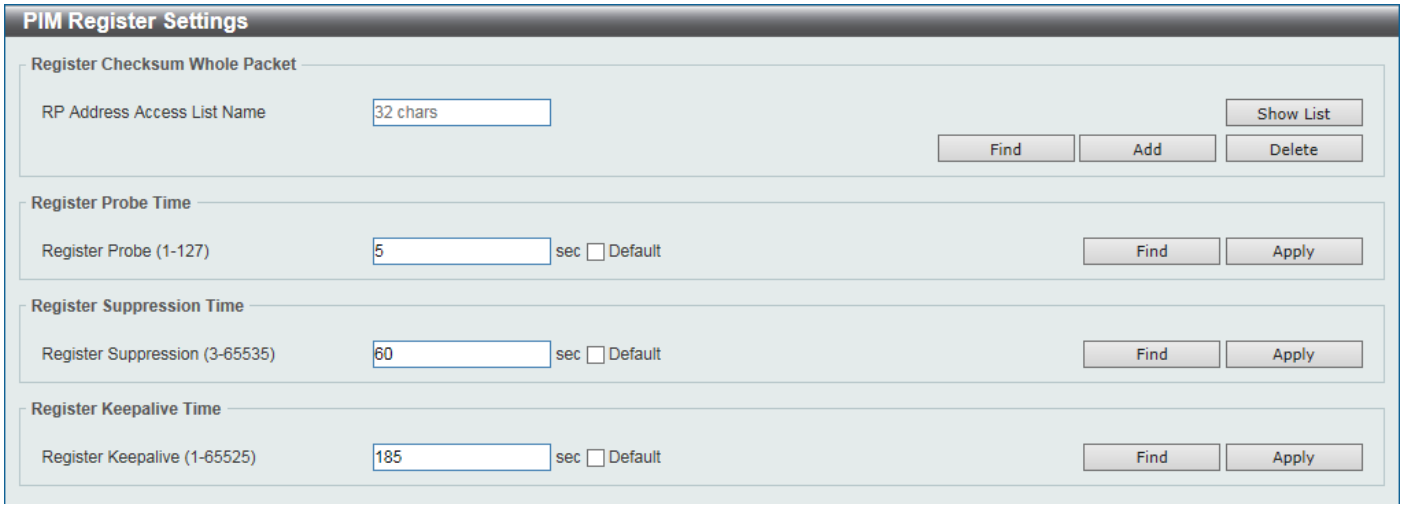


Figure 6-100 PIM Register Settings Window

The fields that can be configured in **Register Checksum Wholepkt** are described below:

Parameter	Description
RP Address Access List Name	Enter the standard access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration.

Click the **Find** button to find and display specified entries.

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

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **Register Probe Time** are described below:

Parameter	Description
Register Probe	Enter the register probe time value here. The range is from 1 to 127 seconds. The register probe time is the time before the Register Stop Timer (RST) expires when a DR may send a Null-Register to the RP to cause it to resend a Register-Stop message. By default, this value is 5 seconds. Select the **Default** option to use the default value.

Click the **Find** button to find and display specified entries.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Suppression Time** are described below:

Parameter	Description
Register Suppression	Enter the register suppression timeout value here. The range is from 3 to 65535 seconds. When a DR receives the register stop message, it will start the suppression timer. During the suppression period, a DR stops sending the register message to the RP. Use this feature on the first hop router. The value of the register probe time must be less than half the value of the register suppression time to prevent a possible negative value in the setting of the register stop timer. The minimal value for the register suppression time is 3. By default, this value is 60 seconds. Select the **Default** option to use the default value.

Click the **Find** button to find and display specified entries.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Keepalive Time** are described below:

Parameter	Description
Register Keepalive	Enter the register keep-alive time value here. The range from 1 to 65525 seconds. By default, this value is 185 seconds. Select the **Default** option to use the default value.

Click the **Find** button to find and display specified entries.

Click the **Apply** button to accept the changes made.

After clicking the **Show List** button, the following page will appear.

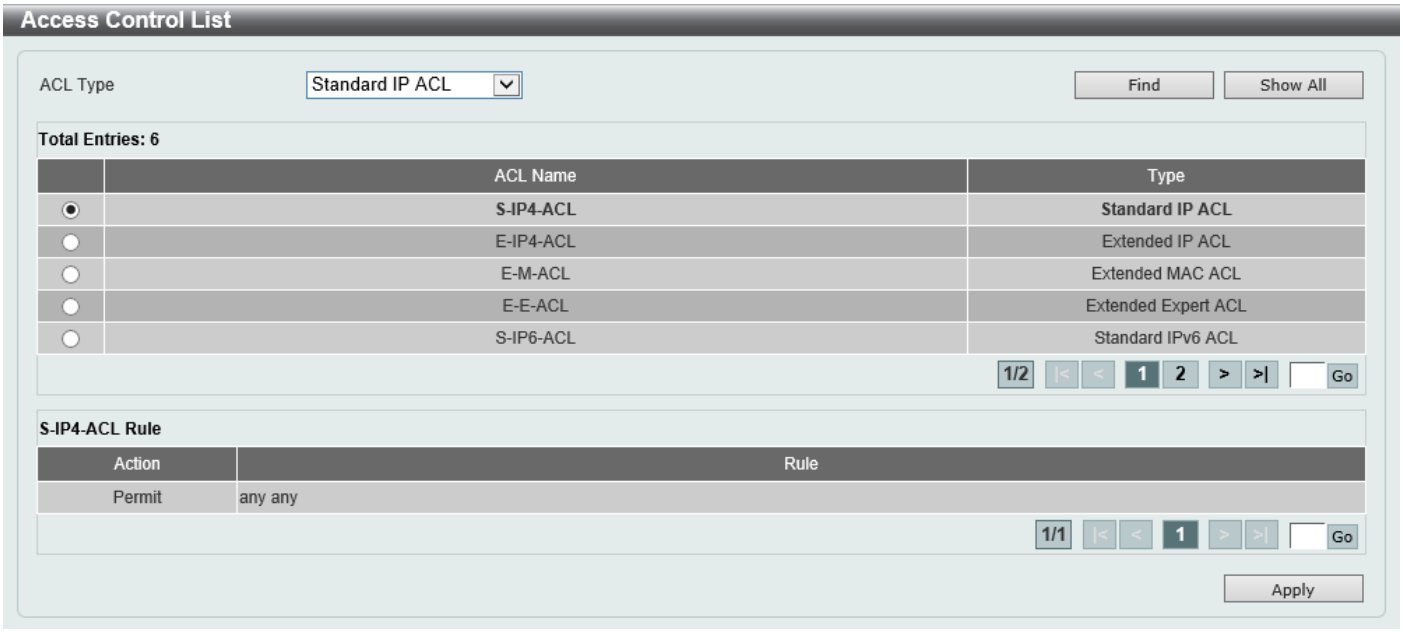


Figure 6-101 PIM Register Settings (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

PIM SPT Threshold Settings

This window is used to display and configure the PIM SPT threshold settings. Use this feature on the last hop of the router. In the PIM-SM mode, initially the multicast traffic from the source will be flowing along the RPT share tree to the receiver. After the first packet arrives at the last hop router, for each group of traffic, it can operate in one of the following two modes. With the mode **Infinity**, the traffic keeps following the share tree. With the mode **0**, the source tree will be established and the traffic Switchover to the source tree.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM SPT Threshold Settings**, as shown below:

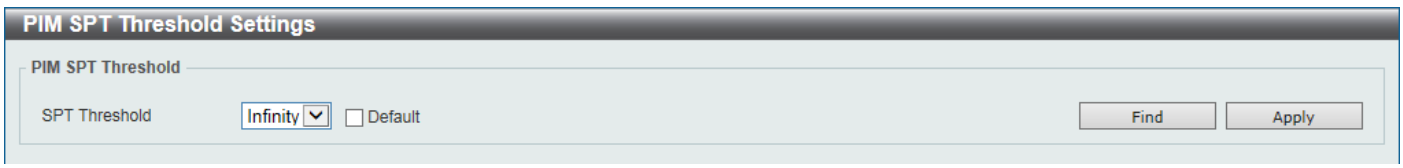


Figure 6-102 PIM SPT Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
SPT Threshold	Select the SPT threshold option here. Options to choose from are: • **Infinity** - Specifies to always rely on the shared tree. • **0** - Specifies to establish the source tree right at the arrival of the first packet. By default, the **Infinity** option is used. Select the **Default** option to use the default setting.

Click the **Apply** button to accept the changes made.

PIM SSM Settings

This window is used to display and configure the PIM SSM settings. Use this feature on the last hop of the router only. When SSM is enabled, the last hop router will initiate to establish a source-based tree for the channel (S,G) on receiving a IGMPv3 include (S, G) request that falls in the SSM range from the attached hosts.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM SSM Settings**, as shown below:

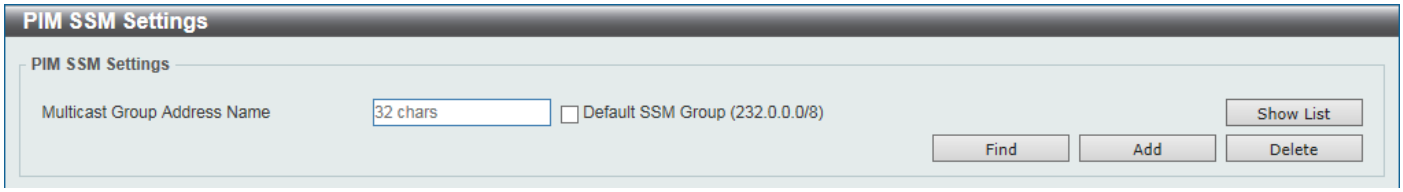


Figure 6-103 PIM SSM Settings Window

The fields that can be configured are described below:

Parameter	Description
Multicast Group Address Name	Enter the standard IP access list name here that defines the user-specified SSM group addresses. The group address should be defined in the destination IP address field of the rule entry. Click the **Show List** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration. Select the **Default SSM Group (232.0.0.0/8)** option to use the default SSM group addresses. By default, the SSM group address range is 232/8.

Click the **Find** button to find and display specified entries.

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

Click the **Delete** button to delete an entry based on the information entered.

After clicking the **Show List** button, the following page will appear.

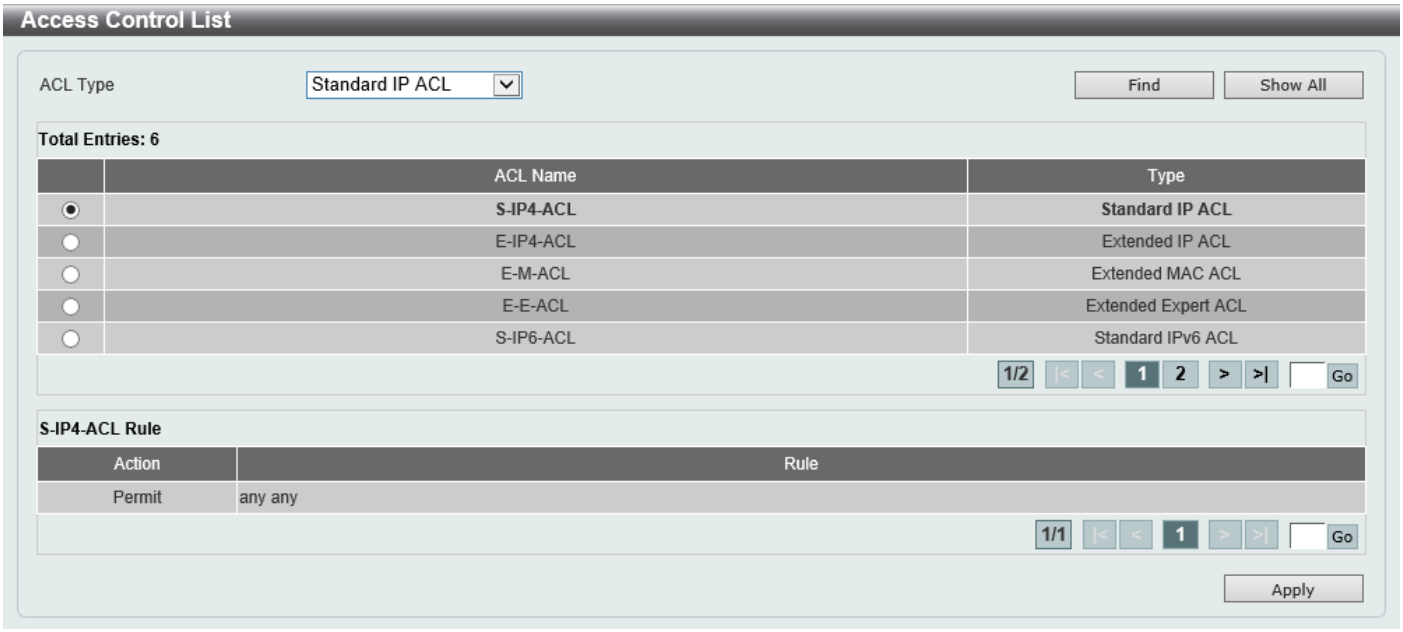


Figure 6-104 PIM SSM Settings (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

PIM Neighbor Table

This window is used to find and display PIM neighbor information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM Neighbor Table**, as shown below:

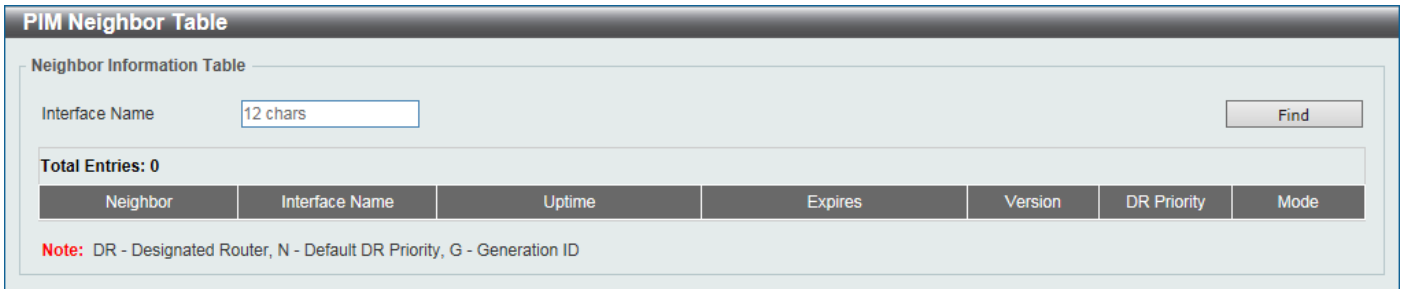


Figure 6-105 PIM Neighbor Table Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the VLAN interface name here to display PIM-SM neighbor information.

Click the **Find** button to locate a specific entry based on the information entered.

PIM for IPv6

In this section, the settings associated with PIM Sparse Mode for IPv6 (PIM-SMv6) and PIM Dense Mode for IPv6 (PIM-DMv6) will be configured.

PIM for IPv6 Interface

This window is used to display and configure the PIM IPv6 interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Interface**, as shown below:

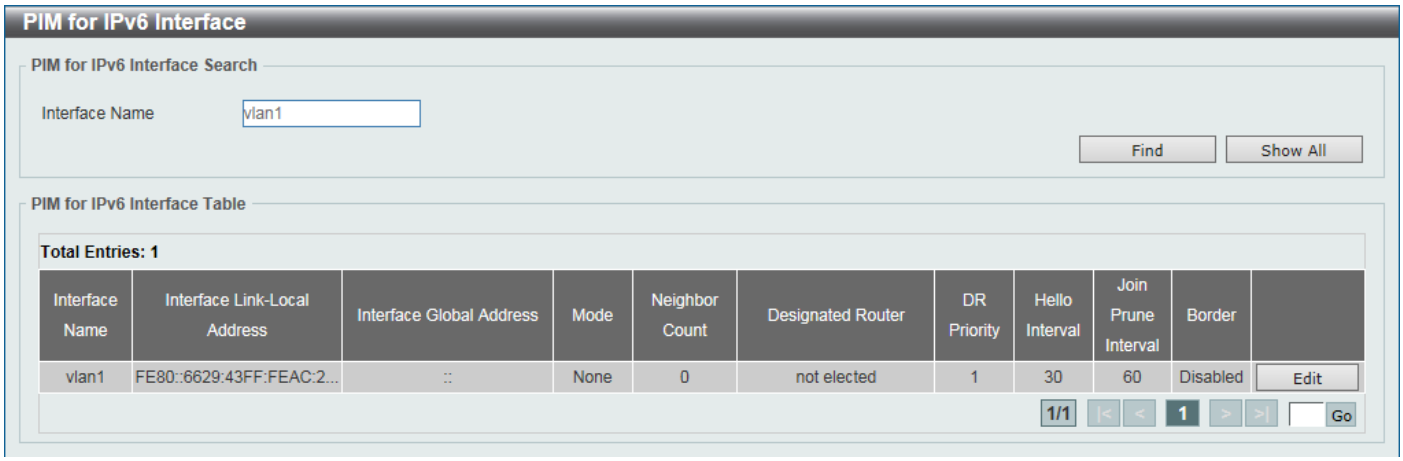


Figure 6-106 PIM for IPv6 Interface Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the VLAN interface name here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

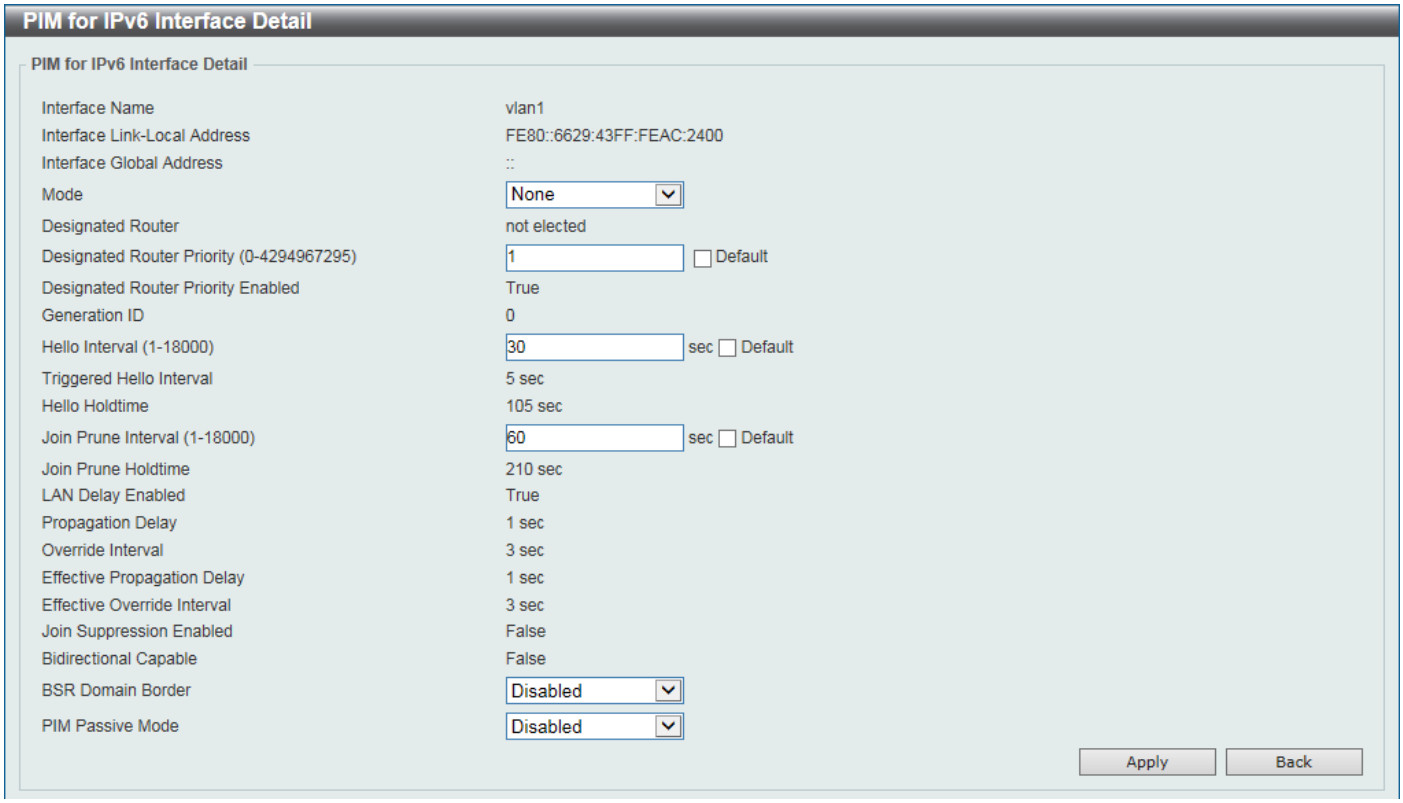


Figure 6-107 PIM for IPv6 Interface (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Mode	Select the IPv6 PIM mode used in this interface here. Options to choose from are **None** and **Sparse Mode**. PIM for IPv6 will be disabled in this interface when the **None** option was selected.
Designated Router Priority	Enter the DR priority value here. The range is from 0 to 4294967295. A larger value means a higher priority. This feature only takes effective when the VLAN interface is PIM-SM mode enabled. When a DR is a candidate for election, the following conditions apply: • The router with the highest priority value configured on an interface will be elected as the DR. If multiple routers have the same highest priority, then the router with the highest IPv6 address configured on the interface will be elected as the DR. • If a router does not advertise a priority value in its hello messages, the router is regarded as having the highest priority and will be elected as the DR. If there are multiple routers do not include the DR priority option in their hello messages, then the router with the highest IPv6 address will be elected as the DR. By default, this value is 1. Select the **Default** option to use the default value.
Hello Interval	Enter hello message interval value here. The range is from 1 to 18000 seconds. A PIM router learns PIM neighbors via the hello message. Routers configured for IP multicast send PIM hello messages to detect PIM routers. For SM, hello messages are also used to determine which router will be elected as the designated router for each LAN segment. By default, this value is 30 seconds. Select the **Default** option to use the default value.
Join Prune Interval	Enter the Join/Prune message interval value here. The range is from 1 to 18000 seconds. When configuring the Join/Prune interval, the user needs to consider the factors, such as configured bandwidth and expected average number of multicast route entries for the attached network or link (for example, the period would be

Parameter	Description
	longer for lower-speed links, or for routers in the center of the network that expect to have a larger number of entries). For SM-mode, the router will periodically send the join message based on this interval. The hold-time in a Join/Prune message is 3.5 times the join-prune-interval. The receiving router will start a timer based on this hold-time, and prune the interface if no join message is received on this interface. By default, this value is 60 seconds. Select the **Default** option to use the default value.
BSR Domain Border	Select to enable or disable the BSR domain border feature here. When an interface is configured as a border, it will prevent bootstrap router (BSR) messages from being sent or received through it.
PIM Passive Mode	Select to enable or disable the PIM passive mode for this interface here. This feature only takes effect when the interface is IPv6 PIM enabled. When the passive mode is enabled, the interface will neither send PIM messages out nor accept PIM messages from this interface. The router will act as it is the only PIM router on the network. Use this feature only when there is only one PIM router on the LAN.

Click the **Apply** button to accept the changes made.

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

PIM for IPv6 BSR Candidate Settings

This window is used to display and configure the IPv6 PIM BSR candidate settings. This feature only affects PIM-SM operation. This will cause the router to send bootstrap messages to all its PIM neighbors, with the address of the designated interface as the BSR address. A PIM-SM domain must contain a unique BSR (Bootstrap Router) which is responsible for collect and advertise the RP information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 BSR Candidate Settings**, as shown below:

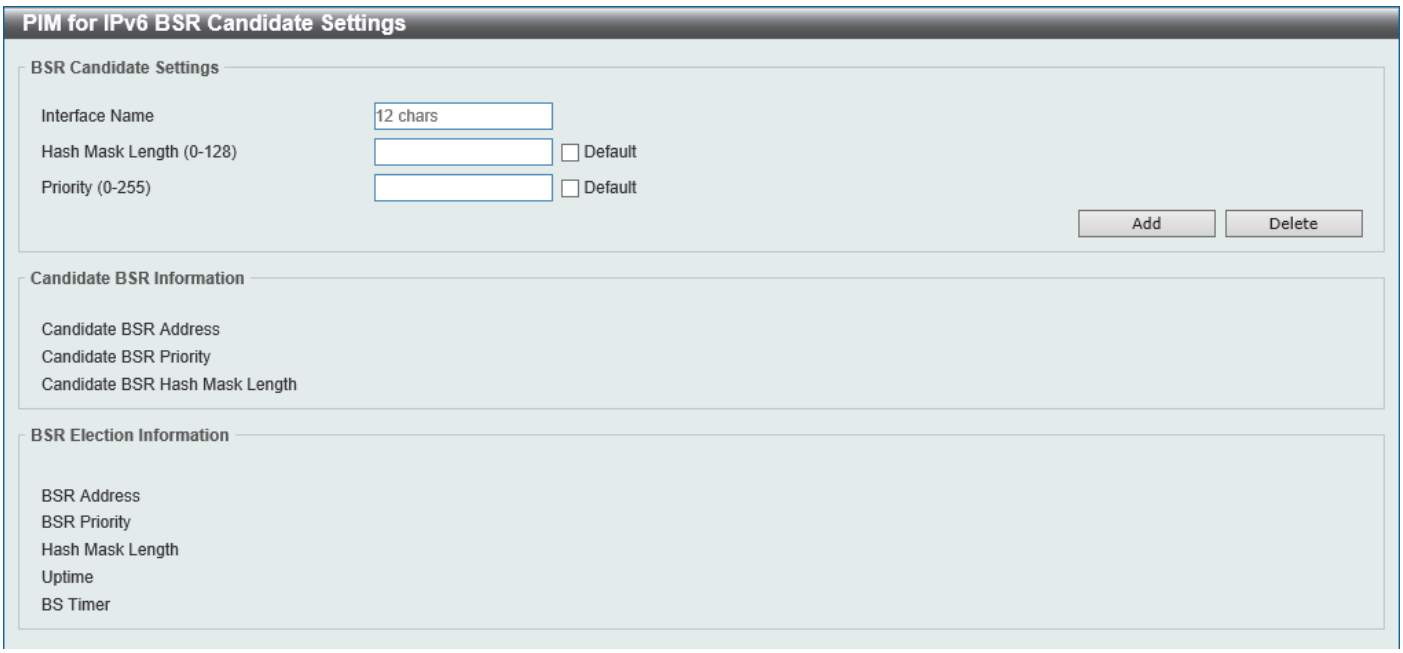


Figure 6-108 PIM for IPv6 BSR Candidate Settings Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the VLAN interface name used here.
Hash Mask Length	Enter the hash mask length for RP selection here. The range is from 0 to 128. The mask (128 bits maximum) that is to be logically AND with the group address before the hash function is executed. All groups with the same seed hash (correspond) to the same RP. Therefore, one RP can be derived for multiple groups. By default, this value is 126. Select the **Default** option to use the default value.
Priority	Enter the priority value for the BSR candidate here. The range is from 0 to 255. The BSR with the larger priority is preferred. If the priority values are the same, the router with the larger IPv6 address is the BSR. By default, this value is 64. Select the **Default** option to use the default value.

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

Click the **Delete** button to delete an entry based on the information entered.

PIM for IPv6 BSR Table

This window is used to view IPv6 PIM BSR information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 BSR Table**, as shown below:

Figure 6-109 PIM for IPv6 BSR Table Window

PIM for IPv6 RP Address

This window is used to display and configure the IPv6 PIM RP address settings. This feature only affects PIM-SM operation. Use this feature to statically define the RP address for multicast groups that are to operate in sparse mode.

Use a single RP for more than one group. The conditions specified by the access list determine for which groups the RP can be used. Multiple RP can be defined, each with a single access list. The new setting overrides the old one.

All routers in a domain should have a consistent multicast group to RP mapping. The first hop router that initiates a register message will use the mapping entries to determine the RP for sending the PIM register message destined for a specific group. The last hop router that initiates a join message uses the mapping entries to determine the RP for sending the join and prune message for a specific group. When a router receives a join message, it will check the mapping entries for forwarding of the message. When a RP receives a register message, if the router is not the right RP for the multicast group, a register-stop message will be sent.

If the PIM domain is using embedded-RP, only the RP needs to be statically configured as the RP for the embedded RP ranges. The other routers will discover the RP address from the IPv6 group address. If these routers want to select

a static RP instead of the embedded RP, the specific embedded RP group range must be configured in the access list of the static RP.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Address**, as shown below:

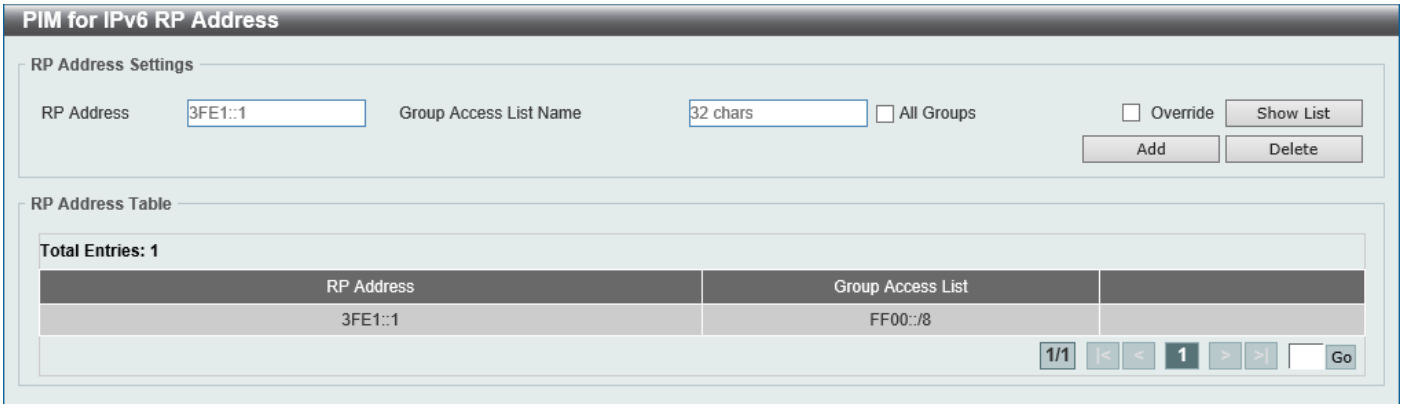


Figure 6-110 PIM for IPv6 RP Address Window

The fields that can be configured are described below:

Parameter	Description
RP Address	Enter the RP IPv6 address here.
Group Access List Name	Enter the standard IPv6 access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration. Select the **All Groups** option to map the RP to all multicast groups.
Override	Selecting this option specifies that the static RP will override dynamically learned RPs.

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

Click the **Delete** button to delete an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

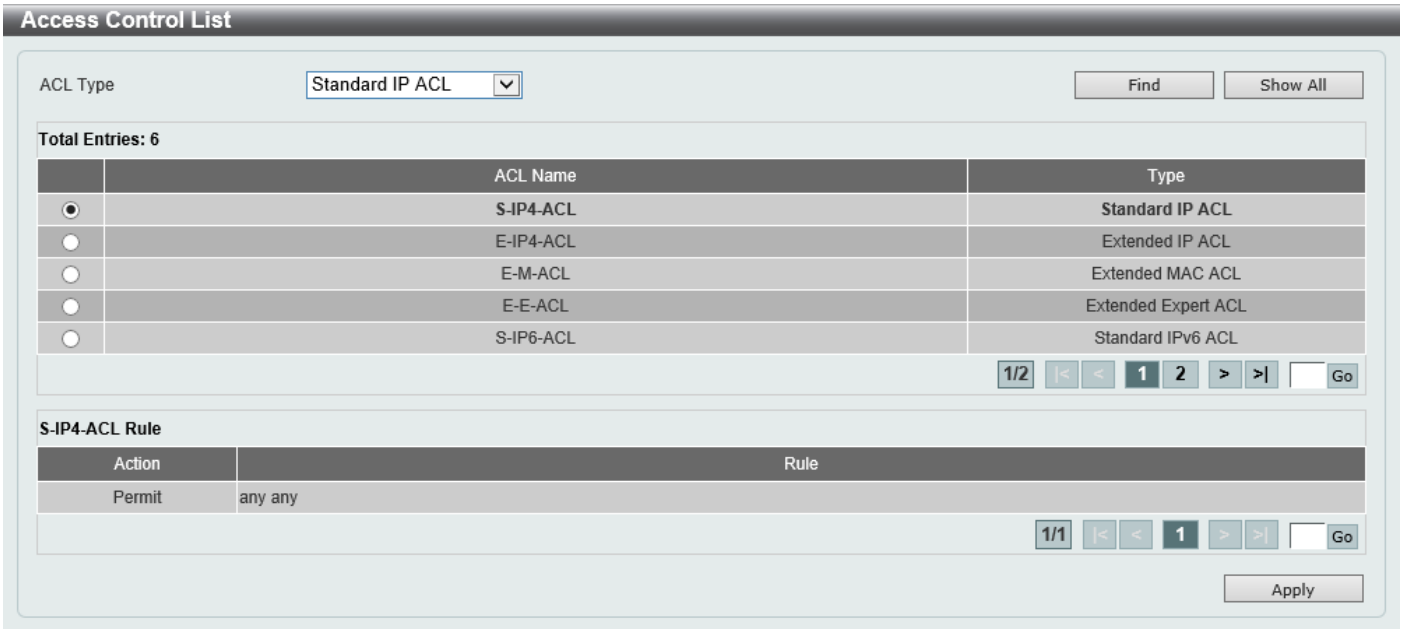


Figure 6-111 PIM for IPv6 RP Address (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

PIM for IPv6 RP Candidate

This window is used to display and configure the IPv6 PIM RP candidate settings. Only one group access list can be specified for each interface. The latest configuration overrides the previous one. This feature can be issued multiple times for different interfaces. This configuration causes the router to send a PIMv2 message advertising itself as a candidate RP to the BSR.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Candidate**, as shown below:

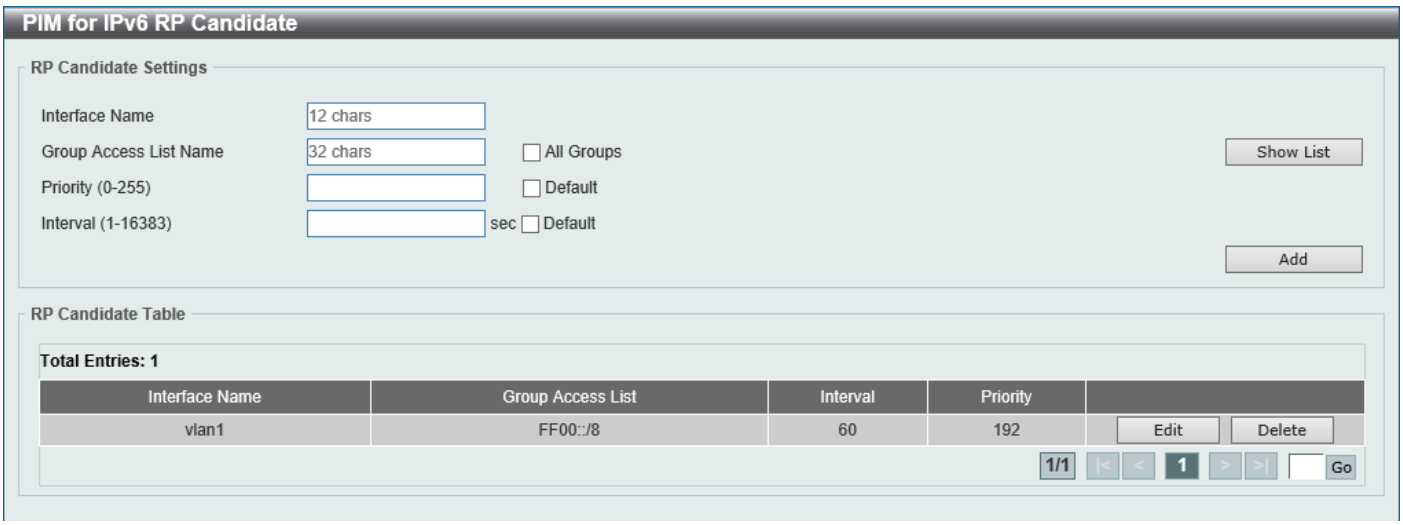


Figure 6-112 PIM for IPv6 RP Candidate Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the interface name here whose IPv6 address will be advertised as the candidate RP (C-RP).
Group Access List Name	Enter the standard IPv6 access list that will be used here. Click the **Show List** button to find and select any of the exiting access lists configured on this Switch to be used in this configuration. Select the **All Groups** option to map the candidate RP to all multicast groups.
Priority	Enter the RP priority value here. The range is from 0 to 255. By default, this value is 192. Select the **Default** option to use the default value.

Parameter	Description
Interval	Enter the RP candidate advertisement interval value here. The range is from 1 to 16383 seconds. By default, this value is 60 seconds. Select the **Default** option to use the default value.

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

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

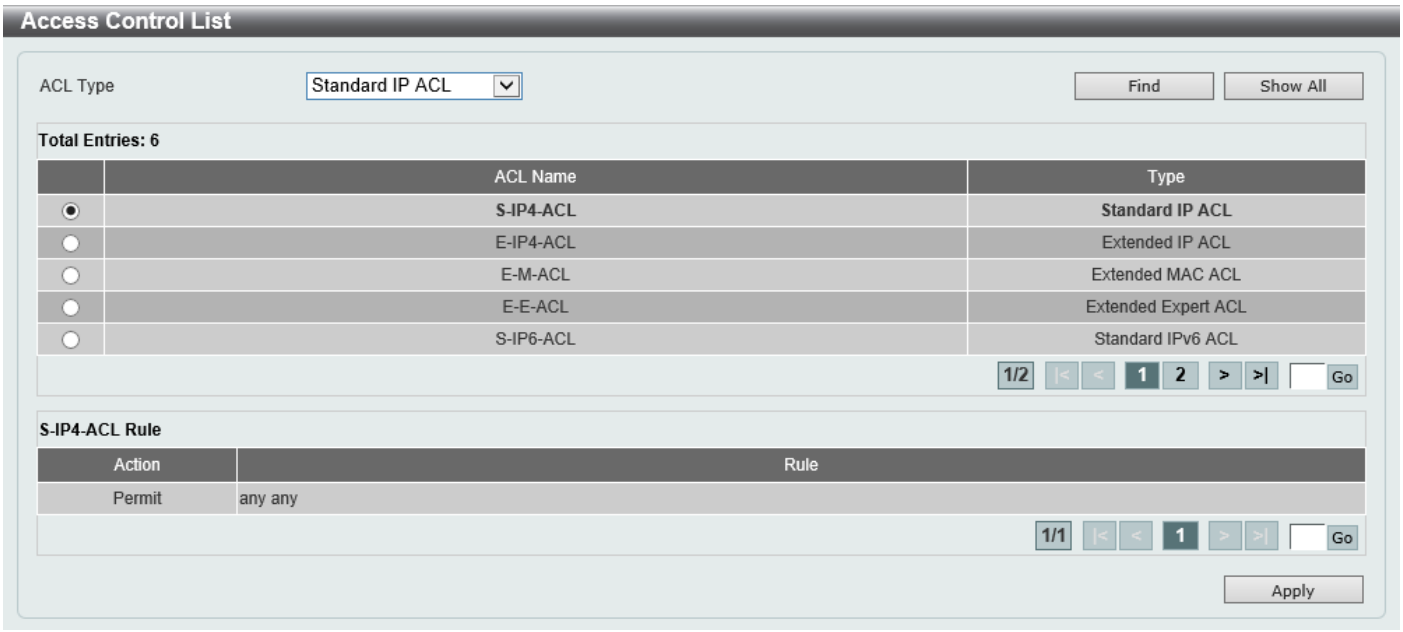


Figure 6-113 PIM for IPv6 RP Candidate (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

After clicking the **Edit** button, the following page will appear.

After clicking the **Edit** button, the fields that can be configured in the **RP Candidate Table** are described below:

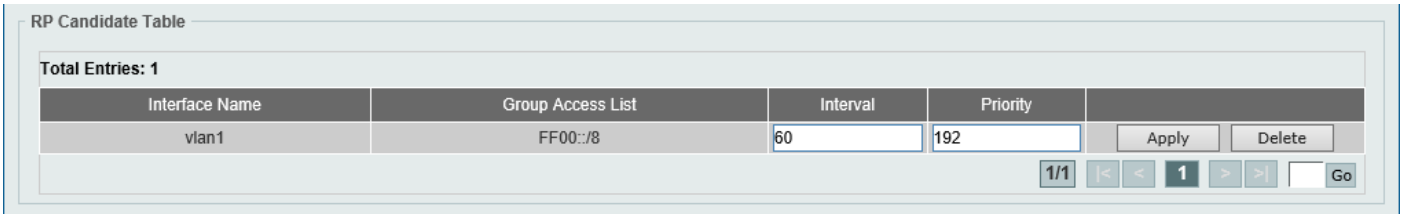


Figure 6-114 PIM for IPv6 RP Candidate (Edit) Window

The additional fields that can be configured are described below:

Parameter	Description
Interval	Enter the RP candidate advertisement interval value here. The range is from 1 to 16383 seconds.
Priority	Enter the RP priority value here. The range is from 0 to 255.

Click the **Apply** button to accept the changes made.

PIM for IPv6 RP Embedded Settings

This window view and configure the IPv6 PIM embedded settings. Embedded RP defines an address allocation policy in which the address of the RP is encoded in an IPv6 multicast group address. This allows an easy deployment of scalable inter-domain multicast and simplifies the intra-domain multicast configuration as well. IPv6 Multicast group addresses embedded with RP information start with ff70::/12 where the flag value of 7 means embedded RP.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Embedded Settings**, as shown below:

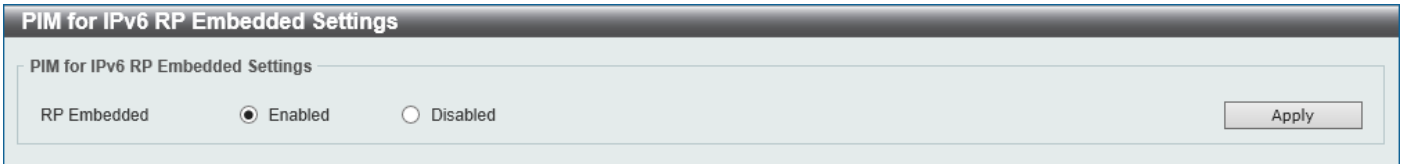


Figure 6-115 PIM for IPv6 RP Embedded Settings Window

The fields that can be configured are described below:

Parameter	Description
RP Embedded	Select to enable or disable the RP embedded feature here.

Click the **Apply** button to accept the changes made.

PIM for IPv6 RP Table

This window is used to find and display IPv6 PIM RP information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Table**, as shown below:

Figure 6-116 PIM for IPv6 RP Table Window

The fields that can be configured are described below:

Parameter	Description
Group Address/Prefix Length	Enter the multicast group IPv6 address and prefix length here.
Source	Select the source to display here. Options to choose from are: • **Bootstrap** - Specifies to display ranges learned through the BSR. • **Embedded RP** - Specifies to display group ranges learned through the embedded rendezvous point (RP). • **Static** - Specifies to display ranges enabled by static configuration.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

PIM for IPv6 Register Settings

This window is used to display and configure the IPv6 PIM register settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Register Settings**, as shown below:

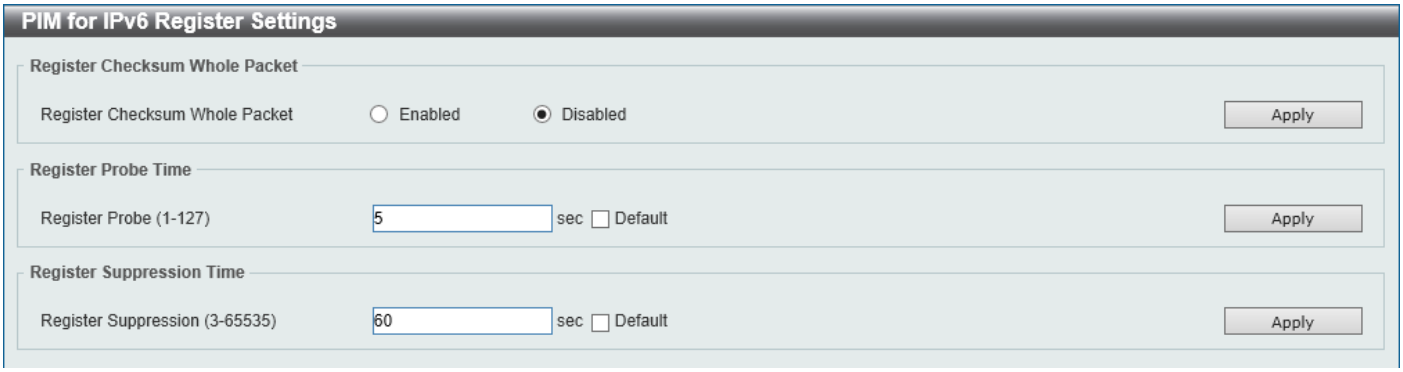


Figure 6-117 PIM for IPv6 Register Settings Window

The fields that can be configured in **Register Checksum Whole Packet** are described below:

Parameter	Description
Register Checksum Whole Packet	Select the enable or disable the register checksum whole-packet feature here. When enabled, it configures the router to calculate the checksum of register message over the entire PIM message including the data portion. By default, the register checksum methodology is PIM RFC-compliant, excluding the data portion in the Register message.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Probe Time** are described below:

Parameter	Description
Register Probe	Enter the register probe time value here. The range is from 1 to 127 seconds. The register-probe time is the time before the Register-Stop Timer (RST) expires when a DR may send a Null-Register to the RP to cause it to resend a Register-Stop message. By default, this value is 5 seconds. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Suppression Time** are described below:

Parameter	Description
Register Suppression	Enter the register suppression timeout value here. The range is from 3 to 65535 seconds. When a DR receives the register-stop message, it will start the suppression timer. During the suppression time, a DR will stop sending Register-encapsulated data to the RP. This timer should be configured on the designated router. The value of the Register Probe Time must be less than half the value of the Register Suppression Time to prevent a possible negative value in the setting of the Register-Stop Timer. The minimal value for Register Suppression Time is 3. By default, this value is 60 seconds. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

PIM for IPv6 SPT Threshold Settings

This window is used to display and configure the Shortest Path Tree (SPT) threshold settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 SPT Threshold Settings**, as shown below:

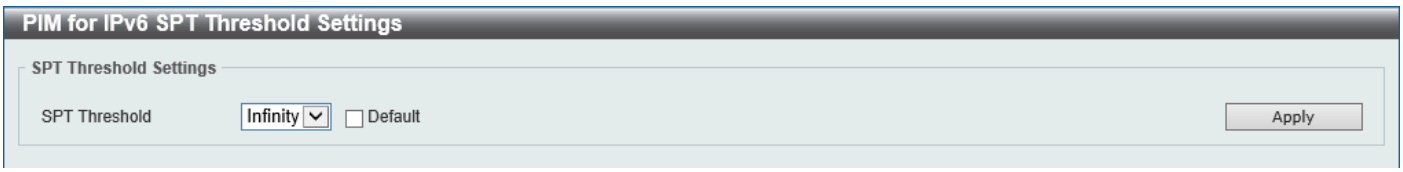


Figure 6-118 SPT Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
SPT Threshold	Select the SPT threshold value here. Options to choose from are: • **Infinity** - Specifies to always rely on the shared tree.

Parameter	Description
	• **0** - Specifies to establish the source tree right at the arrival of the first packet. By default, the **Infinity** option is used. Select the **Default** option to use the default setting.

Click the **Apply** button to accept the changes made.

PIM for IPv6 SSM Settings

This window is used to display and configure the IPv6 PIM SSM settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 SSM Settings**, as shown below:

Figure 6-119 PIM for IPv6 SSM Settings Window

The fields that can be configured are described below:

Parameter	Description
Multicast Group Address Name	Enter the name of the access list that defines the user-specified SSM group address here. Select the **Default SSM Group** option to use the default SSM group address range. By default, the SSM group address range is FF3x::/32.

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

Click the **Delete** button to delete an entry based on the information entered.

After clicking the **Show List** button, the following page will appear.

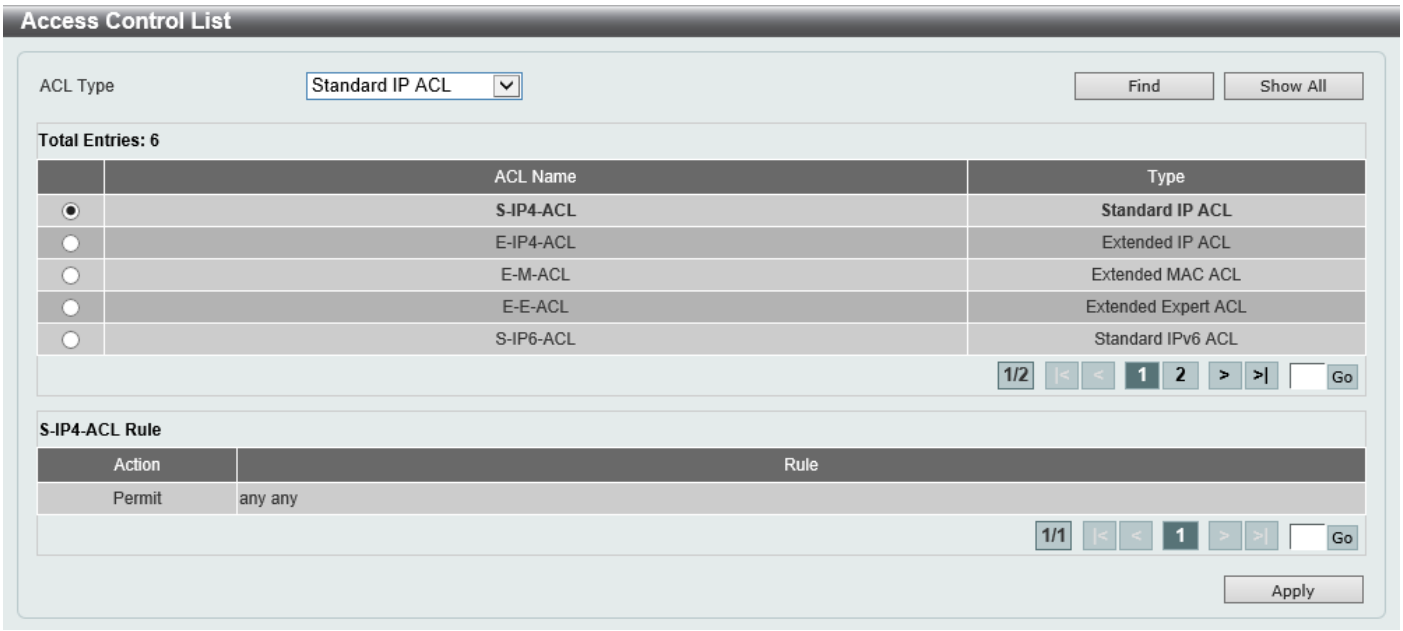


Figure 6-120 PIM for IPv6 SSM Settings (Show List) Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ACL List	Select the radio button of the access list in the table that will be used here.

Click the **Find** button to display a list of access lists based on the selection made.

Click the **Show All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

PIM for IPv6 (S,G) Keepalive Time

This window is used to display and configure the IPv6 PIM (S,G) keep-alive time settings. This feature is used to configure the keep-alive timer, which is the period during which the PIM router will maintain the (S, G) state in the absence of explicit (S, G) local membership or (S, G) join messages received to maintain it.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 (S,G) Keepalive Time**, as shown below:

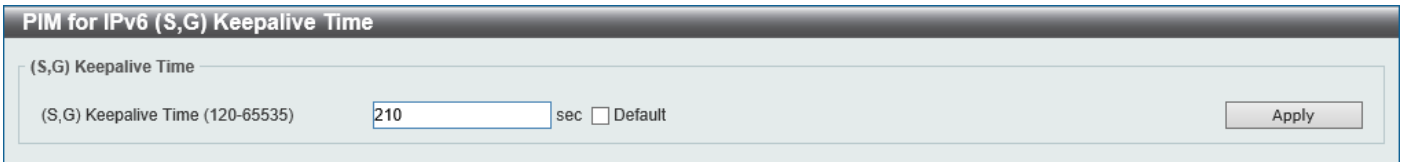


Figure 6-121 PIM for IPv6 (S,G) Keepalive Time Window

The fields that can be configured are described below:

Parameter	Description
(S,G) Keepalive Time	Enter the (S,G) keep-alive time value here. This specifies the period during which the PIM router will maintain the (S, G) state in the absence of explicit (S, G) local membership or (S, G) join messages received to maintain it. The range is from 120 to 65535 seconds. By default, this value is 210 seconds. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

PIM for IPv6 Multicast Route Table

This window is used to display all entries in the IPv6 multicast routing table. The Switch populates the multicast routing table by creating source, group (S,G) entries from star, group (*,G) entries. The star (*) refers to all source addresses, the "S" refers to a single source address, and the "G" is the destination multicast group address. In

creating (S,G) entries, the software uses the best path to that destination group found in the unicast routing table, through Reverse Path Forwarding (RPF).

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Multicast Route Table**, as shown below:

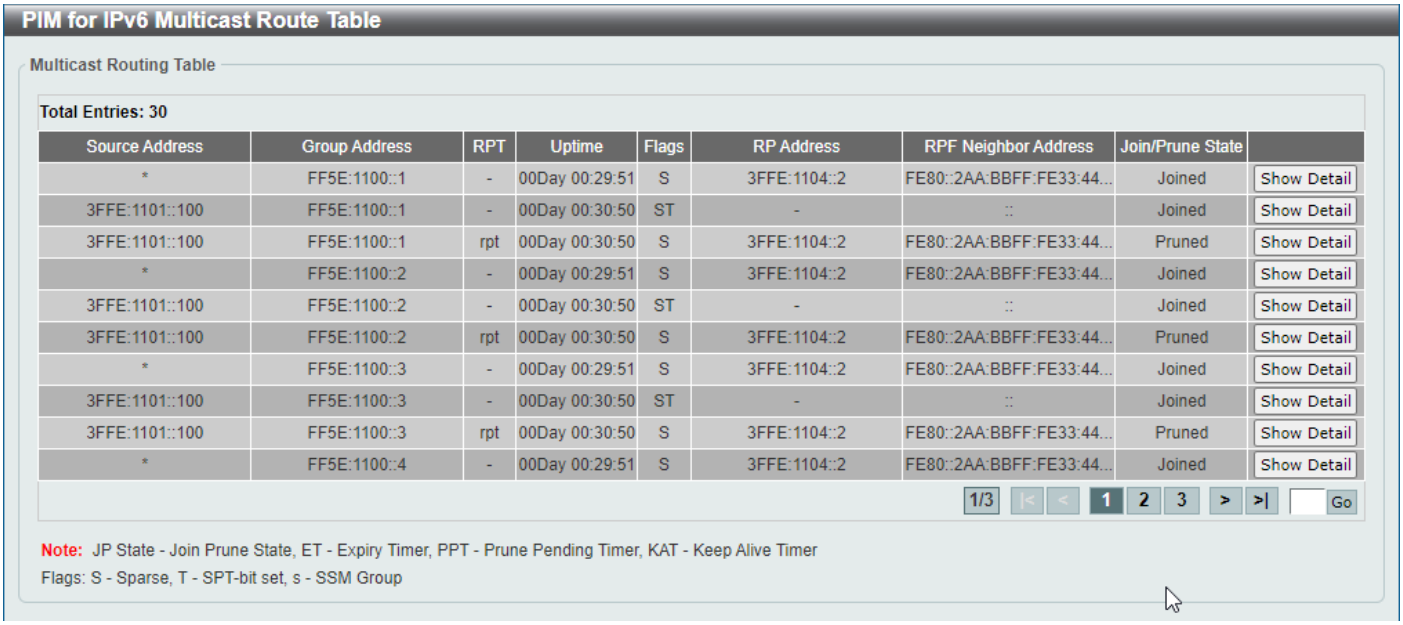


Figure 6-122 PIM for IPv6 Multicast Route Table Window

Click the **Show Detail** button to view detailed information for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

Figure 6-123 PIM for IPv6 Multicast Route Detail Table Window

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

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

PIM for IPv6 Neighbor Table

This window is used to display IPv6 PIM neighbor information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Neighbor Table**, as shown below:

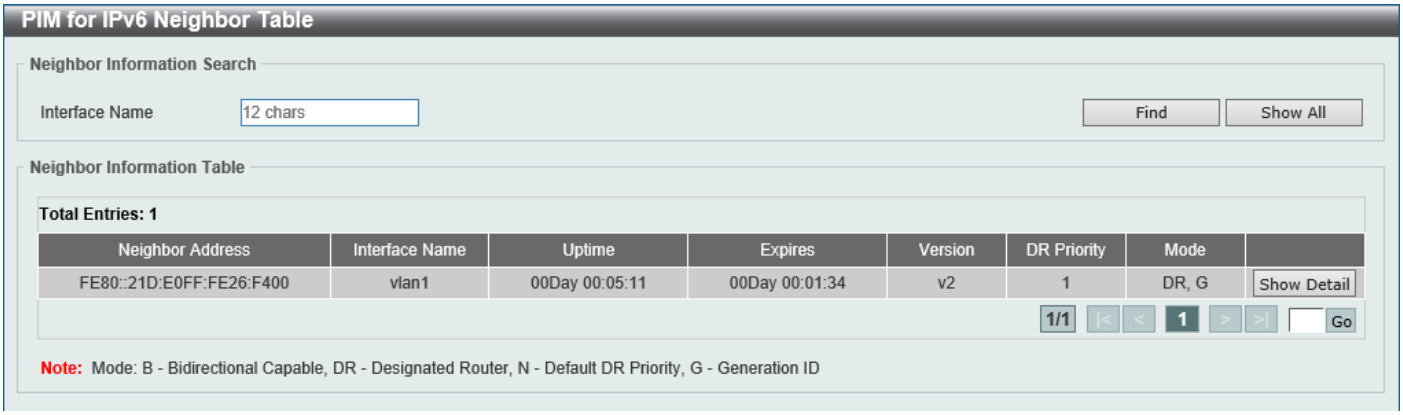


Figure 6-124 PIM for IPv6 Neighbor Table Window

The fields that can be configured are described below:

Parameter	Description
Interface Name	Enter the VLAN interface name used in this display here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Show Detail** button to view detailed information for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following page will appear.

Figure 6-125 PIM for IPv6 Neighbor Detail Table Window

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

MSDP

MSDP Global Settings

This window is used to display and configure the global Multicast Source Discovery Protocol (MSDP) settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > MSDP > MSDP Global Settings**, as shown below:

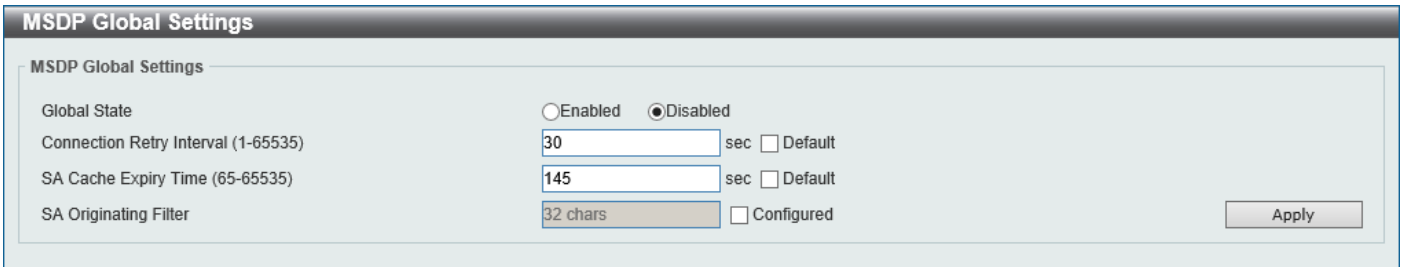


Figure 6-126 MSDP Global Settings Window

The fields that can be configured are described below:

Parameter	Description
Global State	Select to globally enable or disable the MSDP feature here.
Connect Retry Interval	Enter the connect retry interval time value here. The range is from 1 to 65535 seconds. This is used to configure the interval at which MSDP peers will wait after peering sessions are reset before attempting to re-establish. A larger time interval will delay the time before attempting to re-establish the peer session. For best results, configure the value in the range from 1 to 60 seconds. By default, this value is 30 seconds. Select the **Default** option to use the default value.
SA Cache Expiry Time	Enter the Source-Active (SA) cache expiry time value here. The range is from 65 to 65535 seconds. This is used to configure the expiry time for SA cache entries. The interval for SA originating is 60 seconds and it cannot be modified, so the SA cache expiry time allows for the tuning of expected packet loss on a network implicitly. Select the **Default** option to use the default value.
SA Originating Filter	Select the **Configured** option and enter the SA originating filter string here. This string can be up to 32 characters long. An RP is configured to run MSDP and will originate SA messages for all local sources that register with this RP. By configuring the filter with a list, an RP will only originate SA messages for local sources by sending to specified groups that match (S, G) pairs defined in standard IP access list. By selecting the **Configured** option and not specifying the filter string, an RP from originating SA messages for all local sources can be prevented.

Click the **Apply** button to accept the changes made.

MSDP Peer Settings

This window is used to display and configure the MSDP peer settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > MSDP > MSDP Peer Settings**, as shown below:

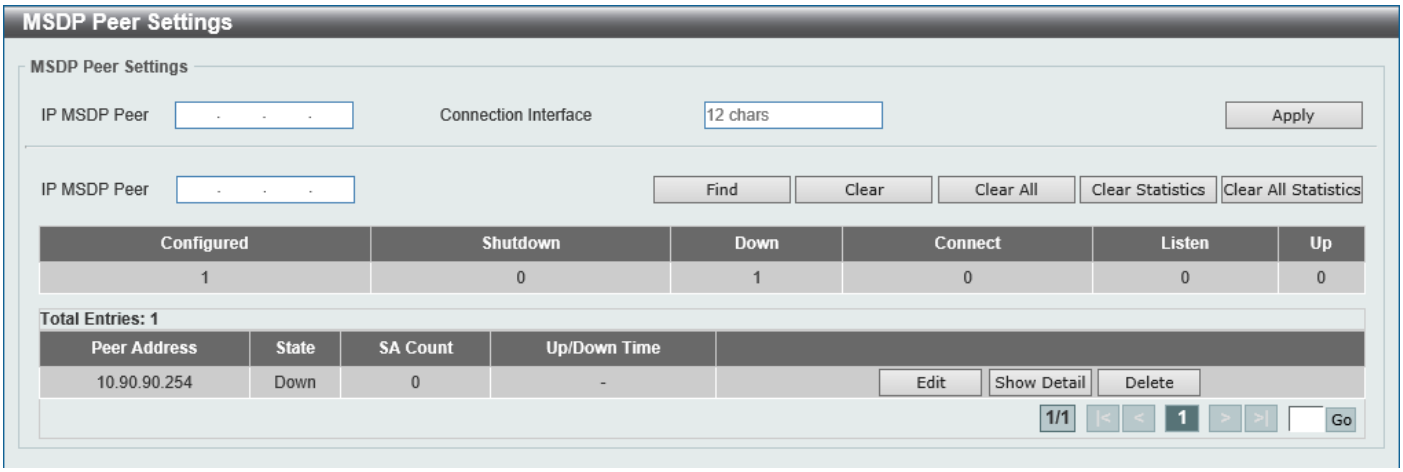


Figure 6-127 MSDP Peer Settings Window

The fields that can be configured are described below:

Parameter	Description
IP MSDP Peer	Enter the MSDP peer IP address here.
Connection Interface	Enter the connect interface name here. This string can be up to 12 characters long. This specifies the local interface that is used as the source IP address for TCP connections.

Click the **Apply** button to accept the changes made.

Click the **Find** button to find and display an entry based on the information entered.

Click the **Clear** button to clear the entries from the table based on the information entered.

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

Click the **Clear Statistics** button to clear the statistics information of the entries based on the information entered.

Click the **Clear All Statistics** button to clear all the statistics information displayed in the table.

Click the **Edit** button to re-configure the specific entry.

Click the **Show Detail** button to display detailed information about the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

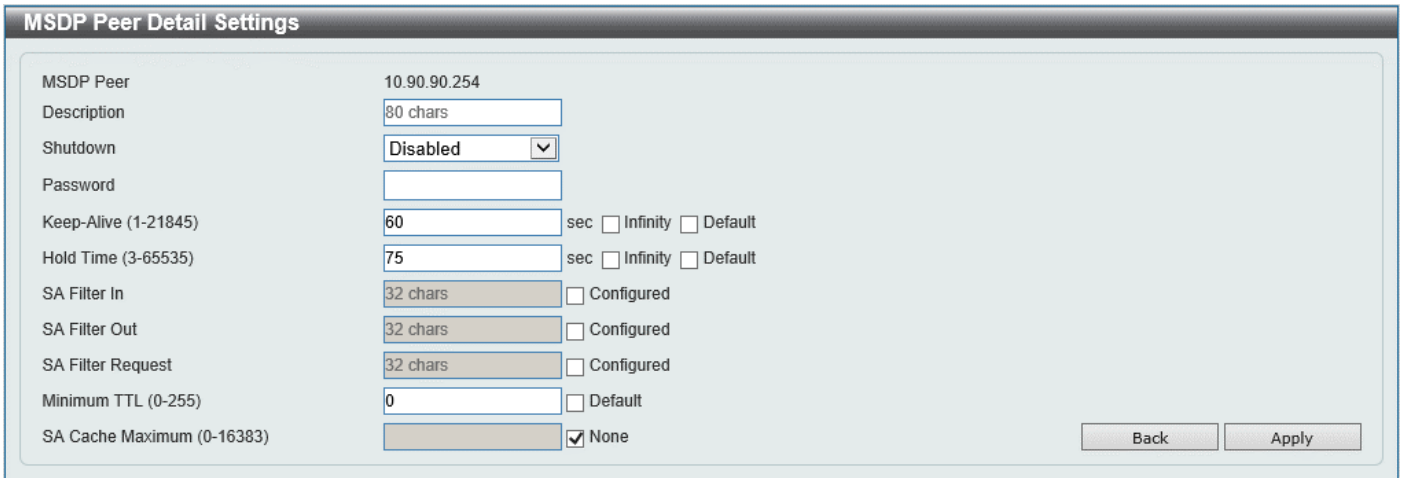


Figure 6-128 MSDP Peer Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Description	Enter the description for the MSDP peer here. This string can be up to 80 characters long.
Shutdown	Select to enable or disable the shutdown feature here. The shutdown state must be configured on an existing MSDP peer. If the MSDP peer is in the shutdown state, the TCP connection between two peers won't be established. If the MSDP peer was changed into the no shutdown state, the TCP connection between two peers will attempt to re-establish.
Password	Enter the MD5 password for a TCP connection between two peers here. MD5 authentication must be configured with the same password on both MSDP peers. Otherwise, the connection between them cannot be established.
Keep-Alive	Enter the keep-alive time value here. The range is from 1 to 21845 seconds. The keep-alive interval should be less than the hold time configured on the remote side of the MSDP TCP connection. Otherwise, the remote side of MSDP TCP connection may be disconnected before receiving the MSDP keep-alive message. Selecting the **Infinity** option specifies the MSDP peer to never send keep-alive messages. By default, this value is 60 seconds. Select the **Default** option to use the default value.
Hold Time	Enter the hold-time value here. The range is from 3 to 65535 seconds. The hold time interval must be larger than keep-alive time configured on the remote side of the MSDP TCP connection. Otherwise, the MSDP TCP connection may be disconnected before receiving the MSDP keep-alive message. Select the **Infinity** option to specify that the connection between two peers is never torn down. Select the **Default** option to use the default value.
SA Filter In	Select the **Configured** option and enter the SA filter-in string here. This string can be up to 32 characters long. The router will receive all SA messages sent to it from a specified peer. By not specifying this string, the router will ignore all SA messages sent to it from a specified peer. By configuring this string, the router will only receive incoming SA messages from a specified peer that matches the (S, G) pairs defined in the standard IP access list.
SA Filter Out	Select the **Configured** option and enter the SA filter-out string here. This string can be up to 32 characters long. The router will forward all SA messages to an MSDP peer. By not specifying this string, the router will stop forwarding SA messages to a specified peer. By specifying this string, the router only forwards SA messages that match (S, G) pairs defined in the standard IP access list to a specified peer.

Parameter	Description
SA Filter Request	Select the **Configured** option and enter the SA filter request string here. This string can be up to 32 characters long. The router will process all SA request messages from a specified peer. By not specifying this string, the router will stop processing Source-Active request messages from a specified peer. By specifying this string, the router only processes SA request messages that request groups that are defined in the standard IP access list from a specified peer.
Minimum TTL	Enter the minimum TTL time value here. The range is from 0 to 255. When the SA messages are sent from MSDP peers, If the Time-To-Live (TTL) value of multicast data packets in SA message will be decreased, if the decreased TTL value is smaller than minimum TTL value of the MSDP peer the SA message was sent to, the SA will not be sent out. By default, this value is 0. Select the **Default** option to use the default value.
SA Cache Maximum	Enter the maximum SA cache value here. The range is from 0 to 16383. When the maximum number of SA cache entries is configured to zero, the Switch cannot learn a SA cache entry from the peer. When the maximum number of SA cache entries is configured to be smaller than the existing SA cache entries, the older existing SA cache entries will be removed until the number of SA cache entries is equal to the maximum number. Select the **None** option to specify that no limitation is applied for the number of Source-Active cache entries.

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

Click the **Apply** button to accept the changes made.

After clicking the **Show Detail** button, the following page will appear.

Figure 6-129 MSDP Peer Settings (Show Detail) Window

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

MSDP SA Cache

This window is used to view and clear the MSDP SA cache table.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > MSDP > MSDP SA Cache**, as shown below:

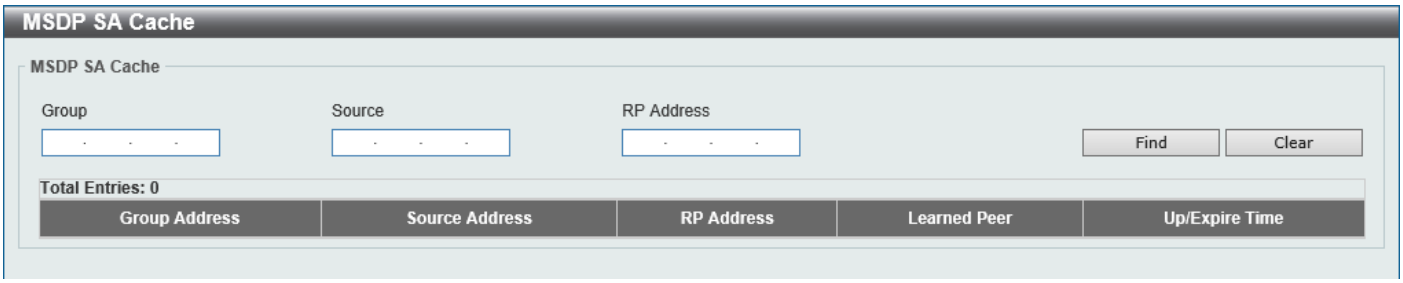


Figure 6-130 MSDP SA Cache Window

The fields that can be configured are described below:

Parameter	Description
Group	Enter the group address that will be used here.
Source	Enter the source address that will be used here.
RP Address	Enter the RP address that will be used here.

Click the **Find** button to find and display an entry based on the information entered.

Click the **Clear** button to clear the entries from the table based on the information entered.

MSDP Static RPF Settings

This window is used to display and configure the MSDP static RPF settings. Before configuring a static RPF peer, an MSDP peer must be added first. If the RP prefix list is specified, the peer will be a static RPF peer only for RPs in the prefix list. When multiple static RPF peers are specified without an RP prefix list, only the connected peer whose address is smallest will be the active static RPF peer. If an MSDP peer is configured as a static RPF peer multiple times, only the last configuration takes effect. If there is one MSDP peer only, this MSDP peer works as a static RPF peer.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > MSDP > MSDP Static RPF Settings**, as shown below:

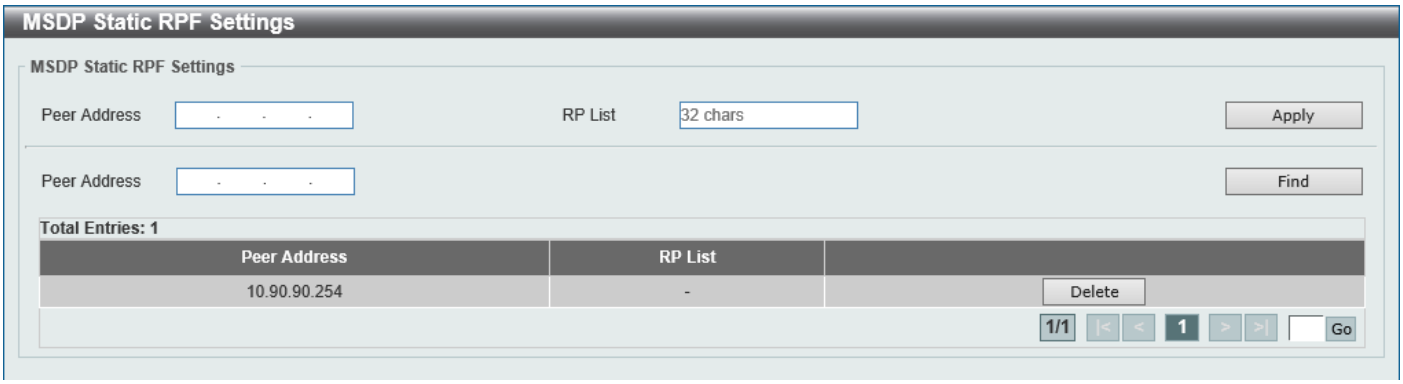


Figure 6-131 MSDP Static RPF Settings Window

The fields that can be configured are described below:

Parameter	Description
Peer Address	Enter the MSDP peer address here.
RP List	Enter the name of the standard IP access list that defines the RP prefix list here. This string can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Find** button to find and display an entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

MSDP Mesh Group Settings

This window is used to display and configure the MSDP mesh group settings. Before adding an MSDP peer to the mesh group, an MSDP peer must be added first. If an MSDP peer has been added to multiple mesh groups, only the last configuration takes effect.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > MSDP > MSDP Mesh Group Settings**, as shown below:

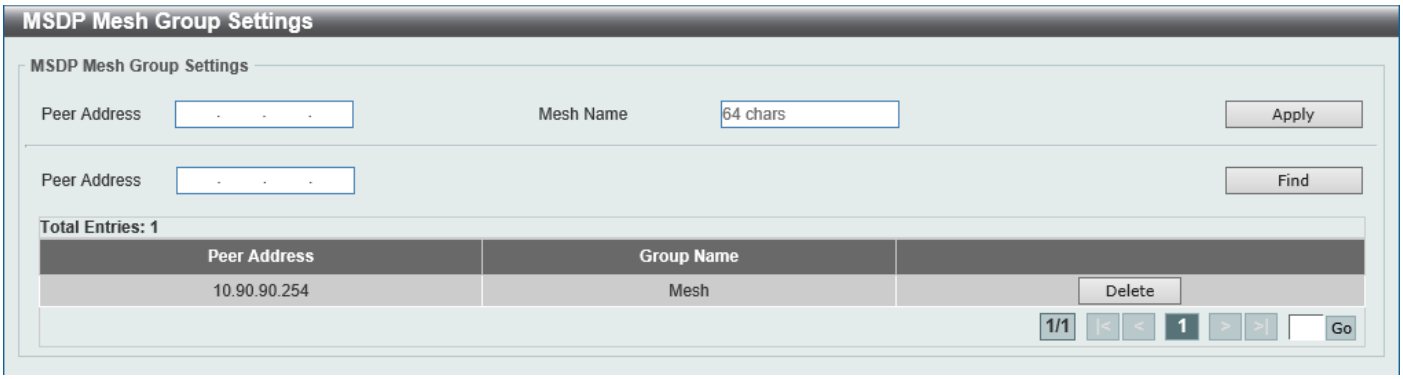


Figure 6-132 MSDP Mesh Group Settings Window

The fields that can be configured are described below:

Parameter	Description
Peer Address	Enter the MSDP peer IP address here.
Mesh Name	Enter the name of the mesh group here. This string can be up to 64 characters long.

Click the **Apply** button to accept the changes made.

Click the **Find** button to find and display an entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPMC

IP Multicast Global Settings

This window is used to display and configure the global IP Multicast (IPMC) settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Global Settings**, as shown below:

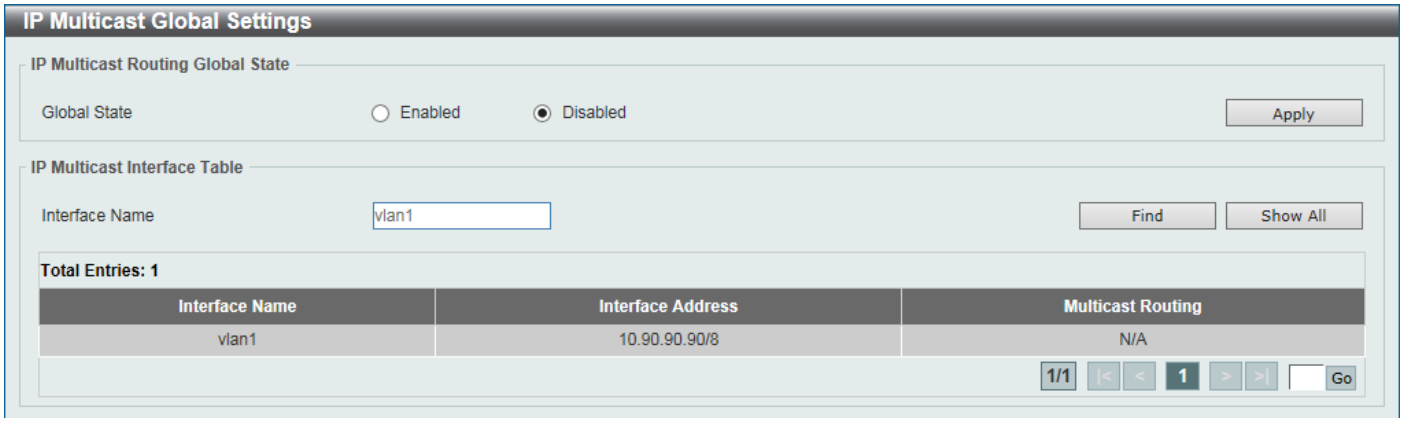


Figure 6-133 IP Multicast Global Settings Window

The fields that can be configured in **IP Multicast Routing Global State** are described below:

Parameter	Description
Global State	Select to globally enable or disable the IP multicast routing feature here. When IP multicast routing is disabled, the system will stop routing multicast packets even though the multicast routing protocol is enabled.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Multicast Interface Table** are described below:

Parameter	Description
Interface Name	Enter the interface name that will be used for the search here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IP Multicast Route Settings

This window is used to display and configure the IP multicast route settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Route Settings**, as shown below:

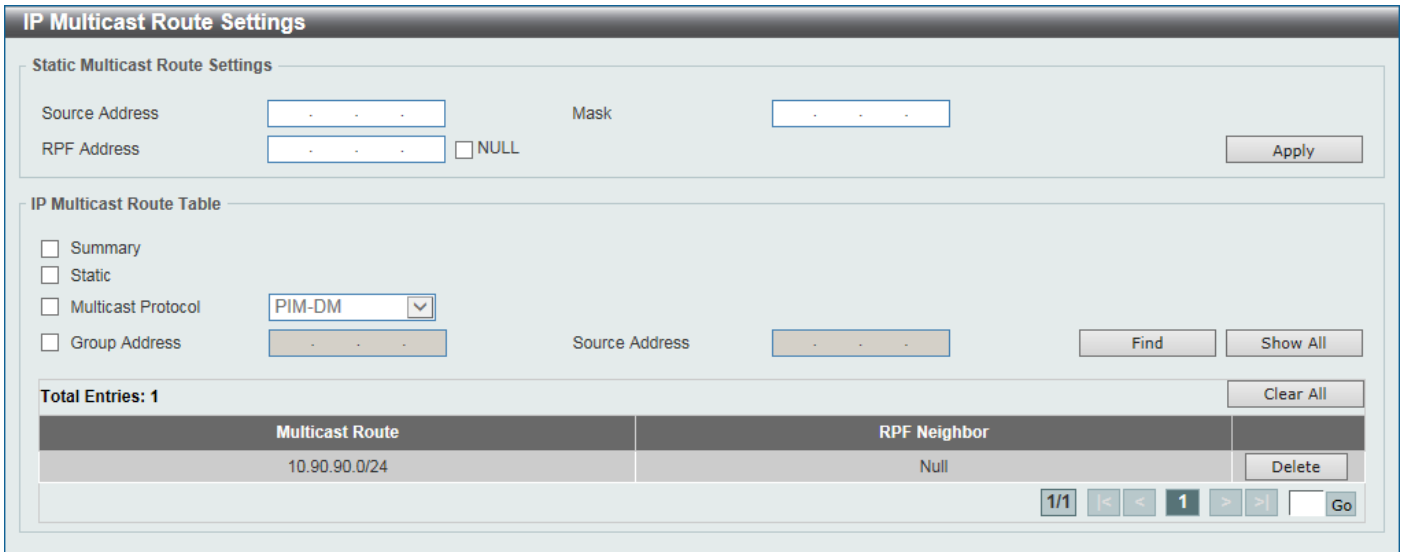


Figure 6-134 IP Multicast Route Settings Window

The fields that can be configured in **Static Multicast Route Settings** are described below:

Parameter	Description
Source Address	Enter the network address of the multicast source here.
Mask	Specifies the network mask for the multicast source here.
RPF Address	Enter the RPF neighbor IP address to reach the network here. Selecting the **NULL** option specifies that the RPF check will always fail for multicast traffic sent from this source network.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Multicast Route Table** are described below:

Parameter	Description
Summary	Selecting this option specifies to display a one-line, abbreviated summary of each entry in the IP multicast routing table.
Static	Selecting this option specifies to display the multicast static routes.
Multicast Protocol	Select this option and then select the multicast protocol that will be used in this display here. Options to choose from are: • **PIM-DM** - Specifies to display only the PIM-DM routes. • **PIM-SM** - Specifies to display only the PIM-SM routes. • **DVMRP** - Specifies to display only the DVMRP routes.
Group Address	Select and enter the multicast group IP address here.
Source Address	Enter the source IP address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IP Multicast RPF Table

This window is used to display Reverse Path Forwarding (RPF) information for a given unicast host address.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast RPF Table**, as shown below:

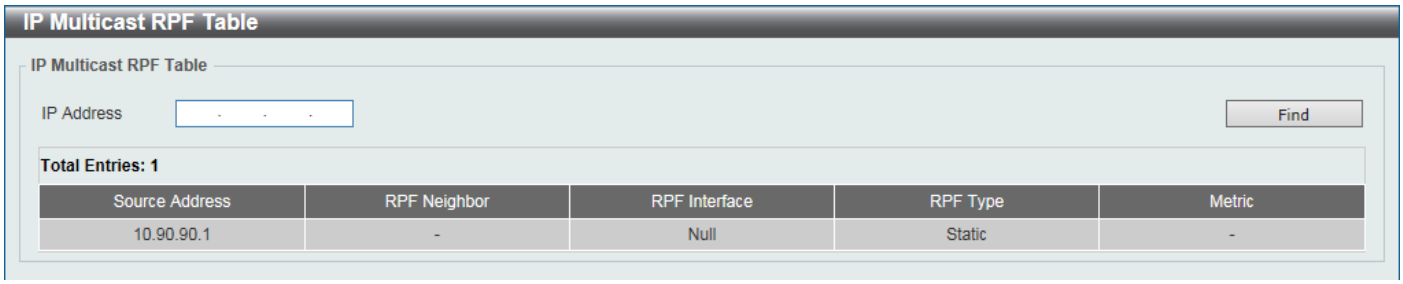


Figure 6-135 IP Multicast RPF Table Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Enter the unicast host IPv4 address here.

Click the **Find** button to locate a specific entry based on the information entered.

IP Multicast Routing Forwarding Cache Table

This window is used to display the content of the IP multicast routing forwarding cache database.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Routing Forwarding Cache Table**, as shown below:

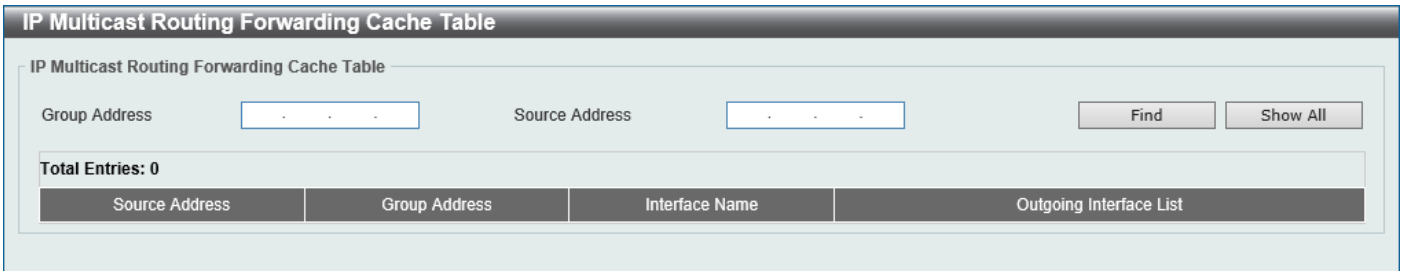


Figure 6-136 IP Multicast Routing Forwarding Cache Table Window

The fields that can be configured are described below:

Parameter	Description
Group Address	Enter the multicast group IP address here.
Source Address	Enter the source IP address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

IP Multicast Protocol Statistics

This window is used to view and clear the IP multicast protocol statistics information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Protocol Statistics**, as shown below:

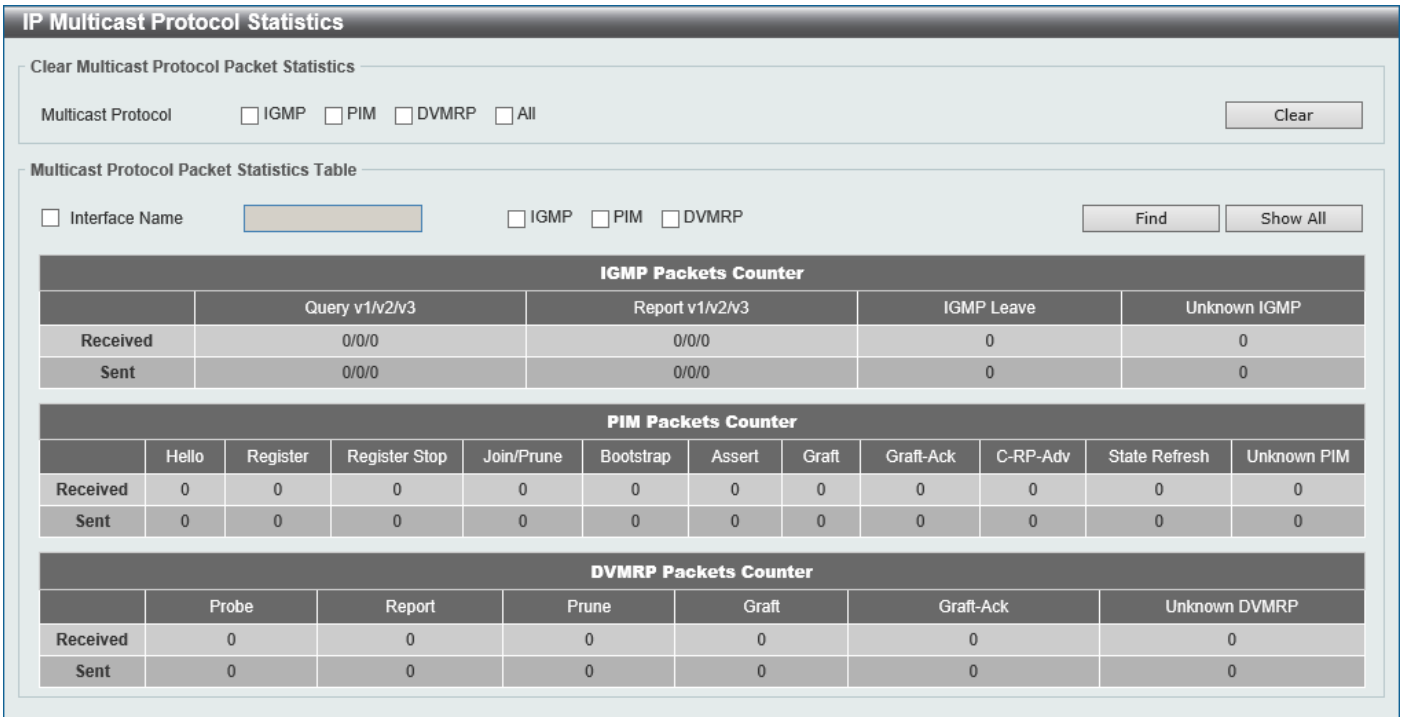


Figure 6-137 IP Multicast Protocol Statistics Window

The fields that can be configured in **Clear Multicast Protocol Packet Statistics** are described below:

Parameter	Description
Multicast Protocol	Select the multicast protocol that will be cleared here. Options to choose from are **IGMP**, **PIM**, **DVMRP**, and **All**.

Click the **Clear** button to clear the entries based on the information specified.

The fields that can be configured in **Multicast Protocol Packet Statistics Table** are described below:

Parameter	Description
Interface Name	Select and enter the interface name that will be used in the display here.
Multicast Protocol	Select the multicast protocol that will be used in the display here. Options to choose from are **IGMP**, **PIM**, and **DVMRP**.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Control Packet CPU Filtering

This window is used to display and configure the IPMC control packet CPU filtering settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > Control Packet CPU Filtering**, as shown below:

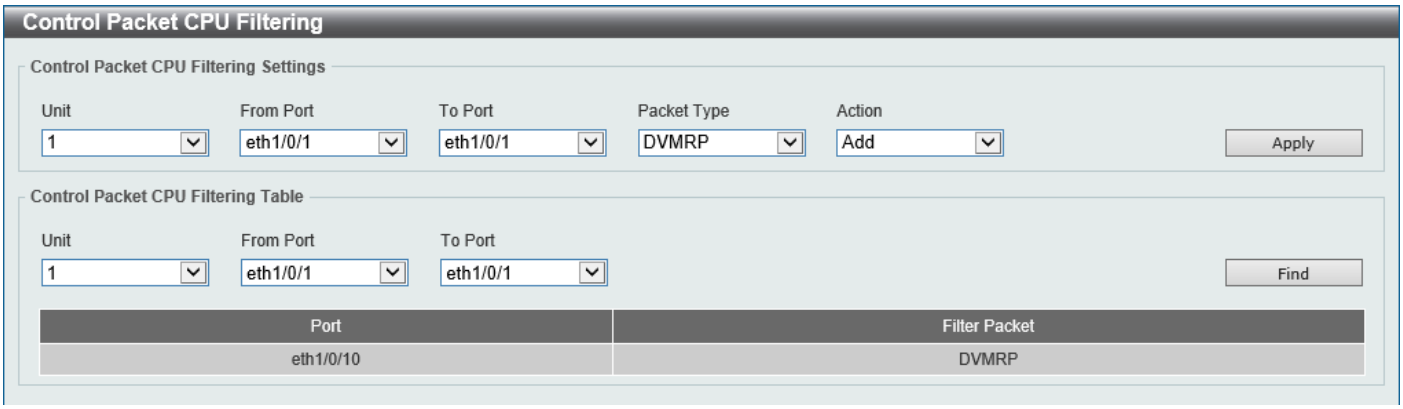


Figure 6-138 Control Packet CPU Filtering Window

The fields that can be configured in **Control Packet CPU Filtering Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Packet Type	Select the packet type here. Options to choose from are: • **DVMRP** - Specifies that the CPU will discard DVMRP Layer 3 control packets sent to it. • **PIM** - Specifies that the CPU will discard PIM Layer 3 control packets sent to it. • **IGMP Query** - Specifies that the CPU will discard IGMP Query Layer 3 control packets sent to it. • **OSPF -** Specifies that the CPU will discard OSPF Layer 3 control packets sent to it. • **RIP -** Specifies that the CPU will discard RIP Layer 3 control packets sent to it. • **VRRP** - Specifies that the CPU will discard VRRP Layer 3 control packets sent to it.
Action	Select the action that will be taken here. Options to choose from are: • **Add** - Specifies to add a new entry based on the information entered. • **Delete** - Specifies to delete an entry based on the information entered.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Control Packet CPU Filtering Table** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this display here.
From Port - To Port	Select the range of ports that will be used for this display here.

Click the **Find** button to find and display entries based on the selections made.

IPv6MC

IPv6 Multicast Global Settings

This window is used to display and configure the global IPv6 multicast settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Multicast Global Settings**, as shown below:

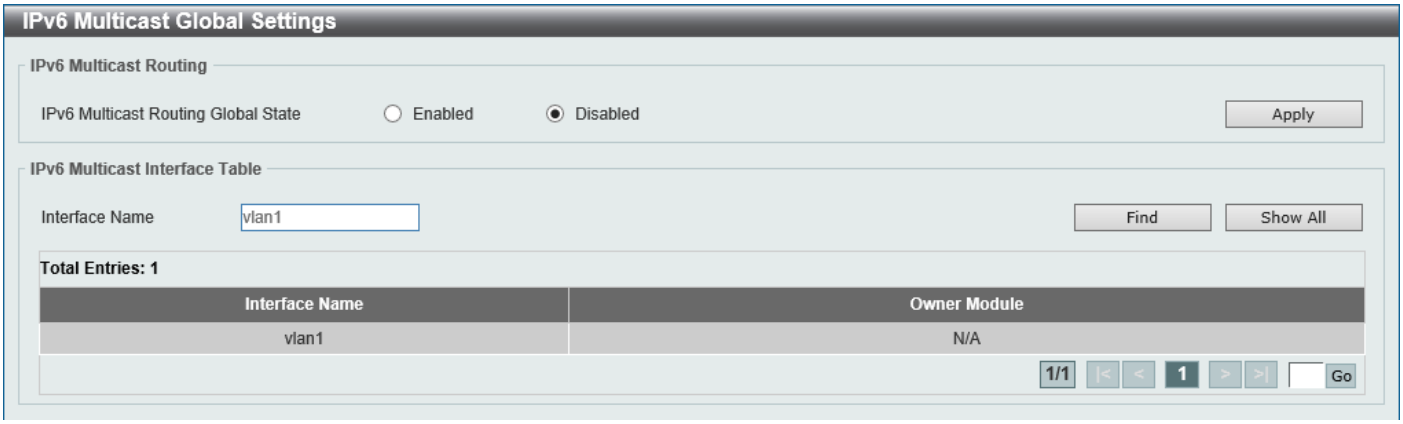


Figure 6-139 IPv6 Multicast Global Settings Window

The fields that can be configured in **IPv6 Multicast Routing** are described below:

Parameter	Description
IPv6 Multicast Routing Global State	Select to globally enable or disable the IPv6 multicast routing feature here. When IPv6 multicast routing is disabled, the system will stop routing multicast packets even though the multicast routing protocol is enabled.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Multicast Interface Table** are described below:

Parameter	Description
Interface Name	Enter the VLAN interface name that will be used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPv6 Static Multicast Route Settings

This window is used to display and configure the IPv6 static multicast route settings. The PIM protocol does not have its own routing table but uses the unicast routing table to determine the reverse path forwarding interface to reach a network. This window is used to configure static multicast route to specify the RPF address for a network.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Static Multicast Route Settings**, as shown below:

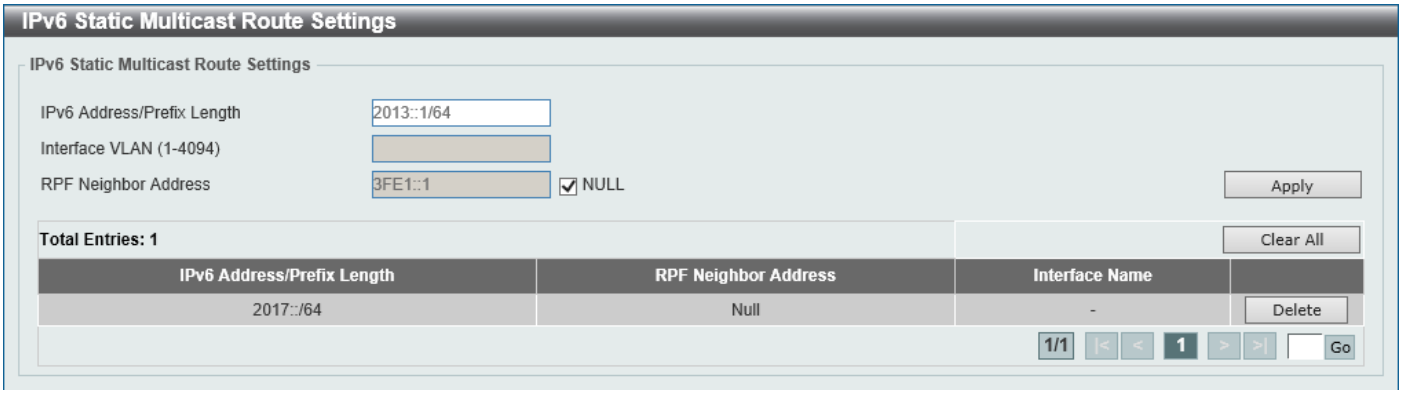


Figure 6-140 IPv6 Static Multicast Route Settings Window

The fields that can be configured are described below:

Parameter	Description
IPv6 Address/Prefix Length	Enter the IPv6 network address and prefix length of the multicast source here. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value.
Interface VLAN	Enter the VLAN ID that will be used here. The range is from 1 to 4094.
RPF Neighbor Address	Enter the IPv6 address of the next hop that can be used to reach the specified network here. Select the **NULL** option to specify that the RPF check result will always fail.

Click the **Apply** button to accept the changes made.

Click the **Clear All** button to clear the information displayed.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IPv6 Multicast Routing Table

This window is used to display the contents of the IPv6 dynamic multicast routing table.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Multicast Routing Table**, as shown below:

Figure 6-141 IPv6 Multicast Routing Table Window

The fields that can be configured are described below:

Parameter	Description
Group IPv6 Address	Enter the multicast group IPv6 address here.
Source IPv6 Address	Enter the source IPv6 address here.
Summary	Select this option to display a one-line, abbreviated summary of each entry in the IPv6 multicast routing table.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

IPv6 Multicast Routing Forwarding Cache Table

This window is used to display the contents of the IPv6 multicast routing forwarding cache database.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Multicast Routing Forwarding Cache Table**, as shown below:

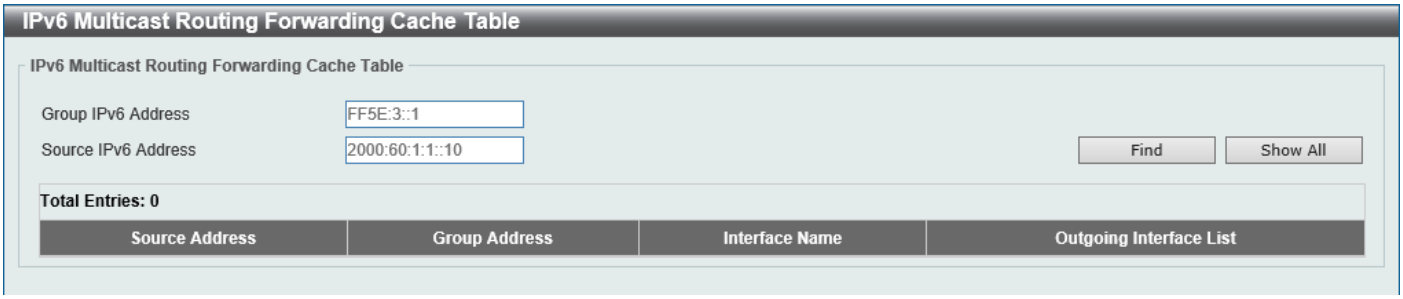


Figure 6-142 IPv6 Multicast Routing Forwarding Cache Table Window

The fields that can be configured are described below:

Parameter	Description
Group IPv6 Address	Enter the multicast group IPv6 address here.
Source IPv6 Address	Enter the source IPv6 address here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

IPv6 RPF Table

This window is used to display Reverse Path Forwarding (RPF) information for a given unicast host address.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 RPF Table**, as shown below:

Figure 6-143 IPv6 RPF Table Window

The fields that can be configured are described below:

Parameter	Description
IPv6 Source Address	Enter the unicast host IPv6 address here.

Click the **Find** button to locate a specific entry based on the information entered.

IP Route Filter

Route Map

This window is used to display and configure the route map settings.

To view the following window, click **L3 Features > IP Route Filter > Route Map**, as shown below:

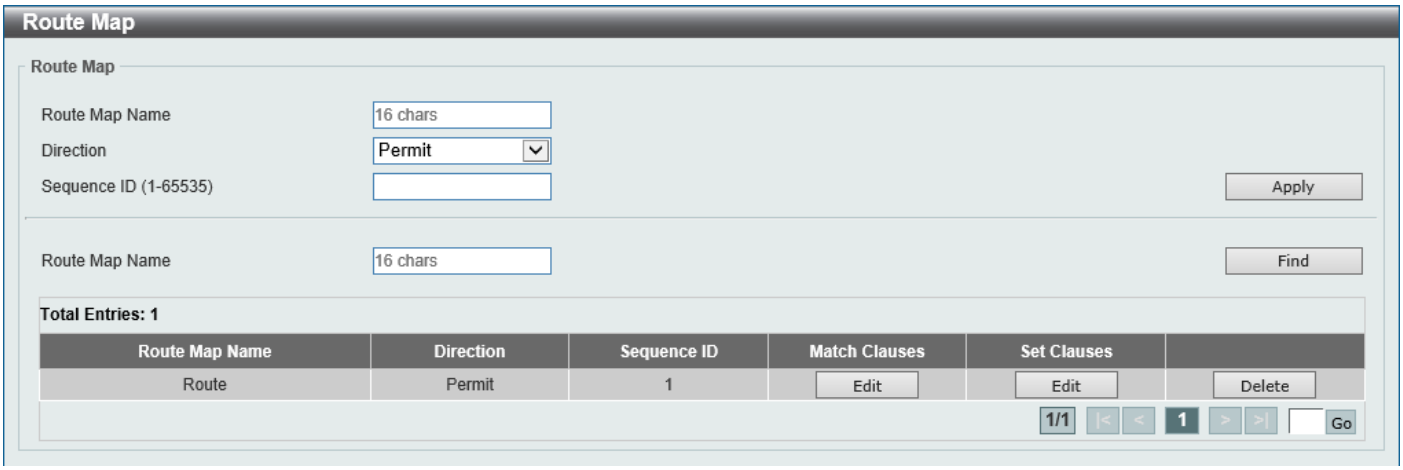


Figure 6-144 Route Map Window

The fields that can be configured are described below:

Parameter	Description
Route Map Name	Enter the route map name here. This name can be up to 16 characters long.
Direction	Select the direction for this rule here. Options to choose from are:

Parameter	Description
	• **Permit** - Specifies that routes that match the rule entry are permitted. • **Deny** - Specifies that routes that match the rule entry are denied.
Sequence ID	Enter the sequence ID for this rule here. The range is from 1 to 65535.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button in the **Match Clauses** column, the following page will appear.

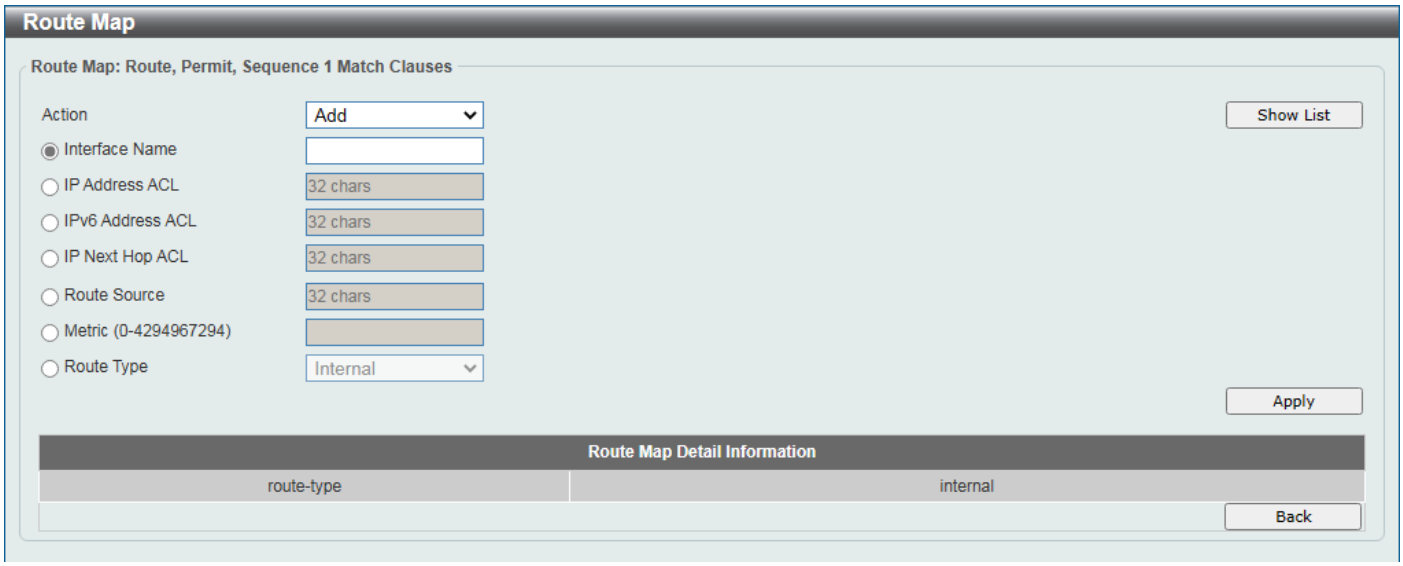


Figure 6-145 Route Map (Match Clauses, Edit) Window

The fields that can be configured are described below:

Parameter	Description
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
Interface Name	Select and enter the interface name that will be used here. This option is used to define a clause to match the route's outgoing interface.
IP Address ACL	Select and enter the standard or extended IP access list name here. This option is used to define a clause to match the route based on the standard or extended IP access list. This string can be up to 32 characters long.
IPv6 Address ACL	Select and enter the standard or extended IPv6 access list name here. This option is used to define a clause to match the route based on the standard or extended IPv6 access list. This string can be up to 32 characters long.
IP Next Hop ACL	Select and enter the standard IP access list name here. This option is used to define a clause to match the route's next hop based on the standard IP access list. This string can be up to 32 characters long.
Route Source	Select and enter the standard or extended IP/IPv6 access list name here. This option is used to define a clause to match the route's source based on the standard or extended IP/IPv6 access list. This string can be up to 32 characters long.
Metric	Select and enter the metric value of the route here. The range is from 0 to 4294967294. This option is used to define a clause to match the route metric.

Parameter	Description
Route Type	Select the route type here. Options to choose from are: • **Internal** - Specifies the intra-area and inter-area routes of Open Shortest Path First (OSPF). • **External** - Specifies the autonomous system's external route of OSPF. If the type-1 and type-2 options are not specified, type-1 and type-2 external routes are included. • **External Type-1** - Specifies the type-1 external route of OSPF. • **External Type-2** - Specifies the type-2 external route of OSPF.

Click the **Apply** button to accept the changes made.

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

After clicking the **Edit** button in the **Set Clauses** column, the following page will appear.

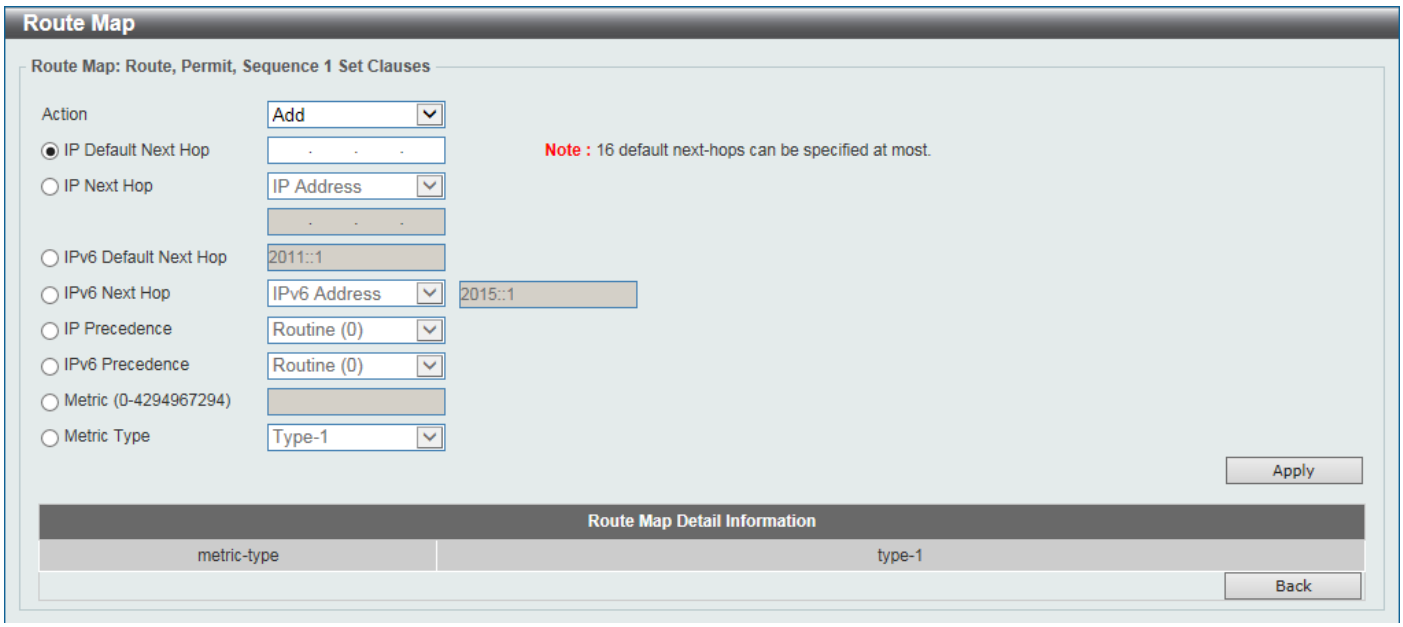


Figure 6-146 Route Map (Set Clauses, Edit) Window

The fields that can be configured are described below:

Parameter	Description
Action	Select **Add** to add a new entry based in the information entered. Select **Delete** to delete an entry based in the information entered.
IP Default Next Hop	Enter the default next-hop IP address in the space provided that will be used to route the packet. This feature can be used to specify multiple default next hop routers. If default next hops are already configured, the default next hops configured later will be added to the default next hop list. When the first default next hop router specified is down, the next default next hop router specified is tried in turn to route the packet. Up to 16 default next-hop IP addresses can be entered.
IP Next Hop	Select the IP next hop type here. This feature is used to configure the next-hop router to route the packet that passes the match clauses of the configured route map sequence. Options to choose from are: • **IP Address** - Specifies the IP addresses of the next-hops to route the packet. Enter the next-hop IP addresses in the spaces provided here. Up to 16 next-hop IP addresses can be entered. • **Recursive** - Specifies the IP address of the recursive as the next-hop router. Enter the recursive next-hop IP address in the space provided here.
IPv6 Default Next Hop	Enter the default next-hop IPv6 address in the space provided that will be used to route the packet. This feature can be used to specify multiple default next hop

Parameter	Description
	routers. If default next hops are already configured, the default next hops configured later will be added to the default next hop list. When the first default next hop router specified is down, the next default next hop router specified is tried in turn to route the packet. Up to 16 default next-hop IP addresses can be entered.
IPv6 Next Hop	Select the IPv6 next hop type here. This feature is used to configure the next-hop router to route the packet that passes the match clauses of the configured route map sequence. The only option available is: • **IPv6 Address** - Specifies the IPv6 addresses of the next-hops to route the packet. Enter the next-hop IPv6 addresses in the space provided here. • **Recursive** - Specifies the IPv6 address of the recursive as the next-hop router. Enter the recursive next-hop IPv6 address in the space provided here.
IP Precedence	Select the IP precedence option here. Options to choose from are **Routine (0)**, **Priority (1)**, **Immediate (2)**, **Flash (3)**, **Flash Override (4)**, **Critical (5)**, **Internet (6)**, and **Network (7)**. Use this feature to set the precedence value in the IP header. This option only takes effect when policy routing involves the IPv4 packet.
IPv6 Precedence	Select the IPv6 precedence option here. Options to choose from are **Routine (0)**, **Priority (1)**, **Immediate (2)**, **Flash (3)**, **Flash Override (4)**, **Critical (5)**, **Internet (6)**, and **Network (7)**. Use this feature to set the precedence value in the IPv6 header. This option only takes effect when policy routing involves the IPv6 packet.
Metric	Select and enter the metric value here that will be used in the modification. The range is from 0 to 4294967294.
Metric Type	Select the metric type here that will be used in the modification. Options to choose from are: • **Type-1** - Specifies to use the OSPF external type-1 metric. • **Type-2** - Specifies to use the OSPF external type-2 metric.

Click the **Apply** button to accept the changes made.

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

Policy Route

This window is used to display and configure the policy route settings.

To view the following window, click **L3 Features > Policy Route**, as shown below:

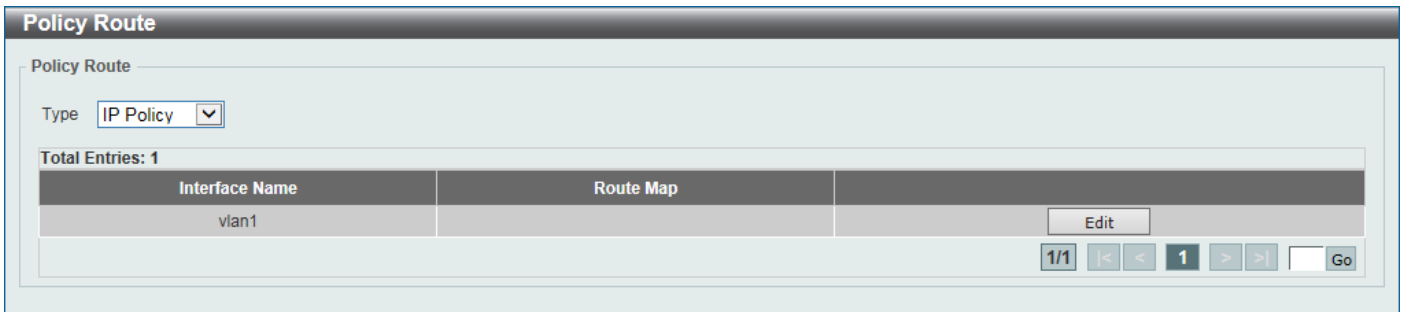


Figure 6-147 Policy Route Window

The fields that can be configured are described below:

Parameter	Description
Type	Select the policy route type here. Options to choose from are: **IP Policy** and **IPv6 Policy**.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

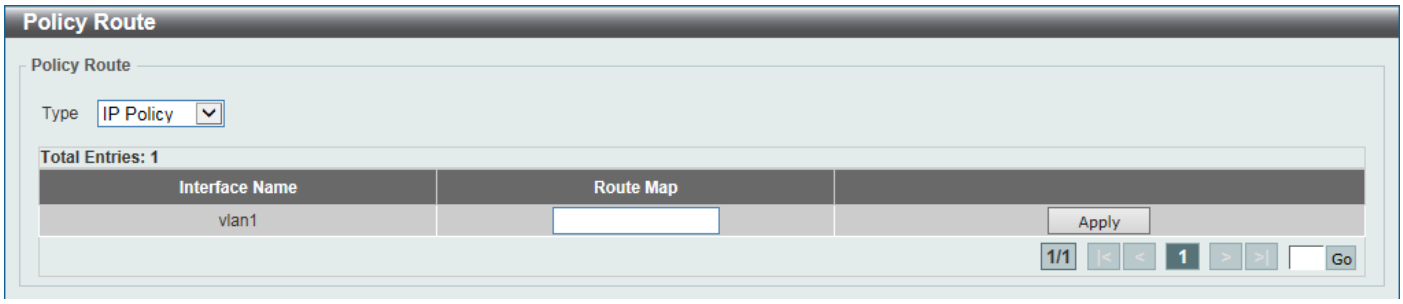


Figure 6-148 Policy Route (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Route Map	Enter the route map name here that will be used in this policy route entry.

Click the **Apply** button to accept the changes made.

VRRP Settings

This window is used to display and configure the Virtual Router Redundancy Protocol (VRRP) settings. All routers in the same VRRP group must be configured with the same virtual router ID and IP address.

A virtual router group is represented by a virtual router ID. The IP address of the virtual router is the default router configured on hosts. The virtual router's IP address can be a real address configured on the routers, or an unused IP address. If the virtual router address is a real IP address, the router that has this IP address is the IP address owner.

A master will be elected in a group of routers that supports the same virtual routers. Others are the backup routers. The master is responsible for forwarding the packets that are sent to the virtual router.

To view the following window, click **L3 Features > VRRP Settings**, as shown below:

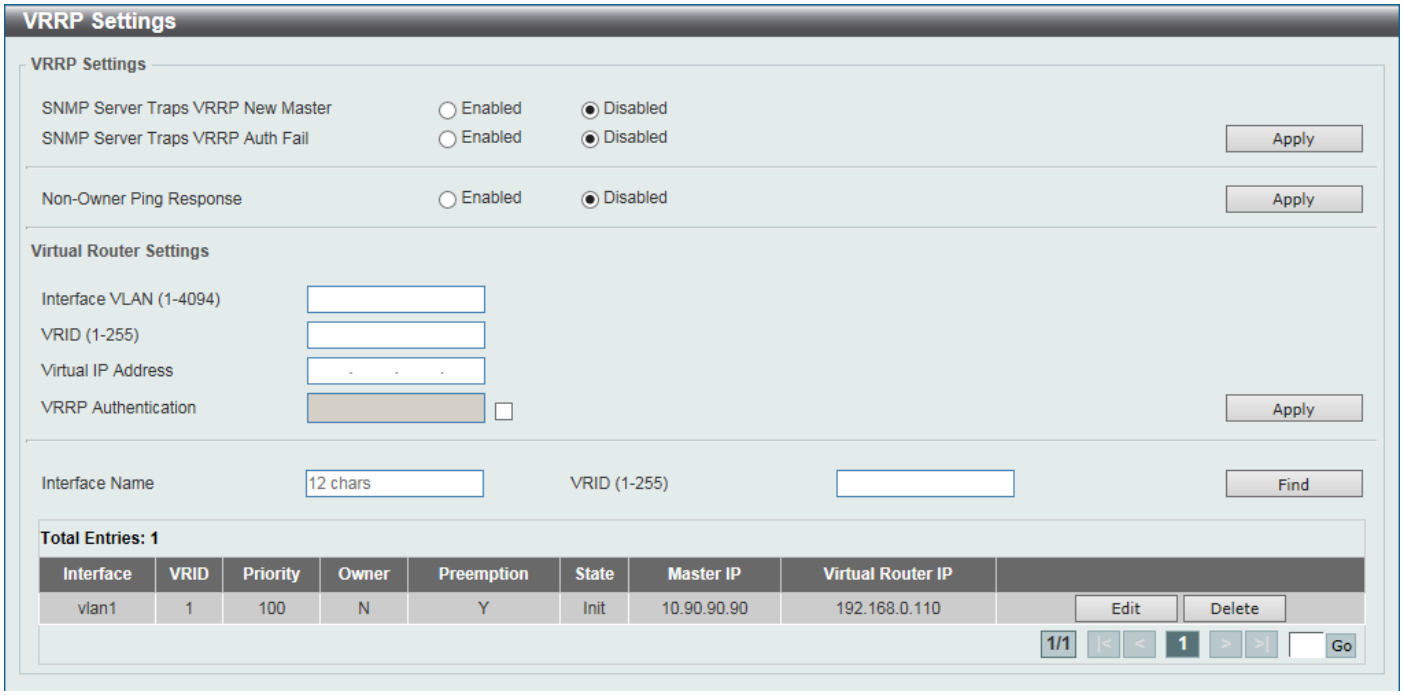


Figure 6-149 VRRP Settings Window

The fields that can be configured in **VRRP Settings** are described below:

Parameter	Description
SNMP Server Traps VRRP New Master	Select to enable or disable the SNMP server traps feature for the new VRRP master. If enabled, once the device has transitioned to the master state, a trap will be sent out.
SNMP Server Traps VRRP Auth Fail	Select to enable or disable the SNMP server traps feature for authentication failures. If enabled, if a packet has been received from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type, then a trap will be sent out.
Non-Owner Ping Response	Select to enable or disable the non-owner ping response feature here. This feature is used to enable the virtual router in the master state to respond to ICMP echo requests for an IP address not owned but associated with this virtual router.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Virtual Router Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN interface ID used here. The range is from 1 to 4094.
VRID	Enter the ID of the virtual router that will be created here. This ID is used to identify the virtual router in the VRRP group. The range is from 1 to 255.
Virtual IP Address	Enter the IPv4 address for the created virtual router group here.
VRRP Authentication	Select to enable and then enter the plain text authentication password for VRRP authentication on the interface here. This string can be up to 8 characters long. The authentication is applied to all virtual routers on this interface. The devices in the same VRRP group must have the same authentication password.
Interface Name	Enter the interface name used here. This name can be up to 12 characters long.
VRID	Enter the ID of the virtual router that will be displayed here. The range is from 1 to 255.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

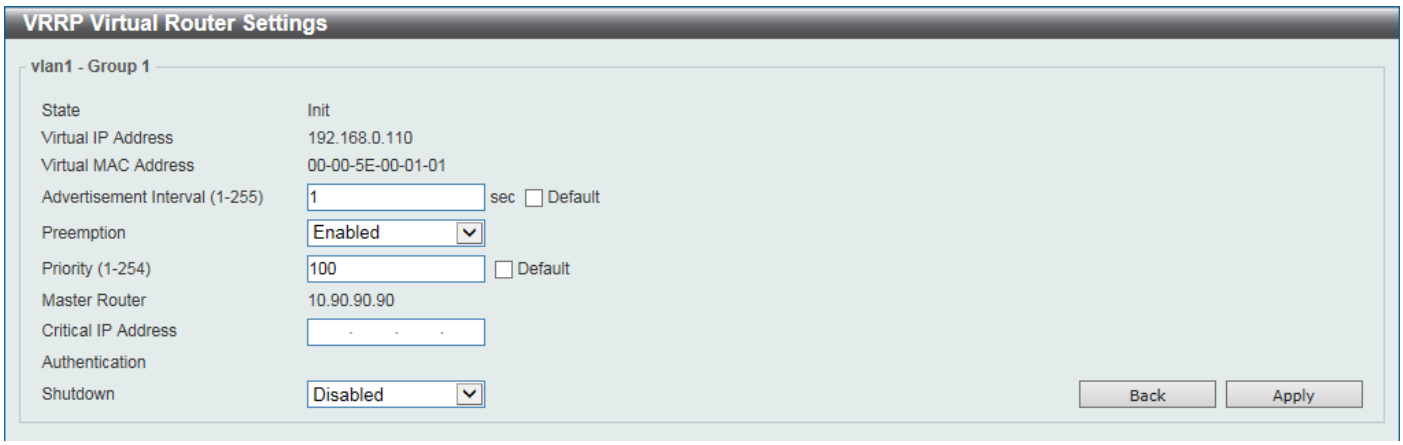


Figure 6-150 VRRP Virtual Router Settings Window

The fields that can be configured are described below:

Parameter	Description
Advertisement Interval	Enter the advertisement interval value here. This is the time interval between successive VRRP advertisements by the master router. The range is from 1 to 255 seconds. By default, this value is 1 second. Select the **Default** option to use the default value.
Preemption	Select to enable or disable the preemption feature here. This feature is used to allow a router to take over the master role if it has a better priority than the current master.
Priority	Enter the priority value here. The range is from 1 to 254. Select the **Default** option to use the default value.
Critical IP Address	Enter the critical IPv4 address here. If the critical IP is configured on one virtual router, the virtual router cannot be activated when the critical IP address is unreachable. One VRRP group can only track one critical IP.
Shutdown	Select to enable or disable the shutdown feature here. This feature is used to disable a virtual router on an interface. Avoid the common mistake of shutting down the IP address owner router before shutting down other non-owner routers.

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

Click the **Apply** button to accept the changes made.

VRRPv3 Settings

This window is used to display and configure the VRRP version 3 (VRRPv3) settings.

To view the following window, click **L3 Features > VRRPv3 Settings**, as shown below:

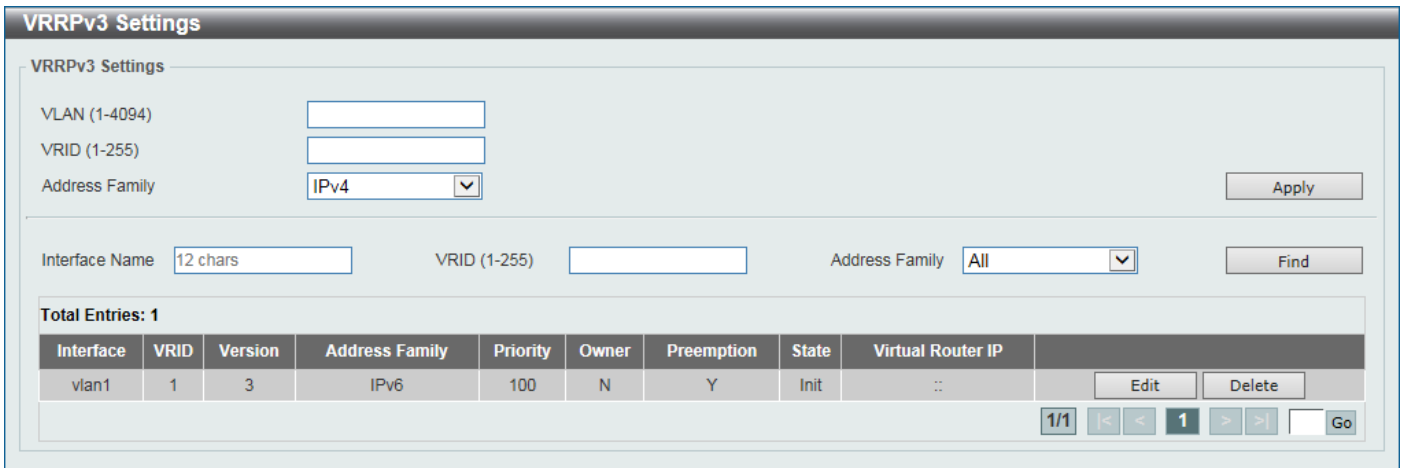


Figure 6-151 VRRPv3 Settings Window

The fields that can be configured are described below:

Parameter	Description
VLAN	Enter the ID of the VLAN interface that will be used here. The range is from 1 to 4094.
VRID	Enter the ID of the virtual router that will be created here. The range is from 1 to 255.
Address Family	Select the address family used here. Options to choose from are: • **IPv4** - Specifies to create an IPv4 virtual router. • **IPv6** - Specifies to create an IPv6 virtual router.
Interface Name	Enter the name of the VLAN interface that will be used in the display here. This string can be up to 12 characters long.
VRID	Enter the ID of the virtual router that will be displayed here. The range is from 1 to 255.
Address Family	Select the address family that will be used in the display here. Options to choose from are: • **All** - Specifies to display all virtual routers. • **IPv4** - Specifies to display IPv4 virtual routers only. • **IPv6** - Specifies to display IPv6 virtual routers only.

Click the **Apply** button to accept the changes made.

Click the **Find** button to find and display an entry based on the information entered.

Click the **Edit** button to configure detailed settings of the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button next to the **Address Family** entry, the following window will appear:

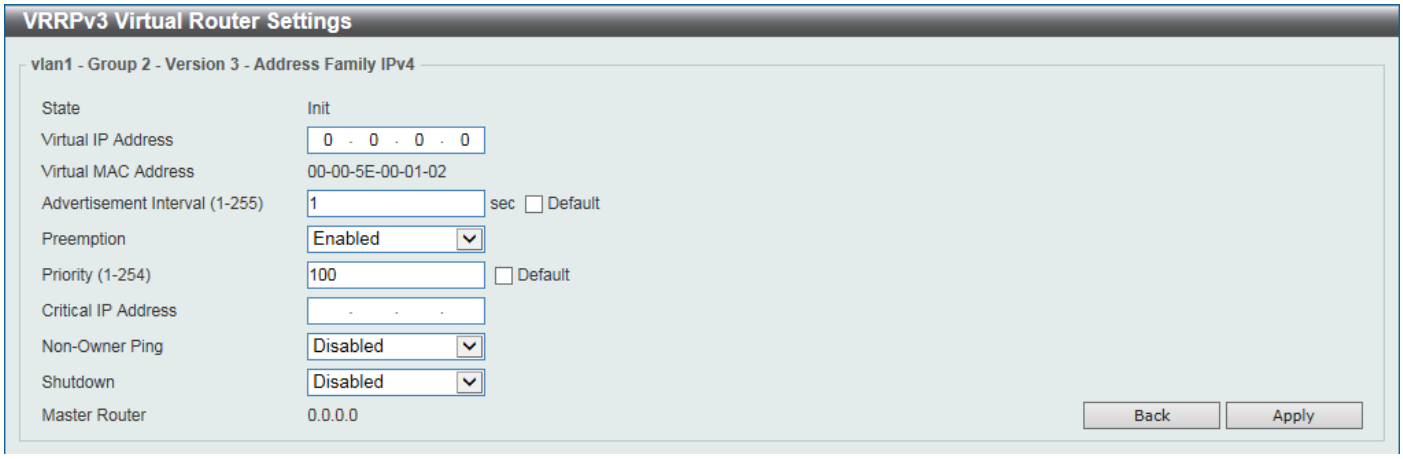


Figure 6-152 VRRPv3 Settings (Edit, IPv4) Window

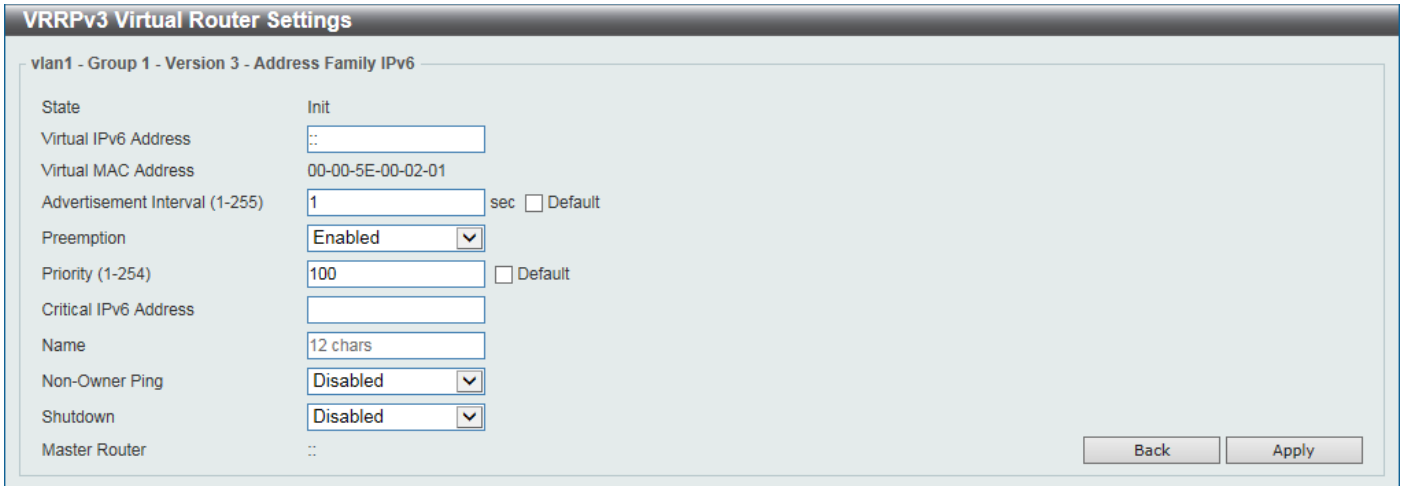


Figure 6-153 VRRPv3 Settings (Edit, IPv6) Window

The fields that can be configured are described below:

Parameter	Description
Virtual IP/IPv6 Address	Enter the virtual IPv4/IPv6 address here. All routers in the same VRRP group must be configured with the same virtual router ID and virtual address. The IPv4/IPv6 address of the virtual router can be a real address configured on the routers or an unused address. If the virtual address is equal to the real address of the interface, this virtual router is the IPv4/IPv6 address owner.
Advertisement Interval	Enter the time interval value between successive advertisements by the master router here. The range is from 1 to 255 seconds. The master will constantly send VRRP advertisements. All virtual routers in a VRRP group must use the same timer values. Select the **Default** option to use the default value.
Preemption	Select to enable or disable the preemption feature here. This is used to allow a router to take over the master role if it has a better priority than the current master.
Priority	Enter the priority value of the virtual router here. The range is from 1 to 254. The master of a VRRP group is elected based on the priority. The virtual router with the highest priority becomes the master and others with lower priorities act as the backup for the VRRP group. If there are multiple routers with the same highest priority value, the router with the larger IPv4 address will become the Master. The router that is the IPv4 address owner of the VRRP group is always the master of the VRRP group, and has the highest priority of 255. Select the **Default** option to use the default value.

