

## Web UI Reference Guide

Product Model: DGS-3000-28SC

Layer 2 Managed Stackable Gigabit Switch

Release 5.00

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## Intended Readers

### *Typographical Conventions* *Notes, Notices and Cautions*

The **DGS-3000-28SC Web UI Reference Guide** contains information for setup and management of the Switch. This manual is intended for network managers familiar with network management concepts and terminology.

## Typographical Conventions

Convention	Description
[ ]	In a command line, square brackets indicate an optional entry. For example: [copy filename] means that optionally you can type copy followed by the name of the file. Do not type the brackets.
<b>Bold font</b>	Indicates a button, a toolbar icon, menu, or menu item. For example: Open the <b>File</b> menu and choose <b>Cancel</b> . Used for emphasis. May also indicate system messages or prompts appearing on screen. For example: <b>You have mail</b> . <b>Bold font</b> is also used to represent filenames, program names and commands. For example: <b>use the copy command</b> .
Boldface Typewriter Font	Indicates commands and responses to prompts that must be typed exactly as printed in the manual.
Initial capital letter	Indicates a window name. Names of keys on the keyboard have initial capitals. For example: Click Enter.
<b>Menu Name &gt; Menu Option</b>	<b>Menu Name &gt; Menu Option</b> Indicates the menu structure. <b>Device &gt; Port &gt; Port Properties</b> means the Port Properties menu option under the Port menu option that is located under the Device menu.

## Notes, Notices and Cautions



A **NOTE** indicates important information that helps make better use of the device.



A **NOTICE** indicates either potential damage to hardware or loss of data and tells how to avoid the problem.



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

# Chapter 1 Web-based Switch Configuration

## *Introduction*

### *Login to the Web Manager*

### *Web-based User Interface*

### *Web Pages*

## Introduction

Most software functions of the DGS-3000-28SC switch can be managed, configured and monitored via the embedded web-based (HTML) interface. Manage the Switch from remote stations anywhere on the network through a standard browser. The browser acts as a universal access tool and can communicate directly with the Switch using the HTTP protocol.

## Login to the Web Manager

To begin managing the Switch, simply run the browser installed on your computer and point it to the IP address you have defined for the device. The URL in the address bar should read something like: `http://123.123.123.123`, where the numbers 123 represent the IP address of the Switch.



**NOTE:** The factory default IP address is 10.90.90.90.

This opens the management module's user authentication window, as seen below.



**Figure 1-1 Enter Network Password window**

Leave both the **User Name** field and the **Password** field blank and click **OK**. This will open the Web-based user interface. The Switch management features available in the web-based manager are explained below.



## Web-based User Interface

The user interface provides access to various Switch configuration and management windows, allows you to view performance statistics, and permits you to graphically monitor the system status.

## Areas of the User Interface

The figure below shows the user interface. Three distinct areas divide the user interface, as described in the table.

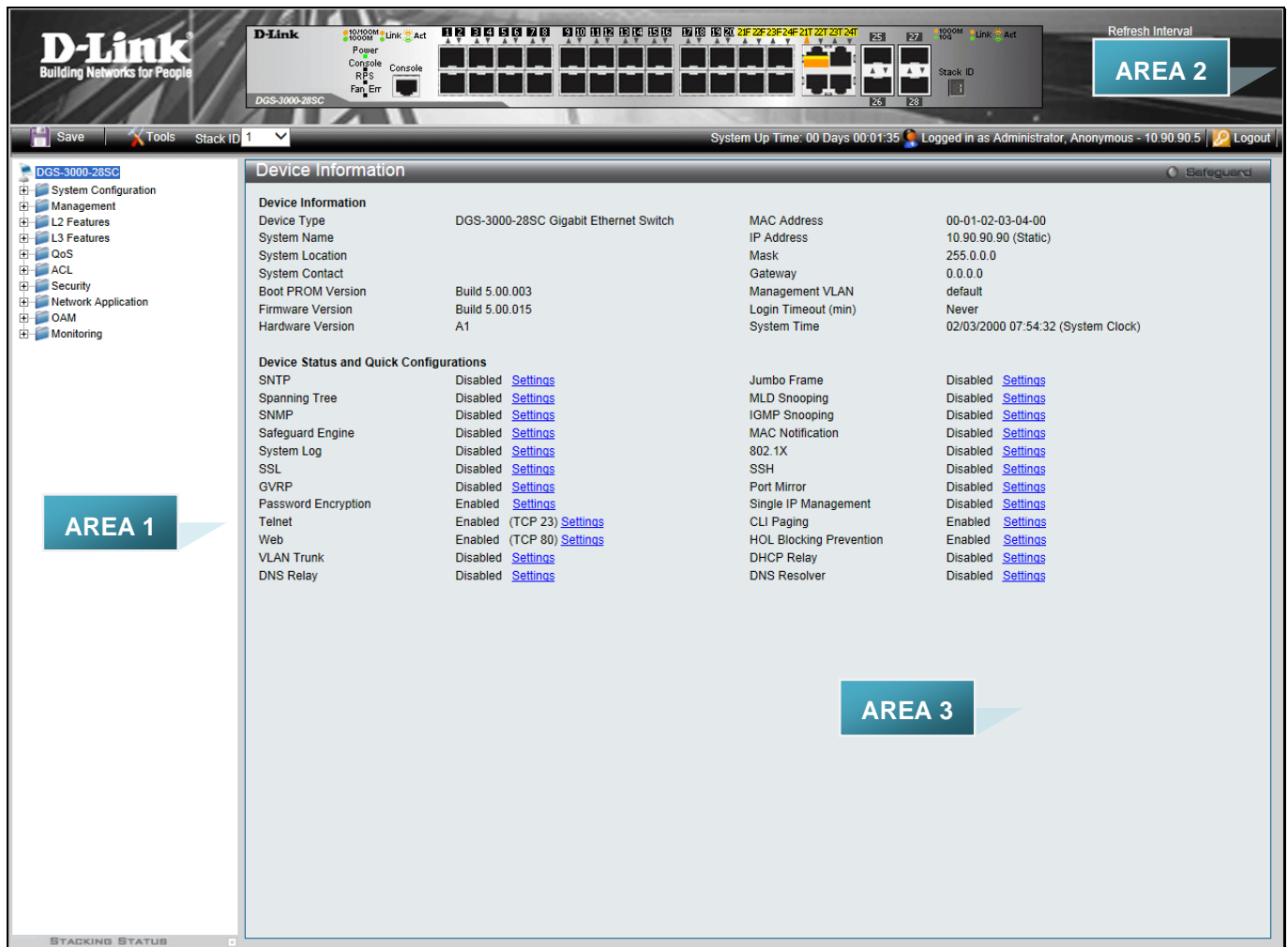


Figure 1-2 Main Web-Manager page

Area Number	Function
Area 1	Select the menu or window to display. Open folders and click the hyperlinked menu buttons and subfolders contained within them to display menus. Click the D-Link logo to go to the D-Link website.
Area 2	Presents a graphical near real-time image of the front panel of the Switch. This area displays the Switch's ports, console and management port, showing port activity. Some management functions, including save, reboot, download and upload are accessible here.
Area 3	Presents switch information based on user selection and the entry of configuration data.

## Web Pages

When connecting to the management mode of the Switch with a web browser, a login screen is displayed. Enter a user name and password to access the Switch's management mode.

Below is a list of the main folders available in the Web interface:

**System Configuration** - In this section the user will be able to configure features regarding the Switch's configuration.

**Management** - In this section the user will be able to configure features regarding the Switch's management.

**L2 Features** - In this section the user will be able to configure features regarding the Layer 2 functionality of the Switch.

**L3 Features** - In this section the user will be able to configure features regarding the Layer 3 functionality of the Switch.

**QoS** - In this section the user will be able to configure features regarding the Quality of Service functionality of the Switch.

**ACL** - In this section the user will be able to configure features regarding the Access Control List functionality of the Switch.

**Security** - In this section the user will be able to configure features regarding the Switch's security.

**Network Application** - In this section the user will be able to configure features regarding network applications handled by the Switch.

**OAM** - In this section the user will be able to configure features regarding the Switch's operations, administration and maintenance (OAM).

**Monitoring** - In this section the user will be able to monitor the Switch's configuration and statistics.



**NOTE:** Be sure to configure the user name and password in the User Accounts menu before connecting the Switch to the greater network.

## Chapter 2 System Configuration

[Device Information](#)  
[System Information Settings](#)  
[Port Configuration](#)  
[Serial Port Settings](#)  
[Warning Temperature Settings](#)  
[Trap Settings](#)  
[System Log Configuration](#)  
[Time Range Settings](#)  
[Port Group Settings](#)  
[Time Settings](#)  
[User Accounts Settings](#)  
[Command Logging Settings](#)  
[Configuration Trap Settings](#)  
[Stacking](#)

### Device Information

This window contains the main settings for all the major functions for 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 **DGS-3000-28SC** link.

The Device Information window shows the Switch's MAC Address (assigned by the factory and unchangeable), the Boot PROM Version, Firmware Version, Hardware Version, and many other important types of information. This is helpful to keep track of PROM and firmware updates and to obtain the Switch's MAC address for entry into another network device's address table, if necessary. In addition, this window displays the status of functions on the Switch to quickly assess their current global status.

Many functions are hyper-linked for easy access to enable quick configuration from this window.

Device Information			
Safeguard			
<b>Device Information</b>			
Device Type	DGS-3000-28SC Gigabit Ethernet Switch	MAC Address	00-01-02-03-04-00
System Name		IP Address	10.90.90.90 (Static)
System Location		Mask	255.0.0.0
System Contact		Gateway	0.0.0.0
Boot PROM Version	Build 5.00.003	Management VLAN	default
Firmware Version	Build 5.00.015	Login Timeout (min)	Never
Hardware Version	A1	System Time	02/03/2000 07:54:32 (System Clock)
<b>Device Status and Quick Configurations</b>			
SNTP	Disabled	<a href="#">Settings</a>	Jumbo Frame
Spanning Tree	Disabled	<a href="#">Settings</a>	MLD Snooping
SNMP	Disabled	<a href="#">Settings</a>	IGMP Snooping
Safeguard Engine	Disabled	<a href="#">Settings</a>	MAC Notification
System Log	Disabled	<a href="#">Settings</a>	802.1X
SSL	Disabled	<a href="#">Settings</a>	SSH
GVRP	Disabled	<a href="#">Settings</a>	Port Mirror
Password Encryption	Enabled	<a href="#">Settings</a>	Single IP Management
Telnet	Enabled (TCP 23)	<a href="#">Settings</a>	CLI Paging
Web	Enabled (TCP 80)	<a href="#">Settings</a>	HOL Blocking Prevention
VLAN Trunk	Disabled	<a href="#">Settings</a>	DHCP Relay
DNS Relay	Disabled	<a href="#">Settings</a>	DNS Resolver

Figure 2-1 Device Information window

Click the [Settings](#) link to navigate to the appropriate feature page for configuration.

### System Information Settings

The user can enter a **System Name**, **System Location**, and **System Contact** to aid in defining the Switch.

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

**Figure 2-2 System Information Settings window**

The fields that can be configured are described below:

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

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

## Port Configuration

### 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 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 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 **System Configuration > Port Configuration > DDM > DDM Settings**, as show below:

**DDM Settings**
Safeguard

Trap State     Enabled                       Disabled

Log State      Enabled                       Disabled

Power Unit     mW                               dBm

---

Unit        From Port        To Port        State        Shutdown

Port	DDM State	Shutdown
1:1	Enabled	None
1:2	Enabled	None
1:3	Enabled	None
1:4	Enabled	None
1:5	Enabled	None
1:6	Enabled	None
1:7	Enabled	None
1:8	Enabled	None
1:9	Enabled	None
1:10	Enabled	None
1:11	Enabled	None
1:12	Enabled	None
1:13	Enabled	None
1:14	Enabled	None
1:15	Enabled	None
1:16	Enabled	None
1:17	Enabled	None
1:18	Enabled	None
1:19	Enabled	None
1:20	Enabled	None
1:21	Enabled	None
1:22	Enabled	None
1:23	Enabled	None
1:24	Enabled	None
1:25	Enabled	None
1:26	Enabled	None

Figure 2-3 DDM Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Trap State</b>	Specify whether to send the trap, when the operating parameter exceeds the alarm or warning threshold.
<b>Log State</b>	Specify whether to send the log, when the operating parameter exceeds the alarm or warning threshold.
<b>Power Unit</b>	Specify the global unit of DDM TX and RX power as mW or dBm.
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>State</b>	Use the drop-down menu to enable or disable the DDM state.
<b>Shutdown</b>	Specify whether to shut down the port, when the operating parameter exceeds the <i>Alarm</i> or <i>Warning</i> threshold. <i>Alarm</i> - Shutdown the port when the configured alarm threshold range is exceeded. <i>Warning</i> - Shutdown the port when the configured warning threshold range is exceeded. <i>None</i> - The port will never shutdown regardless if the threshold ranges are exceeded or not. This is the default.

Click the **Apply** button to accept the changes made for each individual section.

## DDM Temperature Threshold Settings

This window is used to configure the DDM Temperature Threshold Settings for specific ports on the Switch.

To view the following window, click **System Configuration > Port Configuration > DDM > DDM Temperature Threshold Settings**, as show below:

**DDM Temperature Threshold Settings**
Safeguard

Unit	From Port	To Port	High Alarm (-128-127.996)	Low Alarm (-128-127.996)	High Warning (-128-127.996)	Low Warning (-128-127.996)	
1	1	1	<input type="text"/> Celsius	<input type="text"/> Celsius	<input type="text"/> Celsius	<input type="text"/> Celsius	<input type="button" value="Apply"/>

Port	High Alarm (Celsius)	Low Alarm (Celsius)	High Warning (Celsius)	Low Warning (Celsius)
1:1	-	-	-	-
1:2	-	-	-	-
1:3	-	-	-	-
1:4	-	-	-	-
1:5	-	-	-	-
1:6	-	-	-	-
1:7	-	-	-	-
1:8	-	-	-	-
1:9	-	-	-	-
1:10	-	-	-	-
1:11	-	-	-	-
1:12	-	-	-	-
1:13	-	-	-	-
1:14	-	-	-	-
1:15	-	-	-	-
1:16	-	-	-	-
1:17	-	-	-	-
1:18	-	-	-	-
1:19	-	-	-	-
1:20	-	-	-	-
1:21	-	-	-	-
1:22	-	-	-	-
1:23	-	-	-	-
1:24	-	-	-	-
1:25	-	-	-	-
1:26	-	-	-	-

**Note:** (A) means that the threshold is administratively configured.

Figure 2-4 DDM Temperature Threshold Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>High Alarm (-128-127.996)</b>	This is the highest threshold for the alarm. When the operating parameter rises above this value, action associated with the alarm will be taken.
<b>Low Alarm (-128-127.996)</b>	This is the lowest threshold for the alarm. When the operating parameter falls below this value, action associated with the alarm will be taken.
<b>High Warning (-128-127.996)</b>	This is the highest threshold for the warning. When the operating parameter rises above this value, action associated with the warning will be taken.
<b>Low Warning (-128-127.996)</b>	This is the lowest threshold for the warning. When the operating parameter falls below this value, action associated with the warning will be taken.

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

## DDM Voltage Threshold Settings

This window is used to configure the DDM Voltage Threshold Settings for specific ports on the Switch.

To view the following window, click **System Configuration > Port Configuration > DDM > DDM Voltage Threshold Settings**, as show below:

DDM Voltage Threshold Settings
Safeguard

Unit	From Port	To Port	High Alarm (0-6.5535)	Low Alarm (0-6.5535)	High Warning (0-6.5535)	Low Warning (0-6.5535)	
1	1	1	<input type="text"/> Volt	<input type="text"/> Volt	<input type="text"/> Volt	<input type="text"/> Volt	Apply

Port	High Alarm (Volt)	Low Alarm (Volt)	High Warning (Volt)	Low Warning (Volt)
1:1	-	-	-	-
1:2	-	-	-	-
1:3	-	-	-	-
1:4	-	-	-	-
1:5	-	-	-	-
1:6	-	-	-	-
1:7	-	-	-	-
1:8	-	-	-	-
1:9	-	-	-	-
1:10	-	-	-	-
1:11	-	-	-	-
1:12	-	-	-	-
1:13	-	-	-	-
1:14	-	-	-	-
1:15	-	-	-	-
1:16	-	-	-	-
1:17	-	-	-	-
1:18	-	-	-	-
1:19	-	-	-	-
1:20	-	-	-	-
1:21	-	-	-	-
1:22	-	-	-	-
1:23	-	-	-	-
1:24	-	-	-	-
1:25	-	-	-	-
1:26	-	-	-	-

Note: (A) means that the threshold is administratively configured.

Figure 2-5 DDM Voltage Threshold Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>High Alarm (0-6.5535)</b>	This is the highest threshold for the alarm. When the operating parameter rises above this value, action associated with the alarm will be taken.
<b>Low Alarm (0-6.5535)</b>	This is the lowest threshold for the alarm. When the operating parameter falls below this value, action associated with the alarm will be taken.
<b>High Warning (0-6.5535)</b>	This is the highest threshold for the warning. When the operating parameter rises above this value, action associated with the warning will be taken.
<b>Low Warning (0-6.5535)</b>	This is the lowest threshold for the warning. When the operating parameter falls below this value, action associated with the warning will be taken.

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

## DDM Bias Current Threshold Settings

This window is used to configure the threshold of the bias current for specific ports on the Switch.

To view the following window, click **System Configuration > Port Configuration > DDM > DDM Bias Current Threshold Settings**, as show below:

DDM Bias Current Threshold Settings
Safeguard

Unit	From Port	To Port	High Alarm (0-131)	Low Alarm (0-131)	High Warning (0-131)	Low Warning (0-131)	
1	1	1	<input type="text"/> mA	<input type="text"/> mA	<input type="text"/> mA	<input type="text"/> mA	Apply

Port	High Alarm (mA)	Low Alarm (mA)	High Warning (mA)	Low Warning (mA)
1:1	-	-	-	-
1:2	-	-	-	-
1:3	-	-	-	-
1:4	-	-	-	-
1:5	-	-	-	-
1:6	-	-	-	-
1:7	-	-	-	-
1:8	-	-	-	-
1:9	-	-	-	-
1:10	-	-	-	-
1:11	-	-	-	-
1:12	-	-	-	-
1:13	-	-	-	-
1:14	-	-	-	-
1:15	-	-	-	-
1:16	-	-	-	-
1:17	-	-	-	-
1:18	-	-	-	-
1:19	-	-	-	-
1:20	-	-	-	-
1:21	-	-	-	-
1:22	-	-	-	-
1:23	-	-	-	-
1:24	-	-	-	-
1:25	-	-	-	-
1:26	-	-	-	-

Note: (A) means that the threshold is administratively configured.

Figure 2-6 DDM Bias Current Threshold Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>High Alarm (0-131)</b>	This is the highest threshold for the alarm. When the operating parameter rises above this value, action associated with the alarm will be taken.
<b>Low Alarm (0-131)</b>	This is the lowest threshold for the alarm. When the operating parameter falls below this value, action associated with the alarm will be taken.
<b>High Warning (0-131)</b>	This is the highest threshold for the warning. When the operating parameter rises above this value, action associated with the warning will be taken.
<b>Low Warning (0-131)</b>	This is the lowest threshold for the warning. When the operating parameter falls below this value, action associated with the warning will be taken.

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

## DDM TX Power Threshold Settings

This window is used to configure the threshold of Tx power for specific ports on the Switch.

To view the following window, click **System Configuration > Port Configuration > DDM > DDM TX Power Threshold Settings**, as show below:



**DDM TX Power Threshold Settings**
Safeguard

Unit	From Port	To Port	High Alarm (0-6.5535)	Low Alarm (0-6.5535)	High Warning (0-6.5535)	Low Warning (0-6.5535)	
1	1	1	<input type="text"/> mW	<input type="text"/> mW	<input type="text"/> mW	<input type="text"/> mW	<input type="button" value="Apply"/>

Port	High Alarm (mW)	Low Alarm (mW)	High Warning (mW)	Low Warning (mW)
1:1	-	-	-	-
1:2	-	-	-	-
1:3	-	-	-	-
1:4	-	-	-	-
1:5	-	-	-	-
1:6	-	-	-	-
1:7	-	-	-	-
1:8	-	-	-	-
1:9	-	-	-	-
1:10	-	-	-	-
1:11	-	-	-	-
1:12	-	-	-	-
1:13	-	-	-	-
1:14	-	-	-	-
1:15	-	-	-	-
1:16	-	-	-	-
1:17	-	-	-	-
1:18	-	-	-	-
1:19	-	-	-	-
1:20	-	-	-	-
1:21	-	-	-	-
1:22	-	-	-	-
1:23	-	-	-	-
1:24	-	-	-	-
1:25	-	-	-	-
1:26	-	-	-	-

**Note:** (A) means that the threshold is administratively configured.

Figure 2-7 DDM TX Power Threshold Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>High Alarm</b>	This is the highest threshold for the alarm. When the operating parameter rises above this value, action associated with the alarm will be taken.
<b>Low Alarm</b>	This is the lowest threshold for the alarm. When the operating parameter falls below this value, action associated with the alarm will be taken.
<b>High Warning</b>	This is the highest threshold for the warning. When the operating parameter rises above this value, action associated with the warning will be taken.
<b>Low Warning</b>	This is the lowest threshold for the warning. When the operating parameter falls below this value, action associated with the warning will be taken.

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

## DDM RX Power Threshold Settings

This window is used to configure the threshold of RX power for specific ports on the Switch.

To view the following window, click **System Configuration > Port Configuration > DDM > DDM RX Power Threshold Settings**, as show below:

DDM RX Power Threshold Settings
Safeguard

Unit	From Port	To Port	High Alarm (0-6.5535)	Low Alarm (0-6.5535)	High Warning (0-6.5535)	Low Warning (0-6.5535)	
<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="button" value="Apply"/>

Port	High Alarm (mW)	Low Alarm (mW)	High Warning (mW)	Low Warning (mW)
1:1	-	-	-	-
1:2	-	-	-	-
1:3	-	-	-	-
1:4	-	-	-	-
1:5	-	-	-	-
1:6	-	-	-	-
1:7	-	-	-	-
1:8	-	-	-	-
1:9	-	-	-	-
1:10	-	-	-	-
1:11	-	-	-	-
1:12	-	-	-	-
1:13	-	-	-	-
1:14	-	-	-	-
1:15	-	-	-	-
1:16	-	-	-	-
1:17	-	-	-	-
1:18	-	-	-	-
1:19	-	-	-	-
1:20	-	-	-	-
1:21	-	-	-	-
1:22	-	-	-	-
1:23	-	-	-	-
1:24	-	-	-	-
1:25	-	-	-	-
1:26	-	-	-	-

Note: (A) means that the threshold is administratively configured.

Figure 2-8 DDM RX Power Threshold Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>High Alarm</b>	This is the highest threshold for the alarm. When the operating parameter rises above this value, action associated with the alarm will be taken.
<b>Low Alarm</b>	This is the lowest threshold for the alarm. When the operating parameter falls below this value, action associated with the alarm will be taken.
<b>High Warning</b>	This is the highest threshold for the warning. When the operating parameter rises above this value, action associated with the warning will be taken.
<b>Low Warning</b>	This is the lowest threshold for the warning. When the operating parameter falls below this value, action associated with the warning will be taken.

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 **System Configuration > Port Configuration > DDM > DDM Status Table**, as show below:

DDM Status Table					
Port	Temperature (Celsius)	Voltage (V)	Bias Current (mA)	TX Power (mW)	RX Power (mW)
1:1	-	-	-	-	-
1:2	-	-	-	-	-
1:3	-	-	-	-	-
1:4	-	-	-	-	-
1:5	-	-	-	-	-
1:6	-	-	-	-	-
1:7	-	-	-	-	-
1:8	-	-	-	-	-
1:9	-	-	-	-	-
1:10	-	-	-	-	-
1:11	-	-	-	-	-
1:12	-	-	-	-	-
1:13	-	-	-	-	-
1:14	-	-	-	-	-
1:15	-	-	-	-	-
1:16	-	-	-	-	-
1:17	-	-	-	-	-
1:18	-	-	-	-	-
1:19	-	-	-	-	-
1:20	-	-	-	-	-
1:21	-	-	-	-	-
1:22	-	-	-	-	-
1:23	-	-	-	-	-
1:24	-	-	-	-	-
1:25	-	-	-	-	-
1:26	-	-	-	-	-

**Note:** (A) means that the threshold is administratively configured.

Figure 2-9 DDM Status Table window

## Port Settings

This window is used to configure the details of the switch ports.

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

**Port Settings** Safeguard

Unit	From Port	To Port	State	Flow Control	Address Learning	MDIX	Medium Type	AutoSpeed Downgrade
1	01	01	Enabled	Disabled	Enabled	Auto	Copper	Disabled

Speed/Duplex	Capability Advertised	Auto Negotiation
Auto	<input type="checkbox"/> 10 Half <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Half <input type="checkbox"/> 100 Full <input type="checkbox"/> 1000 Full <input type="checkbox"/>	Restart An

**Unit 1 Settings**

Port	State	Speed/Duplex	Flow Control	Connection	MDIX	Address Learning	AutoSpeed Downgrade
01	Enabled	Auto	Disabled	Link Down	-	Enabled	-
02	Enabled	Auto	Disabled	Link Down	-	Enabled	-
03	Enabled	Auto	Disabled	Link Down	-	Enabled	-
04	Enabled	Auto	Disabled	Link Down	-	Enabled	-
05	Enabled	Auto	Disabled	Link Down	-	Enabled	-
06	Enabled	Auto	Disabled	Link Down	-	Enabled	-
07	Enabled	Auto	Disabled	Link Down	-	Enabled	-
08	Enabled	Auto	Disabled	Link Down	-	Enabled	-
09	Enabled	Auto	Disabled	Link Down	-	Enabled	-
10	Enabled	Auto	Disabled	Link Down	-	Enabled	-
11	Enabled	Auto	Disabled	Link Down	-	Enabled	-
12	Enabled	Auto	Disabled	Link Down	-	Enabled	-
13	Enabled	Auto	Disabled	Link Down	-	Enabled	-
14	Enabled	Auto	Disabled	Link Down	-	Enabled	-
15	Enabled	Auto	Disabled	Link Down	-	Enabled	-
16	Enabled	Auto	Disabled	Link Down	-	Enabled	-
17	Enabled	Auto	Disabled	Link Down	-	Enabled	-
18	Enabled	Auto	Disabled	Link Down	-	Enabled	-
19	Enabled	Auto	Disabled	Link Down	-	Enabled	-
20	Enabled	Auto	Disabled	Link Down	-	Enabled	-
21 (C)	Enabled	Auto	Disabled	100M/Full/None	Auto	Enabled	Disabled
21 (F)	Enabled	Auto	Disabled	Link Down	-	Enabled	-
22 (C)	Enabled	Auto	Disabled	Link Down	Auto	Enabled	Disabled
22 (F)	Enabled	Auto	Disabled	Link Down	-	Enabled	-
23 (C)	Enabled	Auto	Disabled	Link Down	Auto	Enabled	Disabled
23 (F)	Enabled	Auto	Disabled	Link Down	-	Enabled	-
24 (C)	Enabled	Auto	Disabled	Link Down	Auto	Enabled	Disabled
24 (F)	Enabled	Auto	Disabled	Link Down	-	Enabled	-
25	Enabled	Auto	Disabled	Link Down	-	Enabled	-
26	Enabled	Auto	Disabled	Link Down	-	Enabled	-

**Note:** ANE means Auto Negotiation Error.

Figure 2-10 Port Settings window

**To configure switch ports:**

1. Choose the port or sequential range of ports using the From Port and To Port drop-down menus.
2. Use the remaining drop-down menus to configure the parameters described below:

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select the appropriate port range used for the configuration here.
<b>State</b>	Toggle the State field to either enable or disable a given port or group of ports.
<b>Speed/Duplex</b>	<p>Toggle the Speed/Duplex field to select the speed and full-duplex/half-duplex state of the port. <i>Auto</i> denotes auto-negotiation among 10, 100 and 1000 Mbps devices, in full- or half-duplex (except 1000 Mbps which is always full duplex). The <i>Auto</i> setting allows the port to automatically determine the fastest speed and the appropriate mode to be supplied to the device connected to the port. The other options are <i>10M Half</i>, <i>10M Full</i>, <i>100M Half</i>, <i>100M Full</i>, <i>1000M Full_Master</i>, and <i>1000M Full_Slave</i>. There is no automatic adjustment of port settings with any option other than <i>Auto</i>.</p> <p>The Switch allows the user to configure three types of gigabit connections; <i>1000M Full_Master</i>, and <i>1000M Full_Slave</i>. Gigabit connections only support full duplex connections and take on certain characteristics that are different from the other choices listed.</p>

	The <i>1000M Full_Master</i> and <i>1000M Full_Slave</i> parameters refer to connections running a 1000BASE-T cable for connection between the Switch port and other device capable of a gigabit connection. The master setting ( <i>1000M Full_Master</i> ) 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 physical layers. The timing control is set on a master physical layer by a local source. The slave setting ( <i>1000M Full_Slave</i> ) uses loop timing, where the timing comes from a data stream received from the master. If one connection is set for <i>1000M Full_Master</i> , the other side of the connection must be set for <i>1000M Full_Slave</i> . Any other configuration will result in a link down status for both ports.
<b>Capability Advertised</b>	When the <b>Speed/Duplex</b> is set to <i>Auto</i> , these capabilities are advertised during auto negotiation. When <i>Auto</i> is selected and if no capability option is selected, then all capabilities will be advertised.
<b>Flow Control</b>	Displays the flow control scheme used for the various port configurations. Ports configured for full-duplex use 802.3x flow control, half-duplex ports use backpressure flow control, and Auto ports use an automatic selection of the two. The default is <i>Disabled</i> .
<b>Address Learning</b>	Enable or disable MAC address learning for the selected ports. When <i>Enabled</i> , destination and source MAC addresses are automatically listed in the forwarding table. When address learning is <i>Disabled</i> , MAC addresses must be manually entered into the forwarding table. This is sometimes done for reasons of security or efficiency. See the section on Forwarding/Filtering for information on entering MAC addresses into the forwarding table. The default setting is <i>Enabled</i> .
<b>MDIX</b>	<i>Auto</i> - Select auto for auto sensing of the optimal type of cabling. <i>Normal</i> - Select normal for normal cabling. If set to normal state, the port is in MDIX mode and can be connected to a PC NIC using a straight-through cable or a port (in MDIX mode) on another switch through a cross-over cable. <i>Cross</i> - Select cross for cross cabling. If set to cross state, the port is in MDI mode, and can be connected to a port (in MDIX mode) on another switch through a straight cable.
<b>Medium Type</b>	If configuring the Combo ports, this defines the type of transport medium to be used.
<b>AutoSpeed Downgrade</b>	Enable or disable automatically downgrading advertised speed. This function only takes effect, when <b>Speed/Duplex</b> is configured as <i>Auto</i> .
<b>Auto Negotiation</b>	Select the auto-negotiation method. <i>Restart An</i> - Select to restart auto-negotiation process. <i>Remote Fault Advertised</i> - When this option is selected, fault conditions will be remotely advertised when the next auto-negotiation process takes place. When selecting <b>Disabled</b> , remote fault advertisement is disabled. When selecting <b>Offline</b> , local devices that were powered off or removed from the active configuration will be advertised at the next auto-negotiation. When selecting <b>Link Fault</b> , local devices that disconnected due to link failure will be advertised at the next auto-negotiation. When selecting ANE, the resolution that precludes operation between local devices and link partners will be advertised at the next auto-negotiation.

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

Click the **Refresh** button to refresh the display section of this window.

## Port Description Settings

The Switch supports a port description feature where the user may name various ports.

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

Figure 2-11 Port Description Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select the appropriate port range used for the configuration here.
<b>Medium Type</b>	Specify the medium type for the selected ports. If configuring the Combo ports, the Medium Type defines the type of transport medium to be used, whether <i>Copper</i> or <i>Fiber</i> .
<b>Description</b>	Users may then enter a description for the chosen port(s).

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

## Port Error Disabled

The following window displays the information about ports that have been disconnected by the Switch when the port is disabled by some protocols.

To view the following window, click **System Configuration > Port Configuration > Port Error Disabled**, as show below:

Figure 2-12 Port Error Disabled

The fields that can be displayed are described below:

Parameter	Description
<b>Port</b>	Display the port that has been error disabled.
<b>Port State</b>	Describe the current running state of the port, whether enabled or disabled.
<b>Connection Status</b>	Display the uplink status of the individual ports, whether enabled or disabled.
<b>Reason</b>	Describe the reason why the port has been error-disabled, such as it has become a shutdown port for storm control.

## Port Media Type

The following window displays the information about the port media type.

To view the following window, click **System Configuration > Port Configuration > Port Media Type**, as shown below.

Unit 1 Information					
Port	Type	Vendor Name / OUI	PN / Rev	SN / Date Code	Compatibility
1	1000Base-X				
2	1000Base-X				
3	1000Base-X				
4	1000Base-X				
5	1000Base-X				
6	1000Base-X				
7	1000Base-X				
8	1000Base-X				
9	1000Base-X				
10	1000Base-X				
11	1000Base-X				
12	1000Base-X				
13	1000Base-X				
14	1000Base-X				
15	1000Base-X				
16	1000Base-X				
17	1000Base-X				
18	1000Base-X				
19	1000Base-X				
20	1000Base-X				
21(C)	1000Base-T				
21(F)	1000Base-X				
22(C)	1000Base-T				
22(F)	1000Base-X				
23(C)	1000Base-T				
23(F)	1000Base-X				
24(C)	1000Base-T				
24(F)	1000Base-X				
25	1000Base-T				
26	1000Base-T				

Figure 2-13 Port Media Type window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Port</b>	Display the port number.
<b>Type</b>	Display the port media type.
<b>Vendor Name / OUI</b>	Display the name of the SFP vendor and its IEEE company ID.
<b>PN / Rev</b>	Display the part number and revision level of the part number provided by the SFP vendor.
<b>SN / Date Code</b>	Display the serial number provided by the SFP vendor and the manufacturing date code.
<b>Compatibility</b>	Display the fiber type, baud rate and wavelength of the SFP.

## Port Auto Negotiation Information

The following window displays the information about port Auto-negotiation.

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

Port Auto Negotiation Information								
Unit <input type="text" value="1"/>								
Unit 1 Information								
Port	AN	RS	CS	CB	CAB	CRB	RFA	RFR
01	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
02	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
03	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
04	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
05	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
06	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
07	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
08	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
09	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
10	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
11	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
12	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
13	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
14	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
15	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
16	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
17	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
18	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
19	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
20	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
21 (C)	Enabled		Complete	10M_Half,1...	10M_Half,1...	10M_Half,1...		
21 (F)	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
22 (C)	Enabled		Configurin...	10M_Half,1...	10M_Half,1...			
22 (F)	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
23 (C)	Enabled		Configurin...	10M_Half,1...	10M_Half,1...			
23 (F)	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
24 (C)	Enabled		Configurin...	10M_Half,1...	10M_Half,1...			
24 (F)	Enabled		Configurin...	1000M_Full	1000M_Full		NoError	NoError
25								
26								

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

Figure 2-14 Port Auto Negotiation Information window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit to be configured.

## Jumbo Frame 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 13312 bytes.

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



**Jumbo Frame Settings**
Safeguard

**Jumbo Frame Global Settings**

Jumbo Frame  Enabled  Disabled Apply

Current Status: The maximum size of frame is 1536 bytes.

---

**Jumbo Frame Port Settings**

Unit  From Port  To Port  State  Apply

---

**Unit 1 Settings**

Port	Jumbo Frame State
1	Enabled
2	Enabled
3	Enabled
4	Enabled
5	Enabled
6	Enabled
7	Enabled
8	Enabled
9	Enabled
10	Enabled
11	Enabled
12	Enabled
13	Enabled
14	Enabled
15	Enabled
16	Enabled
17	Enabled
18	Enabled
19	Enabled
20	Enabled
21	Enabled
22	Enabled
23	Enabled
24	Enabled
25	Enabled
26	Enabled

Figure 2-15 Jumbo Frame Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Jumbo Frame</b>	Use the radio buttons to enable or disable the Jumbo Frame function on the Switch. The default is Disabled. When disabled, the maximum frame size is 1536 bytes. When enabled, the maximum frame size is 13312 bytes.
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select the appropriate port range used for the configuration here.
<b>State</b>	Select to enable or disable the Jumbo Frame state for the specified ports.

Click the **Apply** button to accept the changes made for each individual section.

## EEE Settings

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 **System Configuration > Port Configuration > EEE Settings**, as shown below.

Port	State
1	N/A
2	N/A
3	N/A
4	N/A
5	N/A
6	N/A
7	N/A
8	N/A
9	N/A
10	N/A
11	N/A
12	N/A
13	N/A
14	N/A
15	N/A
16	N/A
17	N/A
18	N/A
19	N/A
20	N/A
21	Disabled
22	Disabled
23	Disabled
24	Disabled
25	N/A
26	N/A

Figure 2-16 EEE Settings window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit to be configured.
From Port / To Port	Select the appropriate port range used for the configuration here.
State	Select to enable or disable the state of this feature here.

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



**NOTE:** EEE and ERPS are mutually exclusive functions.

## Serial Port Settings

This window allows the user to adjust the Baud Rate and the Auto Logout values.

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

Figure 2-17 Serial Port Settings window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Baud Rate</b>	Specify the baud rate for the serial port on the Switch. There are four possible baud rates to choose from, <i>9600</i> , <i>19200</i> , <i>38400</i> and <i>115200</i> . For a connection to the Switch using the console port, the baud rate must be set to <i>9600</i> , which is the default setting.
<b>Auto Logout</b>	Select the logout time used for the console interface. This automatically logs the user out after an idle period of time, as defined. Choose from the following options: <i>2</i> , <i>5</i> , <i>10</i> , <i>15 minutes</i> or <i>Never</i> . The default setting is <i>10 minutes</i> .
<b>Data Bits</b>	Display the data bits used for the serial port connection.
<b>Parity Bits</b>	Display the parity bits used for the serial port connection.
<b>Stop Bits</b>	Display the stop bits used for the serial port connection.

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

## Warning Temperature Settings

This window allows the user to configure the system warning temperature parameters.

To view the following window, click **System Configuration > Warning Temperature Settings**, as show below:

Figure 2-18 Warning Temperature Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Traps State</b>	Use the drop-down menu to enable or disable the traps state option of the warning temperature setting.
<b>Log State</b>	Use the drop-down menu to enable or disable the log state option of the warning temperature setting.
<b>High Threshold (-500-500)</b>	Enter the high threshold value of the warning temperature setting.
<b>Low Threshold (-500-500)</b>	Enter the low threshold value of the warning temperature setting.

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

## Trap Settings

This window is used to configure the fan and power trap state.

To view the following window, click **System Configuration > Trap Settings** as shown below.

Figure 2-19 Trap Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Fan Trap State</b>	Use the drop-down menu to enable or disable the fan traps.
<b>Power Trap State</b>	Use the drop-down menu to enable or disable the power trap state.

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

## System Log Configuration

### System Log Settings

The Switch allows users to choose a method for which to save the switch log to the flash memory of the Switch.

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

Figure 2-20 System Log Settings window

The fields that can be configured are described below:

Parameter	Description
<b>System Log</b>	Use the radio buttons to enable or disable the system log settings.
<b>Save Mode</b>	Use the drop-down menu to choose the method for saving the switch log to the flash memory. The user has three options: <i>On Demand</i> – Users who choose this method will only save log files when they manually tell the Switch to do so, either using the Save Log link in the Save folder. <i>Time Interval</i> – Users who choose this method can configure a time interval by which the Switch will save the log files, in the box adjacent to this configuration field. The user may set a time between 1 and 65535 minutes. <i>Log Trigger</i> – Users who choose this method will have log files saved to the Switch every time a log event occurs on the Switch.

Click the **Apply** button to accept the changes made for each individual section.

### System Log Server Settings

The Switch can send System log messages to up to four designated servers using the System Log Server.

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

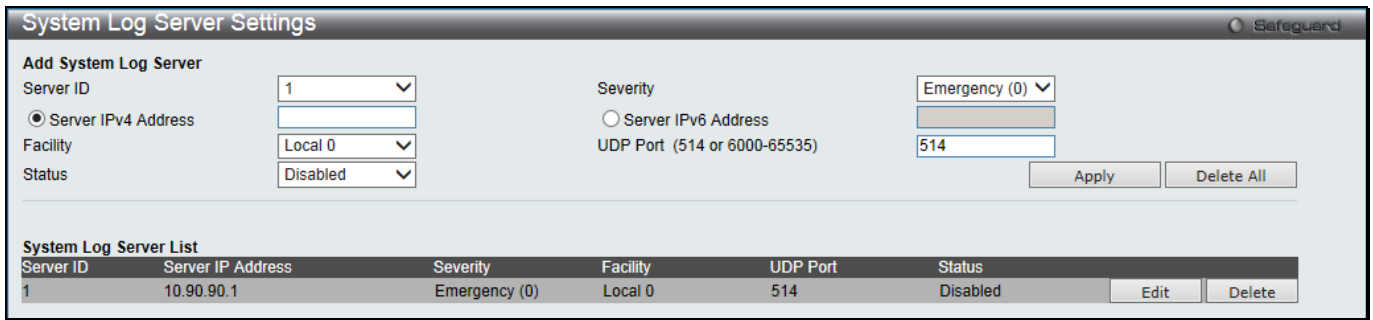


Figure 2-21 System Log Server Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Server ID</b>	Syslog server settings index (1 to 4).
<b>Severity</b>	Use the drop-down menu to select the higher level of messages that will be sent. All messages which level is higher than selecting level will be sent. The options are <i>Emergency (0)</i> , <i>Alert (1)</i> , <i>Critical (2)</i> , <i>Error (3)</i> , <i>Warning (4)</i> , <i>Notice (5)</i> , <i>Informational (6)</i> and <i>Debug (7)</i> .
<b>Server IPv4 Address</b>	The IPv4 address of the Syslog server.
<b>Server IPv6 Address</b>	The IPv6 address of the Syslog server.
<b>Facility</b>	Use the drop-down menu to select <i>Local 0</i> , <i>Local 1</i> , <i>Local 2</i> , <i>Local 3</i> , <i>Local 4</i> , <i>Local 5</i> , <i>Local 6</i> , or <i>Local 7</i> .
<b>UDP Port (514 or 6000-65535)</b>	Type the UDP port number used for sending Syslog messages. The default is 514.
<b>Status</b>	Choose <i>Enabled</i> or <i>Disabled</i> to activate or deactivate.

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.

Click the **Delete All** button to remove all servers configured.

## System Log

Users can view and delete the local history log as compiled by the Switch's management agent.

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

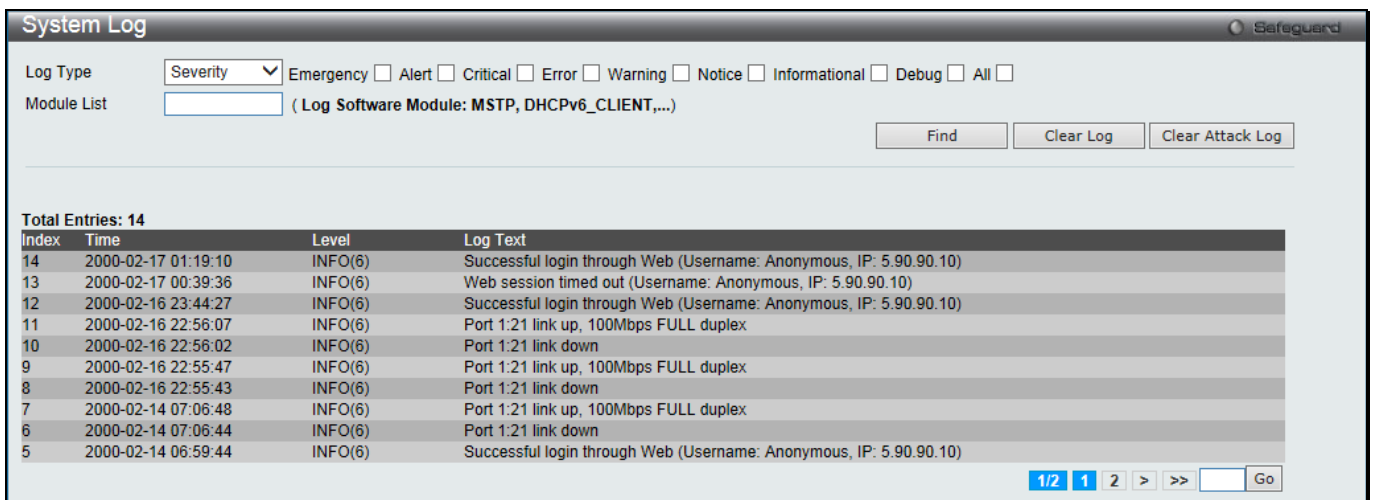


Figure 2-22 System Log window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Log Type</b>	In the drop-down menu the user can select the log type that will be displayed. <i>Severity</i> - When selecting <i>Severity</i> from the drop-down menu, a secondary tick must be made. Secondary ticks are <b>Emergency, Alert, Critical, Error, Warning, Notice, Informational</b> and <b>Debug</b> . To view all information in the log, simply tick the <b>All</b> check box. <i>Module List</i> - When selecting <i>Module List</i> , the module name must be manually entered. Available modules are MSTP, ERROR_LOG and ERPS. <i>Attack Log</i> - When selecting <i>Attack Log</i> all attacks will be listed.
<b>Index</b>	A counter incremented whenever an entry to the Switch's history log is made. The table displays the last entry (highest sequence number) first.
<b>Time</b>	Display the time in days, hours, minutes, and seconds.
<b>Level</b>	Display the level of the log entry.
<b>Log Text</b>	Display text describing the event that triggered the history log entry.

Click the **Find** button to display the log in the display section according to the selection made.

Click the **Clear Log** button to clear the entries from the log in the display section.

Click the **Clear Attack Log** button to clear the entries from the attack log in the display section.

The Switch can record event information in its own log. Click **Go** to go to the next page of the **System Log** window.

## System Log & Trap Settings

The Switch allows users to configure the system log source IP interface addresses here.

To view the following window, click **System Configuration > System Log Configuration > System Log & Trap Settings**, as show below:

Figure 2-23 System Log & Trap Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter the IP interface name used.
<b>IPv4 Address</b>	Enter the IPv4 address used.
<b>IPv6 Address</b>	Enter the IPv6 address used.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all the information entered in the fields.

## System Severity Settings

The Switch can be configured to allow alerts be logged or sent as a trap to an SNMP agent. The level at which the alert triggers either a log entry or a trap message can be set as well. Use the System Severity Settings window to set the criteria for alerts. The current settings are displayed below the System Severity Table.

To view the following window, click **System Configuration > System Log Configuration > System Severity Settings**, as show below:

System Severity	Severity Level
Trap	Information (6)
Log	Information (6)

Figure 2-24 System Severity Settings window

The fields that can be configured are described below:

Parameter	Description
<b>System Severity</b>	Choose how the alerts are used from the drop-down menu. Select <i>Log</i> to send the alert of the Severity Type configured to the Switch's log for analysis. Choose <i>Trap</i> to send it to an SNMP agent for analysis, or select <i>All</i> to send the chosen alert type to an SNMP agent and the Switch's log for analysis.
<b>Severity Level</b>	This drop-down menu allows you to select the level of messages that will be sent. The options are <i>Emergency (0)</i> , <i>Alert (1)</i> , <i>Critical (2)</i> , <i>Error (3)</i> , <i>Warning (4)</i> , <i>Notice (5)</i> , <i>Information (6)</i> and <i>Debug (7)</i> .

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

## Time Range Settings

Time range is a time period that the respective function will take an effect on, such as ACL. For example, the administrator can configure the time-based ACL to allow users to surf the Internet on every Saturday and every Sunday, meanwhile to deny users to surf the Internet on weekdays.

The user may enter up to 64 time range entries on the Switch.

To view the following window, click **System Configuration > Time Range Settings**, as show below:

Figure 2-25 Time Range Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Range Name</b>	Enter a name of no more than 32 alphanumeric characters that will be used to identify this time range on the Switch. This range name will be used in the Access Profile table to identify the access profile and associated rule to be enabled during this time range.
<b>Hours (HH MM)</b>	This parameter is used to set the time in the day that this time range is to be enabled using

<b>SS)</b>	<p>the following parameters:</p> <p><i>Start Time</i> - Use this parameter to identify the starting time of the time range, in hours, minutes and seconds, based on the 24-hour time system.</p> <p><i>End Time</i> - Use this parameter to identify the ending time of the time range, in hours, minutes and seconds, based on the 24-hour time system.</p>
<b>Weekdays</b>	<p>Use the check boxes to select the corresponding days of the week that this time range is to be enabled. Tick the Select All Days check box to configure this time range for every day of the week.</p>

Click the **Apply** button to accept the changes made. Current configured entries will be displayed in the table in the bottom half of the window shown above.

## Port Group Settings

This window is used to create port groups, and add or delete ports from the port groups.

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

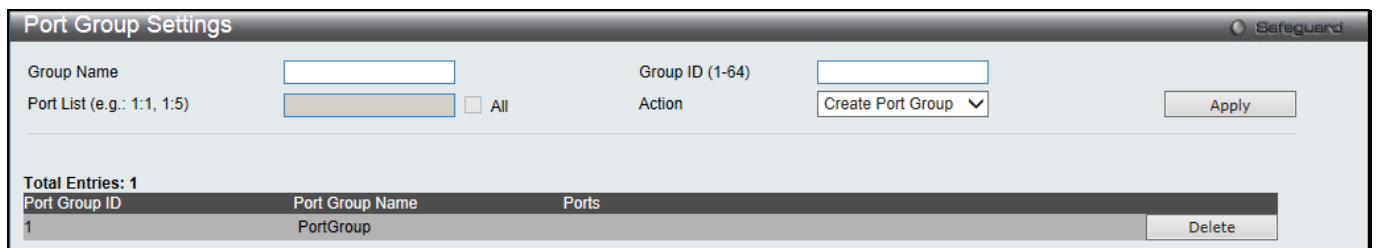


Figure 2-26 Port Group Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Group Name</b>	Enter the name of a port group.
<b>Group ID (1-64)</b>	Enter the ID of a port group
<b>Port List</b>	Enter a port or list of ports. Tick the <b>All</b> check box to apply to all ports.
<b>Action</b>	Use the drop-down menu to select <i>Create Port Group</i> , <i>Add Ports</i> or <i>Delete Ports</i> .

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

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

## Time Settings

Users can configure the time settings for the Switch.

To view the following window, click **System Configuration > Time Settings**, as show below:

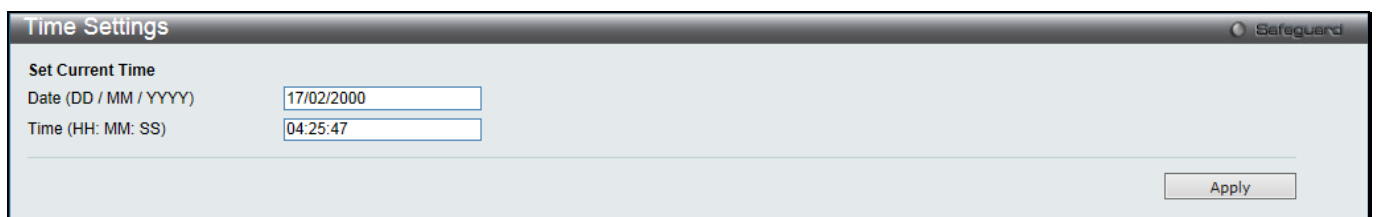


Figure 2-27 Time Settings window

The fields that can be configured are described below:



Parameter	Description
<b>Date (DD / MM / YYYY)</b>	Enter the current day, month, and year to update the system clock.
<b>Time (HH:MM:SS)</b>	Enter the current time in hours, minutes, and seconds.

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

## User Accounts Settings

The Switch allows the control of user privileges.

To view the following window, click **System Configuration > User Accounts Settings**, as show below:

**Figure 2-28 User Accounts Settings window**

To add a new user, type in a User Name and New Password and retype the same password in the Confirm New Password field. Choose the level of privilege (Admin, Operator, Power User or User) from the Access Right drop-down menu.

Management	Admin	Operator	Power User	User
Configuration	Read/Write	Read/Write–partly	Read/Write–partly	No
Network Monitoring	Read/Write	Read/Write	Read-only	Read-only
Community Strings and Trap Stations	Read/Write	Read-only	Read-only	Read-only
Update Firmware and Configuration Files	Read/Write	Read/Write	No	No
System Utilities	Read/Write	Read-only	Read-only	Read-only
Factory Reset	Read/Write	No	No	No
User Account Management				
Add/Update/Delete User Accounts	Read/Write	No	No	No
View User Accounts	Read/Write	No	No	No

The fields that can be configured are described below:

Parameter	Description
<b>User Name</b>	Enter a new user name for the Switch.
<b>Password</b>	Enter a new password for the Switch.
<b>Confirm Password</b>	Re-type in a new password for the Switch.
<b>Access Right</b>	Specify the access right for this user.
<b>Encryption</b>	Specify that encryption will be applied to this account. Option to choose from are <i>Plain Text</i> , and <i>SHA-1</i> .

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.



**NOTICE:** In case of lost passwords or password corruption, refer to Appendix A Password Recovery Procedure, which will guide you through the steps necessary to resolve this issue.



**NOTE:** The username and password should be less than 16 characters.

## Command Logging Settings

This window is used to enable or disable the command logging settings.

To view the following window, click **System Configuration > Command Logging Settings** as shown below.

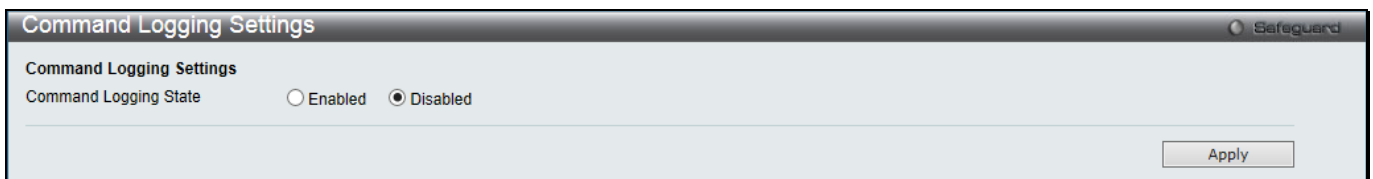


Figure 2-29 Command Logging Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Command Logging State</b>	Use the radio buttons to enable or disable the function.

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



**NOTE:** When the switch is under the booting procedure, all configuration commands will not be logged. When the user uses AAA authentication to logged in, the user name should not be changed if the user has used the Enable Admin function to replace its privilege.

## Configuration Trap Settings

This window is used to configure the trap settings when the configuration is saved, uploaded and downloaded.

To view the following window, click **System Configuration > Configuration Trap Settings** as shown below.



Figure 2-30 Configuration Trap Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Save Configuration Trap</b>	Use the drop-down menu to enable or disable sending the trap by the SNMP agent when the configuration is saved in NVRAM.
<b>Upload configuration</b>	Use the drop-down menu to enable or disable sending the trap by the SNMP

<b>Trap</b>	agent when successfully uploading configuration.
<b>Download Configuration Trap</b>	Use the drop-down menu to enable or disable sending the trap by the SNMP agent when successfully downloading configuration.

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

## Stacking

From firmware release v1.00 of this Switch, the Switch supports switch stacking, where a set of six switches can be combined to be managed by one IP address through TELNET, the GUI interface (web), the console port or through SNMP. The last two SFP+ ports, located on the front panel of the Switch, can also be used for physical stacking to other switches. The user may connect these ports together in one of two possible topologies.

**Duplex Chain** – As shown in Figure 2-31, The Duplex Chain topology stacks switches together in a chain-link format. Using this method, data transfer is only possible in one direction and if there is a break in the chain, then data transfer will obviously be affected.

**Duplex Ring** – As shown in Figure 2-32, the Duplex Ring stacks switches in a ring or circle format where data can be transferred in two directions. This topology is very resilient due to the fact that if there is a break in the ring, data can still be transferred through the stacking cables between switches in the stack.

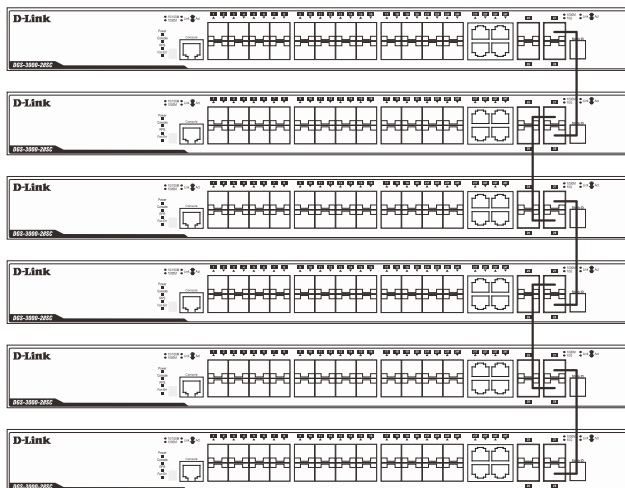


Figure 2-31 Switches stacked in a Duplex Chain

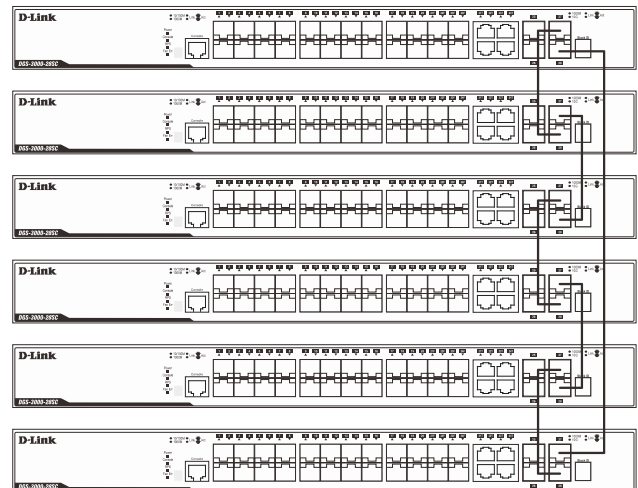


Figure 2-32 Switches stacked in a Duplex Ring

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 which determines the lowest MAC address and then will assign that switch as the Primary Master, if all priorities are the same. The Primary master are physically displayed by the seven segment LED to the far right on the front panel of the switch where this LED will flash between its given Box ID and 'H'.

**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 before physically assembling the stack, or it can be determined automatically by the stack through an election process which determines the second lowest MAC address and then will assign that switch as the Backup Master, if all priorities are the same. The Backup master are physically displayed by the seven segment LED to the far right on the front panel of the switch where this LED will flash between its given Box ID and 'h'.

**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 neighbor switches in the stack and the stack topology and adhere to the Backup Master's commands once it becomes a Primary Master. Slave switches will do a self-check to determine if it is 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, it will determine if it is to become the Primary Master. These roles will be determined, first by priority and if the priority is the same, 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 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 users configurations 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, with a few minor provisions.

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 configurations set on the newly added switch, such as configured 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 different processes occur 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 configurations of the unit removed, and dynamically learned databases, such as ARP, will be cleared as well.

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 configurations of the unit removed, and dynamically learned databases, such as ARP, will be cleared as well. 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 configurations of the unit removed, and dynamically learned databases, such as ARP, will be cleared as well. 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 processed and a new Primary Master and Backup Master is determined. Switches in the stack will clear the configurations of the units removed, and dynamically learned databases, such as ARP, will be cleared as well. Static switch configurations still remain 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.

## Stacking Device Table

This window is used to display the current devices in the Switch Stack.

To view the following window, click **System Configuration > Stacking > Stacking Device Table** as shown below.

Box ID	Box Type	H/W Version	Serial Number
1	DGS-3000-28SC	A1	

Figure 2-33 Stacking Device Table window

## Stacking Mode Settings

To begin the stacking process, users must first enable this device for stacking by using the Stacking Mode Settings window.

To view the following window, click **System Configuration > Stacking > Stacking Mode Settings** as shown below.

Figure 2-34 Stacking Mode Settings window

The fields that can be configured or viewed are described below:

Parameter	Description
<b>Stacking Mode</b>	Specify whether the stacking mode feature will be enabled or disabled. When enabled, the 10Gb ports will function as stacking ports. When disabled, the 10Gb ports will return to normal 10Gb ports.
<b>Force Master Role</b>	Use the radio buttons to enable or disable the function. It is used to ensure the master role is unchanged when adding a new device to the current stacking topology. If the <b>Enabled</b> radio button is selected, the master's priority will become zero after the stacking has stabilized.
<b>Stacking Trap State</b>	Click the radio buttons to enable or disable sending the trap for stacking.
<b>Stacking Log State</b>	Click the radio buttons to enable or disable logging the stacking log.
<b>Current Box ID</b>	The Box ID of the switch in the stack to be configured.
<b>New Box ID</b>	The new box ID of the selected switch in the stack that was selected in the Current Box ID field. The user may choose any number between 1 and 6 to identify the switch in the switch stack. <i>Auto</i> will automatically assign a box number to the switch in the switch stack.
<b>Priority (1-63)</b>	Displays the priority ID of the Switch. A lower number denotes a higher priority. The box (switch) with the lowest priority number in the stack is the Primary Master switch. The Primary Master switch will be used to configure applications of the switch stack.

Click the **Apply** button to accept the changes made for each individual section.

## Chapter 3 Management

[ARP](#)  
[Gratuitous ARP](#)  
[IPv6 Neighbor Settings](#)  
[IP Interface](#)  
[Management Settings](#)  
[Session Table](#)  
[Single IP Management](#)  
[SNMP Settings](#)  
[Telnet Settings](#)  
[Web Settings](#)  
[Power Saving](#)

### ARP

#### Static ARP Settings

The Address Resolution Protocol is a TCP/IP protocol that converts IP addresses into physical addresses. This table allows network managers to view, define, modify, and delete ARP information for specific devices. Static entries can be defined in the ARP table. When static entries are defined, a permanent entry is entered and is used to translate IP addresses to MAC addresses.

To view the following window, click **Management > ARP > Static ARP Settings**, as show below:

**Static ARP Settings** Safeguard

**Global Settings**  
 ARP Aging Time (0-65535)  min

**Add Static ARP Entry**  
 IP Address  MAC Address

**Total Entries: 3**

Interface Name	IP Address	MAC Address	Type	Edit	Delete
System	10.0.0.0	FF-FF-FF-FF-FF-FF	Local/Broadcast	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
System	10.90.90.90	00-01-02-03-04-00	Local	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
System	10.255.255.255	FF-FF-FF-FF-FF-FF	Local/Broadcast	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>

Figure 3-1 Static ARP Settings window

The fields that can be configured are described below:

Parameter	Description
<b>ARP Aging Time (0-65535)</b>	The ARP entry age-out time, in minutes. The default is 20 minutes.
<b>IP Address</b>	The IP address of the ARP entry.
<b>MAC Address</b>	The MAC address of the ARP entry.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Delete All** button to remove all the entries listed.

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

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



## Proxy ARP Settings

The Proxy ARP (Address Resolution Protocol) feature of the Switch 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. For example, if hosts A and B are on different physical networks, B will not receive ARP broadcast requests from A and therefore cannot respond. Yet, if the physical network of A is connected by a router or layer 3 switch to B, the router or Layer 3 switch will see the ARP request from A.

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.

To view the following window, click **Management > ARP > Proxy ARP Settings** as shown below.



Interface Name	Proxy ARP State	Local Proxy ARP State
System	Disabled	Disabled

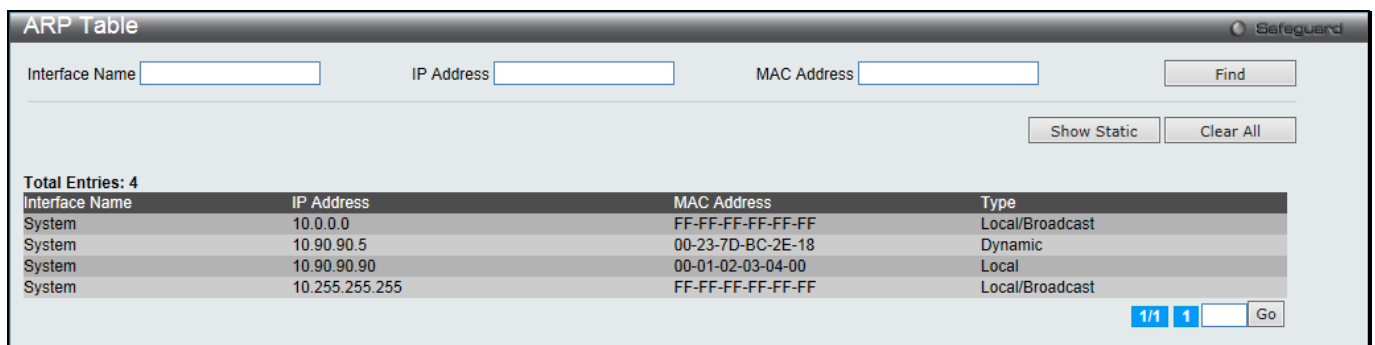
Figure 3-2 Proxy ARP Settings window

Click the **Edit** button to re-configure the specific entry and select the proxy ARP state of the IP interface. By default, both the **Proxy ARP State** and **Local Proxy ARP State** are disabled.

## ARP Table

Users can display current ARP entries on the Switch.

To view the following window, click **Management > ARP > ARP Table** as shown below.



Interface Name	IP Address	MAC Address	Type
System	10.0.0.0	FF-FF-FF-FF-FF-FF	Local/Broadcast
System	10.90.90.5	00-23-7D-BC-2E-18	Dynamic
System	10.90.90.90	00-01-02-03-04-00	Local
System	10.255.255.255	FF-FF-FF-FF-FF-FF	Local/Broadcast

Figure 3-3 ARP Table window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter or view the Interface name used.
<b>IP Address</b>	Enter or view the IP Address used.
<b>MAC Address</b>	Enter or view the MAC Address used.

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

Click the **Show Static** button to display only the static entries in the display table.

Click the **Clear All** button to remove all the entries listed in the table.

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

# Gratuitous ARP

## Gratuitous ARP Global Settings

The user can enable or disable the gratuitous ARP global settings here.

To view the following window, click **Management > Gratuitous ARP > Gratuitous ARP Global Settings**, as show below:

Parameter	Enabled	Disabled
Send On IP Interface Status Up	<input type="radio"/>	<input checked="" type="radio"/>
Send On Duplicate IP Detected	<input type="radio"/>	<input checked="" type="radio"/>
Gratuitous ARP Learning	<input type="radio"/>	<input checked="" type="radio"/>

Figure 3-4 Gratuitous ARP Global Settings Window

The fields that can be configured are described below:

Parameter	Description
<b>Send On IP Interface Status Up</b>	The command is used to enable/disable the sending of gratuitous ARP request packets while the IPIF interface is up. This is used to automatically announce the interface's IP address to other nodes. By default, the state is <b>Enabled</b> , and only one gratuitous ARP packet will be broadcast.
<b>Send On Duplicate IP Detected</b>	The command is used to enable/disable the sending of gratuitous ARP request packet while a duplicate IP is detected. By default, the state is <b>Enabled</b> . For this command, the duplicate IP detected means that the system received an ARP request packet that is sent by an IP address that match the system's own IP address. In this case, the system knows that somebody out there uses an IP address that is conflict with the system. In order to reclaim the correct host of this IP address, the system can send out the gratuitous ARP request packets for this duplicate IP address.
<b>Gratuitous ARP Learning</b>	Normally, the system will only learn the ARP reply packet or a normal ARP request packet that asks for the MAC address that corresponds to the system's IP address. The command is used to enable/disable learning of ARP entry in ARP cache based on the received gratuitous ARP packet. The gratuitous ARP packet is sent by a source IP address that is identical to the IP that the packet is queries for. By default, the state is <b>Enabled</b> .

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



**NOTE:** With the gratuitous ARP learning, the system will not learn new entry but only do the update on the ARP table based on the received gratuitous ARP packet.

## Gratuitous ARP Settings

The user can configure the IP interface's gratuitous ARP parameter.

To view the following window, click **Management > Gratuitous ARP > Gratuitous ARP Settings**, as show below:



Figure 3-5 Gratuitous ARP Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Trap</b>	Use the drop-down menu to enable or disable the trap option. By default the trap is disabled.
<b>Log</b>	Use the drop-down menu to enable or disable the logging option. By default the event log is enabled.
<b>Interface Name</b>	Enter the interface name of the Layer 3 interface. Select <b>All</b> to enable or disable gratuitous ARP trap or log on all interfaces.
<b>Interval Time (0-65535)</b>	Enter the periodically send gratuitous ARP interval time in seconds. 0 means that gratuitous ARP request will not be sent periodically. By default the interval time is 0.

Click the **Apply** button to accept the changes made for each individual section.

## IPv6 Neighbor Settings

The user can configure the Switch's IPv6 neighbor settings. The Switch's current IPv6 neighbor settings will be displayed in the table at the bottom of this window.

To view the following window, click **Management > IPv6 Neighbor Settings**, as show below:

**IPv6 Neighbor Settings**
Safeguard

---

Interface Name

Neighbor IPv6 Address

Link Layer MAC Address

---

Interface Name   All

State

---

Total Entries: 0

Neighbor	Link Layer Address	Interface Name	State	Port	VID

---

State: (I) means Incomplete state. (R) means Reachable state. (S) means State state.  
 (D) means Delay state. (P) means Probe state. (T) means Static state.

Figure 3-6 IPv6 Neighbor Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter the interface name of the IPv6 neighbor.
<b>Neighbor IPv6 Address</b>	Enter the neighbor IPv6 address.
<b>Link Layer MAC Address</b>	Enter the link layer MAC address.
<b>Interface Name</b>	Enter the name of the IPv6 neighbor. Tick the <b>All</b> check box to search for all current interfaces on the Switch.
<b>State</b>	Use the drop-down menu to select All, Address, Static, or Dynamic. When the user selects address from the drop-down menu, the user will be able to enter an IP address in the space provided next to the state option.

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

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

Click the **Clear** button to clear all the information entered in the fields.

## IP Interface

### System IP Address Settings

The IP address may initially be set using the console interface prior to connecting to it through the Ethernet. The Web manager will display the Switch's current IP settings.



**NOTE:** The Switch's factory default IP address is 10.90.90.90 with a subnet mask of 255.0.0.0 and a default gateway of 0.0.0.0.

To view the following window, click **Management > IP Interface > System IP Address Settings**, as show below:

**Figure 3-7 System IP Address Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Static</b>	Allow the entry of an IP address, subnet mask, and a default gateway for the Switch. These fields should be of the form xxx.xxx.xxx.xxx, where each xxx is a number (represented in decimal form) between 0 and 255. This address should be a unique address on the network assigned for use by the network administrator.
<b>DHCP</b>	The Switch will send out a DHCP broadcast request when it is powered up. The DHCP protocol allows IP addresses, network masks, and default gateways to be assigned by a DHCP server. If this option is set, the Switch will first look for a DHCP server to provide it with this information before using the default or previously entered settings.
<b>BOOTP</b>	The Switch will send out a BOOTP broadcast request when it is powered up. The BOOTP protocol allows IP addresses, network masks, and default gateways to be assigned by a central BOOTP server. If this option is set, the Switch will first look for a BOOTP server to provide it with this information before using the default or previously entered settings.

The following table will describe the fields that are about the **System** Interface.

Parameter	Description
<b>Interface Name</b>	Display the System interface name.
<b>Management VLAN Name</b>	This allows the entry of a VLAN name from which a management station will be allowed to manage the Switch using TCP/IP (in-band via Web manager or Telnet). Management stations that are on VLANs other than the one entered here will not be able to manage the Switch in-band unless their IP addresses are entered in the <b>Trusted Host</b> window ( <b>Security &gt; Trusted Host</b> ). If VLANs have not yet been configured for the Switch, the default VLAN contains all of the Switch's ports. There are no entries in the Trusted Host table, by default, so any management station that can connect to the Switch can access the Switch until a management VLAN is specified or Management Station IP addresses are assigned.
<b>Interface Admin State</b>	Use the drop-down menu to enable or disable the configuration on this interface. If the state is disabled, the IP interface cannot be accessed.
<b>IP Address</b>	This field allows the entry of an IPv4 address to be assigned to this IP interface.
<b>Subnet Mask</b>	A Bitmask that determines the extent of the subnet that the Switch is on. Should be of the form xxx.xxx.xxx.xxx, where each xxx is a number (represented in decimal) between 0 and 255. The value should be 255.0.0.0 for a Class A network, 255.255.0.0 for a Class B network, and 255.255.255.0 for a Class C network, but

	custom subnet masks are allowed.
<b>Gateway</b>	IP address that determines where packets with a destination address outside the current subnet should be sent. This is usually the address of a router or a host acting as an IP gateway. If your network is not part of an intranet, or you do not want the Switch to be accessible outside your local network, you can leave this field unchanged.

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

## Interface Settings

Users can display the Switch's current IP interface settings.

To view the following window, click **Management > IP Interface > Interface Settings**, as show below:

Interface Name	VLAN Name	Interface Admin State	Secondary	Link State	IPv4 Edit	IPv6 Edit	Delete
System	default	Enabled	No	Link Up			

Figure 3-8 Interface Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter the name of the IP interface to search for.

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

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

Click the **Delete All** button to remove all the entries listed.

Click the **IPv4 Edit** button to edit the IPv4 settings for the specific entry.

Click the **IPv6 Edit** button to edit the IPv6 settings for the specific entry.

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



**NOTE:** To create IPv6 interfaces, the user has to create an IPv4 interface then edit it to IPv6.

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

Figure 3-9 IPv4 Interface Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter the name of the IP interface being created.

<b>IPv4 Address</b>	Enter the IPv4 address used.
<b>Subnet Mask</b>	Enter the IPv4 subnet mask used.
<b>VLAN Name</b>	Enter the VLAN Name used.
<b>Interface Admin State</b>	Use the drop-down menu to enable or disable the Interface Admin State.
<b>Secondary Interface</b>	Tick the check box to use this Interface as a Secondary Interface. When the primary IP is not available, the VLAN will switch to the secondary interface. It will switch back when the primary IP was recovered.

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

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

Click the **IPv4 Edit** button to see the following window.

**Figure 3-10 IPv4 Interface Settings – Edit window**

The fields that can be configured are described below:

Parameter	Description
<b>IP MTU (512-16383)</b>	Enter the Maximum Transmission Unit (MTU) of the IP interface in bytes.
<b>Get IP From</b>	Use the drop-down menu to specify the method that this Interface uses to acquire an IP address.
<b>Interface Name</b>	Enter the name of the IP interface being configured.
<b>IPv4 Address</b>	Enter the IPv4 address used.
<b>Subnet Mask</b>	Enter the IPv4 subnet mask used.
<b>VLAN Name</b>	Enter the VLAN Name used.
<b>IPv4 State</b>	Use the drop-down menu to enable or disable IPv4 State.
<b>Interface Admin State</b>	Use the drop-down menu to enable or disable the Interface Admin State.
<b>DHCP Option 12 State</b>	Use the drop-down menu to enable or disable insertion of option 12 in the DHCPDISCOVER and DHCPREQUEST message.
<b>DHCP Option 12 Host Name</b>	Enter the host name to be inserted in the DHCPDISCOVER and DHCPREQUEST message.

Click the **Apply** button to accept the changes made for each individual section.

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

Click the **IPv6 Edit** button to see the following window.

Figure 3-11 IPv6 Interface Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IPv6 State</b>	Use the drop-down menu to enable or disable IPv6 State.
<b>Interface Admin State</b>	Use the drop-down menu to enable or disable the Interface Admin State.
<b>IPv6 Network Address</b>	Here the user can enter the IPv6 global or link-local address.
<b>Prefix Name</b>	Enter the IPv6 prefix name.
<b>DHCPv6 Client PD State</b>	Use the drop-down menu to enable or disable DHCPv6 client PD state.
<b>DHCPv6 Client PD Rapid Commit</b>	Use the drop-down menu to enable or disable DHCPv6 client PD rapid commit.
<b>DHCPv6 Client PD Prefix Name</b>	Enter the name requested from the delegation router.
<b>DHCPv6 Client</b>	Use the drop-down menu to enable or disable DHCPv6 client.
<b>DHCPv6 Client Rapid Commit</b>	Use the drop-down menu to enable or disable DHCPv6 client rapid commit. This provides a two-message exchange in order to configure the client faster.
<b>NS Retransmit Time (0-4294967295)</b>	Enter the Neighbor solicitation's retransmit timer in millisecond here. It has the same value as the RA retransmit time in the config ipv6 nd ra command. If this field is configured, it will duplicate the entry into the RA field.
<b>Automatic Link Local Address</b>	Use the drop-down menu to enable or disable the Automatic Link Local Address.
<b>State</b>	Use the drop-down menu to enable or disable router advertisement state.
<b>Life Time (0-9000)</b>	Enter the lifetime of the router as the default router in seconds.
<b>Reachable Time (0-3600000)</b>	Enter the time, in milliseconds, that a node is considered as a neighboring node reachable after receiving a reachability confirmation.
<b>Retransmit Time (0-4294967295)</b>	Enter the interval of the retransmissions of the router advertisement messages in milliseconds.
<b>Hop Limit (0-255)</b>	Enter the hop limit value.

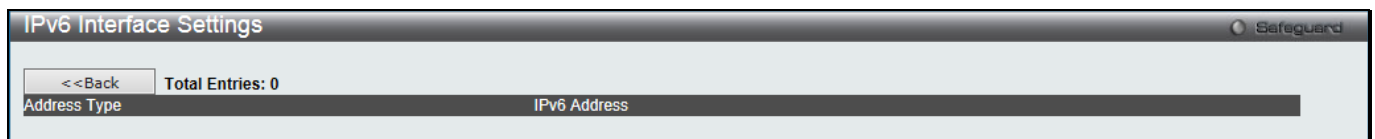
<b>Managed Flag</b>	Use the drop-down menu to enable or disable managed flag. When enabled, this option specifies that hosts receiving the RA message should use the stateful auto-configuration mechanism to get IPv6 addresses for their interface.
<b>Other Configuration Flag</b>	Use the drop-down menu to enable or disable other configuration flag. When enabled, this option specifies that hosts receiving the RA message should also obtain information other than the addresses obtained using the stateful auto-configuration.
<b>Min Router AdvInterval (3-1350)</b>	Enter the minimum interval of sending unsolicited multicast router advertisements from the interface.
<b>Max Router AdvInterval (4-1800)</b>	Enter the maximum interval of sending unsolicited multicast router advertisements from the interface.

Click the **Apply** button to accept the changes made for each individual section.

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

Click the [View All IPv6 Address](#) link to view all the current IPv6 address.

Click the [View All IPv6 Address](#) link to see the following window.



**Figure 3-12 IPv6 Interface Settings window**

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

## Management Settings

Users can stop the scrolling of multiple pages beyond the limits of the console when using the Command Line Interface.

This window is also used to enable the DHCP auto configuration feature on the Switch. When enabled, the Switch is instructed to receive a configuration file from a TFTP server, which will set the Switch to become a DHCP client automatically on boot-up. To employ this method, the DHCP server must be set up to deliver the TFTP server IP address and configuration file name information in the DHCP reply packet. The TFTP server must be up and running and hold the necessary configuration file stored in its base directory when the request is received from the Switch. For more information about loading a configuration file for use by a client, see the DHCP server and/or TFTP server software instructions. The user may also consult the **Upload Log File** window description located in the **Tools** section of this manual.

If the Switch is unable to complete the DHCP auto configuration, the previously saved configuration file present in the Switch's memory will be used.

Users can also configure Password Encryption on the Switch.

To view the following window, click **Management > Management Settings**, as show below:

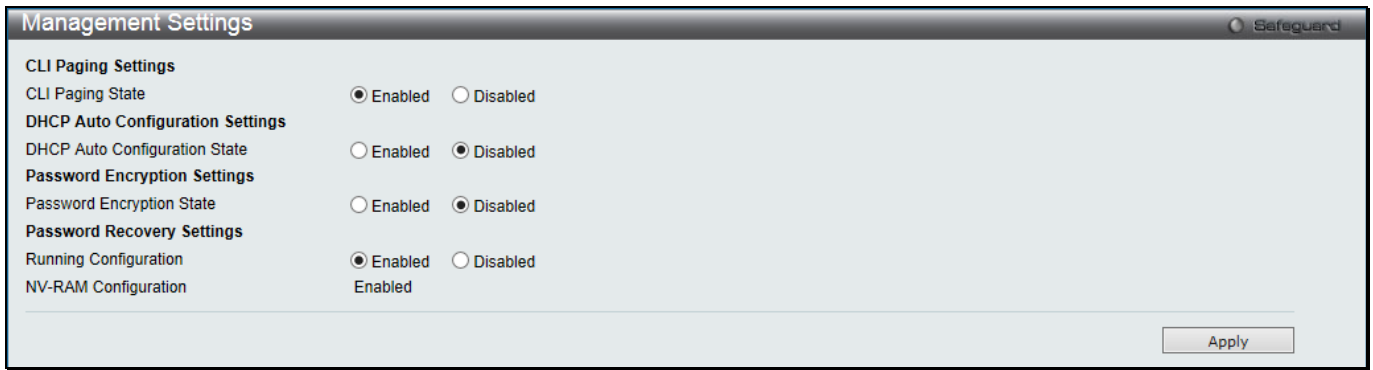


Figure 3-13 Management Settings window

The fields that can be configured are described below:

Parameter	Description
<b>CLI Paging State</b>	Command Line Interface paging stops each page at the end of the console. This allows you to stop the scrolling of multiple pages of text beyond the limits of the console. CLI Paging is Enabled by default. To disable it, click the Disabled radio button.
<b>DHCP Auto Configuration State</b>	Enable or disable the Switch's DHCP auto configuration feature. When enabled, the Switch is instructed to receive a configuration file from a TFTP server, which will set the Switch to become a DHCP client automatically on boot-up. To employ this method, the DHCP server must be set up to deliver the TFTP server IP address and configuration file name information in the DHCP reply packet. The TFTP server must be up and running and hold the necessary configuration file stored in its base directory when the request is received from the Switch.
<b>Password Encryption State</b>	Password encryption will encrypt the password configuration in configuration files. Password encryption is Disabled by default. To enable password encryption, click the Enabled radio button.
<b>Running Configuration</b>	Under the Password Recovery option, the running configuration can be enabled or disabled. Being enabled, will allow the user to perform a password recovery of the running configuration.

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

## Session Table

Users can display the management sessions since the Switch was last rebooted.

To view the following window, click **Management > Session Table**, as show below:

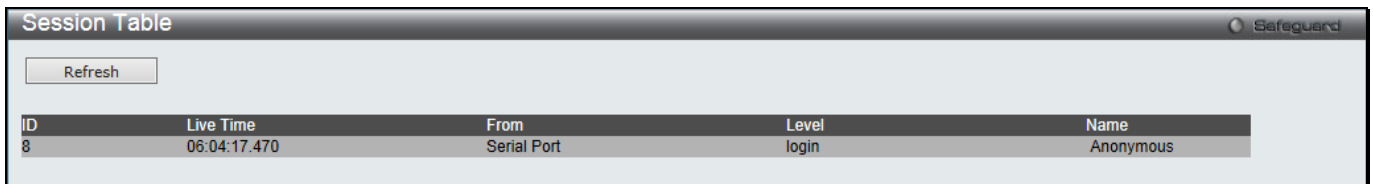


Figure 3-14 Session Table window

Click the **Refresh** button to refresh the display table so that new entries will appear.

## Single IP Management

D-Link Single IP Management 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:



1. SIM can simplify management of small workgroups or wiring closets while scaling the network to handle increased bandwidth demand.
2. SIM can reduce the number of IP address needed in your network.
3. 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:

1. 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 user's network.
2. 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.
3. A SIM group can only have one Commander Switch (CS).
4. A SIM group accepts up to 32 switches (numbered 1-32), not including the Commander Switch (numbered 0).
5. Members of a SIM group cannot cross a router.
6. 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.
7. If multiple VLANs are configured, the SIM group will only utilize the System interface's VLAN on any switch.
8. 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:

1. **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:
  - a. It has an IP Address.
  - b. It is not a command switch or member switch of another Single IP group.
  - c. It is connected to the member switches through its management VLAN.
2. **Member Switch (MS)** – This is a switch that has joined a single IP group and is accessible from the CS, and it takes on the following characteristics:
  - a. It is not a CS or MS of another IP group.
  - b. It is connected to the CS through the CS management VLAN.
3. **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:
  - a. It is not a CS or MS of another Single IP group.
  - b. It is connected to the CS through the CS management VLAN

The following rules also apply to the above roles:

1. Each device begins in a Candidate state.
2. CSs must change their 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.
3. The user can manually configure a CS to become a CaS.
4. A MS can become a CaS by:
  - a. Being configured as a CaS through the CS.
  - b. If report packets from the CS to the MS time out.
5. The user can manually configure a CaS to become a CS
6. 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 DGS-3000 Series 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 MS's of the group and the CS's Administrator's password, and/or authentication will control access to all MS's of the SIM group.

With SIM enabled, the applications in the CS will redirect the packet instead of executing the 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.

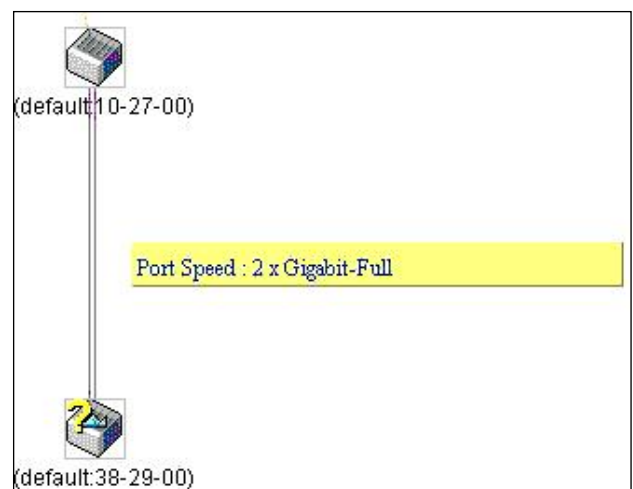
When a CaS becomes a MS, it automatically becomes a member of the first SNMP community (includes read/write and read only) to which the CS belongs. However, if a MS has its own IP address, it can belong to SNMP communities to which other switches in the group, including the CS, do not belong.

### Upgrade to v1.61

To better improve SIM management, the DGS-3000 Series switches have been upgraded to version 1.61 in this release. Many improvements have been made, including:

- The Commander Switch (CS) now has the capability to automatically rediscover member switches that have left the SIM group, either through a reboot or web malfunction. This feature is accomplished through the use of Discover packets and Maintenance packets that previously set SIM members will emit 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, as shown in the adjacent picture.
- 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 downloading and uploading of configuration files both to (for configuration restoration) and from (for configuration backup) MS's, 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 configurations.

## Single IP 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 > Single IP Management > Single IP Settings**, as show below:

Figure 3-15 Single IP Settings window

The fields that can be configured are described below:

Parameter	Description
<b>SIM State</b>	Use the drop-down menu to either enable or disable the SIM state on the Switch. <i>Disabled</i> will render all SIM functions on the Switch inoperable.
<b>Trap State</b>	Use the drop-down menu to enable or disable sending the trap.
<b>Role State</b>	Use the drop-down menu to change the SIM role of the Switch. The two choices are: <i>Candidate</i> – A Candidate Switch (CaS) is not the member of a SIM group but is connected to a Commander Switch. This is the default setting for the SIM role of the Switch. <i>Commander</i> – Choosing this parameter will make the Switch a Commander Switch (CS). The user may join other switches to this Switch, over Ethernet, to be part of its SIM group. Choosing this option will also enable the Switch to be configured for SIM.
<b>Group Name</b>	Enter a Group Name in this textbox. This is optional and only available when SIM State is <b>Enabled</b> and Role State is <b>Commander</b> . This name is used to segment switches into different SIM groups.
<b>Discovery Interval (30-90)</b>	The user may set the discovery protocol interval, in seconds that the Switch will send out discovery packets. Returning information to a Commander Switch will include information about other switches connected to it. (Ex. MS, CaS). The user may set the Discovery Interval from 30 to 90 seconds. The default value is 30 seconds.
<b>Hold Time Count (100-255)</b>	This parameter may be set for the time, in seconds; the Switch will hold information sent to it from other switches, utilizing the Discovery Interval. The user may set the hold time from 100 to 255 seconds. The default value is 100 seconds.

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 the user in configuring SIM through the web, including **Topology**, **Firmware Upgrade**, **Configuration Backup/Restore** and **Upload Log File**.

## Topology

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

The Java Runtime Environment on your server should initiate and lead you to the Topology window, as seen below.

Device name	Local port	Speed	Remote port	Mac Address	Model name
(default:03-04-00)	-	-	-	00-01-02-03-04-00	DGS-3000-28SC L2 Sw...

Figure 3-16 Single IP Management window - Tree View

The Topology window holds the following information on the **Data** tab:

Parameter	Description
<b>Device Name</b>	This field will display the Device Name of the switches in the SIM group configured by the user. If no device is configured by the name, it will be given the name default and tagged with the last six digits of the MAC Address to identify it.
<b>Local Port</b>	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.
<b>Speed</b>	Displays the connection speed between the CS and the MS or CaS.
<b>Remote Port</b>	Displays the number of the physical port on the MS or CaS to which the CS is connected. The CS will have no entry in this field.
<b>MAC Address</b>	Displays the MAC Address of the corresponding Switch.
<b>Model Name</b>	Displays the full Model Name of the corresponding Switch.

To view the Topology View window, open the **View** drop-down menu in the toolbar and then click **Topology**, which will open the following Topology Map. This window will refresh itself periodically (20 seconds by default).

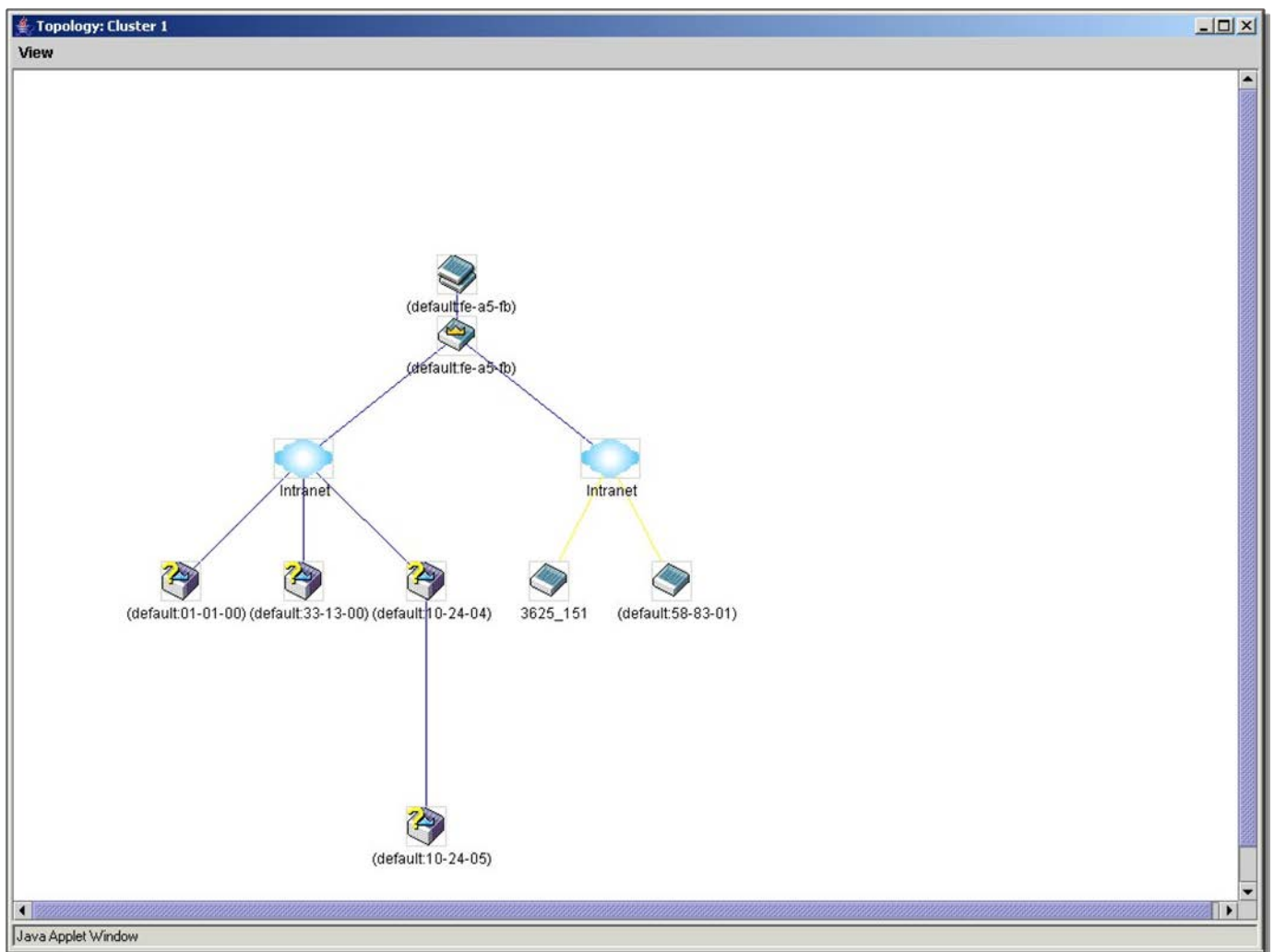


Figure 3-17 Topology view

This window will display how the devices within the Single IP Management 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. Setting the mouse cursor over a specific device in the topology window (tool tip) will display the same information about a specific device as the Tree view does. See the window below for an example.

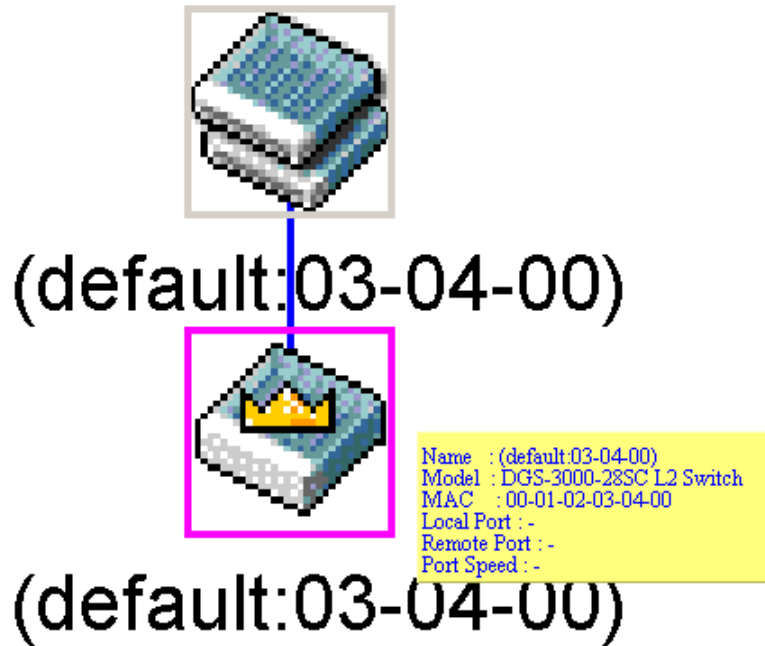


Figure 3-18 Device Information Utilizing the Tool Tip

Setting the mouse cursor over a line between two devices will display the connection speed between the two devices, as shown below.

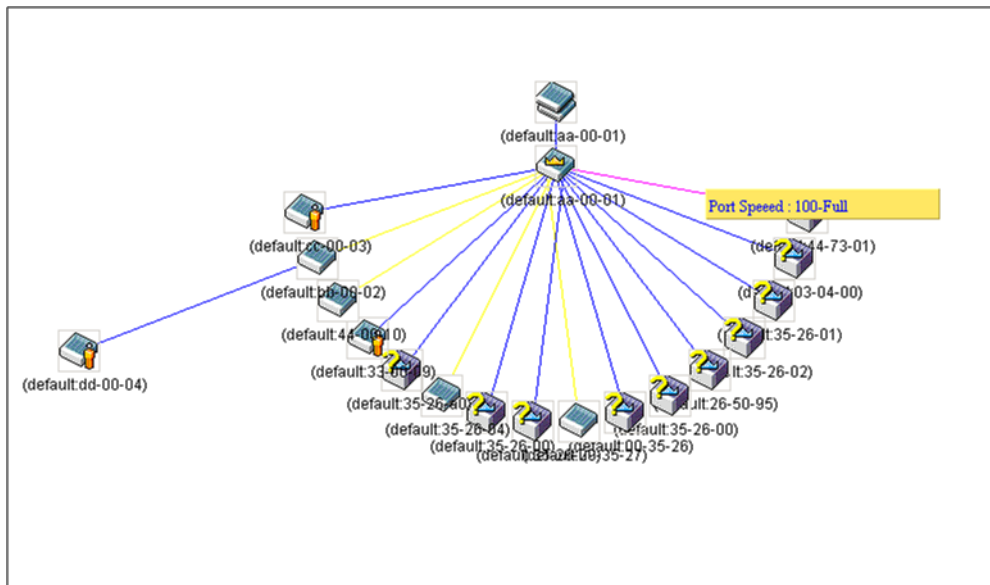


Figure 3-19 Port Speed Utilizing the Tool Tip

**Right-Click**

Right-clicking on a device will 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 Icon**

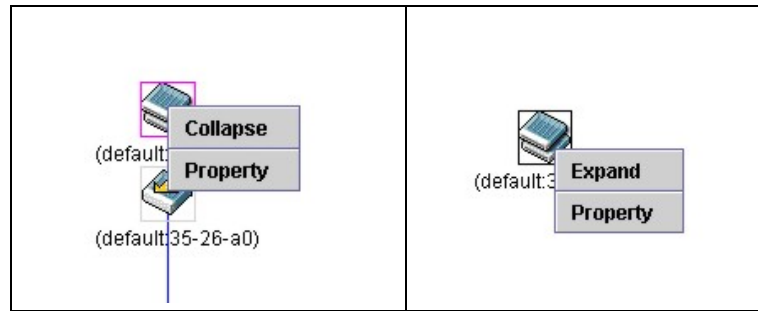


Figure 3-20 Right-Clicking a Group Icon

The following options may appear for the user to configure:

- **Collapse** – To collapse the group that will be represented by a single icon.
- **Expand** – To expand the SIM group, in detail.
- **Property** – To pop up a window to display the group information.

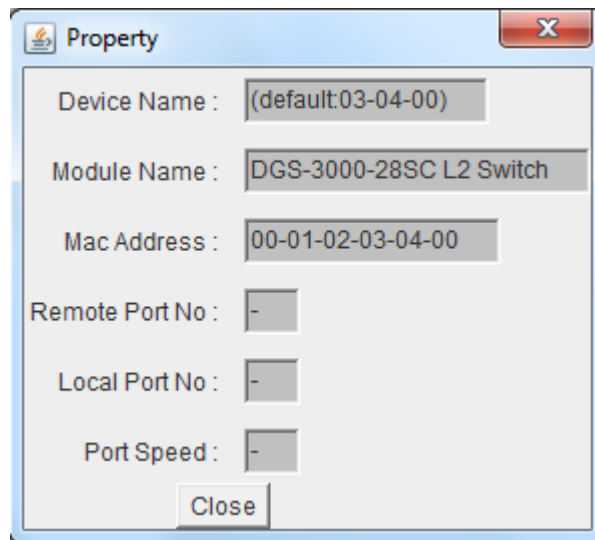


Figure 3-21 Property window

Parameter	Description
<b>Device Name</b>	This field will display the Device Name of the switches in the SIM group configured by the user. If no Device Name is configured by the name, it will be given the name default and tagged with the last six digits of the MAC Address to identify it.
<b>Module Name</b>	Displays the full module name of the switch that was right-clicked.
<b>MAC Address</b>	Displays the MAC Address of the corresponding Switch.
<b>Remote Port No</b>	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.
<b>Local Port No</b>	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.
<b>Port Speed</b>	Displays the connection speed between the CS and the MS or CaS

Click the **Close** button to close the property window.

### Commander Switch Icon

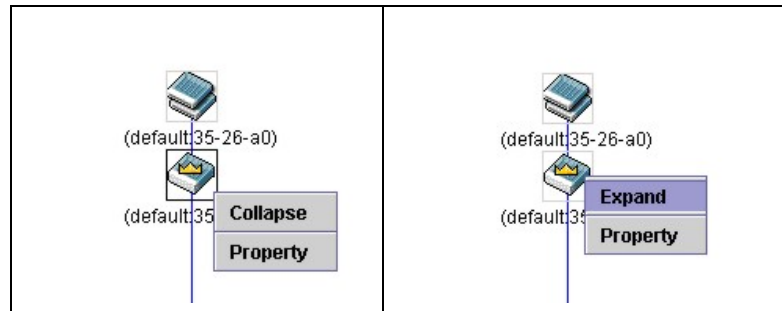


Figure 3-22 Right-clicking a Commander Icon

The following options may appear for the user to configure:

- **Collapse** – To collapse the group that will be represented by a single icon.
- **Expand** – To expand the SIM group, in detail.
- **Property** – To pop up a window to display the group information.

### Member Switch Icon

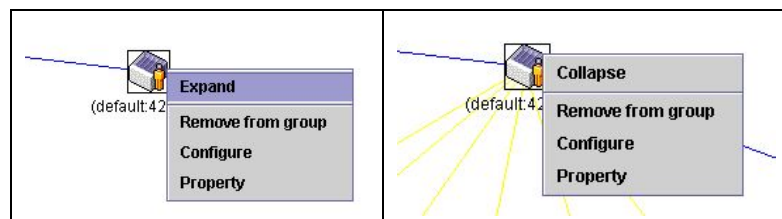


Figure 3-23 Right-clicking a Member icon

The following options may appear for the user to configure:

- **Collapse** – To collapse the group that will be represented by a single icon.
- **Expand** – To expand the SIM group, in detail.
- **Remove from group** – Remove a member from a group.
- **Configure** – Launch the web management to configure the Switch.
- **Property** – To pop up a window to display the device information.

### Candidate Switch Icon

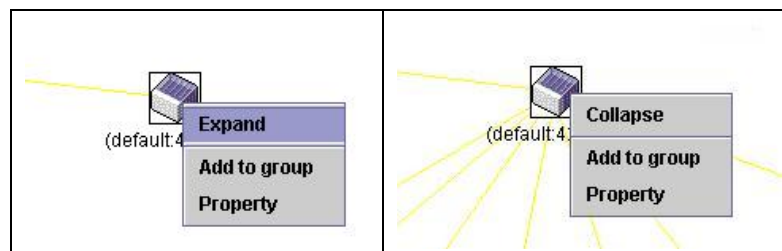


Figure 3-24 Right-clicking a Candidate icon

The following options may appear for the user to configure:

- **Collapse** – To collapse the group that will be represented by a single icon.
- **Expand** – To expand the SIM group, in detail.
- **Add to group** – Add a candidate to a group. Clicking this option will reveal the following dialog box for the user to enter a password for authentication from the Candidate Switch before being added to the SIM group. Click **OK** to enter the password or **Cancel** to exit the dialog box.



Figure 3-25 Input password window



- **Property** – To pop up a window to display the device information.

### Menu Bar

The **Single IP Management** window contains a menu bar for device configurations, as seen below.



Figure 3-26 Menu Bar of the Topology View

### File

- **Print Setup** – Will view the image to be printed.
- **Print Topology** – Will print the topology map.
- **Preference** – Will set display properties, such as polling interval, and the views to open at SIM startup.

### Group

1. **Add to group** – Add a candidate to a group. Clicking this option will reveal the following dialog box for the user to enter a password for authentication from the Candidate Switch before being added to the SIM group. Click **OK** to enter the password or **Cancel** to exit the dialog box.



Figure 3-27 Input password window

2. **Remove from Group** – Remove an MS from the group.

### Device

3. **Configure** – Will open the Web manager for the specific device.

### View

4. **Refresh** – Update the views with the latest status.
5. **Topology** – Display the Topology view.

### Help

- **About** – Will display the SIM information, including the current SIM version.



Figure 3-28 About window

## Firmware Upgrade

This screen is used to upgrade the firmware from the Commander Switch to the Member Switch. Member Switches will be listed in the table and will be specified by **ID**, **Port** (port on the CS where the MS resides), **MAC Address**, **Model Name** and **Version**.

To view the following window, click **Management > Single IP Management > Firmware Upgrade**, as show below:

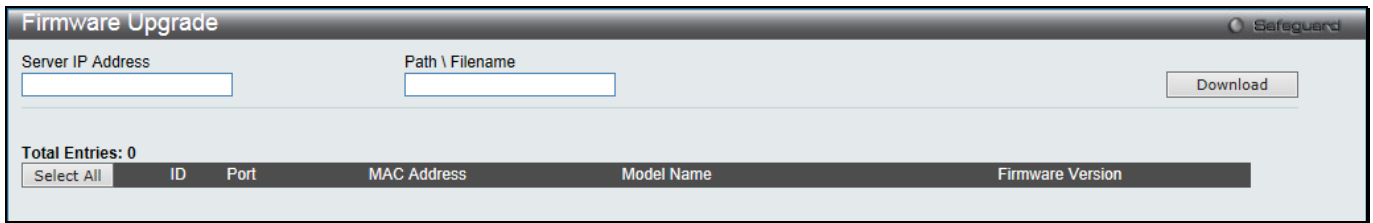


Figure 3-29 Firmware Upgrade window

The fields that can be configured are described below:

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

Click **Download** to initiate the download.

## Configuration File Backup/Restore

This screen is used to download/upload configuration files from the Commander Switch to the Member Switch, using a TFTP server. Member Switches will be listed in the table and will be specified by **ID**, **Port** (port on the CS where the MS resides), **MAC Address**, **Model Name** and **Firmware Version**.

To view the following window, click **Management > Single IP Management > Configuration File Backup/Restore**, as show below:

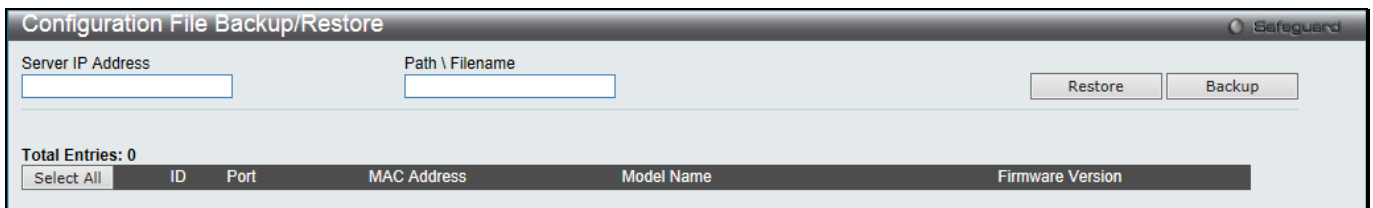


Figure 3-30 Configuration File Backup/Restore window

The fields that can be configured are described below:

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

Click **Restore** to initiate the file transfer from a TFTP server to the Switch.

Click **Backup** to back up the configuration file to a TFTP server.

## Upload Log File

The following window is used to upload log files from SIM member switches to a specified PC.

To view the following window, click **Management > Single IP Management > Upload Log File**, as show below:

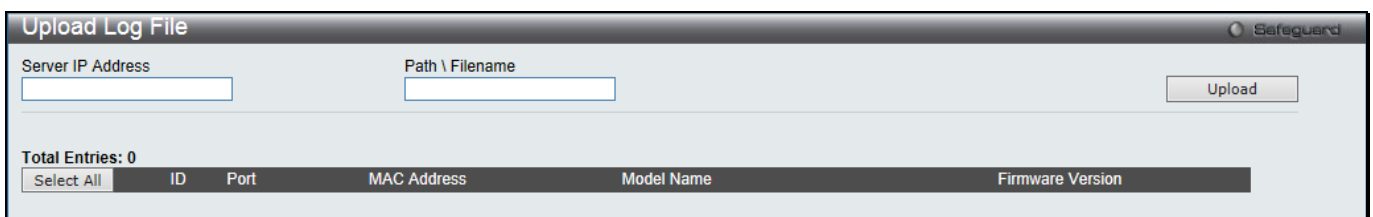


Figure 3-31 Upload Log File window

The fields that can be configured are described below:

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

Click **Upload** to initiate the file transfer.

## SNMP Settings

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 for proper operation, monitor performance and detect potential problems in 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.

SNMPv3 uses a more sophisticated authentication process that is separated into two parts. The first part is to maintain a list of users and their attributes that are allowed to act as SNMP managers. The second part describes what each user on that list can do as an SNMP manager.

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 individual users or groups of SNMP managers can be allowed to perform or be restricted from performing specific SNMP management functions. The functions allowed or restricted are defined using the Object Identifier (OID) associated with a specific MIB. An additional layer of security is available for SNMPv3 in that SNMP messages may be encrypted. To read more about how to configure SNMPv3 settings for the Switch read the next section.

### **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 OFF 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.

### **MIBs**

The Switch in the Management Information Base (MIB) stores management and counter information. The Switch uses the standard MIB-II Management Information Base module. Consequently, values for MIB objects can be retrieved from 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 for the switching environment. SNMP management can be customized to suit the needs of the networks and the preferences of the network administrator. Use the SNMP V3 menus to select the SNMP version used for specific tasks.

The Switch supports the Simple Network Management Protocol (SNMP) versions 1, 2c, and 3. The administrator can specify the SNMP version used to monitor and control the Switch. 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 on the SNMP V3 folder of the Web manager. Workstations on the network that are allowed SNMP privileged access to the Switch can be restricted with the Management Station IP Address menu.

## SNMP Global Settings

SNMP global state settings can be enabled or disabled.

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

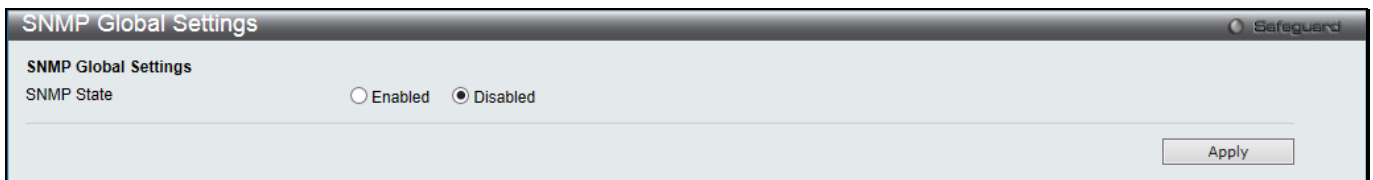


Figure 3-32 SNMP Global Settings window

The fields that can be configured are described below:

Parameter	Description
SNMP State	Enable this option to use the SNMP feature.

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

## SNMP Traps Settings

Users can enable and disable the SNMP trap support function of the switch and SNMP authentication failure trap support, respectively.

To view the following window, click **Management > SNMP Settings > SNMP Traps Settings**, as show below:

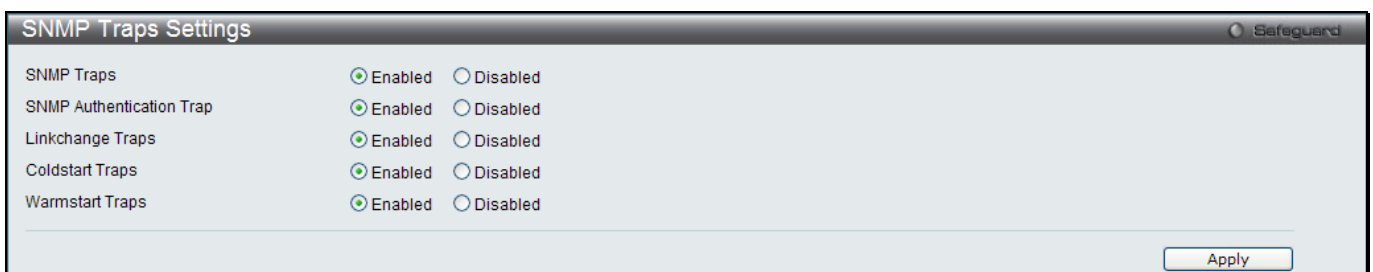


Figure 3-33 SNMP Traps Settings window

The fields that can be configured are described below:

Parameter	Description
SNMP Traps	Enable this option to use the SNMP Traps feature.
SNMP Authentication	Enable this option to use the SNMP Authentication Traps feature.

<b>Trap</b>	
<b>Linkchange Traps</b>	Enable this option to use the SNMP Link Change Traps feature.
<b>Coldstart Traps</b>	Enable this option to use the SNMP Cold Start Traps feature.
<b>Warmstart Traps</b>	Enable this option to use the SNMP Warm Start Traps feature.

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

## SNMP Linkchange Traps Settings

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

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

Unit	From Port	To Port	State
1	01	01	Enabled

Linkchange Traps: Enabled

Unit 1 Settings

Port	State
1	Enabled
2	Enabled
3	Enabled
4	Enabled
5	Enabled
6	Enabled
7	Enabled
8	Enabled
9	Enabled
10	Enabled
11	Enabled
12	Enabled
13	Enabled
14	Enabled
15	Enabled
16	Enabled
17	Enabled
18	Enabled
19	Enabled
20	Enabled
21	Enabled
22	Enabled
23	Enabled
24	Enabled
25	Enabled
26	Enabled

Figure 3-34 SNMP Linkchange Traps Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the starting and ending ports to use.
<b>State</b>	Use the drop-down menu to enable or disable the SNMP link change Trap.

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

## SNMP View Table Settings

Users can assign views to community strings that define which MIB objects can be accessed by a remote SNMP manager. The SNMP Group created with this table maps SNMP users (identified in the SNMP User Table) to the views created in the previous window.

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

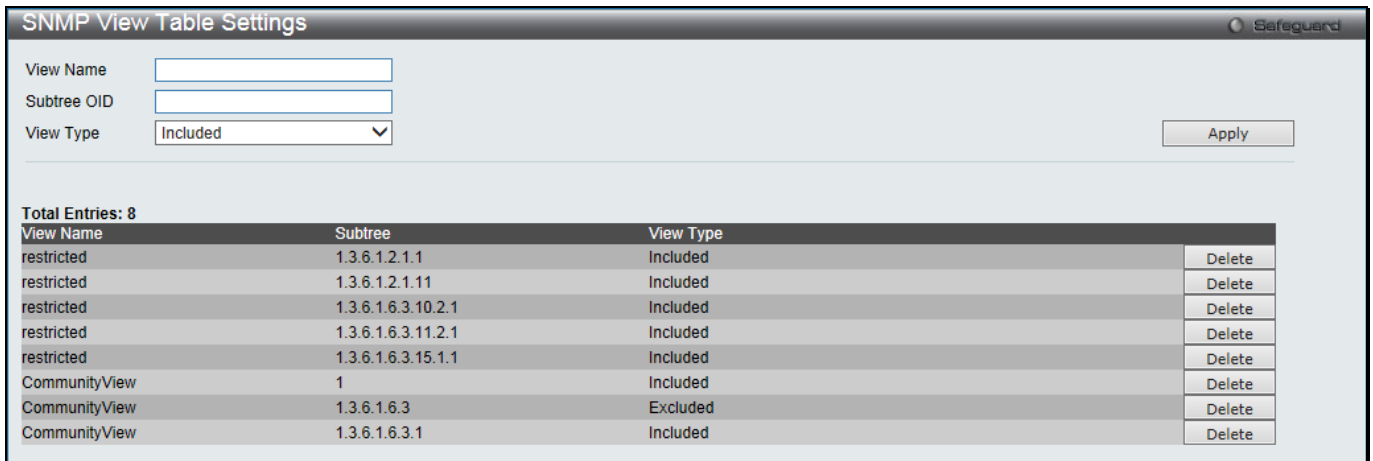


Figure 3-35 SNMP View Table Settings window

The fields that can be configured are described below:

Parameter	Description
<b>View Name</b>	Type an alphanumeric string of up to 32 characters. This is used to identify the new SNMP view being created.
<b>Subtree OID</b>	Type the Object Identifier (OID) Subtree for the view. The OID identifies an object tree (MIB tree) that will be included or excluded from access by an SNMP manager.
<b>View Type</b>	<i>Included</i> – Specify to include this object in the list of objects that an SNMP manager can access. <i>Excluded</i> – Specify to exclude this object from the list of objects that an SNMP manager can access.

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

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

## SNMP Community Table Settings

Users can 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:

1. An Access List of IP addresses of SNMP managers that are permitted to use the community string to gain access to the Switch's SNMP agent.
2. Any MIB view that defines the subset of all MIB objects will be accessible to the SNMP community.
3. Read/write or read-only level permission for the MIB objects accessible to the SNMP community.

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

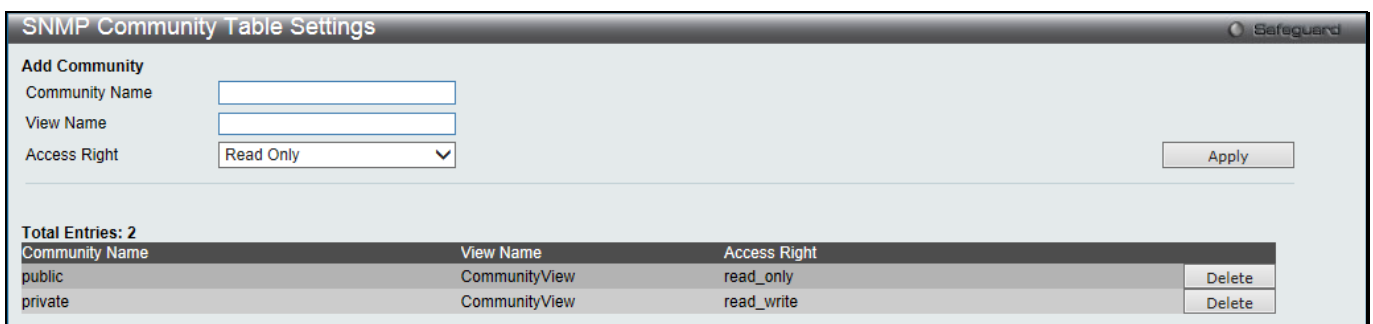


Figure 3-36 SNMP Community Table Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Community Name</b>	Type 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.
<b>View Name</b>	Type 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.
<b>Access Right</b>	<p><i>Read Only</i> – Specify that SNMP community members using the community string created can only read the contents of the MIBs on the Switch.</p> <p><i>Read Write</i> – Specify that SNMP community members using the community string created can read from, and write to the contents of the MIBs on the Switch.</p>

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

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

## SNMP Group Table Settings

An SNMP Group created with this table maps SNMP users (identified in the SNMP User Table) to the views created in the previous window.

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

Group Name	Read View Name	Write View Name	Notify View Name	User-based Security Model	Security Level	
public	CommunityV...		CommunityV...	SNMPv1	NoAuthNoPriv	Delete
public	CommunityV...		CommunityV...	SNMPv2	NoAuthNoPriv	Delete
initial	restricted		restricted	SNMPv3	NoAuthNoPriv	Delete
private	CommunityV...	CommunityV...	CommunityV...	SNMPv1	NoAuthNoPriv	Delete
private	CommunityV...	CommunityV...	CommunityV...	SNMPv2	NoAuthNoPriv	Delete

Figure 3-37 SNMP Group Table Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Group Name</b>	Type an alphanumeric string of up to 32 characters. This is used to identify the new SNMP group of SNMP users.
<b>Read View Name</b>	This name is used to specify the SNMP group created can request SNMP messages.
<b>Write View Name</b>	Specify a SNMP group name for users that are allowed SNMP write privileges to the Switch's SNMP agent.
<b>Notify View Name</b>	Specify a SNMP group name for users that can receive SNMP trap messages generated by the Switch's SNMP agent.
<b>User-based Security Model</b>	<p><i>SNMPv1</i> – Specify that SNMP version 1 will be used.</p> <p><i>SNMPv2</i> – Specify that SNMP version 2c will be used. The SNMPv2 supports both centralized and distributed network management strategies. It includes improvements in the Structure of Management Information (SMI) and adds some security features.</p>

	<p><i>SNMPv3</i> – Specify that the SNMP version 3 will be used. SNMPv3 provides secure access to devices through a combination of authentication and encrypting packets over the network.</p>
<b>Security Level</b>	<p>The Security Level settings only apply to SNMPv3.</p> <p><i>NoAuthNoPriv</i> – Specify that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager.</p> <p><i>AuthNoPriv</i> – Specify that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager.</p> <p><i>AuthPriv</i> – Specify that authorization will be required, and that packets sent between the Switch and a remote SNMP manger will be encrypted.</p>

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

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

## SNMP Engine ID Settings

The Engine ID is a unique identifier used for SNMP V3 implementations on the Switch.

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

**Figure 3-38 SNMP Engine ID Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Engine ID</b>	To change the Engine ID, type the new Engine ID value in the space provided. The SNMP engine ID displays the identification of the SNMP engine on the Switch. The default value is suggested in RFC2271. The very first bit is 1, and the first four octets are set to the binary equivalent of the agent's SNMP management private enterprise number as assigned by IANA (D-Link is 171). The fifth octet is 03 to indicate the rest is the MAC address of this device. The sixth to eleventh octets is the MAC address.

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



**NOTE:** The Engine ID length is 10-64 and accepted characters can range from 0 to F.

## SNMP User Table Settings

This window displays all of the SNMP User's currently configured on the Switch.

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



**SNMP User Table Settings** Safeguard

**Add User**

User Name:  Group Name:

SNMP Version: V3 (dropdown) SNMP V3 Encryption: None (dropdown)

Auth-Protocol by Password: MD5 (dropdown) Password:

Priv-Protocol by Password: None (dropdown) Password:

Auth-Protocol by Key: MD5 (dropdown) Key:

Priv-Protocol by Key: None (dropdown) Key:

---

Total Entries: 1

User Name	Group Name	SNMP Version	Auth-Protocol	Priv-Protocol
initial	initial	V3	None	None

Figure 3-39 SNMP User Table Settings window

The fields that can be configured are described below:

Parameter	Description
<b>User Name</b>	An alphanumeric string of up to 32 characters. This is used to identify the SNMP users.
<b>Group Name</b>	This name is used to specify the SNMP group created can request SNMP messages.
<b>SNMP Version</b>	V3 – Indicates that SNMP version 3 is in use.
<b>SNMP V3 Encryption</b>	Use the drop-down menu to enable encryption for SNMP V3. This is only operable in SNMP V3 mode. The choices are <i>None</i> , <i>Password</i> , or <i>Key</i> .
<b>Auth-Protocol</b>	This field is only operable when V3 is selected in the <b>SNMP Version</b> drop-down menu, and <i>Password</i> or <i>Key</i> is selected in the <b>SNMP V3 Encryption</b> drop-down menu. The <b>Password</b> or <b>Key</b> field will require the user to enter a password or key. <i>MD5</i> – Specify that the HMAC-MD5-96 authentication level will be used. <i>SHA</i> – Specify that the HMAC-SHA authentication protocol will be used.
<b>Priv-Protocol</b>	This field is only operable when V3 is selected in the <b>SNMP Version</b> drop-down menu, and <i>Password</i> or <i>Key</i> is selected in the <b>SNMP V3 Encryption</b> drop-down menu. <i>None</i> – Specify that no authorization protocol is in use. <i>DES</i> – Specify that DES 56-bit encryption is in use, based on the CBC-DES (DES-56) standard. The <b>Password</b> or <b>Key</b> field will require the user to enter a password or key.

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

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

## SNMP Host Table Settings

Users can set up SNMP trap recipients for IPv4.

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

**SNMP Host Table Settings** Safeguard

**Add Host Table**

Host IP Address:

User-based Security Model: SNMPv1 (dropdown)

Security Level: NoAuthNoPriv (dropdown)

Community String / SNMPv3 User Name:

---

Total Entries: 2

Host IP Address	User-based Security Model	Security Level	Community Name/SNMPv3 User Name
10.90.90.2	SNMPv3	NoAuthNoPriv	initial
10.90.90.1	SNMPv1		public

Figure 3-40 SNMP Host Table Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Host IP Address</b>	Type the IP address of the remote management station that will serve as the SNMP host for the Switch.
<b>User-based Security Model</b>	<i>SNMPv1</i> – Specify that SNMP version 1 will be used. <i>SNMPv2</i> – Specify that SNMP version 2 will be used. <i>SNMPv3</i> – Specify that SNMP version 3 will be used.
<b>Security Level</b>	<i>NoAuthNoPriv</i> – To specify that the SNMP version 3 will be used, with a NoAuth-NoPriv security level. <i>AuthNoPriv</i> – To specify that the SNMP version 3 will be used, with an Auth-NoPriv security level. <i>AuthPriv</i> – To specify that the SNMP version 3 will be used, with an Auth-Priv security level.
<b>Community String / SNMPv3 User Name</b>	Type in the community string or SNMP V3 user name as appropriate.

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

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

## SNMP v6Host Table Settings

Users can set up SNMP trap recipients for IPv6.

To view the following window, click **Management > SNMP Settings > SNMP v6Host Table Settings** as shown below.

3-41 SNMP v6Host Table Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Host IPv6 Address</b>	Type the IPv6 address of the remote management station that will serve as the SNMP host for the Switch.
<b>User-based Security Model</b>	<i>SNMPv1</i> – Specify that SNMP version 1 will be used. <i>SNMPv2</i> – Specify that SNMP version 2 will be used. <i>SNMPv3</i> – Specify that SNMP version 3 will be used.
<b>Security Level</b>	<i>NoAuthNoPriv</i> – To specify that the SNMP version 3 will be used, with a NoAuth-NoPriv security level. <i>AuthNoPriv</i> – To specify that the SNMP version 3 will be used, with an Auth-NoPriv security level. <i>AuthPriv</i> – To specify that the SNMP version 3 will be used, with an Auth-Priv security level.
<b>Community String / SNMPv3 User Name</b>	Type in the community string or SNMP V3 user name as appropriate.

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

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

## RMON 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 > SNMP Settings > RMON Settings**, as show below:

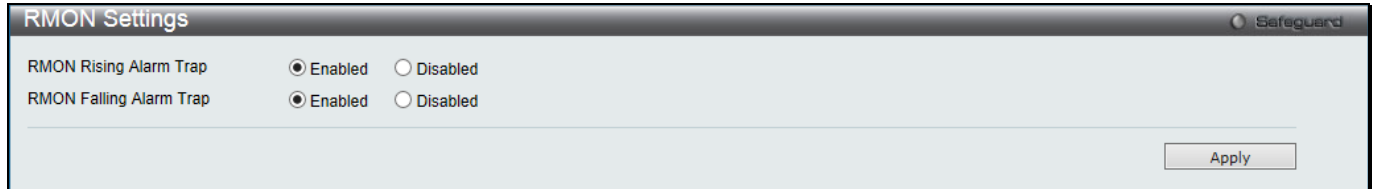


Figure 3-42 RMON Settings window

The fields that can be configured are described below:

Parameter	Description
<b>RMON Rising Alarm Trap</b>	Enable this option to use the RMON Rising Alarm Trap Feature.
<b>RMON Falling Alarm Trap</b>	Enable this option to use the RMON Falling Alarm Trap Feature.

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

## SNMP community Encryption Settings

This window is used to enable or disable SNMP community encryption state.

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

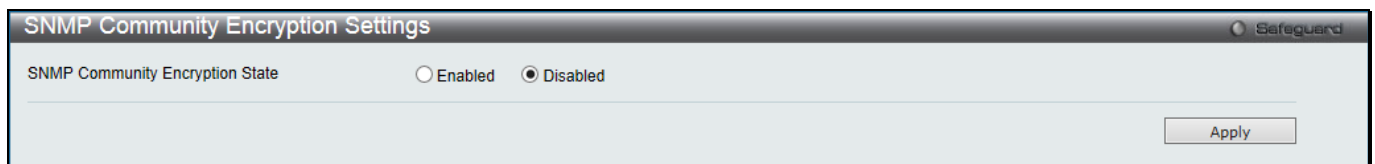


Figure 3-43 SNMP Community Encryption Settings window

The fields that can be configured are described below:

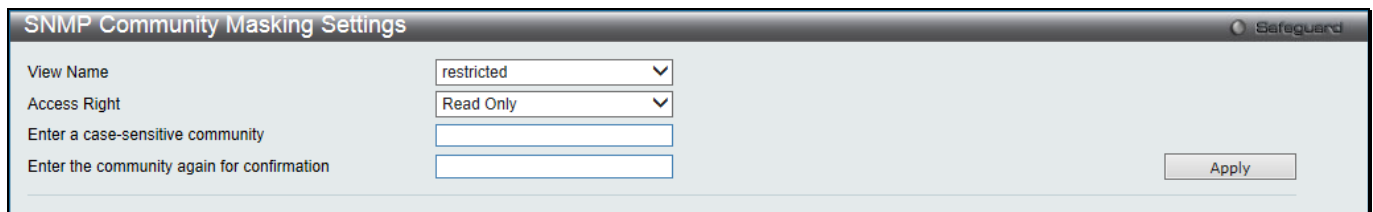
Parameter	Description
<b>SNMP Community Encryption State</b>	Click to enable or disable the encryption state on SNMP community string.

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

## SNMP Community Masking Settings

This window is used to configure a secure method to create a SNMP community string.

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



The screenshot shows the 'SNMP Community Masking Settings' window. It includes a 'View Name' dropdown menu set to 'restricted', an 'Access Right' dropdown menu set to 'Read Only', and two text input fields for entering a case-sensitive community and its confirmation. An 'Apply' button is located at the bottom right.

Figure 3-44 SNMP Community Masking Settings window

The fields that can be configured are described below:

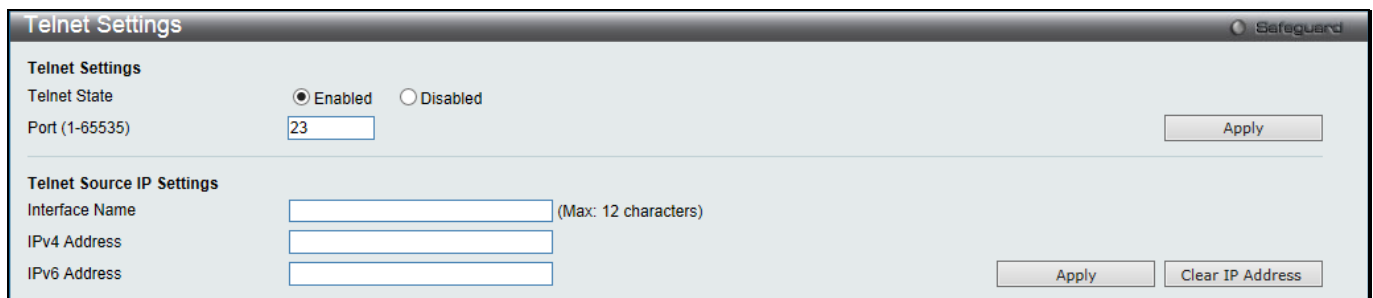
Parameter	Description
<b>View Name</b>	Select an alphanumeric string of up to 32 characters that is used to identify the group of MIB objects that a remote SNMP manager is allowed to access on the Switch. The view name must exist in the SNMP View Table.
<b>Access Right</b>	<i>Read Only</i> – Specify that SNMP community members using the community string created can only read the contents of the MIBs on the Switch. <i>Read Write</i> – Specify that SNMP community members using the community string created can read from, and write to the contents of the MIBs on the Switch.
<b>Enter a case-sensitive community</b>	Type 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.
<b>Enter the community again for confirmation</b>	Re-type the community.

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

## Telnet Settings

Users can configure Telnet Settings on the Switch.

To view the following window, click **Management > Telnet Settings**, as show below:



The screenshot shows the 'Telnet Settings' window. It has two main sections. The first section, 'Telnet Settings', includes a 'Telnet State' radio button group with 'Enabled' selected, and a 'Port (1-65535)' text input field containing '23'. The second section, 'Telnet Source IP Settings', includes an 'Interface Name' text input field with a '(Max: 12 characters)' label, and 'IPv4 Address' and 'IPv6 Address' text input fields. There are 'Apply' and 'Clear IP Address' buttons at the bottom right.

Figure 3-45 Telnet Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Telnet State</b>	Telnet configuration is Enabled by default. If you do not want to allow configuration of the system through Telnet choose Disabled.
<b>Port (1-65535)</b>	The TCP port number used for Telnet management of the Switch. The “well-known” TCP port for the Telnet protocol is 23.
<b>Interface Name</b>	Enter the interface name of the Telnet server.
<b>IPv4 Address</b>	Enter the IP address of the Telnet server.
<b>IPv6 Address</b>	Enter the IPv6 address of the Telnet server.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear IP Address** button to clear out all the information entered in the Telnet Source IP Settings section.

## Web Settings

Users can configure the Web settings on the Switch.

To view the following window, click **Management > Web Settings**, as show below:

Figure 3-46 Web Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Web Status</b>	Web-based management is <b>Enabled</b> by default. If you choose to disable this by clicking <b>Disabled</b> , you will lose the ability to configure the system through the web interface as soon as these settings are applied.
<b>Port (1-65535)</b>	The TCP port number used for web-based management of the Switch. The “well-known” TCP port for the Web protocol is 80.

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

## Power Saving

### LED State Settings

This window is used to configure the port LED state.

To view the following window, click **Management > Power Saving > LED State Settings** as shown below.

Figure 3-47 LED State Settings window

The fields that can be configured are described below:

Parameter	Description
<b>LED State</b>	Click the radio buttons to enable or disable the port LED state.

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

### Power Saving Settings

This window allows the user to implement the Switch’s built-in power saving features and set the schedule to enforce the settings.

To view the following window, click **Management > Power Saving > Power Saving Settings** as shown below.

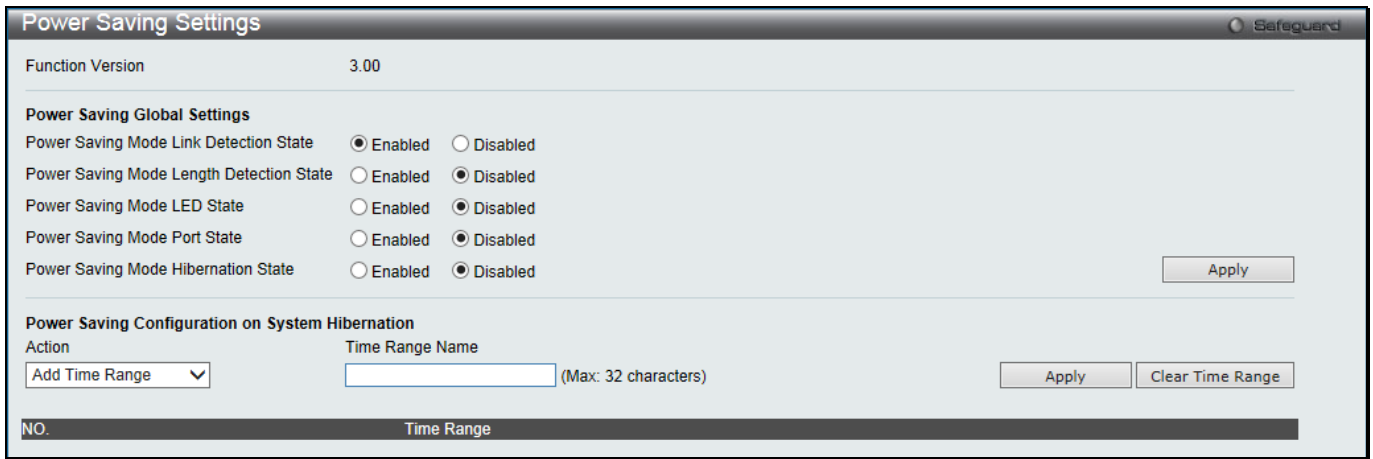


Figure 3-48 Power Saving Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Power Saving Mode Link Detection State</b>	Click the radio buttons 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.
<b>Power Saving Mode Length Detection State</b>	Click the radio buttons to enable or disable length detection state. When enabled, the Switch will automatically determine the length of the cable and adjust the power flow accordingly.
<b>Power Saving Mode LED State</b>	Click the radio buttons to enable or disable LED state. When enabled, the LED's state of ports will be turned off during the configured time range.
<b>Power Saving Mode Port State</b>	Click the radio buttons to enable or disable port state. When enabled, the ports will be shut down during the configured time range.
<b>Power Saving Mode Hibernation State</b>	Click the radio buttons to enable or disable hibernation state. When enabled, the Switch will go into a low power state and be idle during the configured time range. It will shut down all the ports, all network function (telnet, ping, etc.) will not work, and only the console connection will work via the RS232 port. If the Switch is an endpoint type PSE (Power Sourcing Equipment), it will not provide power to the port.
<b>Action</b>	Use the drop down menu to add or delete the schedule.
<b>Time Range Name</b>	Specify the name of the schedule.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear Time Range** to remove all the entries.

## Power Saving LED Settings

This window is used to add or delete the power saving schedule on the LED of all ports.

To view the following window, click **Management > Power Saving > Power Saving LED Settings** as shown below.

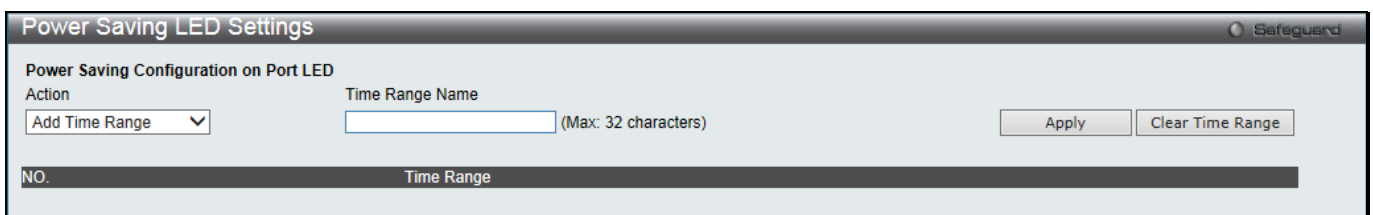


Figure 3-49 Power Saving LED Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Action</b>	Use the drop down menu to add or delete the schedule.
<b>Time Range Name</b>	Specify the name of the schedule.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear Time Range** to remove all the entries.

## Power Saving Port Settings

This window is used to set the power saving state.

To view the following window, click **Management > Power Saving > Power Saving Port Settings** as shown below.

**Figure 3-50 Power Saving Port Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the appropriate port range used for the configuration.
<b>Action</b>	Use the drop down menu to add or delete the schedule.
<b>Time Range Name</b>	Specify the name of the schedule.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear Time Range** to remove all the entries.

To learn more about the D-Link Green Technologies, go to <http://green.dlink.com/> for more details.

## Chapter 4 L2 Features

**VLAN**

**QinQ**

**Layer 2 Protocol Tunneling Settings**

**Spanning Tree**

**Link Aggregation**

**FDB**

**L2 Multicast Control**

**Multicast Filtering**

**ERPS Settings**

**LLDP**

**Local Loopback Port Settings**

**NLB FDB Settings**

## VLAN

### **Understanding IEEE 802.1p Priority**

Priority tagging is a function defined by the IEEE 802.1p standard designed to provide a means of managing traffic on a network where many different types of data may be transmitted simultaneously. It is intended to alleviate problems associated with the delivery of time critical data over congested networks. The quality of applications that are dependent on such time critical data, such as video conferencing, can be severely and adversely affected by even very small delays in transmission.

Network devices that are in compliance with the IEEE 802.1p standard have the ability to recognize the priority level of data packets. These devices can also assign a priority label or tag to packets. Compliant devices can also strip priority tags from packets. This priority tag determines the packet's degree of expeditiousness and determines the queue to which it will be assigned.

Priority tags are given values from 0 to 7 with 0 being assigned to the lowest priority data and 7 assigned to the highest. The highest priority tag 7 is generally only used for data associated with video or audio applications, which are sensitive to even slight delays, or for data from specified end users whose data transmissions warrant special consideration.

The Switch allows you to further tailor how priority tagged data packets are handled on your network. Using queues to manage priority tagged data allows you to specify its relative priority to suit the needs of your network. There may be circumstances where it would be advantageous to group two or more differently tagged packets into the same queue. Generally, however, it is recommended that the highest priority queue, Queue 7, be reserved for data packets with a priority value of 7. Packets that have not been given any priority value are placed in Queue 0 and thus given the lowest priority for delivery.

Strict mode and weighted round robin system are employed on the Switch to determine the rate at which the queues are emptied of packets. The ratio used for clearing the queues is 4:1. This means that the highest priority queue, Queue 7, will clear 4 packets for every 1 packet cleared from Queue 0.

Remember, the priority queue settings on the Switch are for all ports, and all devices connected to the Switch will be affected. This priority queuing system will be especially beneficial if your network employs switches with the capability of assigning priority tags.

### **VLAN Description**

A Virtual Local Area Network (VLAN) is a network topology configured according to a logical scheme rather than the physical layout. VLANs can be used to combine any collection of LAN segments into an autonomous user group that appears as a single LAN. VLANs also logically segment the network into different broadcast domains so that packets are forwarded only between ports within the VLAN. Typically, a VLAN corresponds to a particular subnet, although not necessarily.



VLANs can enhance performance by conserving bandwidth, and improve security by limiting traffic to specific domains.

A VLAN is a collection of end nodes grouped by logic instead of physical location. End nodes that frequently communicate with each other are assigned to the same VLAN, regardless of where they are physically on the network. Logically, a VLAN can be equated to a broadcast domain, because broadcast packets are forwarded to only members of the VLAN on which the broadcast was initiated.

### **Notes about VLANs on the Switch**

- No matter what basis is used to uniquely identify end nodes and assign these nodes VLAN membership, packets cannot cross VLANs without a network device performing a routing function between the VLANs.
- The Switch supports IEEE 802.1Q VLANs. The port untagging function can be used to remove the 802.1Q tag from packet headers to maintain compatibility with devices that are tag-unaware.
- The Switch's default is to assign all ports to a single 802.1Q VLAN named "default."
- The "default" VLAN has a VID = 1.
- The member ports of Port-based VLANs may overlap, if desired.

### **IEEE 802.1Q VLANs**

Some relevant terms:

- **Tagging** – The act of putting 802.1Q VLAN information into the header of a packet.
- **Untagging** – The act of stripping 802.1Q VLAN information out of the packet header.
- **Ingress port** – A port on a switch where packets are flowing into the Switch and VLAN decisions must be made.
- **Egress port** – A port on a switch where packets are flowing out of the Switch, either to another switch or to an end station, and tagging decisions must be made.

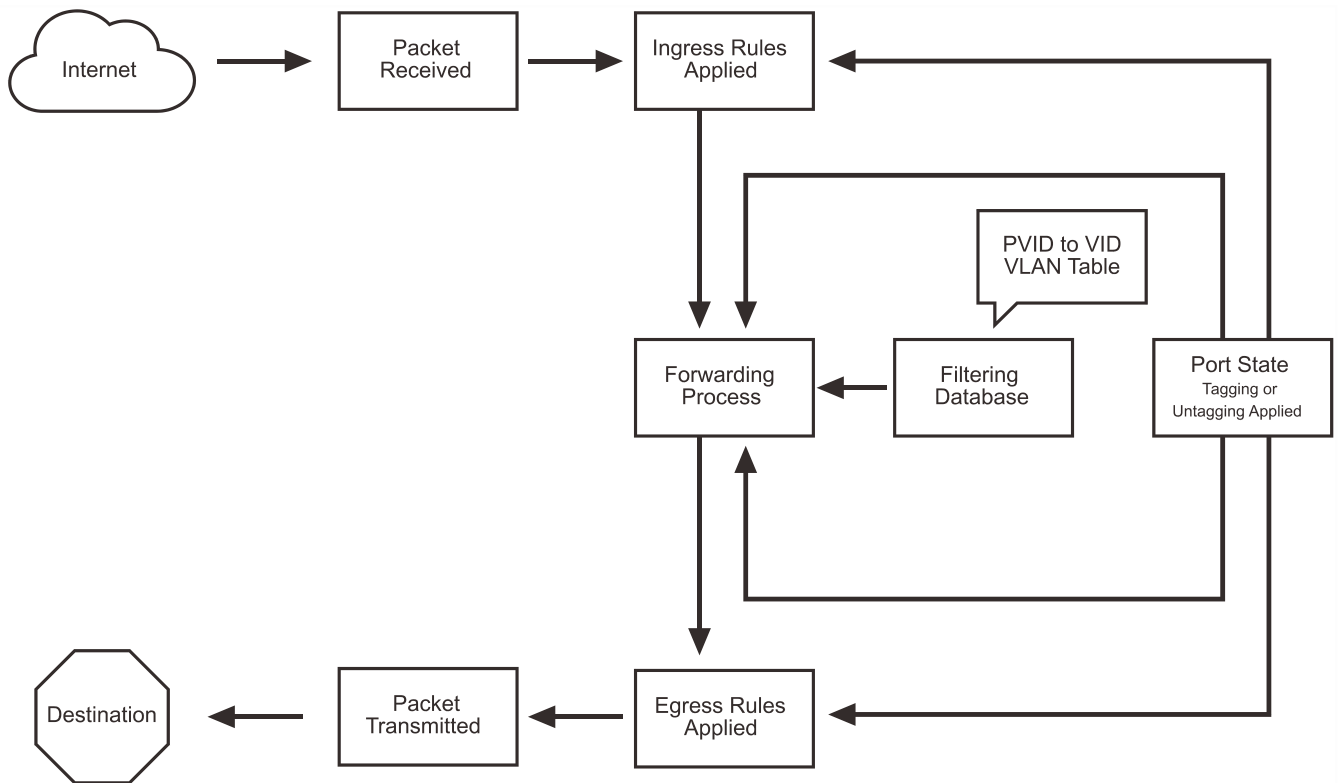
IEEE 802.1Q (tagged) VLANs are implemented on the Switch. 802.1Q VLANs require tagging, which enables them to span the entire network (assuming all switches on the network are IEEE 802.1Q-compliant).

VLANs allow a network to be segmented in order to reduce the size of broadcast domains. All packets entering a VLAN will only be forwarded to the stations (over IEEE 802.1Q enabled switches) that are members of that VLAN, and this includes broadcast, multicast and unicast packets from unknown sources.

VLANs can also provide a level of security to your network. IEEE 802.1Q VLANs will only deliver packets between stations that are members of the VLAN.

Any port can be configured as either tagging or untagging. The untagging feature of IEEE 802.1Q VLANs allows VLANs to work with legacy switches that don't recognize VLAN tags in packet headers. The tagging feature allows VLANs to span multiple 802.1Q-compliant switches through a single physical connection and allows Spanning Tree to be enabled on all ports and work normally.

The IEEE 802.1Q standard restricts the forwarding of untagged packets to the VLAN the receiving port is a member of.



**Figure 4-1 IEEE 802.1Q Packet Forwarding**

In the diagram above, the main characteristics of IEEE 802.1Q are as follows:

- Assigns packets to VLANs by filtering.
- Assumes the presence of a single global spanning tree.
- Uses an explicit tagging scheme with one-level tagging.
- 802.1Q VLAN Packet Forwarding
- Packet forwarding decisions are made based upon the following three types of rules:
  - Ingress rules – rules relevant to the classification of received frames belonging to a VLAN.
  - Forwarding rules between ports – decides whether to filter or forward the packet.
  - Egress rules – determines if the packet must be sent tagged or untagged.

## 802.1Q VLAN Tags

The figure below shows the 802.1Q VLAN tag. There are four additional octets inserted after the source MAC address. Their presence is indicated by a value of 0x8100 in the EtherType field. When a packet's EtherType field is equal to 0x8100, the packet carries the IEEE 802.1Q/802.1p tag. The tag is contained in the following two octets and consists of 3 bits of user priority, 1 bit of Canonical Format Identifier (CFI – used for encapsulating Token Ring packets so they can be carried across Ethernet backbones), and 12 bits of VLAN ID (VID). The 3 bits of user priority are used by 802.1p. The VID is the VLAN identifier and is used by the 802.1Q standard. Because the VID is 12 bits long, 4094 unique VLANs can be identified.

The tag is inserted into the packet header making the entire packet longer by 4 octets. All of the information originally contained in the packet is retained.

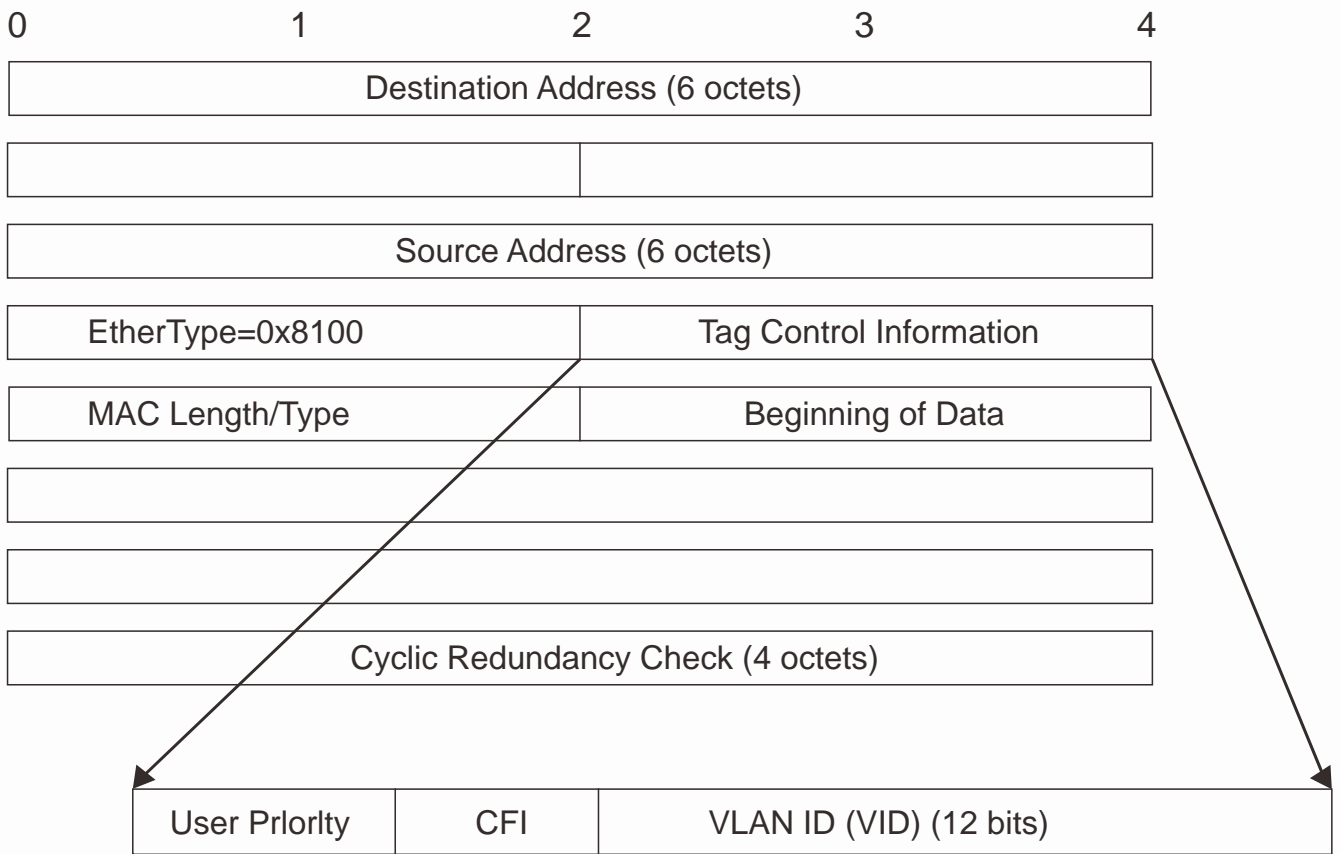


Figure 4-2 IEEE 802.1Q Tag

The EtherType and VLAN ID are inserted after the MAC source address, but before the original EtherType/Length or Logical Link Control. Because the packet is now a bit longer than it was originally, the Cyclic Redundancy Check (CRC) must be recalculated.

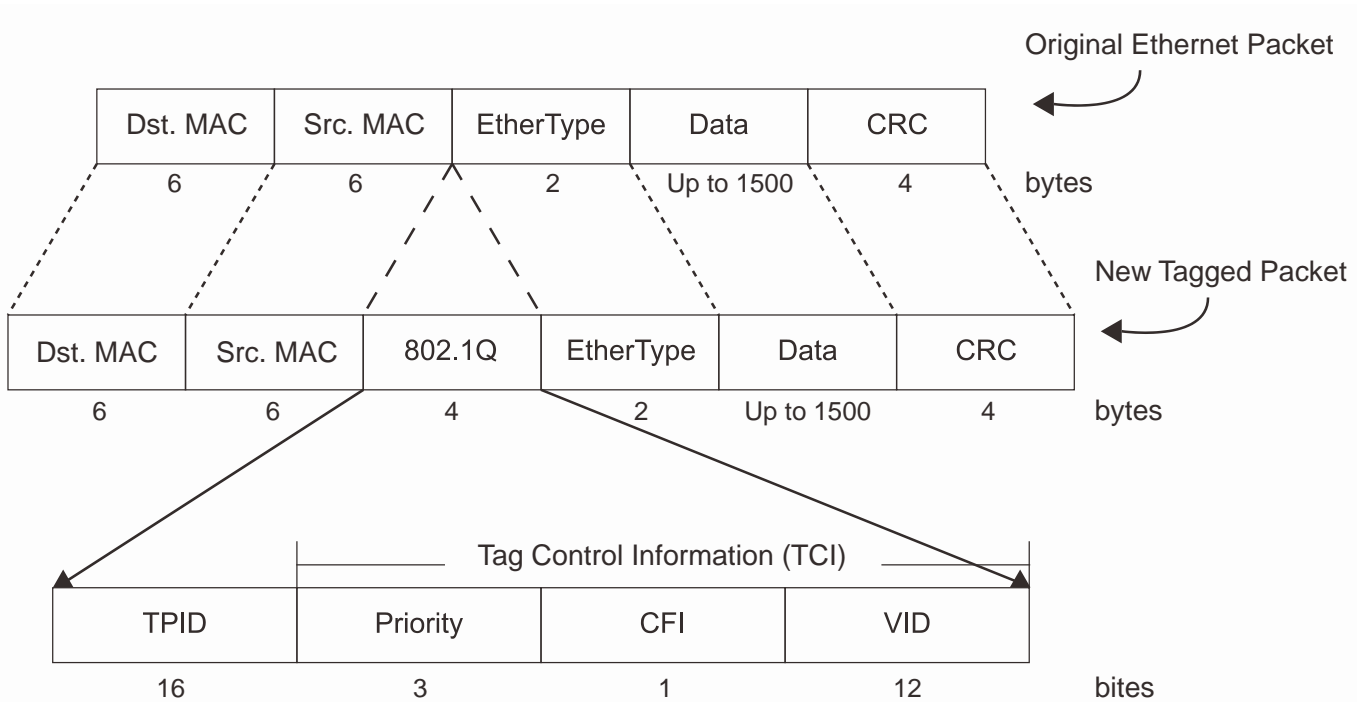


Figure 4-3 Adding an IEEE 802.1Q Tag

## **Port VLAN ID**

Packets that are tagged (are carrying the 802.1Q VID information) can be transmitted from one 802.1Q compliant network device to another with the VLAN information intact. This allows 802.1Q VLANs to span network devices (and indeed, the entire network, if all network devices are 802.1Q compliant).

Unfortunately, not all network devices are 802.1Q compliant. These devices are referred to as tag-unaware. 802.1Q devices are referred to as tag-aware.

Prior to the adoption of 802.1Q VLANs, port-based and MAC-based VLANs were in common use. These VLANs relied upon a Port VLAN ID (PVID) to forward packets. A packet received on a given port would be assigned that port's PVID and then be forwarded to the port that corresponded to the packet's destination address (found in the Switch's forwarding table). If the PVID of the port that received the packet is different from the PVID of the port that is to transmit the packet, the Switch will drop the packet.

Within the Switch, different PVIDs mean different VLANs (remember that two VLANs cannot communicate without an external router). So, VLAN identification based upon the PVIDs cannot create VLANs that extend outside a given switch (or switch stack).

Every physical port on a switch has a PVID. 802.1Q ports are also assigned a PVID, for use within the Switch. If no VLANs are defined on the Switch, all ports are then assigned to a default VLAN with a PVID equal to 1. Untagged packets are assigned the PVID of the port on which they were received. Forwarding decisions are based upon this PVID, in so far as VLANs are concerned. Tagged packets are forwarded according to the VID contained within the tag. Tagged packets are also assigned a PVID, but the PVID is not used to make packet-forwarding decisions, the VID is.

Tag-aware switches must keep a table to relate PVIDs within the Switch to VIDs on the network. The Switch will compare the VID of a packet to be transmitted to the VID of the port that is to transmit the packet. If the two VIDs are different, the Switch will drop the packet. Because of the existence of the PVID for untagged packets and the VID for tagged packets, tag-aware and tag-unaware network devices can coexist on the same network.

A switch port can have only one PVID, but can have as many VIDs as the Switch has memory in its VLAN table to store them.

Because some devices on a network may be tag-unaware, a decision must be made at each port on a tag-aware device before packets are transmitted – should the packet to be transmitted have a tag or not? If the transmitting port is connected to a tag-unaware device, the packet should be untagged. If the transmitting port is connected to a tag-aware device, the packet should be tagged.

## **Tagging and Untagging**

Every port on an 802.1Q compliant switch can be configured as tagging or untagging.

Ports with tagging enabled will put the VID number, priority and other VLAN information into the header of all packets that flow into and out of it.

If a packet has previously been tagged, the port will not alter the packet, thus keeping the VLAN information intact. Other 802.1Q compliant devices on the network to make packet-forwarding decisions can then use the VLAN information in the tag.

Ports with untagging enabled will strip the 802.1Q tag from all packets that flow into and out of those ports. If the packet doesn't have an 802.1Q VLAN tag, the port will not alter the packet. Thus, all packets received by and forwarded by an untagging port will have no 802.1Q VLAN information. (Remember that the PVID is only used internally within the Switch). Untagging is used to send packets from an 802.1Q-compliant network device to a non-compliant network device.

## **Ingress Filtering**

A port on a switch where packets are flowing into the Switch and VLAN decisions must be made is referred to as an ingress port. If ingress filtering is enabled for a port, the Switch will examine the VLAN information in the packet header (if present) and decide whether or not to forward the packet.

If the packet is tagged with VLAN information, the ingress port will first determine if the ingress port itself is a member of the tagged VLAN. If it is not, the packet will be dropped. If the ingress port is a member of the 802.1Q VLAN, the Switch then determines if the destination port is a member of the 802.1Q VLAN. If it is not, the packet is dropped. If the destination port is a member of the 802.1Q VLAN, the packet is forwarded and the destination port transmits it to its attached network segment.

If the packet is not tagged with VLAN information, the ingress port will tag the packet with its own PVID as a VID (if the port is a tagging port). The switch then determines if the destination port is a member of the same VLAN (has the same VID) as the ingress port. If it does not, the packet is dropped. If it has the same VID, the packet is forwarded and the destination port transmits it on its attached network segment.

This process is referred to as ingress filtering and is used to conserve bandwidth within the Switch by dropping packets that are not on the same VLAN as the ingress port at the point of reception. This eliminates the subsequent processing of packets that will just be dropped by the destination port.

### **Default VLANs**

The Switch initially configures one VLAN, VID = 1, called "default." The factory default setting assigns all ports on the Switch to the "default." As new VLANs are configured in Port-based mode, their respective member ports are removed from the "default."

Packets cannot cross VLANs. If a member of one VLAN wants to connect to another VLAN, the link must be through an external router.



**NOTE:** If no VLANs are configured on the Switch, then all packets will be forwarded to any destination port. Packets with unknown source addresses will be flooded to all ports. Broadcast and multicast packets will also be flooded to all ports.

An example is presented below:

VLAN Name	VID	Switch Ports
System (default)	1	5, 6, 7
Engineering	2	9, 10
Sales	5	1, 2, 3, 4

### **Port-based VLANs**

Port-based VLANs limit traffic that flows into and out of switch ports. Thus, all devices connected to a port are members of the VLAN(s) the port belongs to, whether there is a single computer directly connected to a switch, or an entire department.

On port-based VLANs, NICs do not need to be able to identify 802.1Q tags in packet headers. NICs send and receive normal Ethernet packets. If the packet's destination lies on the same segment, communications take place using normal Ethernet protocols. Even though this is always the case, when the destination for a packet lies on another switch port, VLAN considerations come into play to decide if the packet gets dropped by the Switch or delivered.

### **VLAN Segmentation**

Take for example a packet that is transmitted by a machine on Port 1 that is a member of VLAN 2. If the destination lies on another port (found through a normal forwarding table lookup), the Switch then looks to see if the other port (Port 10) is a member of VLAN 2 (and can therefore receive VLAN 2 packets). If Port 10 is not a member of VLAN 2, then the packet will be dropped by the Switch and will not reach its destination. If Port 10 is a member of VLAN 2, the packet will go through. This selective forwarding feature based on VLAN criteria is how VLANs segment networks. The key point being that Port 1 will only transmit on VLAN 2.

## 802.1Q VLAN Settings

The **VLAN List** tab lists all previously configured VLANs by VLAN ID and VLAN Name.

To view the following window, click **L2 Features > VLAN > 802.1Q VLAN Settings**, as show below:

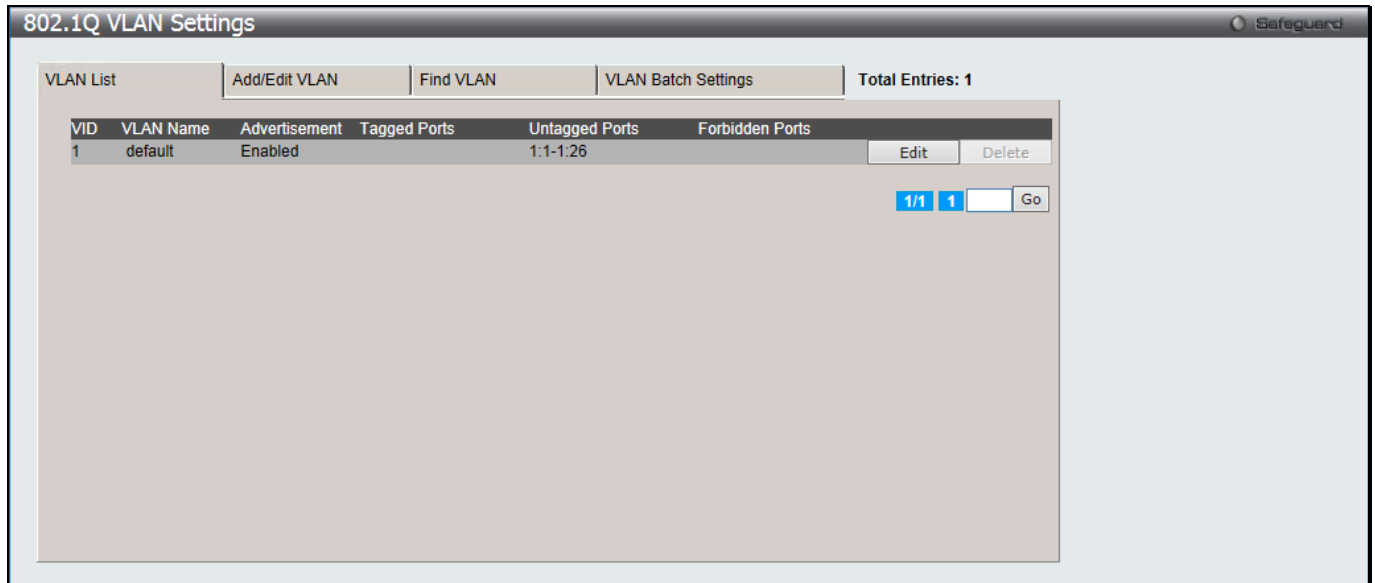


Figure 4-4 802.1Q VLAN Settings –VLAN List Tab window

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.

To create a new 802.1Q VLAN or modify an existing 802.1Q VLAN, click the **Add/Edit VLAN** tab.

A new tab will appear, as shown below, to configure the port settings and to assign a unique name and number to the new VLAN.

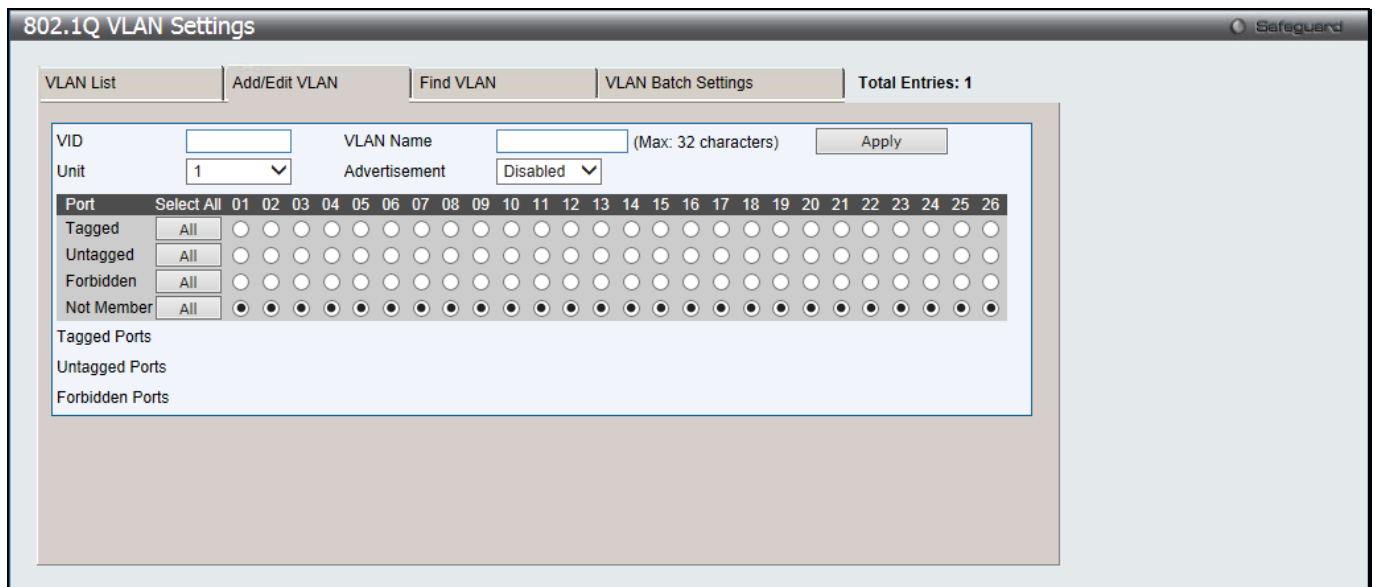


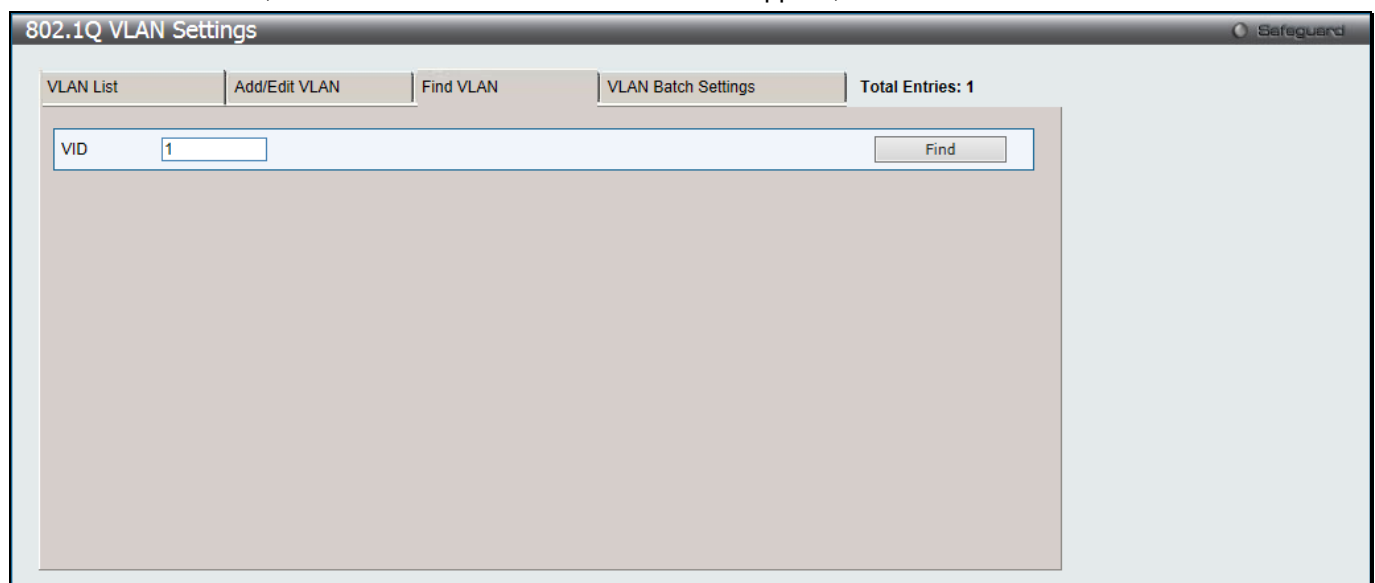
Figure 4-5 802.1Q VLAN Settings – Add/Edit VLAN Tab window

The fields that can be configured are described below:

Parameter	Description
<b>VID</b>	Allow the entry of a VLAN ID or displays the VLAN ID of an existing VLAN in the <b>Add/Edit VLAN</b> tab. VLANs can be identified by either the VID or the VLAN name.
<b>VLAN Name</b>	Allow the entry of a name for the new VLAN or for editing the VLAN name in the <b>Add/Edit VLAN</b> tab.
<b>Unit</b>	Select the unit you want to configure.
<b>Advertisement</b>	Enable this function to allow the Switch sending out GVRP packets to outside sources, notifying that they may join the existing VLAN.
<b>Port</b>	Display all ports of the Switch for the configuration option.
<b>Tagged</b>	Specify the port as 802.1Q tagging. Clicking the radio button will designate the port as tagged. Click the <b>All</b> button to select all ports.
<b>Untagged</b>	Specify the port as 802.1Q untagged. Clicking the radio button will designate the port as untagged. Click the <b>All</b> button to select all ports.
<b>Forbidden</b>	Click the radio button to specify the port as not being a member of the VLAN and that the port is forbidden from becoming a member of the VLAN dynamically. Click the <b>All</b> button to select all ports.
<b>Not Member</b>	Click the radio button to allow an individual port to be specified as a non-VLAN member. Click the <b>All</b> button to select all ports.

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

To search for a VLAN, click the **Find VLAN** tab. A new tab will appear, as shown below.



**Figure 4-6 802.1Q VLAN Settings – Find VLAN Tab window**

Enter the VLAN ID number in the field offered and then click the **Find** button. You will be redirected to the **VLAN List** tab.

To create, delete and configure a VLAN Batch entry click the **VLAN Batch Settings** tab, as shown below.

Figure 4-7 802.1Q VLAN Settings – VLAN Batch Settings Tab window

The fields that can be configured are described below:

Parameter	Description
<b>VID List</b>	Enter a VLAN ID List that can be added, deleted or configured.
<b>Advertisement</b>	Enabling this function will allow the Switch to send out GVRP packets to outside sources, notifying that they may join the existing VLAN.
<b>Port List</b>	Allows an individual port list to be added or deleted as a member of the VLAN.
<b>Tagged</b>	Specify the port as 802.1Q tagged. Use the drop-down menu to designate the port as tagged.
<b>Untagged</b>	Specify the port as 802.1Q untagged. Use the drop-down menu to designate the port as untagged.
<b>Forbidden</b>	Specify the port as not being a member of the VLAN and that the port is forbidden from becoming a member of the VLAN dynamically. Use the drop-down menu to designate the port as forbidden.

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



**NOTE:** The Switch supports up to 4k static VLAN entries.

## 802.1v Protocol VLAN

### 802.1v Protocol Group Settings

The user can create Protocol VLAN groups and add protocols to that group. The 802.1v Protocol VLAN Group Settings support multiple VLANs for each protocol and allows the user to configure the 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. The lower half of the table displays any previously created groups.

To view the following window, click **L2 Features > VLAN > 802.1v protocol VLAN > 802.1v Protocol Group Settings**, as show below:



Figure 4-8 802.1v Protocol Group Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Group ID (1-16)</b>	Select an ID number for the group, between 1 and 16.
<b>Group Name</b>	This is used to identify the new Protocol VLAN group. Type an alphanumeric string of up to 32 characters.
<b>Protocol</b>	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. Use the drop-down menu to toggle between <i>Ethernet II</i> , <i>IEEE802.3 SNAP</i> , and <i>IEEE802.3 LLC</i> .
<b>Protocol Value (0-FFFF)</b>	Enter a value for the Group. The protocol value is used to identify a protocol of the frame type specified. The form of the input is 0x0 to 0xffff. Depending on the frame type, the octet string will have one of the following values: For Ethernet II, this is a 16-bit (2-octet) hex value. For example, IPv4 is 800, IPv6 is 86dd, ARP is 806, 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 **Add** button to add a new entry based on the information entered.

Click the **Delete All** button to remove all the entries based on the information entered.

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

Click the **Delete Settings** button to remove the Protocol for the Protocol VLAN Group information for the specific entry.

Click the **Delete Group** button to remove the entry completely.



**NOTE:** The Group name value should be less than 33 characters.

## 802.1v Protocol VLAN Settings

The user can configure Protocol VLAN settings. The lower half of the table displays any previously created settings. To view the following window, click **L2 Features > VLAN > 802.1v protocol VLAN > 802.1v Protocol VLAN Settings**, as show below:

Figure 4-9 802.1v Protocol VLAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Group ID</b>	Select a previously configured Group ID from the drop-down menu.
<b>Group Name</b>	Select a previously configured Group Name from the drop-down menu.
<b>VID (1-4094)</b>	This is the VLAN ID that, along with the VLAN Name, identifies the VLAN the user wishes to create.
<b>VLAN Name</b>	This is the VLAN Name that, along with the VLAN ID, identifies the VLAN the user wishes to create.
<b>802.1p Priority</b>	<p>This parameter is specified if you want to re-write the 802.1p default priority previously set in the Switch, which is used to determine the CoS queue to which 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 by the user.</p> <p>Click the corresponding box if you want to set the 802.1p default priority of a packet to the value entered in the Priority (0-7) field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch.</p> <p>For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.</p>
<b>Port List</b>	Enter a list of ports. Tick the <b>All Ports</b> check box to select all ports.

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

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.

## Asymmetric VLAN Settings

Shared VLAN Learning is a primary example of the requirement for Asymmetric VLANs. Under normal circumstances, a pair of devices communicating in a VLAN environment will both send and receive using the same VLAN; however, there are some circumstances in which it is convenient to make use of two distinct VLANs, one used for A to transmit to B and the other used for B to transmit to A in these cases Asymmetric VLANs are needed. An example of when this type of configuration might be required would be if the client was on a distinct IP subnet, or if there was some confidentiality-related need to segregate traffic between the clients.

To view this window click **L2 Features > VLAN > Asymmetric VLAN Settings** as shown below.

Figure 4-10 Asymmetric VLAN Settings window

Click **Apply** to implement changes.

## GVRP

### GVRP Global Settings

Users can determine whether the Switch will share its VLAN configuration information with other GARP VLAN Registration Protocol (GVRP) enabled switches. In addition, Ingress Checking can be used to limit traffic by filtering incoming packets whose PVID does not match the PVID of the port. Results can be seen in the table under the configuration settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Global Settings**, as show below:

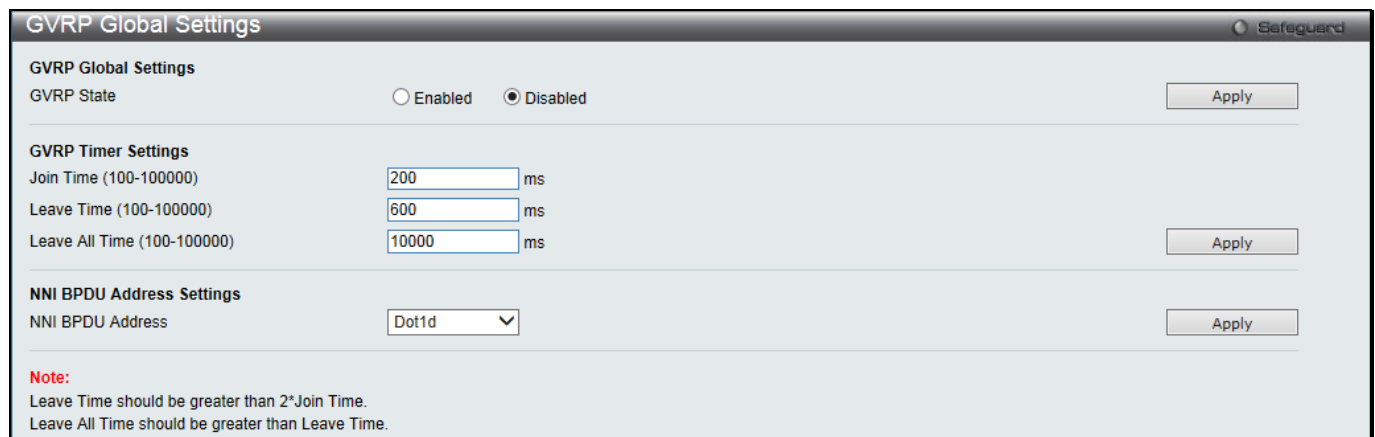


Figure 4-11 GVRP Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>GVRP State</b>	Click the radio buttons to enable or disable the GVRP State.
<b>Join Time (100-100000)</b>	Enter the Join Time value in milliseconds.
<b>Leave Time (100-100000)</b>	Enter the Leave Time value in milliseconds.
<b>Leave All Time (100-100000)</b>	Enter the Leave All Time value in milliseconds.
<b>NNI BPDU Address</b>	Used to determine the GVRP PDU protocol address for GVRP in service provide site. It can use 802.1D GVRP address or 802.1ad service provider GVRP address.

Click the **Apply** button to accept the changes made for each individual section.



**NOTE:** The **Leave Time** value should be greater than twice the **Join Time** value. The **Leave All Time** value should be greater than the **Leave Time** value.

### GVRP Port Settings

This window is used to configure the GVRP port parameters.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Port Settings**, as show below:

**GVRP Port Settings** Safeguard

Unit:  From Port:  To Port:  PVID (1-4094):  GVRP:  Ingress Checking:  Acceptable Frame Type:

**Unit 1 Settings**

Port	PVID	GVRP	Ingress Checking	Acceptable Frame Type
1	1	Disabled	Enabled	All
2	1	Disabled	Enabled	All
3	1	Disabled	Enabled	All
4	1	Disabled	Enabled	All
5	1	Disabled	Enabled	All
6	1	Disabled	Enabled	All
7	1	Disabled	Enabled	All
8	1	Disabled	Enabled	All
9	1	Disabled	Enabled	All
10	1	Disabled	Enabled	All
11	1	Disabled	Enabled	All
12	1	Disabled	Enabled	All
13	1	Disabled	Enabled	All
14	1	Disabled	Enabled	All
15	1	Disabled	Enabled	All
16	1	Disabled	Enabled	All
17	1	Disabled	Enabled	All
18	1	Disabled	Enabled	All
19	1	Disabled	Enabled	All
20	1	Disabled	Enabled	All
21	1	Disabled	Enabled	All
22	1	Disabled	Enabled	All
23	1	Disabled	Enabled	All
24	1	Disabled	Enabled	All
25	1	Disabled	Enabled	All
26	1	Disabled	Enabled	All

Figure 4-12 GVRP Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the starting and ending ports to use.
<b>PVID (1-4094)</b>	This field is used to manually assign a PVID to a VLAN. The Switch's default is to assign all ports to the default VLAN with a VID of 1. The PVID is used by the port to tag outgoing, untagged packets, and to make filtering decisions about incoming packets. If the port is specified to accept only tagged frames - as tagging, and an untagged packet is forwarded to the port for transmission, the port will add an 802.1Q tag using the PVID to write the VID in the tag. When the packet arrives at its destination, the receiving device will use the PVID to make VLAN forwarding decisions. If the port receives a packet, and Ingress filtering is <i>Enabled</i> , the port will compare the VID of the incoming packet to its PVID. If the two are unequal, the port will drop the packet. If the two are equal, the port will receive the packet.
<b>GVRP</b>	The GARP VLAN Registration Protocol (GVRP) enables the port to dynamically become a member of a VLAN. GVRP is <i>Disabled</i> by default.
<b>Ingress Checking</b>	This drop-down menu allows the user to enable the port to compare the VID tag of an incoming packet with the port VLAN membership. If enable ingress checking and the reception port is not the member port of the frame's VLAN, the frame shall be discarded.
<b>Acceptable Frame Type</b>	This field denotes the type of frame that will be accepted by the port. The user may choose between <i>Tagged Only</i> , which means only VLAN tagged frames will be accepted, and <i>All</i> , which mean both tagged and untagged frames will be accepted. <i>All</i> is enabled by default.

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

## MAC-based VLAN

## MAC-based VLAN Settings

Users can create new MAC-based VLAN entries with its mask, search and delete existing entries. When a static MAC-based VLAN entry is created for a user, the traffic from this user will be able to be serviced under the specified VLAN.

To view the following window, click **L2 Features > VLAN > MAC-based VLAN > MAC-based VLAN Settings**, as show below:

Figure 4-13 MAC-based VLAN with Mask Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MAC Address</b>	Specify the MAC address.
<b>Mask Address</b>	Specify the mask of the MAC address. Tick the <b>Default</b> check box to have the default mask address, FF-FF-FF-FF-FF-FF.
<b>VID (1-4094)</b>	Select this option and enter the VLAN ID.
<b>VLAN Name</b>	Select this option and enter the VLAN name of a previously configured VLAN.
<b>Priority</b>	Select the priority assigned to the untagged packets.

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

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

Click the **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed.

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-based VLAN Table

This window is used to display MAC-based VLAN information.

To view the following window, click **L2 Features > VLAN > MAC-based VLAN > MAC-based VLAN Table**, as show below:

Figure 4-14 MAC-based VLAN with Mask Table window

The fields that can be configured are described below:

Parameter	Description
<b>MAC Address</b>	Specify the MAC address.
<b>VID (1-4094)</b>	Select this option and enter the VLAN ID.
<b>VLAN Name</b>	Select this option and enter the VLAN name of a previously configured VLAN.

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

Click the **View All** button to display all the existing entries.

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

## Private VLAN Settings

A private VLAN is comprised of a primary VLAN, up to one isolated VLAN, and a number of community VLANs. A private VLAN ID is presented by the VLAN ID of the primary VLAN. The command used to associate or de-associate a secondary VLAN with a primary VLAN.

A secondary VLAN cannot be associated with multiple primary VLANs. The untagged member port of the primary VLAN is named as the promiscuous port. The tagged member port of the primary VLAN is named as the trunk port. A promiscuous port of a private VLAN cannot be promiscuous port of other private VLANs. The primary VLAN member port cannot be a secondary VLAN member at the same time, or vice versa. A secondary VLAN can only have the untagged member port. The member port of a secondary VLAN cannot be member port of other secondary VLAN at the same time. When a VLAN is associated with a primary VLAN as the secondary VLAN, the promiscuous port of the primary VLAN will behave as the untagged member of the secondary VLAN, and the trunk port of the primary VLAN will behave as the tagged member of the secondary VLAN. A secondary VLAN cannot be specified with advertisement. Only the primary VLAN can be configured as a layer 3 interface. The private VLAN member port cannot be configured with the traffic segmentation function.

This window allows the user to configure the private VLAN parameters.

To view the following window, click **L2 Features > VLAN > Private VLAN Settings** as shown below.

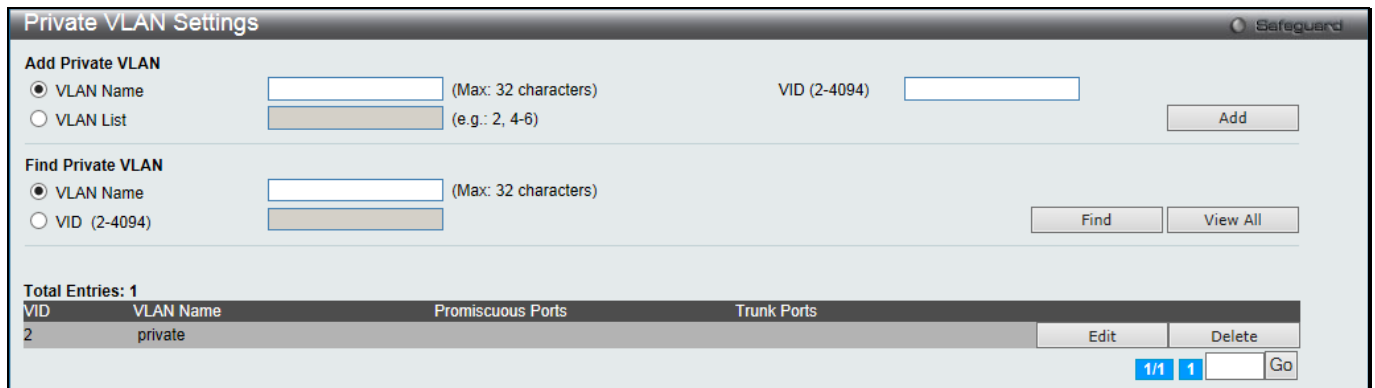


Figure 4-15 Private VLAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Enter a VLAN name.
<b>VID (2-4094)</b>	Enter a VID value.
<b>VLAN List</b>	Enter a list of VLAN ID.

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

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

Click the **View All** button to display all the existing entries.

Click the **Edit** button to configure the secondary VLAN.

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 **Edit** button to see the following window.

Figure 4-16 Private VLAN Settings - Edit window

The fields that can be configured are described below:

Parameter	Description
<b>Secondary VLAN Type</b>	Use the drop-down menu to select secondary VLAN type between <i>Isolated</i> or <i>Community</i> .
<b>Secondary VLAN Name</b>	Enter a secondary VLAN name.
<b>Secondary VLAN List</b>	Enter a list of secondary VLAN ID.

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

Click the [View Private VLAN List](#) link to view all the private VLAN.

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.

## PVID Auto Assign Settings

Users can enable or disable PVID Auto Assign Status. The default setting is enabled.

To view the following window, click **L2 Features > VLAN > PVID Auto Assign Settings**, as show below:

Figure 4-17 PVID Auto Assign Settings window

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

## VLAN Counter Settings

This window is used to view and configure the VLAN counter settings.

To view the following window, click **L2 Features > VLAN > VLAN Counter Settings** as shown below.



Figure 4-18 VLAN Counter Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VID List</b>	Click the radio button and enter the VID list used for this configuration.
<b>VLAN Name</b>	Click the radio button and enter the VLAN name of the VLAN used for this configuration.
<b>Ports</b>	Enter a list of ports to be configured. Tick the <b>All Ports</b> check box to select all ports.
<b>Packet Type</b>	Use the drop-down menu to select the packet type to be counted.
<b>Counter Type</b>	Use the drop-down menu to select whether the statistics are counted by <i>Packet</i> or <i>Byte</i> .
<b>Direction</b>	Use the drop-down menu to select traffic direction to be counted.

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

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

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

Click the **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed in the table.

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

## Voice VLAN

### Voice VLAN Global Settings

Voice VLAN is a VLAN used to carry voice traffic from IP phone. Because the sound quality of an IP phone call will be deteriorated if the data is unevenly sent, the quality of service (QoS) for voice traffic shall be configured to ensure the transmission priority of voice packet is higher than normal traffic.

The switches determine whether a received packet is a voice packet by checking its source MAC address. If the source MAC addresses of packets comply with the organizationally unique identifier (OUI) addresses configured by the system, the packets are determined as voice packets and transmitted in voice VLAN.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN Global Settings** as shown below.



Figure 4-19 Voice VLAN Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Voice VLAN State</b>	The state of the voice VLAN.
<b>Voice VLAN Name</b>	The name of the voice VLAN.
<b>Voice VID (1-4094)</b>	The VLAN ID of the voice VLAN.
<b>Priority</b>	The priority of the voice VLAN, the range is 0 – 7. The default priority is 5.
<b>Aging Time (1-65535)</b>	The aging time to set, the range is 1 – 65535 minutes. The default value is 720 minutes. The aging time is used to remove a port from voice VLAN if the port is an automatic VLAN member. When the last voice device stops sending traffic and the MAC address of this voice device is aged out, the voice VLAN aging timer will be started. The port will be removed from the voice VLAN after expiration of voice VLAN aging timer. If the voice traffic resumes during the aging time, the aging timer will be reset and stop.
<b>Log State</b>	Used to enable or disable sending of issue of voice VLAN log.

Click the **Apply** button to accept the changes made for each individual section.

## Voice VLAN Port Settings

This window is used to show the ports voice VLAN information.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN Port Settings** as shown below.

Voice VLAN Port Settings Safeguard

Unit:  From Port:  To Port:  State:  Mode:  Apply

**Unit 1 Settings**

Port	State	Mode
1	Disabled	Auto Untagged
2	Disabled	Auto Untagged
3	Disabled	Auto Untagged
4	Disabled	Auto Untagged
5	Disabled	Auto Untagged
6	Disabled	Auto Untagged
7	Disabled	Auto Untagged
8	Disabled	Auto Untagged
9	Disabled	Auto Untagged
10	Disabled	Auto Untagged
11	Disabled	Auto Untagged
12	Disabled	Auto Untagged
13	Disabled	Auto Untagged
14	Disabled	Auto Untagged
15	Disabled	Auto Untagged
16	Disabled	Auto Untagged
17	Disabled	Auto Untagged
18	Disabled	Auto Untagged
19	Disabled	Auto Untagged
20	Disabled	Auto Untagged
21	Disabled	Auto Untagged
22	Disabled	Auto Untagged
23	Disabled	Auto Untagged
24	Disabled	Auto Untagged
25	Disabled	Auto Untagged
26	Disabled	Auto Untagged

Figure 4-20 Voice VLAN Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select a range of port to display.
<b>State</b>	Use the drop-down menu to enable or disable the state of the port.
<b>Mode</b>	Use the drop-down menu to configure the mode of the port.

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

## Voice VLAN OUI Settings

This window is used to configure the user-defined voice traffic's OUI. The OUI is used to identify the voice traffic. There are a number of pre-defined OUIs. The user can further define the user-defined OUIs if needed. The user-defined OUI cannot be the same as the pre-defined OUI.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN OUI Settings** as shown below.

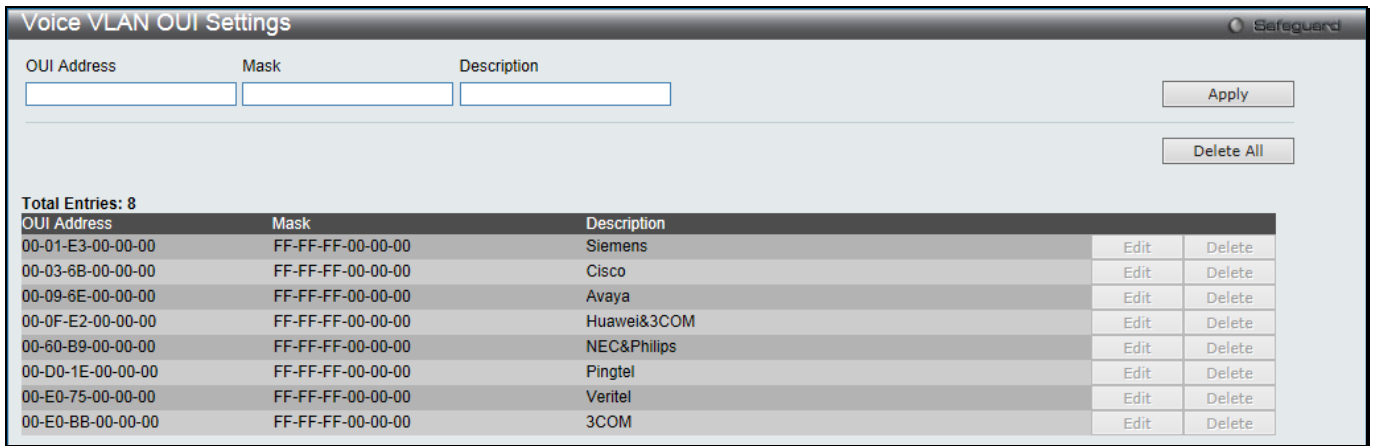


Figure 4-21 Voice VLAN OUI Settings window

The fields that can be configured are described below:

Parameter	Description
<b>OUI Address</b>	User defined OUI MAC address.
<b>Mask</b>	User defined OUI MAC address mask.
<b>Description</b>	The description for the user defined OUI.

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

Click the **Delete All** button to remove all the entries listed.

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

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

## Voice VLAN Device

This window is used to show voice devices that are connected to the ports. The start time is the time when the device is detected on this port, the activate time is the latest time saw the device sending the traffic.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN Device** as shown below.

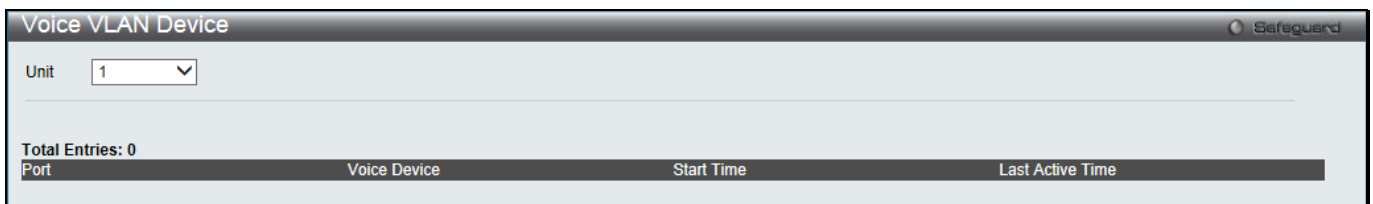


Figure 4-22 Voice VLAN Device window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.

## Voice VLAN LLDP-MED Voice Device

This window is used to show the voice devices being discovered by the LLDP-MED.

To view the following window, click **L2 Features > VLAN > Voice VLAN > Voice VLAN LLDP-MED Voice Device** as shown below.

Voice VLAN LLDP-MED Voice Device							
Total Entries: 0							
Index	Local Port	Chassis ID Subtype	Chassis ID	Port ID Subtype	Port ID	Create Time	Remain Time

Figure 4-23 Voice VLAN LLDP-MED Voice Device window

## Surveillance VLAN

### Surveillance VLAN Global Settings

Surveillance VLAN is a VLAN used to carry video traffic from surveillance devices. This window is used to configure the surveillance VLAN global settings.

To view the following window, click **L2 Features > VLAN > Surveillance VLAN > Surveillance VLAN Global Settings** as shown below.

Surveillance VLAN Global Settings	
Surveillance VLAN State	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
Surveillance VLAN Name	<input type="text"/>
Surveillance VID (1-4094)	<input type="text"/> <span style="float: right;">Apply</span>
Priority	<input type="text" value="5"/> <span style="float: right;">Apply</span>
Aging Time (1-65535)	<input type="text" value="720"/> min
Log State	<input type="text" value="Enabled"/> <span style="float: right;">Apply</span>

Figure 4-24 Surveillance VLAN Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Surveillance VLAN State</b>	The state of the surveillance VLAN.
<b>Surveillance VLAN Name</b>	The name of the surveillance VLAN.
<b>Surveillance VID (1-4094)</b>	The VLAN ID of the surveillance VLAN.
<b>Priority</b>	The priority of the surveillance VLAN, the range is 0 – 7. The default priority is 5.
<b>Aging Time (1-65535)</b>	The aging time to set, the range is 1 – 65535 minutes. The default value is 720 minutes. The aging time is used to remove a port from surveillance VLAN if the port is an automatic surveillance VLAN member. When the last surveillance device 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 reset and stop.
<b>Log State</b>	Used to enable/disable sending of issue of surveillance VLAN log.

Click the **Apply** button to accept the changes made for each individual section.

### Surveillance VLAN Port Settings

This window is used to show the ports surveillance VLAN information.

To view the following window, click **L2 Features > VLAN > Surveillance VLAN > Surveillance VLAN Port Settings** as shown below.

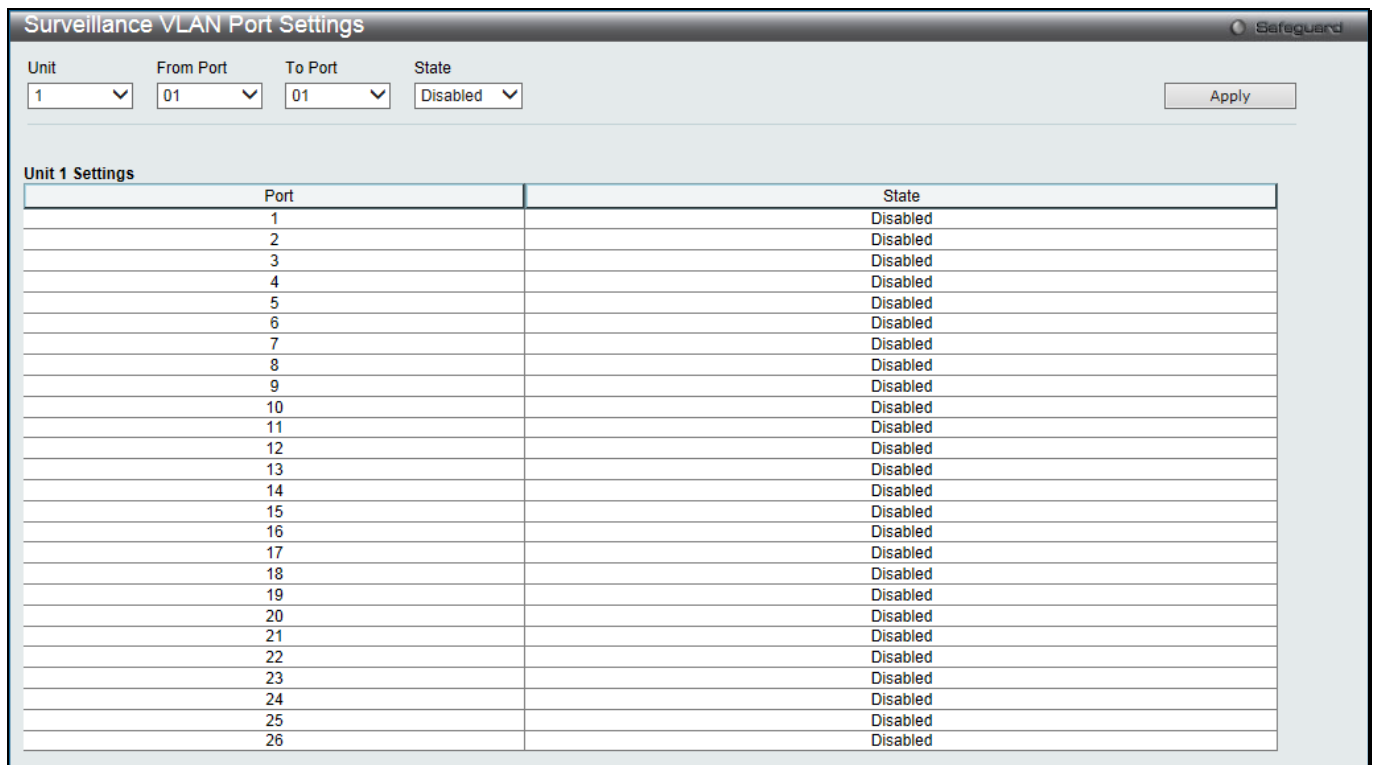


Figure 4-25 Surveillance VLAN Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select a range of port to display.
<b>State</b>	Use the drop-down menu to enable or disable the state of the port.

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

## Surveillance VLAN OUI Settings

This window is used to configure the user-defined surveillance traffic's OUI. The OUI is used to identify the surveillance traffic. There are a number of pre-defined OUIs. The user can further define the user-defined OUIs if needed. The user-defined OUI cannot be the same as the pre-defined OUI.

To view the following window, click **L2 Features > VLAN > Surveillance VLAN > Surveillance VLAN OUI Settings** as shown below.

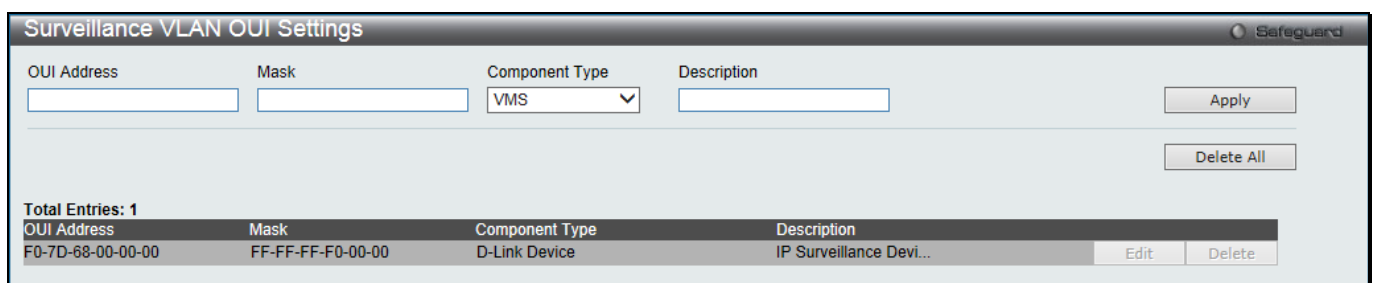


Figure 4-26 Surveillance VLAN OUI Settings window

The fields that can be configured are described below:

Parameter	Description
<b>OUI Address</b>	User defined OUI MAC address.

<b>Mask</b>	User defined OUI MAC address mask.
<b>Component Type</b>	Use the drop-down menu to select a surveillance component that can be auto-detected by surveillance VLAN. Available choices are: <i>VMS</i> , <i>VMS Client</i> , <i>Video Encoder</i> , <i>Network Storage</i> and <i>Other</i> .
<b>Description</b>	The description for the user defined OUI.

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

Click the **Delete All** button to remove all the entries listed.

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

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

## Surveillance VLAN Device

This window is used to show surveillance devices that are connected to the ports. The start time is the time when the device is detected on this port, the activate time is the latest time saw the device sending the traffic.

To view the following window, click **L2 Features > VLAN > Surveillance VLAN > Surveillance VLAN Device** as shown below.