Parameter	Description
Critical IP/IPv6 Address	Enter the critical IPv4/IPv6 address here. If the critical IPv4/IPv6 is configured on one virtual router, the virtual router cannot be activated when the critical IPv4/IPv6 address is unreachable. One VRRP group can only track one critical IPv4/IPv6 address.
Non-Owner Ping	Select to enable or disable the non-owner ping feature here. This is used to enable a non-IPv4/IPv6 address owner virtual router in the master state to respond to ICMP echo requests for IPv4/IPv6 addresses.
Shutdown	Select to enable or disable the shutdown feature here. Avoid the common mistake of shutting down the IPv4/IPv6 address owner routers before shutting down other non-owner routers.

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

Click the **Apply** button to accept the changes made.

7. Quality of Service (QoS)

Basic Settings

Port Default CoS

This window is used to display and configure the port default CoS settings.

To view the following window, click **QoS > Basic Settings > Port Default CoS**, as shown below:

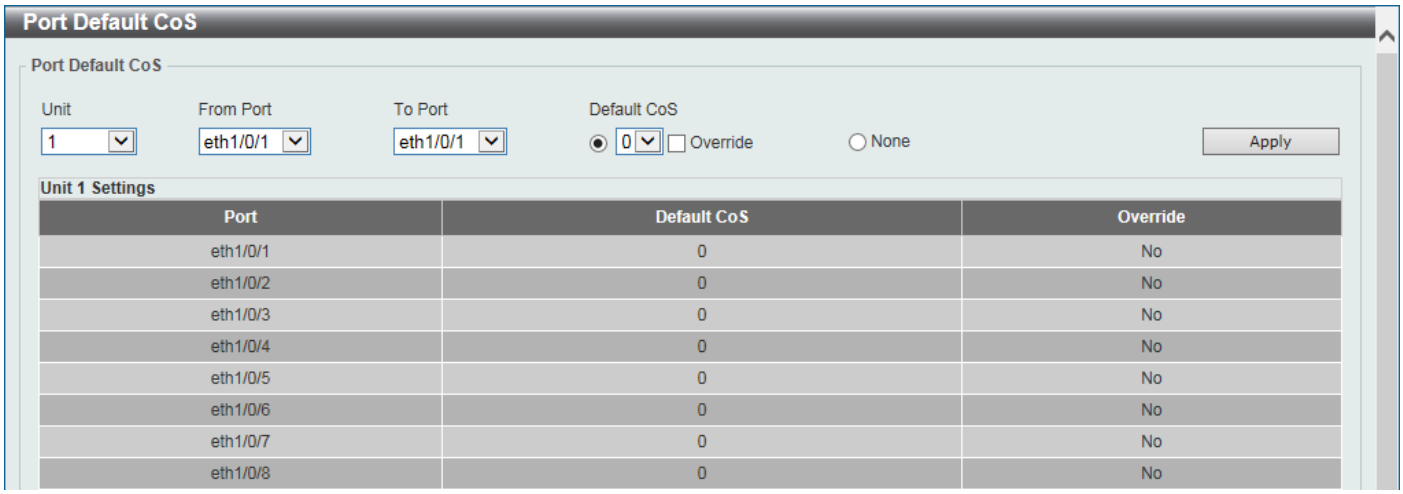


Figure 7-1 Port Default CoS Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Default CoS	Select the default CoS option for the port(s) specified here. Options to choose from are 0 to 7. Select the **Override** option to override the CoS of the packets. The default CoS will be applied to all incoming packets, tagged or untagged, received by the port. Select the **None** option to specify that the CoS of the packets will be the packet's CoS if the packets are tagged, and will be the port default CoS if the packet is untagged.

Click the **Apply** button to accept the changes made.

Port Scheduler Method

This window is used to display and configure the port scheduler method settings.

To view the following window, click **QoS > Basic Settings > Port Scheduler Method**, as shown below:

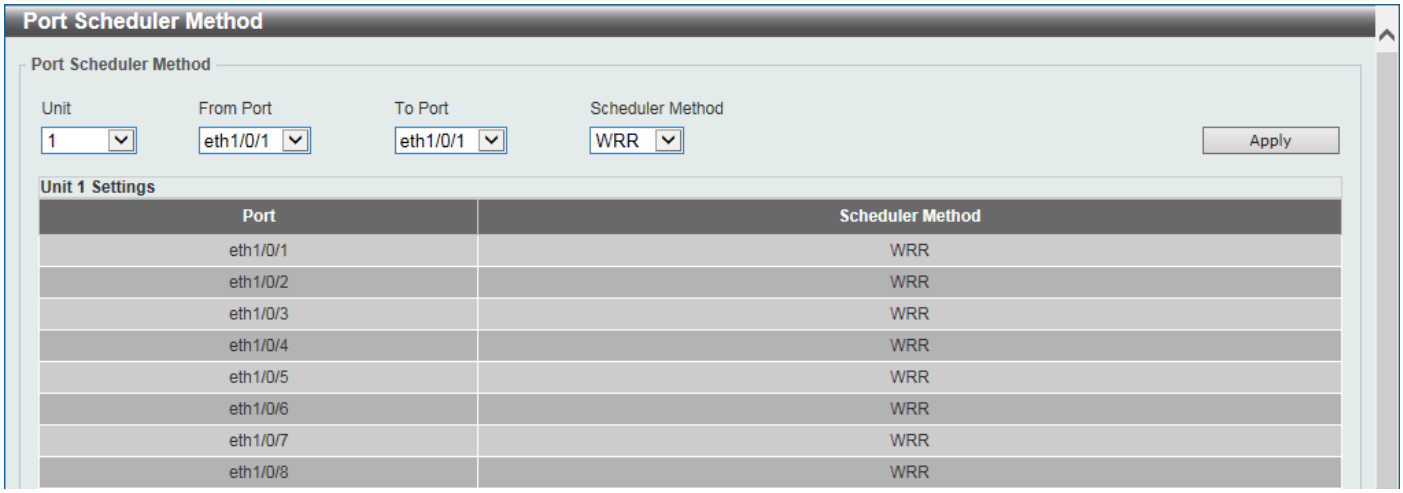


Figure 7-2 Port Scheduler Method Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Scheduler Method	Select the scheduler method that will be applied to the specified port(s). Options to choose from are: • **SP** (Strict Priority) - Specifies that all queues use strict priority scheduling. It provides strict priority access to the queues from the highest CoS queue to the lowest. • **RR** (Round-Robin) - Specifies that all queues use round-robin scheduling. It provides fair access to service a single packet at each queue before moving on to the next one. • **WRR** (Weighted Round-Robin) - Operates by transmitting permitted packets into the transmit queue in a round robin order. Initially, each queue sets its weight to a configurable weighting. Every time a packet from a higher priority CoS queue is sent, the corresponding weight is subtracted by 1 and the packet in the next lower CoS queue will be serviced. When the weight of a CoS queue reaches zero, the queue will not be serviced until its weight is replenished. When weights of all CoS queues reach 0, the weights get replenished at a time. • **WDRR** (Weighted Deficit Round-Robin) - Operates by serving an accumulated set of backlogged credits in the transmit queue in a round robin order. Initially, each queue sets its credit counter to a configurable quantum value. Every time a packet from a CoS queue is sent, the size of the packet is subtracted from the corresponding credit counter and the service right is turned over to the next lower CoS queue. When the credit counter drops below 0, the queue is no longer serviced until its credits are replenished. When the credit counters of all CoS queues reaches 0, the credit counters will be replenished at that time. All packets are serviced until their credit counter is zero or negative and the last packet is transmitted completely. When this condition happens, the credits are replenished. When the credits are replenished, a quantum of credits are added to each CoS queue credit counter. The quantum for each CoS queue may be different based on the user configuration.

Parameter	Description
	To set a CoS queue in the **SP** mode, any higher priority CoS queue must also be in the strict priority mode. By default, the **WRR** option is used.

Click the **Apply** button to accept the changes made.

Queue Settings

This window is used to display and configure the queue settings.

To view the following window, click **QoS > Basic Settings > Queue Settings**, as shown below:

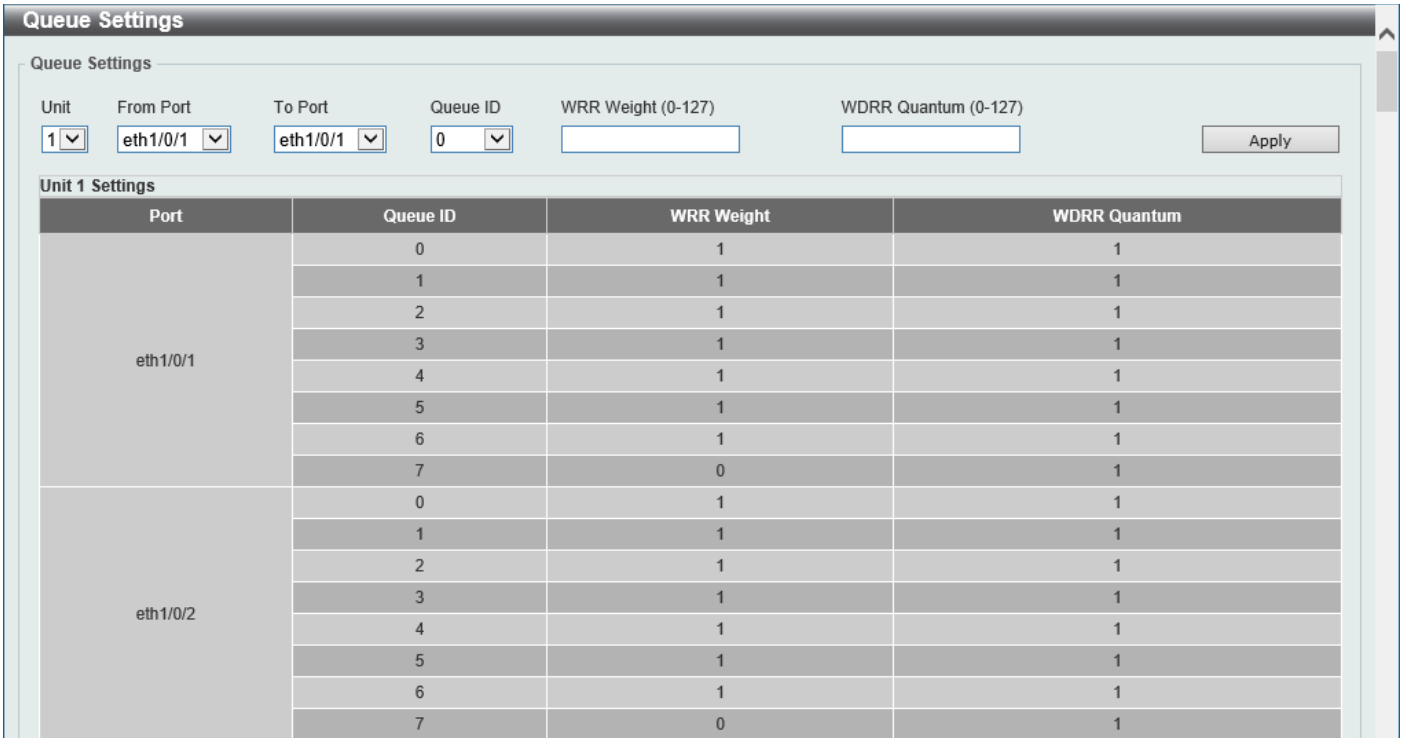


Figure 7-3 Queue Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Queue ID	Enter the queue ID value here. The range is from 0 to 7.
WRR Weight	Enter the WRR weight value here. The range is from 0 to 127. To satisfy the behavior requirements of Expedited Forwarding (EF), the highest queue is always selected by the Per-hop Behavior (PHB) EF and the schedule mode of this queue should be strict priority scheduling. Therefore, the weight of the last queue should be zero while the Differentiate Service is supported.
WDRR Quantum	Enter the WDRR quantum value here. The range is from 0 to 127.

Click the **Apply** button to accept the changes made.

CoS to Queue Mapping

This window is used to display and configure the CoS-to-Queue mapping settings.

To view the following window, click **QoS > Basic Settings > CoS to Queue Mapping**, as shown below:

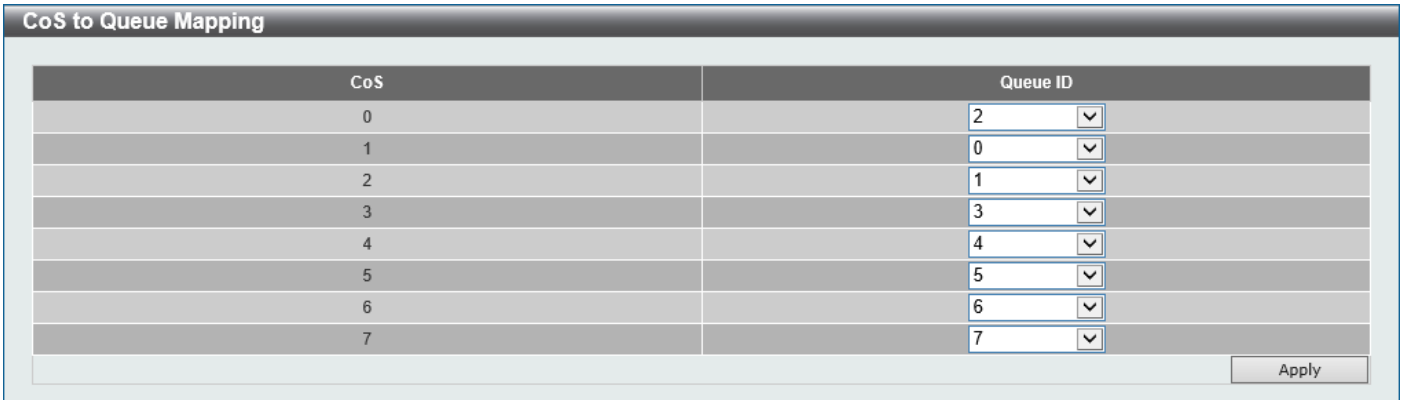


Figure 7-4 CoS to Queue Mapping Window

The fields that can be configured are described below:

Parameter	Description
Queue ID	Select the queue ID that will be mapped to the corresponding CoS value. Options to choose from are 0 to 7.

Click the **Apply** button to accept the changes made.

Port Rate Limiting

This window is used to display and configure the port rate limiting settings.

To view the following window, click **QoS > Basic Settings > Port Rate Limiting**, as shown below:

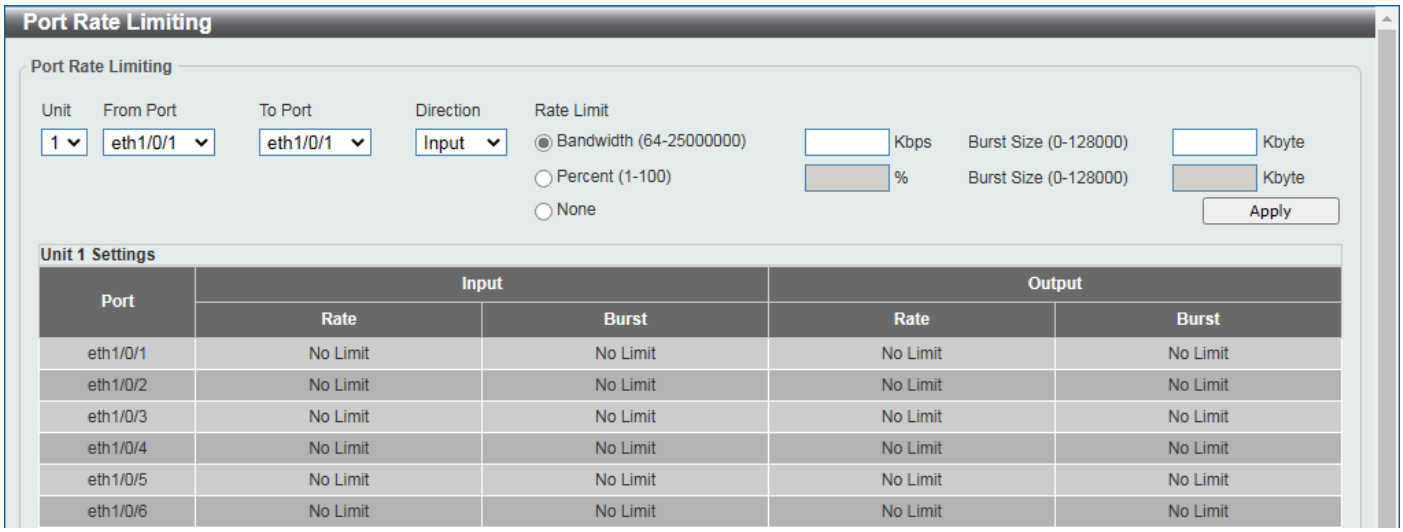


Figure 7-5 Port Rate Limiting Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Parameter	Description
From Port - To Port	Select the range of ports that will be used for this configuration here.
Direction	Only the **Output** option is available. This specifies that the rate limit for egress packets is configured.

Rate Limit	Select and enter the rate limit value here. The specified limitation cannot exceed the maximum speed of the specified interface. For the ingress bandwidth limitation, the ingress will send a pause frame or a flow control frame when the received traffic exceeds the limitation. Options to choose from are:
	• **Bandwidth** - Select and enter the rate limit bandwidth value here. The range is from 64 to 25000000 Kbps.
	  ○ **Burst Size** - Enter the burst size here. The range is from 0 to 128000 Kilobytes. When this value is 0, the rate limit function is disabled (no limit) on the interface.
	• **Percent** - Select and enter the rate limit bandwidth percentage here. The range is from 1 to 100 percent (%).
	  ○ **Burst Size** - Enter the burst size here. The range is from 0 to 128000 Kilobytes.
	• **None** - Select this option to remove the rate limit on the specified port(s). By default, this option is used for Input and Output through all the ports.

Click the **Apply** button to accept the changes made.

Queue Rate Limiting

This window is used to display and configure the queue rate limiting settings.

To view the following window, click **QoS > Basic Settings > Queue Rate Limiting**, as shown below:

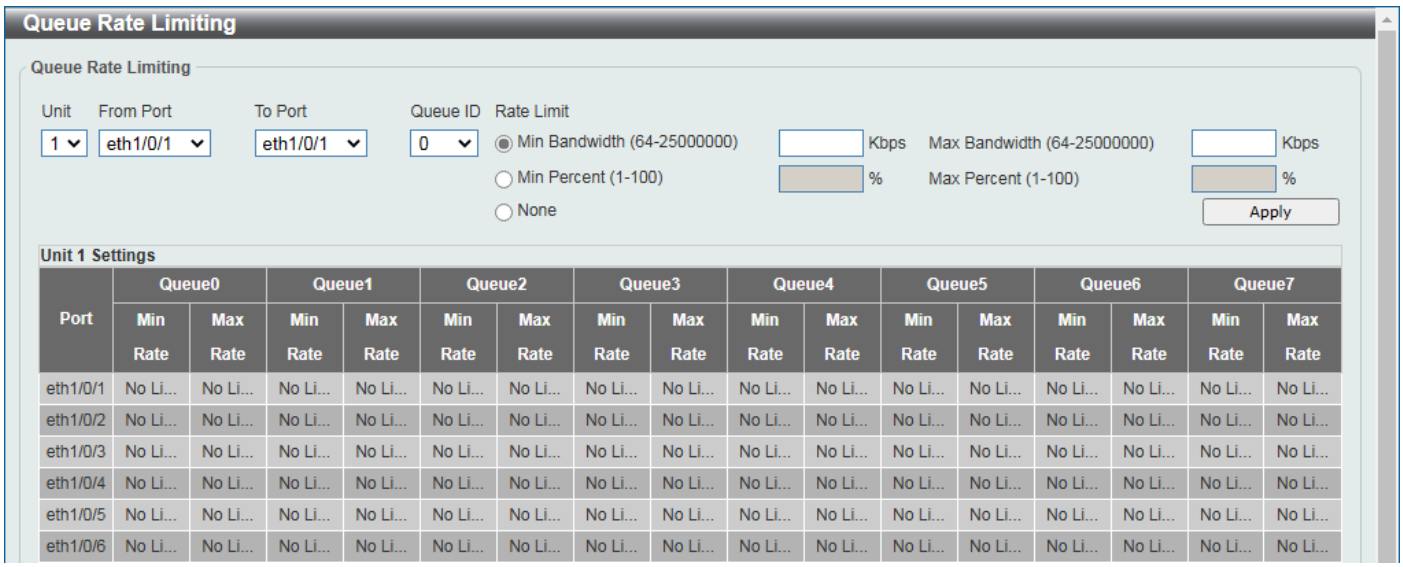


Figure 7-6 Queue Rate Limiting Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Queue ID	Select the queue ID that will be configured here. Options to choose from are 0 to 7.
Rate Limit	Select and enter the queue rate limit settings here. Options to choose from are:

Parameter	Description

	• **Min Bandwidth** - Select and enter the minimum rate limit bandwidth value here. The range is from 64 to 25000000 Kbps.
	  ○ **Max Bandwidth** - Enter the maximum rate limit bandwidth value here. The range is from 64 to 25000000 Kbps.
	• **Min Percent** - Select and enter the minimum rate limit percentage here. The range is from 1 to 100 percent (%).
	  ○ **Max Percent** - Enter the maximum rate limit percentage here. The range is from 1 to 100 percent (%).
	• **None** - Select this option to remove the rate limit on the specified port(s). By default, this option is used for through all the queues on all the ports.
	When the minimal bandwidth is configured, the packet transmitted from the queue can be guaranteed. When the maximum bandwidth is configured, packets transmitted from the queue cannot exceed the maximum bandwidth even if the bandwidth is available.
	When configuring the minimal bandwidth, the aggregate of the configured minimum bandwidth must be less than 75 percent of the interface bandwidth to make sure the configured minimal bandwidth can be guaranteed. It is not necessary to set the minimum guaranteed bandwidth for the highest strict priority queue. This is because the traffic in this queue will be serviced first if the minimal bandwidth of all queues is satisfied.
	The configuration of this command can only be attached to a physical port but not a port-channel. That is the minimum guaranteed bandwidth of one CoS cannot be used across physical ports.

Click the **Apply** button to accept the changes made.

Advanced Settings

DSCP Mutation Map

This window is used to display and configure the Differentiated Services Code Point (DSCP) mutation map settings. When a packet is received by an interface, based on a DSCP mutation map, the incoming DSCP can be mutated to another DSCP immediately before any QoS operations. The DSCP mutation is helpful to integrate domains with different DSCP assignments. The DSCP-CoS map and DSCP-color map will still be based on the original DSCP of the packet. All the subsequent operations will base on the mutated DSCP.

To view the following window, click **QoS > Advanced Settings > DSCP Mutation Map**, as shown below:

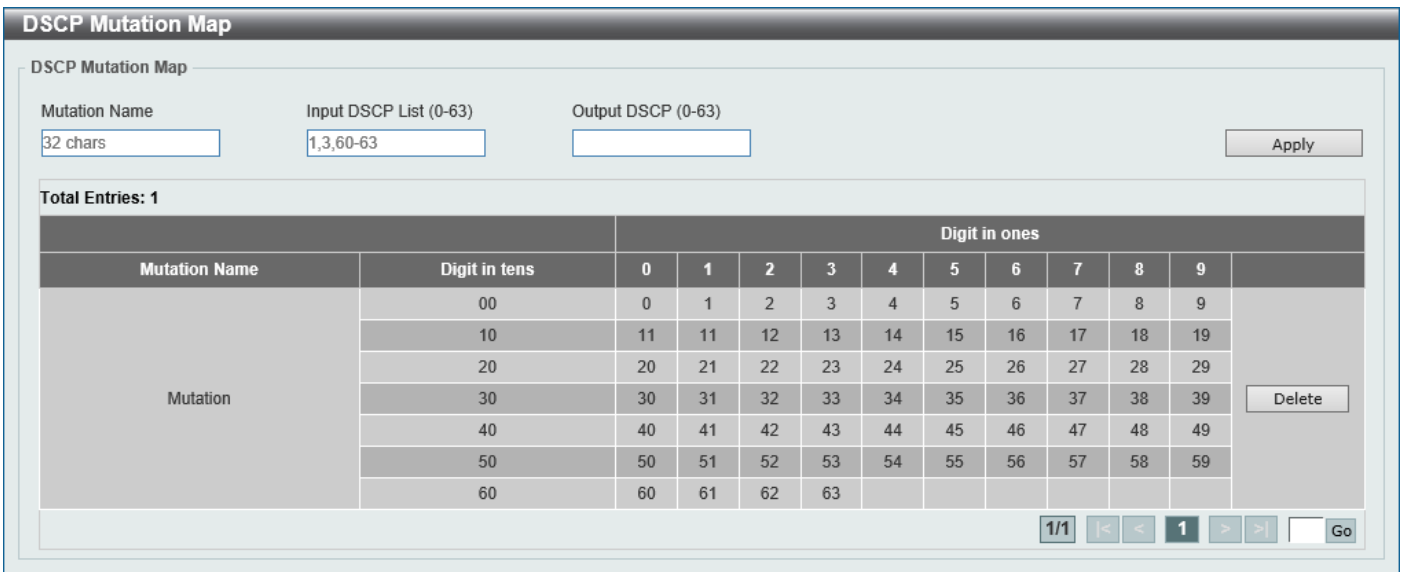


Figure 7-7 DSCP Mutation Map Window

The fields that can be configured are described below:

Parameter	Description
Mutation Name	Enter the DSCP mutation map name here. This name can be up to 32 characters long.
Input DSCP List	Enter the input DSCP list value here. The range is from 0 to 63.
Output DSCP List	Enter the output DSCP list value here. The range is from 0 to 63.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Port Trust State and Mutation Binding

This window is used to display and configure the port trust state and mutation binding settings.

To view the following window, click **QoS > Advanced Settings > Port Trust State and Mutation Binding**, as shown below:

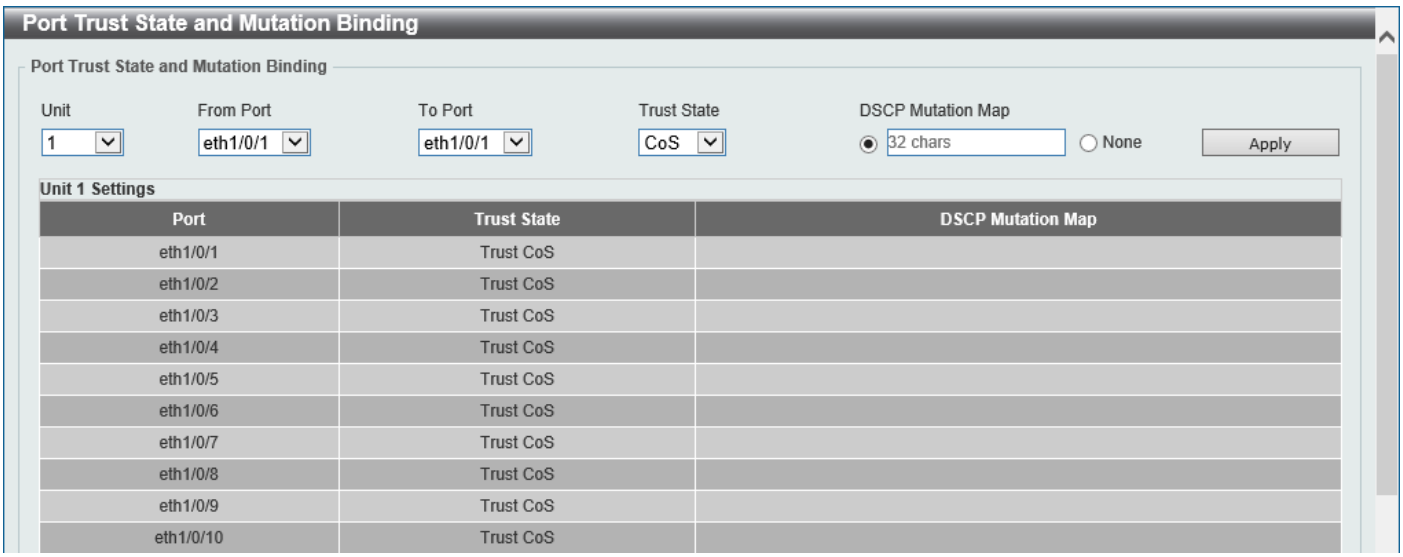


Figure 7-8 Port Trust State and Mutation Binding Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Trust State	Select the port trust state option here. Options to choose from are **CoS** and **DSCP**.
DSCP Mutation Map	Select and enter the DSCP mutation map name used here. This name can be up to 32 characters long. Select the **None** option to not allocate a DSCP mutation map to the port(s).

Click the **Apply** button to accept the changes made.

DSCP CoS Mapping

This window is used to display and configure the DSCP CoS mapping settings.

To view the following window, click **QoS > Advanced Settings > DSCP CoS Mapping**, as shown below:

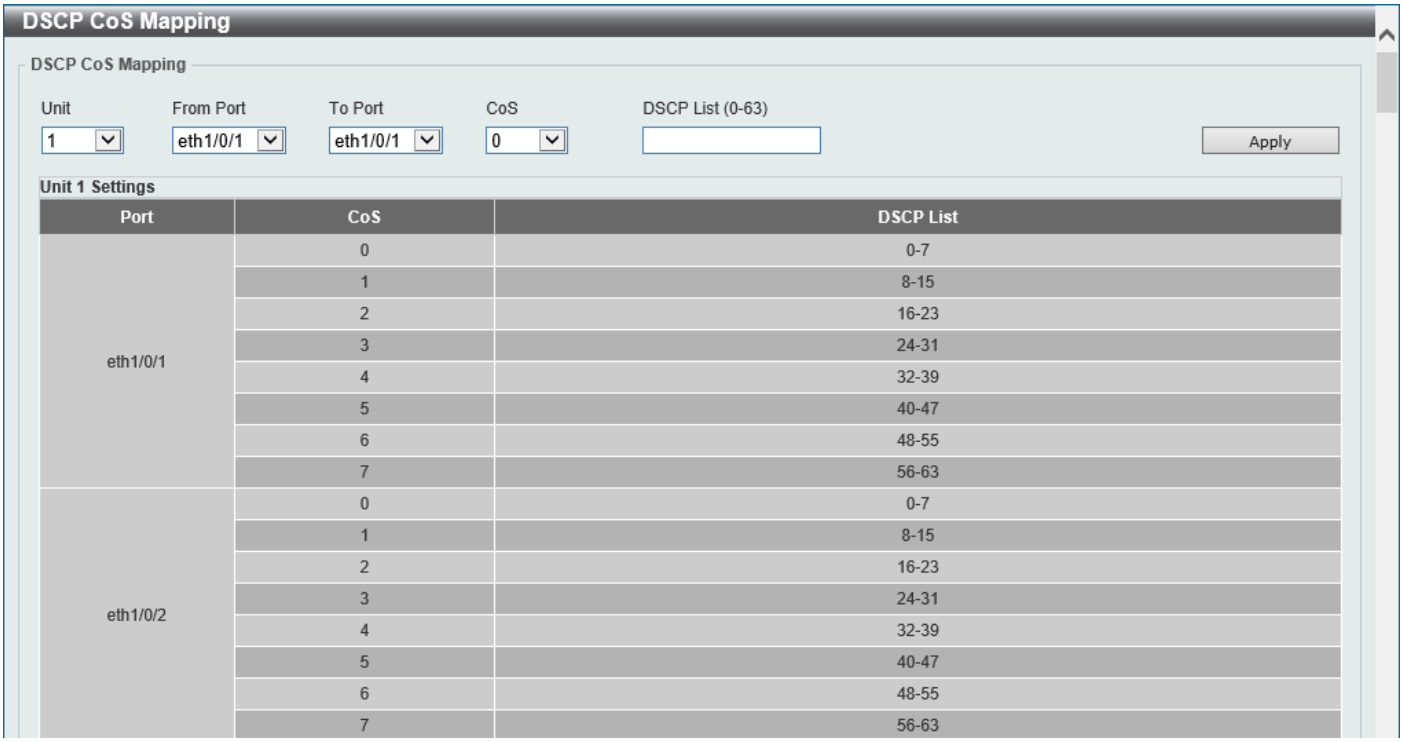


Figure 7-9 DSCP CoS Mapping Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
CoS	Select the CoS value to map to the DSCP list. Options to choose from are 0 to 7.
DSCP List	Enter the DSCP list value to map to the CoS value here. The range is from 0 to 63.

Click the **Apply** button to accept the changes made.

CoS Color Mapping

This window is used to display and configure the CoS color mapping settings.

To view the following window, click **QoS > Advanced Settings > CoS Color Mapping**, as shown below:

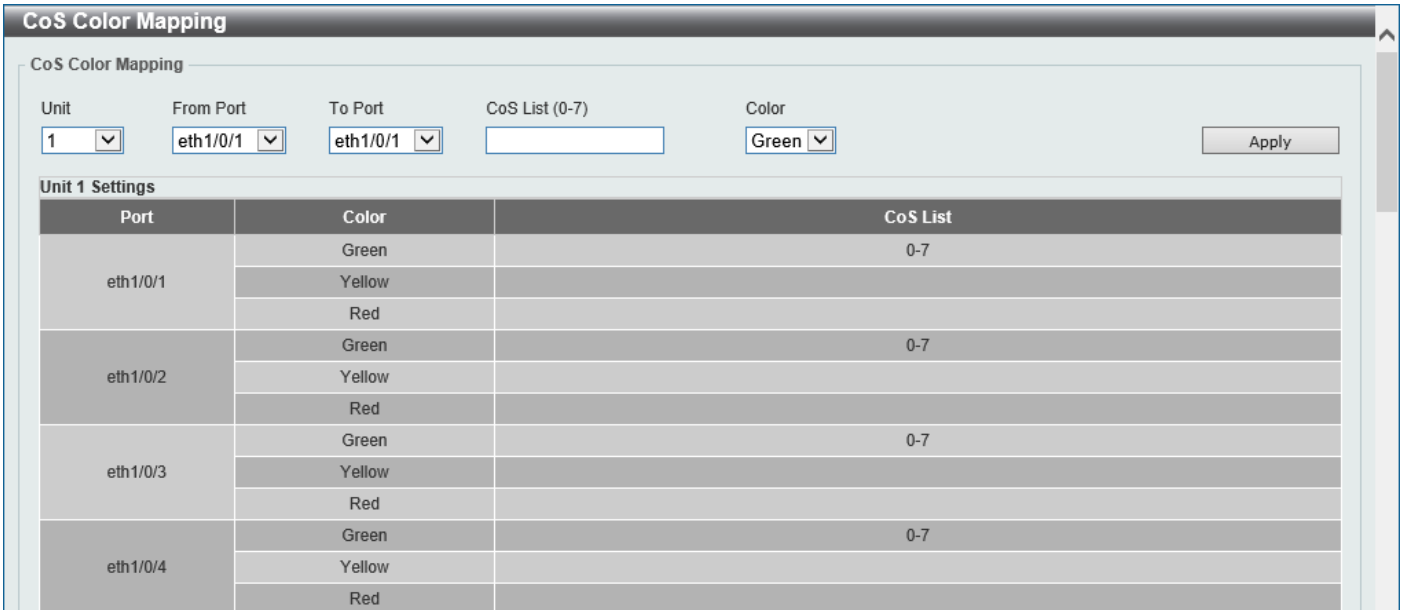


Figure 7-10 CoS Color Mapping Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
CoS List	Enter the CoS value that will be mapped to the color. The range is from 0 to 7.
Color	Select the color option that will be mapped to the CoS value. Options to choose from are **Green**, **Yellow**, and **Red**.

Click the **Apply** button to accept the changes made.

DSCP Color Mapping

This window is used to display and configure the DSCP color mapping settings.

To view the following window, click **QoS > Advanced Settings > DSCP Color Mapping**, as shown below:

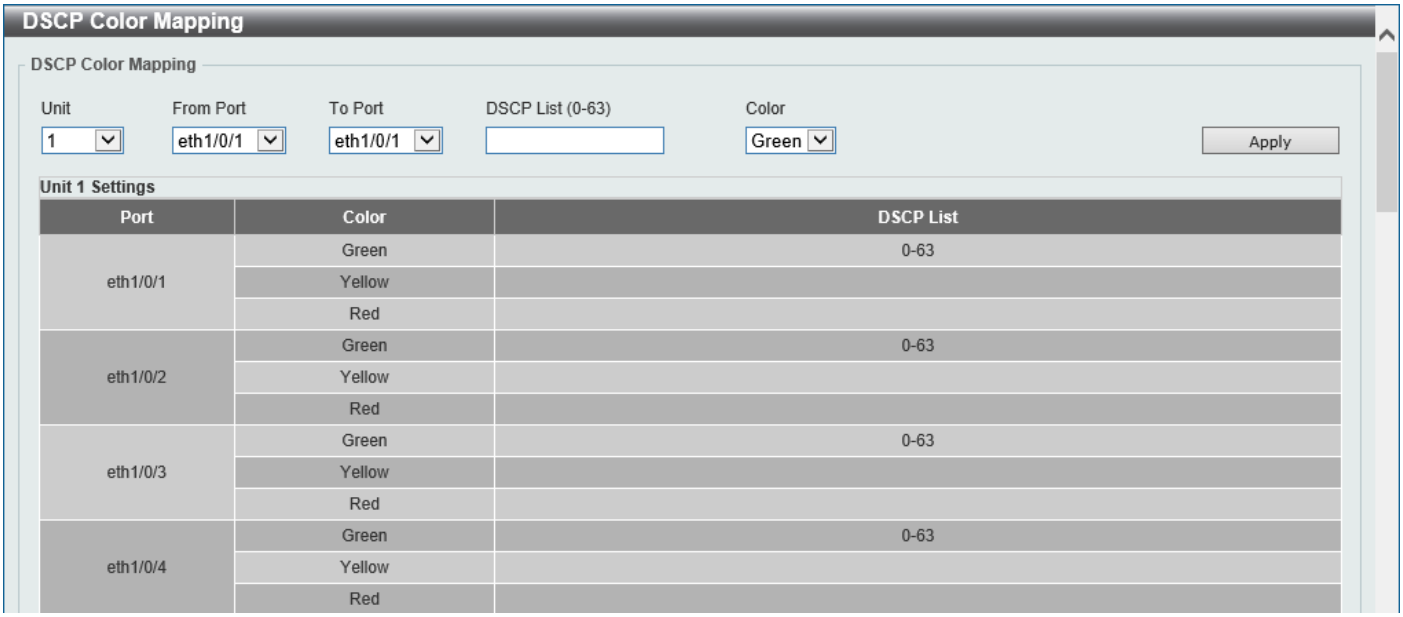


Figure 7-11 DSCP Color Mapping Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
DSCP List	Enter the DSCP list value here that will be mapped to a color. The range is from 0 to 63.
Color	Select the color option that will be mapped to the DSCP value. Options to choose from are **Green**, **Yellow**, and **Red**.

Click the **Apply** button to accept the changes made.

Class Map

This window is used to display and configure the class map settings.

To view the following window, click **QoS > Advanced Settings > Class Map**, as shown below:

Figure 7-12 Class Map Window

The fields that can be configured are described below:

Parameter	Description
Class Map Name	Enter the class map name here. This name can be up to 32 characters long.
Multiple Match Criteria	Select the multiple match criteria option here. Options to choose from are **Match All** and **Match Any**.

Click the **Apply** button to accept the changes made.

Click the **Match** button to configure the specific entry.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Match** button, the following page will be available.

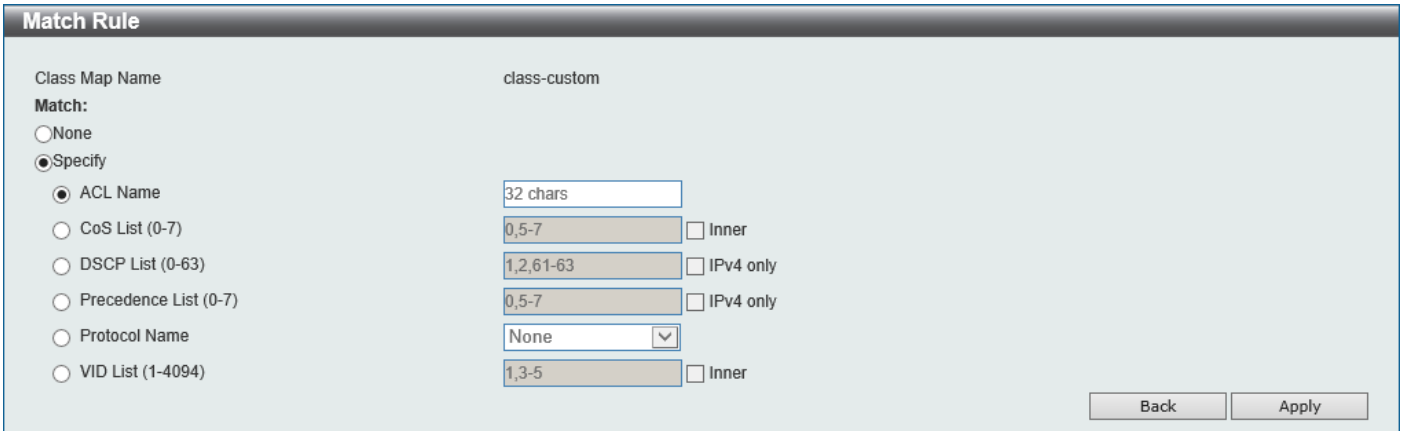


Figure 7-13 Class Map (Match) Window

The fields that can be configured are described below:

Parameter	Description
None	Select this option to match nothing to this class map.
Specify	Select the option to match something to this class map.
ACL Name	Select and enter the access list name that will be matched with this class map here. This name can be up to 32 characters long.
CoS List	Select and enter the CoS list value that will be matched with this class map here. The range is from 0 to 7. Select the **Inner** option to match the inner most CoS of the QinQ packets on a Layer 2 CoS marking.
DSCP List	Select and enter the DSCP list value that will be matched with this class map here. The range is from 0 to 63. Select the **IPv4 only** option to match IPv4 packets only. If not specified, the match is for both IPv4 and IPv6 packets.
Precedence List	Select and enter the precedence list value that will be matched with this class map here. The range is from 0 to 7. Select the **IPv4 only** option to match IPv4 packets only. If not specified, the match is for both IPv4 and IPv6 packets. For IPv6 packets, the precedence is most three significant bits of traffic class of IPv6 header.
Protocol Name	Select the protocol name that will be matched with the class map here. Options to choose from are **ARP**, **BGP**, **DHCP**, **DNS**, **EGP**, **FTP**, **IPv4**, **IPv6**, **NetBIOS**, **NFS**, **NTP**, **OSPF**, **PPPOE**, **RIP**, **RTSP**, **SSH**, **Telnet**, and **TFTP**.
VID List	Select and enter the VLAN list value that will be matched with the class map here. The range is from 1 to 4094.

Parameter	Description
	Select the **Inner** option to match the inner-most VLAN ID in the IEEE 802.1Q double tagged frame.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Aggregate Policer

This window is used to display and configure the aggregate policer settings.

To view the following window, click **QoS > Advanced Settings > Aggregate Policer** and select the **Single Rate Settings** tab, as shown below:

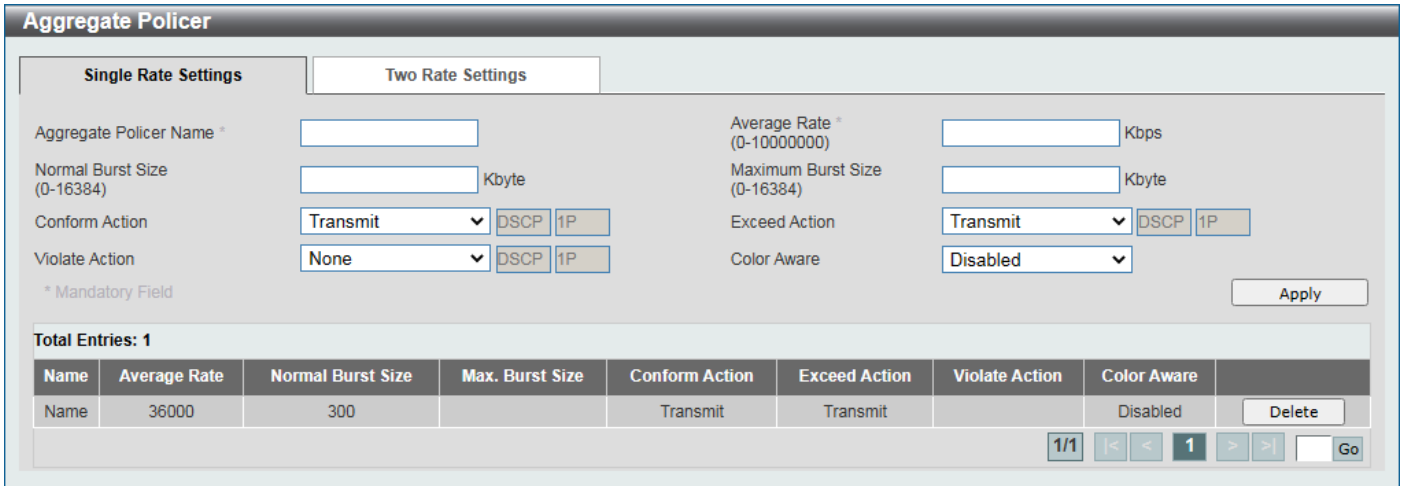


Figure 7-14 Aggregate Policer (Single Rate Setting) Window

The fields that can be configured are described below:

Parameter	Description
Aggregate Policer Name	Enter the aggregate policer name here.
Average Rate	Enter the average rate value here. The range is from 0 to 10000000 kbps.
Normal Burst Size	Enter the normal burst size value here. The range is from 0 to 16384 Kbytes.
Maximum Burst Size	Enter the maximum burst size value here. The range is from 0 to 16384 Kbytes.
Confirm Action	Select the confirm action here. The confirm action specifies the action to take on green color packets. Options to choose from are: • **Drop** - Specifies that the packet will be dropped. • **Set-DSCP-Transmit** - Specifies to enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value. • **Set-1P-Transmit** - Specifies to enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value. • **Transmit** - Specifies that packets will be transmitted unaltered. • **Set-DSCP-1P** - Specifies to enter the IP DSCP and 1P transmit values in the spaces provided. By default, the **Transmit** option is used. Packets are transmitted unaltered.
Exceed Action	Select the exceed action here. The exceed action specifies the action to take on packets that exceed the rate limit. Options to choose from are: • **Drop** - Specifies that the packet will be dropped.

Parameter	Description
	• **Set-DSCP-Transmit** - Specifies to enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value. • **Set-1P-Transmit** - Specifies to enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value. • **Transmit** - Specifies that packets will be transmitted unaltered. • **Set-DSCP-1P** - Specifies to enter the IP DSCP and 1P transmit values in the spaces provided. By default, the **Drop** option is used. Packets are dropped.
Violate Action	Select the violate action here. The violate action specifies the action to take on packets that violate the normal and maximum burst sizes for singe rate policing. It specifies the action to take for those packets that did not conform to both CIR and PIR. Options to choose from are: • **None** - Specifies that no action will be taken. • **Drop** - Specifies that the packet will be dropped. • **Set-DSCP-Transmit** - Specifies to enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value. • **Set-1P-Transmit** - Specifies to enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value. • **Transmit** - Specifies that packets will be transmitted unaltered. • **Set-DSCP-1P** - Specifies to enter the IP DSCP and 1P transmit values in the spaces provided. By default, for a single rate policer, a single-rate two-color policer is created. By default, for a two-rate policer, the **Drop** option is used. Packets are dropped.
Color Aware	Select the color aware option here. Options to choose from are: • **Enabled** - Specifies that the policer work in the color-aware mode. • **Disabled** - Specifies that the policer work in the colorblind mode.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

To view the following window, select the **Two Rate Settings** tab, as shown below:

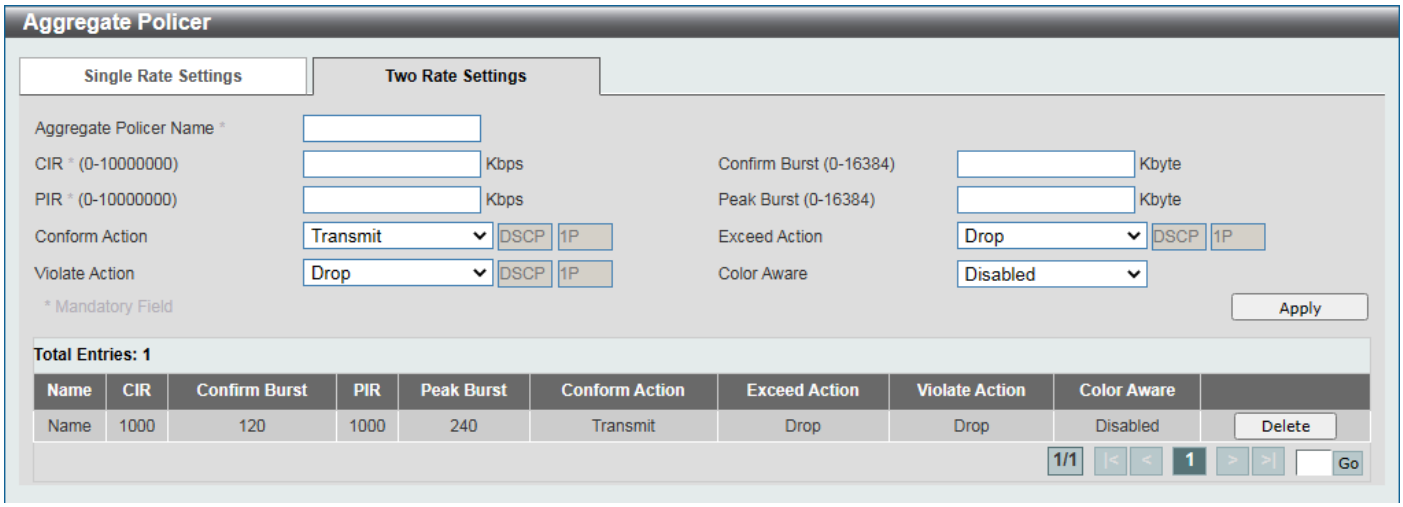


Figure 7-15 Aggregate Policer (Two Rate Settings) Window

The fields that can be configured are described below:

Parameter	Description
Aggregate Policer Name	Enter the aggregate policer name here.
CIR	Enter the Committed Information Rate (CIR) value here. The range is from 0 to 10000000 kbps. The committed packet rate is the first token bucket for the two-rate metering.
Confirm Burst	Enter the confirm burst value here. The range is from 0 to 16384 Kbytes. The confirm burst value specifies the burst size for the first token bucket in kbps.
PIR	Enter the Peak Information Rate (PIR) value here. The range is from 0 to 10000000 kbps. The peak information rate is the second token bucket for the two-rate metering.
Peak Burst	Enter the peak burst value here. The range is from 0 to 16384 Kbytes. The peak burst value is the burst size for the second token bucket in kilobytes.
Confirm Action	Select the confirm action here. The confirm action specifies the action to take on green color packets. Options to choose from are: • **Drop** - Specifies that the packet will be dropped. • **Set-DSCP-Transmit** - Specifies to enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value. • **Set-1P-Transmit** - Specifies to enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value. • **Transmit** - Specifies that packets will be transmitted unaltered. • **Set-DSCP-1P** - Specifies to enter the IP DSCP and 1P transmit values in the spaces provided. By default, the **Transmit** option is used. Packets are transmitted unaltered.
Exceed Action	Select the exceed action here. The exceed action specifies the action to take on packets that exceed the rate limit. Options to choose from are: • **Drop** - Specifies that the packet will be dropped. • **Set-DSCP-Transmit** - Specifies to enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value. • **Set-1P-Transmit** - Specifies to enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value. • **Transmit** - Specifies that packets will be transmitted unaltered. • **Set-DSCP-1P** - Specifies to enter the IP DSCP and 1P transmit values in the spaces provided. By default, for a two rate policer, the Drop option is used. Packets are dropped.
Violate Action	Select the violate action here. The violate action specifies the action to take on packets that violate the normal and maximum burst sizes for singe rate policing. It specifies the action to take for those packets that did not conform to both CIR and PIR. Options to choose from are: • **Drop** - Specifies that the packet will be dropped. • **Set-DSCP-Transmit** - Specifies to enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value. • **Set-1P-Transmit** - Specifies to enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value. • **Transmit** - Specifies that packets will be transmitted unaltered. • **Set-DSCP-1P** - Specifies to enter the IP DSCP and 1P transmit values in the spaces provided. By default, for a single rate policer, a single-rate two-color policer is created.

Parameter	Description
	By default, for a two-rate policer, the **Drop** option is used. Packets are dropped.
Color Aware	Select the color aware option here. Options to choose from are: • **Enabled** - Specifies that the policer work in the color-aware mode. • **Disabled** - Specifies that the policer work in the colorblind mode.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Policy Map

This window is used to display and configure the policy map settings.

To view the following window, click **QoS > Advanced Settings > Policy Map**, as shown below:

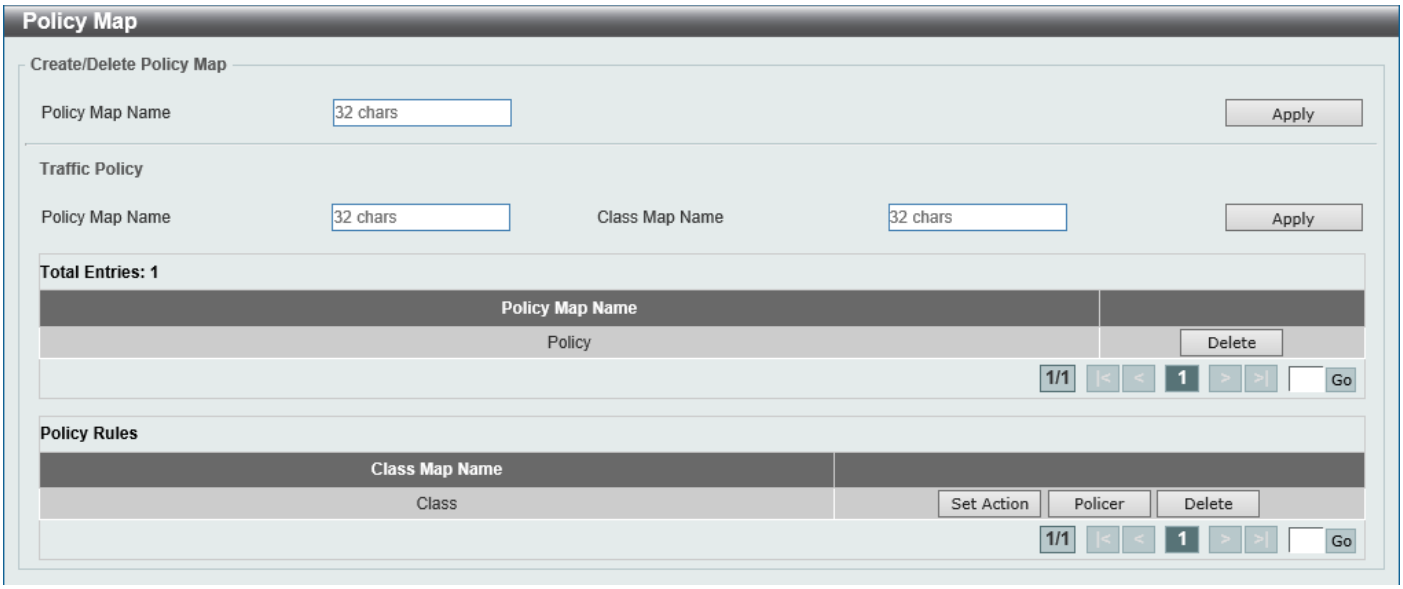


Figure 7-16 Policy Map Window

The fields that can be configured for **Create/Delete Policy Map** are described below:

Parameter	Description
Policy Map Name	Enter the policy map name here that will be created or deleted. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Traffic Policy** are described below:

Parameter	Description
Policy Map Name	Enter the policy map name here. This name can be up to 32 characters long.
Class Map Name	Enter the class map name here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Set Action** button to configure the set action settings for the specified entry.

Click the **Policer** button to configure the policer settings for the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Set Action** button, the following page will appear.

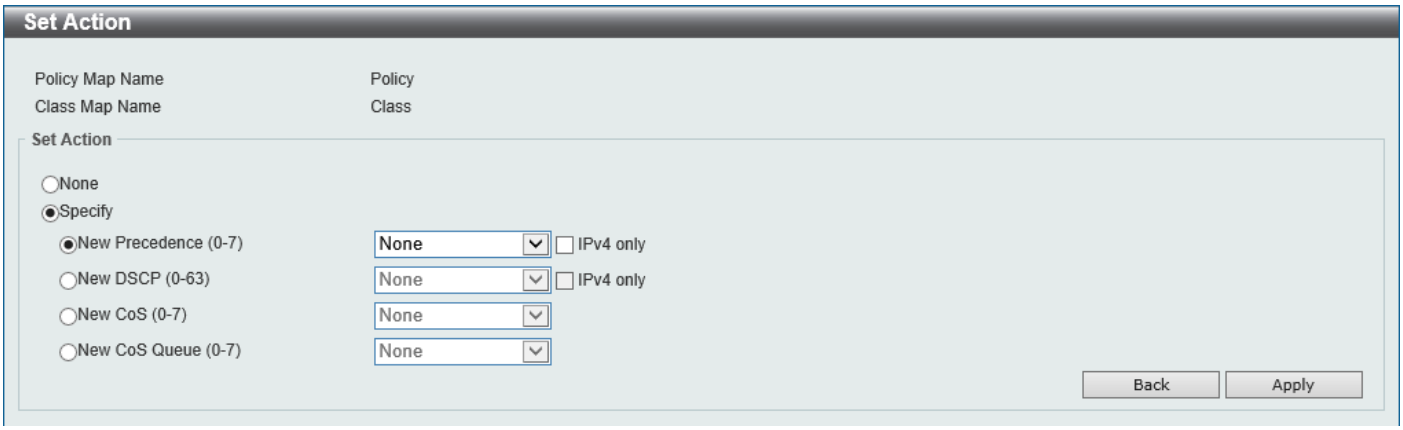


Figure 7-17 Policy Map (Set Action) Window

The fields that can be configured are described below:

Parameter	Description
None	Select this option to specify that no action will be taken.
Specify	Select this option to specify that action will be taken based on the configurations made.
New Precedence	Select the new precedence value for the packet here. The range is from 0 to 7. Select the **IPv4 only** option to specify that IPv4 precedence will be marked only. If not selected, then both IPv4 and IPv6 precedence will be marked. For IPv6 packets, the precedence is the most three significant bits of the traffic class of the IPv6 header. Setting the precedence will not affect the CoS queue selection.
New DSCP	Select the new DSCP value for the packet here. The range is from 0 to 63. Select the **IPv4 only** option to specify that the IPv4 DSCP will be marked only. If not selected, then both the IPv4 and IPv6 DSCP will be marked. Setting the DSCP will not affect the CoS queue selection.
New CoS	Select the new CoS value to the packet here. The range is from 0 to 7. Setting the CoS will affect the CoS queue selection while the policy map is applied on the ingress interface.
New Cos Queue	Select the new CoS queue value to the packets here. This will overwrite the original CoS queue selection. Setting the CoS queue will not take effect if the policy map is applied for the egress flow on the interface.

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

Click the **Apply** button to accept the changes made.

After clicking the **Policer** button, the following page will appear.

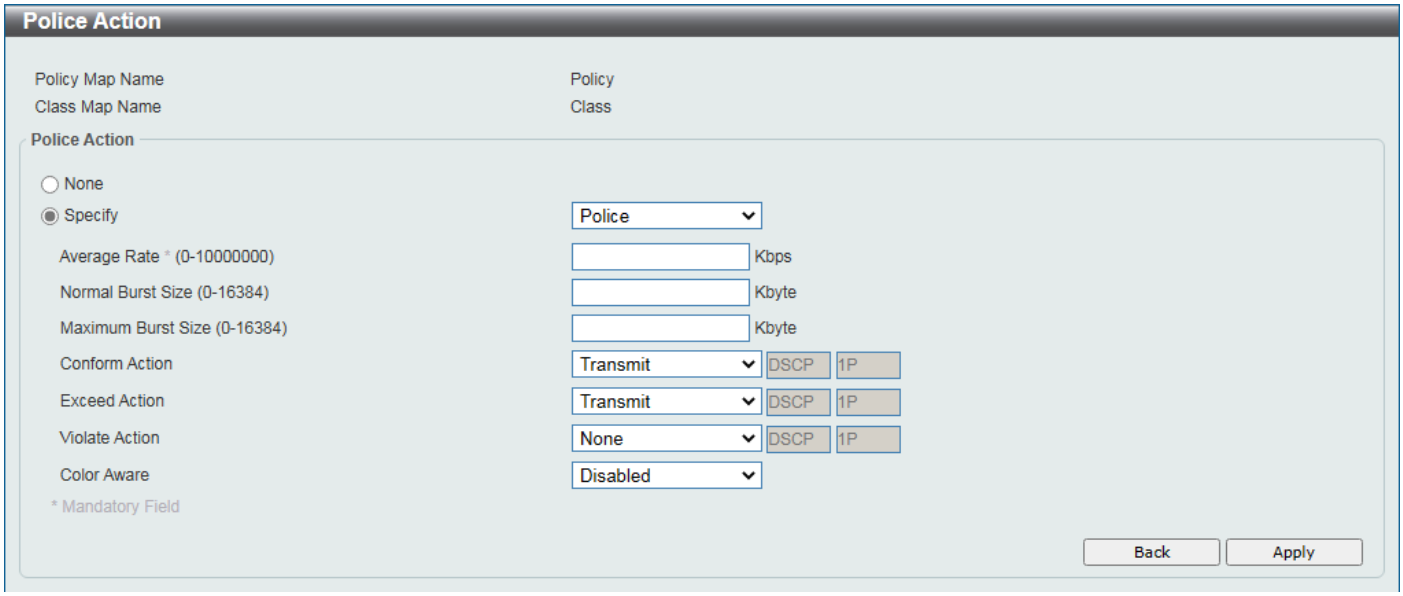


Figure 7-18 Policy Map (Policer) Window

The fields that can be configured are described below:

Parameter	Description
None	Select this option to specify that no policer settings will be configured for this entry.
Specify	Select this option to specify that the following policer settings will be applied to this entry.
Average Rate	Enter the average rate value here. The range is from 0 to 10000000 Kbps.
Normal Burst Size	Enter the normal burst size value here. The range is from 0 to 16384 Kbps.
Maximum Burst Size	Enter the maximum burst size value here. The range is from 0 to 16384 Kbps.
Conform Action	Select the conform action that will be taken here. This action will be taken on green color packets. Option to choose from are: • **Drop** - Specifies that the conform action is to drop the packet. • **Set-DSCP-Transmit** - Specifies that the conform action is to modify the DSCP value and then to transmit the packet with the new DSCP value. Enter the new DSCP value in the space provided. • **Set-1P-Transmit** - Specifies that the conform action is to modify the 802.1p value and then to transmit the packet with the new 802.1p value. Enter the new 802.1p value in the space provided. • **Transmit** - Specifies that the conform action is to transmit the packet unmodified. • **Set-DSCP-1P** - Specifies that the conform action is to modify the DSCP and 802.1p values and then to transmit the packet with the new DSCP and 802.1p values. Enter the new DSCP and 802.1p values in the spaces provided.
Exceed Action	Select the exceed action that will be taken here. This action will be taken on yellow color packets that exceed the rate limit. Option to choose from are: • **Drop** - Specifies that the exceed action is to drop the packet. • **Set-DSCP-Transmit** - Specifies that the exceed action is to modify the DSCP value and then to transmit the packet with the new DSCP value. Enter the new DSCP value in the space provided. • **Set-1P-Transmit** - Specifies that the exceed action is to modify the 802.1p value and then to transmit the packet with the new 802.1p value. Enter the new 802.1p value in the space provided. • **Transmit** - Specifies that the exceed action is to transmit the packet unmodified.

Parameter	Description
	• **Set-DSCP-1P** - Specifies that the exceed action is to modify the DSCP and 802.1p values and then to transmit the packet with the new DSCP and 802.1p values. Enter the new DSCP and 802.1p values in the spaces provided.
Violate Action	Select the violate action that will be taken here. This action will be taken on red color packets. Option to choose from are: • **None** - Specifies that no violate action will be taken. • **Drop** - Specifies that the violate action is to drop the packet. • **Set-DSCP-Transmit** - Specifies that the violate action is to modify the DSCP value and then to transmit the packet with the new DSCP value. Enter the new DSCP value in the space provided. • **Set-1P-Transmit** - Specifies that the violate action is to modify the 802.1p value and then to transmit the packet with the new 802.1p value. Enter the new 802.1p value in the space provided. • **Transmit** - Specifies that the violate action is to transmit the packet unmodified. • **Set-DSCP-1P** - Specifies that the violate action is to modify the DSCP and 802.1p values and then to transmit the packet with the new DSCP and 802.1p values. Enter the new DSCP and 802.1p values in the spaces provided.
Color Aware	Select to enable or disable the color aware feature here. When disabled, the policer works in the colorblind mode. When enabled, the policer works in the color-aware mode.

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

Click the **Apply** button to accept the changes made.

Policy Binding

This window is used to display and configure the policy binding settings.

To view the following window, click **QoS > Advanced Settings > Policy Binding**, as shown below:

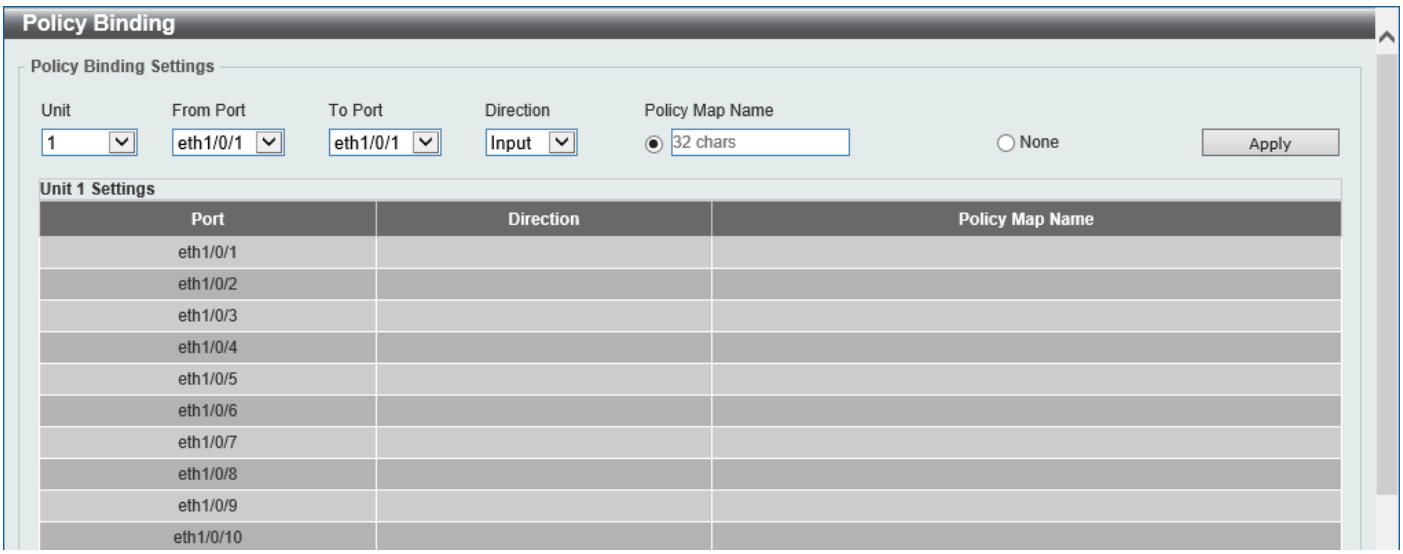


Figure 7-19 Policy Binding Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Direction	Select the direction option here. Options to choose from are **Input** and **Output**. Input specified ingress traffic and output specifies egress traffic.
Policy Map Name	Enter the policy map name here. This name can be up to 32 characters long. Select the **None** option to not tie a policy map to this entry.

Click the **Apply** button to accept the changes made.

QoS PFC

Network QoS Class Map

This window is used to display and configure the network Quality of Service (QoS) Priority-based Flow Control (PFC) class map settings.

To view the following window, click **QoS > QoS PFC > Network QoS Class Map**, as shown below:

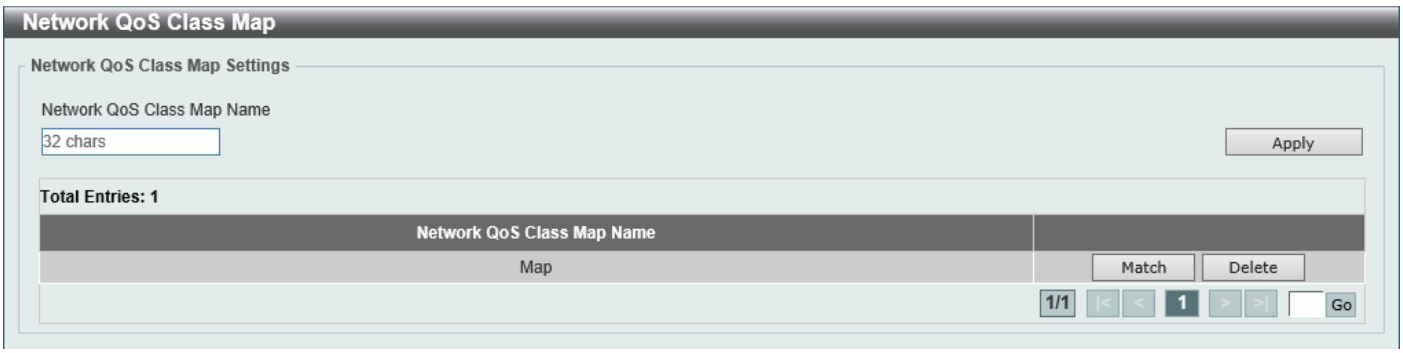


Figure 7-20 Network QoS Class Map Window

The fields that can be configured are described below:

Parameter	Description
Network QoS Class Map Name	Enter the network QoS class map name to be associated with a traffic policy here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Match** button to configure the match rule settings for the map name.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Match** button, the following page will appear.

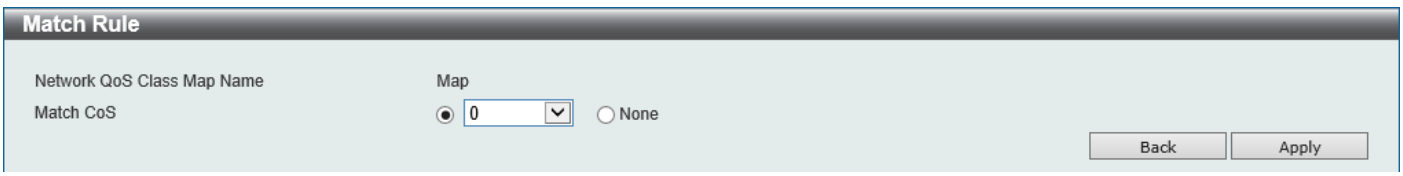


Figure 7-21 Network QoS Class Map (Match) Window

The fields that can be configured are described below:

Parameter	Description
Match CoS	Select the IEEE 802.1Q Class of Service (CoS) value to be matched here. The range is from 0 to 7. When a packet is received, the packet will be given an internal CoS. This internal CoS is used to select the transmit queue based on the CoS to queue map. The CoS queue with a higher number will receive a higher priority. Select to **None** option to disable the matching of CoS values.

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

Click the **Apply** button to accept the changes made.

Network QoS Policy Map

This window is used to display and configure the network QoS policy map settings.

To view the following window, click **QoS > QoS PFC > Network QoS Policy Map**, as shown below:

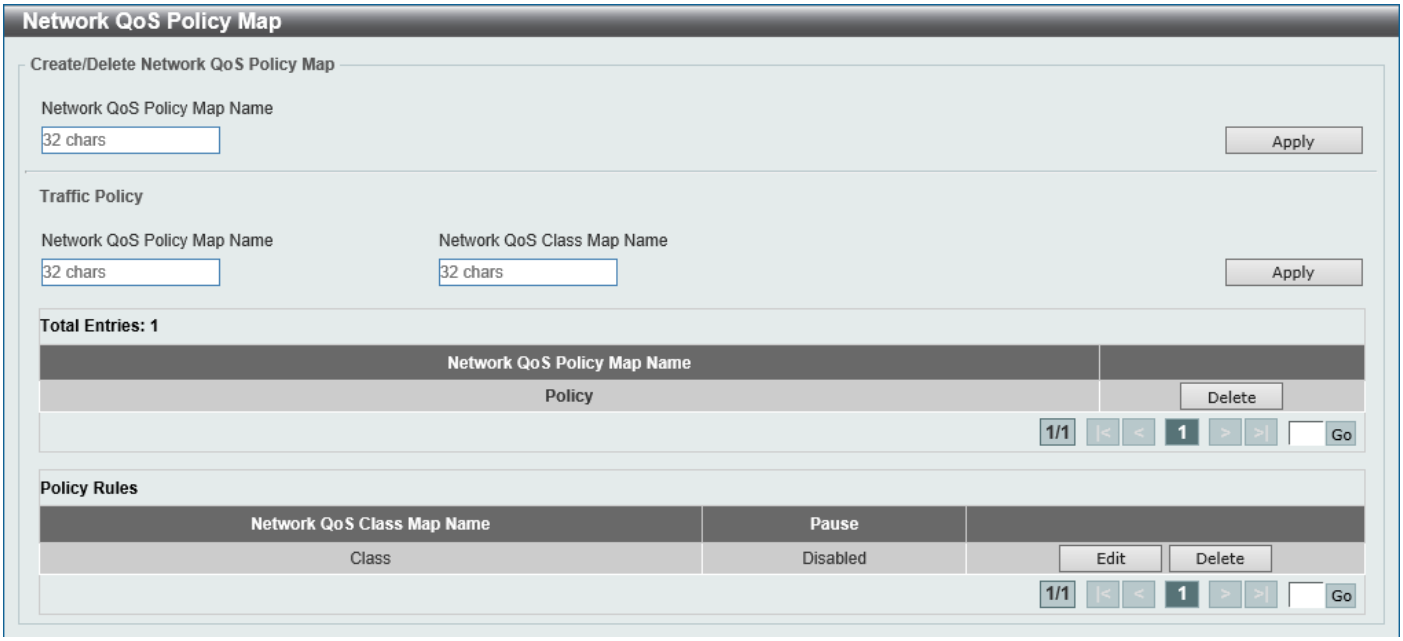


Figure 7-22 Network QoS Policy Map Window

The fields that can be configured in **Create/Delete Network QoS Policy Map** are described below:

Parameter	Description
Network QoS Policy Map name	Enter the network QoS policy map name here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Traffic Policy** are described below:

Parameter	Description
Network QoS Policy Map Name	Enter the network QoS policy map name here that will be associated with the class map. This name can be up to 32 characters long.
Network QoS Class Map Name	Enter the network QoS class map name here that will be associated with the policy map. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

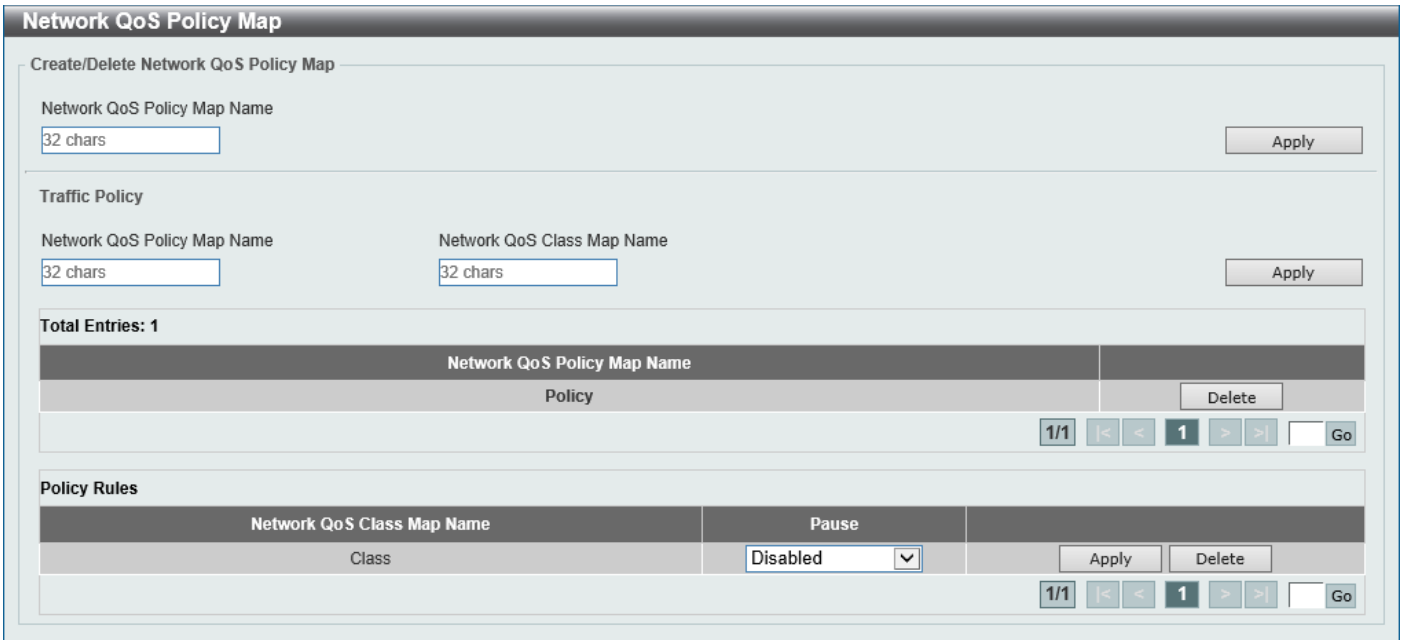


Figure 7-23 Network QoS Policy Map (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Pause	Select to enable or disable the pause feature here. This feature is used to enable PFC on a class referenced in a type network QoS policy map.

Click the **Apply** button to accept the changes made.

Network QoS Policy Binding

This window is used to display and configure the network QoS policy binding settings.

To view the following window, click **QoS > QoS PFC > Network QoS Policy Binding**, as shown below:

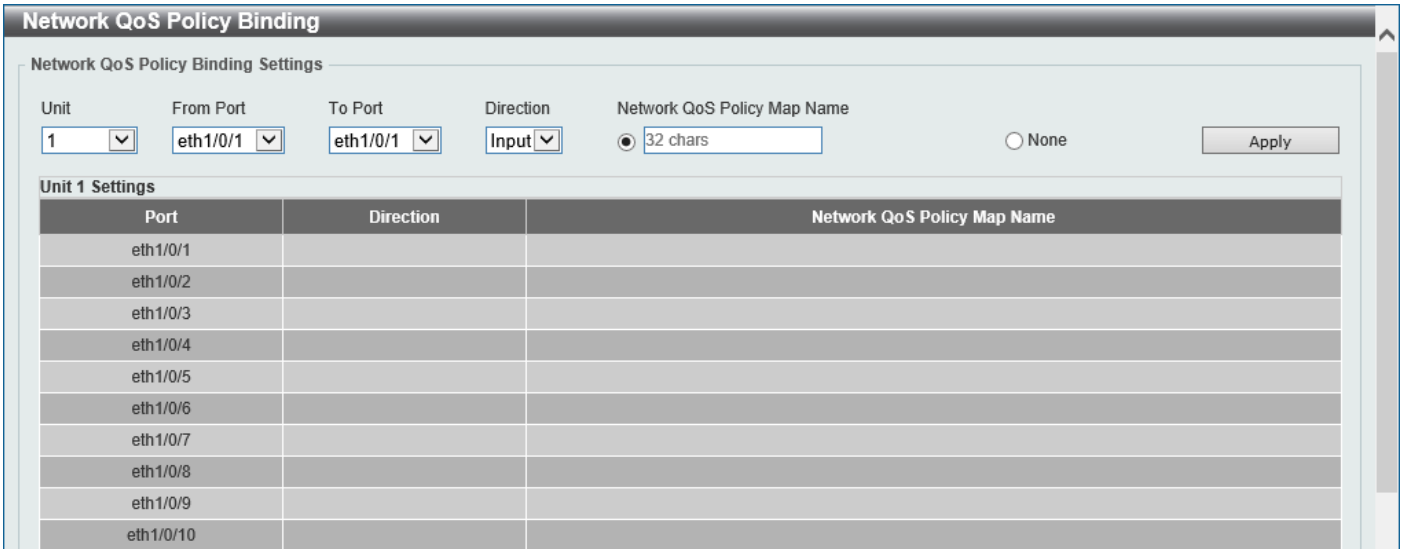


Figure 7-24 Network QoS Policy Binding Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
Direction	Select the **Input** direction here. This specifies to apply the policy map for ingress flow on the interface.
Network QoS Policy Map Name	Enter the network QoS policy map name here. This name can be up to 32 characters long.
None	Select this option to not associate this configuration with a network QoS policy map.

Click the **Apply** button to accept the changes made.

PFC Port Settings

This window is used to display and configure the Priority-based Flow Control (PFC) port settings.

To view the following window, click **QoS > QoS PFC > PFC Port Settings**, as shown below:

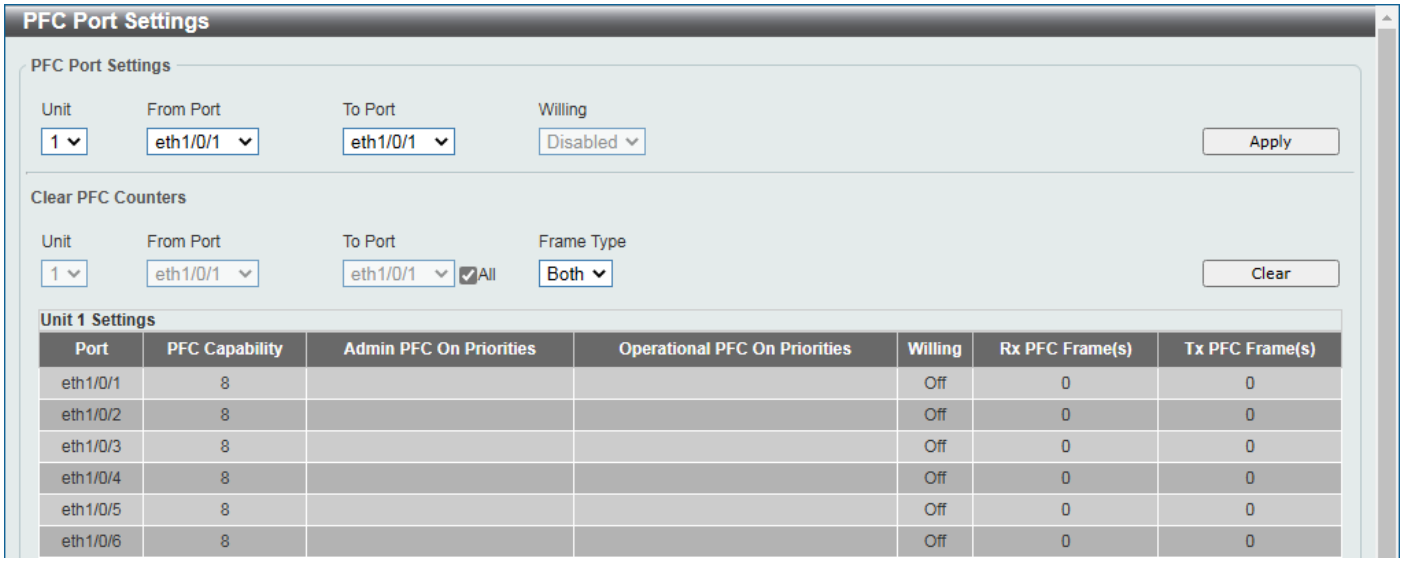


Figure 7-25 PFC Port Settings Window

The fields that can be configured in **PFC Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Clear PFC Counters** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here. Select the **All** option to specify that all ports will be used here.
Frame Type	Select the frame type that will be cleared here. Options to choose from are: • **RX** - Specifies to clear the counters of received PFC frames. • **TX** - Specifies to clear the counters of transmitted PFC frames. • **Both** - Specifies to clear the counters of received and transmitted PFC frames.

Click the **Clear** button to clear the counters based on the selections made.

WRED

Weighted Random Early Detection (WRED) is another implementation for QoS that will help the overall throughput for your QoS queues. Based on the egress queue of the QoS function set on the Switch, this method will analyze these packets and their QoS queue to determine if there will be an overflow of packets entering the QoS queues and consequentially, minimize the packet flow into these queues by dropping random packets.

WRED employs two methods of avoiding congestion within the QoS queue.

- Every QoS queue has a minimum and a maximum level for acceptance of packets. Once the maximum threshold has been reached for this queue, the Switch will begin discarding all ingress packets, this minimizing the allotted bandwidth for QoS. When below the minimum threshold, the Switch will accept all ingress packets.
- When the ingress packets are somewhere between the maximum and minimum queue, the Switch will use a slope probability function to determine a random method of dropping packets based on the maximum drop rate which specifies the drop probability when the queues reach maximum threshold. If queues are closer to the maximum threshold, the Switch will increase the discarding of random packets to even out the flow to the queues and avoid overflows to higher priority queues.

WRED Profile

This window is used to display and configure the Weighted Random Early Detection (WRED) profile settings.

To view the following window, click **QoS > WRED > WRED Profile**, as shown below:

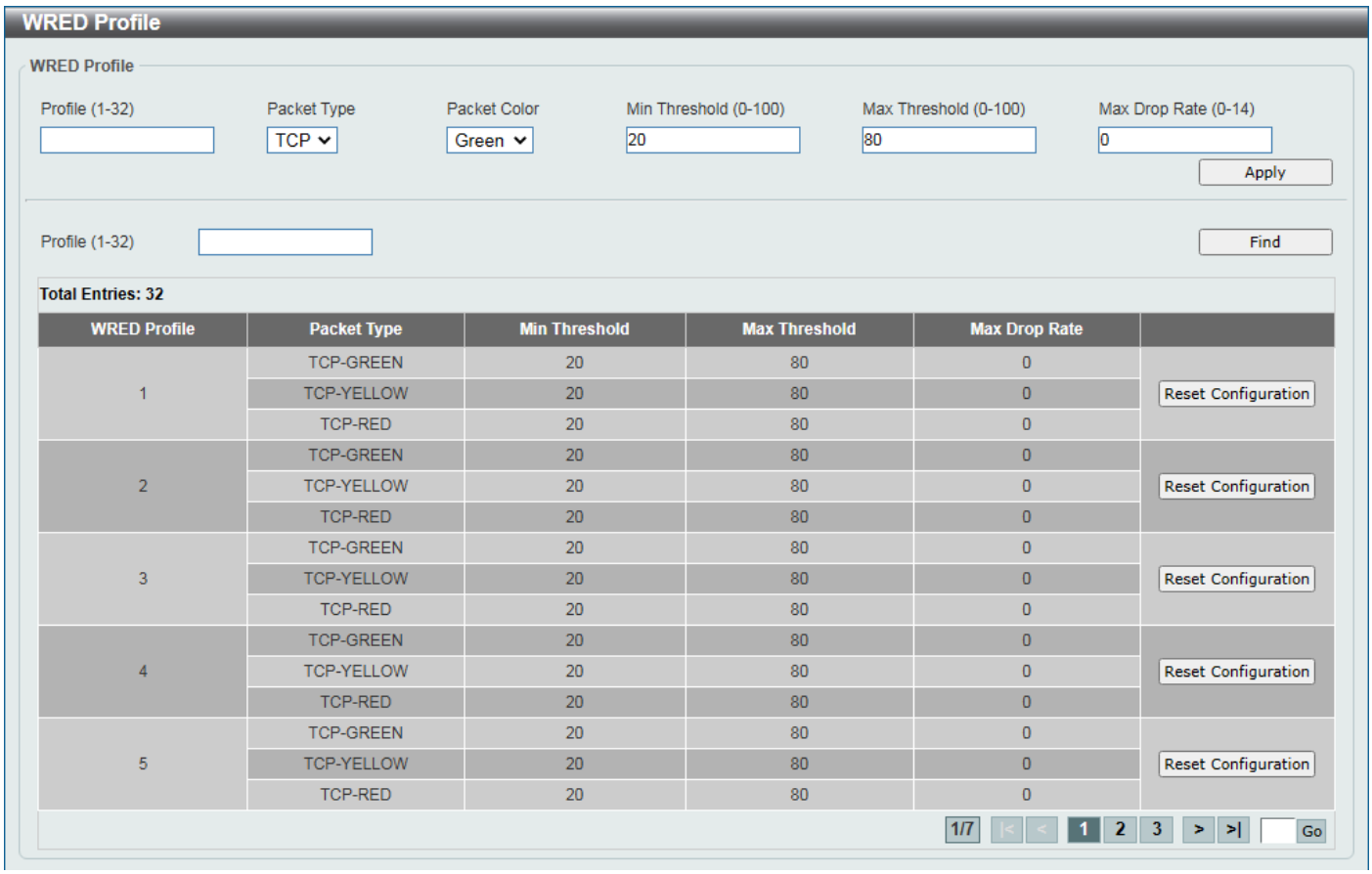


Figure 7-26 WRED Profile Window

The fields that can be configured are described below:

Parameter	Description
Profile	Enter the WRED profile ID here. The range is from 1 to 32.
Packet Type	Specifies that the packet type is TCP.
Packet Color	Select the packet color here. Options to choose from are: • **Green** - Specifies the WRED drop parameters for green packets to be set. • **Yellow** - Specifies the WRED drop parameters for yellow packets to be set. • **Red** - Specifies the WRED drop parameters for red packets to be set.
Min Threshold	Enter the minimum threshold value here that will be used to start WRED dropping. The range is from 0 to 100.

Parameter	Description
Max Threshold	Enter the maximum threshold value here over which WRED will drop all packets destined for this queue. The range is from 0 to 100.
Max Drop Rate	Enter the maximum drop-rate value here. The range is from 0 to 14. This feature specifies the drop probability when the average queue size reaches the maximum threshold. When this value is zero, then the packet will not be dropped or remarked for ECN.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Reset Configuration** button to reset the configuration on the specified entry.

WRED Queue

This window is used to display and configure the WRED queue settings. WRED drops packets, based on the average queue size exceeding a specific threshold, to indicate congestion.

To view the following window, click **QoS > WRED > WRED Queue**, as shown below:

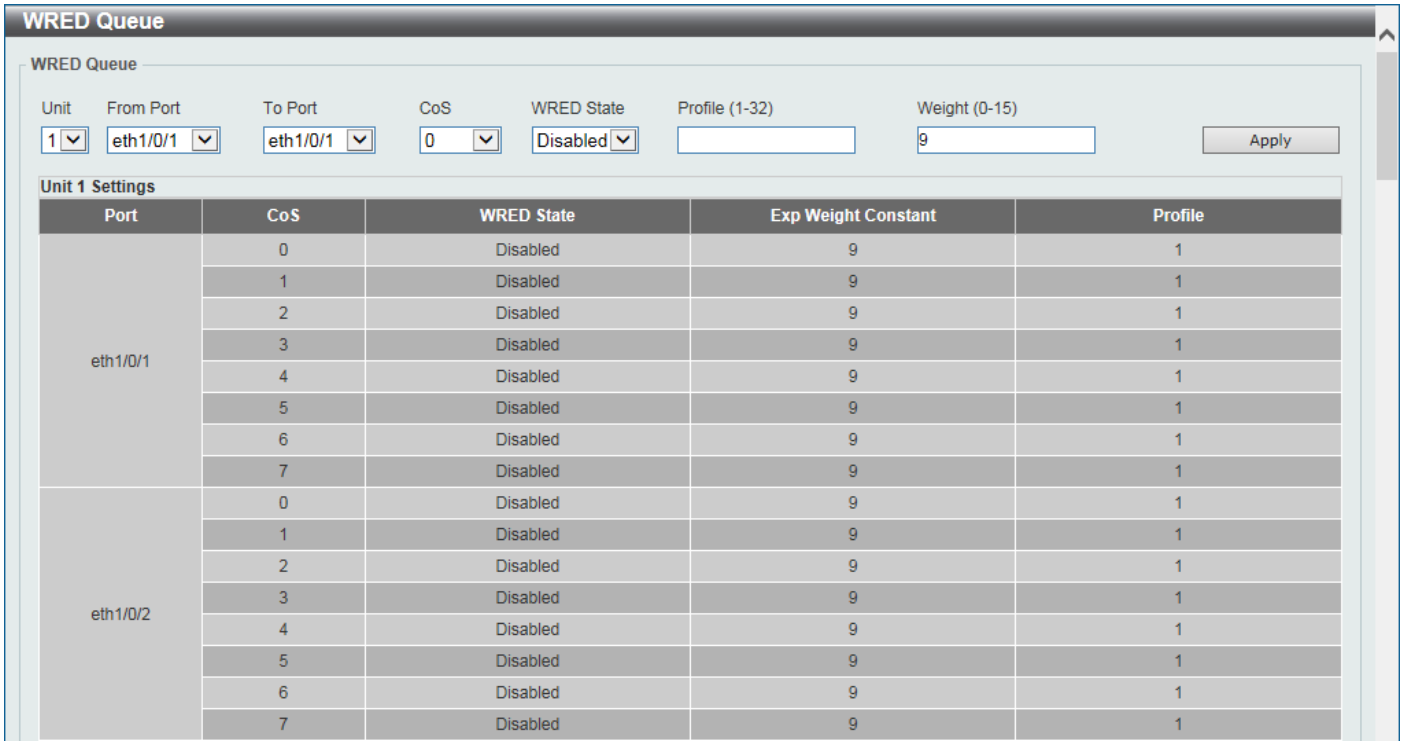


Figure 7-27 WRED Queue Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
CoS	Select the CoS value here. The range is from 0 to 7.
WRED State	Select to enable or disable the WRED feature state on the specified port(s) here.
Profile	Enter the WRED profile ID here. The range is from 1 to 128.
Weight	Enter the exponential weight value here. The range is from 0 to 15. This feature is used to configure the WRED exponential weight factor for the average queue size calculation for the queue.

Click the **Apply** button to accept the changes made.

WRED Drop Counter

This window is used to view and clear the WRED drop counter information.

To view the following window, click **QoS > WRED > WRED Drop Counter**, as shown below:

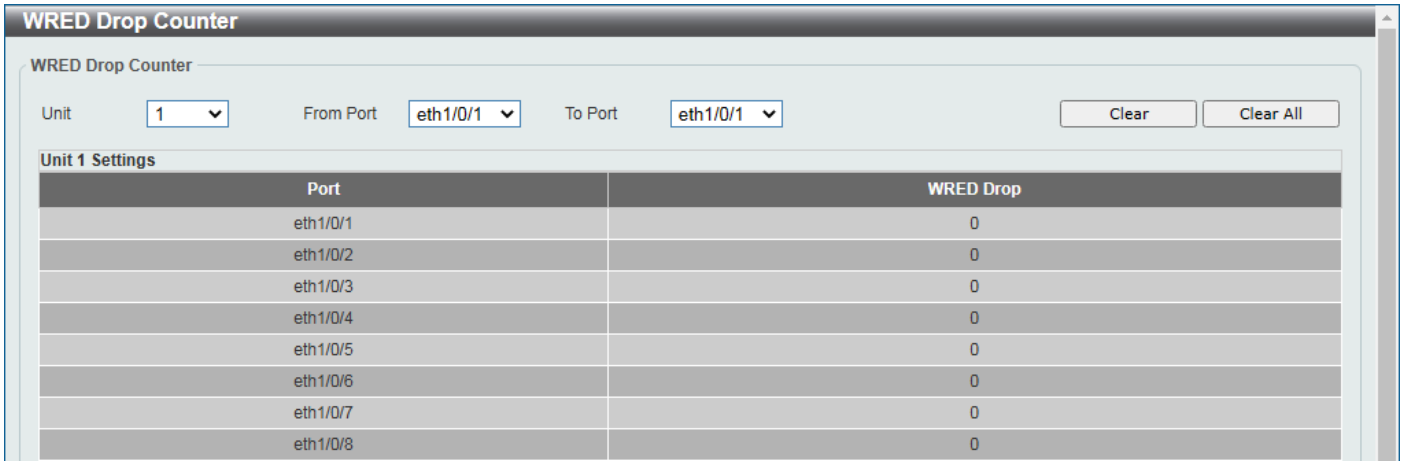


Figure 7-28 WRED Drop Counter Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Clear** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear the counter information associated with all entries.

iSCSI

The iSCSI awareness application involved in providing automated QoS preferential treatment of iSCSI flows can be divided into the following categories:

- Detecting the establishment and termination of iSCSI sessions and connections by snooping packets used in the iSCSI protocol.
- Maintaining a database of currently active iSCSI sessions and connections to store data about the participants. This allows the formulation of classifier rules giving the data packets for the session the desired QoS treatment.
- Installing and removing classifier rule sets as needed for the iSCSI session traffic.
- Monitoring activity in the iSCSI sessions to allow for aging out session entries if the session termination packets are not received.

iSCSI Settings

This window is used to display and configure the Internet Small Computer Systems Interface (iSCSI) settings.

To view the following window, click **QoS > iSCSI > iSCSI Settings**, as shown below:

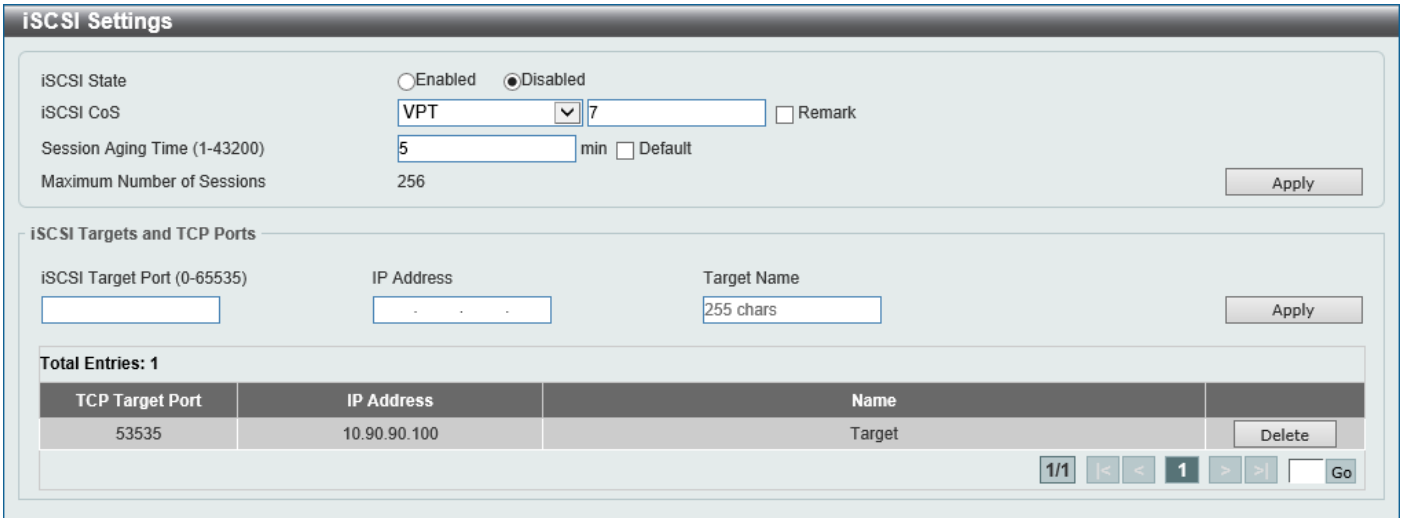


Figure 7-29 iSCSI Settings Window

The fields that can be configured are described below:

Parameter	Description
iSCSI State	Select to globally enable or disable the iSCSI awareness feature here.
iSCSI CoS	Select the iSCSI CoS that will be configured here. Options to choose from are: • **VPT** - Specifies to use VLAN Priority Tag (VPT) to assign iSCSI session packets. Enter the VPT value in the space provided. • **DSCP** - Specifies to use DSCP to assign iSCSI session packets. Enter the DSCP value in the space provided. • **Default** - Specifies to use the default settings. By default, the VPT is used with the value of 7. Select the **Remark** option to mark the iSCSI frames with the configured VPT or DSCP when egressing the Switch.
Session Aging Time	Enter the session aging time value here. The range is from 1 to 43200 minutes. This is used to configure the aging time for iSCSI sessions. When configuring the aging time to be longer than the current setting, the current sessions will be timed out and use the new aging time. When configuring the aging time to be shorter than the current setting, sessions that are longer than the new aging time will be deleted, and sessions that are shorter than or equal to the new aging time will be continue to be monitored with the new setting. Select the **Default** option to use the default value which is 5 minutes.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **iSCSI Targets and TCP Ports** are described below:

Parameter	Description
iSCSI Target Port	Enter the iSCSI target port number here. The range is from 0 to 65535.
IP Address	Enter the IP address of the iSCSI target here.
Target Name	Enter the iSCSI target name here. This string can be up to 255 characters long. The name can be manually configured, or obtained from iSNS or from a *sendTargets* response. The initiator must present both its iSCSI Initiator Name and

Parameter	Description
	the iSCSI Target Name to connect in the first login request of a new session or connection.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

iSCSI Sessions

This window is used to view the iSCSI active session table.

To view the following window, click **QoS > iSCSI > iSCSI Sessions**, as shown below:

Figure 7-30 iSCSI Sessions Window

8. Access Control List (ACL)

ACL Configuration Wizard

This window is used to guide the user to create a new ACL access list or configure an existing ACL access list.

Step 1 - Create/Update

To view the following window, click **ACL > ACL Configuration Wizard**, as shown below:

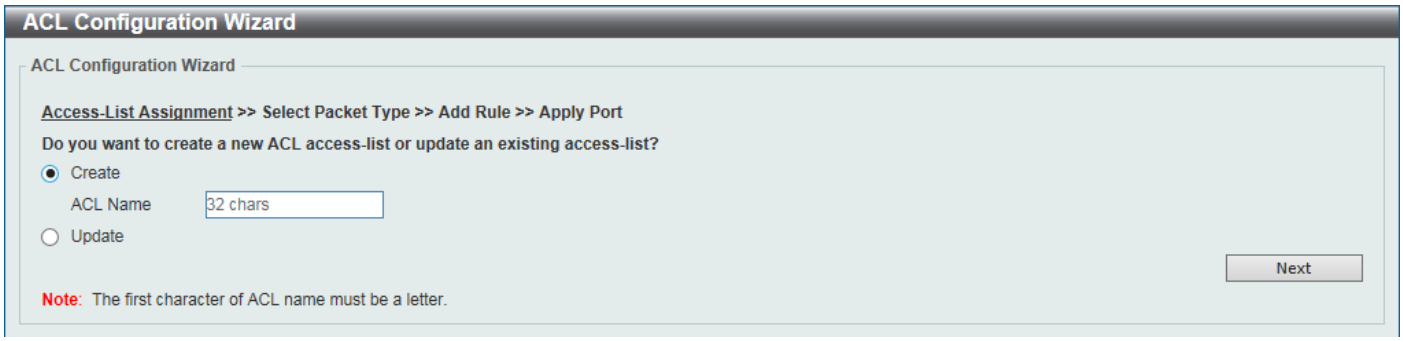


Figure 8-1 ACL Configuration Wizard (Create) Window

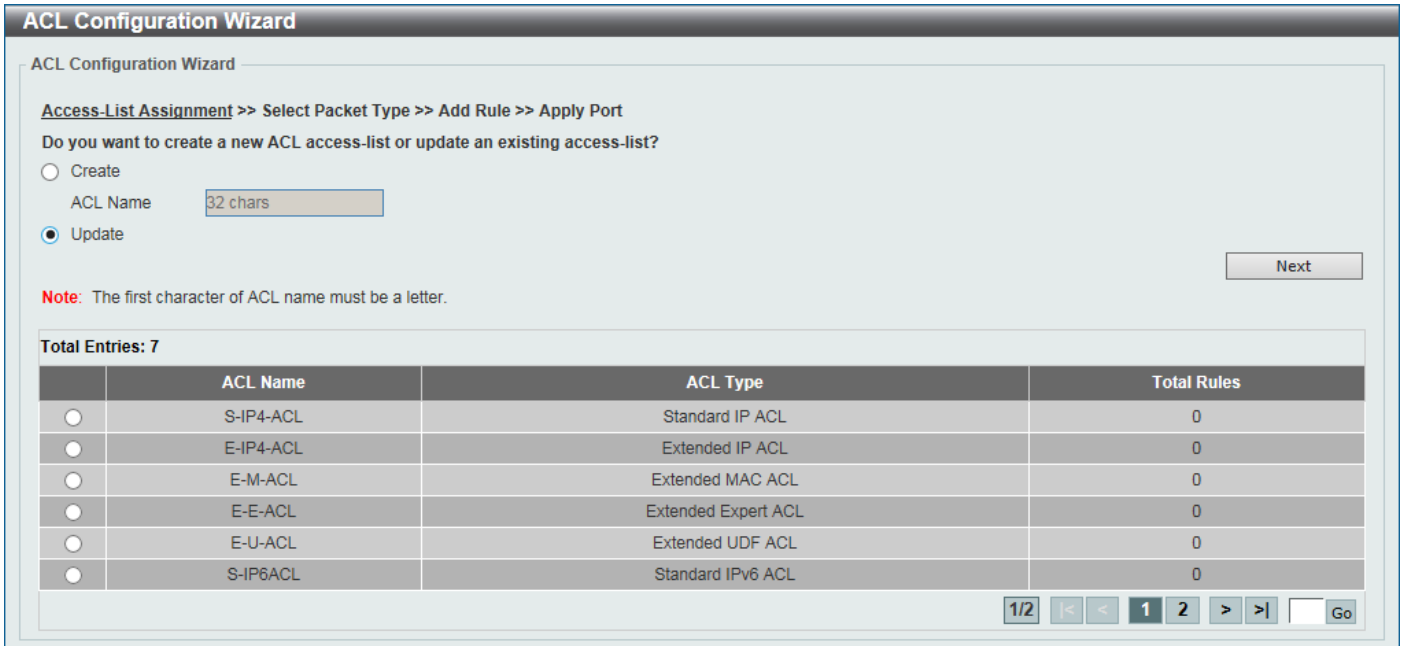


Figure 8-2 ACL Configuration Wizard (Update) Window

The fields that can be configured are described below:

Parameter	Description
Create	Select this option to create a new ACL access list using the configuration wizard.
ACL Name	Enter the new ACL name here. This name can be up to 32 characters long.
Update	Select this option to update an existing ACL access list. Select the existing ACL in the table to process with the update.

Click the **Next** button to continue to the next step.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Step 2 - Select Packet Type

After clicking the **Next** button, the following window will appear.

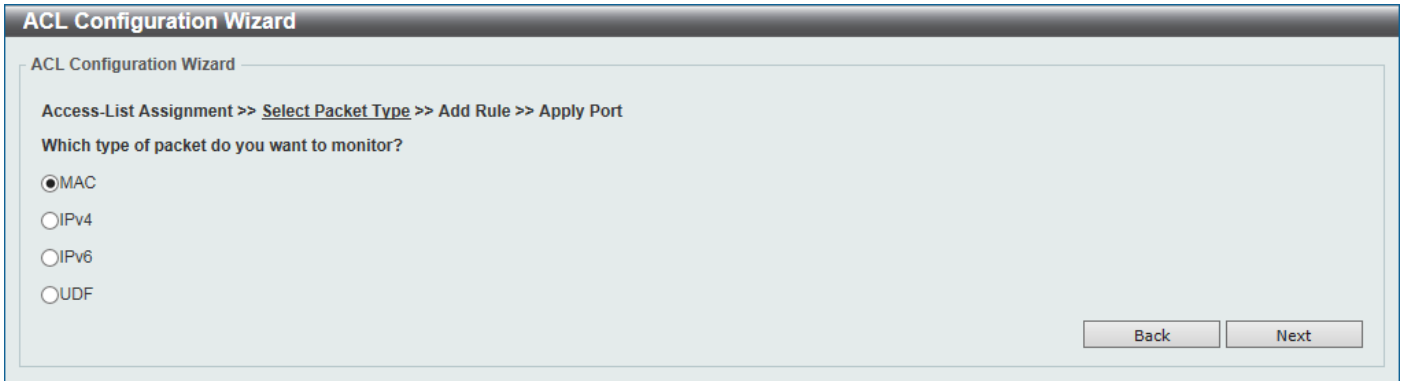


Figure 8-3 ACL Configuration Wizard (Create, Packet Type) Window

The fields that can be configured are described below:

Parameter	Description
MAC	Select to create/update a MAC ACL.
IPv4	Select to create/update an IPv4 ACL.
IPv6	Select to create/update an IPv6 ACL.
UDF	Select to create/update an UDF ACL.

Click the **Back** button to return to the previous step.

Click the **Next** button to continue to the next step.

Step 3 - Add Rule

Extended MAC ACL

Selecting to **Create** or **Update** a **MAC** ACL and click the **Next** button to view the following window:

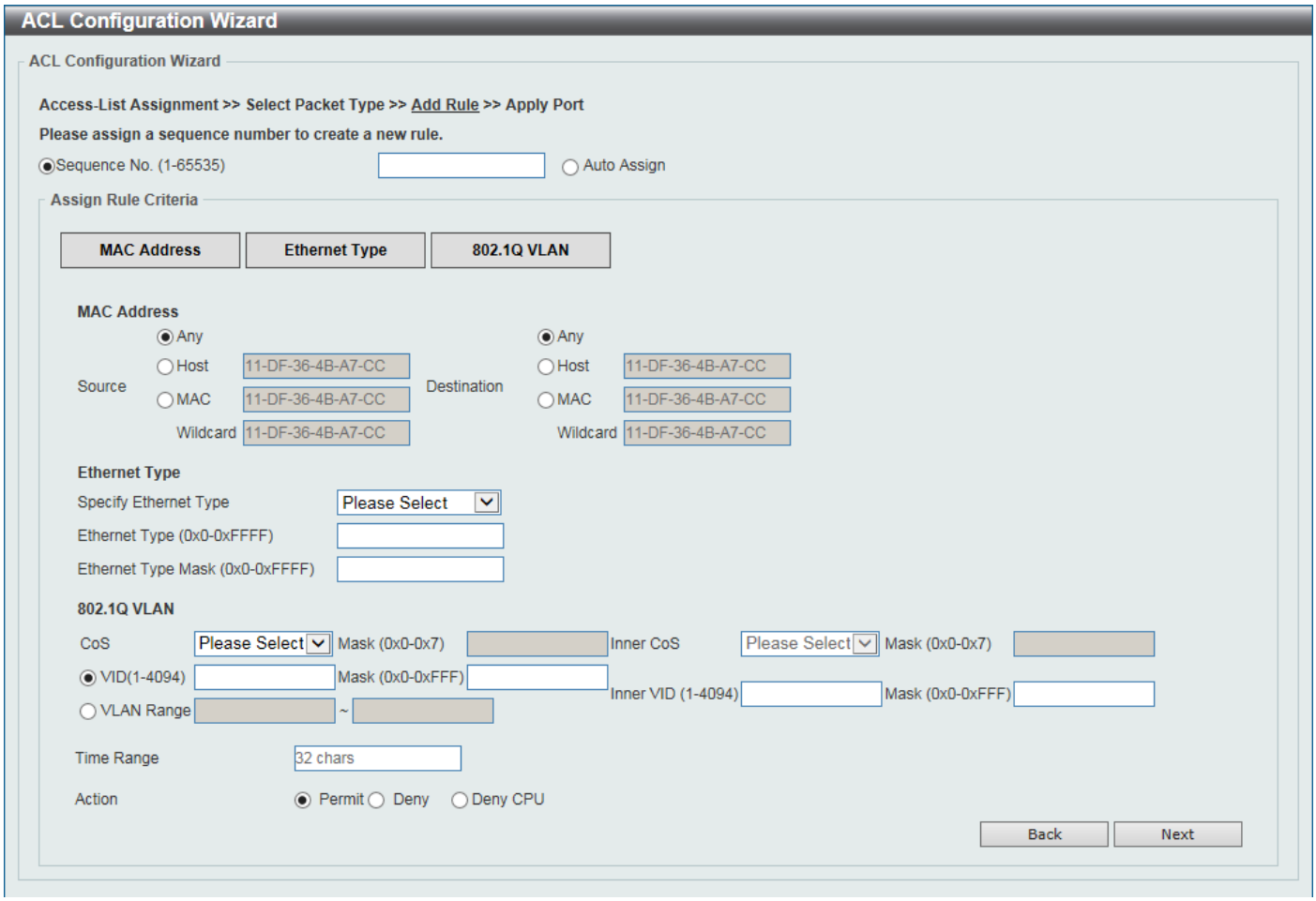


Figure 8-4 ACL Configuration Wizard (Extended MAC ACL) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the ACL rule number here. The range is from 1 to 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry.
Source	Select and enter the source MAC address information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the source MAC address and wildcard value in the spaces provided.
Destination	Select and enter the destination MAC address information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the destination MAC address and wildcard value in the spaces provided.

Parameter	Description
Specify Ethernet Type	Select the Ethernet type option here. Options to choose from are **aarp**, **appletalk**, **decent-iv**, **etype-6000**, **etype-8042**, **lat**, **lavc-sca**, **mop-console**, **mop-dump**, **vines-echo**, **vines-ip**, **xns-idp**, and **arp**.
Ethernet Type	Enter the Ethernet type hexadecimal value here. The range is from 0x0 to 0xFFFF. When any Ethernet type profile is selected in the **Specify Ethernet Type** drop-down list, the appropriate hexadecimal value will automatically be entered.
Ethernet Type Mask	Enter the Ethernet type mask hexadecimal value here. The range is from 0x0 to 0xFFFF. When any Ethernet type profile is selected in the **Specify Ethernet Type** drop-down list, the appropriate hexadecimal value will automatically be entered.
CoS	Select the CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the CoS mask value here. The range is from 0x0 to 0x7.
Inner CoS	After selecting the CoS value, select the inner CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the inner CoS mask value here. The range is from 0x0 to 0x7.
VID	Enter the VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the VLAN ID mask value here. The range is from 0x0 to 0xFFF.
Inner VID	Enter the inner VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the inner VLAN ID mask value here. The range is from 0x0 to 0xFFF.
VLAN Range	Select and enter the VLAN range that will be associated with this ACL rule here. Enter the starting and ending VLANs in the spaces provided. The range is from 1 to 4094.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.

Click the **Back** button to return to the previous step.

Click the **Next** button to continue to the next step.

Extended/Standard IPv4 ACL

Selecting to **Create** or **Update** an **IPv4** ACL and click the **Next** button to view the following window:

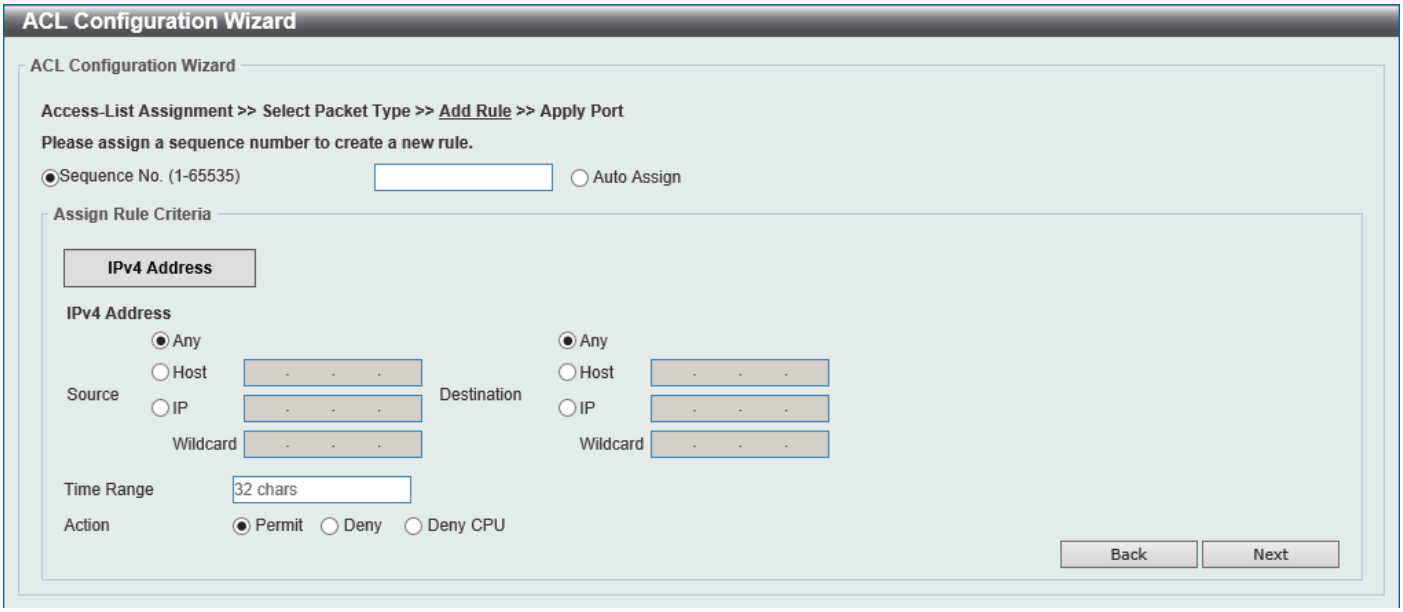


Figure 8-5 ACL Configuration Wizard (Standard IPv4 ACL) Window

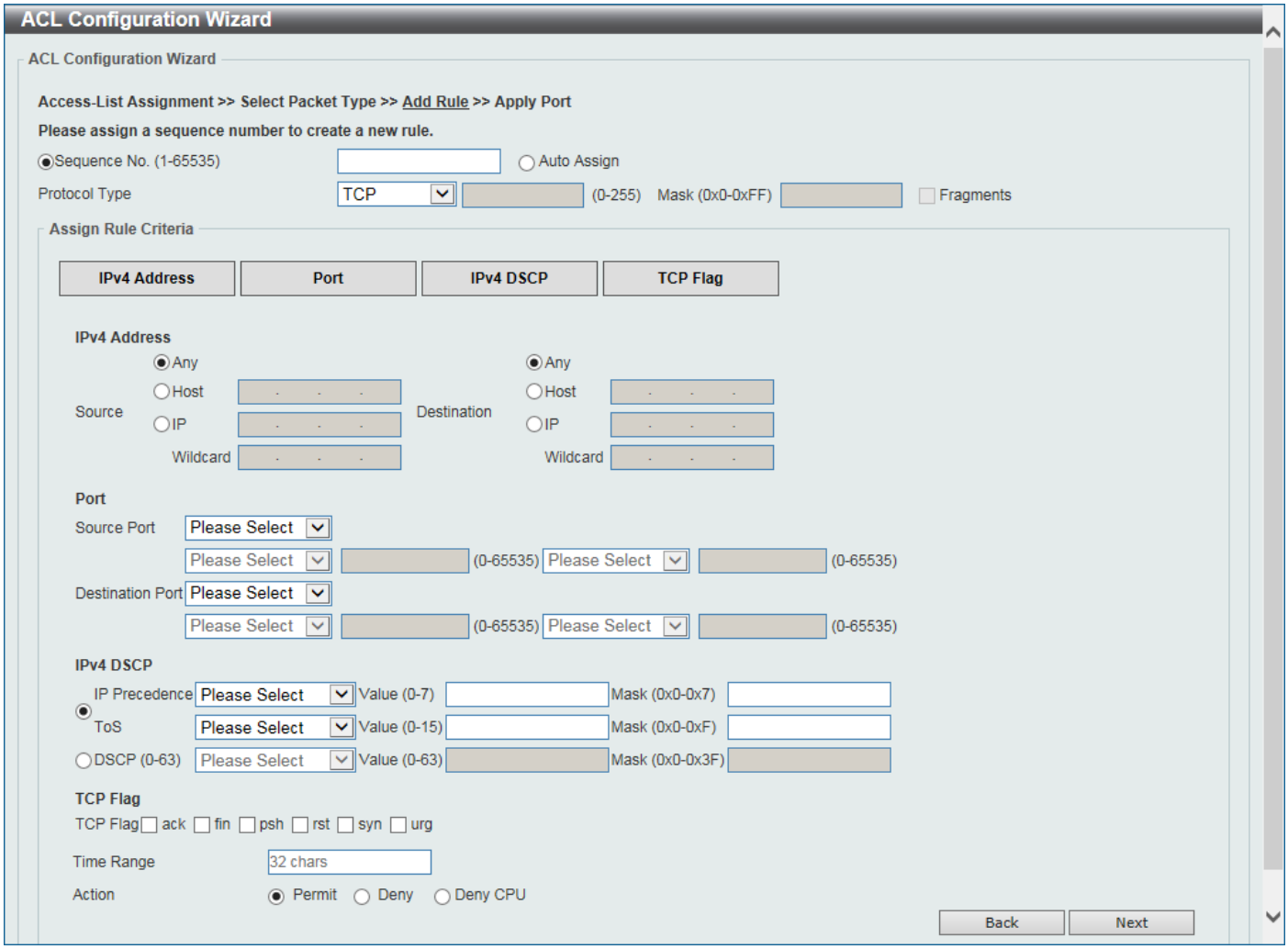


Figure 8-6 ACL Configuration Wizard (Extended IPv4 ACL) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the ACL rule number here. The range is from 1 to 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry.

Parameter	Description
Protocol Type	Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP** (88), **ESP** (50), **GRE** (47), **IGMP** (2), **OSPF** (89), **PIM** (103), **VRRP** (112), **IP-in-IP** (94), **PCP** (108), **Protocol ID**, and **None**. • **Value** - The protocol ID can also manually be entered here. The range is from 0 to 255. • **Mask** - After selecting the **Protocol ID** option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF. • **Fragments** - Select this option to include packet fragment filtering.

The fields that can be configured in **Assign rule criteria** are described below:

Parameter	Description
Source	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Destination	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Source Port	Select and enter the source port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified source port number and mask will be used. Enter the source port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Destination Port	Select and enter the destination port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified destination port number and mask will be used. Enter the destination port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.

Parameter	Description
Specify ICMP Message Type	Select the ICMP message type used here. This parameter is only available in the protocol type **ICMP**.
ICMP Message Type	When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
Message Code	When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
IP Precedence	Select the IP precedence value used here. Options to choose from are **routine** (0), **priority** (1), **immediate** (2), **flash** (3), **flash-override** (4), **critical** (5), **internet** (6), and **network** (7). • **Value** - The IP precedence value can also manually be entered here. The range is from 0 to 7. • **Mask** - Enter the IP precedence mask value here. The range is from 0x0 to 0x7.
ToS	Select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **normal** (0), **min-monetary-cost** (1), **max-reliability** (2), **max-throughput** (4), and **min-delay** (8). • **Value** - The ToS value can also manually be entered here. The range is from 0 to 15. • **Mask** - Enter the ToS mask value here. The range is from 0x0 to 0xF.
DSCP	Select the DSCP value that will be used here. Options to choose from are **default** (0), **af11** (10), **af12** (12), **af13** (14), **af21** (18), **af22** (20), **af23** (22), **af31** (26), **af32** (28), **af33** (30), **af41** (34), **af42** (36), **af43** (38), **cs1** (8), **cs2** (16), **cs3** (24), **cs4** (32), **cs5** (40), **cs6** (48), **cs7** (56), and **ef** (46). • **Value** - The DSCP value can also manually be entered here. The range is from 0 to 63. • **Mask** - Enter the DSCP mask value here. The range is from 0x0 to 0x3F.
TCP Flag	Select the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. This parameter is only available in the protocol type **TCP**.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.

Click the **Back** button to return to the previous step.

Click the **Next** button to continue to the next step.

Extended/Standard IPv6 ACL

Selecting to **Create** or **Update** an **IPv6** ACL and click the **Next** button to view the following window:

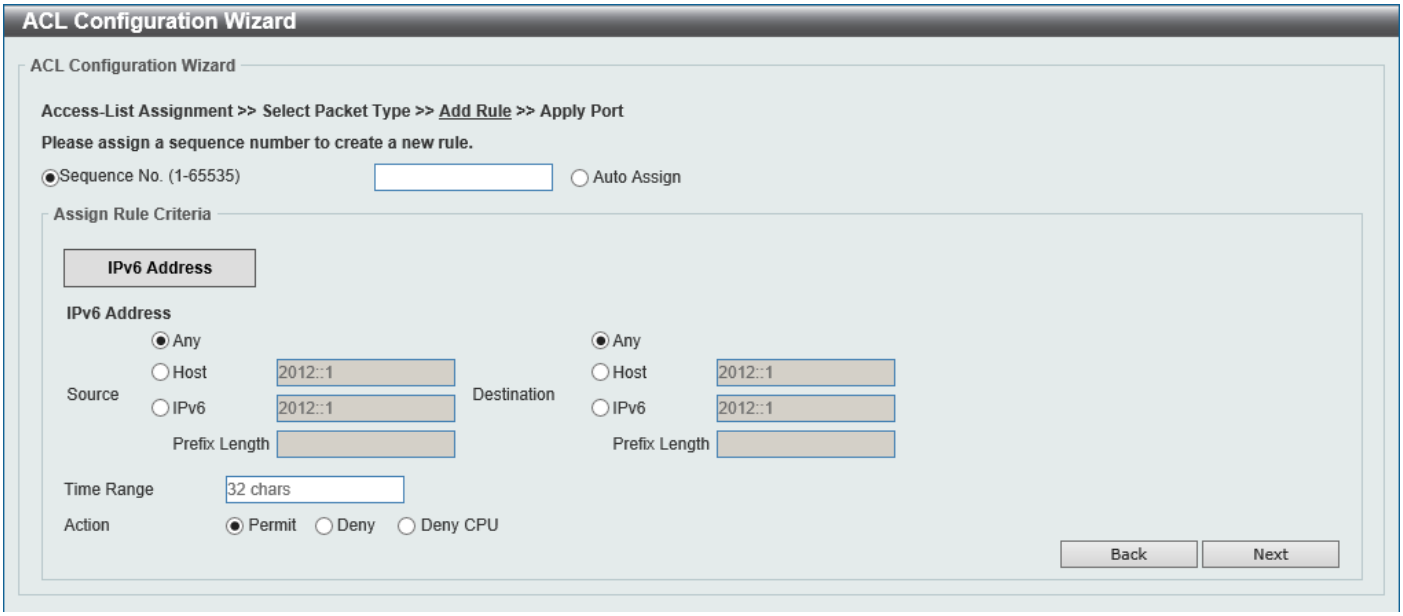


Figure 8-7 ACL Configuration Wizard (Standard IPv6 ACL) Window

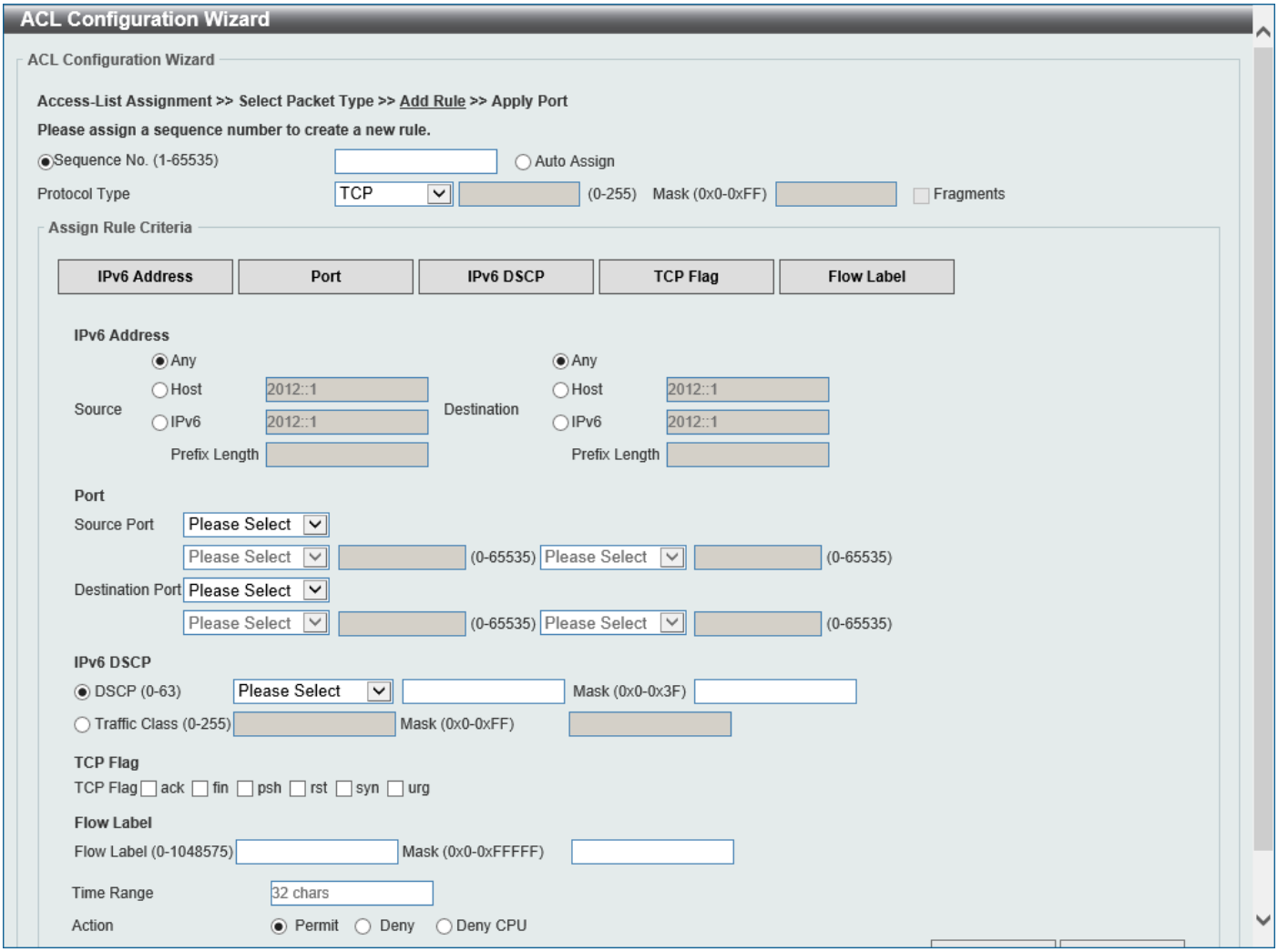


Figure 8-8 ACL Configuration Wizard (Extended IPv6 ACL) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the ACL rule number here. The range is from 1 to 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry.