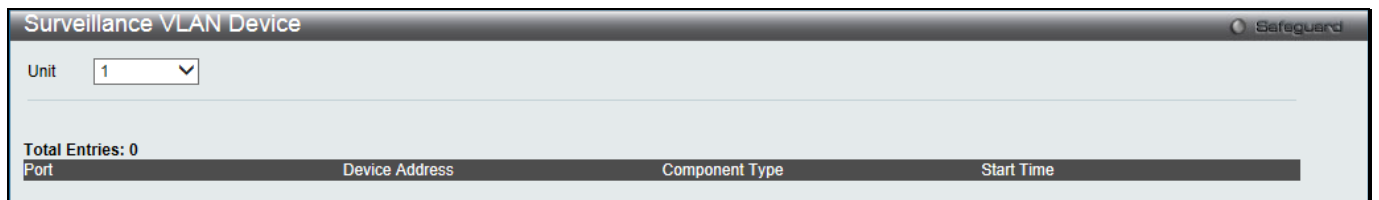


Figure 4-27 Surveillance VLAN Device window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.

## VLAN Trunk Settings

Enable VLAN on a port to allow frames belonging to unknown VLAN groups to pass through that port. This is useful if you want to set up VLAN groups on end devices without having to configure the same VLAN groups on intermediary devices.

Suppose you want to create VLAN groups 1 and 2 (V1 and V2) on devices A and B. Without a VLAN Trunk, you must first configure VLAN groups 1 and 2 on all intermediary switches C, D and E; otherwise they will drop frames with unknown VLAN group tags. However, with VLAN Trunk enabled on a port(s) in each intermediary switch, you only need to create VLAN groups in the end devices (A and B). C, D and E automatically allow frames with VLAN group tags 1 and 2 (VLAN groups that are unknown to those switches) to pass through their VLAN trunking port(s).

Refer to the following figure for an illustrated example.

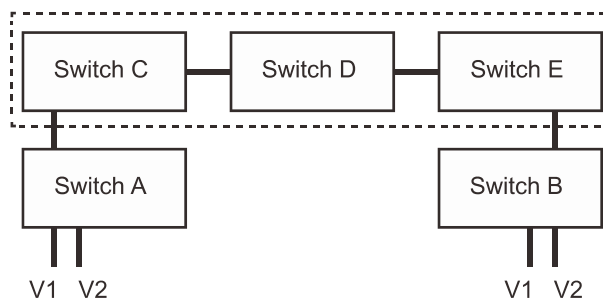


Figure 4-28 Example of VLAN Trunk

Users can combine a number of VLAN ports together to create VLAN trunks.

To view the following window, click **L2 Features > VLAN > VLAN Trunk Settings**, as show below:

Figure 4-29 VLAN Trunk Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Trunk State</b>	Enable or disable the VLAN trunking global state.
<b>Unit</b>	Select the unit you want to configure.
<b>Ports</b>	The ports to be configured. By clicking the <b>Select All</b> button, all the ports will be included. By clicking the <b>Clear All</b> button, all the ports will not be included.

Click the **Apply** button to accept the changes made for each individual section.

## Browse VLAN

Users can display the VLAN status for each of the Switch's ports viewed by VLAN. Enter a VID (VLAN ID) in the field at the top of the window and click the **Find** button.

To view the following window, click **L2 Features > VLAN > Browse VLAN**, as show below:

Figure 4-30 Browse VLAN window

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.



**NOTE:** The abbreviations used on this window are **Tagged Port (T)**, **Untagged Port (U)** and **Forbidden Port (F)**.

## Show VLAN Ports

Users can display the VLAN ports of the Switch's viewed by VID. Enter a Port or a **Port List** in the field at the top of the window and click the **Find** button.

To view the following window, click **L2 Features > VLAN > Show VLAN Ports**, as show below:



Figure 4-31 Show VLAN Ports window

The fields that can be configured are described below:

Parameter	Description
Port List	Enter a list of ports to be displayed.

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

Click the **View All** button to display all the existing entries.

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

## QinQ

Double or Q-in-Q VLANs allow network providers to expand their VLAN configurations to place customer VLANs within a larger inclusive VLAN, which adds a new layer to the VLAN configuration. This basically lets large ISP's create L2 Virtual Private Networks and also create transparent LANs for their customers, which will connect two or more customer LAN points without over-complicating configurations on the client's side. Not only will over-complication be avoided, but also now the administrator has over 4000 VLANs in which over 4000 VLANs can be placed, therefore greatly expanding the VLAN network and enabling greater support of customers utilizing multiple VLANs on the network.

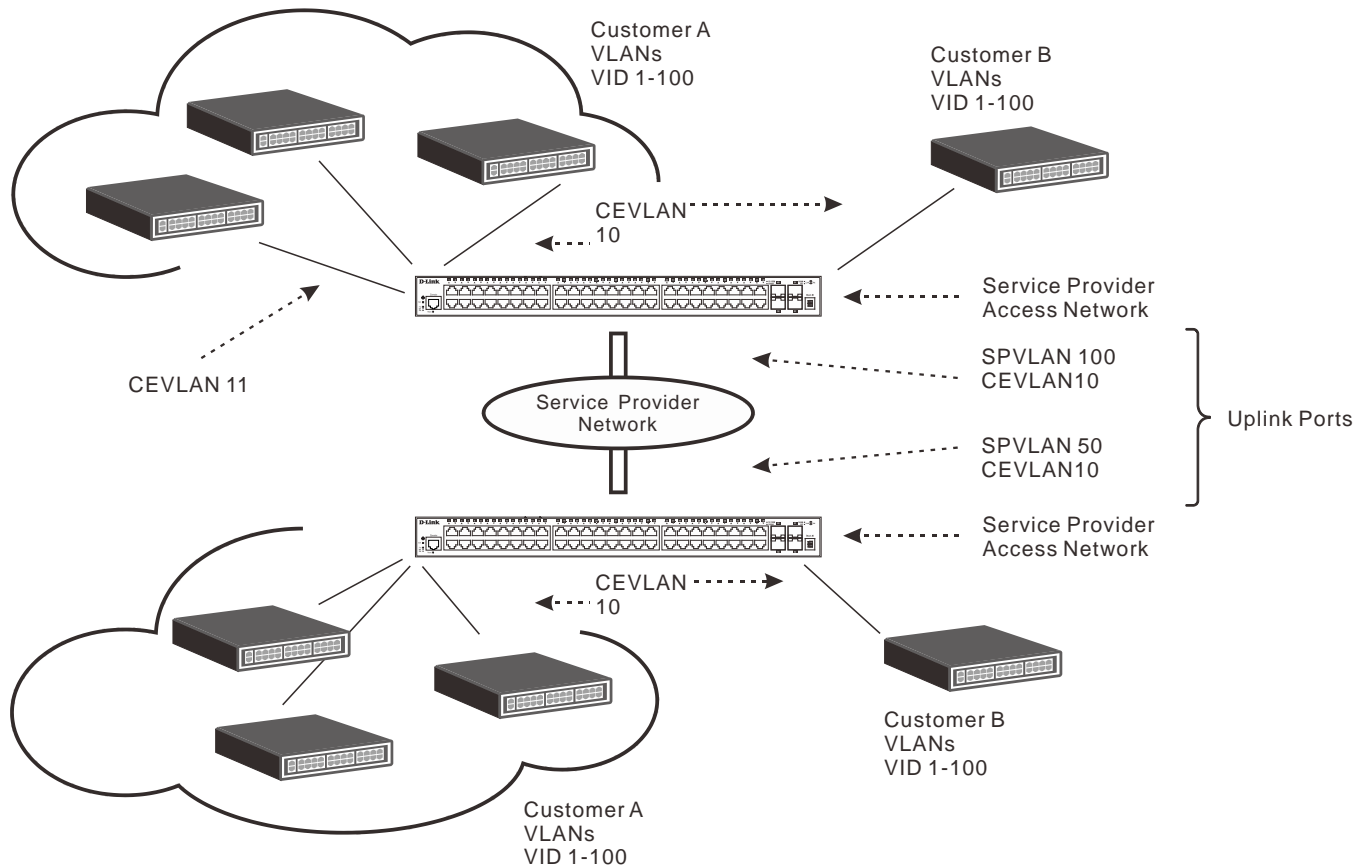
Double VLANs are basically VLAN tags placed within existing IEEE 802.1Q VLANs which we will call SPVIDs (Service Provider VLAN IDs). These VLANs are marked by a TPID (Tagged Protocol ID), configured in hex form to be encapsulated within the VLAN tag of the packet. This identifies the packet as double-tagged and segregates it from other VLANs on the network, therefore creating a hierarchy of VLANs within a single packet.

Here is an example Double VLAN tagged packet.

Destination Address	Source Address	SPVLAN (TPID + Service Provider VLAN Tag)	802.1Q CEVLAN Tag (TPID + Customer VLAN Tag)	Ether Type	Payload
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Consider the example below:





**Figure 4-32 QinQ example window**

In this example, the Service Provider Access Network switch (Provider edge switch) is the device creating and configuring Double VLANs. Both CEVLANS (Customer VLANs), 10 and 11, are tagged with the SPVID 100 on the Service Provider Access Network and therefore belong to one VLAN on the Service Provider's network, thus being a member of two VLANs. In this way, the Customer can retain its normal VLAN and the Service Provider can congregate multiple Customer VLANs within one SPVLAN, thus greatly regulating traffic and routing on the Service Provider switch. This information is then routed to the Service Provider's main network and regarded there as one VLAN, with one set of protocols and one routing behavior.

### **Regulations for Double VLANs**

Some rules and regulations apply with the implementation of the Double VLAN procedure.

1. All ports must be configured for the SPVID and its corresponding TPID on the Service Provider's edge switch.
2. All ports must be configured as Access Ports or Uplink ports. Access ports can only be Ethernet ports while Uplink ports must be Gigabit ports.
3. Provider Edge switches must allow frames of at least 1522 bytes or more, due to the addition of the SPVID tag.
4. Access Ports must be an un-tagged port of the service provider VLANs. Uplink Ports must be a tagged port of the service provider VLANs.
5. The switch cannot have both double and normal VLANs co-existing. Once the change of VLAN is made, all Access Control lists are cleared and must be reconfigured.
6. Once Double VLANs are enabled, GVRP must be disabled.
7. All packets sent from the CPU to the Access ports must be untagged.
8. The following functions will not operate when the switch is in Double VLAN mode:
9. Guest VLANs.
10. Web-based Access Control.
11. IP Multicast Routing.
12. GVRP.
13. All Regular 802.1Q VLAN functions.

## QinQ Settings

This window is used to configure the Q-in-Q parameters.

To view the following window, click **L2 Features > QinQ > QinQ Settings**, as show below:

**QinQ Global Settings**

QinQ State  Enabled  Disabled Apply

Inner TPID 0x  (hex : 0x1-0xffff) Apply

Unit  From Port  To Port  Role  Missdrop  Outer TPID  Use Inner Priority  Add Inner Tag (hex : 0x1-0xffff)   Disabled Apply

**Unit 1 Settings**

Port	Role	Missdrop	Outer TPID	Use Inner Priority	Add Inner Tag
1	NNI	Disabled	0x88A8	Disabled	Disabled
2	NNI	Disabled	0x88A8	Disabled	Disabled
3	NNI	Disabled	0x88A8	Disabled	Disabled
4	NNI	Disabled	0x88A8	Disabled	Disabled
5	NNI	Disabled	0x88A8	Disabled	Disabled
6	NNI	Disabled	0x88A8	Disabled	Disabled
7	NNI	Disabled	0x88A8	Disabled	Disabled
8	NNI	Disabled	0x88A8	Disabled	Disabled
9	NNI	Disabled	0x88A8	Disabled	Disabled
10	NNI	Disabled	0x88A8	Disabled	Disabled
11	NNI	Disabled	0x88A8	Disabled	Disabled
12	NNI	Disabled	0x88A8	Disabled	Disabled
13	NNI	Disabled	0x88A8	Disabled	Disabled
14	NNI	Disabled	0x88A8	Disabled	Disabled
15	NNI	Disabled	0x88A8	Disabled	Disabled
16	NNI	Disabled	0x88A8	Disabled	Disabled
17	NNI	Disabled	0x88A8	Disabled	Disabled
18	NNI	Disabled	0x88A8	Disabled	Disabled
19	NNI	Disabled	0x88A8	Disabled	Disabled
20	NNI	Disabled	0x88A8	Disabled	Disabled
21	NNI	Disabled	0x88A8	Disabled	Disabled
22	NNI	Disabled	0x88A8	Disabled	Disabled
23	NNI	Disabled	0x88A8	Disabled	Disabled
24	NNI	Disabled	0x88A8	Disabled	Disabled
25	NNI	Disabled	0x88A8	Disabled	Disabled
26	NNI	Disabled	0x88A8	Disabled	Disabled

Figure 4-33 QinQ Settings Window

The fields that can be configured are described below:

Parameter	Description
<b>QinQ State</b>	Click to enable or disable the Q-in-Q state.
<b>Inner TPID</b>	Enter an Inner TPID in SP-VLAN tag here.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to use in the configuration.
<b>Role</b>	Port role in Q-in-Q mode, it can be UNI port or NNI port
<b>Missdrop</b>	This option enables or disables C-VLAN based SP-VLAN assignment miss drop. If Missdrop is enabled, the packet that does not match any assignment rule in the Q-in-Q profile will be dropped. If disabled, then the packet will be forwarded and will be assigned to the PVID of the received port.
<b>Outer TPID</b>	Enter an Outer TPID in SP-VLAN tag here.
<b>Add Inner Tag</b>	Specify that an Inner Tag will be added to the entry. By default the <b>Disabled</b> check box is selected.

Click the **Apply** button to accept the changes made for each individual section.

## VLAN Translation Settings

This window is used to add translation relationship between C-VLAN and SP-VLAN. On ingress at UNI port, the C-VLAN tagged packets will be translated to SP-VLAN tagged packets by adding or replacing according the configured rule. On egress at this port, the SP-VLAN tag will be recovered to C-VLAN tag or be striped. The priority will be the priority in the SP-VLAN tag if the inner priority flag is disabled for the receipt port.

To view the following window, click **L2 Features > QinQ > VLAN Translation Settings**, as show below:

Figure 4-34 VLAN Translation Settings Window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to use in the configuration.
<b>CVID (1, 5-7)</b>	Enter the C-VLAN ID to match.
<b>Action</b>	The action indicates to add an S-tag before a C-tag or to replace the original C-tag by an S-tag.
<b>SVID (1-4094)</b>	Enter the SP-VLAN ID.
<b>Priority</b>	Use the drop-down menu to select the priority of the s-tag.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Delete All** button to remove all the entries listed.

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

Click the **Delete** button to remove a specific entry.

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

## VLAN Translation Port Mapping Settings

This window is used to configure the ports to map with flow-based Q-in-Q translation profile.

To view the following window, click **L2 Features > QinQ > VLAN Translation Port Mapping Settings**, as show below:

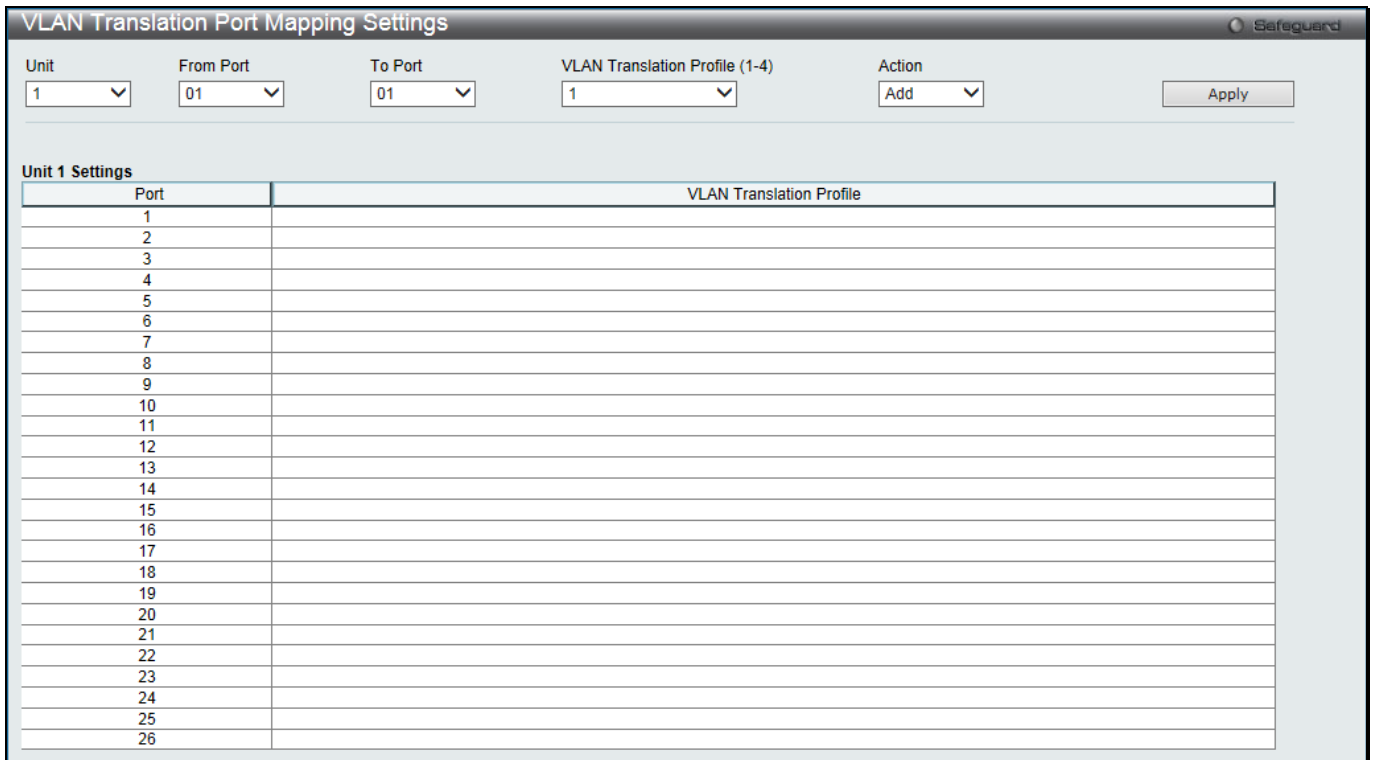


Figure 4-35 VLAN Translation Port Mapping Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select a range of port to display.
<b>VLAN Translation Profile (1-4)</b>	Use the drop-down menu to select the profile ID of VLAN translation.
<b>Action</b>	Use the drop-down menu to add or delete the specified ports from the VLAN translation profile.

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

## VLAN Translation Profile List

This window is used to display and configure flow-based Q-in-Q translation rules and profiles.

To view the following window, click **L2 Features > QinQ > VLAN Translation Profile List**, as show below:



Figure 4-36 VLAN Translation Profile List window

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-4)</b>	Specify the VLAN translation profile ID.

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

Click the **Add QinQ Profile** button to add a new Q-in-Q translation rule.

Click the **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed in the table.

Click the **Show Match** button to see the detail information of the Q-in-Q VLAN translation rule.

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

Click the **Add QinQ Profile** button to see the following window.

Figure 4-37 VLAN Translation Profile List - Add QinQ Profile window

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-4)</b>	Use the drop-down menu to select the profile ID of VLAN translation.
<b>Rule ID (1-128)</b>	Specify the rule ID for the profile.
<b>Action</b>	Use the drop-down menu to select the action for the profile. <i>Add</i> – Specify to add a tag for the assigned S-VLAN before the Outer-VLAN tag. If there is a service tag (S-TAG) in the packet, this rule will not take effect. <i>Replace</i> – Specify to replace the Outer VLAN ID in the tag with the SVID. If there is no TAG in the packet, this rule will not take effect.
<b>SVID (1-4094)</b>	Specify the S-VLAN ID to be assigned to the matched packet.
<b>Priority</b>	Use the drop-down menu to select the 802.1p priority of the S-TAG.
<b>Source MAC</b>	Specify the source MAC address.
<b>Source Mask</b>	Specify the mask of the source MAC.
<b>Destination MAC</b>	Specify the destination MAC address.
<b>Destination Mask</b>	Specify the mask of the destination MAC.
<b>Source IP</b>	Specify the source IP address.
<b>Source IP Mask</b>	Specify the subnet mask of the source IP address.
<b>Destination IP</b>	Specify the destination IP address.
<b>Destination IP Mask</b>	Specify the subnet mask of the destination IP address.
<b>L4 Source Port</b>	Specify the L4 source port ID.
<b>L4 Destination Port</b>	Specify the L4 destination port ID.
<b>Outer VID List</b>	Specify the Outer VLAN ID of the packet.

<b>802.1p</b>	Use the drop-down menu to select the 802.1p priority of the packet.
<b>IP Protocol</b>	Specify the L3 protocol value.

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

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

## Layer 2 Protocol Tunneling Settings

This window is used to configure Layer 2 protocol tunneling settings.

To view the following window, click **L2 Features > Layer 2 Protocol tunneling Settings**, as show below:

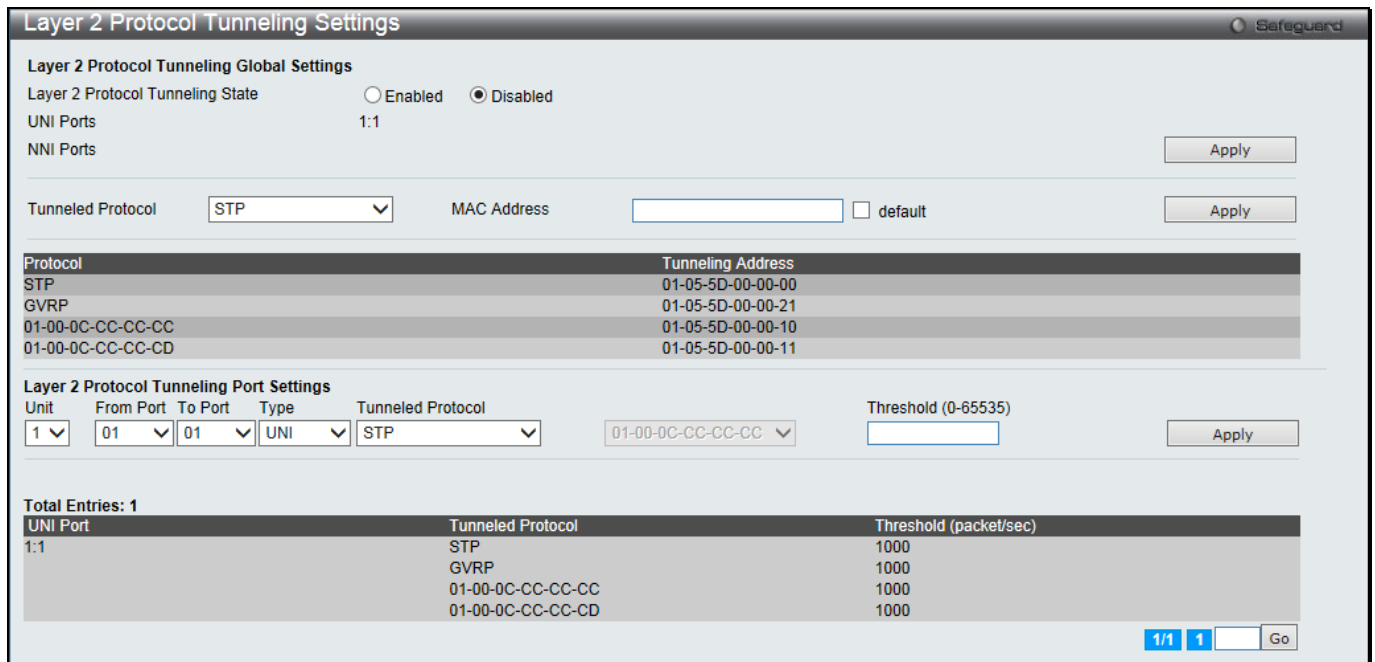


Figure 4-38 Layer 2 Protocol Tunneling Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Layer 2 Protocol Tunneling State</b>	Click to enable or disable the Layer 2 protocol tunneling state.
<b>Tunneled Protocol</b>	Use the drop-down menus to select tunneled protocols to be configured. <i>STP</i> – Specify the BPDU received on the UNI that will be tunneled to the specified MAC address. <i>GVRP</i> – Specify that the GVRP PDU received on the UNI that will be tunneled to the specified MAC address. <i>01-00-0C-CC-CC-CC</i> – Specify another vendor’s PDU received on the UNI that will be tunneled to the specified MAC address. <i>01-00-0C-CC-CC-CD</i> – Specify another vendor’s PDU received on the UNI that will be tunneled to the specified MAC address.
<b>MAC Address</b>	Specify the MAC address that the selected protocol will be tunneled to. Tick the <b>Default</b> check box to use the default tunneling address.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to use in the configuration.
<b>Type</b>	Specify the type of the ports. <i>UNI</i> – Specify the ports as UNI ports. <i>NNI</i> – Specify the ports as NNI ports.

	<i>None</i> - Disable tunnel on it.
<b>Tunneled Protocol</b>	Use the drop-down menus to select tunneled protocols on the UNI ports. <i>STP</i> – Specify to use the STP protocol. <i>GVRP</i> – Specify to use the GVRP protocol. <i>Protocol MAC</i> – Specify the destination MAC address of the L2 protocol packets that will tunneled on these UNI ports. The MAC address can be 01-00-0C-CC-CC-CC or 01-00-0C-CC-CC-CD. <i>All</i> - All tunnel enabled Layer 2 protocols will be tunneled on the ports.
<b>Threshold (0-65535)</b>	Specify the drop threshold for packets-per-second accepted on the UNI ports. The ports drop the PDU if the protocol's threshold is exceeded.

Click the **Apply** button to accept the changes made for each individual section.

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

## Spanning Tree

This Switch supports three versions of the Spanning Tree Protocol: 802.1D-1998 STP, 802.1D-2004 Rapid STP, and 802.1Q-2005 MSTP. 802.1D-1998 STP will be familiar to most networking professionals. However, since 802.1D-2004 RSTP and 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 802.1D-1998 STP, 802.1D-2004 RSTP, and 802.1Q-2005 MSTP.

### 802.1Q-2005 MSTP

Multiple Spanning Tree Protocol, or 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).

An 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. Consequentially, 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 have a single MSTP configuration that will have the following three attributes:

1. 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).
2. A configuration revision number (named here as a Revision Level and found in the **MST Configuration Identification** window) and;
3. 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:

1. The Switch must be set to the MSTP setting (found in the **STP Bridge Global Settings** window in the STP Version field)
2. The correct spanning tree priority for the MSTP instance must be entered (defined here as a Priority in the **MSTI Config Information** window when configuring MSTI ID settings).
3. 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 the IEEE 802.1Q-2005, the Rapid Spanning Tree Protocol (RSTP) as defined by the IEEE 802.1D-2004 specification and a version compatible with the IEEE 802.1D-1998 STP. RSTP can operate with legacy equipment implementing IEEE 802.1D-1998; however the advantages of using RSTP will be lost.

The IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP) evolved from the 802.1D-1998 STP standard. RSTP was developed in order to overcome some limitations of STP that impede the function of some recent switching innovations, in particular, certain Layer 3 functions that are increasingly handled by Ethernet switches. The basic function and much of the terminology is the same as STP. Most of the settings configured for STP are also used for RSTP. 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 creates a single state 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. Table 7-3 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 thus faster topology adjustment. A drawback of 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
<i>Discarding</i>	<i>Discarding</i>	<i>Blocking</i>	No	No
<i>Discarding</i>	<i>Discarding</i>	<i>Listening</i>	No	No
<i>Learning</i>	<i>Learning</i>	<i>Learning</i>	No	<b>Yes</b>
<b>Forwarding</b>	<b>Forwarding</b>	<b>Forwarding</b>	<b>Yes</b>	<b>Yes</b>

RSTP is capable of a more rapid transition to a forwarding state - it no longer relies on timer configurations - 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

The edge port is a configurable designation used for a port that 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, immediately becoming 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 is 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 provides for 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 per-user-defined group of ports basis.



**NOTE:** STP should be disabled on the ring ports before enabling ERPS.

## STP Bridge Global Settings

This window is used to configure the STP bridge global parameters.

To view the following window, click **L2 Features > Spanning Tree > STP Bridge Global Settings**, as show below:

Figure 4-39 STP Bridge Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>STP State</b>	Use the radio button to globally enable or disable STP.
<b>STP New Root Trap</b>	Click to enable or disable sending new root traps.
<b>STP Topology Change Trap</b>	Click to enable or disable sending topology change traps.
<b>STP Version</b>	Use the drop-down menu to choose the desired version of STP: <i>STP</i> - Select this parameter to set the Spanning Tree Protocol (STP) globally on the switch. <i>RSTP</i> - Select this parameter to set the Rapid Spanning Tree Protocol (RSTP) globally on the Switch. <i>MSTP</i> - Select this parameter to set the Multiple Spanning Tree Protocol (MSTP) globally on the Switch.
<b>Forwarding BPDU</b>	This field can be <i>Enabled</i> or <i>Disabled</i> . When <i>Enabled</i> , it allows the forwarding of STP BPDU packets from other network devices. The default is <i>Disabled</i> .
<b>Bridge Max Age (6-40)</b>	The Max Age 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. The user may choose a time between 6 and 40 seconds. The default value is 20 seconds.
<b>Bridge Hello Time (1-2)</b>	The Hello Time can be set from 1 to 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. The default is 2 seconds.
<b>Bridge Forward Delay (4-30)</b>	The Forward Delay can be from 4 to 30 seconds. Any port on the Switch spends this time in the listening state while moving from the blocking state to the forwarding state. The default is 15 seconds
<b>Tx Hold Count (1-10)</b>	Used to set the maximum number of Hello packets transmitted per interval. The count can be specified from 1 to 10. The default is 6.
<b>Max Hops (6-40)</b>	Used to set the number of hops between devices in a spanning tree region before the BPDU (bridge protocol data unit) 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 BPDU packet and the information held for the port will age out. The user may set a hop count from 6 to 40. The default is 20.
<b>NNI BPDU Address</b>	Used to determine the BPDU protocol address for STP in service provide site. It can use 802.1D STP address or 802.1ad service provider STP address.

Click the **Apply** button to accept the changes made for each individual section.



**NOTE:** The Bridge Hello Time cannot be longer than the Bridge Max Age. Otherwise, a configuration error will occur. Observe the following formulas when setting the above parameters:

Bridge Max Age  $\leq$  2 x (Bridge Forward Delay - 1 second)

Bridge Max Age  $>$  2 x (Bridge Hello Time + 1 second)

## STP Port Settings

STP can be set up on a port per port basis. It is advisable to define an STP Group to correspond to a VLAN group of ports.

To view the following window, click **L2 Features > Spanning Tree > STP Port Settings**, as show below:

STP Port Settings
Safeguard

Unit:

From Port:

To Port:

External Cost (0 = Auto):

Migrate:

Edge:

P2P:

Port STP:

Restricted Role:

Restricted TCN:

Forward BPDU:

Loop Guard:

Port	External Cost	Edge	P2P	Port STP	Restricted Role	Restricted TCN	Forward BPDU	Hello Time	Loop Guard
1	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
2	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
3	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
4	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
5	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
6	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
7	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
8	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
9	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
10	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
11	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
12	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
13	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
14	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
15	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False
16	Auto/200000	False/No	Auto/Yes	Enabled	False	False	Disabled	2/2	False

Port field:  
M = Trunk Master; T = Trunk Member  
External Cost, Edge, P2P and Hello Time fields:  
Value1/Value2 (Value1 = Configured value; Value2 = Actual value)

Figure 4-40 STP Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the starting and ending ports to be configured.
<b>External Cost (0=Auto)</b>	This 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. The default 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. The default port cost for a 100Mbps port is 200000 and the default port cost for a Gigabit port is 20000. Enter a value between 1 and 200000000 to determine the External Cost. The lower the number, the greater the probability the port will be chosen to forward packets.
<b>P2P</b>	Choosing <i>True</i> indicates a point-to-point (P2P) shared link. P2P ports are similar to edge ports; however they are restricted in that a P2P port must operate in full duplex. Like edge ports, P2P ports transition to a forwarding state rapidly thus benefiting from RSTP. A P2P value of <i>False</i> indicates that the port cannot have P2P status. <i>Auto</i> allows the port to have P2P status whenever possible and operate as if the P2P status were <i>True</i> . If the port cannot maintain this status, (for example if the port is forced to half-duplex operation) the P2P status changes to operate as if the P2P value were <i>False</i> . The default setting for this parameter is <i>Auto</i> .
<b>Restricted TCN</b>	Topology Change Notification is a simple BPDU that a bridge sends out to its root port to signal a topology change. Restricted TCN can be toggled between <i>True</i> and <i>False</i> . If set to <i>True</i> , this stops the port from propagating received topology change notifications and topology changes to other ports. The default is <i>False</i> .
<b>Migrate</b>	When operating in RSTP mode, selecting <i>Yes</i> forces the port that has been selected to transmit RSTP BPDUs.
<b>Port STP</b>	This drop-down menu allows you to enable or disable STP for the selected group of ports. The default is <i>Enabled</i> .
<b>Forward BPDU</b>	Use the drop-down menu to enable or disable the flooding of BPDU packets when STP is disabled.
<b>Edge</b>	Choosing <i>True</i> designates the port as an edge port. Edge ports cannot create loops,

	however an edge port can lose edge port status if a topology change creates a potential for a loop. An edge port normally should not receive BPDU packets. If a BPDU packet is received, it automatically loses edge port status. Choosing the <i>False</i> parameter indicates that the port does not have edge port status. Alternatively, the <i>Auto</i> option is available.
<b>Restricted Role</b>	Use the drop-down menu to toggle Restricted Role between <i>True</i> and <i>False</i> . If set to <i>True</i> , the port will never be selected to be the Root port. The default is <i>False</i> .
<b>Loop Guard</b>	When set to <i>True</i> , if the root port or alternate port does not receive BPDUs from the upstream switching device, the port will enter the Discarding state and no longer forward packets until receiving new BPDUs.

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

## MST Configuration Identification

This window allows the user to configure a MSTI instance on the Switch. These settings will uniquely identify a multiple spanning tree instance set on the Switch. The Switch initially possesses one CIST, or Common Internal Spanning Tree, of which the user may modify the parameters for but cannot change the MSTI ID for, and cannot be deleted.

To view the following window, click **L2 Features > Spanning Tree > MST Configuration Identification**, as show below:

Figure 4-41 MST Configuration Identification window

The fields that can be configured are described below:

Parameter	Description
<b>Configuration Name</b>	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.
<b>Revision Level (0-65535)</b>	This value, along with the Configuration Name, identifies the MSTP region configured on the Switch.
<b>MSTI ID (1-64)</b>	Enter a number between 1 and 64 to set a new MSTI on the Switch.
<b>Type</b>	This field allows the user to choose a desired method for altering the MSTI settings. The user has two choices: <i>Add VID</i> - Select this parameter to add VIDs to the MSTI ID, in conjunction with the VID List parameter. <i>Remove VID</i> - Select this parameter to remove VIDs from the MSTI ID, in conjunction with the VID List parameter.
<b>VID List</b>	This field is used to specify the VID range from configured VLANs set on the Switch. Supported VIDs on the Switch range from ID number 1 to 4094.

Click the **Apply** button to accept the changes made for each individual section.

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

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

## STP Instance Settings

This window displays MSTIs currently set on the Switch and allows users to change the Priority of the MSTIs. To view the following window, click **L2 Features > Spanning Tree > STP Instance Settings**, as show below:

Figure 4-42STP Instance Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MSTI ID (1-64)</b>	Enter the MSTI ID in this field. An entry of 0 denotes the CIST (default MSTI).
<b>Priority</b>	Enter the priority in this field. The available range of values is from 0 to 61440.

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

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

Click the **View** button to display the information of the specific entry.

## MSTP Port Information

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

To view the following window, click **L2 Features > Spanning Tree > MSTP Port Information**, as show below:

Figure 4-43 MSTP Port Information window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Select the port you want to configure.

<b>Instance ID</b>	The MSTI ID of the instance to be configured. Enter a value between 0 and 15. An entry of 0 in this field denotes the CIST (default MSTI).
<b>Internal Path Cost (1-200000000)</b>	This parameter is set to represent the relative cost of forwarding packets to specified ports when an interface is selected within an STP instance. Selecting this parameter with a value in the range of 1 to 200000000 will set the quickest route when a loop occurs. A lower Internal cost represents a quicker transmission. Selecting 0 (zero) for this parameter will set the quickest route automatically and optimally for an interface. Tick the <b>Auto</b> check box to allow the system to assign a value here.
<b>Priority</b>	Enter a value between 0 and 240 to set the priority for the port interface. A higher priority will designate the interface to forward packets first. A lower number denotes a higher priority.

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

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

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

## RSTP Multiprocess Settings

This window is used to configure the RSTP multi-process function.

To view the following window, click **L2 Features > Spanning Tree > RSTP Multiprocess Settings**, as show below:

The fields that can be configured are described below:

Parameter	Description
<b>RSTP Multiprocess State</b>	Click to enable or disable
<b>RSTP Multiprocess Name</b>	Specify the name of RSTP ring.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the appropriate port range used for the configuration.
<b>Action</b>	Use the drop-down menu to add or delete the specified ports from the RSTP ring.
<b>Ring Name</b>	Specify the name of RSTP ring.

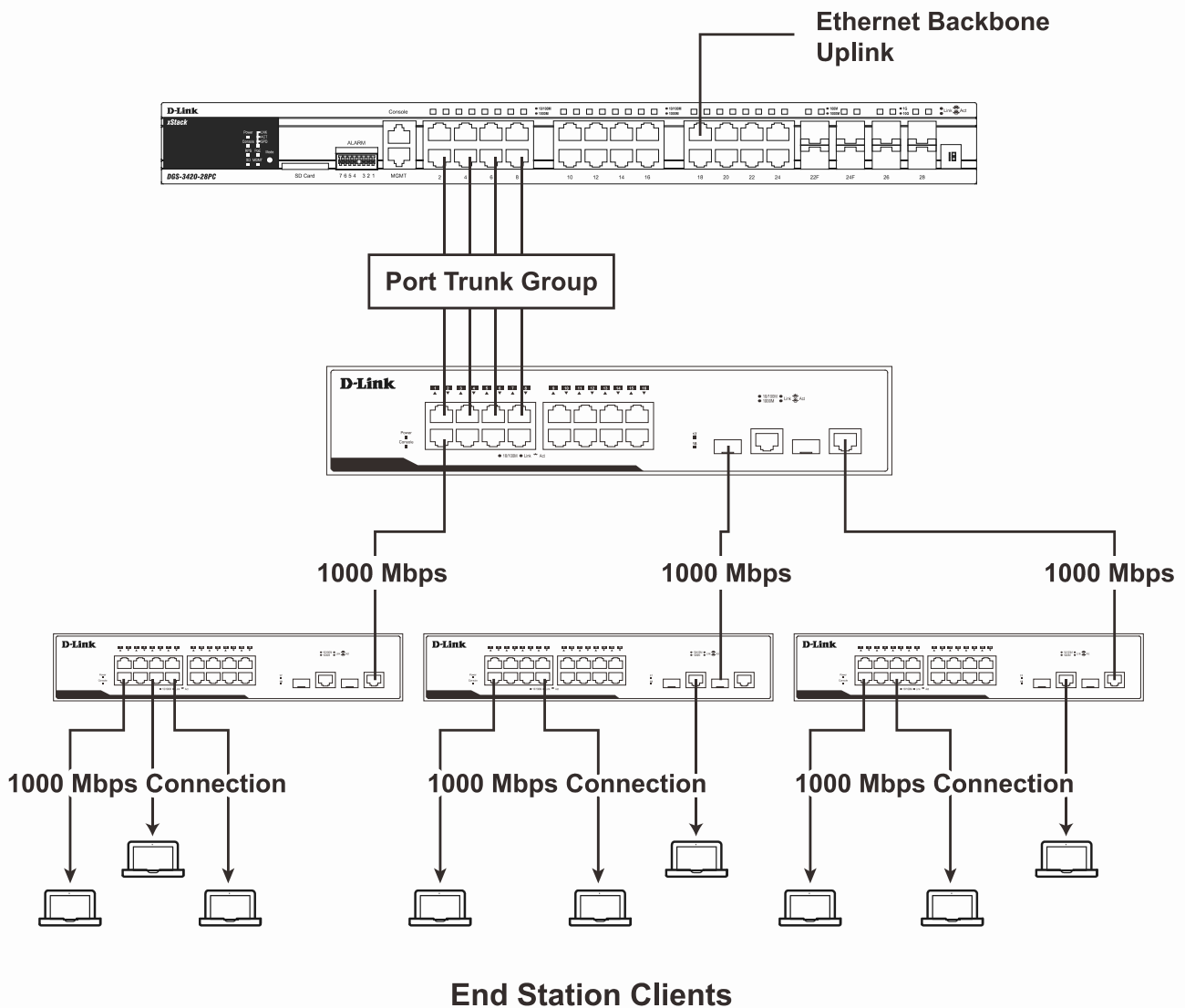
Click the **Apply** button to accept the changes made for each individual section.

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

## 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 two to eight ports in each group.



4-44 Example of Port Trunk Group

Link aggregation allows several ports to be grouped together and to act as a single link. This gives a bandwidth that is a multiple of a single link's bandwidth.

Link aggregation is most commonly used to link a bandwidth intensive network device or devices, such as a server, to the backbone of a network.

All of the ports in the group must be members of the same VLAN, and their STP status, static multicast, traffic segmentation and 802.1p default priority configurations must be identical. Port locking, port mirroring, traffic control, and 802.1X must not be enabled on the trunk group. Further, the LACP aggregated links must all be of the same speed and should be configured as full duplex.

The Master Port of the group is to be configured by the user, and all configuration options, including the VLAN configuration that can be applied to the Master Port, are applied to the entire 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, on the switch level. On the port level, the STP will use the port parameters of the Master Port in the calculation of port cost and in determining the state of the link aggregation group. 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.

## Port Trunking Settings

This window is used to configure the port trunk settings for the switch.

To view the following window, click **L2 Features > Link Aggregation > Port Trunking Settings**, as show below:

Figure 4-45 Port Trunking Settings window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Algorithm</b>	This is the traffic hash algorithm among the ports of the link aggregation group. Options to choose from are <i>MAC Source</i> , <i>MAC Destination</i> , <i>MAC Source Destination</i> , <i>IP Source</i> , <i>IP Destination</i> and <i>IP Source Destination</i> .
<b>Unit</b>	Select the unit to be configured.
<b>Group ID (1-32)</b>	Select an ID number for the group.
<b>Type</b>	This drop-down menu allows users to select between <i>Static</i> and <i>LACP</i> (Link Aggregation Control Protocol). <i>LACP</i> allows member ports to negotiate with link partners using LACP PDUs to decide the aggregation.
<b>Master Port</b>	Choose the Master Port for the trunk group using the drop-down menu.
<b>State</b>	Use the drop-down menu to toggle between <i>Enabled</i> and <i>Disabled</i> . This is used to turn a port trunking group on or off.
<b>Trap</b>	Use the drop-down menu to enable or disable Link Up and Link Down notifications for this link aggregation group.
<b>Member Ports</b>	Choose the members of a trunked group. Up to eight ports can be assigned to a group.
<b>Active Ports</b>	Show the ports that are currently forwarding packets.

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

Click the **Clear All** button to clear out all the information entered.

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





**NOTE:** The maximum number of ports that can be configured in one Static Trunk or LACP Group are 8 ports.

## LACP Port Settings

In conjunction with the Trunking window, users can create port trunking groups on the Switch. Using the following window, the user may set which ports will be active and passive in processing and sending LACP control frames.

To view the following window, click **L2 Features > Link Aggregation > LACP Port Settings**, as show below:

Port	Activity	LACP Timeout
1	Passive	Short
2	Passive	Short
3	Passive	Short
4	Passive	Short
5	Passive	Short
6	Passive	Short
7	Passive	Short
8	Passive	Short
9	Passive	Short
10	Passive	Short
11	Passive	Short
12	Passive	Short
13	Passive	Short
14	Passive	Short
15	Passive	Short
16	Passive	Short
17	Passive	Short
18	Passive	Short
19	Passive	Short
20	Passive	Short
21	Passive	Short
22	Passive	Short
23	Passive	Short
24	Passive	Short
25	Passive	Short
26	Passive	Short

Figure 4-46 LACP Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	A consecutive group of ports may be configured starting with the selected port.
<b>Activity</b>	<p><i>Active</i> - Active LACP ports are capable of processing and sending LACP control frames. This allows LACP compliant devices to negotiate the aggregated link so the group may be changed dynamically as needs require. In order to utilize the ability to change an aggregated port group, that is, to add or subtract ports from the group, at least one of the participating devices must designate LACP ports as active. Both devices must support LACP.</p> <p><i>Passive</i> - LACP ports that are designated as passive cannot initially send LACP control frames. In order to allow the linked port group to negotiate adjustments and make changes dynamically, one end of the connection must have "active" LACP ports (see above).</p>
<b>LACP Timeout</b>	<p><i>Short</i> - Specify to have 3 seconds before LACP invalidating received LACP PDU information and 1 second between LACP PDU periodic transmissions.</p> <p><i>Long</i> - Specify to have 90 seconds before LACP invalidating received LACP PDU information and 30 second between LACP PDU periodic transmissions.</p>

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

# FDB

## Static FDB Settings

### Unicast Static FDB Settings

Users can set up static unicast forwarding on the Switch.

To view the following window, click **L2 Features > FDB > Static FDB Settings > Unicast Static FDB Settings**, as show below:

Figure 4-47 Unicast Static FDB Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Click the radio button and enter the VLAN name of the VLAN on which the associated unicast MAC address resides.
<b>VLAN List</b>	Click the radio button and enter a list of VLAN on which the associated unicast MAC address resides.
<b>MAC Address</b>	The MAC address to which packets will be statically forwarded. This must be a unicast MAC address.
<b>Port / Drop</b>	Allows the selection of the port number on which the MAC address entered above resides. This option could also drop the MAC address from the unicast static FDB. When selecting <i>Port</i> , enter the port number in the field.

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.

### Multicast Static FDB Settings

Users can set up static multicast forwarding on the Switch.

To view the following window, click **L2 Features > FDB > Static FDB Settings > Multicast Static FDB Settings**, as show below:

**Multicast Forwarding Settings**

VID:

Multicast MAC Address:

Unit:

Port	Select All	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
None	<input type="button" value="All"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Egress	<input type="button" value="All"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Egress Ports

Total Entries: 1

VID	MAC Address	Mode	Egress Ports
1	01-22-33-44-55-55	Static	

Figure 4-48 Multicast Static FDB Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VID</b>	The VLAN ID of the VLAN the corresponding MAC address belongs to.
<b>Multicast MAC Address</b>	The static destination MAC address of the multicast packets. This must be a multicast MAC address.
<b>Unit</b>	Select the unit to be configured.
<b>Port</b>	Allows the selection of ports that will be members of the static multicast group and ports that are either forbidden from joining dynamically, or that can join the multicast group dynamically, using GMRP. The options are: <i>None</i> - No restrictions on the port dynamically joining the multicast group. When <i>None</i> is chosen, the port will not be a member of the Static Multicast Group. Click the <b>All</b> button to select all the ports. <i>Egress</i> - The port is a static member of the multicast group. Click the <b>All</b> button to select all the ports.

Click the **Clear All** button to clear out all the information entered.

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.

## MAC Notification Settings

MAC Notification is used to monitor MAC addresses learned and entered into the forwarding database. This window allows you to globally set MAC notification on the Switch. Users can set MAC notification for individual ports on the Switch.

To view the following window, click **L2 Features > FDB > MAC Notification Settings**, as show below:

Figure 4-49 MAC Notification Settings window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Enable or disable MAC notification globally on the Switch
<b>Interval (1-2147483647)</b>	The time in seconds between notifications. Value range to use is 1 to 2147483647.
<b>History Size (1-500)</b>	The maximum number of entries listed in the history log used for notification. Up to 500 entries can be specified.
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select the starting and ending ports for MAC notification.
<b>State</b>	Enable MAC Notification for the ports selected using the drop-down menu.

Click the **Apply** button to accept the changes made for each individual section.

## MAC Address Aging Time Settings

Users can configure the MAC Address aging time on the Switch.

To view the following window, click **L2 Features > FDB > MAC Address Aging Time Settings**, as show below:

Figure 4-50 MAC Address Aging Time Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MAC Address Aging Time (10-1000000)</b>	This field specify the length of time a learned MAC Address will remain in the forwarding table without being accessed (that is, how long a learned MAC Address is allowed to remain idle). To change this option, type in a different value representing the MAC address' age-out time in seconds. The MAC Address Aging Time can be set to any value between 10 and 1000000 seconds. The default setting is 300 seconds.

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

## MAC Address Table

This allows the Switch's MAC address forwarding table to be viewed. When the Switch learns an association between a MAC address, VLAN and a port number, it makes an entry into its forwarding table. These entries are then used to forward packets through the Switch.

To view the following window, click **L2 Features > FDB > MAC Address Table**, as show below:

VID	VLAN Name	MAC Address	Port	Type	Status
1	default	00-01-02-03-04-00	CPU	Self	Forward
1	default	00-23-7D-BC-2E-18	1:21	Dynamic	Forward

Figure 4-51 MAC Address Table window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Port</b>	The port to which the MAC address below corresponds.
<b>VLAN Name</b>	Enter a VLAN Name for the forwarding table to be browsed by.
<b>VID List</b>	Enter a list of VLAN IDs for the forwarding table to be browsed by.
<b>MAC Address</b>	Enter a MAC address for the forwarding table to be browsed by.
<b>Security</b>	Tick the check box to display the FDB entries that are created by the security module.

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

Click the **Clear Dynamic Entries** button to delete all dynamic entries of the address table.

Click the **View All Entries** button to display all the existing entries.

Click the **Clear All Entries** button to remove all the entries listed in the table.

Click the **Add to Static MAC table** button to add the specific entry to the Static MAC table.

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

## ARP & FDB Table

This window is used to find the ARP and FDB table parameters.

To view the following window, click **L2 Features > FDB > ARP & FDB Table**, as show below:

Interface	IP Address	MAC Address	VLAN Name	Port
System	10.90.90.5	00-23-7D-BC-2E-18	default	1:21

Figure 4-52 ARP & FDB Table window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Port</b>	Select the port number to use for this configuration.
<b>MAC Address</b>	Enter the MAC address to use for this configuration.
<b>IP Address</b>	Enter the IP address the use for this configuration.

Click the **Find by Port** button to locate a specific entry based on the port number selected.

Click the **Find by MAC** button to locate a specific entry based on the MAC address entered.

Click the **Find by IP Address** button to locate a specific entry based on the IP address entered.

Click the **View All Entries** button to display all the existing entries.

Click the **Add to IP MAC Port Binding Table** to add the specific entry to the IMPB Entry Settings window.

## VLAN Learning Settings

This window is used to configure the FDB VLAN learning state on the Switch.

To view the following window, click **L2 Features > FDB > VLAN Learning Settings**, as show below:

VID	VLAN Name	State
1	default	Enabled

Figure 4-53 VLAN Learning Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Enter a VLAN Name for the forwarding table to be browsed by.
<b>VLAN List</b>	Enter a list of VLAN IDs for the forwarding table to be browsed by.
<b>Sate</b>	Use the drop-down menu to enable or disable VLAN learning state.

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.

## L2 Multicast Control

### IGMP Proxy

Based on IGMP forwarding, the IGMP proxy runs the host part of IGMP on the upstream and router part of IGMP on the downstream, and replicates multicast traffic across VLANs on devices such as the edge boxes. It reduces the number of the IGMP control packets transmitted to the core network.

### IGMP Proxy Settings

This window is used to configure the IGMP proxy state and IGMP proxy upstream interface.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Proxy > IGMP Proxy Settings** as shown below.

Figure 4-54 IGMP Proxy Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IGMP Proxy State</b>	Here the user can enable or disable the IGMP Proxy Global State.
<b>VLAN Name</b>	The VLAN name for the interface.
<b>VID</b>	The VID for the interface.
<b>Source IP Address</b>	Enter the source IP address of the upstream protocol packet here. If it is not specified, the zero IP address will be used as the protocol source IP address.
<b>Unsolicited Report Interval (0-25)</b>	The Unsolicited report interval. It is the time between repetitions of the host's initial report of membership in a group. Default is 10 seconds. If set to 0, it means to send only one report packet.
<b>Unit</b>	Select the unit to be configured.
<b>Port(s)</b>	Here the user can select the port that will be included in this configuration.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

## IGMP Proxy Downstream Settings

This window is used to configure the IGMP proxy downstream interface. The IGMP proxy downstream interface must be an IGMP snooping enabled VLAN.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Proxy > IGMP Proxy Downstream Settings** as shown below.

Figure 4-55 IGMP Proxy Downstream Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Specify the VLAN Name which belongs to the IGMP proxy downstream interface.
<b>VID List</b>	Specify a list of VLANs which belong to the IGMP proxy downstream interface.
<b>Downstream Action</b>	Here the user can <b>Add</b> or <b>Delete</b> a downstream interface.

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

## IGMP Proxy Group

This window is used to display the IGMP Proxy Group settings.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Proxy > IGMP Proxy Group** as shown below.

Group NO.	Destination IP Address	Source IP Address	
1	224.2.2.2	0.0.0.0	<a href="#">Member Ports</a>
2	224.2.2.5	0.0.0.0	<a href="#">Member Ports</a>
3	224.2.2.6	0.0.0.0	<a href="#">Member Ports</a>
4	227.3.1.1	0.0.0.0	<a href="#">Member Ports</a>
5	227.3.1.5	0.0.0.0	<a href="#">Member Ports</a>
6	227.3.1.9	0.0.0.0	<a href="#">Member Ports</a>

Figure 4-56 IGMP Proxy Group window

Click the [Member Ports](#) link to view the IGMP proxy member port information.

After clicking the [Member Ports](#) option, the following window will appear.

VID	Port List	Status
2	2-4	Active
4	3,6	Active
3	2-4	Inactive
5	3,6	Inactive

Figure 4-57 IGMP Proxy Group window

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



## 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. When enabled for IGMP snooping, the Switch can open or close a port to a specific device based on IGMP messages passing through the Switch.

### IGMP Snooping Settings

In order to use IGMP Snooping it must first be enabled for the entire Switch under IGMP Snooping 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 show below:

Figure 4-58 IGMP Snooping Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IGMP Snooping State</b>	Click to enable or disable the IGMP Snooping state.
<b>Max Learned Entry Value (1-960)</b>	Enter the maximum learning entry value.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Edit** button to configure the IGMP Snooping Parameters Settings.

Click the [Modify Router Port](#) link to configure the IGMP Snooping Router Port Settings.

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 4-59 IGMP Snooping Parameters Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Query Interval (1-65535)</b>	Specify the amount of time in seconds between general query transmissions. The default setting is 125 seconds..
<b>Max Response Time (1-25)</b>	Specify the maximum time in seconds to wait for reports from members. The default setting is 10 seconds.
<b>Robustness Value (1-7)</b>	Provides fine-tuning to allow for expected packet loss on a subnet. The value of the robustness value is used in calculating the following IGMP message intervals: By default, the robustness variable is set to 2.
<b>Last Member Query Interval (1-25)</b>	Specify the maximum amount of time between group-specific query messages, including those sent in response to leave-group messages. You might lower this interval to reduce the amount of time it takes a router to detect the loss of the last member of a group.
<b>Data Drive Group Expiry Time (1-65535)</b>	Specify the data driven group lifetime in seconds.
<b>Proxy Reporting Source IP</b>	Enter the source IP of proxy reporting integrated report.
<b>Proxy Reporting State</b>	Use the drop-down menu to enable or disable the proxy reporting. If enabled, multiple IGMP reports or leave for a specific (S, G) will be integrated into one report only before sending to the router port.
<b>Querier State</b>	Specify to enable or disable the querier state.
<b>Fast Leave</b>	Enable or disable the IGMP snooping fast leave function. If enabled, the membership is immediately removed when the system receive the IGMP leave message.
<b>State</b>	<p>If the state is enable, it allows the switch to be selected as a IGMP Querier (sends IGMP query packets). If the state is disabled, then the switch can not play the role as a querier.</p> <p><b>NOTE:</b> that if the Layer 3 router connected to the switch provides only the IGMP proxy function but does not provide the multicast routing function, then this state must be configured as disabled. Otherwise, if the Layer 3 router is not selected as the querier, it will not send the IGMP query packet. Since it will not also send the multicast-routing protocol packet, the port will be timed out as a router port.</p>
<b>Report Suppression</b>	When enabled, the Switch uses IGMP report suppression to forward only one IGMP report per multicast router query to multicast devices.
<b>Suppression Time (0-300)</b>	Specify the interval of duplicated suppression reports.
<b>Data Driven Learning State</b>	Specify to enable or disable the data driven learning state.
<b>Data Drive Learning Aged Out</b>	Specify to enable or disable the data drive learning aged out option.
<b>Version</b>	Specify the version of the IGMP general query sent by the Switch.
<b>Topology Change Notification</b>	Use the drop-down menu to select whether the IGMP snooping should process or ignore the link layer topology changes caused by spanning tree operation.

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

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

After clicking the [Modify Router Port](#) link, the following window will appear.

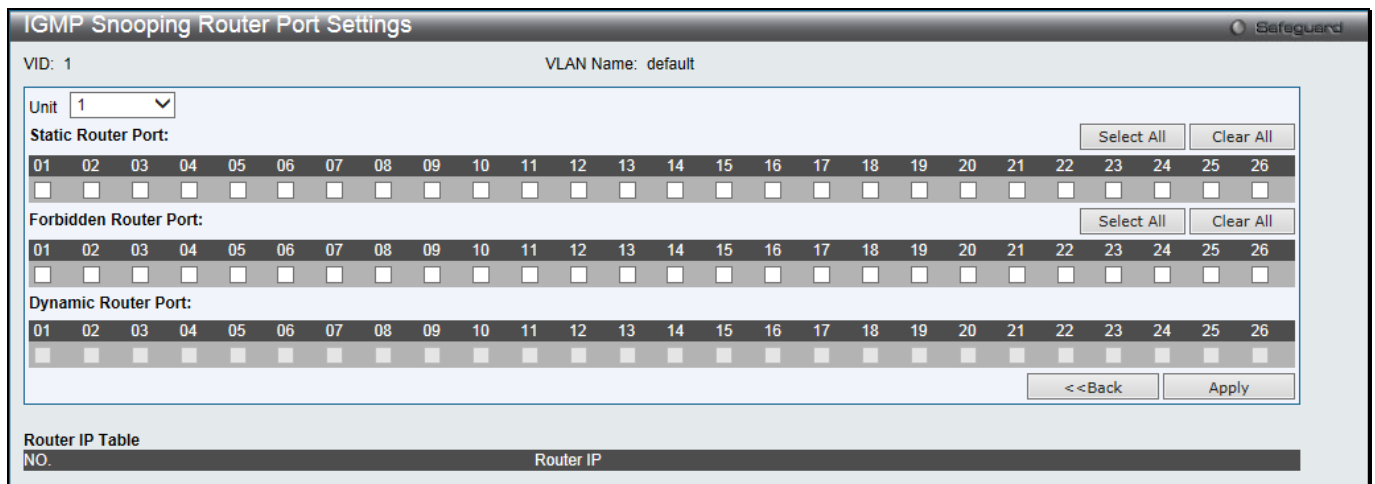


Figure 4-60 IGMP Snooping Router Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Static Router Port</b>	This section is used to designate a range of ports as being connected to multicast-enabled routers. This will ensure that all packets with such a router as its destination will reach the multicast-enabled router regardless of the protocol.
<b>Forbidden Router Port</b>	This section is used to designate a range of ports as being not connected to multicast-enabled routers. This ensures that the forbidden router port will not propagate routing packets out.
<b>Dynamic Router Port</b>	Displays router ports that have been dynamically configured.
<b>Ports</b>	Select the appropriate ports individually to include them in the Router Port configuration.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

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

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

## IGMP Snooping Rate Limit Settings

This window is used to configure the IGMP snooping rate limit parameters.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Rate Limit Settings**, as show below:

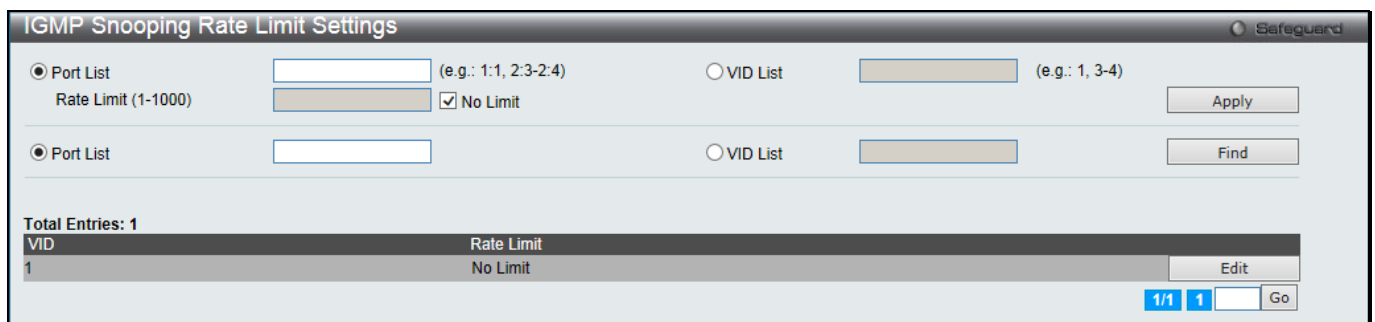


Figure 4-61 IGMP Snooping Rate Limit Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Port List</b>	Click the radio button and enter the port list used for this configuration.
<b>VID List</b>	Click the radio button and enter the VID list used for this configuration.
<b>Rate Limit (1-1000)</b>	Enter the IGMP snooping rate limit used. Tick the <b>No Limit</b> check box to ignore the rate limit.

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.

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

## IGMP Snooping Static Group Settings

Users can view the Switch's IGMP Snooping Group Table. IGMP Snooping allows the Switch to read the Multicast Group IP address and the corresponding MAC address from IGMP packets that pass through the Switch.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Static Group Settings**, as show below:

Figure 4-62 IGMP Snooping Static Group Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Enter the VLAN name of the multicast group.
<b>VID List</b>	Enter the VID list or of the multicast group.
<b>IPv4 Address</b>	Enter the IPv4 address.

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

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

Click the **Delete** button to remove the specific entry based on the information entered.

Click the **View All** button to display all the existing entries.

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 following window will appear.

Figure 4-63 IGMP Snooping Static Group Settings – Edit window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Ports</b>	Tick the check boxes to select the ports to be configured.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

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

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

## IGMP Router Port

Users can display which of the Switch's ports are currently configured as router ports. A router port configured by a user (using the console or Web-based management interfaces) is displayed as a static router port, designated by S. A router port that is dynamically configured by the Switch is designated by D, while a Forbidden port is designated by F.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Router Port**, as show below:

Figure 4-64 IGMP Router Port window

The fields that can be configured are described below:

Parameter	Description
<b>VID</b>	Enter the VLAN ID of the multicast group.

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.



**NOTE:** The abbreviations used on this window are **Static Router Port (S)**, **Dynamic Router Port (D)** and **Forbidden Router Port (F)**.

## IGMP Snooping Group

Users can view the Switch's IGMP Snooping Group Table. IGMP Snooping allows the Switch to read the Multicast Group IP address and the corresponding MAC address from IGMP packets that pass through the Switch.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Group**, as show below:

Figure 4-65 IGMP Snooping Group window

The user may search the IGMP Snooping Group Table by either *VLAN Name* or *VID List* by entering it in the top left hand corner and clicking **Find**.

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	The VLAN Name of the multicast group.
<b>VID List</b>	The VLAN ID list of the multicast group.
<b>Port List</b>	Specify the port number(s) used to find a multicast group.
<b>Group IPv4 Address</b>	Enter the IPv4 address.
<b>Data Driven</b>	If selected, only data driven groups will be displayed.

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

Click the **Clear Data Driven** button to delete the specific IGMP snooping group which is learned by the Data Driven feature of the specified VLAN.

Click the **View All** button to display all the existing entries.

Click the **Clear All Data Driven** button to delete all IGMP snooping groups which is learned by the Data Driven feature of specified VLANs.

## IGMP Snooping Forwarding Table

This window displays the switch's current IGMP snooping forwarding table. It provides an easy way for user to check the list of ports that the multicast group comes from and specific sources that it will be forwarded to. The packet comes from the source VLAN. They will be forwarded to the forwarding VLAN. The IGMP snooping further restricts the forwarding ports.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Forwarding Table**, as show below:

Figure 4-66 IGMP Snooping Forwarding Table window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	The VLAN Name of the multicast group.
<b>VID List</b>	The VLAN ID list of the multicast group.

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

Click the **View All** button to display all the existing entries.

## IGMP Snooping Counter

Users can view the switch's IGMP Snooping counter table.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Counter**, as show below:

Figure 4-67 IGMP Snooping Counter window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	The VLAN Name of the multicast group.
<b>VID List</b>	The VLAN ID list of the multicast group.
<b>Port List</b>	The <i>Port List</i> of the multicast group.

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

Click the **View All** button to display all the existing entries.

Click the [Packet Statistics](#) link to view the IGMP Snooping Counter Table.

After clicking the [Packet Statistics](#) link, the following window will appear.

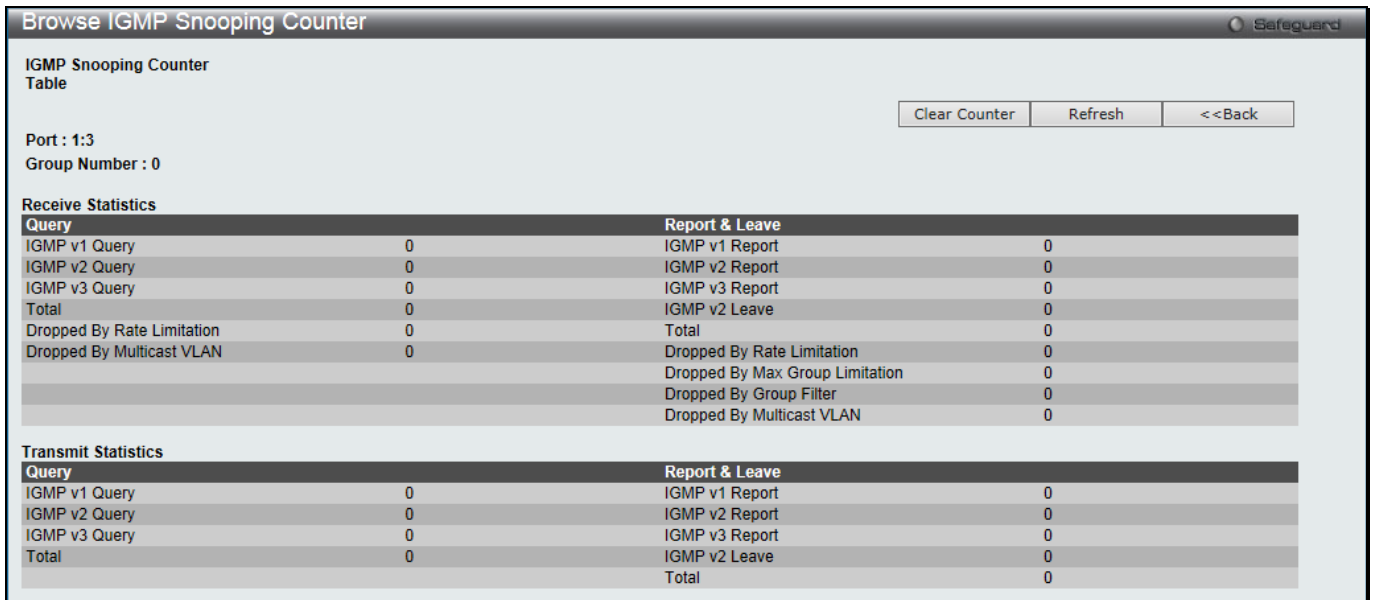


Figure 4-68 Browse IGMP Snooping Counter window

Click the **Clear Counter** button to clear all the information displayed in the fields.

Click the **Refresh** button to refresh the display table so that new information will appear.

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

## CPU Filter L3 Control Packet Settings

This window is used to discard and display Layer 3 control packets sent to the CPU from specific ports.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > CPU Filter L3 control Packet Settings**, as show below:

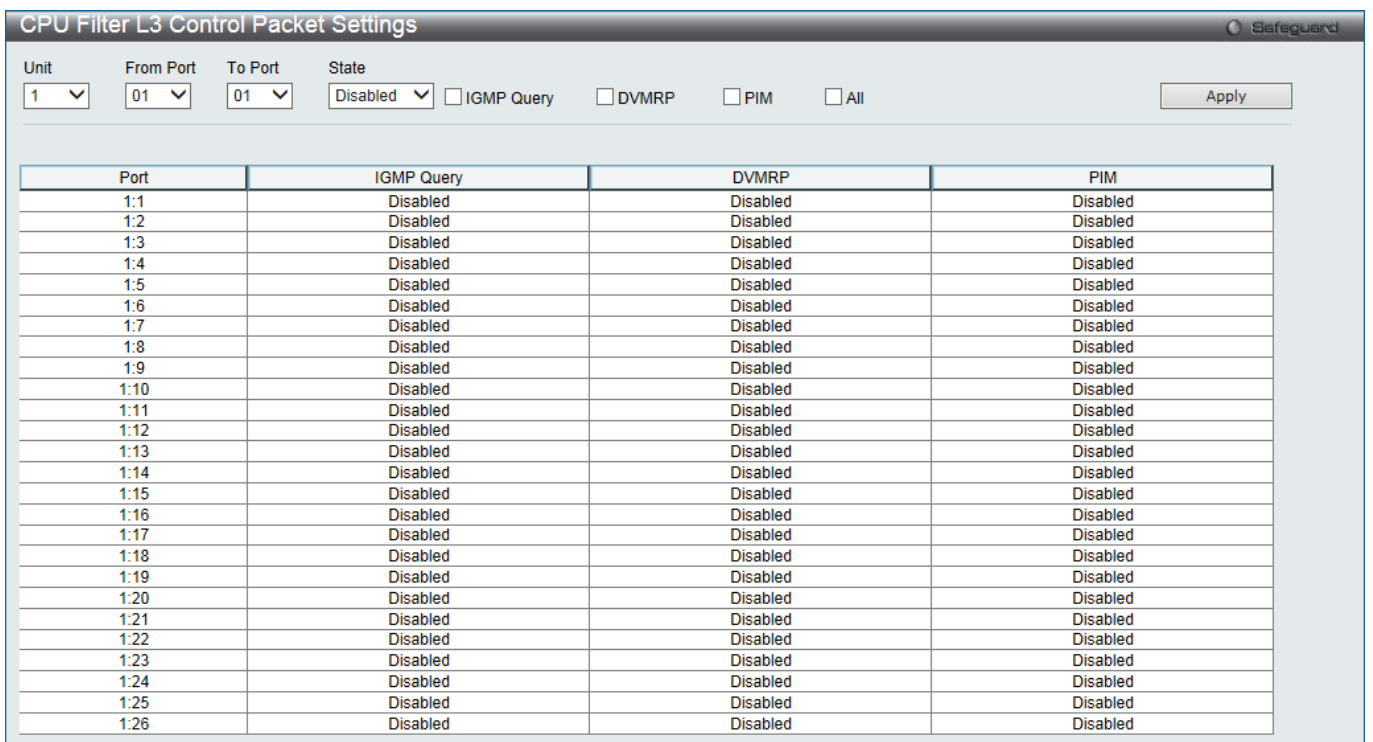


Figure 4-69 CPU Filter L3 Control Packet Settings window

The fields that can be configured are described below:



Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>State</b>	Use the drop-down menu to enable or disable the filtering function.
<b>IGMP Query</b>	Tick to enable filtering IGMP Query protocol packets.
<b>DVMRP</b>	Tick to enable filtering DVMRP protocol packets.
<b>PIM</b>	Tick to enable filtering PIM protocol packets.
<b>All</b>	Tick to enable filtering all layer 3 control packets.

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

## IGMP Snooping Forward Lookup Mode Settings

This window is used to configure IGMP forward lookup mode.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Forward Lookup Mode Settings**, as show below:

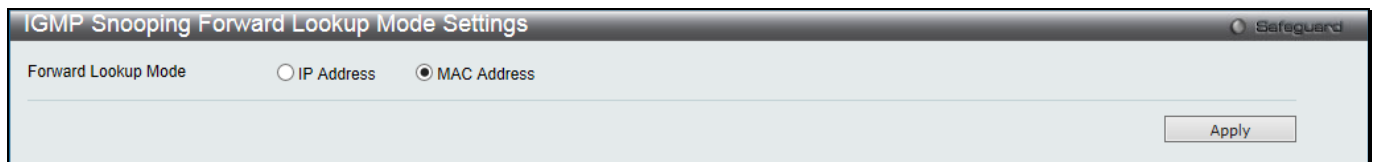


Figure 4-70 IGMP Snooping Forward Lookup Mode Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Forward Lookup Mode</b>	Select to determine the multicast forwarding is based on IP address or MAC address.

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

## MLD Proxy

MLD proxy plays the host role on the upstream interface. It will send MLD report packet to the router port. MLD proxy plays the router role on the downstream interfaces. It reduces the number of the MLD control packets transmitted to the core network.

### MLD Proxy Settings

This window is used to configure the MLD proxy state and MLD proxy upstream interface.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Proxy > MLD Proxy Settings** as shown below.

Figure 4-71 MLD Proxy Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MLD Proxy State</b>	Here the user can enable or disable the MLD Proxy Global State.
<b>VLAN Name</b>	The VLAN name for the interface.
<b>VID</b>	The VID for the interface.
<b>Source IP Address</b>	The Source IP of the protocol packet. If it is unspecified, the zero IP will be used.
<b>Unsolicited Report Interval (0-25)</b>	The unsolicited report interval. It is the time between repetitions of the host's initial report of membership in a group. Default is 10 seconds. If set to 0, it means to send only one report packet.
<b>Unit</b>	Select the unit to be configured.
<b>Static Router Port</b>	Select the static router ports that will be included in the configuration.
<b>Dynamic Router Port</b>	Display a list of ports that are connected to multicast-enabled routers.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

## MLD Proxy Downstream Settings

This window is used to configure the MLD proxy downstream interface. The MLD proxy downstream interface must be a MLD snooping enabled VLAN.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Proxy > MLD Proxy Downstream Settings** as shown below.

Figure 4-72 MLD Proxy Downstream Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	The VLAN name for the interface.


<b>VID List</b>	The VID List for the interface.
<b>Downstream Action</b>	Here the user can select the appropriate action. Selecting <b>Add</b> will add a downstream interface. Selecting <b>Delete</b> will remove a downstream interface.

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

## MLD Proxy Group

This window is used to display the MLD Proxy Group.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Proxy > MLD Proxy Group** as shown below.

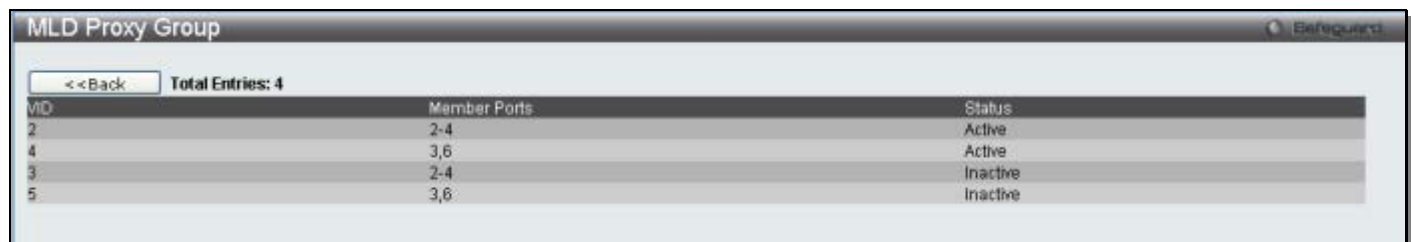


MLD Proxy Group			
Total Entries: 1			
Group NO.	Destination IP Address	Source IP Address	
1	FF01::0202	FE80:0:0:200	<a href="#">Member Ports</a>

Figure 4-73 MLD Proxy Group window

Click the [Member Ports](#) link to view the MLD proxy member port information.

After clicking the [Member Ports](#) option, the following window will appear.



MLD Proxy Group			
<a href="#">&lt;&lt;Back</a>		Total Entries: 4	
VID	Member Ports	Status	
2	2,4	Active	
4	3,6	Active	
3	2,4	Inactive	
5	3,6	Inactive	

Figure 4-74 MLD Proxy Group window

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

## 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 a 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**

Three types of messages are transferred between devices using MLD snooping. These three messages are all defined by four ICMPv6 packet headers, labeled 130, 131, 132, and 143.

Chapter 1 **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 is used to advertise all multicast addresses that are ready to send multicast data to all listening ports, and the Multicast Specific query,

which advertises 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.

Chapter 2 **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.

Chapter 3 **Multicast Listener Done** – Akin 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.

Chapter 4 **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.

### Data Driven Learning

The Switch allows you to implement data driven learning for MLD snooping groups. If data-driven learning, also known as dynamic IP multicast learning, is enabled for a VLAN, when the Switch receives IP multicast traffic on the VLAN, an MLD snooping group is created. Learning of an entry is not activated by MLD membership registration, but activated by the traffic. For an ordinary MLD snooping entry, the MLD protocol will take care of the aging out of the entry. For a data-driven entry, the entry can be specified not to age out or to age out by a timer.

When the data driven learning State is enabled, the multicast filtering mode for all ports is ignored. This means multicast packets will be flooded.



**NOTE:** If a data-driven group is created and MLD member ports are learned later, the entry will become an ordinary MLD snooping entry. In other words, the aging out mechanism will follow the conditions of an ordinary MLD snooping entry.

Data driven learning is useful on a network which has video cameras connected to a Layer 2 switch that is recording and sending IP multicast data. The switch needs to forward IP data to a data centre without dropping or flooding any packets. Since video cameras do not have the capability to run MLD protocols, the IP multicast data will be dropped with the original MLD snooping function.

## MLD Snooping Settings

Users can configure the settings for MLD snooping.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Settings**, as show below:

VID	VLAN Name	State
1	default	Disabled

Figure 4-75 MLD Snooping Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MLD Snooping State</b>	Click to enable or disable the MLD snooping state.
<b>Max Learning Entry Value (1-960)</b>	Enter the maximum learning entry value.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Edit** button to configure the MLD Snooping Parameters Settings for a specific entry.

Click the [Modify Router Port](#) link to configure the MLD Snooping Router Port Settings for a 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 window will appear.

Figure 4-76 MLD Snooping Parameters Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Query Interval (1-65535)</b>	Specify the amount of time in seconds between general query transmissions. The default setting is 125 seconds.
<b>Max Response Time (1-25)</b>	The maximum time in seconds to wait for reports from listeners. The default setting is 10 seconds.
<b>Robustness Value (1-7)</b>	Provides fine-tuning to allow for expected packet loss on a subnet. The value of the robustness variable is used in calculating the following MLD message intervals: <i>Group listener interval</i> - Amount of time that must pass before a multicast router decides there are no more listeners of a group on a network. <i>Other Querier present interval</i> - Amount of time that must pass before a multicast router decides that there is no longer another multicast router that is the Querier. <i>Last listener query count</i> - Number of group-specific queries sent before the router assumes there are no local listeners of a group. The default number is the value of the robustness variable. By default, the robustness variable is set to 2. You might want to increase this value if you expect a subnet to be loosely.
<b>Last Listener Query Interval (1-25)</b>	The maximum amount of time between group-specific query messages, including those sent in response to done-group messages. You might lower this interval to reduce the amount of time it takes a router to detect the loss of the last listener of a group.
<b>Data Driven Group Expiry Time (1-65535)</b>	Enter the data driven group expiry time value.
<b>Proxy Reporting Source IP</b>	Enter the source IP of proxy reporting integrated report.
<b>Proxy Reporting State</b>	Use the drop-down menu to enable or disable the proxy reporting.

<b>Querier State</b>	This allows the switch to be specified as an MLD Querier (sends MLD query packets) or a Non-Querier (does not send MLD query packets). Set to enable or disable.
<b>Fast Done</b>	Here the user can enable or disable the fast done feature.
<b>State</b>	Used to enable or disable MLD snooping for the specified VLAN. This field is <i>Disabled</i> by default.
<b>Report Suppression</b>	Enable or disable the report suppression features.
<b>Suppression Time (0-300)</b>	Specify the interval of duplicated suppression reports.
<b>Data Driven Learning State</b>	Enable or disable data driven learning of MLD snooping groups.
<b>Data Driven Learning Aged Out</b>	Enable or disable the age out function for data driven entries.
<b>Version</b>	Specify the version of the MLD general query sent by the Switch.
<b>Topology Change Notification</b>	Use the drop-down menu to select whether the MLD snooping should process or ignore the link layer topology changes caused by spanning tree operation.

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

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

After clicking the [Modify Router Port](#) link, the following window will appear.

Figure 4-77 MLD Snooping Router Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Static Router Port</b>	This section is used to designate a range of ports as being connected to multicast-enabled routers. This will ensure that all packets with such a router as its destination will reach the multicast-enabled router regardless of the protocol.
<b>Forbidden Router Port</b>	This section is used to designate a range of ports as being not connected to multicast-enabled routers. This ensures that the forbidden router port will not propagate routing packets out.
<b>Dynamic Router Port</b>	Display router ports that have been dynamically configured.
<b>Ports</b>	Select the appropriate ports individually to include them in the Router Port configuration.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

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

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

## MLD Snooping Rate Limit Settings

This window is used to configure the rate limit of the MLD control packet that the switch can process on a specific port or VLAN.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Rate Limit Settings**, as show below:

Figure 4-78 MLD Snooping Rate Limit Settings window

The fields that can be configured are described below:

Parameter	Description
Port List	Enter the Port List here.
VID List	Enter the VID List value here.
Rate Limit	Configure the rate limit of MLD control packet that the switch can process on a specific port/VLAN. The rate is specified in packet per second. The packet that exceeds the limited rate will be dropped. Tick the <b>No Limit</b> check box to lift the rate limit requirement.

Click the **Apply** button to accept the changes made for each individual section.

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.

## MLD Snooping Static Group Settings

This window used to configure the MLD snooping multicast group static members.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Static Group Settings**, as show below:

Figure 4-79 MLD Snooping Static Group Settings window

The fields that can be configured are described below:



Parameter	Description
<b>VLAN Name</b>	The name of the VLAN on which the static group resides.
<b>VID List</b>	The ID of the VLAN on which the static group resides.
<b>IPv6 Address</b>	Specify the multicast group IPv6 address.

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

Click the **Create** button to add a static group.

Click the **Delete** button to delete a static group.

Click the **View All** button to display all the existing entries.

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 following window will appear.

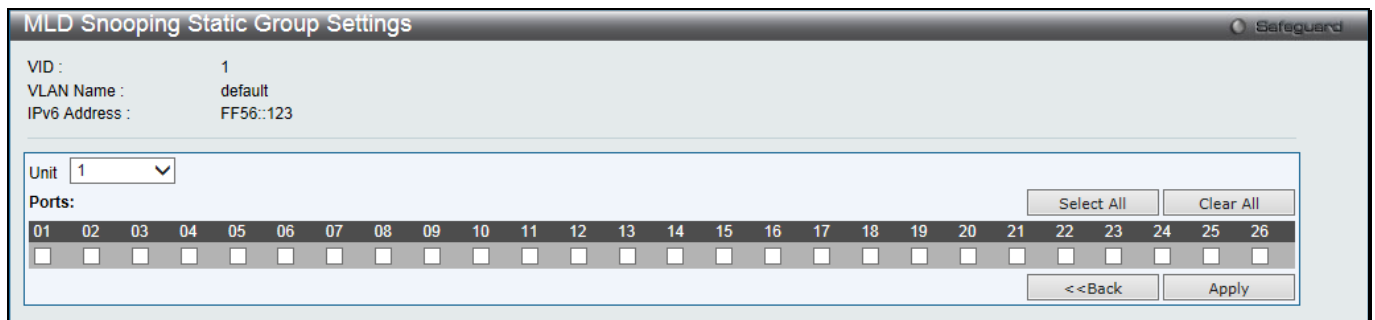


Figure 4-80 MLD Snooping Static Group Settings – Edit window

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>Ports</b>	Tick the check boxes to select the ports to be configured.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

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

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

## MLD Router Port

Users can display which of the Switch’s ports are currently configured as router ports in IPv6. A router port configured by a user (using the console or Web-based management interfaces) is displayed as a static router port, designated by S. A router port that is dynamically configured by the Switch is designated by D, while a Forbidden port is designated by F.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Router Port**, as show below:

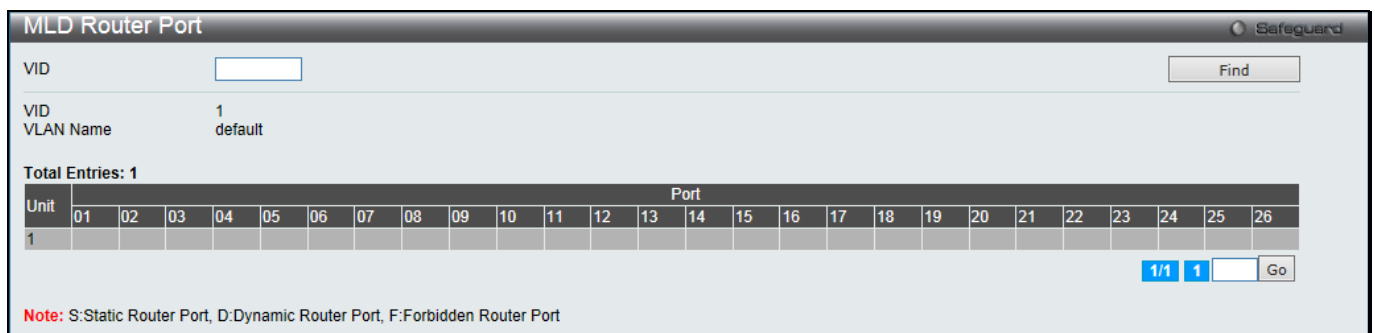


Figure 4-81 MLD Router Port window



Parameter	Description
VID	Enter a VLAN ID.

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.



**NOTE:** The abbreviations used on this window are **Static Router Port (S)**, **Dynamic Router Port (D)** and **Forbidden Router Port (F)**.

## MLD Snooping Group

Users can view MLD Snooping Groups present on the Switch. MLD Snooping is an IPv6 function comparable to IGMP Snooping for IPv4.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Group**, as show below:

Figure 4-82 MLD Snooping Group window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Click the radio button and enter the VLAN name of the multicast group.
<b>VID List</b>	Click the radio button and enter a VLAN list of the multicast group.
<b>Port List</b>	Specify the port number(s) used to find a multicast group.
<b>Group IPv6 Address</b>	Enter the group IPv6 address used here.
<b>Data Driven</b>	If Data Drive is selected, only data driven groups will be displayed.

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

Click the **Clear Data Driven** button to delete the specific MLD snooping group which is learned by the Data Driven feature of the specified VLAN.

Click the **View All** button to display all the existing entries.

Click the **Clear All Data Driven** button to delete all MLD snooping groups which is learned by the Data Driven feature of specified VLANs.

## MLD Snooping Forwarding Table

This window displays the switch's current MLD snooping forwarding table. It provides an easy way for user to check the list of ports that the multicast group comes from and specific sources that it will be forwarded to. The packet comes from the source VLAN. They will be forwarded to the forwarding VLAN.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Forwarding Table**, as show below:

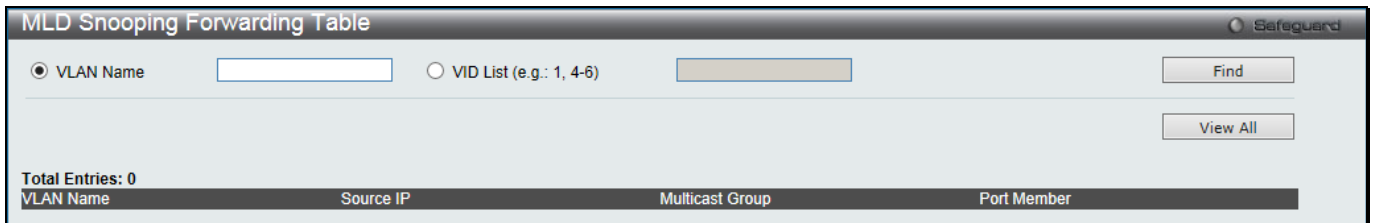


Figure 4-83 MLD Snooping Forwarding Table window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	The name of the VLAN for which you want to view MLD snooping forwarding table information.
<b>VID List</b>	The ID of the VLAN for which you want to view MLD snooping forwarding table information.

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

Click the **View All** button to display all the existing entries.

## MLD Snooping Counter

This window displays the statistics counter for MLD protocol packets that are received by the switch since MLD Snooping is enabled.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Counter**, as show below:

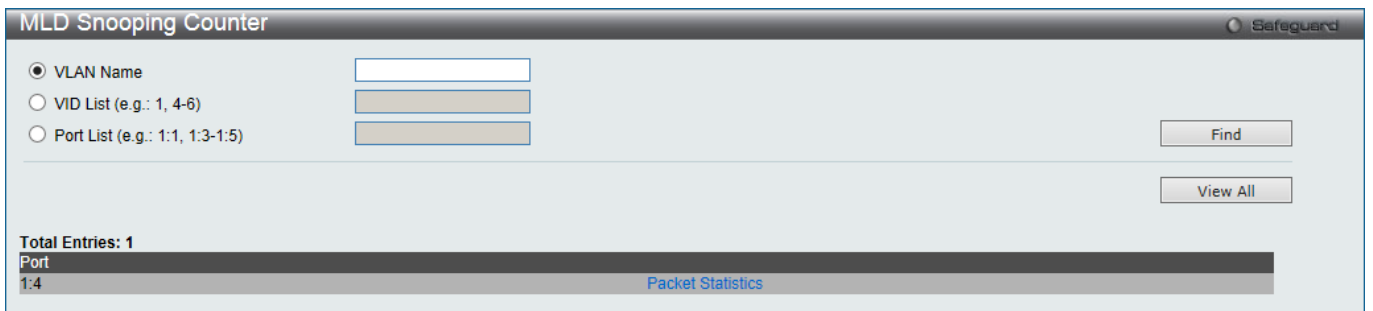


Figure 4-84 MLD Snooping Counter window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Specify a VLAN name to be displayed.
<b>VID List</b>	Specify a list of VLANs to be displayed.
<b>Port List</b>	Specify a list of ports to be displayed.

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

Click the **View All** button to display all the existing entries.

Click the [Packet Statistics](#) link to view the MLD Snooping Counter Settings for the specific entry.

After clicking the [Packet Statistics](#) link, the following window will appear.

**Browse MLD Snooping Counter**

MLD Snooping Counter Table

Port : 1:4  
Group Number : 0

Clear Counter Refresh <<Back

**Receive Statistics**

Query	Report & Done
MLD v1 Query	MLD v1 Report 0
MLD v2 Query	MLD v2 Report 0
Total	MLD v1 Done 0
Dropped By Rate Limitation	Total 0
Dropped By Multicast VLAN	Dropped By Rate Limitation 0
	Dropped By Max Group Limitation 0
	Dropped By Group Filter 0
	Dropped By Multicast VLAN 0

**Transmit Statistics**

Query	Report & Done
MLD v1 Query	MLD v1 Report 0
MLD v2 Query	MLD v2 Report 0
Total	MLD v1 Done 0
	Total 0

Figure 4-85 Browse MLD Snooping Counter window

Click the **Clear Counter** button to clear all the information displayed in the fields.

Click the **Refresh** button to refresh the display table so that new information will appear.

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

## MLD Snooping Forward Lookup Mode Settings

This window is used to configure MLD forward lookup mode.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Forward Lookup Mode Settings**, as show below:

**MLD Snooping Forward Lookup Mode Settings**

Forward Lookup Mode  IPv6 Address  MAC Address

Apply

Figure 4-86 MLD Snooping Forward Lookup Mode Settings

The fields that can be configured are described below:

Parameter	Description
<b>Forward Lookup Mode</b>	Select to determine the multicast forwarding is based on IPv6 address or MAC address.

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

## Multicast VLAN

In a switching environment, multiple VLANs may exist. Every time a multicast query passes through the Switch, the switch must forward separate different copies of the data to each VLAN on the system, which, in turn, increases data traffic and may clog up the traffic path. To lighten the traffic load, multicast VLANs may be incorporated. These multicast VLANs will allow the Switch to forward this multicast traffic as one copy to recipients of the multicast VLAN, instead of multiple copies.

Regardless of other normal VLANs that are incorporated on the Switch, users may add any ports to the multicast VLAN where they wish multicast traffic to be sent. Users are to set up a source port, where the multicast traffic is entering the switch, and then set the ports where the incoming multicast traffic is to be sent. The source port cannot be a recipient port and if configured to do so, will cause error messages to be produced by the switch. Once properly configured, the stream of multicast data will be relayed to the receiver ports in a much more timely and reliable fashion.

**Restrictions and Provisos:**

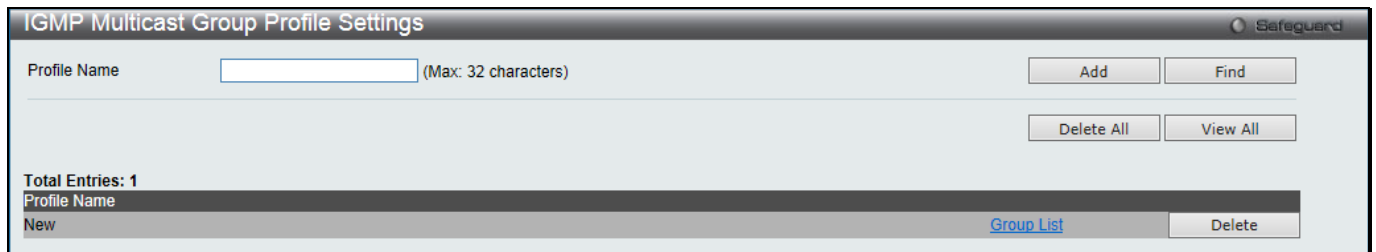
The Multicast VLAN feature of this Switch does have some restrictions and limitations, such as:

- Multicast VLANs can be implemented on edge and non-edge switches.
- Member ports and source ports can be used in multiple ISM VLANs. But member ports and source ports cannot be the same port in a specific ISM VLAN.
- The Multicast VLAN is exclusive with normal 802.1q VLANs, which means that VLAN IDs (VIDs) and VLAN Names of 802.1q VLANs and ISM VLANs cannot be the same. Once a VID or VLAN Name is chosen for any VLAN, it cannot be used for any other VLAN.
- The normal display of configured VLANs will not display configured Multicast VLANs.
- Once an ISM VLAN is enabled, the corresponding IGMP snooping state of this VLAN will also be enabled.
- One IP multicast address cannot be added to multiple ISM VLANs, yet multiple Ranges can be added to one ISM VLAN.

## IGMP Multicast Group Profile Settings

Users can add a profile to which multicast address reports are to be received on specified ports on the Switch. This function will therefore limit the number of reports received and the number of multicast groups configured on the Switch. The user may set an IP Multicast address or range of IP Multicast addresses to accept reports (Permit) or deny reports (Deny) coming into the specified switch ports.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > IGMP Multicast Group Profile Settings**, as show below:



**Figure 4-87 IGMP Multicast Group Profile Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Profile Name</b>	Enter a name for the IP Multicast Profile.

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

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

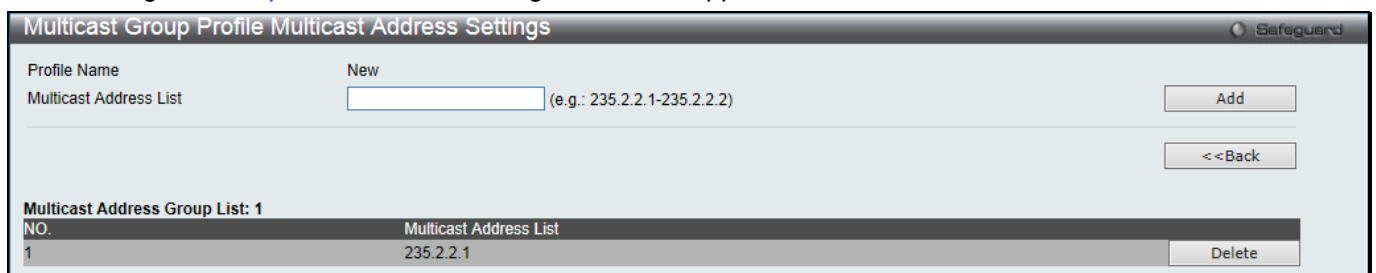
Click the **Delete All** button to remove all the entries listed.

Click the **View All** button to display all the existing entries.

Click the [Group List](#) link to configure the Multicast Group Profile Address Settings for the specific entry.

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

After clicking the [Group List](#) link, the following window will appear.



**Figure 4-88 Multicast Group Profile Multicast Address Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Multicast Address List</b>	Enter the multicast address list value.

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

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

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

## IGMP Snooping Multicast VLAN Settings

This window is used to configure the IGMP snooping multicast VLAN parameters.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > IGMP Snooping Multicast Group VLAN Settings**, as show below:

Figure 4-89 IGMP Snooping Multicast VLAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IGMP Multicast VLAN State</b>	Click the radio buttons to enable or disable the IGMP Multicast VLAN state.
<b>IGMP Multicast VLAN Forward Unmatched</b>	Click the radio buttons to enable or disable the IGMP Multicast VLAN Forwarding Unmatched state.
<b>IGMP Multicast VLAN Auto Assign VLAN</b>	Click the radio buttons to enable or disable to automatically assign the IGMP control packets to the right ISM VLAN.
<b>VLAN Name</b>	Enter the VLAN Name used.
<b>VID (2-4094)</b>	Enter the VID used.
<b>Remap Priority</b>	0-7 – The remap priority value (0 to 7) to be associated with the data traffic to be forwarded on the multicast VLAN. None – If this is specified, the packet's original priority is used. The default setting is None.
<b>Replace Priority</b>	Specify that the packet's priority will be changed by the switch, based on the remap priority. This flag will only take effect when the remap priority is set.

Click the **Apply** button to accept the changes made for each individual section.

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

Click the [Profile List](#) link to configure the IGMP Snooping Multicast VLAN Settings for the specific entry.

Click the **Edit** button to configure the IGMP Snooping Multicast VLAN Settings for the specific entry.

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

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

Figure 4-90 IGMP Snooping Multicast VLAN Settings – Edit window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Use the drop-down menu to enable or disable the state.
<b>Replace Source IP</b>	With the IGMP snooping function, the IGMP report packet sent by the host will be forwarded to the source port. Before forwarding of the packet, the source IP address in the join packet needs to be replaced by this IP address. If <b>Not Replaced</b> is selected, the source IP address will not be replaced.
<b>Remap Priority</b>	0-7 – The remap priority value (0 to 7) to be associated with the data traffic to be forwarded on the multicast VLAN. <i>None</i> – If <b>None</b> is specified, the packet's original priority is used. The default setting is <i>None</i> .
<b>Replace Priority</b>	Specify that the packet's priority will be changed by the switch, based on the remap priority. This flag will only take effect when the remap priority is set.
<b>Unit</b>	Select the unit to be configured.
<b>Untagged Member Ports</b>	Specify the untagged member port of the multicast VLAN.
<b>Tagged Member Ports</b>	Specify the tagged member port of the multicast VLAN.
<b>Untagged Source Ports</b>	Specify the untagged source port(s) of the multicast VLAN. The PVID of the untagged source port is automatically changed to the multicast VLAN. Source ports must be either tagged or untagged for any single multicast VLAN, i.e. both types cannot be members of the same multicast VLAN.
<b>Tagged Source Ports</b>	Specify the tagged source port(s) of the multicast VLAN.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

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

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

After clicking the [Profile List](#) link, the following window will appear.

Figure 4-91 IGMP Snooping Multicast VLAN Group List Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Profile Name</b>	Use the drop-down menu to select the IGMP Snooping Multicast VLAN Group Profile name.

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

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

Click the [Show IGMP Snooping Multicast VLAN Entries](#) link to view the IGMP Snooping Multicast VLAN Settings.

## MLD Multicast Group Profile Settings

Users can add, delete, or configure the MLD multicast group profile in this window.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > MLD Multicast Group Profile Settings** as shown below.

Figure 4-92 MLD Multicast Group Profile Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Profile Name</b>	Enter the MLD Multicast Group Profile name.

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

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

Click the **Delete All** button to remove all the entries listed.

Click the **View All** button to display all the existing entries.

Click the [Group List](#) link to configure the Multicast Group Profile Multicast Address Settings for the specific entry.

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

After clicking the [Group List](#) link, the following window will appear:



Figure 4-93 Multicast Group Profile Multicast Address Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Multicast Address List</b>	Enter the multicast address list.

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

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

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

## MLD Snooping Multicast VLAN Settings

Users can add, delete, or configure the MLD snooping multicast VLAN in this window.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > MLD Snooping Multicast VLAN Settings** as shown below.

Figure 4-94 MLD Snooping Multicast VLAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MLD Multicast VLAN State</b>	Click the radio buttons to enable or disable the MLD multicast VLAN state.
<b>MLD Multicast VLAN Forward Unmatched</b>	Click the radio buttons to can enable or disable the MLD multicast VLAN Forward Unmatched state.
<b>MLD Multicast VLAN Auto Assign VLAN</b>	Click the radio buttons to enable or disable to automatically assign the MLD control packets to the right ISM VLAN.
<b>VLAN Name</b>	Enter the VLAN name used.
<b>VID (2-4094)</b>	Enter the VID value used.
<b>Remap Priority</b>	The user can select this option to enable the Remap Priority feature. Specify the remap priority (0 to 7) to be associated with the data traffic to be forwarded on the multicast VLAN. If <b>None</b> is specified, the packet's original priority will be used. The default setting is None.



<b>Replace Priority</b>	Tick the check box to specify that the packet's priority will be changed by the switch, based on the remap priority. This flag will only take effect when the remap priority is set.
-------------------------	--

Click the **Apply** button to accept the changes made for each individual section.

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

Click the **Edit** button to configure the MLD Snooping Multicast VLAN Settings for the specific entry.

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

Click the [Profile List](#) link to configure the MLD Snooping Multicast VLAN Settings for the specific entry.

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

Figure 4-95 MLD Snooping Multicast VLAN Settings – Edit window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Use the drop-down menu to enable or disable the state.
<b>Replace Source IP</b>	With the MLD snooping function, the MLD report packet sent by the host will be forwarded to the source port. Before forwarding of the packet, the source IP address in the join packet needs to be replaced by this IP address. If <b>Not Replaced</b> is specified, the source IP address will not be replaced.
<b>Remap Priority</b>	0-7 – The remap priority value (0 to 7) to be associated with the data traffic to be forwarded on the multicast VLAN. None – Specify to use the packet's original priority. The default setting is None.
<b>Replace Priority</b>	Tick the check box to specify that the packet's priority will be changed by the Switch based on the remap priority. This flag will only take effect when the remap priority is set.
<b>Unit</b>	Select the unit to be configured.
<b>Untagged Member Ports</b>	Specify the untagged member port of the multicast VLAN.
<b>Tagged Member Ports</b>	Specify the tagged member port of the multicast VLAN.
<b>Untagged Source Ports</b>	Specify the untagged source port(s) of the multicast VLAN. The PVID of the untagged source port is automatically changed to the multicast VLAN. Source ports must be either tagged or untagged for any single multicast VLAN, i.e. both types cannot be members of the same multicast VLAN.
<b>Tagged Source Ports</b>	Specify the tagged source port(s) of the multicast VLAN.

Click the **Select All** button to select all the ports for configuration.

Click the **Clear All** button to unselect all the ports for configuration.

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

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

After clicking the [Profile List](#) link, the following window will appear:

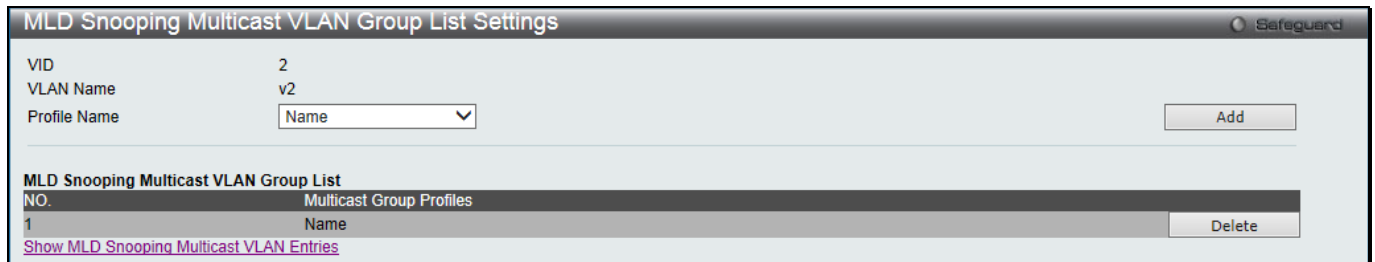


Figure 4-96 MLD Snooping Multicast VLAN Group List Settings window

The fields that can be configured are described below:

Parameter	Description
Profile Name	Use the drop-down menu to select the IGMP Snooping Multicast VLAN Group Profile name.

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

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

Click the [Show MLD Snooping Multicast VLAN Entries](#) link to view the MLD Snooping Multicast VLAN Settings.

## Multicast Filtering

### IPv4 Multicast Filtering

#### IPv4 Multicast Profile Settings

Users can add a profile to which multicast address(s) reports are to be received on specified ports on the Switch. This function will therefore limit the number of reports received and the number of multicast groups configured on the Switch. The user may set an IPv4 Multicast address or range of IPv4 Multicast addresses to accept reports (Permit) or deny reports (Deny) coming into the specified switch ports.

To view the following window, click **L2 Features > Multicast Filtering > IPv4 Multicast Filtering > IPv4 Multicast Profile Settings**, as show below:

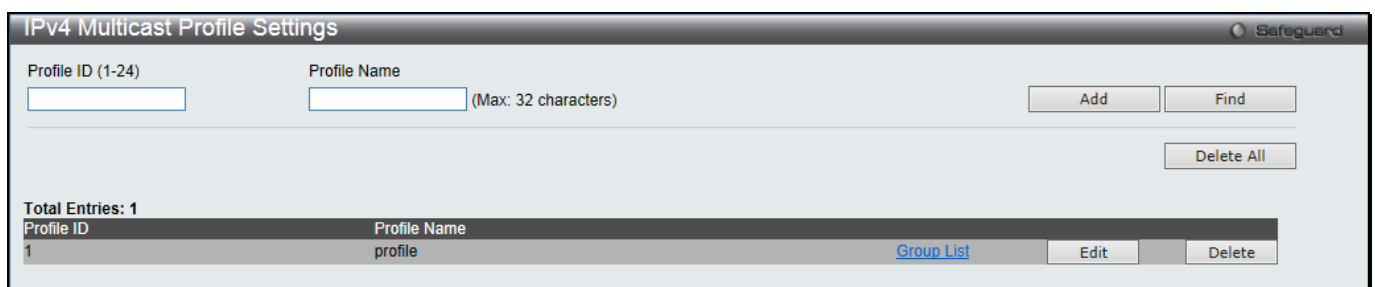


Figure 4-97 IPv4 Multicast Profile Settings window

The fields that can be configured are described below:

Parameter	Description
Profile ID (1-24)	Enter a Profile ID between 1 and 24.
Profile Name	Enter a name for the IP Multicast Profile.

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

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

Click the **Delete All** button to remove all the entries listed.

Click the [Group List](#) link to configure the multicast address group list settings for the specific entry.

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

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

After clicking the [Group List](#) link, the following window will appear.

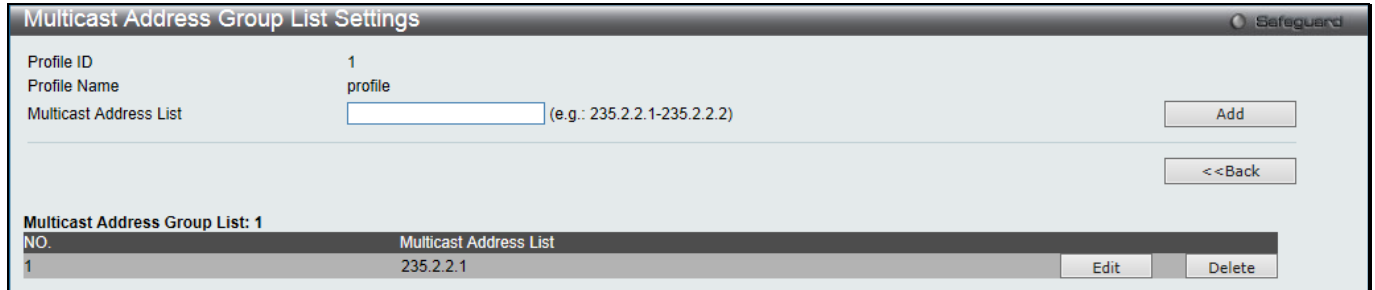


Figure 4-98 Multicast Address Group List Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Multicast Address List</b>	Enter the multicast address list.

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

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

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

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

## IPv4 Limited Multicast Range Settings

Users can configure the ports and VLANs on the Switch that will be involved in the Limited IPv4 Multicast Range. The user can configure the range of multicast ports that will be accepted by the source ports to be forwarded to the receiver ports.

To view the following window, click **L2 Features > Multicast Filtering > IPv4 Multicast Filtering > IPv4 Limited Multicast Range Settings**, as show below:

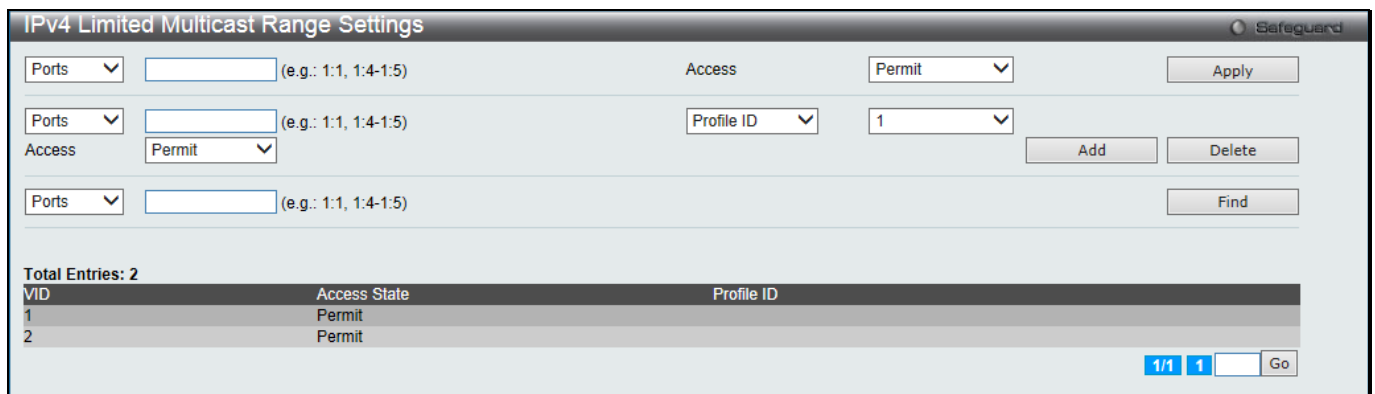


Figure 4-99 IPv4 Limited Multicast Range Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Ports / VID List</b>	Select the appropriate port(s) or VLAN IDs used for the configuration.

<b>Access</b>	Assign access permissions to the ports selected. Options listed are <b>Permit</b> and <b>Deny</b> .
<b>Profile ID / Profile Name</b>	Use the drop-down menu to select the profile ID or profile name used and then assign <b>Permit</b> or <b>Deny</b> access to them.

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

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

Click the **Delete** button to remove the specific 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.

## IPv4 Max Multicast Group Settings

Users can configure the ports and VLANs on the switch that will be a part of the maximum filter group, up to a maximum of 960.

To view the following window, click **L2 Features > Multicast Filtering > IPv4 Multicast Filtering > IPv4 Max Multicast Group Settings**, as show below:

Figure 4-100 IPv4 Max Multicast Group Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Ports / VID List</b>	Select the appropriate port(s) or VLAN IDs used for the configuration here.
<b>Max Group (1-960)</b>	If the checkbox <b>Infinite</b> is not selected, the user can enter a <b>Max Group</b> value.
<b>Infinite</b>	Tick the check box to enable or disable the use of the Infinite value.
<b>Action</b>	Use the drop-down menu to select the appropriate action for this rule. The user can select <b>Drop</b> to initiate the drop action or the user can select <b>Replace</b> to initiate the replace action.

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

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.

## IPv6 Multicast Filtering

Users can add a profile to which multicast address(s) reports are to be received on specified ports on the Switch. This function will therefore limit the number of reports received and the number of multicast groups configured on the Switch. The user may set an IPv6 Multicast address or range of IPv6 Multicast addresses to accept reports (Permit) or deny reports (Deny) coming into the specified switch ports.

### IPv6 Multicast Profile Settings

This window is used to add, delete, and configure the IPv6 multicast profile.

To view the following window, click **L2 Features > Multicast Filtering > IPv6 Multicast Filtering > IPv6 Multicast Profile Settings**, as show below:

Figure 4-101 IPv6 Multicast Profile Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-24)</b>	Enter a Profile ID between 1 and 24.
<b>Profile Name</b>	Enter a name for the IP Multicast Profile.

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

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

Click the **Delete All** button to remove all the entries listed.

Click the [Group List](#) link to configure the multicast address group list settings for the specific entry.

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

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

After clicking the [Group List](#) link, the following window will appear.

Figure 4-102 Multicast Address Group List Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Multicast Address List</b>	Enter the multicast address list here.

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

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

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

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

## IPv6 Limited Multicast Range Settings

Users can configure the ports and VLANs on the Switch that will be involved in the Limited IPv6 Multicast Range.

To view the following window, click **L2 Features > Multicast Filtering > IPv6 Multicast Filtering > IPv6 Limited Multicast Range Settings**, as show below:

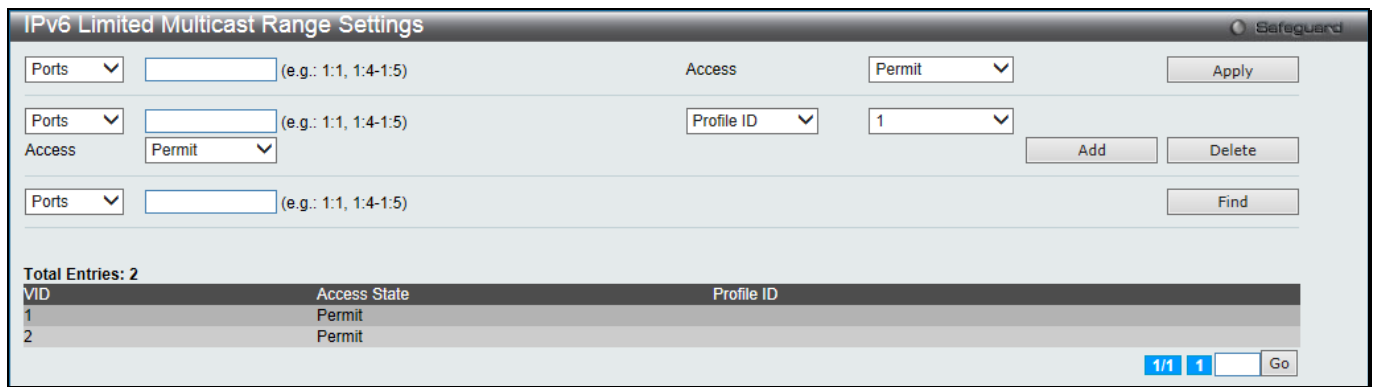


Figure 4-103 IPv6 Limited Multicast Range Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Ports / VID List</b>	Select the appropriate port(s) or VLAN IDs used for the configuration here.
<b>Access</b>	Assign access permissions to the ports selected. Options listed are <b>Permit</b> and <b>Deny</b> .
<b>Profile ID / Profile Name</b>	Use the drop-down menu to select the profile ID or profile name used and then assign <b>Permit</b> or <b>Deny</b> access to them.

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

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

Click the **Delete** button to remove the specific 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.

## IPv6 Max Multicast Group Settings

Users can configure the ports and VLANs on the switch that will be a part of the maximum filter group, up to a maximum of 960.

To view the following window, click **L2 Features > Multicast Filtering > IPv6 Multicast Filtering > IPv6 Multicast Group Settings**, as show below:

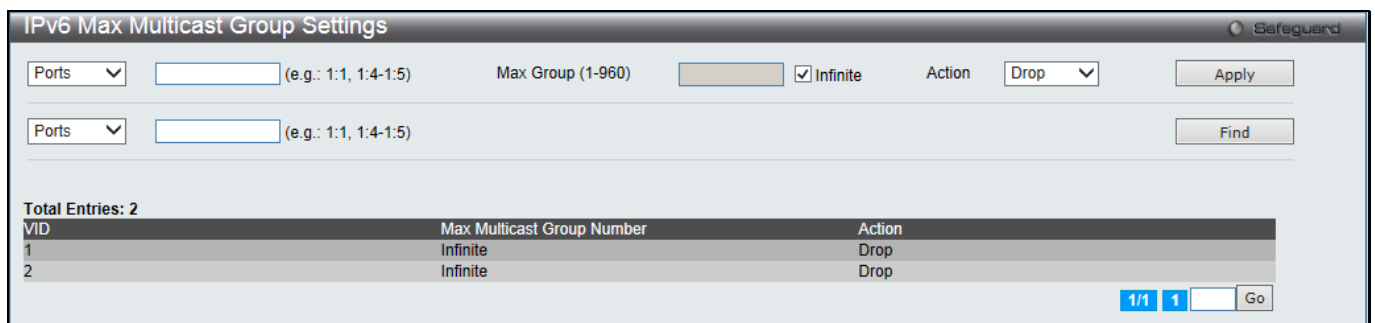


Figure 4-104 IPv6 Max Multicast Group Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Ports / VID List</b>	Select the appropriate port(s) or VLAN IDs used for the configuration here.
<b>Max Group (1-960)</b>	If the checkbox <b>Infinite</b> is not selected, the user can enter a <b>Max Group</b> value.
<b>Infinite</b>	Tick the check box to enable or disable the use of the Infinite value.
<b>Action</b>	Use the drop-down menu to select the appropriate action for this rule. The user can select <b>Drop</b> to initiate the drop action or the user can select <b>Replace</b> to initiate the replace action.

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

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.

## Multicast Filtering Mode

Users can configure the multicast filtering mode.

To view the following window, click **L2 Features > Multicast Filtering > Multicast Filtering Mode**, as show below:

Figure 4-105 Multicast Filtering Mode window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name / VID List</b>	The VLAN to which the specified filtering action applies. Tick the <b>All</b> check box to apply this feature to all the VLANs.
<b>Multicast Filter Mode</b>	This drop-down menu allows you to select the action the Switch will take when it receives a multicast packet that requires forwarding to a port in the specified VLAN. <i>Forward All Groups</i> – This will instruct the Switch to forward all multicast packets to the specified VLAN. <i>Forward Unregistered Groups</i> – The multicast packets whose destination is an unregistered multicast group will be forwarded within the range of ports specified above. <i>Filter Unregistered Groups</i> – The multicast packets whose destination is a registered multicast group will be forwarded within the range of ports specified above.

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

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.

## Multicast Filtering Control Packet

Users can configure the multicast filtering mode.

To view the following window, click **L2 Features > Multicast Filtering > Multicast Filtering Control Packet**, as show below:

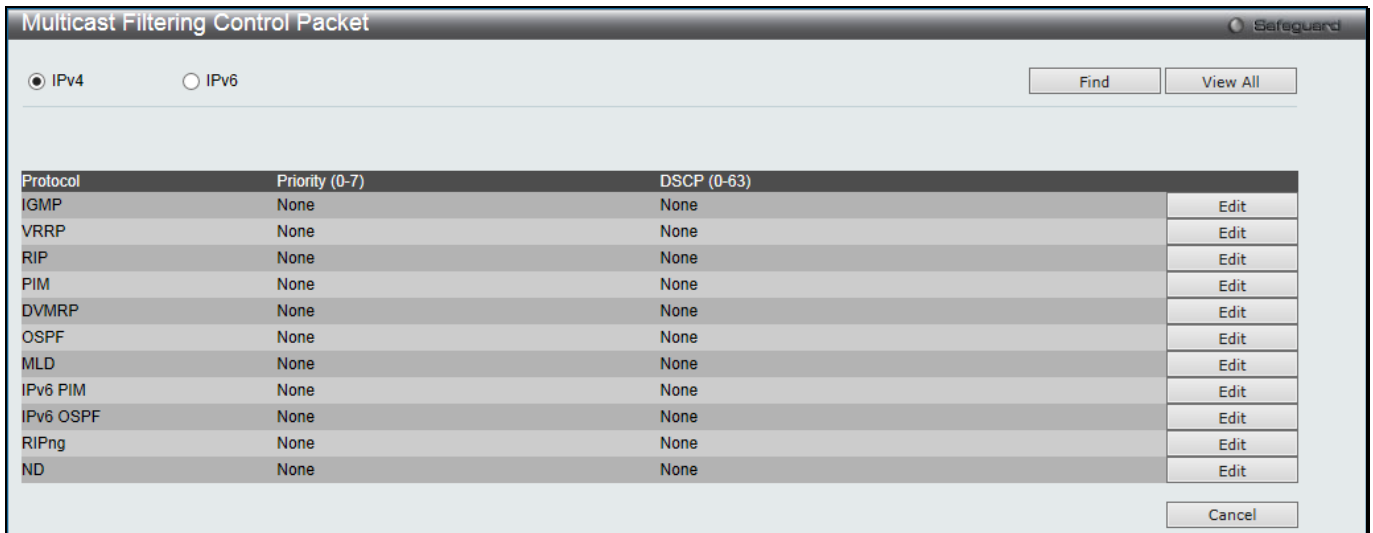


Figure 4-106 Multicast Filtering Control Packet window

The fields that can be configured are described below:

Parameter	Description
<b>IPv4</b>	Click the radio button to specify the IPv4 protocol.
<b>IPv6</b>	Click the radio button to specify the IPv6 protocol.

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

Click the **View All** button to display all the existing entries.

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

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

After click the **Edit** button, the following window will appear:

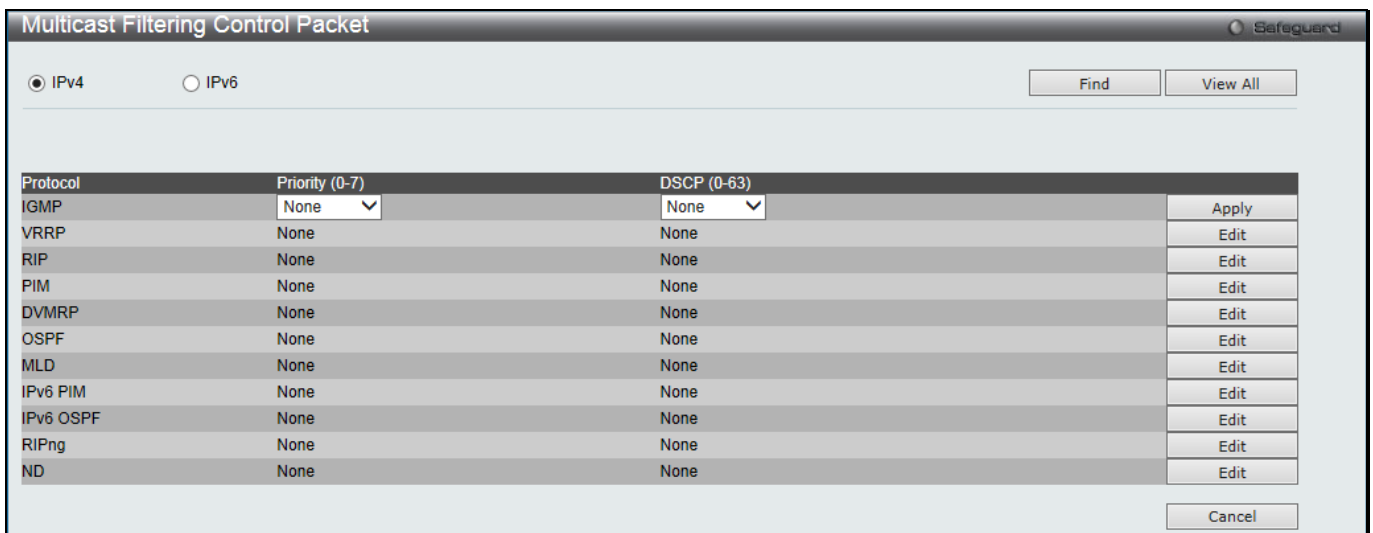


Figure 4-107 Multicast Filtering Control Packet - Edit window

The fields that can be configured are described below:

Parameter	Description
<b>Priority (0-7)</b>	Use the drop-down menu to select the priority of the specific protocol.
<b>DSCP (0-63)</b>	Use the drop-down menu to select the DSCP of the specific protocol.

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



## ERPS Settings

ERPS (Ethernet Ring Protection Switching) is the first industry standard (ITU-T G.8032) for Ethernet ring protection switching. It is achieved by integrating mature Ethernet operations, administration, and maintenance (OAM) \* functions and a simple automatic protection switching (APS) protocol for Ethernet ring networks. ERPS provides sub-50ms 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 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.

### **G.8032 Terms and Concepts**

**RPL (Ring Protection Link)** – Link designated by mechanism that is blocked during Idle state to prevent loop on Bridged ring

**RPL Owner** – Node connected to RPL that blocks traffic on RPL during Idle state and unblocks during Protected state

**R-APS (Ring – Automatic Protection Switching)** - Protocol messages defined in Y.1731 and G.8032 used to coordinate the protection actions over the ring through RAPS VLAN (R-APS Channel).

**RAPS VLAN (R-APS Channel)** – A separate ring-wide VLAN for transmission of R-APS messages

**Protected VLAN** – The service traffic VLANs for transmission of normal network traffic

This window is used to enable the ERPS function on the switch.



**NOTE:** EEE, STP and LBD should be disabled on the ring ports before enabling ERPS. The ERPS cannot be enabled before the R-APS VLAN is created, and ring ports, RPL port, RPL owner, are configured.



**NOTE:** EEE and ERPS are mutually exclusive functions.

To view the following window, click **L2 Features > ERPS Settings**, as show below:

Figure 4-108 ERPS Settings Window

The fields that can be configured are described below:

Parameter	Description
ERPS State	Click to enable or disable the ERPS State.
ERPS Log	Click to enable or disable the ERPS Log.
ERPS Trap	Click to enable or disable the ERPS Trap.

<b>R-APS VLAN (1-4094)</b>	Specify the VLAN which will be the R-APS VLAN.
----------------------------	--

Click the **Apply** button to accept the changes made for each individual section.

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

Click the **View All** button to view all the entries configured.

Click the [Detail Information](#) link to view detailed information of the R-APS entry.

Click the [Sub-Ring Information](#) link to view detailed information of the ERPS sub-ring settings.

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 [Detail Information](#) link, the following window will appear:

ERPS Settings		Safeguard
<b>ERPS Information</b>		
R-APS VLAN	1	
Ring Status	Disabled	
Admin West Port		
Operational West Port		
Admin East Port		
Operational East Port		
Admin RPL Port	None	
Operational RPL Port	None	
Admin RPL Owner	Disabled	
Operational RPL Owner	Disabled	
Protected VLAN(s)		
Ring MEL (0-7)	1	
Holdoff Time (0-10000)	0	ms
Guard Time (10-2000)	500	ms
WTR Time (1-12)	5	min
Revertive	Enabled	
Current Ring State	-	
		<input type="button" value="Edit"/> <input type="button" value=" &lt;&lt;Back"/>

Figure 4-109 ERPS Settings - Detail Information window

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

Click on the **<<Back** button to return to the ERPS settings page.

After click the **Edit** button, the following window will appear:

ERPS Settings		Safeguard
<b>ERPS Information</b>		
R-APS VLAN	1	
Ring Status	Disabled <input type="checkbox"/>	
Admin West Port	Unit 1 <input type="checkbox"/> Virtual Channel <input type="checkbox"/>	
Operational West Port		
Admin East Port	Unit 1 <input type="checkbox"/> Virtual Channel <input type="checkbox"/>	
Operational East Port		
Admin RPL Port	None <input type="checkbox"/>	
Operational RPL Port	None	
Admin RPL Owner	Disabled <input type="checkbox"/>	
Operational RPL Owner	Disabled	
Protected VLAN(s) (e.g.: 4-6)	<input type="text"/>	<input checked="" type="radio"/> Add <input type="radio"/> Delete
Ring MEL (0-7)	1 <input type="checkbox"/>	
Holdoff Time (0-10000)	0 <input type="checkbox"/>	ms
Guard Time (10-2000)	500 <input type="checkbox"/>	ms
WTR Time (1-12)	5 <input type="checkbox"/>	min
Revertive	Enabled <input type="checkbox"/>	
Current Ring State	-	
		<input type="button" value="Apply"/> <input type="button" value=" &lt;&lt;Back"/>

Figure 4-110 ERPS Settings - Edit Detail Information window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>R-APS VLAN</b>	Display the R-APS VLAN ID.
<b>Ring Status</b>	Specify to enable or disable the specified ring.
<b>Admin West Port</b>	Specify that the port or the virtual channel will be associated with the west ring port.
<b>Operational West Port</b>	Display the operational west port.
<b>Admin East Port</b>	Specify that the port or the virtual channel will be associated with the east ring port.
<b>Operational East Port</b>	Display the operational east port value.
<b>Admin RPL Port</b>	Specify the RPL port used. Options to choose from are <b>West Port</b> , <b>East Port</b> , and <b>None</b> .
<b>Operational RPL Port</b>	Display the operational RPL port value.
<b>Admin RPL Owner</b>	Specify to enable or disable the RPL owner node.
<b>Operational RPL Owner</b>	Display the operational RPL owner value.
<b>Protected VLAN(s)</b>	Specify to add or delete the protected VLAN group.
<b>Ring MEL (0-7)</b>	Specify the ring MEL of the R-APS function. The default ring MEL is 1.
<b>Holdoff Time (0-10000)</b>	Specify the hold-off time of the R-APS function. The default hold-off time is 0 milliseconds.
<b>Guard Time (10-20000)</b>	Specify the guard time of the R-APS function. The default guard time is 500 milliseconds.
<b>WTR Time (5-12)</b>	Specify the WTR time of the R-APS function.
<b>Revertive</b>	Specify the state of the R-APS revertive option.
<b>Current Ring State</b>	Display the current Ring state.

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

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

After clicking the [Sub-Ring Information](#) link, the following window will appear:

Figure 4-111 ERPS Sub-Ring Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Sub-Ring R-APS VLAN (1-4094)</b>	Enter the R-APS VLAN ID.
<b>State</b>	Tick the check box and select to add or delete the entry.
<b>TC Propagation State</b>	Tick the check box and select to enable or disable the TC propagation state.

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

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

# Local Loopback Port Settings

This window is used to configure the internal loopback test on the specified ports or recover from external loopback mode.

To view the following window, click **L2 Features > Local Loopback Port Settings**, as show below:

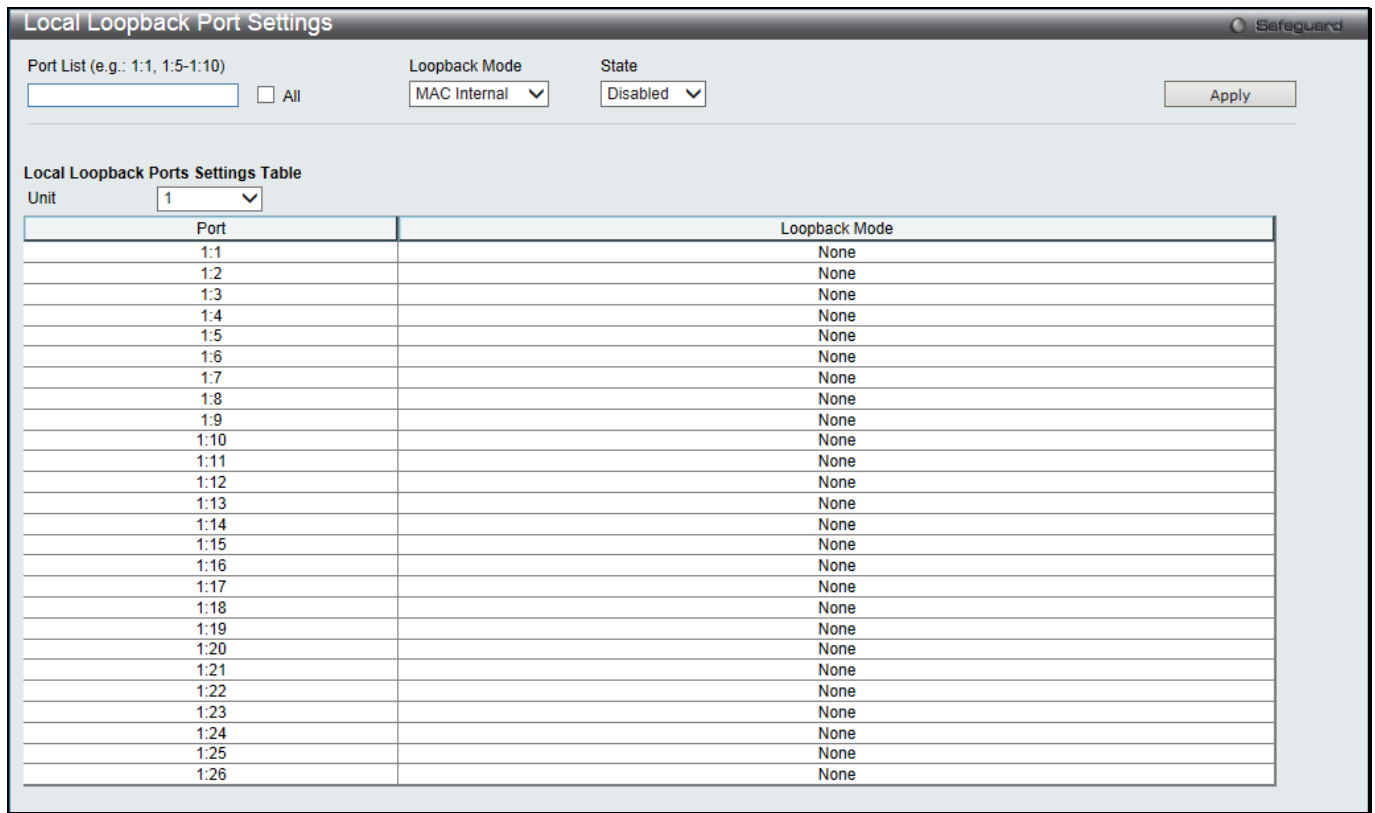


Figure 4-112 Local Loopback Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Port List</b>	Enter a port or list of ports. Tick the <b>All</b> check box to apply to all ports.
<b>Loopback Mode</b>	Use the drop-down menu to select the loopback mode.
<b>State</b>	Use the drop-down menu to enable the specified loopback mode.
<b>Unit</b>	Select the unit you want to display.

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

To view the following window, the **Loopback Mode** must be enabled and then disabled for the specified ports as **MAC Internal**.

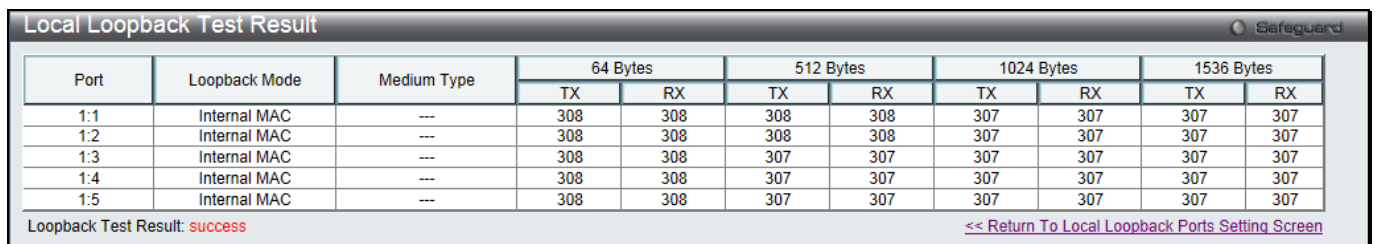


Figure 4-113 Local Loopback Test Result window

Click the [<<Return To Local Loopback Ports Setting Screen](#) to go back to the Local Loopback Port Settings window.

# LLDP

## LLDP

### LLDP Global Settings

This window is used to configure the LLDP global parameters.

To view the following window, click **L2 Features > LLDP > LLDP > LLDP Global Settings**, as show below:

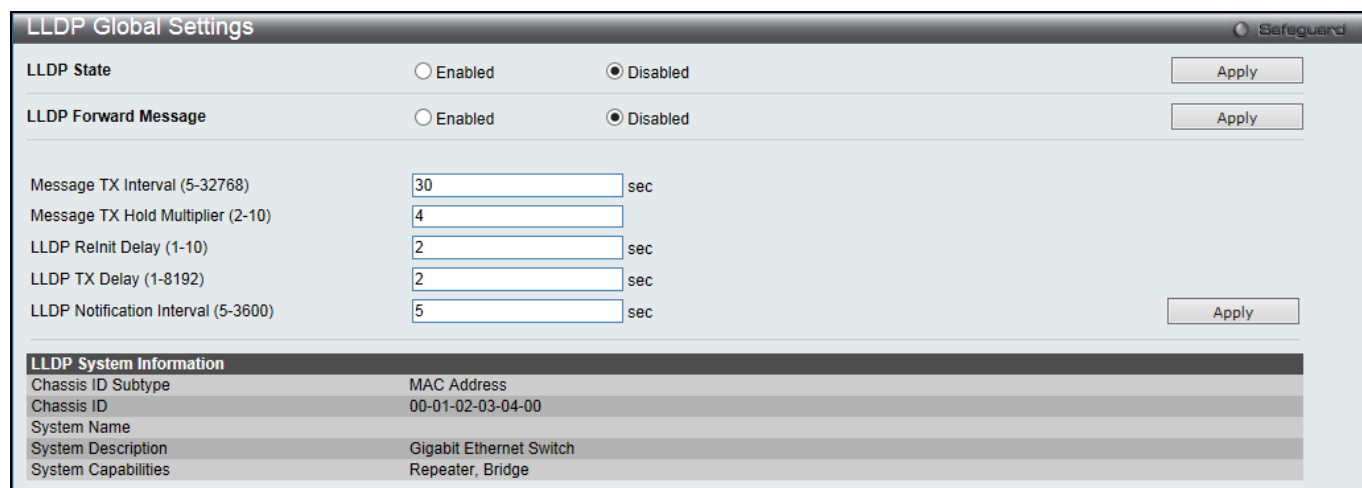


Figure 4-114 LLDP Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>LLDP State</b>	Click the radio buttons to enable or disable the LLDP feature.
<b>LLDP Forward Message</b>	When LLDP is disabled this function controls the LLDP packet forwarding message based on individual ports. If LLDP is enabled on a port it will flood the LLDP packet to all ports that have the same port VLAN and will advertise to other stations attached to the same IEEE 802 LAN.
<b>Message TX Interval (5-32768)</b>	This interval controls how often active ports retransmit advertisements to their neighbors. To change the packet transmission interval, enter a value in seconds (5 to 32768).
<b>Message TX Hold Multiplier (2-10)</b>	This function calculates the Time-to-Live for creating and transmitting the LLDP advertisements to LLDP neighbors by changing the multiplier used by an LLDP Switch. When the Time-to-Live for an advertisement expires the advertised data is then deleted from the neighbor Switch's MIB.
<b>LLDP Reinit Delay (1-10)</b>	The LLDP re-initialization delay interval is the minimum time that an LLDP port will wait before reinitializing after receiving an LLDP disable command. To change the LLDP re-init delay, enter a value in seconds (1 to 10).
<b>LLDP TX Delay (1-8192)</b>	LLDP TX Delay allows the user to change the minimum time delay interval for any LLDP port which will delay advertising any successive LLDP advertisements due to change in the LLDP MIB content. To change the LLDP TX Delay, enter a value in seconds (1 to 8192).
<b>LLDP Notification Interval (5-3600)</b>	LLDP Notification Interval is used to send notifications to configured SNMP trap receiver(s) when an LLDP change is detected in an advertisement received on the port from an LLDP neighbor. To set the LLDP Notification Interval, enter a value in seconds (5 to 3600).

Click the **Apply** button to accept the changes made for each individual section.

## LLDP Port Settings

This window is used to configure the LLDP port parameters.

To view the following window, click **L2 Features > LLDP > LLDP > LLDP Port Settings**, as show below:

**LLDP Port Settings**

Unit: 1 | From Port: 01 | To Port: 01 | Notification: Disabled | Admin Status: TX and RX

Subtype: IPv4 | Action: Disabled | Address: | Port ID Subtype: Local

Note: The IPv4 (IPv6) address should be the switch's address.

Port ID	Notification	Admin Status	IPv4 (IPv6) Address
1	Disabled	TX and RX	
2	Disabled	TX and RX	
3	Disabled	TX and RX	
4	Disabled	TX and RX	
5	Disabled	TX and RX	
6	Disabled	TX and RX	
7	Disabled	TX and RX	
8	Disabled	TX and RX	
9	Disabled	TX and RX	
10	Disabled	TX and RX	
11	Disabled	TX and RX	
12	Disabled	TX and RX	
13	Disabled	TX and RX	
14	Disabled	TX and RX	
15	Disabled	TX and RX	
16	Disabled	TX and RX	
17	Disabled	TX and RX	
18	Disabled	TX and RX	
19	Disabled	TX and RX	
20	Disabled	TX and RX	
21	Disabled	TX and RX	
22	Disabled	TX and RX	
23	Disabled	TX and RX	
24	Disabled	TX and RX	
25	Disabled	TX and RX	
26	Disabled	TX and RX	

Figure 4-115 LLDP Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select the ports used for this configuration.
<b>Notification</b>	Use the drop-down menu to enable or disable the status of the LLDP notification. This function controls the SNMP trap however it cannot implement traps on SNMP when the notification is disabled.
<b>Admin Status</b>	This function controls the local LLDP agent and allows it to send and receive LLDP frames on the ports. This option contains <b>TX</b> , <b>RX</b> , <b>TX And RX</b> or <b>Disabled</b> . <b>TX</b> - the local LLDP agent can only transmit LLDP frames. <b>RX</b> - the local LLDP agent can only receive LLDP frames. <b>TX And RX</b> - the local LLDP agent can both transmit and receive LLDP frames. <b>Disabled</b> - the local LLDP agent can neither transmit nor receive LLDP frames. The default value is TX And RX.
<b>Subtype</b>	Use the drop-down menu to select the type of the IP address information will be sent.
<b>Action</b>	Use the drop-down menu to enable or disable the action field.
<b>Address</b>	Enter the IP address that will be sent.
<b>Port ID Subtyp</b>	Use the drop-down menu to select the subtype of the Port ID.

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 > LLDP management Address List**, as show below:

Figure 4-116 LLDP Management Address List window

The fields that can be configured are described below:

Parameter	Description
<b>IPv4 / IPv6</b>	Use the drop-down menu to select either IPv4 or IPv6.
<b>Address</b>	Enter the management IP address or the IP address of the entity you wish to advertise to. The IPv4 address is a management IP address, so the IP information will be sent with the frame.

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

## LLDP Basic TLVs Settings

TLV stands for Type-length-value, which allows the specific sending information as a TLV element within LLDP packets. This window is used to enable the settings for the Basic TLVs Settings. An active LLDP port on the Switch always included mandatory data in its outbound advertisements. There are four optional data types that can be configured for an individual port or group of ports to exclude one or more of these data types from outbound LLDP advertisements. The mandatory data type includes four basic types of information (end of LLDPDU TLV, chassis ID TLV, port ID TLV, and Time to Live 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 > LLDP Basic TLVs Settings**, as show below:

LLDP Basic TLVs Settings
Safeguard

Unit:  From Port:  To Port:

Port Description:

System Name:

System Description:

System Capabilities:

**Unit 1 Settings**

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

Figure 4-117 LLDP Basic TLVs Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the port range to use for this configuration.
<b>Port Description</b>	Use the drop-down menu to enable or disable the Port Description option.
<b>System Name</b>	Use the drop-down menu to enable or disable the System Name option.
<b>System Description</b>	Use the drop-down menu to enable or disable the System Description option.
<b>System Capabilities</b>	Use the drop-down menu to enable or disable the System Capabilities option.

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

## LLDP Dot1 TLVs Settings

LLDP Dot1 TLVs are organizationally specific TLVs which are defined in IEEE 802.1 and used to configure an individual port or group of ports to exclude one or more of the IEEE 802.1 organizational port VLAN ID TLV data types from outbound LLDP advertisements.

To view the following window, click **L2 Features > LLDP > LLDP > LLDP Dot1 TLVs Settings**, as show below:



LLDP Dot1 TLVs Settings
Safeguard

Unit  From Port  To Port

Dot1 TLV PVID   
Dot1 TLV Protocol VLAN     
Dot1 TLV VLAN     
Dot1 TLV Protocol Identity

**Unit 1 Settings**

Port	PVID State	Port and Protocol VID State	VID	VLAN Name State	VID	Protocol Identity State	Protocol Identity
1	Disabled	Disabled		Disabled		Disabled	
2	Disabled	Disabled		Disabled		Disabled	
3	Disabled	Disabled		Disabled		Disabled	
4	Disabled	Disabled		Disabled		Disabled	
5	Disabled	Disabled		Disabled		Disabled	
6	Disabled	Disabled		Disabled		Disabled	
7	Disabled	Disabled		Disabled		Disabled	
8	Disabled	Disabled		Disabled		Disabled	
9	Disabled	Disabled		Disabled		Disabled	
10	Disabled	Disabled		Disabled		Disabled	
11	Disabled	Disabled		Disabled		Disabled	
12	Disabled	Disabled		Disabled		Disabled	
13	Disabled	Disabled		Disabled		Disabled	
14	Disabled	Disabled		Disabled		Disabled	
15	Disabled	Disabled		Disabled		Disabled	
16	Disabled	Disabled		Disabled		Disabled	
17	Disabled	Disabled		Disabled		Disabled	
18	Disabled	Disabled		Disabled		Disabled	
19	Disabled	Disabled		Disabled		Disabled	
20	Disabled	Disabled		Disabled		Disabled	
21	Disabled	Disabled		Disabled		Disabled	
22	Disabled	Disabled		Disabled		Disabled	
23	Disabled	Disabled		Disabled		Disabled	
24	Disabled	Disabled		Disabled		Disabled	
25	Disabled	Disabled		Disabled		Disabled	
26	Disabled	Disabled		Disabled		Disabled	

Figure 4-118 LLDP Dot1 TLVs Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select the port range to use for this configuration.
<b>Dot1 TLV PVID</b>	Use the drop-down menu to enable or disable and configure the Dot1 TLV PVID option.
<b>Dot1 TLV Protocol VLAN</b>	Use the drop-down menu to enable or disable, and configure the Dot1 TLV Protocol VLAN option. After enabling this option to the user can select to use either <i>VLAN Name</i> , <i>VLAN ID</i> or <i>All</i> in the next drop-down menu. After selecting this, the user can enter either the VLAN name or VLAN ID value in the space provided.
<b>Dot1 TLV VLAN</b>	Use the drop-down menu to enable or disable, and configure the Dot1 TLV VLAN option. After enabling this option to the user can select to use either <i>VLAN Name</i> , <i>VLAN ID</i> or <i>All</i> in the next drop-down menu. After selecting this, the user can enter either the VLAN name or VLAN ID value in the space provided.
<b>Dot1 TLV Protocol Identity</b>	Use the drop-down menu to enable or disable, and configure the Dot1 TLV Protocol Identity option. After enabling this option the user can select to either use <i>EAPOL</i> , <i>LACP</i> , <i>GVRP</i> , <i>STP</i> , or <i>All</i> .

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

## LLDP Dot3 TLVs Settings

This window is used to configure an individual port or group of ports to exclude one or more IEEE 802.3 organizational specific TLV data type from outbound LLDP advertisements.

To view the following window, click **L2 Features > LLDP > LLDP > LLDP Dot3 TLVs Settings**, as show below:

LLDP Dot3 TLVs Settings
Safeguard

Unit
From Port
To Port

1
01
01

MAC / PHY Configuration Status
Link Aggregation

Disabled
Disabled

Maximum Frame Size
Apply

Disabled

**Unit 1 Settings**

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

Figure 4-119 LLDP Dot3 TLVs Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select the port range to use for this configuration.
<b>MAC / PHY Configuration Status</b>	This TLV optional data type indicates that the LLDP agent should transmit the MAC/PHY configuration/status TLV. This indicates it is possible for two ends of an IEEE 802.3 link to be configured with different duplex and/or speed settings and still establish some limited network connectivity. More precisely, the information includes whether the port supports the auto-negotiation function, whether the function is enabled, whether it has auto-negotiated advertised capability, and what is the operational MAU type. The default state is Disabled.
<b>Link Aggregation</b>	The Link Aggregation option indicates that LLDP agents should transmit 'Link Aggregation TLV'. This indicates the current link aggregation status of IEEE 802.3 MACs. More precisely, the information should include whether the port is capable of doing link aggregation, whether the port is aggregated in an aggregated link, and what is the aggregated port ID. The default state is Disabled.
<b>Maximum Frame Size</b>	The Maximum Frame Size indicates that LLDP agent should transmit 'Maximum-frame-size TLV'. The default state is Disabled.

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

## LLDP Statistic System

The LLDP Statistics System page allows you an overview of 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 > LLDP Statistic System**, as show below:

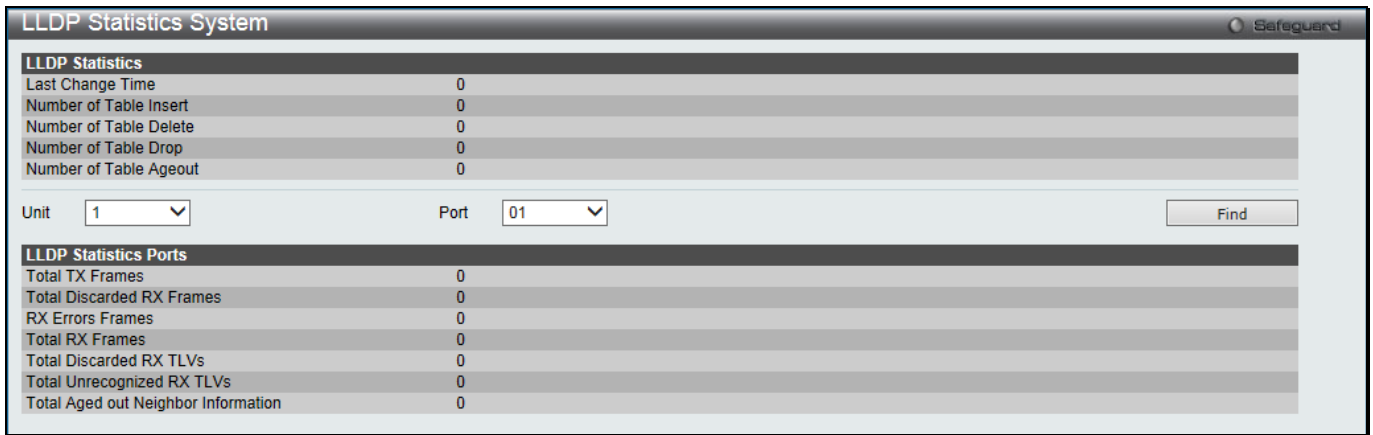


Figure 4-120 LLDP Statistics System window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Use the drop-down menu to select a port.

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

## LLDP Local Port Information

The LLDP Local Port Information page displays the information on a per port basis currently available for populating outbound LLDP advertisements in the local port brief table shown below.

To view the following window, click **L2 Features > LLDP > LLDP > LLDP Local Port Information**, as show below:

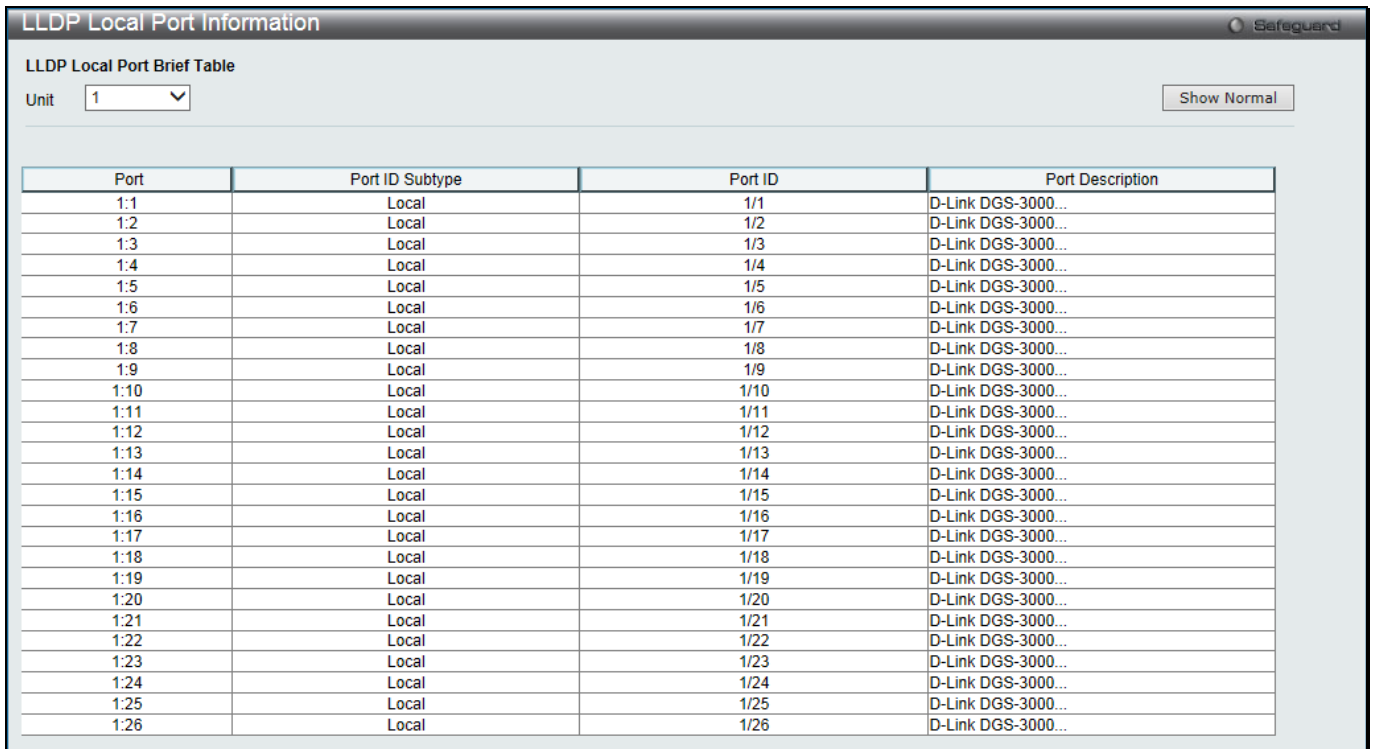


Figure 4-121 LLDP Local Port Information window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.

To view the normal LLDP Local Port information page per port, click the **Show Normal** button.

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

Figure 4-122 LLDP Local Port Information – Show Normal window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Use the drop-down menu to select a port.

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

To view more details about, for example, the **Management Address Count**, click the [Show Detail](#) hyperlink.

To view the brief LLDP Local Port information page per port, click the **Show Brief** button.

After clicking the [Show Detail](#) hyperlink under the **Management Address Count**, the following window will appear:

Figure 4-123 LLDP Local Port Information – Show Detail window

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

## LLDP Remote Port Information

This window displays port information learned from the neighbors. The switch receives packets from a remote station but is able to store the information as local.

To view the following window, click **L2 Features > LLDP > LLDP > LLDP Remote Port Information**, as show below:



Figure 4-124 LLDP Remote Port Information window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Use the drop-down menu to select a port.

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

To view the normal LLDP Remote Port information page per port, click the **Show Normal** button.

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



Figure 4-125 LLDP Remote Port Information – Show Normal window

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

## LLDP-MED

### LLDP-MED System Settings

This window is used to configure the LLDP-MED log state and the fast start repeat count, and display the LLDP-MED system information.

To view the following window, click **L2 Features > LLDP > LLDP-MED > LLDP-MED System Settings** as shown below.

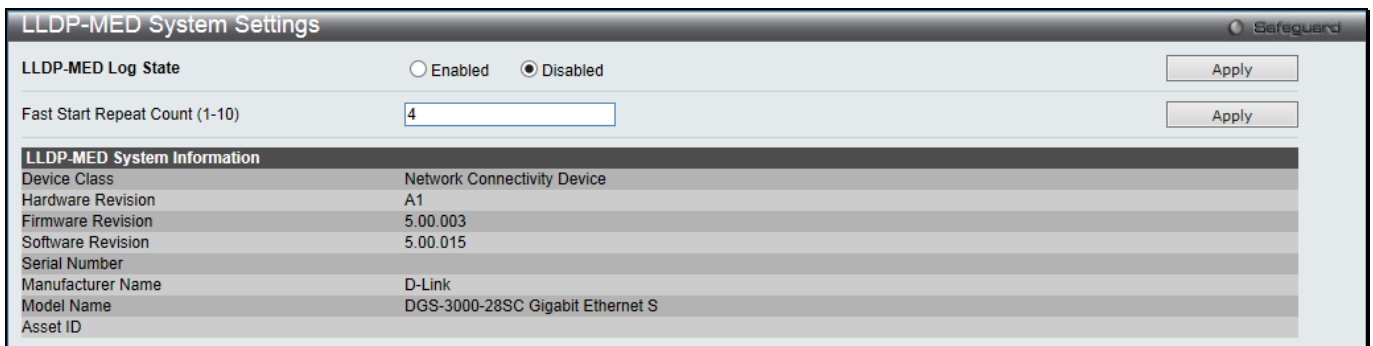


Figure 4-126 LLDP-MED System Settings window

The fields that can be configured are described below:

Parameter	Description
<b>LLDP-MED Log State</b>	Click to enable or disable the log state of LLDP-MED events.

<b>Fast Start Repeat Count (1-10)</b>	Enter a value between 1 and 10 for the fast start repeat count. When an LLDP-MED Capabilities TLV is detected for an MSAP identifier not associated with an existing LLDP remote system MIB, then the application layer shall start the fast start mechanism and set the 'medFastStart' timer to 'medFastStartRepeatCount' times 1. The default value is 4.
---------------------------------------	---

Click the **Apply** button to accept the changes made for each individual section.

## LLDP-MED Port Settings

This window is used to enable or disable transmitting LLDP-MED TLVs.

To view the following window, click **L2 Features > LLDP > LLDP-MED > LLDP-MED Port Settings** as shown below.

Unit	From Port	To Port	NTCS	State	<input type="checkbox"/> Capabilities <input type="checkbox"/> Network Policy <input type="checkbox"/> Inventory <input type="checkbox"/> All				
1	01	01	Disabled	Disabled					
<b>Note: NTCS: Notification Topology Change Status</b>									
<b>Unit 1 Settings</b>									
Port	NTCS	Capabilities	Network Policy	Inventory					
1	Disabled	Disabled	Disabled	Disabled					
2	Disabled	Disabled	Disabled	Disabled					
3	Disabled	Disabled	Disabled	Disabled					
4	Disabled	Disabled	Disabled	Disabled					
5	Disabled	Disabled	Disabled	Disabled					
6	Disabled	Disabled	Disabled	Disabled					
7	Disabled	Disabled	Disabled	Disabled					
8	Disabled	Disabled	Disabled	Disabled					
9	Disabled	Disabled	Disabled	Disabled					
10	Disabled	Disabled	Disabled	Disabled					
11	Disabled	Disabled	Disabled	Disabled					
12	Disabled	Disabled	Disabled	Disabled					
13	Disabled	Disabled	Disabled	Disabled					
14	Disabled	Disabled	Disabled	Disabled					
15	Disabled	Disabled	Disabled	Disabled					
16	Disabled	Disabled	Disabled	Disabled					
17	Disabled	Disabled	Disabled	Disabled					
18	Disabled	Disabled	Disabled	Disabled					
19	Disabled	Disabled	Disabled	Disabled					
20	Disabled	Disabled	Disabled	Disabled					
21	Disabled	Disabled	Disabled	Disabled					
22	Disabled	Disabled	Disabled	Disabled					
23	Disabled	Disabled	Disabled	Disabled					
24	Disabled	Disabled	Disabled	Disabled					
25	Disabled	Disabled	Disabled	Disabled					
26	Disabled	Disabled	Disabled	Disabled					

Figure 4-127 LLDP-MED Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the port range to use for this configuration.
<b>NTCS</b>	Use the drop-down menu to enable or disable Notification Topology Change Status.
<b>State</b>	Use the drop-down menu to enable or disable transmit LLDP-MED TLVs, and tick the check boxes of the TLV types that the LLDP agent should transmit. TLV types are <b>Capabilities</b> , <b>Network Policy</b> and <b>Inventory</b> . Tick the <b>All</b> check box to select all TLV types.

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

## LLDP-MED Local Port Information

This window displays the per-port information currently available for populating outbound LLDP-MED advertisements.

To view the following window, click **L2 Features > LLDP > LLDP-MED > LLDP-MED Local Port Information** as shown below.



Figure 4-128 LLDP-MED Local Port Information window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Use the drop-down menu to select a port.

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

## LLDP-MED Remote Port Information

This window displays the information learned from the neighbor parameters.

To view the following window, click **L2 Features > LLDP > LLDP-MED > LLDP-MED Remote Port Information** as shown below.

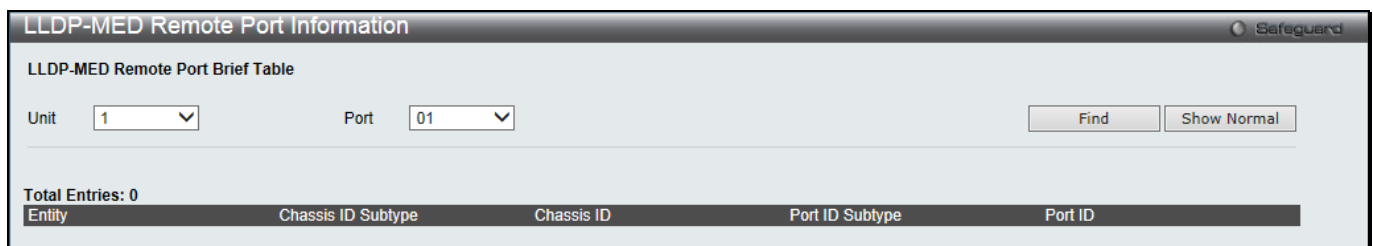


Figure 4-129 LLDP-MED Remote Port Information window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Use the drop-down menu to select a port.

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

To view the normal LLDP Remote Port information page per port, click the **Show Normal** button.

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



Figure 4-130 LLDP-MED Remote Port Information – Show Normal window

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

## NLB FDB Settings

The Switch supports Network Load Balancing (NLB). This is a MAC forwarding control for supporting 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 servers, but will only be processed by one of them. In multicast mode, the client uses a multicast MAC address as the destination MAC to reach the server. Regardless of the mode, the destination MAC is the shared MAC. The server uses its own MAC address (rather than the shared MAC) as the source MAC address of the reply packet. The NLB multicast FDB entry will be mutually exclusive with the L2 multicast entry.

To view the following window, click **L2 Features > NLB FDB Settings**, as shown below.

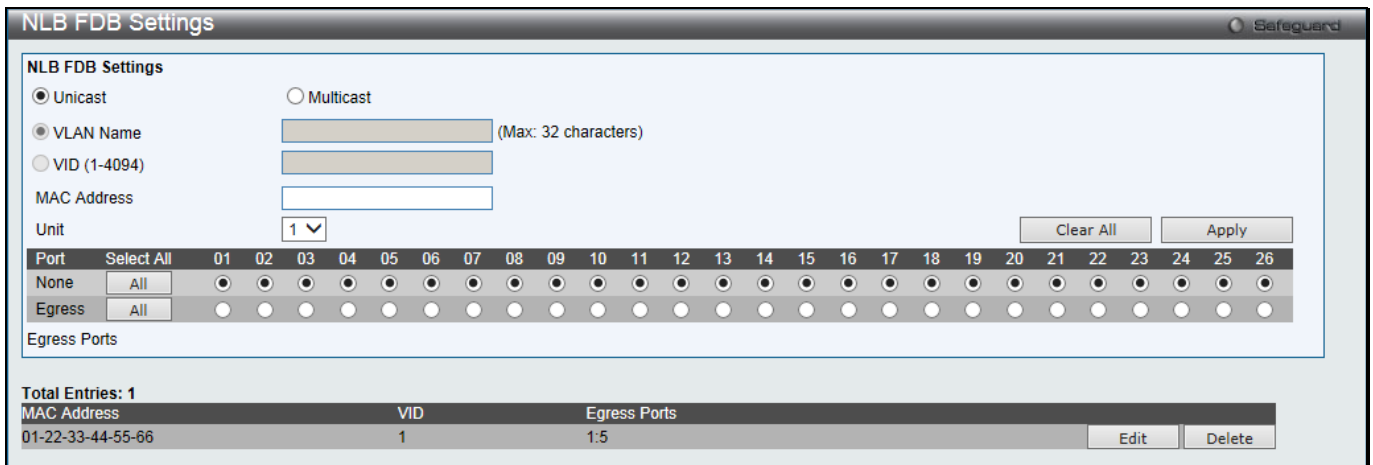


Figure 4-131 NLB FDB Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unicast</b>	Click to create NLB unicast FDB entry.
<b>Multicast</b>	Click to create NLB multicast FDB entry.
<b>VLAN Name</b>	Click the radio button and enter the VLAN of the NLB multicast FDB entry to be created.
<b>VID (1-4094)</b>	Click the radio button and enter the VLAN by the VLAN ID.
<b>MAC Address</b>	Enter the MAC address of the NLB FDB entry to be created.
<b>Unit</b>	Select the unit you want to configure.
<b>Ports</b>	Click the ports to be configured. Click the <b>All</b> button to select all ports.

Click the **Clear All** button to remove all the entered information in the fields.

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

Click the **Edit** button to update the information of the corresponding entry.

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



## Chapter 5 L3 Features

[IPv4 Static/Default Route Settings](#)  
[IPv4 Route Table](#)  
[IPv6 Static/Default Route Settings](#)  
[IPv6 Route Table](#)  
[IP Forwarding Table](#)

### IPv4 Static/Default Route Settings

The Switch supports static and default routing for IPv4 formatted addressing. Users can create a gateway for IPv4. Once the gateway has been set, the Switch will send an ARP request packet to the next hop router that has been set by the user. Once an ARP response has been 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.

Entries into the Switch's forwarding table can be made using a gateway.

To view the following window, click **L3 Features > IPv4 Static/Default Route Settings**, as show below:

IPv4 Static/Default Route Settings

IPv4 Static/Default Route Settings

IP Address   Default

Netmask  (e.g.: 255.255.255.254 or 0-32)

Gateway  (e.g.: 172.18.211.10)

Metric (1-65535)

Backup State

Apply

Total Entries: 1

IP Address/Netmask	Gateway	Cost	Protocol	Backup	Status
0.0.0.0/0	172.18.211.10	10	Default	Primary	Inactive

Delete

Figure 5-1 IPv4 Static/Default Route Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IP Address</b>	This field allows the entry of an IPv4 address to be assigned to the static route. Tick the <b>Default</b> check box to assign to the default route.
<b>Netmask</b>	This field allows the entry of a subnet mask to be applied to the corresponding subnet mask of the IP address.
<b>Gateway</b>	This field allows the entry of a Gateway IP Address to be applied to the corresponding gateway of the IP address.
<b>Metric (1-65535)</b>	Represents the metric value of the IP interface entered into the table. This field may read a number between 1 and 65535.
<b>Backup State</b>	Each IP address can only have one primary route, while another route should be assigned to the backup state. When the primary route fails, the Switch will try the backup route. The field represents the Backup state that the Static and Default Route is configured for.

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

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

### IPv4 Route Table

The IP routing table stores all the routes information of the Switch. This window is used to display all the route information on the switch.

To view the following window, click **L3 Features > IPv4 Route Table**, as show below:

Figure 5-2 IPv4 Route Table window

The fields that can be configured are described below:

Parameter	Description
<b>Network Address</b>	Click the radio button and enter the destination network address of the route to be displayed.
<b>IP Address</b>	Click the radio button and enter the destination IP address of the route want to be displayed. The longest prefix matched route will be displayed.
<b>Hardware</b>	Select the Hardware option to display only the routes that have been written into the chip.

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.

## IPv6 Static/Default Route Settings

A static or default entry of an IPv6 address can be entered into the Switch's routing table for IPv6 formatted addresses.

To view the following window, click **L3 Features > IPv6 Static/Default Route Settings**, as show below:

Figure 5-3 IPv6 Static/Default Route Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IPv6 Address/Prefix Length</b>	This field allows the entry of an IPv6 address to be assigned to the static route. Tick the <b>Default</b> check box to assign to the default route.
<b>Interface Name</b>	The IP Interface where the static IPv6 route is created.
<b>Nexthop Address</b>	The corresponding IPv6 address for the next hop Gateway address in IPv6 format.
<b>Metric (1-65535)</b>	The metric of the IPv6 interface entered into the table representing the number of routers between the Switch and the IPv6 address above. Metric values allowed are

	between 1 and 65535.
<b>Backup State</b>	Each IPv6 address can only have one primary route, while another route should be assigned to the backup state. When the primary route fails, the Switch will try the backup route. The field represents the Backup for the IPv6 configuration. This field may be Primary or Backup.

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

Click the **Delete All** button to remove all the entries listed.

Click the **Delete** button to delete the corresponding 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 the current IPv6 routing table or specified route entries.

To view the following window, click **L3 Features > IPv6 Route Table** as shown below.



Figure 5-4 IPv6 Route Table window

The fields that can be configured are described below:

Parameter	Description
<b>IPv6 Address/Prefix Length</b>	Tick the check box and enter a 128-bit length IPv6 address.
<b>IPv6 Address</b>	Tick the check box and enter the destination IPv6 address of the route to be displayed.
<b>Hardware</b>	Tick the check box to display only the routes that have been written into the chip.

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.

## IP Forwarding Table

The IP forwarding table stores all the direct connected IP information. This window is used to view all the direct connected IP information.

To view the following window, click **L3 Features > IP Forwarding Table** as shown below.

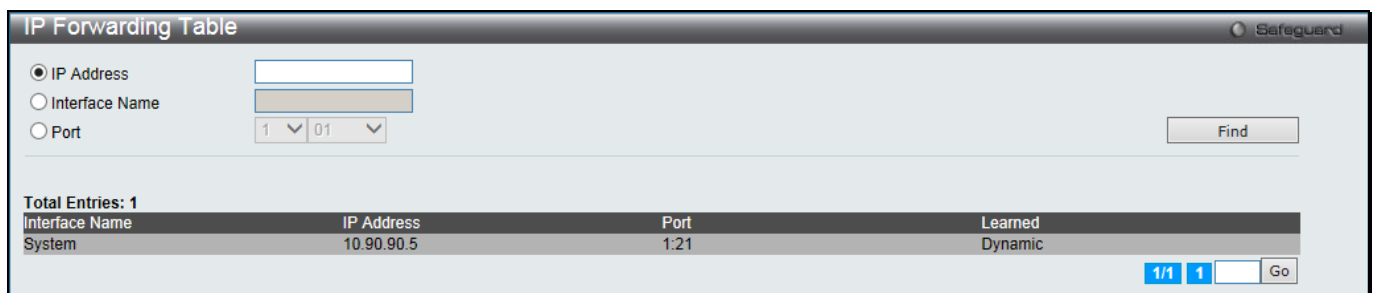


Figure 5-5 IP Forwarding Table window

The fields that can be configured are described below:

Parameter	Description
<b>IP Address</b>	Click the radio button and enter the IP address.
<b>Interface Name</b>	Click the radio button and enter the interface name.
<b>Port</b>	Click the radio button and select the unit and port.

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.

## Chapter 6 QoS

### 802.1p Settings

#### Bandwidth Control

#### Traffic Control Settings

#### DSCP

#### HOL Blocking Prevention

#### Scheduling Settings

#### SRED

The Switch supports 802.1p priority queuing Quality of Service. The following section discusses the implementation of QoS (Quality of Service) and benefits of using 802.1p priority queuing.

### Advantages of QoS

QoS is an implementation of the IEEE 802.1p standard that allows network administrators a method of reserving bandwidth for important functions that require a large bandwidth or have a high priority, such as VoIP (voice-over Internet Protocol), web browsing applications, file server applications or video conferencing. Not only can a larger bandwidth be created, but other less critical traffic can be limited, so excessive bandwidth can be saved. The Switch has separate hardware queues on every physical port to which packets from various applications can be mapped to, and, in turn prioritized. View the following map to see how the Switch implements basic 802.1P priority queuing.

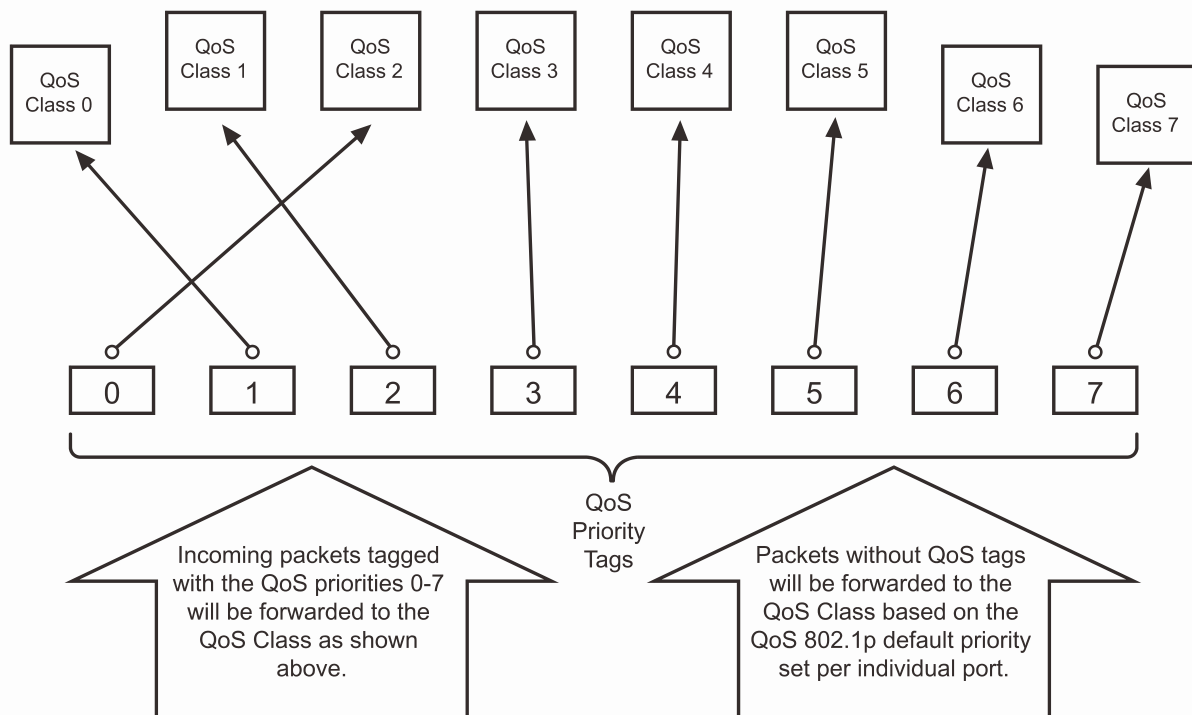


Figure 6-1 Mapping QoS on the Switch

The picture above shows the default priority setting for the Switch. Class-7 has the highest priority of the seven priority classes of service on the Switch. In order to implement QoS, the user is required to instruct the Switch to examine the header of a packet to see if it has the proper identifying tag. Then the user may forward these tagged packets to designated classes of service on the Switch where they will be emptied, based on priority.

For example, let's say a user wishes to have a video conference between two remotely set computers. The administrator can add priority tags to the video packets being sent out, utilizing the Access Profile commands. Then, on the receiving end, the administrator instructs the Switch to examine packets for this tag, acquires the tagged

packets and maps them to a class queue on the Switch. Then in turn, the administrator will set a priority for this queue so that will be emptied before any other packet is forwarded. This result in the end user receiving all packets sent as quickly as possible, thus prioritizing the queue and allowing for an uninterrupted stream of packets, which optimizes the use of bandwidth available for the video conference.

## **Understanding QoS**

The Switch supports 802.1p priority queuing. The Switch has eight priority queues. These priority queues are numbered from 7 (Class 7) — the highest priority queue — to 0 (Class 0) — the lowest priority queue. The eight priority tags specified in IEEE 802.1p (p0 to p7) are mapped to the Switch's priority queues as follows:

1. Priority 0 is assigned to the Switch's Q2 queue.
2. Priority 1 is assigned to the Switch's Q0 queue.
3. Priority 2 is assigned to the Switch's Q1 queue.
4. Priority 3 is assigned to the Switch's Q3 queue.
5. Priority 4 is assigned to the Switch's Q4 queue.
6. Priority 5 is assigned to the Switch's Q5 queue.
7. Priority 6 is assigned to the Switch's Q6 queue.
8. Priority 7 is assigned to the Switch's Q7 queue.

For strict priority-based scheduling, any packets residing in the higher priority classes of service are transmitted first. Multiple strict priority classes of service are emptied based on their priority tags. Only when these classes are empty, are packets of lower priority transmitted.

For weighted round-robin queuing, the number of packets sent from each priority queue depends upon the assigned weight. For a configuration of eight CoS queues, A~H with their respective weight value: 8~1, the packets are sent in the following sequence: A1, B1, C1, D1, E1, F1, G1, H1, A2, B2, C2, D2, E2, F2, G2, A3, B3, C3, D3, E3, F3, A4, B4, C4, D4, E4, A5, B5, C5, D5, A6, B6, C6, A7, B7, A8, A1, B1, C1, D1, E1, F1, G1, H1.

For weighted round-robin queuing, if each CoS queue has the same weight value, then each CoS queue has an equal opportunity to send packets just like round-robin queuing.

For weighted round-robin queuing, if the weight for a CoS is set to 0, then it will continue processing the packets from this CoS until there are no more packets for this CoS. The other CoS queues that have been given a nonzero value, and depending upon the weight, will follow a common weighted round-robin scheme.

Remember that the Switch has eight configurable priority queues (and eight Classes of Service) for each port on the Switch.



**NOTICE:** The Switch contains eight classes of service for each port on the Switch. One of these classes is reserved for internal use on the Switch and is therefore not configurable. All references in the following section regarding classes of service will refer to only the eight classes of service that may be used and configured by the administrator.

## 802.1p Settings

### 802.1p Default Priority Settings

The Switch allows the assignment of a default 802.1p priority to each port on the Switch. This window allows the user to assign a default 802.1p priority to any given port on the switch that will insert the 802.1p priority tag to untagged packets received. The priority and effective priority tags are numbered from 0, the lowest priority, to 7, the highest priority. The effective priority indicates the actual priority assigned by RADIUS. If the RADIUS assigned value exceeds the specified limit, the value will be set at the default priority. For example, if the RADIUS assigns a limit of 8 and the default priority is 0, the effective priority will be 0.

To view the following window, click **QoS > 802.1p Settings > 802.1p Default Priority Settings**, as show below:

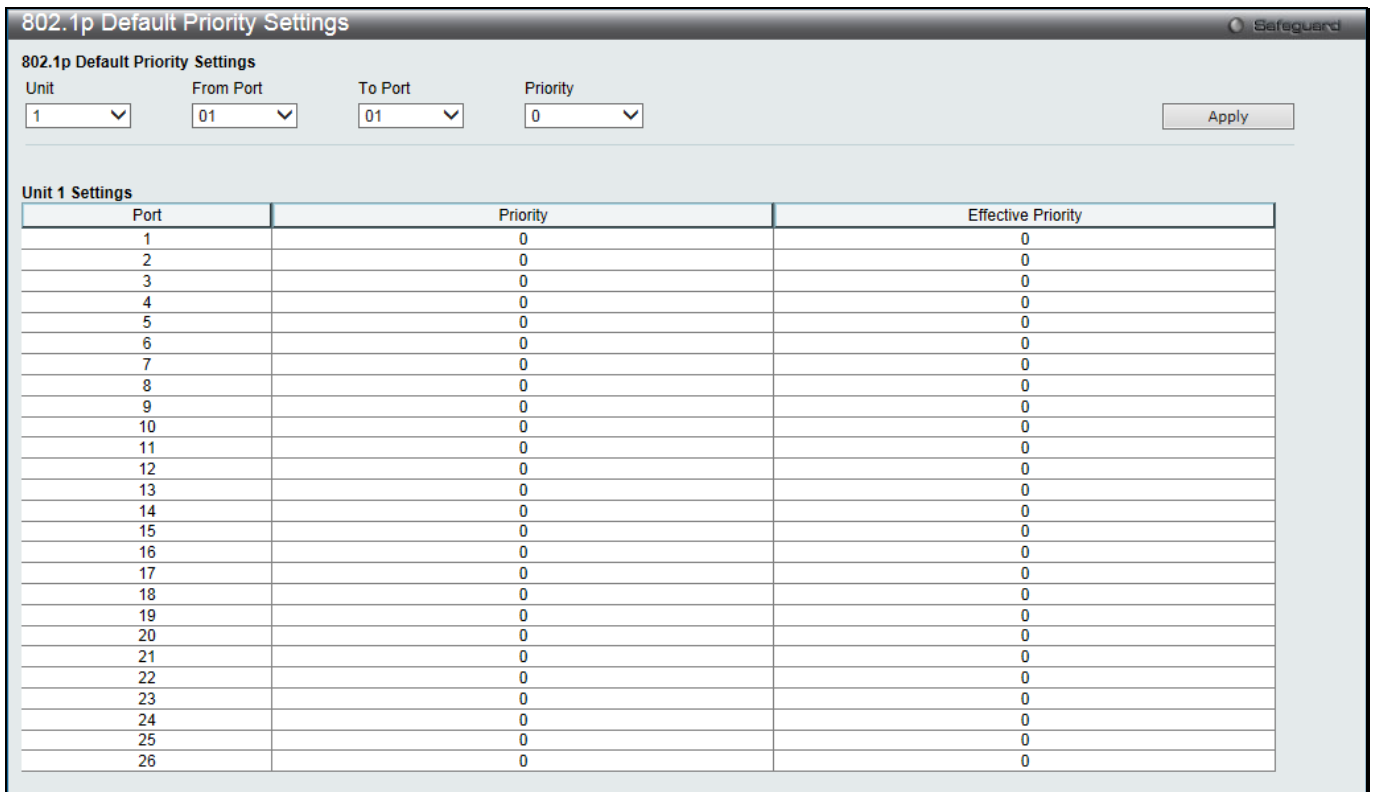


Figure 6-2 Default Priority Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the starting and ending ports to use.
<b>Priority</b>	Use the drop-down menu to select a value from 0 to 7.

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

## 802.1p User Priority Settings

The Switch allows the assignment of a class of service to each of the 802.1p priorities.

To view the following window, click **QoS > 802.1p Settings > 802.1p User Priority Settings**, as show below:

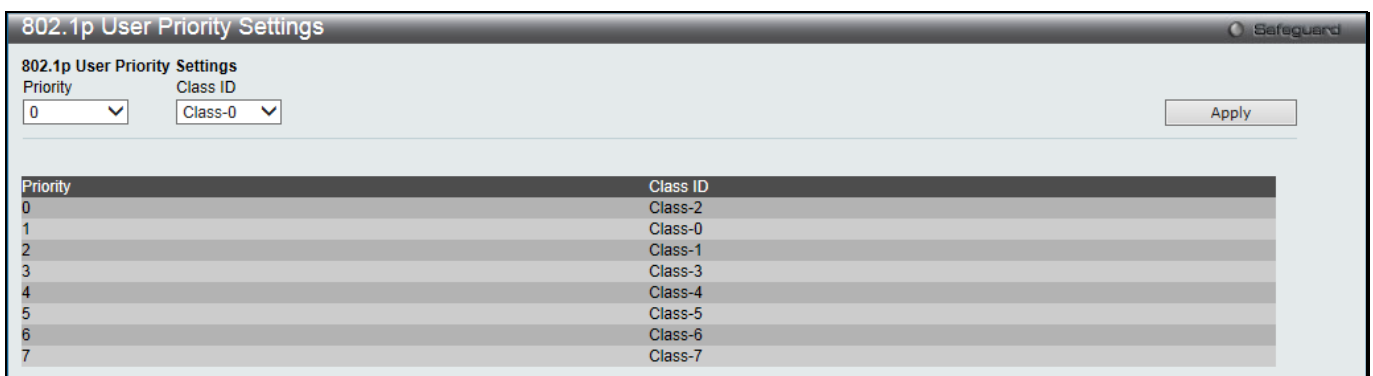


Figure 6-3 802.1p User Priority Settings window

Once a priority has been assigned to the port groups on the Switch, then a Class may be assigned to each of the eight levels of 802.1p priorities using the drop-down menus on this window. User priority mapping is not only for the default priority configured in the last page, but also for all the incoming tagged packets with 802.1p tag.

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

## 802.1p Map Settings

This window is used to the mapping of 802.1p to the packet's initial color.

To view the following window, click **QoS > 802.1p Settings > 802.1p Map Settings**, as show below:

Port	0	1	2	3	4	5	6	7
1	Green	Green	Green	Green	Green	Green	Green	Green
2	Green	Green	Green	Green	Green	Green	Green	Green
3	Green	Green	Green	Green	Green	Green	Green	Green
4	Green	Green	Green	Green	Green	Green	Green	Green
5	Green	Green	Green	Green	Green	Green	Green	Green
6	Green	Green	Green	Green	Green	Green	Green	Green
7	Green	Green	Green	Green	Green	Green	Green	Green
8	Green	Green	Green	Green	Green	Green	Green	Green
9	Green	Green	Green	Green	Green	Green	Green	Green
10	Green	Green	Green	Green	Green	Green	Green	Green
11	Green	Green	Green	Green	Green	Green	Green	Green
12	Green	Green	Green	Green	Green	Green	Green	Green
13	Green	Green	Green	Green	Green	Green	Green	Green
14	Green	Green	Green	Green	Green	Green	Green	Green
15	Green	Green	Green	Green	Green	Green	Green	Green
16	Green	Green	Green	Green	Green	Green	Green	Green
17	Green	Green	Green	Green	Green	Green	Green	Green
18	Green	Green	Green	Green	Green	Green	Green	Green
19	Green	Green	Green	Green	Green	Green	Green	Green
20	Green	Green	Green	Green	Green	Green	Green	Green
21	Green	Green	Green	Green	Green	Green	Green	Green
22	Green	Green	Green	Green	Green	Green	Green	Green
23	Green	Green	Green	Green	Green	Green	Green	Green
24	Green	Green	Green	Green	Green	Green	Green	Green
25	Green	Green	Green	Green	Green	Green	Green	Green
26	Green	Green	Green	Green	Green	Green	Green	Green

Figure 6-4 802.1p Map Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select the starting and ending ports to use.
<b>Priority List (0-7)</b>	Enter the list of source priority for incoming packets.
<b>Color</b>	Select the mapped color for a packet. The default is <i>Green</i> .

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

## Bandwidth Control

The bandwidth control settings are used to place a ceiling on the transmitting and receiving data rates for any selected port.

### Bandwidth Control Settings

The Effective RX/TX Rate refers to the actual bandwidth of the switch port, if it does not match the configured rate. This usually means that the bandwidth has been assigned by a higher priority resource, such as a RADIUS server.

To view the following window, click **QoS > Bandwidth Control > Bandwidth Control Settings**, as show below:



**Bandwidth Control Settings** Safeguard

Unit:  From Port:  To Port:  Type:  No Limit:  Rate (64-10240000):  Kbit/sec Apply

**Unit 1 Settings**

Port	RX Rate (Kbit/sec)	TX Rate (Kbit/sec)	Effective RX (Kbit/sec)	Effective TX (Kbit/sec)
1	No Limit	No Limit	-	-
2	No Limit	No Limit	-	-
3	No Limit	No Limit	-	-
4	No Limit	No Limit	-	-
5	No Limit	No Limit	-	-
6	No Limit	No Limit	-	-
7	No Limit	No Limit	-	-
8	No Limit	No Limit	-	-
9	No Limit	No Limit	-	-
10	No Limit	No Limit	-	-
11	No Limit	No Limit	-	-
12	No Limit	No Limit	-	-
13	No Limit	No Limit	-	-
14	No Limit	No Limit	-	-
15	No Limit	No Limit	-	-
16	No Limit	No Limit	-	-
17	No Limit	No Limit	-	-
18	No Limit	No Limit	-	-
19	No Limit	No Limit	-	-
20	No Limit	No Limit	-	-
21	No Limit	No Limit	-	-
22	No Limit	No Limit	-	-
23	No Limit	No Limit	-	-
24	No Limit	No Limit	-	-
25	No Limit	No Limit	-	-
26	No Limit	No Limit	-	-

The Effective RX/TX Rate refers to the actual bandwidth of the switch port, if it does not match the configured rate. This usually means that the bandwidth has been assigned by a higher priority resource, such as a RADIUS server.

Figure 6-5 Bandwidth Control Settings window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select the port range to use for this configuration.
<b>Type</b>	This drop-down menu allows a selection between <i>RX</i> (receive), <i>TX</i> (transmit), and <i>Both</i> . This setting will determine whether the bandwidth ceiling is applied to receiving, transmitting, or both receiving and transmitting packets.
<b>No Limit</b>	This drop-down menu allows the user to specify that the selected port will have no bandwidth limit or not. <b>NOTE:</b> If the configured number is larger than the port speed, it means no bandwidth limit.
<b>Rate (64-10240000)</b>	This field allows the input of the data rate that will be the limit for the selected port. The user may choose a rate between <i>64</i> and <i>10240000</i> Kbits per second.
<b>Effective RX</b>	If a RADIUS server has assigned the RX bandwidth, then it will be the effective RX bandwidth. The authentication with the RADIUS sever can be per port or per user. For per user authentication, there may be multiple RX bandwidths assigned if there are multiple users attached to this specific port. The final RX bandwidth will be the largest one among these multiple RX bandwidths.
<b>Effective TX</b>	If a RADIUS server has assigned the TX bandwidth, then it will be the effective TX bandwidth. The authentication with the RADIUS sever can be per port or per user. For per user authentication, there may be multiple TX bandwidths assigned if there are multiple users attached to this specific port. The final TX bandwidth will be the largest one among these multiple TX bandwidths.

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

## Queue Bandwidth Control Settings

This window is used to configure the queue bandwidth control settings.

To view the following window, click **QoS > Bandwidth Control > Queue Bandwidth Control Settings**, as show below:

Figure 6-6 Queue Bandwidth Control Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select the port range to use for this configuration.
<b>From Queue / To Queue</b>	Use the drop-down menu to select the queue range to use for this configuration.
<b>Min Rate (64-10240000)</b>	Specify the packet limit, in Kbps that the ports are allowed to receive. Tick the <b>No limit</b> check box to have unlimited rate of packets received by the specified queue.
<b>Max Rate (64-10240000)</b>	Enter the maximum rate for the queue. For no limit select the <b>No Limit</b> option.

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



**NOTE:** The minimum granularity of queue bandwidth control is 64Kbit/sec. The system will adjust the number to the multiple of 64 automatically.

## Traffic Control Settings

On a computer network, packets such as Multicast packets and Broadcast packets continually flood the network as normal procedure. At times, this traffic may increase due to a malicious end station on the network or a malfunctioning device, such as a faulty network card. Thus, switch throughput problems will arise and consequently affect the overall performance of the switch network. To help rectify this packet storm, the Switch will monitor and control the situation.

Packet storms are monitored to determine if too many packets are flooding the network based on threshold levels provided by the user. Once a packet storm has been detected, the Switch will drop packets coming into the Switch until the storm has subsided. This method can be utilized by selecting the *Drop* option of the Action parameter in the window below.

The Switch will also scan and monitor packets coming into the Switch by monitoring the Switch's chip counter. This method is only viable for Broadcast and Multicast storms because the chip only has counters for these two types of packets. Once a storm has been detected (that is, once the packet threshold set below has been exceeded), the Switch will shut down the port to all incoming traffic, with the exception of STP BPDU packets, for a time period specified using the Count Down parameter.

If a Time Interval parameter times-out for a port configured for traffic control and a packet storm continues, that port will be placed in Shutdown Forever mode, which will cause a warning message to be sent to the Trap Receiver. Once in Shutdown Forever mode, the method of recovering the port is to manually recoup it using the **System Configuration > Port configuration > Port Settings** window or automatic recovering after the time period that is configured in the **Traffic Auto Recover Time** field. Select the disabled port and return its State to *Enabled* status. To utilize this method of Storm Control, choose the *Shutdown* option of the Action parameter in the window below.

Use this window to enable or disable storm control and adjust the threshold for multicast and broadcast storms. To view the following window, click **QoS > Traffic Control Settings**, as show below:

Traffic Control Settings
Safeguard

**Traffic Control Settings**

Unit:    
 From Port:  To Port:    
 Action:  Countdown (0 or 3-30):  min  Disabled   
 Time Interval (5-600):  sec Traffic Control Type:    
 Broadcast (0-1488100):  pkt/s Multicast (0-1488100):  pkt/s   
 Unicast (0-1488100):  pkt/s

---

Traffic Trap Settings:  Traffic Log Settings:

---

Traffic Auto Recover Time (0-65535):  min

---

**Unit 1 Settings**

Port	Traffic Control Type	Action	Broadcast	Multicast	Unicast	Countdown	Interval	Shutdown Forever
1	None	Drop	131072	131072	131072	0	5	
2	None	Drop	131072	131072	131072	0	5	
3	None	Drop	131072	131072	131072	0	5	
4	None	Drop	131072	131072	131072	0	5	
5	None	Drop	131072	131072	131072	0	5	
6	None	Drop	131072	131072	131072	0	5	
7	None	Drop	131072	131072	131072	0	5	
8	None	Drop	131072	131072	131072	0	5	
9	None	Drop	131072	131072	131072	0	5	
10	None	Drop	131072	131072	131072	0	5	
11	None	Drop	131072	131072	131072	0	5	
12	None	Drop	131072	131072	131072	0	5	
13	None	Drop	131072	131072	131072	0	5	
14	None	Drop	131072	131072	131072	0	5	
15	None	Drop	131072	131072	131072	0	5	
16	None	Drop	131072	131072	131072	0	5	
17	None	Drop	131072	131072	131072	0	5	

Note: For unicast storm traffic, the violated action is always 'drop'.

Figure 6-7 Traffic Control Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select the port range to use for this configuration.
<b>Action</b>	Select the method of traffic control from the drop-down menu. The choices are: <i>Drop</i> – Utilizes the hardware Traffic Control mechanism, which means the Switch's hardware will determine the Packet Storm based on the Threshold value stated and drop packets until the issue is resolved. <i>Shutdown</i> – Utilizes the Switch's software Traffic Control mechanism to determine the Packet Storm occurring. Once detected, the port will deny all incoming traffic to the port except STP BPDU packets, which are essential in keeping the Spanning Tree operational on the Switch. If the Count Down timer has expired and yet the Packet Storm continues, the port will be placed in Shutdown Forever mode and is no longer operational until the port recovers after 5 minutes automatically or the user manually resets the port using the <b>Port Settings</b> window ( <b>Configuration&gt; Port Configuration&gt; Port Settings</b> ). Choosing this option obligates the user to configure the Time Interval setting as well, which will provide packet count samplings from the Switch's chip to determine if a Packet Storm is occurring.
<b>Countdown (0 or 3-30)</b>	The Count Down timer is set to determine the amount of time, in minutes, that the Switch will wait before shutting down the port that is experiencing a traffic storm. This parameter is only useful for ports configured as <i>Shutdown</i> in their Action field and therefore will not operate for hardware-based Traffic Control implementations. The possible time settings for this field are 0 and 3 to 30 minutes. To disable this feature select the <b>Disable</b> option.
<b>Time Interval (5-600)</b>	The Time Interval will set the time between Multicast and Broadcast packet counts sent from the Switch's chip to the Traffic Control function. These packet counts are the determining factor in deciding when incoming packets exceed the Threshold value. The Time Interval may be set between 5 and 600 seconds, with a default setting of 5 seconds.
<b>Traffic Control Type</b>	Specify the desired Storm Control Type: <i>None</i> , <i>Broadcast</i> , <i>Multicast</i> , <i>Unknown Unicast</i> , <i>Broadcast + Multicast</i> , <i>Broadcast + Unknown Unicast</i> , <i>Multicast + Unknown Unicast</i> , and <i>Broadcast + Multicast + Unknown Unicast</i> .
<b>Broadcast (0-1488100)</b>	Enter the number of broadcast packets per second received by the Switch that will trigger the storm traffic control measure.
<b>Multicast (0-1488100)</b>	Enter the number of multicast packets per second received by the Switch that will trigger the storm traffic control measure.
<b>Unicast (0-1488100)</b>	Enter the number of unicast packets per second received by the Switch that will trigger the storm traffic control measure.
<b>Traffic Trap Settings</b>	Enable sending of Storm Trap messages when the type of action taken by the Traffic Control function in handling a Traffic Storm is one of the following: <i>None</i> – No trap state is specified. <i>Storm Occurred</i> – Will send Storm Trap warning messages upon the occurrence of a Traffic Storm only. <i>Storm Cleared</i> – Will send Storm Trap messages when a Traffic Storm has been cleared by the Switch only. <i>Both</i> – Will send Storm Trap messages when a Traffic Storm has been both detected and cleared by the Switch. This function cannot be implemented in the hardware mode. (When <i>Drop</i> is chosen for the Action parameter)
<b>Traffic Log Settings</b>	Use the drop-down menu to enable or disable the function. If enabled, the traffic control states are logged when a storm occurs and when a storm is cleared. If the log state is disabled, the traffic control events are not logged.
<b>Traffic Auto Recover</b>	Enter the time allowed for auto recovery from shutdown for a port. The default value

**Time (0-65535)**

is 0, which means there is no auto recovery and the port remains in shutdown forever mode. This requires manual entry of the CLI command **config ports [ <portlist> | all ] state enable** to return the port to a forwarding state.

Click the **Apply** button to accept the changes made for each individual section.



**NOTE:** Traffic Control cannot be implemented on ports that are set for Link Aggregation (Port Trunking).



**NOTE:** Ports that are in the Shutdown Forever mode will be seen as Discarding in Spanning Tree windows and implementations though these ports will still be forwarding BPDUs to the Switch's CPU.



**NOTE:** Ports that are in Shutdown Forever mode will be seen as link down in all windows and screens until the user recovers these ports.



**NOTE:** The minimum granularity of storm control on each port is 1pps.

## DSCP

### DSCP Trust Settings

This window is used to configure the DSCP trust state of ports. When ports are under the DSCP trust mode, the switch will insert the priority tag to untagged packets by using the DSCP Map settings instead of the default port priority.

To view the following window, click **QoS > DSCP > DSCP Trust Settings**, as show below:

Port	DSCP Trust
1	Disabled
2	Disabled
3	Disabled
4	Disabled
5	Disabled
6	Disabled
7	Disabled
8	Disabled
9	Disabled
10	Disabled
11	Disabled
12	Disabled
13	Disabled
14	Disabled
15	Disabled
16	Disabled
17	Disabled
18	Disabled
19	Disabled
20	Disabled
21	Disabled
22	Disabled
23	Disabled
24	Disabled
25	Disabled
26	Disabled

**Figure 6-8 DSCP Trust Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select a range of port to configure.
<b>State</b>	Use the drop-down menu to enable or disable DSCP trust. By default, DSCP trust is disabled.

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

## DSCP Map Settings

The mapping of DSCP to queue will be used to determine the priority of the packet (which will be then used to determine the scheduling queue) when the port is in DSCP trust state.

The DSCP-to-DSCP mapping is used in the swap of DSCP of the packet when the packet is ingresses to the port. The remaining processing of the packet will base on the new DSCP. By default, the DSCP is mapped to the same DSCP.

The DSCP color mapping is used to the mapping of DSCP to a priority and the packet's initial color.

To view the following window, click **QoS > DSCP > DSCP Map Settings**, as show below:

The screenshot shows the 'DSCP Map Settings' window. At the top, there are configuration fields: Unit (1), From Port (01), To Port (01), DSCP Map (DSCP Priority), DSCP List (0-63), and Priority (0). An 'Apply' button is on the right. Below these fields is a table titled 'Unit 1 Settings' with 26 rows (ports 1-26) and 9 columns (Port, 0, 1, 2, 3, 4, 5, 6, 7). Each row contains a range of DSCP values for each queue.

Port	0	1	2	3	4	5	6	7
1	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
2	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
3	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
4	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
5	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
6	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
7	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
8	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
9	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
10	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
11	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
12	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
13	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
14	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
15	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
16	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
17	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
18	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
19	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
20	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
21	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
22	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
23	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
24	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
25	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
26	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63

Figure 6-9 DSCP Map Settings - DSCP Priority window

To view the following window, click **QoS > DSCP > DSCP Map Settings** and select **DSCP DSCP** from the DSCP Map drop-down menu, as show below:

Port 1	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	10	11	12	13	14	15	16	17	18	19
2	20	21	22	23	24	25	26	27	28	29
3	30	31	32	33	34	35	36	37	38	39
4	40	41	42	43	44	45	46	47	48	49
5	50	51	52	53	54	55	56	57	58	59
6	60	61	62	63						

Figure 6-10 DSCP Map Settings - DSCP DSCP window

To view the following window, click **QoS > DSCP > DSCP Map Settings** and select **DSCP Color** from the DSCP Map drop-down menu, as show below:

Port	Green	Red	Yellow
1	0-63		
2	0-63		
3	0-63		
4	0-63		
5	0-63		
6	0-63		
7	0-63		
8	0-63		
9	0-63		
10	0-63		
11	0-63		
12	0-63		
13	0-63		
14	0-63		
15	0-63		
16	0-63		
17	0-63		
18	0-63		
19	0-63		
20	0-63		
21	0-63		
22	0-63		
23	0-63		
24	0-63		
25	0-63		
26	0-63		

Figure 6-11 DSCP Map Settings - DSCP Color window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select a range of port to configure.
<b>DSCP Map</b>	Use the drop-down menu to select one of two options: <i>DSCP Priority</i> – Specify a list of DSCP values to be mapped to a specific priority. <i>DSCP DSCP</i> – Specify a list of DSCP value to be mapped to a specific DSCP. <i>DSCP Color</i> - Specify a list of DSCP value to be mapped to a specific color.
<b>DSCP List (0-63)</b>	Enter a DSCP List value.
<b>Priority</b>	Use the drop-down menu to select a Priority value. This appears when selecting <b>DSCP Priority</b> in the <b>DSCP Map</b> drop-down menu.
<b>DSCP (0-63)</b>	Enter a DSCP value. This appears when selecting <b>DSCP DSCP</b> in the <b>DSCP Map</b> drop-down menu.