Parameter	Description
Protocol Type	Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **Protocol ID**, **ESP** (50), **PCP** (108), **SCTP** (132), and **None**. • **Value** - The protocol ID can also manually be entered here. The range is from 0 to 255. • **Mask** - After selecting the **Protocol ID** option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF. • **Fragments** - Select this option to include packet fragment filtering.

The fields that can be configured in **Assign rule criteria** are described below:

Parameter	Description
Source	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IPv6 address here. • **IPv6** - The **Prefix Length** option will be available. Enter the source IPv6 address and prefix length value in the spaces provided.
Destination	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IPv6 address here. • **IPv6** - The **Prefix Length** option will be available. Enter the destination IPv6 address and prefix length value in the spaces provided.
Source Port	Select and enter the source port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified source port number and mask will be used. Enter the source port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Destination Port	Select and enter the destination port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified destination port number and mask will be used. Enter the destination port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Specify ICMP Message Type	Select the ICMP message type used here. This parameter is only available in the protocol type **ICMP**.

Parameter	Description
ICMP Message Type	When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
Message Code	When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
DSCP	Select the DSCP value that will be used here. Options to choose from are **default** (0), **af11** (10), **af12** (12), **af13** (14), **af21** (18), **af22** (20), **af23** (22), **af31** (26), **af32** (28), **af33** (30), **af41** (34), **af42** (36), **af43** (38), **cs1** (8), **cs2** (16), **cs3** (24), **cs4** (32), **cs5** (40), **cs6** (48), **cs7** (56), and **ef** (46). • **Value** - The DSCP value can also manually be entered here. The range is from 0 to 63. • **Mask** - Enter the DSCP mask value here. The range is from 0x0 to 0x3F.
Traffic Class	Select and enter the traffic class value here. The range is from 0 to 255. • **Mask** - Enter the traffic class mask value here. The range is from 0x0 to 0xFF.
TCP Flag	Select the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. This parameter is only available in the protocol type **TCP**.
Flow Label	Enter the flow label value here. The range is from 0 to 1048575. • **Mask** - Enter the flow label mask value here. The range is from 0x0 to 0xFFFFF.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.

Click the **Back** button to return to the previous step.

Click the **Next** button to continue to the next step.

Extended UDF ACL

Selecting to **Create** or **Update** an **UDF** ACL and click the **Next** button to view the following window:

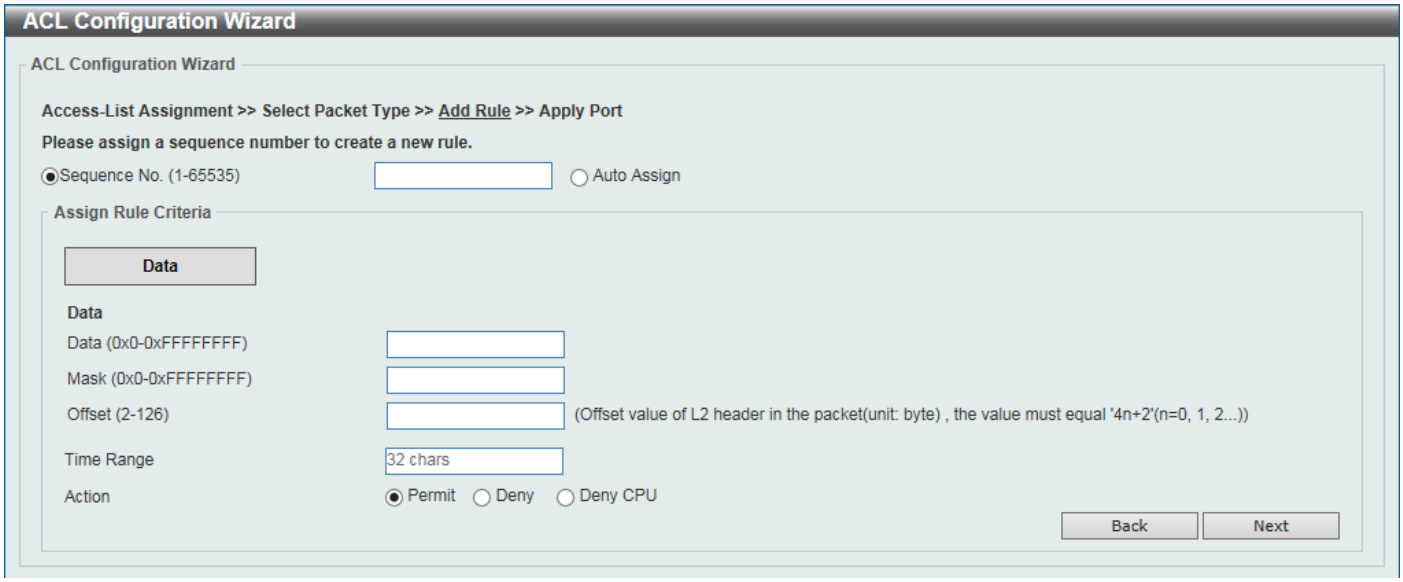


Figure 8-9 ACL Configuration Wizard (Extended UDF ACL) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the ACL rule number here. The range is from 1 to 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry.

The fields that can be configured in **Assign rule criteria** are described below:

Parameter	Description
Data	Enter the UDF fields per rule to match the content of the packet. • **Mask** - Enter the data mask value here. The range may be: ○ **0x0** to **0xffffffff** ○ **0x0** to **0xffff** ○ **0x0** to **0xff**
Offset	Enter the offset value as specified by the L2 header. An offset value of 126 will match packet byte offsets 126,127,0, and 1.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.

Click the **Back** button to return to the previous step.

Click the **Next** button to continue to the next step.

Extended Expert ACL

Selecting to **Update** an extended expert ACL and click the **Next** button to view the following window:

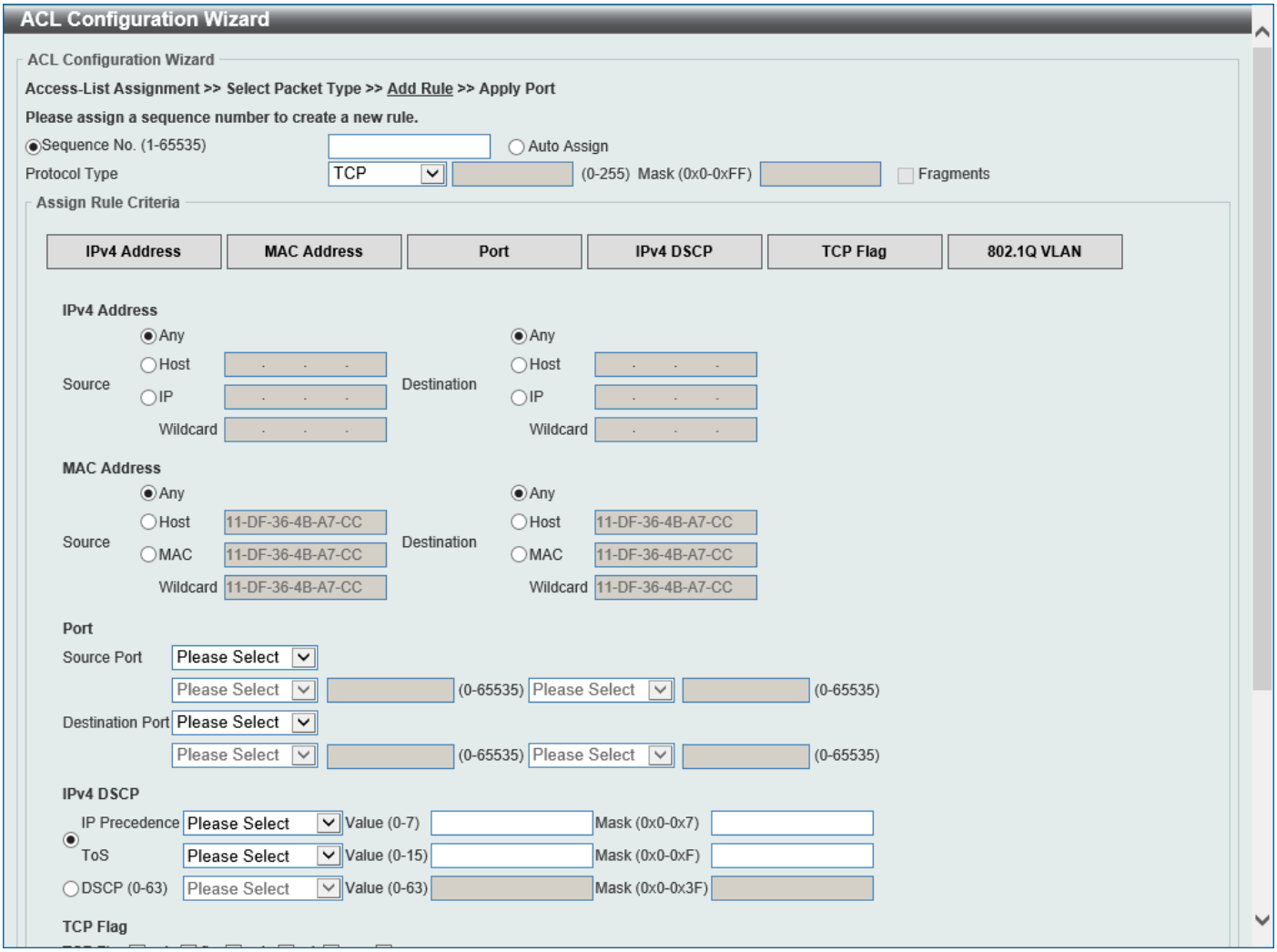


Figure 8-10 ACL Configuration Wizard (Extended Expert ACL) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the ACL rule number here. The range is from 1 to 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry.
Protocol Type	Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP** (88), **ESP** (50), **GRE** (47), **IGMP** (2), **OSPF** (89), **PIM** (103), **VRRP** (112), **IP-in-IP** (94), **PCP** (108), **Protocol ID**, and **None**. • **Value** - The protocol ID can also manually be entered here. The range is from 0 to 255. • **Mask** - After selecting the **Protocol ID** option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF. • **Fragments** - Select this option to include packet fragment filtering.

The fields that can be configured in **Assign rule criteria** are described below:

Parameter	Description
Source IPv4 Address	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule.

Parameter	Description
	• **Host** - Enter the source host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Destination IPv4 Address	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Source MAC Address	Select and enter the source MAC address information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the source MAC address and wildcard value in the spaces provided.
Destination MAC Address	Select and enter the destination MAC address information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the destination MAC address and wildcard value in the spaces provided.
Source Port	Select and enter the source port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified source port number and mask will be used. Enter the source port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Destination Port	Select and enter the destination port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified destination port number and mask will be used. Enter the destination port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Specify ICMP Message Type	Select the ICMP message type used here.

Parameter	Description
	This parameter is only available in the protocol type **ICMP**.
ICMP Message Type	When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
Message Code	When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
IP Precedence	Select the IP precedence value used here. Options to choose from are **routine** (0), **priority** (1), **immediate** (2), **flash** (3), **flash-override** (4), **critical** (5), **internet** (6), and **network** (7). • **Value** - The IP precedence value can also manually be entered here. The range is from 0 to 7. • **Mask** - Enter the IP precedence mask value here. The range is from 0x0 to 0x7.
ToS	Select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **normal** (0), **min-monetary-cost** (1), **max-reliability** (2), **max-throughput** (4), and **min-delay** (8). • **Value** - The ToS value can also manually be entered here. The range is from 0 to 15. • **Mask** - Enter the ToS mask value here. The range is from 0x0 to 0xF.
DSCP	Select the DSCP value that will be used here. Options to choose from are **default** (0), **af11** (10), **af12** (12), **af13** (14), **af21** (18), **af22** (20), **af23** (22), **af31** (26), **af32** (28), **af33** (30), **af41** (34), **af42** (36), **af43** (38), **cs1** (8), **cs2** (16), **cs3** (24), **cs4** (32), **cs5** (40), **cs6** (48), **cs7** (56), and **ef** (46). • **Value** - The DSCP value can also manually be entered here. The range is from 0 to 63. • **Mask** - Enter the DSCP mask value here. The range is from 0x0 to 0x3F.
TCP Flag	Select the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. This parameter is only available in the protocol type **TCP**.
CoS	Select the CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the CoS mask value here. The range is from 0x0 to 0x7.
Inner CoS	After selecting the CoS value, select the inner CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the inner CoS mask value here. The range is from 0x0 to 0x7.
VID	Enter the VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the VLAN ID mask value here. The range is from 0x0 to 0xFFF.
Inner VID	Enter the inner VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the inner VLAN ID mask value here. The range is from 0x0 to 0xFFF.
VLAN Range	Select and enter the VLAN range that will be associated with this ACL rule here. Enter the starting and ending VLANs in the spaces provided. The range is from 1 to 4094.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Parameter	Description
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.

Click the **Back** button to return to the previous step.

Click the **Next** button to continue to the next step.

Step 4 - Apply Port

After clicking the **Next** button, the following window will appear.

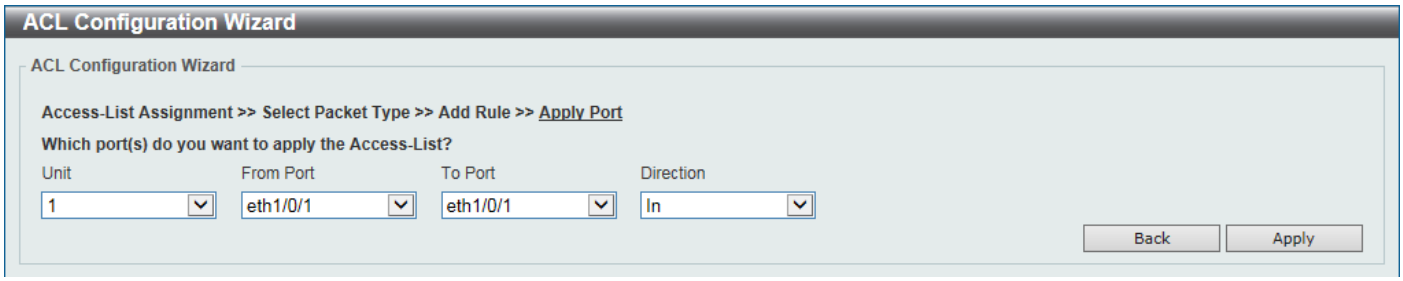


Figure 8-11 ACL Configuration Wizard (Create, Port) Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Direction	Select the direction here. Options to choose from are **In** and **Out**.

Click the **Back** button to return to the previous step.

Click the **Apply** button to accept the changes made and return to the main ACL Wizard window.

ACL Access List

This window is used to display and configure the ACLs, ACL rules, and settings.

To view the following window, click **ACL > ACL Access List**, as shown below:

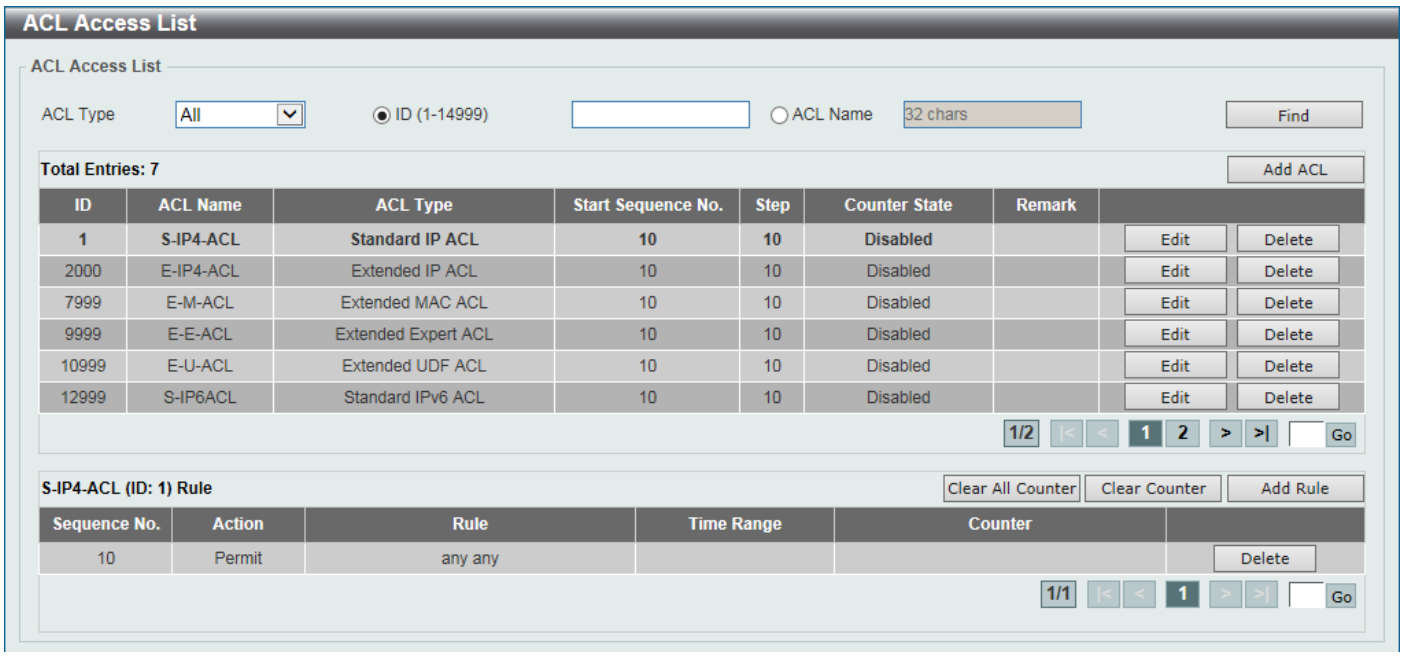


Figure 8-12 ACL Access List Window

The fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type to find here. Options to choose from are **All**, **IP ACL**, **IPv6 ACL**, **MAC ACL**, **Expert ACL**, and **UDF ACL**.
ID	Select and enter the access list ID here. The range is from 1 to 14999.
ACL Name	Select and enter the access list name here. This name can be up to 32 characters long.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Add ACL** button to create a new ACL.

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button, next to the ACL, to remove the specific ACL.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Clear All Counter** button to clear all the counter information displayed.

Click the **Clear Counter** button to clear the counter information for the rule displayed.

Click the **Add Rule** button to create an ACL rule for the ACL selected.

Click the **Delete** button, next to the ACL rule, to remove the specific ACL rule.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

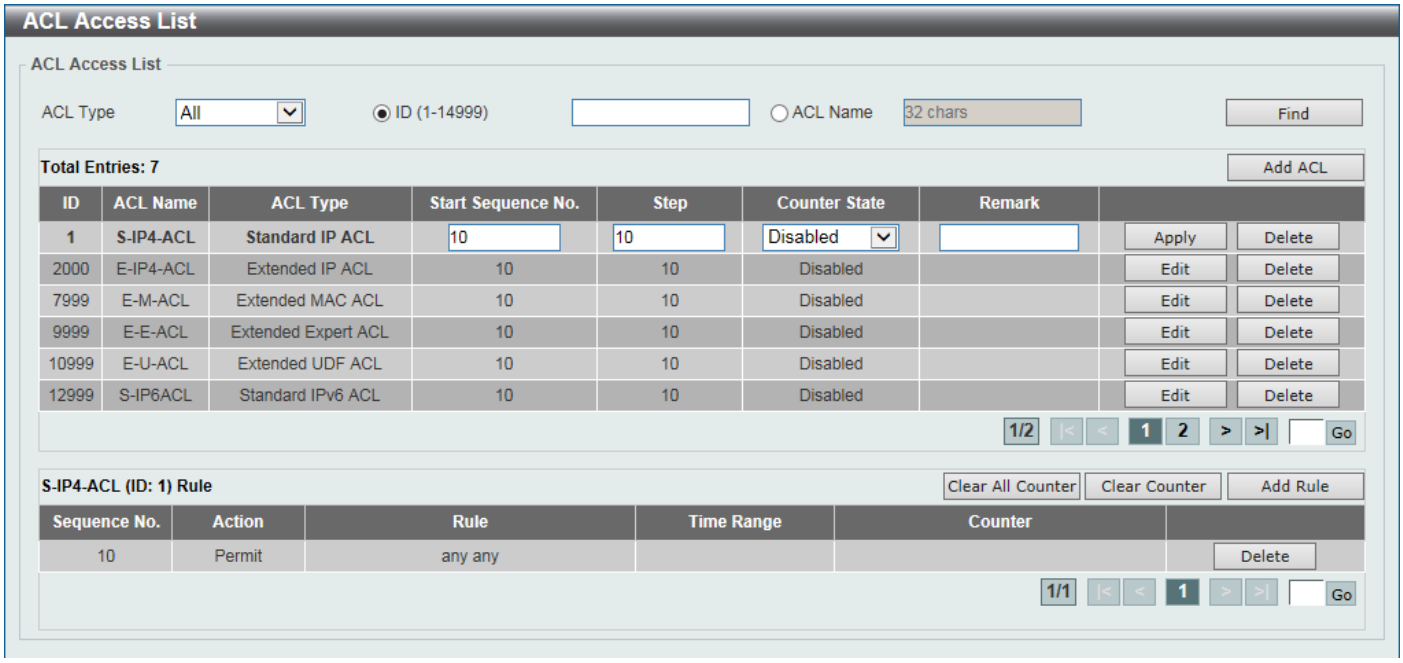


Figure 8-13 ACL Access List (Edit) Window

After clicking the **Edit** button, the fields that can be configured are described below:

Parameter	Description
Start Sequence No.	Enter the start sequence number here.
Step	Enter the sequence number step here. The step range is from 1 to 32. This specifies the number that the sequence numbers step. For example, if the increment (step) value is 5 and the beginning sequence number is 20, the subsequent sequence numbers are 25, 30, 35, 40, and so on. By default, this value is 10.
Counter State	Select to enable or disable the counter state option here.
Remark	Enter an optional remark that will be associated with this ACL here.

Click the **Apply** button to accept the changes made.

After clicking the **Add ACL** button, the following page will appear.

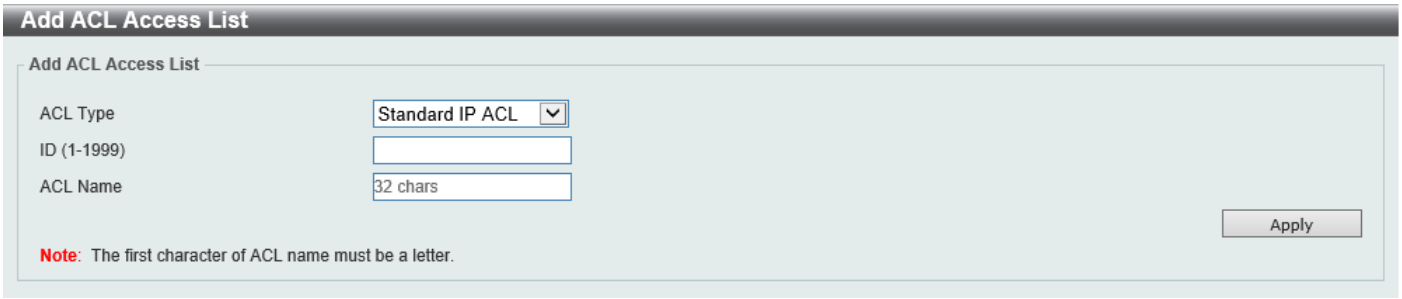


Figure 8-14 ACL Access List (Add ACL) Window

After clicking the **Add ACL** button, the fields that can be configured are described below:

Parameter	Description
ACL Type	Select the ACL type that will be created here. Options to choose from are **Standard IP ACL**, **Extended IP ACL**, **Standard IPv6 ACL**, **Extended IPv6 ACL**, **Extended MAC ACL**, **Extended Expert ACL**, and **Extended UDF ACL**.
ID	Enter the ID for the ACL here.

Parameter	Description
	• For a **Standard IP ACL**, the range from 1 to 1999. • For an **Extended IP ACL**, the range from 2000 to 3999. • For a **Standard IPv6 ACL**, the range from 11000 to 12999. • For an **Extended IPv6 ACL**, the range from 13000 to 14999. • For an **Extended MAC ACL**, the range from 6000 to 7999. • For an **Extended Expert ACL**, the range from 8000 to 9999. • For an **Extended UDF ACL**, the range from 10000 to 10999.
ACL Name	Enter the name of the ACL here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Standard IP ACL

After selecting a Standard IP ACL and clicking the **Add Rule** button, the following page will appear.

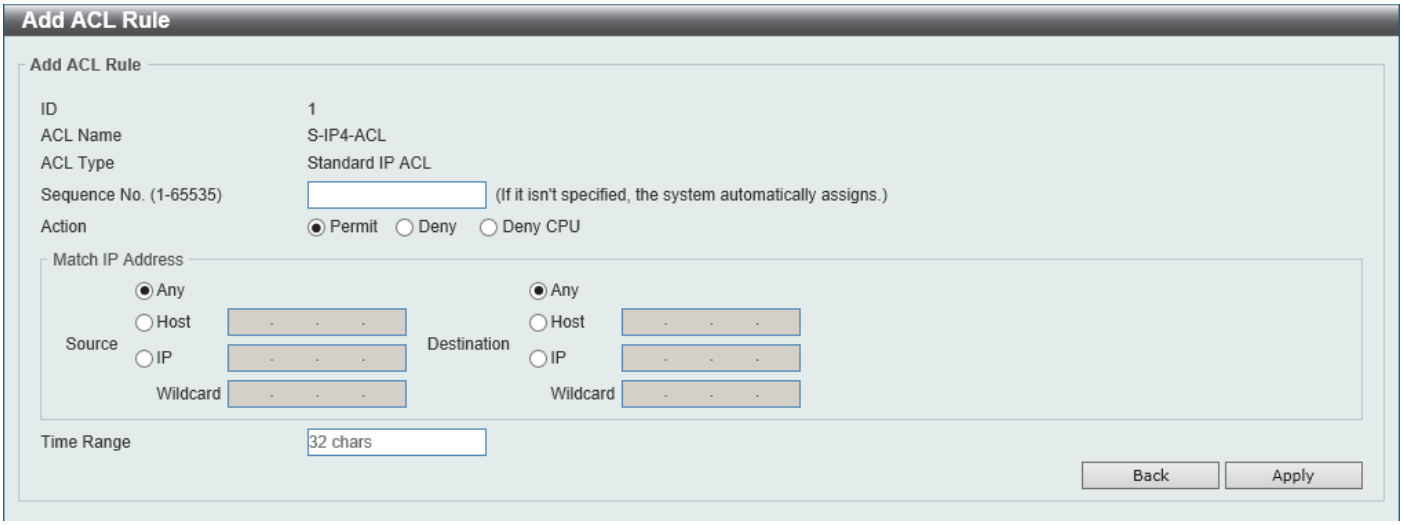


Figure 8-15 Standard IP ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Source	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Destination	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IP address here.

Parameter	Description
	• **IP** - The **Wildcard** option will be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Extended IP ACL

After selecting an Extended IP ACL and clicking the **Add Rule** button, the following page will appear.

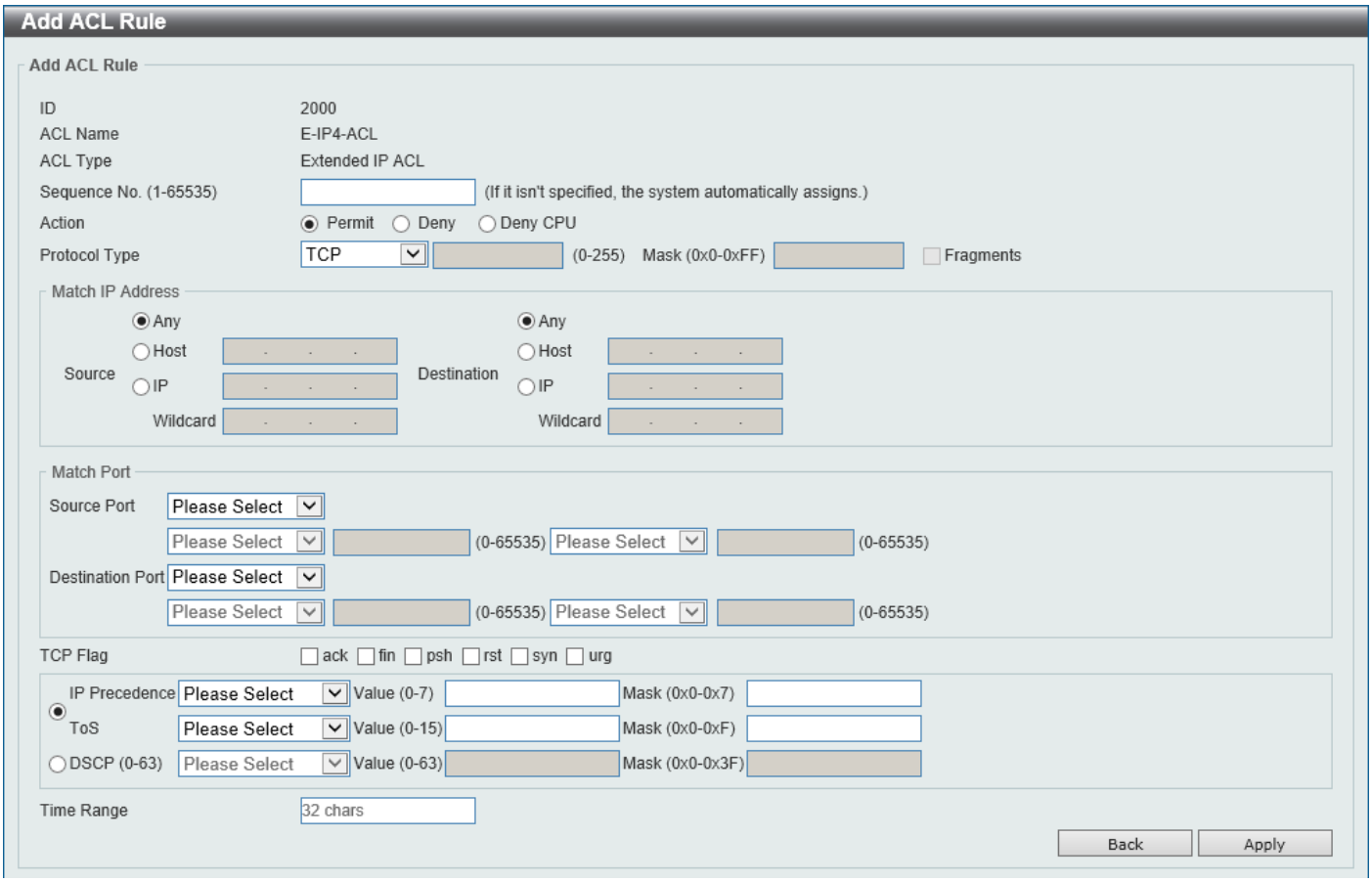


Figure 8-16 Extended IP ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Protocol Type	Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP** (88), **ESP** (50), **GRE** (47), **IGMP** (2), **OSPF** (89), **PIM** (103), **VRRP** (112), **IP-in-IP** (94), **PCP** (108), **Protocol ID**, and **None**. • **Value** - The protocol ID can also manually be entered here. The range is from 0 to 255.

Parameter	Description
	• **Mask** - After selecting the **Protocol ID** option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF. • **Fragments** - Select this option to include packet fragment filtering.
Source	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Destination	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Source Port	Select and enter the source port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified source port number and mask will be used. Enter the source port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Destination Port	Select and enter the destination port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified destination port number and mask will be used. Enter the destination port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Specify ICMP Message Type	Select the ICMP message type used here. This parameter is only available in the protocol type **ICMP**.
ICMP Message Type	When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
Message Code	When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. The range is from 0 to 255.

Parameter	Description
	When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
TCP Flag	Select the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. This parameter is only available in the protocol type **TCP**.
IP Precedence	Select the IP precedence value used here. Options to choose from are **routine** (0), **priority** (1), **immediate** (2), **flash** (3), **flash-override** (4), **critical** (5), **internet** (6), and **network** (7). • **Value** - The IP precedence value can also manually be entered here. The range is from 0 to 7. • **Mask** - Enter the IP precedence mask value here. The range is from 0x0 to 0x7.
ToS	Select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **normal** (0), **min-monetary-cost** (1), **max-reliability** (2), **max-throughput** (4), and **min-delay** (8). • **Value** - The ToS value can also manually be entered here. The range is from 0 to 15. • **Mask** - Enter the ToS mask value here. The range is from 0x0 to 0xF.
DSCP	Select the DSCP value that will be used here. Options to choose from are **default** (0), **af11** (10), **af12** (12), **af13** (14), **af21** (18), **af22** (20), **af23** (22), **af31** (26), **af32** (28), **af33** (30), **af41** (34), **af42** (36), **af43** (38), **cs1** (8), **cs2** (16), **cs3** (24), **cs4** (32), **cs5** (40), **cs6** (48), **cs7** (56), and **ef** (46). • **Value** - The DSCP value can also manually be entered here. The range is from 0 to 63. • **Mask** - Enter the DSCP mask value here. The range is from 0x0 to 0x3F.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Standard IPv6 ACL

After selecting a Standard IPv6 ACL and clicking the **Add Rule** button, the following page will appear.

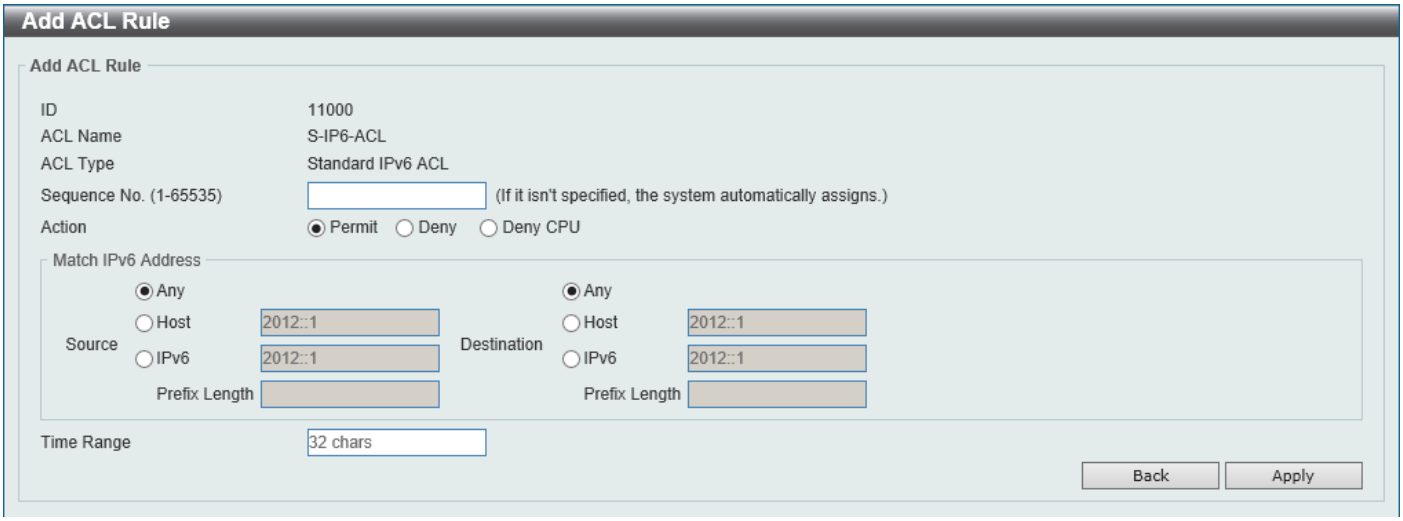


Figure 8-17 Standard IPv6 ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Source	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IPv6 address here. • **IPv6** - The **Prefix Length** option will be available. Enter the source IPv6 address and prefix length value in the spaces provided.
Destination	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IPv6 address here. • **IPv6** - The **Prefix Length** option will be available. Enter the destination IPv6 address and prefix length value in the spaces provided.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Extended IPv6 ACL

After selecting an Extended IPv6 ACL and clicking the **Add Rule** button, the following page will appear.

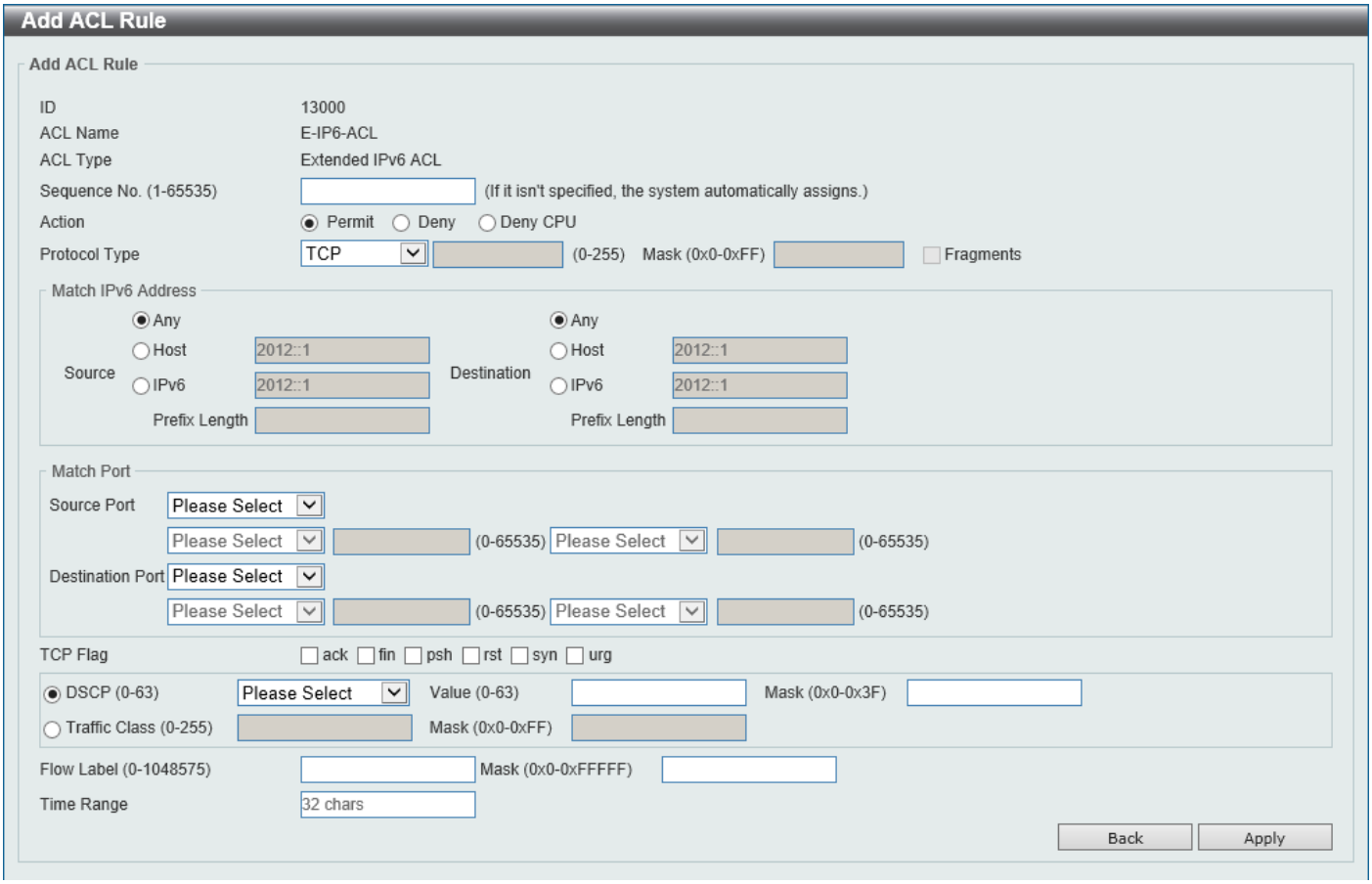


Figure 8-18 Extended IPv6 ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Protocol Type	Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **Protocol ID**, **ESP** (50), **PCP** (108), **SCTP** (132), and **None**. • **Value** - The protocol ID can also manually be entered here. The range is from 0 to 255. • **Mask** - After selecting the **Protocol ID** option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF. • **Fragments** - Select this option to include packet fragment filtering.
Source	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IPv6 address here. • **IPv6** - The **Prefix Length** option will be available. Enter the source IPv6 address and prefix length value in the spaces provided.
Destination	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule.

Parameter	Description
	• **Host** - Enter the destination host IPv6 address here. • **IPv6** - The **Prefix Length** option will be available. Enter the destination IPv6 address and prefix length value in the spaces provided.
Source Port	Select and enter the source port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified source port number and mask will be used. Enter the source port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Destination Port	Select and enter the destination port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified destination port number and mask will be used. Enter the destination port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
TCP Flag	Select the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. This parameter is only available in the protocol type **TCP**.
Specify ICMP Message Type	Select the ICMP message type used here. This parameter is only available in the protocol type **ICMP**.
ICMP Message Type	When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
Message Code	When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
DSCP	Select the DSCP value that will be used here. Options to choose from are **default** (0), **af11** (10), **af12** (12), **af13** (14), **af21** (18), **af22** (20), **af23** (22), **af31** (26), **af32** (28), **af33** (30), **af41** (34), **af42** (36), **af43** (38), **cs1** (8), **cs2** (16), **cs3** (24), **cs4** (32), **cs5** (40), **cs6** (48), **cs7** (56), and **ef** (46). • **Value** - The DSCP value can also manually be entered here. The range is from 0 to 63. • **Mask** - Enter the DSCP mask value here. The range is from 0x0 to 0x3F.
Traffic Class	Select and enter the traffic class value here. The range is from 0 to 255.

Parameter	Description
	• **Mask** - Enter the traffic class mask value here. The range is from 0x0 to 0xFF.
Flow Label	Enter the flow label value here. The range is from 0 to 1048575. • **Mask** - Enter the flow label mask value here. The range is from 0x0 to 0xFFFFF.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Extended MAC ACL

After selecting an Extended MAC ACL and clicking the **Add Rule** button, the following page will appear.

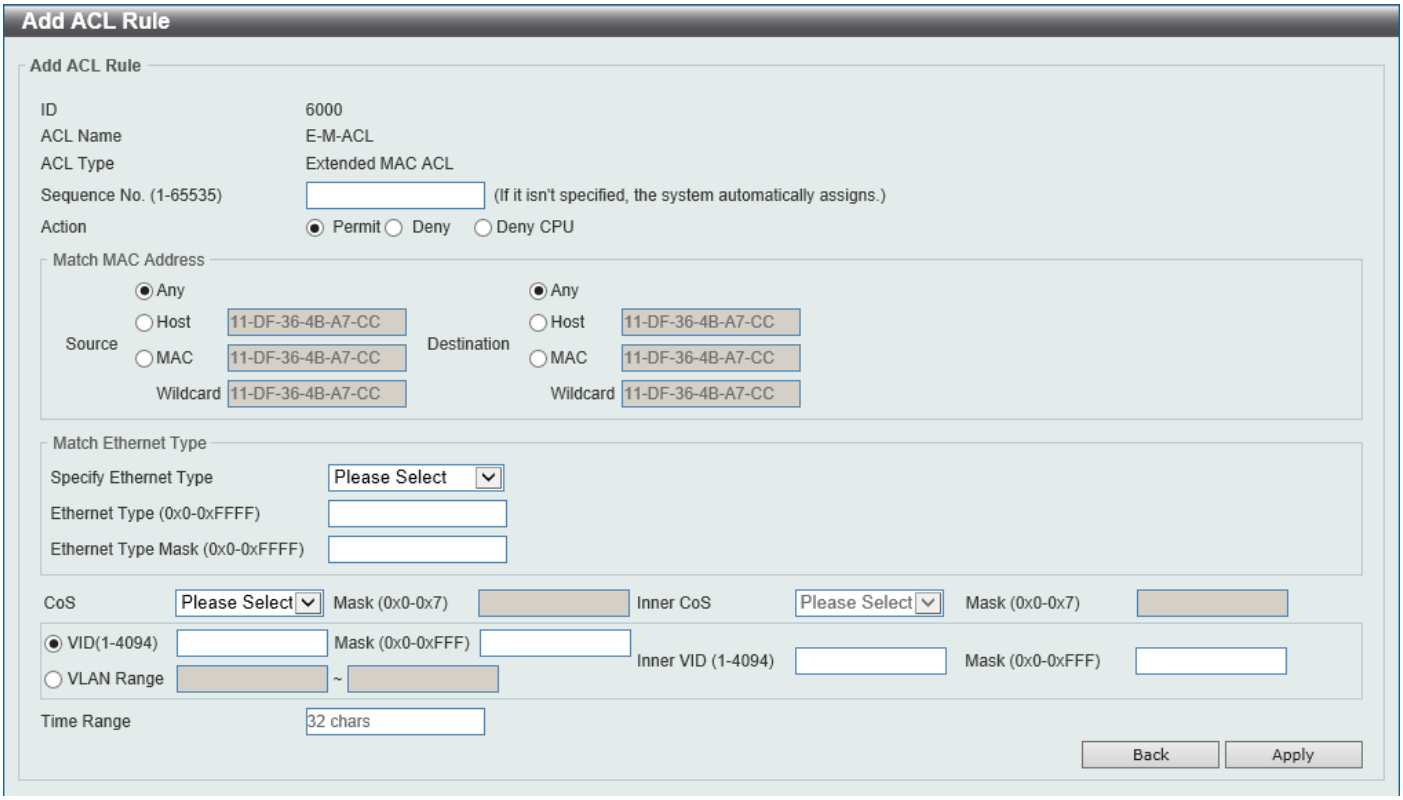


Figure 8-19 Extended MAC ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Source	Select and enter the source MAC address information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host MAC address here.

Parameter	Description
	• **MAC** - The **Wildcard** option will be available. Enter the source MAC address and wildcard value in the spaces provided.
Destination	Select and enter the destination MAC address information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the destination MAC address and wildcard value in the spaces provided.
Specify Ethernet Type	Select the Ethernet type option here. Options to choose from are **aarp**, **appletalk**, **decent-iv**, **etype-6000**, **etype-8042**, **lat**, **lavc-sca**, **mop-console**, **mop-dump**, **vines-echo**, **vines-ip**, **xns-idp**, and **arp**.
Ethernet Type	Enter the Ethernet type hexadecimal value here. The range is from 0x0 to 0xFFFF. When the Ethernet type profile is selected, above, the appropriate hexadecimal value will automatically be entered.
Ethernet Type Mask	Enter the Ethernet type mask hexadecimal value here. The range is from 0x0 to 0xFFFF. When the Ethernet type profile is selected, above, the appropriate hexadecimal value will automatically be entered.
CoS	Select the CoS value that will be used here. The range is from 0 to 7. • **Mask** - Enter the CoS mask value here. The range is from 0x0 to 0x7.
Inner CoS	After selecting the CoS value, select the inner CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the inner CoS mask value here. The range is from 0x0 to 0x7.
VID	Enter the VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the VLAN ID mask value here. The range is from 0x0 to 0xFFF.
Inner VID	Enter the inner VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the inner VLAN ID mask value here. The range is from 0x0 to 0xFFF.
VLAN Range	Select and enter the VLAN range that will be associated with this ACL rule here. Enter the starting and ending VLANs in the spaces provided. The range is from 1 to 4094.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Extended Expert ACL

After selecting an Extended Expert ACL and clicking the **Add Rule** button, the following page will appear.

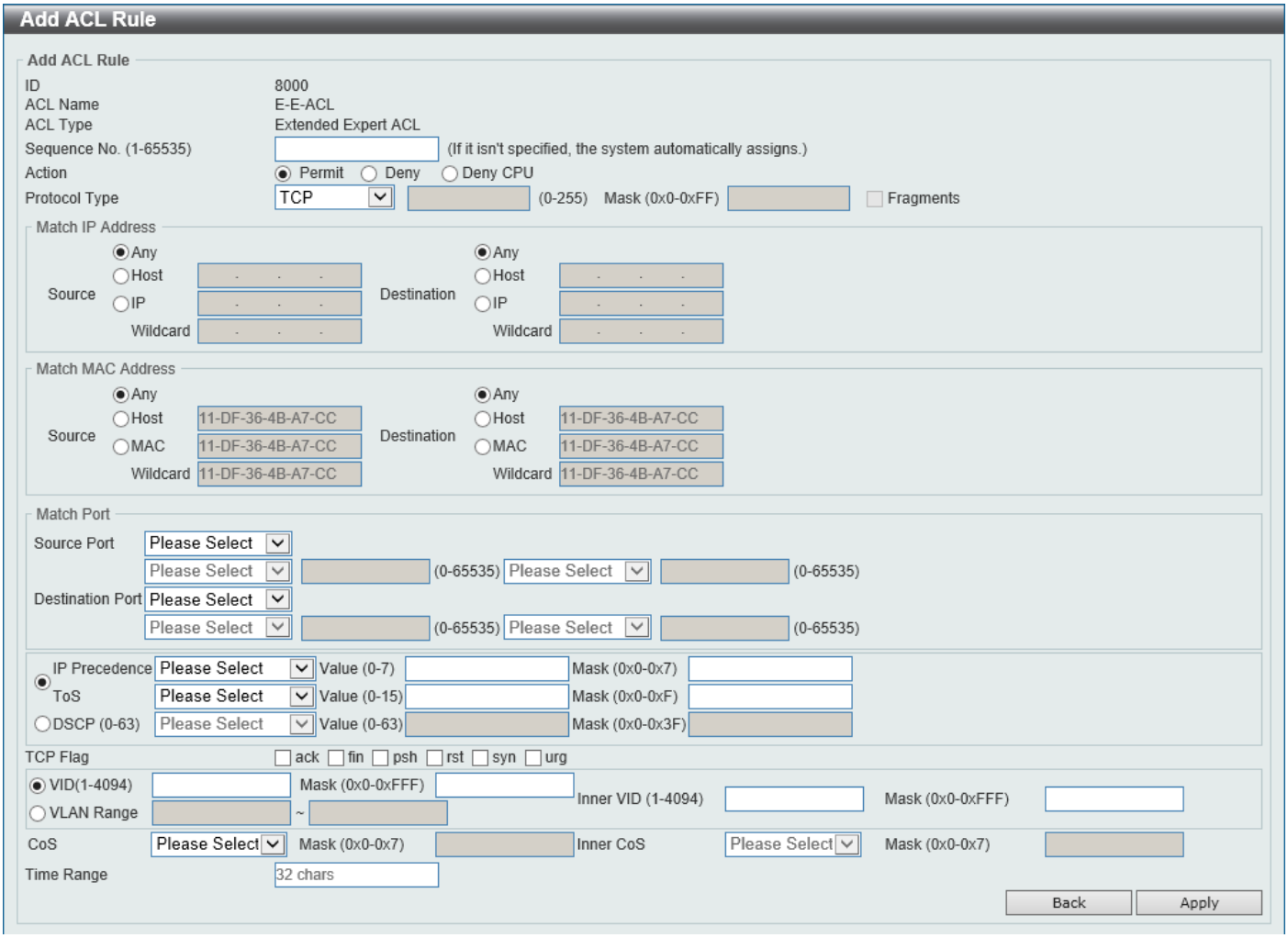


Figure 8-20 Extended Expert ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Protocol Type	Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP** (88), **ESP** (50), **GRE** (47), **IGMP** (2), **OSPF** (89), **PIM** (103), **VRRP** (112), **IP-in-IP** (94), **PCP** (108), **Protocol ID**, and **None**. • **Value** - The protocol ID can also manually be entered here. The range is from 0 to 255. • **Mask** - After selecting the **Protocol ID** option, manually enter the protocol mask value here. The range is from 0x0 to 0xFF. • **Fragments** - Select this option to include packet fragment filtering.
Source IP Address	Select and enter the source information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host IP address here.

Parameter	Description
	• **IP** - The **Wildcard** option will be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Destination IP Address	Select and enter the destination information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host IP address here. • **IP** - The **Wildcard** option will be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked.
Source MAC Address	Select and enter the source MAC address information here. Options to choose from are: • **Any** - Any source traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the source host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the source MAC address and wildcard value in the spaces provided.
Destination MAC Address	Select and enter the destination MAC address information here. Options to choose from are: • **Any** - Any destination traffic will be evaluated according to the conditions of this rule. • **Host** - Enter the destination host MAC address here. • **MAC** - The **Wildcard** option will be available. Enter the destination MAC address and wildcard value in the spaces provided.
Source Port	Select and enter the source port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified source port number and mask will be used. Enter the source port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Destination Port	Select and enter the destination port value here. Options to choose from are: • **=** - The specific selected port number will be used. • **>** - All ports greater than the selected port, will be used. • **<** - All ports smaller than the selected port, will be used. • **≠** - All ports, excluding the selected port, will be used. • **Range** - The start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. • **Mask** - The specified destination port number and mask will be used. Enter the destination port mask value in the space provided. The range is from 0x0 to 0xFFFF. This parameter is only available in the protocol type **TCP** and **UDP**.
Specify ICMP Message Type	Select the ICMP message type used here. This parameter is only available in the protocol type **ICMP**.

Parameter	Description
ICMP Message Type	When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
Message Code	When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. The range is from 0 to 255. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. This parameter is only available in the protocol type **ICMP**.
IP Precedence	Select the IP precedence value used here. Options to choose from are **routine** (0), **priority** (1), **immediate** (2), **flash** (3), **flash-override** (4), **critical** (5), **internet** (6), and **network** (7). • **Value** - The IP precedence value can also manually be entered here. The range is from 0 to 7. • **Mask** - Enter the IP precedence mask value here. The range is from 0x0 to 0x7.
ToS	Select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **normal** (0), **min-monetary-cost** (1), **max-reliability** (2), **max-throughput** (4), and **min-delay** (8). • **Value** - The ToS value can also manually be entered here. The range is from 0 to 15. • **Mask** - Enter the ToS mask value here. The range is from 0x0 to 0xF.
DSCP	Select the DSCP value that will be used here. Options to choose from are **default** (0), **af11** (10), **af12** (12), **af13** (14), **af21** (18), **af22** (20), **af23** (22), **af31** (26), **af32** (28), **af33** (30), **af41** (34), **af42** (36), **af43** (38), **cs1** (8), **cs2** (16), **cs3** (24), **cs4** (32), **cs5** (40), **cs6** (48), **cs7** (56), and **ef** (46). • **Value** - The DSCP value can also manually be entered here. The range is from 0 to 63. • **Mask** - Enter the DSCP mask value here. The range is from 0x0 to 0x3F.
TCP Flag	Select the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. This parameter is only available in the protocol type **TCP**.
VID	Enter the VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the VLAN ID mask value here. The range is from 0x0 to 0xFFF.
Inner VID	Enter the inner VLAN ID that will be associated with this ACL rule here. The range is from 1 to 4094. • **Mask** - Enter the inner VLAN ID mask value here. The range is from 0x0 to 0xFFF.
VLAN Range	Select and enter the VLAN range that will be associated with this ACL rule here. Enter the starting and ending VLANs in the spaces provided. The range is from 1 to 4094.
CoS	Select the CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the CoS mask value here. The range is from 0x0 to 0x7.
Inner CoS	After selecting the CoS value, select the inner CoS value that will be used here. The range is from **0** to **7**. • **Mask** - Enter the inner CoS mask value here. The range is from 0x0 to 0x7.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

Extended UDF ACL

After selecting an Extended UDF ACL and clicking the **Add Rule** button, the following page will appear.

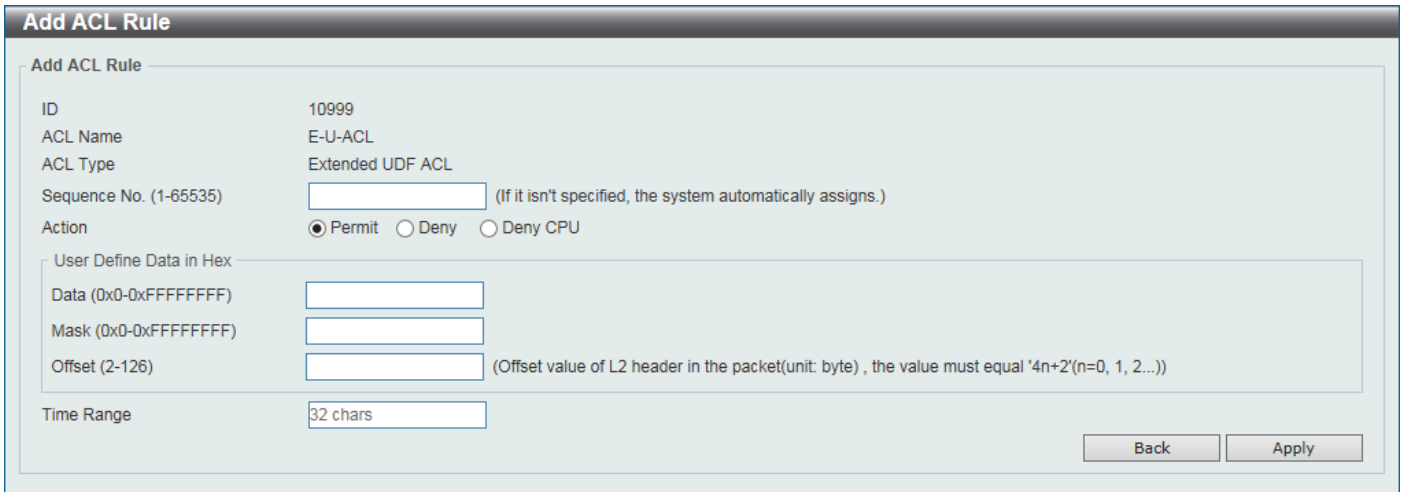


Figure 8-21 Extended UDF ACL (Add Rule) Window

The fields that can be configured are described below:

Parameter	Description
Sequence No.	Enter the sequence number of this ACL rule here. The range is from 1 to 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry.
Action	Select the action that this rule will take here. Options to choose from are **Permit**, **Deny**, and **Deny CPU**.
Data	Enter the UDF fields per rule to match the content of the packet. • **Mask** - Enter the data mask value here. The range may be: ○ **0x0** to **0xffffffff** ○ **0x0** to **0xffff** ○ **0x0** to **0xff**
Offset	Enter the offset value as specified by the L2 header. An offset value of 126 will match packet byte offsets 126,127,0, and 1.
Time Range	Enter the name of the time range profile that will be used in this ACL rule here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

ACL Interface Access Group

This window is used to display and configure the ACL interface access group settings.

To view the following window, click **ACL > ACL Interface Access Group**, as shown below:

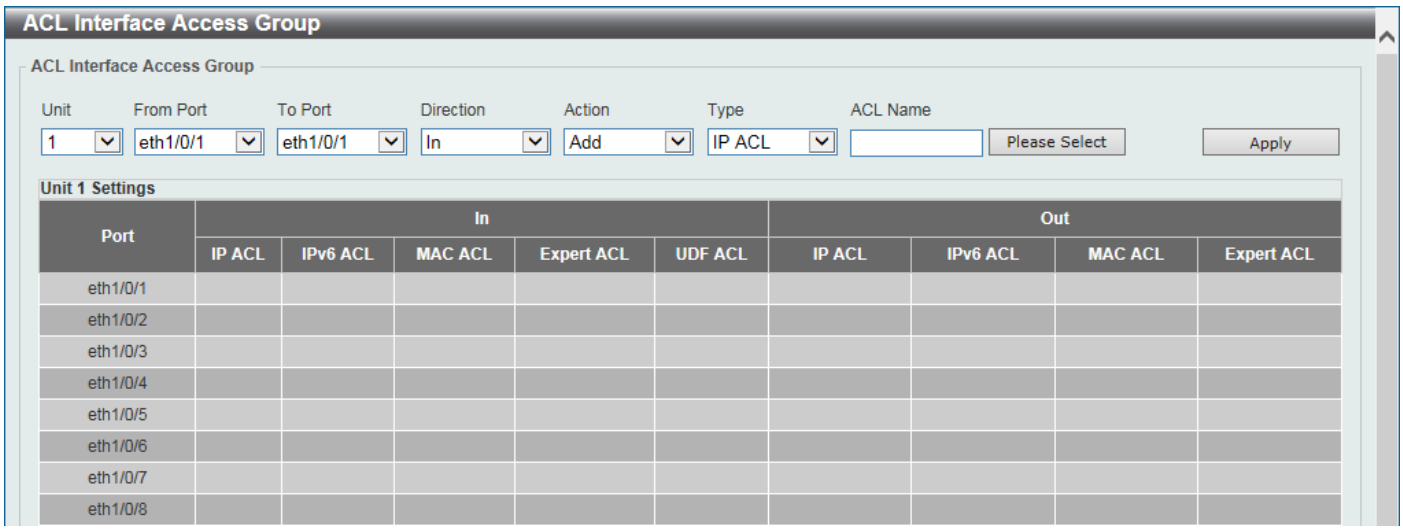


Figure 8-22 ACL Interface Access Group Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
Direction	Select the direction here. Options to choose from are **In** and **Out**.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
Type	Select the ACL type here. Options to choose from are **IP ACL**, **IPv6 ACL**, **MAC ACL**, **Expert ACL**, and **UDF ACL**.
ACL Name	Enter the ACL name here. This name can be up to 32 characters long. Click the **Please Select** button to select an existing ACL from the list.

Click the **Apply** button to accept the changes made.

After clicking the **Please Select** button, the following window will appear:

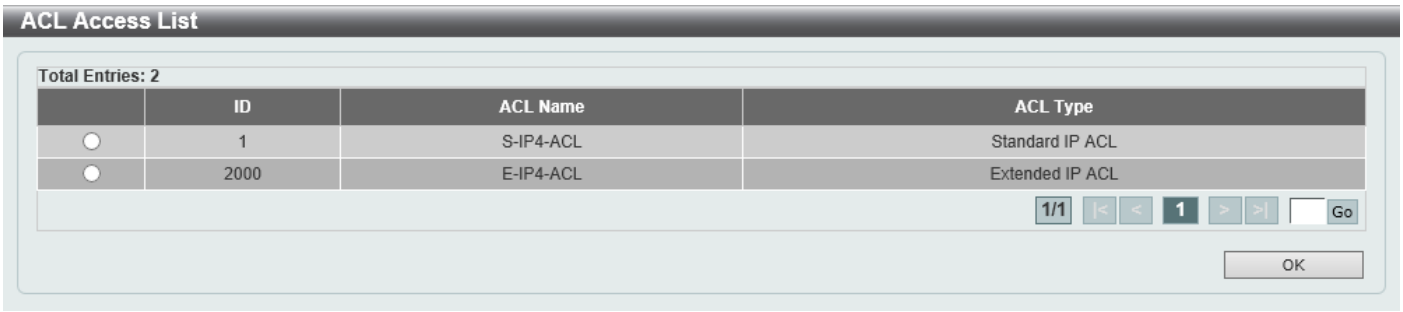


Figure 8-23 ACL Interface Access Group (Please Select) Window

Select the radio button next to the entry to use that ACL in the configuration.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **OK** button to accept the selection made.

ACL VLAN Access Map

This window is used to display and configure the ACL VLAN access map settings.

To view the following window, click **ACL > ACL VLAN Access Map**, as shown below:

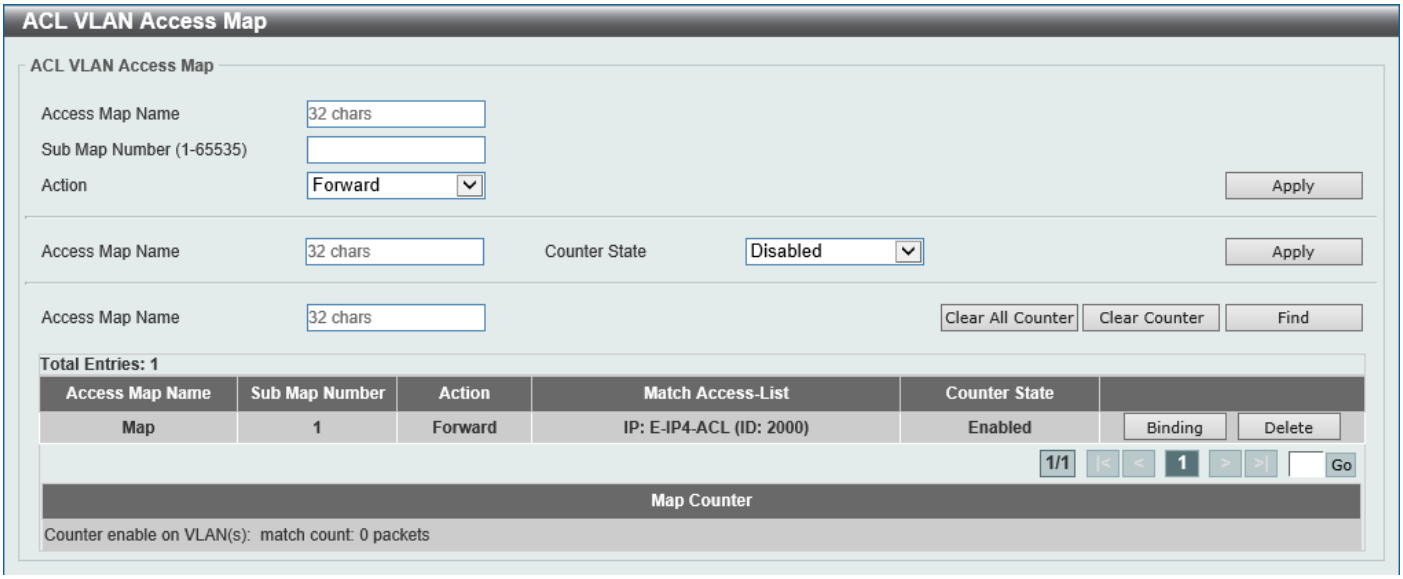


Figure 8-24 ACL VLAN Access Map Window

The fields that can be configured are described below:

Parameter	Description
Access Map Name	Enter the access map name here. This name can be up to 32 characters long.
Sub Map Number	Enter the sub-map number here. The range is from 1 to 65535.
Action	Select the action that will be taken here. Options to choose from are **Forward**, **Drop**, and **Redirect**. When the **Redirect** option is selected, select the redirected interface from the drop-down list.
Counter State	Select whether to enable or disable the counter state.

Click the **Apply** button to accept the changes made.

Click the **Clear All Counter** button to clear the counter information for all the access maps.

Click the **Clear Counter** button to the clear the counter information for the specified access map.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Binding** button to match an access list to the ACL VLAN access map.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Binding** button, the following window will appear:

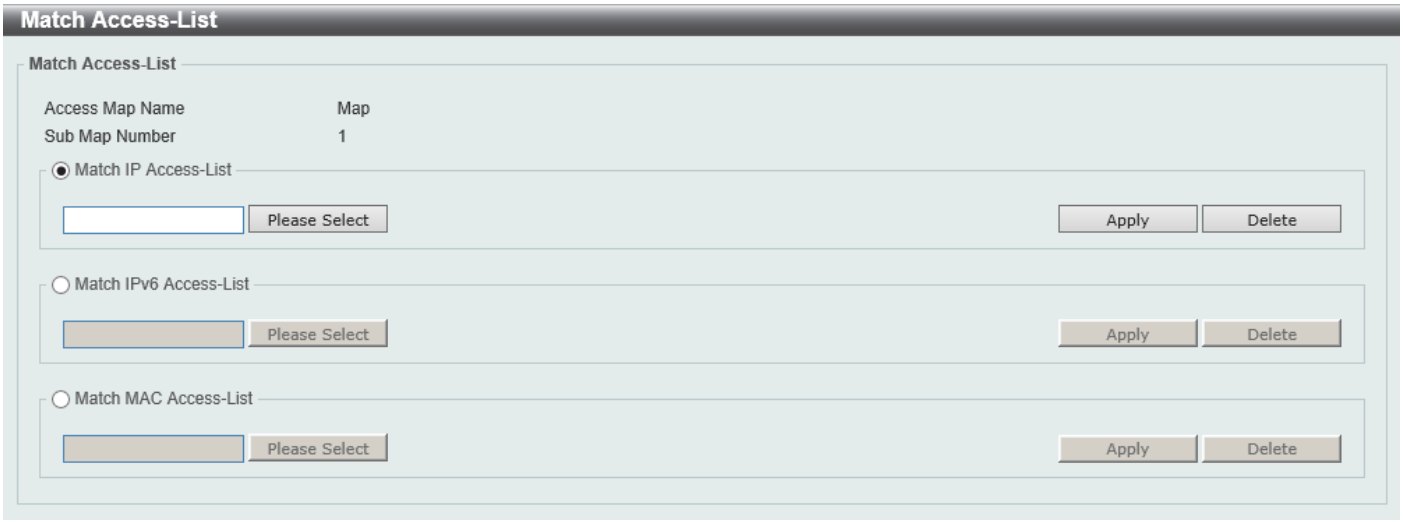


Figure 8-25 ACL VLAN Access Map (Binding) Window

The fields that can be configured are described below:

Parameter	Description
Match IP Access-List	Here the IP access list that will be matched will be displayed.
Match IPv6 Access-List	Here the IPv6 access list that will be matched will be displayed.
Match MAC Access-List	Here the MAC access list that will be matched will be displayed.

Click the **Please Select** button navigate to a list of access lists to be used in this configuration.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

After clicking the **Please Select** button, the following window will appear:

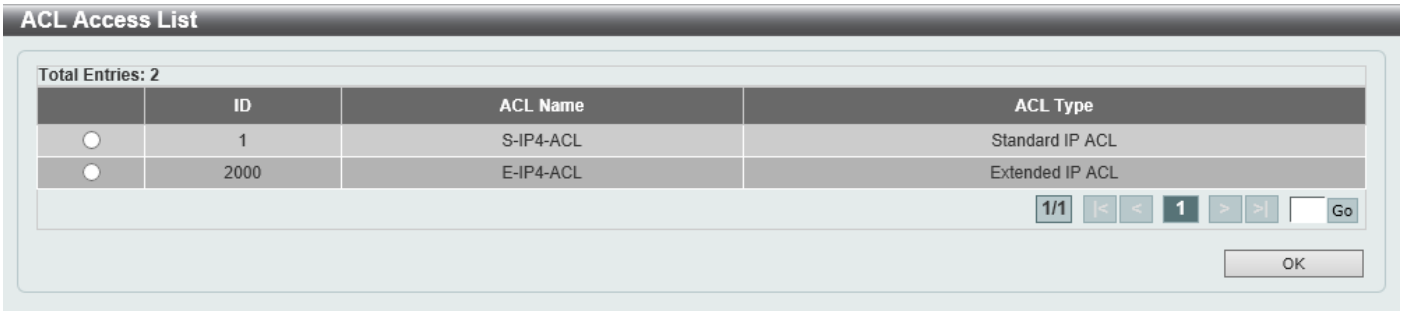


Figure 8-26 ACL VLAN Access Map (Binding, Selection) Window

Select the radio button next to the entry to use that access list in the configuration.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **OK** button to accept the selection made.

ACL VLAN Filter

This window is used to display and configure the ACL VLAN filter settings.

To view the following window, click **ACL > ACL VLAN Filter**, as shown below:

Figure 8-27 ACL VLAN Filter Window

The fields that can be configured are described below:

Parameter	Description
Access Map Name	Enter the access map name here. This name can be up to 32 characters long.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
VID List	Enter the VLAN ID list that will be used here. Select the **All VLANs** option to apply this configuration to all the VLANs configured on this Switch.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

CPU ACL

This window is used to display and configure the CPU ACL settings.

To view the following window, click **ACL > CPU ACL**, as shown below:

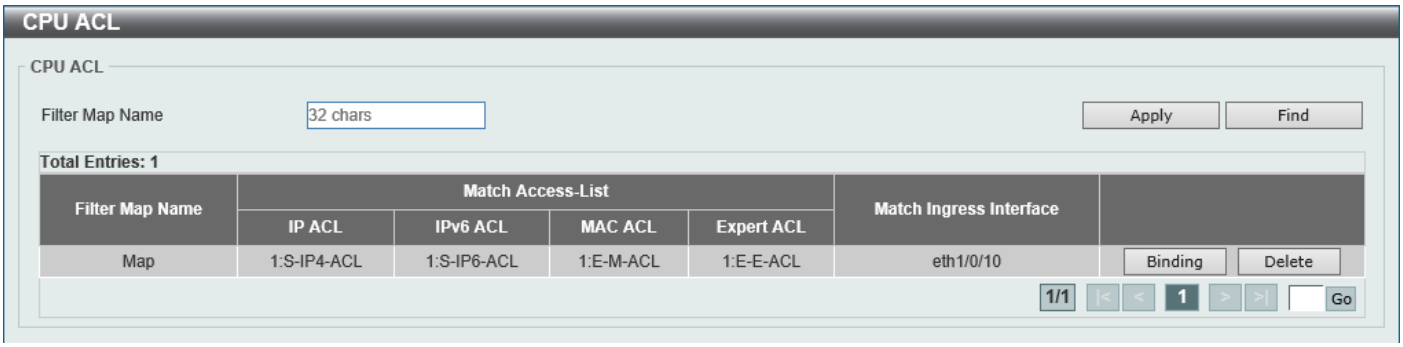


Figure 8-28 CPU ACL Window

The fields that can be configured are described below:

Parameter	Description
Filter Map Name	Enter the CPU ACL filter map name here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Binding** button to configure the binding settings for the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Binding** button, the following page will appear.

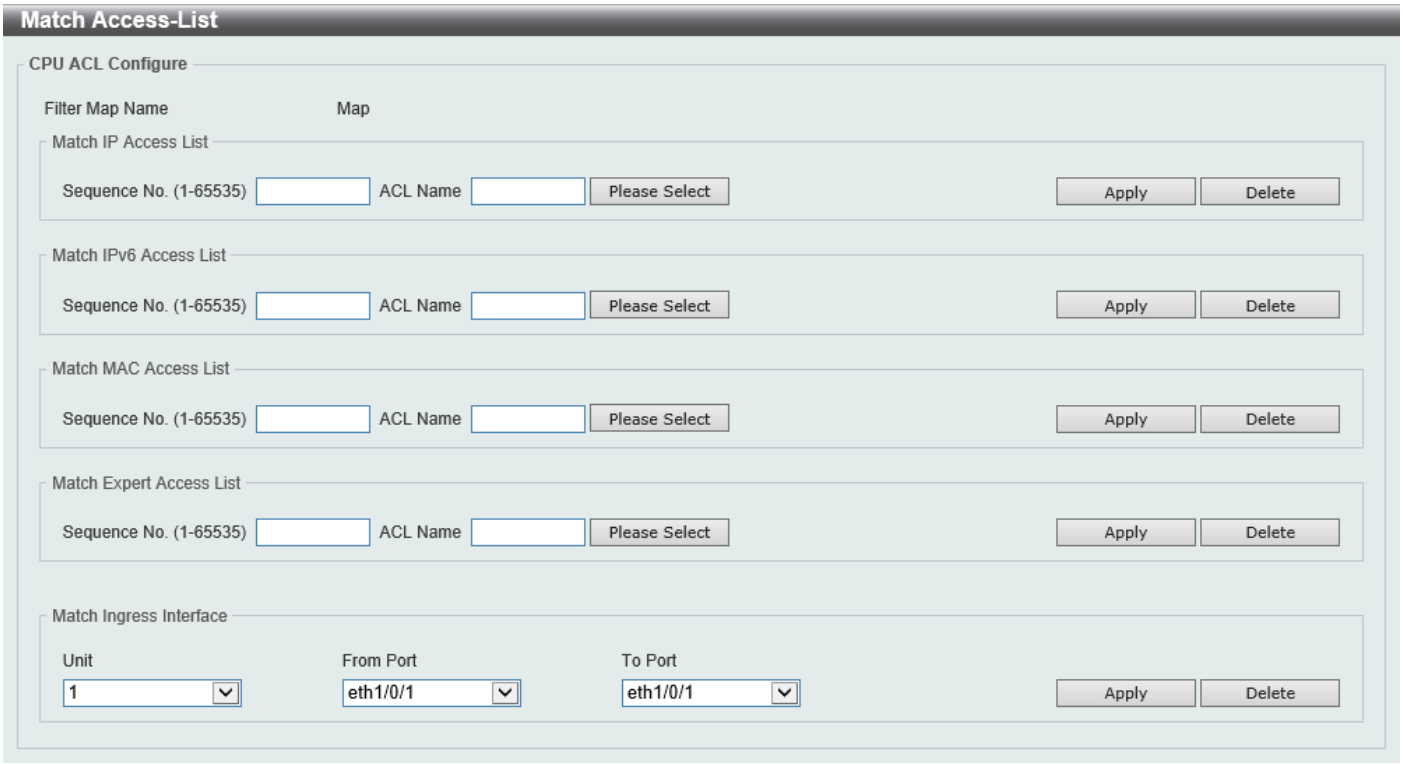


Figure 8-29 CPU ACL (Binding) Window

The fields that can be configured in **Match IP Access List** are described below:

Parameter	Description
Sequence No.	Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list.
ACL Name	Enter the standard or extended IP access list name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match IPv6 Access List** are described below:

Parameter	Description
Sequence No.	Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list.

Parameter	Description
ACL Name	Enter the standard or extended IPv6 access list name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match MAC Access List** are described below:

Parameter	Description
Sequence No.	Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list.
ACL Name	Enter the extended MAC access list name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match Expert Access List** are described below:

Parameter	Description
Sequence No.	Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list.
ACL Name	Enter the extended expert access list name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match Ingress Interface** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

After clicking the **Please Select** button, the following window will appear:

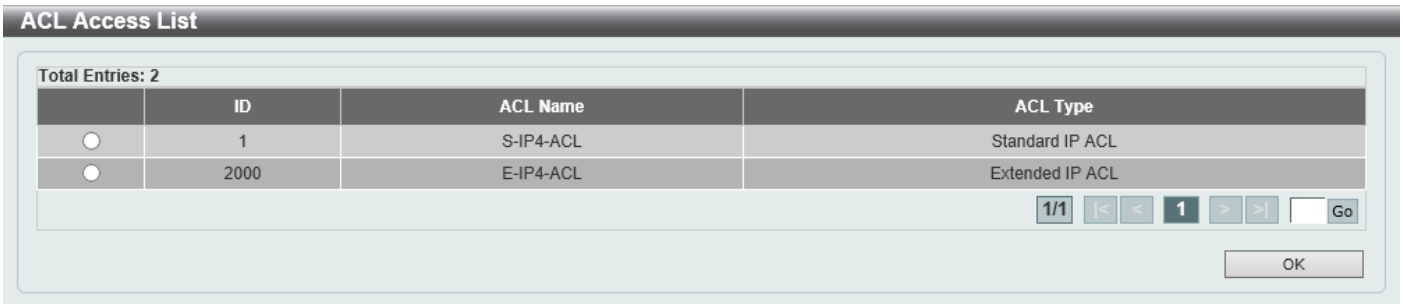


Figure 8-30 CPU ACL (Binding, Please Select) Window

The fields that can be configured are described below:

Parameter	Description
ACL List	Select the radio button next to the access list entry to use that access list in the configuration.

Select the ACL and click the **OK** button to accept the selection made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

9. Security

Port Security

Port Security Global Settings

This window is used to display and configure the global port security settings. Port Security is a security feature that prevents unauthorized computers (with source MAC addresses) unknown to the Switch prior to locking the port (or ports) from connecting to the Switch's locked ports and gaining access to the network.

To view the following window, click **Security > Port Security > Port Security Global Settings**, as shown below:

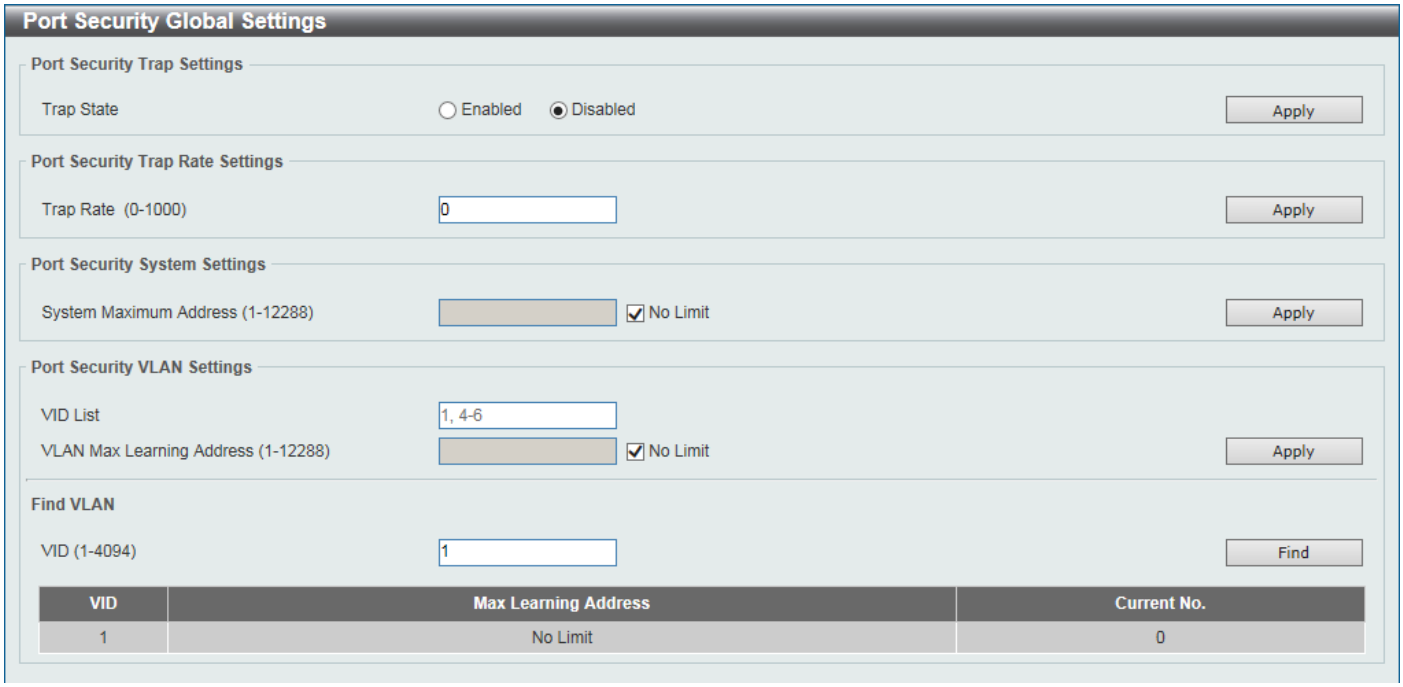


Figure 9-1 Port Security Global Settings Window

The fields that can be configured in **Port Security Trap Settings** are described below:

Parameter	Description
Trap State	Select to enable or disable port security traps on the Switch.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Security Trap Rate Settings** are described below:

Parameter	Description
Trap Rate	Enter the number of traps per second. The range is from 0 to 1000. By default, this value is 0. This indicates that an SNMP trap is generated for every security violation.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Security System Settings** are described below:

Parameter	Description
System Maximum Address	Enter the maximum number of secure MAC addresses allowed. The range is from 1 to 12288. By default, there is no limit.

Parameter	Description
	Select the **No Limit** checkbox to allow the maximum number of secure MAC address.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Security VLAN Settings** are described below:

Parameter	Description
VID List	Enter the VLAN ID(s) here.
VLAN Max Learning Address	Enter the maximum number of allowed MAC addresses that can be learned on the specified VLAN(s) here. The range is from 1 to 12288. Tick the **No Limit** checkbox to allow the maximum number of secure MAC address.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find VLAN** are described below:

Parameter	Description
VID	Enter the VLAN ID that will be located here.

Click the **Find** button to locate a specific entry based on the information entered.

Port Security Port Settings

This window is used to display and configure the port security port settings.

To view the following window, click **Security > Port Security > Port Security Port Settings**, as shown below:

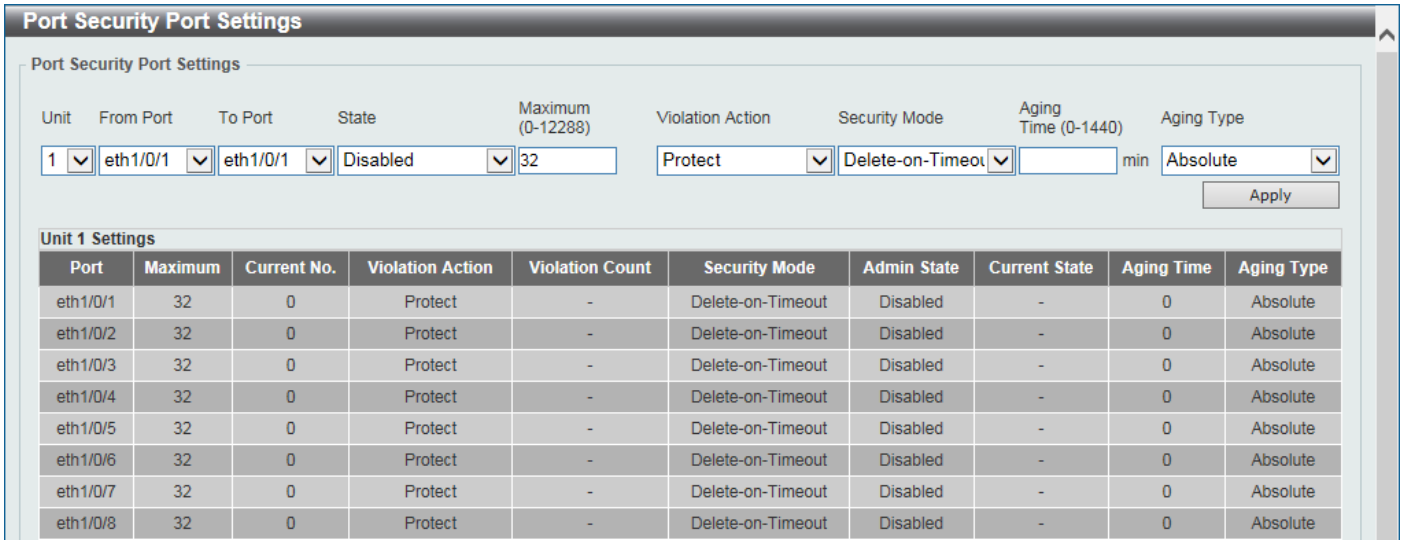


Figure 9-2 Port Security Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the port security feature on the port(s) specified.

Parameter	Description
Maximum	Enter the maximum number of secure MAC addresses that will be allowed on the port(s) specified. The range is from 0 to 12288. By default, this value is 32.
Violation Action	Select the violation action that will be taken here. Options to choose from are: • **Protect** - Specifies to drop all packets from the insecure hosts at the port-security process level, but does not increment the security-violation count. • **Restrict** - Specifies to drop all packets from the insecure hosts at the port-security process level and increments the security-violation count and record the system log. • **Shutdown** - Specifies to shut down the port if there is a security violation and record the system log.
Security Mode	Select the security mode option here. Options to choose from are: • **Permanent** - Specifies that under this mode, all learned MAC addresses are not be purged out unless the user manually deletes those entries. • **Delete-on-Timeout** - Specifies that under this mode, all learned MAC addresses are purged out when an entry is aged out or when the user manually deletes these entries.
Aging Time	Enter the aging time value used for auto-learned dynamic secured addresses on the specified port here. The range is from 0 to 1440 minutes.
Aging Type	Select the aging type here. Options to choose from are: • **Absolute** - Specifies that all the secure addresses on this port age out exactly after the time specified and is removed from the secure address list. • **Inactivity** - Specifies that the secure addresses on this port age out only if there is no data traffic from the secure source address for the specified time period. By default, the **Absolute** option is used.

Click the **Apply** button to accept the changes made.

Port Security Address Entries

This window is used to view, clear, and configure the port security address entries.

To view the following window, click **Security > Port Security > Port Security Address Entries**, as shown below:

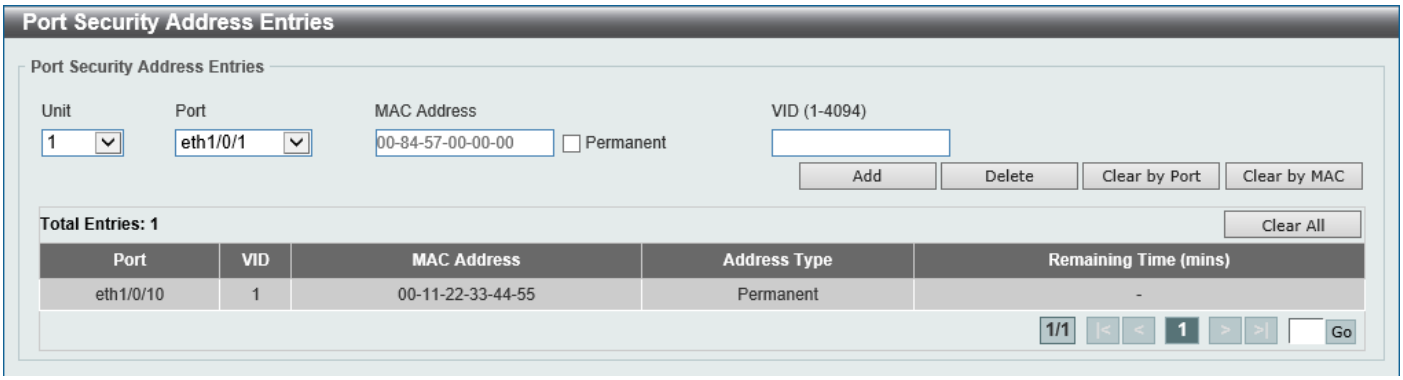


Figure 9-3 Port Security Address Entries Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the appropriate port range used for the configuration here.

Parameter	Description
MAC Address	Enter the MAC address here. Select **Permanent** to specify that all learned MAC addresses are not purged out unless the user manually delete those entries.
VID	Enter the VLAN ID here. The range is from 1 to 4094.

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

Click the **Delete** button to remove a new entry based on the information entered.

Click the **Clear by Port** button to clear the information based on the port selected.

Click the **Clear by MAC** button to clear the information based on the MAC address entered.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

802.1X

802.1X (Port-based and Host-based Access Control)

The IEEE 802.1X standard is a security measure for authorizing and authenticating users to gain access to various wired or wireless devices on a specified Local Area Network by using a Client and Server based access control model. This is accomplished by using a RADIUS server to authenticate users trying to access a network by relaying Extensible Authentication Protocol over LAN (EAPOL) packets between the Client and the Server.

The following figure represents a basic EAPOL packet:

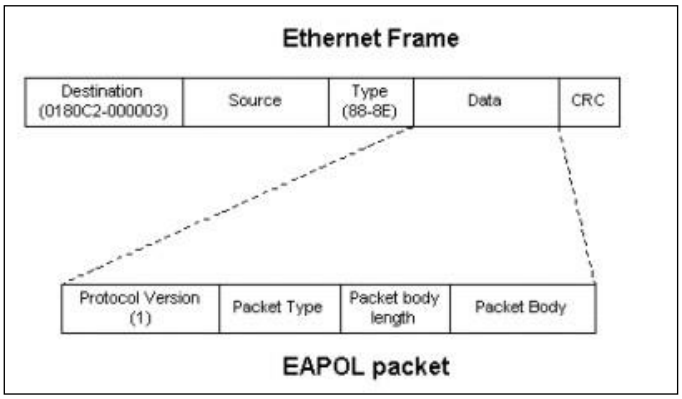


Figure 9-4 The EAPOL Packet

Utilizing this method, unauthorized devices are restricted from connecting to a LAN through a port to which the user is connected. EAPOL packets are the only traffic that can be transmitted through the specific port until authorization is granted. The 802.1X access control method has three roles, each of which are vital to creating and up keeping a stable and working Access Control security method.

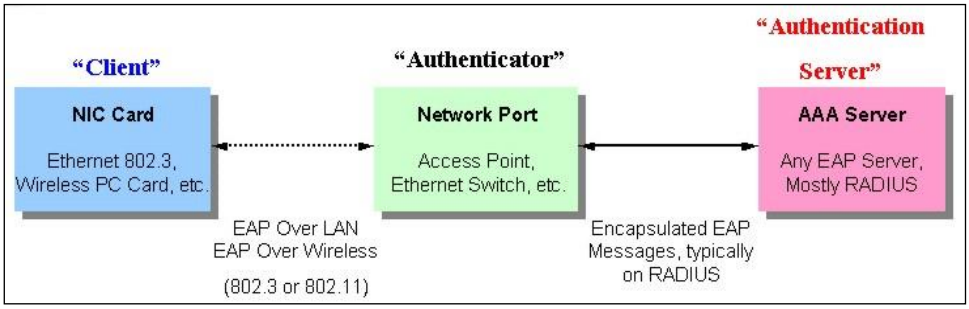


Figure 9-5 The three roles of 802.1X

The following section will explain the three roles of Client, Authenticator, and Authentication Server in greater detail.

Authentication Server

The Authentication Server is a remote device that is connected to the same network as the Client and Authenticator, must be running a RADIUS Server program and must be configured properly on the Authenticator (Switch). Clients connected to a port on the Switch must be authenticated by the Authentication Server (RADIUS) before attaining any services offered by the Switch on the LAN. The role of the Authentication Server is to certify the identity of the Client attempting to access the network by exchanging secure information between the RADIUS server and the Client through EAPOL packets and, in turn, informs the Switch whether or not the Client is granted access to the LAN and/or Switches services.

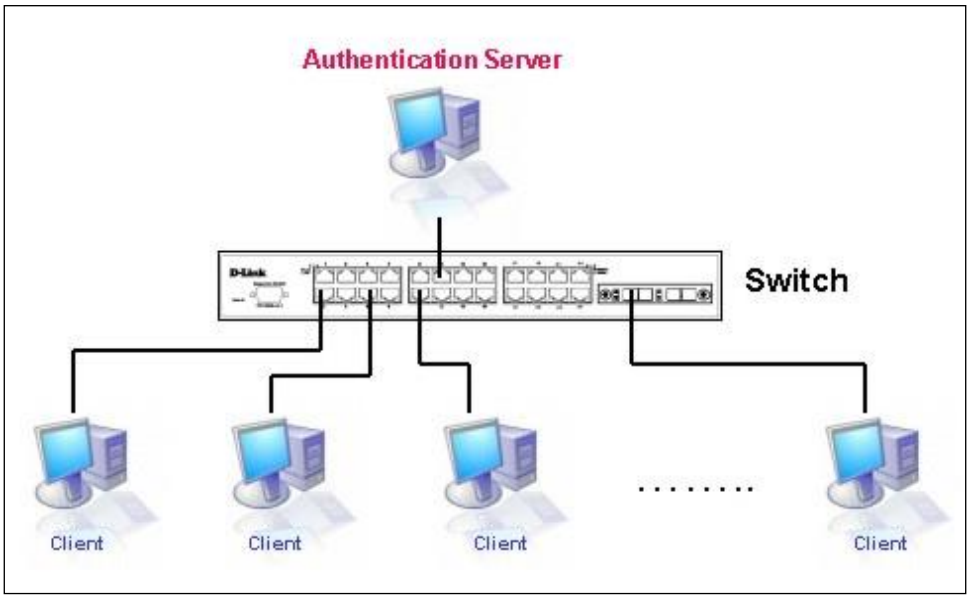


Figure 9-6 The Authentication Server

Authenticator

The Authenticator (the Switch) is an intermediary between the Authentication Server and the Client. The Authenticator serves two purposes when utilizing the 802.1X function. The first purpose is to request certification information from the Client through EAPOL packets, which is the only information allowed to pass through the Authenticator before access is granted to the Client. The second purpose of the Authenticator is to verify the information gathered from the Client with the Authentication Server, and to then relay that information back to the Client.

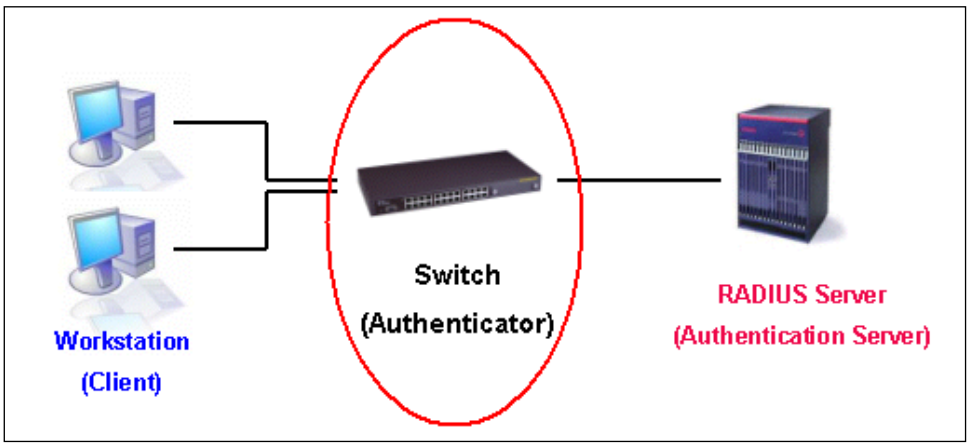


Figure 9-7 The Authenticator

Three steps must be implemented on the Switch to properly configure the Authenticator.

- The 802.1X State must be Enabled. (**Security > 802.1X > 802.1X Global Settings**)
- The 802.1X settings must be implemented by port (**Security > 802.1X > 802.1X Port Settings**)

- A RADIUS server must be configured on the Switch. (**Security > RADIUS > RADIUS Server Settings**)

Client

The Client is simply the end station that wishes to gain access to the LAN or Switch services. All end stations must be running software that is compliant with the 802.1X protocol. For users running Windows 7 and later, that software is included within the operating system. All other users are required to attain 802.1X client software from an outside source. The Client will request access to the LAN and or Switch through EAPOL packets and, in turn will respond to requests from the Switch.

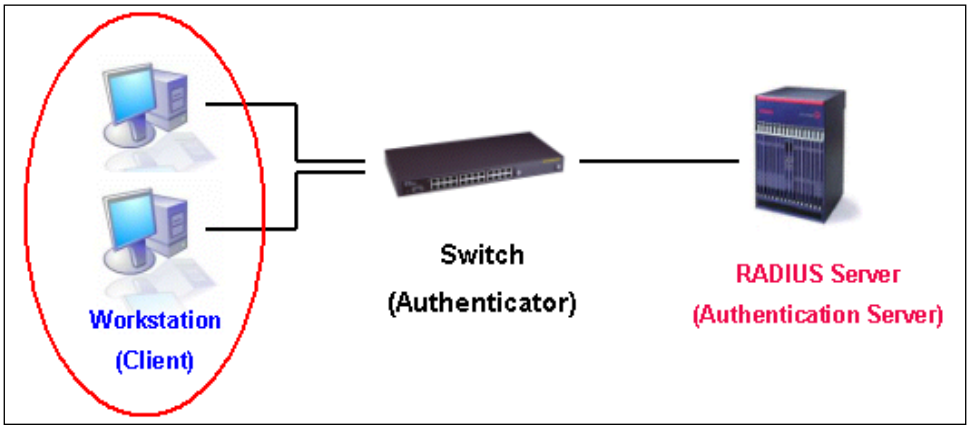


Figure 9-8 The Client

Authentication Process

Utilizing the three roles stated above, the 802.1X protocol provides a stable and secure way of authorizing and authenticating users attempting to access the network. Only EAPOL traffic is allowed to pass through the specified port before a successful authentication is made. This port is "locked" until the point when a Client with the correct username and password (and MAC address if 802.1X is enabled by MAC address) is granted access and therefore successfully "unlocks" the port. Once the port is unlocked, normal traffic is allowed to pass through the port. The following figure displays a detailed explanation of how the authentication process is completed between the three roles stated above.

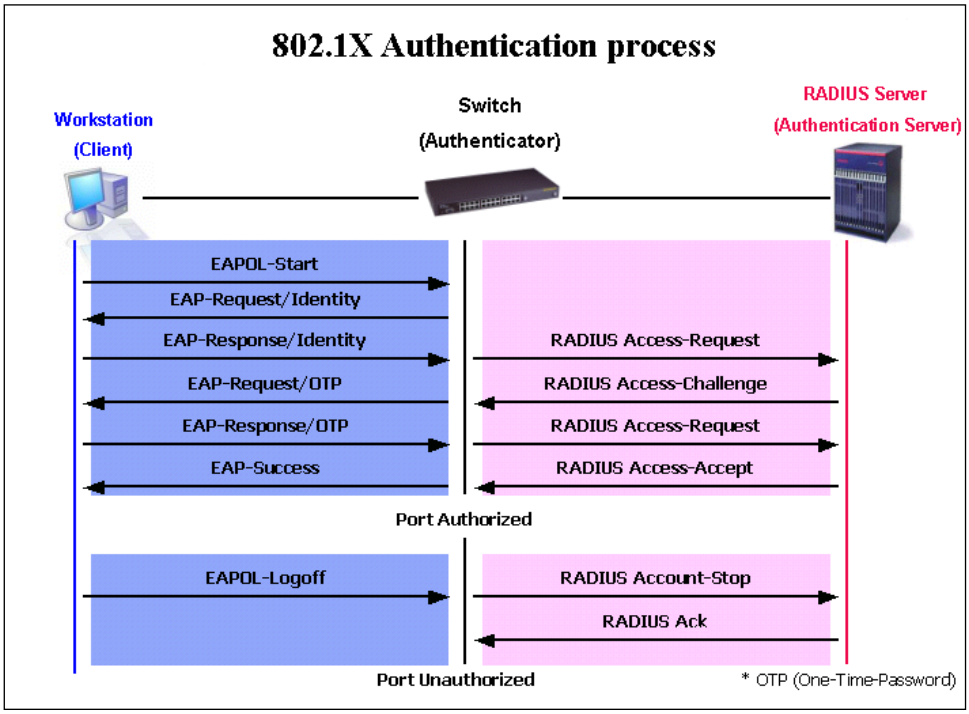


Figure 9-9 The 802.1X Authentication Process

The D-Link implementation of 802.1X allows network administrators to choose between two types of Access Control used on the Switch, which are:

- **Port-based Access Control** - This method requires only one user to be authenticated per port by a remote RADIUS server to allow the remaining users on the same port access to the network.
- **Host-based Access Control** - Using this method, the Switch will automatically learn up to a maximum of 4096 MAC addresses by port and set them in a list. Each MAC address must be authenticated by the Switch using a remote RADIUS server before being allowed access to the Network.

Understanding 802.1X Port-based and Host-based Network Access Control

The original intent behind the development of 802.1X was to leverage the characteristics of point-to-point in LANs. As any single LAN segment in such infrastructures has no more than two devices attached to it, one of which is a Bridge Port. The Bridge Port detects events that indicate the attachment of an active device at the remote end of the link, or an active device becoming inactive. These events can be used to control the authorization state of the Port and initiate the process of authenticating the attached device if the Port is unauthorized. This is the Port-based Network Access Control.

Port-based Network Access Control

Once the connected device has successfully been authenticated, the Port then becomes Authorized, and all subsequent traffic on the Port is not subject to access control restriction until an event occurs that causes the Port to become Unauthorized. Hence, if the Port is actually connected to a shared media LAN segment with more than one attached device, successfully authenticating one of the attached devices effectively provides access to the LAN for all devices on the shared segment. Clearly, the security offered in this situation is open to attack.

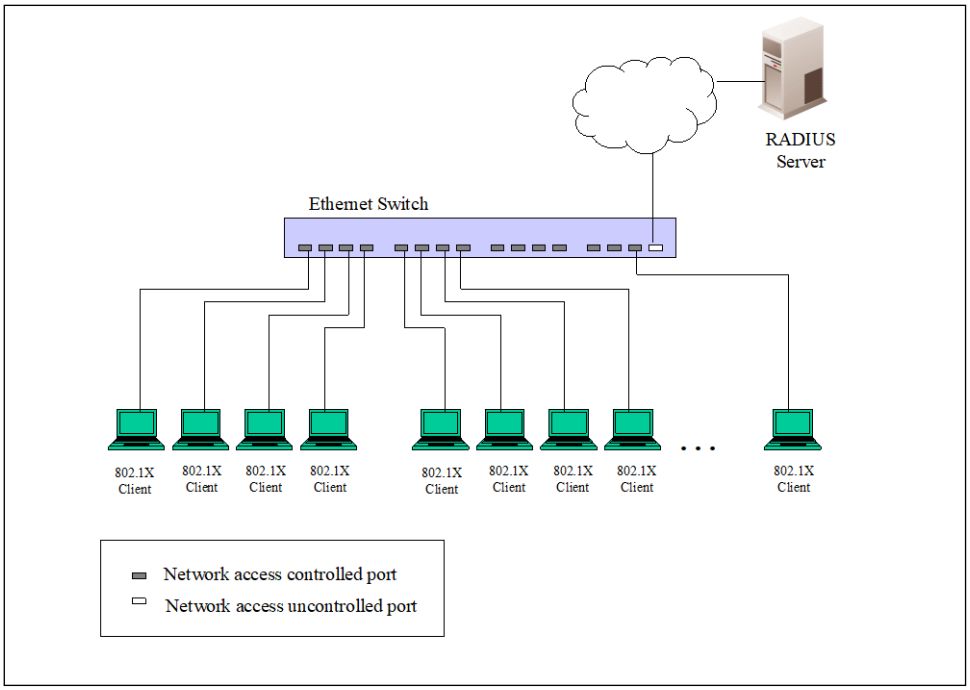


Figure 9-10 Example of Typical Port-based Configuration

Host-based Network Access Control

In order to successfully make use of 802.1X in a shared media LAN segment, it would be necessary to create "logical" Ports, one for each attached device that required access to the LAN. The Switch would regard the single physical Port connecting it to the shared media segment as consisting of a number of distinct logical Ports, each logical Port being independently controlled from the point of view of EAPOL exchanges and authorization state. The Switch learns each

attached devices' individual MAC addresses, and effectively creates a logical Port that the attached device can then use to communicate with the LAN via the Switch.

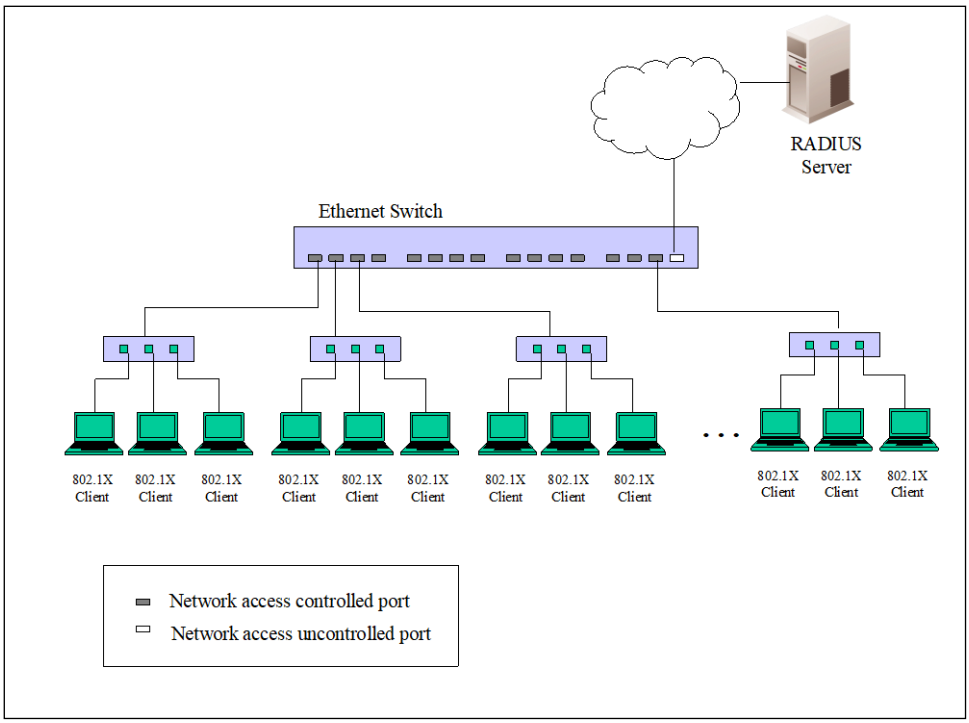


Figure 9-11 Example of Typical Host-based Configuration

802.1X Global Settings

This window is used to display and configure the global 802.1X settings.

To view the following window, click **Security > 802.1X > 802.1X Global Settings**, as shown below:

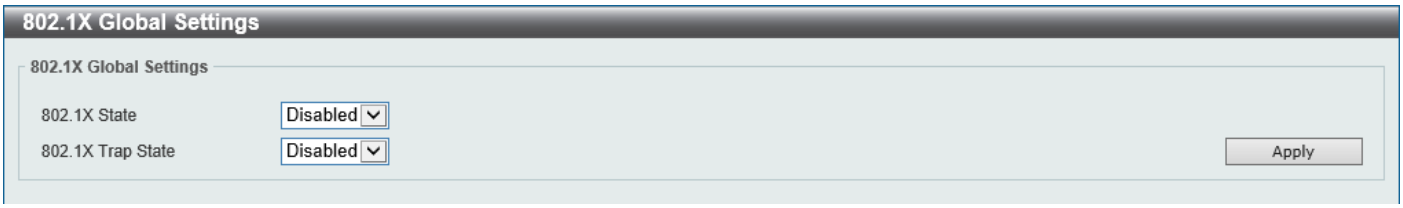


Figure 9-12 802.1X Global Settings Window

The fields that can be configured are described below:

Parameter	Description
802.1X State	Select to enable or disable the global 802.1X state here.
802.1X Trap State	Select to enable or disable the 802.1X trap state here.

Click the **Apply** button to accept the changes made.

802.1X Port Settings

This window is used to display and configure the 802.1X port settings.

To view the following window, click **Security > 802.1X > 802.1X Port Settings**, as shown below:

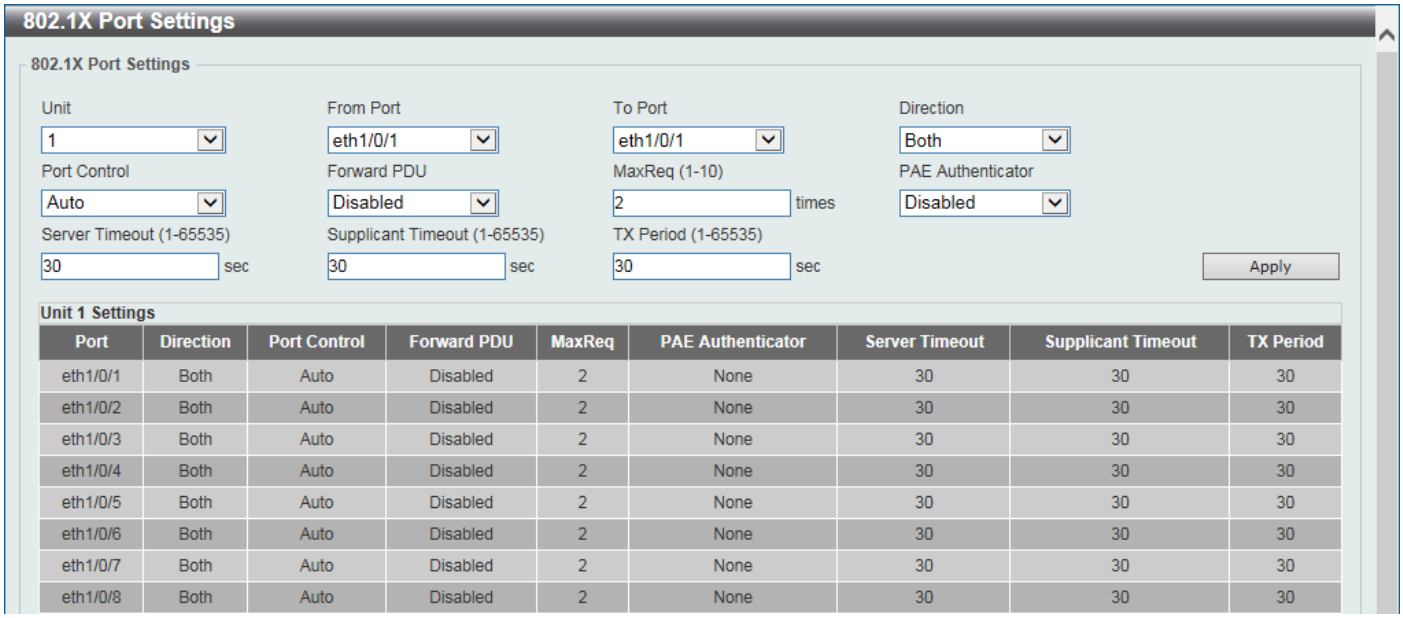


Figure 9-13 802.1X Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Direction	Select the direction here. Options to choose from are **Both** and **In**. This option configures the direction of the traffic on a controlled port as unidirectional (**In**) or bidirectional (**Both**).
Port Control	Select the port control option here. Options to choose from are **ForceAuthorized**, **Auto**, and **ForceUnauthorized**. If the port control is set to force-authorized, then the port is not controlled in both directions. If the port control is set to automatic, then the access to the port for the controlled direction needs to be authenticated. If the port control is set to force-unauthorized, then the access to the port for the controlled direction is blocked.
Forward PDU	Select to enable or disable the forward PDU option here.
MaxReq	Enter the maximum required times value here. The range is from 1 to 10. By default, this value is 2. This option configures the maximum number of times that the backend authentication state machine will retransmit an Extensible Authentication Protocol (EAP) request frame to the supplicant before restarting the authentication process.
PAE Authenticator	Select to enable or disable the PAE authenticator option here. This option configures a specific port as an IEEE 802.1X port access entity (PAE) authenticator.
Server Timeout	Enter the server timeout value here. The range is from 1 to 65535 seconds. By default, this value is 30 seconds.
Supplicant Timeout	Enter the supplicant timeout value here. The range is from 1 to 65535 seconds. By default, this value is 30 seconds.
TX Period	Enter the transmission period value here. The range is from 1 to 65535 seconds. By default, this value is 30 seconds.

Click the **Apply** button to accept the changes made.

Authentication Sessions Information

This window is used to display and configure the authentication session information.

To view the following window, click **Security > 802.1X > Authentication Sessions Information**, as shown below:

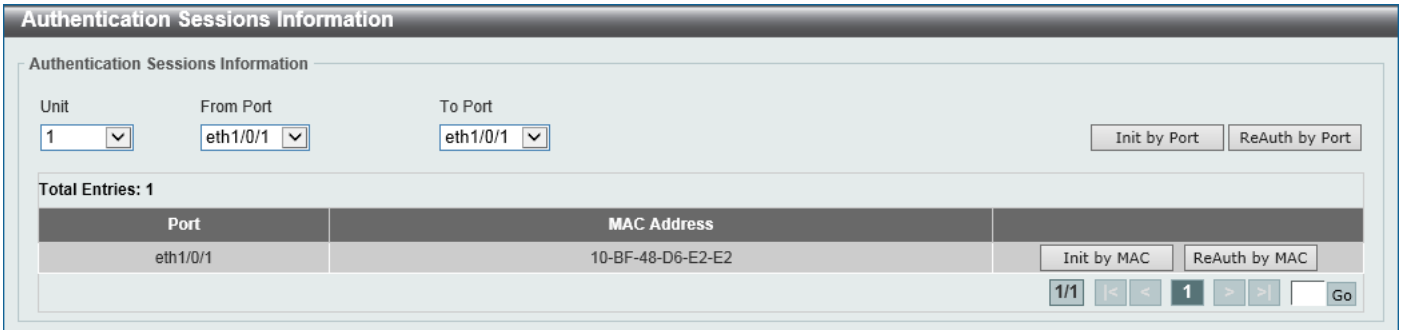


Figure 9-14 Authentication Sessions Information Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Init by Port** button to initiate the session information based on the port selections made.

Click the **ReAuth by Port** button to re-authenticate the session information based on the port selections made.

Click the **Init by MAC** button to initiate the session information based on the MAC address.

Click the **ReAuth by MAC** button to re-authenticate the session information based on the MAC address.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Authenticator Statistics

This window is used to view and clear the authenticator statistics.

To view the following window, click **Security > 802.1X > Authenticator Statistics**, as shown below:

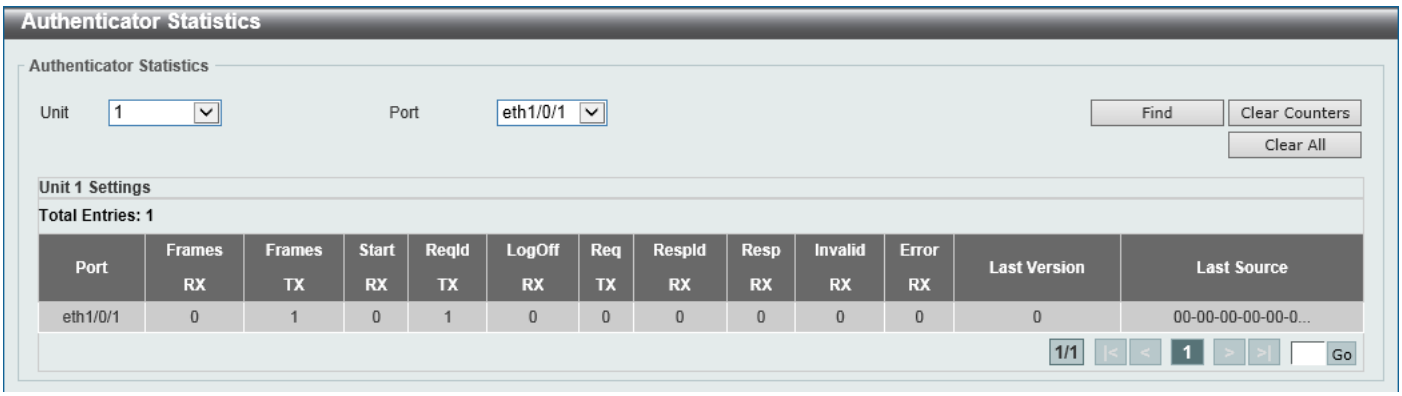


Figure 9-15 Authenticator Statistics Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this query here.
Port	Select the appropriate port used for the query here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear Counters** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Authenticator Session Statistics

This window is used to view and clear the authenticator session statistics.

To view the following window, click **Security > 802.1X > Authenticator Session Statistics**, as shown below:

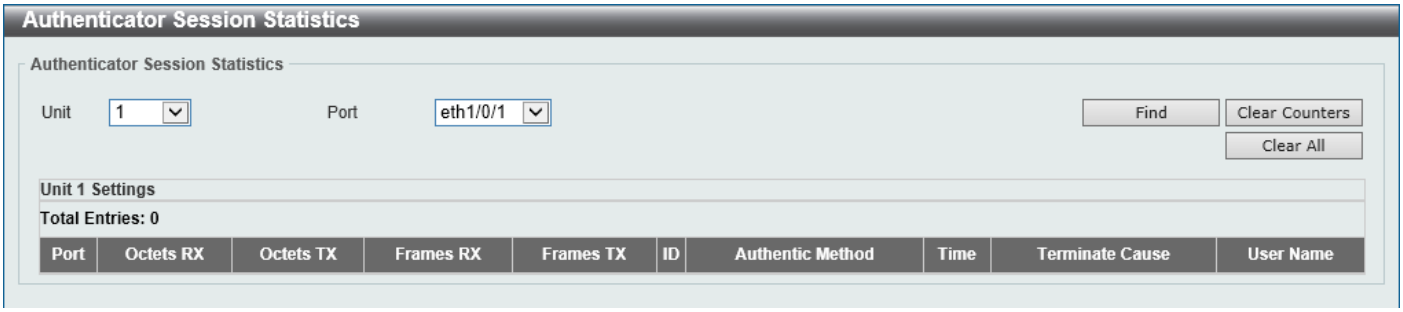


Figure 9-16 Authenticator Session Statistics Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this query here.
Port	Select the appropriate port used for the query here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear Counters** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

Authenticator Diagnostics

This window is used to view and clear the authenticator diagnostics information.

To view the following window, click **Security > 802.1X > Authenticator Diagnostics**, as shown below:

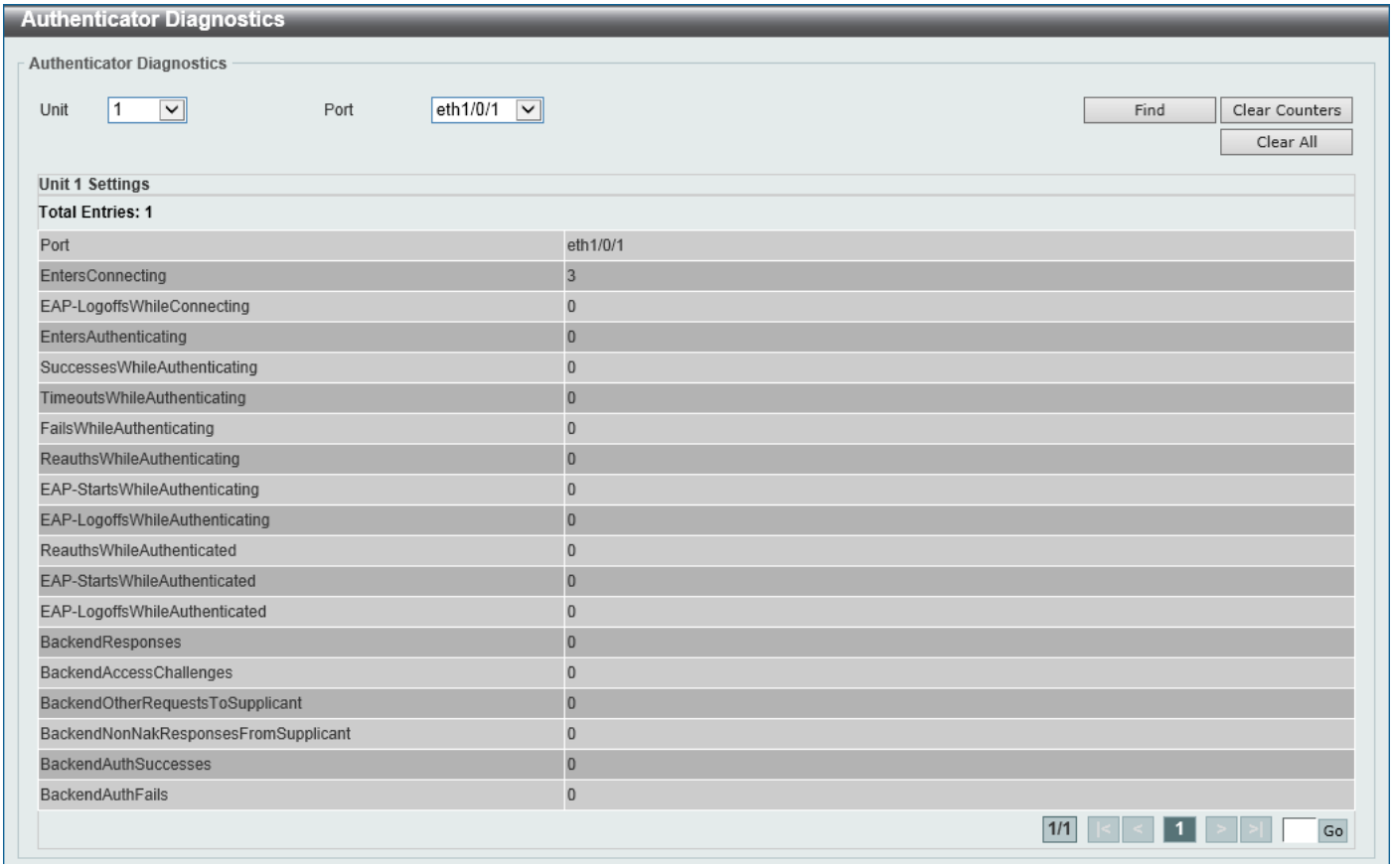


Figure 9-17 Authenticator Diagnostics Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this query here.
Port	Select the appropriate port used for the query here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear Counters** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

AAA

AAA Global Settings

This window is used to enable or disable the global Authentication, Authorization, and Accounting (AAA) state.

To view the following window, click **Security > AAA > AAA Global Settings**, as shown below:

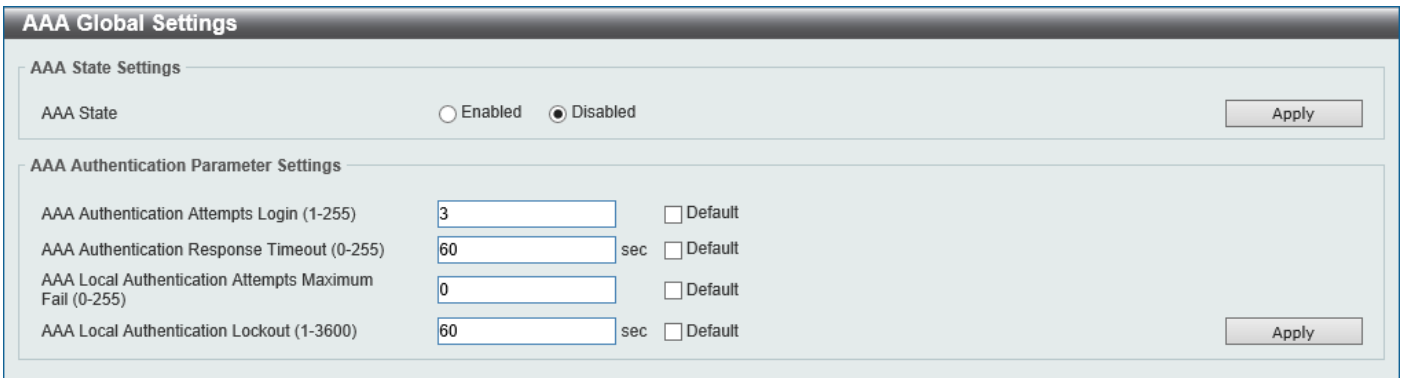


Figure 9-18 AAA Global Settings Window

The fields that can be configured in **AAA State Settings** are described below:

Parameter	Description
AAA State	Select to enable or disable the global Authentication, Authorization, and Accounting (AAA) state.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication Parameter Settings** are described below:

Parameter	Description
AAA Authentication Attempts Login	Enter the number of allowed AAA authentication login attempts here. The range is from 1 to 255. By default, this value is 3. Select the **Default** option to use the default value.
AAA Authentication Response Timeout	Enter the AAA authentication response timeout value here. The range is from 0 to 255 seconds. By default, this value is 60 seconds. Select the **Default** option to use the default value.
AAA Local Authentication Attempts Maximum Fail	Enter the maximum amount of times local AAA authentication attempts are allowed to fail here. If this value is 0, this feature is disabled. The range is from 0 to 255. By default, this value is 0. Select the **Default** option to use the default value.
AAA Local Authentication Lockout	Enter the local AAA authentication lockout time here. The range is from 1 to 3600 seconds. By default, this is 60 seconds. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

Application Authentication Settings

This window is used to display and configure the application authentication settings.

To view the following window, click **Security > AAA > Application Authentication Settings**, as shown below:

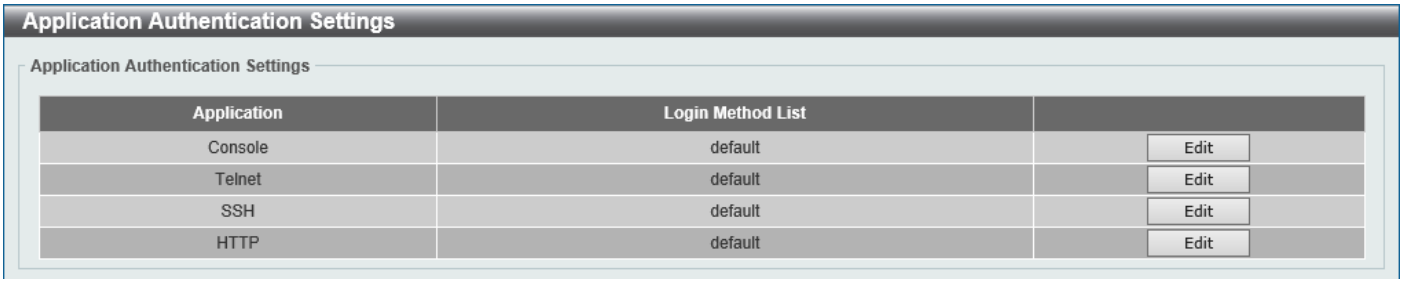


Figure 9-19 Application Authentication Settings Window

Click the **Edit** button to re-configure the specific entry.

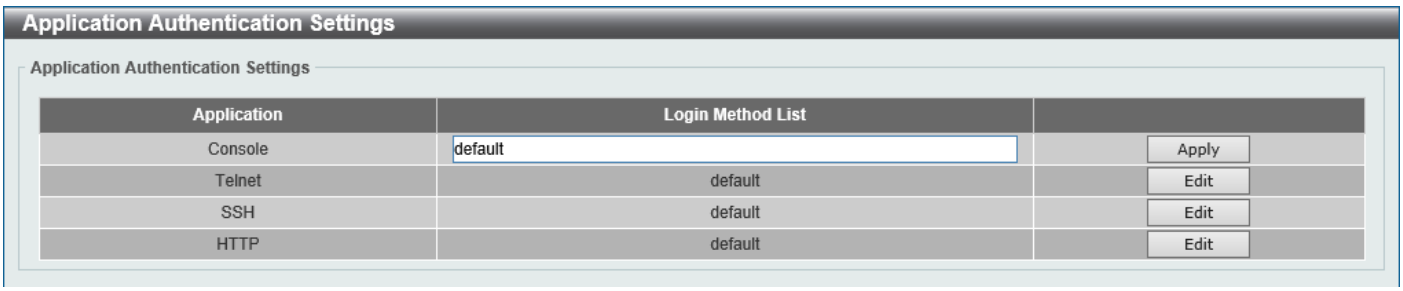


Figure 9-20 Application Authentication Settings (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Login Method List	After clicking the **Edit** button for the specific entry, enter the login method list name used here.