<b>Port</b>	Use the drop-down menu to select a port. This appears when selecting <b>DSCP DSCP</b> in the <b>DSCP Map</b> drop-down menu.
<b>Color</b>	Use the drop-down menu to select the result color of the mapping. This appears when selecting <b>DSCP Color</b> in the <b>DSCP Map</b> drop-down menu.

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

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

## HOL Blocking Prevention

HOL (Head of Line) Blocking happens when one of the destination ports of a broadcast or multicast packet are busy. The switch will hold this packet in the buffer while the other destination port will not transmit the packet even they are not busy.

The HOL Blocking Prevention will ignore the busy port and forward the packet directly to have lower latency and better performance.

This window is used to enable or disable HOL Blocking Prevention.

To view the following window, click **QoS > HOL Blocking Prevention** as shown below.

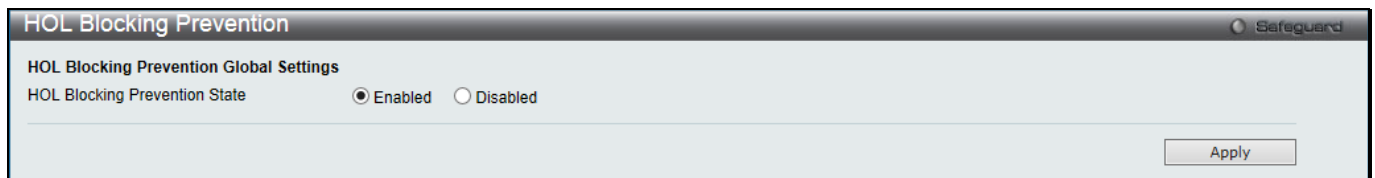


Figure 6-12 HOL blocking Prevention window

The fields that can be configured are described below:

Parameter	Description
<b>HOL Blocking Prevention State</b>	Click the radio buttons to enable or disable the HOL blocking prevention global settings.

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

## Scheduling Settings

### QoS Scheduling

This window allows the user to configure the way the Switch will map an incoming packet per port based on its 802.1p user priority, to one of the eight available hardware priority queues available on the Switch.

To view the following window, click **QoS > Scheduling Settings > QoS Scheduling** as shown below.



Port	Class ID	Weight
1	Class-0	1
1	Class-1	2
1	Class-2	3
1	Class-3	4
1	Class-4	5
1	Class-5	6
1	Class-6	7
1	Class-7	8
2	Class-0	1
2	Class-1	2
2	Class-2	3
2	Class-3	4
2	Class-4	5
2	Class-5	6
2	Class-6	7
2	Class-7	8
3	Class-0	1
3	Class-1	2
3	Class-2	3
3	Class-3	4
3	Class-4	5
3	Class-5	6
3	Class-6	7
3	Class-7	8
4	Class-0	1
4	Class-1	2
4	Class-2	3
4	Class-3	4
4	Class-4	5
4	Class-5	6
4	Class-6	7
4	Class-7	8
5	Class-0	1
5	Class-1	2
5	Class-2	3

Figure 6-13 QoS Scheduling window

The following parameters can be configured:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Enter the port or port list you wish to configure.
<b>Class ID</b>	Select the Class ID, from 0-7 to configure for the QoS parameters.
<b>Scheduling Mechanism</b>	<p><i>Strict</i> – The highest class of service is the first to process traffic. That is, the highest class of service will finish before other queues empty.</p> <p><i>Weight</i> – Use the weighted round-robin (<i>WRR</i>) algorithm to handle packets in an even distribution in priority classes of service.</p>

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

## QoS Scheduling Mechanism

Changing the output scheduling used for the hardware queues in the Switch can customize QoS. As with any changes to QoS implementation, careful consideration should be given to how network traffic in lower priority queues are affected. Changes in scheduling may result in unacceptable levels of packet loss or significant transmission delays. If you choose to customize this setting, it is important to monitor network performance, especially during peak demand, as bottlenecks can quickly develop if the QoS settings are not suitable.

To view the following window, click **QoS > Scheduling Settings > QoS Scheduling Mechanism** as shown below.

**QoS Scheduling Mechanism** Safeguard

QoS Scheduling Mechanism Settings

Unit:  From Port:  To Port:  Scheduling Mechanism:

**Unit 1 Settings**

Port	Mode
1	Strict
2	Strict
3	Strict
4	Strict
5	Strict
6	Strict
7	Strict
8	Strict
9	Strict
10	Strict
11	Strict
12	Strict
13	Strict
14	Strict
15	Strict
16	Strict
17	Strict
18	Strict
19	Strict
20	Strict
21	Strict
22	Strict
23	Strict
24	Strict
25	Strict
26	Strict

Figure 6-14 QoS Scheduling Mechanism

The following parameters can be configured:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Enter the port or port list you wish to configure.
<b>Scheduling Mechanism</b>	<p><i>Strict</i> – The highest class of service is the first to process traffic. That is, the highest class of service will finish before other queues empty.</p> <p><i>Weighted Round Robin</i> – Use the weighted round-robin algorithm to handle packets in an even distribution in priority classes of service.</p>

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



**NOTE:** The settings you assign to the queues, numbers 0-7, represent the IEEE 802.1p priority tag number. Do not confuse these settings with port numbers.

## SRED

Simple random early detection (sRED) is a simplified RED mechanism based on ASIC capability. Random Early Detection (RED) is a congestion avoidance mechanism at the gateway in packet switched networks. RED gateways keep the average queue size low while allowing occasional bursts of packets in the queue. The switch provides support for sRED through active queue management by probabilistic dropping of incoming colored packets.

Active queue management is a class of algorithms that attempt to proactively drop or mark frames before congestion becomes excessive. The goal is to detect the onset of persistent congestion and take proactive action so that TCP sources contributing to the congestion back off gracefully, insuring good network utilization while minimizing frame loss.

This proactive approach starts discarding specific colored packets before the packet buffer becomes full. If this queue depth is less than the threshold, there is minimal (or no) congestion and the packet is queued. If congestion is detected the packet is dropped or queued based on the DSCP.

# SRED Settings

This window is used to configure the sRED settings.

To view the following window, click **QoS > SRED > SRED Settings** as shown below.

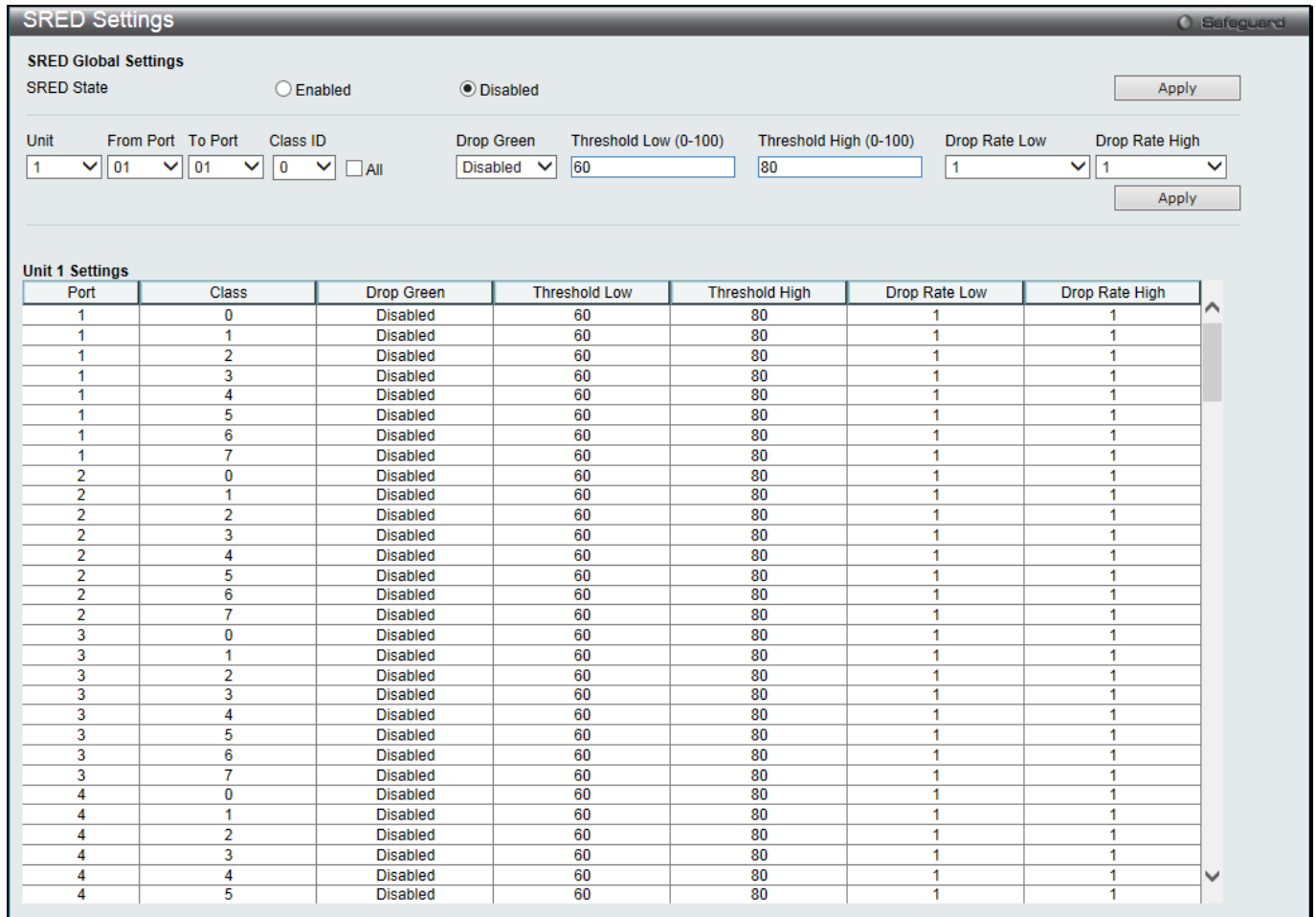


Figure 6-15 SRED Settings Window

The following parameters can be configured:

Parameter	Description
<b>SRED State</b>	Specify the sRED feature’s state on the Switch.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Specify the list of port that will be used for this configuration.
<b>Class ID</b>	Select the Class ID, from 0-7, to configure for the SRED parameters. Selecting <b>All</b> will set the parameters configured here for all CoS queues.
<b>Drop Green</b>	<p><i>Enabled:</i> Probabilistic drop yellow and red colored packets if the queue depth is above the lower threshold, and probabilistic drop green colored packets if the queue depth is above the upper threshold.</p> <p><i>Disabled:</i> Probabilistic drop red colored packets if the queue depth is above the lower threshold, and probabilistic drop yellow colored packets if the queue depth is above the upper threshold. Green packets will not be dropped even it reach the threshold. □</p>
<b>Threshold Low (0-100)</b>	Threshold Low refers to drop red or yellow packets depending on the <b>Drop Green</b> option.
<b>Threshold High (0-100)</b>	Threshold High refers to drop yellow or green packets depending on the <b>Drop</b>

	<b>Green</b> option.
<b>Drop Rate Low</b>	Specify the low drop rate value used.
<b>Drop Rate High</b>	Specify the high drop rate value used.

Click the **Apply** button to accept the changes made for each individual section.

## SRED Drop Counter

This window is used to view the SRED Drop Counter settings on the Switch.

To view the following window, click **QoS > SRED > SRED Drop Counter** as shown below.

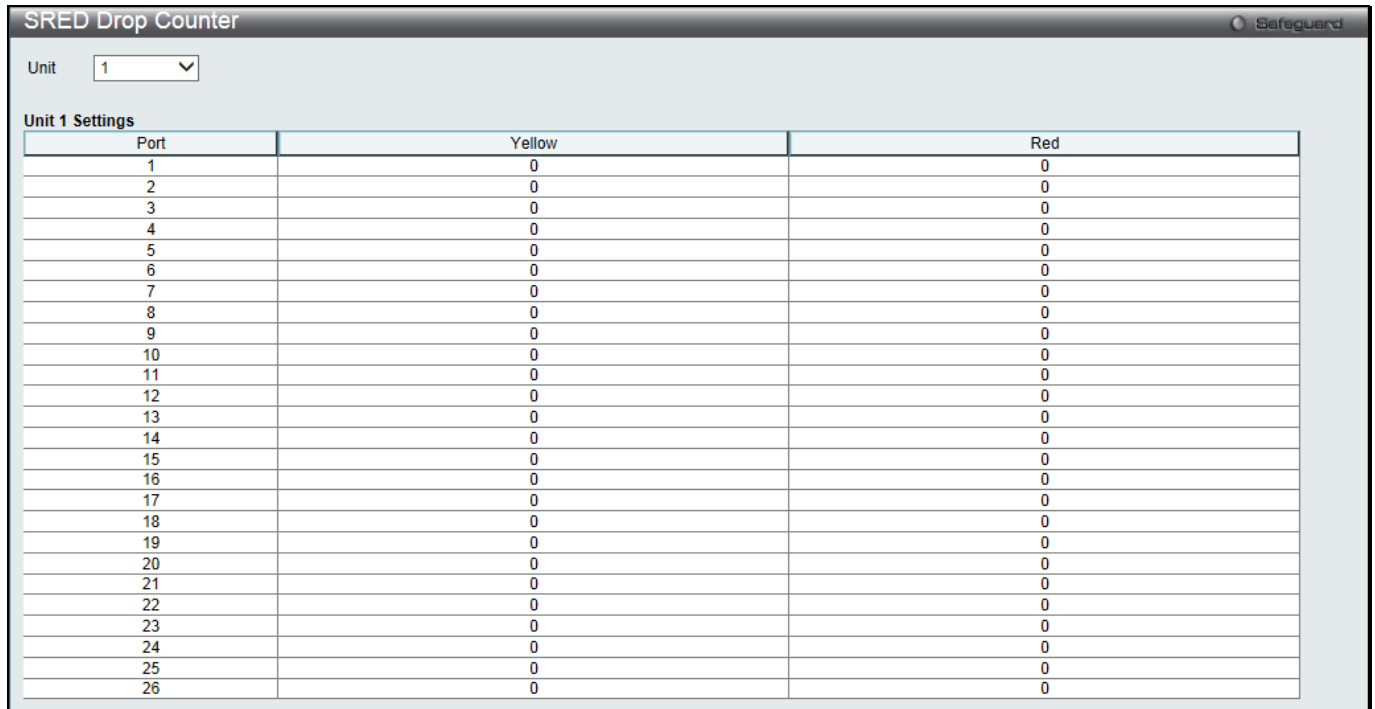


Figure 6-16 SRED Drop Counter Window

The following parameters can be configured:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.

# Chapter 7 ACL

**ACL Configuration Wizard**  
**Access Profile List**  
**CPU Access Profile List**  
**ACL Finder**  
**ACL Flow Meter**  
**Egress Access Profile List**  
**Egress ACL Flow Meter**

## ACL Configuration Wizard

The ACL Configuration Wizard will aid the user in the creation of access profiles and ACL Rules automatically by simply inputting the address or service type and the action needed. It saves administrators a lot of time.

To view the following window, click **ACL > ACL Configuration Wizard** as shown below.

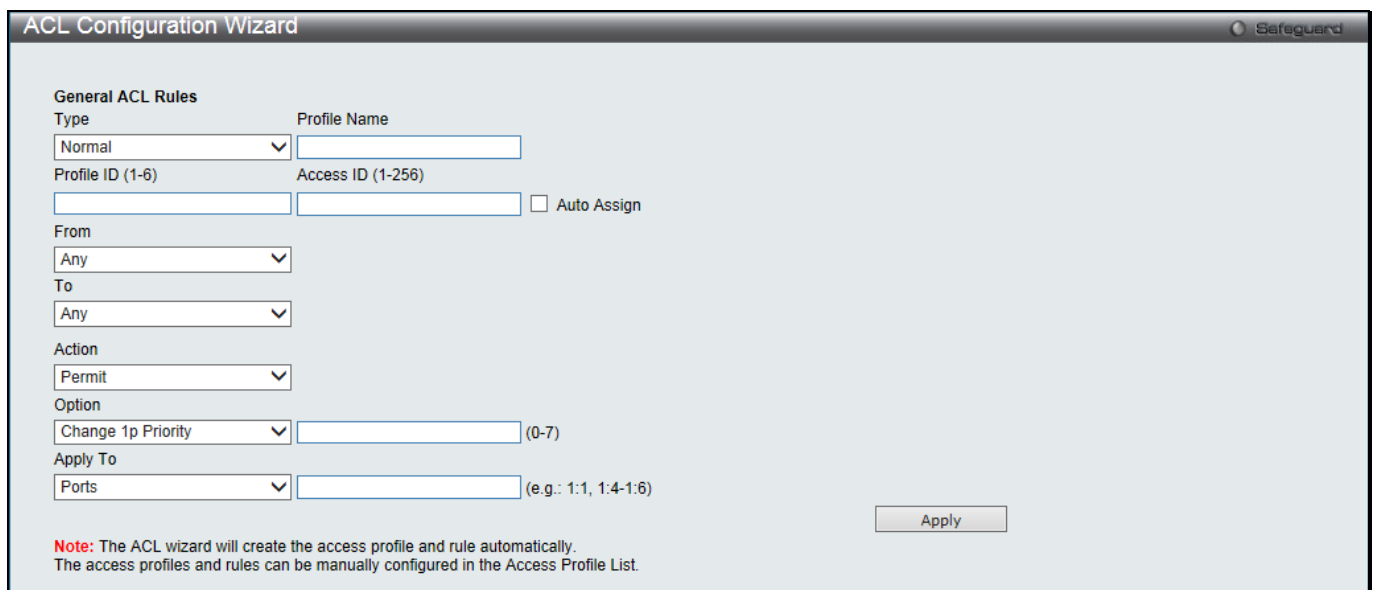


Figure 7-1 ACL Configuration Wizard window

The fields that can be configured are described below:

Parameter	Description
<b>Type</b>	Use the drop-down menu to select the general ACL Rule types: <i>Normal</i> – Select to create a Normal ACL Rule. <i>CPU</i> – Select to create a CPU ACL Rule. <i>Egress</i> – Select to create a Egress ACL Rule
<b>Profile Name</b>	After selecting to configure a <i>Normal</i> or <i>Egress</i> type rule, the user can enter the Profile Name for the new rule here.
<b>Profile ID</b>	Enter the Profile ID for the new rule. When <i>Normal</i> is selected in the <b>Type</b> drop-down menu, the range of profile ID is from 1 to 6. When <i>CPU</i> is selected in the <b>Type</b> drop-down menu, the range of profile ID is from 1 to 5. When <i>Egress</i> is selected in the <b>Type</b> drop-down menu, the range of profile ID is from 1 to 4.
<b>Access ID</b>	Enter the Access ID for the new rule. Selecting the <b>Auto Assign</b> option will allow the switch to automatically assign an unused access ID to this rule. When <i>Normal</i> is selected in the <b>Type</b> drop-down menu, the range of access ID is from 1 to 256. When <i>CPU</i> is selected in the <b>Type</b> drop-down menu, the range of access ID is from 1 to 100. When <i>Egress</i> is selected in the <b>Type</b> drop-down menu, the range of access ID is from 1 to 128.

<b>From / To</b>	<p>This rule can be created to apply to four different categories:</p> <p><i>Any</i> – Selecting this option will include any starting category to this rule.</p> <p><i>MAC Address</i> – Selecting this option will allow the user to enter a range of MAC addresses for this rule.</p> <p><i>IPv4 Address</i> – Selecting this option will allow the user to enter a range of IPv4 addresses for this rule.</p> <p><i>IPv6</i> – Selecting this option will allow the user to enter a range of IPv6 addresses for this rule.</p>
<b>Action</b>	<p>Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below).</p> <p>Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.</p> <p>Select <i>Mirror</i> to specify that packets that match the access profile are mirrored to a port defined in the mirror port section. Port Mirroring must be enabled and a target port must be set.</p>
<b>Option</b>	<p>After selecting the <i>Permit</i> action, the user can select one of the following options:</p> <p><i>Change 1p Priority</i> – Here the user can enter the 1p priority value.</p> <p><i>Replace DSCP</i> – Here the user can enter the DSCP value.</p> <p><i>Replace ToS Precedence</i> – Here the user can enter the ToS Precedence value.</p>
<b>Apply To</b>	<p>Use the drop-down menu to select and enter the information that this rule will be applied to.</p> <p><i>Ports</i> – Enter a port number or a port range. This appears when <i>Normal</i> or <i>CPU</i> is selected in the <b>Type</b> drop-down menu.</p> <p><i>VLAN Name</i> – Enter a VLAN name. This appears when <i>Normal</i> or <i>Egress</i> is selected in the <b>Type</b> drop-down menu.</p> <p><i>VLAN ID</i> – Enter a VLAN ID. This appears when <i>Normal</i> or <i>Egress</i> is selected in the <b>Type</b> drop-down menu.</p> <p><i>Group ID</i> – Enter a ID of a port group. This appears when <i>Egress</i> is selected in the <b>Type</b> drop-down menu.</p> <p><i>Group Name</i> – Enter a name of a port group. This appears when <i>Egress</i> is selected in the <b>Type</b> drop-down menu.</p> <p><i>Port</i> – Enter a port number. This appears when <i>Egress</i> is selected in the <b>Type</b> drop-down menu.</p>

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



**NOTE:** The Switch will use one minimum mask to cover all the terms that user input, however, some extra bits may also be masked at the same time. To optimize the ACL profile and rules, please use manual configuration.

## Access Profile List

Access profiles allow you to establish criteria to determine whether the Switch will forward packets based on the information contained in each packet's header.

To view the following window, click **ACL > Access Profile List** as shown below.

The Switch supports four Profile Types, Ethernet ACL, IPv4 ACL, IPv6 ACL, and Packet Content ACL.

Creating an access profile is divided into two basic parts. The first is to specify which part or parts of a frame the Switch will examine, such as the MAC source address or the IP destination address. The second part is entering the criteria the Switch will use to determine what to do with the frame. The entire process is described below in two parts.

Users can display the currently configured Access Profiles on the Switch.

Access Profile List				Safeguard		
Add ACL Profile		Delete All		Total User Set Rule Entries / Total Used HW Entries / Total Available HW Entries: 4 / 4 / 1532		
Profile ID	Profile Name	Profile Type		Show Details	Add/View Rules	Delete
1	Ethernet	Ethernet		Show Details	Add/View Rules	Delete
2	IPv4	IP		Show Details	Add/View Rules	Delete
3	IPv6	IPv6		Show Details	Add/View Rules	Delete
4	PacketContent	User Defined		Show Details	Add/View Rules	Delete
						1/1 1 Go

Figure 7-2 Access Profile List window

Click the **Add ACL Profile** button to add an entry to the **Access Profile List**.

Click the **Delete All** button to remove all access profiles from this table.

Click the **Show Details** button to display the information of the specific profile ID entry.

Click the **Add/View Rules** button to view or add ACL rules within the specified profile ID.

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.

There are four **Add Access Profile** windows;

1. one for Ethernet (or MAC address-based) profile configuration,
2. one for IPv6 address-based profile configuration,
3. one for IPv4 address-based profile configuration, and
4. one for packet content profile configuration.

## Add an Ethernet ACL Profile

The window shown below is the Add ACL Profile window for Ethernet. To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more files to the mask.

After clicking the **Add ACL Profile** button, the following window will appear.

**Add ACL Profile** Safeguard

Profile ID (1-6)  Profile Name

Select ACL Type

Ethernet ACL   IPv4 ACL  Packet Content ACL

IPv6 ACL

You can select the field in the packet to create filtering mask

MAC Address	VLAN	802.1p	Ethernet Type	PayLoad
<p><b>MAC Address</b></p> <p><input type="checkbox"/> Source MAC Mask <input type="text"/></p> <p><input type="checkbox"/> Destination MAC Mask <input type="text"/></p> <p><b>802.1Q VLAN</b></p> <p><input type="checkbox"/> VLAN</p> <p><input type="checkbox"/> VLAN Mask (0-FFF) <input type="text"/></p> <p><b>802.1p</b></p> <p><input type="checkbox"/> 802.1p</p> <p><b>Ethernet Type</b></p> <p><input type="checkbox"/> Ethernet Type</p>				

Figure 7-3 Add ACL Profile window (Ethernet ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-6)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 6.
<b>Profile Name</b>	Enter a profile name for the profile created.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content. This will change the window according to the requirements for the type of profile. Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header. Select Packet Content to instruct the Switch to examine the packet content in each frame's header.
<b>Source MAC Mask</b>	Enter a MAC address mask for the source MAC address, e.g. FF-FF-FF-FF-FF-FF.
<b>Destination MAC Mask</b>	Enter a MAC address mask for the destination MAC address, e.g. FF-FF-FF-FF-FF-FF.
<b>802.1Q VLAN</b>	Selecting this option instructs the Switch to examine the 802.1Q VLAN identifier of each packet header and use this as the full or partial criterion for forwarding.
<b>VLAN Mask</b>	Select and enter the VLAN mask value.
<b>802.1p</b>	Selecting this option instructs the Switch to examine the 802.1p priority value of each packet header and use this as the, or part of the criterion for forwarding.
<b>Ethernet Type</b>	Selecting this option instructs the Switch to examine the Ethernet type value in each



frame's header.

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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

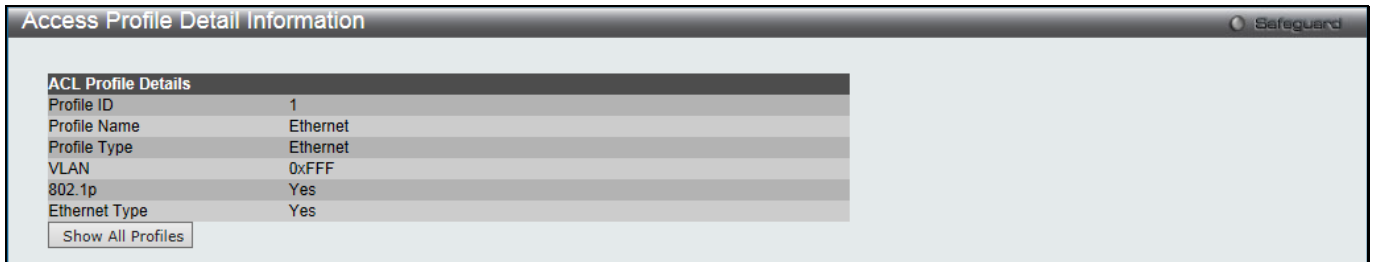


Figure 7-4 Access Profile Detail Information window (Ethernet ACL)

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.

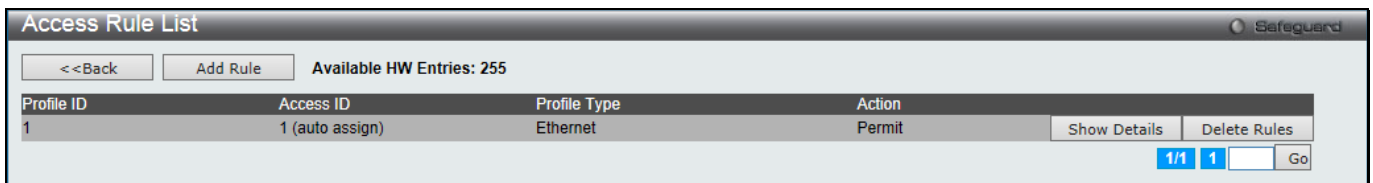


Figure 7-5 Access Rule List window (Ethernet ACL)

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

Add Access Rule
Safeguard

**Profile Information**

Profile ID	1	Profile Name	Ethernet
Profile Type	Ethernet	VLAN	0xFFF
802.1p	Yes	Ethernet Type	Yes

---

**Rule Detail**  
(Keep the input field blank to specify that the corresponding option does not matter).

Access ID (1-256)   Auto Assign

VLAN Name

VLAN ID

VLAN Mask (0-FFF)

802.1p (0-7)

Ethernet Type (0-FFFF)

**Rule Action**

Action

Priority (0-7)

Replace Priority

Replace DSCP (0-63)

Replace ToS Precedence (0-7)

Time Range Name

Counter

Mirror Group ID (1-4)

(e.g.: 1:1, 1:4-1:6, 1:9)

Figure 7-6 Add Access Rule window (Ethernet ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-256)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 256. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>VLAN Name</b>	Enter the VLAN name.
<b>VLAN ID</b>	Enter the VLAN ID.
<b>VLAN Mask</b>	Select and enter the VLAN mask value.
<b>Source MAC Address</b>	Enter the source MAC address.
<b>Source MAC Address Mask</b>	Select and enter the source MAC address mask.
<b>Destination MAC Address</b>	Enter the destination MAC address.
<b>Destination MAC Address Mask</b>	Select and enter the destination MAC address mask.
<b>802.1p</b>	Enter the 802.1p priority tag value. This value must be between 0 and 7.
<b>Ethernet Type (0-FFFF)</b>	Enter the Ethernet type value.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered. Select <i>Mirror</i> to specify that packets that match the access profile are mirrored to a

	port defined in the config mirror port command. Port Mirroring must be enabled and a target port must be set.
<b>Priority (0-7)</b>	Tick the corresponding check box if you want to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace Priority</b>	Tick this check box to replace the Priority value in the adjacent field.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv4 packet, only one of them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Replace ToS Precedence (0-7)</b>	Specify that the IP precedence of the outgoing packet is changed with the new value. If used without an action priority, the packet is sent to the default traffic class.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Ports</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an error message and the access rule will not be configured.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear.

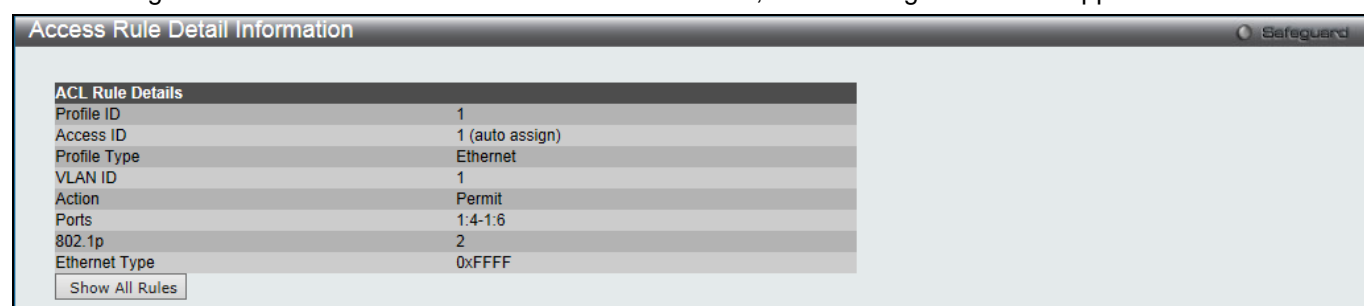


Figure 7-7 Access Rule Detail Information window (Ethernet ACL)

Click the **Show All Rules** button to navigate back to the Access Rule List.

## Adding an IPv4 ACL Profile

The window shown below is the Add ACL Profile window for IPv4. To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more filed to the mask.

After clicking the **Add ACL Profile** button, the following window will appear.

Figure 7-8 Add ACL Profile window (IPv4 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-6)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 6.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content. This will change the window according to the requirements for the type of profile. Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header. Select Packet Content to instruct the Switch to examine the packet content in each frame's header.
<b>802.1Q VLAN</b>	Selecting this option instructs the Switch to examine the 802.1Q VLAN identifier of each packet header and use this as the full or partial criterion for forwarding.
<b>VLAN Mask</b>	Select and enter the VLAN mask value.
<b>IPv4 DSCP</b>	Selecting this option instructs the Switch to examine the DiffServ Code part of each packet header and use this as the, or part of the criterion for forwarding.
<b>IPv4 Source IP Mask</b>	Enter an IP address mask for the source IP address, e.g. 255.255.255.255.
<b>IPv4 Destination IP Mask</b>	Enter an IP address mask for the destination IP address, e.g. 255.255.255.255.
<b>Protocol</b>	Selecting this option instructs the Switch to examine the protocol type value in each frame's header. Then the user must specify what protocol(s) to include according to the following guidelines:

Select *ICMP* to instruct the Switch to examine the Internet Control Message Protocol (ICMP) field in each frame's header.

Select *Type* to further specify that the access profile will apply an ICMP type value, or specify *Code* to further specify that the access profile will apply an ICMP code value.

Select *IGMP* to instruct the Switch to examine the Internet Group Management Protocol (IGMP) field in each frame's header.

Select *Type* to further specify that the access profile will apply an IGMP type value.

Select *TCP* to use the TCP port number contained in an incoming packet as the forwarding criterion. Selecting TCP requires that you specify a source port mask and/or a destination port mask.

*Source Port Mask* - Specify a TCP port mask for the source port in hex form (hex 0x0-0xffff), which you wish to filter.

*Destination Port Mask* - Specify a TCP port mask for the destination port in hex form (hex 0x0-0xffff) which you wish to filter.

*TCP Flag Bits* - The user may also identify which flag bits to filter. Flag bits are parts of a packet that determine what to do with the packet. The user may filter packets by filtering certain flag bits within the packets, by checking the boxes corresponding to the flag bits of the TCP field. The user may choose between urg (urgent), ack (acknowledgement), psh (push), rst (reset), syn (synchronize), fin (finish).

Select *UDP* to use the UDP port number contained in an incoming packet as the forwarding criterion. Selecting UDP requires that you specify a source port mask and/or a destination port mask.

*Source Port Mask* - Specify a UDP port mask for the source port in hex form (hex 0x0-0xffff).

*Destination Port Mask* - Specify a UDP port mask for the destination port in hex form (hex 0x0-0xffff).

Select *Protocol ID* - Enter a value defining the protocol ID in the packet header to mask. Specify the protocol ID mask in hex form (hex 0x0-0xff).

*Protocol ID Mask* - Specify that the rule applies to the IP protocol ID traffic.

*User Define* - Specify the Layer 4 part mask

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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

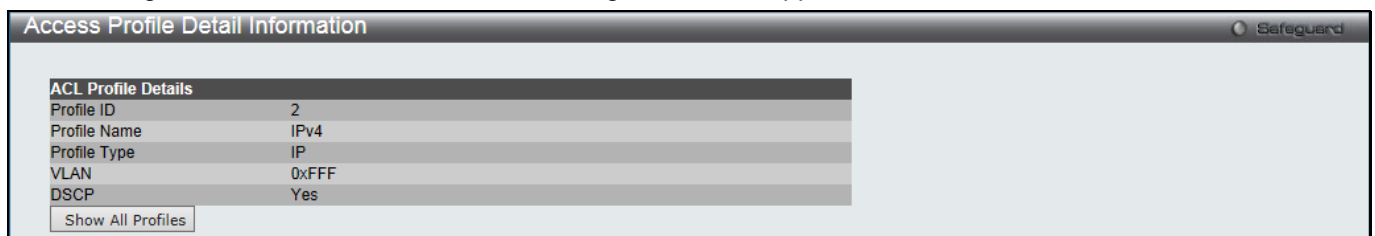


Figure 7-9 Access Profile Detail Information window (IPv4 ACL)

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.



Figure 7-10 Access Rule List window (IPv4 ACL)

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

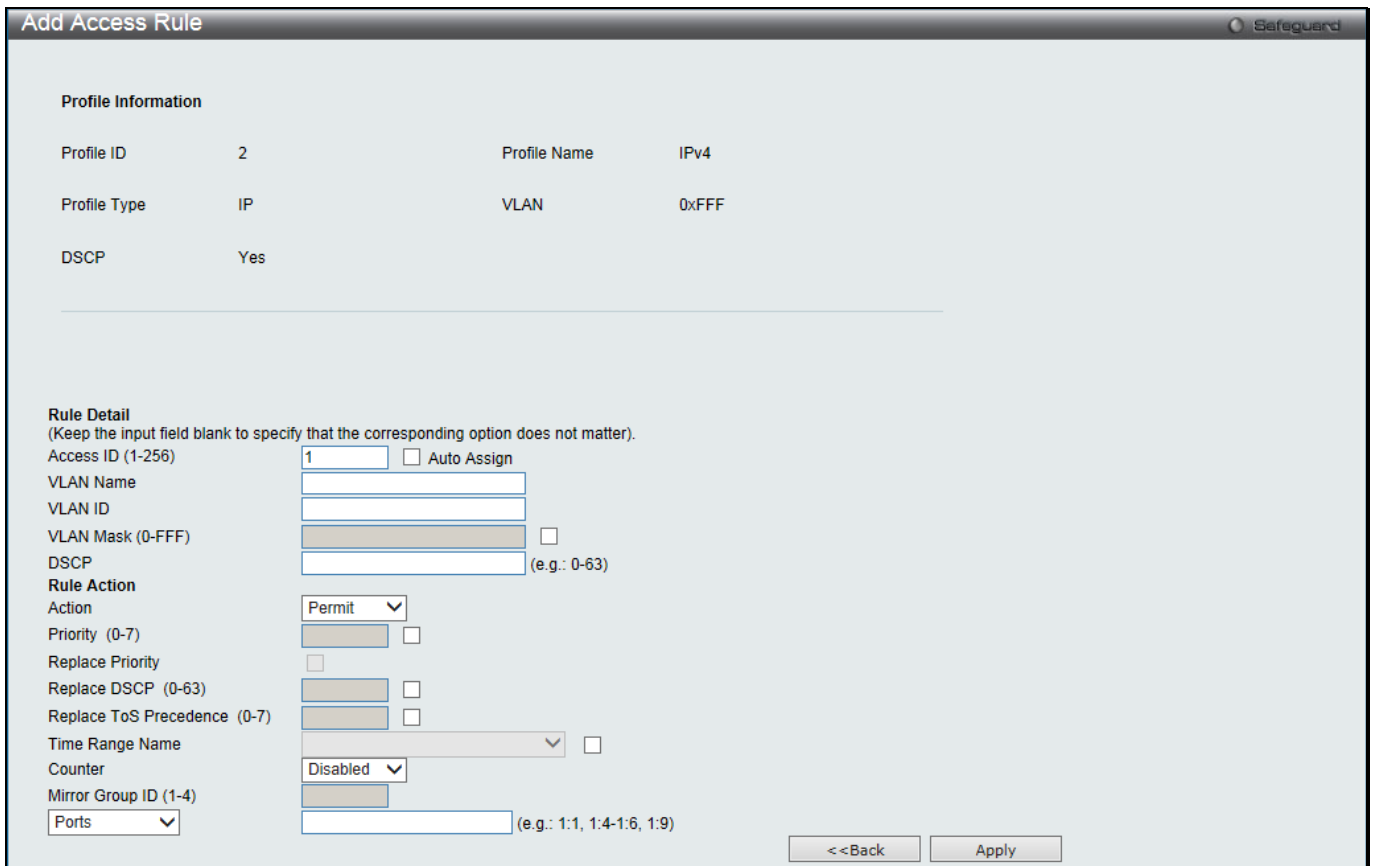


Figure 7-11 Add Access Rule (IPv4 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-256)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 256. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>VLAN Name</b>	Enter the VLAN name.
<b>VLAN ID</b>	Enter the VLAN ID.
<b>VLAN Mask</b>	Select and enter the VLAN mask value.
<b>Source IP Address</b>	Enter the source IP address.
<b>Source IP Address Mask</b>	Select and enter the source IP address mask.

<b>Destination IP Address</b>	Enter the destination IP address.
<b>Destination IP Address Mask</b>	Select and enter the destination IP address mask.
<b>DSCP</b>	Enter the DSCP value.
<b>Protocol</b>	<p>Selecting this option instructs the Switch to examine the protocol type value in each frame's header. Then the user must specify what protocol(s) to include according to the following guidelines:</p> <p>Select this option to specify that the rule will be applied to ICMP traffic.  <i>Type</i> – Enter the ICMP packet type value.  <i>Code</i> – Enter the ICMP code value.</p> <p>Select <i>IGMP</i> to instruct the Switch to examine the Internet Group Management Protocol (IGMP) field in each frame's header.  <i>Type</i> – Enter the IGMP packet type value.</p> <p>Select <i>TCP</i> to use the TCP port number contained in an incoming packet as the forwarding criterion. Selecting TCP requires that you specify a source port mask and/or a destination port mask.  <i>TCP Source Port</i> - Specify a TCP port number for the source port form (0-65535).  <i>TCP Source Port Mask</i> - Specify a TCP port mask for the source port in hex form (hex 0x0-0xffff), which you wish to filter.  <i>TCP Destination Port</i> - Specify a TCP port number for the destination port form (0-65535).  <i>TCP Destination Port Mask</i> - Specify a TCP port mask for the destination port in hex form (hex 0x0-0xffff) which you wish to filter.  <i>Flag Bits</i> - The user may also identify which flag bits to filter. Flag bits are parts of a packet that determine what to do with the packet. The user may filter packets by filtering certain flag bits within the packets, by checking the boxes corresponding to the flag bits of the TCP field. The user may choose between urg (urgent), ack (acknowledgement), psh (push), rst (reset), syn (synchronize), fin (finish).</p> <p>Select <i>UDP</i> to use the UDP port number contained in an incoming packet as the forwarding criterion. Selecting UDP requires that you specify a source port mask and/or a destination port mask.  <i>UDP Source Port</i> - Specify a UDP port number for the source port form (0-65535).  <i>UDP Source Port Mask</i> - Specify a UDP port mask for the source port in hex form (hex 0x0-0xffff).  <i>UDP Destination Port</i> - Specify a UDP port number for the destination port form (0-65535).  <i>UDP Destination Port Mask</i> - Specify a UDP port mask for the destination port in hex form (hex 0x0-0xffff).</p> <p>Select <i>Protocol ID</i> - Enter a value defining the protocol ID in the packet header to mask.  <i>Protocol ID</i> - Specify that the rule applies to the IP protocol ID traffic from (0-255).  <i>User</i> - Specify the Layer 4 part value.  <i>User Mask</i> - Specify the Layer 4 part mask</p>
<b>Action</b>	<p>Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below).</p> <p>Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.</p> <p>Select <i>Mirror</i> to specify that packets that match the access profile are mirrored to a port</p>

	defined in the config mirror port command. Port Mirroring must be enabled and a target port must be set.
<b>Priority (0-7)</b>	Tick the corresponding check box if you want to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace Priority</b>	Tick this check box to replace the Priority value in the adjacent field.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv4 packet, only one of them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Replace ToS Precedence (0-7)</b>	Specify that the IP precedence of the outgoing packet is changed with the new value. If used without an action priority, the packet is sent to the default TC.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Ports</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an error message and the access rule will not be configured. Ticking the All Ports check box will denote all ports on the Switch.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear.

ACL Rule Details	
Profile ID	2
Access ID	1 (auto assign)
Profile Type	IP
VLAN ID	1
Action	Permit
Ports	1:1
DSCP	10

Show All Rules

**Figure 7-12 Access Rule Detail Information (IPv4 ACL)**

Click the **Show All Rules** button to navigate back to the Access Rule List.

## Adding an IPv6 ACL Profile

The window shown below is the Add ACL Profile window for IPv6. To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more filed to the mask.

After clicking the **Add ACL Profile** button, the following window will appear.



Figure 7-13 Add ACL Profile window (IPv6 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-6)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 6.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content. This will change the window according to the requirements for the type of profile. Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header. Select Packet Content to instruct the Switch to examine the packet content in each frame's header.
<b>IPv6 Class</b>	Ticking this check box will instruct the Switch to examine the <i>class</i> field of the IPv6 header. This class field is a part of the packet header that is similar to the Type of Service (ToS) or Precedence bits field in IPv4.
<b>IPv6 Flow Label</b>	Ticking this check box will instruct the Switch to examine the <i>flow label</i> field of the IPv6 header. This flow label field is used by a source to label sequences of packets such as non-default quality of service or real time service packets.
<b>IPv6 TCP</b>	<i>Source Port Mask</i> – Specify that the rule applies to the range of TCP source ports. <i>Destination Port Mask</i> – Specify the range of the TCP destination port range.
<b>IPv6 UDP</b>	<i>Source Port Mask</i> – Specify the range of the TCP source port range. <i>Destination Port Mask</i> – Specify the range of the TCP destination port mask.
<b>ICMP</b>	Select <i>ICMP</i> to instruct the Switch to examine the Internet Control Message Protocol

	(ICMP) field in each frame's header. Select <i>Type</i> to further specify that the access profile will apply an ICMP type value, or specify <i>Code</i> to further specify that the access profile will apply an ICMP code value.
<b>IPv6 Source Mask</b>	The user may specify an IP address mask for the source IPv6 address by ticking the corresponding check box and entering the IP address mask.
<b>IPv6 Destination Mask</b>	The user may specify an IP address mask for the destination IPv6 address by ticking the corresponding check box and entering the IP address mask.

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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



**Figure 7-14 Access Profile Detail Information window (IPv6 ACL)**

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.



**Figure 7-15 Access Rule List window (IPv6 ACL)**

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

**Add Access Rule** Safeguard

**Profile Information**

Profile ID: 3      Profile Name: IPv6

Profile Type: IPv6      IPv6 Class: Yes

IPv6 Flow Label: Yes

---

**Rule Detail**  
(Keep the input field blank to specify that the corresponding option does not matter).

Access ID (1-256):   Auto Assign

Class:  (e.g.: 0-255)

Flow Label:  (e.g.: 0-FFFFF)

**Rule Action**

Action:

Priority (0-7):

Replace Priority:

Replace DSCP (0-63):

Replace ToS Precedence (0-7):

Time Range Name:

Counter:

Mirror Group ID (1-4):

(e.g.: 1:1, 1:4-1:6, 1:9)

Figure 7-16 Add Access Rule (IPv6 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-256)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 256. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>Class</b>	Enter the IPv6 class mask value.
<b>Flow Label</b>	Configuring this field, in hex form, will instruct the Switch to examine the flow label field of the IPv6 header. This flow label field is used by a source to label sequences of packets such as non-default quality of service or real time service packets.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that packets that match the access profile are not forwarded by the Switch and will be filtered. Select <i>Mirror</i> to specify that packets that match the access profile are mirrored to a port defined in the config mirror port command. Port Mirroring must be enabled and a target port must be set.
<b>Priority (0-7)</b>	Tick the corresponding check box to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace Priority</b>	Tick this check box to replace the Priority value in the adjacent field.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv6 packet, only one of

	them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Replace ToS Precedence (0-7)</b>	Specify that the IP precedence of the outgoing packet is changed with the new value. If used without an action priority, the packet is sent to the default TC.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Ports</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an error message and the access rule will not be configured. Ticking the All Ports check box will denote all ports on the Switch.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.
<b>IPv6 Source Address</b>	Enter the source IPv6 address.
<b>IPv6 Source Address Mask</b>	Select and enter the source IPv6 address mask.
<b>IPv6 Destination Address</b>	Enter the destination IPv6 address.
<b>IPv6 Destination Address Mask</b>	Select and enter the destination IPv6 address mask.
<b>Protocol</b>	<p>Selecting this option instructs the Switch to examine the protocol type value in each frame's header. Then the user must specify what protocol(s) to include according to the following guidelines:</p> <p>Select <b>ICMP</b> to specify that the rule will be applied to ICMP traffic.  <i>Type</i> – Enter the ICMP packet type value.  <i>Code</i> – Enter the ICMP code value.</p> <p>Select <b>TCP</b> to use the TCP port number contained in an incoming packet as the forwarding criterion. Selecting TCP requires that you specify a source port mask and/or a destination port mask.  <i>TCP Source Port</i> - Specify a TCP port number for the source port form (0-65535).  <i>TCP Source Port Mask</i> - Specify a TCP port mask for the source port in hex form (hex 0x0-0xffff), which you wish to filter.  <i>TCP Destination Port</i> - Specify a TCP port number for the destination port form (0-65535).  <i>TCP Destination Port Mask</i> - Specify a TCP port mask for the destination port in hex form (hex 0x0-0xffff) which you wish to filter.</p> <p>Select <b>UDP</b> to use the UDP port number contained in an incoming packet as the forwarding criterion. Selecting UDP requires that you specify a source port mask and/or a destination port mask.  <i>UDP Source Port</i> - Specify a UDP port number for the source port form (0-65535).  <i>UDP Source Port Mask</i> - Specify a UDP port mask for the source port in hex form (hex 0x0-0xffff), which you wish to filter.  <i>UDP Destination Port</i> - Specify a UDP port number for the destination port form (0-65535).  <i>UDP Destination Port Mask</i> - Specify a UDP port mask for the destination port in hex form (hex 0x0-0xffff) which you wish to filter.</p>

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear.



Figure 7-17 Access Rule Detail Information (IPv6 ACL)

Click the **Show All Rules** button to navigate back to the Access Rule List.

## Adding a Packet Content ACL Profile

The window shown below is the Add ACL Profile window for Packet Content: To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more filed to the mask.

After clicking the **Add ACL Profile** button, the following window will appear.

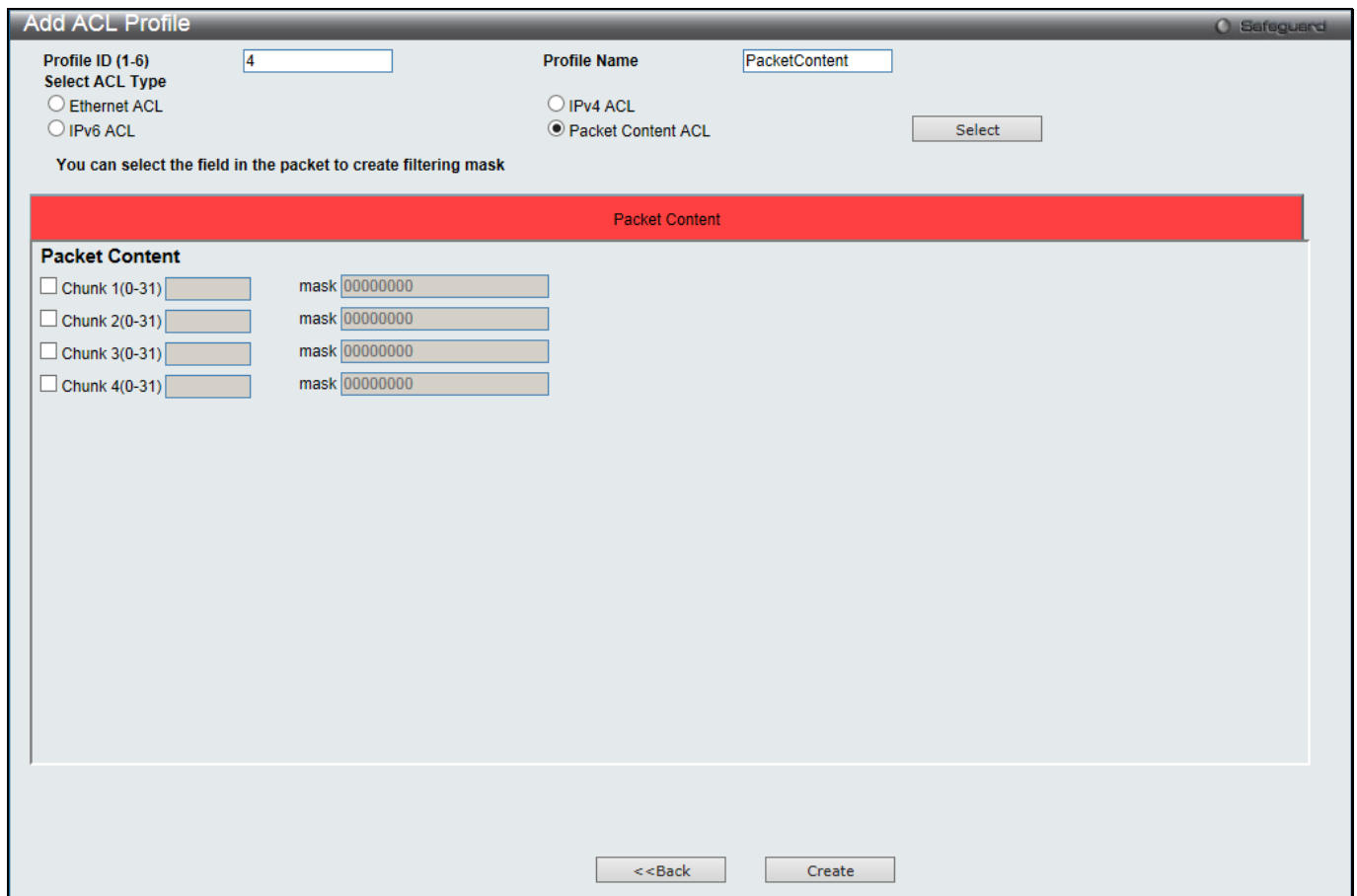



Figure 7-18 Add ACL Profile (Packet Content ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-6)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 6.

<p><b>Select ACL Type</b></p>	<p>Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content. This will change the window according to the requirements for the type of profile.</p> <p>Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header.</p> <p>Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header.</p> <p>Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header</p> <p>Select Packet Content to instruct the Switch to examine the packet content in each frame's header.</p>														
<p><b>Packet Content</b></p>	<p>Allows users to examine up to 4 specified offset_chunks within a packet at one time and specifies the frame content offset and mask. There are 4 chunk offsets and masks that can be configured. A chunk mask presents 4 bytes. 4 offset_chunks can be selected from a possible 32 predefined offset_chunks as described below:</p> <p>offset_chunk_1, offset_chunk_2, offset_chunk_3, offset_chunk_4.</p> <table border="1" data-bbox="454 860 1310 1084"> <thead> <tr> <th>chunk0</th> <th>chunk1</th> <th>chunk2</th> <th>.....</th> <th>chunk29</th> <th>chunk30</th> <th>chunk31</th> </tr> </thead> <tbody> <tr> <td>B126, B127, B0, B1</td> <td>B2, B3, B4, B5</td> <td>B6, B7, B8, B9</td> <td>.....</td> <td>B114, B115, B116, B117</td> <td>B118, B119, B120, B121</td> <td>B122, B123, B124, B125</td> </tr> </tbody> </table> <p>Example: offset_chunk_1 0 0xffffffff will match packet byte offset 126,127,0,1 offset_chunk_1 0 0x0000ffff will match packet byte offset,0,1</p> <div style="display: flex; align-items: center;">  <p><b>NOTE:</b> Only one packet_content_mask profile can be created.</p> </div>	chunk0	chunk1	chunk2	.....	chunk29	chunk30	chunk31	B126, B127, B0, B1	B2, B3, B4, B5	B6, B7, B8, B9	.....	B114, B115, B116, B117	B118, B119, B120, B121	B122, B123, B124, B125
chunk0	chunk1	chunk2	.....	chunk29	chunk30	chunk31									
B126, B127, B0, B1	B2, B3, B4, B5	B6, B7, B8, B9	.....	B114, B115, B116, B117	B118, B119, B120, B121	B122, B123, B124, B125									

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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

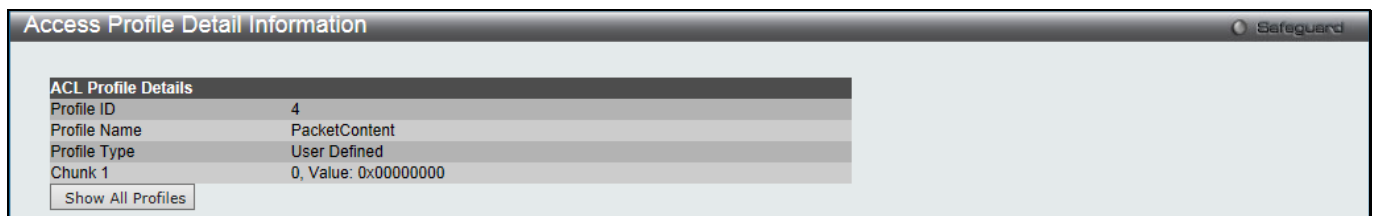


Figure 7-19 Access Profile Detail Information (Packet Content ACL)

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.

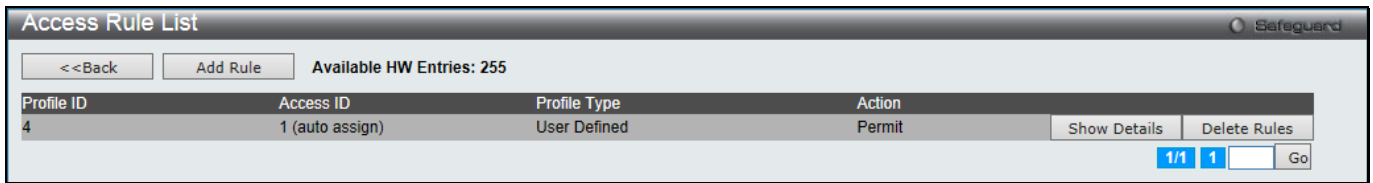


Figure 7-20 Access Rule List (Packet Content ACL)

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

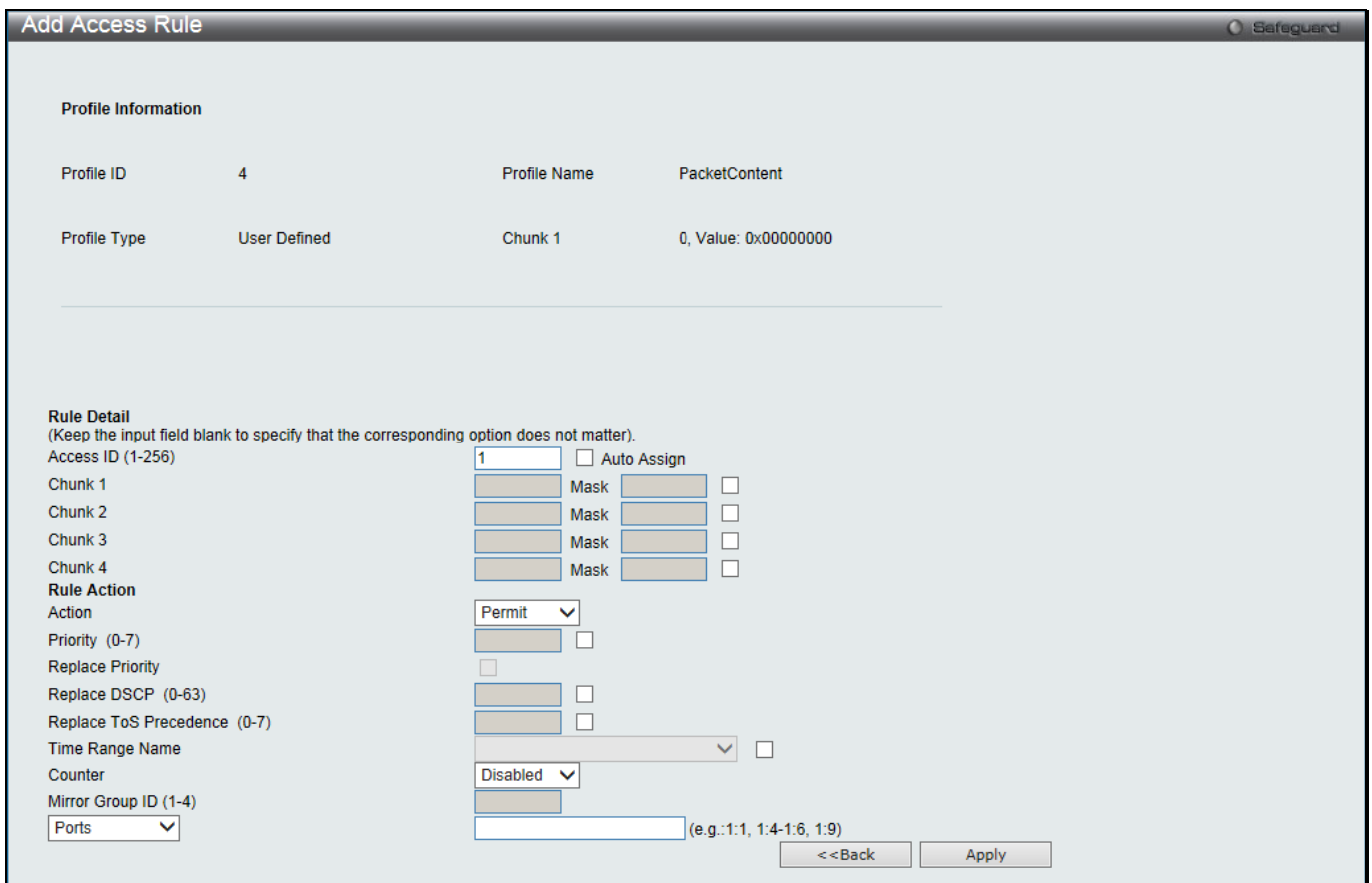


Figure 7-21 Add Access Rule (Packet Content ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-256)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 256. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>Offset1-4</b>	Enter the data to match for each UDF data field defined in the profile here. <i>Mask</i> – Enter the offset mask value used here.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that the packets that match the access profile are not

	forwarded by the Switch and will be filtered. Select <i>Mirror</i> to specify that packets that match the access profile are mirrored to a port defined in the config mirror port command. Port Mirroring must be enabled and a target port must be set.
<b>Priority (0-7)</b>	Tick the corresponding check box if you want to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace Priority</b>	Tick this check box to replace the Priority value in the adjacent field.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv4 packet, only one of them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Replace ToS Precedence (0-7)</b>	Specify that the IP precedence of the outgoing packet is changed with the new value. If used without an action priority, the packet is sent to the default TC.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Ports</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an error message and the access rule will not be configured. Ticking the All Ports check box will denote all ports on the Switch.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear.

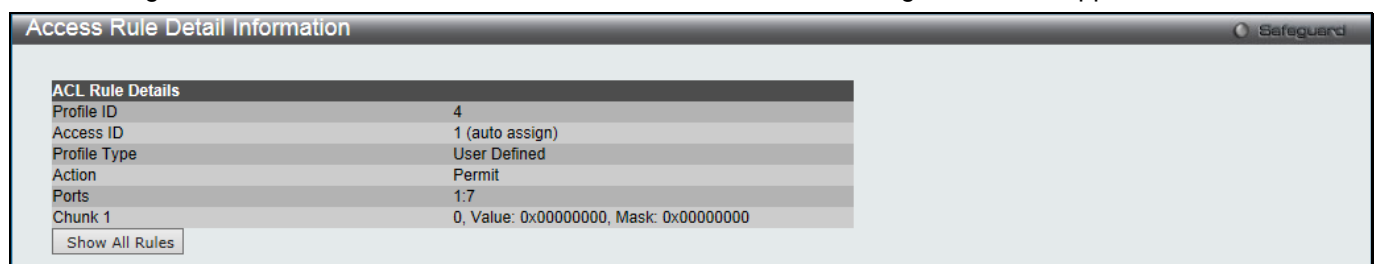


Figure 7-22 Access Rule Detail Information (Packet Content ACL)

Click the **Show All Rules** button to navigate back to the Access Rule List.

## CPU Access Profile List

Due to a chipset limitation and needed extra switch security, the Switch incorporates CPU Interface filtering. This added feature increases the running security of the Switch by enabling the user to create a list of access rules for packets destined for the Switch's CPU interface. Employed similarly to the Access Profile feature previously mentioned, CPU interface filtering examines Ethernet, IPv4, IPv6 and Packet Content Mask packet headers destined for the CPU and will either forward them or filter them, based on the user's implementation. As an added



feature for the CPU Filtering, the Switch allows the CPU filtering mechanism to be enabled or disabled globally, permitting the user to create various lists of rules without immediately enabling them.



**NOTE:** CPU Interface Filtering is used to control traffic access to the switch directly such as protocols transition or management access. A CPU interface filtering rule won't impact normal L2/3 traffic forwarding. However, an improper CPU interface filtering rule may cause the network to become unstable.

To view the following window, click **ACL > CPU Access Profile List** as shown below.

Creating an access profile for the CPU is divided into two basic parts. The first is to specify which part or parts of a frame the Switch will examine, such as the MAC source address or the IP destination address. The second part is entering the criteria the Switch will use to determine what to do with the frame. The entire process is described below.

Users may globally enable or disable the CPU Interface Filtering State mechanism by using the radio buttons to change the running state. Choose Enabled to enable CPU packets to be scrutinized by the Switch and Disabled to disallow this scrutiny.

Profile ID	Profile Type	Show Details	Add/View Rules	Delete
1	Ethernet	Show Details	Add/View Rules	Delete
2	IP	Show Details	Add/View Rules	Delete
3	IPv6	Show Details	Add/View Rules	Delete
4	User Defined	Show Details	Add/View Rules	Delete

Figure 7-23 CPU Access Profile List window

The fields that can be configured are described below:

Parameter	Description
<b>CPU Interface Filtering State</b>	Click to enable or disable the CPU interface filtering state.

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

Click the **Add CPU ACL Profile** button to add an entry to the **CPU ACL Profile List**.

Click the **Delete All** button to remove all access profiles from this table.

Click the **Show Details** button to display the information of the specific profile ID entry.

Click the **Add/View Rules** button to view or add CPU ACL rules within the specified profile ID.

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

There are four **Add CPU ACL Profile** windows;

- 1 one for Ethernet (or MAC address-based) profile configuration,
- 2 one for IPv6 address-based profile configuration,
- 3 one for IPv4 address-based profile configuration, and
- 4 one for packet content profile configuration.

## Adding a CPU Ethernet ACL Profile

The window shown below is the Add CPU ACL Profile window for Ethernet. To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more files to the mask.

After clicking the **Add CPU ACL Profile** button, the following window will appear.

Figure 7-24 Add CPU ACL Profile (Ethernet ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-5)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 5.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content mask. This will change the window according to the requirements for the type of profile. Select Ethernet to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 to instruct the Switch to examine the IPv6 address in each frame's header. Select Packet Content Mask to specify a mask to hide the content of the packet header.
<b>Source MAC Mask</b>	Enter a MAC address mask for the source MAC address.
<b>Destination MAC Mask</b>	Enter a MAC address mask for the destination MAC address.
<b>802.1Q VLAN</b>	Selecting this option instructs the Switch to examine the VLAN identifier of each packet header and use this as the full or partial criterion for forwarding.
<b>802.1p</b>	Selecting this option instructs the Switch to specify that the access profile will apply only to packets with this 802.1p priority value.
<b>Ethernet Type</b>	Selecting this option instructs the Switch to examine the Ethernet type value in each frame's header.

Click the **Select** button to select a CPU ACL type.

Click the **Create** button to create a profile.

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

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

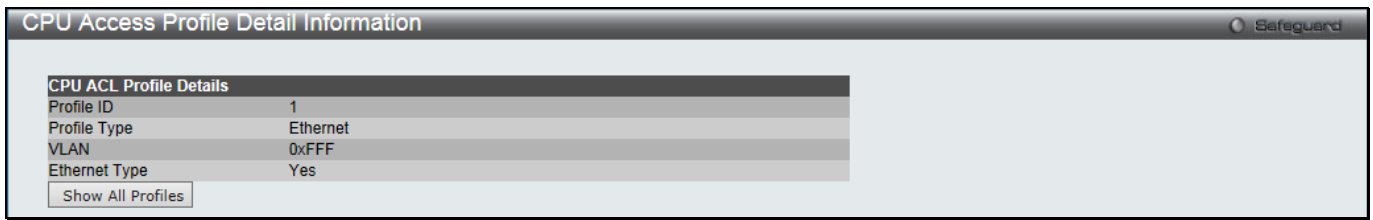


Figure 7-25 CPU Access Profile Detail Information (Ethernet ACL)

Click the **Show All Profiles** button to navigate back to the **CPU ACL Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.



Figure 7-26 CPU Access Rule List (Ethernet ACL)

Click the **Add Rule** button to create a new CPU ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

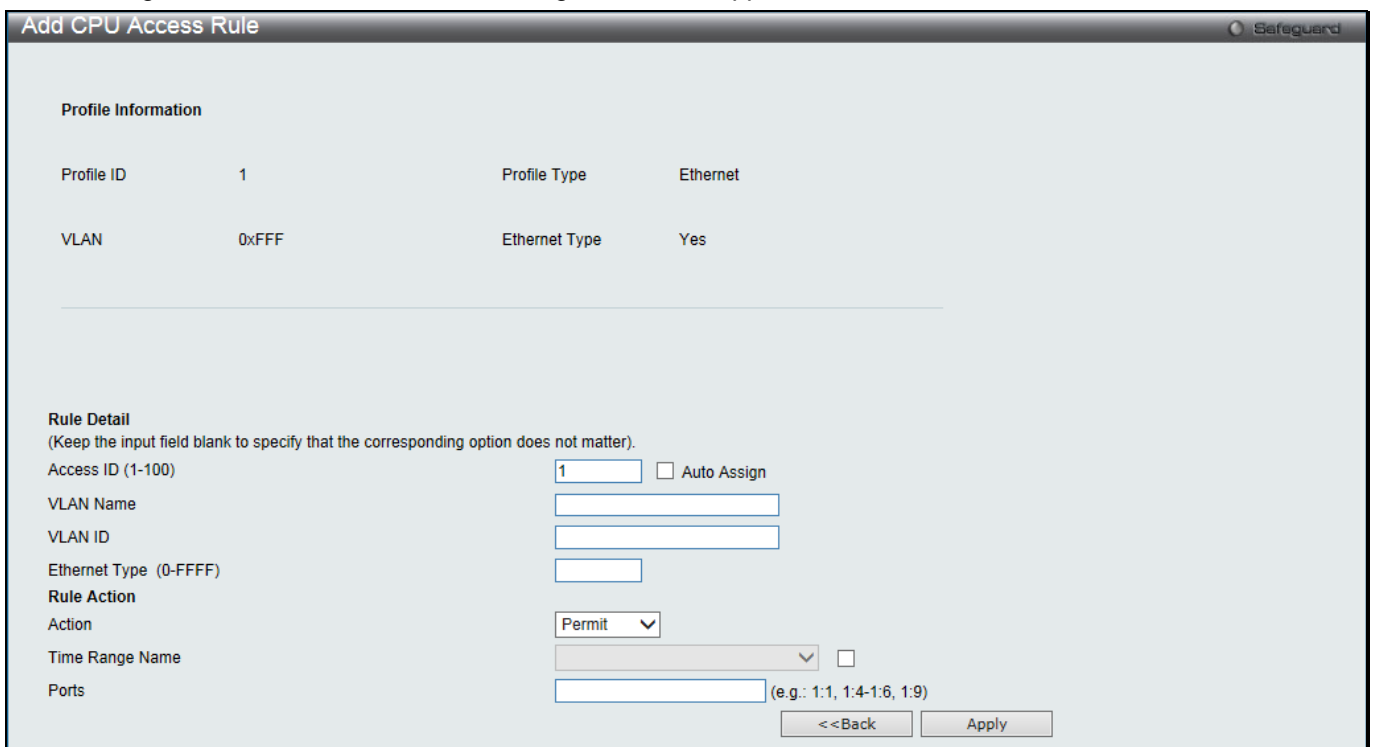


Figure 7-27 Add CPU Access Rule (Ethernet ACL)

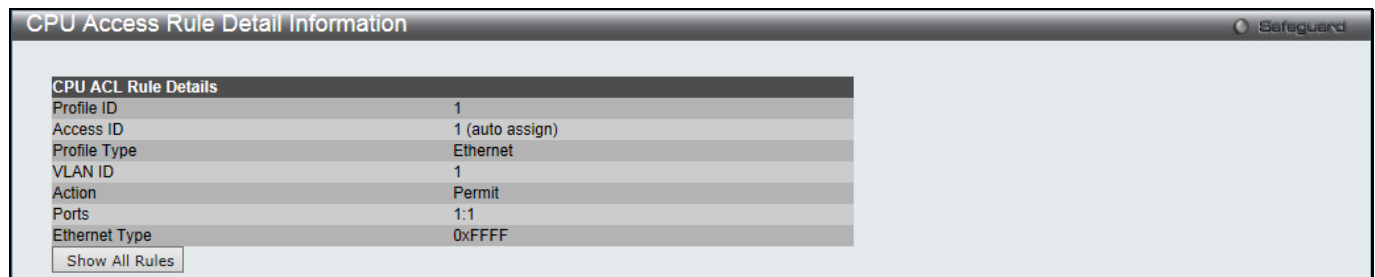
The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-100)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 100. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>VLAN Name</b>	Enter the VLAN name.
<b>VLAN ID</b>	Enter the VLAN ID.
<b>Source MAC Address</b>	Enter the source MAC address.
<b>Destination MAC Address</b>	Enter the destination MAC address.
<b>802.1p</b>	Enter the 802.1p priority tag value. This value must be between 0 and 7.
<b>Ethernet Type (0-FFFF)</b>	Enter the Ethernet type value.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Ports</b>	Ticking the All Ports check box will denote all ports on the Switch.

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

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

After clicking the **Show Details** button in the **CPU Access Rule List**, the following window will appear.



CPU Access Rule Detail Information	
CPU ACL Rule Details	
Profile ID	1
Access ID	1 (auto assign)
Profile Type	Ethernet
VLAN ID	1
Action	Permit
Ports	1:1
Ethernet Type	0xFFFF
<input type="button" value="Show All Rules"/>	

Figure 7-28 CPU Access Rule Detail Information (Ethernet ACL)

Click the **Show All Rules** button to navigate back to the CPU Access Rule List.

## Adding a CPU IPv4 ACL Profile

The window shown below is the **Add CPU ACL Profile** window for IP (IPv4). To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more files to the mask.

After clicking the **Add CPU ACL Profile** button, the following window will appear.

Figure 7-29 Add CPU ACL Profile (IPv4 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-5)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 5.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content mask. This will change the menu according to the requirements for the type of profile. Select Ethernet to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 to instruct the Switch to examine the IPv6 address in each frame's header. Select Packet Content Mask to specify a mask to hide the content of the packet header.
<b>802.1Q VLAN</b>	Selecting this option instructs the Switch to examine the VLAN part of each packet header and use this as the, or part of the criterion for forwarding.
<b>IPv4 DSCP</b>	Selecting this option instructs the Switch to examine the DiffServ Code part of each packet header and use this as the, or part of the criterion for forwarding.
<b>Source IP Mask</b>	Enter an IP address mask for the source IP address, e.g. 255.255.255.255.
<b>Destination IP Mask</b>	Enter an IP address mask for the destination IP address, e.g. 255.255.255.255.
<b>Protocol</b>	Selecting this option instructs the Switch to examine the protocol type value in each frame's header. You must then specify what protocol(s) to include according to the following guidelines:  Select <i>ICMP</i> to instruct the Switch to examine the Internet Control Message Protocol (ICMP) field in each frame's header. Select <i>Type</i> to further specify that the access profile will apply an ICMP type value, or

specify *Code* to further specify that the access profile will apply an ICMP code value.

Select *IGMP* to instruct the Switch to examine the Internet Group Management Protocol (IGMP) field in each frame's header.

Select *Type* to further specify that the access profile will apply an IGMP type value.

Select *TCP* to use the TCP port number contained in an incoming packet as the forwarding criterion. Selecting TCP requires a source port mask and/or a destination port mask is to be specified.

*Source Port Mask* - Specify a TCP port mask for the source port in hex form (hex 0x0-0xffff), which you wish to filter.

*Destination Port Mask* - Specify a TCP port mask for the destination port in hex form (hex 0x0-0xffff) which you wish to filter.

*TCP Flag Bits* - The user may also identify which flag bits to filter. Flag bits are parts of a packet that determine what to do with the packet. The user may filter packets by filtering certain flag bits within the packets, by checking the boxes corresponding to the flag bits of the TCP field. The user may choose between urg (urgent), ack (acknowledgement), psh (push), rst (reset), syn (synchronize), fin (finish).

Select *UDP* to use the UDP port number contained in an incoming packet as the forwarding criterion. Selecting UDP requires that you specify a source port mask and/or a destination port mask.

*Source Port Mask* - Specify a UDP port mask for the source port in hex form (hex 0x0-0xffff).

*Destination Port Mask* - Specify a UDP port mask for the destination port in hex form (hex 0x0-0xffff).

Select *Protocol ID* - Enter a value defining the protocol ID in the packet header to mask. Specify the protocol ID mask in hex form (hex 0x0-0xff).

*Protocol ID Mask* – Specify that the rule applies to the IP Protocol ID Traffic.

*User Define* – Specify the L4 part mask.

Click the **Select** button to select a CPU ACL type.

Click the **Create** button to create a profile.

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

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

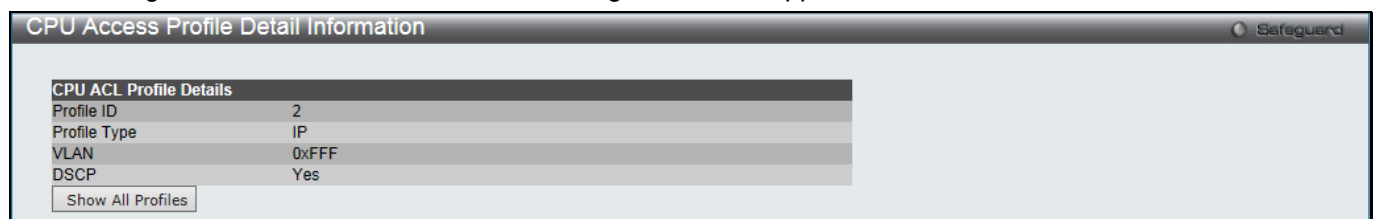


Figure 7-30 CPU Access Profile Detail Information (IPv4 ACL)

Click the **Show All Profiles** button to navigate back to the **CPU ACL Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.

Figure 7-31 CPU Access Rule List (IPv4 ACL)

Click the **Add Rule** button to create a new CPU ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

Figure 7-32 Add CPU Access Rule (IPv4 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-100)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 100. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>VLAN Name</b>	Enter the VLAN name.
<b>VLAN ID</b>	Enter the VLAN ID.
<b>Source IP Address</b>	Enter the source IP address.
<b>Destination IP Address</b>	Enter the destination IP address.
<b>DSCP</b>	Enter the DSCP value.
<b>Protocol</b>	Selecting this option instructs the Switch to examine the protocol type value in each frame's header. Then the user must specify what protocol(s) to include according to

	<p>the following guidelines:</p> <p>Select this option to specify that the rule will be applied to ICMP traffic.  <i>Type</i> – Enter the ICMP packet type value.  <i>Code</i> – Enter the ICMP code value.</p> <p>Select <i>IGMP</i> to instruct the Switch to examine the Internet Group Management Protocol (IGMP) field in each frame's header.  <i>Type</i> – Enter the IGMP packet type value.</p> <p>Select <i>TCP</i> to use the TCP port number contained in an incoming packet as the forwarding criterion. Selecting TCP requires that you specify a source port mask and/or a destination port mask.  <i>TCP Source Port</i> - Specify a TCP port number for the source port form (0-65535).  <i>TCP Destination Port</i> - Specify a TCP port number for the destination port form (0-65535).  <i>Flag Bits</i> - The user may also identify which flag bits to filter. Flag bits are parts of a packet that determine what to do with the packet. The user may filter packets by filtering certain flag bits within the packets, by checking the boxes corresponding to the flag bits of the TCP field. The user may choose between urg (urgent), ack (acknowledgement), psh (push), rst (reset), syn (synchronize), fin (finish).</p> <p>Select <i>UDP</i> to use the UDP port number contained in an incoming packet as the forwarding criterion. Selecting UDP requires that you specify a source port mask and/or a destination port mask.  <i>UDP Source port</i> - Specify a UDP port number for the source port form (0-65535).  <i>UDP Destination port</i> - Specify a UDP port number for the destination port form (0-65535).</p> <p>Select <i>Protocol ID</i> - Enter a value defining the protocol ID in the packet header to mask.  <i>Protocol ID</i> - Specify that the rule applies to the IP protocol ID traffic from (0-255).  <i>User</i> - Specify the Layer 4 part value.</p>
<b>Action</b>	<p>Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below).</p> <p>Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.</p>
<b>VLAN Name</b>	Allows the entry of a name for a previously configured VLAN.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Ports</b>	Ticking the All Ports check box will denote all ports on the Switch.

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

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

After clicking the **Show Details** button in the **CPU Access Rule List**, the following window will appear.





Figure 7-33 CPU Access Rule Detail Information (IPv4 ACL)

Click the **Show All Rules** button to navigate back to the CPU Access Rule List.

## Adding a CPU IPv6 ACL Profile

The window shown below is the **Add CPU ACL Profile** window for IPv6. To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more filed to the mask.

After clicking the **Add CPU ACL Profile** button, the following window will appear.

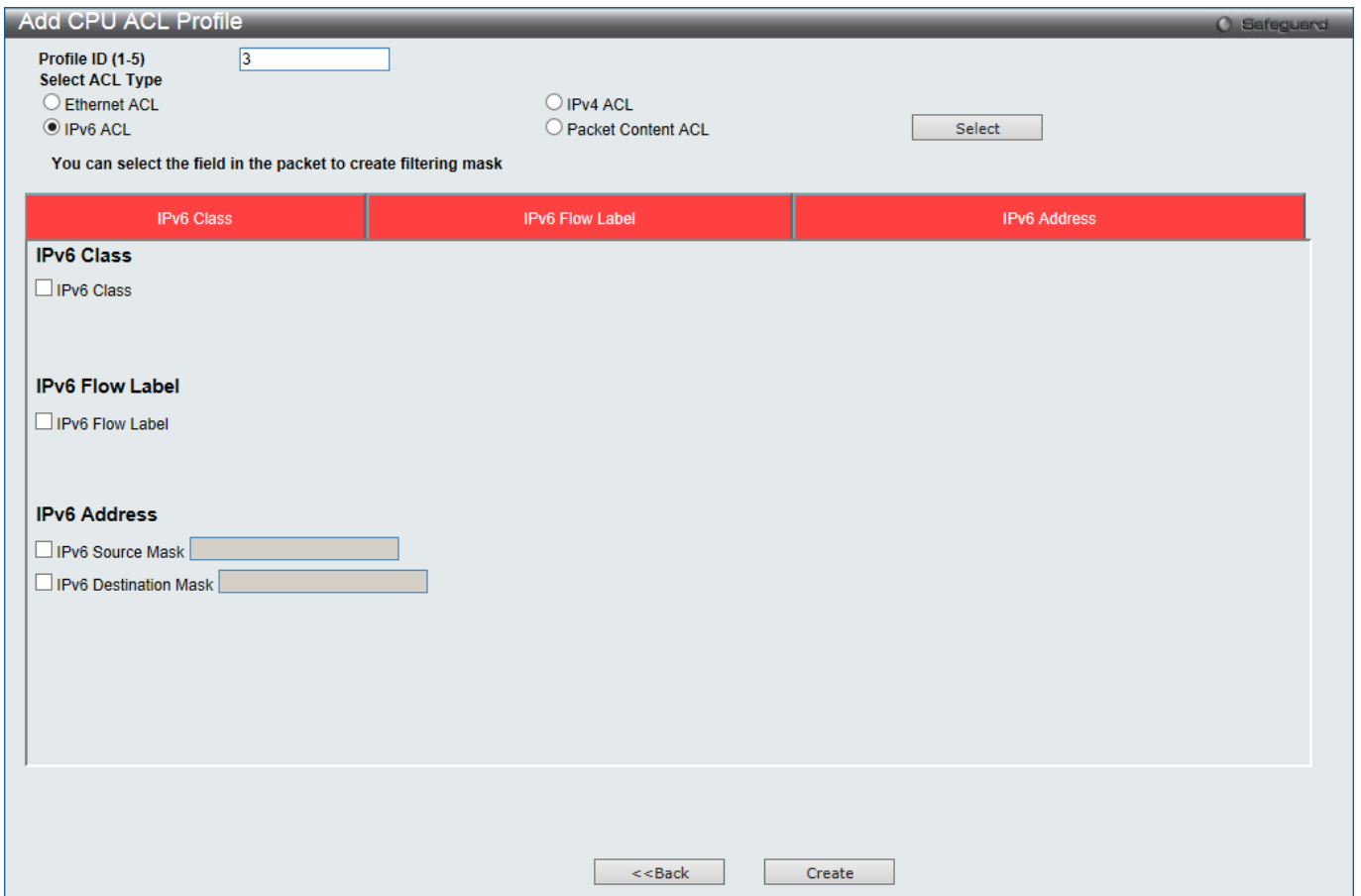


Figure 7-34 Add CPU ACL Profile (IPv6 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-5)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 5.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content mask. This will change the menu according to the requirements for the type of profile. Select Ethernet to instruct the Switch to examine the layer 2 part of each packet header.

	<p>Select IPv4 to instruct the Switch to examine the IPv4 address in each frame's header.</p> <p>Select IPv6 to instruct the Switch to examine the IPv6 address in each frame's header.</p> <p>Select Packet Content Mask to specify a mask to hide the content of the packet header.</p>
<b>IPv6 Class</b>	Checking this field will instruct the Switch to examine the <i>class</i> field of the IPv6 header. This class field is a part of the packet header that is similar to the Type of Service (ToS) or Precedence bits field in IPv4.
<b>IPv6 Flow Label</b>	Checking this field will instruct the Switch to examine the <i>flow label</i> field of the IPv6 header. This flow label field is used by a source to label sequences of packets such as non-default quality of service or real time service packets.
<b>IPv6 Source Mask</b>	The user may specify an IP address mask for the source IPv6 address by checking the corresponding box and entering the IP address mask.
<b>IPv6 Destination Mask</b>	The user may specify an IP address mask for the destination IPv6 address by checking the corresponding box and entering the IP address mask.

Click the **Select** button to select a CPU ACL type.

Click the **Create** button to create a profile.

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

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

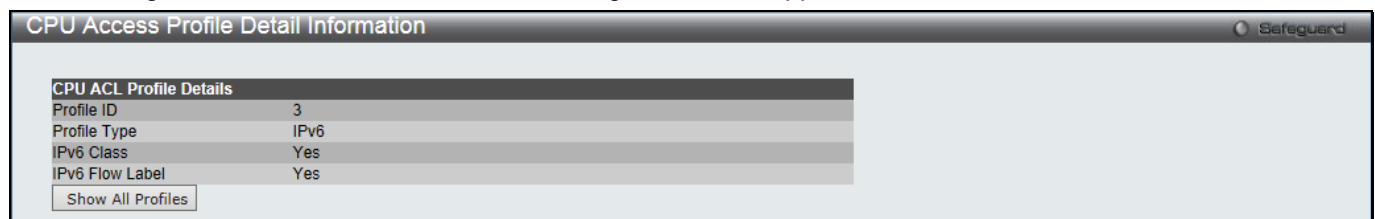


Figure 7-35 CPU Access Profile Detail Information (IPv6 ACL)

Click the **Show All Profiles** button to navigate back to the **CPU ACL Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.

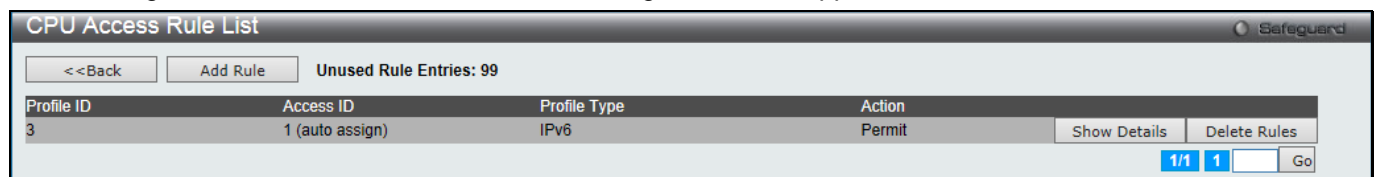


Figure 7-36 CPU Access Rule List (IPv6 ACL)

Click the **Add Rule** button to create a new CPU ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

Add CPU Access Rule
Safeguard

**Profile Information**

Profile ID	3	Profile Type	IPv6
IPv6 Class	Yes	IPv6 Flow Label	Yes

---

**Rule Detail**  
(Keep the input field blank to specify that the corresponding option does not matter).

Access ID (1-100)   Auto Assign

Class  (e.g.: 0-255)

Flow Label  (e.g.: 0-FFFFFF)

**Rule Action**

Action Permit ▼

Time Range Name   ▼

Ports  (e.g.: 1:1, 1:4-1:6, 1:9)

Figure 7-37 Add CPU Access Rule (IPv6 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-100)</b>	Enter a unique identifier number for this access. This value can be set from 1 to 100. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>Class</b>	Enter the IPv6 class mask value.
<b>Flow Label</b>	Configuring this field, in hex form, will instruct the Switch to examine the flow label field of the IPv6 header. This flow label field is used by a source to label sequences of packets such as non-default quality of service or real time service packets.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Ports</b>	Ticking the All Ports check box will denote all ports on the Switch.
<b>IPv6 Source Address</b>	Enter the source IPv6 address.
<b>IPv6 Destination Address</b>	Enter the destination IPv6 address.

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

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

After clicking the **Show Details** button in the **CPU Access Rule List**, the following window will appear.



Figure 7-38 CPU Access Rule Detail Information (IPv6 ACL)

Click the **Show All Rules** button to navigate back to the CPU Access Rule List.

## Adding a CPU Packet Content ACL Profile

The window shown below is the Add CPU ACL Profile window for Packet Content. To use specific filtering masks in this ACL profile, click the packet filtering mask field to highlight it red. This will add more filed to the mask.

After clicking the **Add CPU ACL Profile** button, the following window will appear.

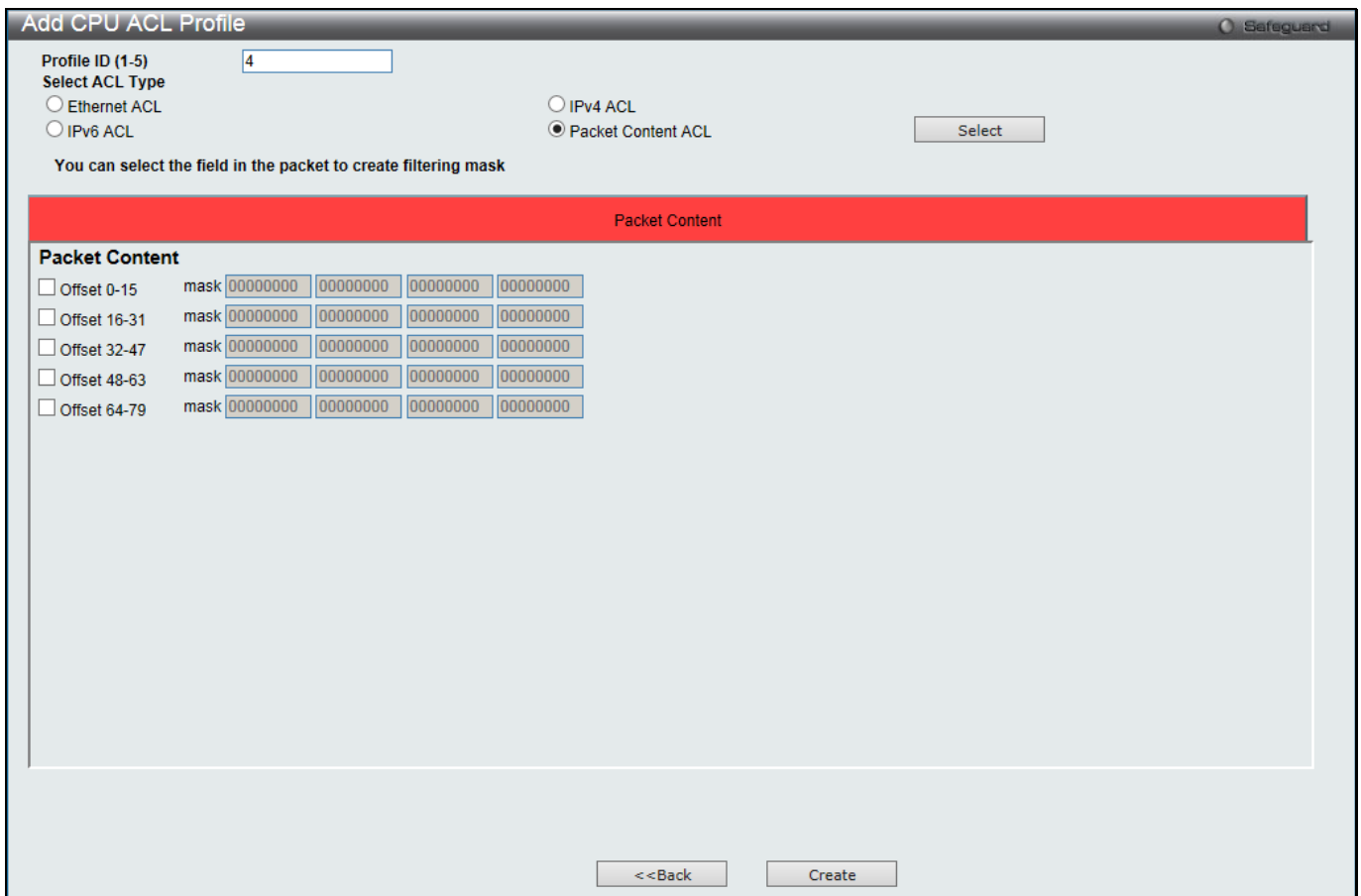


Figure 7-39 Add CPU ACL Profile (Packet Content ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-5)</b>	Here the user can enter a unique identifier number for this profile set. This value can be set from 1 to 5.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, IPv6 address, or packet content mask. This will change the menu according to the requirements for the type of profile.

	Select Ethernet to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 to instruct the Switch to examine the IPv6 address in each frame's header. Select Packet Content Mask to specify a mask to hide the content of the packet header.
<b>Offset</b>	This field will instruct the Switch to mask the packet header beginning with the offset value specified:  0-15 - Enter a value in hex form to mask the packet from the beginning of the packet to the 15th byte. 16-31 – Enter a value in hex form to mask the packet from byte 16 to byte 31. 32-47 – Enter a value in hex form to mask the packet from byte 32 to byte 47. 48-63 – Enter a value in hex form to mask the packet from byte 48 to byte 63. 64-79 – Enter a value in hex form to mask the packet from byte 64 to byte 79.

Click the **Select** button to select a CPU ACL type.

Click the **Create** button to create a profile.

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

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

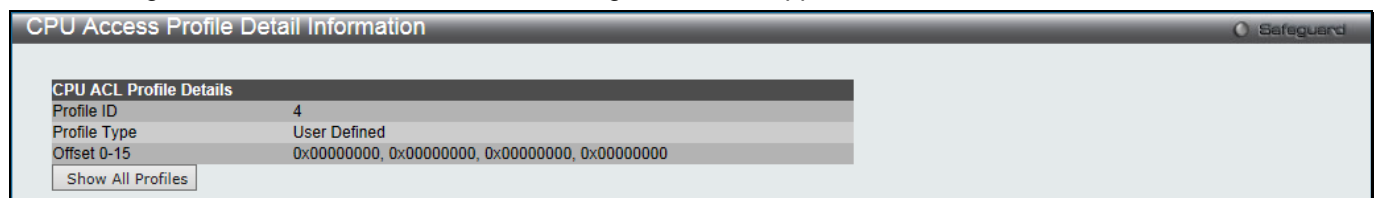


Figure 7-40 CPU Access Profile Detail Information (Packet Content ACL)

Click the **Show All Profiles** button to navigate back to the **CPU ACL Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear.

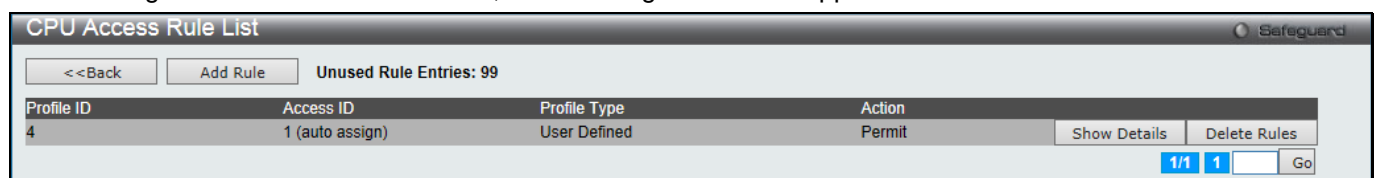


Figure 7-41 CPU Access Rule List (Packet Content ACL)

Click the **Add Rule** button to create a new CPU ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear.

Figure 7-42 Add CPU Access Rule (Packet Content ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-100)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 100. <i>Auto Assign</i> – Select this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>Offset</b>	This field will instruct the Switch to mask the packet header beginning with the offset value specified: Offset 0-15 - Enter a value in hex form to mask the packet from the beginning of the packet to the 15th byte. Offset 16-31 - Enter a value in hex form to mask the packet from byte 16 to byte 31. Offset 32-47 - Enter a value in hex form to mask the packet from byte 32 to byte 47. Offset 48-63 - Enter a value in hex form to mask the packet from byte 48 to byte 63. Offset 64-79 - Enter a value in hex form to mask the packet from byte 64 to byte 79.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Ports</b>	Ticking the All Ports check box will denote all ports on the Switch.

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

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

After clicking the **Show Details** button in the **CPU Access Rule List**, the following window will appear.

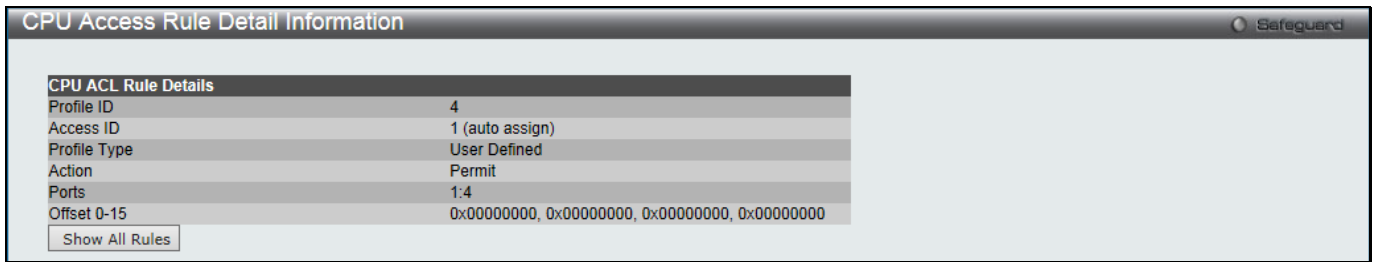


Figure 7-43 CPU Access Rule Detail Information (Packet Content ACL)

Click the **Show All Rules** button to navigate back to the CPU Access Rule List.

## ACL Finder

The ACL rule finder helps you to identify any rules that have been assigned to a specific port and edit existing rules quickly.

To view the following window, click **ACL > ACL Finder** as shown below.

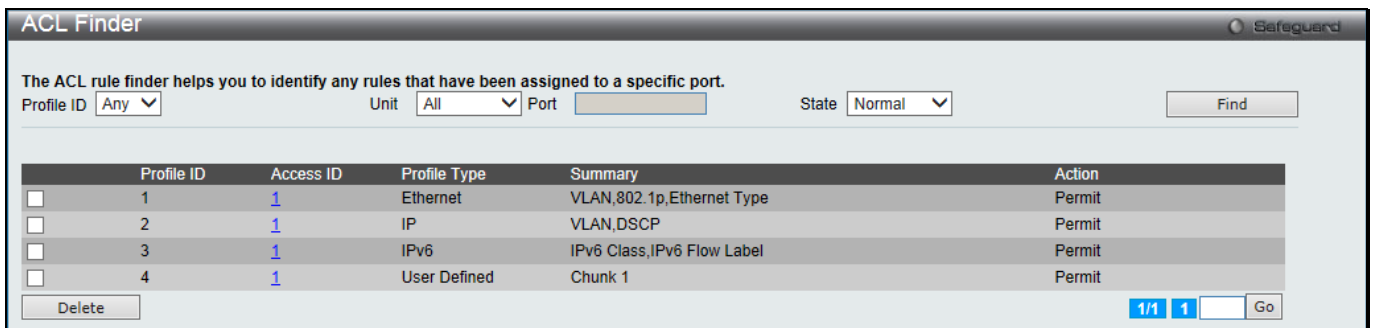


Figure 7-44 ACL Finder window

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID</b>	Use the drop-down menu to select the Profile ID for the ACL rule finder to identify the rule.
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Enter the port number for the ACL rule finder to identify the rule.
<b>State</b>	Use the drop-down menu to select the state. <i>Normal</i> - Allow the user to find normal ACL rules. <i>CPU</i> - Allow the user to find CPU ACL rules. <i>Egress</i> – Allow the user to find Egress ACL rules.

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

Click the **Delete** button to remove the specific entry selected.

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

## ACL Flow Meter

Before configuring the ACL Flow Meter, here is a list of acronyms and terms users will need to know.

**trTCM** – Two Rate Three Color Marker. This, along with the srTCM, are two methods available on the switch for metering and marking packet flow. The trTCM meters and IP flow and marks it as a color based on the flow's surpassing of two rates, the CIR and the PIR.

**CIR** – Committed Information Rate. Common to both the trTCM and the srTCM, the CIR is measured in bytes of IP packets. IP packet bytes are measured by taking the size of the IP header but not the link specific headers. For the

trTCM, the packet flow is marked green if it doesn't exceed the CIR and yellow if it does. The configured rate of the CIR must not exceed that of the PIR. The CIR can also be configured for unexpected packet bursts using the CBS and PBS fields.