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Application Accounting Settings

This window is used to display and configure the application accounting settings.

To view the following window, click **Security > AAA > Application Accounting Settings**, as shown below:

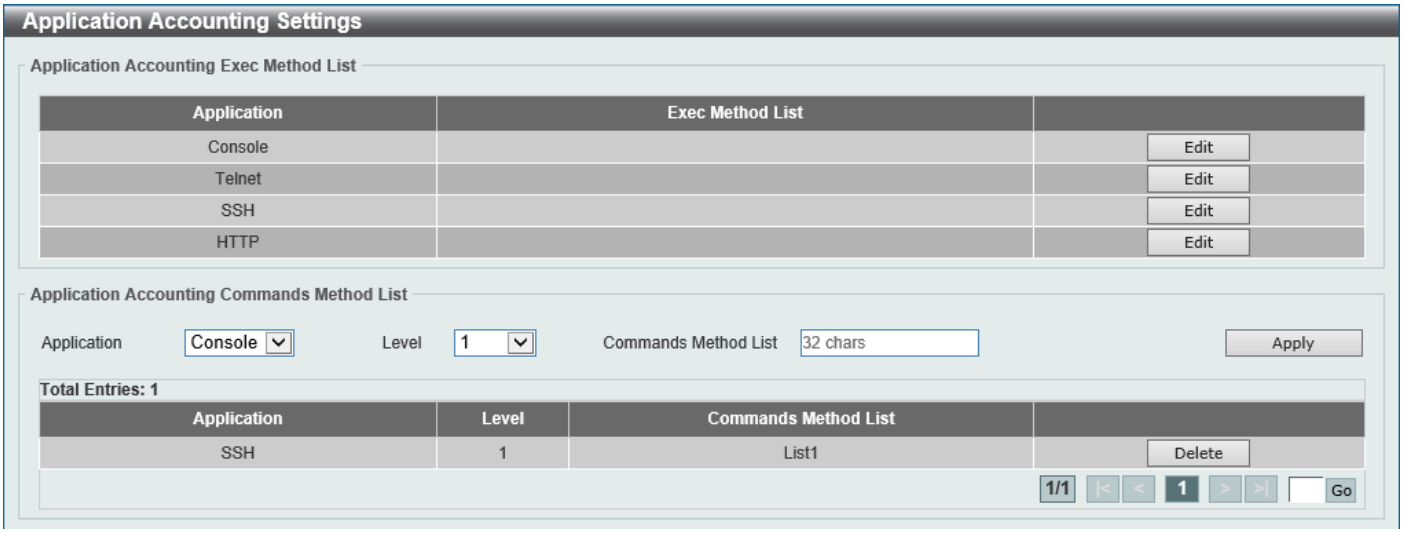


Figure 9-21 Application Accounting Settings Window

Click the **Edit** button to re-configure the specific entry.

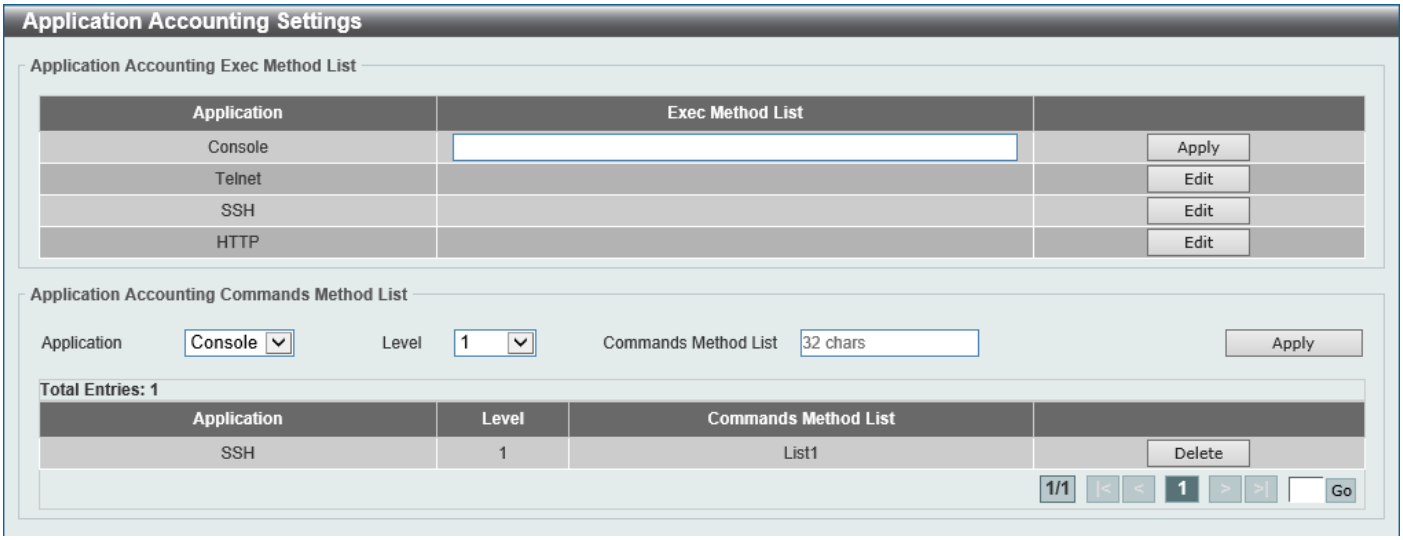


Figure 9-22 Application Accounting Settings (Edit) Window

The fields that can be configured in **Application Accounting Exec Method list** are described below:

Parameter	Description
Exec Method List	After clicking the **Edit** button for the specific entry, enter the EXEC method list name used here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Application Accounting Commands Method List** are described below:

Parameter	Description
Application	Select the application used here. Options to choose from are **Console**, **Telnet**, and **SSH**.
Level	Select the privilege level used here. Options to choose from are levels 1 to 15.

Parameter	Description
Commands Method List	Enter the commands method list name used here.

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Authentication Settings

This window is used to display and configure the AAA network and EXEC authentication settings.

To view the following window, click **Security > AAA > Authentication Settings** and select the **AAA Authentication Network** tab, as shown below:

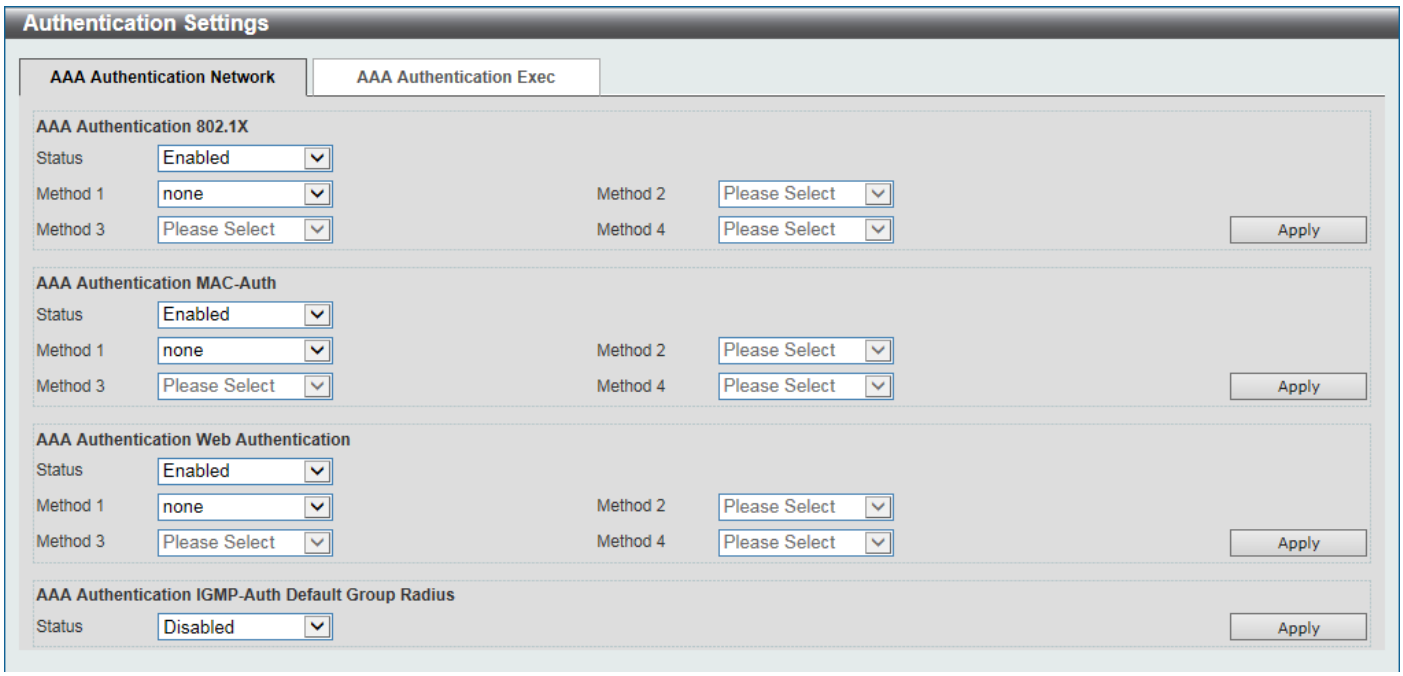


Figure 9-23 Authentication Settings Window

The fields that can be configured in **AAA Authentication 802.1X** are described below:

Parameter	Description
Status	Select to enable or disable the AAA 802.1X authentication state here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are: • **none** - Normally, the method is listed as the last method. The user will pass authentication if it is not denied by previous method authentication. • **local** - Specifies to use the local database for authentication. • **group** - Specifies to use the server groups defined by the AAA group server. Enter the AAA group server name in the space provided. This string can be up to 32 characters long. • **radius** - Specifies to use the servers defined by the RADIUS server host command.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication MAC-Auth** are described below:

Parameter	Description
Status	Select to enable or disable the AAA MAC authentication state here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are: • **none** - Normally, the method is listed as the last method. The user will pass authentication if it is not denied by previous method authentication. • **local** - Specifies to use the local database for authentication. • **group** - Specifies to use the server groups defined by the AAA group server. Enter the AAA group server name in the space provided. This string can be up to 32 characters long. • **radius** - Specifies to use the servers defined by the RADIUS server host command.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication Web Authentication** are described below:

Parameter	Description
Status	Select to enable or disable the AAA Web authentication state here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are: • **none** - Normally, the method is listed as the last method. The user will pass authentication if it is not denied by previous method authentication. • **local** - Specifies to use the local database for authentication. • **group** - Specifies to use the server groups defined by the AAA group server. Enter the AAA group server name in the space provided. This string can be up to 32 characters long. • **radius** - Specifies to use the servers defined by the RADIUS server host command.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication IGMP-Auth Default Group Radius** are described below:

Parameter	Description
Status	Select to enable or disable the default method list for IGMP authentication here.

Click the **Apply** button to accept the changes made.

To view the following window, select the **AAA Authentication Exec** tab, as shown below:

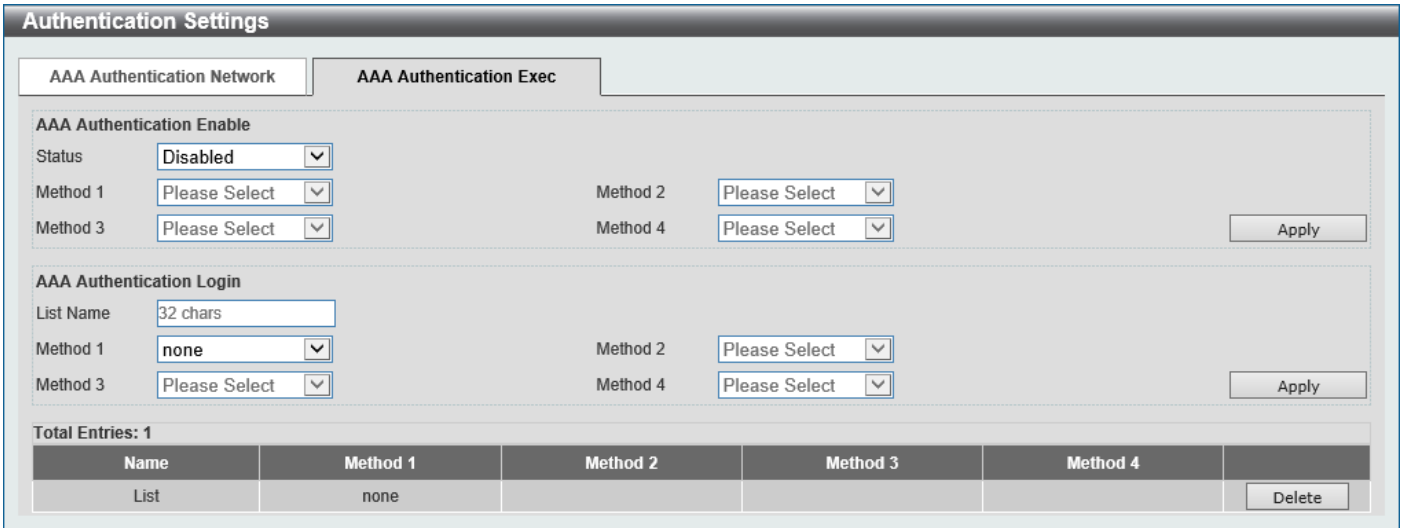


Figure 9-24 Authentication Settings (AAA Authentication EXEC) Window

The fields that can be configured in **AAA Authentication Enable** are described below:

Parameter	Description
Status	Select to enable or disable the AAA authentication enable state here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are: • **none** - Normally, the method is listed as the last method. The user will pass the authentication if it is not denied by previous method authentication. • **enable** - Specifies to use the local enable password for authentication. • **group** - Specifies to use the server groups defined by the AAA group server command. Enter the AAA group server name in the space provided. This string can be up to 32 characters long. • **radius** - Specifies to use the servers defined by the RADIUS server host command. • **tacacs+** - Specifies to use the servers defined by the TACACS+ server host command.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication Login** are described below:

Parameter	Description
List Name	Enter the method list name that will be used with the AAA authentication login option here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are: • **none** - Normally, the method is listed as the last method. The user will pass authentication if it is not denied by previous method's authentication. • **local** - Specifies to use the local database for authentication. • **group** - Specifies to use the server groups defined by the AAA group server command. Enter the AAA group server name in the space provided. This string can be up to 32 characters long. • **radius** - Specifies to use the servers defined by the RADIUS server host command. • **tacacs+** - Specifies to use the servers defined by the TACACS+ server host command.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Accounting Settings

This window is used to display and configure the AAA accounting settings.

To view the following window, click **Security > AAA > Accounting Settings** and select the **AAA Accounting Network** tab, as shown below:

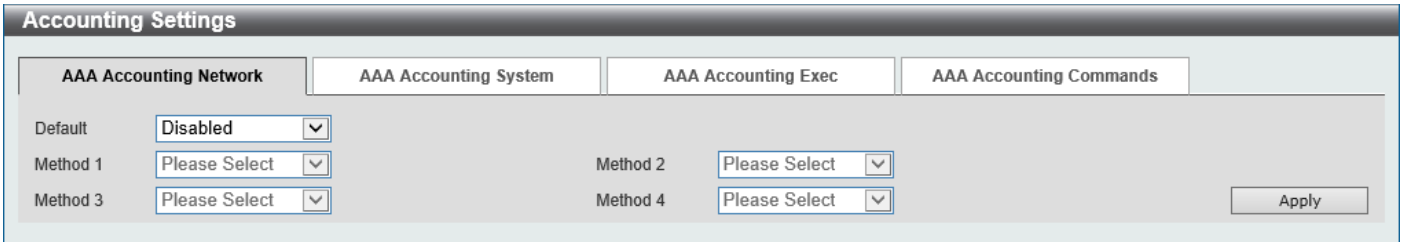


Figure 9-25 Accounting Settings Window

The fields that can be configured in **AAA Accounting Network** are described below:

Parameter	Description
Default	Select to enable or disable the use of the default method list here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are **None**, **Group**, **RADIUS**, and **TACACS+**. **None** is only available for **Method 1**.

Click the **Apply** button to accept the changes made.

To view the following window, select the **AAA Accounting System** tab, as shown below:

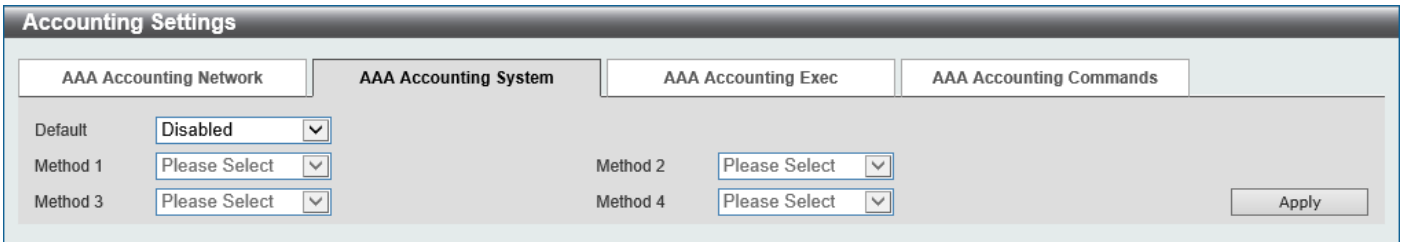


Figure 9-26 Accounting Settings (AAA Accounting System) Window

The fields that can be configured in **AAA Accounting System** are described below:

Parameter	Description
Default	Select to enable or disable the use of the default method list here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are **None**, **Group**, **RADIUS**, and **TACACS+**. **None** is only available for **Method 1**.

Click the **Apply** button to accept the changes made.

To view the following window, select the **AAA Accounting Exec** tab, as shown below:

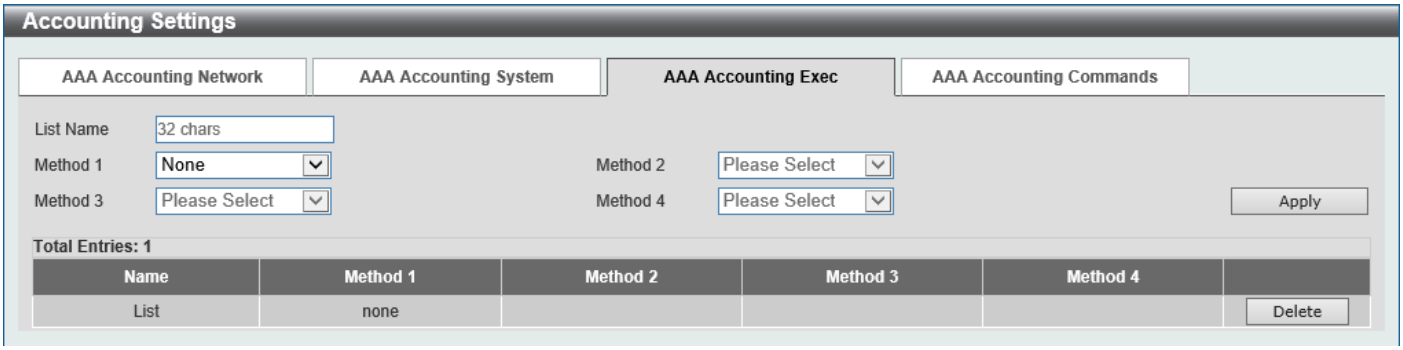


Figure 9-27 Accounting Settings (AAA Accounting Exec) Window

The fields that can be configured in **AAA Accounting Exec** are described below:

Parameter	Description
List Name	Enter the method list name that will be used with the AAA accounting EXEC option here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are **None**, **Group**, **RADIUS**, and **TACACS+**. **None** is only available for **Method 1**.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

To view the following window, select the **AAA Accounting Commands** tab, as shown below:

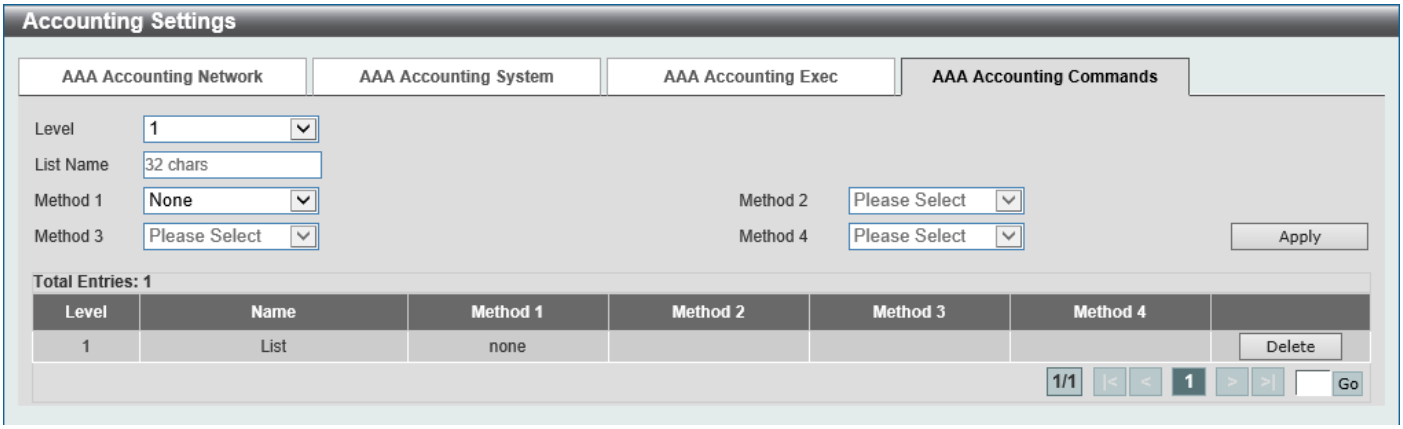


Figure 9-28 Accounting Settings (AAA Accounting Commands) Window

The fields that can be configured are described below:

Parameter	Description
Level	Select the privilege level used here. Options to choose from are levels 1 to 15.
List Name	Enter the method list name that will be used with the AAA accounting commands option here.
Method 1 ~ Method 4	Select the method lists that will be used for this configuration here. Options to choose from are **None**, **Group**, and **TACACS+**. **None** is only available for **Method 1**.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Server RADIUS Dynamic Author Settings

This window is used to display and configure the Switch as an AAA server to facilitate the inter-action with an external policy server.

To view the following window, click **Security > AAA > Server RADIUS Dynamic Author Settings**, as shown below:

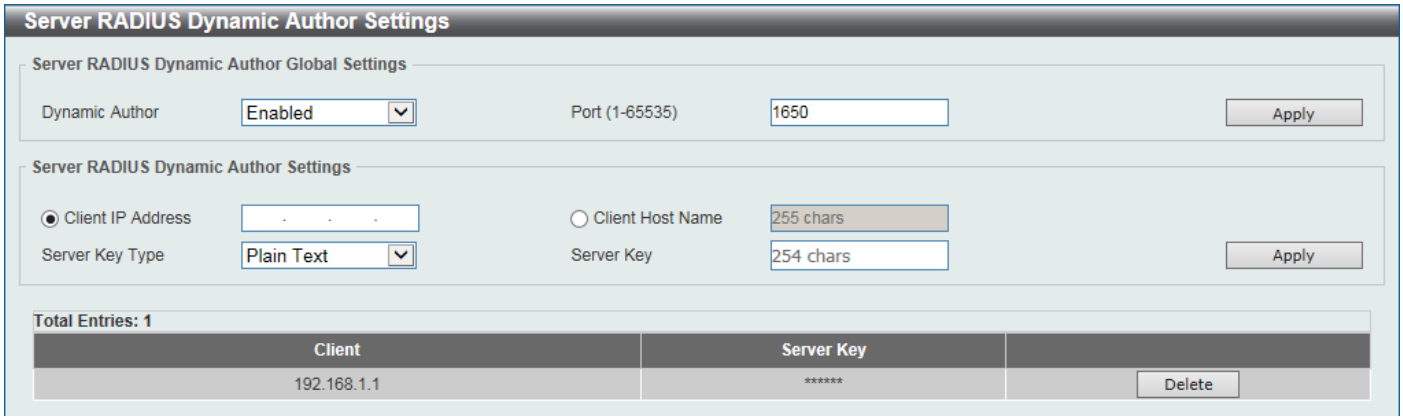


Figure 9-29 Server RADIUS Dynamic Author Settings Window

The fields that can be configured in **Server RADIUS Dynamic Author Global Settings** are described below:

Parameter	Description
Dynamic Author	Select to enable or disable the dynamic authorization.
Port	Enter the port number for the Switch to listen to RADIUS requests from the RADIUS client.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Server RADIUS Dynamic Author Settings** are described below:

Parameter	Description
Client IP Address	Select and enter the client IP address here.
Client Host Name	Select and enter the client host name here.
Server Key Type	Select the key type that will be used here. Options to choose from are **Plain Text** and **Encrypted**.
Server Key	Enter the key, used to communicate with the RADIUS server, here. This key can be up to 254 characters long.

Click the **Apply** button to accept the changes made.

RADIUS

RADIUS Global Settings

This window is used to display and configure the global RADIUS settings.

To view the following window, click **Security > RADIUS > RADIUS Global Settings**, as shown below:

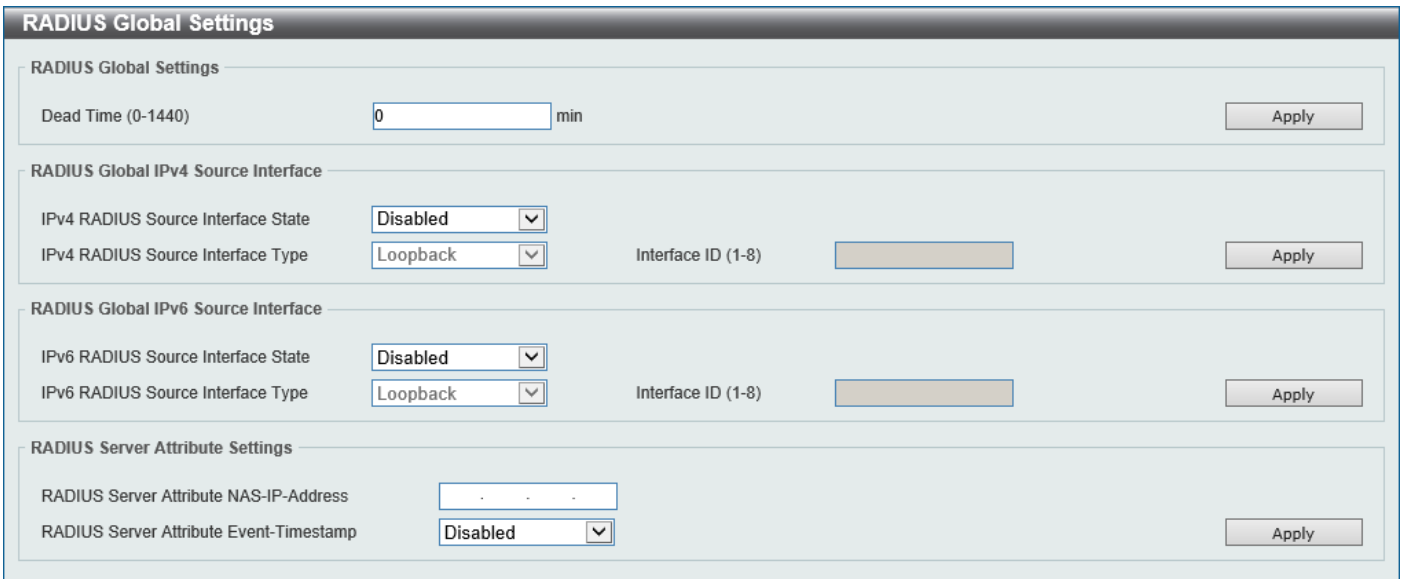


Figure 9-30 RADIUS Global Settings Window

The fields that can be configured in **RADIUS Global Settings** are described below:

Parameter	Description
Dead Time	Enter the dead time value here. The range is from 1 to 1440 minutes. By default, this value is 0 minutes. When this option is 0, the unresponsive server will not be marked as dead. This setting can be used to improve the authentication processing time by setting the dead time to skip the unresponsive server host entries. When the system performs authentication with the authentication server, it attempts one server at a time. If the attempted server does not respond, the system will attempt the next server. When the system finds a server does not respond, it will mark the server as down, start a dead time timer, and skip them in authentication of the following requests until expiration of the dead time.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RADIUS Global IPv4 Source Interface** are described below:

Parameter	Description
IPv4 RADIUS Source Interface State	Select to enable or disable the state of the IPv4 RADIUS source interface here.
IPv4 RADIUS Source Interface Type	Select the IPv4 RADIUS source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv4 RADIUS source interface type as Loopback. • **MGMT** - Specifies the IPv4 RADIUS source interface type as MGMT. • **VLAN** - Specifies the IPv4 RADIUS source interface type as VLAN.
Interface ID	Enter the IPv4 RADIUS source interface ID here. The Loopback interface range is from 1 to 8. The MGMT interface can only be 0.

Parameter	Description
	The VLAN interface range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RADIUS Global IPv6 Source Interface** are described below:

Parameter	Description
IPv6 RADIUS Source Interface State	Select to enable or disable the state of the IPv6 RADIUS source interface here.
IPv6 RADIUS Source Interface Type	Select the IPv6 RADIUS source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv6 RADIUS source interface type as Loopback. • **VLAN** - Specifies the IPv6 RADIUS source interface type as VLAN.
Interface ID	Enter the IPv6 RADIUS source interface ID here. The Loopback interface range is from 1 to 8. The VLAN interface range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RADIUS Server Attribute Settings** are described below:

Parameter	Description
RADIUS Server Attribute NAS-IP-Address	Enter the IPv4 address of the RADIUS server attribute 4 in the RADIUS packet here.
RADIUS Server Attribute Event-Timestamp	Select to enable or disable the RADIUS server attribute event-timestamp function here.

Click the **Apply** button to accept the changes made.

RADIUS Server Settings

This window is used to display and configure the RADIUS server settings.

To view the following window, click **Security > RADIUS > RADIUS Server Settings**, as shown below:

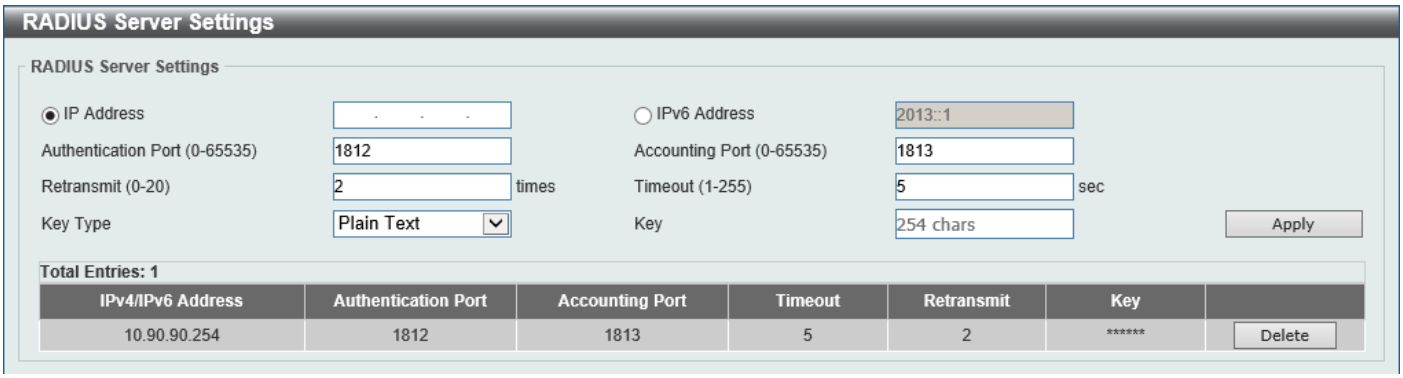


Figure 9-31 RADIUS Server Settings Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Enter the RADIUS server IPv4 address here.
IPv6 Address	Enter the RADIUS server IPv6 address here.

Parameter	Description
Authentication Port	Enter the authentication port number used here. The range is from 0 to 65535. By default, this value is 1812. If no authentication is used, use the value 0.
Accounting Port	Enter the accounting port number used here. The range is from 0 to 65535. By default, this value is 1813. If no accounting is used, use the value 0.
Retransmit	Enter the retransmit value used here. The range is from 0 to 20. By default, this value is 2. To disable this option, enter the value 0.
Timeout	Enter the timeout value used here. The range is from 1 to 255 seconds. By default, this value is 5 seconds.
Key Type	Select the key type that will be used here. Options to choose from are **Plain Text** and **Encrypted**.
Key	Enter the key, used to communicate with the RADIUS server, here. This key can be up to 254 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

RADIUS Group Server Settings

This window is used to display and configure the RADIUS group server settings.

To view the following window, click **Security > RADIUS > RADIUS Group Server Settings**, as shown below:

Figure 9-32 RADIUS Group Server Settings Window

The fields that can be configured are described below:

Parameter	Description
Group Server Name	Enter the RADIUS group server name here. This name can be up to 32 characters long.
IPv4 Address	Enter the group server IPv4 address here.
IPv6 Address	Enter the group server IPv6 address here.

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

Click the **Show Detail** button to view and configure detailed settings for the RADIUS group server.

Click the **Delete** button to remove the specified entry.

After clicking the **Show Detail** button, the following page will be available.

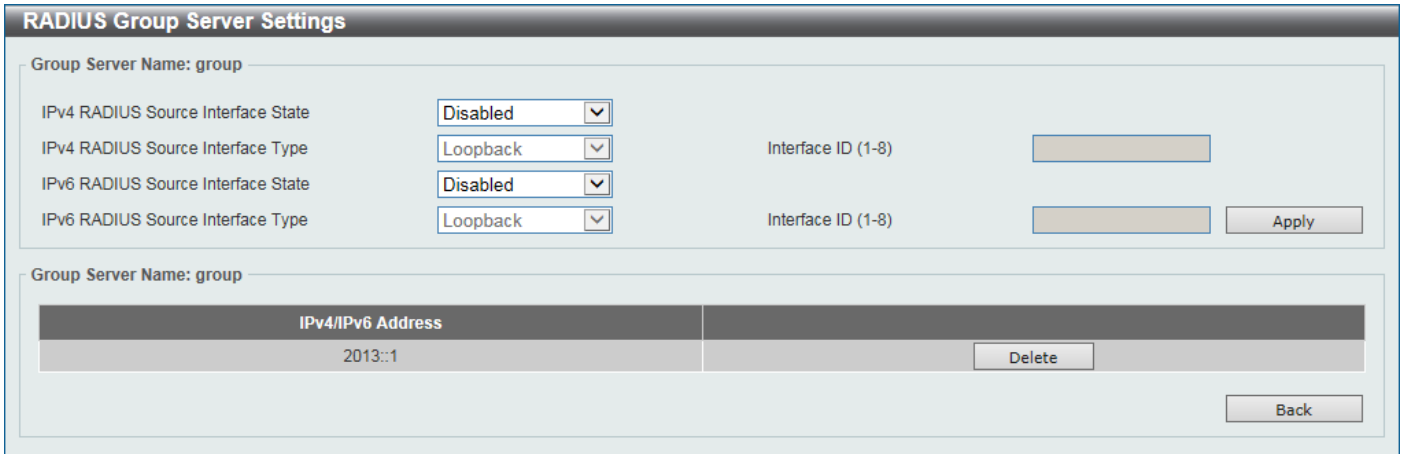


Figure 9-33 RADIUS Group Server Settings (Detail) Window

The fields that can be configured are described below:

Parameter	Description
IPv4 RADIUS Source Interface State	Select to enable or disable the state of the IPv4 RADIUS source interface here.
IPv4 RADIUS Source Interface Type	Select the IPv4 RADIUS source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv4 RADIUS source interface type as Loopback. • **MGMT** - Specifies the IPv4 RADIUS source interface type as MGMT. • **VLAN** - Specifies the IPv4 RADIUS source interface type as VLAN.
Interface ID	Enter the IPv4 RADIUS source interface ID here. The Loopback interface range is from 1 to 8. The MGMT interface is can only be 0. The VLAN interface range is from 1 to 4094.
IPv6 RADIUS Source Interface State	Select to enable or disable the state of the IPv6 RADIUS source interface here.
IPv6 RADIUS Source Interface Type	Select the IPv6 RADIUS source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv6 RADIUS source interface type as Loopback. • **VLAN** - Specifies the IPv6 RADIUS source interface type as VLAN.
Interface ID	Enter the IPv6 RADIUS source interface ID here. The Loopback interface range is from 1 to 8. The VLAN interface range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

RADIUS Statistic

This window is used to view and clear the RADIUS statistics information.

To view the following window, click **Security > RADIUS > RADIUS Statistic**, as shown below:

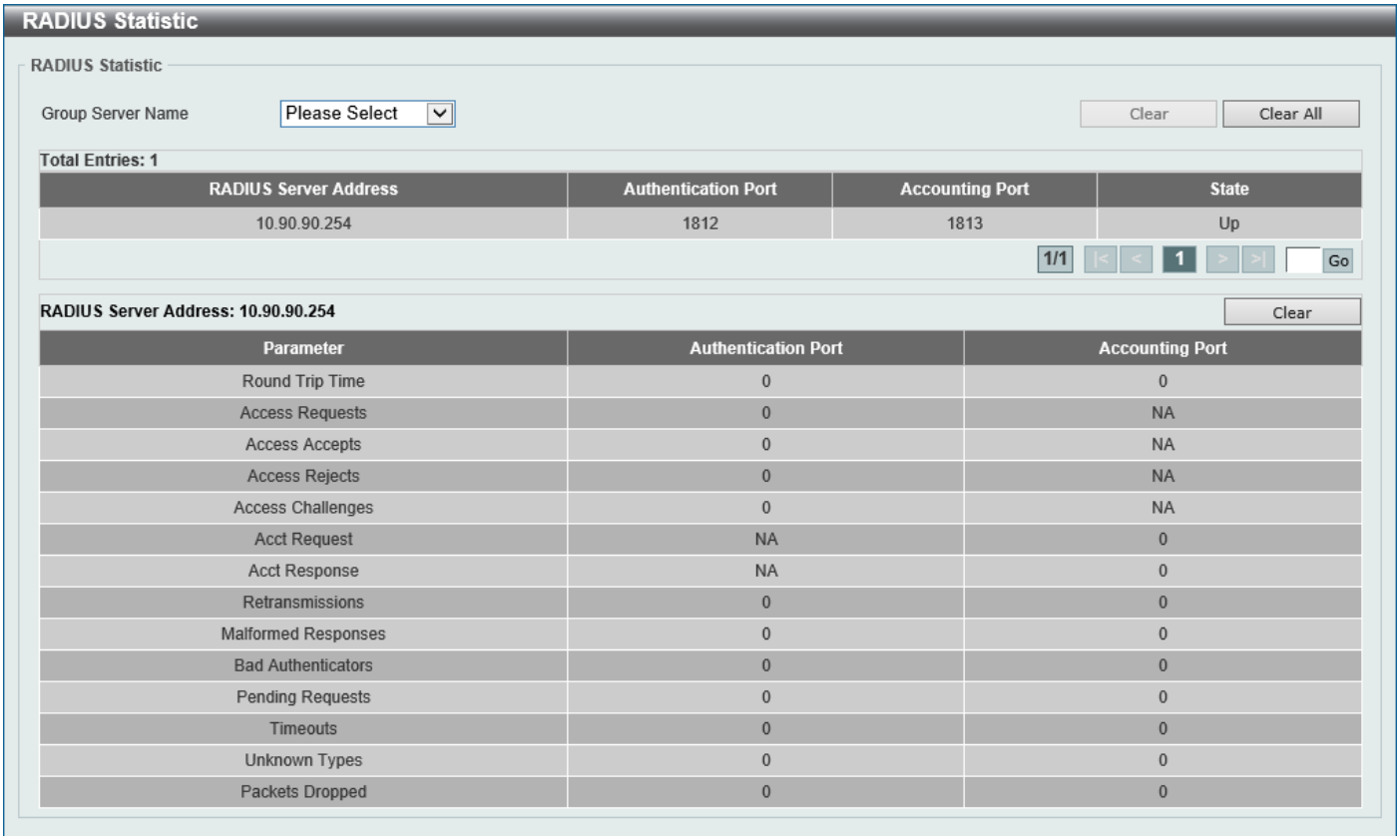


Figure 9-34 RADIUS Statistic Window

The fields that can be configured are described below:

Parameter	Description
Group Server Name	Select the RADIUS group server name from this list here.

Click the **Clear** button to clear the information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

TACACS+

TACACS+ Global Settings

This window is used to display and configure the global TACACS+ server settings.

To view the following window, click **Security > TACACS+ > TACACS+ Global Settings**, as shown below:

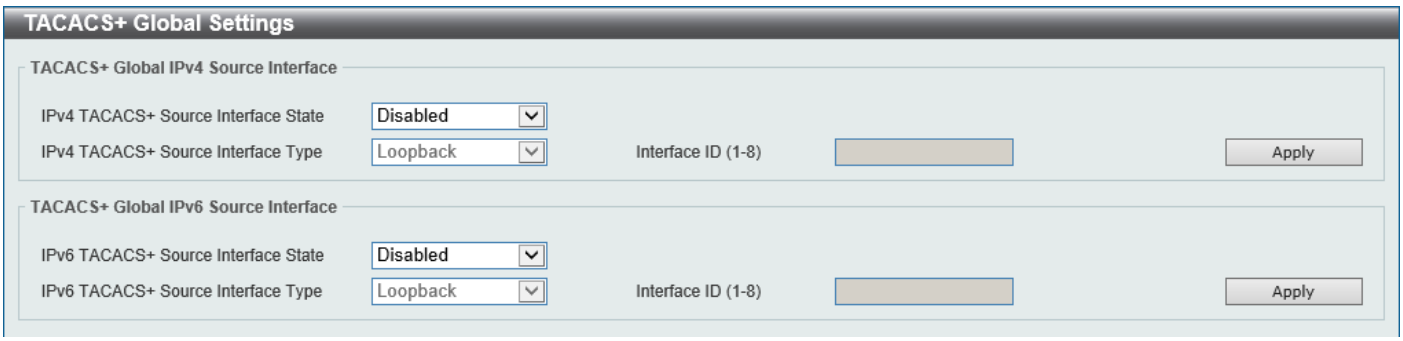


Figure 9-35 TACACS+ Global Settings Window

The fields that can be configured in **TACACS+ Global IPv4 Source Interface** are described below:

Parameter	Description
IPv4 TACACS+ Source Interface State	Select to enable or disable the state of the IPv4 TACACS+ source interface here.
IPv4 TACACS+ Source Interface Type	Select the IPv4 TACACS+ source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv4 TACACS+ source interface type as Loopback. • **MGMT** - Specifies the IPv4 TACACS+ source interface type as MGMT. • **VLAN** - Specifies the IPv4 TACACS+ source interface type as VLAN.
Interface ID	Enter the IPv4 TACACS+ source interface ID here. The Loopback interface range is from 1 to 8. The MGMT interface can only be 0. The VLAN interface range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **TACACS+ Global IPv6 Source Interface** are described below:

Parameter	Description
IPv6 TACACS+ Source Interface State	Select to enable or disable the state of the IPv6 TACACS+ source interface here.
IPv6 TACACS+ Source Interface Type	Select the IPv6 TACACS+ source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv6 TACACS+ source interface type as Loopback. • **VLAN** - Specifies the IPv6 TACACS+ source interface type as VLAN.
Interface ID	Enter the IPv6 TACACS+ source interface ID here. The Loopback interface range is from 1 to 8. The VLAN interface range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

TACACS+ Server Settings

This window is used to display and configure the TACACS+ server settings.

To view the following window, click **Security > TACACS+ > TACACS+ Server Settings**, as shown below:

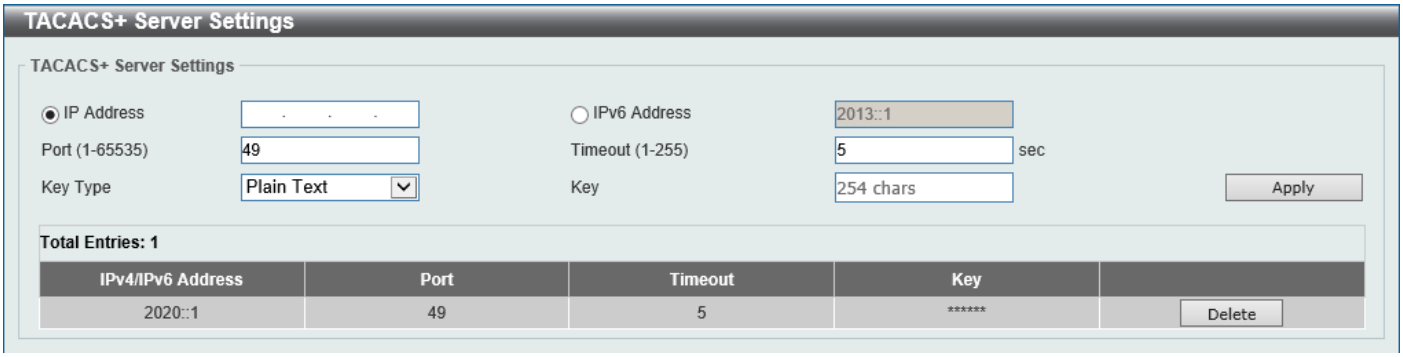


Figure 9-36 TACACS+ Server Settings Window

The fields that can be configured are described below:

Parameter	Description
IP Address	Enter the TACACS+ server IPv4 address here.
IPv6 Address	Enter the TACACS+ server IPv6 address here.
Port	Enter the port number used here. The range is from 1 to 65535. By default, this value is 49.
Timeout	Enter the timeout value here. The range is from 1 to 255 seconds. By default, this value is 5 seconds.
Key Type	Select the key type that will be used here. Options to choose from are **Plain Text** and **Encrypted**.
Key	Enter the key, used to communicate with the TACACS+ server, here. This key can be up to 254 characters long.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

TACACS+ Group Server Settings

This window is used to display and configure the TACACS+ group server settings.

To view the following window, click **Security > TACACS+ > TACACS+ Group Server Settings**, as shown below:

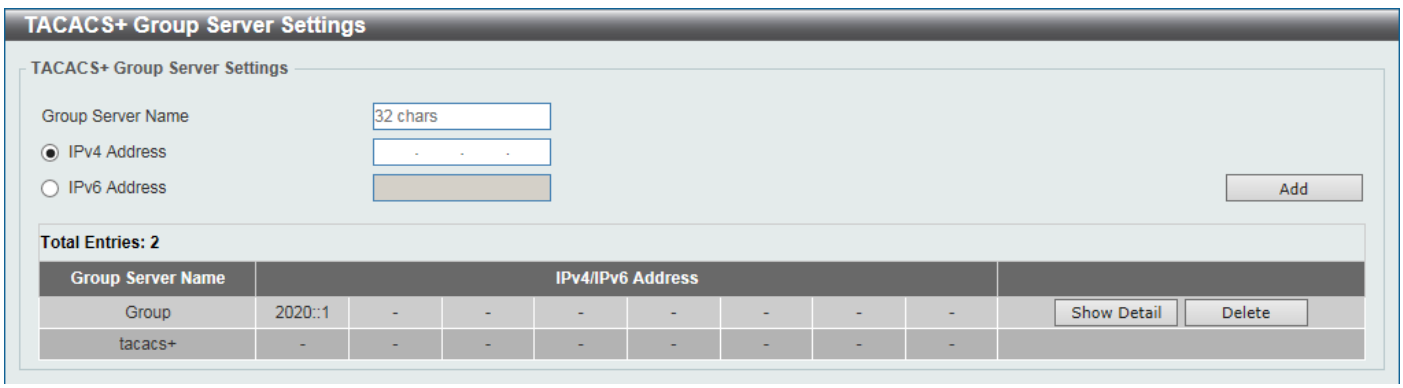


Figure 9-37 TACACS+ Group Server Settings Window

The fields that can be configured are described below:

Parameter	Description
Group Server Name	Enter the TACACS+ group server name here. This name can be up to 32 characters long.
IPv4 Address	Enter the IPv4 address of the TACACS+ group server here.
IPv6 Address	Enter the IPv6 address of the TACACS+ group server here.

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

Click the **Show Detail** button to view and configure detailed settings for the TACACS+ group server.

Click the **Delete** button to remove the specified entry.

After clicking the **Show Detail** button, the following page will be available.

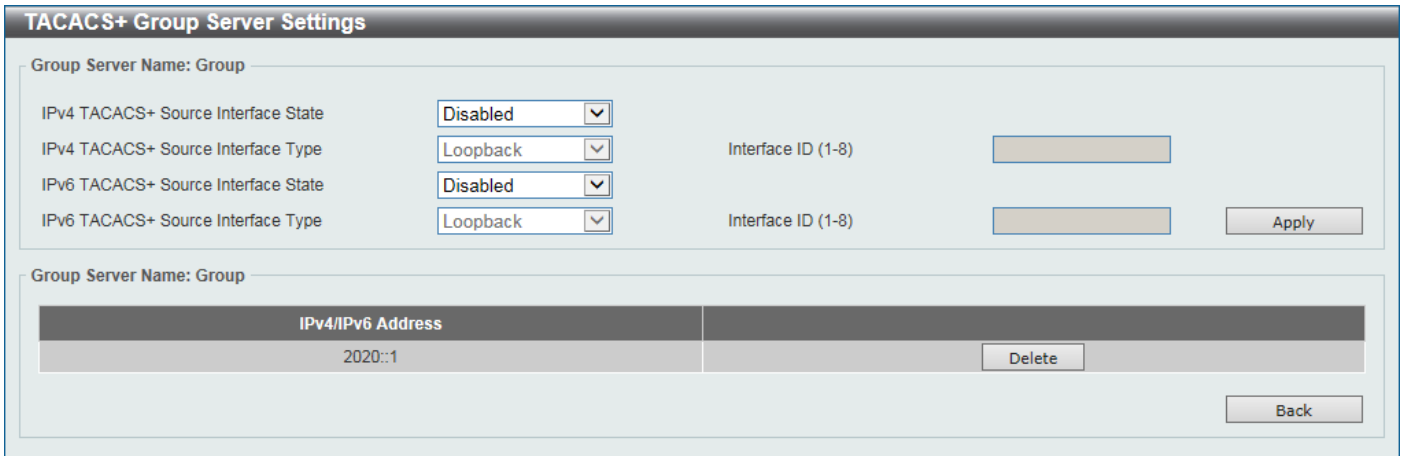


Figure 9-38 TACACS+ Group Server Settings (Show Detail) Window

The fields that can be configured are described below:

Parameter	Description
IPv4 TACACS+ Source Interface State	Select to enable or disable the state of the IPv4 TACACS+ source interface here.
IPv4 TACACS+ Source Interface Type	Select the IPv4 TACACS+ source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv4 TACACS+ source interface type as Loopback. • **MGMT** - Specifies the IPv4 TACACS+ source interface type as MGMT. • **VLAN** - Specifies the IPv4 TACACS+ source interface type as VLAN.
Interface ID	Enter the IPv4 TACACS+ source interface ID here. The Loopback interface range is from 1 to 8. The MGMT interface can only be 0. The VLAN interface range is from 1 to 4094.
IPv6 TACACS+ Source Interface State	Select to enable or disable the state of the IPv6 TACACS+ source interface here.
IPv6 TACACS+ Source Interface Type	Select the IPv6 TACACS+ source interface type here. Options to choose from are: • **Loopback** - Specifies the IPv6 TACACS+ source interface type as Loopback. • **VLAN** - Specifies the IPv6 TACACS+ source interface type as VLAN.
Interface ID	Enter the IPv6 TACACS+ source interface ID here. The Loopback interface range is from 1 to 8. The VLAN interface range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

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

TACACS+ Statistic

This window is used to view and clear the TACACS+ statistic information.

To view the following window, click **Security > TACACS+ > TACACS+ Statistic**, as shown below:

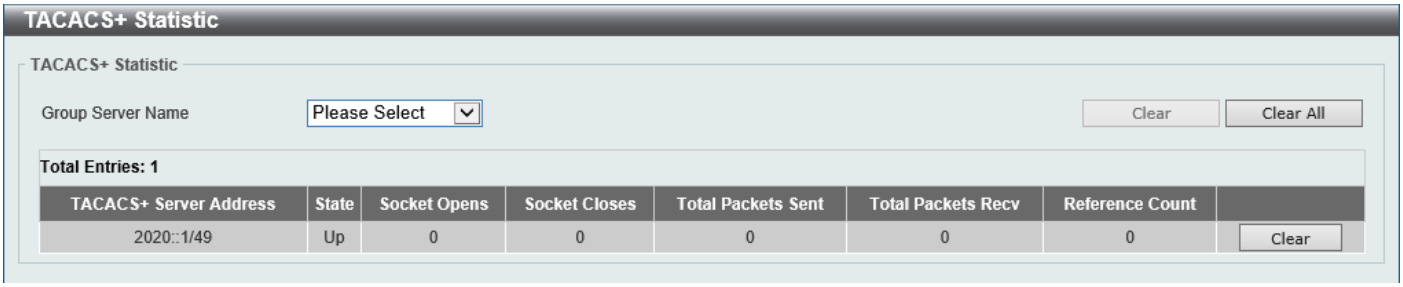


Figure 9-39 TACACS+ Statistic Window

The fields that can be configured are described below:

Parameter	Description
Group Server Name	Select the TACACS+ group server name from this list here.

Click the first **Clear** button to clear the information based on the group selected.

Click the **Clear All** button to clear all the information in this table.

Click the second **Clear** button to clear all the information for the specific entry.

IMPB

The IP network layer uses a four-byte address. The Ethernet link-layer uses a six-byte MAC address. Binding these two address types together allows the transmission of data between the layers. The primary purpose of IP-MAC-Port Binding (IMPB) is to restrict the access to a Switch to a number of authorized users. Authorized clients can access a Switch's port by either checking the pair of IP-MAC addresses with the pre-configured database or if DHCP snooping has been enabled in which case the Switch will automatically learn the IP/MAC pairs by snooping DHCP packets and saving them to the IMPB white list. If an unauthorized user tries to access an IP-MAC binding enabled port, the system will block the access by dropping its packet. Active and inactive entries use the same database. The function is port-based, meaning a user can enable or disable the function on the individual port.

IPv4

DHCPv4 Snooping

DHCP Snooping Global Settings

This window is used to display and configure the global DHCP snooping settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Global Settings**, as shown below:

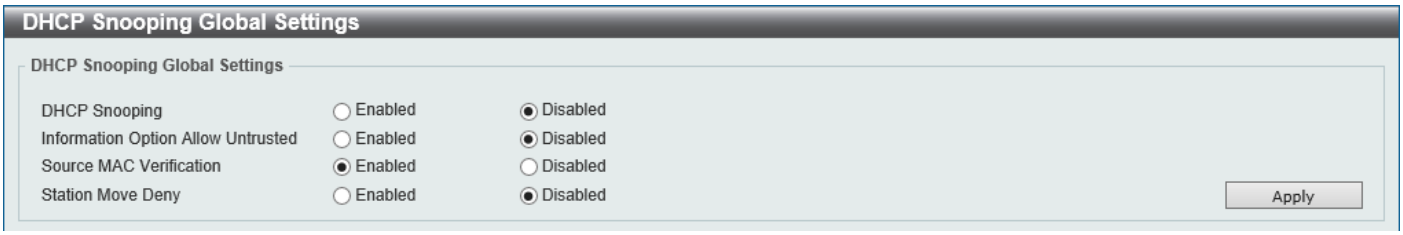


Figure 9-40 DHCP Snooping Global Settings Window

The fields that can be configured are described below:

Parameter	Description
DHCP Snooping	Select to enable or disable the global DHCP snooping status.
Information Option Allow Untrusted	Select to enable or disable the option to globally allow DHCP packets with the relay Option 82 on the untrusted interface.
Source MAC Verification	Select to enable or disable the verification that the source MAC address in a DHCP packet matches the client hardware address.
Station Move Deny	Select to enable or disable the DHCP snooping station move state. When DHCP snooping station move is enabled, the dynamic DHCP snooping binding entry with the same VLAN ID and MAC address on the specific port can move to another port if it detects that a new DHCP process belong to the same VLAN ID and MAC address.

Click the **Apply** button to accept the changes made.

DHCP Snooping Port Settings

This window is used to display and configure the DHCP snooping port settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Port Settings**, as shown below:

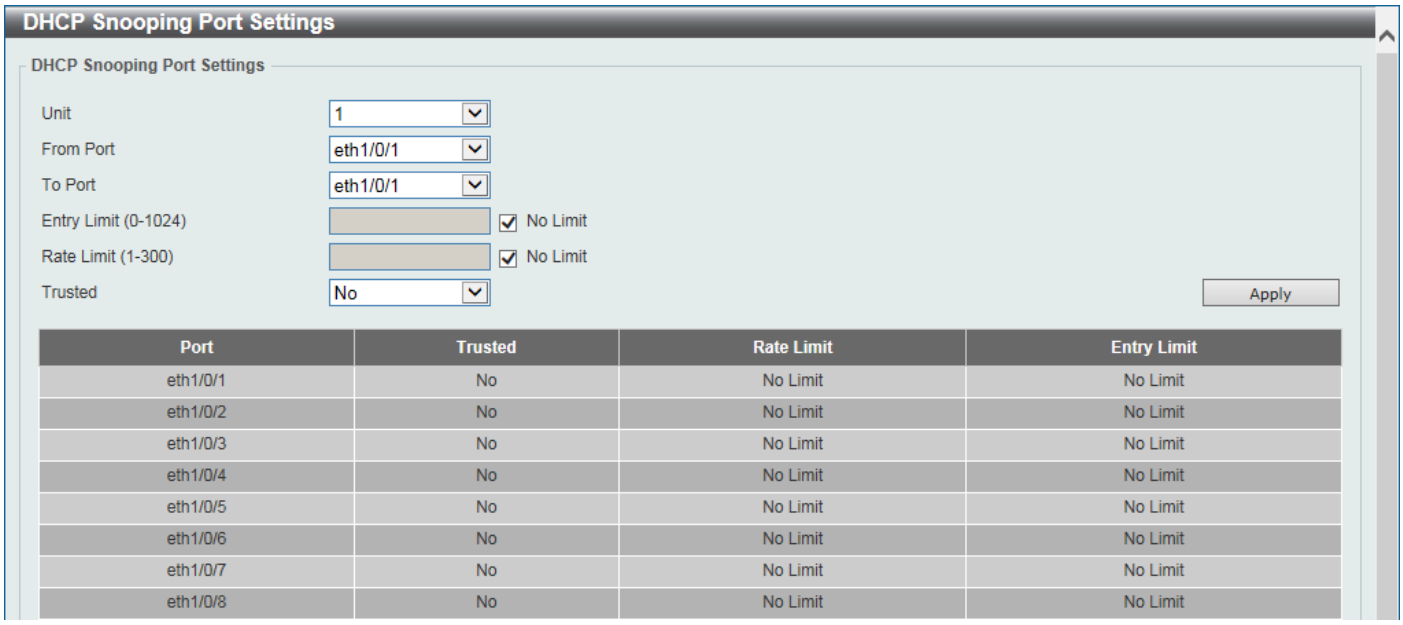


Figure 9-41 DHCP Snooping Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Entry Limit	Enter the entry limit value here. The range is from 0 to 1024. Select the **No Limit** option to use the default value.
Rate Limit	Enter the rate limit value here. The range is from 1 to 300. Select the **No Limit** option to disable the function.
Trusted	Select the trusted option here. Options to choose from are **No** and **Yes**. Ports connected to the DHCP server or to other Switches should be configured as trusted interfaces. The ports connected to DHCP clients should be configured as untrusted interfaces. DHCP snooping acts as a firewall between untrusted interfaces and DHCP servers.

Click the **Apply** button to accept the changes made.

DHCP Snooping VLAN Settings

This window is used to display and configure the DHCP snooping VLAN settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping VLAN Settings**, as shown below:

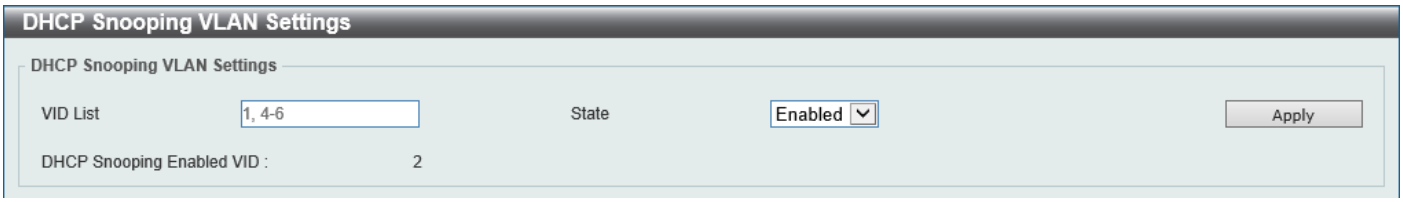


Figure 9-42 DHCP Snooping VLAN Settings Window

The fields that can be configured are described below:

Parameter	Description
VID List	Enter the VLAN ID list used here.
State	Select to enable or disable the DHCP snooping VLAN setting here.

Click the **Apply** button to accept the changes made.

DHCP Snooping Database

This window is used to display and configure the DHCP snooping database settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Database**, as shown below:

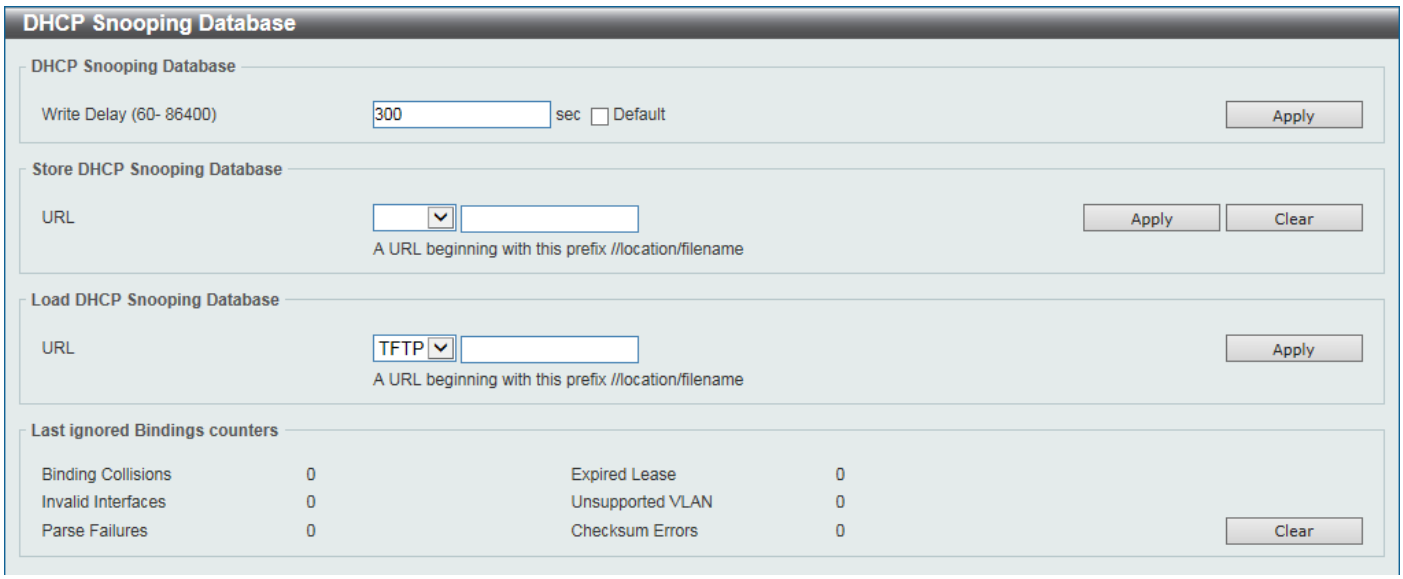


Figure 9-43 DHCP Snooping Database Window

The fields that can be configured in **DHCP Snooping Database** are described below:

Parameter	Description
Write Delay	Enter the write delay time value here. The range is from 60 to 86400 seconds. By default, this value is 300 seconds.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Store DHCP Snooping Database** are described below:

Parameter	Description
URL	Select the location from the drop-down list and enter the URL where the DHCP snooping database will be stored to here. Locations to choose from are **TFTP**, **FTP**, and **Flash**. An example URL is given.

Click the **Apply** button to accept the changes made.

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

The fields that can be configured in **Load DHCP Snooping Database** are described below:

Parameter	Description
URL	Select the location from the drop-down list and enter the URL where the DHCP snooping database will be loaded from here. Locations to choose from are **TFTP**, **FTP**, and **Flash**. An example URL is given.

Click the **Apply** button to accept the changes made.

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

DHCP Snooping Binding Entry

This window is used to display and configure the DHCP snooping binding entries.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Binding Entry**, as shown below:

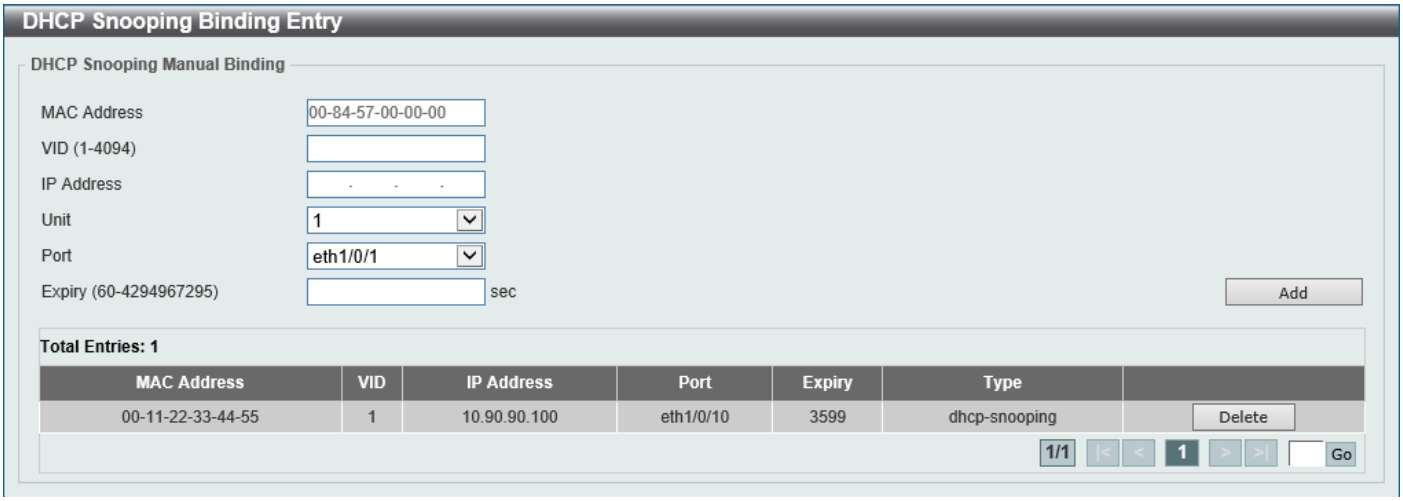


Figure 9-44 DHCP Snooping Binding Entry Window

The fields that can be configured are described below:

Parameter	Description
MAC Address	Enter the MAC address of the DHCP snooping binding entry here.
VID	Enter the VLAN ID of the DHCP snooping binding entry here. The range is from 1 to 4094.
IP Address	Enter the IP address of the DHCP snooping binding entry here.
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the appropriate port used for the configuration here.

Parameter	Description
Expiry	Enter the expiry time value used here. The range is from 60 to 4294967295 seconds.

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

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Dynamic ARP Inspection

ARP Access List

This window is used to display and configure the dynamic ARP inspection settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Access List**, as shown below:

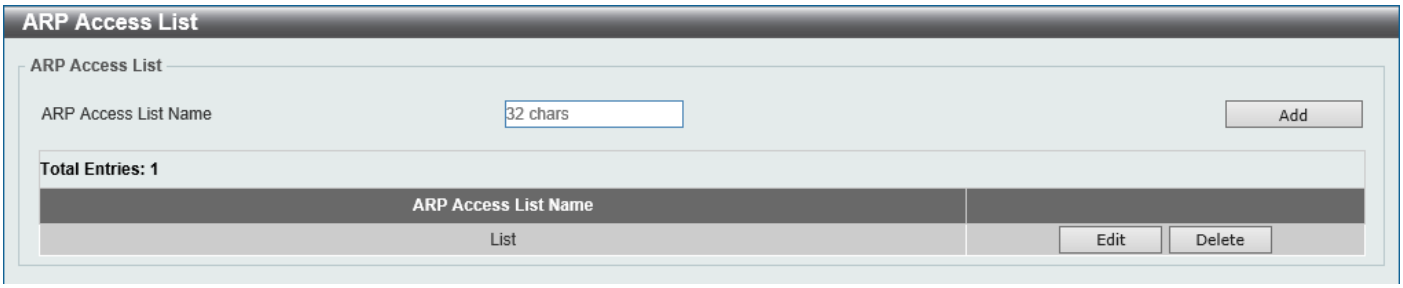


Figure 9-45 ARP Access List Window

The fields that can be configured are described below:

Parameter	Description
ARP Access List Name	Enter the ARP access list name used here. This name can be up to 32 characters long.

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

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

After clicking the **Edit** button, the following window will appear.

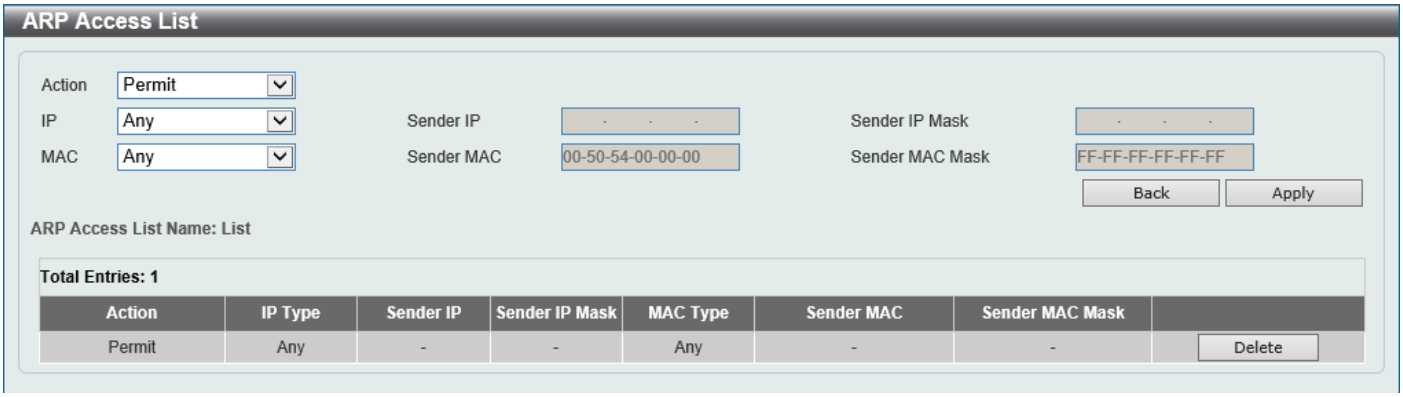


Figure 9-46 ARP Access List (Edit) Window

The fields that can be configured are described below:

Parameter	Description
Action	Select the action that will be taken here. Options to choose from are **Permit** and **Deny**.
IP	Select the type of sender IP address that will be used here. Options to choose from are **Any**, **Host**, and **IP with Mask**.
Sender IP	After selecting the **Host** or **IP with Mask** options as the type of **IP**, enter the sender IP address used here.
Sender IP Mask	After selecting the **IP with Mask** option as the type of **IP**, enter the sender IP mask used here.
MAC	Select the type of sender MAC address that will be used here. Options to choose from are **Any**, **Host**, and **MAC with Mask**.
Sender MAC	After selecting the **Host** or **MAC with Mask** options as the type of **MAC**, enter the sender MAC address used here.
Sender MAC Mask	After selecting the **MAC with Mask** option as the type of **MAC**, enter the sender MAC mask used here.

Click the **Back** button to return to the previous page.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

ARP Inspection Settings

This window is used to display and configure the ARP inspection settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Settings**, as shown below:

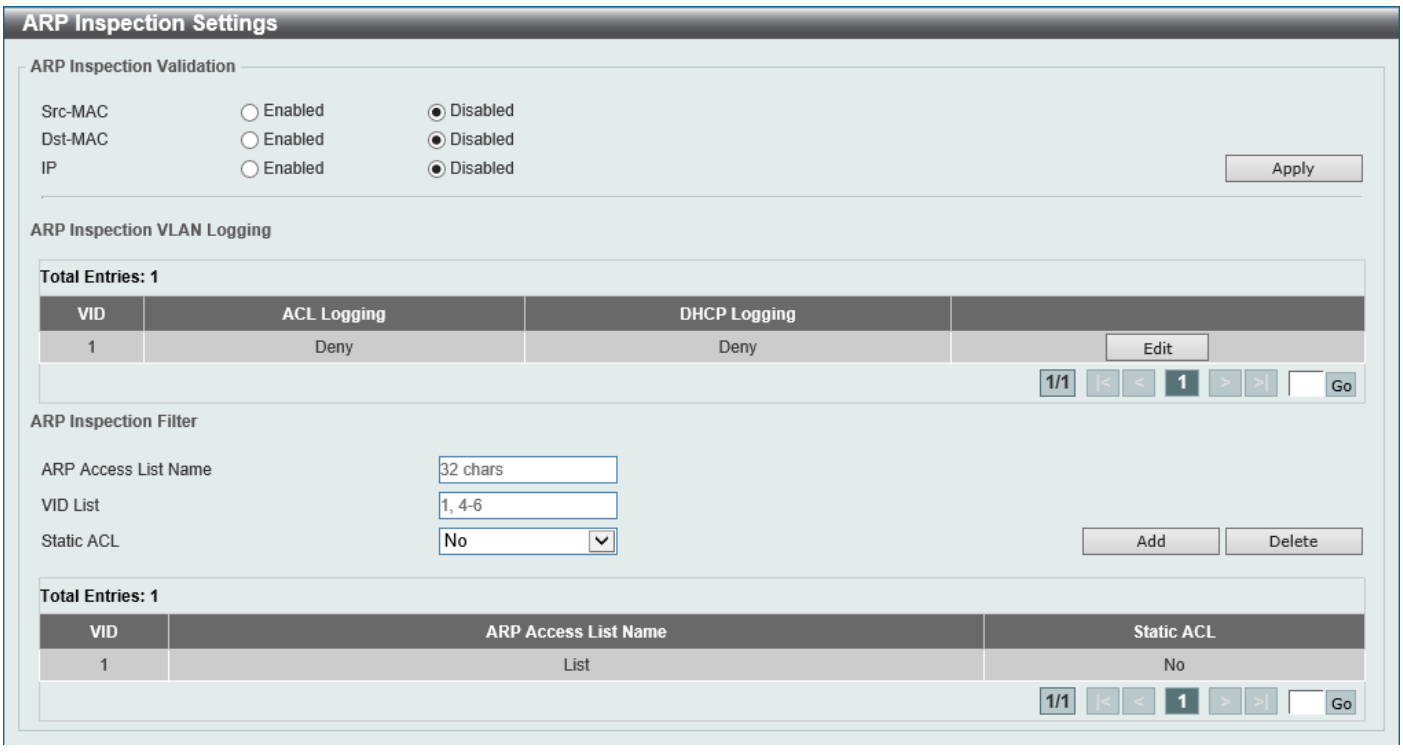


Figure 9-47 ARP Inspection Settings Window

The fields that can be configured in **ARP Inspection Validation** are described below:

Parameter	Description
Src-MAC	Select to enable or disable the source MAC option here. This option specifies to check for ARP requests and response packets and the consistency of the source MAC address in the Ethernet header against the sender MAC address in the ARP payload.
Dst-MAC	Select to enable or disable the destination MAC option here. This option specifies to check for ARP response packets and the consistency of the destination MAC address in the Ethernet header against the target MAC address in the ARP payload.
IP	Select to enable or disable the IP option here. This option specifies to check the ARP body for invalid and unexpected IP addresses. It also specifies to check the validity of IP address in the ARP payload. The sender IP in both the ARP request and response and target IP in the ARP response are validated. Packets destined for the IP addresses 0.0.0.0, 255.255.255.255, and all IP multicast addresses are dropped. Sender IP addresses are checked in all ARP requests and responses, and target IP addresses are checked only in ARP responses.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to configure the ACL/DHCP logging actions.

The fields that can be configured in **ARP Inspection VLAN Logging** are described below:

Parameter	Description
ACL Logging	After clicking the **Edit** button, select the ACL logging action here. Options to choose from are **Deny**, **Permit**, **All**, and **None**.
DHCP Logging	After clicking the **Edit** button, select the DHCP logging action here. Options to choose from are **Deny**, **Permit**, **All**, and **None**.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **ARP Inspection Filter** are described below:

Parameter	Description
ARP Access List Name	Enter the ARP access list name used here. This name can be up to 32 characters long.
VID List	Enter the VLAN ID list used here.
Static ACL	Select whether to use a static ACL or not here by either selecting **Yes** or **No**.

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

Click the **Delete** button to remove an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

ARP Inspection Port Settings

This window is used to display and configure the ARP inspection port settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Port Settings**, as shown below:

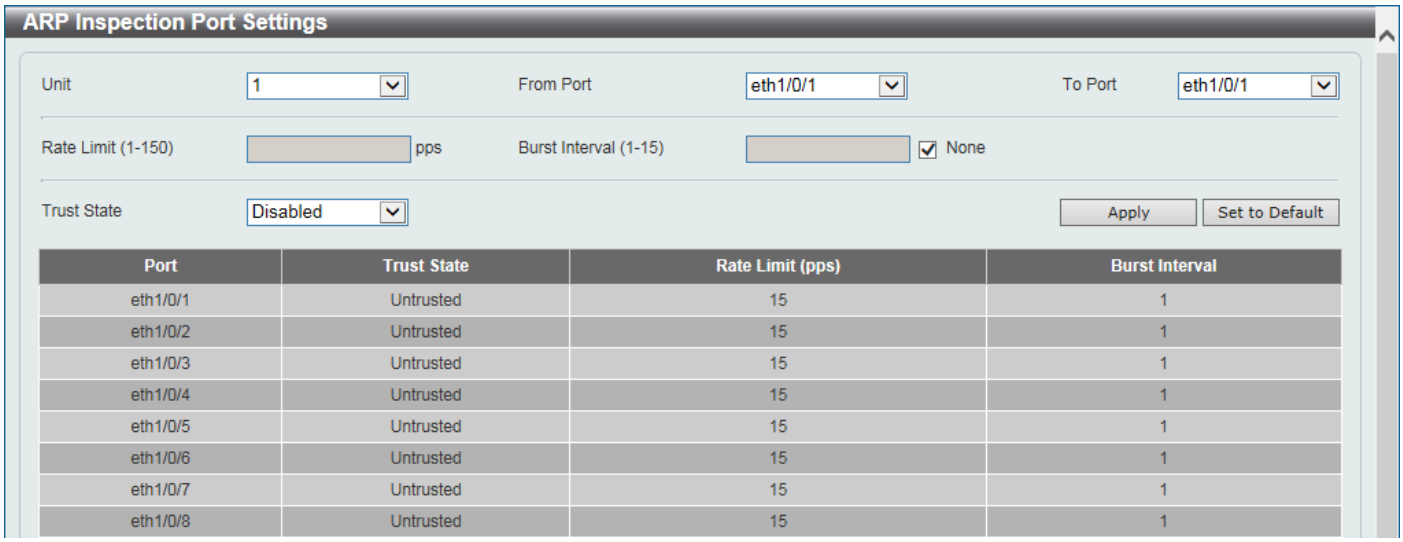


Figure 9-48 ARP Inspection Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Rate Limit	Enter the rate limit value here. The range is from 1 to 150 packets per seconds.
Burst Interval	Enter the burst interval value here. The range is from 1 to 15. Select the **None** option to disable the option.
Trust State	Select to enable or disable the trust state here.

Click the **Apply** button to accept the changes made.

Click the **Set to Default** button to change the information to the default values.

ARP Inspection VLAN

This window is used to display and configure the ARP inspection VLAN settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection VLAN**, as shown below:

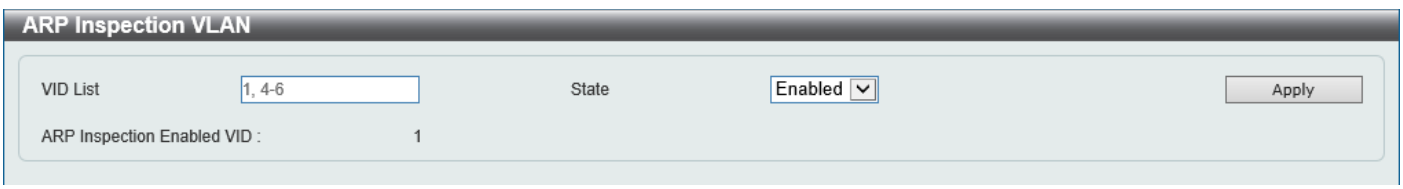


Figure 9-49 ARP Inspection VLAN Window

The fields that can be configured are described below:

Parameter	Description
VID List	Enter the VLAN ID list used here.
State	Select to enable or disable the ARP inspection option's state for the specified VLAN here.

Click the **Apply** button to accept the changes made.

ARP Inspection Statistics

This window is used to view and clear the ARP inspection statistics information.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Statistics**, as shown below:

Figure 9-50 ARP Inspection Statistics Window

The fields that can be configured are described below:

Parameter	Description
VID List	Enter the VLAN ID list used here.

Click the **Clear by VLAN** button to clear the information based on the VLAN ID(s) entered.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

ARP Inspection Log

This window is used to view, configure, and clear the ARP inspection log information.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Log**, as shown below:

Figure 9-51 ARP Inspection Log Window

The fields that can be configured are described below:

Parameter	Description
Log Buffer	Enter the log buffer value used here. The range is from 1 to 1024. By default, this value is 32.

Click the **Apply** button to accept the changes made.

Click the **Clear Log** button to clear the log.

IP Source Guard

IP Source Guard Port Settings

This window is used to display and configure the IP Source Guard (IPSG) port settings.

To view the following window, click **Security > IMPB > IPv4 > IP Source Guard > IP Source Guard Port Settings**, as shown below:

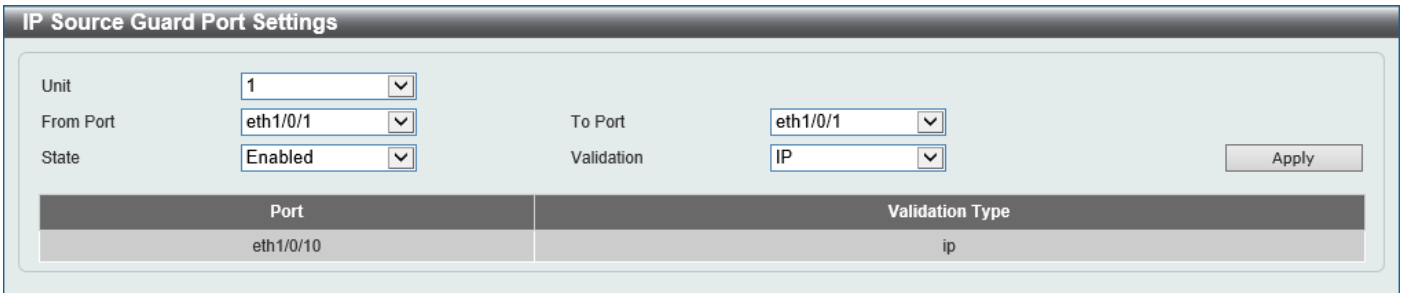


Figure 9-52 IP Source Guard Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the IPSG's state for the specified port(s) here.
Validation	Select the validation method used here. Options to choose from are: • **IP** - Specifies that the IP address of the received packets will be checked. • **IP-MAC** - Specifies that the IP address and the MAC address of the received packets will be checked.

Click the **Apply** button to accept the changes made.

IP Source Guard Binding

This window is used to display and configure the IPSG binding settings.

To view the following window, click **Security > IMPB > IPv4 > IP Source Guard > IP Source Guard Binding**, as shown below:

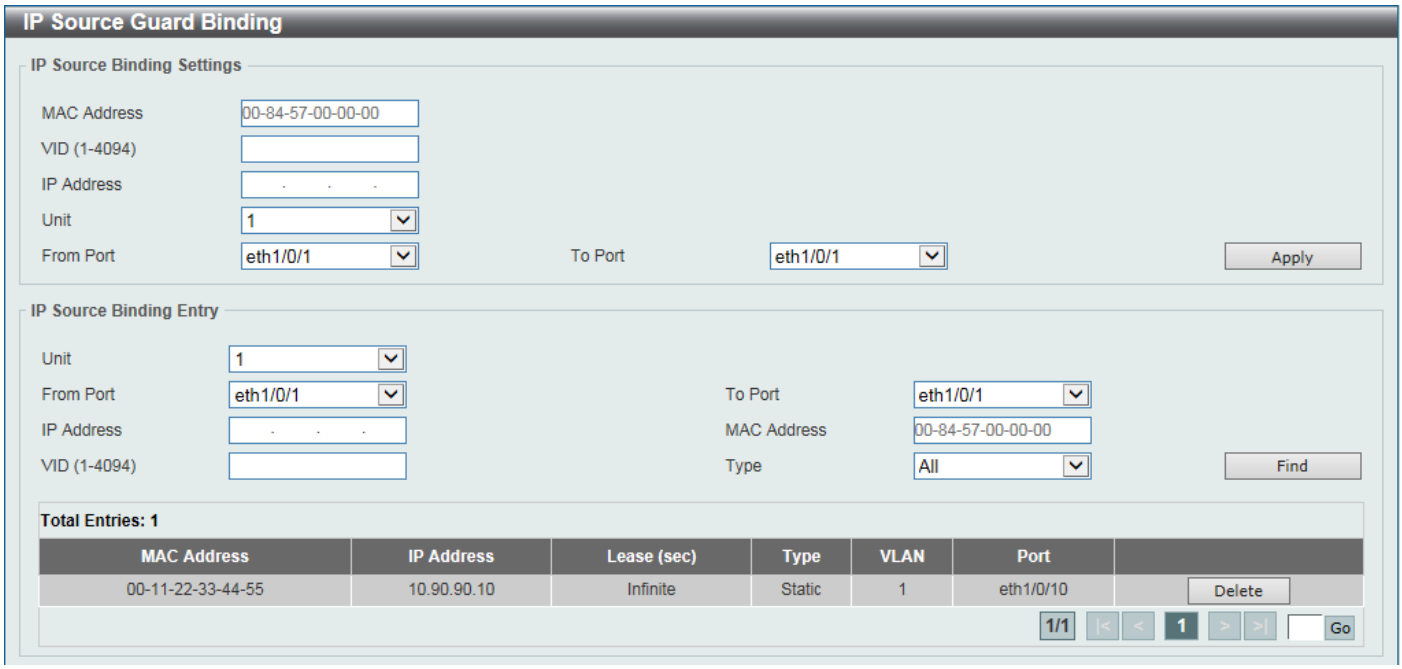


Figure 9-53 IP Source Guard Binding Window

The fields that can be configured in **IP Source Binding Settings** are described below:

Parameter	Description
MAC Address	Enter the MAC address of the binding entry here.
VID	Enter the VLAN ID of the binding entry here.
IP Address	Enter the IP address of the binding entry here.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Source Binding Entry** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this query here.
From Port - To Port	Select the appropriate port range used for the query here.
IP Address	Enter the IP address of the binding entry here.
MAC Address	Enter the MAC address of the binding entry here.
VID	Enter the VLAN ID of the binding entry here.
Type	Select the type of binding entry to find here. Options to choose from are: • **All** - Specifies that all the DHCP binding entries will be displayed. • **DHCP Snooping** - Specifies to display the IP-source guard binding entry learned by DHCP binding snooping. • **Static** - Specifies to display the IP-source guard binding entry that is manually configured.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

IP Source Guard HW Entry

This window is used to view the IPSG hardware entries.

To view the following window, click **Security > IMPB > IPv4 > IP Source Guard > IP Source Guard HW Entry**, as shown below:

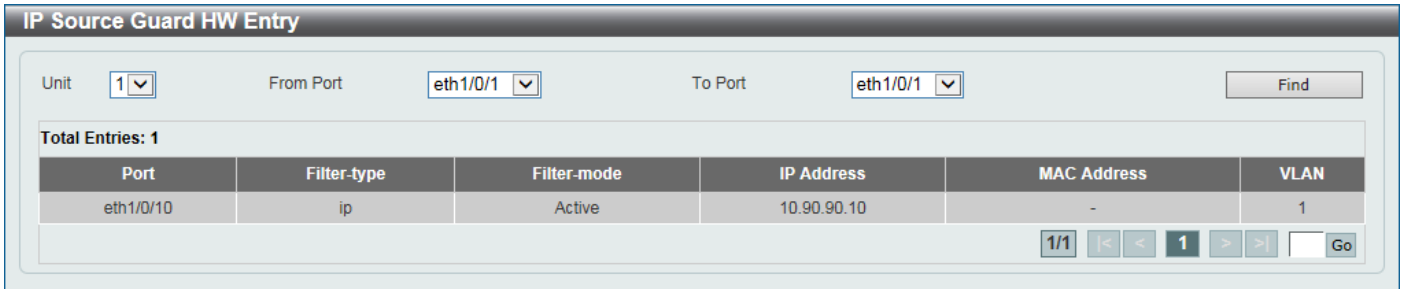


Figure 9-54 IP Source Guard HW Entry Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this query here.
From Port - To Port	Select the appropriate port range used for the query here.

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Advanced Settings

IP-MAC-Port Binding Settings

This window is used to display and configure the IP-MAC-Port binding settings.

To view the following window, click **Security > IMPB > IPv4 > Advanced Settings > IP-MAC-Port Binding Settings**, as shown below:

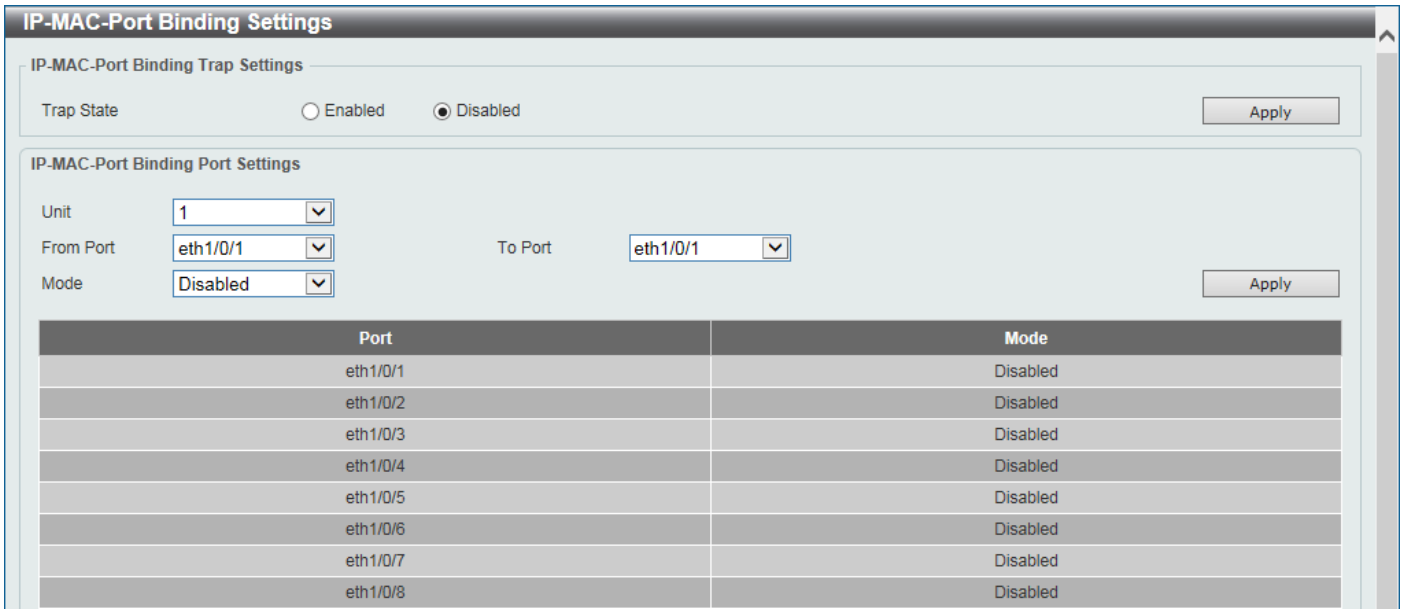


Figure 9-55 IP-MAC-Port Binding Settings Window

The fields that can be configured in **IP-MAC-Port Binding Trap Settings** are described below:

Parameter	Description
Trap State	Select the enable or disable the IP-MAC-Port binding option's trap state.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP-MAC-Port Binding Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Mode	Select the mode of access control that will be used here. Options to choose from are: • **Disabled** - Specifies that IP-MAC-Port binding function is disabled on the specified port(s). • **Strict** - When a port is enabled for IMPB strict-mode access control, a host can only access the port after the host sends ARP or IP packets and the ARP packet or IP packet sent by the host passes the binding check. To pass the binding check, the source IP address, source MAC address, VLAN ID, and arrival port number must match any of the entries defined by either the IPSG static binding entry or the DHCP snooping learned dynamic binding entry. • **Loose** - When a port is enabled for IMPB loose-mode access control, a host will be denied to access the port after the host sends ARP or IP packets and the ARP packet or IP packet sent by the host does not pass the binding check. To pass the binding check, the source IP address, source MAC address, VLAN ID, and arrival port must match any of the entries defined by

Parameter	Description
	either the IPSG static binding entry or the DHCP snooping learned dynamic binding entry.

Click the **Apply** button to accept the changes made.

IP-MAC-Port Binding Blocked Entry

This window is used to view and clear the IP-MAC-Port binding blocked entry table.

To view the following window, click **Security > IMPB > IPv4 > Advanced Settings > IP-MAC-Port Binding Blocked Entry**, as shown below:

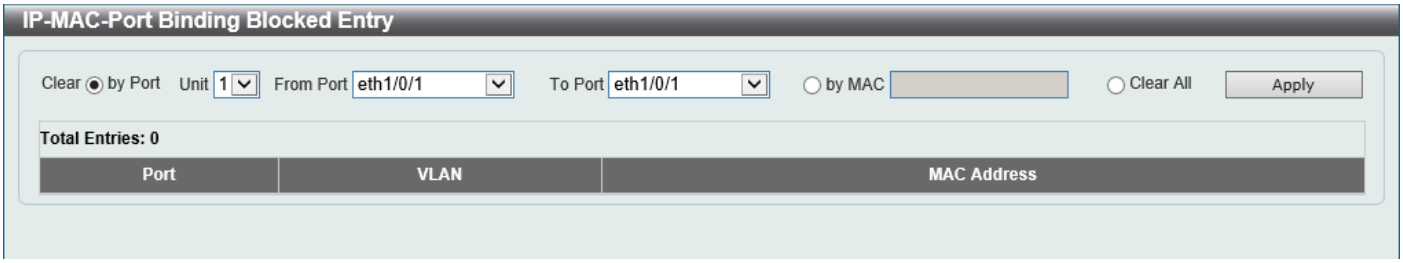


Figure 9-56 IP-MAC-Port Binding Blocked Entry Window

The fields that can be configured are described below:

Parameter	Description
Clear by Port	Select this option to clear the entry table based on the port(s) selected.
Unit	Select the Switch unit that will be clear here.
From Port - To Port	Select the appropriate port range that will be cleared here.
Clear by MAC	Select this option to clear the entry table based on the MAC address entered. Enter the MAC address that will be cleared in the space provided.
Clear All	Select this option to clear all entries that contain MAC addresses.

Click the **Apply** button to accept the changes made.

IPv6

IPv6 Snooping

This window is used to display and configure the IPv6 snooping settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 Snooping** and select the **IPv6 Snooping Policy Settings** tab, as shown below:

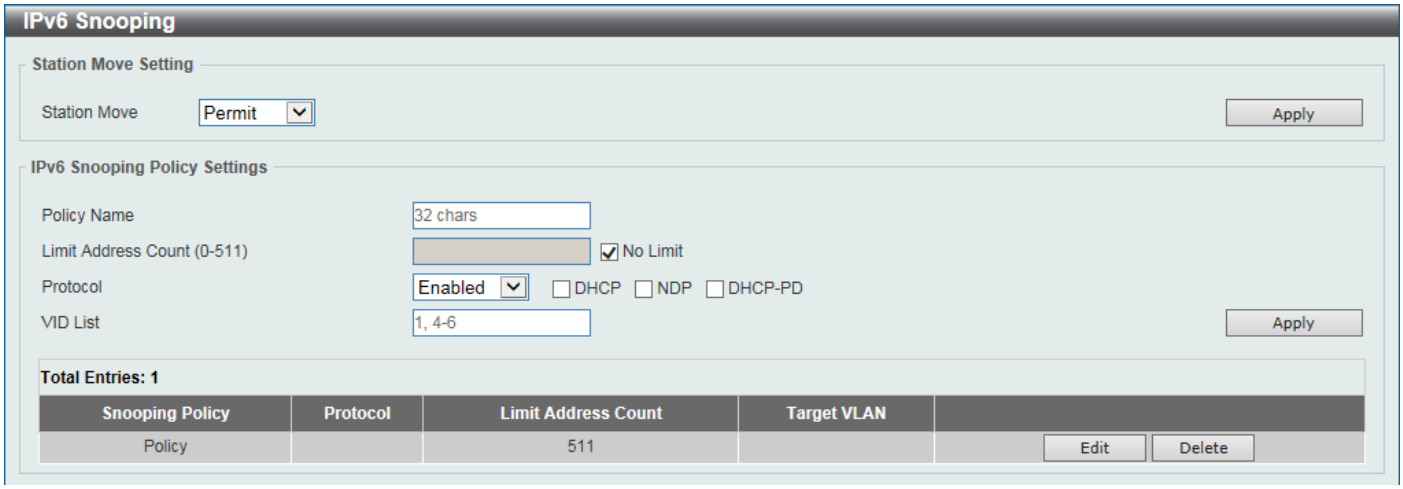


Figure 9-57 IPv6 Snooping Window

The fields that can be configured in **Station Move Setting** are described below:

Parameter	Description
Station Move	Select the station move options here. Options to choose from are **Permit** and **Deny**.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Snooping Policy Settings** are described below:

Parameter	Description
Policy Name	Enter the IPv6 snooping policy name used here. This name can be up to 32 characters long.
Limit Address Count	Enter the address count limit value used here. The range is from 0 to 511. By default, this value is 511. Select the **No Limit** option to use the default value.
Protocol	Select the protocol state here. Options to choose from are: • **DHCP** - Specifies that addresses should be snooped in DHCPv6 packets. • **NDP** - Specifies that addresses should be snooped in NDP packets. • **DHCP-PD** - Specified that IPv6 prefix should be snooped in DHCPv6 PD packets. DHCPv6 snooping sniffs the DHCPv6 packets sent between the DHCPv6 client and server in the address assigning procedure. When a DHCPv6 client successfully got a valid IPv6 address, DHCPv6 snooping creates its binding database. ND Snooping is designed for a stateless auto-configuration assigned IPv6 address and manually configured IPv6 address. Before assigning an IPv6 address, the host must perform Duplicate Address Detection first. ND snooping detects DAD messages (DAD Neighbor Solicitation (NS) and DAD Neighbor Advertisement (NA)) to build its binding database. The NDP packet (NS and NA) is also used to

Parameter	Description
	detect whether a host is still reachable and determine whether to delete a binding or not. DHCP-PD snooping performs DHCPv6 snooping of Prefix Delegation (PD) to setup bindings between the Delegating Router (assigned with an IPv6 prefix) and the corresponding Requesting Router. The bindings can be used to validate the source prefix in the packets.
VID List	Enter the VLAN ID list used here.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

IPv6 ND Inspection

This window is used to display and configure the IPv6 ND inspection settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 ND Inspection**, as shown below:

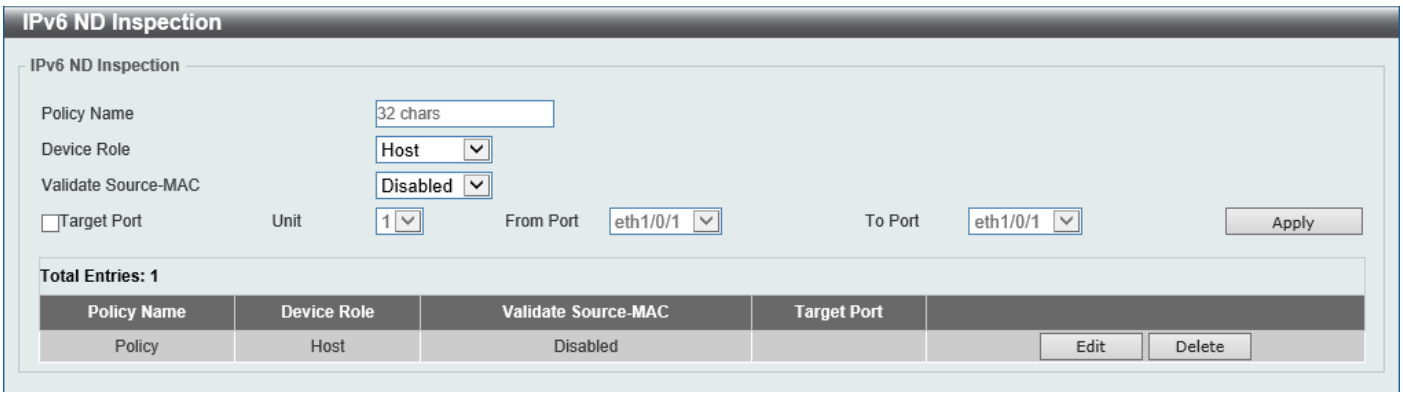


Figure 9-58 IPv6 ND Inspection Window

The fields that can be configured are described below:

Parameter	Description
Policy Name	Enter the policy name used here. This name can be up to 32 characters long.
Device Role	Select the device role here. Options to choose from are **Host** and **Router**. By default, the device's role is set as host and inspection for NS and NA messages are performed. If the device role is set as router, the NS and NA inspection is not performed. When performing NS/NA inspection, the message will be verified against the dynamic binding table learned from the ND protocol or from the DHCP.
Validate Source-MAC	Select to enable or disable the validation of the source MAC address option here. When the Switch receives an ND message that contains a link-layer address, the source MAC address is checked against the link-layer address. The packet will be dropped if the link-layer address and the MAC addresses are different from each other.
Target Port	Tick this option to specify the target port.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

IPv6 RA Guard

This window is used to display and configure the IPv6 Router Advertisement (RA) guard settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 RA Guard**, as shown below:

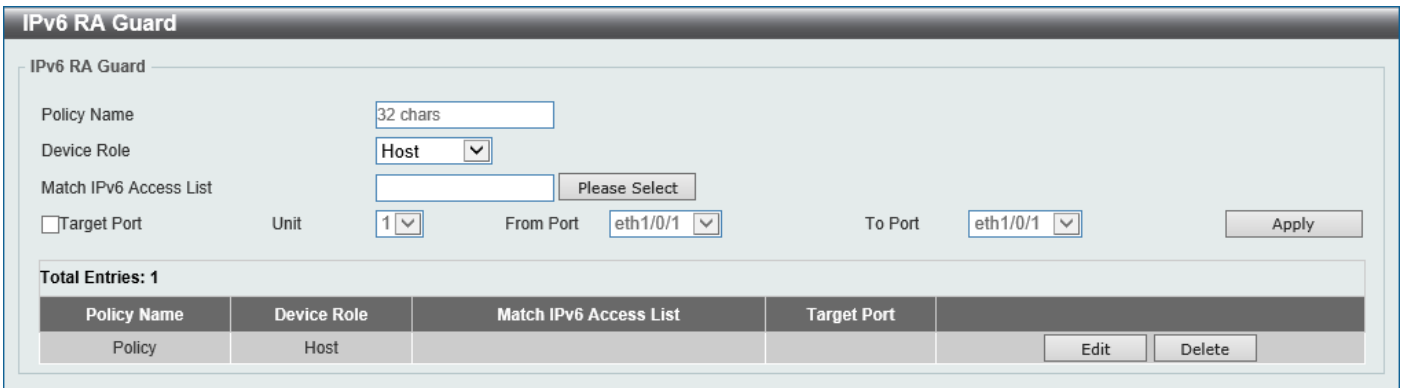


Figure 9-59 IPv6 RA Guard Window

The fields that can be configured are described below:

Parameter	Description
Policy Name	Enter the policy name here. This name can be up to 32 characters long.
Device Role	Select the device role here. Options to choose from are **Host** and **Router**. By default, the device's role is **Host**, which will block all the RA packets. If the device's role is **Router**, RA packets will be forwarded according to the port's bound ACL.
Match IPv6 Access List	Enter or select the IPv6 access list to match here. Click the **Please Select** button to select an existing ACL from the list.
Target Port	Tick this option to specify the target port.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

After clicking the **Please Select** button, the following window will appear:

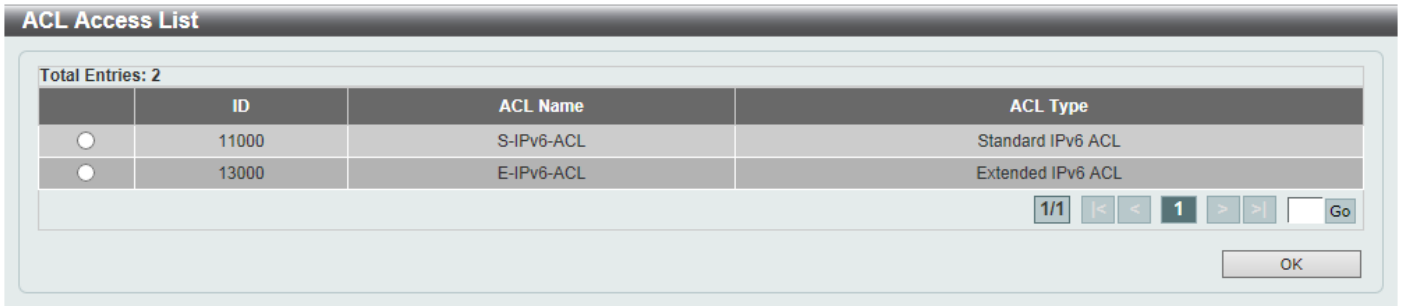


Figure 9-60 ACL Access List Window

Select the radio button next to the entry to use that ACL in the configuration.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **OK** button to accept the selection made.

IPv6 DHCP Guard

This window is used to display and configure the IPv6 DHCP guard settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 DHCP Guard**, as shown below:

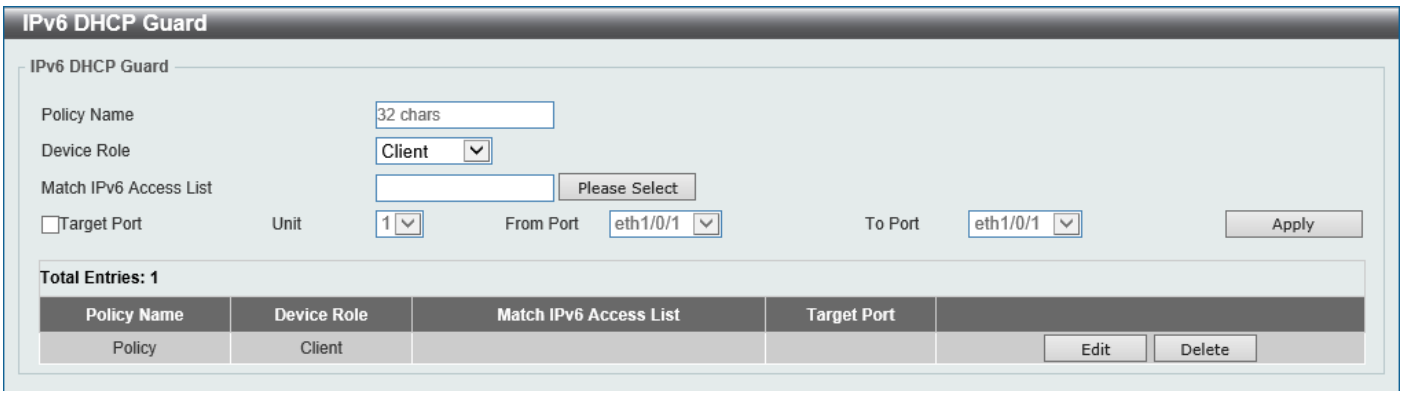


Figure 9-61 IPv6 DHCP Guard Window

The fields that can be configured are described below:

Parameter	Description
Policy Name	Enter the policy name here. This name can be up to 32 characters long.
Device Role	Select the device role here. Options to choose from are: • **Client** - Specifies to block all the DHCPv6 packets from the DHCPv6 server. • **Server** - Specifies that DHCPv6 Server packets will be forwarded according to the port's bound ACL.
Match IPv6 Access List	Enter or select the IPv6 access list to match here. Click the **Please Select** button to select an existing ACL from the list.
Target Port	Tick this option to specify the target port.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

After clicking the **Please Select** button, the following window will appear:

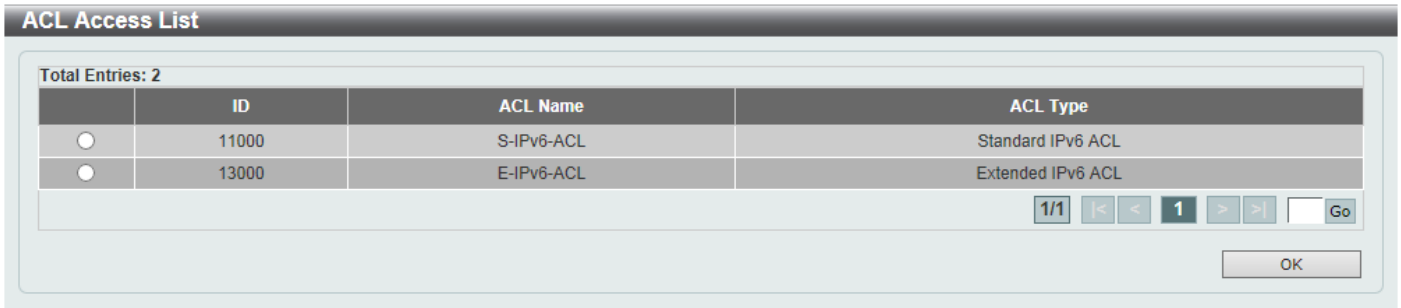


Figure 9-62 ACL Access List Window

Select the radio button next to the entry to use that ACL in the configuration.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **OK** button to accept the selection made.

IPv6 Source Guard

IPv6 Source Guard Settings

This window is used to display and configure the IPv6 source guard settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 Source Guard > IPv6 Source Guard Settings**, as shown below:

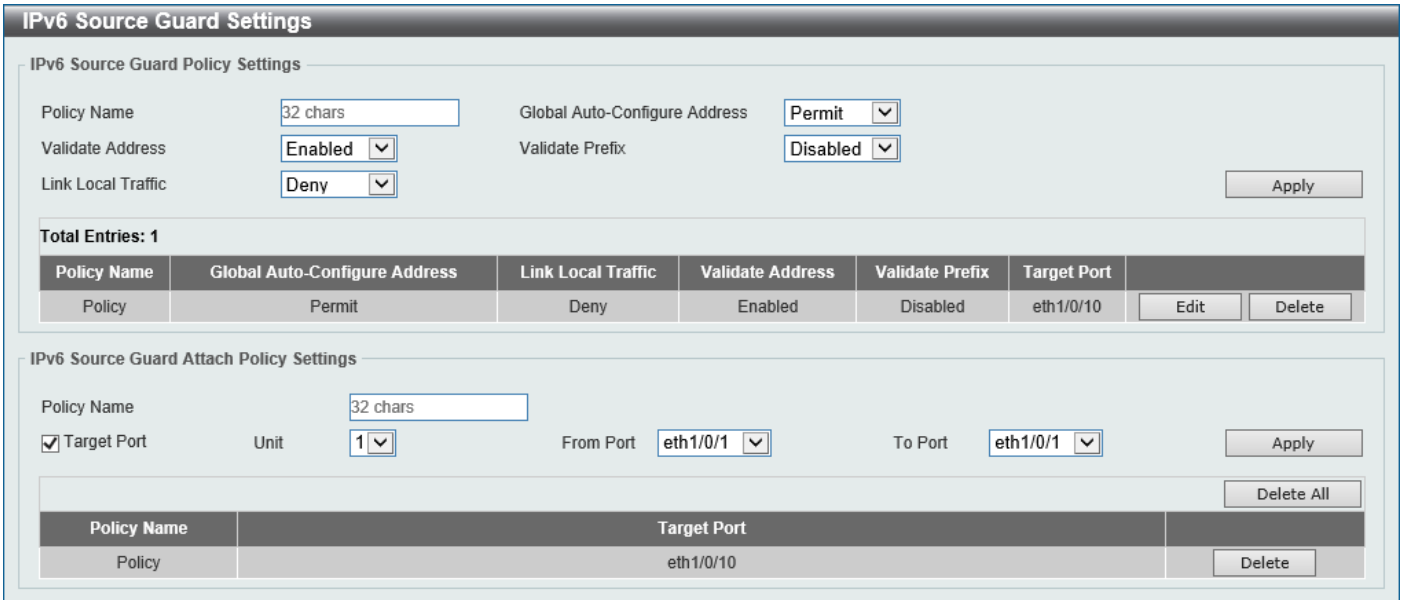


Figure 9-63 IPv6 Source Guard Settings Window

The fields that can be configured in **IPv6 Source Guard Policy Settings** are described below:

Parameter	Description
Policy Name	Enter the policy name here. This name can be up to 32 characters long.
Global Auto-Configure Address	Select to permit of deny data traffic from the auto-configured global address. It is useful when all global addresses on a link are assigned by DHCP and the administrator that wants to block hosts with self-configured addresses from sending traffic.
Validate Address	Select to enable or disable the validate address feature here. This is used to enable the IPv6 source guard to perform the validate address feature.
Validate Prefix	Select to enable or disable the validate prefix feature here. This is used to enable the IPv6 source guard to perform the IPv6 prefix-guard operation.
Link Local Traffic	Select to permit of deny hardware permitted data traffic send by the link-local address.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

The fields that can be configured in **IPv6 Source Guard Attach Policy Settings** are described below:

Parameter	Description
Policy Name	Enter the policy name here. This name can be up to 32 characters long.

Parameter	Description
Target Port	Select this option to specify the target port.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to remove all the entries.

Click the **Delete** button to remove the specified entry.

IPv6 Neighbor Binding

This window is used to display and configure the IPv6 neighbor binding settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 Source Guard > IPv6 Neighbor Binding**, as shown below:

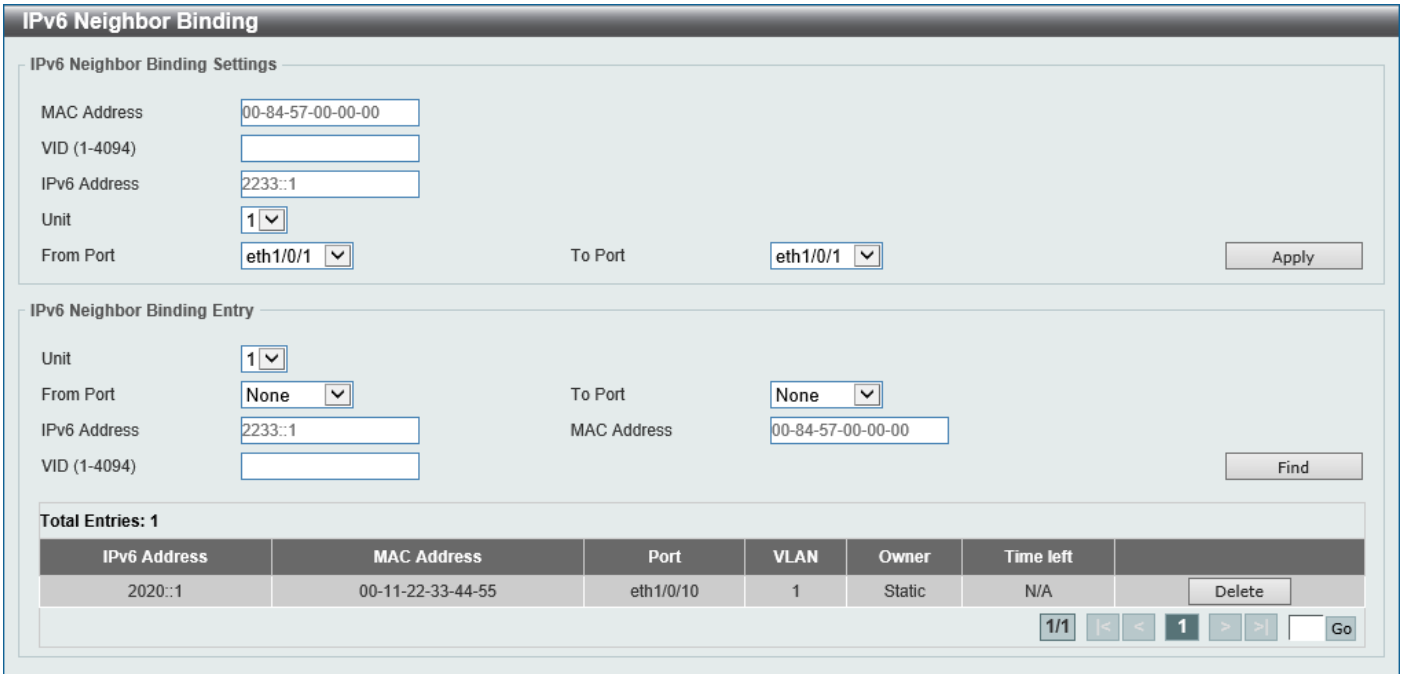


Figure 9-64 IPv6 Neighbor Binding Window

The fields that can be configured in **IPv6 Neighbor Binding Settings** are described below:

Parameter	Description
MAC Address	Enter the MAC address used here.
VID	Enter the VLAN ID used here. The range is from 1 to 4094.
IPv6 Address	Enter the IPv6 address used here.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Neighbor Binding Entry** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this search here.

Parameter	Description
From Port - To Port	Select the appropriate port range used for the search here.
IPv6 Address	Enter the IPv6 address to find here.
MAC Address	Enter the MAC address to find here.
VID	Enter the VLAN ID to find here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DHCP Server Screening

This function allows users to not only to restrict all DHCP server packets but also to receive any specified DHCP server packet by any specified DHCP client. It is useful when one or more DHCP servers are present on the network and both provide DHCP services to different distinct groups of clients.

When the DHCP Server Screening function is enabled on a port, all DHCP server packets received on this ports will be redirected to the CPU for a software-based check. Legal DHCP server packets will be forwarded out and illegal DHCP server packets will be dropped. When DHCP Server Screening function is enabled, all DHCP server packets will be filtered from a specific port.

DHCP Server Screening Global Settings

This window is used to display and configure the global DHCP server screening settings.

To view the following window, click **Security > DHCP Server Screening > DHCP Server Screening Global Settings**, as shown below:

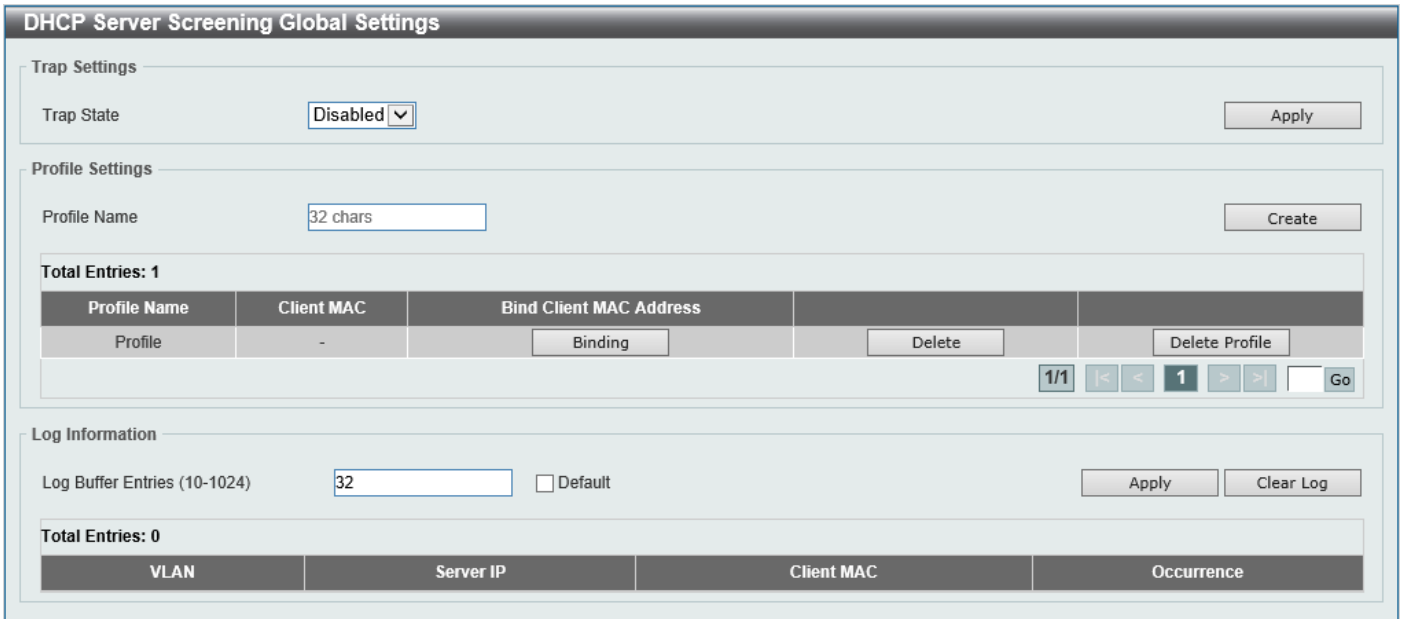


Figure 9-65 DHCP Server Screening Global Settings Window

The fields that can be configured in **Trap Settings** are described below:

Parameter	Description
Trap State	Select to enable or disable the DHCP server-screening trap here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Profile Settings** are described below:

Parameter	Description
Profile Name	Enter the DHCP server screening profile name here. This name can be up to 32 characters long.

Click the **Create** button to create a new profile.

Click the **Binding** button to configure the client MAC address in the profile.

Click the **Delete** button to remove the specified entry.

Click the **Delete Profile** button to remove the specified profile.

The fields that can be configured in **Log Information** are described below:

Parameter	Description
Log Buffer Entries	Enter the logged buffer entries value here. The range is from 10 to 1024. By default, this value is 32. Select the **Default** option to use the default value.

Click the **Apply** button to accept the changes made.

Click the **Clear Log** button to clear the log.

After clicking the **Binding** button, the following window will appear:

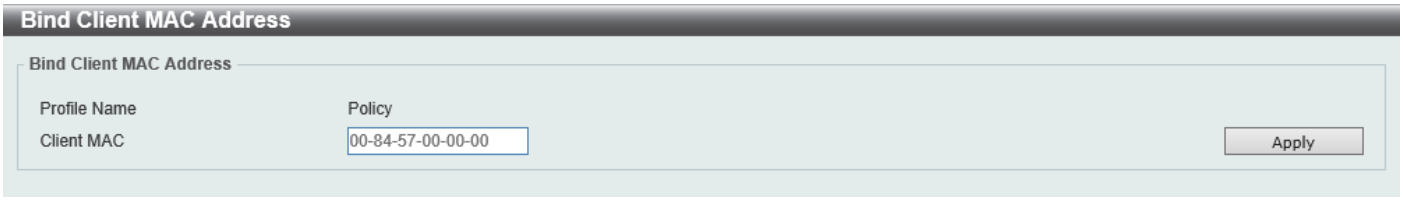


Figure 9-66 Bind Client MAC Address Window

The fields that can be configured are described below:

Parameter	Description
Client MAC	Enter the MAC address used here.

Click the **Apply** button to accept the changes made.

DHCP Server Screening Port Settings

This window is used to display and configure the DHCP server screening port settings.

To view the following window, click **Security > DHCP Server Screening > DHCP Server Screening Port Settings**, as shown below:

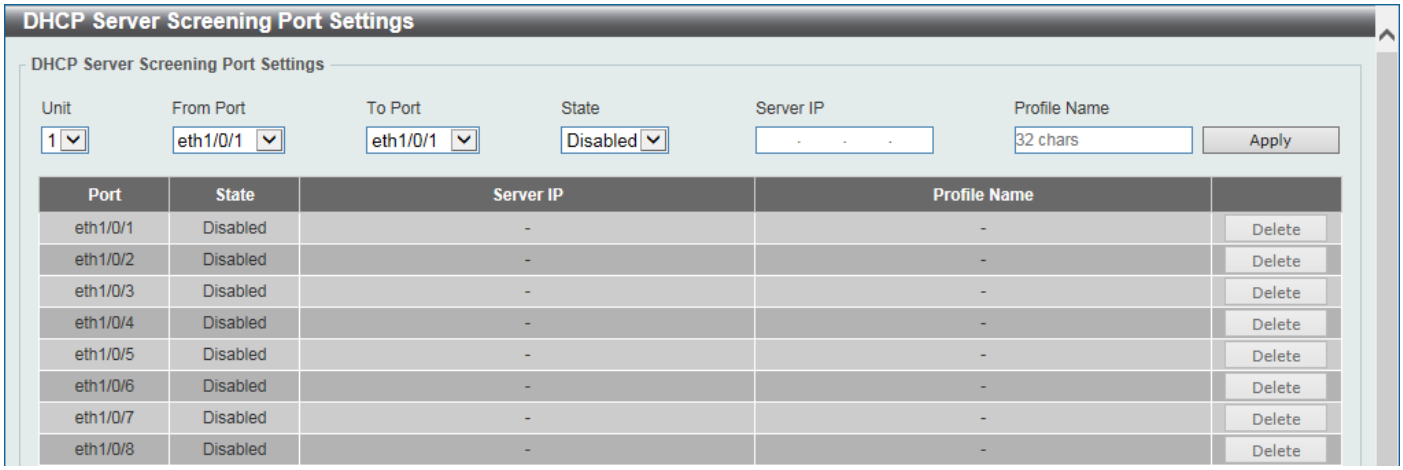


Figure 9-67 DHCP Server Screening Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the DHCP server screening function on the port(s) specified.
Server IP	Enter the DHCP server IP address here.
Profile Name	Enter the DHCP server screening profile that will be used for the port(s) specified here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

ARP Spoofing Prevention

This window is used to display and configure the ARP spoofing prevention settings. When an entry is created, ARP packets whose sender IP address matches the gateway IP address, of an entry, but its sender MAC address field does not match the gateway MAC address, of the entry, will be dropped by the system. The ASP will bypass the ARP packets whose sender IP address doesn't match the configured gateway IP address.

If an ARP address matches a configured gateway's IP address, MAC address, and port list, then bypass the Dynamic ARP Inspection (DAI) check no matter if the receiving port is ARP trusted or untrusted.

To view the following window, click **Security > ARP Spoofing Prevention**, as shown below:

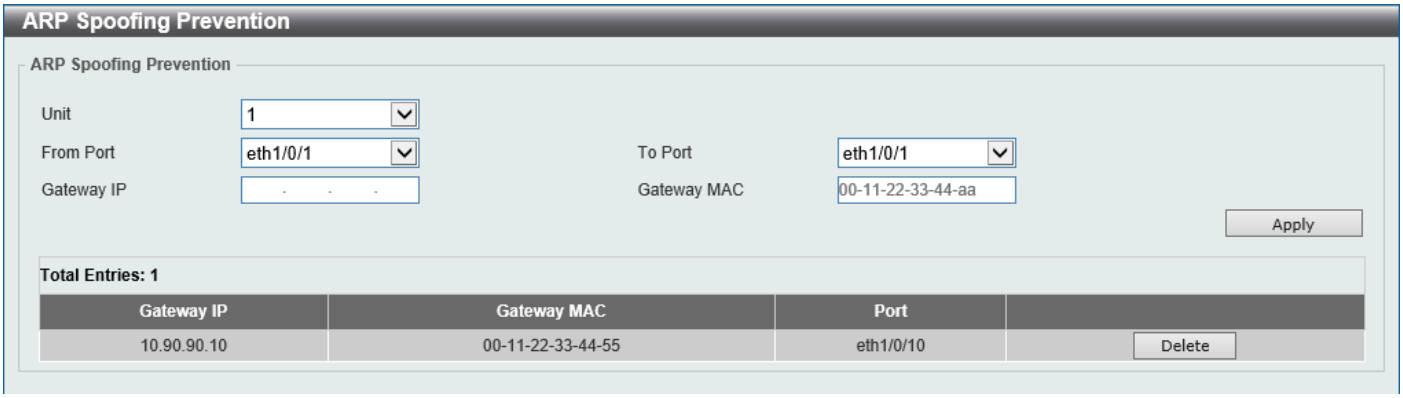


Figure 9-68 ARP Spoofing Prevention Window

The fields that can be configured in **ARP Spoofing Prevention** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Gateway IP	Enter the gateway IP address used here.
Gateway MAC	Enter the gateway MAC address used here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

BPDU Attack Protection

This window is used to display and configure the BPDU attack protection settings. In generally, there are two states in the BPDU attack protection function. One is normal state, and another is under attack state. The under attack state has three modes: drop, block, and shutdown. A BPDU protection enabled port will enter an under attack state when it receives one STP BPDU packet and it will take action based on the configuration.

BPDU protection has a higher priority than the (Forward BPDU) FBPDU setting configured by configure STP command in the determination of BPDU handling. That is, when FBPDU is configured to forward STP BPDU but BPDU protection is enabled, then the port will not forward STP BPDU.

BPDU protection also has a higher priority than the BPDU tunnel port setting in determination of BPDU handling. That is, when a port is configured as BPDU tunnel port for STP, it will forward STP BPDU. However, if the port is BPDU protection enabled. Then the port will not forward STP BPDU.