**CBS** – Committed Burst Size. Measured in bytes, the CBS is associated with the CIR and is used to identify packets that exceed the normal boundaries of packet size. The CBS should be configured to accept the biggest IP packet that is expected in the IP flow.

**PIR** – Peak Information Rate. This rate is measured in bytes of IP packets. IP packet bytes are measured by taking the size of the IP header but not the link specific headers. If the packet flow exceeds the PIR, that packet flow is marked red. The PIR must be configured to be equal or more than that of the CIR.

**PBS** – Peak Burst Size. Measured in bytes, the PBS is associated with the PIR and is used to identify packets that exceed the normal boundaries of packet size. The PBS should be configured to accept the biggest IP packet that is expected in the IP flow.

**srTCM** – Single Rate Three Color Marker. This, along with the trTCM, are two methods available on the switch for metering and marking packet flow. The srTCM marks its IP packet flow based on the configured CBS and EBS. A packet flow that does not reach the CBS is marked green, if it exceeds the CBS but not the EBS its marked yellow, and if it exceeds the EBS its marked red.

**CBS** – Committed Burst Size. Measured in bytes, the CBS is associated with the CIR and is used to identify packets that exceed the normal boundaries of packet size. The CBS should be configured to accept the biggest IP packet that is expected in the IP flow.

**EBS** – Excess Burst Size. Measured in bytes, the EBS is associated with the CIR and is used to identify packets that exceed the boundaries of the CBS packet size. The EBS is to be configured for an equal or larger rate than the CBS.

**DSCP** – Differentiated Services Code Point. The part of the packet header where the color will be added. Users may change the DSCP field of incoming packets.

The ACL Flow Meter function will allow users to color code IP packet flows based on the rate of incoming packets. Users have two types of Flow metering to choose from, trTCM and srTCM, as explained previously. When a packet flow is placed in a color code, the user can choose what to do with packets that have exceeded that color-coded rate.

**Green** – When an IP flow is in the green mode, its configurable parameters can be set in the Conform field, where the packets can have their DSCP field changed. This is an acceptable flow rate for the ACL Flow Meter function.

**Yellow** – When an IP flow is in the yellow mode, its configurable parameters can be set in the Exceed field. Users may choose to either Permit or Drop exceeded packets. Users may also choose to change the DSCP field of the packets.

**Red** – When an IP flow is in the red mode, its configurable parameters can be set in the Violate field. Users may choose to either Permit or Drop exceeded packets. Users may also choose to change the DSCP field of the packets.

Users may also choose to count exceeded packets by clicking the Counter check box. If the counter is enabled, the counter setting in the access profile will be disabled. Users may only enable two counters for one flow meter at any given time.

To view the following window, click **ACL > ACL Flow Meter** as shown below.

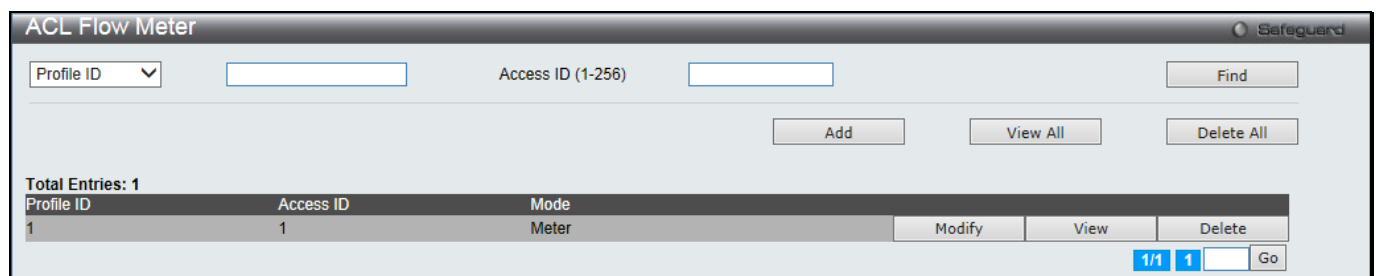


Figure 7-45 ACL Flow Meter

The fields that can be configured are described below:



Parameter	Description
<b>Profile ID</b>	Use the drop-down menu to select it and enter the Profile ID for the flow meter.
<b>Profile Name</b>	Use the drop-down menu to select it and enter the Profile Name for the flow meter.
<b>Access ID (1-256)</b>	Here the user can enter the Access ID for the flow meter.

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

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

Click the **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed.

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

Click the **View** button to display the information of 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 **Add** or **Modify** button, the following page will appear.

Figure 7-46 ACL Flow meter Configuration window

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-6)</b>	Click the radio button and enter the Profile ID for the flow meter.
<b>Profile Name</b>	Click the radio button and enter the Profile Name for the flow meter.
<b>Access ID (1-256)</b>	Enter the Access ID for the flow meter.
<b>Mode</b>	<p><b>Rate</b> – Specify the rate for single rate two color mode.</p> <p><i>Rate</i> – Specify the committed bandwidth in Kbps for the flow.</p> <p><i>Burst Size</i> – Specify the burst size for the single rate two color mode. The unit is in kilobyte.</p> <p><i>Rate Exceeded</i> – Specify the action for packets that exceed the committed rate in single rate two color mode. The action can be specified as one of the following:</p> <p><i>Drop Packet</i> – Drop the packet immediately.</p> <p><i>Remark DSCP</i> – Mark the packet with a specified DSCP. The packet is set to drop for packets with a high precedence.</p>

	<p><b>trTCM</b> – Specify the “two-rate three-color mode.”</p> <p><i>CIR</i> – Specify the Committed information Rate. The unit is Kbps. CIR should always be equal or less than PIR.</p> <p><i>PIR</i> – Specify the Peak information Rate. The unit is Kbps. PIR should always be equal to or greater than CIR.</p> <p><i>CBS</i> – Specify the Committed Burst Size. The unit is in kilobyte.</p> <p><i>PBS</i> – Specify the Peak Burst Size. The unit is in kilobyte.</p> <p><b>srTCM</b> – Specify the “single-rate three-color mode”.</p> <p><i>CIR</i> – Specify the Committed Information Rate. The unit is in kilobyte.</p> <p><i>CBS</i> – Specify the Committed Burst Size. The unit is in kilobyte.</p> <p><i>EBS</i> – Specify the Excess Burst Size. The unit is in kilobyte.</p>
<b>Action</b>	<p><b>Conform</b> – This field denotes the green packet flow. Green packet flows may have their <i>DSCP</i> field rewritten to a value stated in this field. Users may also choose to count green packets by using counter parameter.</p> <p><i>Replace DSCP</i> – Packets that are in the green flow may have their DSCP field rewritten using this parameter and entering the DSCP value to replace.</p> <p><i>Counter</i> – Use this parameter to enable or disable the packet counter for the specified ACL entry in the green flow.</p> <p><b>Exceed</b> – This field denotes the yellow packet flow. Yellow packet flows may have excess packets permitted through or dropped. Users may replace the DSCP field of these packets by checking its radio button and entering a new DSCP value in the allotted field.</p> <p><i>Counter</i> – Use this parameter to enable or disable the packet counter for the specified ACL entry in the yellow flow.</p> <p><b>Violate</b> – This field denotes the red packet flow. Red packet flows may have excess packets permitted through or dropped. Users may replace the DSCP field of these packets by checking its radio button and entering a new DSCP value in the allotted field.</p> <p><i>Counter</i> – Use this parameter to enable or disable the packet counter for the specified ACL entry in the red flow.</p>

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

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

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

ACL Flow Meter Display			
Profile ID	1		
Access ID	1		
Mode	Rate	Rate (Kbps)	1000
		Burst Size (Kbyte)	1000
		Rate Exceeded	10
		Remark DSCP	
			<<Back

Figure 7-47 ACL Flow meter Display window

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

## Egress Access Profile List

Egress ACL performs per-flow processing of packets when they egress the Switch. The Switch supports three Profile Types, Ethernet ACL, IPv4 ACL, and IPv6 ACL.

To view the following window, click **ACL > Egress Access Profile List** as shown below.

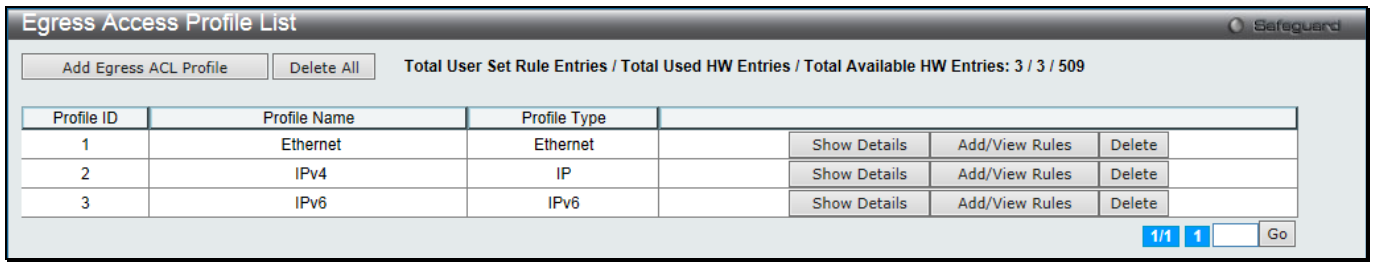


Figure 7-48 Egress Access Profile List window

Click the **Add Egress ACL** button to add an entry to the **Egress Access Profile List**.

Click the **Delete All** button to remove all access profiles from this table.

Click the **Show Details** button to display the information of the specific profile ID entry.

Click the **Add/View Rules** button to view or add Egress ACL rules within the specified profile ID.

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.

There are three **Add Egress ACL** windows;

- one for Ethernet profile configuration,
- one for IPv6 address-based profile configuration, and
- one for IPv4 address-based profile configuration.

## Add an Ethernet ACL Profile

The window shown below is the Add Egress ACL Profile window for Ethernet. To use specific filtering masks in this egress ACL profile, click the packet filtering mask field to highlight it red. This will add more fields to the mask.

After clicking the **Add Egress ACL** button, the following window will appear:

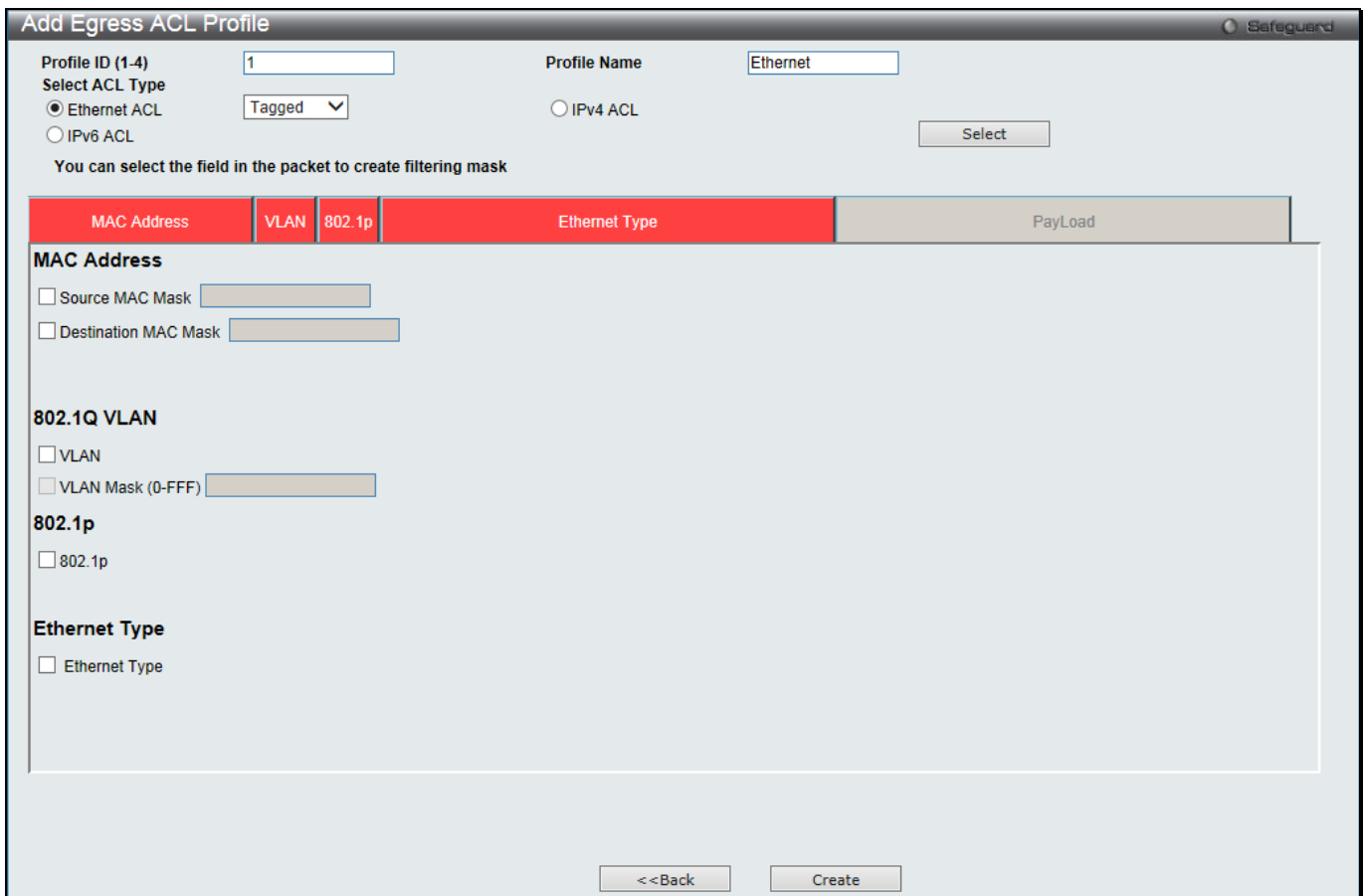


Figure 7-49 Add Egress ACL Profile window (Ethernet ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-4)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 4. A lower value denotes a higher priority.
<b>Profile Name</b>	Enter a profile name for the profile created.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, or IPv6 address. This will change the window according to the requirements for the type of profile. Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header.
<b>Source MAC Mask</b>	Enter a MAC address mask for the source MAC address.
<b>Destination MAC Mask</b>	Enter a MAC address mask for the destination MAC address.
<b>802.1Q VLAN</b>	Selecting this option instructs the Switch to examine the 802.1Q VLAN identifier of each packet header and use this as the full or partial criterion for forwarding.
<b>802.1p</b>	Selecting this option instructs the Switch to examine the 802.1p priority value of each packet header and use this as the, or part of the criterion for forwarding.
<b>Ethernet Type</b>	Selecting this option instructs the Switch to examine the Ethernet type value in each frame's header.

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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

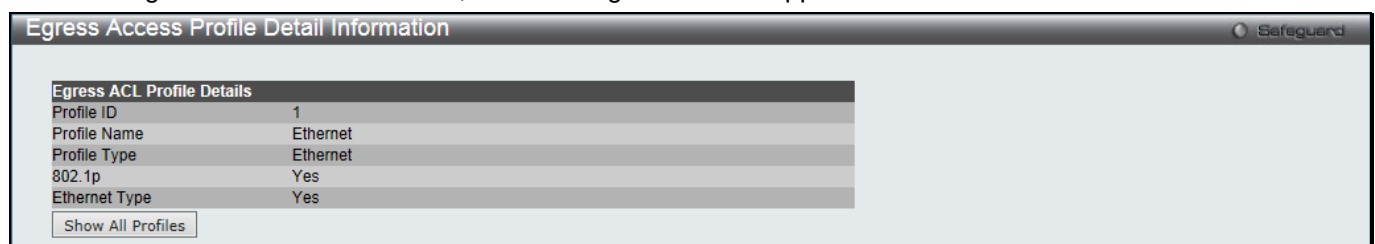


Figure 7-50 Egress Access Profile Detail Information window (Ethernet ACL)

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear:

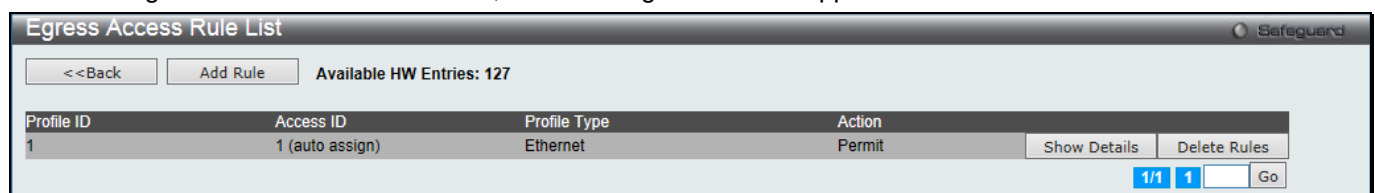


Figure 7-51 Egress Access Rule List window (Ethernet ACL)

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear:

Figure 7-52 Add Egress Access Rule window (Ethernet ACL)

The fields that can be configured are described below:

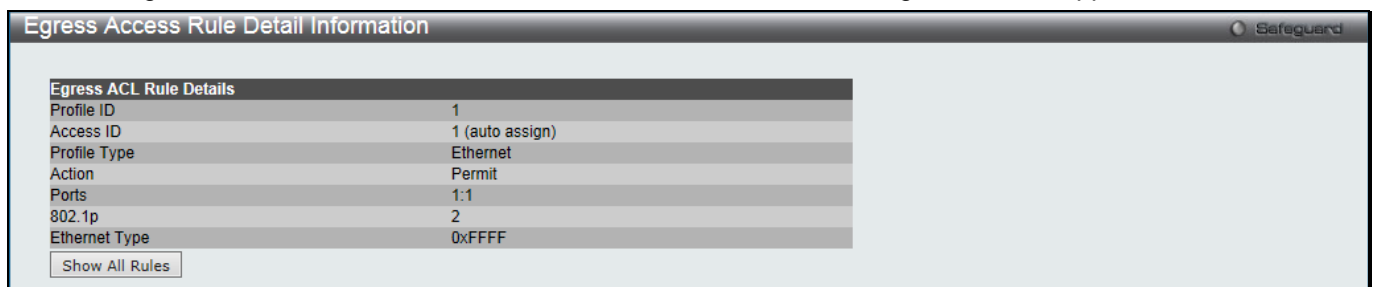
Parameter	Description
<b>Access ID (1-128)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 128. A lower value denotes a higher priority. <i>Auto Assign</i> – Ticking this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>Ethernet Type</b>	Specify the Ethernet type.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.
<b>Priority (0-7)</b>	Tick the corresponding check box if you want to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv4 packet, only one of them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times

	when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Port</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an error message and the access rule will not be configured.
<b>Port Group ID</b>	Specify the port group ID to apply to the access rule.
<b>Port Group Name</b>	Specify the port group name to apply to the access rule.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear:



**Figure 7-53 Egress Access Rule Detail Information window (Ethernet ACL)**

Click the **Show All Rules** button to navigate back to the Access Rule List.

## Adding an IPv4 ACL Profile

The window shown below is the Add Egress ACL Profile window for IPv4. To use specific filtering masks in this egress ACL profile, click the packet filtering mask field to highlight it red. This will add more fields to the mask.

After clicking the **Add Egress ACL** button, the following window will appear:

Figure 7-54 Add Egress ACL Profile window (IPv4 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-4)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 4. A lower value denotes a higher priority.
<b>Profile Name</b>	Enter a profile name for the profile created.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, or IPv6 address. This will change the window according to the requirements for the type of profile. Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header.
<b>802.1Q VLAN</b>	Selecting this option instructs the Switch to examine the 802.1Q VLAN identifier of each packet header and use this as the full or partial criterion for forwarding.
<b>IPv4 DSCP</b>	Selecting this option instructs the Switch to examine the DiffServ Code part of each packet header and use this as the, or part of the criterion for forwarding.
<b>IPv4 Source IP Mask</b>	Enter an IP address mask for the source IP address.
<b>IPv4 Destination IP Mask</b>	Enter an IP address mask for the destination IP address.
<b>Protocol</b>	Selecting this option instructs the Switch to examine the protocol type value in each frame's header. Then the user must specify what protocol(s) to include according to the following guidelines:  Select <i>ICMP</i> to instruct the Switch to examine the Internet Control Message Protocol

	<p>(ICMP) field in each frame's header.</p> <p>Select <i>Type</i> to further specify that the access profile will apply an ICMP type value, or specify <i>Code</i> to further specify that the access profile will apply an ICMP code value.</p> <p>Select <i>IGMP</i> to instruct the Switch to examine the Internet Group Management Protocol (IGMP) field in each frame's header.</p> <p>Select <i>Type</i> to further specify that the access profile will apply an IGMP type value.</p> <p>Select <i>TCP</i> to use the TCP port number contained in an incoming packet as the forwarding criterion. Selecting TCP requires that you specify a source port mask and/or a destination port mask.</p> <p><i>src port mask</i> - Specify a TCP port mask for the source port in hex form (hex 0x0-0xffff), which you wish to filter.</p> <p><i>dst port mask</i> - Specify a TCP port mask for the destination port in hex form (hex 0x0-0xffff) which you wish to filter.</p> <p><i>flag bit</i> - The user may also identify which flag bits to filter. Flag bits are parts of a packet that determine what to do with the packet. The user may filter packets by filtering certain flag bits within the packets, by checking the boxes corresponding to the flag bits of the TCP field. The user may choose between urg (urgent), ack (acknowledgement), psh (push), rst (reset), syn (synchronize), fin (finish).</p> <p>Select <i>UDP</i> to use the UDP port number contained in an incoming packet as the forwarding criterion. Selecting UDP requires that you specify a source port mask and/or a destination port mask.</p> <p><i>src port mask</i> - Specify a UDP port mask for the source port in hex form (hex 0x0-0xffff).</p> <p><i>dst port mask</i> - Specify a UDP port mask for the destination port in hex form (hex 0x0-0xffff).</p> <p>Select <i>Protocol ID</i> - Enter a value defining the protocol ID in the packet header to mask. Specify the protocol ID mask in hex form (hex 0x0-0xff).</p> <p><i>Protocol ID Mask</i> - Specify that the rule applies to the IP protocol ID traffic.</p> <p><i>User Define</i> - Specify the Layer 4 part mask</p>
--	---

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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

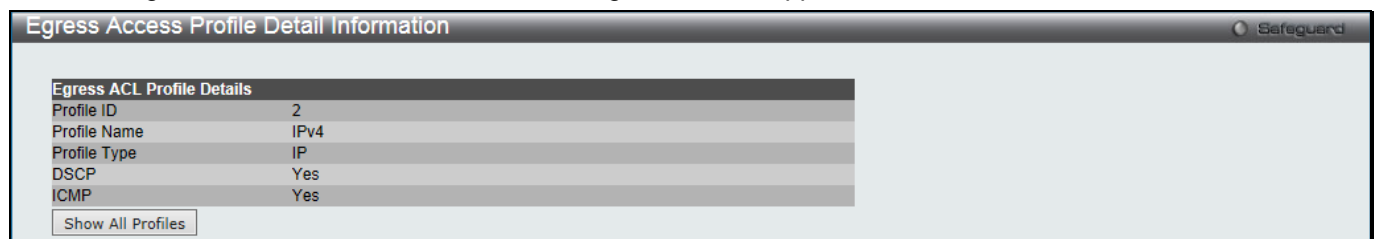


Figure 7-55 Egress Access Profile Detail Information window (IPv4 ACL)

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear:





Figure 7-56 Egress Access Rule List window (IPv4 ACL)

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear:

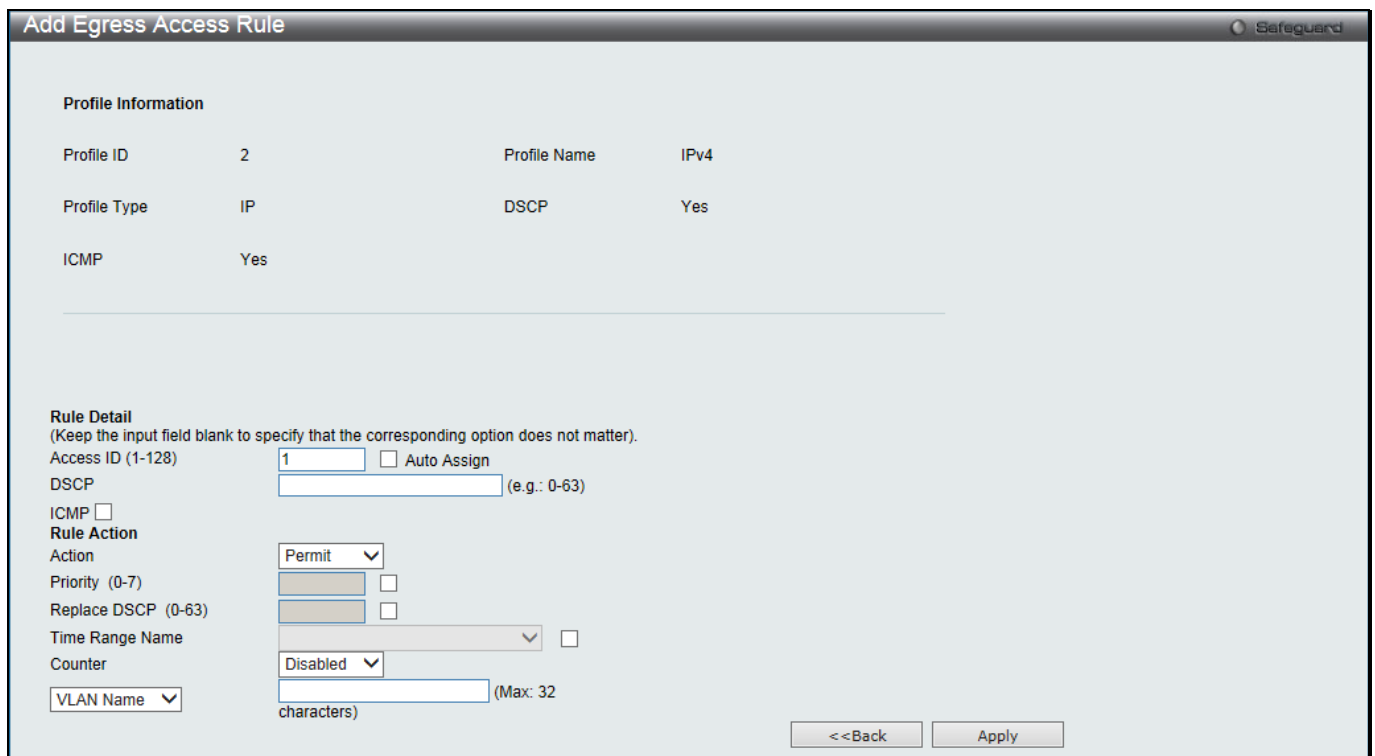


Figure 7-57 Add Egress Access Rule (IPv4 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Access ID (1-128)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 128. A lower value denotes a higher priority. Auto Assign – Ticking this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>DSCP</b>	Specify the value of DSCP. The DSCP value ranges from 0 to 63.
<b>Action</b>	Select Permit to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select Deny to specify that the packets that match the access profile are not forwarded by the Switch and will be filtered.
<b>Priority (0-7)</b>	Tick the corresponding check box if you want to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original

	value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv4 packet, only one of them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Ports</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an error message and the access rule will not be configured. Ticking the All Ports check box will denote all ports on the Switch.
<b>Port Group ID</b>	Specify the port group ID to apply to the access rule.
<b>Port Group Name</b>	Specify the port group name to apply to the access rule.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear:

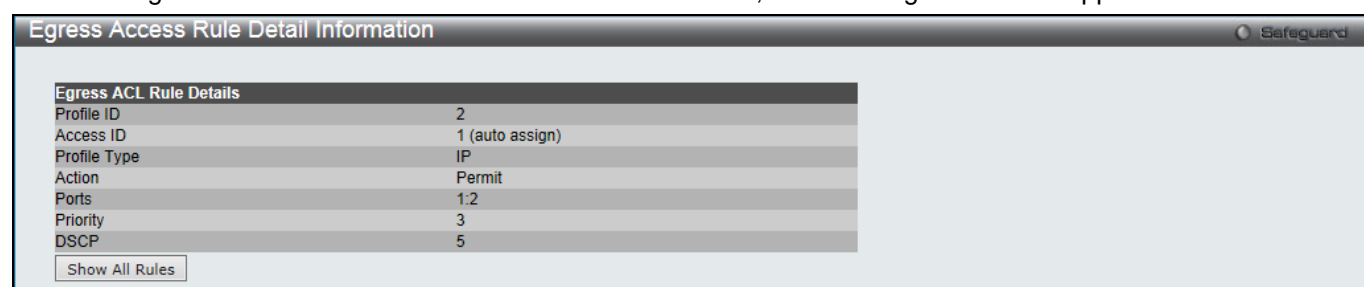


Figure 7-58 Egress Access Rule Detail Information (IPv4 ACL)

Click the **Show All Rules** button to navigate back to the Access Rule List.

## Adding an IPv6 ACL Profile

The window shown below is the Add Egress ACL Profile window for IPv6. To use specific filtering masks in this egress ACL profile, click the packet filtering mask field to highlight it red. This will add more files to the mask.

After clicking the **Add Egress ACL** button, the following window will appear:

Figure 7-59 Add Egress ACL Profile window (IPv6 ACL)

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-4)</b>	Enter a unique identifier number for this profile set. This value can be set from 1 to 4. A lower value denotes a higher priority.
<b>Profile Name</b>	Enter a profile name for the profile created.
<b>Select ACL Type</b>	Select profile based on Ethernet (MAC Address), IPv4 address, or IPv6 address. This will change the window according to the requirements for the type of profile. Select Ethernet ACL to instruct the Switch to examine the layer 2 part of each packet header. Select IPv4 ACL to instruct the Switch to examine the IPv4 address in each frame's header. Select IPv6 ACL to instruct the Switch to examine the IPv6 address in each frame's header.
<b>IPv6 Class</b>	Ticking this check box will instruct the Switch to examine the <i>class</i> field of the IPv6 header. This class field is a part of the packet header that is similar to the Type of Service (ToS) or Precedence bits field in IPv4.
<b>IPv6 TCP</b>	<i>Source Port Mask</i> – Specify that the rule applies to the range of TCP source ports. <i>Destination Port Mask</i> – Specify the range of the TCP destination port range.
<b>IPv6 UDP</b>	<i>Source Port Mask</i> – Specify the range of the UDP source port range. <i>Destination Port Mask</i> – Specify the range of the UDP destination port mask.
<b>ICMP</b>	Select <i>ICMP</i> to instruct the Switch to examine the Internet Control Message Protocol (ICMP) field in each frame's header.
<b>IPv6 Source Mask</b>	The user may specify an IP address mask for the source IPv6 address by ticking the corresponding check box and entering the IP address mask, e.g. 255.255.255.255.

<b>IPv6 Destination Mask</b>	The user may specify an IP address mask for the destination IPv6 address by ticking the corresponding check box and entering the IP address mask, e.g. 255.255.255.255.
------------------------------	---

Click the **Select** button to select an ACL type.

Click the **Create** button to create a profile.

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

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

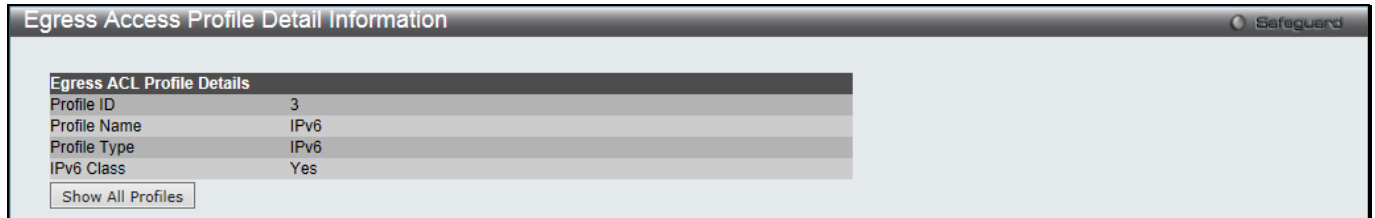


Figure 7-60 Egress Access Profile Detail Information window (IPv6 ACL)

Click the **Show All Profiles** button to navigate back to the **Access Profile List** Page.

After clicking the **Add/View Rules** button, the following window will appear:



Figure 7-61 Egress Access Rule List window (IPv6 ACL)

Click the **Add Rule** button to create a new ACL rule in this profile.

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

Click the **Show Details** button to view more information about the specific rule created.

Click the **Delete Rules** 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 **Add Rule** button, the following window will appear:

Add Egress Access Rule
Safeguard

**Profile Information**

Profile ID	3	Profile Name	IPv6
Profile Type	IPv6	IPv6 Class	Yes

---

**Rule Detail**  
(Keep the input field blank to specify that the corresponding option does not matter).

Access ID (1-128)   Auto Assign

Class  (e.g.: 0-255)

**Rule Action**

Action

Priority (0-7)

Replace DSCP (0-63)

Time Range Name

Counter

VLAN Name  (Max: 32 characters)

Figure 7-62 Add Egress Access Rule (IPv6 ACL)

The fields that can be configured are described below:

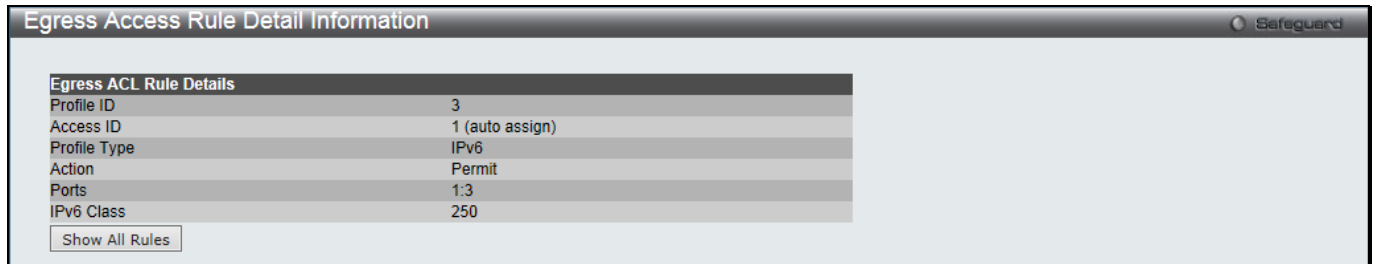
Parameter	Description
<b>Access ID (1-128)</b>	Type in a unique identifier number for this access. This value can be set from 1 to 128. A lower value denotes a higher priority. Auto Assign – Ticking this check box will instruct the Switch to automatically assign an Access ID for the rule being created.
<b>Class</b>	Specify the value of IPv6 class.
<b>Action</b>	Select <i>Permit</i> to specify that the packets that match the access profile are forwarded by the Switch, according to any additional rule added (see below). Select <i>Deny</i> to specify that packets that match the access profile are not forwarded by the Switch and will be filtered.
<b>Priority (0-7)</b>	Tick the corresponding check box to re-write the 802.1p default priority of a packet to the value entered in the Priority field, which meets the criteria specified previously in this command, before forwarding it on to the specified CoS queue. Otherwise, a packet will have its incoming 802.1p user priority re-written to its original value before being forwarded by the Switch. For more information on priority queues, CoS queues and mapping for 802.1p, see the QoS section of this manual.
<b>Replace DSCP (0-63)</b>	Select this option to instruct the Switch to replace the DSCP value (in a packet that meets the selected criteria) with the value entered in the adjacent field. When an ACL rule is added to change both the priority and DSCP of an IPv6 packet, only one of them can be modified due to a chip limitation. Currently the priority is changed when both the priority and DSCP are set to be modified.
<b>Time Range Name</b>	Tick the check box and enter the name of the Time Range settings that has been previously configured in the <b>Time Range Settings</b> window. This will set specific times when this access rule will be implemented on the Switch.
<b>Counter</b>	Here the user can select the counter. By checking the counter, the administrator can see how many times that the rule was hit.
<b>Ports</b>	When a range of ports is to be configured, the Auto Assign check box <b>MUST</b> be ticked in the Access ID field of this window. If not, the user will be presented with an

	error message and the access rule will not be configured. Ticking the All Ports check box will denote all ports on the Switch.
<b>Port Group ID</b>	Specify the port group ID to apply to the access rule.
<b>Port Group Name</b>	Specify the port group name to apply to the access rule.
<b>VLAN Name</b>	Specify the VLAN name to apply to the access rule.
<b>VLAN ID</b>	Specify the VLAN ID to apply to the access rule.

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

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

After clicking the **Show Details** button in the **Access Rule List**, the following window will appear:



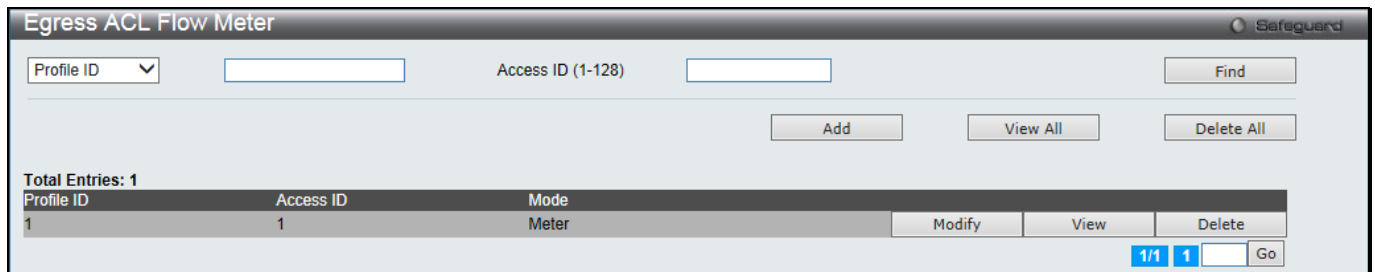
**Figure 7-63 Egress Access Rule Detail Information (IPv6 ACL)**

Click the **Show All Rules** button to navigate back to the Access Rule List.

## Egress ACL Flow Meter

This window is used to configure the packet flow-based metering based on an egress access profile and rule.

To view the following window, click **ACL > Egress ACL Flow Meter** as shown below.



**Figure 7-64 Egress ACL Flow Meter window**

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID</b>	Use the drop-down menu to select it and enter the Profile ID for the flow meter.
<b>Profile Name</b>	Use the drop-down menu to select it and enter the Profile Name for the flow meter.
<b>Access ID (1-128)</b>	Here the user can enter the Access ID for the flow meter.

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

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

Click the **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed.

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

Click the **View** button to display the information of the specific entry.

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

After clicking the **Add** or **Modify** button, the following window will appear:

Figure 7-65 Egress ACL Flow Meter Configuration window

The fields that can be configured are described below:

Parameter	Description
<b>Profile ID (1-4)</b>	Enter the Profile ID for the flow meter. A lower value denotes a higher priority.
<b>Profile Name</b>	Enter the Profile Name for the flow meter.
<b>Access ID (1-128)</b>	Enter the Access ID for the flow meter. A lower value denotes a higher priority.
<b>Mode</b>	<p><b>Rate</b> – Specify the rate for single rate two color mode.</p> <p><i>Rate</i> – Specify the committed bandwidth in Kbps for the flow.</p> <p><i>Burst Size</i> – Specify the burst size for the single rate two color mode. The unit is in kilobyte.</p> <p><i>Rate Exceeded</i> – Specify the action for packets that exceed the committed rate in single rate two color mode. The action can be specified as one of the following:</p> <p><i>Drop Packet</i> – Drop the packet immediately.</p> <p><i>Remark DSCP</i> – Mark the packet with a specified DSCP. The packet is set to drop for packets with a high precedence.</p> <p><b>trTCM</b> – Specify the “two-rate three-color mode.”</p> <p><i>CIR</i> – Specify the Committed information Rate. The unit is Kbps. CIR should always be equal or less than PIR.</p> <p><i>PIR</i> – Specify the Peak information Rate. The unit is Kbps. PIR should always be equal to or greater than CIR.</p> <p><i>CBS</i> – Specify the Committed Burst Size. The unit is in kilobyte.</p> <p><i>PBS</i> – Specify the Peak Burst Size. The unit is in kilobyte.</p> <p><b>srTCM</b> – Specify the “single-rate three-color mode”.</p> <p><i>CIR</i> – Specify the Committed Information Rate. The unit is in Kbps.</p> <p><i>CBS</i> – Specify the Committed Burst Size. The unit is in kilobyte.</p> <p><i>EBS</i> – Specify the Excess Burst Size. The unit is in kilobyte.</p>
<b>Action</b>	<p><b>Conform</b> – This field denotes the green packet flow. Green packet flows may have their <i>DSCP</i> field rewritten to a value stated in this field. Users may also choose to count green packets by using counter parameter.</p> <p><i>Replace DSCP</i> – Packets that are in the green flow may have their DSCP field rewritten</p>

using this parameter and entering the DSCP value to replace.

*Counter* – Use this parameter to enable or disable the packet counter for the specified ACL entry in the green flow.

**Exceed** – This field denotes the yellow packet flow. Yellow packet flows may have excess packets permitted through or dropped. Users may replace the DSCP field of these packets by checking its radio button and entering a new DSCP value in the allotted field.

*Counter* – Use this parameter to enable or disable the packet counter for the specified ACL entry in the yellow flow.

**Violate** – This field denotes the red packet flow. Red packet flows may have excess packets permitted through or dropped. Users may replace the DSCP field of these packets by checking its radio button and entering a new DSCP value in the allotted field.

*Counter* – Use this parameter to enable or disable the packet counter for the specified ACL entry in the red flow.

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

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

After clicking the **View** button, the following window will appear:

Egress ACL Flow Meter Display				Safeguard
Profile ID	1			
Access ID	1			
Mode	Rate	Rate (Kbps)	1000	
		Burst Size (Kbyte)	1000	
		Rate Exceeded	Remark DSCP	30
				<<Back

**Figure 7-66 Egress ACL Flow meter Display window**

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



## Chapter 8 Security

### **802.1X**

#### **RADIUS**

#### **IP-MAC-Port Binding (IMPB)**

#### **MAC-based Access Control (MAC)**

#### **Web-based Access Control (WAC)**

#### **Compound Authentication**

#### **IGMP Access Control Settings**

#### **Port Security**

#### **ARP Spoofing Prevention Settings**

#### **BPDU Attack Protection**

#### **Loopback Detection Settings**

#### **RPC PortMapper Filter Settings**

#### **NetBIOS Filtering Settings**

#### **Traffic Segmentation Settings**

#### **DHCP Server Screening**

#### **Access Authentication Control**

#### **SSL**

#### **SSH**

#### **DoS Attack Prevention Settings**

#### **Trusted Host Settings**

#### **Safeguard Engine Settings**

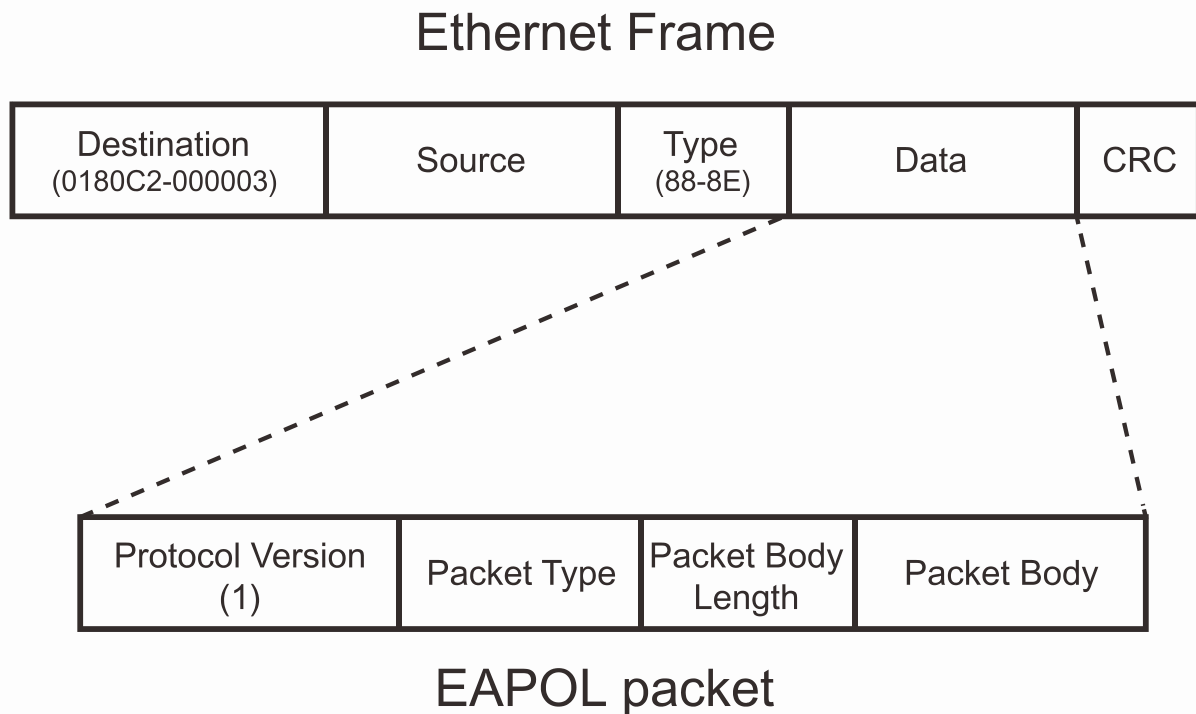
#### **SFTP Server Settings**

#### **CPU Protect Settings**

## 802.1X

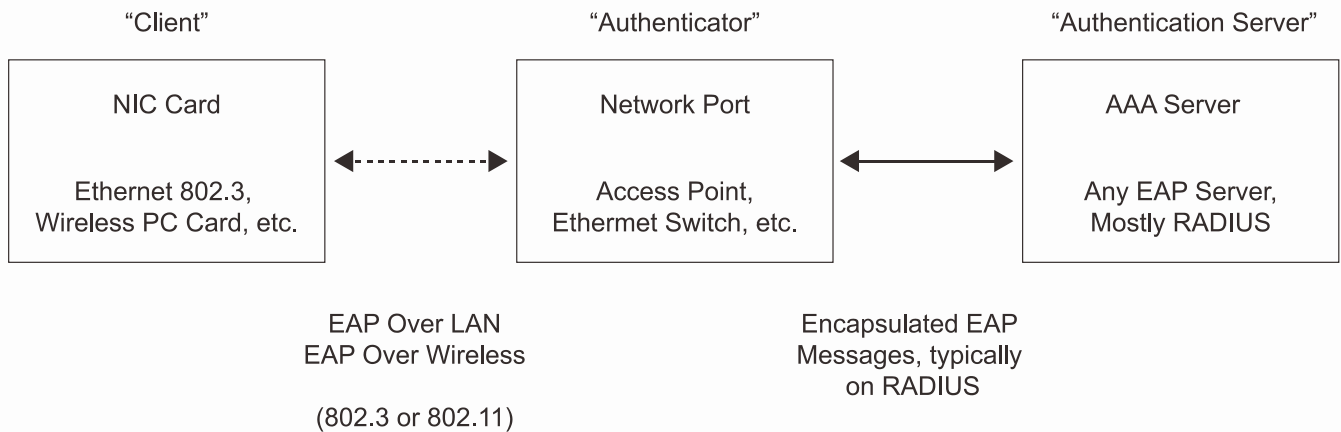
### **802.1X (Port-Based and Host-Based Access Control)**

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 8-1 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 8-2 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.

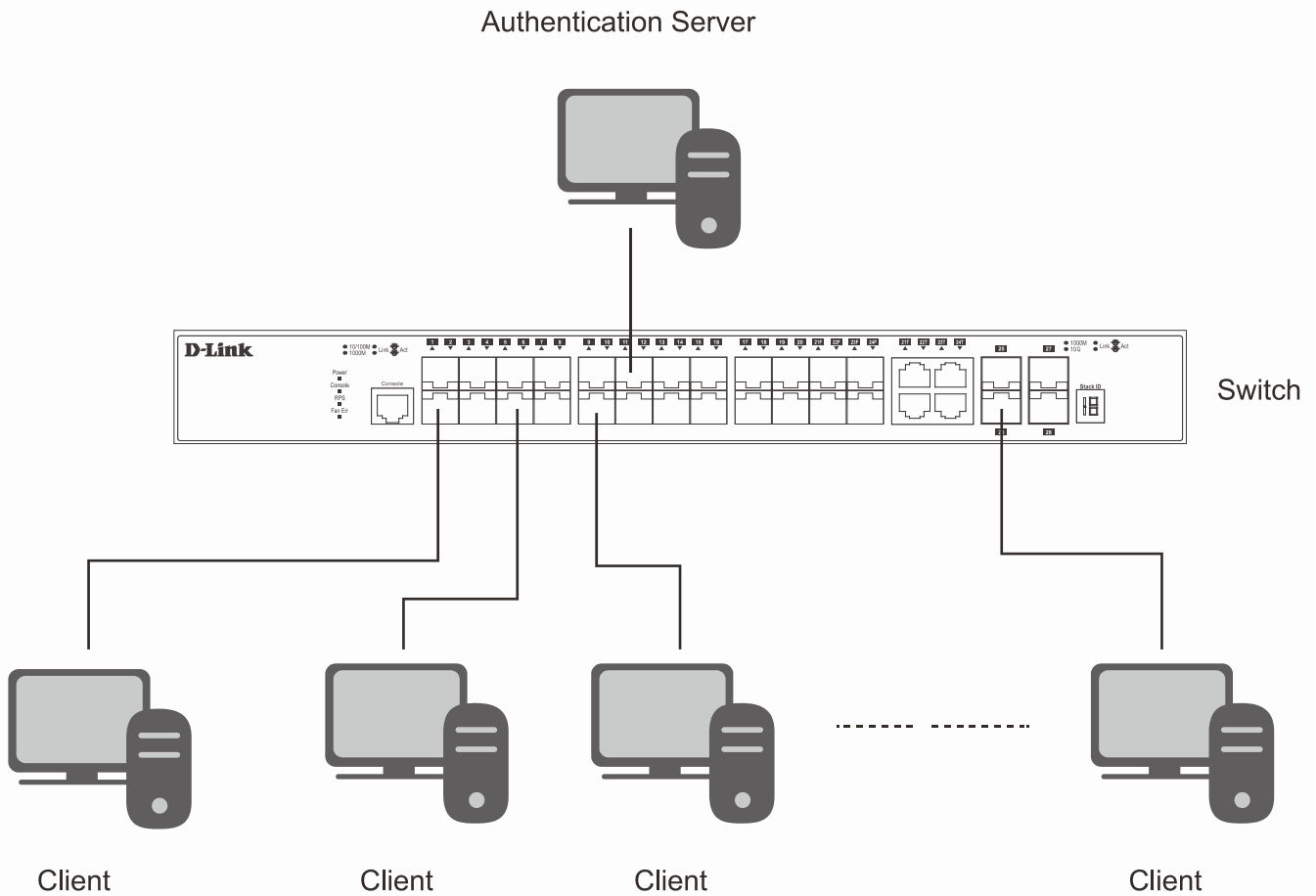


Figure 8-3 The Authentication Server

**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.

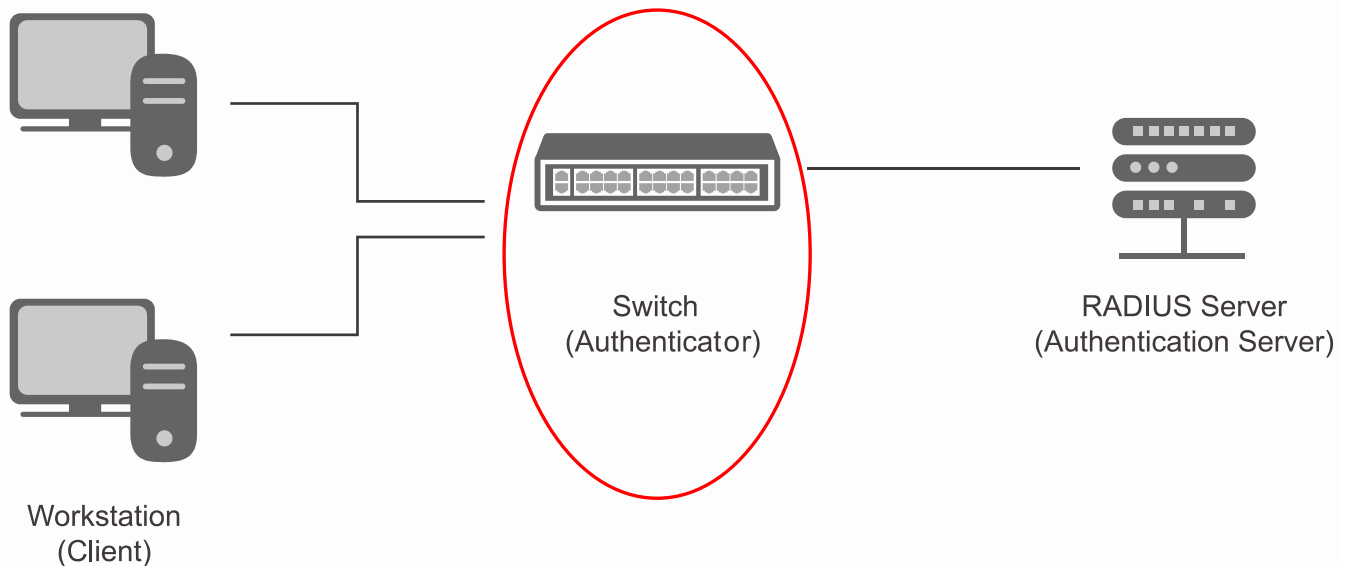


Figure 8-4 The Authenticator

Three steps must be implemented on the Switch to properly configure the Authenticator.

- 1 The 802.1X State must be *Enabled*. (**Security / 802.1X / 802.1X Global Settings**)
- 2 The 802.1X settings must be implemented by port (**Security / 802.1X / 802.1X Port Settings**)
- 3 A RADIUS server must be configured on the Switch. (**Security / RADIUS / Authentication 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 XP and Windows Vista, 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.

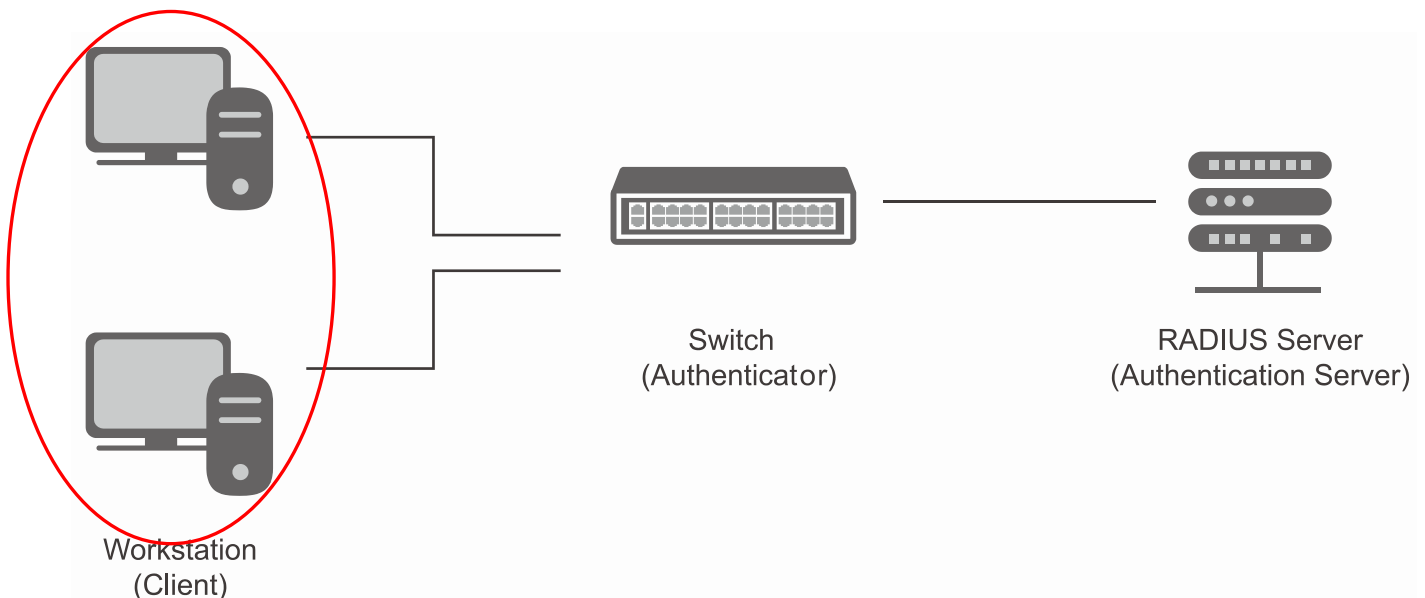
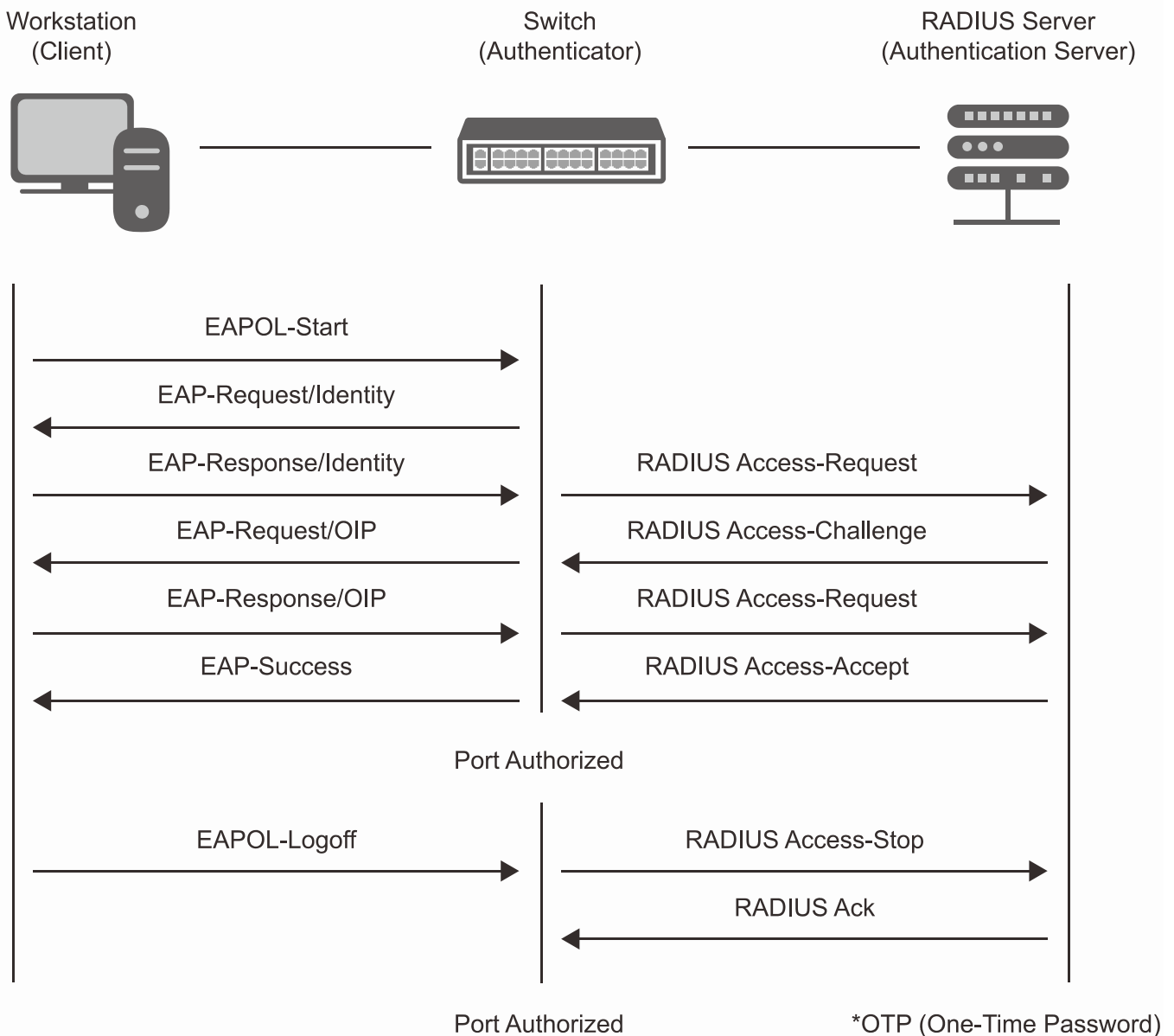


Figure 8-5 The Client

### 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 is granted access and therefore successfully "unlocks" the port. Once unlocked, normal

traffic is allowed to pass through the port. The following figure displays a more detailed explanation of how the authentication process is completed between the three roles stated above.



**Figure 8-6 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:

1. **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.
2. **Host-Based Access Control** – Using this method, the Switch will automatically learn up to a maximum of 448 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. This configuration can be modified port by port, and is controlled by compound authentication. The default configurations of all the ports are host-based.

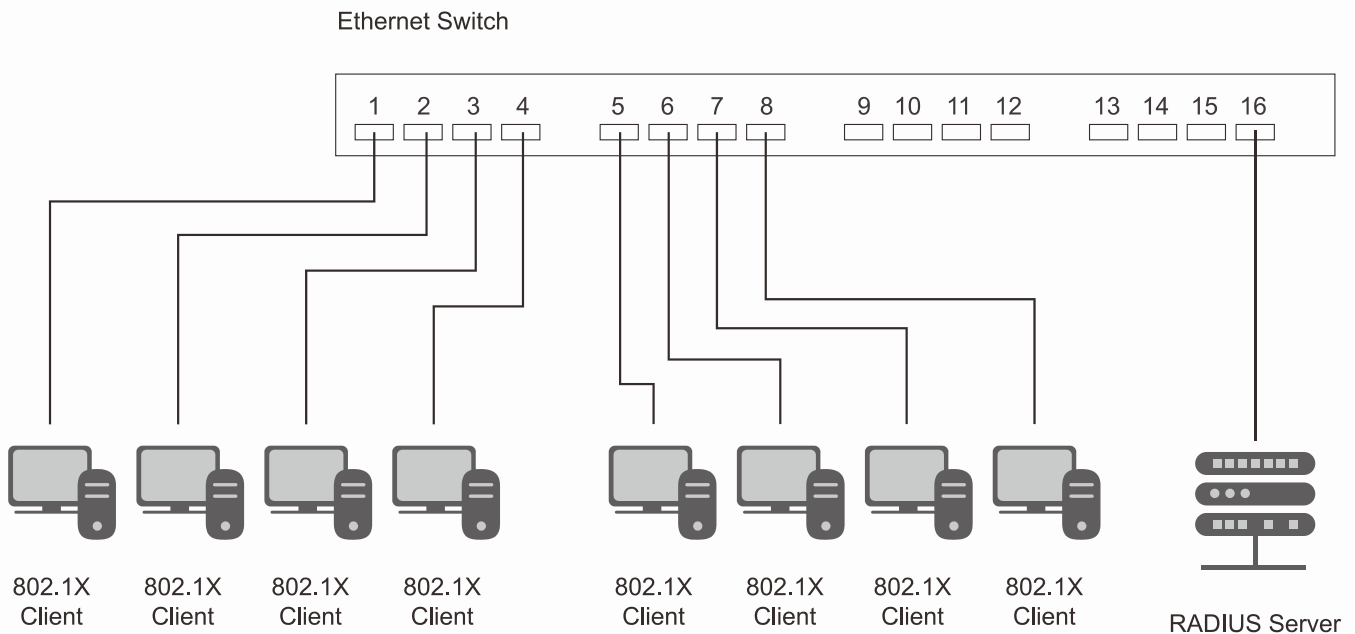
### **Understanding 802.1X Port-based and Host-based Network Access Control**

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. The following figure is an example of port-based configuration. Port 1 to 15 is network access controlled port. Port 16 is network access uncontrolled port.



**Figure 8-7 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.

Furthermore, the user can also configure the authentication VLANs to specify that the client with a specific VLAN ID must get authorized to access the network. The clients that are not part of the authentication VLAN ID can access the network without being authorized. The following figure is an example of host-based configuration. Port 1 to 15 is network access controlled port. Port 16 is network access uncontrolled port.

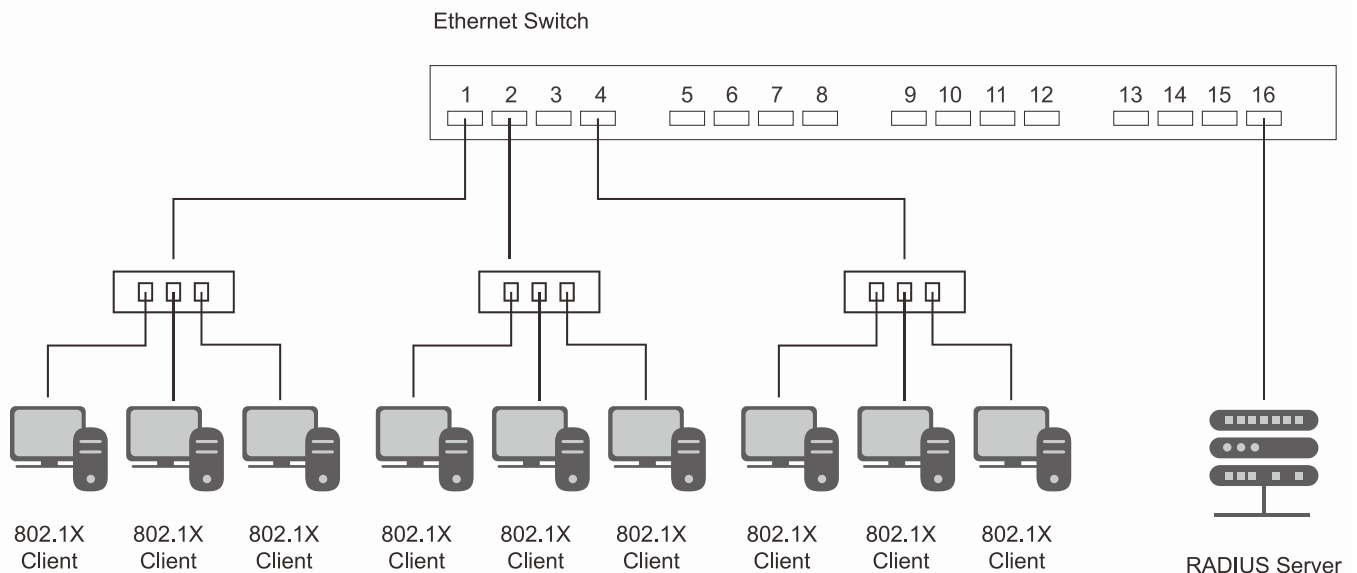


Figure 8-8 Example of Typical Host-based Configuration

## 802.1X Global Settings

Users can configure the 802.1X global parameter.

To view the following window, click **Security > 802.1X > 802.1X Global Settings** as shown below.

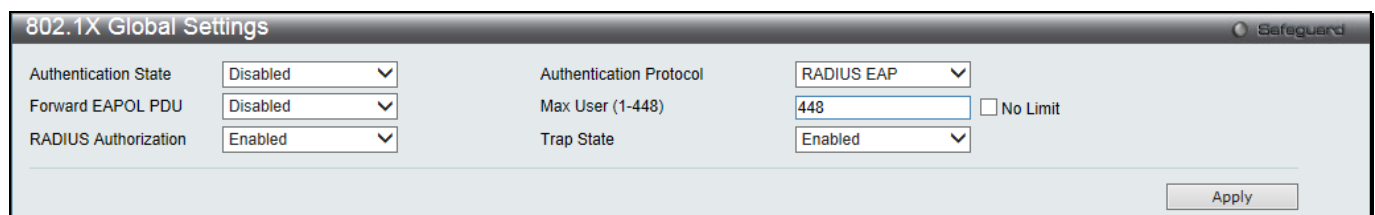


Figure 8-9 802.1X Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Authentication State</b>	Choose the 802.1X authentication state. Options to choose from are <i>Disabled</i> or <i>Enabled</i> .
<b>Authentication Protocol</b>	Choose the authentication protocol. Options to choose from are <i>Local</i> or <i>RADIUS EAP</i> .
<b>Forward EAPOL PDU</b>	This is a global setting to control the forwarding of EAPOL PDU. When 802.1X functionality is disabled globally or for a port, and if 802.1X forward PDU is enabled both globally and for the port, a received EAPOL packet on the port will be flooded in the same VLAN to those ports for which 802.1X forward PDU is enabled and 802.1X is disabled (globally or just for the port). The default state is disabled.
<b>Max User (1-448)</b>	Specify the maximum number of users. The limit on the maximum users is 448 users. Tick the <b>No Limit</b> check box to have 448 users.
<b>RADIUS Authorization</b>	This option is used to enable or disable acceptance of authorized configuration. When the authorization is enabled for 802.1X's RADIUS, the authorized data assigned by the RADIUS server will be accepted if the global authorization network is enabled.
<b>Trap State</b>	Use the drop-down menu to enable or disable trap state.

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

## 802.1X Port Settings

Users can configure the 802.1X authenticator port settings.

To view the following window, click **Security > 802.1X > 802.1X Port Settings** as shown below.

Port	AdmDir	OpenCrDir	Port Control	TX Period	Quiet Period	Supp-Timeout	Server-Timeout	MaxReq	ReAuth Period	ReAuth	Capability	Forward EAPOL PDU	Max User
1	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
2	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
3	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
4	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
5	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
6	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
7	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
8	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
9	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
10	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
11	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
12	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
13	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
14	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
15	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
16	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
17	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
18	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
19	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
20	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
21	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
22	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
23	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16
24	Both	Both	Auto	30	60	30	30	2	3600	Disabled	None	Disabled	16

Figure 8-10 802.1X Port Settings

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select a range of ports you wish to configure.
<b>QuietPeriod (0-65535)</b>	This allows the user to set the number of seconds that the Switch remains in the quiet state following a failed authentication exchange with the client. The default setting is 60 seconds.
<b>SuppTimeout (1-65535)</b>	This value determines timeout conditions in the exchanges between the Authenticator and the client. The default setting is 30 seconds. It is defined in SuppTimeout, IEEE-802.1X-2001, page 47. The initialization value is used for the awhile timer when timing out the Supplicant. Its default value is 30 seconds; however, if the type of challenge involved in the current exchange demands a different value of timeout (for example, if the challenge requires an action on the part of the user), then the timeout value is adjusted accordingly. It can be set by management to any value in the range from 1 to 65535 seconds.
<b>ServerTimeout (1-65535)</b>	This value determines timeout conditions in the exchanges between the Authenticator and the authentication server. The default setting is 30 seconds.
<b>MaxReq (1-10)</b>	The maximum number of times that the Switch will retransmit an EAP Request to the client before it times out of the authentication sessions. The default setting is 2. It is defined in MaxReq, IEEE-802.1X-2001 page 47. The maximum number of times that the state machine will retransmit an EAP Request packet to the



	Supplicant before it times out the authentication session. Its default value is 2; it can be set by management to any value in the range from 1 to 10.
<b>TxPeriod (1-65535)</b>	This sets the TxPeriod of time for the authenticator PAE state machine. This value determines the period of an EAP Request/Identity packet transmitted to the client. The default setting is 30 seconds.
<b>ReAuthPeriod (1-65535)</b>	A constant that defines a nonzero number of seconds between periodic re-authentication of the client. The default setting is 3600 seconds.
<b>ReAuthentication</b>	Determines whether regular re-authentication will take place on this port. The default setting is <i>Disabled</i> .
<b>Port Control</b>	<p>This allows the user to control the port authorization state.</p> <p>Select <i>ForceAuthorized</i> to disable 802.1X and cause the port to transition to the authorized state without any authentication exchange required. This means the port transmits and receives normal traffic without 802.1X-based authentication of the client.</p> <p>If <i>ForceUnauthorized</i> is selected, the port will remain in the unauthorized state, ignoring all attempts by the client to authenticate. The Switch cannot provide authentication services to the client through the interface.</p> <p>If <i>Auto</i> is selected, it will enable 802.1X and cause the port to begin in the unauthorized state, allowing only EAPOL frames to be sent and received through the port. The authentication process begins when the link state of the port transitions from down to up, or when an EAPOL-start frame is received. The Switch then requests the identity of the client and begins relaying authentication messages between the client and the authentication server.</p> <p>The default setting is <i>Auto</i>.</p>
<b>Capability</b>	This allows the 802.1X Authenticator settings to be applied on a per-port basis. Select <i>Authenticator</i> to apply the settings to the port. When the setting is activated, a user must pass the authentication process to gain access to the network. Select <i>None</i> disable 802.1X functions on the port.
<b>Direction</b>	Sets the administrative-controlled direction to <i>Both</i> or <i>In</i> . If <i>Both</i> is selected, control is exerted over both incoming and outgoing traffic through the controlled port selected in the first field. If <i>In</i> is selected, the control is only exerted over incoming traffic through the port the user selected in the first field.
<b>Forward EAPOL PDU</b>	This is a port setting to control the forwarding of EAPOL PDU. When 802.1X functionality is disabled globally or for a port, and if 802.1X forward PDU is enabled both globally and for the port, a received EAPOL packet on the port will be flooded in the same VLAN to those ports for which 802.1X forward PDU is enabled and 802.1X is disabled (globally or just for the port). The default state is disabled.
<b>Max Users (1-448)</b>	Specify the maximum number of users. The maximum user limit is 448 users. The default is 16. Tick the <b>No Limit</b> check box to have 448 users.

Click the **Refresh** button to refresh the display table so that new entries will appear.

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

## 802.1X User Settings

Users can set different 802.1X users in switch's local database.

To view the following window, click **Security > 802.1X > 802.1X User Settings** as shown below.

Figure 8-11 802.1X User Settings window

The fields that can be configured are described below:

Parameter	Description
<b>802.1X User</b>	The user can enter an 802.1X user's username in here.
<b>Password</b>	The user can enter an 802.1X user's password in here.
<b>Confirm Password</b>	The user can re-enter an 802.1X user's password in here.

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

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



**NOTE:** The **802.1X User** and **Password** values should be less than 16 characters.

## Guest VLAN Settings

On 802.1X security-enabled networks, there is a need for non- 802.1X supported devices to gain limited access to the network, due to lack of the proper 802.1X software or incompatible devices, such as computers running Windows 98 or older operating systems, or the need for guests to gain access to the network without full authorization or local authentication on the Switch. To supplement these circumstances, this switch now implements 802.1X Guest VLANs. These VLANs should have limited access rights and features separate from other VLANs on the network.

To implement 802.1X Guest VLANs, the user must first create a VLAN on the network with limited rights and then enable it as an 802.1X guest VLAN. Upon initial entry to the Switch, the client wishing services on the Switch will need to be authenticated by a remote RADIUS Server or local authentication on the Switch to be placed in a fully operational VLAN.

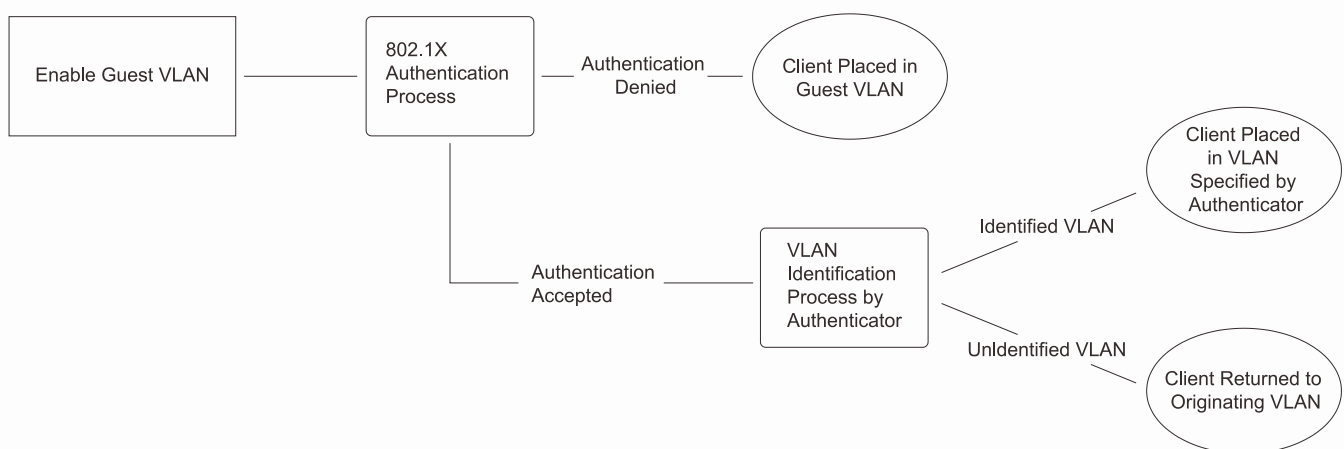


Figure 8-12 Guest VLAN Authentication Process

If authenticated and the authenticator possess the VLAN placement information, that client will be accepted into the fully operational target VLAN and normal switch functions will be open to the client. If the authenticator does not

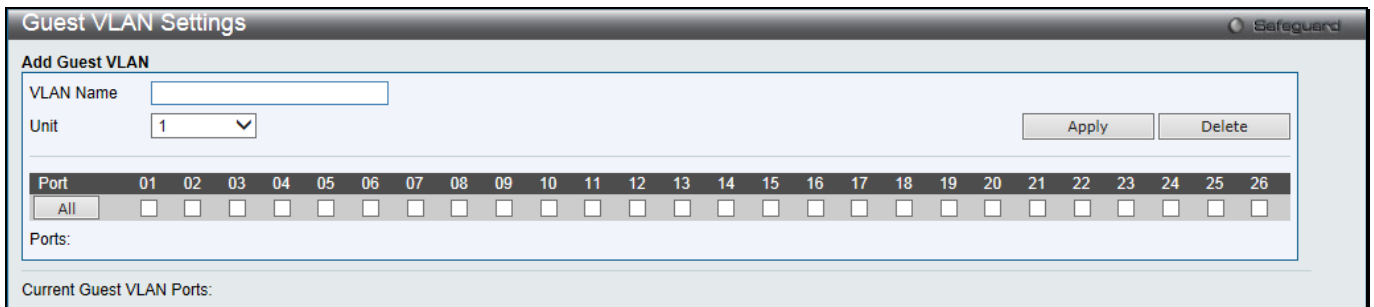
have target VLAN placement information, the client will be returned to its originating VLAN. Yet, if the client is denied authentication by the authenticator, it will be placed in the Guest VLAN where it has limited rights and access. The adjacent figure should give the user a better understanding of the Guest VLAN process.

**Limitations Using the Guest VLAN**

- 1 Ports supporting Guest VLANs cannot be GVRP enabled and vice versa.
- 2 A port cannot be a member of a Guest VLAN and a static VLAN simultaneously.
- 3 Once a client has been accepted into the target VLAN, it can no longer access the Guest VLAN.

Remember, to set an 802.1X guest VLAN, the user must first configure a normal VLAN, which can be enabled here for guest VLAN status. Only one VLAN may be assigned as the 802.1X guest VLAN.

To view the following window, click **Security > 802.1X > Guest VLAN Settings** as shown below.



**Figure 8-13 Guest VLAN Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Enter the pre-configured VLAN name to create as an 802.1X guest VLAN.
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Set the ports to be enabled for the 802.1X guest VLAN. Click the <b>All</b> button to select all the ports.

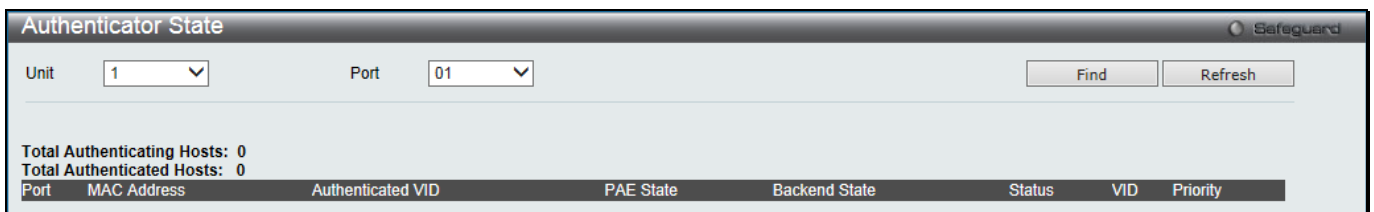
Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry based on the information entered.

## Authenticator State

This window is used to display the authenticator state.

To view the following window, click **Security > 802.1X > Authenticator State** as shown below.



**Figure 8-14 Authenticator State window**

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be displayed.
<b>Port</b>	Select a port to be displayed.

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

Click the **Refresh** button to refresh the display table so that new entries will appear.



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Authenticator Statistics

This window is used to display the authenticator statistics information.

To view the following window, click **Security > 802.1X > Authenticator Statistics** as shown below.

Index	Frames RX	Frames TX	RX Start	TX Reqld	RX LogOf
1	null	null	null	null	null
2	null	null	null	null	null
3	null	null	null	null	null
4	null	null	null	null	null
5	null	null	null	null	null
6	null	null	null	null	null
7	null	null	null	null	null
8	null	null	null	null	null
9	null	null	null	null	null
10	null	null	null	null	null

Figure 8-15 Authenticator Statistics window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be displayed.
<b>Port</b>	Select a port to be displayed.
<b>Time Interval</b>	Use the drop-down menu to select the interval to update the statistics.

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

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Authenticator Session Statistics

This window is used to display the authenticator session statistics information.

To view the following window, click **Security > 802.1X > Authenticator Session Statistics** as shown below.

Index	Octets RX	Octets TX	Frames RX	Frames TX	Time Interval
1	null	null	null	null	
2	null	null	null	null	
3	null	null	null	null	
4	null	null	null	null	
5	null	null	null	null	
6	null	null	null	null	
7	null	null	null	null	
8	null	null	null	null	
9	null	null	null	null	
10	null	null	null	null	

Figure 8-16 Authenticator Session Statistics window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be displayed.
<b>Port</b>	Select a port to be displayed.
<b>Time Interval</b>	Use the drop-down menu to select the interval to update the statistics.

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

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Authenticator Diagnostics

This window is used to display the authenticator diagnostics information.

To view the following window, click **Security > 802.1X > Authenticator Diagnostics** as shown below.

Index	Connect Enter	Connect LogOff	Auth Enter	Auth Success	Auth Timeout
1	null	null	null	null	null
2	null	null	null	null	null
3	null	null	null	null	null
4	null	null	null	null	null
5	null	null	null	null	null
6	null	null	null	null	null
7	null	null	null	null	null
8	null	null	null	null	null
9	null	null	null	null	null
10	null	null	null	null	null

Figure 8-17 Authenticator Diagnostics window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit to be displayed.
Port	Select a port to be displayed.
Time Interval	Use the drop-down menu to select the interval to update the statistics.

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

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Initialize Port-based Port(s)

This window is used to display the authenticator diagnostics information.

To view the following window, click **Security > 802.1X > Initialize Port-based Port(s)** as shown below.

Port	MAC Address	Authenticated VID	PAE State	Backend State	Status	VID	Priority
------	-------------	-------------------	-----------	---------------	--------	-----	----------

Figure 8-18 Initialize Port-based Port(s) window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit to be displayed.
From Port / To Port	Select a range of ports to be displayed.

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Initialize Host-based Port(s)

This window is used to display the current initialized host-based ports.

To view the following window, click **Security > 802.1X > Initialize Host-based Port(s)** as shown below.

Figure 8-19 Initialize Host-based Port(s) window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit to be displayed.
From Port / To Port	Select a range of ports to be displayed.
MAC Address	Tick the check box and enter the authenticated MAC address of the client connected to the corresponding port.

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Reauthenticate Port-based Port(s)

This window is used to display the current status of the re-authenticated port-based port(s).

To view the following window, click **Security > 802.1X > Reauthenticate Port-based Port(s)** as shown below.

Figure 8-20 Reauthenticate Port-based Port(s) window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit to be displayed.
From Port / To Port	Select a range of ports to be displayed.

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## Reauthenticate Host-based Port(s)

This window is used to display the current status of the re-authenticated host-based port(s).

To view the following window, click **Security > 802.1X > Reauthenticate Host-based Port(s)** as shown below.

Figure 8-21 Reauthenticate Host-based Port(s) window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be displayed.
<b>From Port / To Port</b>	Select a range of ports to be displayed.
<b>MAC Address</b>	Tick the check box and enter the authenticated MAC address of the client connected to the corresponding port.

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



**NOTE:** The user must first globally enable **Authentication State** in the 802.1X Global Settings window before initializing ports. Information in this window cannot be viewed before enabling the authentication state.

## RADIUS

### Authentication RADIUS Server Settings

The RADIUS feature of the Switch allows the user to facilitate centralized user administration as well as providing protection against a sniffing, active hacker.

To view the following window, click **Security > RADIUS > Authentication RADIUS Server Settings** as shown below.



Authentication RADIUS Server Settings

Index: 1

IPv4 Address: (e.g.: 10.90.90.90)

IPv6 Address: (e.g.: 56FF::2)

Authentication Port (1-65535):   Default

Accounting Port (1-65535):   Default

Timeout (1-255):  sec  Default

Retransmit (1-20):  times  Default

Key (Max: 32 characters):

Confirm Key:

Apply

**RADIUS Server List**

Index	IP Address	Auth-Port	Acct-Port	Timeout	Retransmit	Key	Edit	Delete
1	10.90.90.90	1812	1813	5	2	*****		
2								
3								

Figure 8-22 Authentication RADIUS Server Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Index</b>	Choose the desired RADIUS server to configure: 1, 2 or 3.
<b>IPv4 Address</b>	Click the radio button and enter the RADIUS server IP address.
<b>IPv6 Address</b>	Click the radio button and enter the RADIUS server IPv6 address.
<b>Authentication Port (1-65535)</b>	Set the RADIUS authentic server(s) UDP port which is used to transmit RADIUS data between the Switch and the RADIUS server. The default port is 1812.
<b>Accounting Port (1-65535)</b>	Set the RADIUS account server(s) UDP port which is used to transmit RADIUS accounting statistics between the Switch and the RADIUS server. The default port is 1813.
<b>Timeout (1-255)</b>	Set the RADIUS server age-out, in seconds.
<b>Retransmit (1-20)</b>	Set the RADIUS server retransmit time, in times.
<b>Key</b>	Set the key the same as that of the RADIUS server.
<b>Confirm Key</b>	Confirm the key the same as that of the RADIUS server.

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

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

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

## RADIUS Authentication

Users can display information concerning the activity of the RADIUS authentication client on the client side of the RADIUS authentication protocol.

To view the following window, click **Security > RADIUS > RADIUS Authentication** as shown below.

ServerIndex	InvalidServerAddr	Identifier	AuthServerAddr	ServerPortNumber	RoundTripTime	AccessRequests	AccessRejects
1	0	D-Link	10.90.90.90	1812	0	0	0
2	0	D-Link		0	0	0	0
3	0	D-Link		0	0	0	0

Figure 8-23 RADIUS Authentication window

The user may also select the desired time interval to update the statistics, between 1s and 60s, where “s” stands for seconds. The default value is 1s.

The fields that can be displayed are described below:

Parameter	Description
<b>ServerIndex</b>	The identification number assigned to each RADIUS Authentication server that the client shares a secret with.
<b>InvalidServerAddr</b>	The number of RADIUS Access-Response packets received from unknown addresses.
<b>Identifier</b>	The NAS-Identifier of the RADIUS authentication client.
<b>AuthServerAddr</b>	The (conceptual) table listing the RADIUS authentication servers with which the client shares a secret.
<b>ServerPortNumber</b>	The UDP port the client is using to send requests to this server.
<b>RoundTripTime</b>	The time interval (in hundredths of a second) between the most recent Access-Reply/Access-Challenge and the Access-Request that matched it from this RADIUS authentication server.
<b>AccessRequests</b>	The number of RADIUS Access-Request packets sent to this server. This does not include retransmissions.
<b>AccessRetrans</b>	The number of RADIUS Access-Request packets retransmitted to this RADIUS authentication server.
<b>AccessAccepts</b>	The number of RADIUS Access-Accept packets (valid or invalid) received from this server.
<b>AccessRejects</b>	The number of RADIUS Access-Reject packets (valid or invalid) received from this

	server.
<b>AccessChallenges</b>	The number of RADIUS Access-Challenge packets (valid or invalid) received from this server.
<b>AccessResponses</b>	The number of malformed RADIUS Access-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators or Signature attributes or known types are not included as malformed access responses.
<b>BadAuthenticators</b>	The number of RADIUS Access-Response packets containing invalid authenticators or Signature attributes received from this server.
<b>PendingRequests</b>	The number of RADIUS Access-Request packets destined for this server that have not yet timed out or received a response. This variable is incremented when an Access-Request is sent and decremented due to receipt of an Access-Accept, Access-Reject or Access-Challenge, a timeout or retransmission.
<b>Timeouts</b>	The number of authentication timeouts to this server. After a timeout the client may retry to the same server, send to a different server, or give up. A retry to the same server is counted as a retransmit as well as a timeout. A send to a different server is counted as a Request as well as a timeout.
<b>UnknownTypes</b>	The number of RADIUS packets of unknown type which were received from this server on the authentication port
<b>PacketsDropped</b>	The number of RADIUS packets of which were received from this server on the authentication port and dropped for some other reason.

Click the **Clear** button to clear the current statistics shown.

## RADIUS Account Client

Users can display managed objects used for managing RADIUS accounting clients, and the current statistics associated with them.

To view the following window, click **Security > RADIUS > RADIUS Account Client** as shown below.

ServerIndex	InvalidServerAddr	Identifier	ServerAddr
1	0	D-Link	10.90.90.90
2	0	D-Link	
3	0	D-Link	

Figure 8-24 RADIUS Account Client window

The user may also select the desired time interval to update the statistics, between 1s and 60s, where “s” stands for seconds. The default value is 1s.

The fields that can be configured are described below:

Parameter	Description
<b>ServerIndex</b>	The identification number assigned to each RADIUS Accounting server that the client shares a secret with.
<b>InvalidServerAddr</b>	The number of RADIUS Accounting-Response packets received from unknown addresses.
<b>Identifier</b>	The NAS-Identifier of the RADIUS accounting client.
<b>ServerAddr</b>	The IP address of the RADIUS authentication server referred to in this table entry.
<b>ServerPortNumber</b>	The UDP port the client is using to send requests to this server.
<b>RoundTripTime</b>	The time interval between the most recent Accounting-Response and the Accounting-Request that matched it from this RADIUS accounting server.
<b>Requests</b>	The number of RADIUS Accounting-Request packets sent. This does not include retransmissions.
<b>Retransmissions</b>	The number of RADIUS Accounting-Request packets retransmitted to this RADIUS accounting server. Retransmissions include retries where the Identifier and Acct-Delay have been updated, as well as those in which they remain the same.
<b>Responses</b>	The number of RADIUS packets received on the accounting port from this server.
<b>MalformedResponses</b>	The number of malformed RADIUS Accounting-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators and unknown types are not included as malformed accounting responses.

<b>BadAuthenticators</b>	The number of RADIUS Accounting-Response packets, which contained invalid authenticators, received from this server.
<b>PendingRequests</b>	The number of RADIUS Accounting-Request packets sent to this server that have not yet timed out or received a response. This variable is incremented when an Accounting-Request is sent and decremented due to receipt of an Accounting-Response, a timeout or a retransmission.
<b>Timeouts</b>	The number of accounting timeouts to this server. After a timeout the client may retry to the same server, send to a different server, or give up. A retry to the same server is counted as a retransmit as well as a timeout. A send to a different server is counted as an Accounting-Request as well as a timeout.
<b>UnknownTypes</b>	The number of RADIUS packets of unknown type which were received from this server on the accounting port.
<b>PacketsDropped</b>	The number of RADIUS packets, which were received from this server on the accounting port and dropped for some other reason.

Click the **Clear** button to clear the current statistics shown.

## IP-MAC-Port Binding (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 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 DHCPv4, DHCPv6, and ND 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. For the Switch, active and inactive entries use the same database. The maximum number of IPv4 entries that can be created is 1020 and of these entries only a maximum of 510 entries can be active at any given time. The maximum number of IPv6 entries that can be created is 511 and all of these entries can be active at any given time. The creation of authorized users can be manually configured by CLI or Web. The function is port-based, meaning a user can enable or disable the function on the individual port.

## IMPB Global Settings

Users can enable or disable the Roaming State, Trap/Log state, DHCPv4/DHCPv6 Snoop state, and ND Snoop state on the Switch. The Trap/Log field will enable and disable the sending of trap/log messages for IP-MAC-port binding. When enabled, the Switch will send a trap message to the SNMP agent and the Switch log when an ARP packet is received that doesn't match the IP-MAC-port binding configuration set on the Switch.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > IMPB Global Settings** as shown below.

Figure 8-25 IMPB Global Settings

The fields that can be configured are described below:

Parameter	Description
<b>Roaming State</b>	Click the radio buttons to enable or disable the IMPB roaming state.
<b>Trap / Log</b>	Click the radio buttons to enable or disable the sending of trap/log messages for IP-MAC-port binding. When <i>Enabled</i> , the Switch will send a trap message to the SNMP agent and the Switch log when an ARP packet is received that doesn't match the IP-MAC-port binding configuration set on the Switch. The default is <i>Disabled</i> .
<b>DHCP Snooping (IPv4)</b>	Click the radio buttons to enable or disable DHCP snooping (IPv4) for IP-MAC-Port binding. The default is <i>Disabled</i> .
<b>DHCP Snooping (IPv6)</b>	Click the radio buttons to enable or disable DHCP snooping (IPv6) for IP-MAC-Port binding. The default is <i>Disabled</i> .
<b>ND Snooping</b>	Click the radio buttons to enable or disable enable ND snooping on the Switch. The default is <i>Disabled</i> .
<b>Recover Learning Ports</b>	Enter the port numbers used to recover the learning port state. Tick the <b>All</b> check box to apply to all ports.
<b>Recover Time (60-1000000)</b>	Enter an interval in second used by the auto-recovery mechanism.
<b>File Name</b>	Enter the location of the file or click the <b>Browse</b> button to navigate to the file for the download.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Download** button to download the address binding entries.

Click the **Upload** button to upload the address binding entries to HTTP.

Click the **Save** button to save the DHCPv4 snooping binding entries.

## IMPB Port Settings

Select a port or a range of ports with the From Port and To Port fields. Enable or disable the port with the ARP Inspection state, IP Inspection state, Allow Zero IP and Forward DHCP Packet field, and configure the port's protocol setting and Stop Learning Threshold.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > IMPB Port Settings** as shown below.

Port	ARP Inspection	IP Inspection	ND Inspection	Protocol	Zero IP	DHCP Packet	Stop Learning Threshold/Mode
1	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
2	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
3	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
4	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
5	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
6	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
7	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
8	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
9	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
10	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
11	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
12	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
13	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
14	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
15	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
16	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
17	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
18	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
19	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
20	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
21	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
22	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
23	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
24	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
25	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal
26	Disabled	Disabled	Disabled	All	Not Allow	Forward	500/Normal

Figure 8-26 IMPB Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select a range of ports to set for IP-MAC-port binding.
<b>ARP Inspection</b>	<p>When the ARP inspection function is enabled, the legal ARP packets are forwarded, while the illegal packets are dropped.</p> <p><i>Disabled</i> - Disable the ARP inspection function.</p> <p><i>Enabled (Strict)</i> - This mode disables hardware learning of the MAC address. All packets are dropped by default until a legal ARP or IP packets are detected. When enabling this mode, the Switch stops writing dropped FDB entries on these ports. If detecting legal packets, the Switch needs to write forward FDB entry.</p> <p><i>Enabled (Loose)</i> - In this mode, all packets are forwarded by default until an illegal ARP packet is detected.</p> <p>The default value is Disabled.</p>
<b>IP Inspection</b>	<p>When both ARP and IP inspections are enabled, all IP packets are checked. The legal IP packets are forwarded, while the illegal IP packets are dropped. When IP Inspection is enabled, and ARP Inspection is disabled, all non-IP packets (Ex. L2 packets, or ARP) are forwarded by default.</p> <p>The default value is Disabled.</p>
<b>ND Inspection</b>	Use the drop-down menu to enable or disable the ND inspection of the specified ports.
<b>Protocol</b>	Use the drop-down menu to select the protocol. Available options are: <i>IPv4</i> , <i>IPv6</i> and <i>All</i> .
<b>Zero IP</b>	Use the drop-down menu to enable or disable this feature. Allow zero IP configures the state which allows ARP packets with 0.0.0.0 source IP to bypass.
<b>DHCP Packet</b>	By default, the DHCP packet with broadcast DA will be flooded. When set to disable, the broadcast DHCP packet received by the specified port will not be forwarded in strict mode. This setting is effective when DHCP snooping is enabled, in the case

	when a DHCP packet which has been trapped by the CPU needs to be forwarded by the software. This setting controls the forwarding behavior in this situation.
<b>Stop Learning Threshold</b>	Here is displayed the number of blocked entries on the port. The default value is 500.

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

## IMPB Entry Settings

This window is used to create static IP-MAC-binding port entries and view all IMPB entries on the Switch.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > IMPB Entry Settings** as shown below.

Figure 8-27 IMPB Entry Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IPv4 Address</b>	Click the radio button and enter the IP address to bind to the MAC address set below.
<b>IPv6 Address</b>	Click the radio button and enter the IPv6 address to bind to the MAC address set below.
<b>MAC Address</b>	Enter the MAC address to bind to the IPv4/IPv6 Address set above.
<b>Ports</b>	Specify the switch ports for which to configure this IP-MAC binding entry (IP Address + MAC Address). Tick the <b>All Ports</b> check box to configure this entry for all ports on the Switch.

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 **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed.

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

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.

## MAC Block List

This window is used to view unauthorized devices that have been blocked by IP-MAC binding restrictions.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > MAC Block List** as shown below.



Figure 8-28 MAC Block List

The fields that can be configured are described below:

Parameter	Description
VLAN Name	Enter a VLAN Name.
MAC Address	Enter a MAC address.

Click the **Find** button to find an unauthorized device that has been blocked by the IP-MAC binding restrictions

Click the **View All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed.

## DHCP Snooping

### DHCP Snooping Maximum Entry Settings

This window is used to configure the maximum DHCP snooping entry for ports on.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > DHCP Snooping > DHCP Snooping Maximum Entry Settings** as shown below.

Port	Maximum Entry	Maximum IPv6 Entry
1	No Limit	No Limit
2	No Limit	No Limit
3	No Limit	No Limit
4	No Limit	No Limit
5	No Limit	No Limit
6	No Limit	No Limit
7	No Limit	No Limit
8	No Limit	No Limit
9	No Limit	No Limit
10	No Limit	No Limit
11	No Limit	No Limit
12	No Limit	No Limit
13	No Limit	No Limit
14	No Limit	No Limit
15	No Limit	No Limit
16	No Limit	No Limit
17	No Limit	No Limit
18	No Limit	No Limit
19	No Limit	No Limit
20	No Limit	No Limit
21	No Limit	No Limit
22	No Limit	No Limit
23	No Limit	No Limit
24	No Limit	No Limit
25	No Limit	No Limit
26	No Limit	No Limit

Figure 8-29 DHCP Snooping Max Entry Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to use.
<b>Maximum Entry (1-50)</b>	Enter the maximum entry value. Tick the <b>No Limit</b> check box to lift the maximum entry.
<b>Maximum IPv6 Entry (1-50)</b>	Enter the maximum entry value for IPv6 DHCP Snooping. Tick the <b>No Limit</b> check box to have unlimited maximum number of the learned entries.

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

## DHCP Snooping Entry

This window is used to view dynamic entries on specific ports.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > DHCP Snooping > DHCP Snooping Entry** as shown below.

Figure 8-30 DHCP Snooping Entry window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Use the drop-down menu to select the desired port.
<b>Ports</b>	Specify the ports for DHCP snooping entries. Tick the <b>All Ports</b> check box to select all entries for all ports. Tick the <b>IPv4</b> check box to select IPv4 DHCP snooping learned entries. Tick the <b>IPv6</b> check box to select IPv6 DHCP snooping learned entries.

Click the **Find** button to locate a specific entry based on the port number selected.

Click the **Clear** button to clear all the information entered in the fields.

Click the **View All** button to display all the existing entries.

## DHCP Snooping Limit Rate Settings

This window is used to view the DHCP snooping limit rate entries.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > DHCP Snooping > DHCP Snooping Limit Rate Settings** as shown below.

DHCP Snooping Limit Rate Settings
Safeguard

Unit
From Port
To Port

Rate Limit (1-2048)
 No Limit

Action
Apply

Port	Rate Limit (pps)	Action
1	No Limit	-
2	No Limit	-
3	No Limit	-
4	No Limit	-
5	No Limit	-
6	No Limit	-
7	No Limit	-
8	No Limit	-
9	No Limit	-
10	No Limit	-
11	No Limit	-
12	No Limit	-
13	No Limit	-
14	No Limit	-
15	No Limit	-
16	No Limit	-
17	No Limit	-
18	No Limit	-
19	No Limit	-
20	No Limit	-
21	No Limit	-
22	No Limit	-
23	No Limit	-
24	No Limit	-
25	No Limit	-
26	No Limit	-

Figure 8-31 DHCP Snooping Limit Rate Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port/To Port</b>	Select a range of ports to be configured.
<b>Rate Limit (1-2048)</b>	Enter the number of DHCP messages that an interface can receive per second. Tick the <b>No Limit</b> check box to disable DHCP snooping rate limiting.
<b>Action</b>	Use the drop-down menu to select the DHCP protection mode. <i>Shutdown</i> – Shut down the port when the port enters the under attack state. <i>Drop</i> – Drop all the above rate limit DHCP packets when the port enters the under attack state.