To view the following window, click **Security > BPDU Attack Protection**, as shown below:

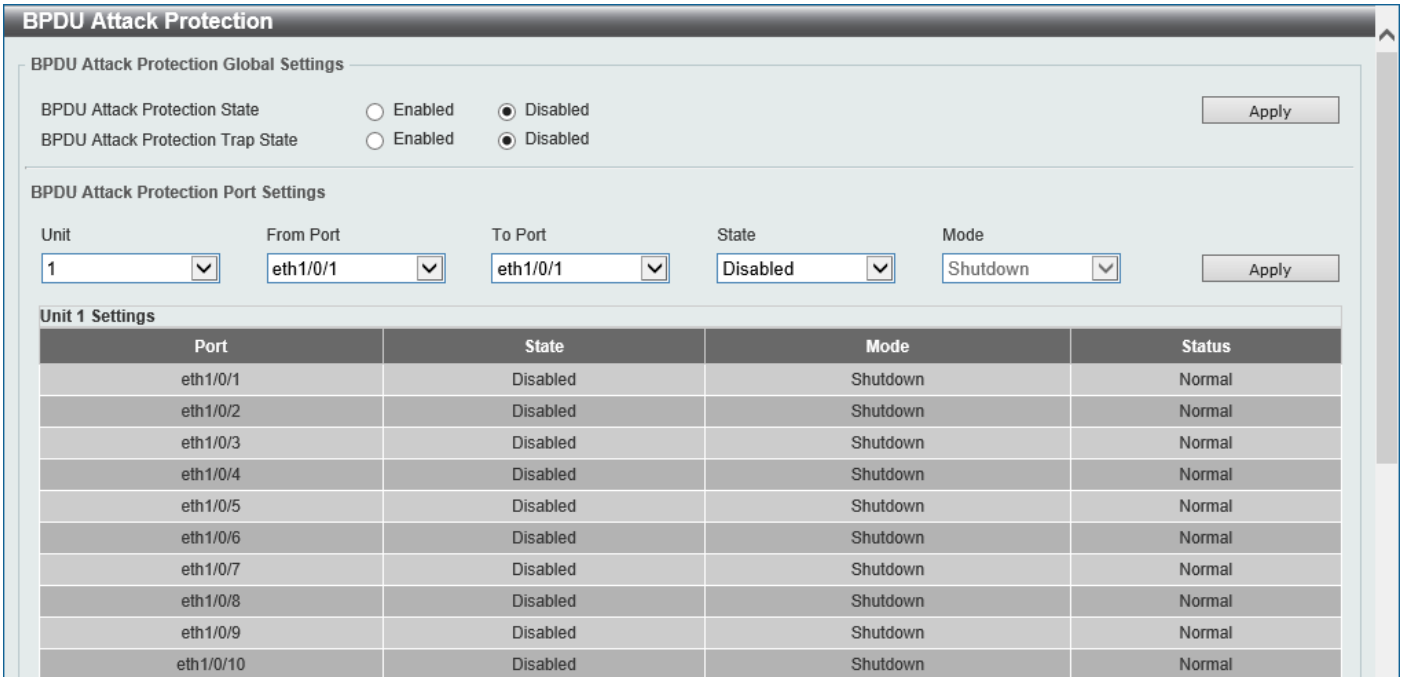


Figure 9-69 BPDU Attack Protection Window

The fields that can be configured in **BPDU Attack Protection Global Settings** are described below:

Parameter	Description
BPDU Attack Protection State	Select to enable or disable the global BPDU attack protection state here.
BPDU Attack Protection Trap State	Select to enable or disable the BPDU attack protection trap state here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **BPDU Attack Protection Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the BPDU attack protection state on the specified ports.
Mode	Select the BPDU attack protection mode that will be applied to the specified ports. Options to choose from are: • **Drop** - Drop all received BPDU packets when the port enters under attack state. • **Block** - Drop all packets (include BPDU and normal packets) when the port enters under attack state. • **Shutdown** - Shut down the port when the port enters under attack state.

Click the **Apply** button to accept the changes made.

NetBIOS Filtering

This window is used to display and configure the NetBIOS filtering settings.

To view the following window, click **Security > NetBIOS Filtering**, as shown below:

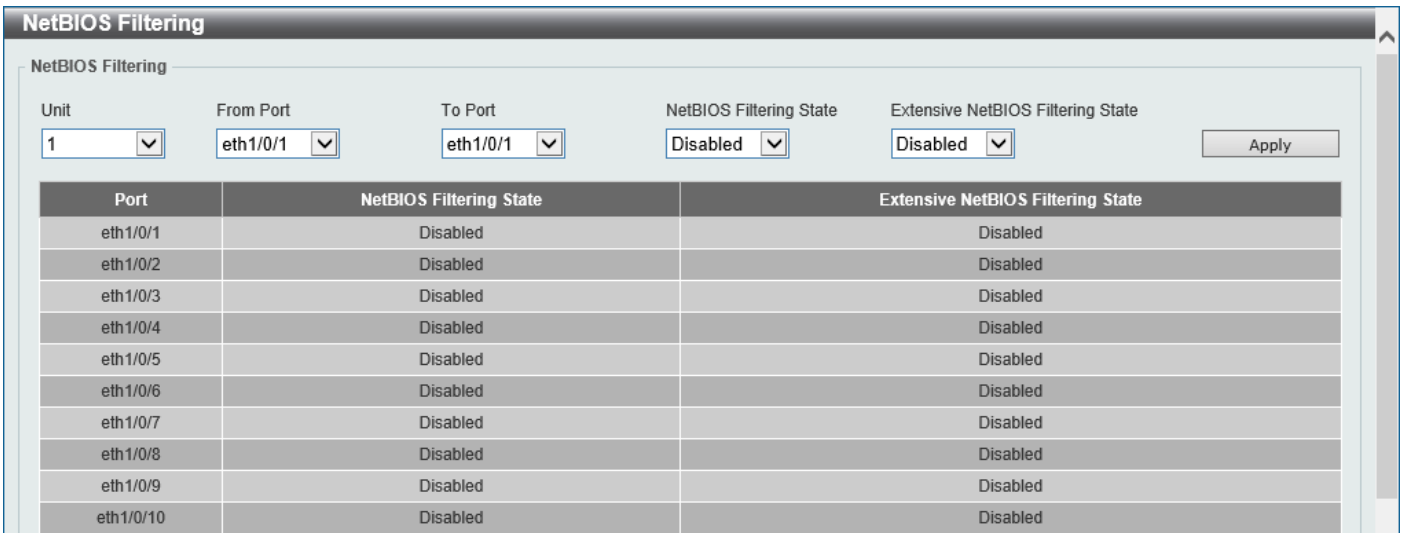


Figure 9-70 NetBIOS Filtering Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here.
NetBIOS Filtering State	Select to enable or disable the NetBIOS filtering state on the specified ports. This is used to permit or deny NetBIOS packets on physical ports.
Extensive NetBIOS Filtering State	Select to enable or disable the extensive NetBIOS filtering state on the specified ports. This is used to permit or deny NetBIOS packets over 802.3 frames on physical ports.

Click the **Apply** button to accept the changes made.

MAC Authentication

This window is used to display and configure the MAC authentication settings. MAC authentication is a feature designed to authenticate a user by MAC address when the user is trying to access the network via the Switch. The

Switch itself can perform the authentication based on a local database or be a RADIUS client and perform the authentication process via the RADIUS protocol with a remote RADIUS server.

To view the following window, click **Security > MAC Authentication**, as shown below:

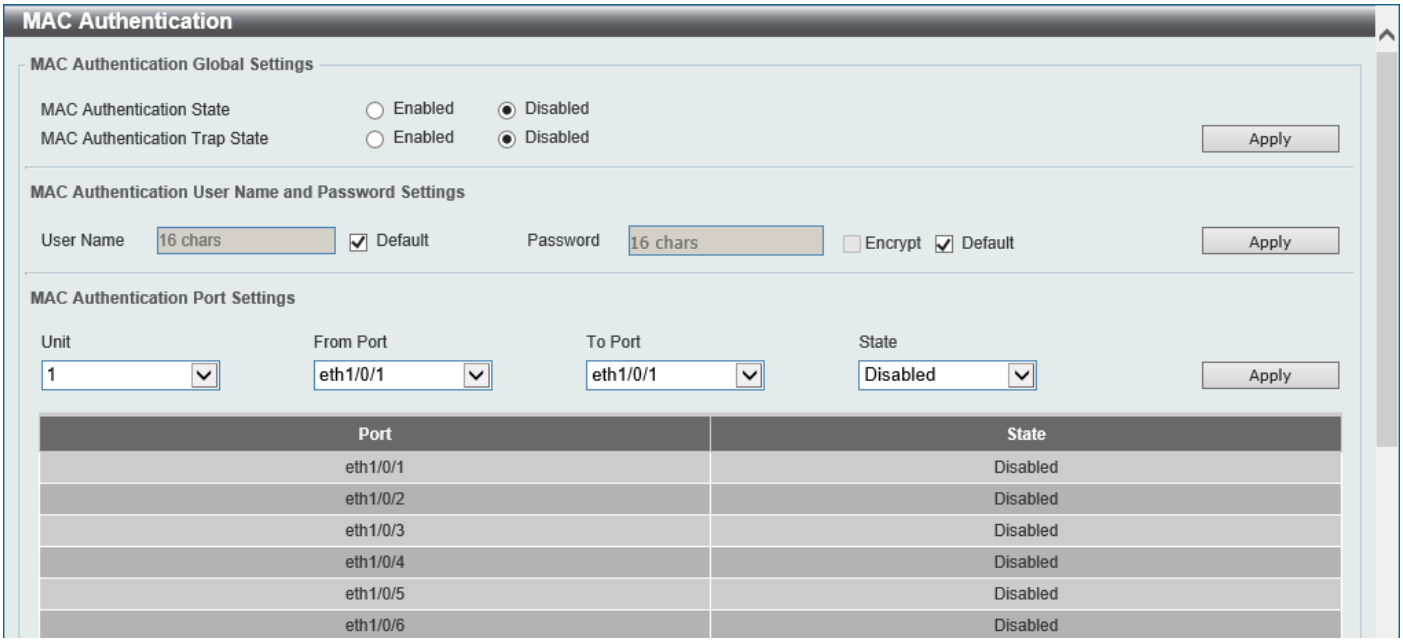


Figure 9-71 MAC Authentication Window

The fields that can be configured in **MAC Authentication Global Settings** are described below:

Parameter	Description
MAC Authentication State	Select to enable or disable the global MAC authentication state.
MAC Authentication Trap State	Select to enable or disable the MAC authentication trap state.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MAC Authentication User Name and Password Settings** are described below:

Parameter	Description
User Name	Enter the username used for MAC authentication here. This name can be up to 16 characters long. Select the **Default** option to restore the username to the client MAC address here.
Password	Enter the password used for MAC authentication here. Select the **Encrypt** option save this password in the encrypted form. Select the **Default** option to restore the password to the client MAC address here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MAC Authentication Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable MAC authentication for the port(s) specified here.

Click the **Apply** button to accept the changes made.

Web-based Access Control

Web-based Access Control (WAC) is a feature designed to authenticate a user when the user is trying to access the Internet via the Switch. The authentication process uses the HTTP or HTTPS protocol. The Switch enters the authenticating stage when users attempt to browse Web pages (e.g., http://www.dlink.com) through a Web browser. When the Switch detects HTTP or HTTPS packets and this port is unauthenticated, the Switch will launch a pop-up user name and password window to query users. Users are not able to access the Internet until the authentication process is passed.

The Switch can be the authentication server itself and do the authentication based on a local database, or be a RADIUS client and perform the authentication process via the RADIUS protocol with a remote RADIUS server. The client user initiates the authentication process of WAC by attempting to gain Web access.

D-Link's implementation of WAC uses a virtual IP that is exclusively used by the WAC function and is not known by any other modules of the Switch. In fact, to avoid affecting a Switch's other features, WAC will only use a virtual IP address to communicate with hosts. Thus, all authentication requests must be sent to a virtual IP address but not to the IP address of the Switch's physical interface.

Virtual IP works like this, when a host PC communicates with the WAC Switch through a virtual IP, the virtual IP is transformed into the physical IPIF (IP interface) address of the Switch to make the communication possible. The host PC and other servers' IP configurations do not depend on the virtual IP of WAC. The virtual IP does not respond to any ICMP packets or ARP requests, which means it is not allowed to configure a virtual IP on the same subnet as the Switch's IPIF (IP interface) or the same subnet as the host PCs' subnet.

As all packets to a virtual IP from authenticated and authenticating hosts will be trapped to the Switch's CPU, if the virtual IP is the same as other servers or PCs, the hosts on the WAC-enabled ports cannot communicate with the server or PC, which really own the IP address. If the hosts need to access the server or PC, the virtual IP cannot be the same as the one of the server or PC. If a host PC uses a proxy to access the Web, to make the authentication work properly the user of the PC should add the virtual IP to the exception of the proxy configuration. If the virtual IP is not configured, then access cannot start Web authentication.

The Switch's implementation of WAC features a user-defined port number that allows the configuration of the TCP port for either the HTTP or HTTPS protocols. This TCP port for HTTP or HTTPs is used to identify the HTTP or HTTPs packets that will be trapped to the CPU for authentication processing, or to access the login page. By default, HTTP is used. By default, the HTTP port number is 80, and HTTPS port number is 443.

The following diagram illustrates the basic six steps all parties go through in a successful Web Authentication process:

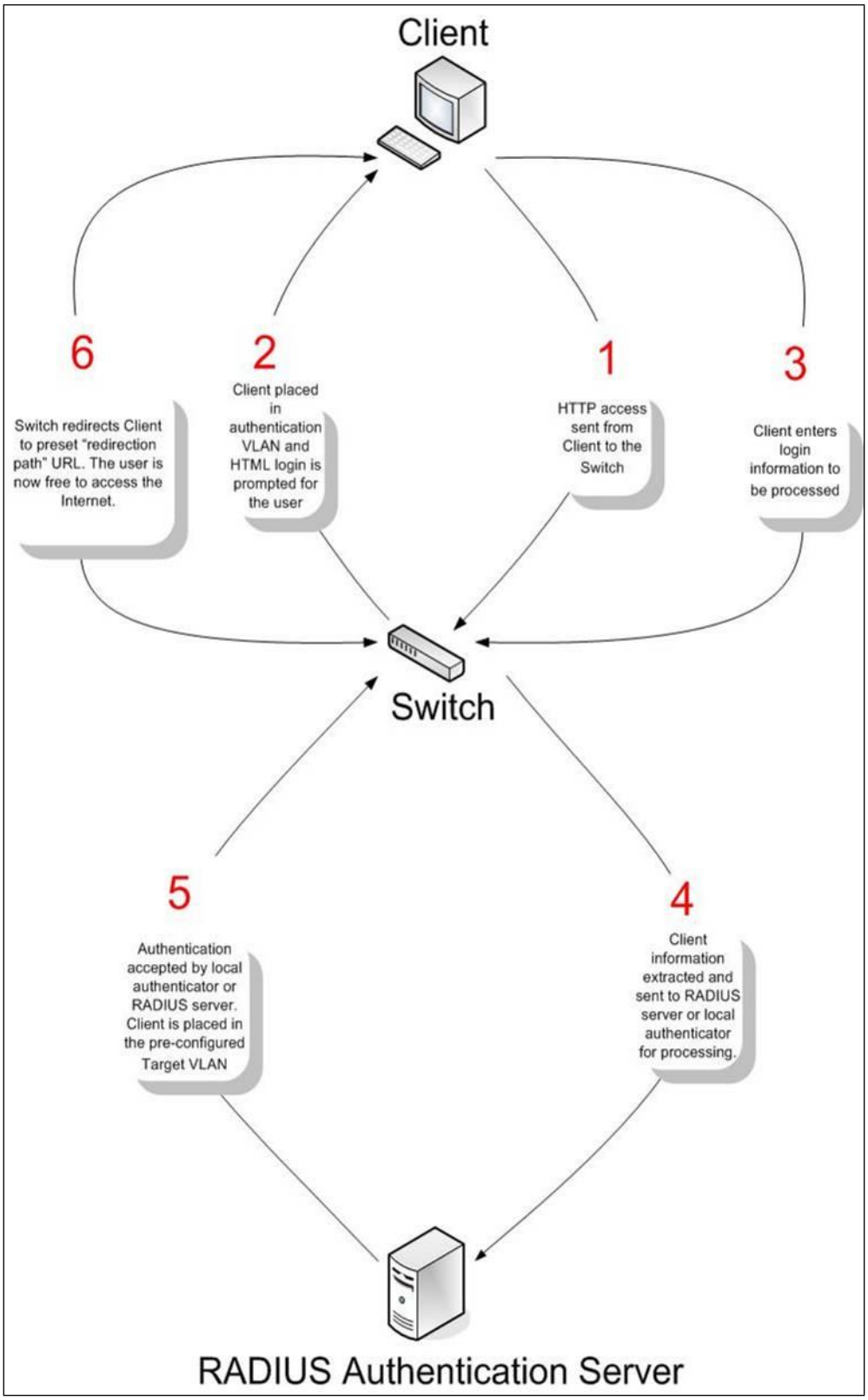


Figure 9-72 RADIUS Authentication Server

Conditions and Limitations

- If the client is utilizing DHCP to attain an IP address, the authenticating VLAN must provide a DHCP server or a DHCP relay function so that client may obtain an IP address.
- Certain functions exist on the Switch that will filter HTTP packets, such as the ACL function. The user needs to be very careful when setting filter functions for the target VLAN, so that these HTTP packets are not denied by the Switch.

- If a RADIUS server is to be used for authentication, the user must first establish a RADIUS Server with the appropriate parameters, including the target VLAN, before enabling Web Authentication on the Switch.

Web Authentication

This window is used to display and configure the Web authentication settings.

To view the following window, click **Security > Web-based Access Control > Web Authentication**, as shown below:

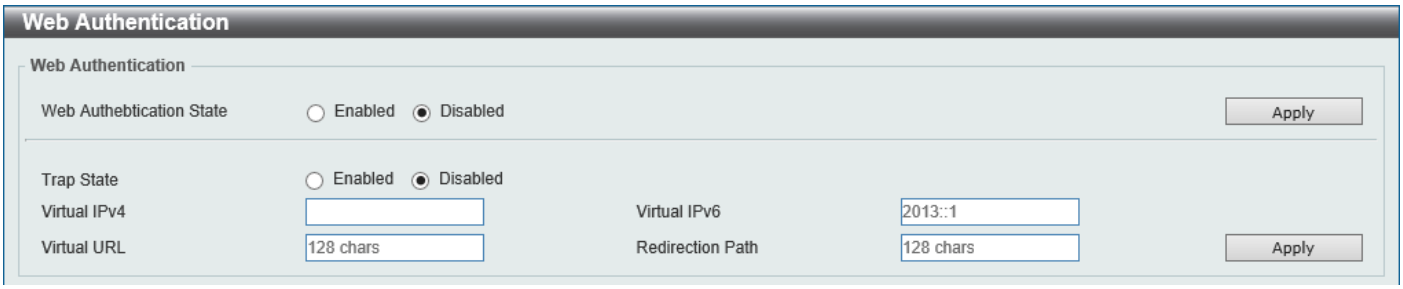


Figure 9-73 Web Authentication Window

The fields that can be configured are described below:

Parameter	Description
Web Authentication State	Select to enable or disable the global Web authentication state.
Trap State	Select to enable or disable the Web authentication trap state.
Virtual IPv4	Enter the virtual IPv4 address used here. The virtual IP of Web authentication is just the characterization of the Web authentication function on the Switch. All Web authentication processes communicate with this IP address, however, the virtual IP does not respond to any ICMP packet or ARP request. Therefore, it's not allowed to configure virtual IP in the same subnet as the Switch's IP interface or the same subnet as the host PCs' subnet, otherwise the Web authentication cannot operate correctly. The defined URL only takes effect when the virtual IP address is configured. The users get the FQDN URL stored on the DNS server to get the virtual IP address. The obtained IP address must match the virtual IP address configured by the command. If the IPv4 virtual IP is not configured, the IPv4 access cannot start a Web authentication.
Virtual IPv6	Enter the virtual IPv6 address used here. If the IPv6 virtual IP is not configured, the IPv6 access cannot start a Web authentication.
Virtual URL	Enter the virtual URL used here. This URL can be up to 128 characters long.
Redirection Path	Enter the redirection path here. This path can be up to 128 characters long.

Click the **Apply** button to accept the changes made.

NOTE: The WAC virtual IP address should be configured before enabling WAC because WAC will not function correctly if the virtual IP is not configured.

WAC Port Settings

This window is used to display and configure the WAC port settings.

To view the following window, click **Security > Web-based Access Control > WAC Port Settings**, as shown below:

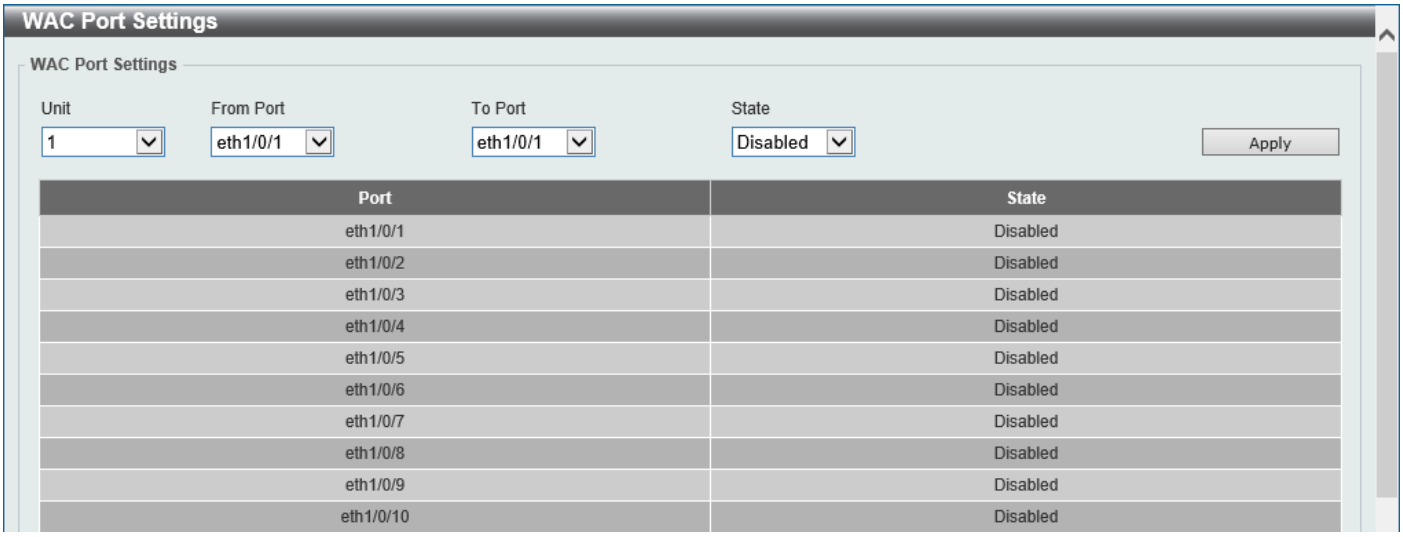


Figure 9-74 WAC Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the WAC feature on the port(s) specified.

Click the **Apply** button to accept the changes made.

WAC Customize Page

This window is used to display and configure the WAC customized login page.

To view the following window, click **Security > Web-based Access Control > WAC Customize Page**, as shown below:

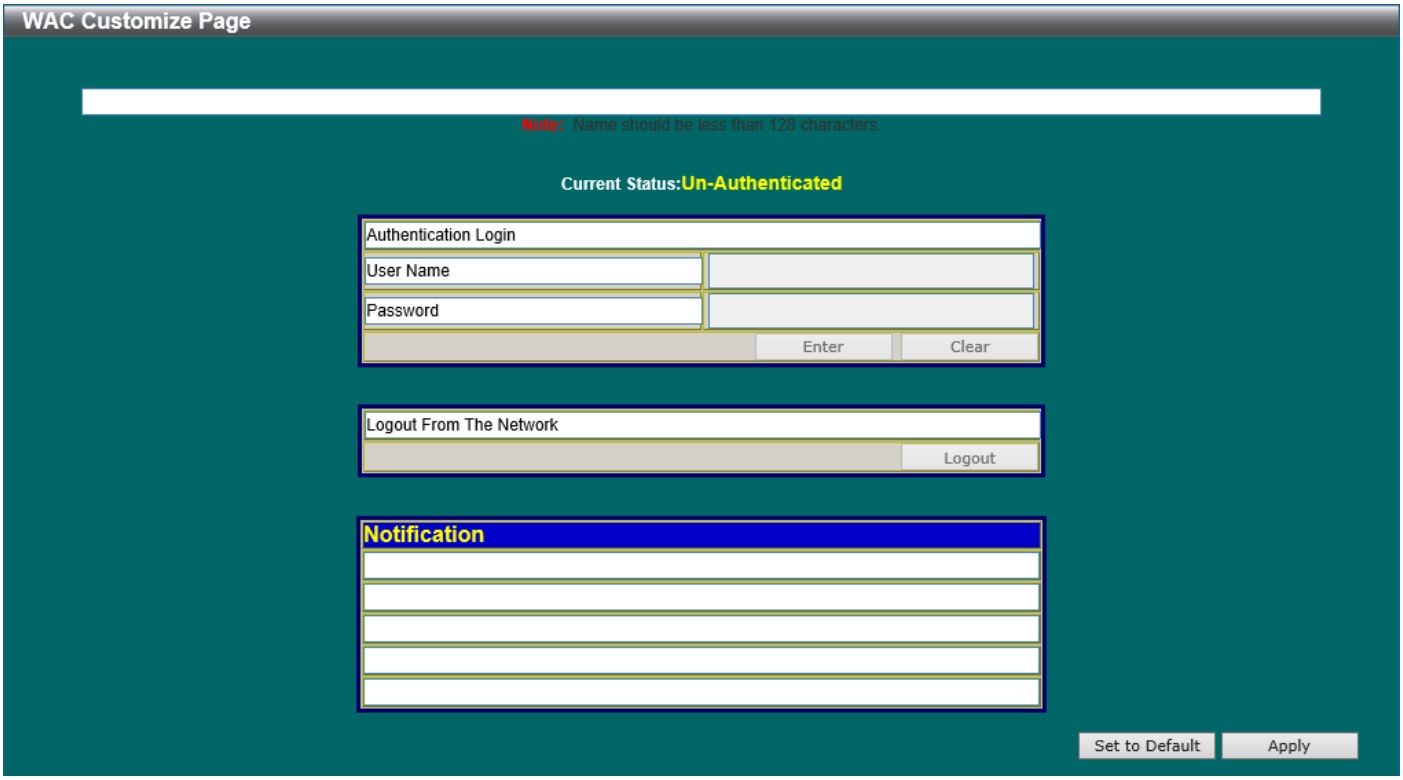


Figure 9-75 WAC Customize Page Window

The fields that can be configured are described below:

Parameter	Description
Page Title	Enter a custom page title message here. This message can be up to 128 characters long.
Login Window Title	Enter a custom login window title here. This title can be up to 64 characters long.
User Name Title	Enter a custom username title here. This title can be up to 32 characters long.
Password Title	Enter a custom password title here. This title can be up to 32 characters long.
Logout Window Title	Enter a custom logout window title here. This title can be up to 64 characters long.
Notification	Enter additional information to display in the notification area here. This information can be up to 128 characters long for each line. There a 5 lines available for additional information.

Click the **Set to Default** button to replace the information with the default information.

Click the **Apply** button to accept the changes made.

Network Access Authentication

Guest VLAN

This window is used to display and configure the network access authentication guest VLAN settings.

To view the following window, click **Security > Network Access Authentication > Guest VLAN**, as shown below:

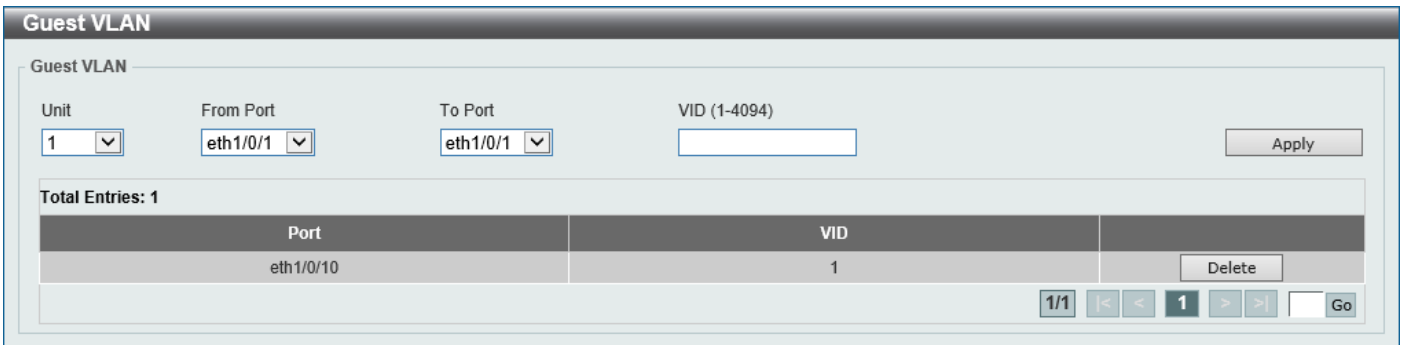


Figure 9-76 Guest VLAN Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
VID	Enter the VLAN ID used here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Network Access Authentication Global Settings

This window is used to display and configure the global Network Access Authentication settings.

To view the following window, click **Security > Network Access Authentication > Network Access Authentication Global Settings**, as shown below:

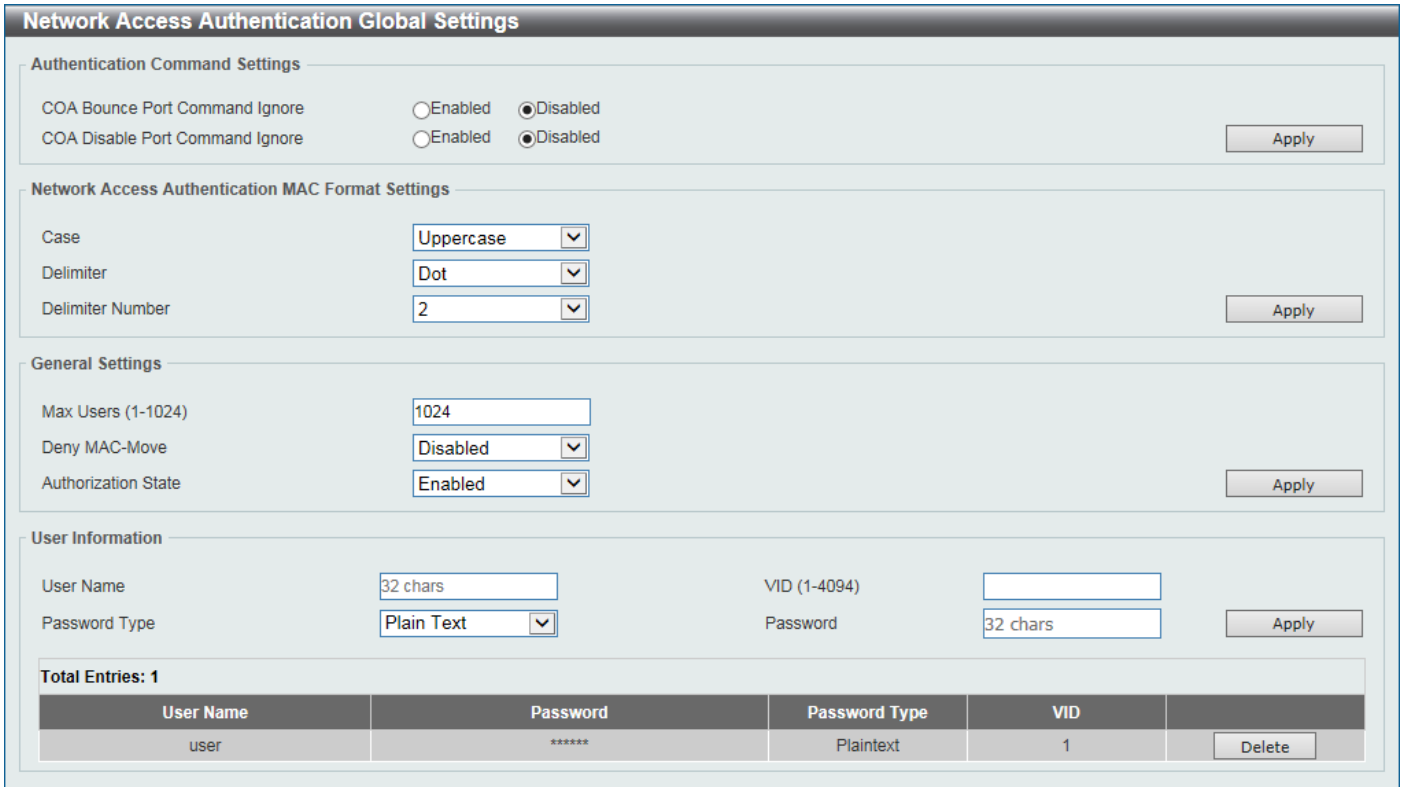


Figure 9-77 Network Access Authentication Global Settings Window

The fields that can be configured in **Authentication Aommand Settings** are described below:

Parameter	Description
COA Bounce Port Command Ignore	Select to enable (ignore) or disable (accept) a RADIUS CoA bounce port command.
COA Disable Port Command Ignore	Select to enable (ignore) or disable (accept) a RADIUS CoA disable port command.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Network Access Authentication MAC Format Settings** are described below:

Parameter	Description
Case	Select the case format that will be used for the network access authentication MAC address here. Options to choose from are **Lowercase** and **Uppercase**.
Delimiter	Select the delimiter that will be used for the network access authentication MAC address here. Options to choose from are **Hyphen**, **Colon**, **Dot**, and **None**.
Delimiter Number	Select the delimiter number option here. Options to choose from are **1**, **2**, and **5**.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **General Settings** are described below:

Parameter	Description
Max Users	Enter the maximum amount of users allowed here. The range is from 1 to 1024. By default, this value is 1024.
Deny MAC-Move	Select to enable or disable the deny MAC-move feature here. This option controls whether to allow authenticated hosts to do roaming across different Switch ports and only controls whether a host, which is authenticated at a port set to the multi-authenticate mode, is allowed to move to another port. If a station is allowed to move, there are two situations. It may either need to be re-authenticated or directly moved to the new port without re-authentication based on the following rule. If the new port has the same authentication configuration as the original port, then re-authentication is not needed. The host will inherit the same authorization attributes with new port. The authenticated host can do roaming from port 1 to port 2, and inherit the authorization attributes without re-authentication. If the new port has the different authentication configuration as the original port, then re-authentication is needed. The authenticated host on port 1 can move and re-authenticated by port 2. If the new port has no authentication method enabled, then the station is directly moved to the new port. The session with the original port is removed. The authenticated host on port 1 can be moved to port 2. If this feature is disabled and an authenticated host moves to another port, then this is treated as a violation error.
Authorization State	Select to enable or disable the authorized state here. The option is used to enable or disable the acceptance of an authorized configuration. When authorization is enabled for authentication, the authorized attributes (for example VLAN, 802.1p default priority, bandwidth, and ACL) assigned by the RADIUS server will be accepted if the authorization status is enabled. Bandwidth and ACL are assigned on a per-port basis. If in the multi-authenticated mode, VLAN and 802.1p are assigned on a per-host basis. Otherwise, Bandwidth and ACL are assigned on a per-port basis.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **User Information** are described below:

Parameter	Description
User Name	Enter the user name used here. This name can be up to 32 characters long.
VID	Enter the VLAN ID used here. The range is form 1 to 4094.
Password Type	Select the password type option here. Options to choose from are **Plain Text** and **Encrypted**.
Password	Enter the password used here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Network Access Authentication Port Settings

This window is used to display and configure the network access authentication port settings.

To view the following window, click **Security > Network Access Authentication > Network Access Authentication Port Settings**, as shown below:

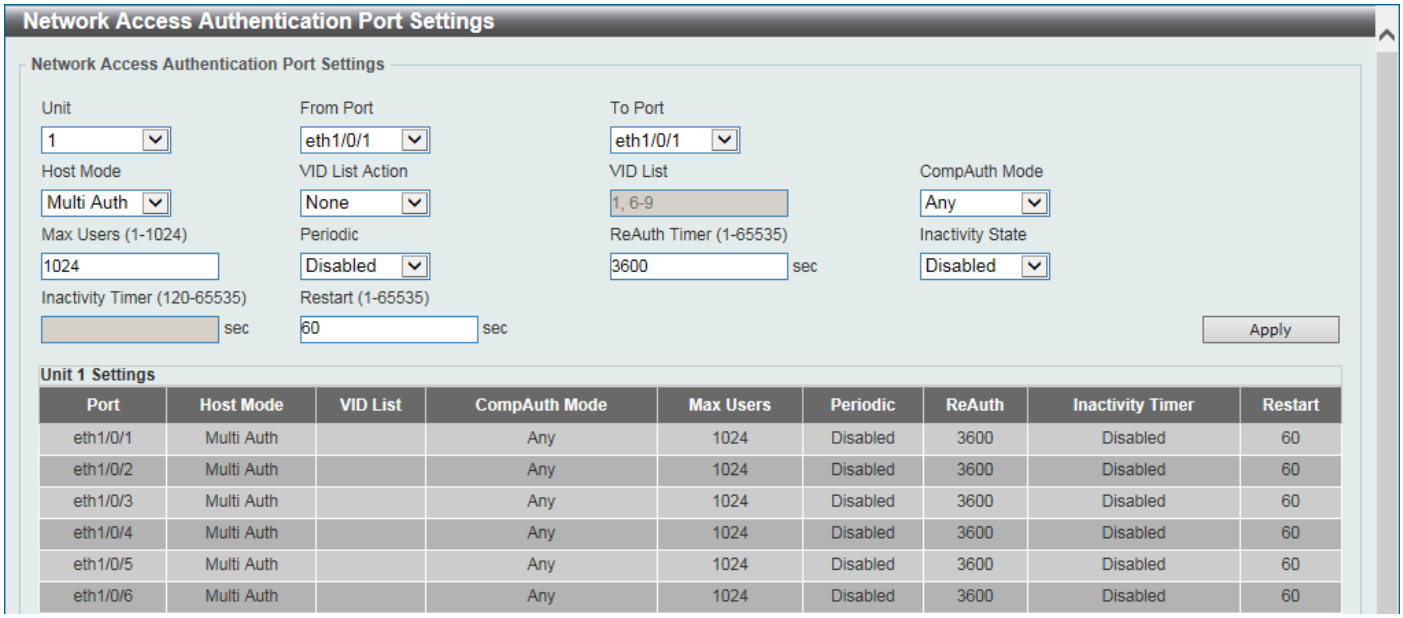


Figure 9-78 Network Access Authentication Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Host Mode	Select the host mode option that will be associated with the selected ports here. Options to choose from are: • **Multi Host** - If the port is operated in the multi-host mode, and if one of the hosts is authenticated, then all other hosts are allowed to access the port. According to 802.1X authentication, if the re-authentication fails or the authenticated user logs off, the port will be blocked for a quiet period. The port restores the processing of EAPOL packets after the quiet period. • **Multi Auth** - If the port is operated in the multi-authenticated mode, then each host needs to be authenticated individually to access the port. A host is represented by its MAC address. Only the authorized host is allowed to access.
VID List Action	Select the VID list action here. Options to choose from are **None**, **Add**, and **Delete**.
VID List	After selecting the **Multi Auth** option as the **Host Mode**, the following parameter is available. Enter the VLAN ID used here. This is useful when different VLANs on the Switch have different authentication requirements. After the client is authenticated, the client will not be re-authenticated when received from other VLANs. This option is useful for trunk ports to do per-VLAN authentication control. When a port's authentication mode is changed to multi-host, the previous authentication VLAN(s) on this port will be cleared.
CompAuth Mode	Select the compound authentication mode here. Options to choose from are: • **Any** - Select to pass if any of the authentication methods passes. If **Any** is selected, MAC-based access control is disabled and 802.1X is enabled, 802.1X authentication will be required.

Parameter	Description
	• **MAC-WAC** – Select to verify MAC-based access control first. If the client passes MAC authentication, Web-based access control (WAC) will be verify. Both authentication methods need to be passed to have a successful authentication.
Max Users	Enter the maximum users value used here. The range is from 1 to 1024.
Periodic	Select to enable or disable periodic re-authentication for the selected port here. This parameter only affects the 802.1X protocol.
ReAuth Timer	Enter the re-authentication timer value here. The range is from 1 to 65535 seconds. By default, this value is 3600 seconds.
Inactivity State	Select to enable or disable the inactivity state here.
Inactivity Timer	When the **Inactivity State** is enabled, enter the inactivity timer value here. The range is from 120 to 65535 seconds. This parameter only affects the WAC authentication protocol.
Restart	Enter the restart time value used here. The range is from 1 to 65535 seconds.

Click the **Apply** button to accept the changes made.

Network Access Authentication Sessions Information

This window is used to view and clear the network access authentication session information.

To view the following window, click **Security > Network Access Authentication > Network Access Authentication Sessions Information**, as shown below:

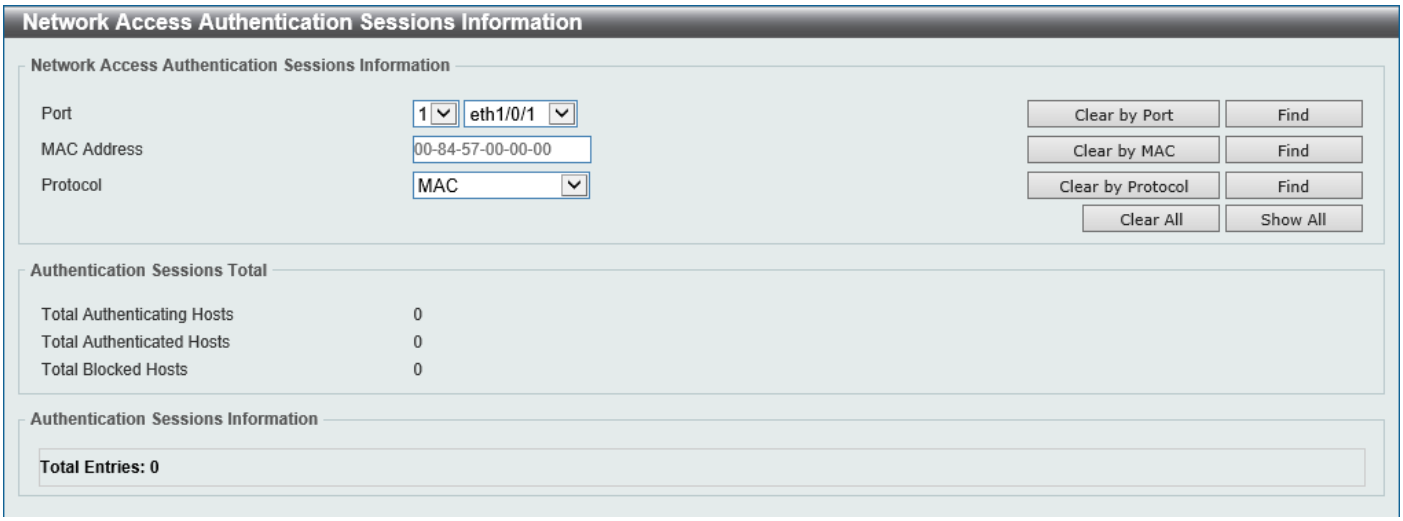


Figure 9-79 Network Access Authentication Sessions Information Window

The fields that can be configured are described below:

Parameter	Description
Port	Select the appropriate Switch unit and port used for the query here.
MAC Address	Enter the MAC address used here.
Protocol	Select the protocol option used here. Options to choose from are **MAC**, **WAC**, and **DOT1X**.

Click the **Clear by Port** button to the clear the information based on the port selected.

Click the **Clear by MAC** button to the clear the information based on the MAC address entered.

Click the **Clear by Protocol** button to the clear the information based on the protocol selected.

Click the **Clear All** button to clear all the information in this table.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to locate and display all the entries.

Safeguard Engine

Periodically, malicious hosts on the network will attack the Switch by utilizing packet flooding (ARP Storm) or other methods. These attacks may increase the Switch's CPU load beyond its capability. To alleviate this problem, the Safeguard Engine function was added to the Switch's software.

The Safeguard Engine can help the overall operability of the Switch by minimizing the workload of the Switch while the attack is ongoing, thus making it capable to forward essential packets over its network in a limited bandwidth.

If the CPU load rises above the rising threshold value, the Safeguard Engine function will be activated and the Switch will enter the exhausted mode. In the exhausted mode, the Switch will limit the bandwidth available for ARP and broadcast IP packets. If the CPU load falls below the falling threshold value, the Safeguard Engine will be deactivated and the Switch will exit the exhausted mode and enter the normal mode.

Packets that are destined to the CPU can be classified into three groups. These groups, otherwise known as sub-interfaces, are logical interfaces that the CPU will use to identify certain types of traffic. The three groups are **Protocol**, **Manage**, and **Route**. Generally, the **Protocol** group should receive the highest priority when the Switch's CPU processes received packets and the **Route** group should receive the lowest priority as the Switch's CPU usually does get involved in the processing of routing packets. In the **Protocol** group, packets are protocol control packets identified by the router. In the **Manage** group, packets are destined to any router or system network management interface by means of interactive access protocols, like Telnet and SSH. In the **Route** group, packets are identified as traversing routing packets that is generally processed by the router CPU.

In the following table a list of supported protocols are displayed with their respective sub-interfaces (groups):

Protocol Name	Sub-interface (Group)	Description
802.1X	Protocol	Port-based Network Access Control
ARP	Protocol	Address resolution Protocol
DHCP	Protocol	Dynamic Host Configuration Protocol
DNS	Protocol	Domain Name System
GVRP	Protocol	GARP VLAN Registration Protocol
ICMPv4	Protocol	Internet Control Message Protocol
ICMPv6-Neighbor	Protocol	IPv6 Internet Control Message Protocol Neighbor Discovery Protocol (NS/NA/RS/RA)
ICMPv6-Other	Protocol	IPv6 Internet Control Message Protocol except Neighbor Discovery Protocol (NS/NA/RS/RA)
IGMP	Protocol	Internet Group Management Protocol
LACP	Protocol	Link Aggregation Control Protocol
PPPoE	Protocol	Point-to-point protocol over Ethernet
SNMP	Manage	Simple Network Management Protocol
SSH	Manage	Secure Shell
STP	Protocol	Spanning Tree Protocol
Telnet	Manage	Telnet
TFTP	Manage	Trivial File Transfer Protocol

Protocol Name	Sub-interface (Group)	Description
Web	Manage	Hypertext Transfer Protocol (HTTP) and Hypertext Transfer Protocol Secure (HTTPS)

A customized rate limit (in packets per second) can be assigned to the Safeguard Engine's sub-interfaces as a whole or to individual protocols specified by the user in the management interface. Be careful when customizing the rate limit for individual protocols, using this function, as improper rate limits can cause the Switch to process packets abnormally.

NOTE: When Safeguard Engine is enabled, the Switch will allot bandwidth to various traffic flows (ARP, IP) using the FFP (Fast Filter Processor) metering table to control the CPU utilization and limit traffic. This may limit the speed of routing traffic over the network.

Safeguard Engine Settings

This window is used to display and configure the safeguard engine settings.

To view the following window, click **Security > Safeguard Engine > Safeguard Engine Settings**, as shown below:

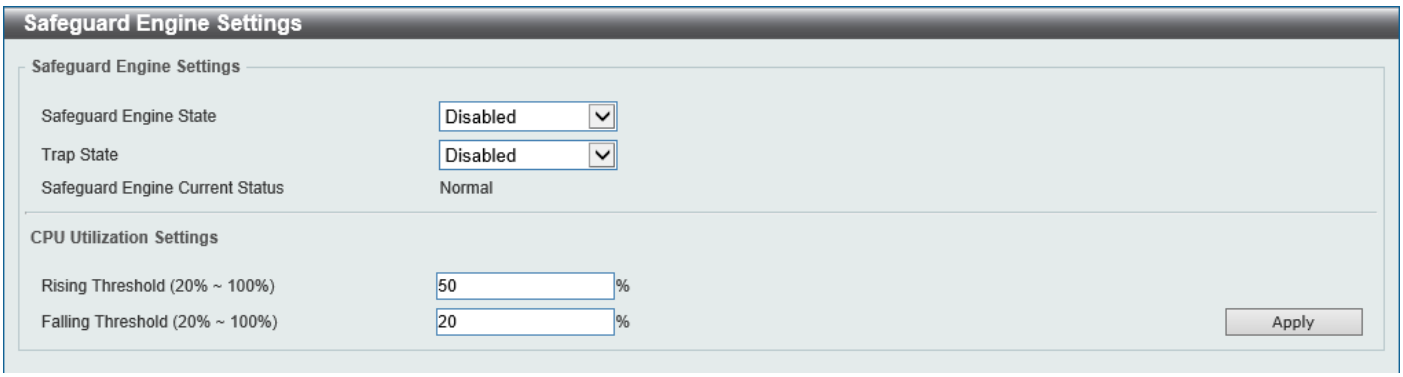


Figure 9-80 Safeguard Engine Settings Window

The fields that can be configured in **Safeguard Engine Settings** are described below:

Parameter	Description
Safeguard Engine State	Select to enable or disable the safeguard engine feature here.
Trap State	Select to enable or disable the safeguard engine trap state here.

The fields that can be configured in **CPU Utilization Settings** are described below:

Parameter	Description
Rising Threshold	Enter the rising threshold value here. The range is from 20% to 100%. This value is used to configure the acceptable level of CPU utilization before the Safeguard Engine mechanism is enabled. Once the CPU utilization reaches this percentage level, the Switch will move into Exhausted mode, based on the parameters provided in this window.
Falling Threshold	Enter the falling threshold value here. The range is from 20% to 100%. This value is used to configure the acceptable level of CPU utilization as a percentage, where the Switch leaves the Safeguard Engine state and returns to normal mode.

Click the **Apply** button to accept the changes made.

CPU Protect Counters

This window is used to view and clear the CPU protection counter information.

To view the following window, click **Security > Safeguard Engine > CPU Protect Counters**, as shown below:

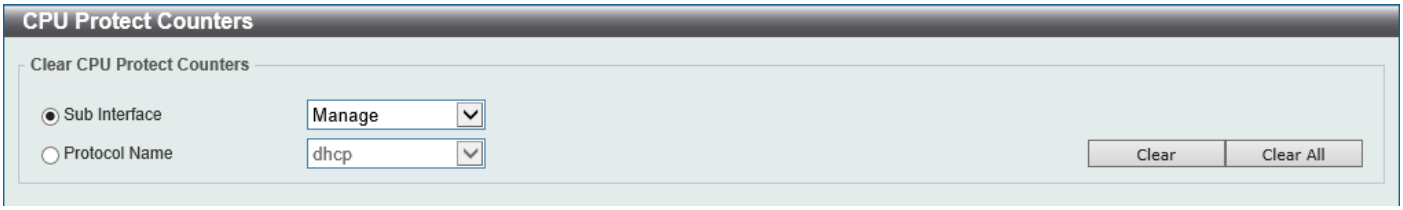


Figure 9-81 CPU Protect Counters Window

The fields that can be configured are described below:

Parameter	Description
Sub Interface	Select the sub-interface option here. Options to choose from are **Manage**, **Protocol**, **Route**, and **All**. This option specifies to clear the CPU protect related counters of sub-interfaces.
Protocol Name	Select the protocol name option here.

Click the **Clear** button to clear the information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

CPU Protect Sub-Interface

This window is used to display and configure the CPU protection sub-interface settings.

To view the following window, click **Security > Safeguard Engine > CPU Protect Sub-Interface**, as shown below:

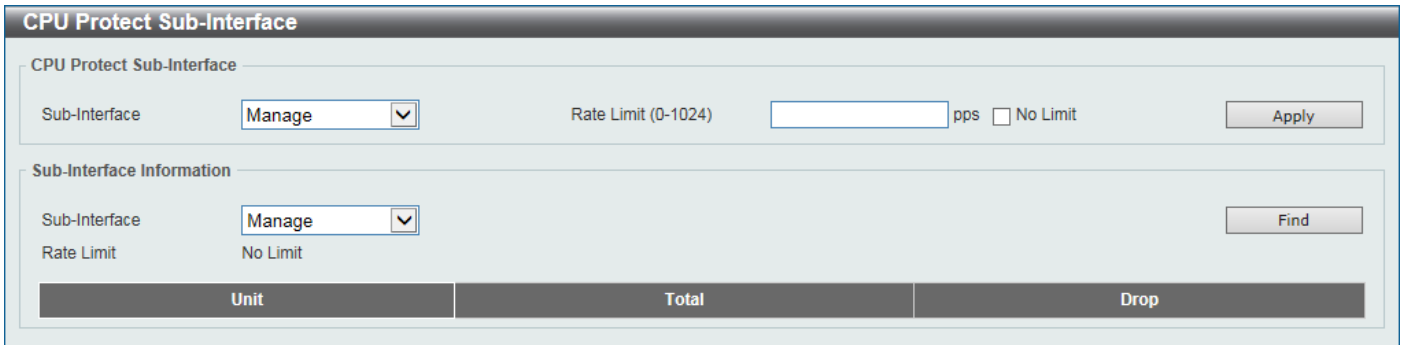


Figure 9-82 CPU Protect Sub-Interface Window

The fields that can be configured in **CPU Protect Sub-Interface** are described below:

Parameter	Description
Sub-Interface	Select the sub-interface option here. Options to choose from are **Manage**, **Protocol**, and **Route**.
Rate Limit	Enter the rate limit value used here. The range is from 0 to 1024 packets per second. Select the **No Limit** option to disable the rate limit.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Sub-Interface Information** are described below:

Parameter	Description
Sub-Interface	Select the sub-interface option here. Options to choose from are **Manage**, **Protocol**, and **Route**.

Click the **Find** button to locate a specific entry based on the information entered.

CPU Protect Type

This window is used to display and configure the CPU protection type settings.

To view the following window, click **Security > Safeguard Engine > CPU Protect Type**, as shown below:

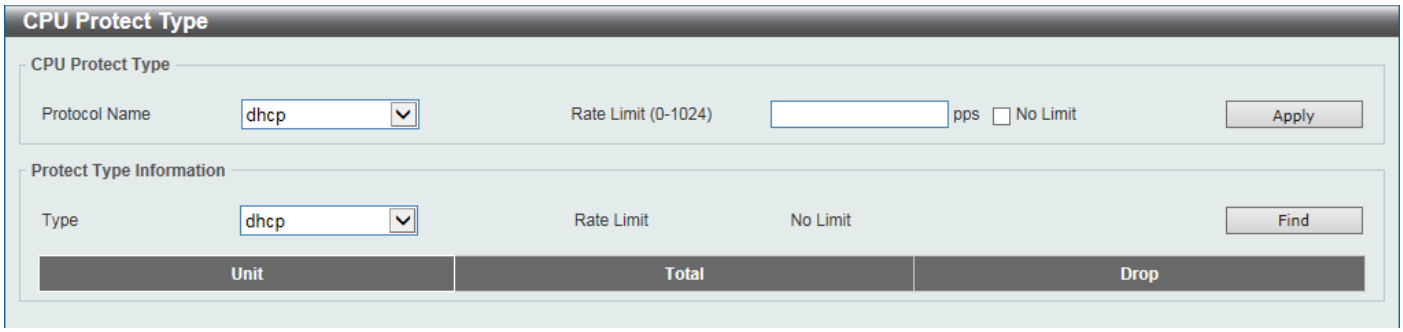


Figure 9-83 CPU Protect Type Window

The fields that can be configured in **CPU Protect Type** are described below:

Parameter	Description
Protocol Name	Select the protocol name option here.
Rate Limit	Enter the rate limit value used here. The range is from 0 to 1024 packets per second. Select the **No Limit** option to disable the rate limit.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Protect Type Information** are described below:

Parameter	Description
Type	Select the protocol type here. After selecting the protocol type, the **Rate Limit** assigned to the protocol type will be displayed. Select the **Unit** option to specify the unit ID of the Switch in the physical stack.

Click the **Find** button to locate a specific entry based on the information entered.

Trusted Host

This window is used to display and configure the trusted host settings.

To view the following window, click **Security > Trusted Host**, as shown below:

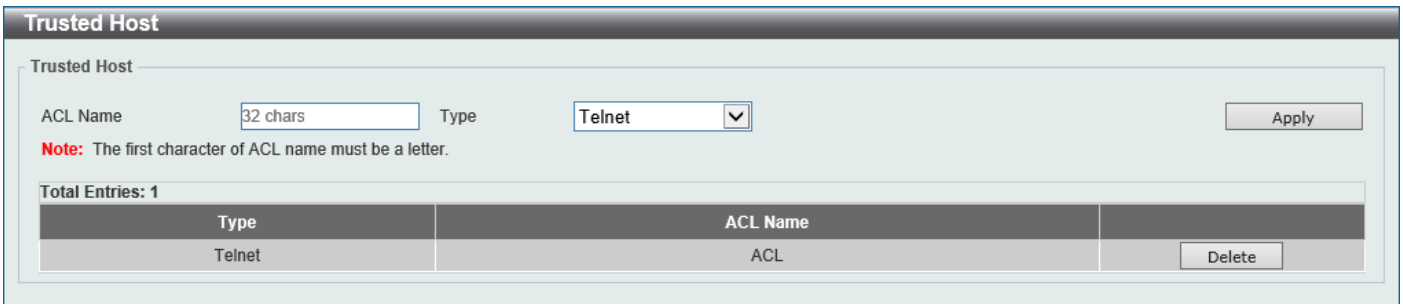


Figure 9-84 Trusted Host Window

The fields that can be configured are described below:

Parameter	Description
ACL Name	Enter the access class' name here. This name can be up to 32 characters long.
Type	Select the trusted host type here. Options to choose from are **Telnet**, **SSH**, **Ping**, **HTTP**, and **HTTPS**.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Traffic Segmentation Settings

This window is used to display and configure the traffic segmentation settings. When the traffic segmentation forwarding domain is specified, packets received by the port will be restricted in Layer 2 packet forwarding to interfaces within the domain. When the forwarding domain of a port is empty, Layer 2 forwarding for packets received by the port is not restricted.

The traffic segmentation member list can be comprised of different interface types, for example port and port-channel in the same forwarding domain. If the interfaces specified by the command include a port-channel, all the member ports of this port-channel will be included in the forwarding domain.

If the forwarding domain of an interface is empty, then there is no restriction on Layer 2 forwarding of packets received by the port.

To view the following window, click **Security > Traffic Segmentation Settings**, as shown below:

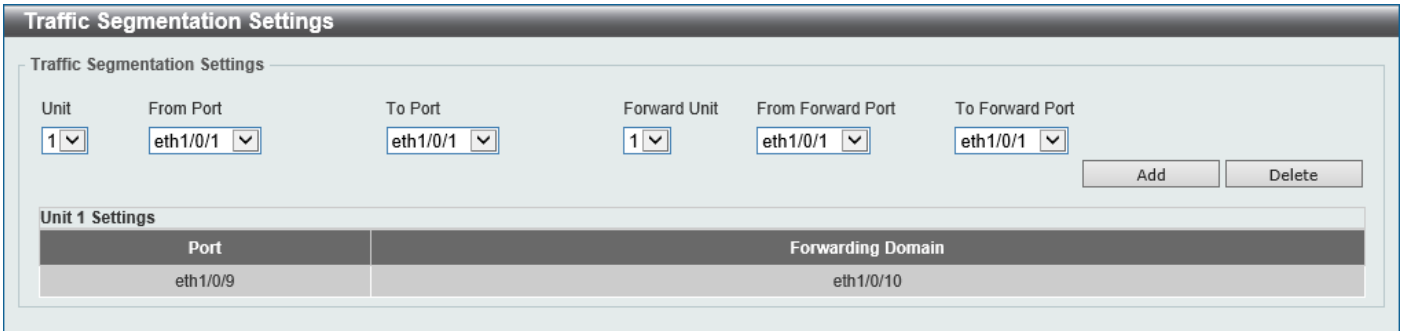


Figure 9-85 Traffic Segmentation Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the receiving Switch unit that will be used for this configuration here.
From Port - To Port	Select the receiving port range used for the configuration here.
Forward Unit	Select the forward Switch unit that will be used for this configuration here.
From Forward Port ~ To Forward Port	Select the forward port range used for the configuration here.

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

Click the **Delete** button to remove an entry based on the information entered.

Storm Control Settings

This window is used to display and configure the storm control settings.

To view the following window, click **Security > Storm Control Settings**, as shown below:

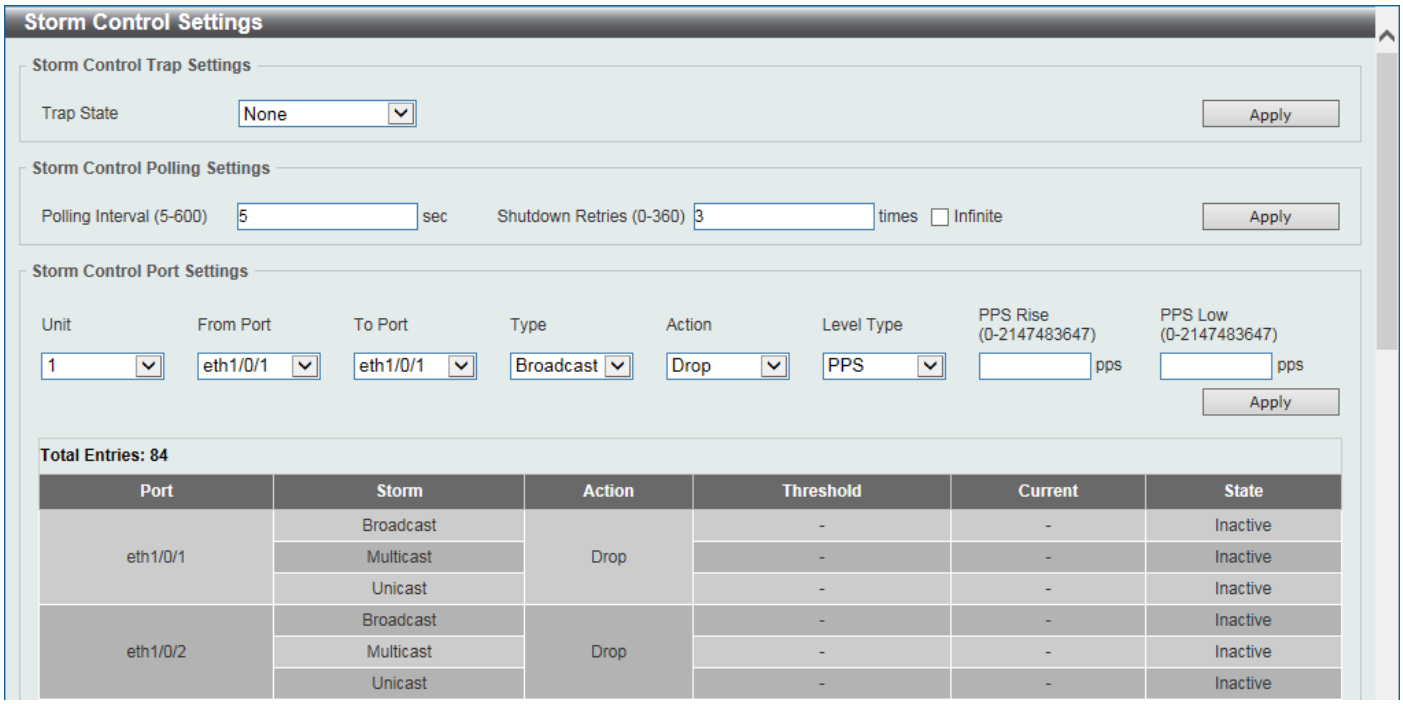


Figure 9-86 Storm Control Settings Window

The fields that can be configured in **Storm Control Trap Settings** are described below:

Parameter	Description
Trap State	Select the storm control trap option here. Options to choose from are: • **None** - No traps are sent. • **Storm Occur** - A trap notification is sent when a storm event is detected. • **Storm Clear** - A trap notification is sent when a storm event is cleared. • **Both** - A trap notification is sent when a storm event is detected and cleared.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Storm Control Polling Settings** are described below:

Parameter	Description
Polling Interval	Enter the interval value used here. The range is from 5 to 600 seconds. By default, this value is 5 seconds.
Shutdown Retries	Enter the shutdown retries value used here. The range is from 0 to 360. By default, this value is 3. Select the **Infinite** option to disable this feature.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Storm Control Port Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Type	Select the type of storm attack that will be controlled here. Options to choose from are **Broadcast**, **Multicast**, and **Unicast**. When the action is configured as the shutdown mode, the unicast refers to both known and unknown unicast packets; that is, if the known and unknown unicast packets hit the specified threshold, the port will be shutdown. Otherwise, unicast refers to unknown unicast packets.
Action	Select the action that will be taken here. Options to choose from are: • **None** - Specifies not to filter the storm packets. • **Shutdown** - Specifies to shut down the port when the value specified for rise threshold is reached. • **Drop** - Specifies to discards packets that exceed the risen threshold.
Level Type	Select the level type option here. Options to choose from are **PPS**, **Kbps**, and **Level**.
PPS Rise	Enter the rise packets per second value here. This option specifies the rise threshold value in packets count per second. The range is from 0 to 2147483647 packets per second.
PPS Low	Enter the low packets per second value here. This option specifies the low threshold value in packets count per second. The range is from 0 to 2147483647 packets per second. By default, this is 80% of the specified **PPS Rise** value.

Click the **Apply** button to accept the changes made.

After selecting the **Kbps** option as the **Level Type**, the following parameters are available.

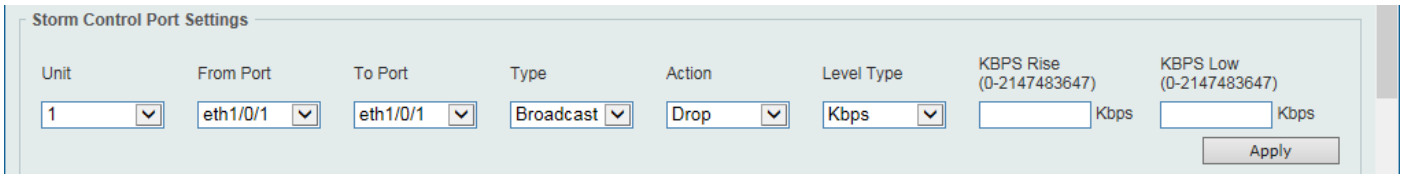


Figure 9-87 Storm Control Settings (Level Type - Kbps) Window

The additional fields that can be configured in **Storm Control Port Settings** are described below:

Parameter	Description
KBPS Rise	Enter the rise KBPS value used here. This option specifies the rise threshold value as a rate of kilobits per second at which traffic is received on the port. The range is from 0 to 2147483647 Kbps.
KBPS Low	Enter the low KBPS value used here. This option specifies the low threshold value as a rate of kilobits per second at which traffic is received on the port. The range is

Parameter	Description
	from 0 to 2147483647 Kbps. By default, this is 80% of the specified **KBPS Rise** value.

Click the **Apply** button to accept the changes made.

After selecting the **Level** option as the **Level Type**, the following parameters are available.

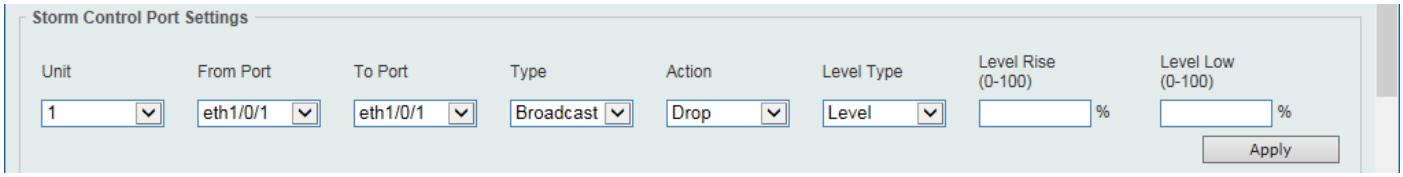


Figure 9-88 Storm Control Settings (Level Type - Level) Window

The additional fields that can be configured in **Storm Control Port Settings** are described below:

Parameter	Description
Level Rise	Enter the rise level value used here. This option specifies the rise threshold value as a percentage of the total bandwidth per port at which traffic is received on the port. The range is from 0% to 100%.
Level Low	Enter the low-level value used here. This option specifies the low threshold value as a percentage of the total bandwidth per port at which traffic is received on the port. The range is from 0% to 100%. By default, this is 80% of the **Level Rise** value.

Click the **Apply** button to accept the changes made.

DoS Attack Prevention Settings

This window is used to display and configure the Denial-of-Service (DoS) attack prevention settings. The following well-known DoS types, which can be detected by most Switches:

- **Land Attack:** This type of attack involves IP packets where the source and destination address are set to the address of the target device. It may cause the target device to reply to itself continuously.
- **Blat Attack**: This type of attack will send packets with the TCP/UDP source port equal to the destination port of the target device. It may cause the target device to respond to itself.
- **TCP Null:** This type of attack involves port scanning by using specific packets, which contain a sequence number of 0 and no flags.
- **TCP Xmas:** This type of attack involves port scanning by using specific packets, which contain a sequence number of 0 and the Urgent (URG), Push (PSH), and FIN flags.
- **TCP SYN-FIN:** This type of attack involves port scanning by using specific packets, which contain SYN and FIN flags.
- **TCP SYN SrcPort Less 1024:** This type of attack involves port scanning by using specific packets, which contain source port 0 to 1023, and SYN flag.
- **Ping of Death Attack:** A ping of death is a type of attack on a computer that involves sending a malformed or otherwise a malicious ping to a computer. A ping is normally 64 bytes in size (many computers cannot handle a ping larger than the maximum IP packet size which is 65535 bytes). The sending of a ping of this size can crash the target computer. Traditionally, this bug has been relatively easy to exploit. Generally, sending a 65536 byte ping packet is illegal according to networking protocol, but a packet of such a size can be sent if it is fragmented; when the target computer reassembles the packet, a buffer overflow can occur, which often causes a system crash.
- **TCP Tiny Fragment Attack:** The Tiny TCP Fragment attacker uses IP fragmentation to create extremely small fragments and force the TCP header information into a separate packet fragment to pass through the check function of the router and issue an attack.
- **All Types:** All of above types.

To view the following window, click **Security > DoS Attack Prevention Settings**, as shown below:

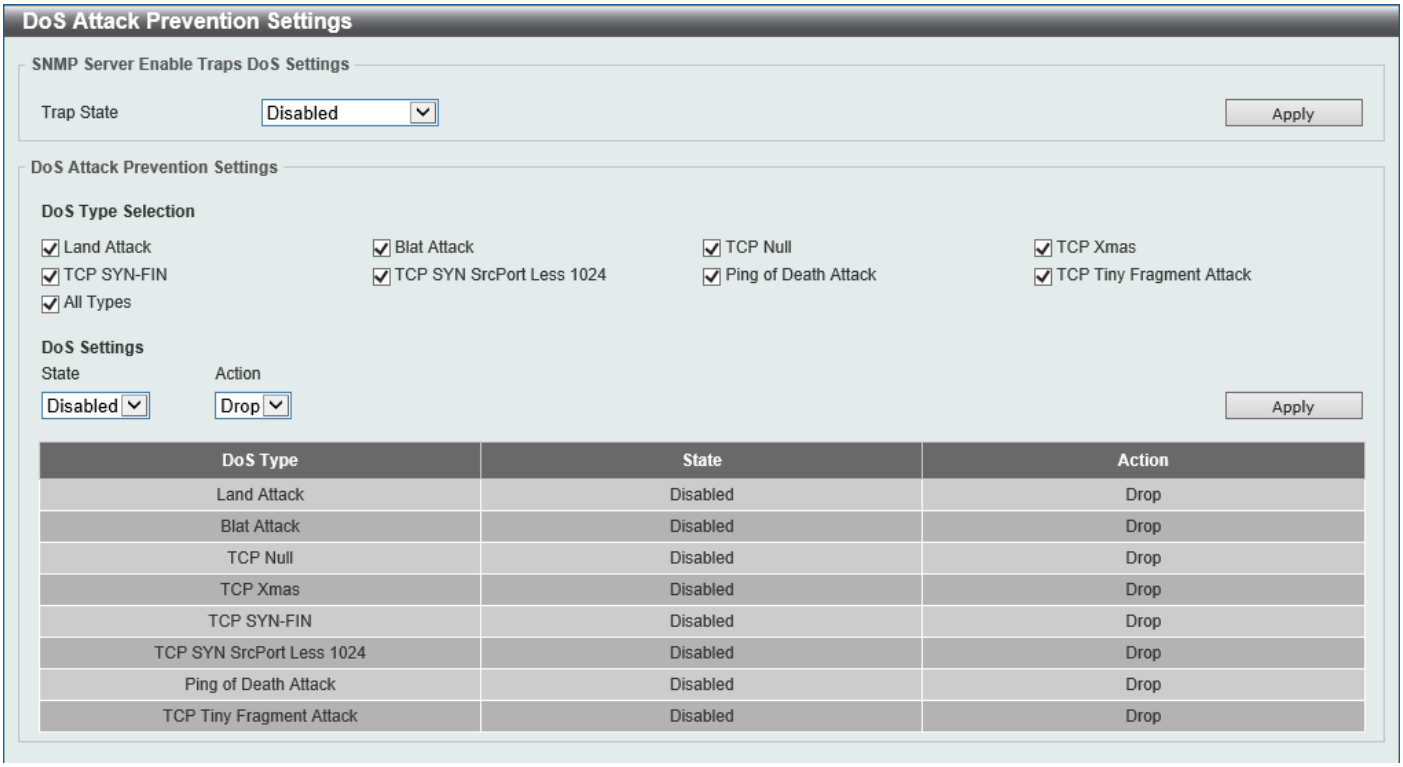


Figure 9-89 DoS Attack Prevention Settings Window

The fields that can be configured in **SNMP Server Enable Traps DoS Settings** are described below:

Parameter	Description
Trap State	Select to enable or disable the DoS attack prevention trap state here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DoS Attack Prevention Settings** are described below:

Parameter	Description
DoS Type Selection	Select the DoS type option that will be prevented here.
State	Select to enable or disable the global DoS attack prevention state here.
Action	Select the action that will be taken when the DoS attack was detected here. The only option to select here is **Drop**.

Click the **Apply** button to accept the changes made.

SSH

Secure Shell (SSH) is a program allowing secure remote login and secure network services over an insecure network that allows a secure login to remote host computers, a safe method of executing commands on a remote end node, and will provide secure encrypted and authenticated communication between two non-trusted hosts. SSH, with its array of unmatched security features is an essential tool in today's networking environment. It is a powerful guardian against numerous existing security hazards that now threaten network communications.

The steps required to use the SSH protocol for secure communication between a remote PC (the SSH client) and the Switch (the SSH server) are as follows:

- Create a user account with admin-level access using the User Accounts window. This is identical to creating any other admin-level User Account on the Switch, including specifying a password. This password is used to logon to the Switch, once a secure communication path has been established using the SSH protocol.

- Configure the User Account to use a specified authorization method to identify users that are allowed to establish SSH connections with the Switch using the SSH User Authentication Mode window. There are three choices as to the method SSH will use to authorize the user, which are Host Based, Password, and Public Key.
- Configure the encryption algorithm that SSH will use to encrypt and decrypt messages sent between the SSH client and the SSH server, using the SSH Authentication Method and Algorithm Settings window.
- Finally, enable SSH on the Switch using the SSH Configuration window.

After completing the preceding steps, a SSH Client on a remote PC can be configured to manage the Switch using a secure, in band connection.

SSH Global Settings

This window is used to display and configure the global SSH settings.

To view the following window, click **Security > SSH > SSH Global Settings**, as shown below:

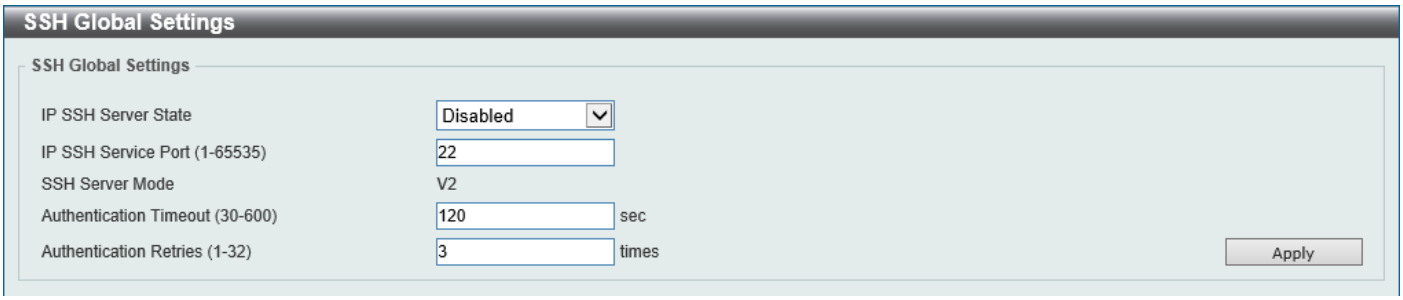


Figure 9-90 SSH Global Settings Window

The fields that can be configured are described below:

Parameter	Description
IP SSH Server State	Select to enable or disable the global SSH server state.
IP SSH Service Port	Enter the SSH service port number used here. The range is from 1 to 65535. By default, this value is 22.
Authentication Timeout	Enter the authentication timeout value here. The range is from 30 to 600 seconds. By default, this value is 120 seconds.
Authentication Retries	Enter the authentication retries value here. The range is from 1 to 32. By default, this value is 3.

Click the **Apply** button to accept the changes made.

SSH Algorithm Settings

This window is used to display and configure the SSH algorithm settings.

To view the following window, click **Security > SSH > SSH Algorithm Settings**, as shown below:

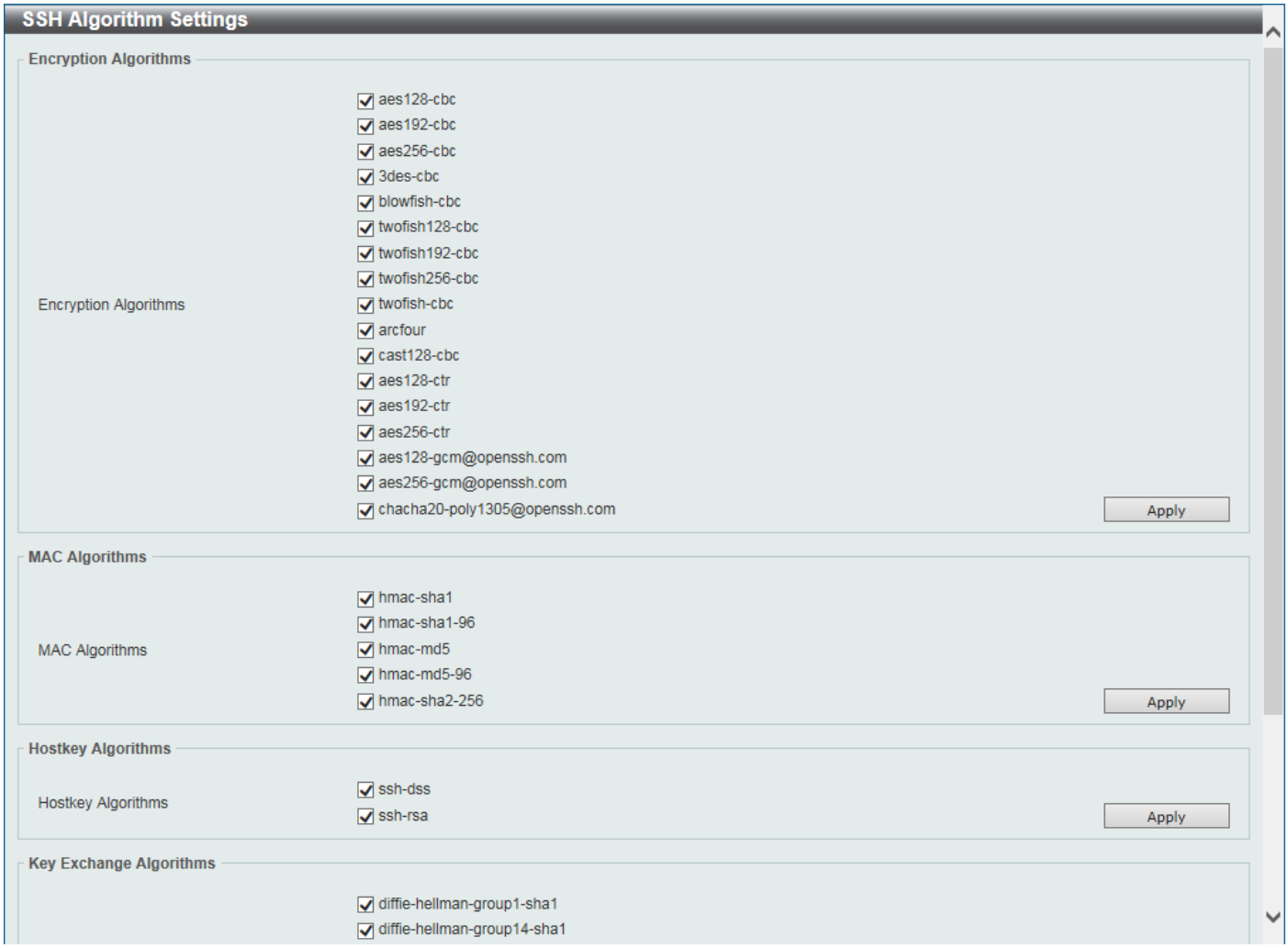


Figure 9-91 SSH Algorithm Settings Window

The fields that can be configured are described below:

Parameter	Description
Encryption Algorithms	Select to define the allowed encryption key algorithm list in the SSH server.
MAC Algorithms	Select to define the allowed Message Authentication Code (MAC) key algorithm list in the SSH server.
Hostkey Algorithms	Select to define the allowed host key algorithm list in the SSH server.
Key Exchange Algorithms	Select to define the allowed key exchange algorithm list in the SSH server.

Click the **Apply** button to accept the changes made.

Host Key

This window is used to view and generate the SSH host key.

To view the following window, click **Security > SSH > Host Key**, as shown below:

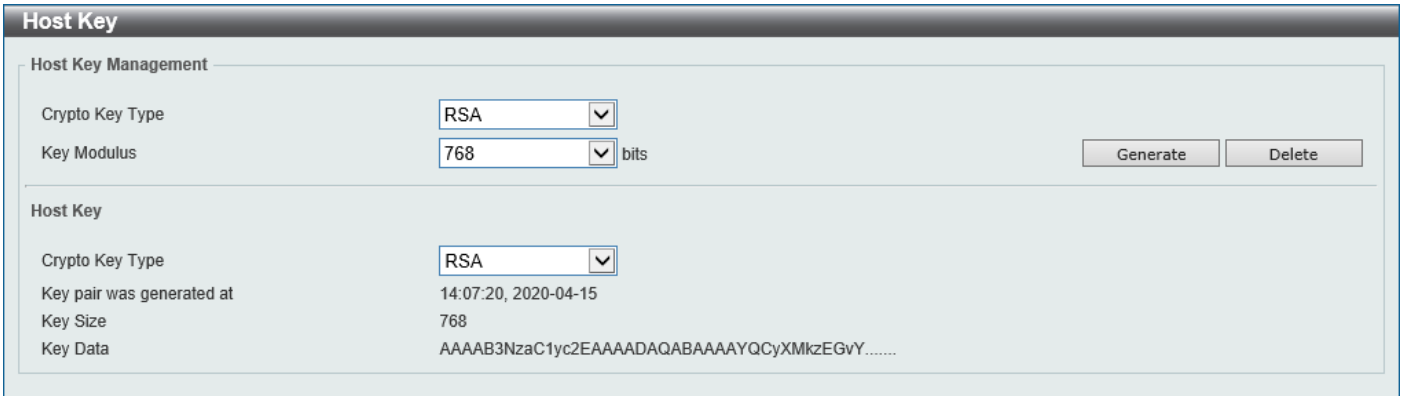


Figure 9-92 Host Key Window

The fields that can be configured in **Host Key Management** are described below:

Parameter	Description
Crypto Key Type	Select the crypto key type used here. Options to choose from are the Rivest Shamir Adleman (**RSA**) key type and the Digital Signature Algorithm (**DSA**) key type.
Key Modulus	Select the key modulus value here. Options to choose from are **512**, **768**, **1024**, and **2048** bit.

Click the **Generate** button to generate a host key based on the selections made.

Click the **Delete** button to remove a host key based on the selections made.

The fields that can be configured in **Host Key** are described below:

Parameter	Description
Crypto Key Type	Select the crypto key type used here. Options to choose from are the Rivest Shamir Adleman (**RSA**) key type and the Digital Signature Algorithm (**DSA**) key type.

After clicking the **Generate** button, the following window will appear:

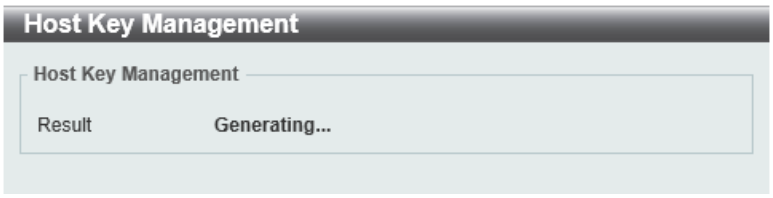


Figure 9-93 Host Key (Generating) Window

After the key was successfully generated, the following window will appear.

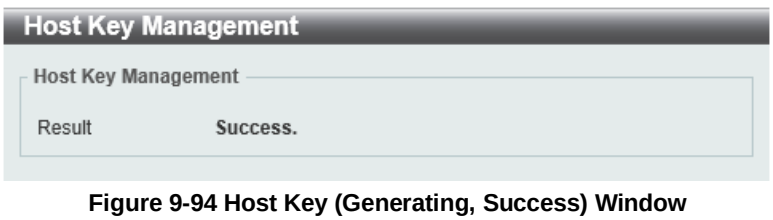


Figure 9-94 Host Key (Generating, Success) Window

SSH Server Connection

This window is used to view the SSH server connections table.

To view the following window, click **Security > SSH > SSH Server Connection**, as shown below:

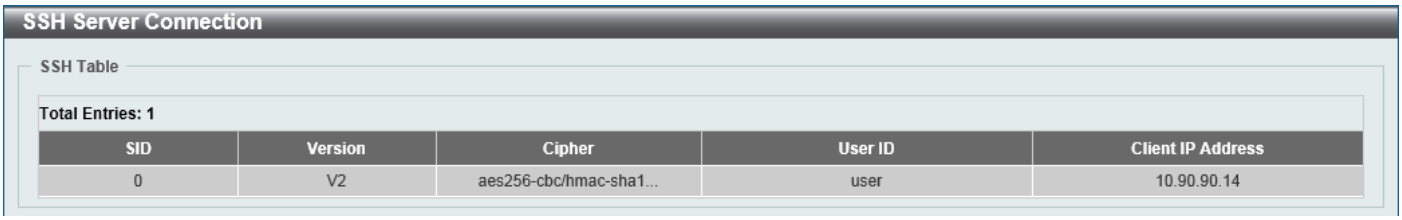


Figure 9-95 SSH Server Connection Window

SSH User Settings

This window is used to display and configure the SSH user settings.

To view the following window, click **Security > SSH > SSH User Settings**, as shown below:

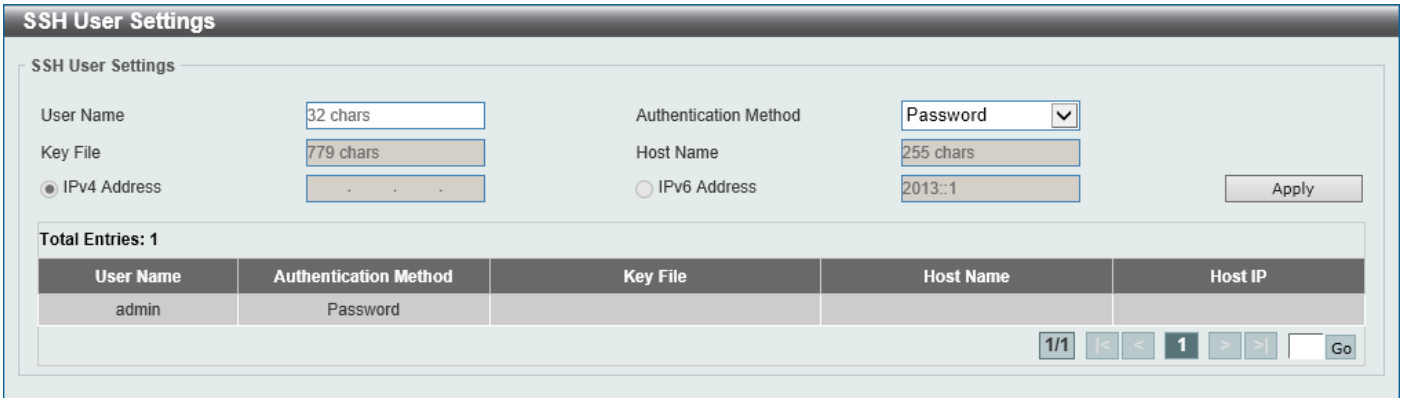


Figure 9-96 SSH User Settings Window

The fields that can be configured are described below:

Parameter	Description
User Name	Enter the SSH user's username used here. This name can be up to 32 characters long.
Authentication Method	Select the authentication methods used here. Options to choose from are **Password**, **Public Key**, and **Host-based**.
Key File	After selecting the **Public Key** or **Host-based** option as the **Authentication Method**, enter the public key here.
Host Name	After selecting the **Host-based** option as the **Authentication Method**, enter the host name here.
IPv4 Address	After selecting the **Host-based** option as the **Authentication Method**, select and enter the IPv4 address here.
IPv6 Address	After selecting the **Host-based** option as the **Authentication Method**, select and enter the IPv6 address here.

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

SSL

Secure Sockets Layer (SSL) is a security feature that will provide a secure communication path between a server and client through the use of authentication, digital signatures, and encryption. These security functions are implemented through the use of a cipher suite, which is a security string that determines the exact cryptographic parameters, specific encryption algorithms, and key sizes to be used for an authentication session and consists of three levels:

- **Key Exchange:** The first part of the cipher suite string specifies the public key algorithm to be used. This Switch utilizes the Rivest Shamir Adleman (RSA) public key algorithm and the Digital Signature Algorithm (DSA), specified here as the DHE DSS Diffie-Hellman (DHE) public key algorithm. This is the first authentication process between client and server as they "exchange keys" in looking for a match and therefore authentication to be accepted to negotiate encryptions on the following level.
- **Encryption:** The second part of the cipher suite that includes the encryption used for encrypting the messages sent between client and host. The Switch supports two types of cryptology algorithms:
    - **Stream Ciphers** - There are two types of stream ciphers on the Switch, RC4 with 40-bit keys, and RC4 with 128-bit keys. These keys are used to encrypt messages and need to be consistent between client and host for optimal use.
    - **CBC Block Ciphers** - CBC refers to Cipher Block Chaining, which means that a portion of the previously encrypted block of encrypted text is used in the encryption of the current block. The Switch supports the 3DES EDE encryption code defined by the Data Encryption Standard (DES) and the Advanced Encryption Standard (AES) to create the encrypted text.
- **Hash Algorithm:** This part of the cipher suite allows the user to choose a message digest function, which will determine a Message Authentication Code. This Message Authentication Code will be encrypted with a sent message to provide integrity and prevent against replay attacks. The Switch supports three hash algorithms, MD5 (Message Digest 5), SHA (Secure Hash Algorithm), and SHA256.

These three parameters are uniquely assembled in four choices on the Switch to create a three-layered encryption code for secure communication between the server and the client. The user may implement any one or combination of the cipher suites available, yet different cipher suites will affect the security level and the performance of the secured connection. The information included in the cipher suites is not included with the Switch and requires downloading from a third source in a file form called a certificate. This function of the Switch cannot be executed without the presence and implementation of the certificate file and can be downloaded to the Switch by utilizing a TFTP server or the Switch file system. The Switch supports TLS 1.0, TLS 1.1, and TLS 1.2. Other versions of SSL may not be compatible with this Switch and may cause problems upon authentication and transfer of messages from client to server.

When the SSL function has been enabled, the web will become disabled. To manage the Switch through the web-based management while utilizing the SSL function, the web browser must support SSL encryption and the header of the URL must begin with https:// (Ex. https://xx.xx.xx.xx). Any other method will result in an error and no access can be authorized for the web-based management.

Users can download a certificate file for the SSL function on the Switch from a TFTP server. The certificate file is a data record used for authenticating devices on the network. It contains information on the owner, keys for authentication and digital signatures. Both the server and the client must have consistent certificate files for optimal use of the SSL function. Currently, the Switch comes with a certificate pre-loaded though the user may need to download more, depending on user circumstances.

SSL Global Settings

This window is used to display and configure the global SSL settings.

To view the following window, click **Security > SSL > SSL Global Settings**, as shown below:

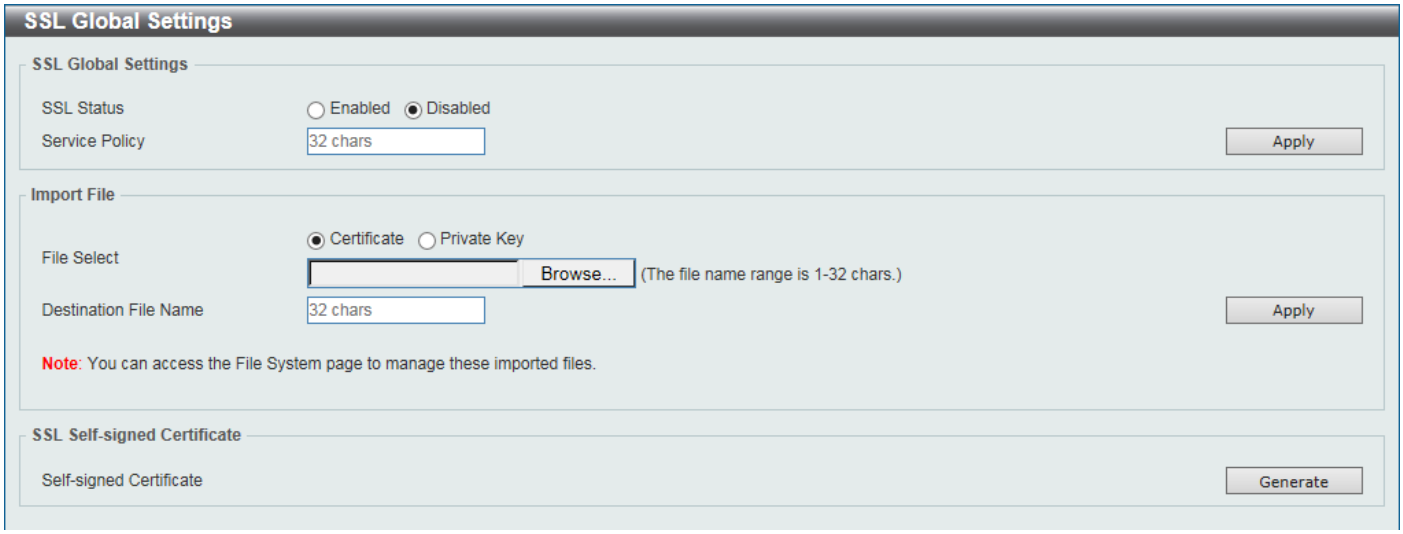


Figure 9-97 SSL Global Settings Window

The fields that can be configured in **SSL Global Settings** are described below:

Parameter	Description
SSL Status	Select to enable or disable the global SSL status here.
Service Policy	Enter the service policy name here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Import File** are described below:

Parameter	Description
File Select	Select the file type that will be loaded here. Options to choose from are **Certificate** and **Private Key**. After selecting the file type, browse to the appropriate file, located on the local computer, by pressing the **Browse** button.
Destination File Name	Enter the destination file name used here. This name can be up to 32 characters long.

Click the **Apply** button to accept the changes made.

Click the **Generate** button in the **SSL-Self-signed Certificate** section to generate a new self-signed certificate, regardless if there is a built-in self-signed certificate or not. The certificate generated does not affect the user-downloaded certificates.

NOTE: The SSL self-signed certificate only supports self-signature RSA certificates with a key length of 2048 bits.

Crypto PKI Trustpoint

This window is used to display and configure the crypto PKI trust point settings.

To view the following window, click **Security > SSL > Crypto PKI Trustpoint**, as shown below:

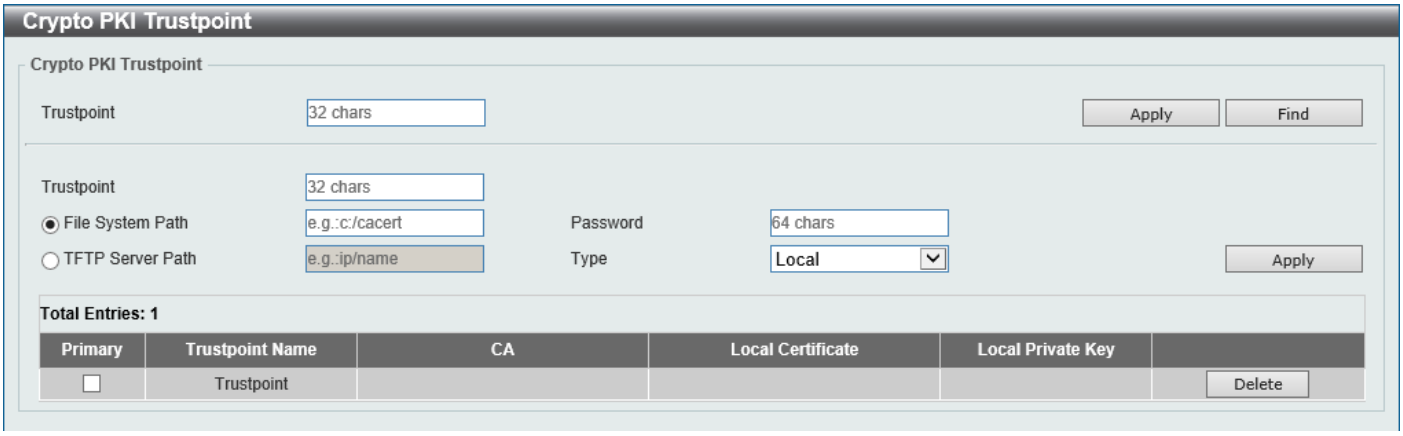


Figure 9-98 Crypto PKI Trustpoint Window

The fields that can be configured are described below:

Parameter	Description
Trustpoint	Enter the name of the trust-point that is associated with the imported certificates and key pairs here. This name can be up to 32 characters long.
File System Path	Enter the file system path for certificates and key pairs here.
Password	Enter the encrypted password phrase that is used to undo encryption when the private keys are imported here. The password phrase is a string of up to 64 characters. If the password phrase is not specified, the NULL string will be used.
TFTP Server Path	Enter the TFTP server path here.
Type	Select the type of certificate that will be imported here. Options to choose from are: • **Both** - Specifies to import the CA certificate, local certificate, and key pairs. • **CA** - Specifies to import the CA certificate only. • **Local** - Specifies to import local certificate and key pairs only.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

SSL Service Policy

This window is used to display and configure the SSL service policy settings.

To view the following window, click **Security > SSL > SSL Service Policy**, as shown below:

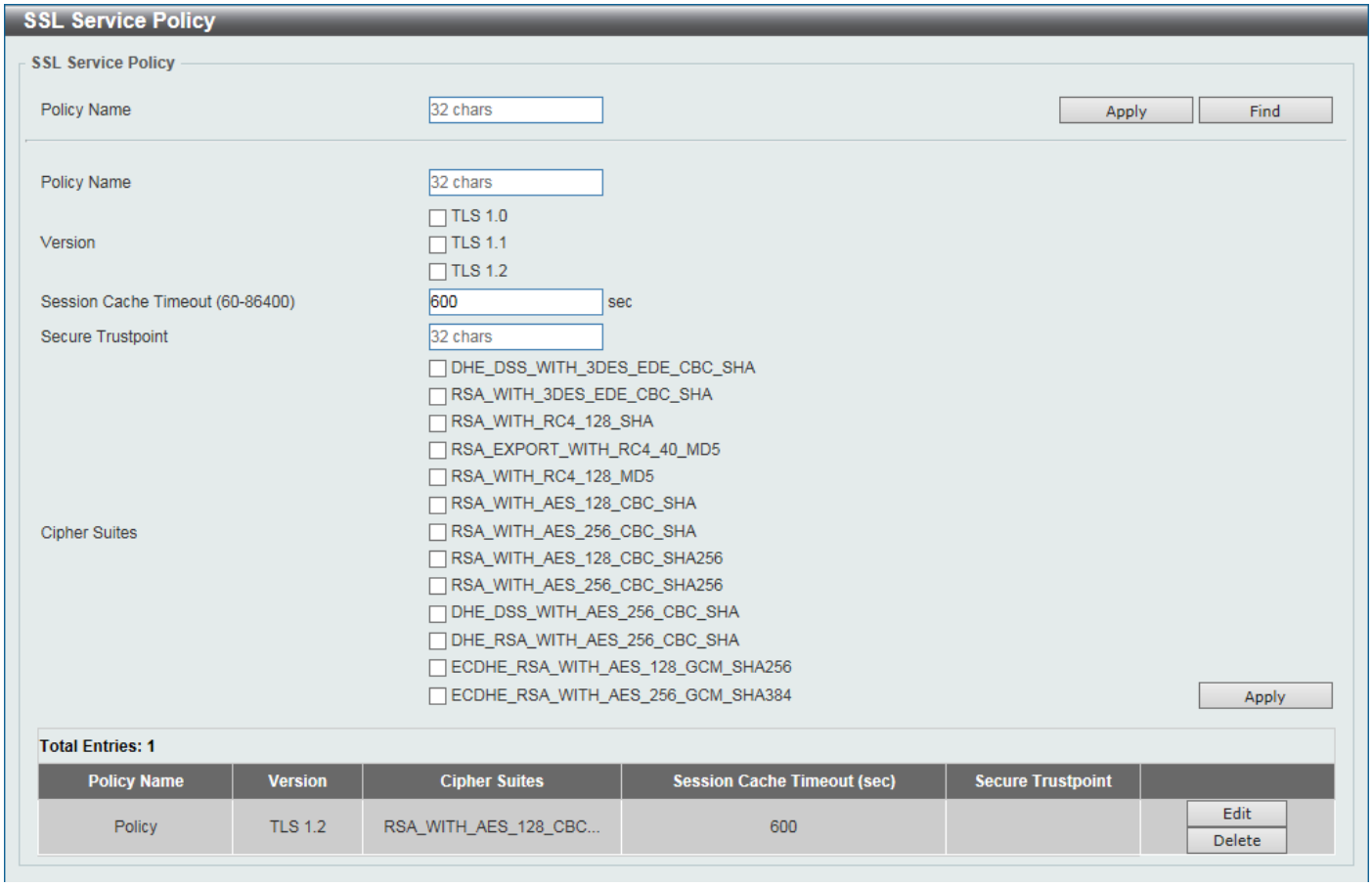


Figure 9-99 SSL Service Policy Window

The fields that can be configured are described below:

Parameter	Description
Policy Name	Enter the SSL service policy name here. This name can be up to 32 characters long.
Version	Select the Transport Layer Security (TLS) version here. Options to choose from are **TLS 1.0**, **TLS 1.1**, and **TLS 1.2**.
Session Cache Timeout	Enter the session cache timeout value used here. The range is from 60 to 86400 seconds. By default, this value is 600 seconds.
Secure Trustpoint	Enter the secure trust point name here. This name can be up to 32 characters long.
Cipher Suites	Select the cipher suites that will be associated with this profile here.

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

SFTP Server Settings

This window is used to display and configure the Secure File Transfer Protocol (SFTP) server settings. SFTP is a remotely secure file transfer protocol over a reliable data stream. Because SFTP itself does not provide authentication and security, the SFTP server runs as a sub-system of the SSH server.

To view the following window, click **Security > SFTP Server Settings**, as shown below:

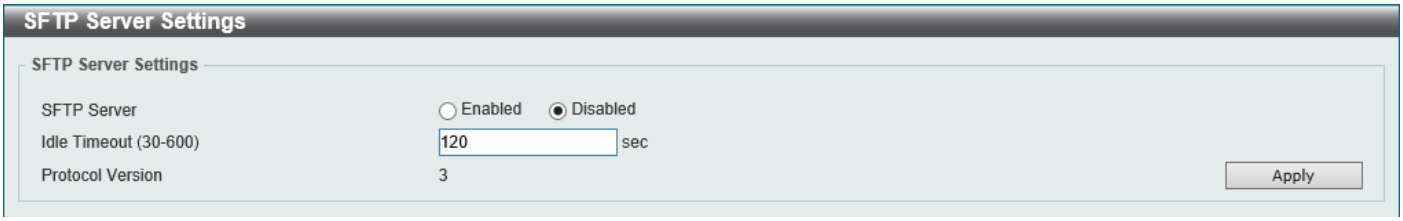


Figure 9-100 SFTP Server Settings Window

The fields that can be configured are described below:

Parameter	Description
SFTP Server	Select to globally enable or disable the SFTP server feature here.
Idle Timeout	Enter the idle timeout value here. If the SFTP server detects no operation after the duration of the idle timer for a specific SFTP session, the Switch will close this SFTP session. The range is from 30 to 600 seconds. By default, this value is 120 seconds.

Click the **Apply** button to accept the changes made.

Network Protocol Port Protection Settings

This window is used to display and configure the network protocol port protection settings.

To view the following window, click **Security > Network Protocol Port Protection Settings**, as shown below:

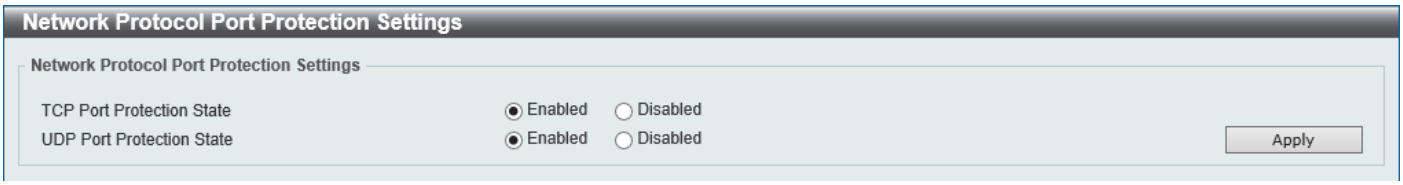


Figure 9-101 Network Protocol Port Protect Settings Window

The fields that can be configured are described below:

Parameter	Description
TCP Port Protect State	Select to enable or disable the TCP port network protocol protection function here.
UDP Port Protect State	Select to enable or disable the UDP port network protocol protection function here.

Click the **Apply** button to accept the changes made.

10. OAM

CFM

CFM Settings

This window is used to display and configure the Connectivity Fault Management (CFM) settings.

To view the following window, click **OAM > CFM > CFM Settings**, as shown below:

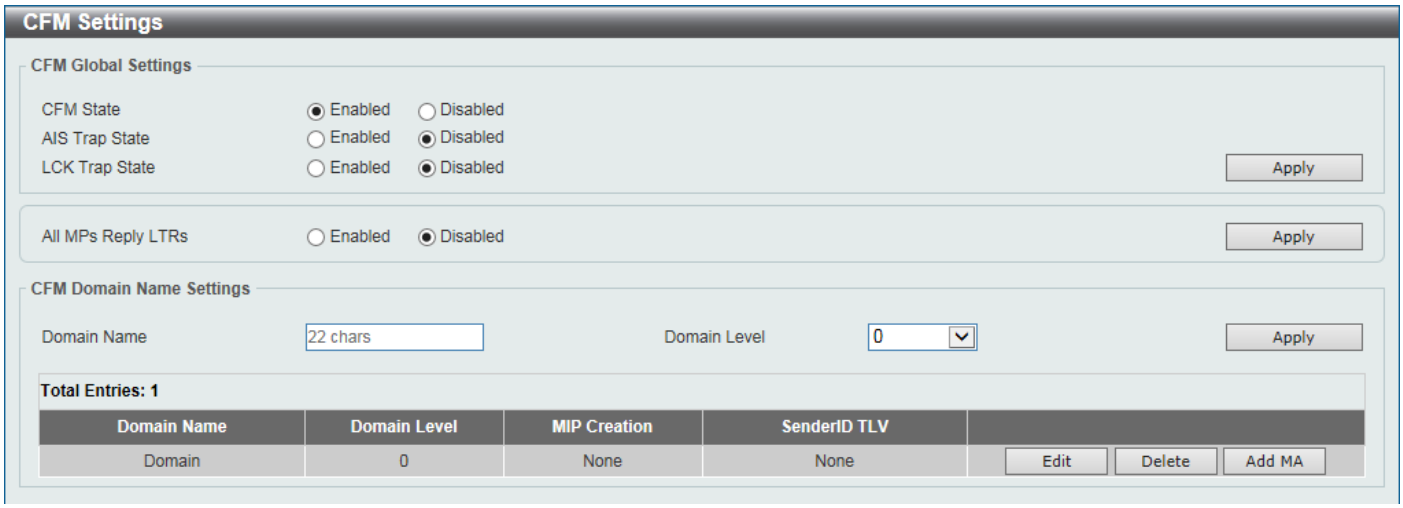


Figure 10-1 CFM Settings Window

The fields that can be configured in **CFM Global Settings** are described below:

Parameter	Description
CFM State	Select to globally enable or disable the CFM feature here.
AIS Trap State	Select to enable or disable the Alarm Indication Signal (AIS) trap feature here. If the trap status of AIS is enabled, once an ETH-AIS event occurs or an ETH-AIS event clears, a trap will be sent out.
LCK Trap State	Select to enable or disable the Locked Signal (LCK) trap feature here. If the trap status of LCK is enabled, once an ETH-LCK event occurs or an ETH-LCK event clears, a trap will be sent out.
All MPs Reply LTRs	Select to enable or disable the all MPs Link-Trace Reply (LTR) feature here. According to IEEE 802.1ag, a Bridge replies with one LTR to a Link-Trace Message (LTM). This feature can make all MPs on an LTM's forwarding path reply with LTRs, whether they are on a Bridge or not.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **CFM Domain Name Settings** are described below:

Parameter	Description
Domain Name	Enter the Maintenance Domain (MD) name here. This name can be up to 22 characters long. The name does not allow spaces. Each MD has a unique name amongst all those used or available to a service provider or operator. It facilitates easy identification of administrative responsibility for each maintenance domain.
Domain Level	Enter the Maintenance Domain (MD) level here. The range is from 0 to 7. A unique MD level is assigned to define the hierarchical relationship between domains. The larger range of domain has the higher value of level.

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Click the **Add MA** button to add a new Maintenance Association (MA) rule.

After clicking the **Edit** button, the following page will appear.

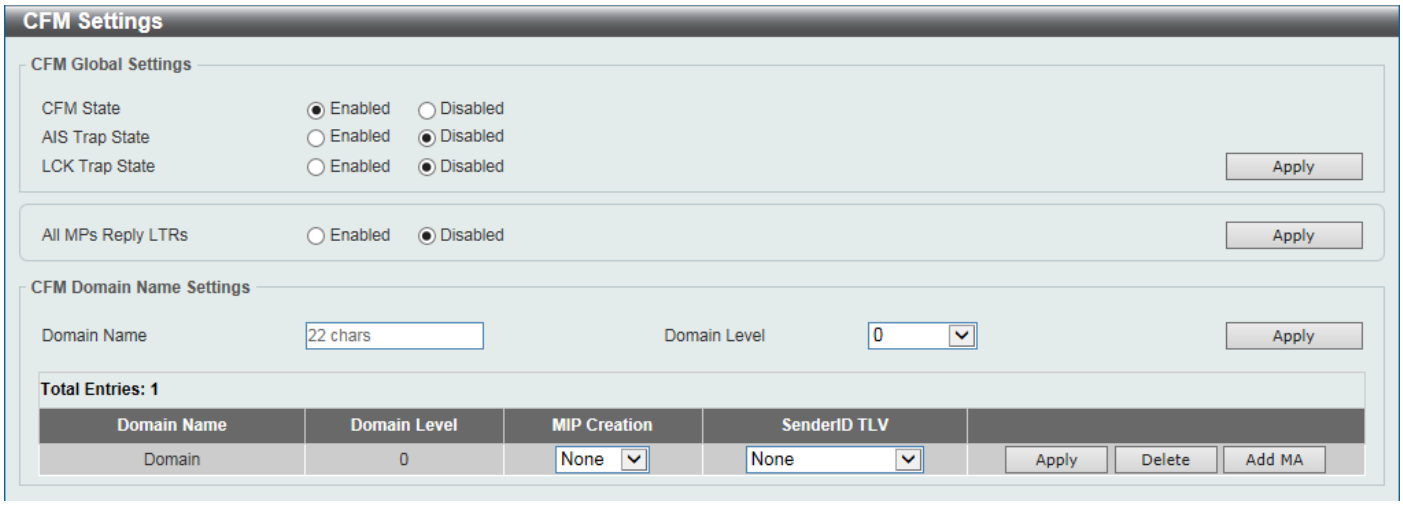


Figure 10-2 CFM Settings (Edit) Window

The fields that can be configured in the table are described below:

Parameter	Description
MIP Creation	Select the Maintenance domain Intermediate Point (MIP) option here. The creation of MIPs on a maintenance domain is useful for tracing the link, MIP by MIP. It also allows the user to perform a loopback from an MEP to an MIP. An enumerated value indicates whether the management entity can create MIP Half Functions (MHF) for a maintenance domain. Options to choose from are: • **None** - Specifies not to create the MIP for a maintenance domain. • **Auto** - Specifies that MIPs will always be created on any port in this MD, when there is no MEP configured on that port for the MAs with the same VID at this MD level or any higher active MD levels, and at the same time there is an MEP configured on that port for the MA with the same VID at the next lower active MD level or there is no MA with the same VID at any lower active MD levels. For an intermediate Switch in an MA, the setting should be **Auto** in order for the MIPs to be created on this device. • **Explicit** - Specifies that MIPs will be created on any port for the MAs in this maintenance, when there is no MEP configured on that port for the MAs with the same VID at this MD level or any higher active MD levels, and at the same time there is an MEP configured on that port for the MA with the same VID at the next lower active MD level.
SenderID TLV	This option is used to configure the default transmission of the sender ID TLV by MPs in an MD. Options to choose from are: • **None** - Specifies not to transmit the sender ID TLV. • **Chassis** - Specifies to transmit the sender ID TLV with the chassis ID information. • **Manage** - Specifies to transmit the sender ID TLV with the managed address information. • **Chassis_Manage** - Specifies to transmit the sender ID TLV with the chassis ID information and the managed address information.

Click the **Apply** button to accept the changes made.

After clicking the **Add MA** button, the following page will appear.

Figure 10-3 CFM Settings (Add MA) Window

The fields that can be configured are described below:

Parameter	Description
MA Name	Enter the Maintenance Association (MA) entry name here. This name can be up to 22 characters long. Each MA in an MD must have a unique MA name. MAs configured in different MDs may have the same MA identifier. When the MA entry is deleted, the configuration on it is also deleted.
MA VID	Enter the Maintenance Association (MA) entry VLAN ID here. The range is from 1 to 4094.

Click the **Apply** button to accept the changes made.

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

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Click the **Add MEP** button to add a new Maintenance association End Point (MEP) entry.

After clicking the **Edit** button, the following page will appear.

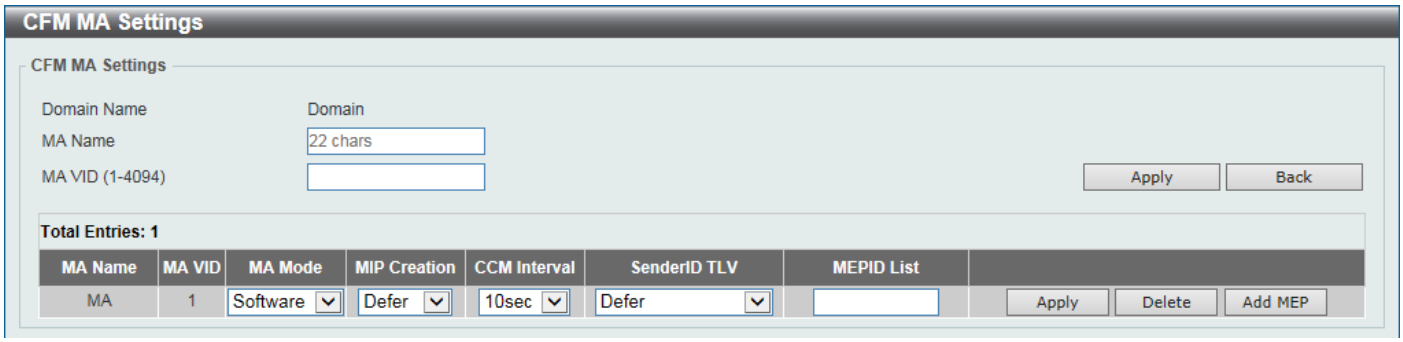


Figure 10-4 CFM Settings (Add MA, Edit) Window

The fields that can be configured in the table are described below:

Parameter	Description
MA Mode	Select the MA mode. Options to choose from are: **Software** and **Hardware**.
MIP Creation	This option is used to configure the MIP creation for an MA. Options to choose from are: • **None** - Specifies not to create the MIP on ports in an MA. • **Auto** - Specifies that MIPs will be created on any port for this MA, when there is no MEP configured on that port for the MAs with the same VID at this MD level or any higher active MD levels, and at the same time there is an MEP configured on that port for the MA with the same VID at the next lower active MD level or there is no MA with the same VID at any lower

Parameter	Description
	active MD levels. For an intermediate Switch in an MA, the setting should be **Auto** in order for the MIPs to be created on this device. • **Explicit** - Specifies that MIPs will be created on any port for this MA, when there is no MEP configured on that port for the MAs with the same VID at this MD level or any higher active MD levels, and at the same time there is an MEP configured on that port for the MA with the same VID at the next lower active MD level. • **Defer** - Specifies to inherit the settings configured for the maintenance domain that the MA is associated with. This is the default value.
CCM Interval	Select the Continuity Check Message (CCM) interval value here. Options to choose from are **3.3ms**, **10ms**, **100ms**, **1sec**, **10sec**, **1min**, and **10min**. An MEP will transmit a CCM packet periodically across the MA. The CCM interval indicates the interval at which CCMs are sent by a MEP in a MA.
SenderID TLV	This option is used to configure the transmission of the sender ID TLV by MPs for an MA. Options to choose from are: • **None** - Specifies not to transmit the sender ID TLV. In the CFM hardware mode, the value is fixed to none. • **Chassis** - Specifies to transmit the sender ID TLV with the chassis ID information. • **Manage** - Specifies to transmit the sender ID TLV with the managed address information. • **Chassis_Manage** - Specifies to transmit the sender ID TLV with the chassis ID information and the managed address information. • **Defer** - Specifies to inherit the setting configured for the maintenance domain that the MA is associated with. This is the default value.
MEPID List	Enter the Maintenance association End Point (MEP) ID contained in the MA here. The range is from 1 to 8191.

Click the **Apply** button to accept the changes made.

After clicking the **Add MEP** button, the following page will appear.

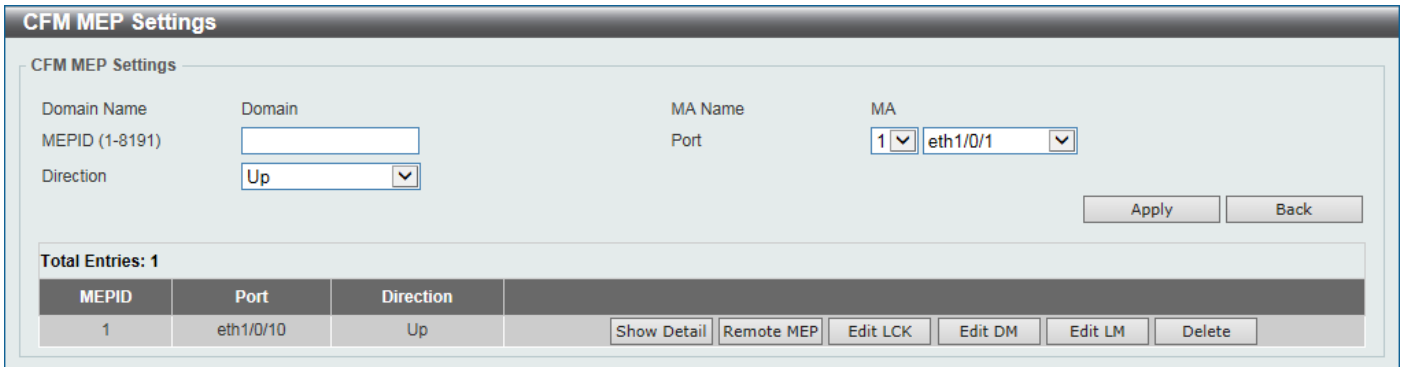


Figure 10-5 CFM Settings (Add MA, Add MEP) Window

The fields that can be configured are described below:

Parameter	Description
MEPID	Enter the MEP ID here. The range is from 1 to 8191. Each MEP configured in the same MA must have a unique MEP ID. The MEP on different MA can have the same MEPID. Before creating a MEP, its MEP ID should be configured in the MA's MEP ID list.
Port	Select the Switch unit ID and port number that will be used here.
Direction	Select the direction of the MEP here. Options to choose from are **Up** and **Down**. • **Up** - Specifies to create an inward facing (up) MEP.

Parameter	Description
	• **Down** - Specifies to create an outward facing (down) MEP.

Click the **Apply** button to accept the changes made.

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

Click the **Show Detail** button to view more detailed information about the specified MEP.

Click the **Remote MEP** button to view the remove MEP table.

Click the **Edit LCK** button to modify the LCK settings of the specified entry.

Click the **Edit DM** button to modify the DM settings of the specified entry.

Click the **Edit LM** button to modify the LM settings of the specified entry.

Click the **Delete** button to delete the specified entry.

After clicking the **Show Detail** button, the following page will appear.

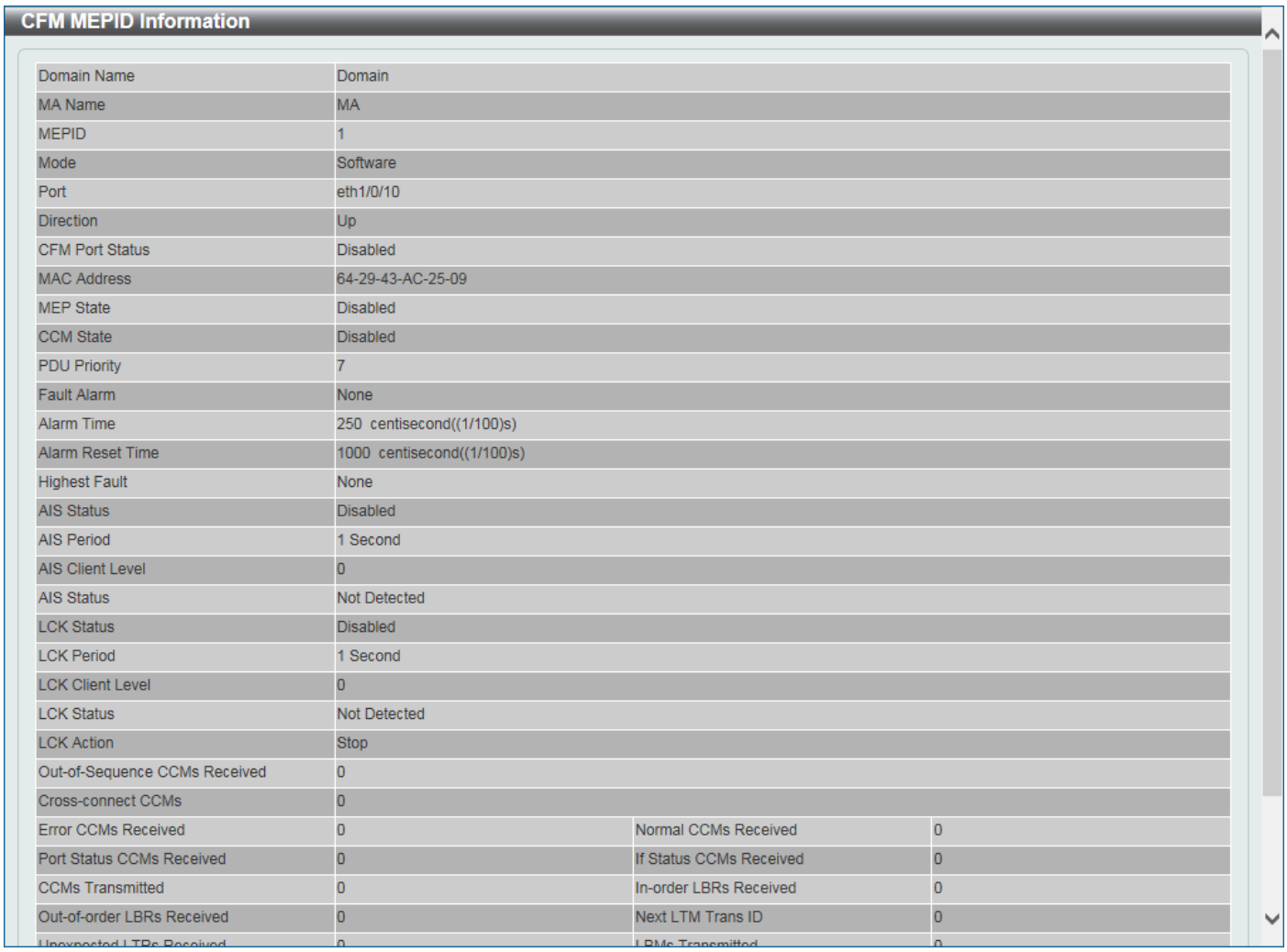


Figure 10-6 CFM Settings (Add MA, Add MEP, MEPID Detail) Window

Click the **Edit** button to modify the specified entry.

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

After clicking the **Edit** button, the following page will appear.

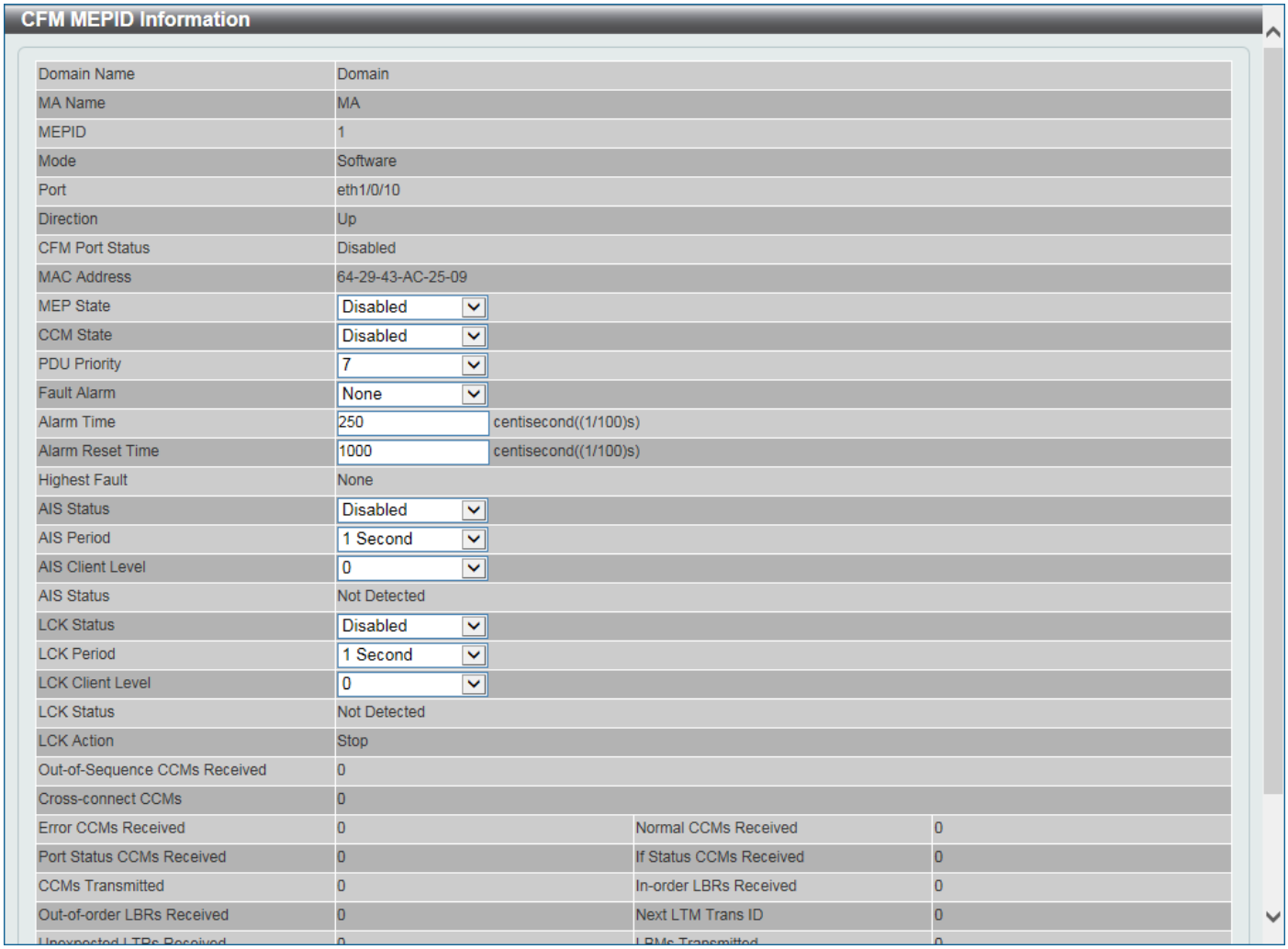


Figure 10-7 CFM Settings (Add MA, Add MEP, MEPID Detail, Edit) Window

The fields that can be configured are described below:

Parameter	Description
MEP State	Select to enable or disable the MEP state on the interface here.
CCM State	Select to enable or disable the CCM state here.
PDU Priority	Select the PDU priority value here. The range is from 0 to 7. This feature is used to define the 802.1p priority that is set in the CCM and other CFM PDUs transmitted by the MEP.
Fault Alarm	Select the type of defects whose fault alarms can be sent by this MEP. Options to choose from are: • **None** - Specifies that no fault alarm will be sent. • **All** - Specifies that the fault alarms can be sent for all types of defects. • **MAC-Status** - Specifies that the fault alarms can be sent for the defects whose priority is equal to or higher than *DefMACstatus*. • **Remote-CCM** - Specifies that the fault alarms can be sent for the defects whose priority is equal to or higher than *DefRemoteCCM*. • **Error-CCM** - Specifies that the fault alarms can be sent for the defects whose priority is equal to or higher than *DefErrorCCM*. • **XCON-CCM** - Specifies that only the fault alarm of *DefXconCCM* can be sent.
Alarm Time	Enter the time period used to define the time from when a defect is detected on the MEP to when a fault alarm will be sent. The range is from 250 to 1000 centiseconds. By default, this value is 250 centiseconds.