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

## ND Snooping

### ND Snooping Maximum Entry Settings

This window is used to configure the maximum ND Snooping entry for ports.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > ND Snooping > ND Snooping Maximum Entry Settings** as shown below.

Port	Maximum Entry
1	No Limit
2	No Limit
3	No Limit
4	No Limit
5	No Limit
6	No Limit
7	No Limit
8	No Limit
9	No Limit
10	No Limit
11	No Limit
12	No Limit
13	No Limit
14	No Limit
15	No Limit
16	No Limit
17	No Limit
18	No Limit
19	No Limit
20	No Limit
21	No Limit
22	No Limit
23	No Limit
24	No Limit
25	No Limit
26	No Limit

Figure 8-32 ND Snooping Maximum Entry Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports that require a restriction on the maximum number of entries that can be learned with ND snooping.
<b>Maximum Entry (1-50)</b>	Enter the maximum entry value. Tick the <b>No Limit</b> check box to have unlimited maximum number of the learned entries.

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

## ND Snooping Entry

This window is used to view dynamic entries on specific ports.

To view the following window, click **Security > IP-MAC-Port Binding (IMPB) > ND Snooping > ND Snooping Entry** as shown below.

Figure 8-33 ND Snooping Entry window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.

<b>Port</b>	Use the drop-down menu to select the desired port.
<b>Ports</b>	Specify the ports for ND snooping entries. Tick the <b>All Ports</b> check box to select all entries for all ports.

Click the **Find** button to locate a specific entry based on the port number selected.

Click the **Clear** button to clear all the information entered in the fields.

Click the **View All** button to display all the existing entries.

## MAC-based Access Control (MAC)

MAC-based access control is a method to authenticate and authorize access using either a port or host. For port-based MAC-based access control, the method decides port access rights, while for host-based MAC-based access control, the method determines the MAC access rights.

A MAC user must be authenticated before being granted access to a network. Both local authentication and remote RADIUS server authentication methods are supported. In MAC-based access control, MAC user information in a local database or a RADIUS server database is searched for authentication. Following the authentication result, users achieve different levels of authorization.

### Notes about MAC-based Access Control

There are certain limitations and regulations regarding MAC-based access control:

- Once this feature is enabled for a port, the Switch will clear the FDB of that port.
- If a port is granted clearance for a MAC address in a VLAN that is not a Guest VLAN, other MAC addresses on that port must be authenticated for access and otherwise will be blocked by the Switch.
- Ports that have been enabled for Link Aggregation and Port Security cannot be enabled for MAC-based Authentication.
- Ports that have been enabled for GVRP cannot be enabled for Guest VLAN.

## MAC-based Access Control Settings

This window is used to set the parameters for the MAC-based access control function on the Switch. The user can set the running state, method of authentication, RADIUS password, view the Guest VLAN configuration to be associated with the MAC-based access control function of the Switch, and configure ports to be enabled or disabled for the MAC-based access control feature of the Switch. Please remember, ports enabled for certain other features, listed previously, and cannot be enabled for MAC-based access control.

To view the following window, click **Security > MAC-based Access Control (MAC) > MAC-based Access Control Settings** as shown below.

**MAC-based Access Control Settings** Safeguard

**MAC-based Access Control Global Settings**

MAC-based Access Control State  Enabled  Disabled Apply

Method  Password Type

RADIUS Authorization  Password

Local Authorization  Trap State

Log State  Max User (1-1000)   No Limit Apply

**Guest VLAN Settings**

VLAN Name   VID (1-4094)

Member Ports (e.g.: 1:1-1:5, 1:9)  Add Delete

Figure 8-34 MAC-based Access Control Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MAC-based Access Control State</b>	Toggle to globally enable or disable the MAC-based access control function on the Switch.
<b>Method</b>	Use this drop-down menu to choose the type of authentication to be used when authentication MAC addresses on a given port. The user may choose between the following methods: <i>Local</i> – Use this method to utilize the locally set MAC address database as the authenticator for MAC-based access control. This MAC address list can be configured in the MAC-based access control Local Database Settings window. <i>RADIUS</i> – Use this method to utilize a remote RADIUS server as the authenticator for MAC-based access control.
<b>RADIUS Authorization</b>	Use the drop-down menu to enable or disable the use of RADIUS Authorization.
<b>Local Authorization</b>	Use the drop-down menu to enable or disable the use of Local Authorization.
<b>Log State</b>	Use the drop-down menu to enable or disable log state.
<b>Password Type</b>	Use the drop-down menu to select the type of RADIUS authentication password for MAC-based access control. <i>Manual String</i> – Use the same password in the <b>Password</b> text box. <i>Client MAC Address</i> – Use the client's MAC address as the password.
<b>Password</b>	Enter the password for the RADIUS server, which is to be used for packets being sent requesting authentication. The default password is "default".
<b>Trap State</b>	Use the drop-down menu to enable or disable trap state.
<b>Max User (1-1000)</b>	Enter the maximum amount of users of the Switch. Tick the <b>No Limit</b> check box to have 1000 users.
<b>VLAN Name</b>	Click the radio button and enter the name of the previously configured Guest VLAN being used for this function.
<b>VID (1-4094)</b>	Click the radio button and enter a Guest VLAN ID.
<b>Member Ports</b>	Enter the list of ports that have been configured for the Guest VLAN.

Click the **Apply** button to accept the changes made for each individual section.

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

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

## MAC-based Access Control Port Settings

This window is used to display the MAC-based access control port settings.

To view the following window, click **Security > MAC-based Access Control (MAC) > MAC-based Access Control Port Settings** as shown below.

MAC-based Access Control Port Settings Safeguard

**Port Settings**

Unit:  From Port:  To Port:  State:  Aging Time (1-1440):  min  Infinite Block Time (0-300):  sec Max User (1-1000):   No Limit Apply

Port	State	Aging Time (min)	Block Time (sec)	Max User
1	Disabled	1440	300	128
2	Disabled	1440	300	128
3	Disabled	1440	300	128
4	Disabled	1440	300	128
5	Disabled	1440	300	128
6	Disabled	1440	300	128
7	Disabled	1440	300	128
8	Disabled	1440	300	128
9	Disabled	1440	300	128
10	Disabled	1440	300	128
11	Disabled	1440	300	128
12	Disabled	1440	300	128
13	Disabled	1440	300	128
14	Disabled	1440	300	128
15	Disabled	1440	300	128
16	Disabled	1440	300	128
17	Disabled	1440	300	128
18	Disabled	1440	300	128
19	Disabled	1440	300	128
20	Disabled	1440	300	128
21	Disabled	1440	300	128
22	Disabled	1440	300	128
23	Disabled	1440	300	128
24	Disabled	1440	300	128
25	Disabled	1440	300	128
26	Disabled	1440	300	128

Figure 8-35 MAC-based Access Control Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configured for MAC-based access control.
<b>State</b>	Use this drop-down menu to enable or disable MAC-based access control on the port or range of ports selected in the Port Settings section of this window.
<b>Aging Time (1-1440)</b>	Enter a value between 1 and 1440 minutes. The default is 1440. To set this value to have no aging time, select the <b>Infinite</b> option.
<b>Block Time (0-300)</b>	Enter a value between 0 and 300 seconds. The default is 300.
<b>Max User (1-1000)</b>	Enter the maximum user used for this configuration. When <b>No Limit</b> is selected, there will be no user limit applied to this rule.

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

## MAC-based Access Control Local Settings

This window is used to configure a list of MAC addresses, along with their corresponding target VLAN, which will be authenticated for the Switch. Once a queried MAC address is matched in this window, it will be placed in the VLAN associated with it here. The Switch administrator may enter up to 128 MAC addresses to be authenticated using the local method configured here.

To view the following window, click **Security > MAC-based Access Control (MAC) > MAC-based Access Control Local Settings** as shown below.

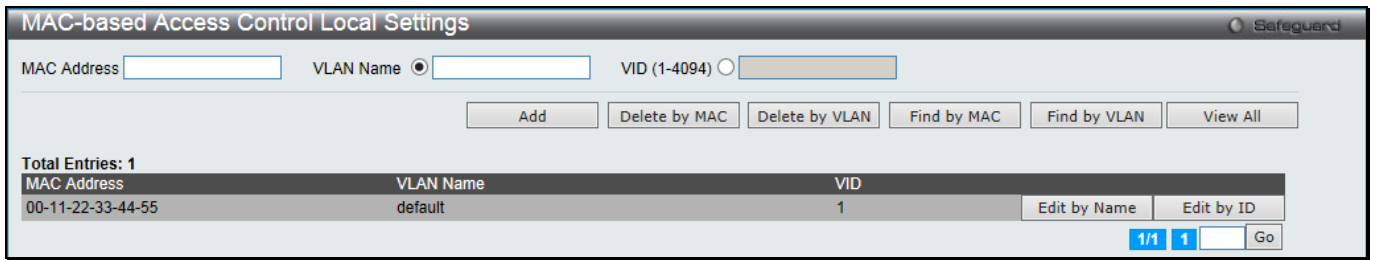


Figure 8-36 MAC-based Access Control Local Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MAC address</b>	Enter the MAC address that will be added to the local authentication list here.
<b>VLAN Name</b>	Enter the VLAN name of the corresponding MAC address here.
<b>VID (1-4094)</b>	Enter the VLAN ID of the corresponding MAC address here.

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

Click the **Delete by MAC** button to remove the specific entry based on the MAC address entered.

Click the **Delete by VLAN** button to remove the specific entry based on the VLAN name or ID entered.

Click the **Find by MAC** button to locate a specific entry based on the MAC address entered.

Click the **Find by VLAN** button to locate a specific entry based on the VLAN name or ID entered.

Click the **View All** button to display all the existing entries.

Click the **Edit by Name** to modify the specific VLAN name.

Click the **Edit by ID** button to modify the specific VLAN ID.

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

To change the VLAN Name of the corresponding MAC address, the user can click the **Edit by Name** button.

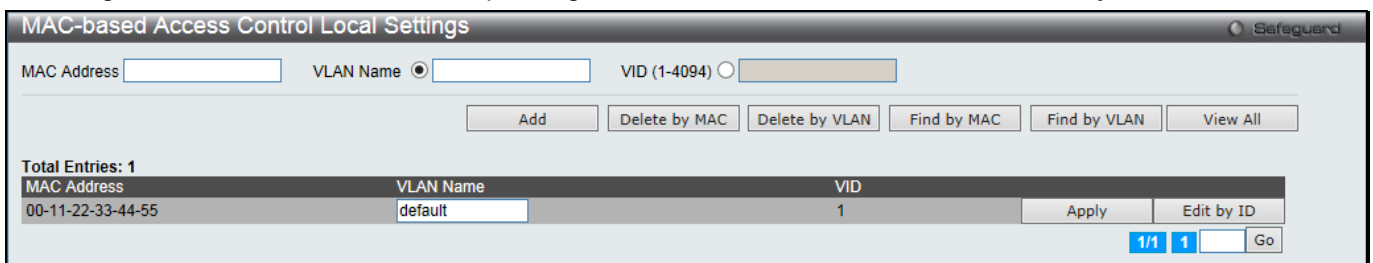


Figure 8-37 MAC-based Access Control Local Settings – Edit by Name window

To change the VID value of the corresponding MAC address, the user can click the **Edit by ID** button.

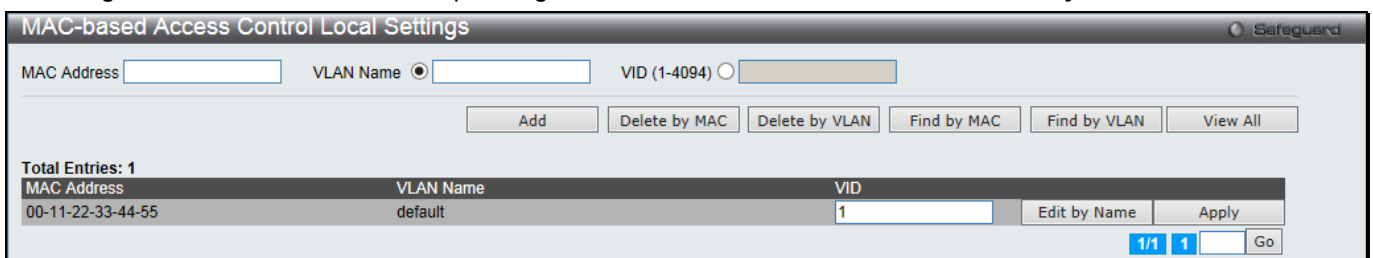


Figure 8-38 MAC-based Access Control Local Settings – Edit by ID window

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.

## MAC-based Access Control Authentication State

This window is used to display MAC-based access control authentication state information.



To view the following window, click **Security > MAC-based Access Control (MAC) > MAC-based Access Control Authentication State** as shown below.

Figure 8-39 MAC-based Access Control Authentication State window

The fields that can be configured are described below:

Parameter	Description
Port List	Enter a list of ports to be displayed.

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

Click the **Clear by Port** button to clear all the information linked to the port number entered.

Click the **View All Hosts** button to display all the existing hosts.

Click the **Clear All Hosts** button to clear out all the existing hosts.

## Web-based Access Control (WAC)

Web-based Authentication Login 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 un-authenticated, the Switch will redirect the user to the WAC login page where the user name and password must be entered. 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.

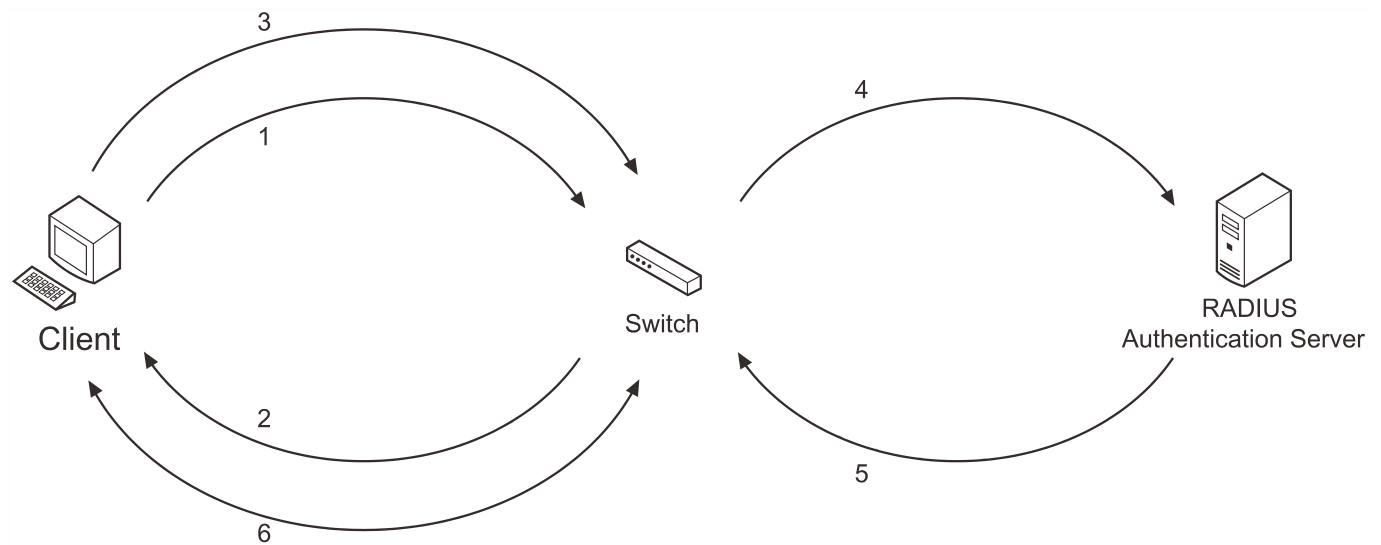
Virtual IP works like this, when a host PC communicates with the WAC Switch through a virtual IP, the virtual IP is transformed into the physical IPIF (IP interface) address of the Switch to make the communication possible. The host PC and other servers' IP configurations do not depend on the virtual 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.

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. If not

specified, the default port number for HTTP is 80 and the default port number for HTTPS is 443. If no protocol is specified, the default protocol is HTTP.

The following diagram illustrates the basic six steps all parties go through in a successful Web Authentication process:



The six steps are:

1. HTTP access sent from Client to the Switch.
2. Client placed in authentication VLAN and HTML login is prompted for the user.
3. Client enters login information to be processed.
4. Client information extracted and sent to RADIUS server or local authenticator for processing.
5. Authentication accepted by local authenticator or RADIUS server. Client is placed in the pre-configured Target VLAN.
6. Switch redirects Client to preset "redirection path" URL. The user is now free to access the Internet.

### **Conditions and Limitations**

1. If the client is utilizing DHCP to attain an IP address, the authentication VLAN must provide a DHCP server or a DHCP relay function so that client may obtain an IP address.
2. Certain functions exist on the Switch that will filter HTTP packets, such as the Access Profile 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.
3. 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.

## WAC Global Settings

Users can configure the Switch for the Web-based access control function.

To view the following window, click **Security > Web-based Access Control (WAC) > WAC Global Settings** as shown below.

Figure 8-40 WAC Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>WAC Global State</b>	Use this selection menu to either enable or disable the Web Authentication on the Switch.
<b>Virtual IP</b>	Enter a virtual IP address. This is used to accept authentication requests from unauthenticated hosts. Only requests sent to this IP will get a correct response.
<b>Virtual IPv6</b>	Enter a virtual IPv6 address. This is used to accept authentication requests from unauthenticated hosts. Only requests sent to this IP will get a correct response.
<b>Redirection Path</b>	Enter the URL of the website that authenticated users placed in the VLAN are directed to once authenticated.
<b>Clear Redirection Path</b>	The user can enable or disable this option to clear the redirection path.
<b>RADIUS Authorization</b>	The user can enable or disable this option to enable RADIUS Authorization or not.
<b>Local Authorization</b>	The user can enable or disable this option to enable Local Authorization or not.
<b>Method</b>	Use this drop-down menu to choose the authenticator for Web-based Access Control. The user may choose: <i>Local</i> – Choose this parameter to use the local authentication method of the Switch as the authenticating method for users trying to access the network via the switch. This is, in fact, the username and password to access the Switch configured using the WAC User Settings window ( <b>Security &gt; Web-based Access Control &gt; WAC User Settings</b> ) seen below. <i>RADIUS</i> – Choose this parameter to use a remote RADIUS server as the authenticating method for users trying to access the network via the switch. This RADIUS server must have already been pre-assigned by the administrator using the Authentication RADIUS Server Settings window ( <b>Security &gt; RADIUS &gt; Authentication RADIUS Server Settings</b> ).
<b>HTTP(S) Port (1-65535)</b>	Enter a HTTP port number. Port 80 is the default. <i>HTTP</i> – Specify that the TCP port will run the WAC HTTP protocol. The default value is 80. HTTP port cannot run at TCP port 443. <i>HTTPS</i> – Specify that the TCP port will run the WAC HTTPS protocol. The default value is 443. HTTPS cannot run at TCP port 80.
<b>Trap State</b>	Select to enable or disable WAC trap state.

Click the **Apply** button to accept the changes made for each individual section.



**NOTE:** A successful authentication should direct the client to the stated web page. If the client does not reach this web page, yet does not receive a **Fail!** Message, the client will already be authenticated and therefore should refresh the current browser window or attempt to open a different web page.

## WAC User Settings

Users can view and set local database user accounts for Web authentication.

To view the following window, click **Security > Web-based Access Control (WAC) > WAC User Settings** as shown below.

Figure 8-41 WAC User Settings window

The fields that can be configured are described below:

Parameter	Description
<b>User Name</b>	Enter the user name of up to 15 alphanumeric characters of the guest wishing to access the Web through this process. This field is for administrators who have selected <i>Local</i> as their Web-based authenticator.
<b>VLAN Name</b>	Click the button and enter a VLAN Name in this field.
<b>VID (1-4094)</b>	Click the button and enter a VID in this field.
<b>Password</b>	Enter the password the administrator has chosen for the selected user. This field is case-sensitive and must be a complete alphanumeric string. This field is for administrators who have selected <i>Local</i> as their Web-based authenticator.
<b>Confirm Password</b>	Retype the password entered in the previous field.

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

Click the **Delete All** button to remove all the entries listed.

Click the **Edit VLAN Name** button to re-configure the specific entry's VLAN Name.

Click the **Edit VID** button to re-configure the specific entry's VLAN ID.

Click the **Clear VLAN** button to remove the VLAN information from the specific entry.

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

## WAC Port Settings

Users can view and set port configurations for Web authentication.

To view the following window, click **Security > Web-based Access Control (WAC) > WAC Port Settings** as shown below.

**WAC Port Settings**
Safeguard

Unit:

From Port:

Aging Time (1-1440):  min  Infinite

Idle Time (1-1440):  min  Infinite

To Port:

State:

Block Time (0-300):  sec

Port	State	Aging Time	Idle Time	Block Time
1	Disabled	1440	Infinite	60
2	Disabled	1440	Infinite	60
3	Disabled	1440	Infinite	60
4	Disabled	1440	Infinite	60
5	Disabled	1440	Infinite	60
6	Disabled	1440	Infinite	60
7	Disabled	1440	Infinite	60
8	Disabled	1440	Infinite	60
9	Disabled	1440	Infinite	60
10	Disabled	1440	Infinite	60
11	Disabled	1440	Infinite	60
12	Disabled	1440	Infinite	60
13	Disabled	1440	Infinite	60
14	Disabled	1440	Infinite	60
15	Disabled	1440	Infinite	60
16	Disabled	1440	Infinite	60
17	Disabled	1440	Infinite	60
18	Disabled	1440	Infinite	60
19	Disabled	1440	Infinite	60
20	Disabled	1440	Infinite	60
21	Disabled	1440	Infinite	60
22	Disabled	1440	Infinite	60
23	Disabled	1440	Infinite	60
24	Disabled	1440	Infinite	60
25	Disabled	1440	Infinite	60
26	Disabled	1440	Infinite	60

Figure 8-42 WAC Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be enabled as WAC ports.
<b>Aging Time (1-1440)</b>	Specify the time period during which an authenticated host will remain in the authenticated state. Enter a value between <i>1</i> and <i>1440</i> minutes. Tick the <b>Infinite</b> check box to indicate the authenticated host will never age out on the port. The default value is <i>1440</i> minutes (24 hours).
<b>State</b>	Use this drop-down menu to enable the configured ports as WAC ports.
<b>Idle Time (1-1440)</b>	If there is no traffic during the Idle Time parameter, the host will be moved back to the unauthenticated state. Enter a value between <i>1</i> and <i>1440</i> minutes. Tick the <b>Infinite</b> check box to indicate the Idle state of the authenticated host on the port will never be checked. The default value is <i>infinite</i> .
<b>Block Time (0-300)</b>	This parameter is the period of time a host will be blocked if it fails to pass authentication. Enter a value between <i>0</i> and <i>300</i> seconds. The default value is <i>60</i> seconds.

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

## WAC Authentication State

Users can view and delete the hosts for Web authentication.

To view the following window, click **Security > Web-based Access Control (WAC) > WAC Authentication State** as shown below.

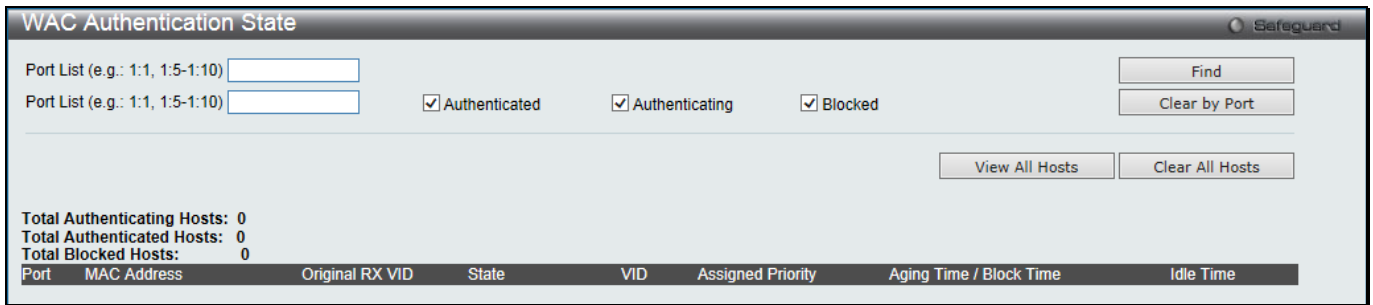


Figure 8-43 WAC Authentication State window

The fields that can be configured are described below:

Parameter	Description
<b>Port List</b>	Enter the desired range of ports and tick the appropriate check box(s), Authenticated, Authenticating, and Blocked.
<b>Authenticated</b>	Tick this check box to clear all authenticated users for a port.
<b>Authenticating</b>	Tick this check box to clear all authenticating users for a port.
<b>Blocked</b>	Tick this check box to clear all blocked users for a port.

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

Click the **Clear by Port** button to remove entry based on the port list entered.

Click the **View All Hosts** button to display all the existing entries.

Click the **Clear All Hosts** button to remove all the entries listed.

## WAC Customize Page

This window is used to customize the authenticate page elements.

To view the following window, click **Security > Web-based Access Control (WAC) > WAC Customize Page** as shown below.

Note: Name should be less than 128 characters.

Current Status: **Un-Authenticated**

Authentication Login

User Name

Password

Enter Clear

Logout From The Network

Logout

**Notification**

Set to default Apply

Figure 8-44 WAC Customize Page window

Complete the WAC authentication information in this window to set the WAC page settings. Click the **Apply** button to implement the changes made. Click the **Set to default** button to go back to the default settings of all elements.

## Compound Authentication

Compound Authentication settings allows for multiple authentication to be supported on the Switch.

### Compound Authentication Settings

Users can configure Authorization Network State Settings and compound authentication methods for a port or ports on the Switch.

To view the following window, click **Security > Compound Authentication > Compound Authentication Settings** as shown below.

Compound Authentication Settings Safeguard

Authorization Attributes State  Enabled  Disabled Apply

Authentication Server Failover  Block  Local  Permit Apply

**Compound Authentication Port Settings**

Unit:  From Port:  To Port:  Authentication Methods:  Authorized Mode:  VID List (e.g.: 1, 6-9):  State:  Apply

Port	Authentication Methods	Authorized Mode	Authentication VLAN
1	None	Host-based	
2	None	Host-based	
3	None	Host-based	
4	None	Host-based	
5	None	Host-based	
6	None	Host-based	
7	None	Host-based	
8	None	Host-based	
9	None	Host-based	
10	None	Host-based	
11	None	Host-based	
12	None	Host-based	
13	None	Host-based	
14	None	Host-based	
15	None	Host-based	
16	None	Host-based	
17	None	Host-based	
18	None	Host-based	
19	None	Host-based	
20	None	Host-based	
21	None	Host-based	
22	None	Host-based	
23	None	Host-based	
24	None	Host-based	
25	None	Host-based	
26	None	Host-based	

Figure 8-45 Compound Authentication Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Authorization Attributes State</b>	Click the radio buttons to enable or disable the Authorization Attributes State.
<b>Authentication Server Failover</b>	Click the radio buttons to configure the authentication server failover function. <b>Block</b> (default setting). The client is always regarded as un-authenticated. <b>Local</b> . The switch will resort to using the local database to authenticate the client. If the client fails on local authentication, the client is regarded as un-authenticated, otherwise, it is authenticated. <b>Permit</b> . The client is always regarded as authenticated. If guest VLAN is enabled, clients will stay on the guest VLAN, otherwise, they will stay on the original VLAN.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be enabled as compound authentication ports.
<b>Authentication Methods</b>	The compound authentication method options include: <i>None</i> , <i>Any (MAC, 802.1X or WAC)</i> , <i>802.1X+IMPB</i> , <i>IMPB+WAC</i> , and <i>MAC+IMPB</i> . If the compound authentication method selected includes IMPB and all other methods (802.1X, WAC or MAC) are globally disabled, only IMPB will be used. If the <i>MAC+WAC</i> option is selected, both authentication methods will be applied. If one of the authentication methods fail or is globally disabled, then access will be denied.  <i>None</i> - all compound authentication methods are disabled. <i>Any (MAC, 802.1X or WAC)</i> - if any of the authentication methods pass, then access will be granted. In this mode, MAC, 802.1X and WAC can be enabled on a port at the same time. In <i>Any (MAC, 802.1X or WAC)</i> mode, whether an individual security module is active on a port depends on its system state.



	<p>802.1X+IMPB - 802.1X will be verified first, and then IMPB will be verified. Both authentication methods need to be passed.</p> <p>IMPB+WAC - WAC will be verified first, and then IMPB will be verified. Both authentication methods need to be passed.</p> <p>MAC+IMPB - MAC will be verified first, and then IMPB will be verified. Both authentication methods need to be passed.</p>
<b>Authorized Mode</b>	Toggle between <i>Host-based</i> and <i>Port-based</i> . When <i>Port-based</i> is selected, if one of the attached hosts passes the authentication, all hosts on the same port will be granted access to the network. If the user fails the authorization, this port will keep trying the next authentication method. When <i>Host-based</i> is selected, users are authenticated individually.
<b>VID List</b>	When <i>Host-based</i> is selected in <b>Authorized Mode</b> , enter a list of VLAN IDs. When the VID List is entered, hosts that belong to the specified VLANs need to be authenticated to be able to access the network. Hosts that belong to VLANs, which are not specified in the VID List, do not need to be authenticated to be able to access the network.
<b>State</b>	Use the drop-down menu to assign or remove the specified VID list as authentication VLAN(s).

Click the **Apply** button to accept the changes made for each individual section.

## Compound Authentication Guest VLAN Settings

Users can create compound Authentication VLANs, assign ports to or remove ports from a guest VLAN.

To view the following window, click **Security > Compound Authentication > Compound Authentication Guest VLAN Settings** as shown below.

Figure 8-46 Compound Authentication Guest VLAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Click the button and assign a VLAN as a Guest VLAN. The VLAN must be an existing static VLAN.
<b>VID (1-4094)</b>	Click the button and assign a VLAN ID for a Guest VLAN. The VLAN must be an existing static VLAN before this VID can be configured.
<b>Port List</b>	The list of ports to be configured. Alternatively, tick the <b>All Ports</b> check box to set every port at once.
<b>Action</b>	Use the drop-down menu to choose the desired operation: <i>Create VLAN</i> , <i>Add Ports</i> , or <i>Delete Ports</i> .

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

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

Once properly configured, the Guest VLAN and associated ports will be listed in the lower part of the window.

## Compound Authentication MAC Format Settings

This window is used to configure the MAC address format to be used for authenticating the user name via the RADIUS server.

To view the following window, click **Security > Compound Authentication > Compound Authentication MAC Format Settings** as shown below.

Figure 8-47 Compound Authentication MAC Format Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Case</b>	Select to use uppercase or lowercase format.
<b>Delimiter</b>	Select to have <i>Hyphen</i> , <i>Colon</i> or <i>Dot</i> when entering the MAC address. Select <i>None</i> for not having any delimiter.
<b>Delimiter Number</b>	Select number of delimiters in the MAC address.

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

## IGMP Access Control Settings

Users can set IGMP authentication, otherwise known as IGMP access control, on individual ports on the Switch. When the **Authentication State** is **Enabled**, and the Switch receives an IGMP join request, the Switch will send the access request to the RADIUS server to do the authentication.

IGMP authentication processes IGMP reports as follows: When a host sends a join message for the interested multicast group, the Switch has to do authentication before learning the multicast group/port. The Switch sends an Access-Request to an authentication server and the information including host MAC, switch port number, switch IP, and multicast group IP. When the Access-Accept is answered from the authentication server, the Switch learns the multicast group/port. When the Access-Reject is answered from the authentication server, the Switch won't learn the multicast group/port and won't process the packet further. The entry (host MAC, switch port number, and multicast group IP) is put in the "authentication failed list." When there is no answer from the authentication server after T1 time, the Switch resends the Access-Request to the server. If the Switch doesn't receive a response after N1 times, the result is denied and the entry (host MAC, switch port number, multicast group IP) is put in the "authentication failed list." In general case, when the multicast group/port is already learned by the switch, it won't do the authentication again. It only processes the packet as standard.

IGMP authentication processes IGMP leaves as follows: When the host sends leave message for the specific multicast group, the Switch follows the standard procedure for leaving a group and then sends an Accounting-Request to the accounting server for notification. If there is no answer from the accounting server after T2 time, the Switch resends the Accounting-Request to the server. The maximum number of retry times is N2.

To view this window, click **Security > IGMP Access Control Settings** as shown below:

Unit	From Port	To Port	State
1	01	01	Disabled

Unit 1 Settings	
Port	State
01	Disabled
02	Disabled
03	Disabled
04	Disabled
05	Disabled
06	Disabled
07	Disabled
08	Disabled
09	Disabled
10	Disabled
11	Disabled
12	Disabled
13	Disabled
14	Disabled
15	Disabled
16	Disabled
17	Disabled
18	Disabled
19	Disabled
20	Disabled
21	Disabled
22	Disabled
23	Disabled
24	Disabled
25	Disabled
26	Disabled

Figure 8-48 IGMP Access Control Settings

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be enabled as compound authentication ports.
<b>State</b>	Use the drop-down menu to enable or disable the authentication state.

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

## Port Security

### Port Security Settings

A given port's (or a range of ports') dynamic MAC address learning can be locked such that the current source MAC addresses entered into the MAC address forwarding table cannot be changed once the port lock is enabled. The port can be locked by changing the **Admin State** drop-down menu to *Enabled* and clicking **Apply**.

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 Settings** as shown below.

**Port Security Settings** Safeguard

Port Security Trap Settings  Enabled  Disabled

Port Security Log Settings  Enabled  Disabled Apply

---

**Port Security System Settings**

System Maximum Address (1-3072)   No Limit Apply

---

Unit	From Port	To Port	Admin State	Action	Lock Address Mode	Max Learning Address (0-3072)
1	01	01	Disabled	Drop	Delete on Reset	32

---

**Port Security Port Table**

Port	Admin State	Lock Address Mode	Max Learning Address	Action		
1	Disabled	DeleteOnReset	32	Drop	Edit	View Details
2	Disabled	DeleteOnReset	32	Drop	Edit	View Details
3	Disabled	DeleteOnReset	32	Drop	Edit	View Details
4	Disabled	DeleteOnReset	32	Drop	Edit	View Details
5	Disabled	DeleteOnReset	32	Drop	Edit	View Details
6	Disabled	DeleteOnReset	32	Drop	Edit	View Details
7	Disabled	DeleteOnReset	32	Drop	Edit	View Details
8	Disabled	DeleteOnReset	32	Drop	Edit	View Details
9	Disabled	DeleteOnReset	32	Drop	Edit	View Details
10	Disabled	DeleteOnReset	32	Drop	Edit	View Details
11	Disabled	DeleteOnReset	32	Drop	Edit	View Details
12	Disabled	DeleteOnReset	32	Drop	Edit	View Details
13	Disabled	DeleteOnReset	32	Drop	Edit	View Details
14	Disabled	DeleteOnReset	32	Drop	Edit	View Details
15	Disabled	DeleteOnReset	32	Drop	Edit	View Details
16	Disabled	DeleteOnReset	32	Drop	Edit	View Details
17	Disabled	DeleteOnReset	32	Drop	Edit	View Details
18	Disabled	DeleteOnReset	32	Drop	Edit	View Details
19	Disabled	DeleteOnReset	32	Drop	Edit	View Details

Figure 8-49 Port Security Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Port Security Trap Settings</b>	Click to enable or disable port security traps on the Switch.
<b>Port Security Log Settings</b>	Click to enable or disable port security logs on the Switch.
<b>System Maximum Address (1-3072)</b>	Enter the system maximum address. Tick the <b>No Limit</b> check box to have unlimited system addresses.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configured.
<b>Admin State</b>	Use the drop-down menu to enable or disable Port Security (locked MAC address table for the selected ports).
<b>Action</b>	Use the drop-down menus to select the action to be taken when the number of secure MAC address reaches the maximum learning on the port. <i>Drop</i> - When the number of secure MAC address reaches the maximum learning on the port, new entry will be dropped. This is the default setting. <i>Shutdown</i> - When the number of secure MAC address reaches the maximum learning on the port, the port will be shut down and enter error-disabled state immediately. The port state is recovered only by enabling the port manually. The Shutdown action only applies to port level security setting.
<b>Lock Address Mode</b>	This drop-down menu allows the option of how the MAC address table locking will be implemented on the Switch, for the selected group of ports. The options are: <i>DeleteOnReset</i> – The locked addresses will not age out until the Switch has been reset or rebooted. <i>DeleteOnTimeout</i> – The locked addresses will age out after the aging timer expires.

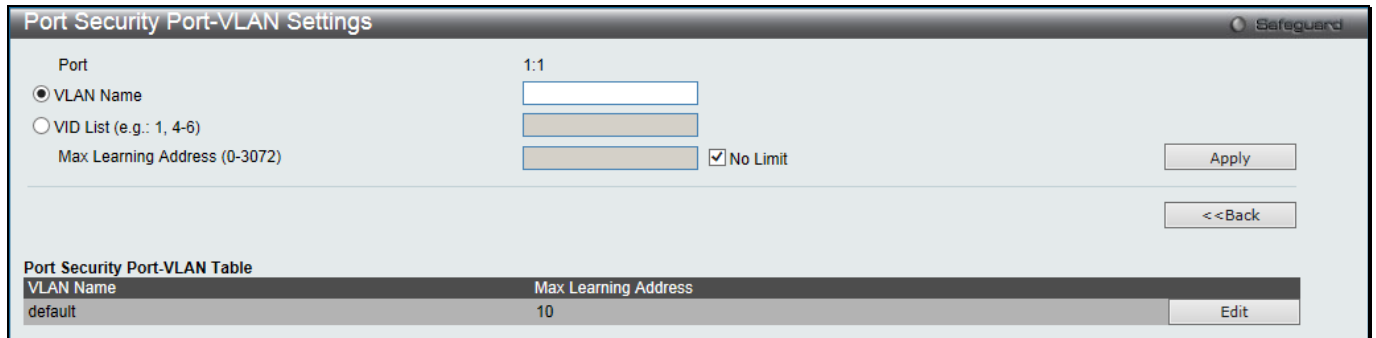
	<i>Permanent</i> – The locked addresses will only age out after the Switch has been reset.
<b>Max Learning Address (0-3072)</b>	Specify the maximum value of port security entries that can be learned on this port.

Click the **Apply** button to accept the changes made for each individual section.

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

Click the **View Details** button to display the information of the specific entry.

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



**Figure 8-50 Port Security Port-VLAN Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Click the button and enter the name of the VLAN that the port security settings will be displayed for.
<b>VID List</b>	Click the button and enter VLAN IDs that the port security settings will be displayed for.
<b>Max Learning Address (0-3072)</b>	Specify the maximum value of port security entries that can be learned on this port. Tick the <b>No Limit</b> check box to have unlimited number of port security entries that can be learned by the system.

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

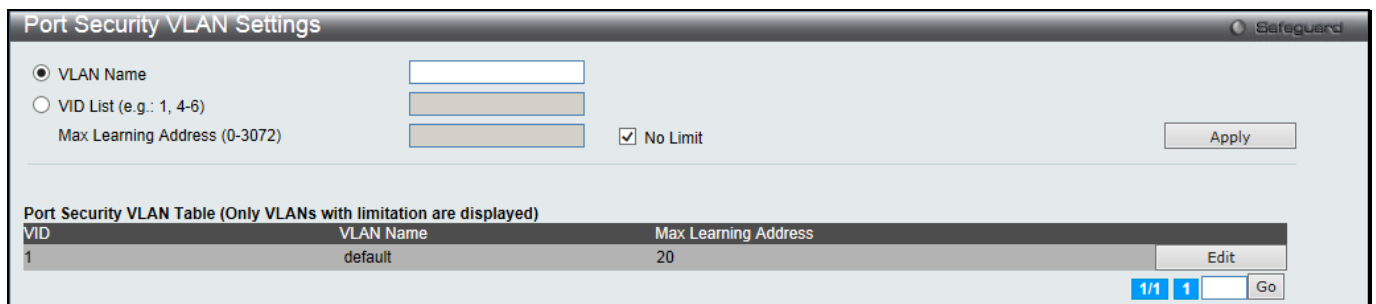
Click the **Edit** button to re-configure the specific entry.

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

## Port Security VLAN Settings

Users can configure the maximum number of port-security entries that can be learned on a specific VLAN.

To view the following window, click **Security > Port Security > Port Security VLAN Settings** as shown below.



**Figure 8-51 Port Security VLAN Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>VLAN Name</b>	Enter the VLAN Name.
<b>VID List</b>	Specify a list of the VLAN be VLAN ID.
<b>Max Learning Address (0-3072)</b>	Specify the maximum number of port-security entries that can be learned by this VLAN. Tick the <b>No Limit</b> check box to have unlimited number of port security entries that can be learned by the VLAN.

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.

## Port Security Entries

Users can remove an entry from the port security entries learned by the Switch and entered into the forwarding database.

To view the following window, click **Security > Port Security > Port Security Entries** as shown below.

Figure 8-52 Port Security Entries window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>VLAN Name</b>	The VLAN Name of the entry in the forwarding database table that has been permanently learned by the Switch.
<b>VID List</b>	The VLAN ID of the entry in the forwarding database table that has been permanently learned by the Switch.
<b>Port List</b>	Enter the port number or list here to be used for the port security entry search. When <b>All</b> is selected, all the ports configured will be displayed.
<b>MAC Address</b>	The MAC address of the entry in the forwarding database table that has been permanently learned by the Switch.
<b>Lock Mode</b>	The type of MAC address in the forwarding database table.

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

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

Click the **Show All** button to display all the existing entries.

Click the **Clear All** button to remove all the entries listed.

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.

## ARP Spoofing Prevention Settings

The user can configure the spoofing prevention entry to prevent spoofing of MAC for the protected gateway. When an entry is created, those ARP packets whose sender IP matches the gateway IP of an entry, but its source MAC field does not match the gateway MAC of the entry will be dropped by the system.

To view the following window, click **Security > ARP Spoofing Prevention Settings** as shown below.

Gateway IP Address	Gateway MAC Address	Ports	
192.168.1.1	00-11-22-33-44-55	1:1-1:26	Edit Delete

Figure 8-53 ARP Spoofing Prevention Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Gateway IP Address</b>	Enter the gateway IP address to help prevent ARP Spoofing.
<b>Gateway MAC Address</b>	Enter the gateway MAC address to help prevent ARP Spoofing.
<b>Ports</b>	Enter the port numbers that this feature applies to. Alternatively the user can select <b>All Ports</b> to apply this feature to all the ports of the switch.

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

Click the **Delete All** button to remove all the entries listed.

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

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

## BPDU Attack Protection

This window is used to configure the BPDU protection function for the ports on the switch. In generally, there are two states in BPDU protection function. One is normal state, and another is under attack state. The under attack state have 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. Thus, BPDU protection can only be enabled on the STP-disabled port.

BPDU protection has a higher priority than the 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. But 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.



**BPDU Attack Protection**
Safeguard

---

**BPDU Attack Protection Global Settings**

BPDU Attack Protection State  Enabled  Disabled Apply

Trap State  Log State  Apply

Recover Time (60-1000000)  sec  Infinite

Unit  From Port  To Port  State  Mode  Apply

**Unit 1 Settings**

Port	State	Mode	Status
1	Disabled	Shutdown	Normal
2	Disabled	Shutdown	Normal
3	Disabled	Shutdown	Normal
4	Disabled	Shutdown	Normal
5	Disabled	Shutdown	Normal
6	Disabled	Shutdown	Normal
7	Disabled	Shutdown	Normal
8	Disabled	Shutdown	Normal
9	Disabled	Shutdown	Normal
10	Disabled	Shutdown	Normal
11	Disabled	Shutdown	Normal
12	Disabled	Shutdown	Normal
13	Disabled	Shutdown	Normal
14	Disabled	Shutdown	Normal
15	Disabled	Shutdown	Normal
16	Disabled	Shutdown	Normal
17	Disabled	Shutdown	Normal
18	Disabled	Shutdown	Normal
19	Disabled	Shutdown	Normal
20	Disabled	Shutdown	Normal
21	Disabled	Shutdown	Normal
22	Disabled	Shutdown	Normal
23	Disabled	Shutdown	Normal
24	Disabled	Shutdown	Normal
25	Disabled	Shutdown	Normal
26	Disabled	Shutdown	Normal

Figure 8-54 BPDU Attack Protection window

The fields that can be configured are described below:

Parameter	Description
<b>BPDU Attack Protection State</b>	Click the radio buttons to enable or disable the BPDU Attack Protection state.
<b>Trap State</b>	Specify when a trap will be sent. Options to choose from are <i>None</i> , <i>Attack Detected</i> , <i>Attack Cleared</i> or <i>Both</i> .
<b>Log State</b>	Specify when a log entry will be sent. Options to choose from are <i>None</i> , <i>Attack Detected</i> , <i>Attack Cleared</i> or <i>Both</i> .
<b>Recover Time (60-1000000)</b>	Specify the BPDU protection Auto-Recovery timer. The default value of the recovery timer is 60. Tick the <b>Infinite</b> check box so that the port will not recovered automatically.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select a range of ports to use for this configuration.
<b>State</b>	Use the drop-down menu to enable or disable the protection mode for a specific port.
<b>Mode</b>	Specify the BPDU protection mode. The default mode is shutdown. <i>Drop</i> – Drop all received BPDU packets when the port enters under attack state. <i>Block</i> – Drop all packets (include BPDU and normal packets) when the port enters under attack state. <i>Shutdown</i> – Shut down the port when the port enters under attack state.

Click the **Apply** button to accept the changes made for each individual section.



## Loopback Detection Settings

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.



**NOTE:** LBD should be disabled on the ring ports before enabling ERPS.

To view the following window, click **Security > Loopback Detection Settings** as shown below.

Loopback Detection Settings
Safeguard

**Loopback Detection Global Settings**

Loopback Detection State  Enabled  Disabled Apply

---

**Loopback Detection Global Settings**

Mode	Port-based	Interval (1-32767)	10 sec
Trap State	None	Recover Time (0 or 60-1000000)	60 sec
Log State	Enabled	Enabled VLANs (e.g.: 2-5)	1-4094 <input type="checkbox"/> All VLANs
Function Version	4.06	Action Mode	Shutdown <span style="float: right;">Apply</span>

---

Unit  From Port  To Port  State  Apply

---

**Unit 1 Settings**

Port	Loopback Detection State	Loop Status
1	Disabled	Normal
2	Disabled	Normal
3	Disabled	Normal
4	Disabled	Normal
5	Disabled	Normal
6	Disabled	Normal
7	Disabled	Normal
8	Disabled	Normal
9	Disabled	Normal
10	Disabled	Normal
11	Disabled	Normal
12	Disabled	Normal
13	Disabled	Normal
14	Disabled	Normal
15	Disabled	Normal
16	Disabled	Normal
17	Disabled	Normal
18	Disabled	Normal

Figure 8-55 Loopback Detection Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Loopback Detection State</b>	Use the radio button to enable or disable loopback detection. The default is Disabled.
<b>Mode</b>	Use the drop-down menu to toggle between <i>Port-based</i> and <i>VLAN-based</i> .
<b>Trap State</b>	Set the desired trap status: <i>None</i> , <i>Loop Detected</i> , <i>Loop Cleared</i> , or <i>Both</i> .
<b>Log State</b>	Specify the state of the log for loopback detection.
<b>Interval (1-32767)</b>	The time interval (in seconds) that the device will transmit all the CTP (Configuration Test Protocol) packets to detect a loop-back event. The valid range is from 1 to 32767 seconds. The default setting is 10 seconds.

<b>Recover Time (0 or 60-1000000)</b>	Time allowed (in seconds) for recovery when a Loopback is detected. The Loop-detect Recover Time can be set at 0 seconds, or 60 to 1000000 seconds. Entering 0 will disable the Loop-detect Recover Time. The default is 60 seconds.
<b>Enabled VLANs</b>	Enter a list of VLAN. Tick the <b>All VLANs</b> check box to select all VLANs.
<b>Action Mode</b>	Use the drop-down menus to select the action to be taken when the loop is detected. <i>Shutdown</i> – When the loop is detected, the port will be shut down in the port-based mode, or the traffic will be blocked on the specific VLAN in the VLAN-based mode. <i>None</i> – No action will be taken when the loop is detected.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configured.
<b>State</b>	Use the drop-down menu to toggle between <i>Enabled</i> and <i>Disabled</i> .

Click the **Apply** button to accept the changes made for each individual section.

## RPC PortMapper Filter Settings

This window is used to configure and display the RPC portmapper filter state on the specific ports. The RPC portmapper service listens on a static port (TCP or UDP port 135). It converts the RPC program numbers into TCP/IP (or UDP/IP) protocol port numbers. Some Microsoft applications and services such as Outlook, Exchange, and the Messenger Service also use this service and listen on both TCP and UDP port 135 for endpoint mapping. For management and security concerns, the purpose of this feature is to filter the TCP/UDP port 135 for prohibition of some unwanted services.

To view the following window, click **Security > RPC PortMapper Filter Settings** as shown below.

Figure 8-56 RPC PortMapper Filter Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configured.
<b>State</b>	Use the drop-down menu to enable or disable RPC portmapper filter on specified ports.

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

## NetBIOS Filtering Settings

NetBIOS is an application programming interface, providing a set of functions that applications use to communicate across networks. NetBEUI, the NetBIOS Enhanced User Interface, was created as a data-link-layer frame structure for NetBIOS. A simple mechanism to carry NetBIOS traffic, NetBEUI has been the protocol of choice for small MS-DOS- and Windows-based workgroups. NetBIOS no longer lives strictly inside of the NetBEUI protocol. Microsoft worked to create the international standards described in RFC 1001 and RFC 1002, NetBIOS over TCP/IP (NBT).

If the network administrator wants to block the network communication on more than two computers which use NETBUEI protocol, it can use NETBIOS filtering to filter these kinds of packets.

If the user enables the NETBIOS filter, the switch will create one access profile and three access rules automatically. If the user enables the extensive NETBIOS filter, the switch will create one more access profile and one more access rule.

To view the following window, click **Security > NetBIOS Filtering Settings** as shown below.

Figure 8-57 NetBIOS Filtering Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>NetBIOS Filtering</b>	Select the appropriate port to include in the NetBIOS filtering configuration.
<b>Extensive NetBIOS Filtering</b>	Select the appropriate port to include in the Extensive NetBIOS filtering configuration. Extensive NetBIOS is NetBIOS over 802.3. The Switch will deny the NetBIOS over 802.3 frame on these enabled ports.
<b>Ports</b>	Tick the appropriate ports to be configured.

Click the **Select All** button to select all ports.

Click the **Clear All** button to deselect all ports.

Click the **Apply** button to accept the changes made for each individual section.

## Traffic Segmentation Settings

Traffic segmentation is used to limit traffic flow from a single or group of ports, to a group of ports. This method of segmenting the flow of traffic is similar to using VLANs to limit traffic, but is more restrictive. It provides a method of directing traffic that does not increase the overhead of the master switch CPU.

To view the following window, click **Security > Traffic Segmentation Settings** as shown below.

Traffic Segmentation Settings

Traffic Segmentation Settings

Port List (e.g.: 1:1, 1:5)   All Ports

Forward Port List (e.g.: 1:1, 1:5)   All Ports

Unit

Port	Forward Port List
1	1:1-1:26
2	1:1-1:26
3	1:1-1:26
4	1:1-1:26
5	1:1-1:26
6	1:1-1:26
7	1:1-1:26
8	1:1-1:26
9	1:1-1:26
10	1:1-1:26
11	1:1-1:26
12	1:1-1:26
13	1:1-1:26
14	1:1-1:26
15	1:1-1:26
16	1:1-1:26
17	1:1-1:26
18	1:1-1:26
19	1:1-1:26
20	1:1-1:26
21	1:1-1:26
22	1:1-1:26
23	1:1-1:26
24	1:1-1:26
25	1:1-1:26
26	1:1-1:26

Figure 8-58 Traffic Segmentation Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Port List</b>	Enter a list of ports to be included in the traffic segmentation setup. Tick the <b>All ports</b> check box to select all ports.
<b>Forward Port List</b>	Enter a list of ports to be included in the traffic segmentation setup. by simply ticking the corresponding port's tick box. Tick the <b>All ports</b> check box to select all ports.
<b>Unit</b>	Select the unit you want to configure.

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

## DHCP Server Screening

This function allows the user 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.

The first time the DHCP filter is enabled it will create both an access profile entry and an access rule per port entry, it will also create other access rules. These rules are used to block all DHCP server packets. In addition to a permit DHCP entry it will also create one access profile and one access rule entry the first time the DHCP client MAC address is used as the client MAC address. The Source IP address is the same as the DHCP server's IP address (UDP port number 67). These rules are used to permit the DHCP server packets with specific fields, which the user has configured.

When DHCP Server filter function is enabled all DHCP Server packets will be filtered from a specific port.

## DHCP Server Screening Port Settings

The Switch supports DHCP Server Screening, a feature that denies access to rogue DHCP servers. When the DHCP server filter function is enabled, all DHCP server packets will be filtered from a specific port.

To view the following window, click **Security > DHCP Server Screening > DHCP Server Screening Port Settings** as shown below.

Figure 8-59 DHCP Server Screening Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCP Server Screening Trap State</b>	Click to enable or disable filtering DHCP server trap.
<b>DHCP Server Screening Log State</b>	Click to enable or disable filtering DHCP server log.
<b>Illegitimate Server Log Suppress Duration</b>	Choose an illegal server log suppress duration of 1 minute, 5 minutes, or 30 minutes.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configured.
<b>VID List (1-4094)</b>	Tick the check box and enter a list of VLAN ID.
<b>State</b>	Choose <i>Enabled</i> to enable the DHCP server screening or <i>Disabled</i> to disable it. The default is <i>Disabled</i> .

Click the **Apply** button to accept the changes made for each individual section.

## DHCP Offer Permit Entry Settings

This window is used to add or delete permit entries.

To view the following window, click **Security > DHCP Server Screening > DHCP Offer Permit Entry Settings** as shown below.

Figure 8-60 DHCP Offer Permit Entry Settings window

The fields that can be configured are described below:

Parameter	Description
Server IP Address	The IP address of the DHCP server to be permitted.
Client's MAC Address	Enter the client's MAC address. Leave it blank to received packets from all client's MAC address.
Ports	The port numbers of the filter DHCP server. Tick the <b>All Ports</b> check box to include all the ports on this switch for this configuration.

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

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

## Filter DHCPv6 Server

This window is used to configure the filter DHCPv6 server state.

To view the following window, click **Security > DHCP Server Screening > Filter DHCPv6 Server** as shown below.

Figure 8-61 Filter DHCPv6 Server window

The fields that can be configured are described below:

Parameter	Description
Log State	Click to enable or disable the filter DHCPv6 server log state.
Trap State	Click to enable or disable the filter DHCPv6 server trap state.
Ports	Enter a range of ports to be configured. Tick the <b>All Ports</b> check box to include all the ports on this switch for this configuration.
State	Select to enable or disable the filter DHCPv6 server state.
Source IP Address	Enter the source IPv6 address to the filter DHCPv6 server forward list.

Click the **Apply** button to accept the changes made for each individual section.

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

## Filter ICMPv6

This window is used to configure the filter ICMPv6 RA all nodes trap and log state, and filter ICMPv6 RA all nodes settings.

To view the following window, click **Security > DHCP Server Screening > Filter ICMPv6** as shown below.

Figure 8-62 Filter ICMPv6 window

The fields that can be configured are described below:

Parameter	Description
<b>Trap State</b>	Click to enable or disable the filter ICMPv6 RA all nodes trap state.
<b>Log State</b>	Click to enable or disable the filter ICMPv6 RA all nodes log state.
<b>Ports</b>	Enter a range of ports to be configured. Tick the <b>All Ports</b> check box to include all the ports on this switch for this configuration.
<b>State</b>	Select to enable or disable the filter ICMPv6 RA all nodes state.
<b>Source IP Address</b>	Enter the source IPv6 address to the filter ICMPv6 RA all nodes forward list.

Click the **Apply** button to accept the changes made for each individual section.

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

## Access Authentication Control

The TACACS / XTACACS / TACACS+ / RADIUS commands allow users to secure access to the Switch using the TACACS / XTACACS / TACACS+ / RADIUS protocols. When a user logs in to the Switch or tries to access the administrator level privilege, he or she is prompted for a password. If TACACS / XTACACS / TACACS+ / RADIUS authentication is enabled on the Switch, it will contact a TACACS / XTACACS / TACACS+ / RADIUS server to verify the user. If the user is verified, he or she is granted access to the Switch.

There are currently three versions of the TACACS security protocol, each a separate entity. The Switch's software supports the following versions of TACACS:

- **TACACS** (Terminal Access Controller Access Control System) - Provides password checking and authentication, and notification of user actions for security purposes utilizing via one or more centralized TACACS servers, utilizing the UDP protocol for packet transmission.



- **Extended TACACS (XTACACS)** - An extension of the TACACS protocol with the ability to provide more types of authentication requests and more types of response codes than TACACS. This protocol also uses UDP to transmit packets.
- **TACACS+ (Terminal Access Controller Access Control System plus)** - Provides detailed access control for authentication for network devices. TACACS+ is facilitated through Authentication commands via one or more centralized servers. The TACACS+ protocol encrypts all traffic between the Switch and the TACACS+ daemon, using the TCP protocol to ensure reliable delivery

In order for the TACACS / XTACACS / TACACS+ / RADIUS security function to work properly, a TACACS / XTACACS / TACACS+ / RADIUS server must be configured on a device other than the Switch, called an Authentication Server Host and it must include usernames and passwords for authentication. When the user is prompted by the Switch to enter usernames and passwords for authentication, the Switch contacts the TACACS / XTACACS / TACACS+ / RADIUS server to verify, and the server will respond with one of three messages:

The server verifies the username and password, and the user is granted normal user privileges on the Switch.

The server will not accept the username and password and the user is denied access to the Switch.

The server doesn't respond to the verification query. At this point, the Switch receives the timeout from the server and then moves to the next method of verification configured in the method list.

The Switch has four built-in Authentication Server Groups, one for each of the TACACS, XTACACS, TACACS+ and RADIUS protocols. These built-in Authentication Server Groups are used to authenticate users trying to access the Switch. The users will set Authentication Server Hosts in a preferable order in the built-in Authentication Server Groups and when a user tries to gain access to the Switch, the Switch will ask the first Authentication Server Hosts for authentication. If no authentication is made, the second server host in the list will be queried, and so on. The built-in Authentication Server Groups can only have hosts that are running the specified protocol. For example, the TACACS Authentication Server Groups can only have TACACS Authentication Server Hosts.

The administrator for the Switch may set up six different authentication techniques per user-defined method list (TACACS / XTACACS / TACACS+ / RADIUS / local / none) for authentication. These techniques will be listed in an order preferable, and defined by the user for normal user authentication on the Switch, and may contain up to eight authentication techniques. When a user attempts to access the Switch, the Switch will select the first technique listed for authentication. If the first technique goes through its Authentication Server Hosts and no authentication is returned, the Switch will then go to the next technique listed in the server group for authentication, until the authentication has been verified or denied, or the list is exhausted.

Users granted access to the Switch will be granted normal user privileges on the Switch. To gain access to administrator level privileges, the user must access the **Enable Admin** window and then enter a password, which was previously configured by the administrator of the Switch.



**NOTE:** TACACS, XTACACS and TACACS+ are separate entities and are not compatible. The Switch and the server must be configured exactly the same, using the same protocol. (For example, if the Switch is set up for TACACS authentication, so must be the host server.)

## Enable Admin

Users who have logged on to the Switch on the normal user level and wish to be promoted to the administrator level can use this window. After logging on to the Switch, users will have only user level privileges. To gain access to administrator level privileges, the user will open this window and will have to enter an authentication password. Possible authentication methods for this function include TACACS/XTACACS/TACACS+/RADIUS, user defined server groups, local enable (local account on the Switch), or no authentication (none). Because XTACACS and TACACS do not support the enable function, the user must create a special account on the server host, which has the username "enable", and a password configured by the administrator that will support the "enable" function. This function becomes inoperable when the authentication policy is disabled.

To view the following window, click **Security > Access Authentication Control > Enable Admin** as shown below.



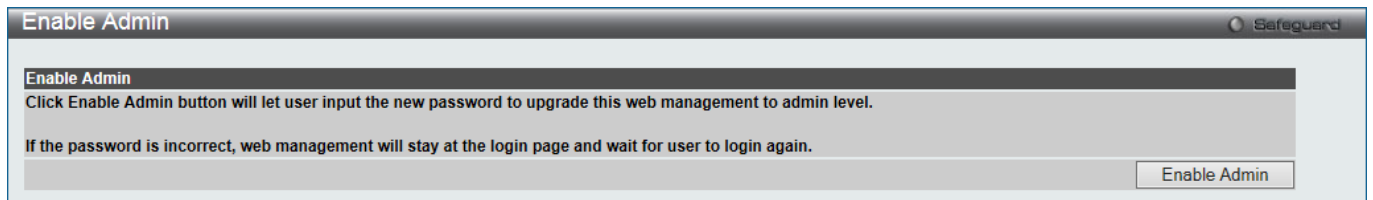


Figure 8-63 Enable Admin window

When this window appears, click the **Enable Admin** button revealing a window for the user to enter authentication (password, username), as shown below. A successful entry will promote the user to Administrator level privileges on the Switch.



Figure 8-64 Log-in Page

## Authentication Policy Settings

Users can enable an administrator-defined authentication policy for users trying to access the Switch. When enabled, the device will check the Login Method List and choose a technique for user authentication upon login.

To view the following window, click **Security > Access Authentication Control > Authentication Policy Settings** as shown below.

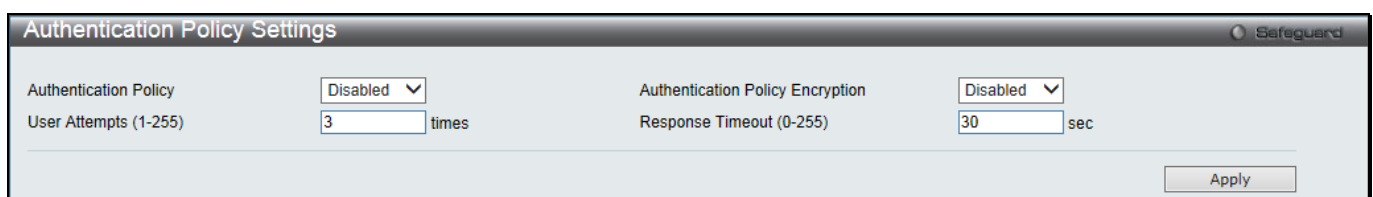


Figure 8-65 Authentication Policy Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Authentication Policy</b>	Use the drop-down menu to enable or disable the Authentication Policy on the Switch.
<b>Authentication Policy Encryption</b>	Use the drop-down menu to enable or disable authentication policy encryption.
<b>User Attempts (1-255)</b>	This command will configure the maximum number of times the Switch will accept authentication attempts. Users failing to be authenticated after the set amount of attempts will be denied access to the Switch and will be locked out of further authentication attempts. Command line interface users will have to wait 60 seconds before another authentication attempt. Telnet and web users will be disconnected

	from the Switch. The user may set the number of attempts from 1 to 255. The default setting is 3.
<b>Response Timeout (0-255)</b>	This field will set the time the Switch will wait for a response of authentication from the user. The user may set a time between 0 and 255 seconds. The default setting is 30 seconds.

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

## Application Authentication Settings

Users can configure Switch configuration applications (Console, Telnet, SSH, HTTP) for login at the user level and at the administration level (Enable Admin) utilizing a previously configured method list.

To view the following window, click **Security > Access Authentication Control > Application Authentication Settings** as shown below.

Application	Login Method List	Enable Method List
Console	default	default
Telnet	default	default
SSH	default	default
HTTP	default	default

Apply

Figure 8-66 Application Authentication Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Application</b>	Lists the configuration applications on the Switch. The user may configure the Login Method List and Enable Method List for authentication for users utilizing the Console (Command Line Interface) application, the Telnet application, SSH, and the Web (HTTP) application.
<b>Login Method List</b>	Using the drop-down menu, configure an application for normal login on the user level, utilizing a previously configured method list. The user may use the default Method List or other Method List configured by the user. See the Login Method Lists window, in this section, for more information.
<b>Enable Method List</b>	Using the drop-down menu, configure an application to promote user level to admin-level users utilizing a previously configured method list. The user may use the default Method List or other Method List configured by the user. See the Enable Method Lists window, in this section, for more information.

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

## Accounting Settings

Users can configure the state of the specified RADIUS accounting service.

To view the following window, click **Security > Access Authentication Control > Accounting Settings** as shown below.

**Accounting Settings** Safeguard

Network:  ▼

Shell:  ▼

System:  ▼

**Command Service Method List Name Settings**

Administrator:  ▼

Operator:  ▼

Power User:  ▼

User:  ▼

**Network:** When enabled, the switch will send informational packets to a remote server when 802.1X, WAC and JWAC port access control events occur on the switch.

**Shell:** When enabled, the switch will send informational packets to a remote server when a user either logs in, logs out or times out on the switch, using the console, Telnet, or SSH.

**System:** When enabled, the switch will send informational packets to a remote server when system events occur on the switch, such as a system reset or system boot.

**Command Accounting:** It's the service for all administrator, operator, power user or user level commands. When it selects method list name, it specifies accounting service by the AAA user defined method list. When it selects none, the switch disables AAA command accounting services by specified command level.

Figure 8-67 Accounting Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Network</b>	When <i>RADIUS Only</i> is selected, the Switch will send network informational packets to a remote RADIUS server. When <i>Method List Name</i> is selected, the Switch will send network informational packets based on the method list created.
<b>Shell</b>	When <i>RADIUS Only</i> is selected, the Switch will send shell informational packets to a remote RADIUS server. When <i>Method List Name</i> is selected, the Switch will send shell informational packets based on the method list created.
<b>System</b>	When <i>RADIUS Only</i> is selected, the Switch will send system informational packets to a remote RADIUS server. When <i>Method List Name</i> is selected, the Switch will send system informational packets based on the method list created.
<b>Administrator</b>	When selected, the accounting service for all administrator level commands will be enabled.
<b>Operator</b>	When selected, the accounting service for all operator level commands will be enabled.
<b>Power User</b>	When selected, the accounting service for all power-user level commands will be enabled.
<b>User</b>	When selected, the accounting service for all user level commands will be enabled.

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

## Authentication Server Group Settings

Users can set up Authentication Server Groups on the Switch. A server group is a technique used to group TACACS/XTACACS/TACACS+/RADIUS server hosts into user-defined categories for authentication using method lists. The user may define the type of server group by protocol or by previously defined server group. The Switch has four built-in Authentication Server Groups that cannot be removed but can be modified. Up to eight authentication server hosts may be added to any particular group.

To view the following window, click **Security > Access Authentication Control > Authentication Server Group Settings** as shown below.

Figure 8-68 Authentication Server Group Settings – Server Group List window

This window displays the Authentication Server Groups on the Switch. The Switch has four built-in Authentication Server Groups that cannot be removed but can be modified. To add a new Server Group, enter a name in the **Group Name** field and then click the **Add** button. To modify a particular group, click the **Edit** button (or the **Edit Server Group** tab), which will then display the following **Edit Server Group** tab:

Figure 8-69 Authentication Server Group Settings – Edit Server Group window

To add an Authentication Server Host to the list, enter its name in the **Group Name** field, IP address in the **IP Address** field, use the drop-down menu to choose the **Protocol** associated with the IP address of the Authentication Server Host, and then click **Add** to add this Authentication Server Host to the group. The entry should appear in the Host List at the bottom of this tab.



**NOTE:** The user must configure Authentication Server Hosts using the Authentication Server Settings window before adding hosts to the list. Authentication Server Hosts must be configured for their specific protocol on a remote centralized server before this function can work properly.



**NOTE:** The three built-in server groups can only have server hosts running the same TACACS daemon. TACACS/XTACACS/TACACS+ protocols are separate entities and are not compatible with each other.

## Authentication Server Settings

User-defined Authentication Server Hosts for the TACACS / XTACACS / TACACS+ / RADIUS security protocols can be set on the Switch. When a user attempts to access the Switch with Authentication Policy enabled, the Switch will send authentication packets to a remote TACACS / XTACACS / TACACS+ / RADIUS server host on a remote host. The TACACS / XTACACS / TACACS+ / RADIUS server host will then verify or deny the request and return the appropriate message to the Switch. More than one authentication protocol can be run on the same physical server host but, remember that TACACS / XTACACS / TACACS+ / RADIUS are separate entities and are not compatible with each other. The maximum supported number of server hosts is 16.

To view the following window, click **Security > Access Authentication Control > Authentication Server Settings** as shown below.

IP Address	Protocol	Port	Accounting Port	Timeout	Key	Retransmit
10.90.90.3	TACACS	49	-----	5	-----	2

Figure 8-70 Authentication Server Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IP Address</b>	The IP address of the remote server host to add.
<b>Protocol</b>	The protocol used by the server host. The user may choose one of the following: <i>TACACS</i> - Enter this parameter if the server host utilizes the TACACS protocol. <i>XTACACS</i> - Enter this parameter if the server host utilizes the XTACACS protocol. <i>RADIUS</i> - Enter this parameter if the server host utilizes the RADIUS protocol. <i>TACACS+</i> - Enter this parameter if the server host utilizes the TACACS+ protocol.
<b>Key</b>	Authentication key to be shared with a configured TACACS+ or RADIUS servers only. Specify an alphanumeric string up to 254 characters.
<b>Accounting Port</b>	Enter the UDP port number which is used to transmit RADIUS accounting statistics between the Switch and the RADIUS server. This field is available when <i>RADIUS</i> is selected in <b>Protocol</b> .
<b>Port (1-65535)</b>	Enter a number between 1 and 65535 to define the virtual port number of the authentication protocol on a server host. The default port number is 49 for TACACS, XTACACS or TACACS+ servers, and 1812 for RADIUS servers. However, the user may set a unique port number for higher security.
<b>Timeout (1-255)</b>	Enter the time in seconds the Switch will wait for the server host to reply to an authentication request. The default value is 5 seconds.
<b>Retransmit (1-20)</b>	Enter the value in the retransmit field to change how many times the device will resend an authentication request when the server does not respond. This value will not take effect when configuring to TACACS+. The default value is 2.

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.



**NOTE:** More than one authentication protocol can be run on the same physical server host but, remember that TACACS/XTACACS/TACACS+ are separate entities and are not compatible with each other.

## Login Method Lists Settings

User-defined or default Login Method List of authentication techniques can be configured for users logging on to the Switch. The sequence of techniques implemented in this command will affect the authentication result. For example, if a user enters a sequence of techniques, for example TACACS - XTACACS- local, the Switch will send an authentication request to the first TACACS host in the server group. If no response comes from the server host, the Switch will send an authentication request to the second TACACS host in the server group and so on, until the list is exhausted. At that point, the Switch will restart the same sequence with the following protocol listed, XTACACS. If no authentication takes place using the XTACACS list, the local account database set in the Switch is used to authenticate the user. When the local method is used, the privilege level will be dependent on the local account privilege configured on the Switch.

Successful login using any of these techniques will give the user a "User" privilege only. If the user wishes to upgrade his or her status to the administrator level, the user must use the **Enable Admin** window, in which the user must enter a previously configured password, set by the administrator.

To view the following window, click **Security > Access Authentication Control > Login Method Lists Settings** as shown below.

Method List Name	Priority 1	Priority 2	Priority 3	Priority 4	Edit	Delete
default	local	----	----	----		

Figure 8-71 Login Method Lists Settings window

The Switch contains one Method List that is set and cannot be removed, yet can be modified. To delete a Login Method List defined by the user, click the **Delete** button corresponding to the entry desired to be deleted. To modify a Login Method List, click on its corresponding **Edit** button.

The fields that can be configured are described below:

Parameter	Description
<b>Method List Name</b>	Enter a method list name defined by the user of up to 15 characters.
<b>Priority 1, 2, 3, 4</b>	The user may add one, or a combination of up to four of the following authentication methods to this method list: <i>none</i> - Adding this parameter will require no authentication needed to access the Switch. <i>local</i> - Adding this parameter will require the user to be authenticated using the local user account database on the Switch. <i>radius</i> - Adding this parameter will require the user to be authenticated using the RADIUS protocol from a remote RADIUS server. <i>tacacs</i> - Adding this parameter will require the user to be authenticated using the TACACS protocol from a remote TACACS server. <i>tacacs+</i> - Adding this parameter will require the user to be authenticated using the TACACS+ protocol from a remote TACACS+ server. <i>xtacacs</i> - Adding this parameter will require the user to be authenticated using the

	XTACACS protocol from a remote XTACACS 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 remove the specific entry.

## Enable Method Lists Settings

Users can set up Method Lists to promote users with user level privileges to Administrator (Admin) level privileges using authentication methods on the Switch. Once a user acquires normal user level privileges on the Switch, he or she must be authenticated by a method on the Switch to gain administrator privileges on the Switch, which is defined by the Administrator. A maximum of eight Enable Method Lists can be implemented on the Switch, one of which is a default Enable Method List. This default Enable Method List cannot be deleted but can be configured.

The sequence of methods implemented in this command will affect the authentication result. For example, if a user enters a sequence of methods like TACACS - XTACACS - Local Enable, the Switch will send an authentication request to the first TACACS host in the server group. If no verification is found, the Switch will send an authentication request to the second TACACS host in the server group and so on, until the list is exhausted. At that point, the Switch will restart the same sequence with the following protocol listed, XTACACS. If no authentication takes place using the XTACACS list, the Local Enable password set in the Switch is used to authenticate the user.

Successful authentication using any of these methods will give the user an "Admin" privilege.



**NOTE:** To set the Local Enable Password, see the next section, entitled Local Enable Password.

To view the following window, click **Security > Access Authentication Control > Enable method Lists Settings** as shown below.

Method List Name	Priority 1	Priority 2	Priority 3	Priority 4		
default	local_enable	----	----	----	Edit	Delete

Figure 8-72 Enable method Lists Settings window

To delete an Enable Method List defined by the user, click the **Delete** button corresponding to the entry desired to be deleted. To modify an Enable Method List, click on its corresponding **Edit** button.

The fields that can be configured are described below:

Parameter	Description
<b>Method List Name</b>	Enter a method list name defined by the user of up to 15 characters.
<b>Priority 1, 2, 3, 4</b>	The user may add one, or a combination of up to four of the following authentication methods to this method list: <i>tacacs</i> - Adding this parameter will require the user to be authenticated using the TACACS protocol from a remote TACACS server. <i>xtacacs</i> - Adding this parameter will require the user to be authenticated using the XTACACS protocol from a remote XTACACS server. <i>tacacs+</i> - Adding this parameter will require the user to be authenticated using the



	<p>TACACS+ protocol from a remote TACACS+ server.</p> <p><i>radius</i> - Adding this parameter will require the user to be authenticated using the RADIUS protocol from a remote RADIUS server.</p> <p><i>local_enable</i> - Adding this parameter will require the user to be authenticated using the local enable password database on the Switch. The local enable password must be set by the user in the next section entitled Local Enable Password.</p> <p><i>none</i> - Adding this parameter will require no authentication needed to access the Switch.</p>
--	---

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.

## Accounting Method Lists Settings

User can create and configure accounting method lists on the Switch.  
 To view the following window, click **Security > Access Authentication Control > Accounting Method Lists Settings** as shown below.



Figure 8-73 Accounting Method Lists Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Method List Name</b>	Enter a method list name defined by the user of up to 15 characters.
<b>Priority 1, 2, 3, 4</b>	<p>The user may add one, or a combination of up to four of the following accounting methods to this method list:</p> <p><i>none</i> - Adding this parameter will require no accounting.</p> <p><i>radius</i> - Adding this parameter will require the user to be accounted using the RADIUS protocol from a remote RADIUS server.</p> <p><i>tacacs+</i> - Adding this parameter will require the user to be accounted using the TACACS protocol from a remote TACACS server.</p>

Click the **Apply** button to accept the changes made.  
 Click the **Edit** button to re-configure the specific entry.  
 Click the **Delete** button to an Enable Method List defined by the user.

## Local Enable Password Settings

Users can configure the locally enabled password for Enable Admin. When a user chooses the "local\_enable" method to promote user level privileges to administrator privileges, he or she will be prompted to enter the password configured here that is locally set on the Switch.

To view the following window, click **Security > Access Authentication Control > Local Enable Password Settings** as shown below.



Figure 8-74 Local Enable Password Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Encryption</b>	Use the drop-down menu to select the encryption type.
<b>Old Local Enable Password</b>	If a password was previously configured for this entry, enter it here in order to change it to a new password
<b>New Local Enable Password</b>	Enter the new password that you wish to set on the Switch to authenticate users attempting to access Administrator Level privileges on the Switch. The user may set a password of up to 15 characters.
<b>Confirm Local Enable Password</b>	Confirm the new password entered above. Entering a different password here from the one set in the New Local Enabled field will result in a fail message.
<b>Local Enable Password</b>	Enter the local password for promoting the privilege level.

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

## Authentication Source IP Interface Settings

This window is used to configure RADIUS or TACACS source IP settings.

To view the following window, click **Security > Access Authentication Control > Authentication Source IP Interface Settings** as shown below.

Figure 8-75 Authentication Source IP Interface Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter the interface name as the source interface for all outgoing RADIUS/TACACS packets.
<b>IPv4 Address</b>	Enter the source IPv4 address as the source interface for all outgoing RADIUS/TACACS packets.
<b>IPv6 Address</b>	Enter the source IPv6 address as the source interface for all outgoing RADIUS packets.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all the information entered in the fields.

## SSL

Secure Sockets Layer, or SSL, is a security feature that will provide a secure communication path between a host 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:

- 5 **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 host as they “exchange keys” in looking for a match and therefore authentication to be accepted to negotiate encryptions on the following level.
- 6 **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) to create the encrypted text.
- 7 **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 two hash algorithms, MD5 (Message Digest 5) and SHA (Secure Hash Algorithm).

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 host. 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. The Switch supports SSLv3. Other versions of SSL may not be compatible with this Switch and may cause problems upon authentication and transfer of messages from client to host.

The SSL Settings window located on the next page will allow the user to enable SSL on the Switch and implement any one or combination of listed cipher suites on the Switch. A cipher suite is a security string that determines the exact cryptographic parameters, specific encryption algorithms and key sizes to be used for an authentication session. The Switch possesses four possible cipher suites for the SSL function, which are all enabled by default. To utilize a particular cipher suite, disable the unwanted cipher suites, leaving the desired one for authentication.

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. The Switch only supports certificate files with `.der` file extensions. Currently, the Switch comes with a certificate pre-loaded though the user may need to download more, depending on user circumstances.

## SSL Settings

This window is used to configure the SSL settings.

To view the following window, click **Security > SSL > SSL Settings** as shown below.

Figure 8-76 SSL Settings window

To set up the SSL function on the Switch, configure the parameters in the SSL Settings section described.

The fields that can be configured are described below:

Parameter	Description
<b>SSL Status</b>	Use the radio buttons to enable or disable the SSL status on the Switch. The default is Disabled.
<b>Cache Timeout (60-86400)</b>	This field will set the time between a new key exchange between a client and a host using the SSL function. A new SSL session is established every time the client and host go through a key exchange. Specifying a longer timeout will allow the SSL session to reuse the master key on future connections with that particular host, therefore speeding up the negotiation process. The default setting is 600 seconds.

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

To set up the **SSL cipher suite function** on the Switch, configure the parameters in the SSL Cipher suite Settings section described below:

Parameter	Description
<b>RSA with RC4_128_MD5</b>	This cipher suite combines the RSA key exchange, stream cipher RC4 encryption with 128-bit keys and the MD5 Hash Algorithm. Use the radio buttons to enable or disable this cipher suite. This field is Enabled by default.
<b>RSA with 3DES EDE CBC SHA</b>	This cipher suite combines the RSA key exchange, CBC Block Cipher 3DES_EDE encryption and the SHA Hash Algorithm. Use the radio buttons to enable or disable this cipher suite. This field is Enabled by default.
<b>DHS DSS with 3DES EDE CBC SHA</b>	This cipher suite combines the DSA Diffie Hellman key exchange, CBC Block Cipher 3DES_EDE encryption and SHA Hash Algorithm. Use the radio buttons to enable or disable this cipher suite. This field is Enabled by default.
<b>RSA EXPORT with RC4 40 MD5</b>	This cipher suite combines the RSA Export key exchange and stream cipher RC4 encryption with 40-bit keys. Use the radio buttons to enable or disable this cipher suite. This field is Enabled by default.

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

To download SSL certificates, configure the parameters in the SSL Certificate Download section described below.

Parameter	Description
<b>Server IP Address</b>	Enter the IPv4 address of the TFTP server where the certificate files are located.
<b>Certificate File Name</b>	Enter the path and the filename of the certificate file to download. This file must have a .der extension. (Ex. c:/cert.der)
<b>Key File Nam</b>	Enter the path and the filename of the key file to download. This file must have a .der extension (Ex. c:/pkey.der)

Click the **Download** button to download the SSL certificate based on the information entered.



**NOTE:** Certain implementations concerning the function and configuration of SSL are not available on the web-based management of this Switch and need to be configured using the command line interface.



**NOTE:** Enabling the SSL command will disable the web-based switch management. To log on to the Switch again, the header of the URL must begin with https://. Entering anything else into the address field of the web browser will result in an error and no authentication will be granted.

## SSL Certification Settings

This window is used to configure the SSL certification settings

To view the following window, click **Security > SSL > SSL Certification Settings** as shown below.

Figure 8-77 SSL Certification Settings window

The fields that can be configured are described below:

Parameter	Description
<b>SSL Certification File Name</b>	Use the drop-down menu to select the SSL Certification File Name.
<b>SSL CA Chain Configuration</b>	Enter chain of certifications on the Switch. Click the <b>Default</b> button to constitute all the certificates as a certificated chain.
<b>SSL Certificate File Name</b>	Enter an SSL certificate file name to be deleted.

Click the **Apply** button to accept the changes made for each individual section.

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

# SSH

SSH is an abbreviation of Secure Shell, which is a program allowing secure remote login and secure network services over an insecure network. It 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 List** 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 Settings 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 Settings

Users can configure and view settings for the SSH server.

To view the following window, click **Security > SSH > SSH Settings** as shown below.

Figure 8-78 SSH Settings window

The fields that can be configured are described below:

Parameter	Description
SSH Server State	Use the radio buttons to enable or disable SSH on the Switch. The default is

	Disabled.
<b>Max. Session (1-8)</b>	Enter a value between 1 and 8 to set the number of users that may simultaneously access the Switch. The default setting is 8.
<b>Connection Timeout (30-600)</b>	Allows the user to set the connection timeout. The user may set a time between 30 and 600 seconds. The default setting is 120 seconds.
<b>Authentication Fail Attempts (2-20)</b>	Allows the Administrator to set the maximum number of attempts that a user may try to log on to the SSH Server utilizing the SSH authentication. After the maximum number of attempts has been exceeded, the Switch will be disconnected and the user must reconnect to the Switch to attempt another login. The number of maximum attempts may be set between 2 and 20. The default setting is 2.
<b>Rekey Timeout</b>	This field is used to set the time period that the Switch will change the security shell encryptions by using the drop-down menu. The available options are <i>Never</i> , <i>10 min</i> , <i>30 min</i> , and <i>60 min</i> . The default setting is <i>Never</i> .
<b>TCP Port Number (1-65535)</b>	Here the user can enter the TCP Port Number used for SSH. The default value is 22.
<b>Bypass Login Screen State</b>	Specifies to bypass the username and password login screen to avoid a secondary authentication after using SSH public key authentication. If this method is specified, the login user using SSH public key authentication can execute command directly with the initial privilege level of the login user.
<b>File Name</b>	Enter the file name, or click the <b>Browse</b> button to navigate to the key file.
<b>Key ID</b>	Enter the key ID to be associated with the user account.
<b>Type</b>	Use the drop-down menu to add or remove the user.
<b>User Name</b>	Enter the user name to be configured.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Download** button to initiate the download.

Click the **Upload SSH Public Key** button to upload the SSH public key file from the switch to a computer through the TFTP protocol.

## SSH Authentication Method and Algorithm Settings

Users can configure the desired types of SSH algorithms used for authentication encryption. There are three categories of algorithms listed and specific algorithms of each may be enabled or disabled by ticking their corresponding check boxes. All algorithms are enabled by default.

To view the following window, click **Security > SSH > SSH Authentication method and Algorithm Settings** as shown below.

Figure 8-79 SSH Authentication Method and Algorithm Settings window

The fields that can be configured for **SSH Authentication Mode** are described below:

Parameter	Description
<b>Password</b>	This may be enabled or disabled to choose if the administrator wishes to use a locally configured password for authentication on the Switch. This parameter is enabled by default.
<b>Public Key</b>	This may be enabled or disabled to choose if the administrator wishes to use a public key configuration set on a SSH server, for authentication. This parameter is enabled by default.
<b>Host-based</b>	This may be enabled or disabled to choose if the administrator wishes to use a host computer for authentication. This parameter is intended for Linux users requiring SSH authentication techniques and the host computer is running the Linux operating system with a SSH program previously installed. This parameter is enabled by default.

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

The fields that can be configured for the **Encryption Algorithm** are described below:

Parameter	Description
<b>3DES-CBC</b>	Use the check box to enable or disable the Triple Data Encryption Standard encryption algorithm with Cipher Block Chaining. The default is enabled.
<b>AES128-CBC</b>	Use the check box to enable or disable the Advanced Encryption Standard AES128 encryption algorithm with Cipher Block Chaining. The default is enabled.
<b>AES192-CBC</b>	Use the check box to enable or disable the Advanced Encryption Standard AES192 encryption algorithm with Cipher Block Chaining. The default is enabled.
<b>AES256-CBC</b>	Use the check box to enable or disable the Advanced Encryption Standard AES256 encryption algorithm with Cipher Block Chaining. The default is enabled.
<b>Cast128-CBC</b>	Use the check box to enable or disable the Cast128 encryption algorithm with Cipher Block Chaining. The default is enabled.
<b>ARC4</b>	Use the check box to enable or disable the Arcfour encryption algorithm. The default is enabled.
<b>Blow-fish CBC</b>	Use the check box to enable or disable the Blowfish encryption algorithm with Cipher Block Chaining. The default is enabled.
<b>Twofish128</b>	Use the check box to enable or disable the twofish128 encryption algorithm. The default is enabled.
<b>Twofish192</b>	Use the check box to enable or disable the twofish192 encryption algorithm. The default is enabled.
<b>Twofish256</b>	Use the check box to enable or disable the twofish256 encryption algorithm. The default is enabled.

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

The fields that can be configured for the **Data Integrity Algorithm** are described below:

Parameter	Description
<b>HMAC-MD5</b>	Use the check box to enable or disable the HMAC (Hash for Message Authentication Code) mechanism utilizing the MD5 Message Digest encryption algorithm. The default is enabled.
<b>HMAC-SHA1</b>	Use the check box to enable or disable the HMAC (Hash for Message Authentication Code) mechanism utilizing the Secure Hash algorithm. The default is enabled.

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

The fields that can be configured for the **Public Key Algorithm** are described below:

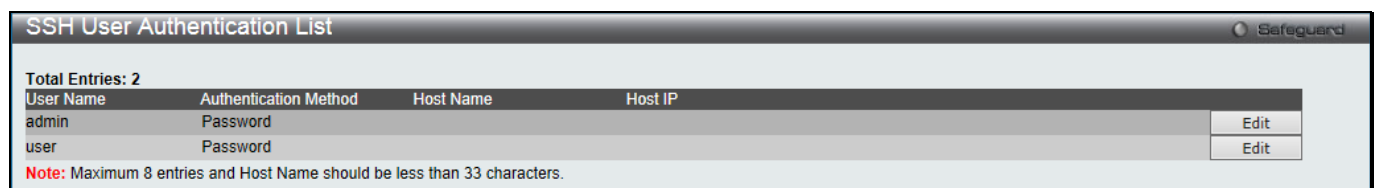
Parameter	Description
<b>HMAC-RSA</b>	Use the check box to enable or disable the HMAC (Hash for Message Authentication Code) mechanism utilizing the RSA encryption algorithm. The default is enabled.
<b>HMAC-DSA</b>	Use the check box to enable or disable the HMAC (Hash for Message Authentication Code) mechanism utilizing the Digital Signature Algorithm (DSA) encryption. The default is enabled.

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

## SSH User Authentication List

Users can configure parameters for users attempting to access the Switch through SSH. In the window above, the User Account “username” has been previously set using the **User Accounts** window in the **System Configuration** folder. A User Account **MUST** be set in order to set the parameters for the SSH user.

To view the following window, click **Security > SSH > SSH User Authentication List** as shown below.



User Name	Authentication Method	Host Name	Host IP
admin	Password		
user	Password		

**Note:** Maximum 8 entries and Host Name should be less than 33 characters.

Figure 8-80 SSH User Authentication List window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>User Name</b>	A name of no more than 15 characters to identify the SSH user. This User Name must be a previously configured user account on the Switch.
<b>Authentication Method</b>	The administrator may choose one of the following to set the authorization for users attempting to access the Switch.  <i>Host Name</i> – This parameter should be chosen if the administrator wishes to use a remote host name for authentication purposes. Choosing this parameter requires the user to input the following information to identify the SSH user.  <i>Password</i> – This parameter should be chosen if the administrator wishes to use an administrator-defined password for authentication. Upon entry of this parameter, the Switch will prompt the administrator for a password, and then to re-type the password for confirmation.  <i>Public Key</i> – This parameter should be chosen if the administrator wishes to use the public key on a SSH server for authentication.
<b>Host Name</b>	Enter an alphanumeric string of no more than 32 characters to identify the remote SSH user. This parameter is only used in conjunction with the <i>Host Based</i> choice in the Auth. Mode field.
<b>Host IP</b>	Enter the corresponding IP address of the SSH user. This parameter is only used in conjunction with the <b>Host Based</b> choice in the <b>Authentication Method</b> field.

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

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



**NOTE:** To set the SSH User Authentication Mode parameters on the Switch, a User Account must be previously configured.



# DoS Attack Prevention Settings

This window is used to configure the Denial-of-Service (DoS) attack prevention settings.

To view the following window, click **Security > DoS Attack Prevention Settings** as shown below.

**DoS Attack Prevention Settings** Safeguard

**DoS Type Selection**

Land Attack       Blat Attack       TCP Tiny Fragment Attack       TCP Null Scan

TCP Xmas Scan       TCP SYNFIN       TCP SYN Src Port Less 1024       Ping of Death Attack

All

---

**DoS Settings**

State:       Action:      

---

**DoS Trap/Log Settings**

DoS Trap State:       DoS Log State:       Function Version: 1.01     

---

**Total Entries: 8**

DoS Type	State	Action	Detail
Land Attack	Disabled	Drop	<a href="#">View Detail</a>
Blat Attack	Disabled	Drop	<a href="#">View Detail</a>
TCP Null Scan	Disabled	Drop	<a href="#">View Detail</a>
TCP Xmas Scan	Disabled	Drop	<a href="#">View Detail</a>
TCP SYNFIN	Disabled	Drop	<a href="#">View Detail</a>
TCP SYN SrcPort Less 1024	Disabled	Drop	<a href="#">View Detail</a>
Ping of Death Attack	Disabled	Drop	<a href="#">View Detail</a>
TCP Tiny Fragment Attack	Disabled	Drop	<a href="#">View Detail</a>

Figure 8-81 DoS Attack Prevention Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Land Attack</b>	Tick to check whether the source address is equal to destination address of a received IP packet.
<b>Blat Attack</b>	Tick check whether the source port is equal to destination port of a received TCP packet.
<b>TCP Tiny Fragment Attack</b>	Tick to check whether the packets are TCP tiny fragment packets.
<b>TCP Null Scan</b>	Tick to check whether a received TCP packet contains a sequence number of 0 and no flags
<b>TCP Xmas Scan</b>	Tick to check whether a received TCP packet contains URG, Push and FIN flags.
<b>TCP SYNFIN</b>	Tick to check whether a received TCP packet contains FIN and SYN flags.
<b>TCP SYN Src Port Less 1024</b>	Tick to check whether the TCP packets source ports are less than 1024 packets.
<b>Ping of Death Attack</b>	Tick to detect whether received packets are fragmented ICMP packets.
<b>All</b>	Tick to select all DoS attack types.
<b>State</b>	Select to enable or disable DoS attack prevention.
<b>Action</b>	Select the action to be taken when detecting the attack.
<b>DoS Trap State</b>	Select to enable or disable DoS prevention trap state.
<b>DoS Log State</b>	Select to enable or disable DoS prevention log state.

Click the **Apply** button to accept the changes made for each individual section.

Click the [View Detail](#) link to view more information regarding the specific entry.

After clicking the [View Detail](#) link, the following window will appear.

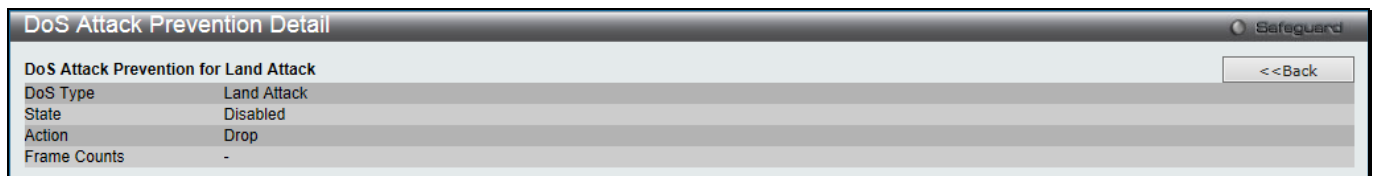


Figure 8-82 DoS Attack Prevention Detail - View Detail window

## Trusted Host Settings

Up to ten trusted host secure IPv4/IPv6 addresses may be configured and used for remote Switch management. It should be noted that if one or more trusted hosts are enabled, the Switch will immediately accept remote instructions from only the specified IPv4/IPv6 addresses. If you enable this feature, be sure to first enter the IPv4/IPv6 address of the station you are currently using.

To view the following window, click **Security > Trusted Host Settings** as shown below.

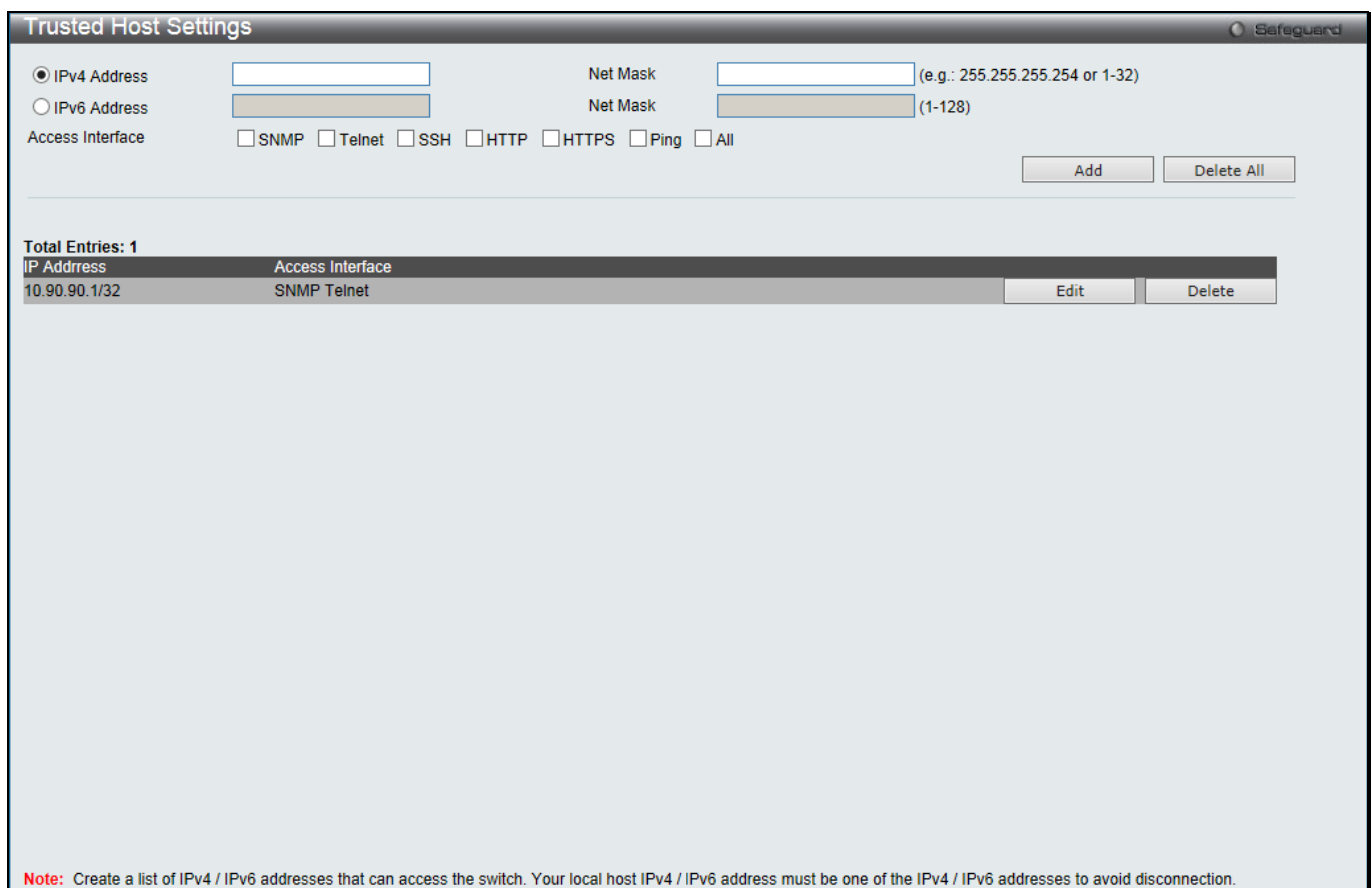


Figure 8-83 Trusted Host window

When the user clicks the **Edit** button, one will be able to edit the service allowed to the selected host.

The fields that can be configured are described below:

Parameter	Description
<b>IPv4 Address</b>	Click the radio button and enter an IPv4 address to add to the trusted host list.
<b>IPv6 Address</b>	Click the radio button and enter an IPv6 address to add to the trusted host list.
<b>Net Mask</b>	Enter a Net Mask address to add to the trusted host list.
<b>Access Interface</b>	Tick the check boxes to select services that will be allowed to the trusted host.

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

Click the **Delete All** button to remove all the entries listed.

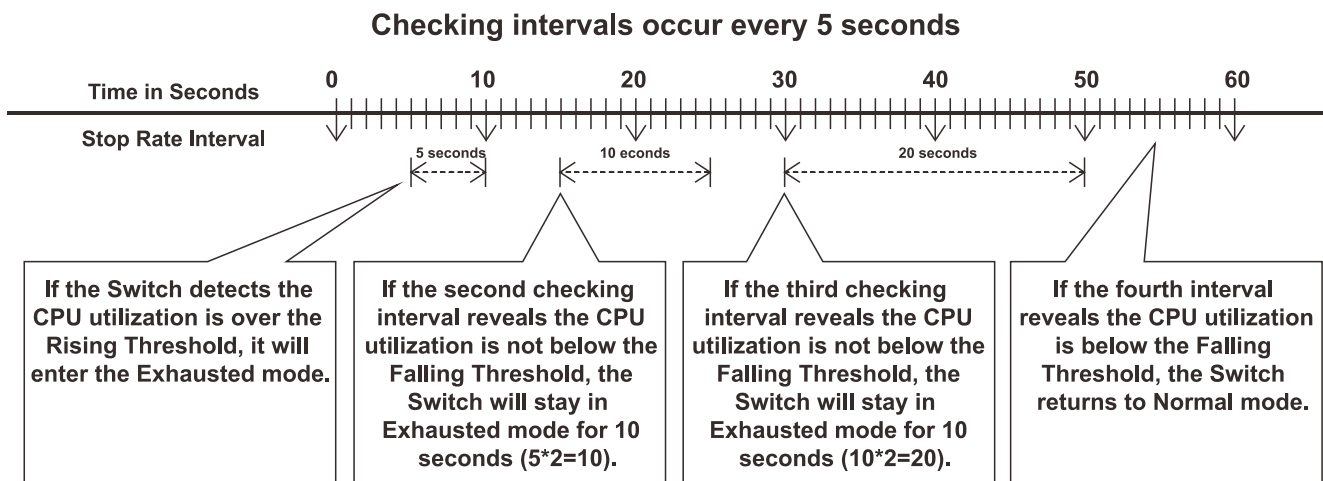
Click the **Edit** button to re-configure the specific entry.

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

## Safeguard Engine Settings

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 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. The Safeguard Engine has two operating modes that can be configured by the user, *Strict* and *Fuzzy*. In the *Strict* mode, when the CPU utilization of the Switch is over the Rising Threshold, it will enter the Exhausted mode. When in this mode, the Switch will stop all IP broadcast packets, packets from un-trusted IP address, and mostly ARP request packets to the Switch for a calculated time interval. Every five seconds, the Safeguard Engine checks the CPU utilization of the Switch. If the threshold has been crossed, the Switch will initially enter the Exhausted mode for five seconds. After another five-second checking interval arrives, the Switch will again check the CPU utilization. If the CPU utilization is lower than Falling Threshold, the Switch will again begin accepting all packets. Yet, if the checking shows that the Switch is too busy, it will fall into the Exhausted mode for double the time of the previous stop period. This doubling of time for stopping these packets will continue until the maximum time has been reached, which is 320 seconds and every stop from this point until a return to normal ingress flow would be 320 seconds. For a better understanding, please examine the following example of the Safeguard Engine.