Parameter	Description
Alarm Reset Time	Enter the time period used to define the time from when all defects detected on the MEP are removed to when the fault alarm mechanism will be reset. The range is from 250 to 1000 centiseconds. By default, this value is 1000 centiseconds.
AIS Status	Select the enable or disable the AIS feature on this interface here.
AIS Period	Select the transmitting interval of the AIS PDU here. Options to choose from are **1 Second** and **1 Minute**. The default period is 1 second.
AIS Client Level	Select the client level ID to which the MEP sends the AIS PDUs here. The default client MD level is that the most immediate client layer Maintenance domain Intermediate Points (MIP) and MEPs exist on. The range is from 0 to 7.
LCK Status	Select the enable or disable the LCK feature on this interface here.
LCK Period	Select the transmitting interval of the LCK PDU here. Options to choose from are **1 Second** and **1 Minute**. The default period is 1 second.
LCK Client Level	Select the client level ID to which the MEP sends the LCK PDU here. The default client MD level is the MD level that the most immediate client layer MIPs and MEPs exist on. The range is from 0 to 7.

Click the **Apply** button to accept the changes made.

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

After clicking the **Remote MEP** button, the following page will appear.

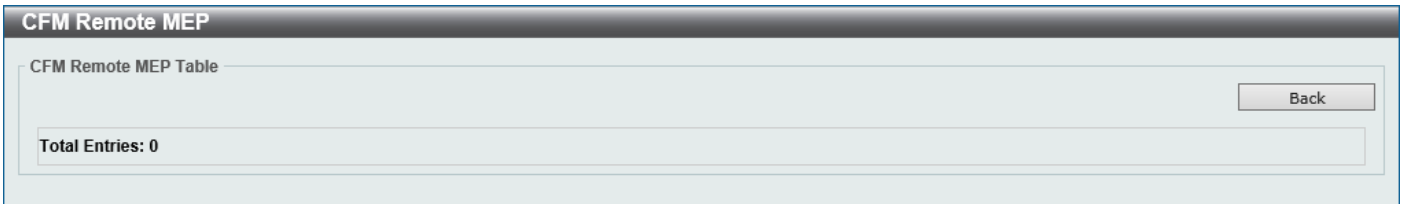


Figure 10-8 CFM Settings (Add MA, Add MEP, Remote MEP) Window

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

After clicking the **Edit LCK** button, the following page will appear.

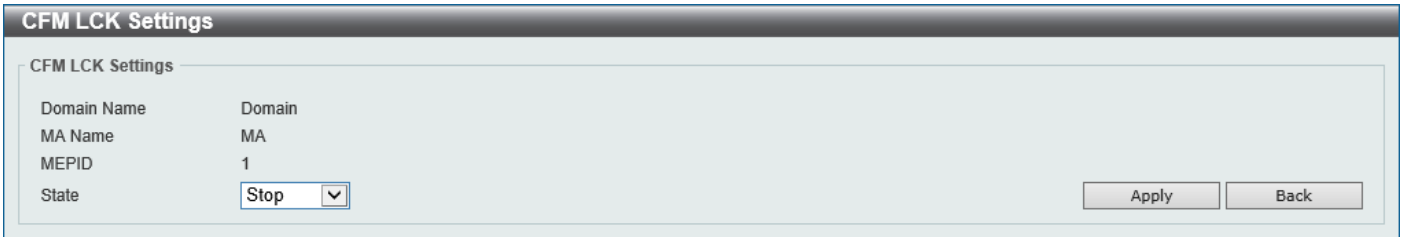


Figure 10-9 CFM Settings (Add MA, Add MEP, Edit LCK) Window

The fields that can be configured are described below:

Parameter	Description
State	Select to **Start** or **Stop** the administrative lock action here. This feature will result in the MEP to send LCK PDUs to a client level MEP.

Click the **Apply** button to accept the changes made.

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

After clicking the **Edit DM** button, the following page will appear.

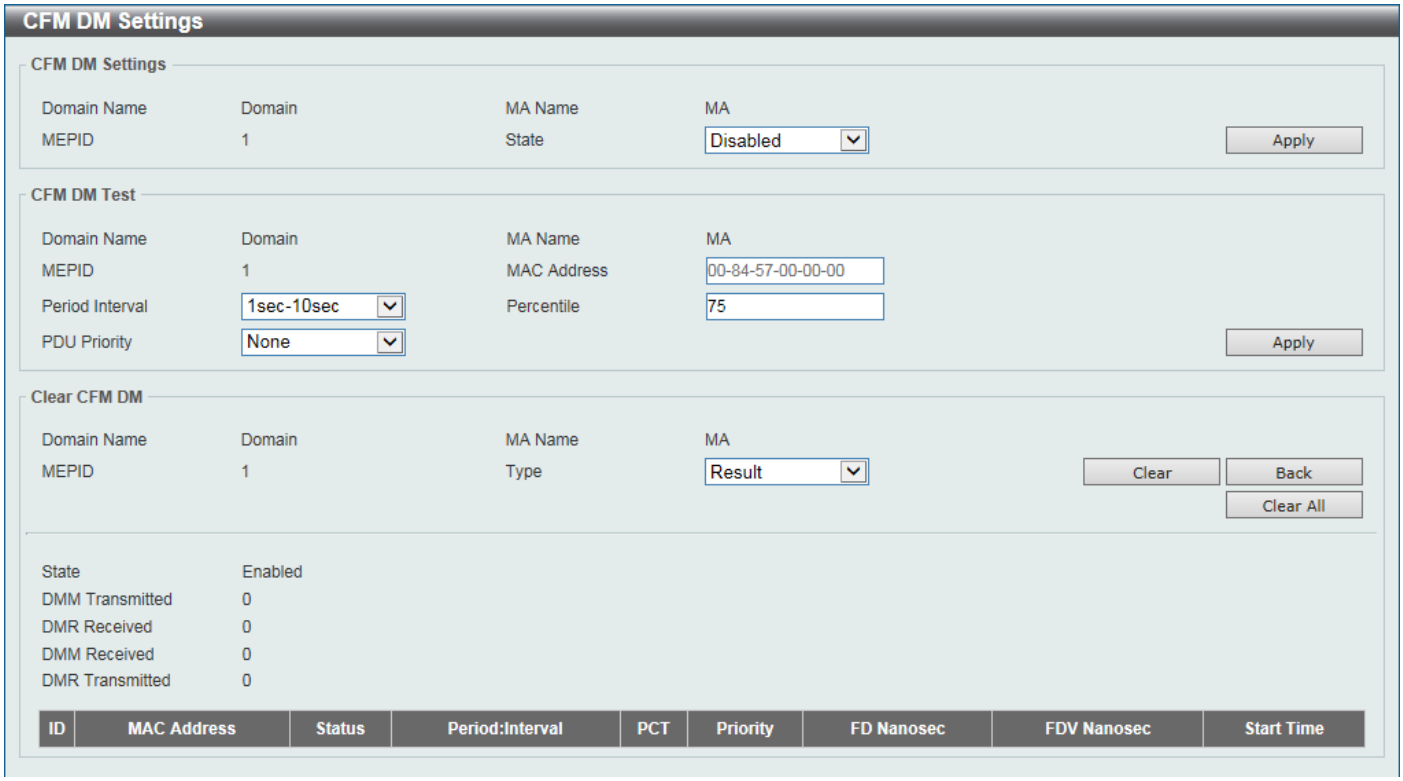


Figure 10-10 CFM Settings (Add MA, Add MEP, Edit DM) Window

The fields that can be configured in **CFM DM Settings** are described below:

Parameter	Description
State	Select to enable or disable MA.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **CFM DM Test** are described below:

Parameter	Description
MAC Address	Enter the destination MAC address here.
Period Interval	Select the transmission period of DMM message and the diagnostic interval. Options to choose from are: • **100ms-1sec** - The transmission period is 100 milliseconds, and the diagnostic interval is 1 second. • **1sec-10sec** - The transmission period is 1 second, and the diagnostic interval is 10 seconds. • **10sec-1min** - The transmission period is 10 seconds, and the diagnostic interval is 1 minute.
Percentile	Enter the percentile of frame delay and frame delay variation measurement.
PDU Priority	Select the 802.1p priority set in the DMM message transmitted by the MEP. This determines the CoS instance with which the frame delay measurement test is associated.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Clear CFM DM** are described below:

Parameter	Description
MA	Select to clear the information of the frame delay measurement function. Options to choose from are: • **Result** - Select to clear the stored frame delay measurement results. • **Statistics** - Select to clear the stored statistics of ETH-DM frames.

Click the **Clear** button to clear the entries based on the information specified.

Click the **Clear All** button to clear the information associated with all entries.

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

After clicking the **Edit LM** button, the following page will appear.

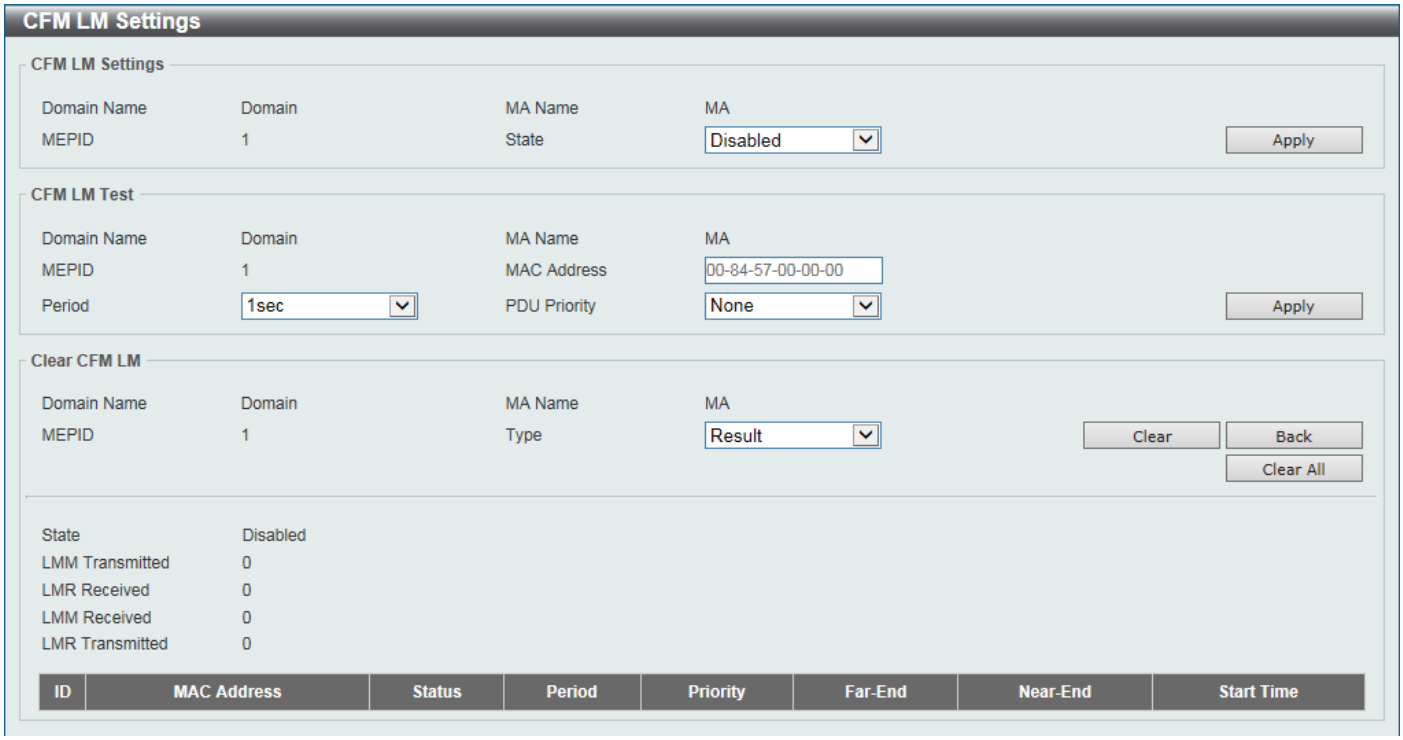


Figure 10-11 CFM Settings (Add MA, Add MEP, Edit LM) Window

The fields that can be configured in **CFM LM Settings** are described below:

Parameter	Description
State	Select to enable or disable MA.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **CFM LM Test** are described below:

Parameter	Description
MAC Address	Enter the destination MAC address here.
Period	Select the transmission period of the LM PDU. Options to choose from are: **100ms**, **1sec**, and **10sec**.
PDU Priority	Select the 802.1p priority set in the LMM message transmitted by the MEP. This determines the CoS instance to which the frame delay measurement test is applied.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Clear CFM LM** are described below:

Parameter	Description
MA	Select to clear the information of the frame loss measurement function. Options to choose from are: • **Result** - Select to clear the stored frame loss measurement results. • **Statistics** - Select to clear the stored statistics of ETH-LM frames.

Click the **Clear** button to clear the entries based on the information specified.

Click the **Clear All** button to clear the information associated with all entries.

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

CFM Port Settings

This window is used to display and configure the CFM port settings.

To view the following window, click **OAM > CFM > CFM Port Settings**, as shown below:

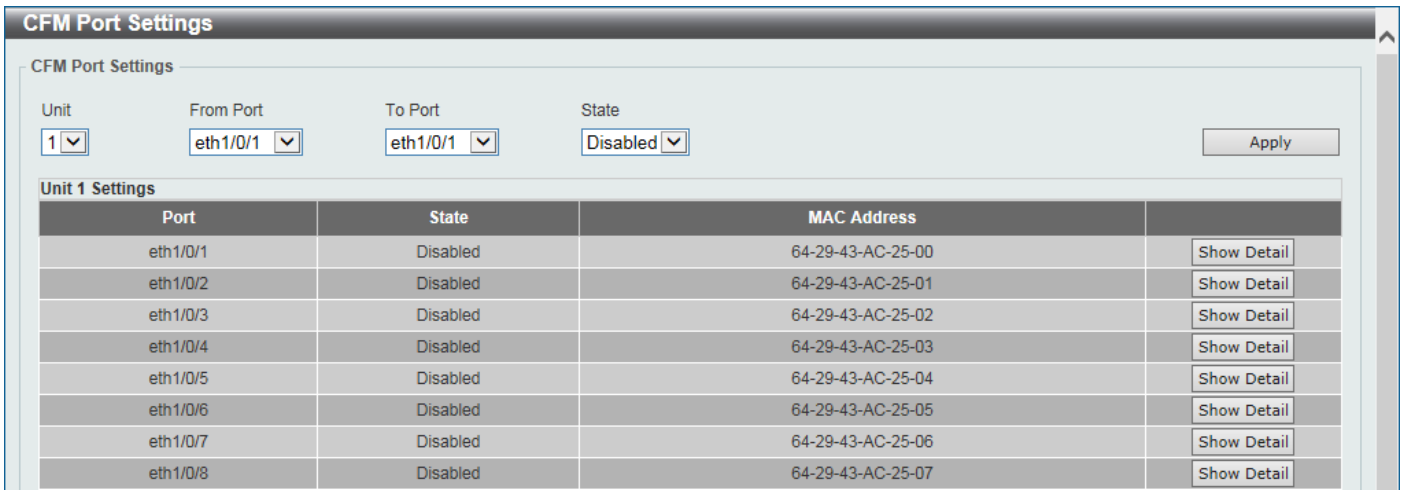


Figure 10-12 CFM Port Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
State	Select the enable or disable the CFM feature on the specified port(s) here.

Click the **Apply** button to accept the changes made.

Click the **Show Detail** button to more detailed information about the CFM settings on the specified port.

After clicking the **Show Detail** button, the following page will appear.

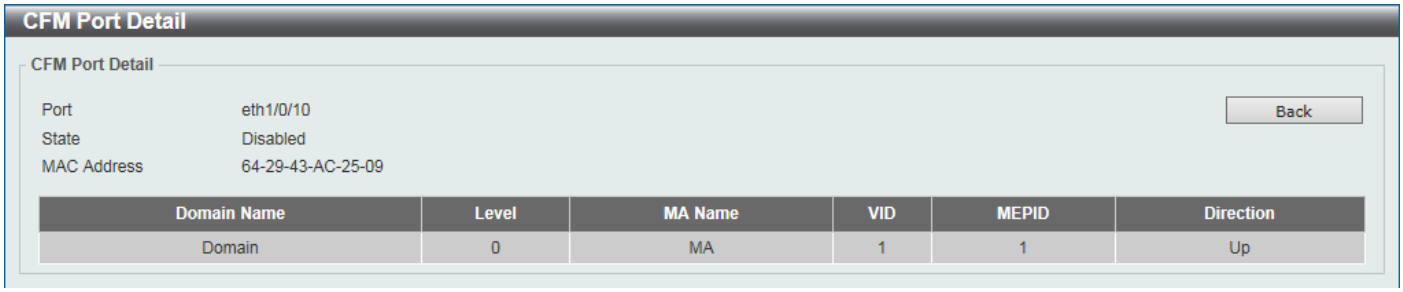


Figure 10-13 CFM Port Settings (View Detail) Window

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

CFM Loopback Test

This window is used to display and configure the CFM loopback test settings.

To view the following window, click **OAM > CFM > CFM Loopback Test**, as shown below:

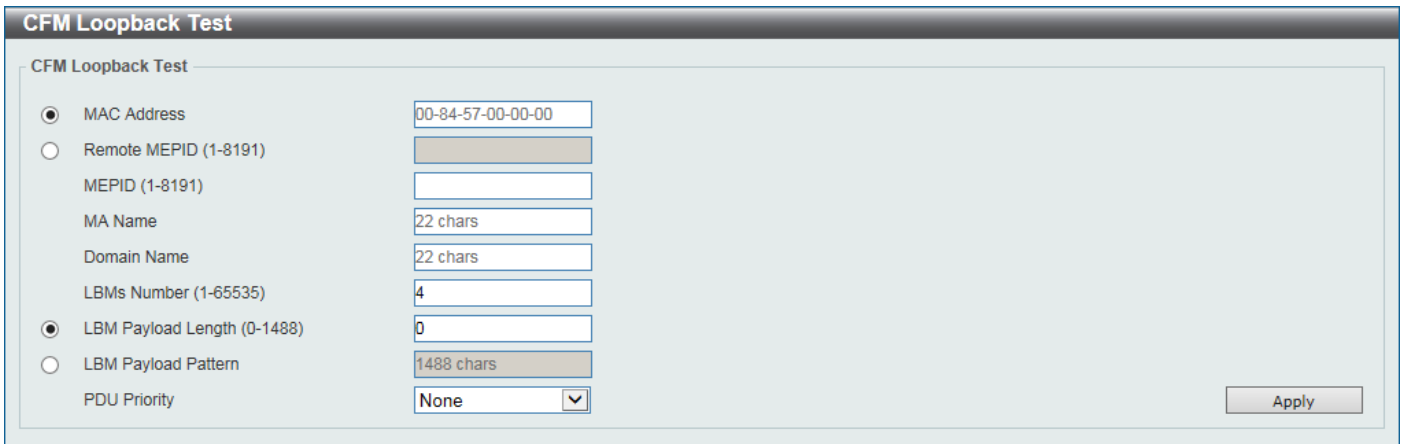


Figure 10-14 CFM Loopback Test Window

The fields that can be configured are described below:

Parameter	Description
MAC Address	Select and enter the destination MAC address here.
Remote MEPID	Select and enter the remote MEP ID here. The range is from 1 to 8191.
MEPID	Enter the MEP ID that will initiate the loopback test here. The range is from 1 to 8191.
MA Name	Enter the MA name here. This name can be up to 22 characters long.
Domain Name	Enter the MD name here. This name can be up to 22 characters long.
LBMs Number	Enter the number of LBMs to be sent here. The range is from 1 to 65535. By default, this value is 4.
LBM Payload Length	Select and enter the payload length of the LBM to be sent here. The range is from 0 to 1488. By default, this value is 0.
LBM Payload Pattern	Select and enter the LBM payload pattern here. This specifies an arbitrary amount of data to be included in a Data TLV, along with an indication whether the Data TLV is to be included. This string can be up to 1488 characters long. No spaces are allowed.

Parameter	Description
PDU Priority	Select the 802.1p priority to be set in the transmitted LBMs here. If **None** is selected, it uses the same priority as the CCMs sent by the MEP. The range is from 0 to 7.

Click the **Apply** button to accept the changes made.

After clicking the **Apply** button, the following **CFM Loopback Test Result** will appear:

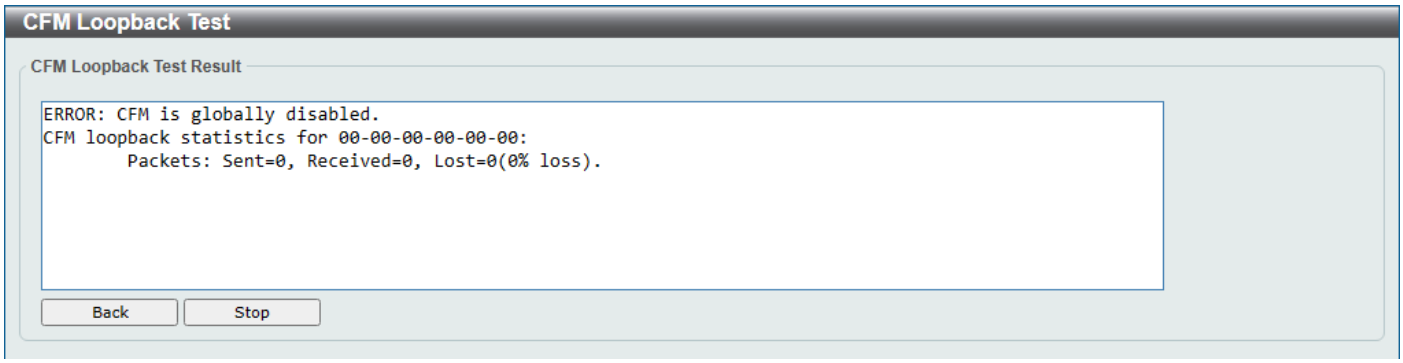


Figure 10-15 CFM Loopback Test Result Window

Click the **Stop** button to halt the CFM Loopback Test.

Click the **Back** button to return to the CFM Loopback Test window.

CFM Linktrace Settings

This window is used to display and configure the CFM link-trace settings.

To view the following window, click **OAM > CFM > CFM Linktrace Settings**, as shown below:

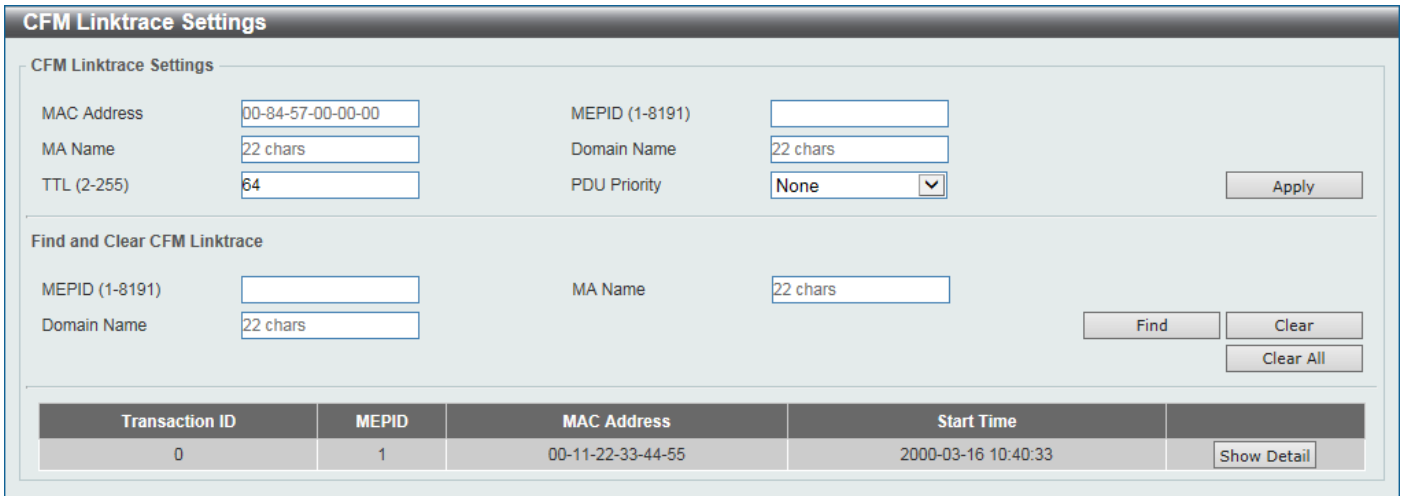


Figure 10-16 CFM Linktrace Settings Window

The fields that can be configured in **CFM Linktrace Settings** are described below:

Parameter	Description
MAC Address	Enter the destination MAC address here.
MEPID	Enter the MEP ID here used to initiate the link-trace feature. The range is from 1 to 8191.
MA Name	Enter the MA name here. The name can be up to 22 characters long.

Parameter	Description
Domain Name	Enter the MD name here. The name can be up to 22 characters long.
TTL	Enter the link-trace message's TTL value here. The range is from 2 to 255. The default value is 64.
PDU Priority	Select the 802.1p priority to be set in the transmitted LTMs here. If **None** is selected, it uses the same priority as the CCMs sent by the MEP. The range is from 0 to 7.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find and Clear CFM Linktrace** are described below:

Parameter	Description
MEPID	Enter the MEP ID here. The range is from 1 to 8191.
MA Name	Enter the MA name here. The name can be up to 22 characters long.
Domain Name	Enter the MD name here. The name can be up to 22 characters long.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

Click the **Clear All** button to clear the information associated with all entries.

Click the **Show Detail** button to view more detailed information about the link-trace entry.

After clicking the **Show Detail** button, the following page will appear.

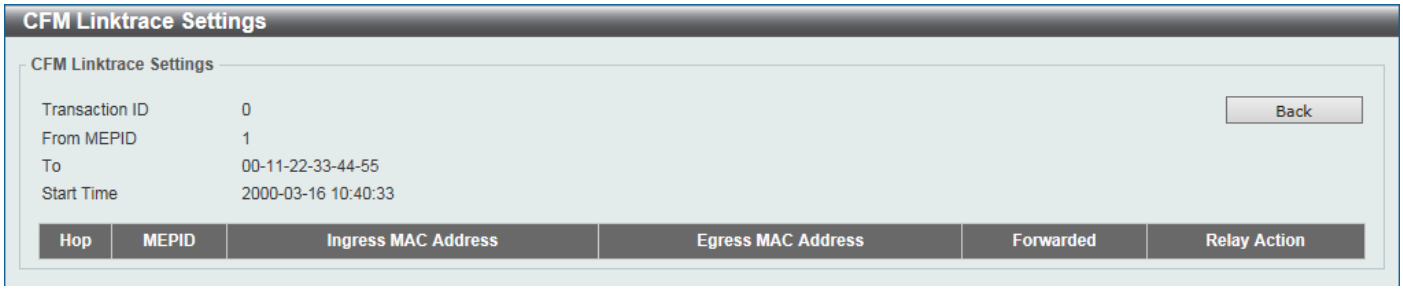


Figure 10-17 CFM Linktrace Settings (Show Detail) Window

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

CFM Packet Counter

This window is used to find and display the CFM packet counter information.

To view the following window, click **OAM > CFM > CFM Packet Counter**, as shown below:

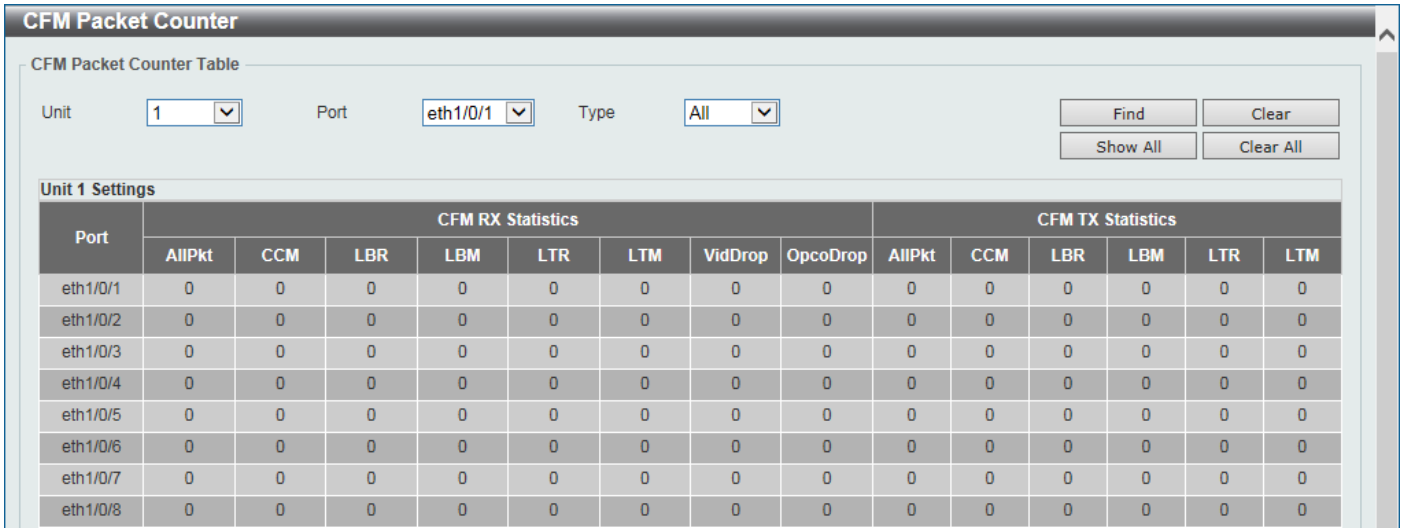


Figure 10-18 CFM Packet Counter Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
Port	Select the Switch port that will be used here.
Type	Select the type of counter information that will be cleared or displayed here. Options to choose from are **All**, **TX**, and **RX**.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the counter information based on the information specified.

Click the **Show All** button to display all the entries.

Click the **Clear All** button to clear the counter information associated with all entries.

CFM Counter CCM

This window is used to view and clear the CFM CCM counter information.

To view the following window, click **OAM > CFM > CFM Counter CCM**, as shown below:

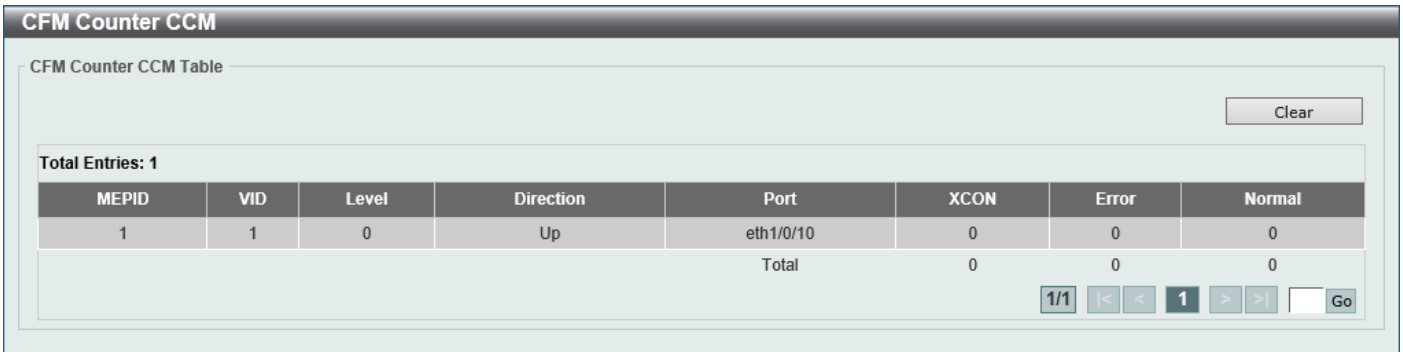


Figure 10-19 CFM Counter CCM Window

Click the **Clear** button to clear the counter information associated with all entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

CFM MIP CCM Table

This window is used to display the MIP CCM database entries.

To view the following window, click **OAM > CFM > CFM MIP CCM Table**, as shown below:

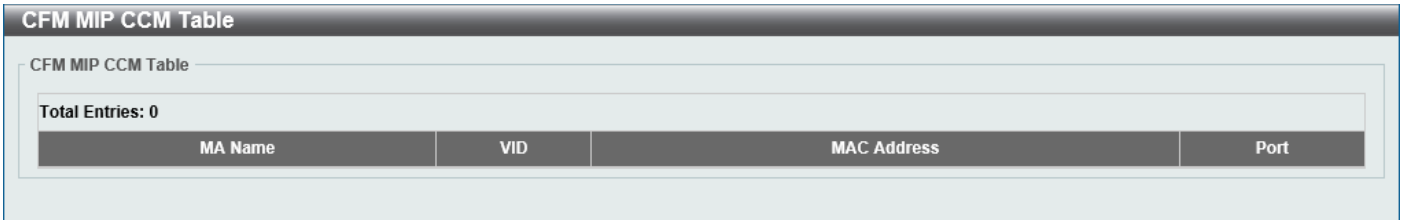


Figure 10-20 CFM MIP CCM Table Window

CFM MEP Fault Table

This window is used to display the MEPs that have faults.

To view the following window, click **OAM > CFM > CFM MEP Fault Table**, as shown below:

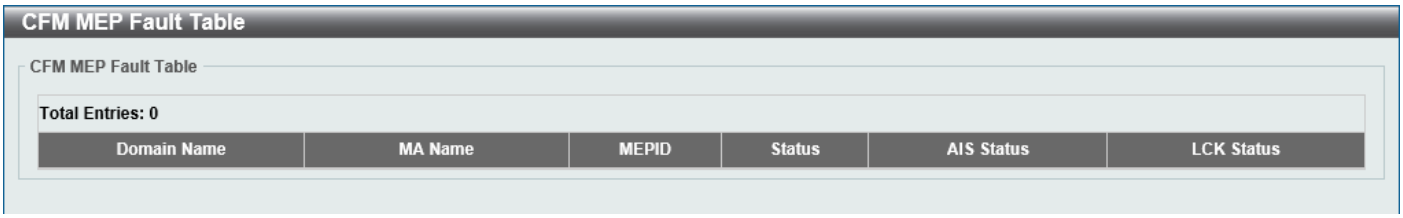


Figure 10-21 CFM MEP Fault Table Window

Cable Diagnostics

The cable diagnostics feature is designed primarily for administrators or customer service representatives to verify and test copper cables; it can rapidly determine the quality of the cables and the types of error.

To view the following window, click **OAM > Cable Diagnostics**, as shown below:

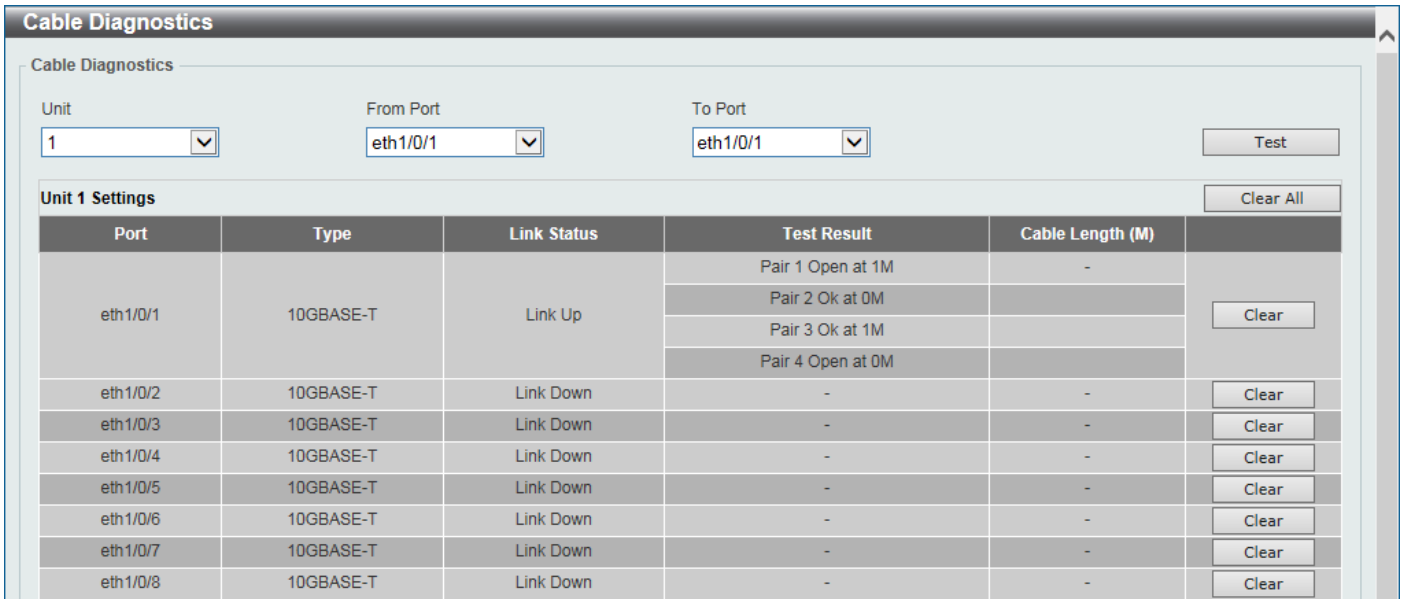


Figure 10-22 Cable Diagnostics Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.

Click the **Test** button to test the specific port.

Click the **Clear All** button to clear all the information in this table.

Click the **Clear** button to clear all the information for the specific port.

NOTE: Cable diagnostic function limitations. Cable length detection is only supported on copper ports.

NOTE: For more accurate test results, use the TIA/EIA-568B pin assignment on the RJ45 connectors.

Fault messages:

- **Open** - This pair is left open.
- **Short** - Two lines of this pair is shorted.
- **CrossTalk** - Lines of this pair is short with lines in other pairs.
- **Unknown** - The diagnosis does not obtain the cable status, please try again.
- **NA** - No cable was found, maybe it's because cable is out of diagnosis specification or the quality is too bad.

Ethernet OAM

Ethernet OAM Settings

This window is used to display and configure the Ethernet Operations, Administration, and Maintenance (OAM) settings.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Settings**, as shown below:

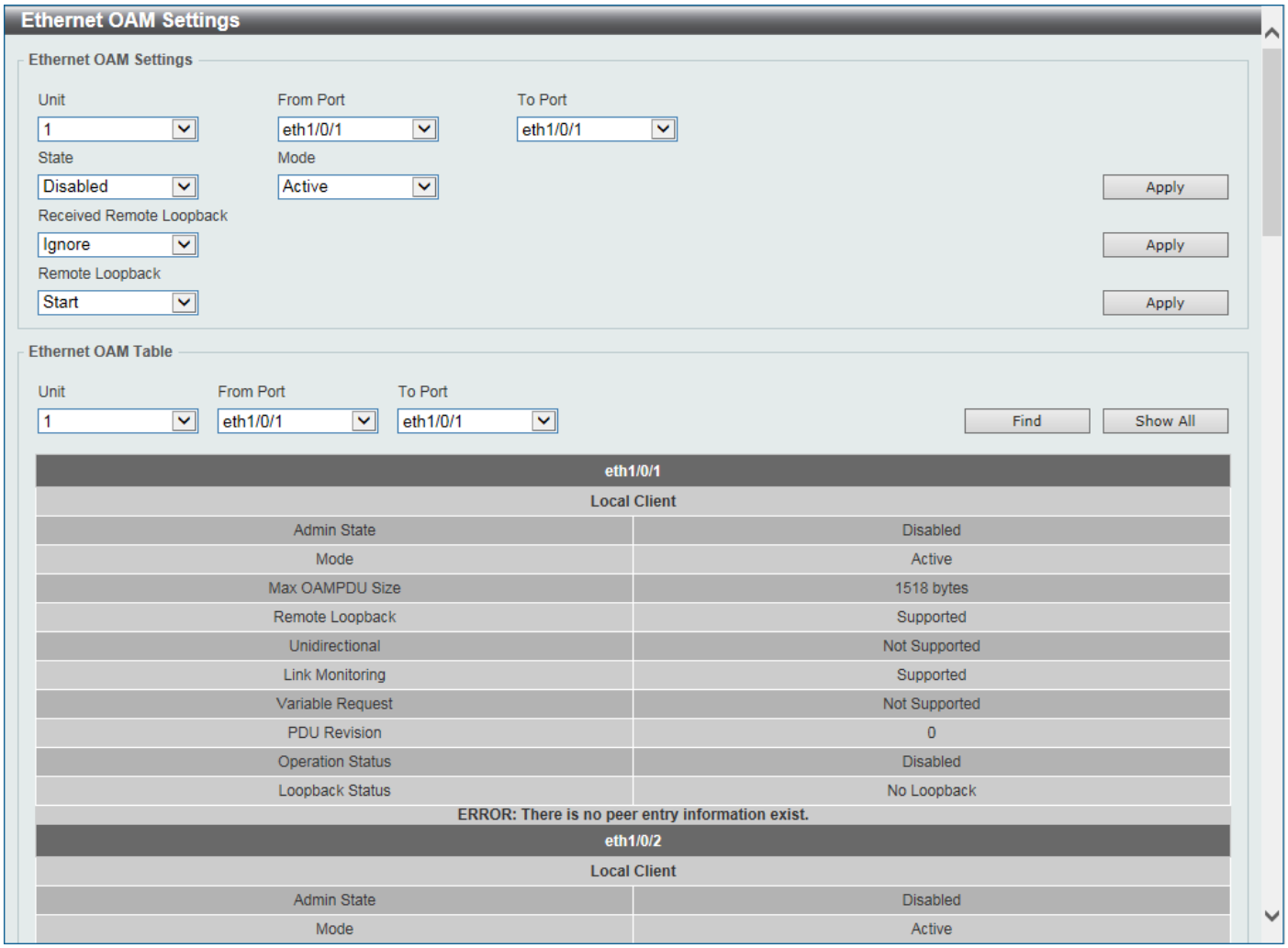


Figure 10-23 Ethernet OAM Settings Window

The fields that can be configured in **Ethernet OAM Settings** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
State	Select to enable or disable the Ethernet OAM feature on the specified ports here. After enabling this function on the interface, the interface will start OAM discovery. If the OAM mode of this interface is active, it initiates the discovery. Otherwise, it reacts to the discovery received from the peer.
Mode	Select the Ethernet OAM mode here. Options to choose from are **Active** and **Passive**. The following two actions are allowed by ports in the active mode, but disallowed by ports in the passive mode. (1) Initiate OAM discovery. (2) Start or stop remote loopback.
Received Remote Loopback	Select to configure the behavior of the received remote loopback requirement from the peer on the specified port(s) here. Options to choose from are:

Parameter	Description
	• **Ignore** - Specifies not to react to remote loopback requirements from a peer. • **Process** - Specifies to react to remote loopback requirements from a peer. The feature is used to configure the client to process or to ignore the received Ethernet OAM remote loopback feature. In the remote loopback mode, all user traffic will not be processed. Ignoring the received remote loopback feature will prevent the port from entering the remote loopback mode.
Remote Loopback	Select the remote loopback action here. Options to choose from are: • **Start** - Specifies to request the peer to change to the remote loopback mode. • **Stop** - Specifies to request the peer to change to the normal operation mode. If the remote peer is configured to ignore the remote loopback request, then the remote peer will not enter or exit the remote loopback mode upon receiving the request. To start the remote peer to enter the remote loopback mode, administrators must ensure that the local client is in the active mode and the OAM connection is established. If the local client is already in the remote loopback mode, then this feature cannot be applied.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet OAM Table** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Ethernet OAM Configuration Settings

This window is used to display and configure the Ethernet OAM configuration settings.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Configuration Settings**, as shown below:

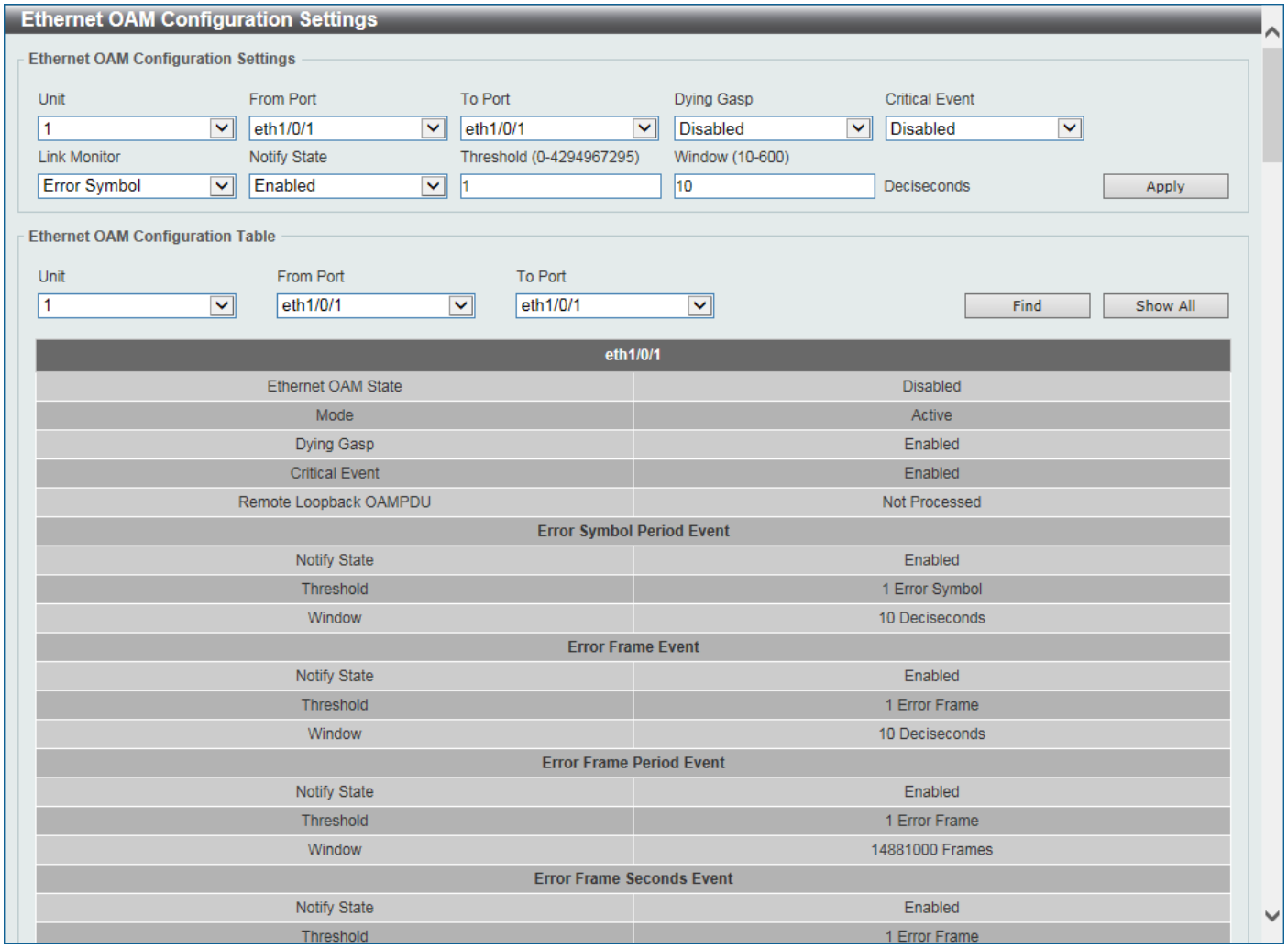


Figure 10-24 Ethernet OAM Configuration Settings Window

The fields that can be configured in **Ethernet OAM Configuration Settings** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
Dying Gasp	Select to enable or disable the dying gasp feature here. This feature is used to configure the capability of the dying gasp event. If the capability for the dying gasp event is disabled, the port will never send out OAM PDUs with the dying gasp event bit set when an unrecoverable local failure condition has occurred.
Critical Event	Select to enable or disable the critical event feature here. This feature is used to configure the capability of the critical event. If the capability for a critical event is disabled, the port will never send out OAM PDUs with critical event bit set when an unspecified critical event has occurred.
Link Monitor	Select the link monitor feature here. Options to choose from are: • **Error Symbol** - This feature is used to enable notifying the Ethernet OAM error symbol event and configure the monitor threshold and window on the specified port.

Parameter	Description
	• **Error Frame** - This feature is used to enable notifying the Ethernet OAM error frame event and configure the monitor threshold and window on the specified port. • **Error Frame Seconds** - This feature is used to enable notifying the Ethernet OAM error frame second event and configure the monitor threshold and window on the specified port. • **Error Frame Period** - This feature is used to enable notifying the Ethernet OAM error frame period event and configure the monitor threshold and window on the specified port.
Notify State	Select to enable or disable the notify state here.
Threshold	Enter the threshold value here. • When **Error Symbol** is selected as the link monitor, enter the number of symbol errors here. If symbol errors occur in the specified window and it exceeds the threshold value, then the event is generated. The range is from 0 to 4294967295. • When **Error Frame** is selected as the link monitor, enter the number of frame errors here. If the error frames occur in the specified window and exceeds the threshold value, then an error frame event is triggered. The range is from 0 to 4294967295. • When **Error Frame Seconds** is selected as the link monitor, enter the number of error frames in seconds here. If the number of the error frames occurred in the specified window and exceeds the threshold value, then the frame event is triggered. The range is from 1 to 900 seconds. • When **Error Frame Period** is selected as the link monitor, enter the number of frame errors that must occur for this event to be triggered here. The range is from 0 to 4294967295.
Window	Enter the window value here. • When **Error Symbol** is selected as the link monitor, enter the amount of time over which the threshold is defined here. If threshold symbol errors occur within the period, an event notification OAM PDU should be generated with an error symbol period event TLV, indicating that the threshold has been crossed in this window. The range is from 10 to 600 deciseconds. • When **Error Frame** is selected as the link monitor, enter the amount of time over which the threshold is defined here. If the threshold frame errors occur within the period, an event notification OAM PDU will be generated with an error frame event TLV, indicating that the threshold has been crossed in this window. The range is from 10 to 600 deciseconds. • When **Error Frame Seconds** is selected as the link monitor, enter the amount of time over which the threshold is defined here. If threshold frame errors occur within the period, an event notification OAM PDU will be generated with an error frame seconds summary event TLV indicating that the threshold has been crossed in this window. The range is from 100 to 9000 deciseconds. • When **Error Frame Period** is selected as the link monitor, enter the number of frames over which the threshold is defined here. If threshold frame errors occur within the period, an event notification OAM PDU should be generated with an error frame period event TLV indicating that the threshold has been crossed in this window. The lower bound is the number of minimum frame-size frames that can be received in 100ms on the underlying physical layer. The upper bound is the number of minimum frame-size frames that can be received in one minute on the underlying physical layer. The range is from 14881 to 3571440000 frames.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet OAM Configuration Table** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Ethernet OAM Event Log Table

This window is used to view and clear the Ethernet OAM event log table.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Event Log Table**, as shown below:

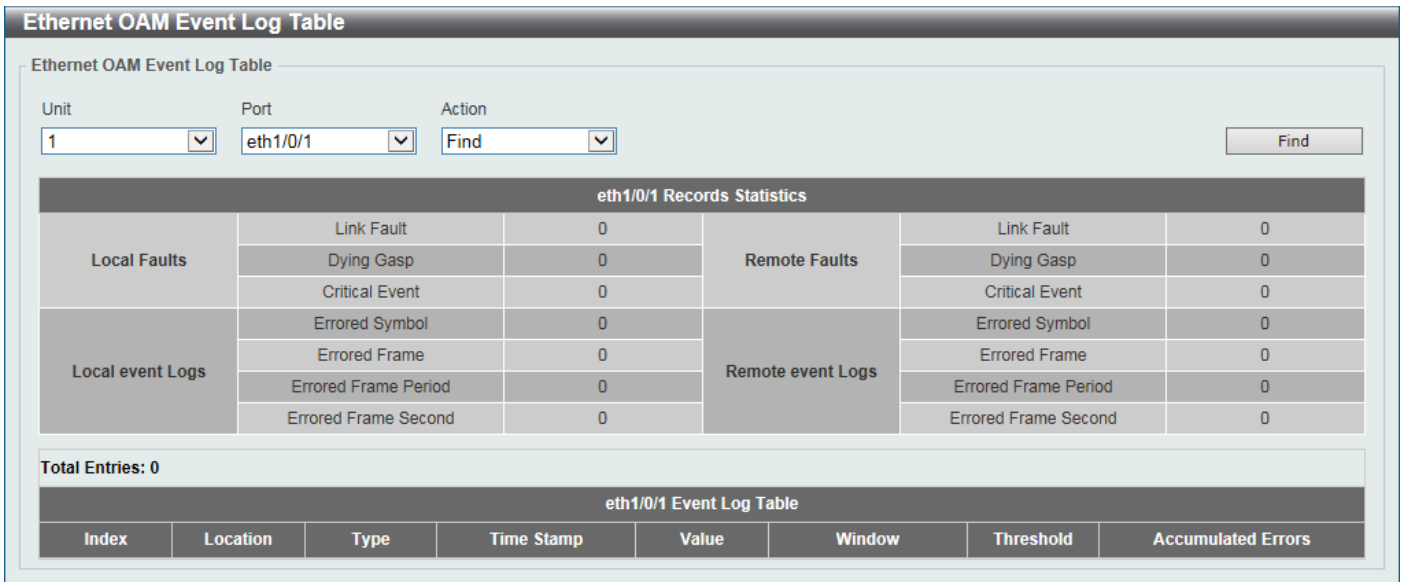


Figure 10-25 Ethernet OAM Event Log Table Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
Port	Select the Switch port that will be used here.
Action	Select the **Find** option to find and display the log entries associated with the specified port. Select the **Clear** option to clear the log entries associated with the specified port.

Click the **Find** button to find and display the log entries associated with the specified port.

Ethernet OAM Statistics Table

This window is used to view and clear the Ethernet OAM statistics table.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Statistics Table**, as shown below:

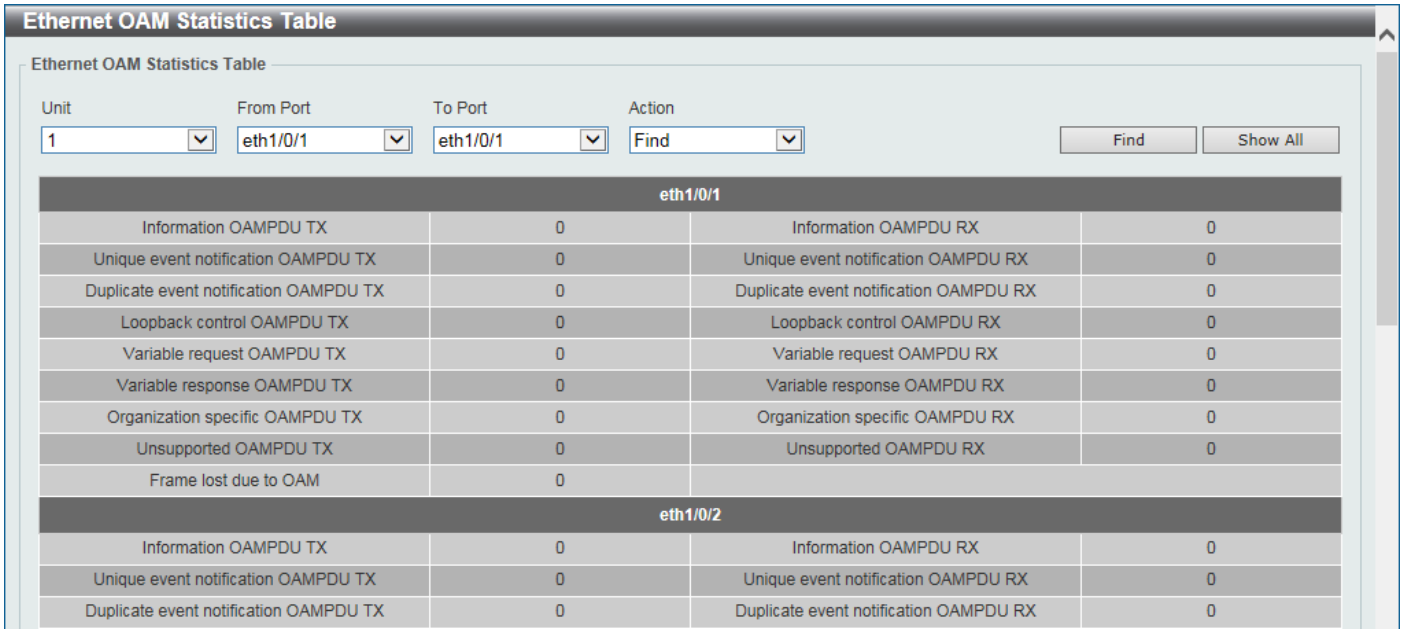


Figure 10-26 Ethernet OAM Statistics Table Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
Action	Select the **Find** option to find and display the statistics information associated with the specified port. Select the **Clear** option to clear the statistics information associated with the specified port(s).

Click the **Find** button to find and display the statistics information associated with the specified port(s).

Click the **Show All** button to display all the statistics information.

Ethernet OAM DULD Settings

This window is used to display and configure the Ethernet OAM D-Link Unidirectional Link Detection (DULD) settings. DULD is an extension of 802.3ah Ethernet OAM. It provides a mechanism to detect a unidirectional point-to-point

Ethernet link without PHY support. OAM vendor specific messages are used in the detection. The detection process is started after OAM discovery was started but does not complete the negotiation in the configured discovery time.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM DULD Settings**, as shown below:

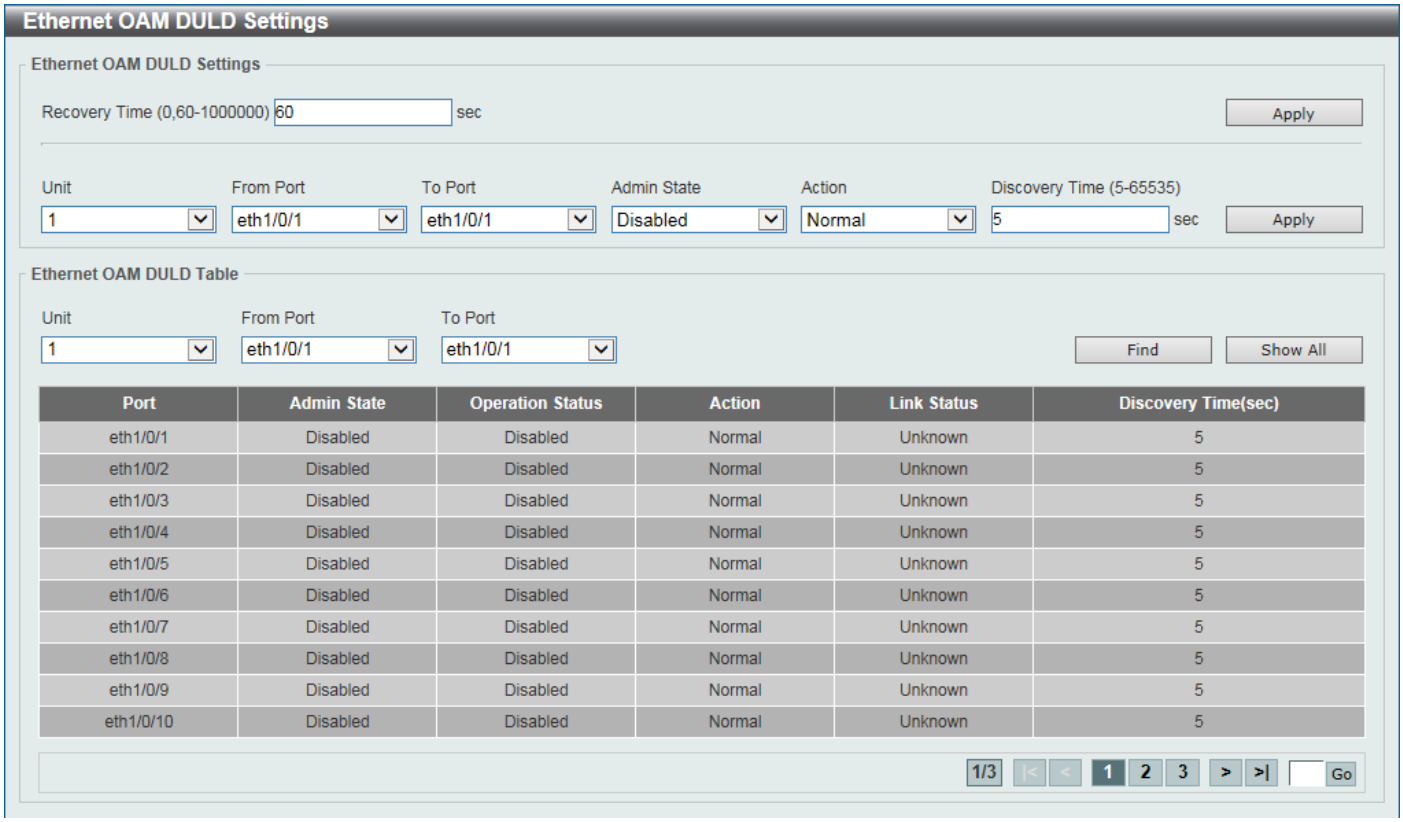


Figure 10-27 Ethernet OAM DULD Settings Window

The fields that can be configured in **Ethernet OAM DULD Settings** are described below:

Parameter	Description
Recovery Time	Enter the Ethernet OAM unidirectional link detection automatic recovery time here. The range is 0, and from 60 to 1000000 seconds. If this value is 0, this feature is disabled. By default, this value is 60 seconds.
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.
Admin State	Select to enable or disable the admin state here. This feature is used to enable Ethernet OAM unidirectional link detection on the specified port(s).
Action	Select the action that will be taken here. Options to choose from are **Normal** and **Shutdown**.
Discovery Time	Enter the discovery time value here. The range is from 5 to 65535 seconds. By default, this value is 5 seconds. If the OAM discovery does not successfully negotiate before discovery time expired, OAM unidirectional link detection will start.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet OAM DULD Table** are described below:

Parameter	Description
Unit	Select the Switch unit ID that will be used here.
From Port - To Port	Select the Switch port range that will be used here.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

DDM

This folder contains windows that perform Digital Diagnostic Monitoring (DDM) functions on the Switch. There are windows that allow the user to view the digital diagnostic monitoring status of SFP/SFP+ modules inserting to the Switch and to configure alarm settings, warning settings, temperature threshold settings, voltage threshold settings, bias current threshold settings, Tx power threshold settings, and Rx power threshold settings.

DDM Settings

The window is used to view and configure the action that will occur for specific ports when an exceeding alarm threshold or warning threshold event is encountered.

To view the following window, click **OAM > DDM > DDM Settings**, as shown below:

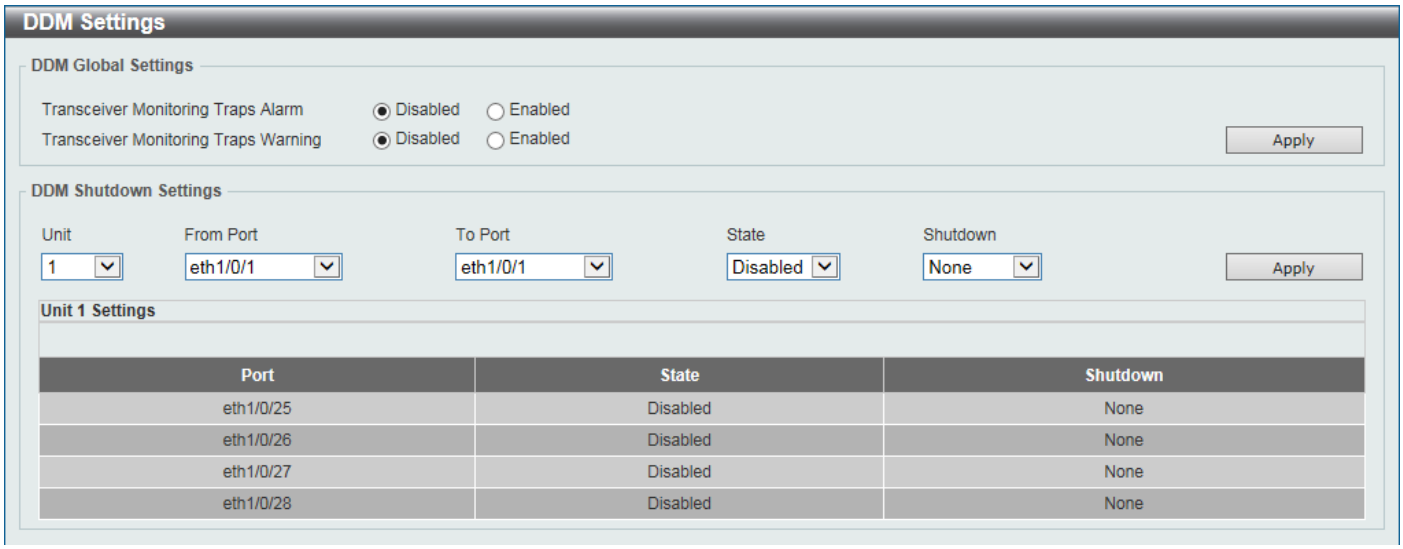


Figure 10-28 DDM Settings Window

The fields that can be configured in **DDM Global Settings** are described below:

Parameter	Description
Transceiver Monitoring Traps Alarm	Select to enable or disable the transceiver monitoring traps alarm feature here.
Transceiver Monitoring Traps Warning	Select to enable or disable the transceiver monitoring traps warning feature here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DDM Shutdown Settings** are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Use the drop-down menu to enable or disable the DDM state.
Shutdown	Specify whether to shut down the port, when the operating parameter exceeds the alarm or warning threshold. Options to choose from are:

Parameter	Description
	• **Alarm** - Shutdown the port when the configured alarm threshold range is exceeded. • **Warning** - Shutdown the port when the configured warning threshold range is exceeded. • **None** - The port will never shutdown regardless if the threshold ranges are exceeded or not. By default, the **None** option is used.

Click the **Apply** button to accept the changes made.

DDM Temperature Threshold Settings

This window is used to display and configure the DDM Temperature Threshold Settings for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM Temperature Threshold Settings**, as shown below:

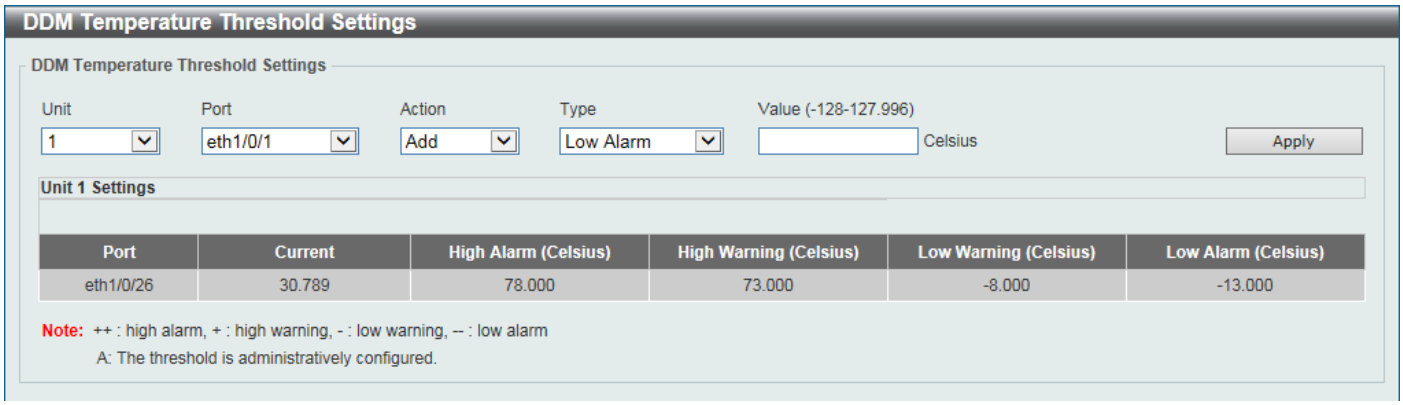


Figure 10-29 DDM Temperature Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the port used for the configuration here.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
Type	Select the type of temperature threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**.
Value	Enter the threshold value. The range is from -128 to 127.996 °C.

Click the **Apply** button to accept the changes made.

DDM Voltage Threshold Settings

This window is used to display and configure the DDM Voltage Threshold Settings for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM Voltage Threshold Settings**, as shown below:

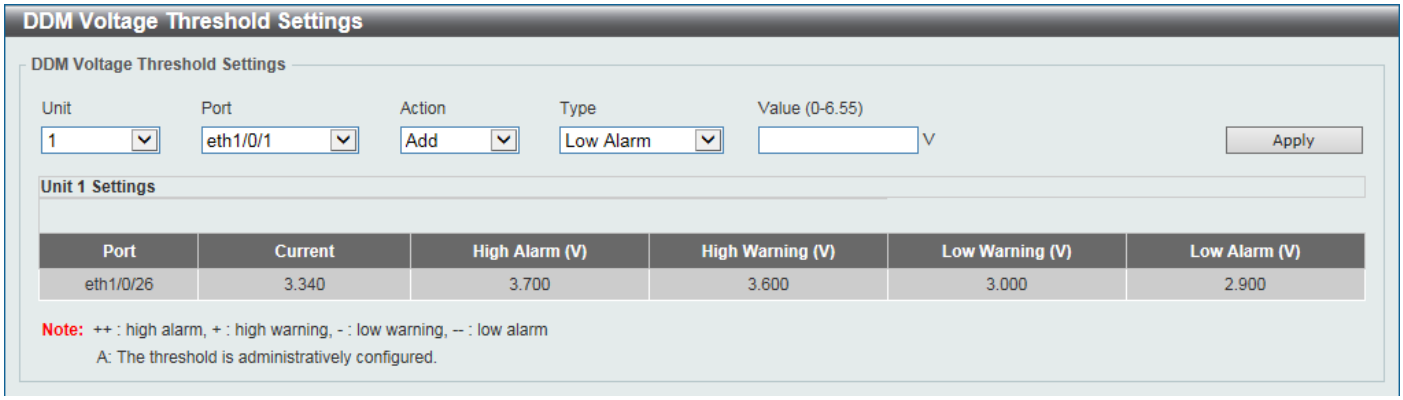


Figure 10-30 DDM Voltage Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the port used for the configuration here.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
Type	Select the type of voltage threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**.
Value	Enter the threshold value. The range is from 0 to 6.55 Volt.

Click the **Apply** button to accept the changes made.

DDM Bias Current Threshold Settings

This window is used to display and configure the threshold of the bias current for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM Bias Current Threshold Settings**, as shown below:

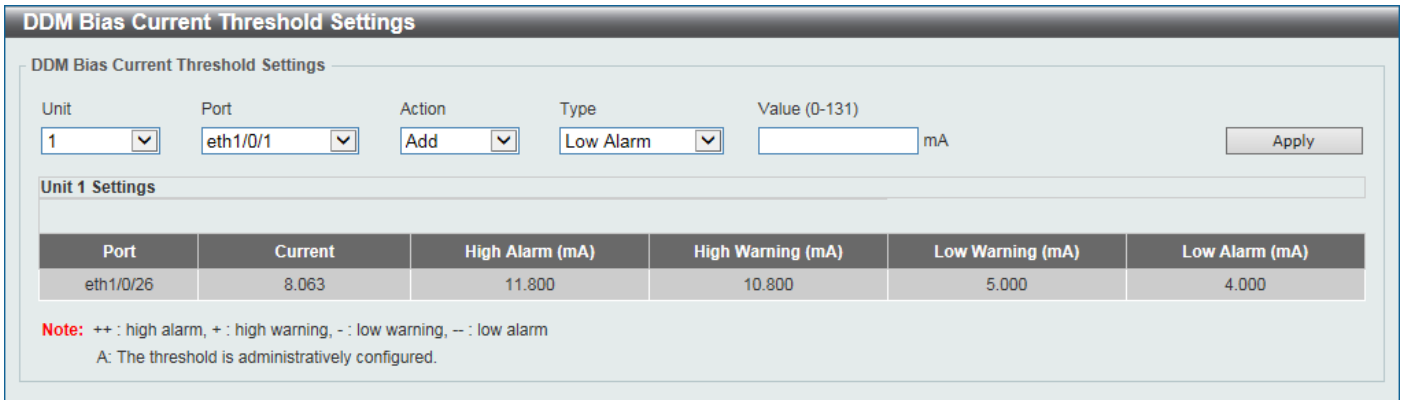


Figure 10-31 DDM Bias Current Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the port used for the configuration here.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
Type	Select the type of bias current threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**.
Value	Enter the threshold value. The range is from 0 to 131 mA.

Click the **Apply** button to accept the changes made.

DDM TX Power Threshold Settings

This window is used to display and configure the threshold of TX power for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM TX Power Threshold Settings**, as shown below:

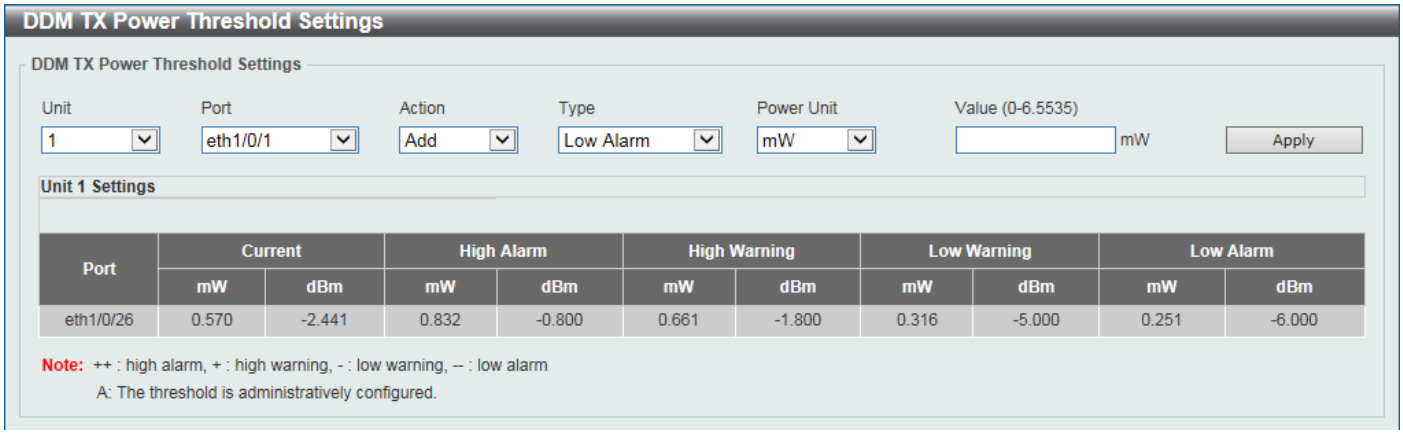


Figure 10-32 DDM TX Power Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the port used for the configuration here.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
Type	Select the type of TX power threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**.
Power Unit	Select the power unit here. Options to choose from are **mW** and **dBm**.
Value	Enter the threshold value either in **mW** or **dBm** here. • When selecting **mW** in the **Power Unit** drop-down list, The range is from 0 to 6.5535. • When selecting **dBm** in the **Power Unit** drop-down list, this value must be from -40 to 8.1647.

Click the **Apply** button to accept the changes made.

DDM RX Power Threshold Settings

This window is used to display and configure the threshold of RX power for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM RX Power Threshold Settings**, as shown below:

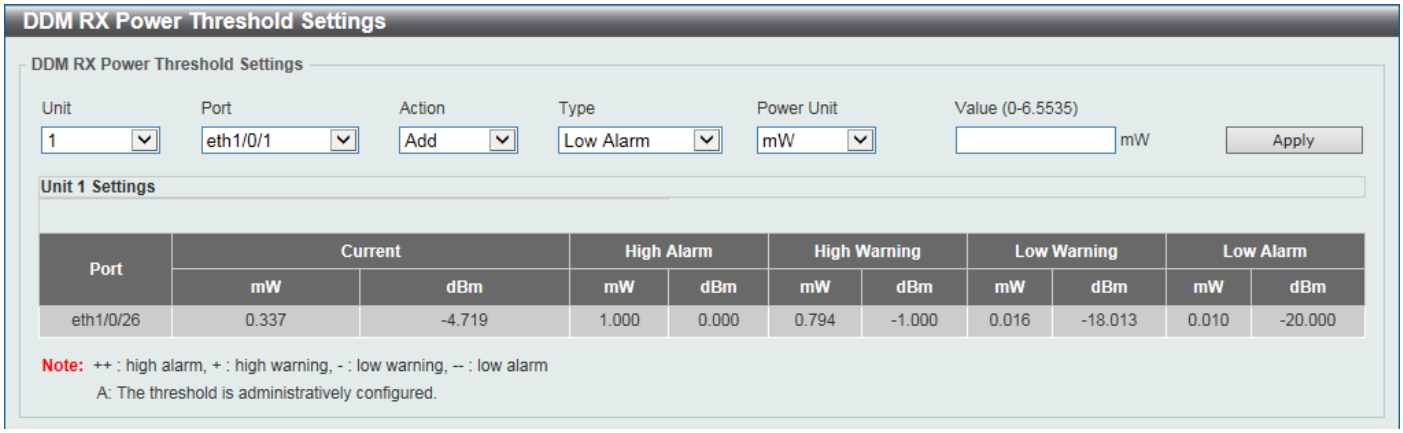


Figure 10-33 DDM RX Power Threshold Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	Select the port used for the configuration here.
Action	Select the action that will be taken here. Options to choose from are **Add** and **Delete**.
Type	Select the type of RX power threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**.
Power Unit	Select the power unit here. Options to choose from are **mW** and **dBm**.
Value	Enter the threshold value either in **mW** or **dBm** here. • When selecting **mW** in the **Power Unit** drop-down list, The range is from 0 to 6.5535. • When selecting dBm in the Power Unit drop-down list, this value must be from -40 to 8.1647.

Click the **Apply** button to accept the changes made.

DDM Status Table

This window is used to display the current operating digital diagnostic monitoring parameters and their values on the SFP module for specified ports.

To view the following window, click **OAM > DDM > DDM Status Table**, as shown below:

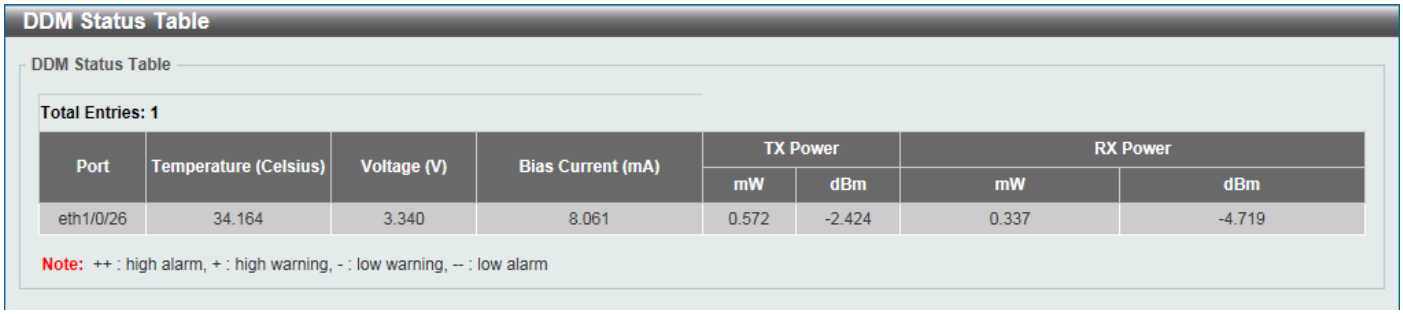


Figure 10-34 DDM Status Table Window

11. Monitoring

VLAN Counter

This window is used to display and configure the VLAN counter settings. This is used to create a control entry for traffic statistics on specified Layer 2 VLAN interface(s).

To view the following window, click **Monitoring > VLAN Counter**, as shown below:

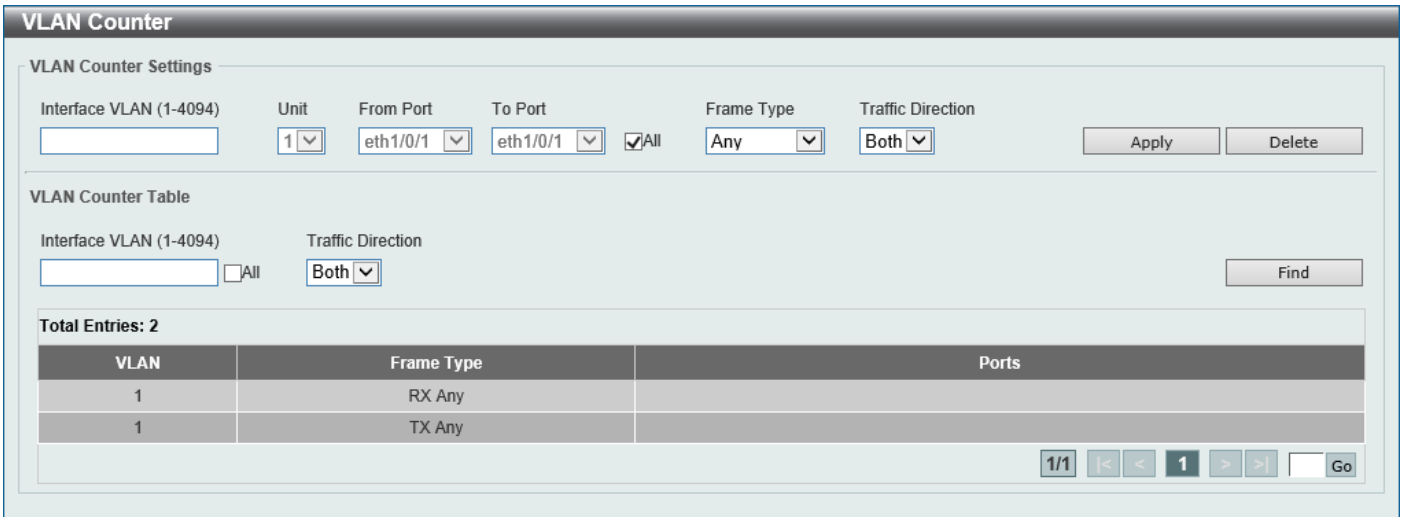


Figure 11-1 VLAN Counter Window

The fields that can be configured for **VLAN Counter Settings** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN ID that will be used here. The range is from 1 to 4094.
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the range of ports that will be used for this configuration here. Select the **All** option to use all the ports in this configuration.
Frame Type	Select the frame type here. Options to choose from are: • **Broadcast** - Specifies to count only broadcast frames. • **Multicast** - Specifies to count only multicast frames. • **Unicast** - Specifies to count only unicast frames. • **Any** - Specifies to count all frames regardless of the frame type. • **All** - Specifies to count the four frame types mentioned above.
Traffic Direction	Select the traffic direction here. Options to choose from are: • **RX** - Specifies to count ingress traffic. • **TX** - Specifies to count egress traffic. • **Both** - Specifies to count ingress and egress traffic.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry (or entries) based on the information entered/selected.

The fields that can be configured for **VLAN Counter Table** are described below:

Parameter	Description
Interface VLAN	Enter the VLAN ID that will be used in the display here. The range is from 1 to 4094. Select the **All** option to display counter information associated with all VLAN interfaces.
Traffic Direction	Select the traffic direction to display here. Options to choose from are: • **RX** - Specifies to display ingress traffic count settings. • **TX** - Specifies to display egress traffic count settings. • **Both** - Specifies to display ingress and egress traffic count settings.

Click the **Find** button to display entries in the table based on the information entered/selected.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Utilization

Port Utilization

This window is used to view the port utilization table.

To view the following window, click **Monitoring > Utilization > Port Utilization**, as shown below:

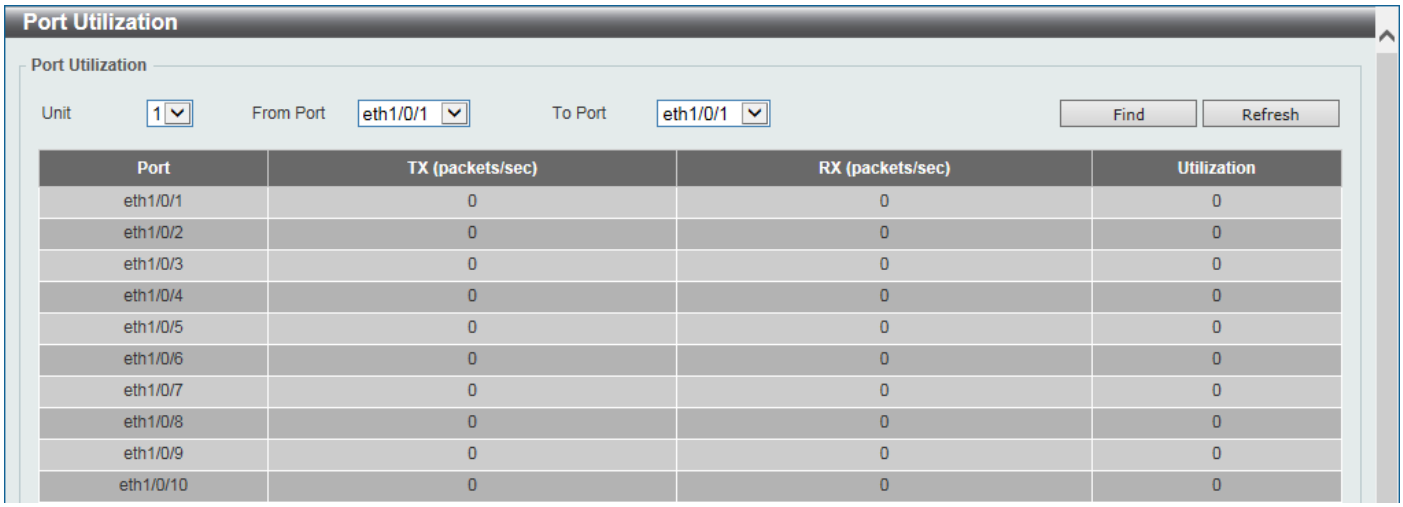


Figure 11-2 Port Utilization Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used here.
From Port - To Port	Select the range of ports that will be used here.

Click the **Find** button to display entries in the table based on the information entered/selected.

Click the **Refresh** button to refresh the information displayed in the table.

History Utilization

This window is used to view the memory, CPU and port history utilization.

To view the following window, click **Monitoring > Utilization > History Utilization**, as shown below:

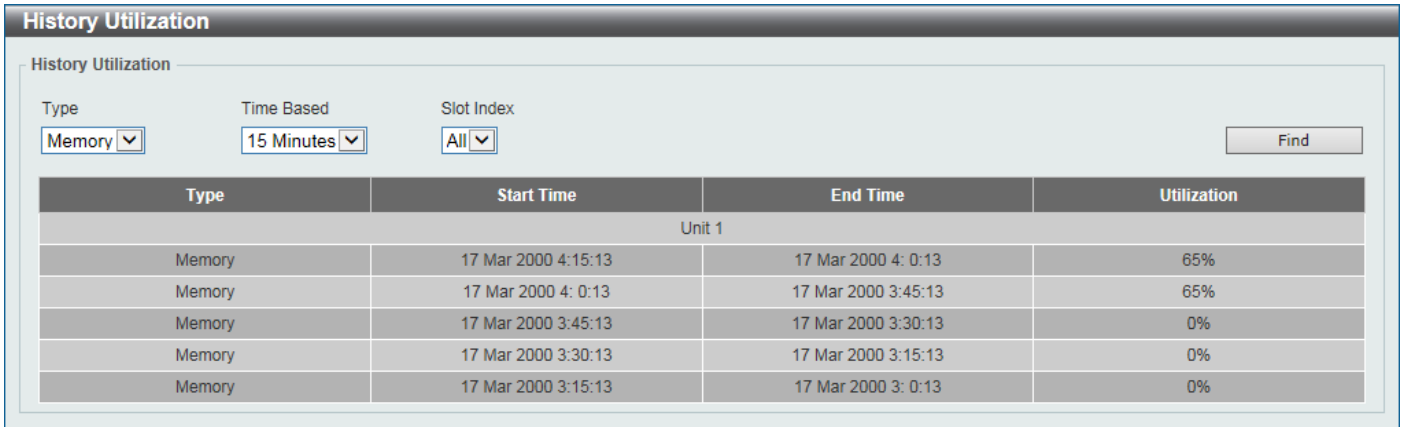


Figure 11-3 History Utilization (Memory) Window

After selecting **CPU** as the **Type**, the following window will appear:

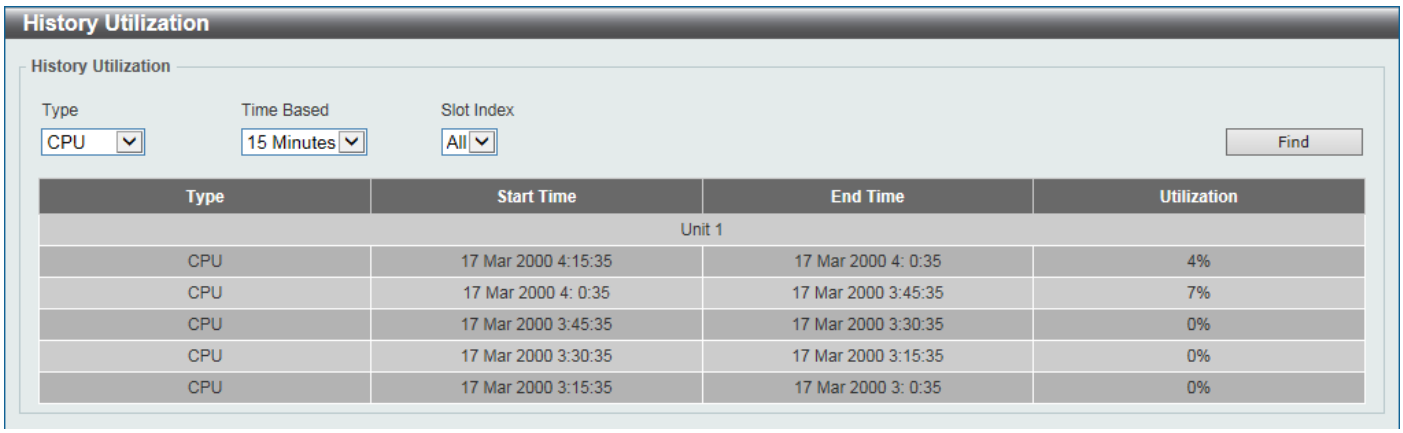


Figure 11-4 History Utilization (CPU) Window

After selecting **Port** as the **Type**, the following window will appear:

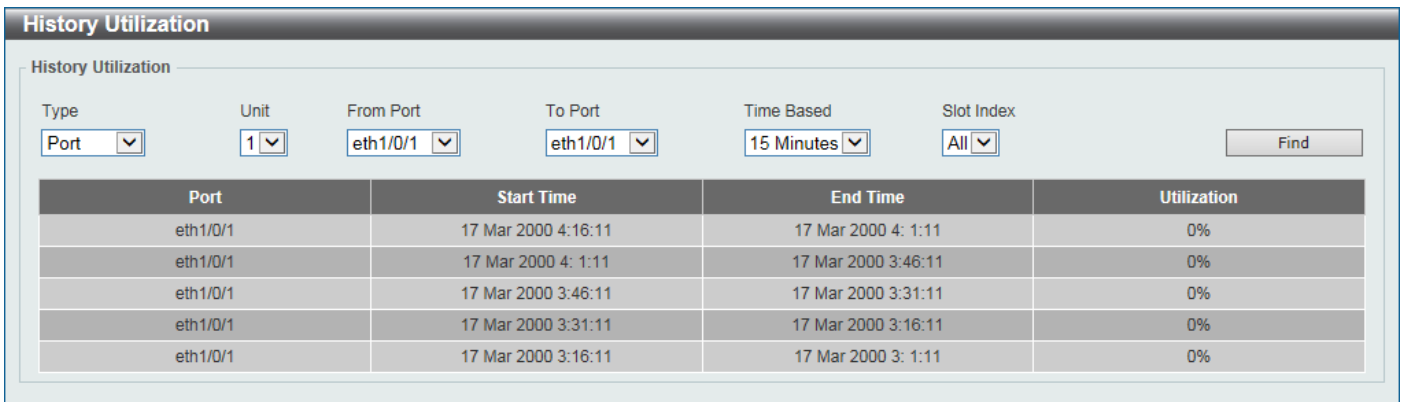


Figure 11-5 History Utilization (Port) Window

The fields that can be configured are described below:

Parameter	Description
Type	Select the history utilization type to display here. Options to choose from are:

Parameter	Description
	• **Memory** - Specifies to display the historical memory utilization information. • **CPU** - Specifies to display the historical CPU utilization information. • **Port** - Specifies to display the historical port utilization information.
Unit	Select the Switch unit that will be used here.
From Port - To Port	Select the range of ports that will be used here.
Time Based	Select the time-based statistical count value here. Options to choose from are: • **15 Minutes** - Specifies to display slots of 15-minute based information. • **1 Day** - Specifies to display slots of daily-based information. For 15-minute based statistics, slot 1 represents the time from 15 minutes ago until now, slot 2 represents the time from 30 minutes ago until 15 minutes ago and so on. For 1-day based statistics, slot 1 represents the time from 24 hours ago until now and slot 2 represents the time from 48 hours ago until 24 hours ago.
Slot Index	Select the slot index here. • After selecting to use 15-minute slots, the options to choose from are **All**, and **1** to **5**. • After selecting to use 1-day slots, the options to choose from are **All**, **1**, and **2**.

Click the **Find** button to display entries in the table based on the information selected.

Statistics

Port

This window is used to view the port statistics information.

To view the following window, click **Monitoring > Statistics > Port**, as shown below:

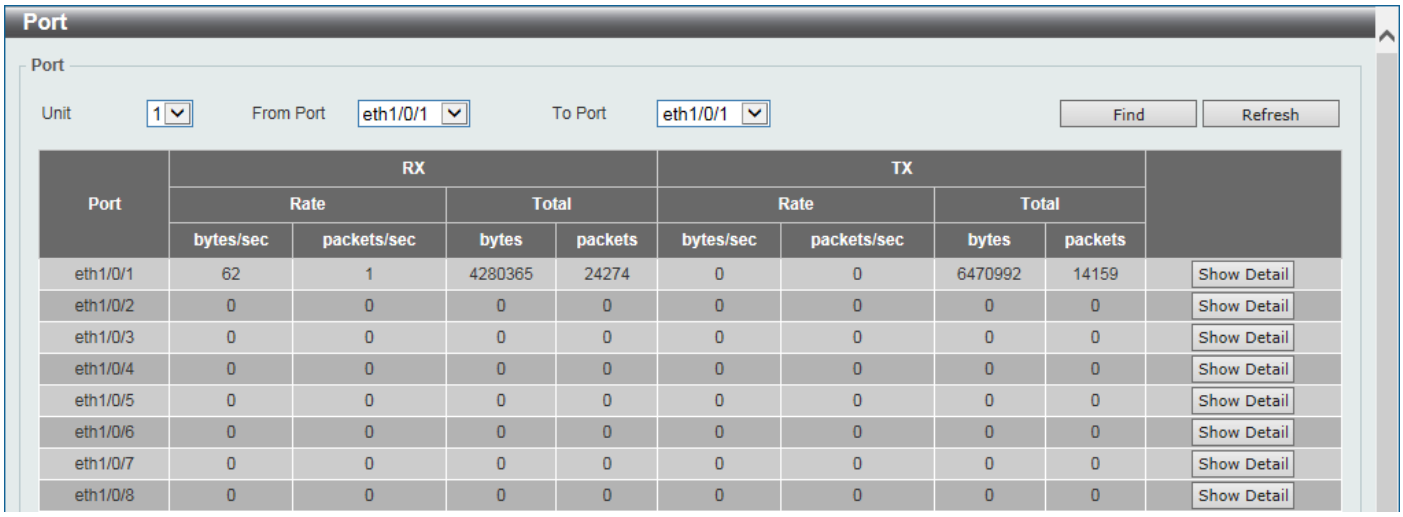


Figure 11-6 Port Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used in this display here.
From Port - To Port	Select the range of ports that will be used in this display here.

Click the **Find** button to display entries in the table based on the information selected.

Click the **Refresh** button to refresh the information displayed in the table.

Click the **Show Detail** button to view detailed statistics information on the specified port.

After clicking the **Show Detail** button, the following window will appear:

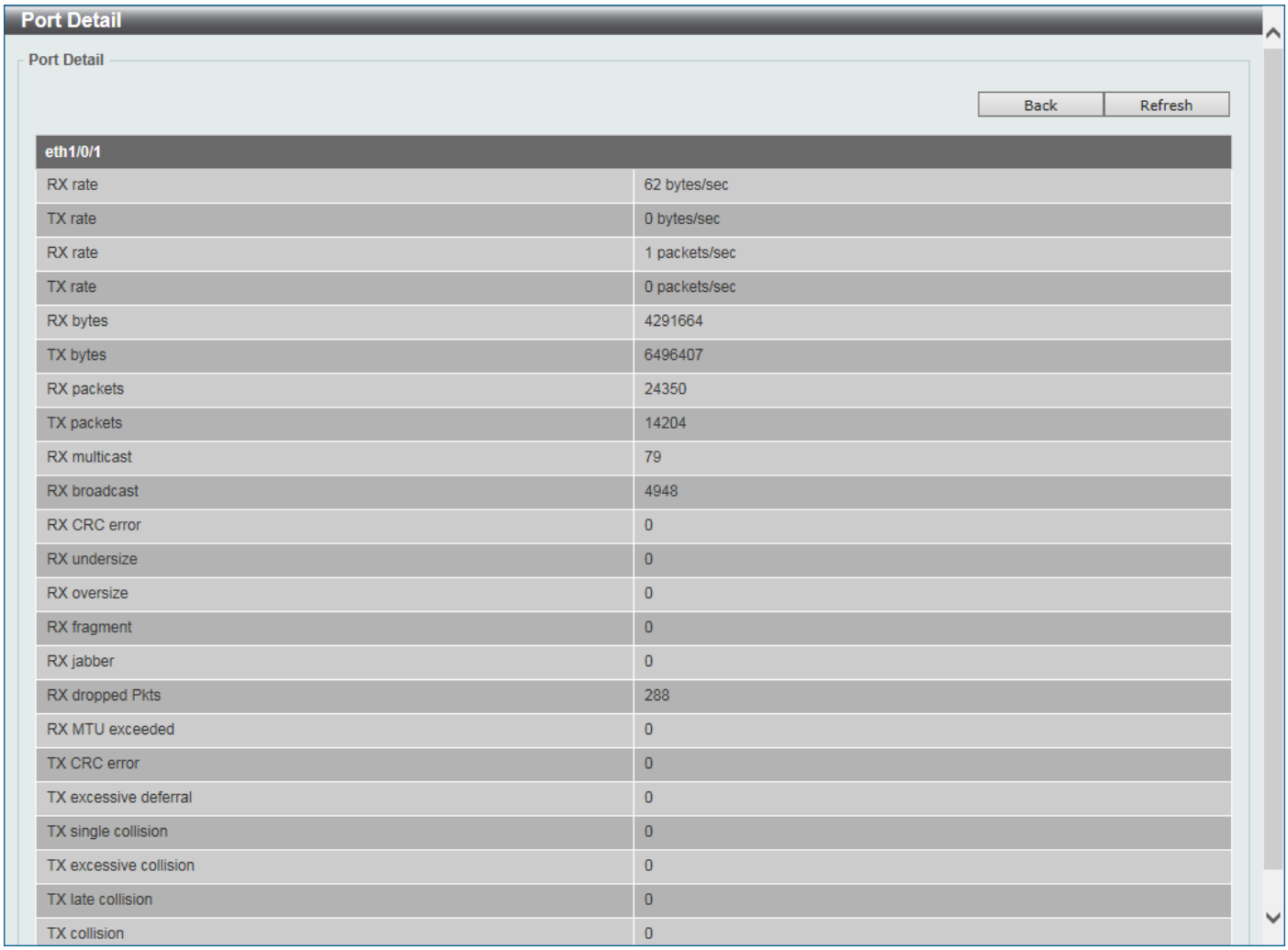


Figure 11-7 Port (Show Detail) Window

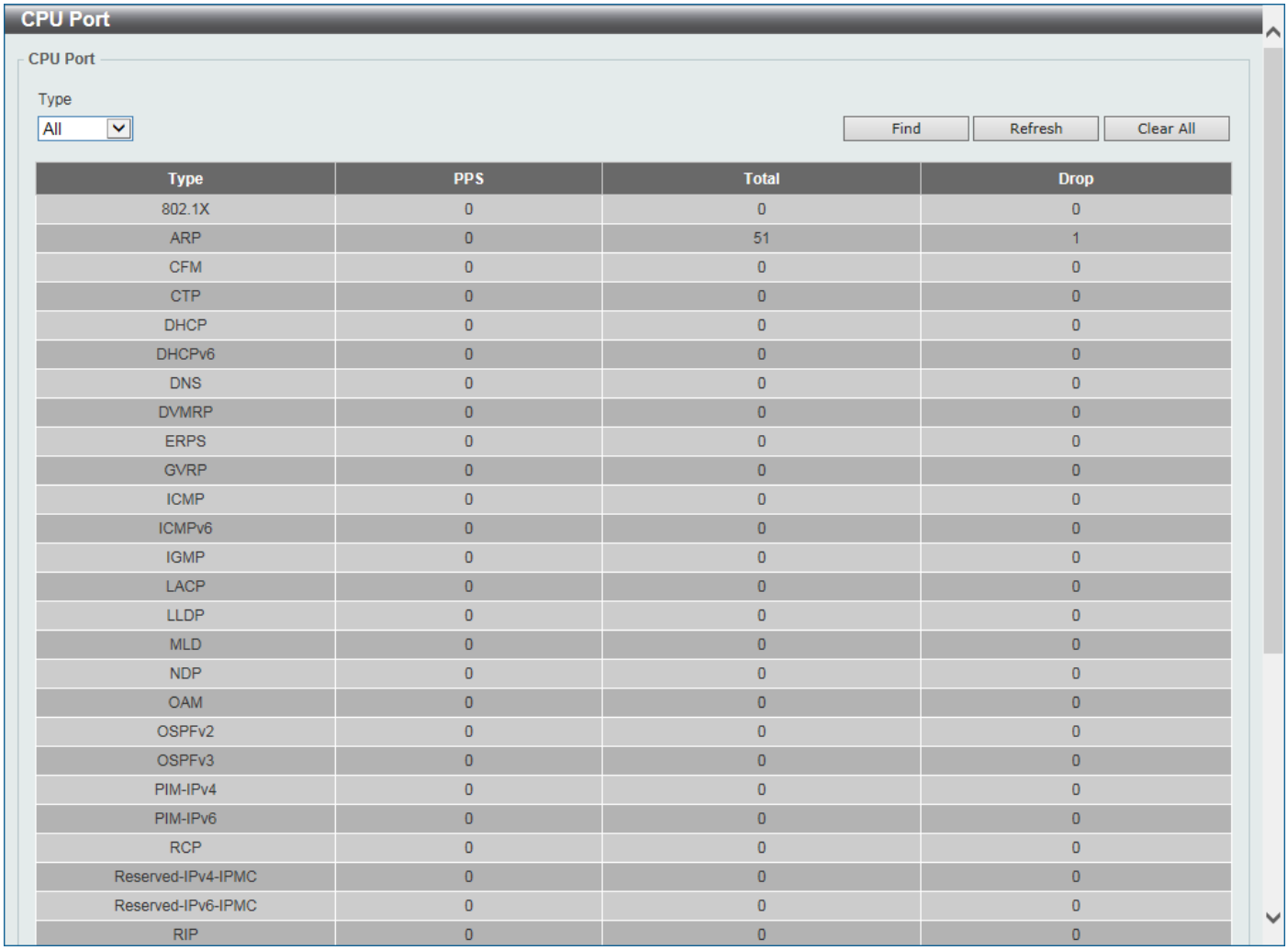
Click the **Back** button to return to the previous window.

Click the **Refresh** button to refresh the information displayed in the table.

CPU Port

This window is used to view the CPU statistics information.

To view the following window, click **Monitoring > Statistics > CPU Port**, as shown below:



Type	PPS	Total	Drop
802.1X	0	0	0
ARP	0	51	1
CFM	0	0	0
CTP	0	0	0
DHCP	0	0	0
DHCPv6	0	0	0
DNS	0	0	0
DVMRP	0	0	0
ERPS	0	0	0
GVRP	0	0	0
ICMP	0	0	0
ICMPv6	0	0	0
IGMP	0	0	0
LACP	0	0	0
LLDP	0	0	0
MLD	0	0	0
NDP	0	0	0
OAM	0	0	0
OSPFv2	0	0	0
OSPFv3	0	0	0
PIM-IPv4	0	0	0
PIM-IPv6	0	0	0
RCP	0	0	0
Reserved-IPv4-IPMC	0	0	0
Reserved-IPv6-IPMC	0	0	0
RIP	0	0	0

Figure 11-8 CPU Port Window

The fields that can be configured are described below:

Parameter	Description
Type	Select the type of information to display here. Options to choose from are **All**, Layer 2 (**L2**), Layer 3 (**L3**), and **Protocol**.

Click the **Find** button to display entries in the table based on the information selected.

Click the **Refresh** button to refresh the information displayed in the table.

Click the **Clear All** button clear all the statistics information displayed in the table.

Interface Counters

This window is used to view the interface counter information.

To view the following window, click **Monitoring > Statistics > Interface Counters**, as shown below:

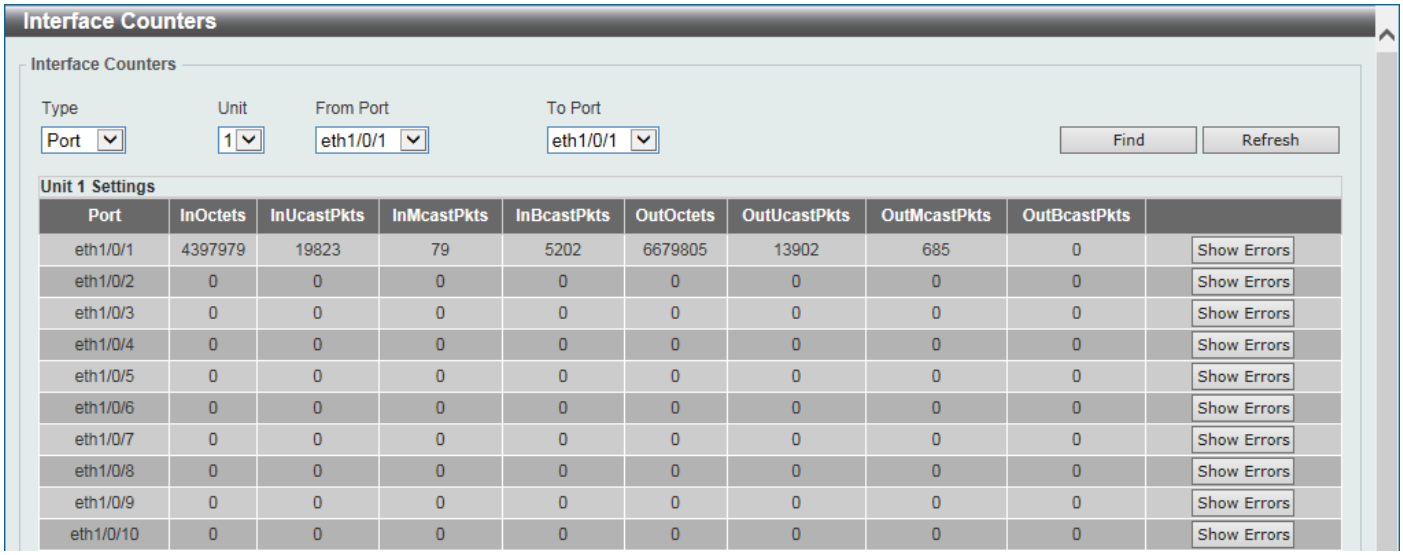


Figure 11-9 Interface Counters (Port) Window

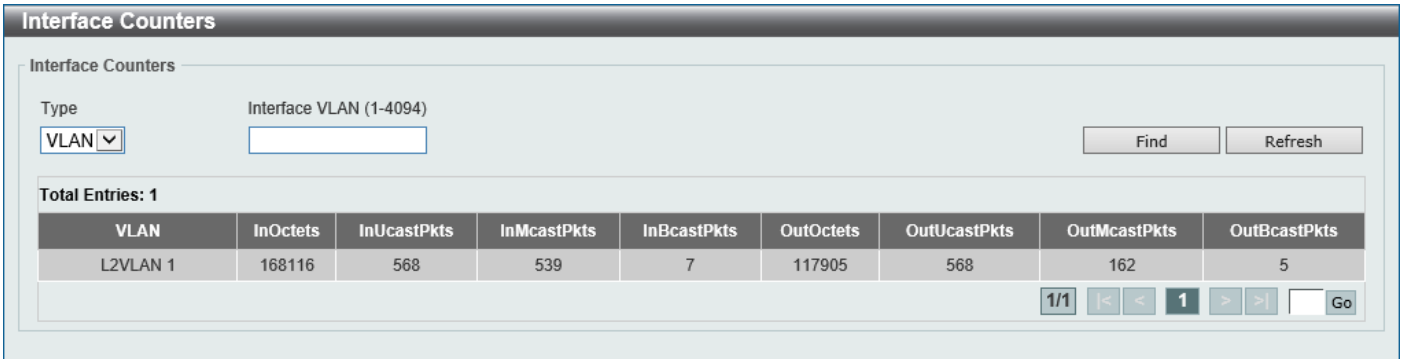


Figure 11-10 Interface Counters (VLAN) Window

The fields that can be configured are described below:

Parameter	Description
Type	Select the type of information to display here. Options to choose from are **Port** and **VLAN**.
Port	Select this option to display interface counters per-port. • **Unit** - Select the Switch unit that will be used in this display here. • **From Port / To Port** - Select the range of ports that will be used in this display here.
VLAN	Select this option to display interface counters per-VLAN. • **Interface VLAN** - Enter the ID of the interface VLAN to display here.

Click the **Find** button to display entries in the table based on the information selected.

Click the **Refresh** button to refresh the information displayed in the table.

Click the **Show Errors** button to view detailed error information on the specified port.

After clicking the **Show Errors** button, the following window will appear:

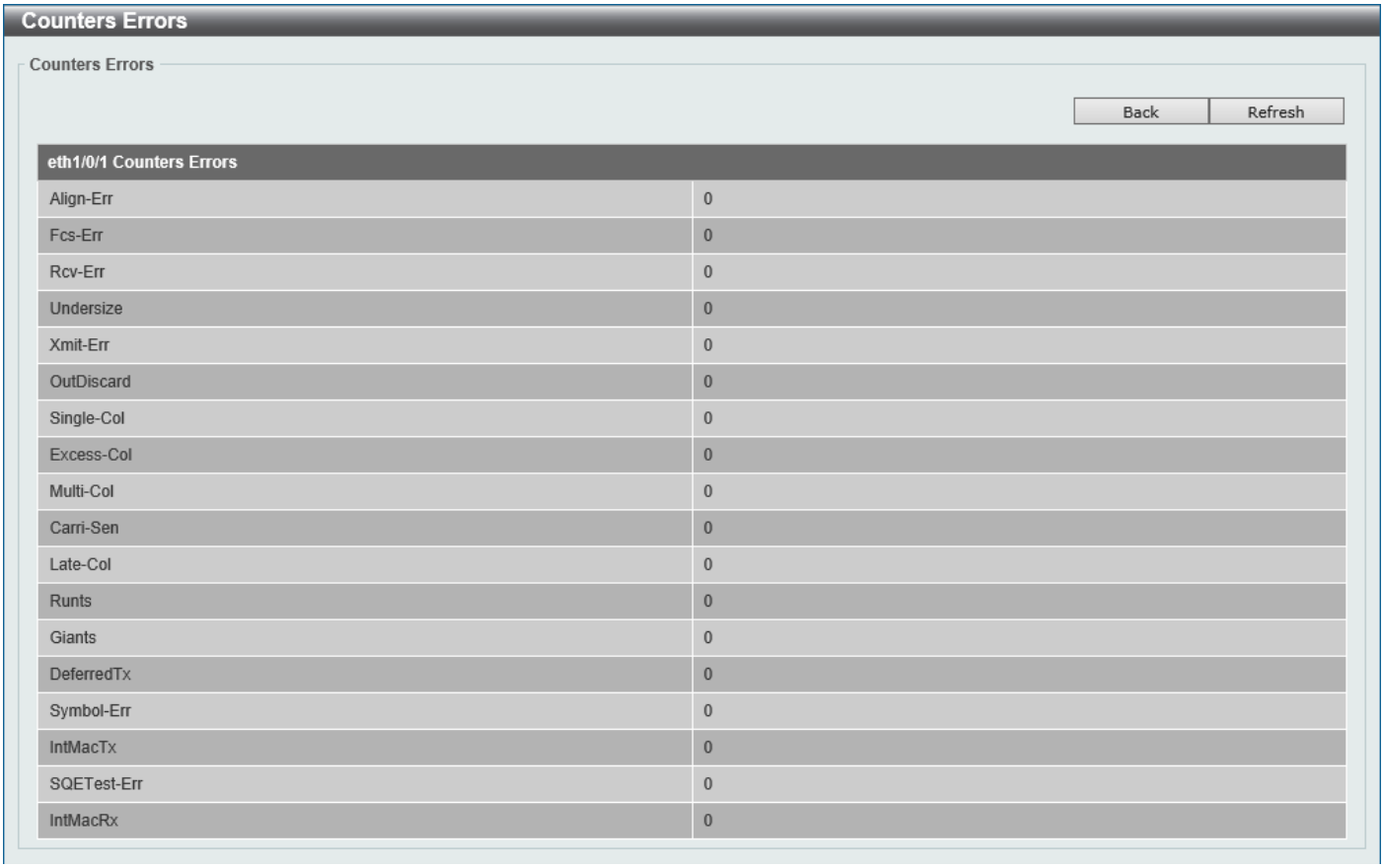


Figure 11-11 Interface Counters (Show Errors) Window

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

Click the **Refresh** button to refresh the information displayed in the table.

Interface History Counters

This window is used to view the history counter information per interface.

To view the following window, click **Monitoring > Statistics > Interface History Counters**, as shown below:

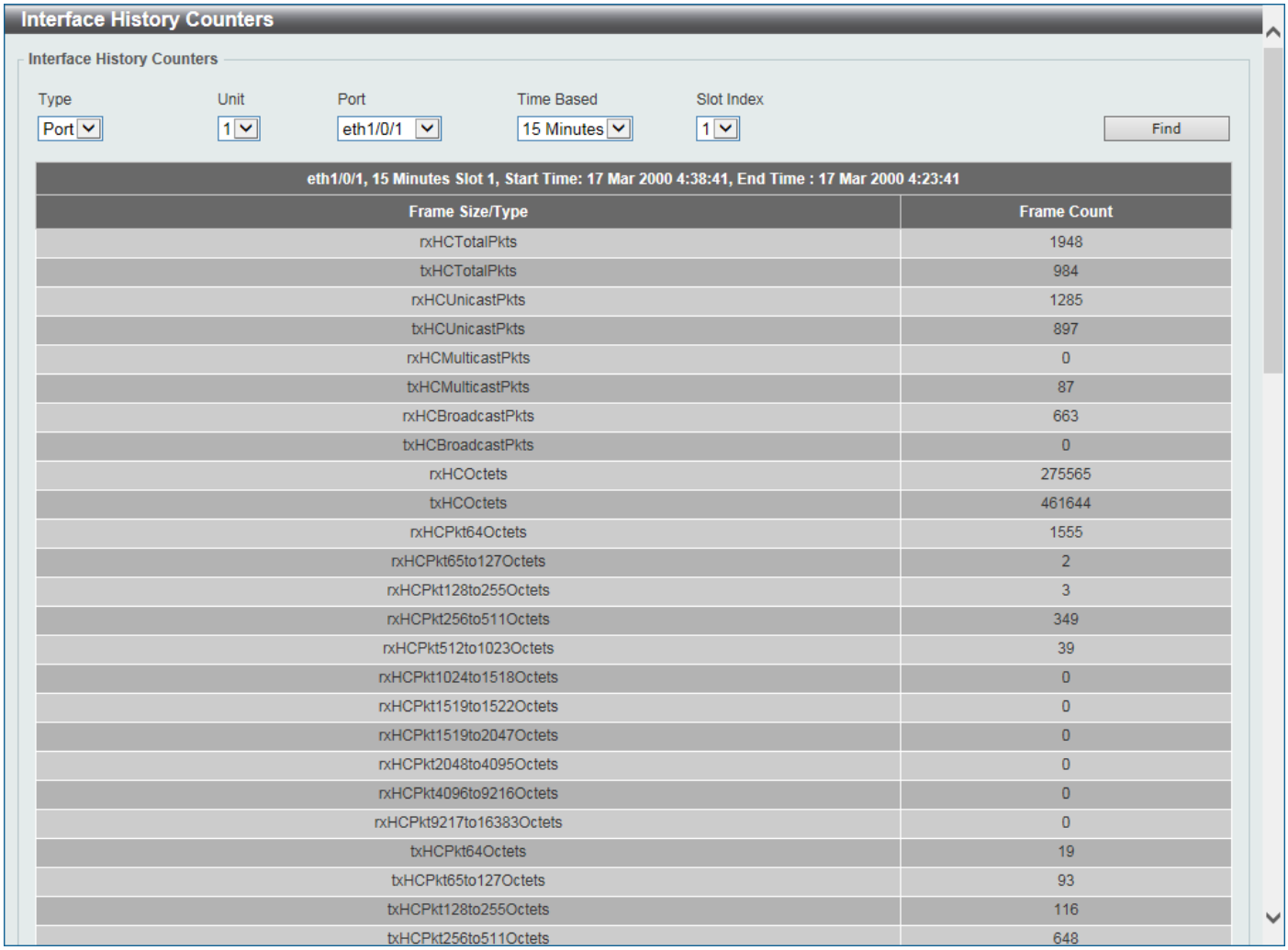


Figure 11-12 Interface History Counters (Port) Window

The fields that can be configured are described below:

Parameter	Description
Type	Select the type of information to display here.
Unit	Select the Switch unit that will be used in this display here.
Port	Select the port that will be used in this display here.
Time Based	Select the time-based statistical count value here. Options to choose from are: • **15 Minutes** - Specifies to display slots of 15-minute based information. • **1 Day** - Specifies to display slots of daily-based information. For 15-minute based statistics, slot 1 represents the time from 15 minutes ago until now, slot 2 represents the time from 30 minutes ago until 15 minutes ago and so on. For 1-day based statistics, slot 1 represents the time from 24 hours ago until now and slot 2 represents the time from 48 hours ago until 24 hours ago.
Slot index	Select the slot index here. • After selecting to use 15-minute slots, the options to choose from are **All**, and **1** to **5**. • After selecting to use 1-day slots, the options to choose from are **1** and **2**.

Click the **Find** button to display entries in the table based on the information selected/entered.

Counters

This window is used to view and clear counter information.

To view the following window, click **Monitoring > Statistics > Counters**, as shown below:

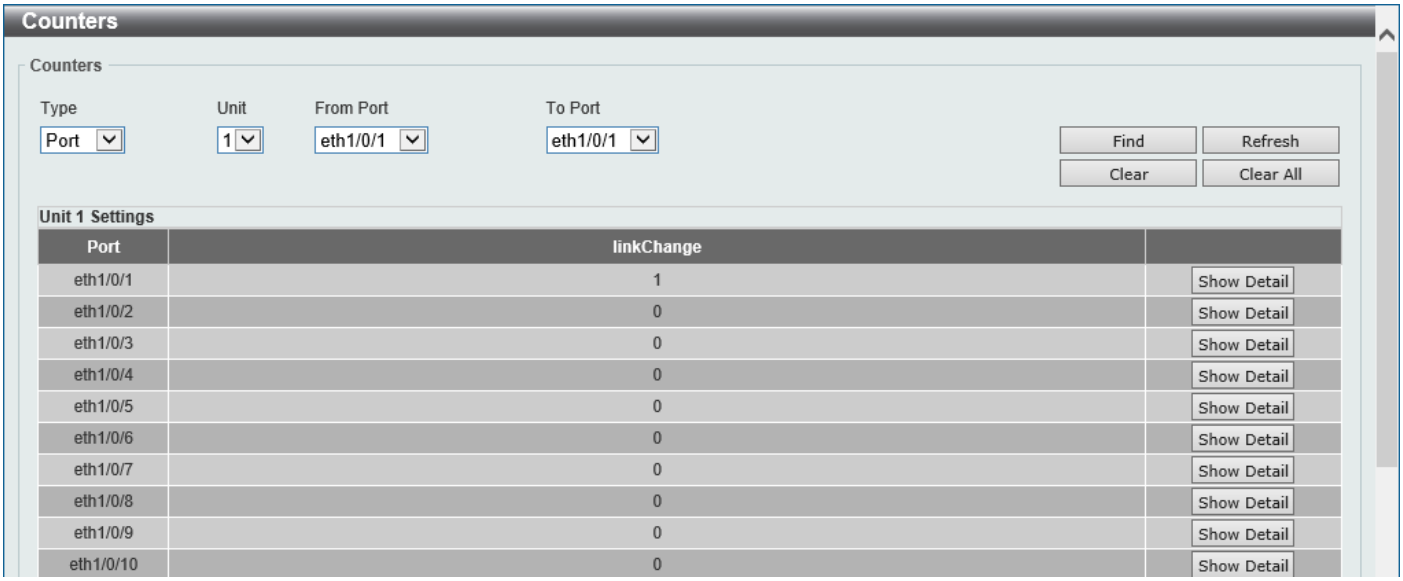


Figure 11-13 Counters (Port) Window

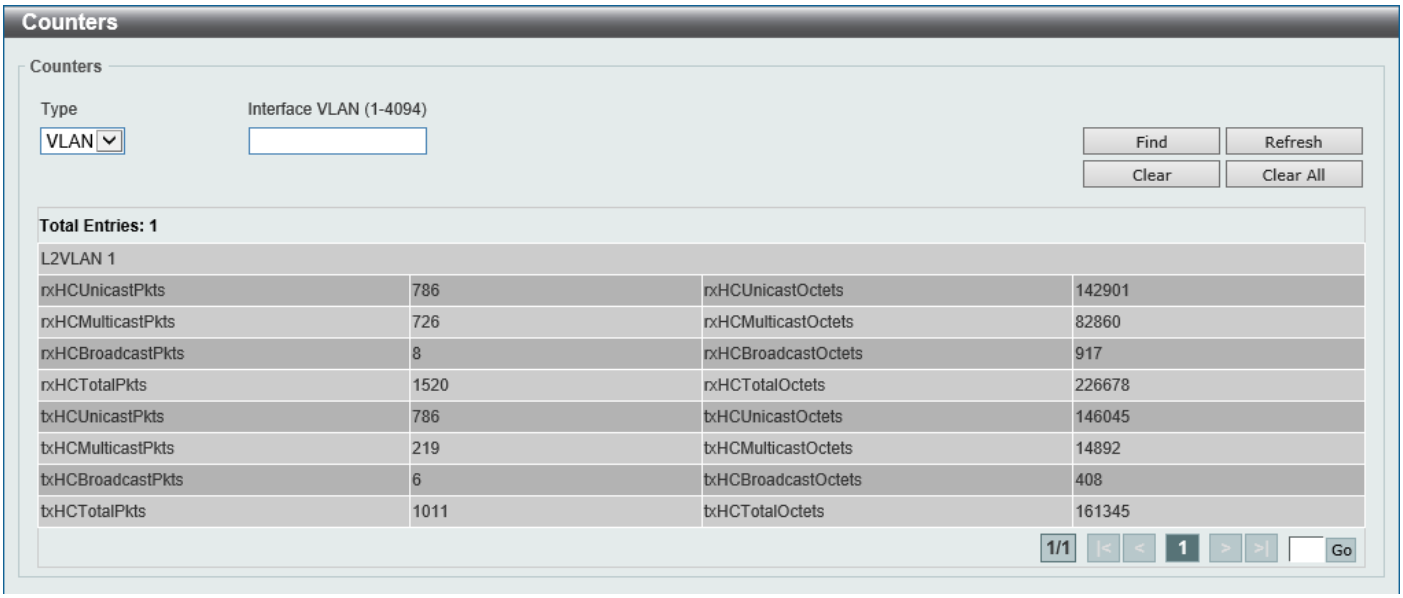


Figure 11-14 Counters (VLAN) Window

The fields that can be configured are described below:

Parameter	Description
Type	Select the type of information to display here. Options to choose from are **Port** and **VLAN**.
Port	Select this option to display counters per-port. • **Unit** - Select the Switch unit that will be used in this display here. • **From Port / To Port** - Select the range of ports that will be used in this display here.

Parameter	Description
VLAN	Select this option to display counters per-VLAN. • **Interface VLAN** - Enter the ID of the interface VLAN to display here.

Click the **Find** button to display entries in the table based on the information selected.

Click the **Refresh** button to refresh the counter information displayed in the table.

Click the **Clear** button clear the counter information displayed in the table based on the information selected.

Click the **Clear All** button clear all the counter information displayed in the table.

Click the **Show Detail** button to view detailed counter information on the specified port.

After clicking the **Show Detail** button, the following window will appear:

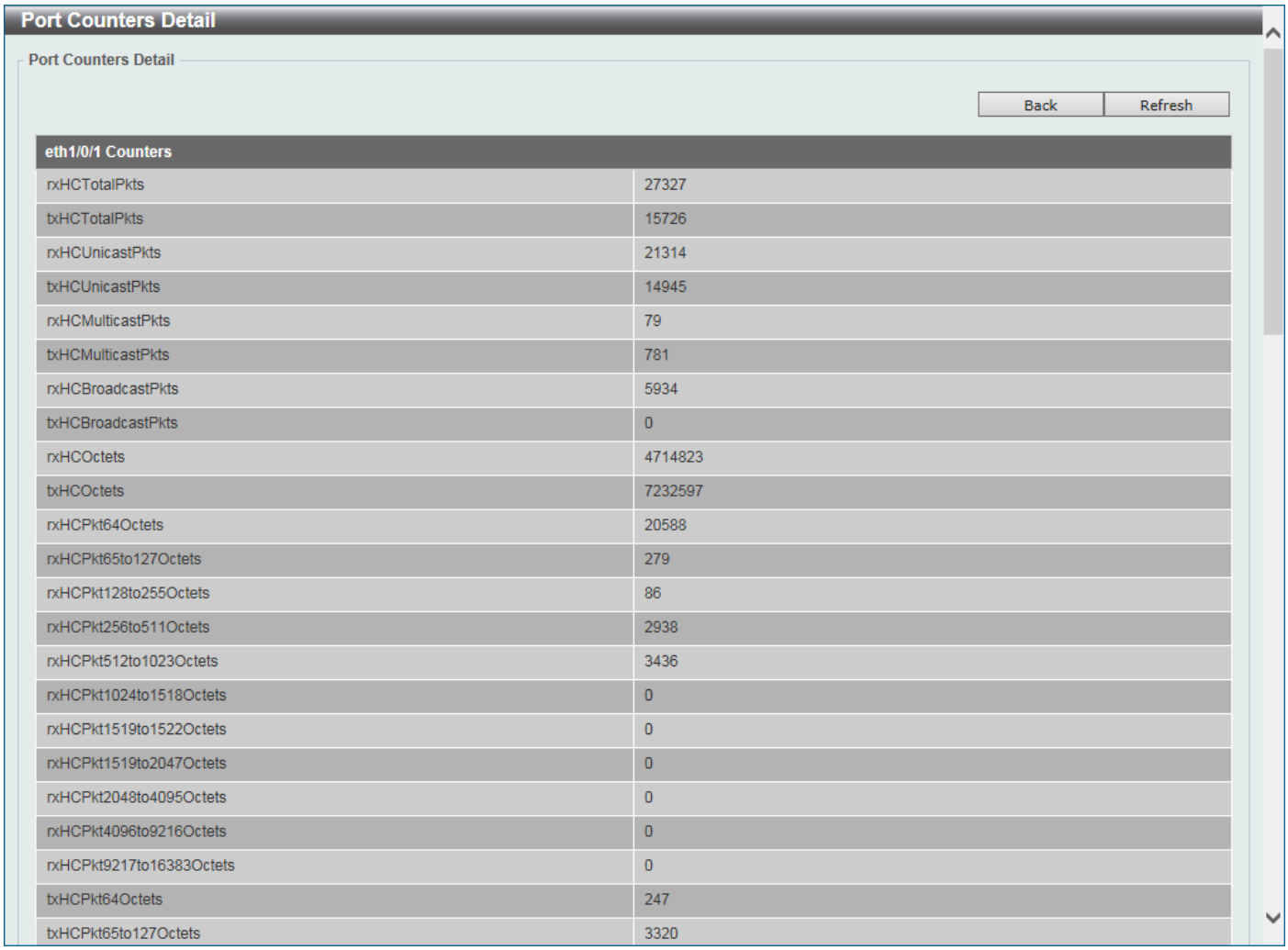


Figure 11-15 Counters (Show Detail) Window

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

Click the **Refresh** button to refresh the information displayed in the table.

Mirror Settings

This window is used to display and configure the mirror feature's settings. The Switch allows users to copy frames transmitted and received on a port and redirect the copies to another port. Attach a monitoring device to the mirroring

port, such as a sniffer or an RMON probe, to view details about the packets passing through the first port. This is useful for network monitoring and troubleshooting purposes.

To view the following window, click **Monitoring > Mirror Settings**, as shown below:

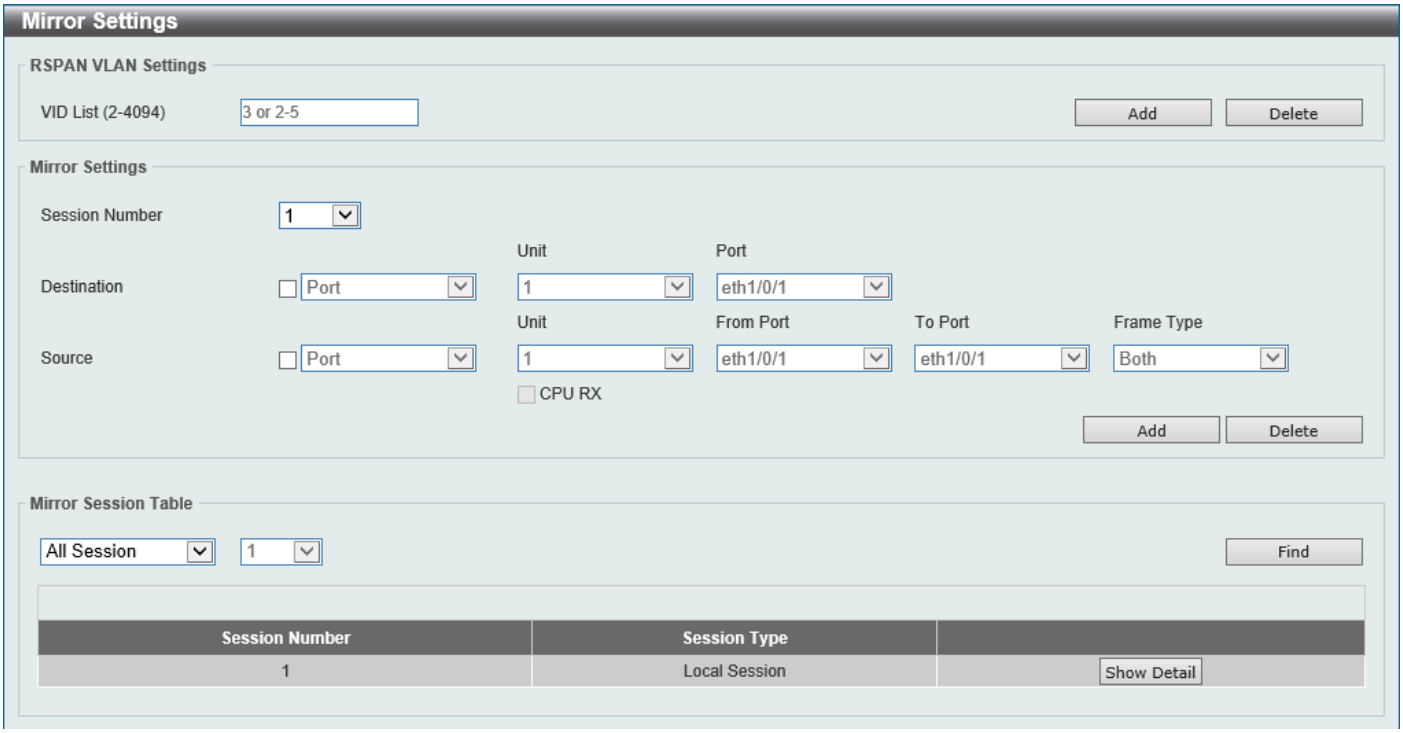


Figure 11-16 Mirror Settings Window

The fields that can be configured for **RSPAN VLAN Settings** are described below:

Parameter	Description
VID List	Enter the VLAN list ID(s) that will be associated with this configuration here.

Click the **Add** button to add the VLAN(s) to the configuration.

Click the **Delete** button to delete the VLAN(s) from the configuration.

The fields that can be configured for **Mirror Settings** are described below:

Parameter	Description
Session Number	Select the mirror session number for this entry here. The range is from 1 to 4.
Destination	Select the checkbox, next to the **Destination** option, to configure the destination for this port mirror entry. In the first drop-down menu, select the destination type option. Options to choose from are: • **Port** - After selecting this option, select the Switch **Unit** ID, and destination **Port** number from the drop-down menus. • **Remote VLAN** - After selecting this option, select the Switch **Unit** ID and destination **Port** number from the drop-down menus and enter the **VID** in the space provided. The range is from 2 to 4094.
Source	Select the checkbox, next to the **Source** option, to configure the source for this port mirror entry. In the first drop-down menu, select the source type option. Options to choose from are: • **Port** - After selecting this option, select the Switch **Unit** ID, **From Port** and **To Port** numbers from the drop-down menus. Lastly select the **Frame Type** option from the last drop-down menu. Options to choose from are **Both**, **RX**,

Parameter	Description
	and **TX**. When selecting **Both**, traffic in both the incoming and outgoing directions will be mirrored. When selecting **RX**, traffic in only the incoming direction will be mirrored. When selecting **TX**, traffic in only the outgoing direction will be mirrored. Select the **CPU RX** option to also monitor CPU RX traffic. • **ACL** - After selecting this option, enter the **ACL Name** in the space provided. • **VLAN** - After selecting this option, enter the **VID List** in the space provided and select the **Frame Type** from the drop-down menu. The only frame type supported is **RX**. • **Remote VLAN** - After selecting this option, enter the **VID** in the space provided. The range is from 2 to 4094.

Click the **Add** button to add the newly configured mirror entry based on the information entered.

Click the **Delete** button to delete an existing mirror entry based on the information entered.

The fields that can be configured for **Mirror Session Table** are described below:

Parameter	Description
Mirror Session Type	Select the mirror session type of information that will be displayed from the drop-down menu. Options to choose from are **All Session**, **Session Number**, **Remote Session**, and **Local Session**. After selecting the **Session Number** option, select the session number from the second drop-down menu. This number is from 1 to 4.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information about the mirror session.

After clicking the **Show Detail** button, the following window will appear:

Figure 11-17 Mirror Settings (Show Detail) Window

Click the **Back** button to return to the previous page.

sFlow

sFlow Agent Information

This window is used to view the sFlow agent information.

To view the following window, click **Monitoring > sFlow > sFlow Agent Information**, as shown below:

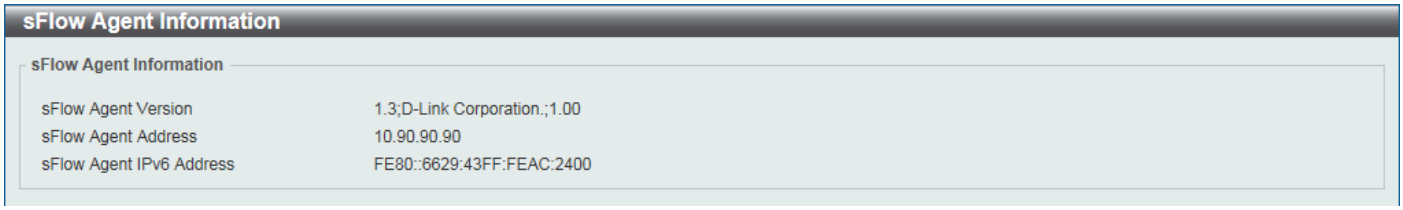


Figure 11-18 sFlow Agent Information Window

sFlow Receiver Settings

This window is used to display and configure receivers for the sFlow agents. Receivers cannot be added to or removed from the sFlow agent.

To view the following window, click **Monitoring > sFlow > sFlow Receiver Settings**, as shown below:

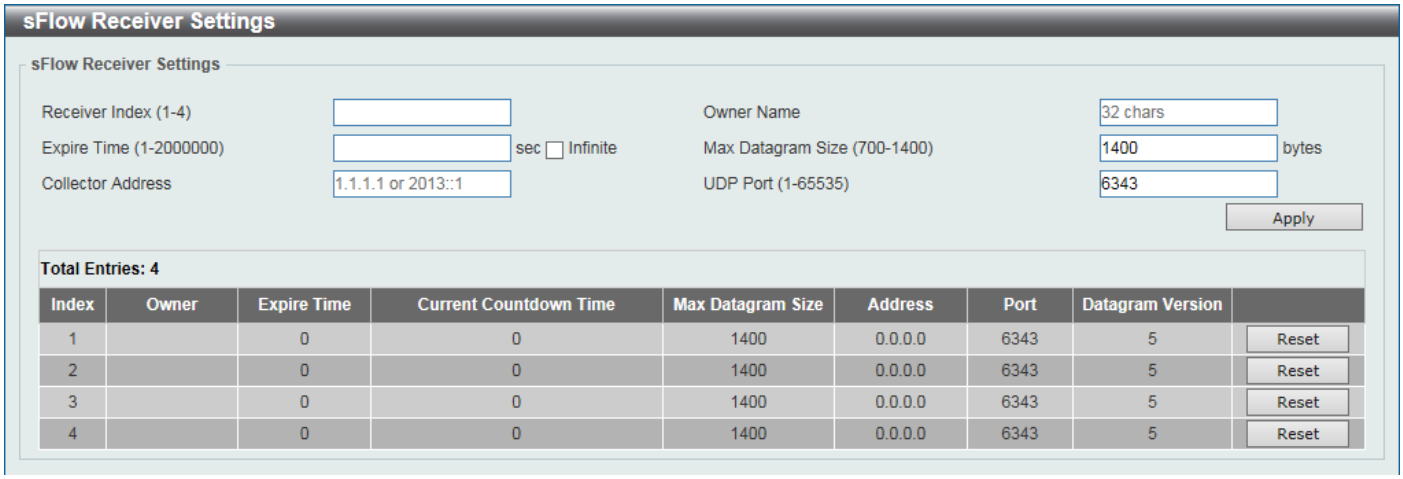


Figure 11-19 sFlow Receiver Settings Window

The fields that can be configured are described below:

Parameter	Description
Receiver Index	Enter the index number of the receiver here. The range is from 1 to 4.
Owner Name	Enter the owner name of the receiver here. This name can be up to 32 characters long.
Expire Time	Enter the expiration time for the entry here. The parameters of the entry will reset when the timer expired. The range is from 1 to 2000000 seconds. Selecting **Infinite** specifies that the entry will not expire.
Max Datagram Size	Enter the maximum number of data bytes of a single sFlow datagram here. The range is from 700 to 1400 bytes. By default, this value is 1400 bytes.
Collector Address	Enter the remote sFlow collector's IPv4 or IPv6 address here.
UDP Port	Enter the remote sFlow collector's UDP port number here. The range is from 1 to 65535. By default, this value is 6343.

Click the **Apply** button to accept the changes made.

Click the **Reset** button to reset the specified entry's settings to the default settings.

sFlow Sampler Settings

This window is used to display and configure the sFlow sampler settings.

To view the following window, click **Monitoring > sFlow > sFlow Sampler Settings**, as shown below:

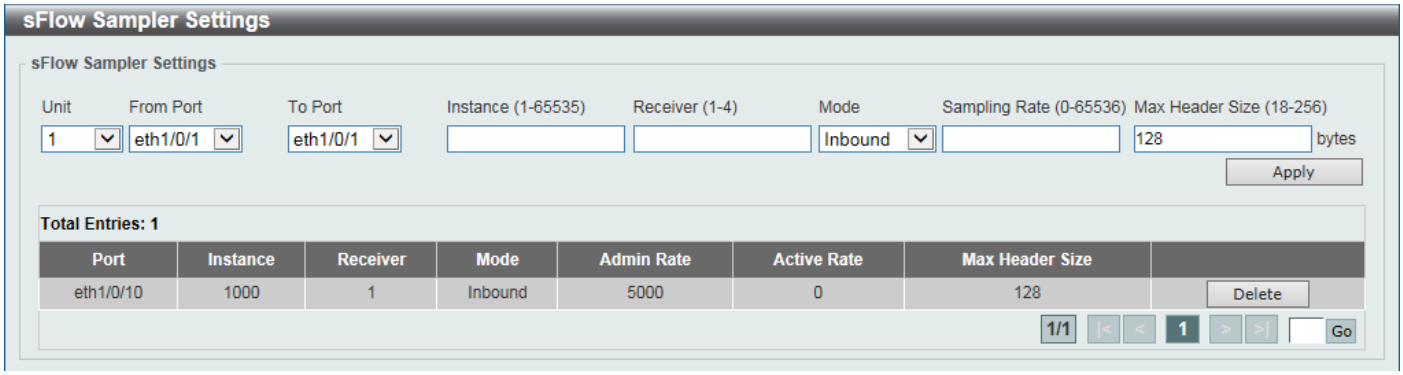


Figure 11-20 sFlow Sampler Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Instance	Enter the instance index number if multiple samplers are associated with one interface. The range is from 1 to 65535.
Receiver	Enter the receiver index for this sampler. If not specified, the value is 0. The range is from 1 to 4.
Mode	Select the mode here. Options to choose from are: • Selecting **Inbound** specifies to sample ingress packets. • Selecting **Outbound** specifies to sample egress packets. By default, the **Inbound** option is used.
Sampling Rate	Enter the packet-sampling rate here. The range is from 0 to 65536. Entering 0 will disable this function. By default, this value is 0.
Max Header Size	Enter the maximum number of bytes that should be copied from sampled packets. The range is from 18 to 256 bytes. By default, this value is 128 bytes.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

sFlow Poller Settings

This window is used to display and configure the sFlow poller settings.

To view the following window, click **Monitoring > sFlow > sFlow Poller Settings**, as shown below:

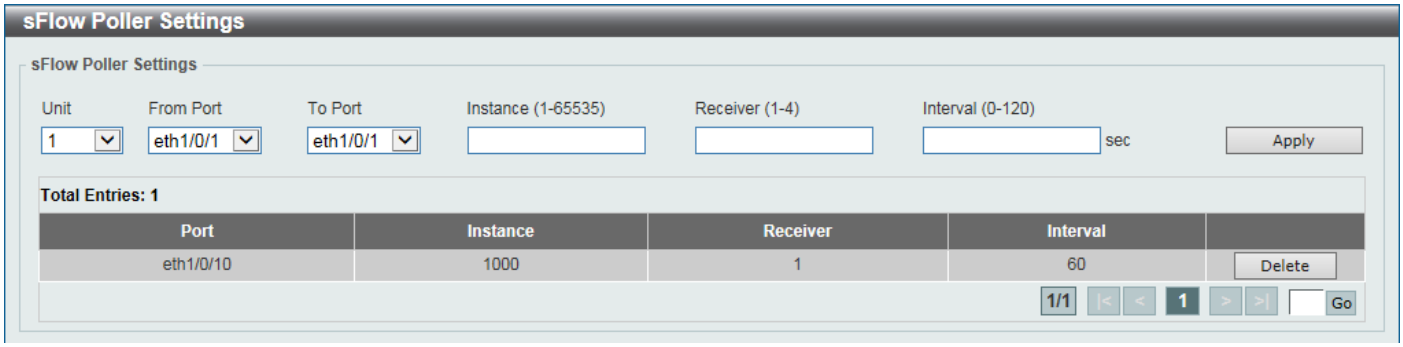


Figure 11-21 sFlow Poller Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Instance	Enter the instance index number if multiple samplers are associated with one interface. The range is from 1 to 65535.
Receiver	Enter the receiver index value for this poller here. The range is from 1 to 4.
Interval	Enter the maximum number of seconds between successive polling samples. The range is from 0 to 120 seconds. Entering 0 will disable this feature. By default, this value is 0.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Device Environment

The device environment feature displays the Switch internal temperature status.

To view the following window, click **Monitoring > Device Environment**, as shown below:

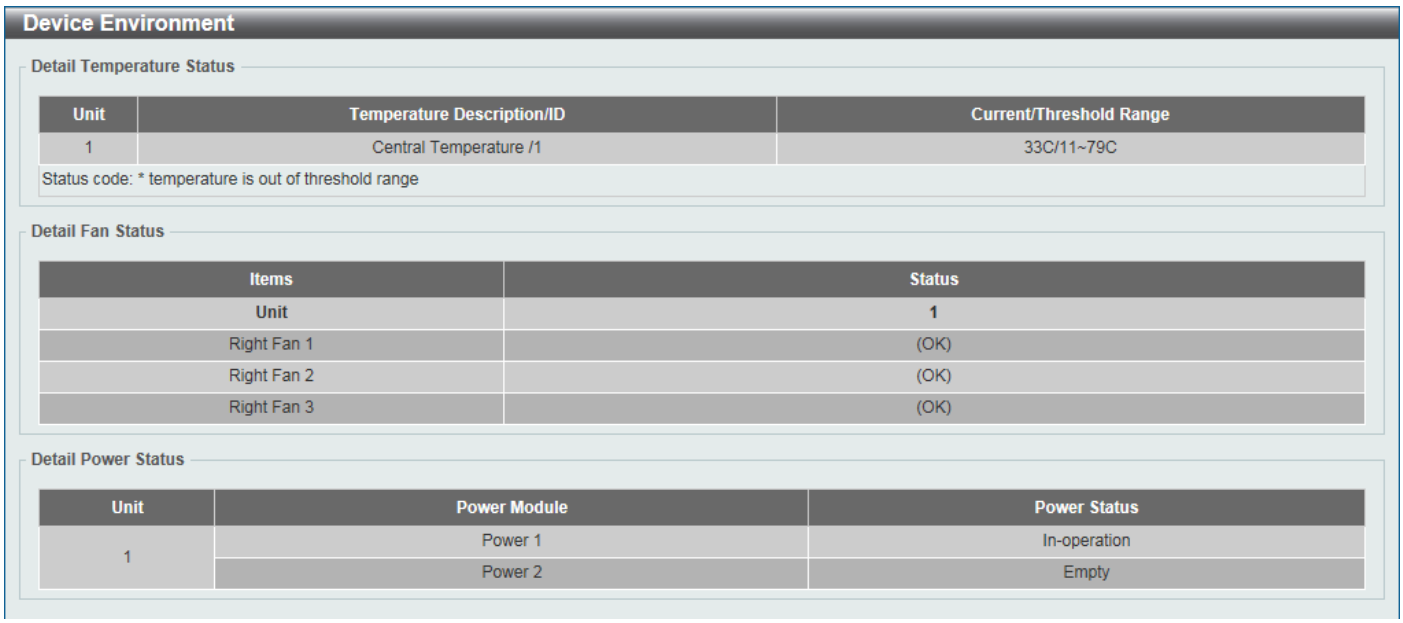


Figure 11-22 Device Environment Window

12. Green

Power Saving

This window is used to display and configure the power saving settings of the Switch.

To view the following window, click **Green > Power Saving** and select the **Power Saving Global Settings** tab, as shown below:

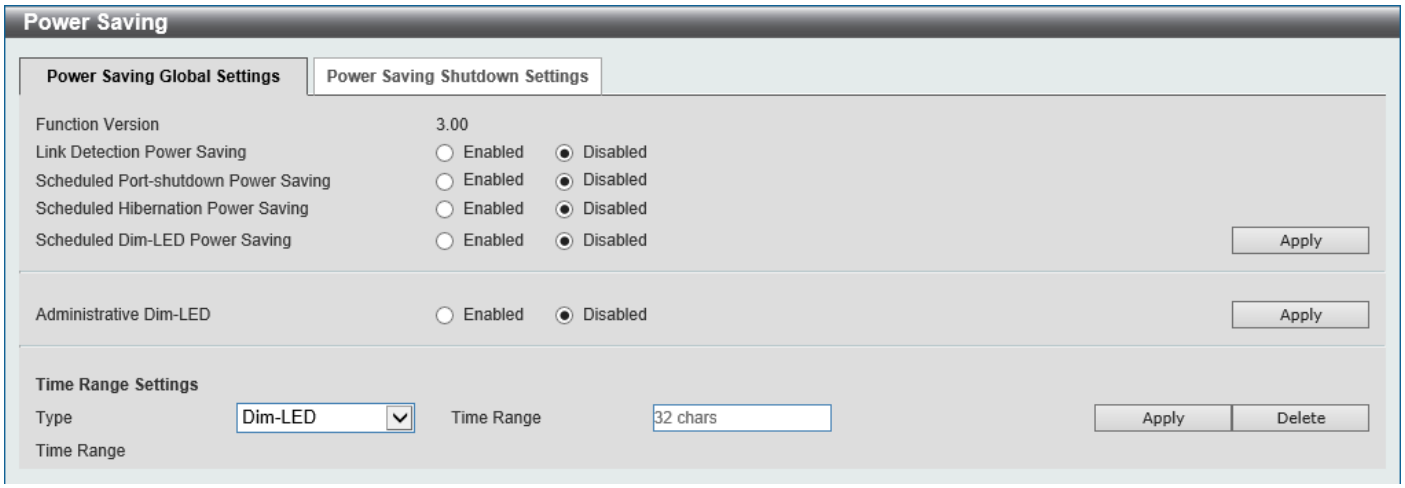


Figure 12-1 Power Saving Global Settings Window

The fields that can be configured in **Power Saving Global Settings** are described below:

Parameter	Description
Link Detection Power Saving	Select to enable or disable the link detection state. When enabled, a port, which has a link down status, will be turned off to save power to the Switch. This will not affect the port's capabilities when the port status is link up.
Scheduled Port-shutdown Power Saving	Select to enable or disable applying the power saving by scheduled port shutdown.
Scheduled Hibernation Power Saving	Select to enable or disable the scheduled hibernation power saving function here. This parameter is only available when physical stacking is *disabled*.
Scheduled Dim-LED Power Saving	Select to enable or disable applying the power saving by scheduled dimming LEDs.
Administrative Dim-LED	Select to enable or disable the port LED function.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Time Range Settings** are described below:

Parameter	Description
Type	Select the type of power saving. Options to choose from are **Dim-LED** and **Hibernation**. **Hibernation** is only available when physical stacking is *disabled*.
Time Range	Enter the name of the time range to associate with the power saving type.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Delete** button to remove the specified entry.

To view the following window, select the **Power Saving Shutdown Settings** tab, as shown below:

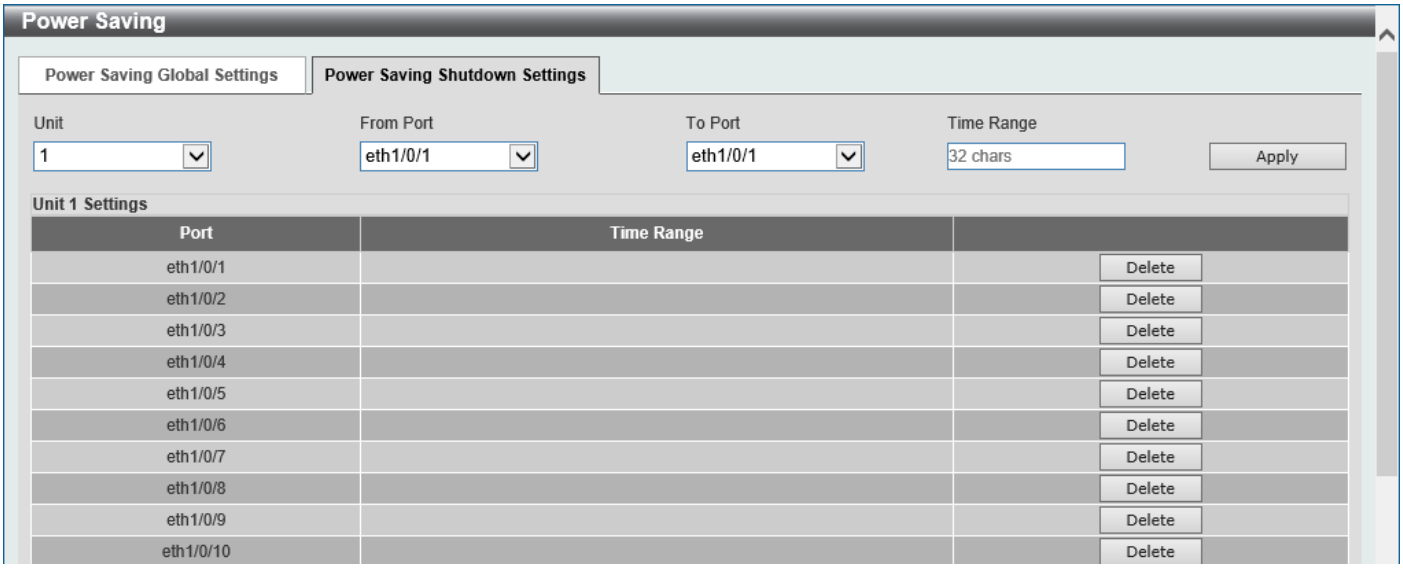


Figure 12-2 Power Saving Shutdown Settings Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
Time Range	Enter the name of the time range to associate with the ports.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

EEE

Energy Efficient Ethernet (EEE) is defined in IEEE 802.3az. It is designed to reduce the energy consumption of a link when no packets are being sent.

To view the following window, click **Green > EEE**, as shown below:

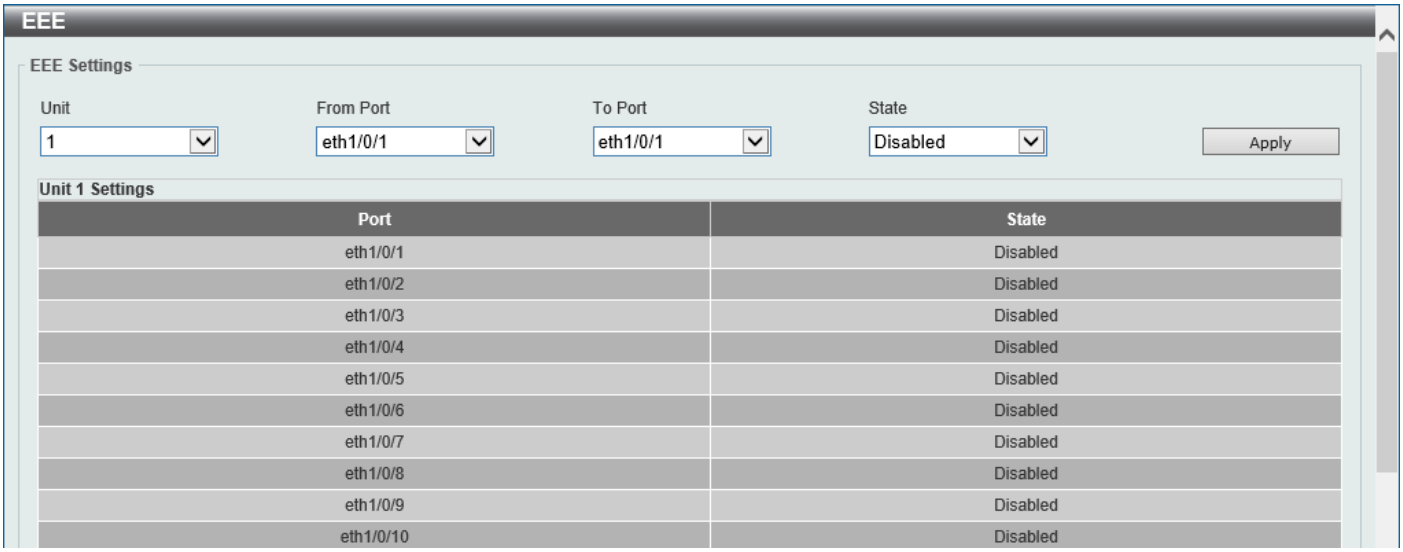


Figure 12-3 EEE Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port - To Port	Select the appropriate port range used for the configuration here.
State	Select this option to enable or disable the state of this feature here.

Click the **Apply** button to accept the changes made.

13. Toolbar

Save

Save Configuration

This window is used to save the running configuration to the start-up configuration. This is to prevent the loss of configuration in the event of a power failure.

To view the following window, click **Save > Save Configuration**, as shown below:

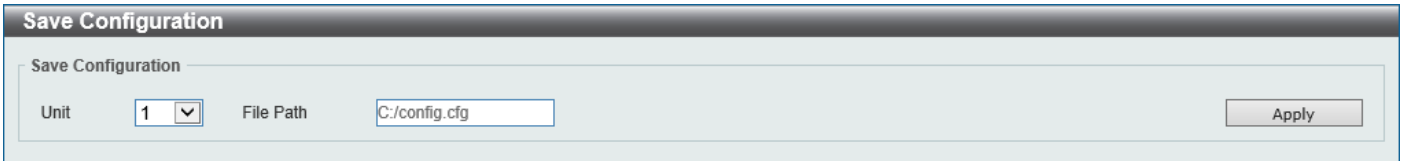


Figure 13-1 Save Configuration Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
File Path	Enter the filename and path in the space provided.

Click the **Apply** button to save the configuration.

Tools

Firmware Upgrade & Backup

Firmware Upgrade from HTTP

This window is used to initiate a firmware upgrade from a local PC using HTTP.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from HTTP**, as shown below:

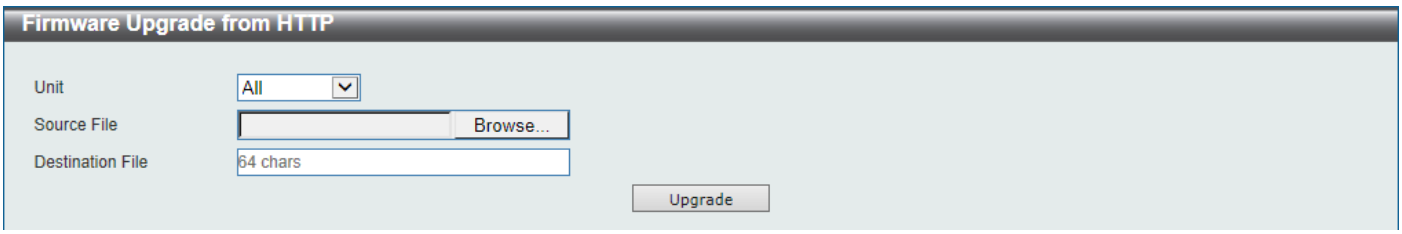


Figure 13-2 Firmware Upgrade from HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Parameter	Description
Source File	In this field the source firmware file's filename and path will be displayed after selection. To navigate to the location of the firmware file located on the local PC, either double click in the text box or click the **Browse** button.
Destination File	Enter the destination path and location where the new firmware should be stored on the Switch. This field can be up to 64 characters long.

Click the **Upgrade** button to initiate the firmware upgrade.

Firmware Upgrade from TFTP

This window is used to initiate a firmware upgrade from a TFTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from TFTP**, as shown below:

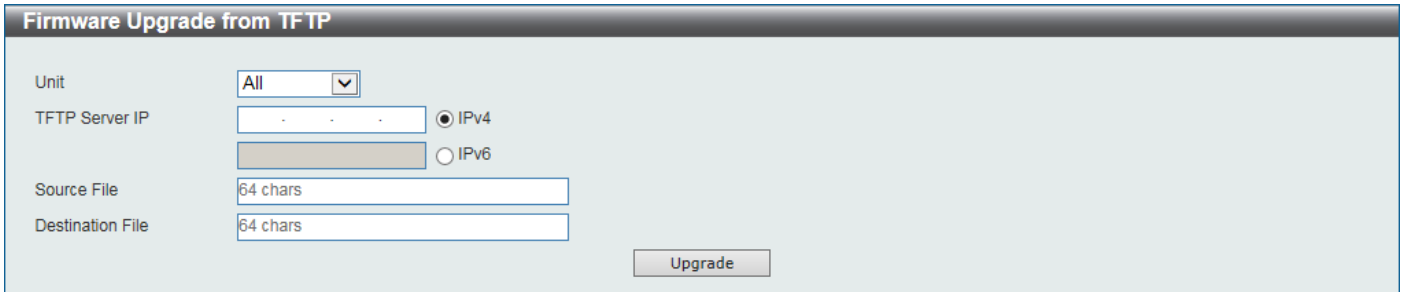


Figure 13-3 Firmware Upgrade from TFTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Source File	Enter the source filename and path of the firmware file located on the TFTP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the new firmware should be stored on the Switch. This field can be up to 64 characters long.

Click the **Upgrade** button to initiate the firmware upgrade.

Firmware Upgrade from FTP

This window is used to initiate a firmware upgrade from an FTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from FTP**, as shown below:

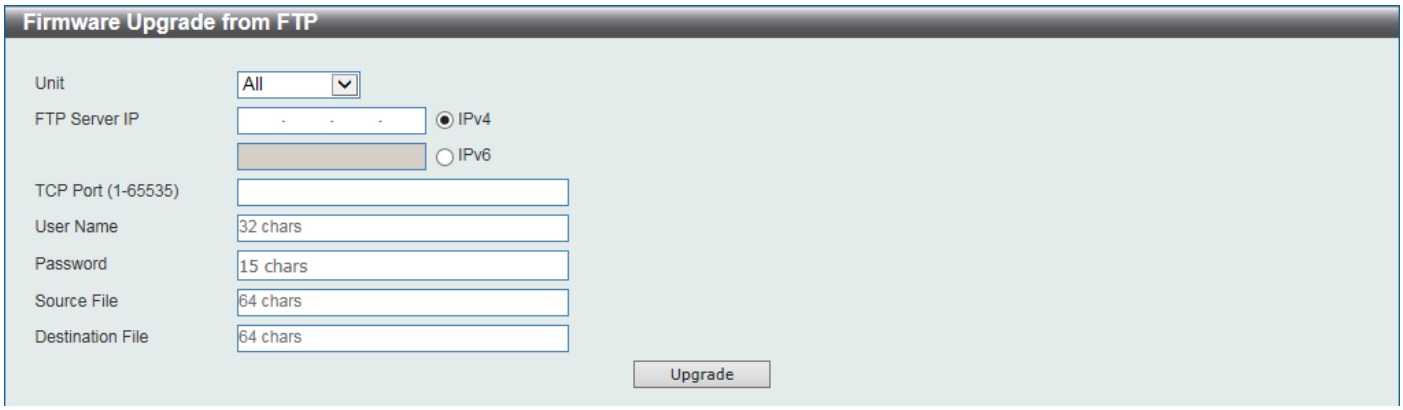


Figure 13-4 Firmware Upgrade from FTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
FTP Server IP	Enter the FTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided.
TCP Port	Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535.
User Name	Enter the user name used for the FTP connection here. This name can be up to 32 characters long.
Password	Enter the password used for the FTP connection here. This password can be up to 15 characters long.
Source File	Enter the source filename and path of the firmware file located on the FTP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the new firmware should be stored on the Switch. This field can be up to 64 characters long.

Click the **Upgrade** button to initiate the firmware upgrade.

Firmware Upgrade from RCP

This window is used to initiate a firmware upgrade from an RCP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from RCP**, as shown below:

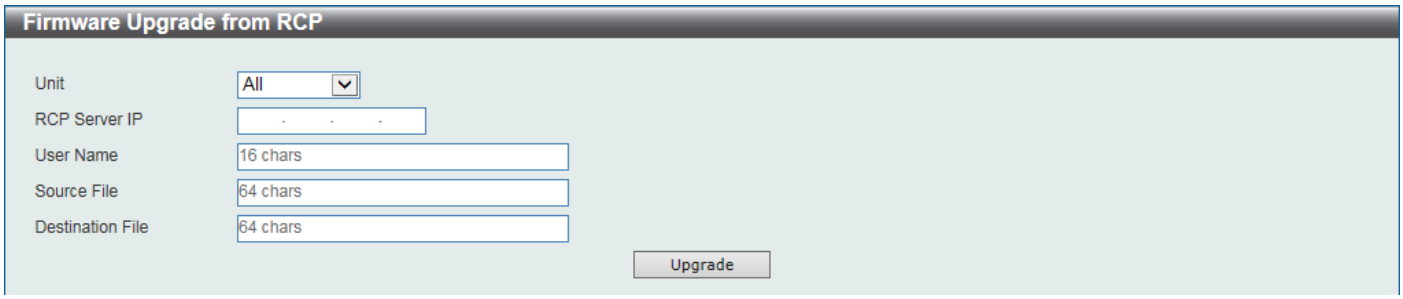


Figure 13-5 Firmware Upgrade from RCP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Source File	Enter the source filename and path of the firmware file located on the RCP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the new firmware should be stored on the Switch. This field can be up to 64 characters long.

Click the **Upgrade** button to initiate the firmware upgrade.

Firmware Backup to HTTP

This window is used to initiate a firmware backup to a local PC using HTTP.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to HTTP**, as shown below:

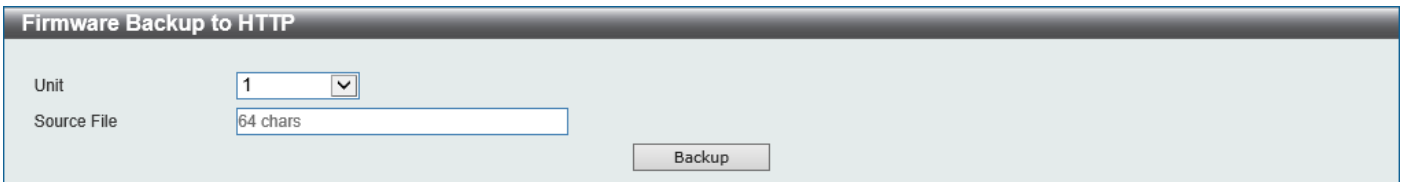


Figure 13-6 Firmware Backup to HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Source File	Enter the source filename and path of the firmware file located on the Switch here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the firmware backup.

Firmware Backup to TFTP

This window is used to initiate a firmware backup to a TFTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to TFTP**, as shown below:

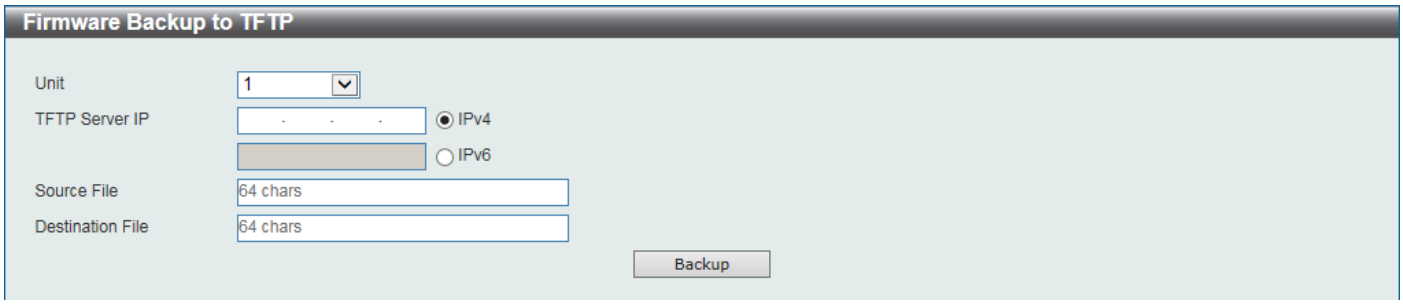


Figure 13-7 Firmware Backup to TFTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Source File	Enter the source filename and path of the firmware file located on the Switch here. This field can be up to 64 characters long.
Destination File	Enter the destination filename and path of the firmware file to be backed up to the TFTP server here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the firmware backup.

Firmware Backup to FTP

This window is used to initiate a firmware backup to an FTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to FTP**, as shown below:

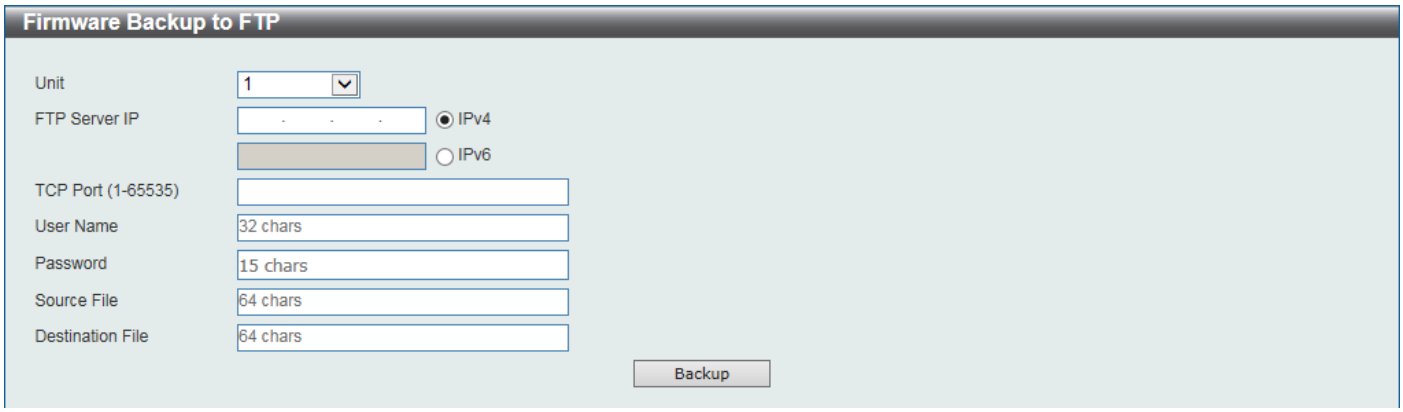


Figure 13-8 Firmware Backup to FTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
FTP Server IP	Enter the FTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided.
TCP Port	Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535.
User Name	Enter the user name used for the FTP connection here. This name can be up to 32 characters long.
Password	Enter the password used for the FTP connection here. This password can be up to 15 characters long.
Source File	Enter the source filename and path of the firmware file located on the Switch here. This field can be up to 64 characters long.
Destination File	Enter the destination filename and path of the firmware file to be backed up to the FTP server here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the firmware backup.

Firmware Backup to RCP

This window is used to initiate a firmware backup to an RCP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to RCP**, as shown below:

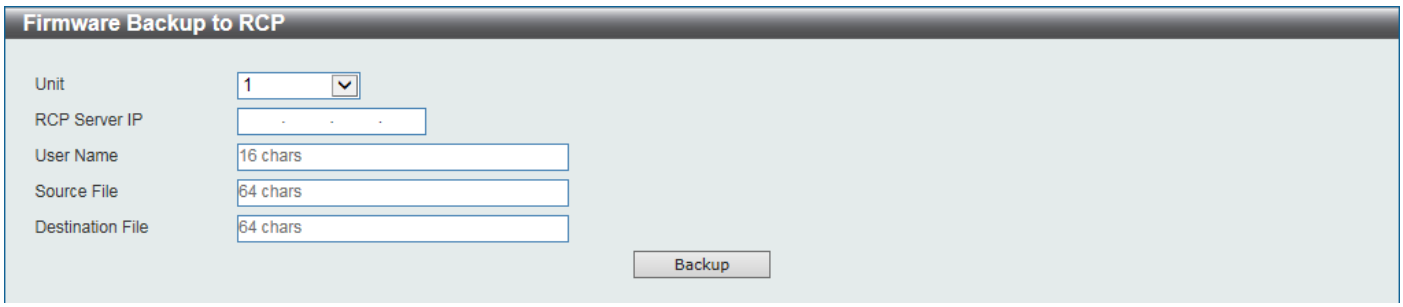


Figure 13-9 Firmware Backup to RCP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Source File	Enter the source filename and path of the firmware file located on the Switch here. This field can be up to 64 characters long.
Destination File	Enter the destination filename and path of the firmware file to be backed up to the RCP server here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the firmware backup.

Configuration Restore & Backup

Configuration Restore from HTTP

This window is used to initiate a configuration restore from a local PC using HTTP.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from HTTP**, as shown below:

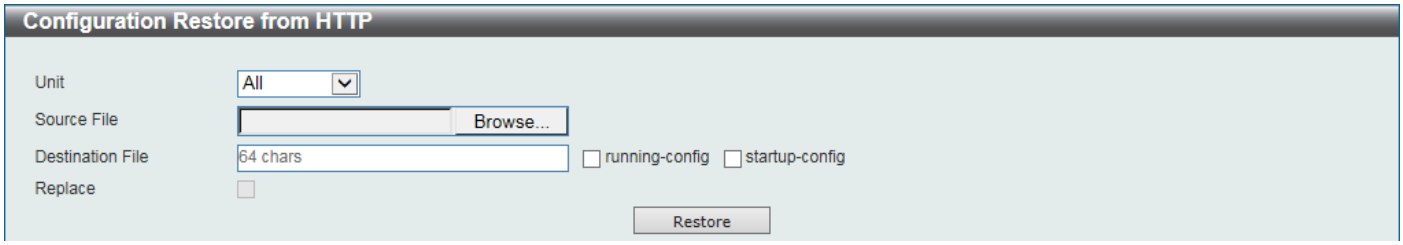


Figure 13-10 Configuration Restore from HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Source File	In this field the source configuration file's filename and path will be displayed after selection. To navigate to the location of the configuration file located on the local PC, either double click in the text box or click the **Browse** button.
Destination File	Enter the destination path and location where the configuration file should be stored on the Switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the Switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the Switch.
Replace	Select this option to replace the configuration file on the Switch with this one.

Click the **Restore** button to initiate the configuration restore.

Configuration Restore from TFTP

This window is used to initiate a configuration restore from a TFTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from TFTP**, as shown below:

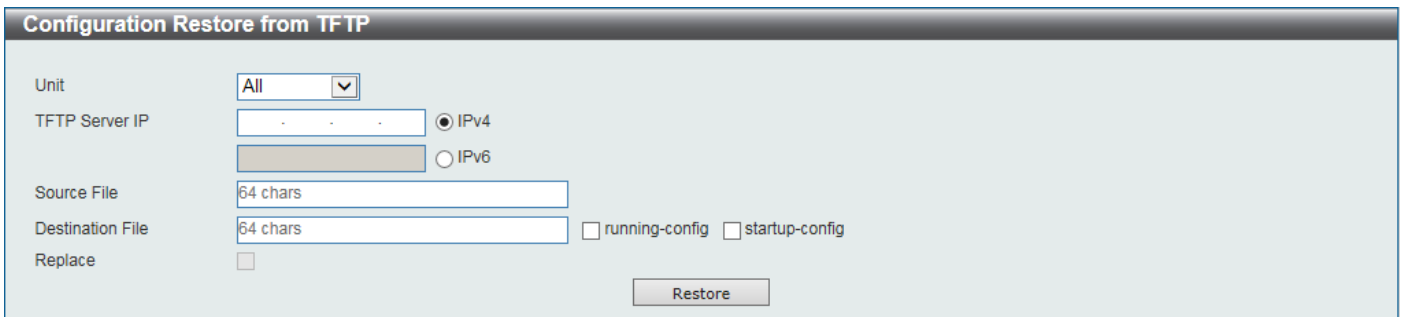


Figure 13-11 Configuration Restore from TFTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Source File	Enter the source filename and path of the configuration file located on the TFTP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the configuration file should be stored on the Switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the Switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the Switch.
Replace	Select this option to replace the configuration file on the Switch with this one.

Click the **Restore** button to initiate the configuration restore.

Configuration Restore from FTP

This window is used to initiate a configuration restore from an FTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from FTP**, as shown below:

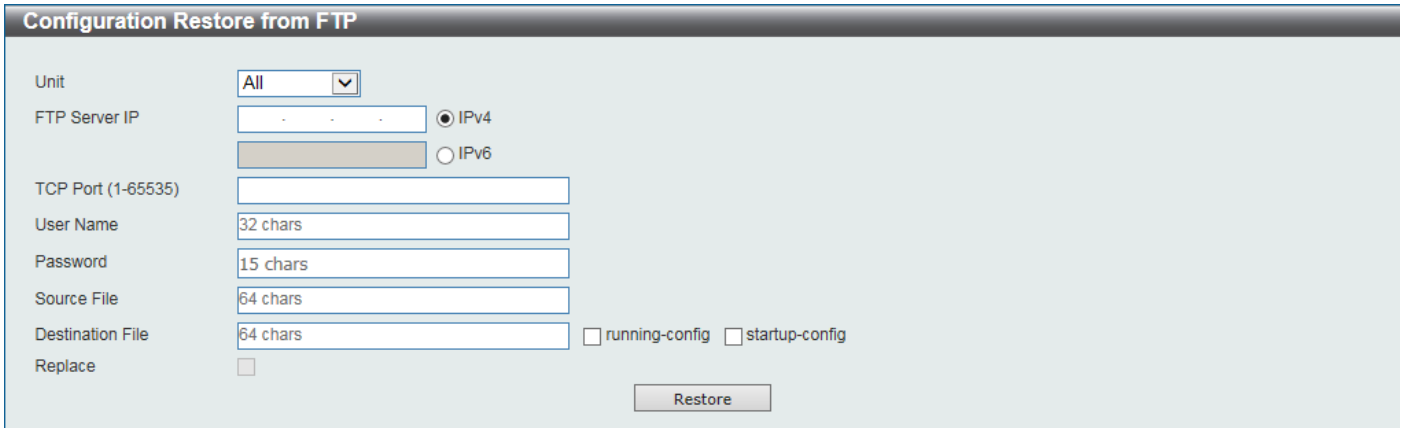


Figure 13-12 Configuration Restore from FTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
FTP Server IP	Enter the FTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided.
TCP Port	Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535.
User Name	Enter the user name used for the FTP connection here. This name can be up to 32 characters long.
Password	Enter the password used for the FTP connection here. This password can be up to 15 characters long.
Source File	Enter the source filename and path of the configuration file located on the FTP server here. This field can be up to 64 characters long.

Parameter	Description
Destination File	Enter the destination path and location where the configuration file should be stored on the Switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the Switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the Switch.
Replace	Select this option to replace the configuration file on the Switch with this one.

Click the **Restore** button to initiate the configuration restore.

Configuration Restore from RCP

This window is used to initiate a configuration restore from an RCP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from RCP**, as shown below:

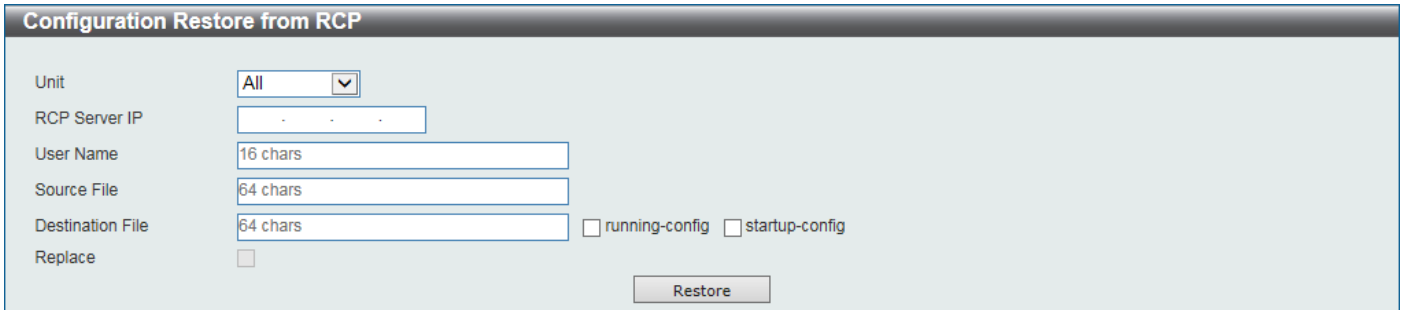


Figure 13-13 Configuration Restore from RCP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Source File	Enter the source filename and path of the configuration file located on the RCP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the configuration file should be stored on the Switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the Switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the Switch.
Replace	Select this option to replace the configuration file on the Switch with this one.

Click the **Restore** button to initiate the configuration restore.

Configuration Backup to HTTP

This window is used to initiate a configuration file backup to a local PC using HTTP.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to HTTP**, as shown below:

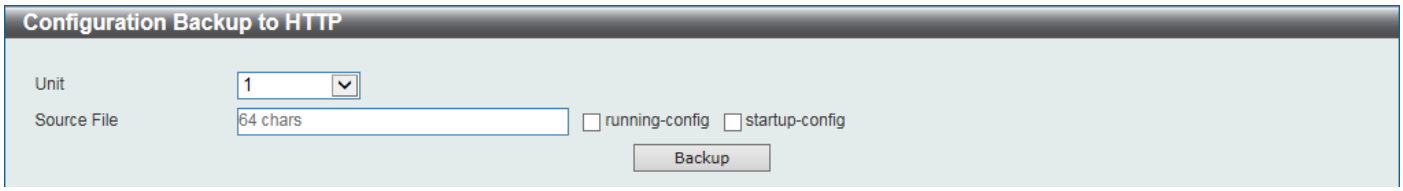


Figure 13-14 Configuration Backup to HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Source File	Enter the source filename and path of the configuration file located on the Switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the Switch. Select the **startup-config** option to back up the start-up configuration file from the Switch.

Click the **Backup** button to initiate the configuration file backup.

Configuration Backup to TFTP

This window is used to initiate a configuration file backup to a TFTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to TFTP**, as shown below:

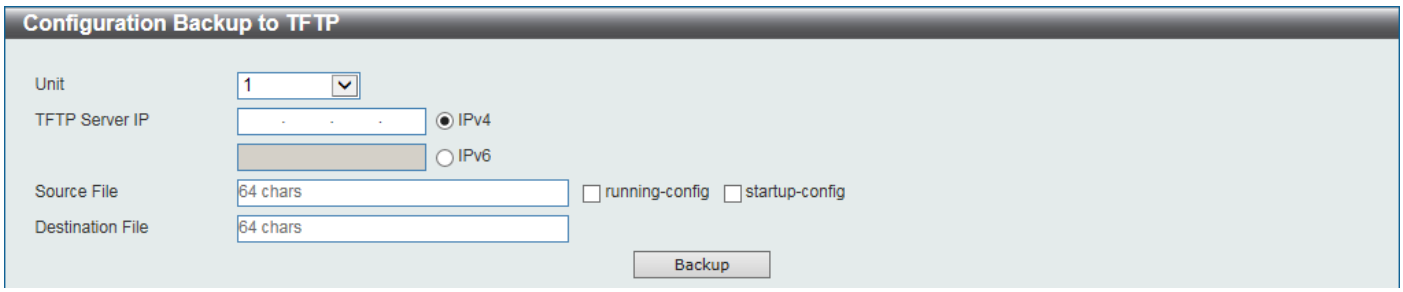


Figure 13-15 Configuration Backup to TFTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Source File	Enter the source filename and path of the configuration file located on the Switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the Switch. Select the **startup-config** option to back up the start-up configuration file from the Switch.
Destination File	Enter the destination path and location where the configuration file should be stored on the TFTP server. This field can be up to 64 characters long.

Click the **Backup** button to initiate the configuration file backup.

Configuration Backup to FTP

This window is used to initiate a configuration file backup to an FTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to FTP**, as shown below:

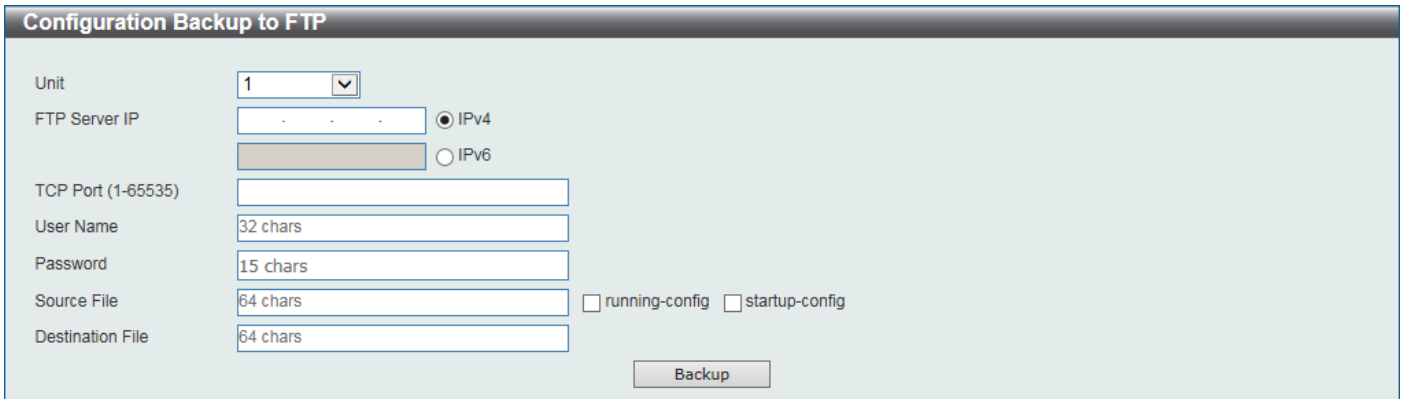


Figure 13-16 Configuration Backup to FTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
FTP Server IP	Enter the FTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided.
TCP Port	Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535.
User Name	Enter the user name used for the FTP connection here. This name can be up to 32 characters long.
Password	Enter the password used for the FTP connection here. This password can be up to 15 characters long.
Source File	Enter the source filename and path of the configuration file located on the Switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the Switch. Select the **startup-config** option to back up the start-up configuration file from the Switch.
Destination File	Enter the destination path and location where the configuration file should be stored on the FTP server. This field can be up to 64 characters long.

Click the **Backup** button to initiate the configuration file backup.

Configuration Backup to RCP

This window is used to initiate a configuration file backup to an RCP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to RCP**, as shown below:

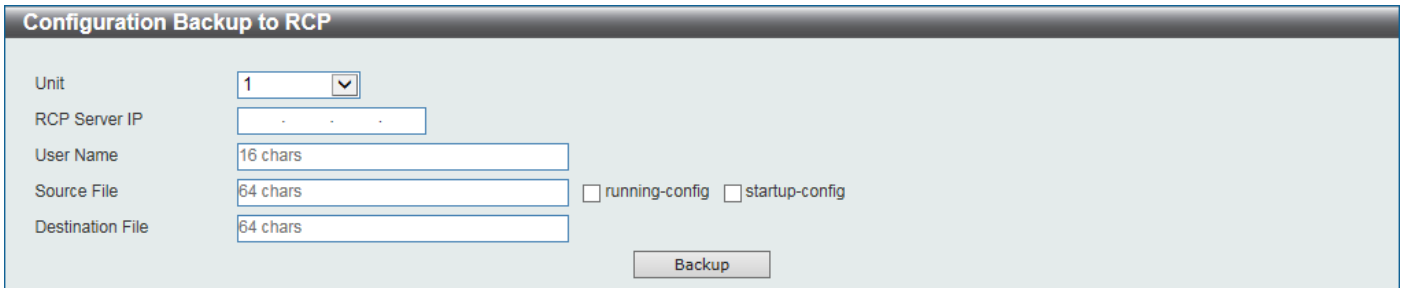


Figure 13-17 Configuration Backup to RCP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Source File	Enter the source filename and path of the configuration file located on the Switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the Switch. Select the **startup-config** option to back up the start-up configuration file from the Switch.
Destination File	Enter the destination path and location where the configuration file should be stored on the RCP server. This field can be up to 64 characters long.

Click the **Backup** button to initiate the configuration file backup.

Certificate & Key Restore & Backup

Certificate & Key Restore from HTTP

This window is used to initiate a certificate and key restore from a local PC using HTTP.

To view the following window, click **Tools > Certificate & Key Restore & Backup > Certificate & Key Restore from HTTP**, as shown below:

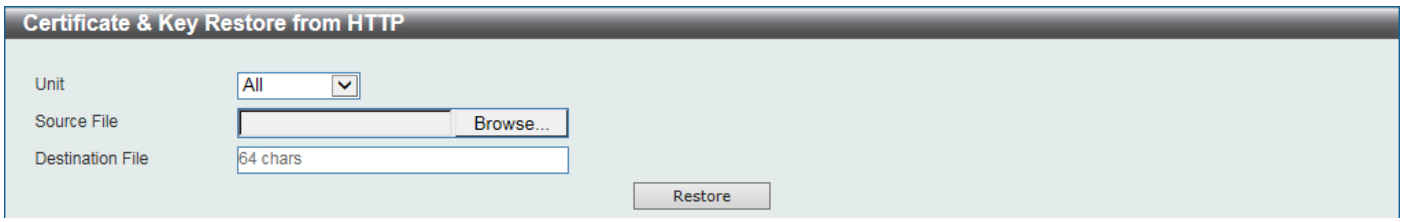


Figure 13-18 Certificate & Key Restore from HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Parameter	Description
Source File	In this field the source certificate and key file's filename and path will be displayed after selection. To navigate to the location of the certificate and key file located on the local PC, either double click in the text box or click the **Browse** button.
Destination File	Enter the destination path and location where the new certificate and key should be stored on the Switch. This field can be up to 64 characters long.

Click the **Restore** button to initiate the certificate and key restore.

Certificate & Key Restore from TFTP

This window is used to initiate a certificate and key restore from a TFTP server.

To view the following window, click **Tools > Certificate & Key Restore & Backup > Certificate & Key Restore from TFTP**, as shown below:

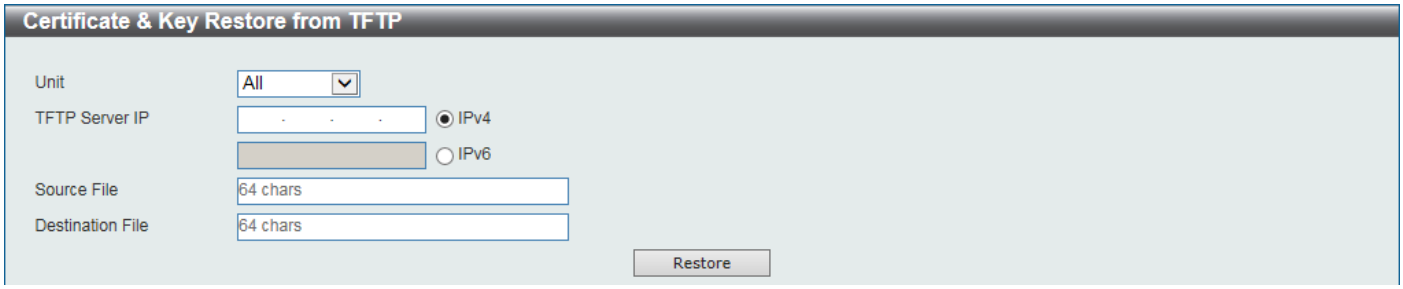


Figure 13-19 Certificate & Key Restore from TFTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Source File	Enter the source filename and path of the certificate and key file located on the TFTP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the new certificate and key should be stored on the Switch. This field can be up to 64 characters long.

Click the **Restore** button to initiate the certificate and key restore.

Certificate & Key Restore from FTP

This window is used to initiate a certificate and key restore from an FTP server.

To view the following window, click **Tools > Certificate & Key Restore & Backup > Certificate & Key Restore from FTP**, as shown below:

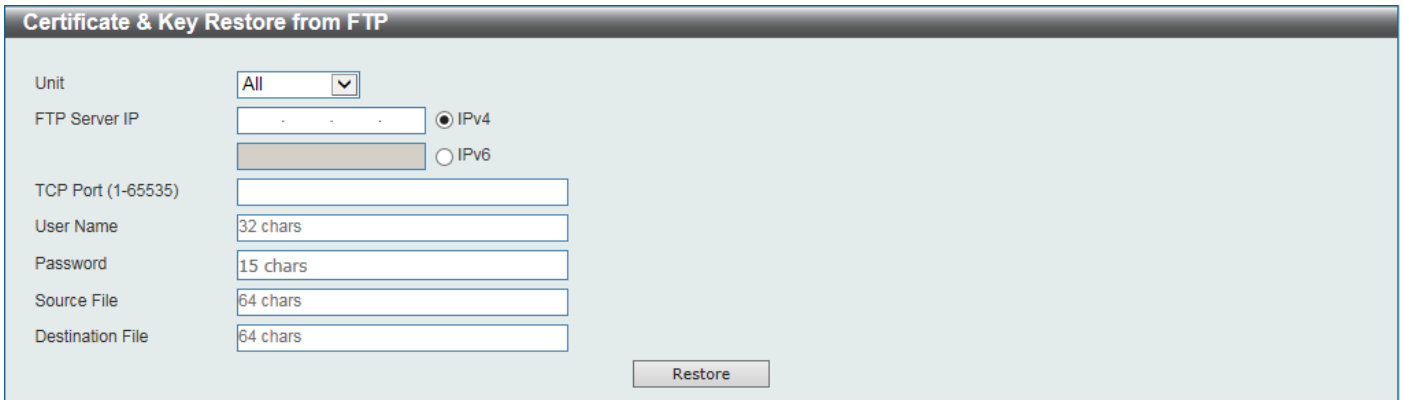


Figure 13-20 Certificate & Key Restore from FTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
FTP Server IP	Enter the FTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided.
TCP Port	Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535.
User Name	Enter the user name used for the FTP connection here. This name can be up to 32 characters long.
Password	Enter the password used for the FTP connection here. This password can be up to 15 characters long.
Source File	Enter the source filename and path of the certificate and key file located on the FTP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the new certificate and key should be stored on the Switch. This field can be up to 64 characters long.

Click the **Restore** button to initiate the certificate and key restore.

Certificate & Key Restore from RCP

This window is used to initiate a certificate and key restore from an RCP server.

To view the following window, click **Tools > Certificate & Key Restore & Backup > Certificate & Key Restore from RCP**, as shown below:

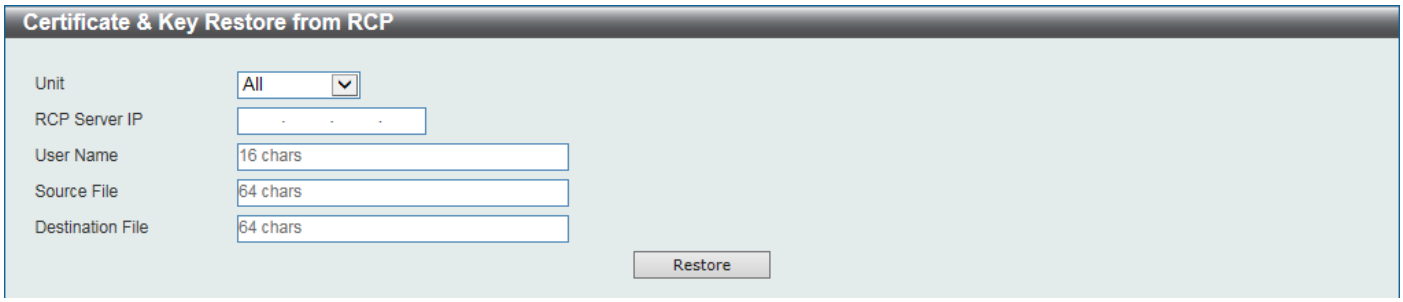


Figure 13-21 Certificate & Key Restore from RCP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Source File	Enter the source filename and path of the certificate and key file located on the RCP server here. This field can be up to 64 characters long.
Destination File	Enter the destination path and location where the new certificate and key should be stored on the Switch. This field can be up to 64 characters long.

Click the **Restore** button to initiate the certificate and key restore.

Public Key Backup to HTTP

This window is used to initiate a public key backup to a local PC using HTTP.

To view the following window, click **Tools > Certificate & Key Upgrade & Backup > Public Key Backup to HTTP**, as shown below:

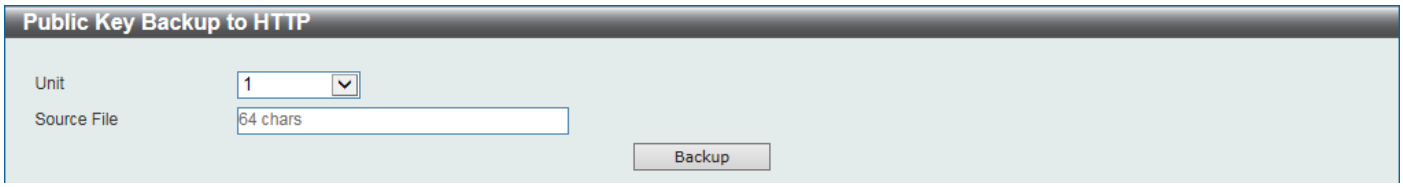


Figure 13-22 Public Key Backup to HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Source File	Enter the source filename and path of the certificate and key file located on the Switch here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the certificate and key backup.

Public Key Backup to TFTP

This window is used to initiate a public key backup to a TFTP server.

To view the following window, click **Tools > Certificate & Key Upgrade & Backup > Public Key Backup to TFTP**, as shown below:

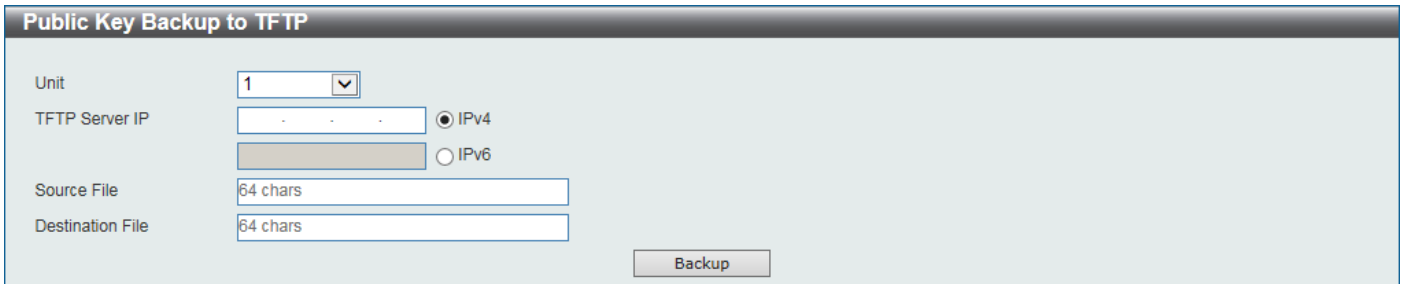


Figure 13-23 Public Key Backup to TFTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Source File	Enter the source filename and path of the certificate and key file located on the Switch here. This field can be up to 64 characters long.
Destination File	Enter the destination filename and path of the certificate and key file to be backed up to the TFTP server here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the certificate and key backup.

Public Key Backup to FTP

This window is used to initiate a public key backup to an FTP server.

To view the following window, click **Tools > Certificate & Key Upgrade & Backup > Public Key Backup to FTP**, as shown below:

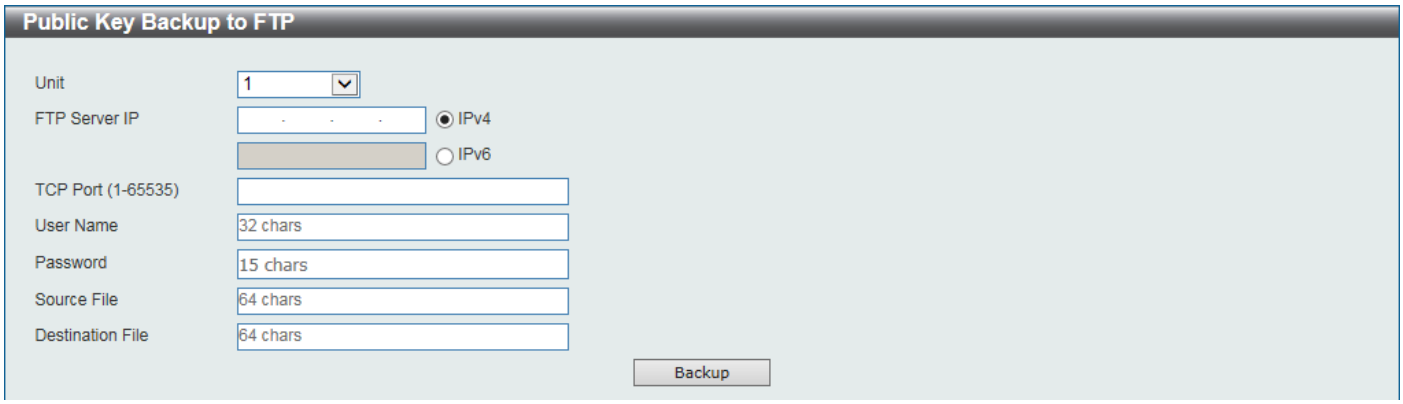


Figure 13-24 Public Key Backup to FTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
FTP Server IP	Enter the FTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided.
TCP Port	Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535.
User Name	Enter the user name used for the FTP connection here. This name can be up to 32 characters long.
Password	Enter the password used for the FTP connection here. This password can be up to 15 characters long.
Source File	Enter the source filename and path of the certificate and key file located on the Switch here. This field can be up to 64 characters long.
Destination File	Enter the destination filename and path of the certificate and key file to be backed up to the FTP server here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the certificate and key backup.

Public Key Backup to RCP

This window is used to initiate a public key backup to an RCP server.

To view the following window, click **Tools > Certificate & Key Upgrade & Backup > Public Key Backup to RCP**, as shown below:

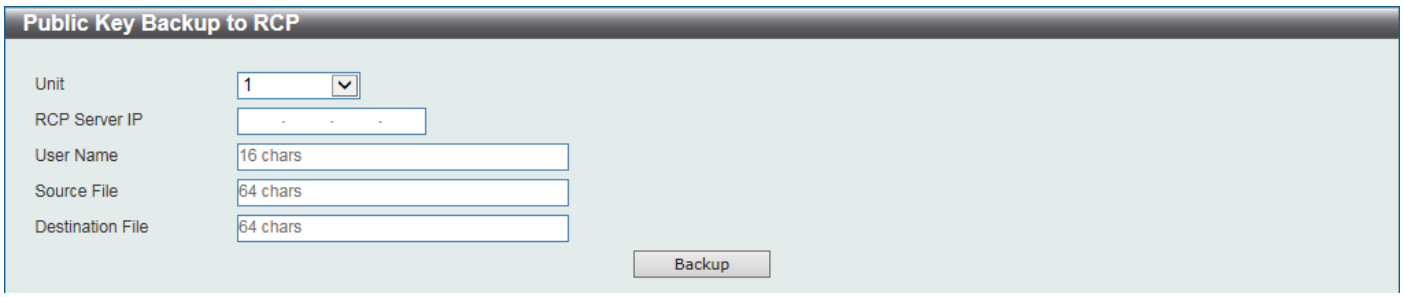


Figure 13-25 Public Key Backup to RCP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Source File	Enter the source filename and path of the certificate and key file located on the Switch here. This field can be up to 64 characters long.
Destination File	Enter the destination filename and path of the certificate and key file to be backed up to the RCP server here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the certificate and key backup.

Log Backup

Log Backup to HTTP

This window is used to initiate a system log backup to a local PC using HTTP.

To view the following window, click **Tools > Log Backup > Log Backup to HTTP**, as shown below:

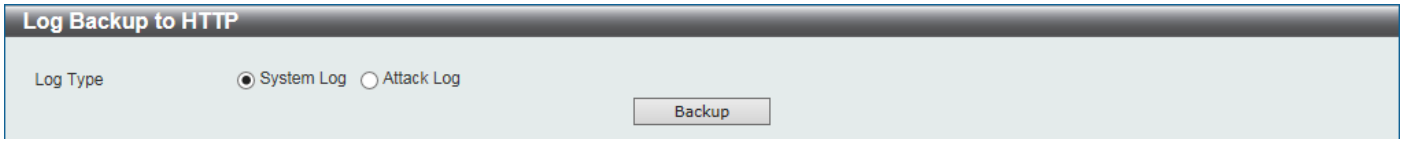


Figure 13-26 Log Backup to HTTP Window

The fields that can be configured are described below:

Parameter	Description
Log Type	Select the log type that will be backed up to the local PC using HTTP. • When the **System Log** option is selected, the system log will be backed up. • When the **Attack Log** is selected, the attack log will be backed up.

Click the **Backup** button to initiate the system log backup.

Log Backup to TFTP

This window is used to initiate a system log backup to a TFTP server.

To view the following window, click **Tools > Log Backup > Log Backup to TFTP**, as shown below:

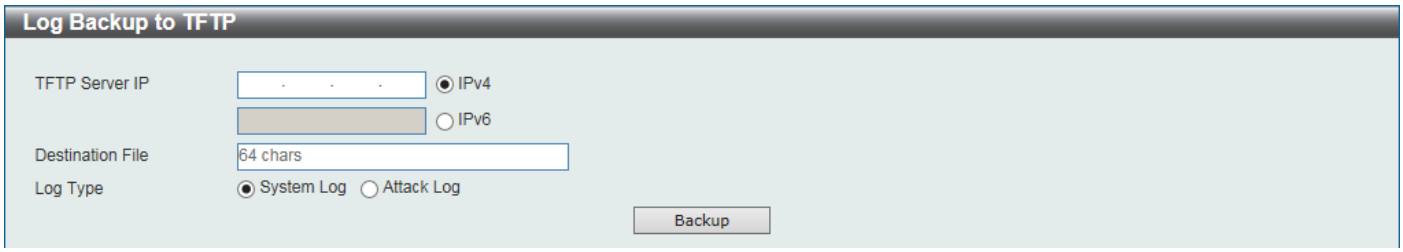


Figure 13-27 Log Backup to TFTP Window

The fields that can be configured are described below:

Parameter	Description
TFTP Server IP	Enter the TFTP server IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided.
Destination File	Enter the destination path and location where the log file should be stored on the TFTP server. This field can be up to 64 characters long.
Log Type	Select the log type that will be backed up to the TFTP server. • When the **System Log** option is selected, the system log will be backed up. • When the **Attack Log** is selected, the attack log will be backed up.

Click the **Backup** button to initiate the system log backup.

Log Backup to RCP

This window is used to initiate a system log backup to an RCP server.

To view the following window, click **Tools > Log Backup > Log Backup to RCP**, as shown below:

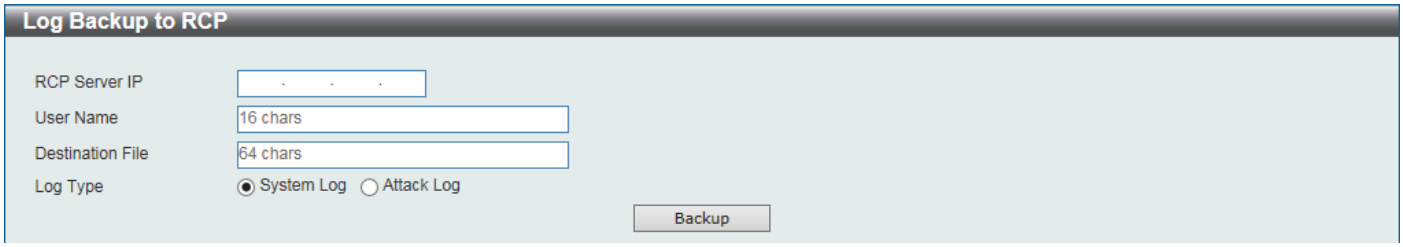


Figure 13-28 Log Backup to RCP Window

The fields that can be configured are described below:

Parameter	Description
RCP Server IP	Enter the RCP server IP address here.
User Name	Enter the user name used for the RCP connection here. This name can be up to 16 characters long.
Destination File	Enter the destination path and location where the log file should be stored on the RCP server. This field can be up to 64 characters long.
Log Type	Select the log type that will be backed up to the RCP server. • When the **System Log** option is selected, the system log will be backed up. • When the **Attack Log** is selected, the attack log will be backed up.

Click the **Backup** button to initiate the system log backup.

Ping

Ping is a small program that sends ICMP Echo packets to the IP address you specify. The destination node then responds to or "echoes" the packets sent from the Switch. This is very useful to verify connectivity between the Switch and other nodes on the network.

To view the following window, click **Tools > Ping**, as shown below:

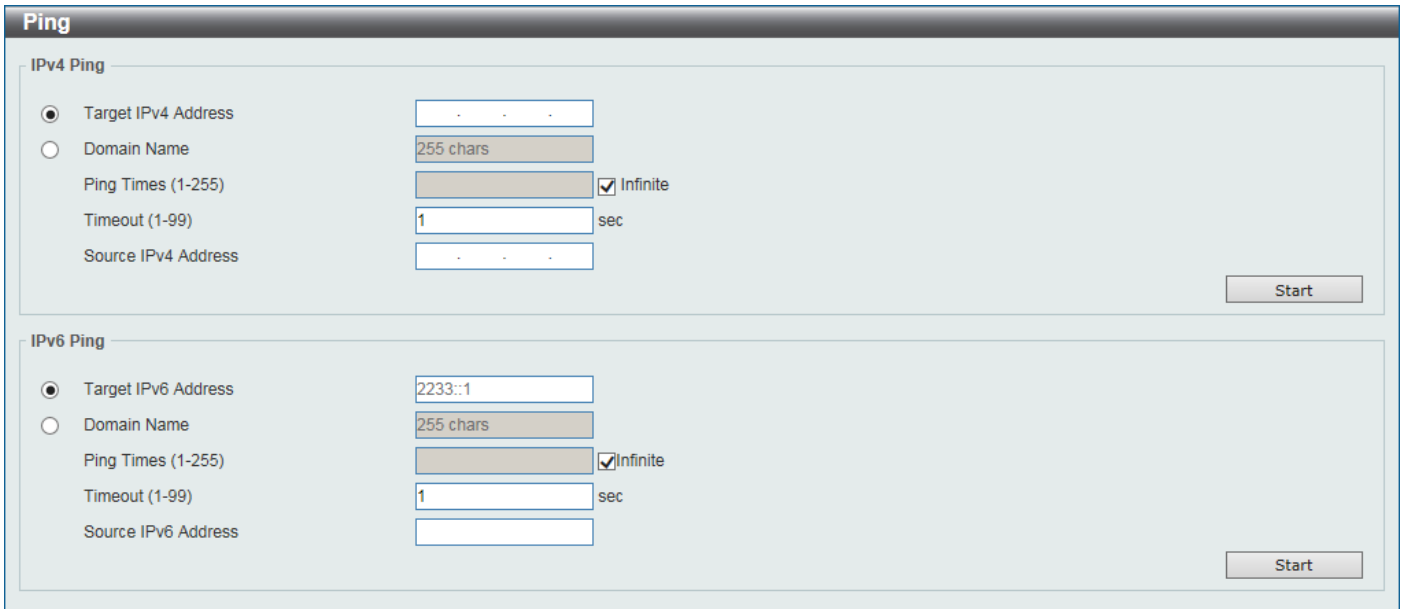


Figure 13-29 Ping Window

The fields that can be configured in **IPv4 Ping** are described below:

Parameter	Description
Target IPv4 Address	Select and enter an IP address to be pinged.
Domain Name	Select and enter the domain name of the system to discover.
Ping Times	Enter the number of times desired to attempt to Ping the IPv4 address configured in this window. The range is from 1 to 255. Tick the **Infinite** check box to keep sending ICMP Echo packets to the specified IP address until the program is stopped.
Timeout	Select a timeout period here. The range is from 1 to 99 seconds for this Ping message to reach its destination. If the packet fails to find the IP address in this specified time, the Ping packet will be dropped.
Source IPv4 Address	Enter the source IPv4 address. If the current Switch has more than one IP address, you can enter one of them to this field. When entered, this IPv4 address will be used as the packets' source IP address sent to the remote host, or as primary IP address.

Click the **Start** button to initiate the Ping Test for each individual section.

The fields that can be configured in **IPv6 Ping** are described below:

Parameter	Description
Target IPv6 Address	Enter an IPv6 address to be pinged.
Domain Name	Select and enter the domain name of the system to discover.
Ping Times	Enter the number of times desired to attempt to Ping the IPv6 address configured in this window. The range is from 1 to 255. Tick the **Infinite** check box to keep sending ICMPv6 Echo packets to the specified IPv6 address until the program is stopped.
Timeout	Select a timeout period here. The range is from 1 to 99 seconds for this Ping message to reach its destination. If the packet fails to find the IPv6 address in this specified time, the Ping packet will be dropped.
Source IPv6 Address	Enter the source IPv6 address. If the current Switch has more than one IPv6 address, you can enter one of them to this field. When entered, this IPv6 address will be used as the packets' source IPv6 address sent to the remote host, or as primary IPv6 address.

Click the **Start** button to initiate the Ping Test for each individual section.

After clicking the **Start** button in **IPv4 Ping** section, the following **IPv4 Ping Result** will appear:

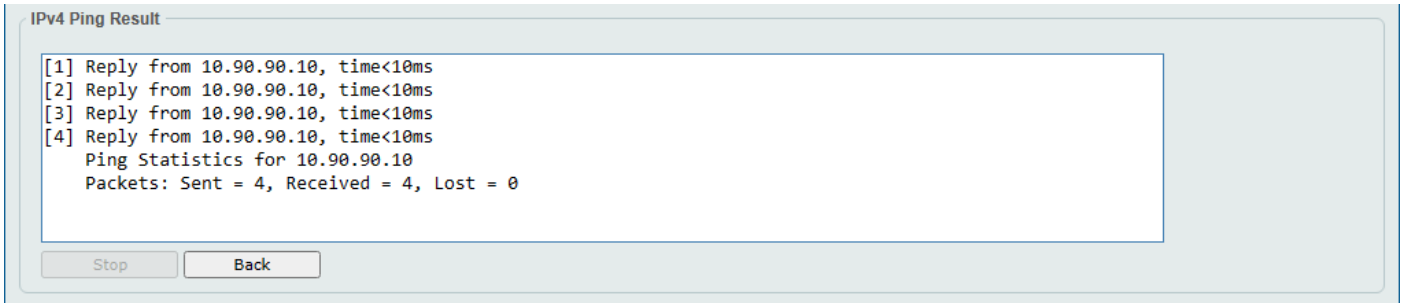


Figure 13-30 IPv4 Ping Result Window

After clicking the **Start** button in **IPv6 Ping** section, the following **IPv6 Ping Result** will appear:

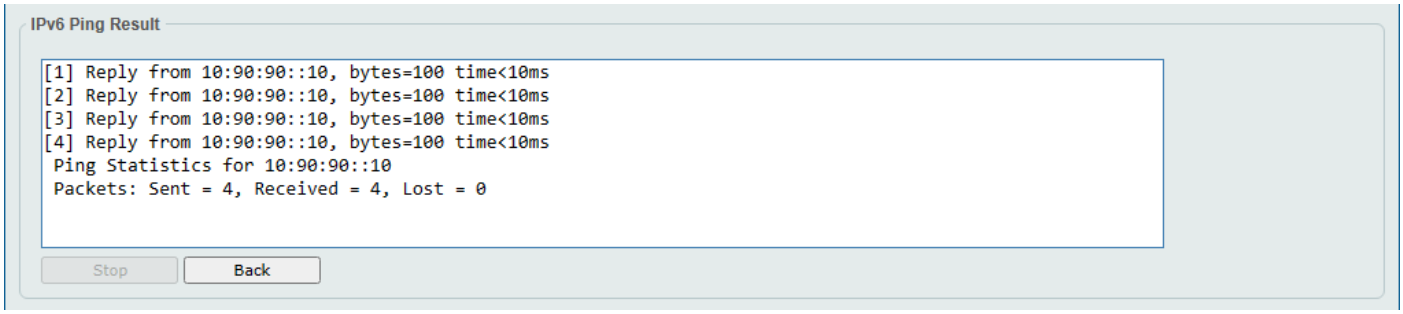


Figure 13-31 IPv6 Ping Result Window

Click the **Stop** button to halt the Ping Test.

Click the **Back** button to return to the Ping section.

Trace Route

The trace route page allows the user to trace a route between the Switch and a given host on the network.

To view the following window, click **Tools > Trace Route**, as shown below:

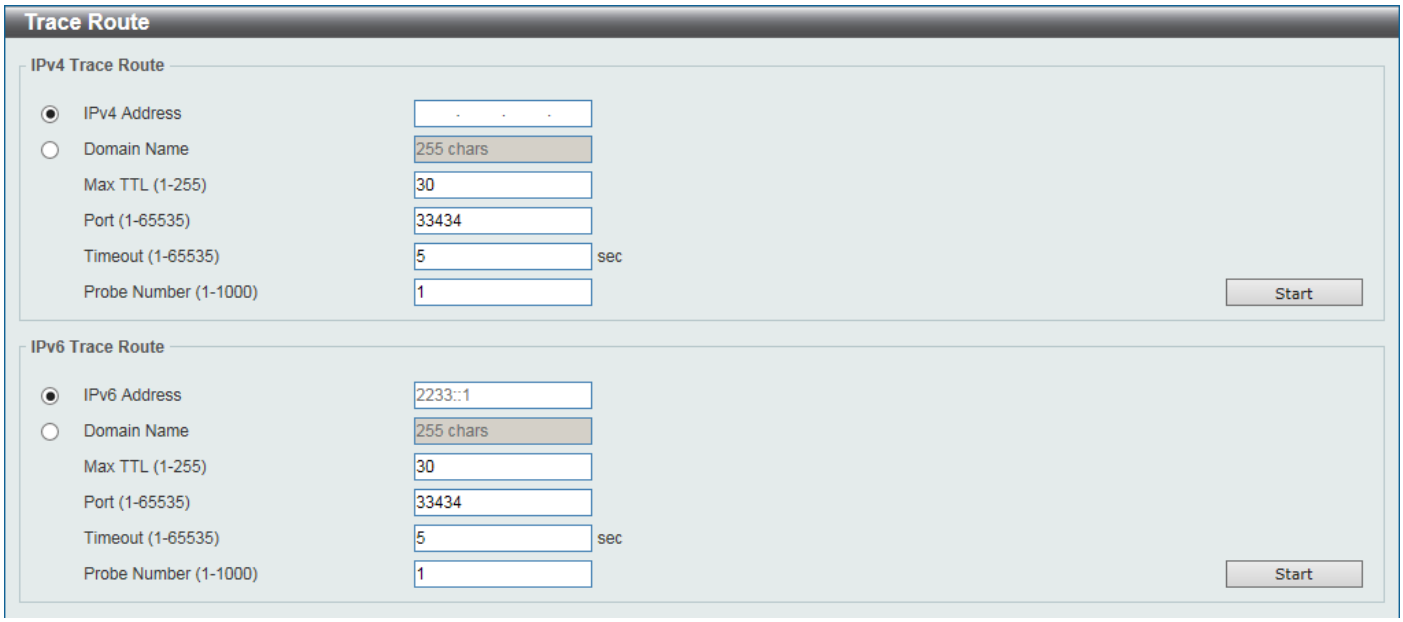


Figure 13-32 Trace Route Window

The fields that can be configured in **IPv4 Trace Route** are described below:

Parameter	Description
IPv4 Address	Select and enter the IPv4 address of the destination here.
Domain Name	Select and enter the domain name of the destination here.
Max TTL	Enter the TTL value of the trace route request here. This is the maximum number of routers that a trace route packet can pass. The trace route option will cross while seeking the network path between two devices. The range for the TTL is 1 to 255 hops.
Port	Enter the port number here. The value range is from 1 to 65535.
Timeout	Enter the timeout period while waiting for a response from the remote device here. A value of 1 to 65535 seconds can be specified. The default is 5 seconds.

Parameter	Description
Probe Number	Enter the probe time number here. The range is from 1 to 1000. If unspecified, the default value is 1.

Click the **Start** button to initiate the route trace for each individual section.

The fields that can be configured in **IPv6 Trace Route** are described below:

Parameter	Description
IPv6 Address	Select and enter the IPv6 address of the destination here.
Domain Name	Select and enter the domain name of the destination here.
Max TTL	Enter the TTL value of the trace route request here. This is the maximum number of routers that a trace route packet can pass. The trace route option will cross while seeking the network path between two devices. The range for the TTL is 1 to 255 hops.
Port	Enter the port number here. The value range is from 1 to 65535.
Timeout	Enter the timeout period while waiting for a response from the remote device here. A value of 1 to 65535 seconds can be specified. The default is 5 seconds.
Probe Number	Enter the probe time number here. The range is from 1 to 1000. If unspecified, the default value is 1.

Click the **Start** button to initiate the route trace for each individual section.

After clicking the **Start** button in **IPv4 Trace Route** section, the following **IPv4 Trace Route Result** will appear:

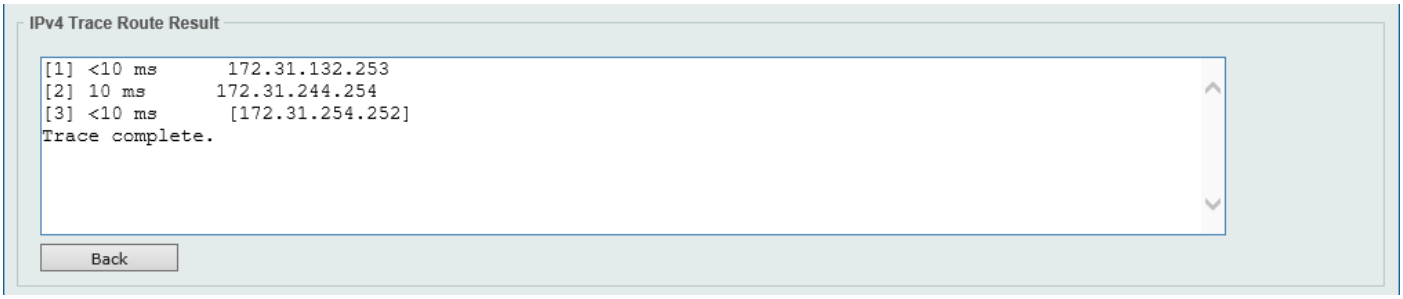


Figure 13-33 IPv4 Trace Route Result Window

After clicking the **Start** button in **IPv6 Trace Route** section, the following **IPv6 Trace Route Result** will appear:

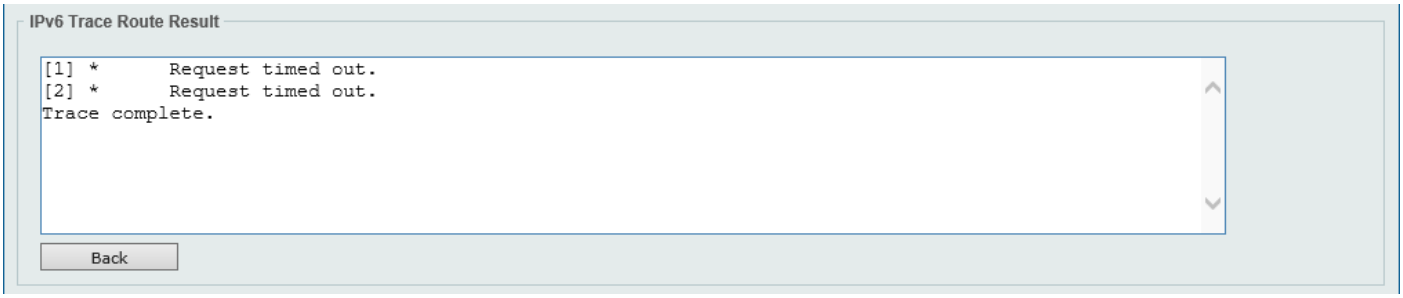


Figure 13-34 IPv6 Trace Route Result Window

Click the **Back** button to stop the trace route and return to the Trace Route section.

Language Management

This window is used to download a language file to the Switch.

To view the following window, click **Tools > Language Management**, as shown below:

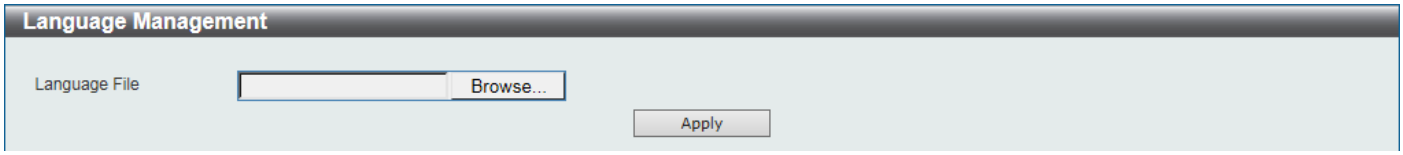


Figure 13-35 Language Management Window

The fields that can be configured are described below:

Parameter	Description
Language File	In this field the language filename and path will be displayed after selection. To navigate to the location of the language file located on the local PC, either double click in the text box or click the **Browse** button.

Click the **Apply** button to save the configuration.

Reset

This window is used to reset the Switch's configuration to the factory default settings.

To view the following window, click **Tools > Reset**, as shown below:

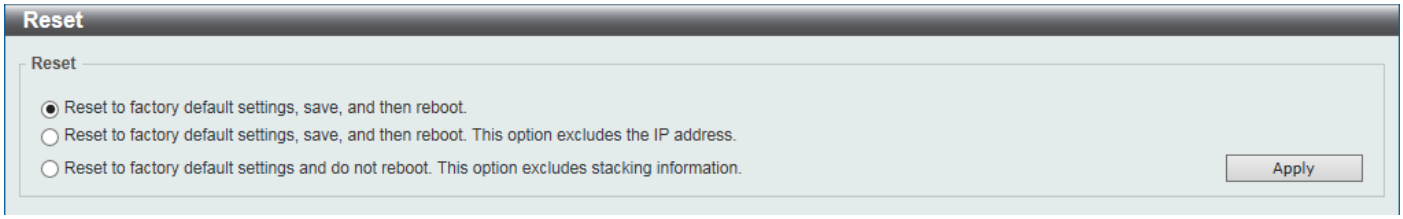


Figure 13-36 Reset Window

Select one of the following options:

- Reset to factory default settings, save, and then reboot.
- Reset to factory default settings, save, and then reboot. This option excludes the IP address.
- Reset to factory default settings and do not reboot. This option excludes stacking information.

Click the **Apply** button to initiate the reset.

Reboot System

This window is used to reboot the Switch and alternatively save the configuration before doing so.

To view the following window, click **Tools > Reboot System**, as shown below:

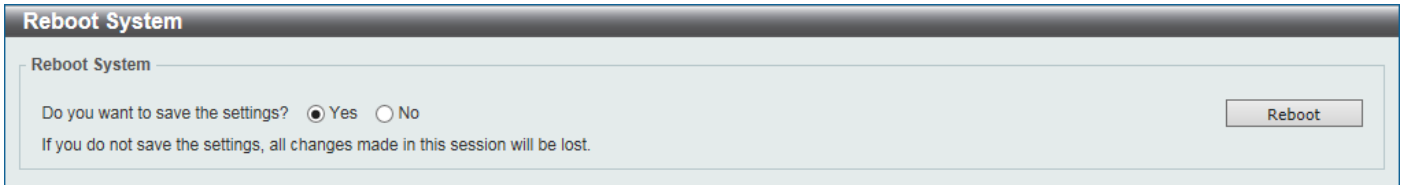


Figure 13-37 Reboot System Window

When rebooting the Switch, any configuration changes that was made during this session, will be lost unless the **Yes** option is selected when asked to save the settings.

Click the **Reboot** button to alternatively save the settings and reboot the Switch.

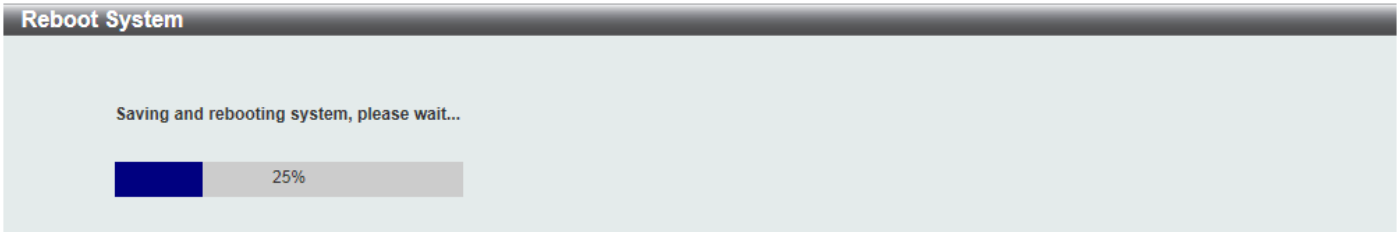


Figure 13-38 Reboot System (Rebooting) Window

Wizard

Click this option to start the Smart Wizard. For more information about the Smart Wizard, refer to **Smart Wizard**.

Online Help

D-Link Support Site

Click this option to connect to the D-Link support website. An Internet connection is required.

User Guide

Click this option to connect to the online user guide for the Switch. An Internet connection is required.

Surveillance Mode

Click this option to change the Web UI mode and style from the **Standard Mode** to the **Surveillance Mode**. An unsuccessful change will display a warning message.

NOTE: All active Web UI user sessions can only access the same Web UI mode at the same time. The mode can only be changed when one user session is active. The mode cannot be changed when another user session is connected to the Web UI.

After clicking the **Surveillance Mode** option in the **Toolbar**, the following window will appear.

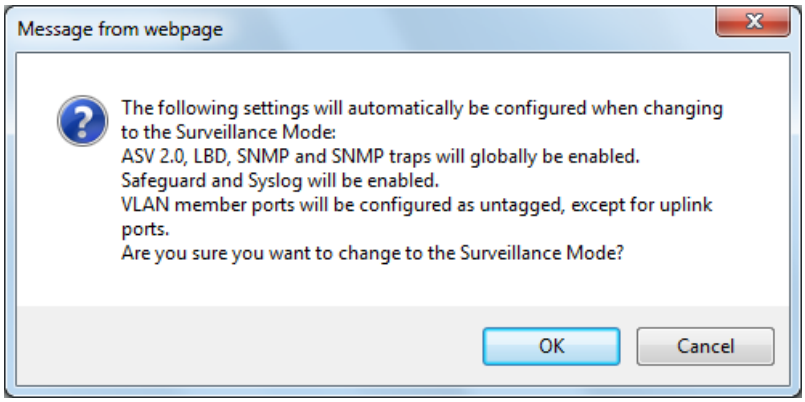


Figure 13-39 Surveillance Mode Confirmation Message

The window above displays a message that the abovementioned configurations need to be changed when access to the Surveillance Mode is given.

Click the **OK** button to continue.

Click the **Cancel** button to return to the **Standard Mode**.

After successfully switching to the Surveillance Mode on the Web UI of the Switch, the following window will appear.

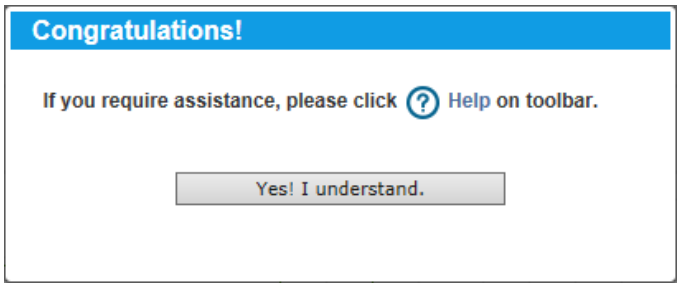


Figure 13-40 Surveillance Mode 'Congratulations' Message

Click the **Yes! I understand** button to continue.

Language

Select the language to be used on the Web UI in the drop-down list.

Logout

Click this option to log out of the Web UI of the Switch.

14. Surveillance Mode

Surveillance Overview

In this window, the **Surveillance Topology** and **Device Information** are displayed. It appears automatically when you access the Surveillance Mode in the Web UI of the Switch.

Surveillance Topology

This window provides more information about what is connected to each port. Hover with the mouse pointer over each device icon to get more information about the recognized device (such as the number of devices, device type, IP address, power consumption, link speed, and errors).

To return to the Surveillance Overview window after viewing other windows, click the **DXS-3410-32XY** link.

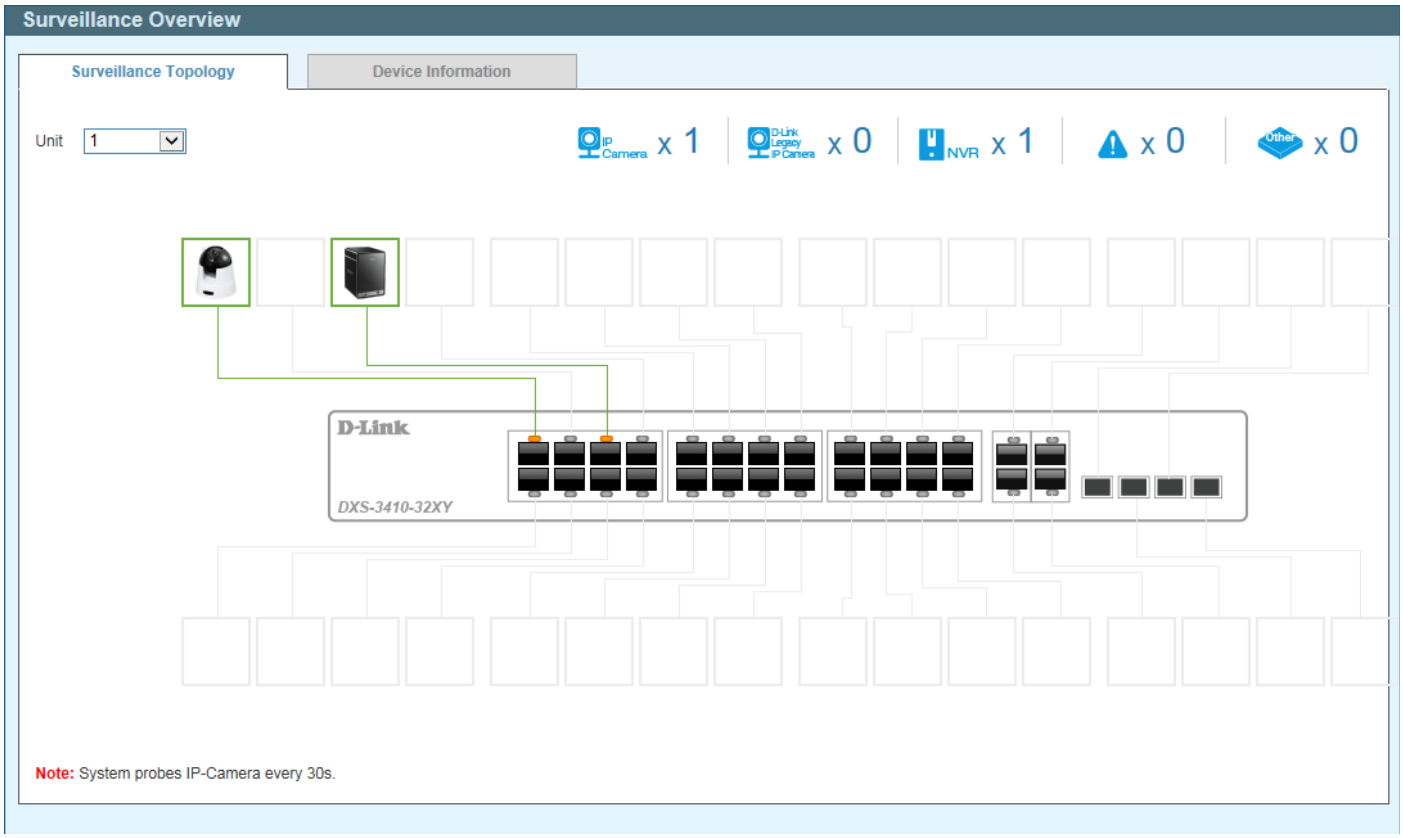


Figure 14-1 Surveillance Overview Window

The following parameters/icons are available in this window and are described below:

Parameter/Icon	Description
Unit	Select the Switch unit that will be used for this configuration here.
IP Camera x 1	This displays the total amount of ONVIF IP cameras connected to the Ethernet ports on the Switch.
D-Link Legacy IP Camera x 0	This displays the total amount of D-Link legacy IP cameras (detected by ASV 1.0) connected to the Ethernet ports on the Switch.
NVR x 1	This displays the total amount of Network Video Recorders (NVRs) connected to the Ethernet ports on the Switch.
x 0	This displays the amount of surveillance warnings generated on the Switch.

Parameter/Icon	Description
Other x 1	This displays the amount of other devices connected to the Ethernet ports on the Switch.
	This displays the device connected to the Ethernet port on the Switch.

After hovering (with the mouse pointer) over the network device icon, the following additional information will be displayed:

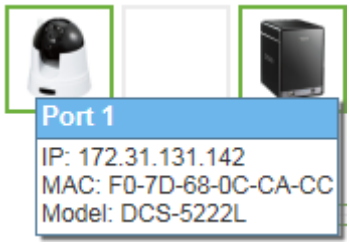


Figure 14-2 Additional Device Information

NOTE: A breakdown of the device icons can be found by clicking the Help menu in the toolbar.

NOTE: The Switch uses ONVIF traffic to monitor the status of the surveillance device, but some third party devices do not fully comply with the ONVIF standard. If you are having problems with surveillance devices not being detected, please check ONVIF compatibility with the manufacturer of the original surveillance device.

Device Information

After clicking the **Device Information** tab, the following window will appear.

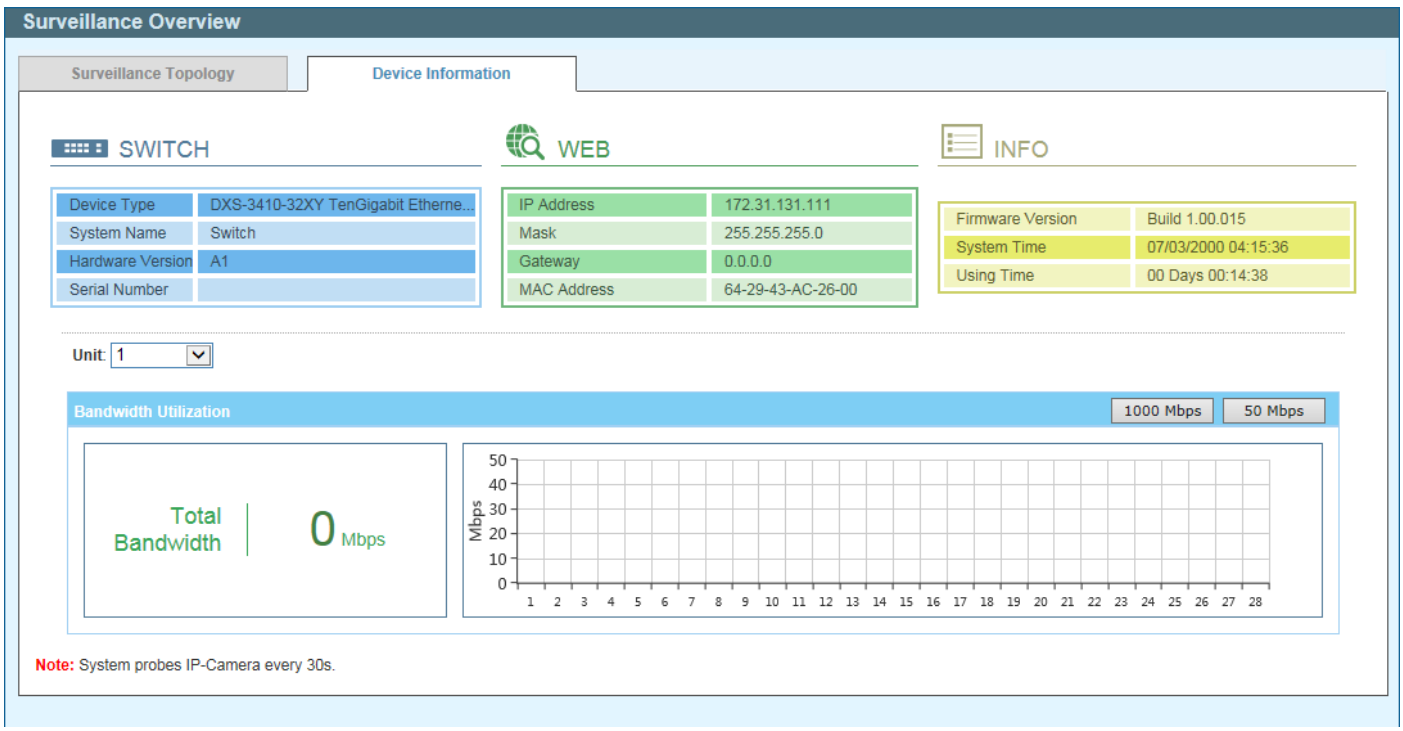


Figure 14-6 Device Information Window

The following parameters are available in this window and are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Click the **1000 Mbps** button to change the maximum bandwidth displayed in the **Bandwidth Utilization** chart to 1 Gbps.

Click the **50 Mbps** button to change the maximum bandwidth displayed in the **Bandwidth Utilization** chart to 50 Mbps.

Port Information

This window is used to display port information like throughput, distance of the network cable, PoE provisioning status, power consumption; loopback detection status, group, and how many IP cameras, NVRs, and other devices are connected to the ports.

To view the following window, click **Port Information**, as shown below:

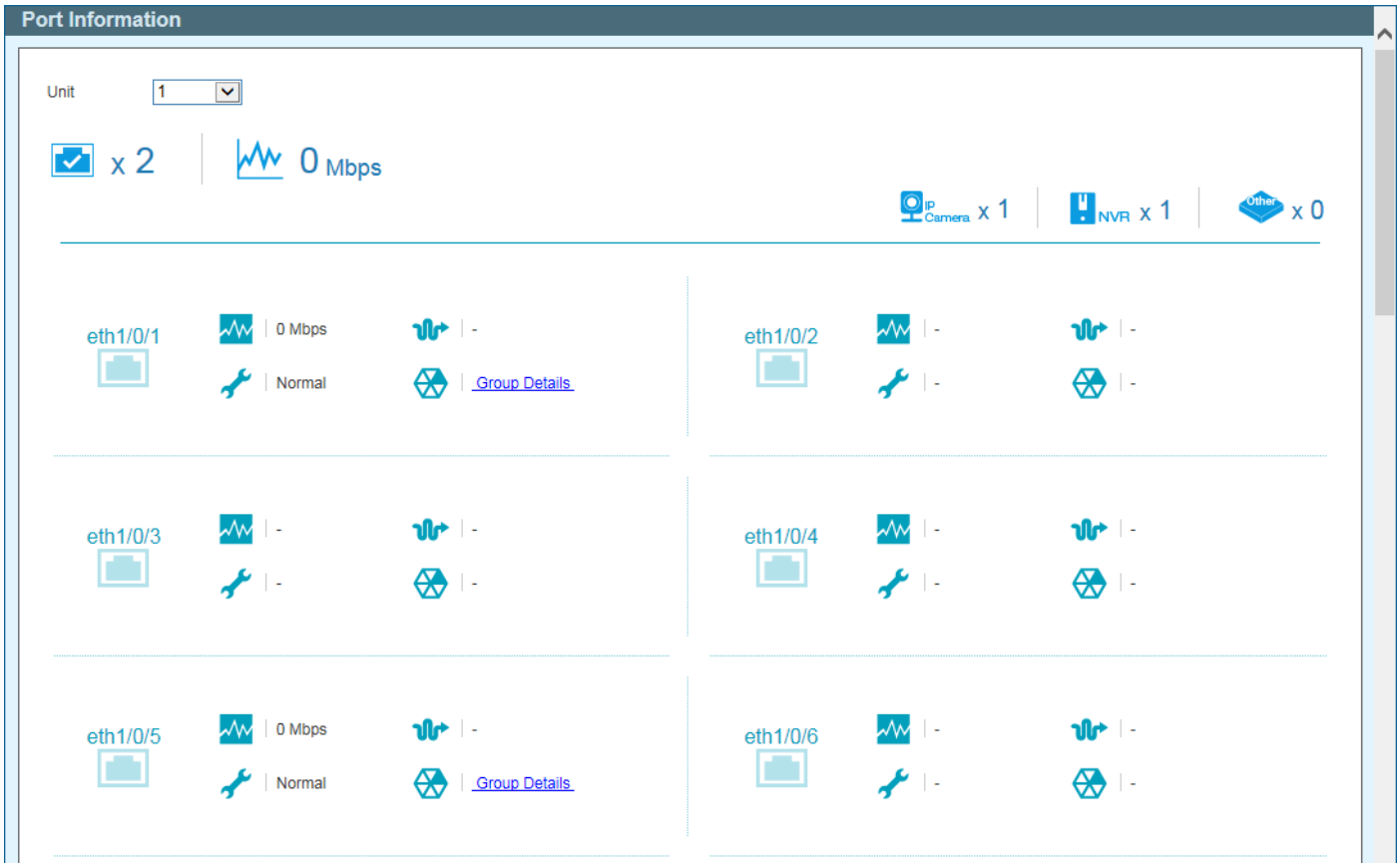


Figure 14-7 Port Information Window

The following parameters/icons are available in this window and are described below:

Parameter/Icon	Description
Unit	Select the Switch unit that will be used for this configuration here.
x 5	This displays the total amount of Ethernet devices connected to the Ethernet ports on the Switch.
6 Mbps	The displays the total amount of inbound bandwidth that is being used by the Ethernet devices connected to the Ethernet ports on the Switch.
IP Camera x 3	This displays the total amount of ONVIF IP cameras connected to the Ethernet ports on the Switch.

Parameter/Icon	Description
NVR x 1	This displays the total amount of NVRs connected to the Ethernet ports on the Switch.
Other x 1	This displays the total amount of other Ethernet devices connected to the Ethernet ports on the Switch.
eth1/0/1	This displays the Ethernet port number on the Switch.
0 Mbps	This displays the amount of inbound bandwidth that is being used by the Ethernet device connected to the respective Ethernet port.
-	This displays the Ethernet cable length between the device and the Ethernet port on the Switch.
Normal Loop	This displays the Loopback Detection status on the Ethernet port. • **Normal** - Specifies that there are no loops in the network. • **Loop** - Specifies that there is a loop in the network. Click the **Loop** link to navigate to the **Health Diagnostic** window.
Group Details	If an ONVIF IP camera or NVR is connected to the port, the **Group Details** link will be available. Select the **Group Details** link to access the Group Details window.
Video Management Server	If a network device is connected to the port that is neither an ONVIF IP camera nor NVR, the device type can be selected. Options to choose from are **Video Management Server**, **VMS Client/Remote Viewer**, **Video Encoder**, **Network Storage**, and **Other IP Surveillance Device**.

Group Details

After clicking **Group Details** link, the following window will appear.

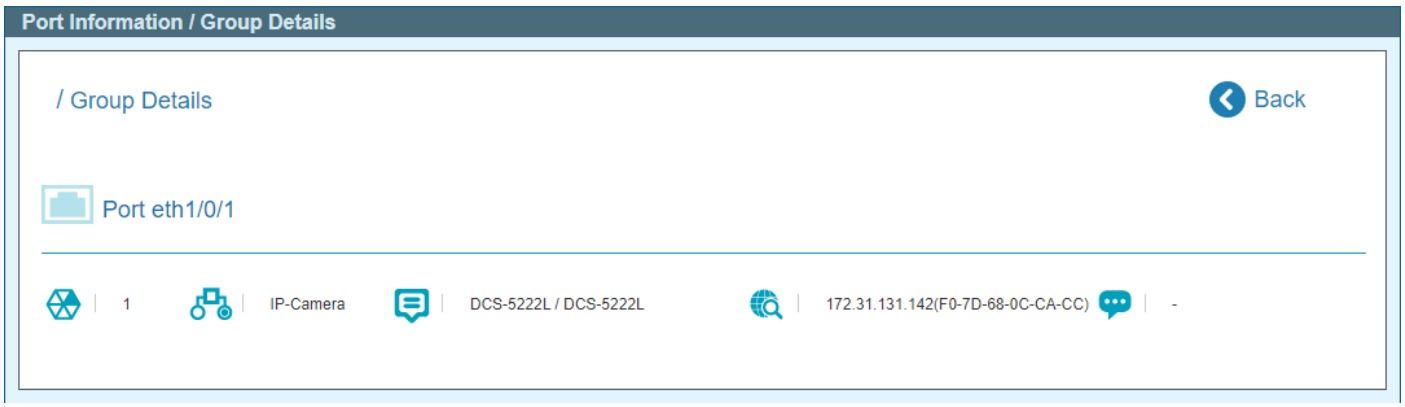


Figure 14-8 Port Information / Group Details Window

The following icons are available in this window and are described below:

Icon	Description
Port eth1/0/1	This displays the Ethernet port number on the Switch.
1	This displays the group ID of the IP camera or NVR on the port.
IP-Camera	This displays the type of device connected to the port. The can be either **IP-Camera** or **NVR**.
DCS-5222L / DCS-5222L	This displays the model name of the IP camera.

Icon	Description
172.31.131.142(F0-7D-68-0C-CA-CC)	This displays the IP Address and MAC Address of the IP camera or NVR.
-	This displays the description of the device connected to the port.

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

IP-Camera Information

This window is used to display IP camera information.

To view the following window, click **IP-Camera Information**, as shown below:

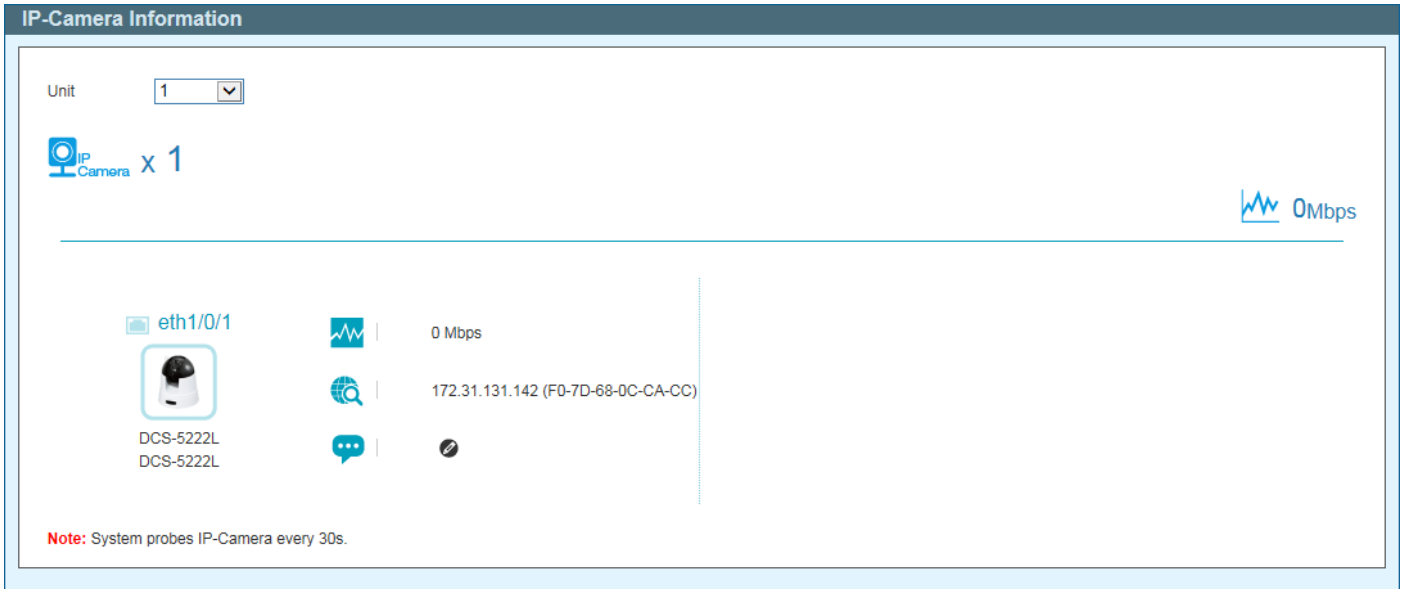


Figure 14-9 IP-Camera Information Window

The following parameters/icons are available in this window and are described below:

Parameter/Icon	Description
Unit	Select the Switch unit that will be used for this configuration here.
IP Camera x 3	This displays the total amount of ONVIF IP cameras connected to the Ethernet ports on the Switch.
0Mbps	The displays the total amount of inbound bandwidth that is being used by the ONVIF IP cameras connected to the Ethernet ports on the Switch.
eth1/0/1	This displays the Ethernet port number on the Switch.
DCS-5222L DCS-5222L	This displays a photo, manufacturer, and model name of the IP camera connected to the port. D-Link IP cameras will display the photo of the specific model connected to the port. Non-D-Link camera will display a generic IP camera photo.
0 Mbps	This displays the amount of inbound bandwidth that is being used by the IP camera.

Parameter/Icon	Description
172.31.131.142 (F0-7D-68-0C-CA-CC)	This displays the IP address and MAC address of the IP camera.
	This displays the description for the IP camera. Click the icon to modify the description.
	Enter the description for the IP camera here. Click the icon to apply the modified description.

NVR Information

This window is used to display NVR information.

To view the following window, click **NVR Information**, as shown below:

Figure 14-10 NVR Information Window

The following parameters/icons are available in this window and are described below:

Parameter/Icon	Description
Unit	Select the Switch unit that will be used for this configuration here.
NVR x 1	This displays the total amount of NVRs connected to the Ethernet ports on the Switch.
0Mbps	The displays the total amount of inbound bandwidth that is being used by the NVRs connected to the Ethernet ports on the Switch.
eth1/0/5	This displays the Ethernet port number on the Switch.
NVR	This displays a generic photo of the NVR connected to the port.
0 Mbps	This displays the amount of inbound bandwidth that is being used by the NVR.

Parameter/Icon	Description
172.31.131.12 (10-BF-48-D6-E3-3B)	This displays the IP address and MAC address of the NVR.
	This displays the description for the NVR. Click the icon to modify the description.
	Enter the description for the NVR here. Click the icon to apply the modified description.
Group 1	This displays the group ID of the NVR.
x 1	This displays the number of ONVIF IP cameras managed by this NVR.
eth1/0/1 (172.31.131.142) (F0-7D-68-0C-CA-CC)	This displays information about the ONVIF IP camera that is managed by this NVR.

Management

File System

This window is used to display and configure the file system settings.

To view the following window, click **Management > File System**, as shown below:

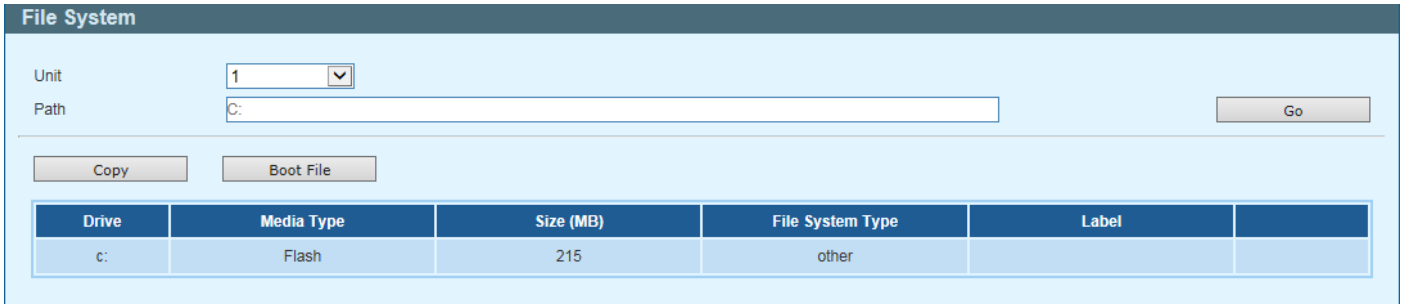


Figure 14-14 File System Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Path	Enter the path string here.

Click the **Go** button to navigate to the path entered.

Click the **Copy** button to copy a specific file to the Switch.

Click the **Boot File** button to configure the bootup image and configuration file settings.

Click the c: hyperlink to navigate the C: drive

After clicking the c: hyperlink, the following window will appear.

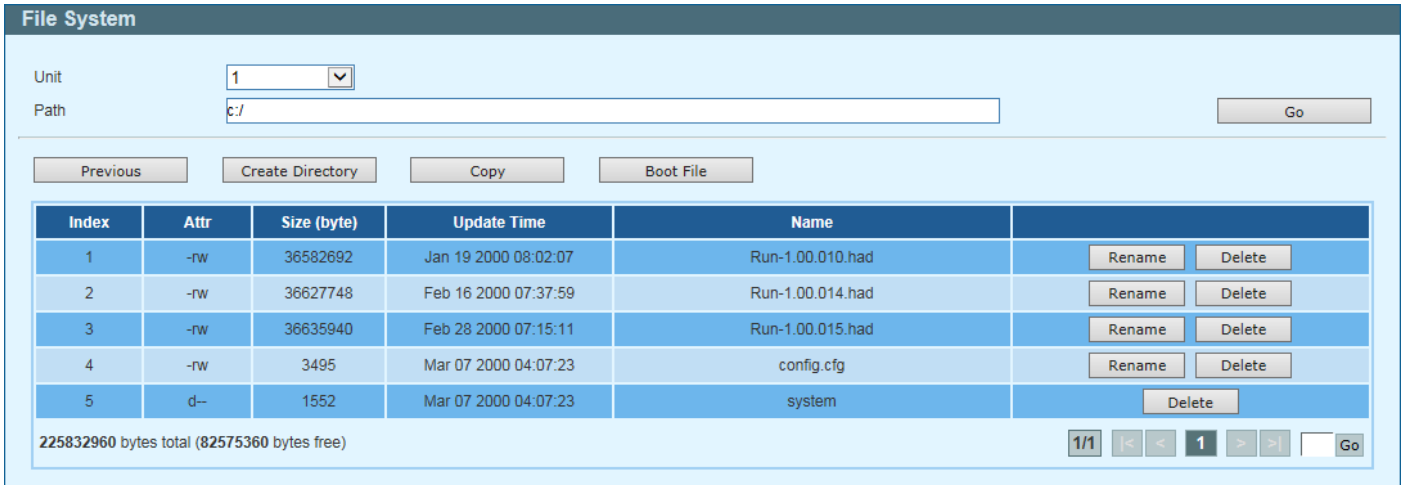


Figure 14-15 File System (c:) Window

Click the **Go** button to navigate to the path entered.

Click the **Previous** button to return to the previous window.

Click the **Create Directory** to create a new directory within the file system of the Switch.

Click the **Copy** button to copy a specific file to the Switch.

Click the **Boot File** button to specify which boot image and configuration to use.

Click the **Rename** button to rename a specific file name.

Click the **Delete** button to remove a specific file from the file system.

After clicking the **Copy** button, the following windows will appear.

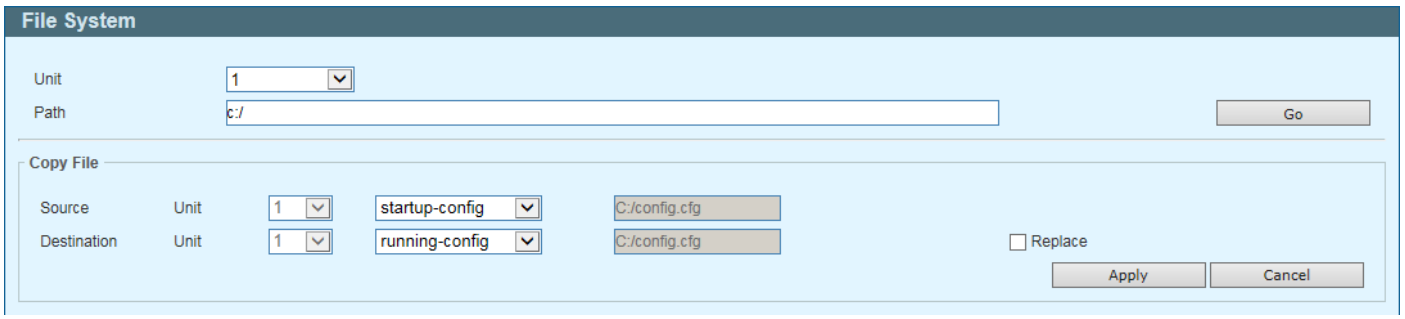


Figure 14-16 File System (Copy) Window

The fields that can be configured are described below:

Parameter	Description
Source	Select the source Switch **Unit** ID and type of source file that will be copied here. Options to choose from are **startup-config** and **Source File**. Only after selecting the **Source File** option can the source file path and filename be entered in the space provided.
Destination	Select the destination Switch **Unit** ID and type of destination file that will be copied here. Options to choose from are **running-config**, **startup-config**, and **Destination File**. Only after selecting the **Destination File** option can the destination file path and filename be entered in the space provided. Select the **Replace** check box to replace the current running configuration with the indicated configuration file.
Replace	Specifies to replace the current running configuration with the indicated configuration file.

Click the **Apply** button to initiate the copy.

Click the **Cancel** button the discard the process.

Time

Clock Settings

This window is used to display and configure the time settings on the Switch.

To view the following window, click **Time > Clock Settings**, as shown below:

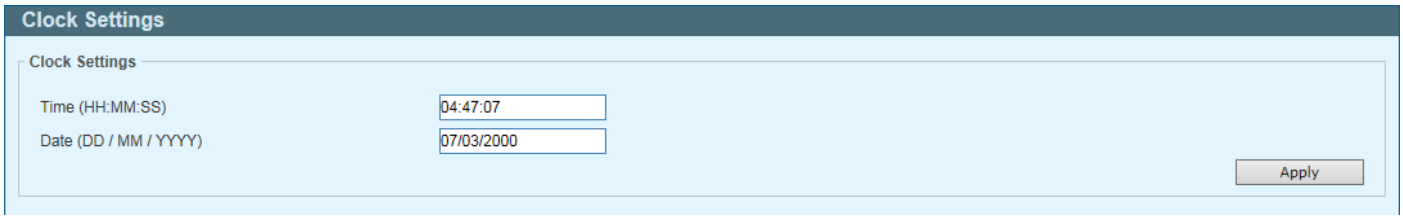


Figure 14-17 Clock Settings Window

The fields that can be configured are described below:

Parameter	Description
Time (HH:MM:SS)	Enter the current time in hours, minutes, and seconds.
Date (DD/MM/YYYY)	Enter the current day, month, and year to update the system clock.

Click the **Apply** button to accept the changes made.

SNTP Settings

This window is used to display and configure the Simple Network Time Protocol (SNTP) settings.

To view the following window, click **Time > SNTP Settings**, as shown below:

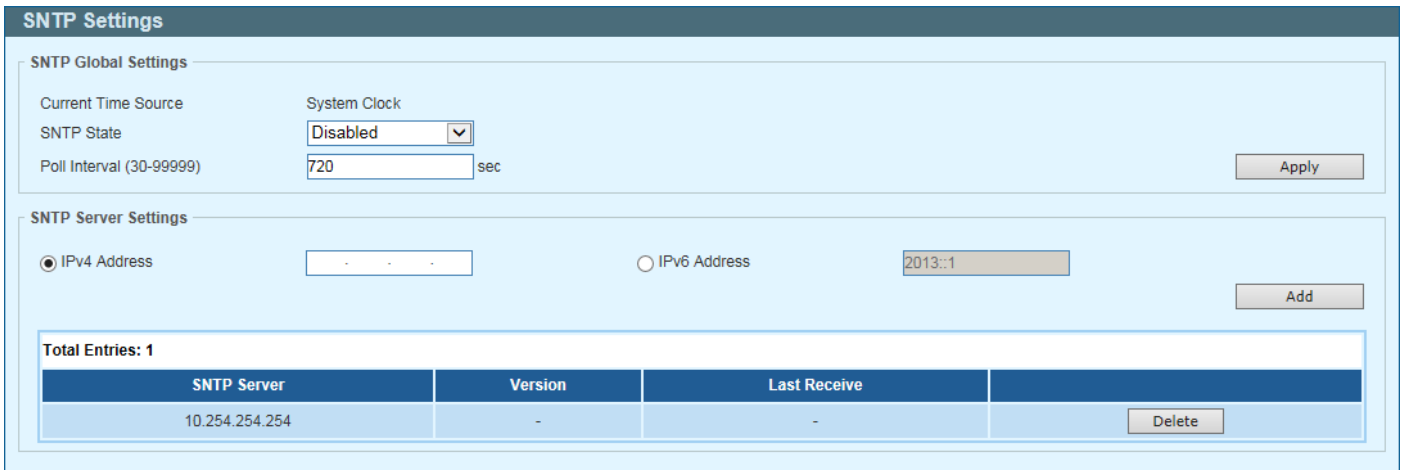


Figure 14-18 SNTP Settings Window

The fields that can be configured in the **SNTP Global Settings** section are described below:

Parameter	Description
SNTP State	Select to enable or disable the SNTP feature here.

Parameter	Description
Poll Interval	Enter the poll interval value here. The range is from 30 to 99999 seconds. By default, this value is 720 seconds.

Click the **Apply** button to accept the changes made.

The fields that can be configured in the **SNTP Server Setting** section are described below:

Parameter	Description
IPv4 Address	Enter the IPv4 address of the SNTP server here.
IPv6 Address	Enter the IPv6 address of the SNTP server here.

Click the **Add** button to add the SNTP server to the configuration.

Click the **Delete** button to remove the SNTP server from the configuration.

Surveillance Settings

This window is used to display and configure the surveillance settings. The Switch has only one Surveillance VLAN. This surveillance VLAN also supports to recognize the surveillance devices, like IP Cameras (IPC) and Network Video Recorders (NVR), using the ONVIF protocol.

To view the following window, click **Surveillance Settings**, as shown below:

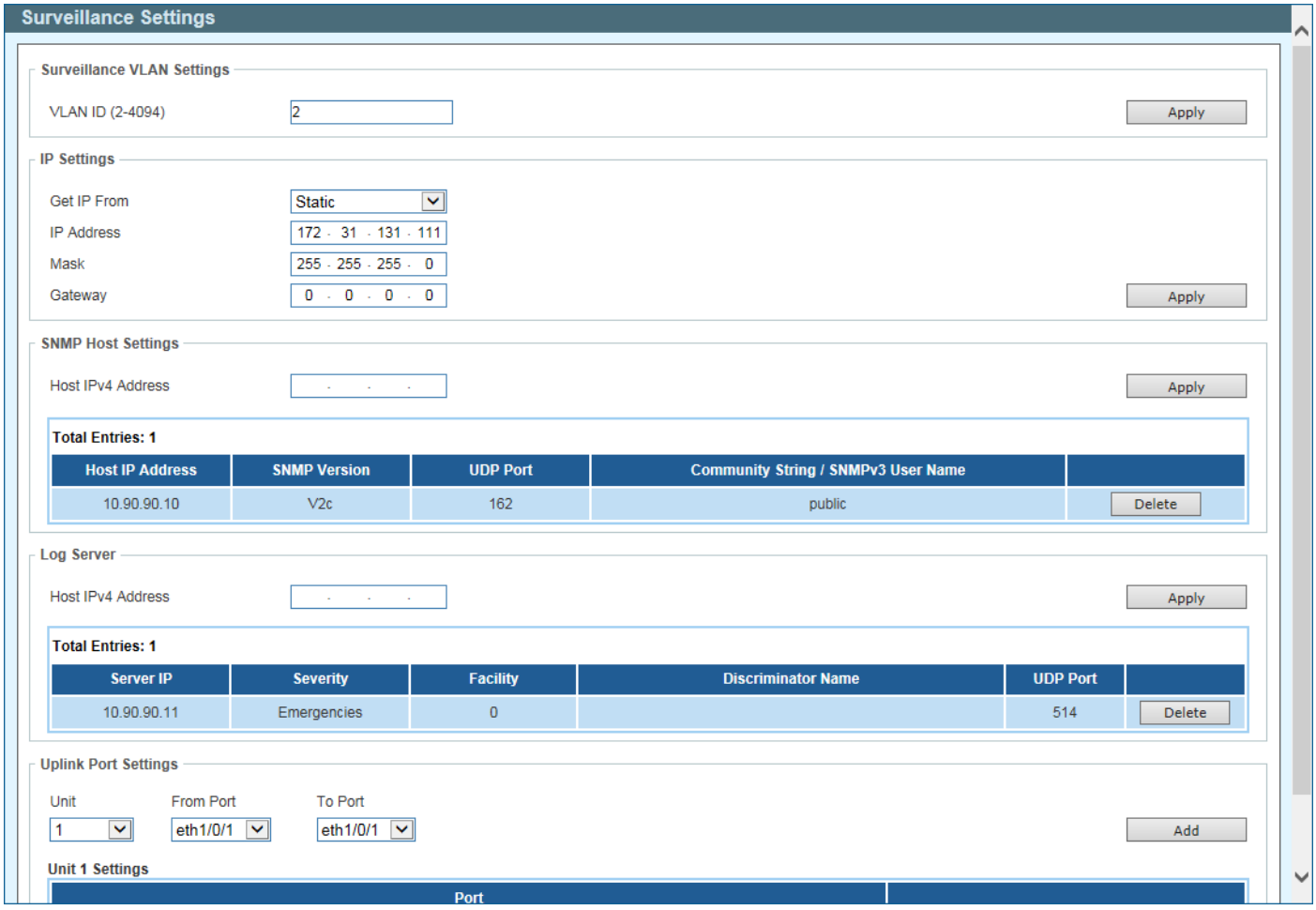


Figure 14-19 Surveillance Settings Window

The fields that can be configured in the **Surveillance VLAN Settings** section are described below:

Parameter	Description
VLAN ID	Enter the ID of the surveillance VLAN here. The range is from 2 to 4094.

Click the **Apply** button to accept the changes made.

The fields that can be configured in the **IP Settings** section are described below:

Parameter	Description
Get IP From	Select the method used to configure the IP address settings on the Switch here. Options to choose from are: • **Static** - Specifies that the IP address settings will be manually configured. • **DHCP** - Specifies that the IP address settings will be automatically obtained from a DHCP server on the network.
IP Address	Enter the IPv4 address of the Switch here.
Mask	Enter the IPv4 subnet mask of the Switch here.
Gateway	Enter the IPv4 address of the default gateway here.

Click the **Apply** button to accept the changes made.

The fields that can be configured in the **SNMP Host Settings** section are described below:

Parameter	Description
Host IPv4 Address	Enter the IPv4 address of the SNMP host here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

The fields that can be configured in the **Log Server** section are described below:

Parameter	Description
Host IPv4 Address	Enter the IPv4 address of the SNMP server here.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

The uplink ports join all surveillance VLANs since they forward surveillance traffic to other switches. It is recommended to connect uplink ports to the other switches because the discovery process is disabled on these ports.

The fields that can be configured in the **Uplink Port Settings** section are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
From Port / To Port	Select the uplink port range that will be used here.

Click the **Add** button to add the specified ports.

Click the **Delete** button to remove the specified entry.

Surveillance Log

This window is used to display the surveillance log.

To view the following window, click **Surveillance Log**, as shown below:

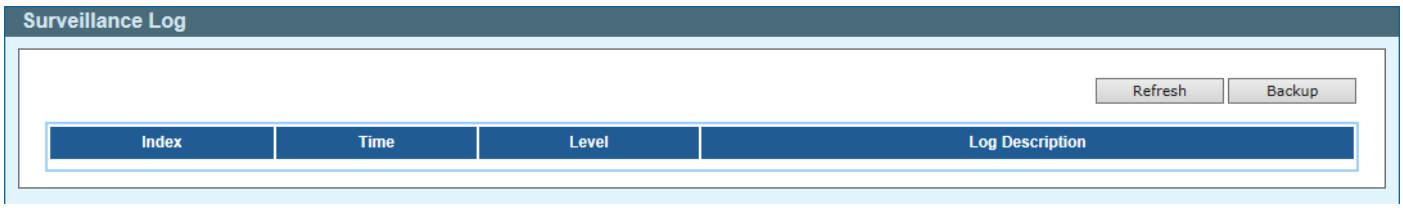


Figure 14-20 Surveillance Log Window

Click the **Refresh** button to refresh the information displayed in the table.

Click the **Backup** button to upload the surveillance log to the PC using HTTP.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Health Diagnostic

This window is used to display Health Diagnostics information, Discovered Surveillance Devices information, and initiate a cable distance test on all or selected ports on the Switch. For each link-up port, the system will check the link status, PoE status and error counters periodically. This page will refresh every 30s.

To view the following window, click **Health Diagnostic**, as shown below:

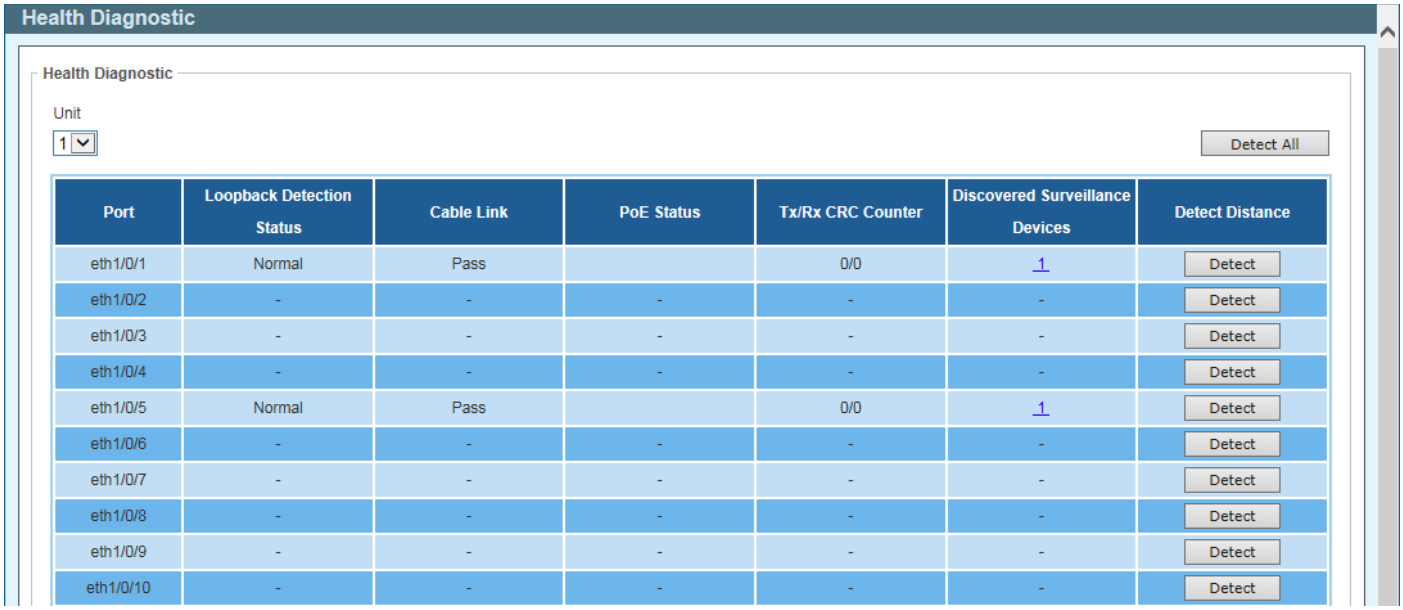


Figure 14-21 Health Diagnostic Window

The fields that can be configured or are displayed are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Port	This field displays the Ethernet port number.
Loopback Detection Status	This field displays the Loopback Detection status on the Ethernet port. It can be one of the following: • **Normal** - No loop is detected on the port.

Parameter	Description
	• **Loop** - A loop is detected on the port.
Cable Link	This field displays the cable link status. It can be one of the following: • **Pass** - The port link is up and operating in the full-duplex mode. • **10M Half** - The port link is up and operating at 10 Mbps speed and in the half-duplex mode. • **100M Half** - The port link is up and operating at 100 Mbps speed and in the half-duplex mode.
PoE Status	This field displays the PoE status. It can be one of the following: **Delivering**, **Searching**, **Pass**, **MPS (Maintain Power Signature) Absent**, **PD Short**, **Overload**, **Power Denied**, **Thermal Shutdown**, **Startup Failure**, or **Classification Failure**.
Tx/Rx CRC Counter	This field displays the TX/RX CRC counter.
Discovered Surveillance Devices	This field displays the number of ONVIF IP cameras and NVRs discovered on the port. Click the hyperlink (1) to view the group details associated with IP camera or NVR connected to the port.
Detect Distance	Click the **Detect** button to initiate a cable distance test on the specified port.

Click the **Detect All** button to initiate a cable distance test on all the ports of the Switch.

Toolbar

Wizard

Click this option to start the Smart Wizard. For more information about the Smart Wizard, refer to **Smart Wizard** on page 2.

Tools

Firmware Upgrade & Backup

Firmware Upgrade from HTTP

This window is used to initiate a firmware upgrade from a local PC using HTTP.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from HTTP**, as shown below:

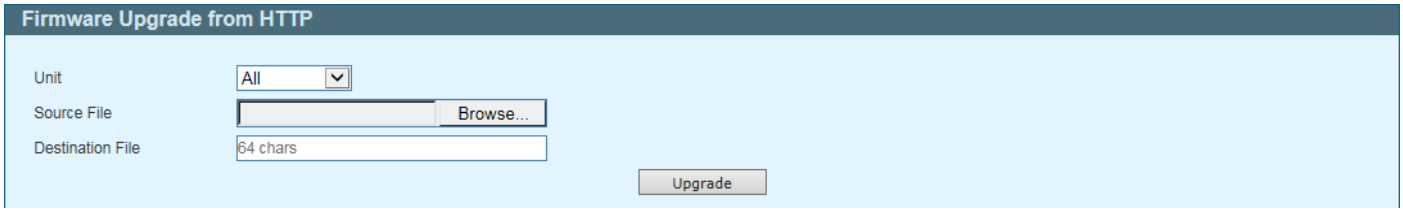


Figure 14-22 Firmware Upgrade from HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Parameter	Description
Source File	Click the **Browse** button and navigate to the firmware file on the local PC here. This file will be uploaded to the Switch.
Destination File	Enter the destination path and location where the new firmware should be stored on the Switch. This field can be up to 64 characters long.

Click the **Upgrade** button to initiate the firmware upgrade.

Firmware Backup to HTTP

This window is used to initiate a firmware backup to a local PC using HTTP.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to HTTP**, as shown below:

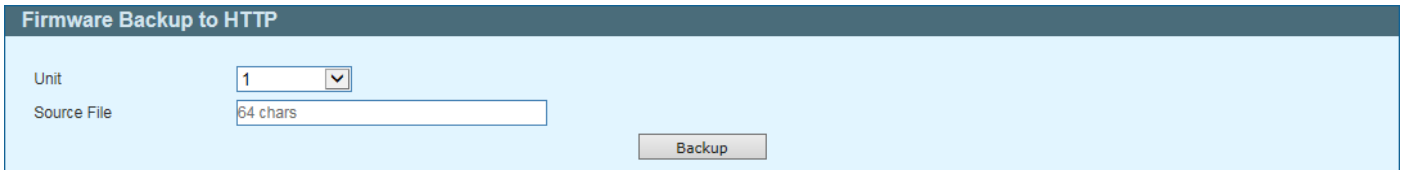


Figure 14-23 Firmware Backup to HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Source File	Enter the source filename and path of the firmware file located on the Switch here. This field can be up to 64 characters long.

Click the **Backup** button to initiate the firmware backup. Wait for the Web browser to prompt where to save the file on the local PC.

Configuration Restore & Backup

Configuration Restore from HTTP

This window is used to initiate a configuration restore from a local PC using HTTP.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from HTTP**, as shown below:

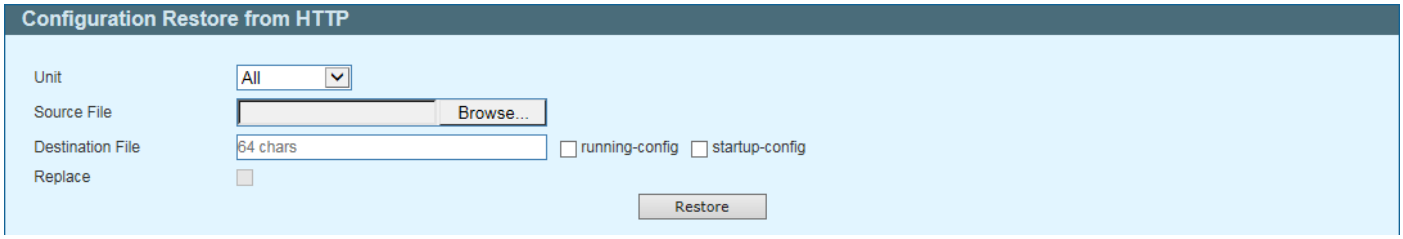


Figure 14-24 Configuration Restore from HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.

Parameter	Description
Source File	In this field the source configuration file's filename and path will be displayed after selection. To navigate to the location of the configuration file located on the local PC, either double click in the text box or click the **Browse** button.
Destination File	Enter the destination path and location where the configuration file should be stored on the Switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the Switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the Switch.
Replace	Select this option to replace the configuration file on the Switch with this one.

Click the **Restore** button to initiate the configuration restore.

Configuration Backup to HTTP

This window is used to initiate a configuration file backup to a local PC using HTTP.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to HTTP**, as shown below:

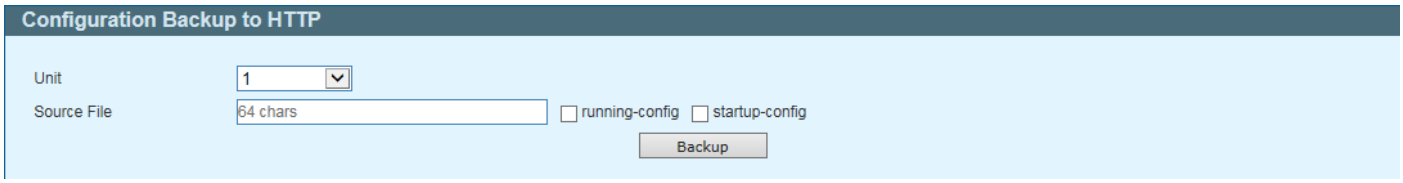


Figure 14-25 Configuration Backup to HTTP Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
Source File	Enter the source filename and path of the configuration file located on the Switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the Switch. Select the **startup-config** option to back up the start-up configuration file from the Switch.

Click the **Backup** button to initiate the configuration file backup. Wait for the Web browser to prompt where to save the file on the local PC.

Language Management

This window is used to install the language file to the Switch.

To view the following window, click **Tools > Language Management**, as shown below:

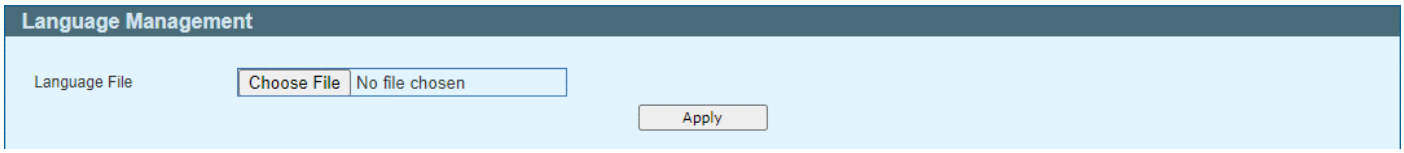


Figure 14-26 Language Management Window

The fields that can be configured are described below:

Parameter	Description
Language File	Click the **Choose File** button and navigate to the language pack file on the local PC here. This file will be uploaded to the Switch.

Click the **Apply** button to initiate the language pack upload and installation.

Reset

This window is used to reset the Switch's configuration to the factory default settings.

To view the following window, click **Tools > Reset**, as shown below:

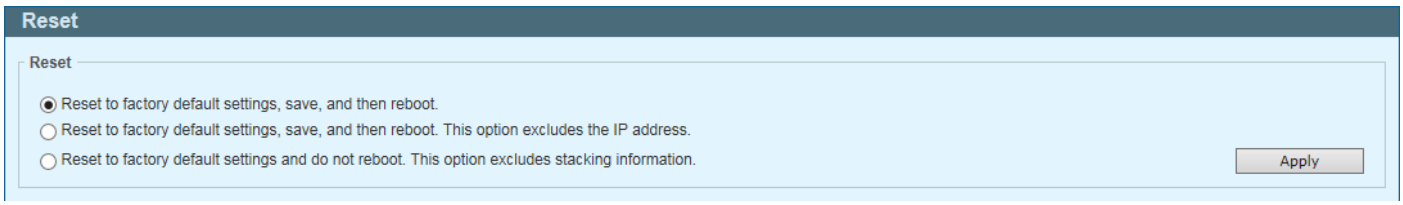


Figure 14-27 Reset Window

Select one of the following options:

- Reset to factory default settings, save, and then reboot.
- Reset to factory default settings, save, and then reboot. This option excludes the IP address.
- Reset to its factory default settings and do not reboot. This option excludes stacking information.

Click the **Apply** button to initiate the reset.

Reboot System

This window is used to reboot the Switch and alternatively save the configuration before doing so.

To view the following window, click **Tools > Reboot System**, as shown below:

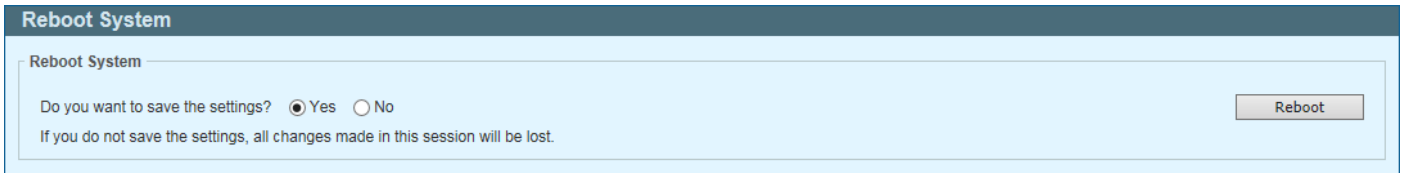


Figure 14-28 Reboot System Window

When rebooting the Switch, any configuration changes that was made during this session, will be lost unless the **Yes** option is selected when asked to save the settings.

Click the **Reboot** button to alternatively save the settings and reboot the Switch.

Save

Save Configuration

This window is used to save the running configuration to the start-up configuration. This is to prevent the loss of configuration in the event of a power failure.

To view the following window, click **Save > Save Configuration**, as shown below:

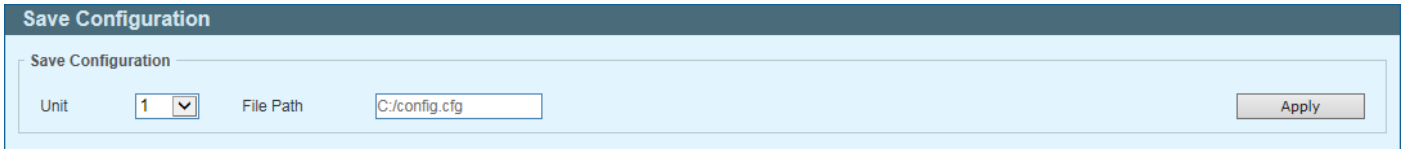


Figure 14-29 Save Configuration Window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the Switch unit that will be used for this configuration here.
File Path	Enter the filename and path in the space provided.

Click the **Apply** button to save the configuration.

Help

Click this option to access the built-in Surveillance Help window.

After clicking the **Help** option, the following window will appear.

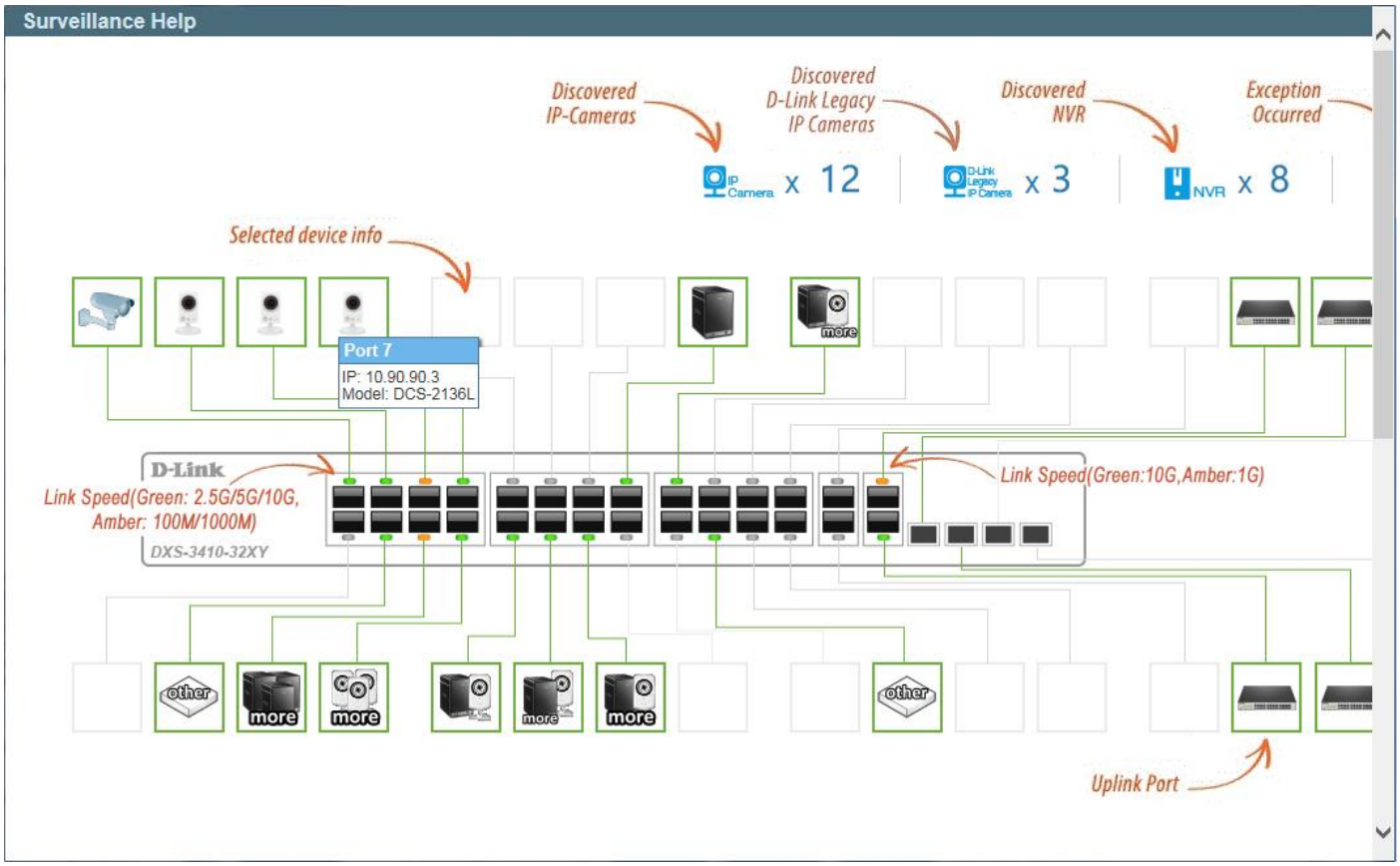
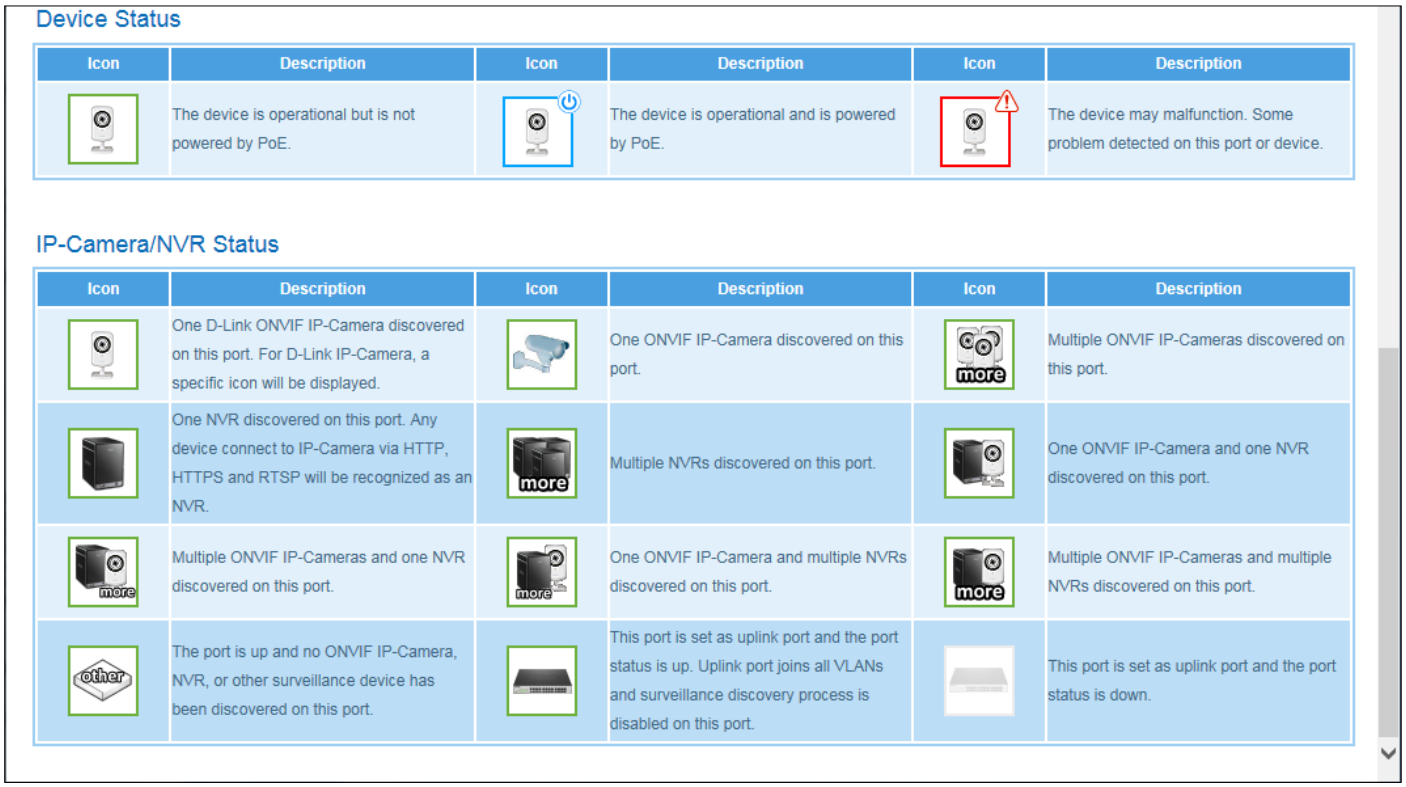


Figure 14-30 Help (Diagram) Window



Device Status

Icon	Description	Icon	Description	Icon	Description
	The device is operational but is not powered by PoE.		The device is operational and is powered by PoE.		The device may malfunction. Some problem detected on this port or device.

IP-Camera/NVR Status

Icon	Description	Icon	Description	Icon	Description
	One D-Link ONVIF IP-Camera discovered on this port. For D-Link IP-Camera, a specific icon will be displayed.		One ONVIF IP-Camera discovered on this port.	more	Multiple ONVIF IP-Cameras discovered on this port.
	One NVR discovered on this port. Any device connect to IP-Camera via HTTP, HTTPS and RTSP will be recognized as an NVR.	more	Multiple NVRs discovered on this port.		One ONVIF IP-Camera and one NVR discovered on this port.
more	Multiple ONVIF IP-Cameras and one NVR discovered on this port.	more	One ONVIF IP-Camera and multiple NVRs discovered on this port.	more	Multiple ONVIF IP-Cameras and multiple NVRs discovered on this port.
other	The port is up and no ONVIF IP-Camera, NVR, or other surveillance device has been discovered on this port.		This port is set as uplink port and the port status is up. Uplink port joins all VLANs and surveillance discovery process is disabled on this port.		This port is set as uplink port and the port status is down.

Figure 14-31 Help (Table) Window

Online Help

D-Link Support Site

Click this option to connect to the D-Link support website. An Internet connection is required.

User Guide

Click this option to connect to the online user guide for the Switch. An Internet connection is required.

Standard Mode

Click the **Standard Mode** button in the toolbar to change the Web UI mode and style from Surveillance Mode to Standard Mode.

NOTE: All active Web UI user sessions can only access the same Web UI mode at the same time. The mode can only be changed when one user session is active. The mode cannot be changed when another user session is connected to the Web UI.

Language

Select the language to be used on the Web UI in the drop-down list.

Logout

Click this option to log out of the Web UI of the Switch.

Appendix A - Password Recovery Procedure

Authenticating any user attempting to access networks is crucial. The primary authentication method used to grant access to qualified users is through a local login, which involves using a username and password. Occasionally, passwords are forgotten or lost, requiring network administrators to reset them. This section will elucidate how the **Password Recovery** feature can assist network administrators in achieving this goal.

Follow these steps to access the **Password Recovery Mode**:

- For security reasons, the administrator must physically connect to the **Console** port of the Switch to initiate password recovery. Power on the Switch.
- While the system is booting up, and when the **Starting runtime image** message appears, press Shift+6 (^) to enter the Password Recovery Mode. In Password Recovery Mode, all ports on the Switch will be disabled.

```
  Loader Procedure
--------------------------------------------------------------------------------
  Please Wait, Loading 1.00.022 Runtime Image ..............  100 %
  UART init ................................................  100 %
  Starting runtime image
```

```
Password Recovery Mode

Switch(reset-config)#
```

In the **Password Recovery Mode**, the following commands can be used.

Command	Description
`no enable password`	This command is used to delete all account level passwords.
`no login password`	This command is used to clear the local login methods.
`no username`	This command is used to delete all local user accounts.
`password-recovery`	This command is used to initiate the password recovery procedure.
`reload`	This command is used to save and reboot the Switch.
`reload clear running-config`	This command is used to reset the running configuration to the factory default settings and then reboot the Switch.
`show running-config`	This command is used to display the current running configuration.
`show username`	This command is used to display local user account information.

Appendix B - System Log Entries

The System Log entries are listed in this appendix.

802.1X

Log	Description	Severity
1	Event Description: This log is recorded when IEEE 802.1X authentication fails. Log Message: 802.1X authentication fail [due to <reason>] from (Username: <username>, <interface-id>, MAC: <mac-address>) Parameters Description: reason: The reason for the authentication failure. Possible reasons include: (1) User authentication failure (2) No server(s) responding (3) No servers configured (4) Insufficient resources (5) User timeout expired username: The user being authenticated. interface-id: The switch interface number. mac-address: The MAC address of the authenticated device.	Critical
2	Event Description: This log is recorded when IEEE 802.1X authentication is successful. Log Message: 802.1X authentication success (Username: <username>, <interface-id>, MAC: <mac-address>) Parameters Description: username: The user being authenticated. interface-id: The interface name. mac-address: The MAC address of the authenticated device.	Informational
3	Event Description: This log is recorded when IEEE 802.1X authentication cannot function due to ACL hardware exhaustion. Log Message: 802.1X cannot work correctly because ACL rule resource is not available	Alert

AAA

Log	Description	Severity
1	Event Description: This log is recorded when the AAA global state is enabled or disabled. Log Message: AAA is <status> Parameters Description: status: The AAA status.	Informational
2	Event Description: This log is recorded when a login is successful. Log Message: Successful login through <exec-type> [from <client-ip>] authenticated by AAA <aaa-method> <server-ip> (Username: <username>) Parameters Description: exec-type: The EXEC types, for example, Console, Telnet, SSH, Web, or Web (SSL). client-ip: The IP address of the client if valid through IP protocol. aaa-method: The authentication method, for example, none, local, or server. server-ip: The IP address of the AAA server if the authentication method is a remote server. username: The username for authentication.	Informational
3	Event Description: This log is recorded when a login fails. Log Message: Login failed through <exec-type> [from <client-ip>] authenticated by AAA <aaa-method> <server-ip> (Username: <username>) Parameters Description: exec-type: The EXEC types, for example, Console, Telnet, SSH, Web, or Web (SSL). client-ip: The IP address of the client if valid through IP protocol. aaa-method: The authentication method, for example, local or server. server-ip: The IP address of the AAA server if the authentication method is a remote server.	Warning

Log	Description	Severity
	username: The username for authentication.	
4	Event Description: This log is recorded when RADIUS assigns valid VLAN ID attributes. Log Message: RADIUS server <server-ip> assigned VID: <vid> to port <interface-id> (Username: <username>) Parameters Description: server-ip: The IP address of the RADIUS server. vid: The VLAN ID assigned by the RADIUS server. interface-id: The port number of the authenticated client. username: The username for authentication.	Informational
5	Event Description: This log is recorded when RADIUS assigns valid bandwidth attributes. Log Message: RADIUS server <server-ip> assigned <direction> bandwidth: <threshold> to port <interface-id> (Username: <username>) Parameters Description: server-ip: The IP address of the RADIUS server. direction: The direction for bandwidth control, for example, ingress or egress. threshold: The bandwidth threshold assigned by the RADIUS server. interface-id: The port number of the authenticated client. username: The username for authentication.	Informational
6	Event Description: This log is recorded when RADIUS assigns valid priority attributes. Log Message: RADIUS server <server-ip> assigned 802.1p default priority: <priority> to port <interface-id> (Username: <username>) Parameters Description: server-ip: The IP address of the RADIUS server. priority: The priority assigned by the RADIUS server. interface-id: The port number of the authenticated client. username: The username for authentication.	Informational
7	Event Description: This log is recorded when RADIUS assigns an ACL script but fails to apply it to the system due to insufficient resources. Log Message: RADIUS server <server-ip> assigns <username> ACL failure at port <interface-id> (<acl-script>) Parameters Description: server-ip: The IP address of the RADIUS server. username: The username for authentication. interface-id: The port number of the authenticated client. acl-script: The ACL script assigned by the RADIUS server.	Warning
8	Event Description: This log is recorded when the remote server does not respond to the login authentication request. Log Message: Login failed through <exec-type> <from client-ip> due to AAA server <server-ip> timeout (Username: <username>) Parameters Description: exec-type: The EXEC types, such as Console, Telnet, SSH, Web, or Web (SSL). client-ip: The IP address of the client if valid through the IP protocol. aaa-method: The authentication method, for example, local or server. server-ip: The IP address of the AAA server if the authentication method is a remote server. username: The username for authentication.	Warning
9	Event Description: This log is recorded when enable privilege is successfully enabled. Log Message: Successful enable privilege through <exec-type> <from client-ip> authenticated by AAA <aaa-method> <server-ip> (Username: <username>) Parameters Description: exec-type: The EXEC types, for example, Console, Telnet, SSH, Web, or Web (SSL). client-ip: The IP address of the client if valid through the IP protocol. aaa-method: The authentication method, for example, local or server. server-ip: The IP address of the AAA server if the authentication method is a remote server. username: The username for authentication.	Informational
10	Event Description: This log is recorded when enable privilege fails.	Warning

Log	Description	Severity
	Log Message: Enable privilege failed through <exec-type> <from client-ip> authenticated by AAA <aaa-method> <server-ip> (Username: <username>) Parameters Description: exec-type: The EXEC types, for example, Console, Telnet, SSH, Web, or Web (SSL). client-ip: The IP address of the client if valid through the IP protocol. aaa-method: The authentication method, for example, local or server. server-ip: The IP address of the AAA server if the authentication method is a remote server. username: The username for authentication.	
11	Event Description: This log is recorded when the remote server does not respond to the enable password authentication request. Log Message: Enable privilege failed through <exec-type> <from client-ip> due to AAA server <server-ip> timeout (Username: <username>) Parameters Description: exec-type: The EXEC types, for example, Console, Telnet, SSH, Web, or Web (SSL). client-ip: The IP address of the client if valid through the IP protocol. aaa-method: The authentication method, for example, local or server. server-ip: The IP address of the AAA server if the authentication method is a remote server. username: The username for authentication.	Warning
12	Event Description: This log is recorded when a local user is locked out. Log Message: User <username> locked out on authentication failure Parameters Description: username: The username of the locked-out user.	Notice
13	Event Description: This log is recorded when a local user is unlocked. Log Message: User <username> unlocked Parameters Description: username: The username of the previously locked-out user.	Notice

ARP

Log	Description	Severity
1	Event Description: This log is recorded when gratuitous ARP detects a duplicate IP address. Log Message: Conflict IP was detected with this device (IP: <ipaddr>, MAC: <macaddr>, Port <port-num>, Interface: <ipif-name>) Parameters Description: ipaddr: The duplicated IP address. macaddr: The MAC address of the duplicated IP address. port-num: The port number of the device. ipif-name: The name of the interface on the switch that contains the duplicated IP address.	Warning

Auto Image

Log	Description	Severity
1	Event Description: This log is recorded when the auto-image firmware upgrade is successful. Log Message: The downloaded firmware was successfully executed by DHCP AutoImage update (TFTP Server IP: <ipaddr>) Parameters Description: ipaddr: The IP address of the TFTP server.	Informational
2	Event Description: This log is recorded when the auto-image firmware upgrade fails. Log Message: The downloaded firmware was not successfully executed by DHCP AutoImage update (TFTP Server IP: <ipaddr>) Parameters Description: ipaddr: The IP address of the TFTP server.	Informational

Auto Save Config

Log	Description	Severity
1	Event Description: This log is generated when the DDP configuration is automatically saved. Log Message:CONFIG-6-DDPSAVECONFIG: Configuration automatically saved to flash due to configuring from DDP(Username: <username>, IP: <ipaddr>) username: The current logged-in user. ipaddr: The IP address of the client.	Informational

Auto Surveillance VLAN

Log	Description	Severity
1	Event Description: This log is recorded when a new surveillance device is detected on an interface. Log Message: New surveillance device detected (<interface-id>, MAC: <mac-address>) Parameters Description: interface-id: The name of the interface. mac-address: The MAC address of the surveillance device.	Informational
2	Event Description: This log is recorded when an interface, which is part of an enabled surveillance VLAN, automatically joins the surveillance VLAN. Log Message: <interface-id> add into surveillance VLAN <vid> Parameters Description: interface-id: The name of the interface. vid: The VLAN ID.	Informational
3	Event Description: This log is recorded when an interface leaves the surveillance VLAN, and no surveillance device is detected during the aging interval for that interface. Log Message: <interface-id> remove from surveillance VLAN <vid> Parameters Description: interface-id: The name of the interface. vid: The VLAN ID.	Informational
4	Event Description: This log is recorded when an IPC is added to the surveillance VLAN. Log Message: ASV: Add IPC (<ipaddr>, MAC: <mac-address>) Parameters Description: ipaddr: The IP address of the IPC. mac-address: The MAC address of the IPC.	Informational
5	Event Description: This log is recorded when an IPC is removed from the surveillance VLAN. Log Message: ASV: Remove IPC (<ipaddr>, MAC: <mac-address>) Log Message: ASV: Removed IPC (<ipaddr>, MAC Address: <mac-address>) Parameters Description: ipaddr: The IP address of the IPC. mac-address: The MAC address of the IPC.	Informational
6	Event Description: This log is recorded when an NVR is added to the surveillance VLAN. Log Message: ASV: Add NVR (<ipaddr>, MAC: <mac-address>) Parameters Description: ipaddr: The IP address of the NVR. mac-address: The MAC address of the NVR.	Informational
7	Event Description: This log is recorded when an NVR is removed from the surveillance VLAN. Log Message: ASV: Remove NVR (<ipaddr>, MAC: <mac-address>) Parameters Description: ipaddr: The IP address of the NVR. mac-address: The MAC address of the NVR.	Informational
8	Event Description: This log is recorded when the mode of ASV 2.0 is changed through the Web. Log Message: ASV: Mode change from <mode> to <mode >	Informational

Log	Description	Severity
	Parameters Description: mode: The mode of ASV 2.0, which can be either standard or surveillance.	

BPDU Protection

Log	Description	Severity
1	Event Description: Record the event when a BPDU attack occurs. Log Message: <interface-id> enter STP BPDU under protection state (mode: <mode>) Parameters Description: interface-id: The interface on which the STP BPDU attack was detected. mode: The BPDU Protection mode of the interface. The mode can be set to drop, block, or shutdown.	Informational
2	Event Description: Record the event when the STP BPDU attack is resolved. Log Message: <interface-id> recover from BPDU under protection state. Parameters Description: interface-id: The interface on which the STP BPDU attack was detected.	Informational

CFM

Log	Description	Severity
1	Event Description: Cross-connect is detected. Log Message: CFM cross-connect. VLAN:<vlanid>, Local(MD Level:<mdlevel>, Interface:<interface-id>, Direction:<mepdirection>) Remote(MEPID:<mepid>, MAC:<macaddr>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Can be "inward" or "outward." mepid: Represents the MEPID of the MEP. The value 0 means an unknown MEPID. macaddr: Represents the MAC address of the MEP. The value "all zeros" means an unknown MAC address.	Critical
2	Event Description: An error CFM CCM packet is detected. Log Message: CFM error ccm. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>) Remote(MEPID:<mepid>, MAC:<macaddr>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Can be "inward" or "outward." mepid: Represents the MEPID of the MEP. The value 0 means an unknown MEPID. macaddr: Represents the MAC address of the MEP. The value "all zeros" means an unknown MAC address.	Warning
3	Event Description: Unable to receive the remote MEP's CCM packet. Log Message: CFM remote down. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the MEP direction, which can be "inward" or "outward."	Warning
4	Event Description: The remote MEP's MAC reports an error status. Log Message: CFM remote MAC error. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>) Parameters Description:	Warning

Log	Description	Severity
	vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the MEP direction, which can be "inward" or "outward."	
5	Event Description: The remote MEP detects CFM defects. Log Message: CFM remote detects a defect. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the MEP direction, which can be "inward" or "outward."	Informational

CFM Extension

Log	Description	Severity
1	Event Description: AIS condition detected. Log Message: AIS condition detected. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>, MEPID:<mepid>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the direction of the MEP. This can be "inward" or "outward." mepid: Represents the MEPID of the MEP.	Notice
2	Event Description: AIS condition cleared. Log Message: AIS condition cleared. MD Level:<mdlevel>, VLAN:<vlanid>,Local(Interface:<interface-id>,Direction:<mepdirection>, MEPID:<mepid>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the direction of the MEP. This can be "inward" or "outward." mepid: Represents the MEPID of the MEP.	Notice
3	Event Description: LCK condition detected. Log Message: LCK condition detected. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>, MEPID:<mepid>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the direction of the MEP. This can be "inward" or "outward." mepid: Represents the MEPID of the MEP.	Notice
4	Event Description: LCK condition cleared. Log Message: LCK condition cleared. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Interface:<interface-id>, Direction:<mepdirection>, MEPID:<mepid>) Parameters Description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents the MD level of the MEP. interface-id: Represents the interface number of the MEP. mepdirection: Represents the direction of the MEP. This can be "inward" or "outward." mepid: Represents the MEPID of the MEP.	Notice

Configuration/Firmware

Log	Description	Severity
1	Event Description: This log is recorded when a firmware upgrade is successful. Log Message: [Unit <unitID>,]Firmware upgraded by <session> successfully (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Informational
2	Event Description: This log is recorded when a firmware upgrade fails. Log Message: [Unit <unitID>,]Firmware upgraded by <session> unsuccessfully (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Warning
3	Event Description: This log is recorded when a firmware upload is successful. Log Message: [Unit <unitID>,]Firmware uploaded by <session> successfully (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Informational
4	Event Description: This log is recorded when a firmware upload fails. Log Message: [Unit <unitID>,]Firmware uploaded by <session> unsuccessfully (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Warning
5	Event Description: This log is recorded when a configuration is downloaded successfully. Log Message: [Unit <unitID>,]Configuration downloaded by <session> successfully. (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client.	Informational

Log	Description	Severity
	server-ip: The IP address of the server. pathfile: The path and file name on the server.	
6	Event Description: This log is recorded when a configuration download fails. Log Message: [Unit <unitID>,]Configuration downloaded by <session> unsuccessfully. (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Warning
7	Event Description: This log is recorded when the configuration is uploaded successfully. Log Message: [Unit <unitID>,]Configuration uploaded by <session> successfully. (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in a standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Informational
8	Event Description: This log is recorded when the configuration upload fails. Log Message: [Unit <unitID>,]Configuration uploaded by <session> unsuccessfully. (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in a standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Warning
9	Event Description: This log is recorded when a log message is uploaded successfully. Log Message: [Unit <unitID>,]Configuration saved to flash by console (Username: <username>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. username: The current login user.	Informational
10	Event Description: This log is recorded when a configuration is saved to the flash remotely. Log Message: [Unit <unitID>,]Configuration saved to flash (Username: <username>, IP: <ipaddr>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. username: The current login user. ipaddr: The IP address of the client.	Informational
11	Event Description: This log is recorded when a log message is uploaded successfully. Log Message: Log message uploaded by <session> successfully. (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>]) Parameters Description: session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client.	Informational

Log	Description	Severity
12	Event Description: This log is recorded when a log message upload fails. Log Message: Log message uploaded by <session> unsuccessfully. (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>]) Parameters Description: session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client.	Warning
13	Event Description: This log is recorded when an unknown file type download fails. Log Message: [Unit <unitID>,]Downloaded by <session> unsuccessfully. (Username: <username> [, IP: <ipaddr>, MAC: <macaddr>], Server IP: <server-ip>, File Name: <pathfile>) Parameters Description: unitID: The unit ID. If the switch is in standalone state, there will be no unitID information for logging. session: The user's session. username: The current login user. ipaddr: The IP address of the client. macaddr: The MAC address of the client. server-ip: The IP address of the server. pathfile: The path and file name on the server.	Warning

NOTE:

1. The user's session indicates Console, Web, SNMP, Telnet, or SSH.

2. If updating configuration/firmware through Console, there will be no IP and MAC information available for logging.

DAD

Log	Description	Severity
1	Event Description: This log is recorded when the DUT receives a Neighbor Solicitation (NS) message with a duplicate address during the Duplicate Address Detection (DAD) duration. The DUT will add this log. Log Message: Duplicate address <ipv6address> on <interface-id> via receiving Neighbor Solicitation Messages Parameters Description: ipv6address: The IPv6 address in NS messages. interface-id: The interface name.	Warning
2	Event Description: This log is recorded when the DUT receives a Neighbor Advertisement (NA) message with a duplicate address during the Duplicate Address Detection (DAD) duration. The DUT will add this log. Log Message: Duplicate address <ipv6address> on <interface-id> via receiving Neighbor Advertisement Messages Parameters Description: ipv6address: The IPv6 address in NA messages. interface-id: The interface name.	Warning

DAI

Log	Description	Severity
1	Event Description: This log is recorded when DAI detects invalid ARP packets. Log Message: Illegal ARP <type> packets (IP: <ip-address>, MAC: <mac-address>, VLAN <vlan-id>, on <interface-id>) Parameters Description: type: The type of ARP packet, indicating whether it is an ARP packet request or response. ip-address: The IP address. mac-address: The MAC address.	Warning

Log	Description	Severity
	vlan-id: The VLAN ID. interface-id: The name of the interface.	
2	Event Description: This log is recorded when DAI detects valid ARP packets. Log Message: Legal ARP <type> packets (IP: <ip-address>, MAC: <mac-address>, VLAN <vlan-id>, on <interface-id>) Parameters Description: type: The type of ARP packet, indicating whether it is an ARP packet request or response. ip-address: The IP address. mac-address: The MAC address. vlan-id: The VLAN ID. interface-id: The name of the interface.	Informational

DDM

Log	Description	Severity
1	Event Description: When any of the SFP parameters exceed the warning threshold. Log Message: Optical transceiver <interface-id> <component> <high-low> warning threshold exceeded Parameters Description: interface-id: Port interface ID. component: DDM threshold type. It can be one of the following types: • temperature • supply voltage • bias current • TX power • RX power high-low: High or low threshold.	Warning
2	Event Description: When any of the SFP parameters exceed the alarm threshold. Log Message: Optical transceiver <interface-id> <component> <high-low> alarm threshold exceeded Parameters Description: interface-id: Port interface ID. component: DDM threshold type. It can be one of the following types: • temperature • supply voltage • bias current • TX power • RX power high-low: High or low threshold.	Critical
3	Event Description: When any of the SFP parameters recover from the warning threshold. Log Message: Optical transceiver <interface-id> <component> back to normal Parameters Description: interface-id: Port interface ID. component: DDM threshold type. It can be one of the following types: • temperature • supply voltage • bias current • TX power • RX power	Warning

DHCP Snooping

Log	Description	Severity
1	Event Description: This message indicates that the reload of DHCP snooping entry from external storage has failed. Log Message: DHCP snooping entry reload failure (URL: <url-string>) Parameters Description: URL: URL string.	Informational

DHCPv6 Client

Log	Description	Severity
1	Event Description: This log is recorded when the DHCPv6 client interface administrator state changes. Log Message: DHCPv6 client on interface <ipif-name> changed state to [enabled | disabled] Parameters Description: ipif-name: The name of the DHCPv6 client interface.	Informational
2	Event Description: This log is recorded when the DHCPv6 client obtains an IPv6 address from a DHCPv6 server. Log Message: DHCPv6 client obtains an IPv6 address <ipv6address> on interface <ipif-name> Parameters Description: ipv6address: The IPv6 address obtained from a DHCPv6 server. ipif-name: The name of the DHCPv6 client interface.	Informational
3	Event Description: This log is recorded when the IPv6 address obtained from a DHCPv6 server starts renewing. Log Message: The IPv6 address <ipv6address> on interface <ipif-name> starts renewing Parameters Description: ipv6address: The IPv6 address obtained from a DHCPv6 server. ipif-name: The name of the DHCPv6 client interface.	Informational
4	Event Description: This log is recorded when the IPv6 address obtained from a DHCPv6 server successfully renews. Log Message: The IPv6 address <ipv6address> on interface <ipif-name> renews success Parameters Description: ipv6address: The IPv6 address obtained from a DHCPv6 server. ipif-name: The name of the DHCPv6 client interface.	Informational
5	Event Description: This log is recorded when the IPv6 address obtained from a DHCPv6 server starts rebinding. Log Message: The IPv6 address <ipv6address> on interface <ipif-name> starts rebinding Parameters Description: ipv6address: The IPv6 address obtained from a DHCPv6 server. ipif-name: The name of the DHCPv6 client interface.	Informational
6	Event Description: This log is recorded when the IPv6 address obtained from a DHCPv6 server successfully rebinds. Log Message: The IPv6 address <ipv6address> on interface <ipif-name> rebinds success Parameters Description: ipv6address: The IPv6 address obtained from a DHCPv6 server. ipif-name: The name of the DHCPv6 client interface.	Informational
7	Event Description: This log is recorded when the IPv6 address from a DHCPv6 server is deleted. Log Message: The IPv6 address <ipv6address> on interface <ipif-name> was deleted Parameters Description: ipv6address: The IPv6 address obtained from a DHCPv6 server. ipif-name: The name of the DHCPv6 client interface.	Informational

DHCPv6 Relay

Log	Description	Severity
1	Event Description: DHCPv6 relay on a specify interface's administrator state changed. Log Message: DHCPv6 relay on interface <ipif-name> changed state to [enabled | disabled] Parameters Description: <ipif-name>: Name of the DHCPv6 relay agent interface.	Informational

DNS Resolver

Log	Description	Severity
1	Event Description: This log is recorded when a duplicate domain name is added to the cache, resulting in the deletion of the dynamic domain name cache. Log Message: [DNS_RESOLVER(1):]Duplicate Domain name case name: <domain-name>, static IP: <ipaddr>, dynamic IP:<ipaddr> Parameters Description: domain-name: The domain name string. ipaddr: The static/dynamic IP address.	Informational

DoS Prevention

Log	Description	Severity
1	Event Description: This log is recorded when a DoS attack is detected. Log Message: <dos-type> is dropped from (IP: <ip-address> Port <interface-id>) Parameters Description: dos-type: The DoS attack type. ip-address: The IP address. interface-id: The name of the interface.	Notice

DULD

Log	Description	Severity
1	Event Description: A unidirectional link has been detected on this port. Log Message: DULD <INTERFACE-ID> is detected as unidirectional link Parameters Description: INTERFACE-ID: The interface name.	Warning

ERPS

Log	Description	Severity
1	Event Description: Manual switch is issued. Log Message: "Manual switch is issued on node (MAC: < macaddr >, instance < InstanceID >)" Parameters Description: macaddr: MAC address. InstanceID: Instance ID.	Warning
2	Event Description: Signal fail is detected. Log Message: "Signal fail detected on node (MAC: < macaddr >, instance < InstanceID >)" Parameters Description: macaddr: MAC address. InstanceID: Instance ID.	Warning
3	Event Description: Signal fail cleared.	Warning

Log	Description	Severity
	Log Message: "Signal fail cleared on node(MAC: < macaddr >, instance < InstanceID >)" Parameters Description: macaddr: MAC address. InstanceID: Instance ID.	
4	Event Description: Force switch is issued. Log Message: "Force switch is issued on node (MAC: < macaddr >, instance < InstanceID >)" Parameters Description: macaddr: MAC address. InstanceID: Instance ID.	Warning
5	Event Description: Clear command is issued. Log Message: "Clear command is issued on node (MAC: < macaddr >, instance < InstanceID >)" Parameters Description: macaddr: MAC address. InstanceID: Instance ID.	Warning
6	Event Description: RPL owner conflicted. Log Message: "RPL owner conflicted on the node (MAC: < macaddr >, instance < InstanceID >)" Parameters Description: macaddr: MAC address. InstanceID: Instance ID.	Warning

ErrDisable

Log	Description	Severity
1	Event Description: When a port enters an error-disable state. Log Message: Port <interface-id> enters error disable state due to <reason-id> Parameters Description: interface-id: The port number. reason-id: Loopback Detection, Port Security Violation, Storm Control, BPDU Protected, ARP Rate Limit, DHCP Rate Limit, L2 Protocol Tunneling, Scheduled Port Shutdown by Power Saving, Scheduled Hibernation by Power Saving.	Warning
2	Event Description: When a port leaves the error-disable state. Log Message: Port <interface-id> leaves the error disable state which is previously caused by <reason-id> Parameters Description: interface-id: The port number. reason-id: Loopback Detection, Port Security Violation, Storm Control, BPDU Protected, ARP Rate Limit, DHCP Rate Limit, L2 Protocol Tunneling, Scheduled Port Shutdown by Power Saving, Scheduled Hibernation by Power Saving.	Warning
3	Event Description: When a port enters an error-disable state. Log Message: Port <interface-id> VLAN <vid> enters error disable state due to <reason-id> Parameters Description: interface-id: The port number. reason-id: Loopback Detection, Port Security Violation, Storm Control, BPDU Protected, L2 Protocol Tunneling, Scheduled Port Shutdown by Power Saving, Scheduled Hibernation by Power Saving. vid: VLAN ID	Warning
4	Event Description: When a port leaves the error-disable state. Log Message: Port <interface-id> VLAN <vid> leaves the error disable state which is previously caused by <reason-id> Log Message: Port <interface-id> in VLAN <vid> leaves the error-disable state, which was previously caused by <reason-id>. Parameters Description: interface-id: The port number. reason-id: Loopback Detection, Port Security Violation, Storm Control, BPDU Protected, L2 Protocol Tunneling, Scheduled Port Shutdown by Power Saving, Scheduled Hibernation by Power Saving. vid: VLAN ID	Warning

Ethernet OAM

Log	Description	Severity
1	Event Description: Dying Gasp Event (Remote) Log Message: OAM dying gasp event received (Port<interface-id>) Parameters Description: interface-id: The interface name.	Warning
2	Event Description: Dying Gasp Event (Local) Log Message: Device encountered an OAM dying gasp event	Warning
3	Event Description: Critical Event (Remote) Log Message: OAM critical event received (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
4	Event Description: Critical Event (Local) Log Message: Device encountered an OAM critical event (Port <interface-id>, <condition>) Parameters Description: interface-id: The interface name. condition: Display string for the condition of generating a critical link event, e.g., OAM disable, Port shutdown, Port link down, Packet overload.	Warning
5	Event Description: Errored Symbol Period Event (Remote) Log Message: Errored symbol period event received (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
6	Event Description: Errored Frame Event (Remote) Log Message: Errored frame event received (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
7	Event Description: Errored Frame Period Event (Remote) Log Message: Errored frame period event received (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
8	Event Description: Errored Frame Seconds Summary Event (Remote) Log Message: Errored frame seconds summary event received (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
9	Event Description: Remote Loopback Start Log Message: OAM Remote loopback started (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
10	Event Description: Remote Loopback Stop Log Message: OAM Remote loopback stopped (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
11	Event Description: Errored Symbol Period Event (Local) Log Message: Device encountered an errored symbol period event (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
12	Event Description: Errored Frame Event (Local) Log Message: Device encountered an errored frame event (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning
13	Event Description: Errored Frame Period Event (Local)	Warning

Log	Description	Severity
	Log Message: Device encountered an errored frame period event (Port <interface-id>) Parameters Description: interface-id: The interface name.	
14	Event Description: Errored Frame Seconds Summary Event (Local) Log Message: Device encountered an errored frame seconds summary event (Port <interface-id>) Parameters Description: interface-id: The interface name.	Warning

Interface

Log	Description	Severity
1	Event Description: This log is recorded when the port link is down. Log Message: Port <port-type><interface-id> link down Parameters Description: port-type: The port type. interface-id: The interface name.	Informational
2	Event Description: This log is recorded when the port link is up. Log Message: Port <port-type><interface-id> link up, <link-speed> Parameters Description: port-type: The port type. interface-id: The interface name. link-speed: The port link speed.	Informational

IPSG

Log	Description	Severity
1	Event Description: This log is recorded when there are no hardware rule resources to set the DHCP snooping entry into the IPSG table. Log Message: Failed to set IPSG entry due to no hardware rule resource. (IP: <ipaddr>, MAC: <macaddr>, VID: <vlanid>, Interface <interface-id>) Parameters Description: ipaddr: The IP address. macaddr: The MAC address. vlanid: The VLAN ID. interface-id: The interface name.	Warning

IPv6SG

Log	Description	Severity
1	Event Description: This log is recorded when there are no hardware rule resources to set the IPv6 snooping entry into the IPv6SG table. Log Message: Failed to set IPv6SG entry due to no hardware rule resource. (IP: <ipaddr>, MAC: <macaddr>, VID: <vlan-id>, Interface <interface-id>) Parameters Description: ipaddr: The IPv6 address of the IPv6 snooping entry. macaddr: The MAC address of the IPv6 snooping entry. vlan-id: The VLAN ID of the IPv6 snooping entry. interface-id: The interface of the IPv6 snooping entry.	Warning

LACP

Log	Description	Severity
1	Event Description: This log is recorded when the link aggregation group link is up. Log Message: Link Aggregation Group <group-id> link up Parameters Description: group-id: The group ID of the link aggregation group.	Informational
2	Event Description: This log is recorded when the link aggregation group link is down. Log Message: Link Aggregation Group <group-id> link down Parameters Description: group-id: The group ID of the link aggregation group.	Informational
3	Event Description: This log is recorded when a member port is attached to the link aggregation group. Log Message: <ifname> attach to Link Aggregation Group <group-id> Parameters Description: ifname: The interface name of the port that is attached to the aggregation group. group-id: The group ID of the aggregation group that the port is attached to.	Informational
4	Event Description: This log is recorded when a member port is detached from the link aggregation group. Log Message: <ifname> detach from Link Aggregation Group <group-id> Parameters Description: ifname: The interface name of the port that is detached from the aggregation group. group-id: The group ID of the aggregation group that the port is detached from.	Informational

LBD

Log	Description	Severity
1	Event Description: This log is recorded when an interface detects a loop. Log Message: <interface-id> LBD loop occurred Parameters Description: interface-id: The interface on which a loop is detected.	Critical
2	Event Description: This log is recorded when an interface detects a loop in a VLAN. Log Message: <interface-id> VLAN <vlan-id> LBD loop occurred Parameters Description: interface-id: The interface on which the loop is detected. vlan-id: The VLAN in which the loop is detected.	Critical
3	Event Description: This log is recorded when an interface loop is recovered. Log Message: <interface-id> LBD loop recovered Parameters Description: interface-id: The interface on which the loop is recovered.	Critical
4	Event Description: This log is recorded when an interface loop is recovered in a VLAN. Log Message: <interface-id> VLAN <vlan-id> LBD loop recovered Parameters Description: interface-id: The interface on which the loop is recovered. vlan-id: The VLAN in which the loop is recovered.	Critical
5	Event Description: This log is recorded when the number of VLANs that loop back exceeds the reserved number. Log Message: Loop VLAN numbers overflow	Critical

LLDP/LLDP-MED

Log	Description	Severity
1	Event Description: This log is recorded when an LLDP-MED topology change is detected.	Notice

Log	Description	Severity
	Log Message: LLDP-MED topology change detected (on port <portNum>. chassis ID: <chassisType>, <chassisID>, port ID: <portType>, <portID>, device class: <deviceClass>) Parameters Description: portNum: The port number. chassisType: The chassis ID subtype. This can be chassisComponent (1), interfaceAlias (2), portComponent (3), macAddress (4), networkAddress (5), interfaceName (6), or local (7). chassisID: The chassis ID. portType: The port ID subtype. This can be interfaceAlias (1), portComponent (2), macAddress (3), networkAddress (4), interfaceName (5), agentCircuitId (6), or local (7). portID: The port ID. deviceClass: The LLDP-MED device type.	
2	Event Description: This log is recorded when an LLDP-MED device type conflict is detected. Log Message: Conflict LLDP-MED device type detected (on port <portNum>, chassis ID: <chassisType>, <chassisID>, port ID: <portType>, <portID>, device class: <deviceClass>) Parameters Description: portNum: The port number. chassisType: The chassis ID subtype. This can be chassisComponent (1), interfaceAlias (2), portComponent (3), macAddress (4), networkAddress (5), interfaceName (6), or local (7). chassisID: The chassis ID. portType: The port ID subtype. This can be interfaceAlias (1), portComponent (2), macAddress (3), networkAddress (4), interfaceName (5), agentCircuitId (6), or local (7). portID: The port ID. deviceClass: The LLDP-MED device type.	Notice
3	Event Description: This log is recorded when an incompatible LLDP-MED TLV set is detected. Log Message: Incompatible LLDP-MED TLV set detected (on port <portNum>, chassis ID: <chassisType>, <chassisID>, port ID: <portType>, <portID>, device class: <deviceClass>) Parameters Description: portNum: The port number. chassisType: The chassis ID subtype. This can be chassisComponent (1), interfaceAlias (2), portComponent (3), macAddress (4), networkAddress (5), interfaceName (6), or local (7). chassisID: The chassis ID. portType: The port ID subtype. This can be interfaceAlias (1), portComponent (2), macAddress (3), networkAddress (4), interfaceName (5), agentCircuitId (6), or local (7). portID: The port ID. deviceClass: The LLDP-MED device type.	Notice

Login/Logout CLI

Log	Description	Severity
1	Event Description: This log is recorded when login through the console is successful. Log Message: Successful login through Console (Username: <username>) Parameters Description: username: The current login user.	Informational
2	Event Description: This log is recorded when login through the console failed. Log Message: Login failed through Console (Username: <username>) Parameters Description: username: The current login user.	Warning
3	Event Description: This log is recorded when the console session timed out. Log Message: Console session timed out (Username: <username>) Parameters Description: username: The current login user.	Informational
4	Event Description: This log is recorded when logout from the console occurred. Log Message: Logout through Console (Username: <username>) Parameters Description:	Informational

Log	Description	Severity
	username: The current login user.	
5	Event Description: This log is recorded when login through Telnet is successful. Log Message: Successful login through Telnet (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Informational
6	Event Description: This log is recorded when login through Telnet failed. Log Message: Login failed through Telnet (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Warning
7	Event Description: This log is recorded when the Telnet session timed out. Log Message: Telnet session timed out (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Informational
8	Event Description: This log is recorded when logout from Telnet occurred. Log Message: Logout through Telnet (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Informational
9	Event Description: This log is recorded when login through SSH is successful. Log Message: Successful login through SSH (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Informational
10	Event Description: This log is recorded when login through SSH failed. Log Message: Login failed through SSH (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Critical
11	Event Description: This log is recorded when the SSH session timed out. Log Message: SSH session timed out (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Informational
12	Event Description: This log is recorded when logout from SSH occurred. Log Message: Logout through SSH (Username: <username>, IP: <ipaddr>) Parameters Description: username: The current login user. ipaddr: The IP address of the client.	Informational

MAC-based Access Control

Log	Description	Severity
1	Event Description: A host has passed the authentication. Log Message: MAC-based Access Control host login success (MAC: <mac-address>, <interface-id>, VID: <vlan-id>) Parameters Description: mac-address: The host MAC address. interface-id: The interface on which the host is authenticated. vlan-id: The VLAN ID on which the host exists after it is authenticated.	Informational

Log	Description	Severity
2	Event Description: A host has aged out. Log Message: MAC-based Access Control host aged out (MAC: <mac-address>, <interface-id>, VID: <vlan-id>) Parameters Description: mac-address: The host MAC address. interface-id: The interface on which the host is authenticated. vlan-id: The VLAN ID on which the host exists before it is aged out.	Informational
3	Event Description: A host failed to pass the authentication. Log Message: MAC-based Access Control host login fail (MAC: <mac-address>, <interface-id>, VID: <vlan-id>) Parameters Description: mac-address: The host MAC address. interface-id: The interface on which the host is authenticated. vlan-id: The originated VLAN ID on which the host exists.	Critical
4	Event Description: The authorized user number on the whole device has reached the maximum user limit. Log Message: MAC-based Access Control enters stop learning state	Warning
5	Event Description: The authorized user number on the whole device is below the maximum user limit in a time interval. Log Message: MAC-based Access Control recovers from stop learning state	Warning
6	Event Description: The authorized user number on an interface has reached the maximum user limit. Log Message: <interface-id> enters MAC-based Access Control stop learning state Parameters Description: interface-id: The interface on which the host is authenticated.	Warning
7	Event Description: The authorized user number on an interface is below the maximum user limit in a time interval. Log Message: <interface-id> recovers from MAC-based Access Control stop learning state Parameters Description: interface-id: The interface on which the host is authenticated.	Warning

MLAG

Log	Description	Severity
1	Event Description: MLAG Group Link Change Log Message: Multi-Chassis Link Aggregation Group < group id > <link status> Parameters Description: group id: MLAG group identification. Link status: Status of the link. • link up: The first member port of the group link is up. • link down: The last member port of the group link is down.	Informational
2	Event Description: MLAG Logical Switch Change Log Message: The MLAG logical switch is <status> Parameters Description: status: Status of the logical switch. • built up: The MLAG logical switch has been established. • destroy: The MLAG logical switch has been destroyed.	Informational
3	Event Description: MLAG Join Conflict Log Message: The MLAG state is conflict (<conflict>) Parameters Description: conflict: The causes of the conflict. • domain is different: The domain differs from the peer device. • device ID is the same: The device ID matches the peer switch. • hello interval is different: The hello interval differs from the peer switch.	Informational

Log	Description	Severity
	• MLAG found a third device: A third device is connected to the MLAG.	
4	Event Description: MLAG Group Has Different Configuration from the Peer Switch Log Message: The MLAG group <group_id> is down (<causes>) Parameters Description: group id: The MLAG group ID. causes: The cause of configuration conflict. • group ID is not exist: The MLAG group ID does not exist. • aggregation mode is different: The Link Aggregation mode differs. • algorithm is different: The Link Aggregation algorithm differs. • total member port is over the maximum number: The total number of local ports and peer ports exceeds the maximum allowed.	Informational

MSTP Debug

Log	Description	Severity
1	Event Description: This log is recorded when the Spanning Tree Protocol is enabled. Log Message: Spanning Tree Protocol is enabled	Informational
2	Event Description: This log is recorded when the Spanning Tree Protocol is disabled. Log Message: Spanning Tree Protocol is disabled	Informational
3	Event Description: This log is recorded when an MSTP instance topology change event occurs. Log Message: Topology changed (Instance: <instance-id>,<interface-id>, MAC:<macaddr>) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. interface-id: The port number that detects or receives topology change information. macaddr: The MAC address of the bridge.	Notice
4	Event Description: This log is recorded when a new MSTP instance root bridge is selected. Log Message: [CIST | CIST Region | MSTI Region] New Root bridge selected ([Instance: <instance-id>] MAC: <macaddr> Priority:<priority>) Log Message: [CIST | CIST Region | MSTI Region] New Root bridge selected ([Instance: <instance-id>] MAC: <macaddr> Priority:<priority>) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. macaddr: The MAC address of the bridge. priority: The bridge priority value. This value is divisible by 4096.	Informational
5	Event Description: This log is recorded when a new MSTP instance root port is selected. Log Message: New root port selected (Instance:<instance-id>, <interface-id>) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. interface-id: The port number that detects or receives topology change information.	Notice
6	Event Description: This log is recorded when an MSTP instance port state change event occurs. Log Message: Spanning Tree port status change (Instance:<instance-id>, <interface-id>) <old-status> -> <new-status> Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. interface-id: The port number that detects or receives topology change information. old-status: The old status of the port. This can be Disable, Discarding, Learning, or Forwarding. new-status: The new status of the port. This can be Disable, Discarding, Learning, or Forwarding.	Notice
7	Event Description: This log is recorded when an MSTP instance port role change event occurs. Log Message: Spanning Tree port role change (Instance:<instance-id>, <interface-id>) <old-role> -> <new-role> Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. interface-id: The port number that detects or receives topology change information.	Informational

Log	Description	Severity
	old-role: The old STP role. This can be DisablePort, AlternatePort, BackupPort, RootPort, DesignatedPort, NonstpPort, or MasterPort. new-role: The new STP role. This can be DisablePort, AlternatePort, BackupPort, RootPort, DesignatedPort, NonstpPort, or MasterPort.	
8	Event Description: This log is recorded when an MST instance is created. Log Message: Spanning Tree instance created (Instance:<instance-id>) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST.	Informational
9	Event Description: This log is recorded when an MST instance is deleted. Log Message: Spanning Tree instance deleted (Instance:<instance-id>) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST.	Informational
10	Event Description: This log is recorded when STP version changes. Log Message: Spanning Tree version change (new version:<new-version>) Parameters Description: new-version: The active STP version.	Informational
11	Event Description: This log is recorded when the configuration name and revision level changed in the MST configuration identification. Log Message: Spanning Tree MST configuration ID name and revision level change (name:<name> revision level <revision-level>) Parameters Description: name: The name given for the specified MST region. revision-level: The revision level. Switches using the same given name but with a different revision level are considered members of different MST regions.	Informational
12	Event Description: This log is recorded when a VLAN is mapped to an MST instance. Log Message: Spanning Tree MST configuration ID VLAN mapping table change (instance: <instance-id> add vlan <startvlanid> [- <endvlanid>]) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. startvlanid: The starting VLAN ID in the VLAN range to be added. endvlanid: The ending VLAN ID in the VLAN range to be added.	Informational
13	Event Description: This log is recorded when a VLAN is deleted from an MST instance. Log Message: Spanning Tree MST configuration ID VLAN mapping table change (instance: <instance-id> delete vlan <startvlanid> [- <endvlanid>]) Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. startvlanid: The starting VLAN ID in the VLAN range to be deleted. endvlanid: The ending VLAN ID in the VLAN range to be deleted.	Informational
14	Event Description: This log is recorded when the port role changes to alternate due to guard root. Log Message: Spanning Tree port role change (Instance:<instance-id>, <interface-id>) to alternate port due to the guard root Parameters Description: instance-id: The MST instance ID. Instance 0 represents the default instance, CIST. interface-id: The port number that detects the event.	Informational

OSPFv2

Log	Description	Severity
1	Event Description: OSPF interface link state changed. Log Message: OSPF interface <intf-name> changed state to [Up | Down] Parameters Description: intf-name: Name of OSPF interface.	Informational
2	Event Description: OSPF interface administrator state changed.	Informational

Log	Description	Severity
	Log Message: OSPF protocol on interface <intf-name> changed state to [Enabled | Disabled] Parameters Description: intf-name: Name of OSPF interface.	
3	Event Description: One OSPF interface changed from one area to another. Log Message: OSPF interface <intf-name> changed from area <area-id> to area <area-id> Parameters Description: intf-name: Name of OSPF interface. area-id: OSPF area ID.	Informational
4	Event Description: One OSPF neighbor state changed from Loading to Full. Log Message: OSPF nbr <nbr-id> on interface <intf-name> changed state from Loading to Full Parameters Description: intf-name: Name of OSPF interface. nbr-id: Neighbor's router ID.	Notice
5	Event Description: One OSPF neighbor state changed from Full to Down. Log Message: OSPF nbr <nbr-id> on interface <intf-name> changed state from Full to Down Parameters Description: intf-name: Name of OSPF interface. nbr-id: Neighbor's router ID.	Notice
6	Event Description: One OSPF neighbor state's dead timer expired. Log Message: OSPF nbr <nbr-id> on interface <intf-name> dead timer expired Parameters Description: intf-name: Name of OSPF interface. nbr-id: Neighbor's router ID.	Notice
7	Event Description: One OSPF virtual neighbor state changed from Loading to Full. Log Message: OSPF nbr <nbr-id> on virtual link changed state from Loading to Full Parameters Description: nbr-id: Neighbor's router ID.	Notice
8	Event Description: One OSPF virtual neighbor state changed from Full to Down. Log Message: OSPF nbr <nbr-id> on virtual link changed state from Full to Down Parameters Description: nbr-id: Neighbor's router ID.	Notice
9	Event Description: OSPF router ID was changed. Log Message: OSPF router ID changed to <router-id> Parameters Description: router-id: OSPF router ID.	Informational
10	Event Description: Enable OSPF. Log Message: OSPF state changed to Enabled	Informational
11	Event Description: Disable OSPF. Log Message: OSPF state changed to Disabled	Informational
12	Event Description: One OSPF neighbor state changed. Log Message: OSPF NBR <nbr-id> on interface <intf-name> changed state from <state> to <state>, <event> Parameters Description: nbr-id: Neighbor's router ID. intf-name: Name of OSPF interface. state: Neighbor state. event: The event that caused the neighbor state to change.	Informational
13	Event Description: One OSPF virtual neighbor state changed. Log Message: OSPF NBR <nbr-id> on virtual link changed state from <state> to <state>, <event> Parameters Description: nbr-id: Neighbor's router ID. state: Neighbor state.	Informational

Log	Description	Severity
	event: The event that caused the virtual neighbor state to change.	

Peripheral

Log	Description	Severity
1	Event Description: This log is recorded when the fan is recovered. Log Message: Unit <unit-id> <fan-descr> back to normal Parameters Description: Unit <unit-id>: The unit ID. fan-descr: The fan ID and position.	Critical
2	Event Description: This log is recorded when a fan failed. Log Message: Unit <unit-id> <fan-descr> failed Parameters Description: Unit <unit-id>: The unit ID. fan-descr: The fan ID and position.	Critical
3	Event Description: This log is recorded when the temperature sensor enters the alarm state. Log Message: Unit <unit-id> <thermal-sensor-descr> detects abnormal temperature <degree> Parameters Description: Unit <unit-id>: The unit ID. thermal-sensor-descr: The sensor ID and position. degree: The current temperature.	Critical
4	Event Description: This log is recorded when the temperature recovers to normal. Log Message: Unit <unit-id> <thermal-sensor-descr> temperature back to normal Parameters Description: Unit <unit-id>: The unit ID. thermal-sensor-descr: The sensor ID and position.	Critical
5	Event Description: Power failed. Log Message: Unit <unit-id> <power-descr> failed Parameters Description: Unit <unit-id>: The unit ID. power-descr: Describe the power.	Critical
6	Event Description: Power is recovered. Log Message: Unit <unit-id> <power-descr> back to normal Parameters Description: Unit <unit-id>: The unit ID. power-descr: Describe the power.	Critical
7	Event Description: Manually change the fan control mode. Log Message: Unit <unit-id> Fan control mode changed from <mode> to <mode> Parameters Description: Unit <unit-id>: The unit ID. <mode>: fan control mode.	Informational
8	Event Description: Fan control mode returns to normal. Log Message: Unit <unit-id> Fan control mode returns to normal mode Parameters Description: Unit <unit-id>: The unit ID.	Warning

Port Security

Log	Description	Severity
1	Event Description: This log is generated when a MAC address triggers a port security violation.	Warning

Log	Description	Severity
	Log Message: MAC address <macaddr> causes port security violation on <interface-id> Parameters Description: macaddr: The MAC address that caused the violation. interface-id: The interface identifier.	
2	Event Description: This log is generated when the system's address table becomes full. Log Message: Limit on system entry number has been exceeded	Warning

Safeguard

Log	Description	Severity
1	Event Description: This log is generated when the host transitions into the exhausted mode. Log Message: Safeguard Engine enters EXHAUSTED mode	Warning
2	Event Description: This log is generated when the host transitions into the normal mode. Log Message: Safeguard Engine enters NORMAL mode	Informational

SD Card Management

Log	Description	Severity
1	Event Description: Schedule Execute Configuration Failure Log Message: Entry <entry-name> to execute configuration <filename> at time < time-range> failure Parameters Description: entry-name: The name of this schedule execute configuration entry. filename: The filename of the configuration. time-range: The name of the time range.	Warning
2	Event Description: Schedule Backup Configuration or Log Failure Log Message: Entry <entry-name> to backup <type>:<filename> at time <time-range> failure Parameters Description: entry-name: The name of this schedule execute configuration entry. type: Configuration or log. filename: The filename of the configuration. time-range: The name of the time range.	Warning
3	Event Description: Schedule Execute Configuration Success Log Message: Entry <entry-name> to execute configuration <filename> success at time < time-range> Parameters Description: entry-name: The name of this schedule execute configuration entry. filename: The filename of the configuration. time-range: The name of the time range.	Informational
4	Event Description: Schedule Backup Configuration or Log Success Log Message: Entry <entry-name> to backup <type>:<filename> success at time <time-range> Parameters Description: entry-name: The name of this schedule execute configuration entry. type: Configuration or log. filename: The filename of the configuration. time-range: The name of the time range.	Informational

SNMP

Log	Description	Severity
1	Event Description: This log is generated when an SNMP request is received with an incorrect community string.	Informational

Log	Description	Severity
	Log Message: SNMP request received from <ipaddr> with invalid community string Parameters Description: ipaddr: The IP address.	

SSH

Log	Description	Severity
1	Event Description: This log is created when the SSH server is enabled. Log Message: SSH server is enabled	Informational
2	Event Description: This log is generated when the SSH server is disabled. Log Message: SSH server is disabled	Informational

Stacking

Log	Description	Severity
1	Event Description: Hot insertion. Log Message: Unit: <unitID>, MAC: <macaddr> Hot insertion Parameters Description: unitID: Box ID. macaddr: MAC address.	Informational
2	Event Description: Hot removal. Log Message: Unit: <unitID>, MAC: <macaddr> Hot removal Parameters Description: unitID: Box ID. macaddr: MAC address.	Informational
3	Event Description: Stacking topology change. Log Message: Stacking topology is <Stack_TP_TYPE>. Master(Unit <unitID>, MAC:<macaddr>) Parameters Description: Stack_TP_TYPE: The stacking topology type can be one of the following: Ring Chain unitID: Box ID. macaddr: MAC address.	Critical
4	Event Description: Backup master changed to master. Log Message: Backup master changed to master. Master (Unit: <unitID>) Parameters Description: unitID: Box ID.	Informational
5	Event Description: Slave changed to master. Log Message: Slave changed to master. Master (Unit: <unitID>) Parameters Description: unitID: Box ID.	Informational
6	Event Description: Box ID conflict. Log Message: Hot insert failed, box ID conflict: Unit <unitID> conflict (MAC: <macaddr> and MAC: <macaddr>) Parameters Description: unitID: Box ID. macaddr: The MAC addresses of the conflicting boxes.	Critical
7	Event Description: Stacking port link up. Log Message: Stacking port <port> link up Parameters Description: port: SIO port ID.	Critical

Log	Description	Severity
8	Event Description: Stacking port link down. Log Message: Stacking port <port> link down Parameters Description: port: SIO port ID.	Critical
9	Event Description: SIO link up. Log Message: SIO interface Unit <unitID> <SIOn > link up Parameters Description: unitID: Box ID. SIOn: The SIO interface number. The currently supported SIO interface numbers should be SIO1 and SIO2.	Critical
10	Event Description: SIO link down. Log Message: SIO interface Unit <unitID> <SIOn > link down Parameters Description: unitID: Box ID. macaddr: The MAC addresses of the conflicting boxes.	Critical

Storm Control

Log	Description	Severity
1	Event Description: This log is generated when a storm is detected. Log Message: <Broadcast | Multicast | Unicast> storm is occurring on <interface-id> Parameters Description: Broadcast: A broadcast storm is detected. Broadcast packets (DA = FF:FF:FF:FF:FF:FF). Multicast: A multicast storm is detected. Multicast packets may include unknown L2 multicast, known L2 multicast, unknown IP multicast, and known IP multicast. Unicast: A unicast storm is detected. Unicast packets may include both known and unknown unicast packets. interface-id: The identifier of the affected interface where the storm is detected.	Warning
2	Event Description: This log is generated when the storm is resolved. Log Message: <Broadcast | Multicast | Unicast> storm is cleared on <interface-id> Parameters Description: Broadcast: The broadcast storm is resolved. Multicast: The multicast storm is resolved. Unicast: The unicast storm is resolved. This includes both known and unknown unicast packets. interface-id: The identifier of the interface where the storm is resolved.	Informational
3	Event Description: This log is generated when a port is shut down due to a packet storm. Log Message: <interface-id> is currently shut down due to the <Broadcast | Multicast | Unicast> storm Parameters Description: interface-id: The interface ID that was error-disabled due to the storm. Broadcast: The interface is disabled due to a broadcast storm occurrence. Multicast: The interface is disabled due to a multicast storm occurrence. Unicast: The interface is disabled due to a unicast storm occurrence. This includes both known and unknown unicast packets.	Warning

System

Log	Description	Severity
1	Event Description: This log is generated when the system performs a warm start. Log Message: Unit <unit-id> System warm start Parameters Description: <unit-id>: The unit ID. Note: If the switch is in standalone mode, there will be no unitID information available for logging.	Critical

Log	Description	Severity
2	Event Description: This log is generated when the system performs a cold start. Log Message: Unit <unit-id> System cold start Parameters Description: <unit-id>: The unit ID. Note: If the switch is in standalone mode, there will be no unitID information available for logging.	Critical
3	Event Description: This log is generated when the system starts up. Log Message: Unit <unit-id> System started up Parameters Description: <unit-id>: The unit ID. Note: If the switch is in standalone mode, there will be no unitID information available for logging.	Critical

Telnet

Log	Description	Severity
1	Event Description: This log is generated when a successful Telnet login occurs. Log Message: Successful login through Telnet (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the Telnet client. ipaddr: The IP address of the Telnet client.	Informational
2	Event Description: This log is generated when a Telnet login attempt fails. Log Message: Login failed through Telnet (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the Telnet client. ipaddr: The IP address of the Telnet client.	Warning
3	Event Description: This log is generated when a successful Telnet logout occurs. Log Message: Logout through Telnet (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the Telnet client. ipaddr: The IP address of the Telnet client.	Informational
4	Event Description: This log is generated when a Telnet session times out. Log Message: Telnet session timed out (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the Telnet client. ipaddr: The IP address of the Telnet client.	Informational

Voice VLAN

Log	Description	Severity
1	Event Description: This log is generated when a new voice device is detected on an interface. Log Message: New voice device detected (<interface-id>, MAC: <mac-address>) Parameters Description: interface-id: The interface name. mac-address: The MAC address of the voice device.	Informational
2	Event Description: This log is generated when an interface, in auto-voice VLAN mode, joins the voice VLAN. Log Message: <interface-id> add into voice VLAN <vid> Parameters Description: interface-id: The interface name. vid: The VLAN ID.	Informational
3	Event Description: This log is generated when an interface leaves the voice VLAN, and no voice device is detected during the aging interval for that interface.	Informational

Log	Description	Severity
	Log Message: <interface-id> remove from voice VLAN <vid> Parameters Description: interface-id: The interface name. vid: The VLAN ID.	

VRRP Debug

Log	Description	Severity
1	Event Description: This log is generated when one virtual router state becomes Master. Log Message: VR <vr-id> at interface <intf-name> switch to Master role Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based.	Informational
2	Event Description: This log is generated when one virtual router state becomes Backup. Log Message: VR <vr-id> at interface <intf-name> switch to Backup state Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based.	Informational
3	Event Description: This log is generated when one virtual router state becomes Init. Log Message: VR <vr-id> at interface <intf-name> switch to Init state Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based.	Informational
4	Event Description: This log is generated when there is an authentication type mismatch in a received VRRP advertisement message. Log Message: Authentication type mismatch on VR <vr-id> at interface <intf-name> Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based.	Warning
5	Event Description: This log is generated when authentication checking fails for a received VRRP advertisement message. Log Message: Authentication fail on VR <vr-id> at interface <intf-name>. Auth type <auth-type> Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based. auth-type: VRRP interface authentication type.	Warning
6	Event Description: This log is generated when there is a checksum error in a received VRRP advertisement message. Log Message: Received an ADV msg with incorrect checksum on VR <vr-id> at interface <intf-name> Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based.	Warning
7	Event Description: This log is generated when there is a Virtual Router ID mismatch in a received VRRP advertisement message. Log Message: Received ADV msg virtual router ID mismatch. VR <vr-id> at interface <intf-name> Parameters Description: vr-id: VRRP virtual router ID. intf-name: Interface name on which the virtual router is based.	Warning
8	Event Description: This log is generated when there is an advertisement interval mismatch in a received VRRP advertisement message. Log Message: Received ADV msg adv interval mismatch. VR <vr-id> at interface <intf-name> Parameters Description: vr-id: VRRP virtual router ID.	Warning

Log	Description	Severity
	intf-name: Interface name on which the virtual router is based.	
9	Event Description: A virtual MAC address is added to the switch's L2 table. Log Message: Added a virtual MAC <vrrp-mac-addr> into L2 table Parameters Description: vrrp-mac-addr: VRRP virtual MAC address.	Notice
10	Event Description: A virtual MAC address is deleted from the switch's L2 table. Log Message: Deleted a virtual MAC <vrrp-mac-addr> from L2 table Parameters Description: vrrp-mac-addr: VRRP virtual MAC address.	Notice
11	Event Description: A virtual MAC address is added to the switch's L3 table. Log Message: Added a virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address.	Notice
12	Event Description: A virtual MAC address is deleted from the switch's L3 table. Log Message: Deleted a virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> from L3 table Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address.	Notice
13	Event Description: Failed to add a virtual MAC address to the switch's L2 table. The L2 table is full. Log Message: Failed to add virtual MAC <vrrp-mac-addr> into chip L2 table. Errcode <vrrp-errcode> Parameters Description: vrrp-mac-addr: VRRP virtual MAC address. vrrp-errcode: Errcode of VRRP protocol behavior.	Error
14	Event Description: Failed to delete a virtual MAC address from the switch's L2 table. The L2 table is full. Log Message: Failed to delete virtual MAC <vrrp-mac-addr> from chip L2 table. Errcode <vrrp-errcode> Parameters Description: vrrp-mac-addr: VRRP virtual MAC address. vrrp-errcode: Errcode of VRRP protocol behavior.	Error
15	Event Description: Failed to add a virtual MAC address to the switch's L3 table. The L3 table is full. Log Message: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. L3 table is full Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address.	Error
16	Event Description: Failed to add a virtual MAC address to the switch's L3 table. The port from which the MAC is learned is invalid. Log Message: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. Port <mac-port> is invalid Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address. mac-port: Port number of VRRP virtual MAC.	Error
17	Event Description: Failed to add a virtual MAC address to the switch's L3 table. The interface from which the MAC is learned is invalid. Log Message: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. Interface <mac-intf> is invalid Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address. mac-intf: Interface ID on which VRRP virtual MAC address is based.	Error
18	Event Description: Failed to add a virtual MAC address to the switch's L3 table. The box from which the MAC is learned is invalid. Log Message: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. Box id <mac-box> is invalid	Error

Log	Description	Severity
	Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address. mac-box: Stacking box number of VRRP virtual MAC.	
19	Event Description: Failed to add a virtual MAC address to the switch chip's L3 table. Log Message: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into chip L3 table. Errcode <vrrp-errcode> Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address. vrrp-errcode: Err code of VRRP protocol behavior.	Error
20	Event Description: Failed to delete a virtual MAC address from the switch chip's L3 table. Log Message: Failed to delete virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> from chip L3 table. Errcode <vrrp-errcode> Parameters Description: vrrp-ip-addr: VRRP virtual IP address. vrrp-mac-addr: VRRP virtual MAC address. vrrp-errcode: Err code of VRRP protocol behavior.	Error

Web

Log	Description	Severity
1	Event Description: This log is generated when a successful login occurs through the Web. Log Message: Successful login through Web (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the HTTP client. ipaddr: The IP address of the HTTP client.	Informational
2	Event Description: This log is generated when a login attempt through the Web fails. Log Message: Login failed through Web (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the HTTP client. ipaddr: The IP address of the HTTP client.	Warning
3	Event Description: This log is generated when the Web session times out. Log Message: Web session timed out (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the HTTP client. ipaddr: The IP address of the HTTP client.	Informational
4	Event Description: This log is generated when a successful logout occurs through the Web. Log Message: Logout through Web (Username: <username>, IP: <ipaddr>) Parameters Description: username: The username of the HTTP client. ipaddr: The IP address of the HTTP client.	Informational

ZTP

Log	Description	Severity
1	Event Description: This log is generated when the reset button on the unit is pressed, triggering the function. Log Message: Unit <UnitID> reset button pressed, trigger <Name> function. Parameters Description: UnitID: The unit ID. Name: "Reboot," "ZTP".	Critical

Log	Description	Severity
2	Event Description: This log is generated when the ZTP firmware is upgraded successfully. Log Message: The downloaded firmware was successfully executed by ZTP update (TFTP Server IP: <ipaddr>) Parameters Description: ipaddr: The IP address of the TFTP server.	Informational
3	Event Description: This log is generated when the ZTP firmware upgrade fails. Log Message: The downloaded firmware was not successfully executed by ZTP update (TFTP Server IP: <ipaddr>) Parameters Description: ipaddr: The IP address of the TFTP server.	Warning

Appendix C - Trap Entries

The Trap Log entries are listed in this appendix.

802.1X

Trap	Name	Description	OID
1	dDot1xExtLoggedSuccess	This trap is sent when a host successfully passes IEEE 802.1X authentication (login successful). Binding Objects: • ifIndex • dnaSessionClientMacAddress • dnaSessionAuthVlan • dnaSessionAuthUserName	1.3.6.1.4.1.171.14.30.0.1
2	dDot1xExtLoggedFail	This trap is sent when a host fails to pass IEEE 802.1X authentication (login failed). Binding Objects: • ifIndex • dnaSessionClientMacAddress • dnaSessionAuthVlan • dnaSessionAuthUserName • dDot1xExtNotifyFailReason	1.3.6.1.4.1.171.14.30.0.2

802.3ah OAM

Trap	Name	Description	OID
1	dot3OamThresholdEvent	This trap is sent when a local or remote threshold crossing event is detected. Binding Objects: • dot3OamEventLogTimestamp • dot3OamEventLogOui • dot3OamEventLogType • dot3OamEventLogLocation • dot3OamEventLogWindowHi • dot3OamEventLogWindowLo • dot3OamEventLogThresholdHi • dot3OamEventLogThresholdLo • dot3OamEventLogValue • dot3OamEventLogRunningTotal • dot3OamEventLogEventTotal	1.3.6.1.2.1.158.0.1
2	dot3OamNonThresholdEvent	This trap is sent when a local or remote non-threshold crossing event is detected. Binding Objects: • dot3OamEventLogTimestamp • dot3OamEventLogOui • dot3OamEventLogType • dot3OamEventLogLocation • dot3OamEventLogEventTotal	1.3.6.1.2.1.158.0.2

Authentication Fail

Trap Name		Description	OID
1	authenticationFailure	This trap is sent to signify that the SNMPv2 entity, acting in an agent role, has received a protocol message that is not properly authenticated. While all implementations of SNMPv2 must be capable of generating this trap, the snmpEnableAuthenTraps object indicates whether this trap will be generated.	1.3.6.1.6.3.1.1.5.5

BPDU Protection

Trap Name		Description	OID
1	dBpduProtectionAttackOccur	This trap is sent when a BPDU attack occurs on an interface. Binding Objects: • ifIndex • dBpduProtectionIfCfgMode	1.3.6.1.4.1.171.14.47.0.1
2	dBpduProtectionAttackRecover	This trap is sent when a BPDU attack is resolved on an interface. Binding Objects: • ifIndex	1.3.6.1.4.1.171.14.47.0.2

CFM

Trap Name		Description	OID
1	dot1agCfmFaultAlarm	This trap is sent when a connectivity defect is detected. Binding Objects: • dot1agCfmMepHighestPrDefect	1.3.111.2.802.1.1.8.0.1
2	dCfmAisOccurred	This trap is sent when the local MEP enters AIS status. Binding Objects: • dCfmEventMdIndex • dCfmEventMaIndex • dCfmEventMepIdentifier	1.3.6.1.4.1.171.14.86.0.1
3	dCfmAisCleared	This trap is sent when the local MEP exits AIS status. Binding Objects: • dCfmEventMdIndex • dCfmEventMaIndex • dCfmEventMepIdentifier	1.3.6.1.4.1.171.14.86.0.2
4	dCfmLockOccurred	This trap is sent when the local MEP enters lock status. Binding Objects: • dCfmEventMdIndex • dCfmEventMaIndex • dCfmEventMepIdentifier	1.3.6.1.4.1.171.14.86.0.3
5	dCfmLockCleared	This trap is sent when the local MEP exits lock status. Binding Objects: • dCfmEventMdIndex • dCfmEventMaIndex • dCfmEventMepIdentifier	1.3.6.1.4.1.171.14.86.0.4

DDM

Trap Name		Description	OID
1	dDdmAlarmTrap	This trap is sent when an abnormal alarm situation occurs or recovers from an abnormal alarm situation to normal status. Only when the current value is greater than the low warning or less than the high warning, a recover trap will be sent. Binding Objects: • dDdmNotifyInfoIfIndex • dDdmNotifyInfoComponent • dDdmNotifyInfoAbnormalLevel • dDdmNotifyInfoThresholdExceedOrRecover	1.3.6.1.4.1.171.14.72.0.1
2	dDdmWarningTrap	This trap is sent when an abnormal warning situation occurs or recovers from an abnormal warning situation to normal status. Binding Objects: • dDdmNotifyInfoIfIndex • dDdmNotifyInfoComponent • dDdmNotifyInfoAbnormalLevel • dDdmNotifyInfoThresholdExceedOrRecover	1.3.6.1.4.1.171.14.72.0.2

DHCP Server Screen Prevention

Trap Name		Description	OID
1	dDhcpFilterAttackDetected	This trap is sent when the DHCP server screen is enabled, and the switch receives a forged DHCP Server packet. Binding Objects: • dDhcpFilterLogBufServerIpAddr • dDhcpFilterLogBufClientMacAddr • dDhcpFilterLogBufferVlanId • dDhcpFilterLogBufferOccurTime	1.3.6.1.4.1.171.14.133.0.1

DoS Attack Prevention

Trap Name		Description	OID
1	dDosPreveAttackDetectedIpPacket	This trap is sent when a DoS attack is detected. Binding Objects: • dDoSPrevCtrlAttackType • dDosPrevNotiInfoDropIpAddressType • dDosPrevNotiInfoDropIpAddress • dDosPrevNotiInfoDropPortNumber	1.3.6.1.4.1.171.14.59.0.3

ERPS

Trap Name		Description	OID
1	dErpsFailuredetectedNotif	This trap is sent when a signal failure is detected.	1.3.6.1.4.1.171.14.78.0.1
2	dErpsFailureClearedNotif	This trap is sent when a signal failure is cleared.	1.3.6.1.4.1.171.14.78.0.2
3	dErpsRPLOwnerConflictNotif	This trap is sent when an RPL owner conflict is detected.	1.3.6.1.4.1.171.14.78.0.3

ErrDisable

Trap	Name	Description	OID
1	dErrDisNotifyPortDisabledAssert	This trap is sent when a port enters the error-disabled state. Binding Objects: • dErrDisNotifyInfoPortIfIndex • dErrDisNotifyInfoLoopDetectedVID • dErrDisNotifyInfoReasonID	1.3.6.1.4.1.171.14.45.0.1
2	dErrDisNotifyPortDisabledClear	This trap is sent when a port-loop restarts after the interval time. Binding Objects: • dErrDisNotifyInfoPortIfIndex • dErrDisNotifyInfoLoopDetectedVID • dErrDisNotifyInfoReasonID	1.3.6.1.4.1.171.14.45.0.2

General Management

Trap	Name	Description	OID
1	dGenMgmtLoginFail	This trap is sent when a user login to the switch fails. Binding Objects: • dGenMgmtNotifyInfoLoginType • dGenMgmtNotifyInfoUserName	1.3.6.1.4.1.171.14.165.0.1

Gratuitous ARP

Trap	Name	Description	OID
1	agentGratuitousARPTrap	This trap is sent when an IP address conflict occurs. Binding Objects: • ipaddr • macaddr • portNumber • agentGratuitousARPInterfaceName	1.3.6.1.4.1.171.14.75.0.1

IMPB

Trap	Name	Description	OID
1	dImpbViolationTrap	This trap is sent when the switch detects an IPMB address violation. Binding Objects: • ifIndex • dImpbViolationIpAddrType • dImpbViolationIpAddress • dImpbViolationMacAddress • dImpbViolationVlan	1.3.6.1.4.1.171.14.22.0.1

LACP

Trap	Name	Description	OID
1	linkup	This trap is sent when the SNMP entity, acting in an agent role, has detected that the ifOperStatus object for one of its communication links has transitioned from the down state to	1.3.6.1.6.3.1.1.5.4

Trap Name		Description	OID
		another state (not the notPresent state). The new state is indicated in ifOperStatus. Binding Objects: • ifIndex • ifAdminStatus • ifOperStatus	
2	linkDown	This trap is sent when the SNMP entity, acting in an agent role, has detected that the ifOperStatus object for one of its communication links is about to transition from another state (not from the notPresent state) to the down state. The old state is indicated in ifOperStatus. Binding Objects: • ifIndex • ifAdminStatus • ifOperStatus	1.3.6.1.6.3.1.1.5.3

LBD

Trap Name		Description	OID
1	dLbdLoopOccurred	This trap is sent when an interface loop occurs. Binding Objects: • dLbdNotifyInfoIfIndex	1.3.6.1.4.1.171.14.46.0.1
2	dLbdLoopRestart	This trap is sent when an interface loop restarts after the interval time. Binding Objects: • dLbdNotifyInfoIfIndex	1.3.6.1.4.1.171.14.46.0.2
3	dLbdVlanLoopOccurred	This trap is sent when an interface with a VID loop occurs. Binding Objects: • dLbdNotifyInfoIfIndex • dLbdNotifyInfoVlanId	1.3.6.1.4.1.171.14.46.0.3
4	dLbdVlanLoopRestart	This trap is sent when an interface loop with a VID restarts after the interval time. Binding Objects: • dLbdNotifyInfoIfIndex • dLbdNotifyInfoVlanId	1.3.6.1.4.1.171.14.46.0.4

LLDP/LLDP-MED

Trap Name		Description	OID
1	lldpRemTablesChange	This trap is sent when the value in lldpStatsRemTableLastChangeTime changes. Binding Objects: • lldpStatsRemTablesInserts • lldpStatsRemTablesDeletes • lldpStatsRemTablesDrops • lldpStatsRemTablesAgeouts	1.0.8802.1.1.2.0.0.1
2	lldpXMedTopologyChangeDetected	This trap is sent when the local device senses a change in the topology that indicates a new remote device attached to a local port, or a remote device has been disconnected or moved from one port to another. Binding Objects: • lldpRemChassisIdSubtype • lldpRemChassisId	1.0.8802.1.1.2.1.5.4795.0.1

Trap Name		Description	OID
		• lldpXMedRemDeviceClass	

MAC-based Access Control

Trap Name		Description	OID
1	dMacAuthLoggedSuccess	This trap is sent when a MAC-based Access Control host successfully logs in. Binding Objects: • ifIndex • dnaSessionClientMacAddress • dnaSessionAuthVlan	1.3.6.1.4.1.171.14.153.0.1
2	dMacAuthLoggedFail	This trap is sent when a MAC-based Access Control host login fails. Binding Objects: • ifIndex • dnaSessionClientMacAddress • dnaSessionAuthVlan	1.3.6.1.4.1.171.14.153.0.2
3	dMacAuthLoggedAgesOut	This trap is sent when a MAC-based Access Control host ages out. Binding Objects: • ifIndex • dnaSessionClientMacAddress • dnaSessionAuthVlan	1.3.6.1.4.1.171.14.153.0.3

MAC Notification

Trap Name		Description	OID
1	swL2macNotification	This trap is sent to indicate a MAC address change in the MAC address table. Binding Objects: • swL2macNotifyInfo	1.3.6.1.4.1.171.14.3.0.1
2	dL2FdbMacNotificationWithVID	This trap is sent to indicate a MAC address change in the MAC address table. Binding Objects: • dL2FdbMacChangeNotifyInfoWithVID	1.3.6.1.4.1.171.14.3.0.2

MSTP

Trap Name		Description	OID
1	newRoot	This trap is sent to indicate that the sending agent has become the new root of the Spanning Tree. This trap is sent by a bridge after its election as the new root, for example, upon the expiration of the Topology Change Timer or immediately subsequent to its election. Implementation of this trap is optional.	1.3.6.1.2.1.17.0.1
2	topologyChange	This trap is sent by a bridge when any of its configured ports transitions from the Learning state to the Forwarding state or from the Forwarding state to the Blocking state. This trap is not sent if a newRoot trap is sent for the same transition. Implementation of this trap is optional.	1.3.6.1.2.1.17.0.2

Peripheral

Trap	Name	Description	OID
1	dEntityExtFanStatusChg	This trap is sent from the commander switch when a fan fails (dEntityExtEnvFanStatus is 'fault') or recovers (dEntityExtEnvFanStatus is 'ok'). Binding Objects: • dEntityExtEnvFanUnitId • dEntityExtEnvFanIndex • dEntityExtEnvFanStatus	1.3.6.1.4.1.171.14.5.0.1
2	dEntityExtThermalStatusChg	This trap is sent from the commander switch when a thermal alarms (dEntityExtEnvTempStatus is 'abnormal') or recovers (dEntityExtEnvTempStatus is 'ok'). Binding Objects: • dEntityExtEnvTempUnitId • dEntityExtEnvTempIndex • dEntityExtEnvTempStatus	1.3.6.1.4.1.171.14.5.0.2
3	dEntityExtPowerStatusChg	This trap is sent when the commander switch sends a notification indicating a power module failure, recovery, or removal. Binding Objects: • dEntityExtEnvPowerUnitId • dEntityExtEnvPowerIndex • dEntityExtEnvPowerStatus	1.3.6.1.4.1.171.14.5.0.3

PIM6-SM

Trap	Name	Description	OID
1	pimNeighborLoss	A pimNeighborLoss notification signifies the loss of an adjacency with a neighbor. This notification should be generated when the neighbor timer expires, and the router has no other neighbor on the same interface with the same IP version and a lower IP address than itself. This notification is generated whenever the counter pimNeighborLossCount is incremented, subject to the rate limit specified by pimNeighborLossNotificationsPeriod. Binding Objects: • pimNeighborUpTime	1.3.6.1.2.1.157.0.1
2	pimInvalidRegister	A pimInvalidRegister notification signifies that an invalid PIM Register message was received by this device. This notification is generated whenever the counter pimInvalidRegisterMsgsRcvd is incremented, subject to the rate limit specified by pimInvalidRegisterNotificationPeriod. Binding Objects: • pimGroupMappingPimMode • pimInvalidRegisterAddressType • pimInvalidRegisterOrigin • pimInvalidRegisterGroup • pimInvalidRegisterRp	1.3.6.1.2.1.157.0.2
3	pimInvalidJoinPrune	A pimInvalidJoinPrune notification signifies that an invalid PIM Join/Prune message was received by this device. This notification is generated whenever the counter pimInvalidJoinPruneMsgsRcvd is incremented, subject to the rate limit specified by pimInvalidJoinPruneNotificationPeriod. Binding Objects: • pimGroupMappingPimMode • pimInvalidJoinPruneAddressType • pimInvalidJoinPruneOrigin	1.3.6.1.2.1.157.0.3

Trap	Name	Description	OID
		• pimInvalidJoinPruneGroup • pimInvalidJoinPruneRp • pimNeighborUpTime	
4	pimRPMappingChage	A pimRPMappingChange notification signifies a change to the active RP mapping on this device. This notification is generated whenever the counter pimRPMappingChangeCount is incremented, subject to the rate limit specified by pimRPMappingChangeNotificationPeriod. Binding Objects: • pimGroupMappingPimMode • pimGroupMappingPrecedence	1.3.6.1.2.1.157.0.4
5	pimInterfaceElection	A pimInterfaceElection notification signifies that a new DR or DF has been elected on a network. This notification is generated whenever the counter pimInterfaceElectionWinCount is incremented, subject to the rate limit specified by pimInterfaceElectionNotificationPeriod. Binding Objects: • pimInterfaceAddressType • pimInterfaceAddress	1.3.6.1.2.1.157.0.5

Port

Trap	Name	Description	OID
1	linkup	This trap is sent when the port link status changes to up. Binding Objects: • ifIndex • ifAdminStatus • ifOperStatus	1.3.6.1.6.3.1.1.5.4
2	linkDown	This trap is sent when the port link status changes to down. Binding Objects: • ifIndex • ifAdminStatus • ifOperStatus	1.3.6.1.6.3.1.1.5.3

Port Security

Trap	Name	Description	OID
1	dPortSecMacAddrViolation	This trap is sent when new MAC addresses violate the predefined port security configuration. Binding Objects: • ifIndex • dPortSecIfCurrentStatus • dPortSecIfLastMacAddress	1.3.6.1.4.1.171.14.8.0.1

RMON

Trap	Name	Description	OID
1	risingAlarm	This trap is sent when an alarm entry crosses its rising threshold and generates an event configured for sending SNMP traps. Binding Objects:	1.3.6.1.2.1.16.0.1

Trap	Name	Description	OID
		• alarmIndex • alarmVariable • alarmSampleType • alarmValue • alarmRisingThreshold	
2	fallingAlarm	This trap is sent when an alarm entry crosses its falling threshold and generates an event configured for sending SNMP traps. Binding Objects: • alarmIndex • alarmVariable • alarmSampleType • alarmValue • alarmFallingThreshold	1.3.6.1.2.1.16.0.2

Safeguard

Trap	Name	Description	OID
1	dSafeguardChgToExhausted	This trap is sent to indicate a change in the system operation mode from normal to exhaust. Binding Objects: • dSafeguardEngineCurrentMode	1.3.6.1.4.1.171.14.19.1.1.0.1
2	dSafeguardChgToNormal	This trap is sent to indicate a change in the system operation mode from exhausted to normal. Binding Objects: • dSafeguardEngineCurrentMode	1.3.6.1.4.1.171.14.19.1.1.0.2

SIM

Trap	Name	Description	OID
1	swSingleIPMSColdStart	This trap is sent when the commander switch's member generates a cold start notification. Binding Objects: • swSingleIPMSID • swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0.11
2	swSingleIPMSWarmStart	This trap is sent when the commander switch sends a notification because its member generates a warm start notification. Binding Objects: • swSingleIPMSID • swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0.12
3	swSingleIPMSLinkDown	This trap is sent when the commander switch sends a notification because its member generates a link down notification. Binding Objects: • swSingleIPMSID • swSingleIPMSMacAddr • ifIndex	1.3.6.1.4.1.171.12.8.6.0.13
4	swSingleIPMSLinkUp	This trap is sent when the commander switch sends a notification because its member generates a link up notification. Binding Objects: • swSingleIPMSID	1.3.6.1.4.1.171.12.8.6.0.14

Trap Name		Description	OID
		• swSingleIPMSMacAddr • ifIndex	
5	swSingleIPMSAuthFail	This trap is sent when the commander switch sends a notification because its member generates an authentication failure notification. Binding Objects: • swSingleIPMSID • swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0.15
6	swSingleIPMSnewRoot	This trap is sent when the commander switch sends a notification because its member generates a new root notification. Binding Objects: • swSingleIPMSID • swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0.16
7	swSingleIPMSTopologyChange	This trap is sent when the commander switch sends a notification because its member generates a topology change notification. Binding Objects: • swSingleIPMSID • swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0.17

Stack

Trap Name		Description	OID
1	dStackInsertNotification	This trap is sent for the Unit Hot Insert notification. Binding Objects: • dStackNotifyInfoBoxId • dStackInfoMacAddr	1.3.6.1.4.1.171.14.9.0.1
2	dStackRemoveNotification	This trap is sent for the Unit Hot Remove notification. Binding Objects: • dStackNotifyInfoBoxId • dStackInfoMacAddr	1.3.6.1.4.1.171.14.9.0.2
3	dStackFailureNotification	This trap is sent for the Unit Failure notification. Binding Objects: • dStackNotifyInfoBoxId	1.3.6.1.4.1.171.14.9.0.3
4	dStackTPChangeNotification	This trap is sent for the Stacking Topology Change notification. Binding Objects: • dStackNotifyInfoTopologyType • dStackNotifyInfoBoxId • dStackInfoMacAddr	1.3.6.1.4.1.171.14.9.0.4
5	dStackRoleChangeNotification	This trap is sent for the Stacking Unit Role Change notification. Binding Objects: • dStackNotifyInfoRoleChangeType • dStackNotifyInfoBoxId	1.3.6.1.4.1.171.14.9.0.5

Start

Trap Name		Description	OID
1	coldStart	This trap is sent to signify that the SNMPv2 entity, acting in an agent role, is reinitializing itself, and its configuration may have been altered.	1.3.6.1.6.3.1.1.5.1
2	warmStart	This trap is sent to signify that the SNMPv2 entity, acting in an agent role, is reinitializing itself in a way that its configuration remains unaltered.	1.3.6.1.6.3.1.1.5.2

Storm Control

Trap Name		Description	OID
1	dStormCtrlOccurred	This trap is sent when dStormCtrlNotifyEnable is set to stormOccurred or 'both,' and a storm is detected. Binding Objects: • ifIndex • dStormCtrlNotifyTrafficType	1.3.6.1.4.1.171.14.25.0.1
2	dStormCtrlStormCleared	This trap is sent when dStormCtrlNotifyEnable is set to stormCleared or 'both,' and a storm is cleared. Binding Objects: • ifIndex • dStormCtrlNotifyTrafficType	1.3.6.1.4.1.171.14.25.0.2

System File

Trap Name		Description	OID
1	dsfUploadImage	This trap is sent when the user successfully uploads an image file.	1.3.6.1.4.1.171.14.14.0.1
2	dsfDownloadImage	This trap is sent when the user successfully downloads an image file.	1.3.6.1.4.1.171.14.14.0.2
3	dsfUploadCfg	This trap is sent when the user successfully uploads a configuration file.	1.3.6.1.4.1.171.14.14.0.3
4	dsfDownloadCfg	This trap is sent when the user successfully downloads a configuration file.	1.3.6.1.4.1.171.14.14.0.4
5	dsfSaveCfg	This trap is sent when the user successfully saves the configuration file.	1.3.6.1.4.1.171.14.14.0.5

VRRP

Trap Name		Description	OID
1	vrrpTrapNewMaster	This trap is sent when the newMaster trap indicates that the sending agent has transitioned to the 'Master' state. Binding Objects: • vrrpOperMasterIpAddr	1.3.6.1.2.1.68.0.1
2	vrrpTrapAuthFailure	This trap is sent when a vrrpAuthFailure trap signifies that a packet has been received from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type. Implementation of this trap is optional. Binding Objects: • vrrpTrapPacketSrc • vrrpTrapAuthErrorType	1.3.6.1.2.1.68.0.2

ZTP

Trap Name		Description	OID
1	swResetButtonPressedTrap	This trap is sent when the reset button is pressed. Binding Objects: • Unit ID • swResetButtonMode	1.3.6.1.4.1.171.12.120.2.0.1

Appendix D - RADIUS Attributes Assignment

The RADIUS Attributes Assignment on the Switch is used in the following modules: Console, Telnet, SSH, Web, 802.1X, MAC-based Access Control, and WAC.

The description that follows explains the following RADIUS Attributes Assignment types:

- Privilege Level
- Ingress/Egress Bandwidth
- 802.1p Default Priority
- VLAN
- ACL

To assign the **Privilege Level** by the RADIUS server, the proper parameters should be configured on the RADIUS server. The table below shows the parameters for the bandwidth.

The parameters of the Vendor-Specific attributes are:

Vendor-Specific Attribute	Description	Value	Usage
Vendor-ID	Defines the vendor.	171 (DLINK)	Required
Vendor-Type	Defines the attribute.	1	Required
Attribute-Specific Field	Used to assign the privilege level of the user to operate the Switch.	Range (1-15)	Required

If the user has configured the privilege level attribute of the RADIUS server (for example, level 15) and the Console, Telnet, SSH, and Web authentication is successful, the device will assign the privilege level (according to the RADIUS server) to this access user. However, if the user does not configure the privilege level attribute and authenticates successfully, the device will not assign any privilege level to the access user. If the privilege level is configured less than the minimum supported value or greater than the maximum supported value, the privilege level will be ignored.

To assign the **Ingress/Egress Bandwidth** by the RADIUS server, the proper parameters should be configured on the RADIUS Server. The table below shows the parameters for bandwidth.

The parameters of the Vendor-Specific attributes are:

Vendor-Specific Attribute	Description	Value	Usage
Vendor-ID	Defines the vendor.	171 (DLINK)	Required
Vendor-Type	Defines the attribute.	2 (for ingress bandwidth) 3 (for egress bandwidth)	Required
Attribute-Specific Field	Used to assign the bandwidth of a port.	Unit (Kbits)	Required

If the user has configured the bandwidth attribute of the RADIUS server (for example, ingress bandwidth 1000Kbps) and 802.1X authentication is successful, the device will assign the bandwidth (according to the RADIUS server) to the port. However, if the user does not configure the bandwidth attribute and authenticates successfully, the device will not assign any bandwidth to the port. If the bandwidth attribute is configured on the RADIUS server with a value of "0", the effective bandwidth will be set "no_limited", and if the bandwidth is configured less than "0" or greater than maximum supported value, the bandwidth will be ignored.

To assign the **802.1p Default Priority** by the RADIUS server, the proper parameters should be configured on the RADIUS server. The table below shows the parameters for 802.1p default priority.

The parameters of the Vendor-Specific attributes are:

Vendor-Specific Attribute	Description	Value	Usage
Vendor-ID	Defines the vendor.	171 (DLINK)	Required
Vendor-Type	Defines the attribute.	4	Required
Attribute-Specific Field	Used to assign the 802.1p default priority of the port.	0 to 7	Required

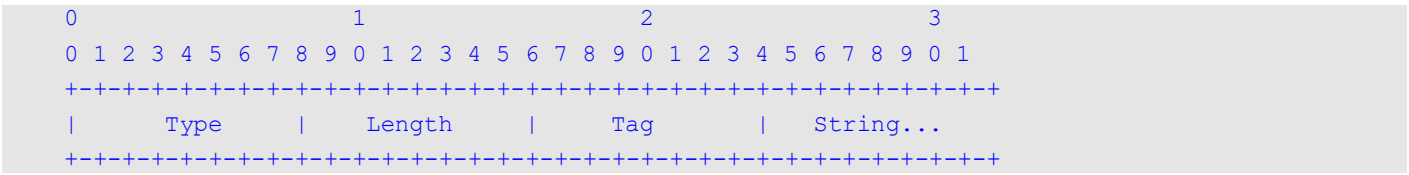
If the user has configured the 802.1p priority attribute of the RADIUS server (for example, priority 7) and the 802.1X, or MAC based authentication is successful, the device will assign the 802.1p default priority (according to the RADIUS server) to the port. However, if the user does not configure the priority attribute and authenticates successfully, the device will not assign a priority to this port. If the priority attribute is configured on the RADIUS server is a value out of range (>7), it will not be set to the device.

To assign the **VLAN** by the RADIUS server, the proper parameters should be configured on the RADIUS server. To use VLAN assignment, RFC 3580 defines the following tunnel attributes in RADIUS packets.

The table below shows the parameters for a VLAN:

RADIUS Tunnel Attribute	Description	Value	Usage
Tunnel-Type	This attribute indicates the tunneling protocol(s) to be used (in the case of a tunnel initiator) or the tunneling protocol in use (in the case of a tunnel terminator).	13 (VLAN)	Required
Tunnel-Medium-Type	This attribute indicates the transport medium being used.	6 (802)	Required
Tunnel-Private-Group-ID	This attribute indicates group ID for a particular tunneled session.	A string (VID)	Required

A summary of the Tunnel-Private-Group-ID Attribute format is shown below.



The table below shows the definition of Tag field (different with RFC 2868):

Tag Field Value	String Field Format
0x01	VLAN name (ASCII)
0x02	VLAN ID (ASCII)
Others (0x00, 0x03 ~ 0x1F, >0x1F)	When the Switch receives the VLAN setting string, it will think it is the VLAN ID first. In other words, the Switch will check all existing VLAN IDs and check if there is one matched. If the Switch can find one matched, it will move to that VLAN. If the Switch cannot find the matched VLAN ID, it will think the VLAN setting string as a "VLAN Name". Then it will check that it can find out a matched VLAN Name.

NOTE: A tag field of greater than 0x1F is interpreted as the first octet of the following field.

If the user has configured the VLAN attribute of the RADIUS server (for example, VID 3) and the 802.1X, or MAC based Access Control, or WAC authentication is successful, the port will be assigned to VLAN 3. However if the user does not configure the VLAN attributes, when the port is not guest VLAN member, it will be kept in its current authentication VLAN, and when the port is guest VLAN member, it will be assigned to its original VLAN.

To assign the **ACL** by the RADIUS server, there are two types of parameters that can be configured on the RADIUS server. (1) VSA14 ACL and (2) NAS-Filter-Rule.

VSA14 ACL Script

The parameters of the Vendor-Specific Attribute are:

RADIUS Tunnel Attribute	Description	Value	Usage
Vendor-ID	Defines the vendor.	171 (DLINK)	Required
Vendor-Type	Defines the attribute.	14 (for ACL script)	Required
Attribute-Specific Field	Used to assign the ACL script. The format is based on **Access Control List (ACL) Commands**.	ACL Script For example: ***ip access-list a1;permit host 10.90.90.100;exit; mac access-list extended m1;permit host 00-00-00-01-90-10 any; exit;***	Required

If the user has configured the ACL attribute of the RADIUS server (for example, ACL script: ip access-list a1;permit host 10.90.90.100;exit; mac access-list extended m1;permit host 00-00-00-01-90-10 any; exit;), and the 802.1X, MAC-based Access Control or WAC authentication is successful, the device will assign the ACL script according to the RADIUS server. The enter **Access-List Configuration Mode** and exit **Access-List Configuration Mode** must be a pair, otherwise the ACP script will be reject.

For more information about the ACL module, please refer to **Access Control List (ACL) Commands** chapter.

NAS-Filter-Rule (92)

The parameters of the NAS-Filter-Rule are:

RADIUS Tunnel Attribute	Description	Value	Usage
NAS-Filter-Rule	This attribute indicates the filter rules to be applied for the user.	A string (concatenating the individual filter rules, separated by a null (0x00) octet)	Required

Filter Rule Format

Use the permit rule to add a permit entry. Use the deny rule to add a deny entry.

{permit | deny} in tcp from any to {any | *DST-IP-ADDR* **|** *DST-IP-NET-ADDR* **|** *DST-IPV6-ADDR* **|** *DST-IPV6-NET-ADDR***} [***TCP-PORT-RANGE***]**

{permit | deny} in udp from any to {any | *DST-IP-ADDR* **|** *DST-IP-NET-ADDR* **|** *DST-IPV6-ADDR* **|** *DST-IPV6-NET-ADDR***} [***UDP-PORT-RANGE***]**

{permit | deny} in icmp from any to {any | *DST-IP-ADDR* **|** *DST-IP-NET-ADDR* **|** *DST-IPV6-ADDR* **|** *DST-IPV6-NET-ADDR***} [***ICMP-TYPE***]**

{permit | deny} in ip from any to {any | *DST-IP-ADDR* **|** *DST-IP-NET-ADDR* **|** *DST-IPV6-ADDR* **|** *DST-IPV6-NET-ADDR***} {permit | deny} in** *IP-PROT-VALUE* **from any to {any |** *DST-IP-ADDR* **|** *DST-IP-NET-ADDR* **|** *DST-IPV6-ADDR* **|** *DST-IPV6-NET-ADDR***}**

Syntax Description

Parameter	Description
tcp, udp, icmp, ip, *IP-PROT-VALUE*	Filter rule can match TCP, UDP, ICMP, IP, or user-specified protocol value. The valid value of IP-PROT-VALUE is from 0 to 255.
any	Use the keyword **any** to match any destination addresses.
DST-IP-ADDR	Specifies a specific destination host IP address.
DST-IP-NET-ADDR	Specifies a group of destination IP addresses with a mask width in the form 1.2.3.4/24.
DST-IPV6-ADDR	Specifies a specific destination host IPv6 address.
DST-IPV6-NET-ADDR	Specifies a group of destination IPv6 networks in the form 2000::1/64.
TCP-PORT-RANGE	(Optional) Specifies to match the TCP port or port range. The format is like 22-23, 80.
UDP-PORT-RANGE	(Optional) Specifies to match the UDP port or port range. The format is like 56, 67-68.
ICMP-TYPE	(Optional) Specifies the ICMP message type. The valid number for the message type is from 0 to 255.

Examples

This example shows how to deny a host's Telnet service on the RADIUS server.

```
Nas-filter-Rule="deny in tcp from any to any 23"
Nas-filter-Rule+="permit in ip from any to any"
```

This example shows how to limit a host to access a group of IP address on the RADIUS server.

```
Nas-filter-Rule="permit in ip from any to 10.10.10.1/24"
Nas-filter-Rule+="permit in ip from any to fe80::d1:1/64"
```

The parameters of the Vendor-Specific Attribute are:

Vendor-Specific Attribute	Description	Value	Usage
Vendor-ID	Defines the vendor.	171 (DLINK)	Required
Vendor-Type	Defines the attribute.	24	Required
Attribute-Specific Field	IPv6 filter rule. Used to accept IPv6 address related inputs.	This attribute indicates one of the following IP modes for the NAS-Filter-Rule. 1=Forward IPv4 and IPv6 traffic	Required

Vendor-Specific Attribute	Description	Value	Usage
		2=Forward IPv4 traffic only (drop any IPv6 traffic) If this attribute is not assigned by the RADIUS server, forward IPv4 traffic only. IPv6 packets will be dropped.	

Note: If both proprietary ACL script (VSA14) and standard NAS-Filter-Rule (92) are assigned at the same time, the NAS-Filter-Rule (92) will take effect, and VSA14 will be ignored.

Appendix E - IETF RADIUS Attributes Support

Remote Authentication Dial-In User Service (RADIUS) attributes carry specific authentication, authorization, information, and configuration details for the request and reply. This appendix lists the RADIUS attributes currently supported by the Switch.

RADIUS attributes are supported by the IETF standard and Vendor-Specific Attribute (VSA). VSA allows the vendor to create an additionally owned RADIUS attribute. For more information about D-Link VSA, refer to the **RADIUS Attributes Assignment** Appendix.

IETF standard RADIUS attributes are defined in the RFC 2865 Remote Authentication Dial-In User Service (RADIUS), RFC 2866 RADIUS Accounting, RFC 2868 RADIUS Attributes for Tunnel Protocol Support, and RFC 2869 RADIUS Extensions.

The following table lists the IETF RADIUS attributes supported by the D-Link Switch.

RADIUS Authentication Attributes:

Number	IETF Attribute
1	User-Name
2	User-Password
3	CHAP-Password
4	NAS-IP-Address
5	NAS-Port
6	Service-Type
7	Framed-Protocol
8	Framed-IP-Address
12	Framed-MTU
18	Reply-Message
24	State
26	Vendor-Specific
27	Session-Timeout
29	Termination-Action
30	Called-Station-ID
31	Calling-Station-ID
32	NAS-Identifier
60	CHAP-Challenge
61	NAS-Port-Type
64	Tunnel-Type
65	Tunnel-Medium-Type
77	Connect-Info
79	EAP-Message
80	Message-Authenticator
81	Tunnel-Private-Group-ID
85	Acct-Interim-Interval
87	NAS-Port-ID
95	NAS-IPv6-Address

RADIUS Accounting Attributes:

Number	IETF Attribute
1	User-Name
4	NAS-IP-Address
5	NAS-Port
6	Service-Type
8	Framed-IP-Address
31	Calling-Station-ID
32	NAS-Identifier
40	Acct-Status-Type
41	Acct-Delay-Time
42	Acct-Input-Octets
43	Acct-Output-Octets
44	Acct-Session-ID
45	Acct-Authentic
46	Acct-Session-Time
47	Acct-Input-Packets
48	Acct-Output-Packets
49	Acct-Terminate-Cause
52	Acct-Input-Gigawords
53	Acct-Output-Gigawords
61	NAS-Port-Type
95	NAS-IPv6-Address