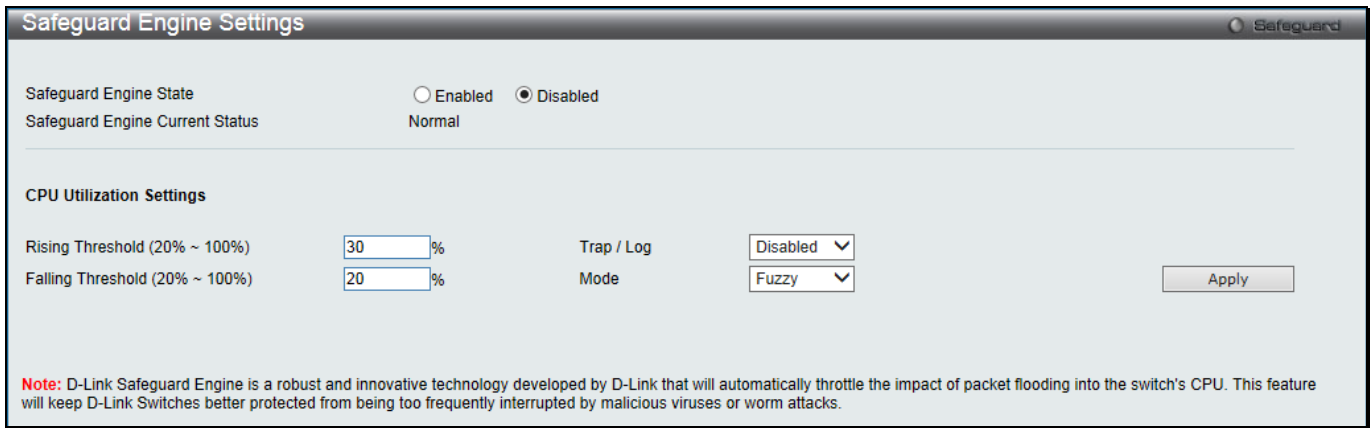
**Figure 8-84 Safeguard Engine Checking Interval Example**

For every consecutive checking interval that reveals the high CPU utilization issue, the Switch will double the time to enter the Exhausted mode to limit the specified traffic to the Switch. In the example above, the Switch doubled the time in the Exhausted mode when consecutive high CPU utilization issues were detected at 5-second intervals. (First stop = 5 seconds, second stop = 10 seconds, third stop = 20 seconds) Once the CPU utilization is below the Falling Threshold, the wait period for the Exhausted mode will return to 5 seconds and the process will resume.

In *Fuzzy* mode, once the Safeguard Engine has entered the Exhausted mode, the Safeguard Engine will decrease the packet flow to the Switch by half. After returning to Normal mode, the packet flow will be increased by 25%. The switch will then return to its interval checking and dynamically adjust the packet flow to avoid overload of the Switch.

Users can enable the Safeguard Engine or configure advanced Safeguard Engine settings for the Switch.

To view the following window, click **Security > Safeguard Engine Settings** as shown below.



Safeguard Engine Settings

Safeguard Engine State  Enabled  Disabled

Safeguard Engine Current Status Normal

CPU Utilization Settings

Rising Threshold (20% ~ 100%)  % Trap / Log

Falling Threshold (20% ~ 100%)  % Mode

**Note:** D-Link Safeguard Engine is a robust and innovative technology developed by D-Link that will automatically throttle the impact of packet flooding into the switch's CPU. This feature will keep D-Link Switches better protected from being too frequently interrupted by malicious viruses or worm attacks.

Figure 8-85 Safeguard Engine Settings window

The fields that can be configured are described below:

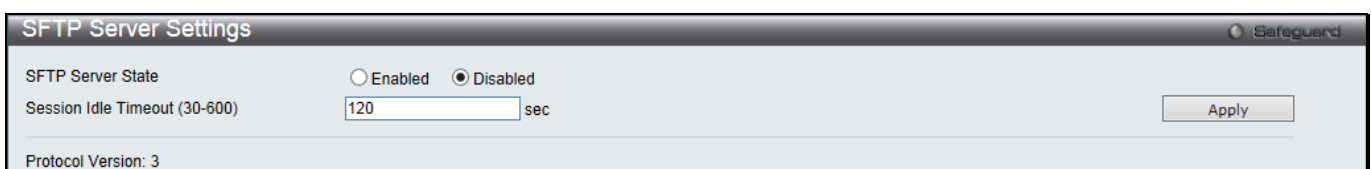
Parameter	Description
<b>Safeguard Engine State</b>	Use the radio button to globally enable or disable Safeguard Engine settings for the Switch.
<b>Rising Threshold (20% - 100%)</b>	Used to configure the acceptable level of CPU utilization before the Safeguard Engine mechanism is enabled. Once the CPU utilization reaches this percentage level, the Switch will move into Exhausted mode, based on the parameters provided in this window.
<b>Falling Threshold (20% - 100%)</b>	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.
<b>Trap / Log</b>	Use the drop-down menu to enable or disable the sending of messages to the device's SNMP agent and switch log once the Safeguard Engine has been activated by a high CPU utilization rate.
<b>Mode</b>	Used to select the type of Safeguard Engine to be activated by the Switch when the CPU utilization reaches a high rate. The user may select: <i>Fuzzy</i> – If selected, the Switch will adjust the bandwidth dynamically depend on some reasonable algorithm. <i>Strict</i> – If selected, the Switch will stop receiving all 'IP broadcast' packets, packets from un-trusted IP address and reduce the bandwidth of 'ARP not to me' packets (the protocol address of target in ARP packet is the Switch itself) to the Switch. That means no matter what reasons cause the high CPU utilization (may not caused by ARP storm), the Switch reluctantly processes the specified traffic mentioned in previous in the Exhausted mode. The default setting is <i>Fuzzy</i> mode.

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

## SFTP Server Settings

Secure File Transfer Protocol (SFTP) over SSH2 is a remotely secure file transfer protocol providing security on all file operations. SFTP server runs as a subsystem of SSH server. SSH server is required to be enabled before enabling SFTP server. This window is used to configure and view the SFTP server settings.

To view the following window, click **Security > SFTP Server Settings** as shown below.



SFTP Server Settings

SFTP Server State  Enabled  Disabled

Session Idle Timeout (30-600)  sec

Protocol Version: 3

Figure 8-86 SFTP Server Settings window

The fields that can be configured are described below:

Parameter	Description
<b>SFTP Server State</b>	Click to enable or disable the SFTP server state.
<b>Session Idle Timeout (30-600)</b>	Enter the idle timer for SFTP server. If the SFTP server detects no operation after this duration for a specific SFTP session, it will close this SFTP session. The default value is 120 seconds.

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

## CPU Protect Settings

This window is used to configure the CPU protect settings.

To view the following window, click **Security > CPU Protection Settings** as shown below.

CPU Protect Type	Rate Limit (pps)
ARP	No Limit
BPDU	No Limit
ICMP	No Limit
IGMP	No Limit
SNMP	No Limit

Figure 8-87 CPU Protect Settings window

The fields that can be configured are described below:

Parameter	Description
<b>CPU Protect State</b>	Click the radio button to enable or disable the CPU protection state.
<b>CPU Protect Type</b>	Tick the check box to select the CPU protection type.
<b>Rate Limit (0-1024)</b>	Enter the rate limit value in packets per second. Tick the <b>No Limit</b> check box to disable this feature.

Click the **Apply** button to accept the changes made for each individual section.

# Chapter 9 Network Application

**DHCP**  
**DNS**  
**DNS Resolver**  
**PPPoE Circuit ID Insertion Settings**  
**RCP Server Settings**  
**SNTP**  
**Flash File System Settings**

## DHCP

## DHCP Relay

### DHCP Relay Global Settings

This window is used to enable and configure DHCP Relay Global Settings. The relay hops count limit allows the maximum number of hops (routers) that the DHCP messages can be relayed through to be set. If a packet's hop count is more than the hop count limit, the packet is dropped. The range is between 1 and 16 hops, with a default value of 4. The relay time threshold sets the minimum time (in seconds) that the Switch will wait before forwarding a DHCPREQUEST packet. If the value in the seconds' field of the packet is less than the relay time threshold, the packet will be dropped. The range is between 0 and 65,535 seconds, with a default value of 0 seconds.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Global Settings** as shown below.

Figure 9-1 DHCP Relay Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCP Relay State</b>	Use the drop-down menu to enable or disable the DHCP relay service on the Switch. The default is <i>Disabled</i> .
<b>DHCP Relay Unicast Sate</b>	Use the drop-down menu to enable or disable to process DHCP unicast packets.
<b>DHCP Relay Hops Count Limit (1-16)</b>	Enter an entry between 1 and 16 to define the maximum number of router hops DHCP messages can be forwarded. The default hop count is 4.
<b>DHCP Relay Time Threshold (0-65535)</b>	Enter an entry between 0 and 65535 seconds, and defines the maximum time limit for routing a DHCP packet. If a value of 0 is entered, the Switch will not process the value in the seconds' field of the DHCP packet. If a non-zero value is entered, the

	Switch will use that value, along with the hop count to determine whether to forward a given DHCP packet.
<b>DHCP Relay Option 82 State</b>	<p>Use the drop-down menu to enable or disable the DHCP Relay Agent Information Option 82 on the Switch. The default is <i>Disabled</i>.</p> <p><i>Enabled</i> –When this field is toggled to <i>Enabled</i>, the relay agent will insert and remove DHCP relay information (option 82 field) in messages between DHCP servers and clients. When the relay agent receives the DHCP request, it adds the option 82 information, and the IP address of the relay agent (if the relay agent is configured), to the packet. Once the option 82 information has been added to the packet it is sent on to the DHCP server. When the DHCP server receives the packet, if the server is capable of option 82, it can implement policies like restricting the number of IP addresses that can be assigned to a single remote ID or circuit ID. Then the DHCP server echoes the option 82 field in the DHCP reply. The DHCP server unicasts the reply back to the relay agent if the request was relayed to the server by the relay agent. The switch verifies that it originally inserted the option 82 data. Finally, the relay agent removes the option 82 field and forwards the packet to the switch port that connects to the DHCP client that sent the DHCP request.</p> <p><i>Disabled</i>- When the field is toggled to <i>Disabled</i>, the relay agent will not insert and remove DHCP relay information (option 82 field) in messages between DHCP servers and clients, and the check and policy settings will have no effect.</p>
<b>DHCP Relay Agent Information Option 82 Check</b>	<p>Use the drop-down menu to enable or disable the Switches ability to check the validity of the packet's option 82 field.</p> <p><i>Enabled</i> – When the field is toggled to <i>Enabled</i>, the relay agent will check the validity of the packet's option 82 field. If the switch receives a packet that contains the option 82 field from a DHCP client, the switch drops the packet because it is invalid. In packets received from DHCP servers, the relay agent will drop invalid messages.</p> <p><i>Disabled</i> – When the field is toggled to <i>Disabled</i>, the relay agent will not check the validity of the packet's option 82 field.</p>
<b>DHCP Relay Agent Information Option 82 Policy</b>	<p>Use the drop-down menu to set the Switches policy for handling packets when the DHCP Relay Agent Information Option 82 Check is set to <i>Disabled</i>. The default is <i>Replace</i>.</p> <p><i>Replace</i> – The option 82 field will be replaced if the option 82 field already exists in the packet received from the DHCP client.</p> <p><i>Drop</i> – The packet will be dropped if the option 82 field already exists in the packet received from the DHCP client.</p> <p><i>Keep</i> – The option 82 field will be retained if the option 82 field already exists in the packet received from the DHCP client.</p>
<b>DHCP Relay Agent Information Option 82 Remote ID</b>	Enter the DHCP Relay Agent Information Option 82 Remote ID.
<b>DHCP Relay Agent Information Option 82 Circuit ID</b>	Enter the DHCP Relay Agent Information Option 82 Circuit ID.
<b>DHCP Relay Option 60 State</b>	<p>Use the drop-down menu to enable or disable the use of the DHCP Relay Option 60 State feature. If the packet does not have option 60 enabled, then the relay servers cannot be determined based on the option 60. In this case the relay servers will be determined based on either option 61 or per IPIF configured servers. If the relay servers are determined based on option 60, option 61 or option 125, then per IPIF configured servers will be ignored. If the relay servers are not determined either by option 60, option 61 or option 125, then per IPIF configured servers will be used to determine the relay servers.</p> <p><i>Enabled</i> – Select this option to enable the DHCP Relay Option 60 state, in order to relay DHCP packets.</p> <p><i>Disabled</i> - Select this option to disable the DHCP Relay Option 60 state.</p>
<b>DHCP Relay Option 61</b>	Use the drop-down menu to enable or disable the use of the DHCP Relay Option

<b>State</b>	<p>61 State feature. When option 61 is enabled, if the packet does not have option 61, then the relay servers cannot be determined based on option 61. If the relay servers are determined based on option 60, option 61 or option 125, then per IPIF configured servers will be ignored. If the relay servers are not determined either by option 60, option 61 or option 125, then per IPIF configured servers will be used to determine the relay servers.</p> <p><i>Enabled</i> – Select this option to enable the DHCP Relay Option 61 state, in order to relay DHCP packets.</p> <p><i>Disabled</i> - Select this option to disable the DHCP Relay Option 61 state.</p>
--------------	---

Click the **Apply** button to accept the changes made for each individual section.



**NOTE:** If the Switch receives a packet that contains the option 82 field from a DHCP client and the information-checking feature is enabled, the Switch drops the packet because it is invalid. However, in some instances, users may configure a client with the option 82 field. In this situation, disable the information check feature so that the Switch does not remove the option 82 field from the packet. Users may configure the action that the Switch takes when it receives a packet with existing option 82 information by configuring the DHCP Agent Information Option 82 Policy.

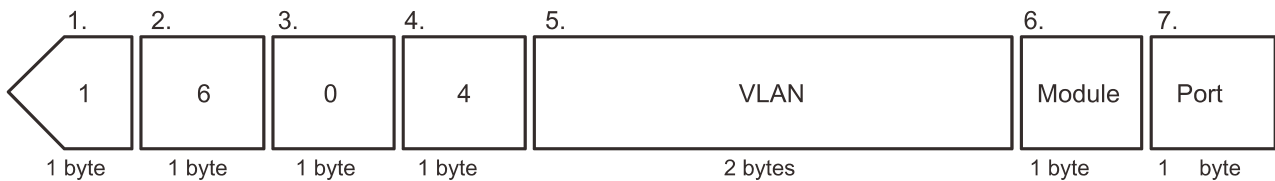
**The Implementation of DHCP Relay Agent Information Option 82**

The **DHCP Relay Option 82** command configures the DHCP relay agent information option 82 setting of the Switch. The formats for the circuit ID sub-option and the remote ID sub-option are as follows:



**NOTE:** For the circuit ID sub-option of a standalone switch, the module field is always zero.

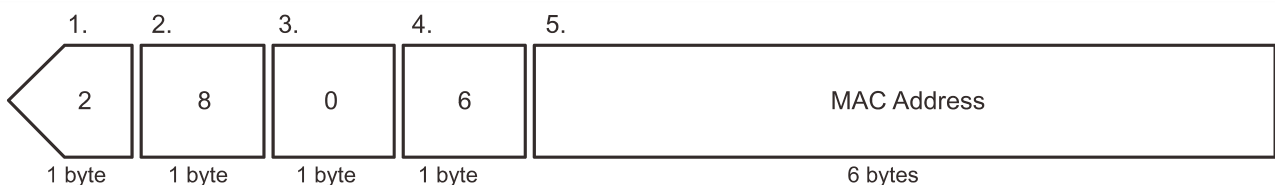
**Circuit ID sub-option format:**



**Figure 9-2 Circuit ID Sub-option Format**

- Sub-option type
- Length
- Circuit ID type
- Length
- VLAN: The incoming VLAN ID of DHCP client packet.
- Module: For a standalone switch, the Module is always 0; for a stackable switch, the Module is the Unit ID.
- Port: The incoming port number of the DHCP client packet, the port number starts from 1.

**Remote ID sub-option format:**



**Figure 9-3 Remote ID Sub-option Format**



- Sub-option type
- Length
- Remote ID type
- Length
- MAC address: The Switch's system MAC address.

## DHCP Relay Interface Settings

This window is used to set up a server, by IP address, for relaying DHCP information to the Switch. The user may enter a previously configured IP interface on the Switch that will be connected directly to the DHCP server using this window. Properly configured settings will be displayed in the DHCP Relay Interface Table at the bottom of the window, once the user clicks the **Apply** button. The user may add up to four server IPs per IP interface on the Switch. Entries may be deleted by clicking the corresponding **Delete** button.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Interface Settings** as shown below.

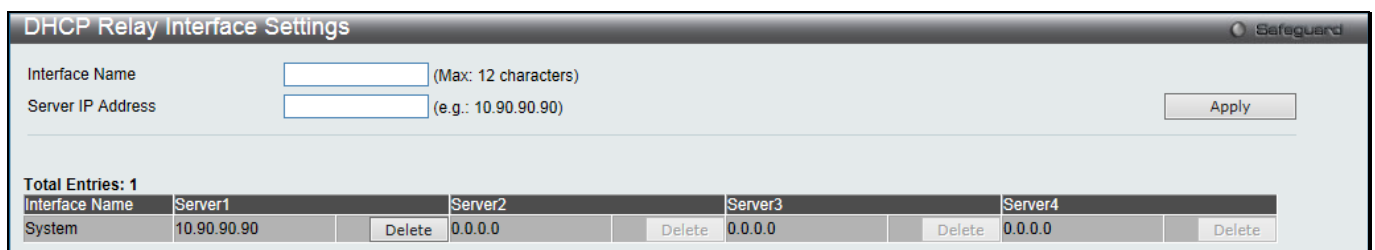


Figure 9-4 DHCP Relay Interface Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	The IP interface on the Switch that will be connected directly to the Client.
<b>Server IP Address</b>	Enter the IP address of the DHCP server. Up to four server IPs can be configured per IP Interface.

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

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

## DHCP Relay VLAN Settings

This window is used to configure an IP address as a destination to forward (relay) DHCP/BOOTP packets. If there is an IP interface in the VLAN and it has configured a DHCP server at the interface level, then the configuration at the interface level has higher priority. In this case, the DHCP server configured on the VLAN will not be used to forward the DHCP packets.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay VLAN Settings** as shown below.

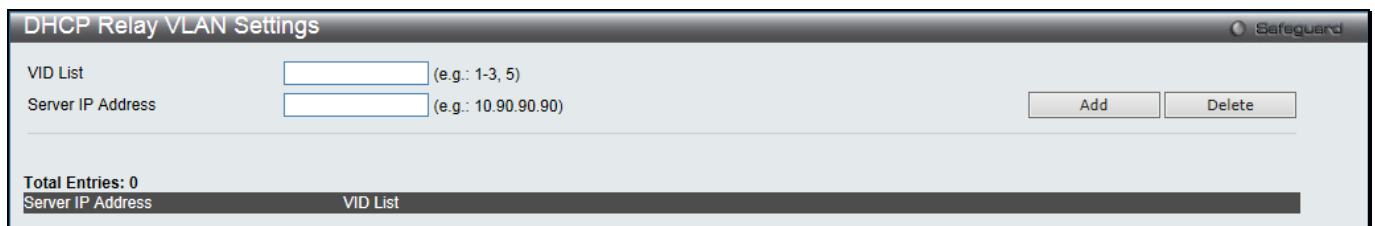


Figure 9-5 DHCP Relay VLAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>VID List</b>	Enter the VLAN ID list used for this configuration here.
<b>Server IP Address</b>	Enter the DHCP/BOOTP server IP address used here.

Click the **Add** button to add an entry.

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

## DHCP Relay Option 60 Server Settings

This window is used to configure the DHCP relay option 60 server parameters.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Option 60 Server Settings** as shown below.

**Figure 9-6 DHCP Relay Option 60 Server Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>Server IP Address</b>	Enter the DHCP Relay Option 60 Server Relay IP Address.
<b>Mode</b>	Use the drop-down menu to select the DHCP Relay Option 60 Server mode.

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

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

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

Click the **Delete All** button to remove all the entries listed.



**NOTE:** When there is no matching server found for the packet based on option 60, the relay servers will be determined by the default relay server setting.

## DHCP Relay Option 60 Settings

This option decides whether the DHCP Relay will process the DHCP option 60 or not.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Option 60 Settings** as shown below.

Figure 9-7 DHCP Relay Option 60 Settings window

The fields that can be configured are described below:

Parameter	Description
<b>String</b>	Enter the DHCP Relay Option 60 String value. Different strings can be specified for the same relay server, and the same string can be specified with multiple relay servers. The system will relay the packet to all the matching servers.
<b>Server IP Address</b>	Enter the DHCP Relay Option 60 Server IP address.
<b>Match Type</b>	Enter the DHCP Relay Option 60 Match Type value. <i>Exact Match</i> – The option 60 string in the packet must full match with the specified string. <i>Partial Match</i> – The option 60 string in the packet only need partial match with the specified string.
<b>IP Address / String</b>	Use the drop-down menu to select <i>IP Address</i> or <i>String</i> , and then enter either the DHCP Relay Option 60 IP address or DHCP Relay Option 60 string value in the field next to it.

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

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

Click the **Delete** button to remove the specific entry based on the information entered.

Click the **Show All** button to display all the existing entries.

Click the **Delete All** button to remove all the entries listed.

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

## DHCP Relay Option 61 Settings

This window is used to configure, add and delete DHCP relay option 61 parameters.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Option 61 Settings** as shown below.

Figure 9-8 DHCP Relay Option 61 Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCP Relay Option 61 Default</b>	Here the user can select the DHCP Relay Option 61 default action. <i>Relay</i> – Specify to relay the packet to an IP address. Enter the IP Address of the default relay server. When there is no matching server found for the packet based on option 61, the relay servers will be determined by this default relay server setting. <i>Drop</i> – Specify to drop the packet.
<b>Client ID</b>	<i>MAC Address</i> – The client's client-ID which is the hardware address of client. <i>String</i> – The client's client-ID, which is specified by administrator.
<b>Relay Rule</b>	<i>Relay</i> – Specify to relay the packet to an IP address. <i>Drop</i> – Specify to drop the packet.

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

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

Click the **Delete** button to remove the specific entry based on the information entered.

Click the **Delete All** button to remove all the entries listed.

## DHCP Relay Port Settings

This window is used to configure the state for DHCP relay on each port.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Port Settings** as shown below.

Unit	From Port	To Port	State
1	01	01	Enabled

Unit 1 Settings	
Port	State
1	Enabled
2	Enabled
3	Enabled
4	Enabled
5	Enabled
6	Enabled
7	Enabled
8	Enabled
9	Enabled
10	Enabled
11	Enabled
12	Enabled
13	Enabled
14	Enabled
15	Enabled
16	Enabled
17	Enabled
18	Enabled
19	Enabled
20	Enabled
21	Enabled
22	Enabled
23	Enabled
24	Enabled
25	Enabled
26	Enabled

Figure 9-9 DHCP Relay Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menu to select a range of port to display.
<b>State</b>	Use the drop-down menu to enable or disable the DHCP relay state of the port.

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

## DHCP Relay Option 82 Port Settings

This window is used to configure the DHCP relay agent option 82 information of each port.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Option 82 Port Settings** as shown below.

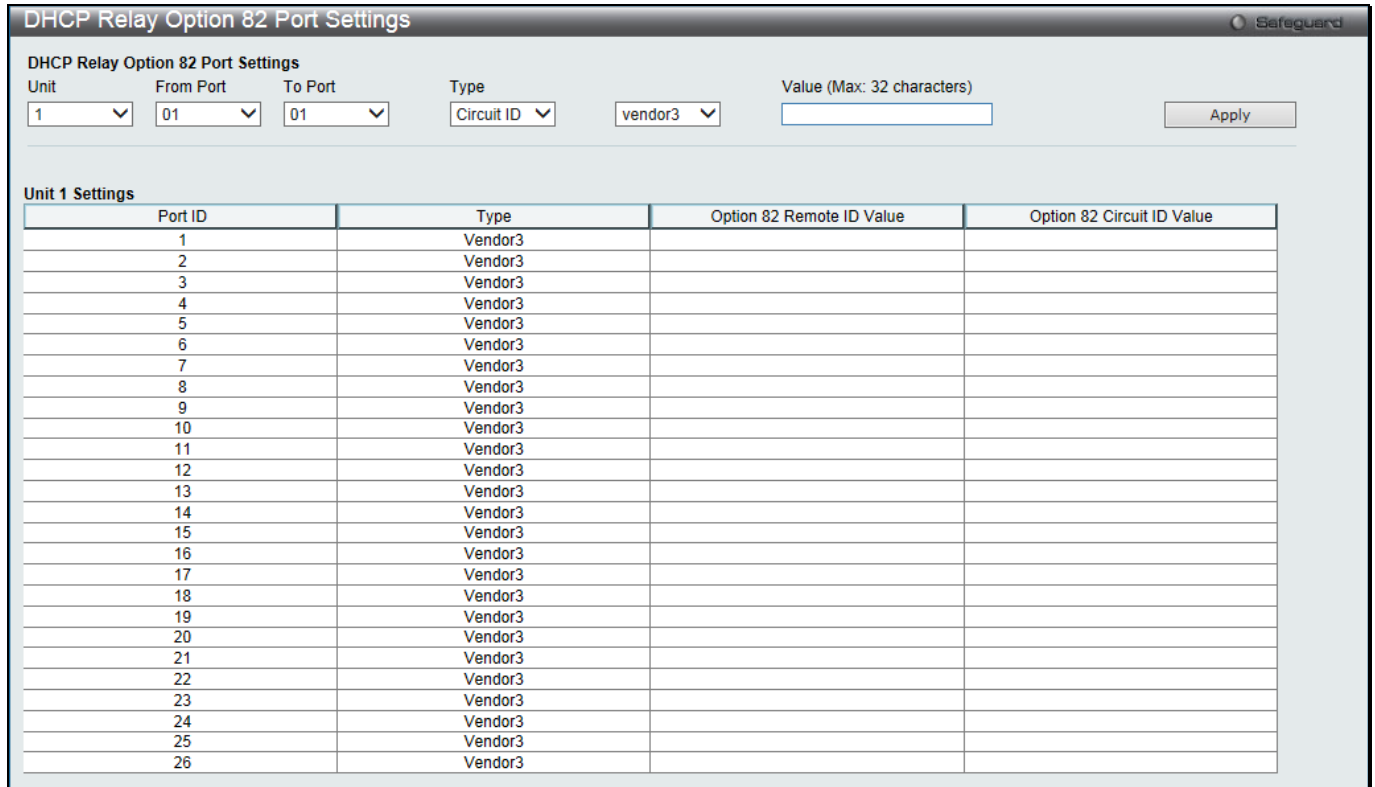


Figure 9-10 DHCP Relay Option 82 Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit to be configured.
<b>From Port / To Port</b>	Select a range of ports to be configured.
<b>Type</b>	Use the drop-down menu to select between <b>Circuit ID</b> and <b>Remote ID</b> .
<b>Value</b>	Enter the user-defined value.

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

## DHCP Relay Server CVID Settings

This window is used to configure DHCP relay agent destination IP address inner VLAN ID.

To view the following window, click **Network Application > DHCP > DHCP Relay > DHCP Relay Server CVID Settings** as shown below.

Figure 9-11 DHCP Relay Server CVID Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCP Relay Server IP</b>	Enter the DHCP or BOOTP server IP address.
<b>DHCP Relay Server CVID</b>	Enter the DHCP or BOOTP inner VLAN ID. The <b>Null</b> check box is selected by default for not entering the inner VLAN ID.

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

## DHCPv6 Relay

### DHCPv6 Relay Global Settings

This window is used to configure the DHCPv6 relay function on the Switch.

To view the following window, click **Network Application > DHCP > DHCPv6 Relay > DHCPv6 Relay Global Settings** as shown below.

Figure 9-12 DHCPv6 Relay Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCPv6 Relay State</b>	Click the radio buttons to enable or disable the DHCPv6 relay function.
<b>DHCPv6 Relay Hops Count (1-32)</b>	Enter the number of relay agents that have to be relayed in this message. The default value is 4.

Click the **Apply** button to accept the changes made for each individual section.

### DHCPv6 Relay Settings

This window is used to configure the DHCPv6 relay state of one or all of the specified interfaces, and add or display a destination IPv6 address to or from the switch's DHCPv6 relay table.

To view the following window, click **Network Application > DHCP > DHCPv6 Relay > DHCPv6 Relay Settings** as shown below.

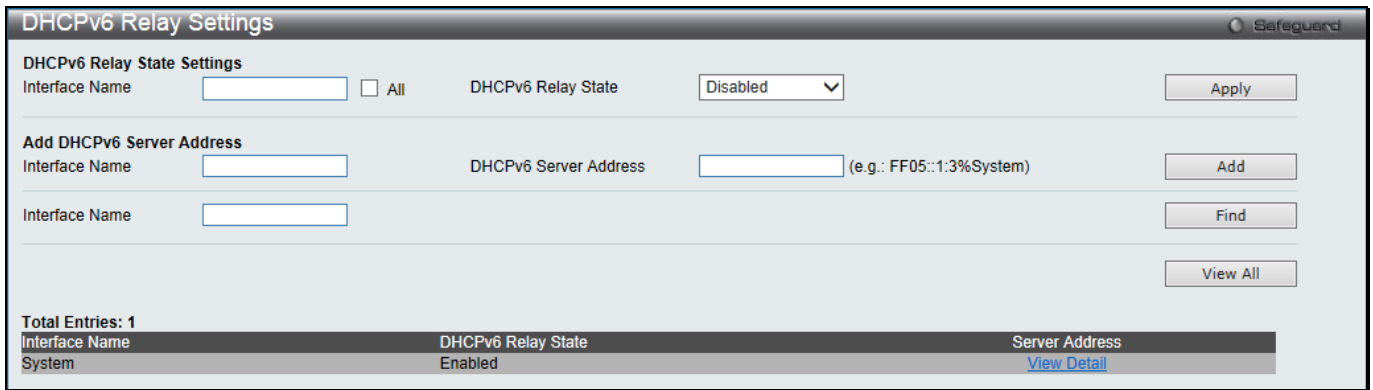


Figure 9-13 DHCPv6 Relay Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Interface Name</b>	Enter the name of the IPv6 interface. Tick the <b>All</b> check box to select all IPv6 interfaces.
<b>DHCPv6 Relay State</b>	Use the drop-down menu to enable or disable the DHCPv6 relay state of the interface.
<b>DHCPv6 Server Address</b>	Enter the DHCPv6 server IPv6 address.

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

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

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

Click the **View All** button to display all the existing entries.

Click the [View Detail](#) link to view more information regarding the specific entry.

After clicking the [View Detail](#) link, the following window will appear.



Figure 9-14 DHCPv6 Relay Settings - View Detail window

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

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

## DHCPv6 Relay Option 37 Settings

This window is used to configure the processing of Option 37 for the DHCPv6 relay function. When the DHCPv6 relay Option 37 is enabled, the DHCP packet will be inserted with the Option 37 field before being relayed to server. The DHCP packet will be processed based on the behavior defined in the check and remote ID type setting. When the state is disabled, the DHCP packet will be relayed directly to server without further checks and inserted with the Option 37.

To view the following window, click **Network Application > DHCP > DHCPv6 Relay > DHCPv6 Relay Option 37 Settings** as shown below.

Figure 9-15 DHCPv6 Relay Option 37 Settings window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Select the DHCPv6 relay Option 37 state. <i>Enabled</i> - When the state is enabled, the DHCP packet will be inserted with the Option 37 field before being relayed to server. <i>Disabled</i> - When the state is disabled, the DHCP packet will be relayed directly to server without further checks and inserted with the Option 37.
<b>Check</b>	Select the check state. This specifies that packets coming from client side should or should not have the Option 37 field. If client originating packets have the Option 37 field set, they will be dropped. <i>Enabled</i> - Specify that the check option is enabled. <i>Disabled</i> - Specify that the check option is disabled.
<b>Remote ID</b>	Select the remote ID state. This specifies the content in the Remote ID. <i>Default</i> - Specify that the remote ID will contain the VLAN ID, Module, Port, and System MAC address of the device. <i>CID With User Define</i> - Specify that the remote ID will contain the VLAN ID, Module, Port, and a user defined string. After selecting this option, enter the CID user defined string in the space provided. This can be up to 128 characters long. <i>User Define</i> - Specify that the remote ID will be a user defined string. After selecting this option, enter the user defined string in the space provided. This can be up to 128 characters long. <i>Vendor1</i> - Specify that the remote ID will be System MAC address of the device.

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

## DHCPv6 Relay Option 18 Settings

This window is used to configure the DHCPv6 relay agent information for processing Option 18 within the Switch. To view the following window, click **Network Application > DHCP > DHCPv6 Relay > DHCPv6 Relay Option 18 Settings** as shown below.

Figure 9-16 DHCPv6 Relay Option 18 Settings window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	When enabled, the DHCP packet will be inserted with the Option 18 field before being relayed to the server. When the state is disabled, the DHCP packet will be relayed directly to server without further checks and inserted with the Option 18.
<b>Check</b>	When enabled, packets coming from the client side should not have the Option 18 field.



	If the client originating packets have the Option 18 field set they will be dropped.
<b>Interface ID</b>	Specify the content in the interface ID. <i>Default</i> - The interface ID will be the incoming VLAN ID of the DHCP client packet. <i>CID</i> - The interface ID will include the VLAN ID, Module, and Port. <i>Vendor1</i> - The interface ID will use the vendor 1 format.

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

## DHCP Local Relay Settings

The DHCP local relay settings allows the user to add option 82 into DHCP request packets when the DHCP client gets an IP address from the same VLAN. If the DHCP local relay settings are not configured, the Switch will flood the packets to the VLAN. In order to add option 82 into the DHCP request packets, the DHCP local relay settings and the state of the Global VLAN need to be enabled.

To view the following window, click **Network Application > DHCP > DHCP Local Relay Settings** as shown below.

Figure 9-17 DHCP Local Relay Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCP Local Relay State</b>	Enable or disable the DHCP Local Relay Global State. The default is Disabled.
<b>VLAN Name</b>	Enter the VLAN name that applies to the DHCP local relay operation.
<b>VLAN ID</b>	Click the radio button and enter the VLAN ID. There are up to 48 VLANs that can apply to the DHCP local relay operation.
<b>State</b>	Enable or disable the configure DHCP Local Relay for VLAN state.

Click the **Apply** button to accept the changes made for each individual section.

## DHCPv6 Local Relay Settings

This window is used to configure DHCPv6 local relay settings. There are up to 48 VLANs that can apply to the DHCPv6 local relay operation.

To view the following window, click **Network Application > DHCP > DHCPv6 Local Relay Settings** as shown below.

Figure 9-18 DHCPv6 Local Relay Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DHCPv6 Local Relay State</b>	Click to enable or disable the DHCPv6 local relay global state.
<b>VLAN Name</b>	Click the radio button and enter the name of VLAN.
<b>VLAN ID</b>	Click the radio button and enter the VLAN ID. There are up to 48 VLANs that can apply to the DHCPv6 local relay operation.
<b>State</b>	Use the drop-down menu to enable or disable the DHCPv6 local relay state of the specified VLAN.

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

## DNS

### DNS Relay

#### DNS Relay Global Settings

This window is used to configure the DNS relay global state.

To view the following window, click **Network Application > DNS > DNS Relay > DNS Relay Global Settings** as shown below.

The screenshot shows a web interface window titled "DNS Relay Global Settings". It contains the following configuration options:

- DNS Relay State:** A drop-down menu currently set to "Disabled".
- Primary Name Server:** A text input field containing "0.0.0.0" with a hint "(e.g.: 172.18.211.10)".
- Secondary Name Server:** A text input field containing "0.0.0.0" with a hint "(e.g.: 172.18.211.10)".
- DNS Relay Cache State:** A drop-down menu currently set to "Disabled".
- DNS Relay Static Table State:** A drop-down menu currently set to "Disabled".

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

Figure 9-19 DNS Relay Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DNS Relay State</b>	Use the drop-down menu to enable or disable DNS relay state.
<b>Primary Name Server</b>	Enter the IP address of the primary name server.
<b>Secondary Name Server</b>	Enter the IP address of the secondary name server.
<b>DNS Relay Cache State</b>	Use the drop-down menu to enable or disable the DNS relay lookup cache function.
<b>DNS Relay Static Table State</b>	Use the drop-down menu to enable or disable the DNS relay static table lookup function.

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

#### DNS Relay Static Settings

This window is used to configure the static domain name in the DNS relay resolution table.

To view the following window, click **Network Application > DNS > DNS Relay > DNS Relay Static Settings** as shown below.

The fields that can be configured are described below:

Parameter	Description
Domain Name	Enter the static domain name.
IP Address	Enter the IP address of the domain.

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

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

## DNS Resolver

### DNS Resolver Global Settings

This window is used to configure the DNS Resolver global state of the switch.

To view the following window, click **Network Application > DNS Resolver > DNS Resolver Global Settings** as shown below.

Figure 9-20 DNS Resolver Global Settings window

The fields that can be configured are described below:

Parameter	Description
DNS Resolver State	Click the radio buttons to enable or disable the DNS resolver state.
Name Server Timeout (1-60)	The maximum time waiting for a response from a specified name server.

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

### DNS Resolver Static Name Server Settings

The window is used to create the DNS Resolver name server of the switch. When adding a name server, if one primary name server exists in the static name server table and a new primary name server is added, the existing primary name server will be changed to a normal name server. If the added primary name server's IP address is the same as an existing normal name server's IP address, the existing normal name server will be changed to a primary name server, but won't add new name server. When no primary name server is specified, the first configured name server will automatically change to become the primary name server. If the deleted name server's IP address is the same as one of the existing name servers' IP addresses, regardless of whether a normal name server or primary name server, the name server will be deleted.

To view the following window, click **Network Application > DNS Resolver > DNS Resolver Static Name Server Settings** as shown below.

Figure 9-21 DNS Resolver Static Name Server Settings window

The fields that can be configured are described below:

Parameter	Description
Server IP Address	Enter a DNS Resolver name server's IPv4 address here. Tick the <b>Primary</b> check box to set the name server as a primary name server.
Server IPv6 Address	Enter a DNS Resolver name server's IPv6 address here. Tick the <b>Primary</b> check box to set the name server as a primary name server.

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

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

## DNS Resolver Dynamic Name Server Table

This window displays the current DNS Resolver name servers.

To view the following window, click **Network Application > DNS Resolver > DNS Resolver Dynamic Name Server Table** as shown below.

Figure 9-22 DNS Resolver Dynamic Name Server Table window

## DNS Resolver Static Host Name Settings

The window is used to create the static host name entry of the switch.

To view the following window, click **Network Application > DNS Resolver > DNS Resolver Static Host Name Settings** as shown below.

Figure 9-23 DNS Resolver Static Host Name Settings window

The fields that can be configured are described below:

Parameter	Description
Host Name	Enter the name of the host.
IP Address	Click the radio button and enter the IPv4 address of the host here.

<b>IPv6 Address</b>	Click the radio button and enter the IPv6 address of the host here.
---------------------	---

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

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

## DNS Resolver Dynamic Host Name Table

This window displays the current host name entries.

To view the following window, click **Network Application > DNS Resolver > DNS Resolver Dynamic Host Name Table** as shown below.

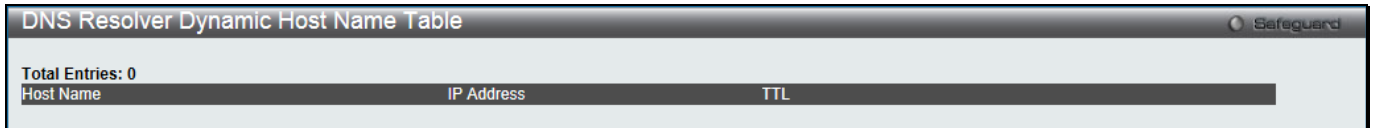


Figure 9-24 DNS Resolver Dynamic Host Name Table window

## PPPoE Circuit ID Insertion Settings

This window is used to configure the PPPoE circuit ID insertion function.

To view the following window, click **Network Application > PPPoE Circuit ID Insertion Settings** as shown below.

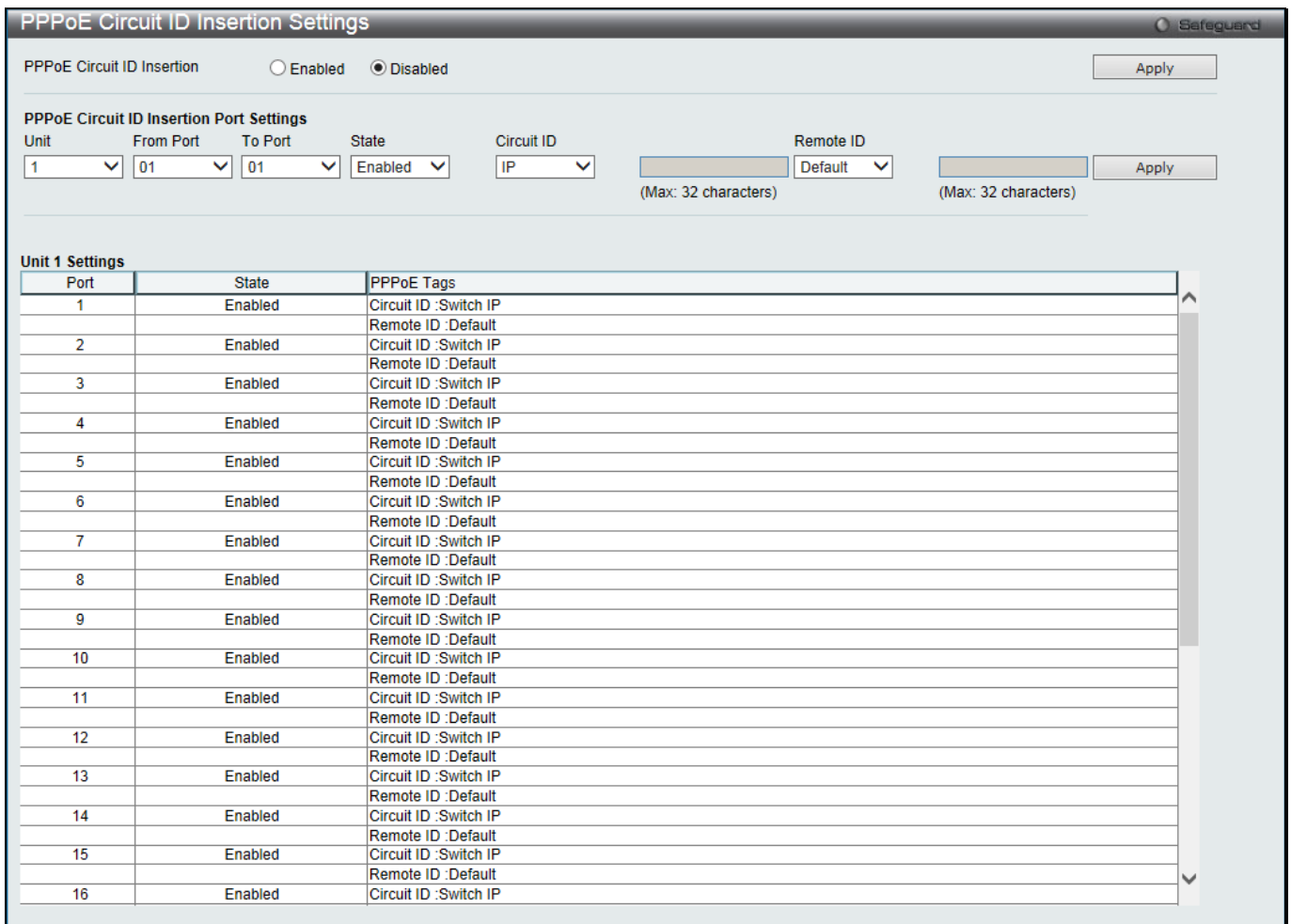


Figure 9-25 PPPoE Circuit ID Insertion Settings window

The fields that can be configured are described below:

Parameter	Description
<b>PPPoE Circuit ID Insertion</b>	Click the radio buttons to enable or disable the PPPoE circuit ID insertion on the Switch.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configured.
<b>State</b>	Use the drop-down menu to enable or disable port's PPPoE circuit ID insertion function.
<b>Circuit ID</b>	Use the drop-down menu to select the device ID part for encoding of the circuit ID option. IP – The IP address of the Switch will be used to encode the circuit ID option. MAC – The MAC address of the Switch will be used to encode the circuit ID option. UDF – Select to enter a user-defined string to be used to encode the circuit ID option. Vendor3 – Select to enter the user-defined string for the circuit ID option.
<b>Remote ID</b>	Use the drop-down menu to select the remote ID option.

Click the **Apply** button to accept the changes made for each individual section.

## RCP Server Settings

This window is used to configure global RCP server information. This global RCP Server setting can be used when the Server or remote user name is not specified. Only **ONE** RCP server can be configured per system. If user does not specify the RCP Server in the CLI command, and global RCP Server was not configured, the Switch will ask user to input the Server IP address or remote user name while executing the RCP commands.

To view the following window, click **Network Application > RCP Server Settings** as shown below.

Figure 9-26 RCP Server Settings window

The fields that can be configured are described below:

Parameter	Description
<b>IP Address</b>	The IP address of global RCP Server. By default, the server is unspecified.
<b>User Name</b>	The remote user name for logon into global RCP Server. By default, global server's remote user name is unspecified.

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.

## SNTP

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, organize the SNTP subnet of servers and clients, and adjust the system clock in each participant.

## SNTP Settings

Users can configure the time settings for the Switch.

To view the following window, click **Network Application > SNTP > SNTP Settings** as shown below.

Figure 9-27 SNTP Settings window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>SNTP State</b>	Use this radio button to enable or disable SNTP.
<b>Current Time</b>	Displays the Current Time.
<b>Time Source</b>	Displays the time source for the system.
<b>IPv4 SNTP Primary Server</b>	The IP address of the primary server from which the SNTP information will be taken.
<b>IPv4 SNTP Secondary Server</b>	The IP address of the secondary server from which the SNTP information will be taken.
<b>IPv6 SNTP Primary Server</b>	The IPv6 address of the primary server from which the SNTP information will be taken.
<b>IPv6 SNTP Secondary Server</b>	The IPv6 address of the secondary server from which the SNTP information will be taken.
<b>SNTP Poll Interval In Seconds (30-99999)</b>	The interval, in seconds, between requests for updated SNTP information.

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

## Time Zone Settings

Users can configure time zones and Daylight Savings Time settings for SNTP.

To view the following window, click **Network Application > SNTP > Time Zone Settings** as shown below.

**Time Zone Settings**
Safeguard

Daylight Saving Time State Disabled ▾

Daylight Saving Time Offset in Minutes 60 ▾

Time Zone Offset: From GMT in +/-HH:MM + ▾ 00 ▾ 00 ▾

---

**DST Repeating Settings**

From: Which Week of the Month First ▾

From: Day of the Week Sun ▾

From: Month Apr ▾

From: Time in HH MM 00 ▾ 00 ▾

To: Which Week of the Month Last ▾

To: Day of the Week Sun ▾

To: Month Oct ▾

To: Time in HH MM 00 ▾ 00 ▾

---

**DST Annual Settings**

From: Month Apr ▾

From: Day 29 ▾

From: Time in HH MM 00 ▾ 00 ▾

To: Month Oct ▾

To: Day 12 ▾

To: Time in HH MM 00 ▾ 00 ▾

---

Figure 9-28 Time Zone Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Daylight Saving Time State</b>	Use this drop-down menu to enable or disable the DST Settings.
<b>Daylight Saving Time Offset In Minutes</b>	Use this drop-down menu to specify the amount of time that will constitute your local DST offset – 30, 60, 90, or 120 minutes.
<b>Time Zone Offset From GMT In +/- HH:MM</b>	Use these drop-down menus to specify your local time zone's offset from Greenwich Mean Time (GMT.)

Parameter	Description
<b>DST Repeating Settings</b>	Using repeating mode will enable DST seasonal time adjustment. Repeating mode requires that the DST beginning and ending date be specified using a formula. For example, specify to begin DST on Saturday during the second week of April and end DST on Sunday during the last week of October.
<b>From: Which Week Of The Month</b>	Enter the week of the month that DST will start.
<b>From: Day Of Week</b>	Enter the day of the week that DST will start on.
<b>From: Month</b>	Enter the month DST will start on.
<b>From: Time In HH:MM</b>	Enter the time of day that DST will start on.
<b>To: Which Week Of The Month</b>	Enter the week of the month the DST will end.
<b>To: Day Of Week</b>	Enter the day of the week that DST will end.



<b>To: Month</b>	Enter the month that DST will end.
<b>To: Time In HH:MM</b>	Enter the time DST will end.

Parameter	Description
<b>DST Annual Settings</b>	Using annual mode will enable DST seasonal time adjustment. Annual mode requires that the DST beginning and ending date be specified concisely. For example, specify to begin DST on April 3 and end DST on October 14.
<b>From: Month</b>	Enter the month DST will start on, each year.
<b>From: Day</b>	Enter the day of the month DST will start on, each year.
<b>From: Time In HH:MM</b>	Enter the time of day DST will start on, each year.
<b>To: Month</b>	Enter the month DST will end on, each year.
<b>To: Day</b>	Enter the day of the month DST will end on, each year.
<b>To: Time In HH:MM</b>	Enter the time of day that DST will end on, each year.

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

## Flash File System Settings

### Why use flash file system:

In old switch system, the firmware, configuration and log information are saved in a flash with fixed addresses and size. This means that the maximum configuration file can only be 2Mb, and even if the current configuration is only 40Kb, it will still take up 2Mb of flash storage space. The configuration file number and firmware numbers are also fixed. A compatible issue will occur in the event that the configuration file or firmware size exceeds the originally designed size.

### Flash File System in our system:

The Flash File System is used to provide the user with flexible file operation on the Flash. All the firmware, configuration information and system log information are stored in the Flash as files. This means that the Flash space taken up by all the files are not fixed, it is the real file size. If the Flash space is enough, the user could download more configuration files or firmware files and use commands to display Flash file information, rename file names, and delete it. Furthermore, the user can also configure the **boot up runtime image** or the **running configuration file** if needed.

In case the file system gets corrupted, Z-modem can be used to download the backup files directly to the system. To view the following window, click **Network Application > Flash File System Settings** as shown below.

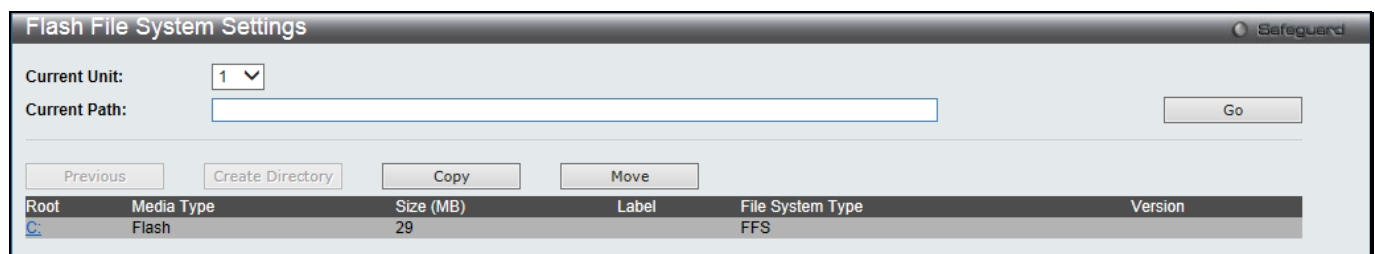


Figure 9-29 Flash File System Settings window

Select the **Current Unit** and enter the **Current Path** string and click the **Go** button to navigate to the path entered. Click the [C:](#) link to navigate the C: drive

After clicking the [C:](#) link button, the following window will appear.

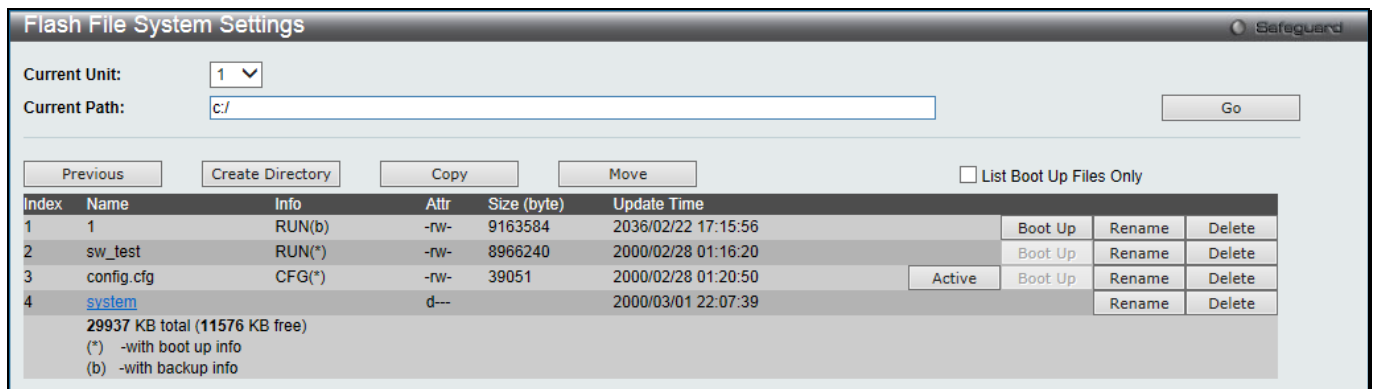


Figure 9-30 Flash File System Setting – Search for Drive window

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

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 **Move** button to move a specific file within the switch.

Tick the **List Boot Up Files Only** option to display only the boot up files.

Click the **Active** button to set a specific config file as the active runtime configuration.

Click the **Boot Up** button to set a specific runtime image as the boot up image.

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

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

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

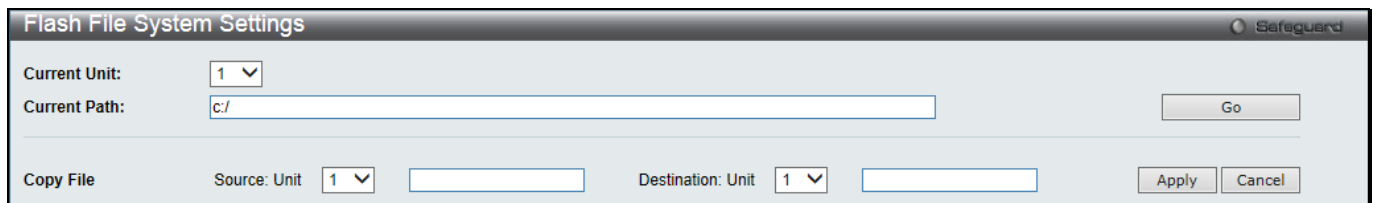


Figure 9-31 Flash File System Settings – Copy window

When copying a file to the file system of this switch, the user must enter the **Source** and **Destination** path.

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

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

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

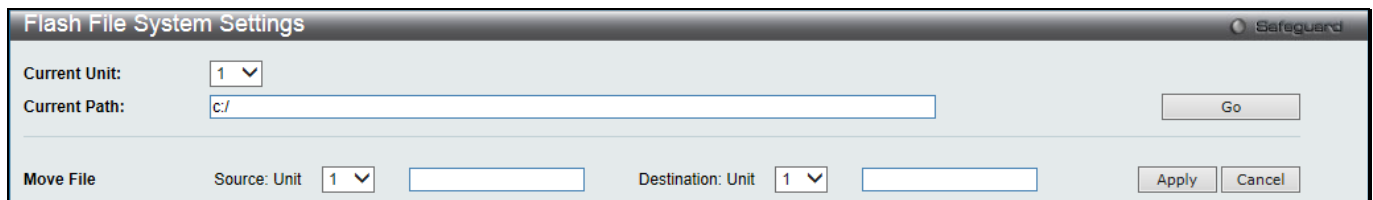


Figure 9-32 Flash File System Settings – Move window

When moving a file to another place, the user must enter the **Source** and **Destination** path.

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

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

# Chapter 10 OAM

**CFM**  
**Ethernet OAM**  
**DULD Settings**  
**Cable Diagnostics**

## CFM

### CFM Settings

This window is used to configure the CFM parameters.

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 are described below:

Parameter	Description
<b>CFM State</b>	Click to enable or disable the CFM feature.
<b>AIS Trap State</b>	Click to enable or disable the AIS trap state.
<b>LCK Trap State</b>	Click to enable or disable the LCK trap state.
<b>All MPs Reply LTRs</b>	Click to enable or disable all MPs to reply LTRs.
<b>MD</b>	Enter the maintenance domain name.
<b>MD Index</b>	Specify the maintenance domain index used.
<b>Level</b>	Use the drop-down menu to select the maintenance domain level.
<b>MIP</b>	This is the control creations of MIPs. <i>None</i> – Don't create MIPs. This is the default value. <i>Auto</i> – MIPs can always be created on any ports in this MD, if that port is not configured with a MEP of this MD. For the intermediate switch in a MA, the setting must be auto in order for the MIPs to be created on this device. <i>Explicit</i> – MIPs can be created on any ports in this MD, only if the next existent lower level has a MEP configured on that port, and that port is not configured with a MEP of this MD.
<b>SenderID TLV</b>	This is the control transmission of the SenderID TLV.

	<p><i>None</i> – Don't transmit sender ID TLV. This is the default value.</p> <p><i>Chassis</i> – Transmit sender ID TLV with chassis ID information.</p> <p><i>Manage</i> – Transmit sender ID TLV with managed address information.</p> <p><i>Chassis Manage</i> – Transmit sender ID TLV with chassis ID information and manage address information.</p>
--	---

Click the **Apply** button to accept the changes made for each individual section.

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

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

Click the **Add MA** button to add a maintenance association (MA).



**NOTE:** The MD Name value should be less than 22 characters.

After clicking the **Add MA** button, the following window will appear.

**Figure 10-2 CFM MA Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>MA</b>	Enter the maintenance association name.
<b>MA Index</b>	Enter the maintenance association index.
<b>VID</b>	VLAN Identifier. Different MA must be associated with different VLANs.

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

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

Click the **MIP Port Table** button to view the CFM MIP Table.

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

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

Click the **Add MEP** button to add a Maintenance End Point entry.

After clicking the **MIP Port Table** button, the following window will appear.

**Figure 10-3 CFM MIP Table window**

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

After click the **Edit** button the following window appears:

CFM MA Settings

MD md

MD Index 1

MA (Max: 22 characters)

MA Index

VID (1-4094)

Add

<<Back

Total Entries: 1

MA Index	MA	VID	MIP	SenderID	CCM	MEP ID(s)
1	ma	1	Defer	Defer	10sec	<input type="text"/>

MIP Port Table Apply Delete Add MEP

Figure 10-4 CFM MA Settings - Edit window

The fields that can be configured are described below:

Parameter	Description
<b>MIP</b>	<p>This is the control creation of MIPs.</p> <p><i>None</i> - Don't create MIPs.</p> <p><i>Defer</i> - Inherit the setting configured for the maintenance domain that this MA is associated with. This is the default value.</p> <p><i>Auto</i> - MIPs can always be created on any ports in this MA, if that port is not configured with a MEP of that MA.</p> <p><i>Explicit</i> - MIP can be created on any ports in this MA, only if the next existent lower level has a MEP configured on that port, and that port is not configured with a MEP of this MA.</p>
<b>SenderID</b>	<p>This is the control transmission of the sender ID TLV.</p> <p><i>None</i> - Don't transmit sender ID TLV. This is the default value.</p> <p><i>Chassis</i> - Transmit sender ID TLV with chassis ID information.</p> <p><i>Manage</i> - Transmit sender ID TLV with manage address information.</p> <p><i>Chassis Manage</i> - Transmit sender ID TLV with chassis ID information and manage address information.</p> <p><i>Defer</i> - Inherit the setting configured for the maintenance domain that this MA is associated with. This is the default value.</p>
<b>CCM</b>	<p>This is the CCM interval.</p> <p><i>100ms</i> - 100 milliseconds. Not recommended.</p> <p><i>1sec</i> - One second.</p> <p><i>10sec</i> - Ten seconds. This is the default value.</p> <p><i>1min</i> - One minute.</p> <p><i>10min</i> - Ten minutes.</p>
<b>MEP ID(s)</b>	<p>This is to specify the MEP IDs contained in the maintenance association. The range of the MEP ID is 1-8191.</p> <p>By default, there is no MEP ID in a newly created maintenance association.</p>

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

After clicking the **Add MEP** button, the following window will appear.

**CFM MEP Settings** Safeguard

MD: md, MD Index: 1, MA: ma, MA Index: 1

MEP Name:  MEP ID (1-8191):

Port: 1 | 01 MEP Direction: Inward Add

**Note:** MEP Name should be less than 32 characters.

<<Back

---

Total Entries: 1

MEP ID	Direction	Port	MEP Name	MAC Address	
1	Inward	1:1	mep	00-01-02-03-04-01	<a href="#">View Detail</a> <span style="float: right;">Delete</span>

Figure 10-5 CFM MEP Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MEP Name</b>	MEP name. It is unique among all MEPs configured on the device.
<b>MEP ID (1-8191)</b>	MEP MEPID. It should be configured in the MA's MEP ID list.
<b>Port</b>	Port number. This port should be a member of the MA's associated VLAN.
<b>MEP Direction</b>	This is the MEP direction. <i>Inward</i> - Inward facing (up) MEP. <i>Outward</i> - Outward facing (down) MEP.

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

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

Click the [View Detail](#) link to view more information regarding the specific entry.

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



**NOTE:** The MEP Name value should be less than 32 characters.

After clicking the [View Detail](#) link, the following window will appear.

**CFM MEP Information** Safeguard

MD : md	MA : ma
MD Index : 1	MA Index : 1
MEP Name : mep	MEPID : 1
Port : 1:1	Direction : Inward
CFM Port Status : Disabled	MAC Address : 00-01-02-03-04-01
Highest Fault : None	Out of Sequence CCMs : 0 Received
Cross Connect CCMs : 0 Received	Error CCMs : 0 Received
Normal CCMs : 0 Received	Port Status CCMs : 0 Received
If Status CCMs : 0 Received	CCMs Transmitted : 0
In Order LBRs : 0 Received	Out of Order LBRs : 0 Received
Next LTM Trans ID : 0	Unexpected LTRs : 0 Received
LBM Transmitted : 0	MEP State : Disabled
CCM State : Disabled	PDU Priority : 7
Fault Alarm : Disabled	Alarm Time (250-1000) : 250 centisecond((1/100)s)
Alarm Reset Time (250-1000) : 1000 centisecond((1/100)s)	AIS State : Disabled
AIS Period : 1 Second	AIS Client Level : Invalid
AIS Status : Not Detected	LCK State : Disabled
LCK Period : 1 Second	LCK Client Level : Invalid
LCK Status : Not Detected	AIS PDUs : 0 Received
AIS PDUs Transmitted : 0	LCK PDUs : 0 Received
LCK PDUs Transmitted : 0	

Edit Edit AIS Edit LCK <<Back

---

Remote MEP(s)

MEPID	MAC Address	Status	RDI	Port Status	Interface Status	LCK	Detect Time
-------	-------------	--------	-----	-------------	------------------	-----	-------------

Figure 10-6 CFM MEP Information window

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

CFM MEP Information		Safeguard	
MD	: md	MA	: ma
MD Index	: 1	MA Index	: 1
MEP Name	: mep	MEPID	: 1
Port	: 1:1	Direction	: Inward
CFM Port Status	: Disabled	MAC Address	: 00-01-02-03-04-01
Highest Fault	: None	Out of Sequence CCMs	: 0 Received
Cross Connect CCMs	: 0 Received	Error CCMs	: 0 Received
Normal CCMs	: 0 Received	Port Status CCMs	: 0 Received
If Status CCMs	: 0 Received	CCMs Transmitted	: 0
In Order LBRs	: 0 Received	Out of Order LBRs	: 0 Received
Next LTM Trans ID	: 0	Unexpected LTRs	: 0 Received
LBM Transmitted	: 0	MEP State	: Disabled
CCM State	: Disabled	PDU Priority	: 7
Fault Alarm	: All	Alarm Time (250-1000)	: 250 centisecond((1/100)s)
Alarm Reset Time (250-1000)	: 1000 centisecond((1/100)s)	AIS State	: Disabled
AIS Period	: 1 Second	AIS Client Level	: Invalid
AIS Status	: Not Detected	LCK State	: Disabled
LCK Period	: 1 Second	LCK Client Level	: Invalid
LCK Status	: Not Detected	AIS PDUs	: 0 Received
AIS PDUs Transmitted	: 0	LCK PDUs	: 0 Received
LCK PDUs Transmitted	: 0		

Remote MEP(s)							
MEPID	MAC Address	Status	RDI	Port Status	Interface Status	LCK	Detect Time

Figure 10-7 CFM MEP Information - Edit window

The fields that can be configured are described below:

Parameter	Description
<b>MEP State</b>	This is the MEP administrative state. <i>Enable</i> - MEP is enabled. <i>Disable</i> - MEP is disabled. This is the default value.
<b>CCM State</b>	This is the CCM transmission state. <i>Enable</i> - CCM transmission enabled. <i>Disable</i> - CCM transmission disabled. This is the default value.
<b>PDU Priority</b>	The 802.1p priority is set in the CCMs and the LTM messages transmitted by the MEP. The default value is 7.
<b>Fault Alarm</b>	This is the control types of the fault alarms sent by the MEP. <i>All</i> - All types of fault alarms will be sent. <i>MAC Status</i> - Only the fault alarms whose priority is equal to or higher than "Some Remote MEP MAC Status Error" are sent. <i>Remote CCM</i> - Only the fault alarms whose priority is equal to or higher than "Some Remote MEP Down" are sent. <i>Errors CCM</i> - Only the fault alarms whose priority is equal to or higher than "Error CCM Received" are sent. <i>Xcon CCM</i> - Only the fault alarms whose priority is equal to or higher than "Cross-connect CCM Received" are sent. <i>None</i> - No fault alarm is sent. This is the default value.
<b>Alarm Time (250-1000)</b>	This is the time that a defect must exceed before the fault alarm can be sent. The unit is in centiseconds, the range is 250-1000. The default value is 250.
<b>Alarm Reset Time (250-1000)</b>	This is the dormant duration time before a defect is triggered before the fault can be re-alarmed. The unit is in centiseconds, the range is 250-1000. The default value is 1000

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

Click the **Edit AIS** button to configure the AIS settings.

Click the **Edit LCK** button to configure the LCK settings.

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

Click the **Edit Lock Action** button to configure the CFM management lock.

Click the **Remote MEP** button to view the remote MEP information.

After clicking the **Edit AIS** button, the following window will appear:

Figure 10-8 CFM Extension AIS Settings window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Tick the check box and use the drop-down menu to enable or disable the AIS function.
<b>Period</b>	The transmitting interval of AIS PDU. The default period is 1 second. Options to choose from are: <i>1sec</i> - Specify that the transmitting interval will be set to 1 second. <i>1min</i> - Specify that the transmitting interval will be set to 1 minute.
<b>Level</b>	The client level ID to which the MEP sends AIS PDU. The default client MD level is MD level at which the most immediate client layer MIPs and MEPs exist. Options to choose from are values between 0-7.

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

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

After click the **Edit LCK** button, the following window will appear:

Figure 10-9 CFM Extension LCK Settings window

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Tick the check box and use the drop-down menu to enable or disable the LCK function.
<b>Period</b>	The transmitting interval of LCK PDU. The default period is 1 second. Options to choose from are: <i>1sec</i> - Specify that the transmitting interval will be set to 1 second. <i>1min</i> - Specify that the transmitting interval will be set to 1 minute.
<b>Level</b>	The client level ID to which the MEP sends LCK PDU. The default client MD level is MD level at which the most immediate client layer MIPs and MEPs exist. Options to choose from are values between 0-7.

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

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



After clicking the **Edit Lock Action** button, the following window will appear:

MD Name	md3
MD Index	2
MA Name	ma3
MA Index	1
MEP ID	2
Remote MEP ID	1
State	Start

**Figure 10-10 CFM Extension Lock Settings window**

The fields that can be configured are described below:

Parameter	Description
<b>State</b>	Select to start or stop the management lock action

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

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

After clicking the **Remote MEP** button, the following window will appear:

MEP Name	ma3_mep2
Remote MEPID	1
MAC Address	00-84-43-06-01-18
Status	FAILED
RDI	No
Port State	Blocked
Interface Status	No
Last CCM Serial Number	70481
Sender Chassis ID	None
Sender Management Address	None
Detect Time	2014-5-6 5:47:54

**Figure 10-11 CFM Remote MEP window**

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

## CFM Port Settings

This window is used to enable or disable the CFM function on a per-port basis.

To view the following window, click **OAM > CFM > CFM Port Settings** as shown below.

The CFM Port Settings window includes the following configuration fields:

- Unit:** 1
- From Port:** 01
- To Port:** 01
- State:** Disabled

The table below shows the state of each port from 1 to 26:

Port	State
1	Disabled
2	Disabled
3	Disabled
4	Disabled
5	Disabled
6	Disabled
7	Disabled
8	Disabled
9	Disabled
10	Disabled
11	Disabled
12	Disabled
13	Disabled
14	Disabled
15	Disabled
16	Disabled
17	Disabled
18	Disabled
19	Disabled
20	Disabled
21	Disabled
22	Disabled
23	Disabled
24	Disabled
25	Disabled
26	Disabled

Figure 10-12 CFM Port Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Use the drop-down menus to select a range of ports to be configuration.
<b>State</b>	Use the drop-down menu to enable or disable the state of specific port regarding the CFM configuration.

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

## CFM MIPCCM Table

This window is used to show the MIP CCM database entries.

To view the following window, click **OAM > CFM > CFM MIPCCM Table** as shown below.

The CFM MIPCCM Table window displays the following information:

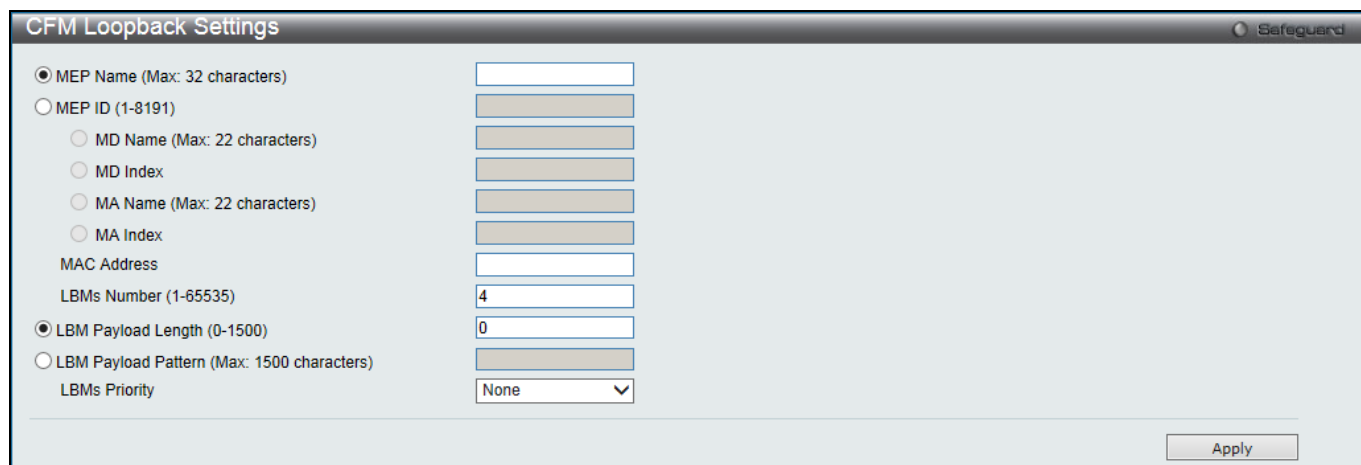
- Total Entries:** 0
- Table Headers:** MA, VID, MAC Address, Port

Figure 10-13 CFM MIPCCM Table window

## CFM Loopback Settings

This window is used to start a CFM loopback test.

To view the following window, click **OAM > CFM > CFM Loopback Settings** as shown below.



The image shows a web UI window titled "CFM Loopback Settings" with a "Safeguard" icon in the top right. The window contains several configuration options:

- MEP Name (Max: 32 characters) [text input]
- MEP ID (1-8191) [text input]
- MD Name (Max: 22 characters) [text input]
- MD Index [text input]
- MA Name (Max: 22 characters) [text input]
- MA Index [text input]
- MAC Address [text input]
- LBM Number (1-65535) [text input with value 4]
- LBM Payload Length (0-1500) [text input with value 0]
- LBM Payload Pattern (Max: 1500 characters) [text input]
- LBM Priority [dropdown menu with "None" selected]

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

Figure 10-14 CFM Loopback Settings window

The fields that can be configured are described below:

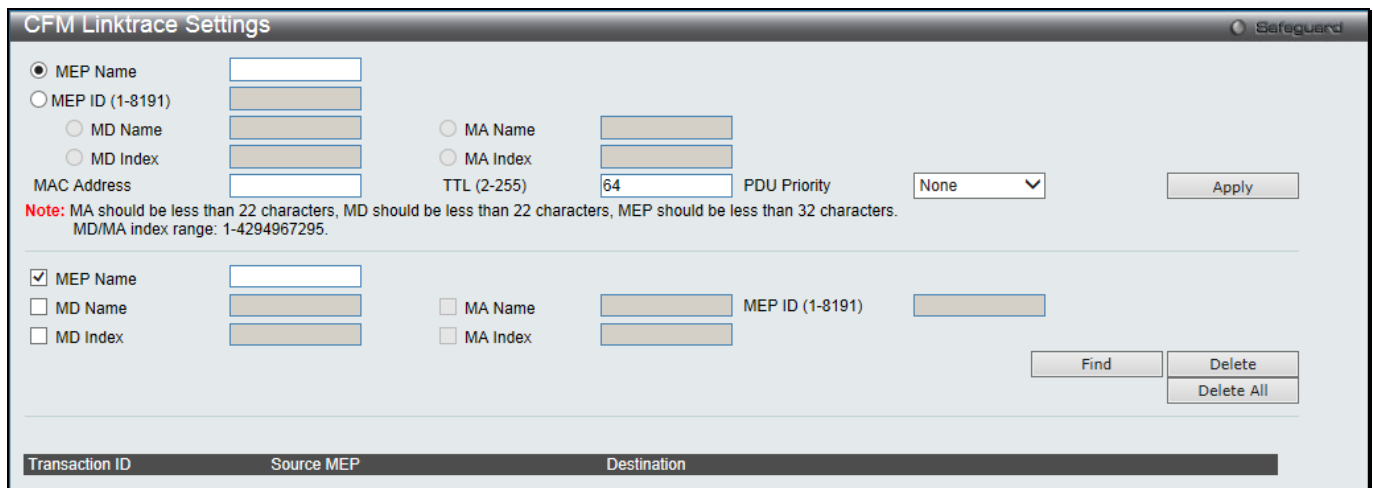
Parameter	Description
<b>MEP Name</b>	Click the radio button and enter the Maintenance End Point name used.
<b>MEP ID (1-8191)</b>	Click the radio button and enter the Maintenance End Point ID used.
<b>MD Name</b>	Click the radio button and enter the Maintenance Domain name used.
<b>MD Index</b>	Click the radio button and enter the Maintenance Domain index used.
<b>MA Name</b>	Click the radio button and enter the Maintenance Association name used.
<b>MA Index</b>	Click the radio button and enter the Maintenance Association index used.
<b>MAC Address</b>	Enter the destination MAC address used here.
<b>LBM Number (1-65535)</b>	Number of LBMs to be sent. The default value is 4.
<b>LBM Payload Length (0-1500)</b>	Click the radio button and enter the payload length of LBM to be sent. The default is 0.
<b>LBM Payload Pattern</b>	Click the radio button and enter an arbitrary amount of data to be included in a Data TLV, along with an indication whether the Data TLV is to be included.
<b>LBM Priority</b>	The 802.1p priority to be set in the transmitted LBMs. If not specified, it uses the same priority as CCMs and LTMs sent by the MA.

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

## CFM Linktrace Settings

This window is used to issue a CFM link track message, display or delete the link trace responses.

To view the following window, click **OAM > CFM > CFM Linktrace Settings** as shown below.



The screenshot shows the 'CFM Linktrace Settings' window. It features a 'Safeguard' icon in the top right. The main area contains two sections of radio buttons for selecting configuration parameters: MEP Name, MEP ID (1-8191), MD Name, MD Index, MA Name, and MA Index. Below these are input fields for MAC Address, TTL (2-255) (set to 64), and PDU Priority (set to None). A red note states: 'Note: MA should be less than 22 characters, MD should be less than 22 characters, MEP should be less than 32 characters. MD/MA index range: 1-4294967295.' An 'Apply' button is located to the right. The bottom section includes checkboxes for the same parameters, a 'MEP ID (1-8191)' input field, and 'Find', 'Delete', and 'Delete All' buttons. At the very bottom, a table header shows 'Transaction ID', 'Source MEP', and 'Destination'.

Figure 10-15 CFM Linktrace Settings window

The fields that can be configured are described below:

Parameter	Description
<b>MEP Name</b>	Click the radio button and enter the Maintenance End Point name used.
<b>MEP ID (1-8191)</b>	Click the radio button and enter the Maintenance End Point ID used.
<b>MD Name</b>	Click the radio button and enter the Maintenance Domain name used.
<b>MD Index</b>	Click the radio button and enter the Maintenance Domain index used.
<b>MA Name</b>	Click the radio button and enter the Maintenance Association name used.
<b>MA Index</b>	Click the radio button and enter the Maintenance Association index used.
<b>MAC Address</b>	Enter the destination MAC address.
<b>TTL (2-255)</b>	Link-trace message TTL value. The default value is 64.
<b>PDU Priority</b>	The 802.1p priority to be set in the transmitted LTM. If not specified, it uses the same priority as CCMs sent by the MA.
<b>MEP Name</b>	Select and enter the Maintenance End Point name used.
<b>MD Name</b>	Select and enter the Maintenance Domain name used.
<b>MD Index</b>	Select and enter the Maintenance Domain index used.
<b>MEP ID (1-8191)</b>	Enter the Maintenance End Point ID used.
<b>MA Name</b>	Select and enter the Maintenance Association name used.
<b>MA Index</b>	Select and enter the Maintenance Association index used.

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 specific entry based on the information entered.

Click the **Delete All** button to remove all the entries listed.

## CFM Packet Counter

This window is used to show the CFM packet's RX/TX counters.

To view the following window, click **OAM > CFM > CFM Packet Counter** as shown below.

Port	All Packets	CCM	LBR	LBM	LTR	LTM
All	0	0	0	0	0	0
1:1	0	0	0	0	0	0
1:2	0	0	0	0	0	0
1:3	0	0	0	0	0	0
1:4	0	0	0	0	0	0
1:5	0	0	0	0	0	0
1:6	0	0	0	0	0	0
1:7	0	0	0	0	0	0
1:8	0	0	0	0	0	0
1:9	0	0	0	0	0	0
1:10	0	0	0	0	0	0
1:11	0	0	0	0	0	0
1:12	0	0	0	0	0	0
1:13	0	0	0	0	0	0
1:14	0	0	0	0	0	0
1:15	0	0	0	0	0	0
1:16	0	0	0	0	0	0
1:17	0	0	0	0	0	0
1:18	0	0	0	0	0	0
1:19	0	0	0	0	0	0
1:20	0	0	0	0	0	0
1:21	0	0	0	0	0	0
1:22	0	0	0	0	0	0
1:23	0	0	0	0	0	0
1:24	0	0	0	0	0	0
1:25	0	0	0	0	0	0
1:26	0	0	0	0	0	0

Figure 10-16 CFM Packet Counter window

The fields that can be configured are described below:

Parameter	Description
<b>Port List</b>	Enter a list of ports to be displayed. Tick the <b>All Ports</b> check box to display all ports.
<b>Type</b>	<i>Transmit</i> – Selecting this option will display all the CFM packets transmitted. <i>Receive</i> – Selecting this option will display all the CFM packets received. <i>CCM</i> – Selecting this option will display all the CCM packets transmitted and received. <i>Transmit and Receive</i> – Selecting this option will display all the CFM packets transmitted and received.

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

Click the **Clear** button to clear all the information entered in the fields.

After selecting *CCM* as the **Type**, the following window will appear:

MEP Name	VID	Port	Level	Direction	XCON	Error	Normal
mep	1	1:1	0	Inward	0	0	0
Total:					0	0	0

Figure 10-17 CFM Packet Counter window

## CFM Fault Table

This window is used to show the MEPs that have faults.

To view the following window, click **OAM > CFM > CFM Fault Table** as shown below.

Figure 10-18 CFM Fault Table window

The fields that can be configured are described below:

Parameter	Description
<b>MD Name</b>	Select and enter the Maintenance Domain name used.
<b>MD Index</b>	Select and enter the Maintenance Domain index used.
<b>MA Name</b>	Select and enter the Maintenance Association name used.
<b>MA Index</b>	Select and enter the Maintenance Association index used.

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

## CFM MP Table

This window is used to display CFM MP table.

To view the following window, click **OAM > CFM > CFM MP Table** as shown below.

Figure 10-19 CFM MP Table window

The fields that can be configured are described below:

Parameter	Description
<b>Port</b>	Use the drop-down menu to select the port number to view.
<b>Level (0-7)</b>	Enter the level to view.
<b>Direction</b>	Use the drop-down menu to select the direction to view. <i>Inward</i> - Inward facing (up) MP. <i>Outward</i> - Outward facing (down) MP. <i>Any</i> - Inward and Outward facing MP.
<b>VID (1-4094)</b>	Enter the VID to view.

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

## Ethernet OAM

### Ethernet OAM Settings

This window is used to configure the Ethernet OAM settings.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Settings** as shown below.

**Ethernet OAM Settings**

Unit: 1 | From Port: 01 | To Port: 01 | Mode: Active | State: Disabled | Remote Loopback: None | Received Remote Loopback: Ignore | **Apply**

**Ethernet OAM Table**

**Port 1**

Local Client	
OAM	Disabled
Mode	Active
Max OAMPDU	1518 Bytes
Remote Loopback	Supported
Unidirection	Not Supported
Link Monitoring	Supported
Variable Request	Not Supported
PDU Revision	0
Operation Status	Disable
Loopback Status	No Loopback

**Port 2**

Local Client	
OAM	Disabled
Mode	Active
Max OAMPDU	1518 Bytes
Remote Loopback	Supported
Unidirection	Not Supported
Link Monitoring	Supported
Variable Request	Not Supported
PDU Revision	0
Operation Status	Disable
Loopback Status	No Loopback

**Port 3**

Local Client	
OAM	Disabled
Mode	Active
Max OAMPDU	1518 Bytes
Remote Loopback	Supported
Unidirection	Not Supported
Link Monitoring	Supported
Variable Request	Not Supported
PDU Revision	0
Operation Status	Disable
Loopback Status	No Loopback

Figure 10-20 Ethernet OAM Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select a range of ports you wish to configure.
<b>Mode</b>	Use the drop-down menu to select to operate in either <i>Active</i> or <i>Passive</i> . The default mode is <i>Active</i> .
<b>State</b>	Use the drop-down menu to enable or disable the OAM function.
<b>Remote Loopback</b>	Use the drop-down menu to select Ethernet OAM remote loopback. <i>None</i> – Select to disable the remote loopback. <i>Start</i> – Select to request the peer to change to the remote loopback mode. <i>Stop</i> – Select to request the peer to change to the normal operation mode.
<b>Received Remote Loopback</b>	Use the drop-down menu to configure the client to process or to ignore the received Ethernet OAM remote loopback command. <i>Process</i> – Select to process the received Ethernet OAM remote loopback command. <i>Ignore</i> – Select to ignore the received Ethernet OAM remote loopback command.

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

## Ethernet OAM Configuration Settings

This window is used to configure Ethernet OAM configuration settings.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Configuration Settings** as shown below.

**Ethernet OAM Configuration Settings**

Ethernet OAM Configuration Settings

Unit: 1 From Port: 01 To Port: 01 Link Event: Link Monitor Link Monitor: Error Symbol Threshold (0-4294967295): 1 Window (1000-60000): 1000 ms

Notify: Enabled

**Note:**  
 The Error Frame Period Window valid values for FastEthernet ports is from 14881 to 8928600 frames.  
 The Error Frame Period Window valid values for GigaEthernet ports is from 148810 to 89286000 frames.  
 The Error Frame Period Window valid values for TenGigaEthernet ports is from 1488100 to 892860000 frames.

**Ethernet OAM Configuration Table**

Port 1	
OAM	Disabled
Mode	Active
Dying Gasp	Enabled
Critical Event	Enabled
Remote Loopback OAMPDU	Not Processed
Symbol Error	
Notify State	Enabled
Window	1000 Milliseconds
Threshold	1 Error Symbol
Frame Error	
Notify State	Enabled
Window	1000 Milliseconds
Threshold	1 Error Frame
Frame Period Error	
Notify State	Enabled
Window	1488100 Frames
Threshold	1 Error Frame
Frame Seconds Error	
Notify State	Enabled
Window	60000 Milliseconds
Threshold	1 Error Seconds
Port 2	
OAM	Disabled
Mode	Active
Dying Gasp	Enabled
Critical Event	Enabled
Remote Loopback OAMPDU	Not Processed
Symbol Error	

Figure 10-21 Ethernet OAM Configuration Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select a range of ports you wish to configure.
<b>Link Event</b>	Use the drop-down menu to select the link events, <i>Link Monitor</i> or <i>Critical Link Event</i> .
<b>Link Monitor</b>	Use the drop-down menu to select link monitor. Available options are <i>Error Symbol</i> , <i>Error Frame</i> , <i>Error Frame Period</i> , and <i>Error Frame Seconds</i> .
<b>Critical Link Event</b>	Use the drop-down menu to select between <i>Dying Gasp</i> and <i>Critical Event</i> .
<b>Threshold</b>	Enter the number of error frame or symbol in the period is required to be equal to or greater than in order for the event to be generated. The available value changes based on the selected <b>Link Monitor</b> .
<b>Window</b>	Enter the period of error frame or symbol in milliseconds summary event. The available value changes based on the selected <b>Link Monitor</b> .
<b>Notify</b>	Specify to enable or disable the event notification. The default state is <i>Enabled</i> .

Click the **Apply** button to accept the changes made for each individual section.

## Ethernet OAM Event Log

The window is used to show ports Ethernet OAM event log information.



To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Event Log** as shown below.

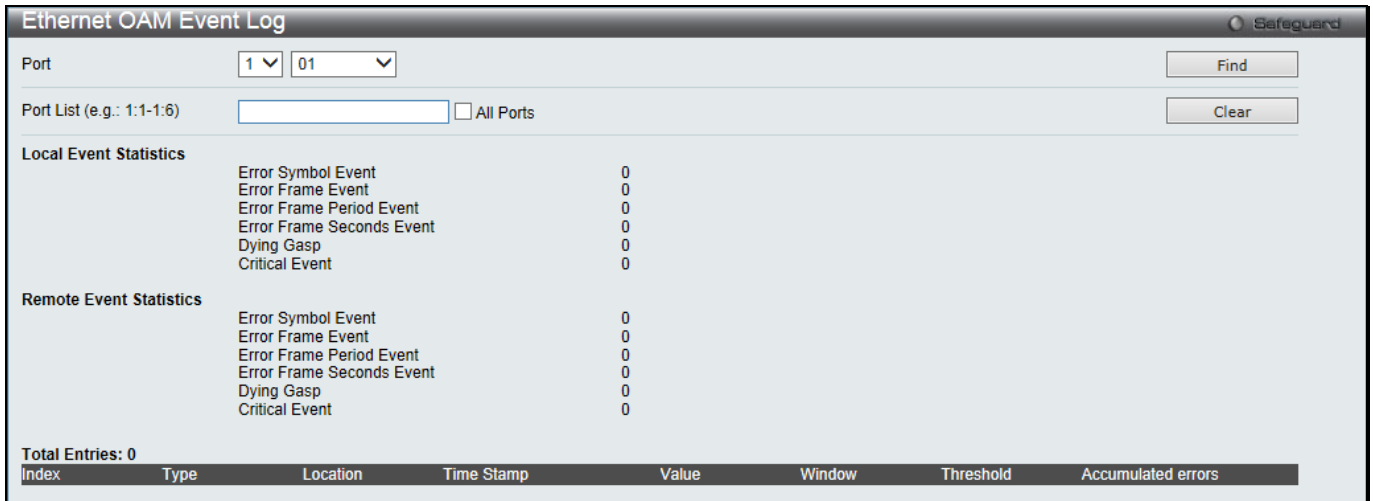


Figure 10-22 Ethernet OAM Event Log window

The fields that can be configured are described below:

Parameter	Description
<b>Port</b>	Use the drop-down menu to select the unit ID and the port number to view.
<b>Port List</b>	Enter a list of ports. Tick the <b>All Ports</b> check box to select all ports.

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

Click the **Clear** button to clear all the information entered in the fields.

## Ethernet OAM Statistics

The window is used to show ports Ethernet OAM statistics information.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Statistics** as shown below.

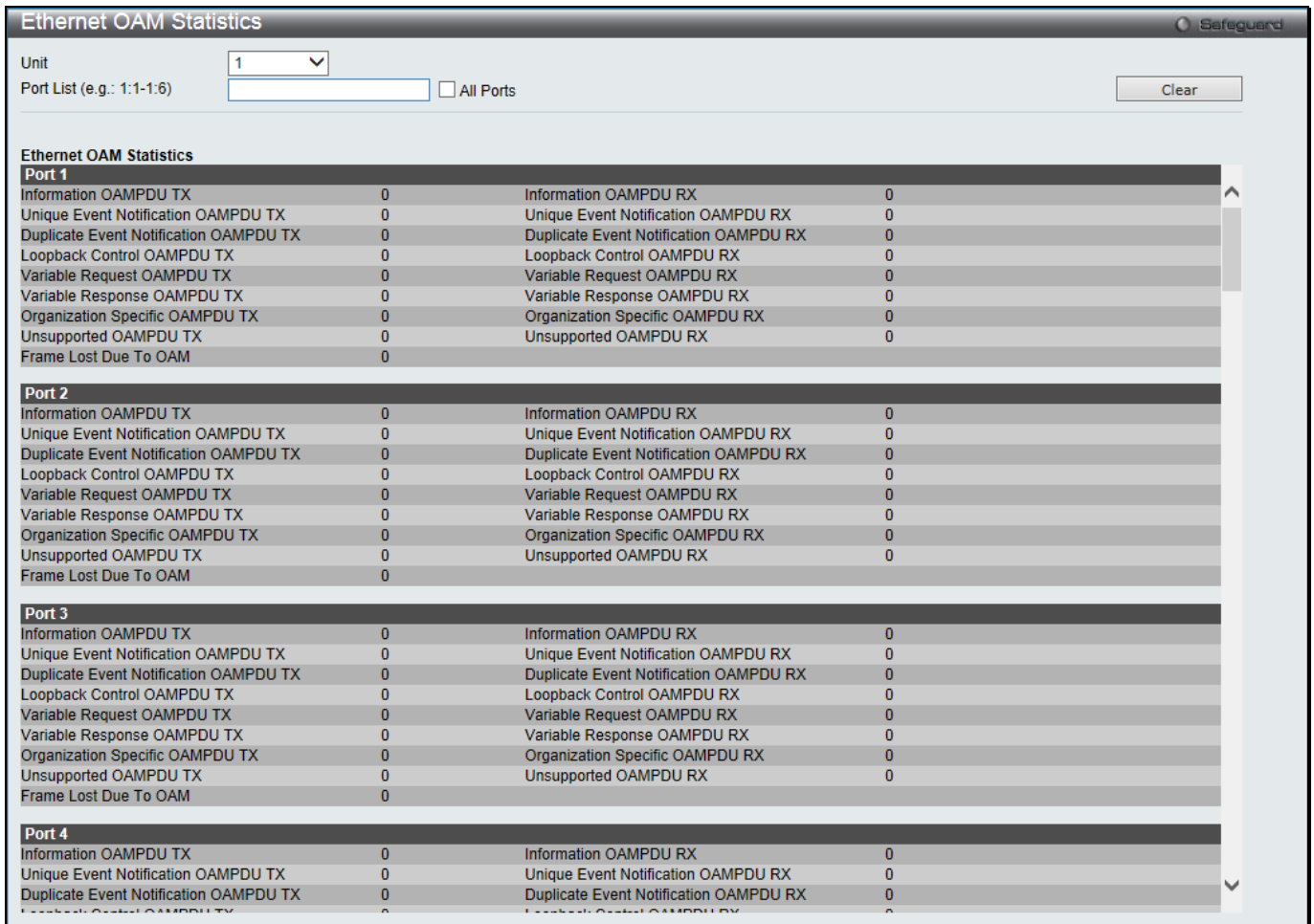


Figure 10-23 Ethernet OAM Statistics window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit you want to configure.
Port List	Enter a list of ports. Tick the <b>All Ports</b> check box to select all ports.

Click the **Clear** button to clear all the information entered in the fields.

## DULD Settings

This window is used to configure and display the unidirectional link detection on port.

To view the following window, click **OAM > DULD Settings** as shown below.

**DULD Settings**
Safeguard

DULD Recover Timer (0 or 60-1000000)  sec Apply

Unit

From Port

To Port

Admin State

Mode

Discovery Time (5-65535)   
  sec Apply

**Unit 1 Settings**

Port	Admin State	Oper Status	Mode	Link Status	Discovery Time (sec)
1	Disabled	Disabled	Normal	Unknown	5
2	Disabled	Disabled	Normal	Unknown	5
3	Disabled	Disabled	Normal	Unknown	5
4	Disabled	Disabled	Normal	Unknown	5
5	Disabled	Disabled	Normal	Unknown	5
6	Disabled	Disabled	Normal	Unknown	5
7	Disabled	Disabled	Normal	Unknown	5
8	Disabled	Disabled	Normal	Unknown	5
9	Disabled	Disabled	Normal	Unknown	5
10	Disabled	Disabled	Normal	Unknown	5
11	Disabled	Disabled	Normal	Unknown	5
12	Disabled	Disabled	Normal	Unknown	5
13	Disabled	Disabled	Normal	Unknown	5
14	Disabled	Disabled	Normal	Unknown	5
15	Disabled	Disabled	Normal	Unknown	5
16	Disabled	Disabled	Normal	Unknown	5
17	Disabled	Disabled	Normal	Unknown	5
18	Disabled	Disabled	Normal	Unknown	5
19	Disabled	Disabled	Normal	Unknown	5
20	Disabled	Disabled	Normal	Unknown	5
21	Disabled	Disabled	Normal	Unknown	5
22	Disabled	Disabled	Normal	Unknown	5
23	Disabled	Disabled	Normal	Unknown	5
24	Disabled	Disabled	Normal	Unknown	5
25	Disabled	Disabled	Normal	Unknown	5
26	Disabled	Disabled	Normal	Unknown	5

Figure 10-24 DULD Settings window

The fields that can be configured are described below:

Parameter	Description
<b>DULD Recover Timer (0 or 60-1000000)</b>	Enter the auto-recover time for unidirectional link detection.
<b>Unit</b>	Select the unit you want to configure.
<b>From Port / To Port</b>	Select a range of ports you wish to configure.
<b>Admin State</b>	Use the drop-down menu to enable or disable the selected ports unidirectional link detection status.
<b>Mode</b>	Use the drop-down menu to select Mode between <i>Shutdown</i> and <i>Normal</i> . <i>Shutdown</i> – If any unidirectional link is detected, disable the port and log an event. <i>Normal</i> - Only log an event when a unidirectional link is detected.
<b>Discovery Time (5-65535)</b>	Enter these ports neighbor discovery time. If the discovery is timeout, the unidirectional link detection will start.

Click the **Apply** button to accept the changes made for each individual section.

## 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.

**Cable Diagnostics**
Safeguard

Unit  Port

Port	Type	Link Status	Test Result	Cable Length (M)
<p>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.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. If cable length is displayed as "NA" it means the cable length is "Not Available". This is due to the port being unable to obtain cable length/either because its link partner is powered-off, or the cables used are broken and/or bad in quality.</li> <li>2. The maximum cable length is limited to 120 meters.</li> <li>3. The accuracy is +/-5 meters, therefore "No Cable" may be displayed under "Test Result", when the length of cable is less than 5 meters.</li> <li>4. It also measures cable fault and identifies the fault in length according to the distance from this switch.</li> </ol>				

Figure 10-25 Cable Diagnostics window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select the unit you want to configure.
<b>Port</b>	Select a port you wish to display.

Click the **Test** button to view the cable diagnostics for a particular port.



**NOTE:** Cable diagnostic function limitations. Cable length detection is only supported on GE ports if the port or the link partner is powered off. Ports must be linked up and running at 1000M speed. Cross-talk errors detection is not supported on FE ports.

#### **Test Result messages:**

1. **Open** - The cable in the error pair does not have a connection at the specified position.
2. **Short** - The cable in the error pair has a short problem at the specified position.
3. **Crosstalk** - The cable in the error pair has a crosstalk problem at the specified position.
4. **Shutdown** - The remote partner is powered off.
5. **Unknown** - The diagnosis does not obtain the cable status. Please try again.
6. **OK** - The pair or cable has no error.
7. **No cable** - The port does not have any cable connected to the remote partner.

# Chapter 11 Monitoring

**Utilization**  
**Statistics**  
**Mirror**  
**sFlow**  
**Ping**  
**Trace Route**  
**Peripheral**

## Utilization

### CPU Utilization

Users can display the percentage of the CPU being used, expressed as an integer percentage and calculated as a simple average by time interval.

To view the following window, click **Monitoring > Utilization > CPU Utilization** as shown below.

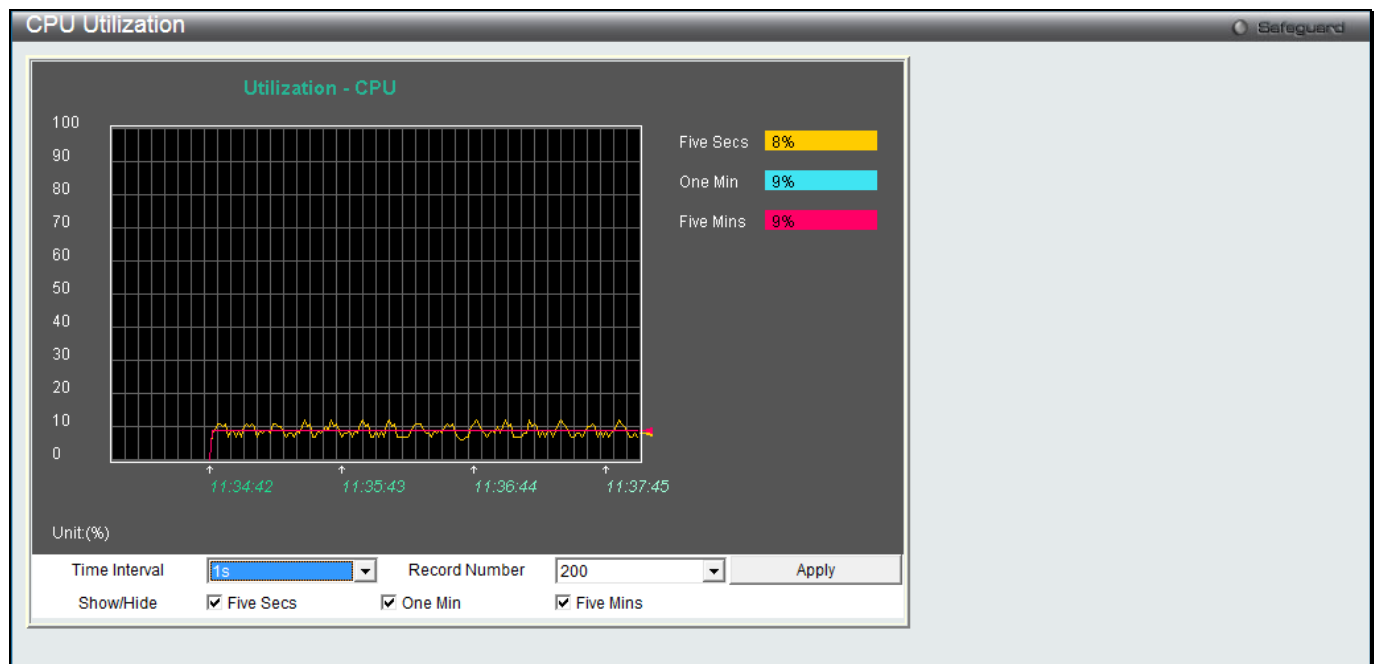


Figure 11-1 CPU Utilization window

The fields that can be configured are described below:

Parameter	Description
<b>Time Interval</b>	Select the desired setting between <i>1s</i> and <i>60s</i> , where "s" stands for seconds. The default value is <i>1s</i> .
<b>Record Number</b>	Select number of times the Switch will be polled between <i>20</i> and <i>200</i> . The default value is <i>200</i> .
<b>Show/Hide</b>	Check whether or not to display <b>Five Secs</b> , <b>One Min</b> , and <b>Five Mins</b> .

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

### DRAM & Flash Utilization

This window is used to display information regarding the DRAM and Flash utilization.

To view the following window, click **Monitoring > Utilization > DRAM & Flash Utilization** as shown below.

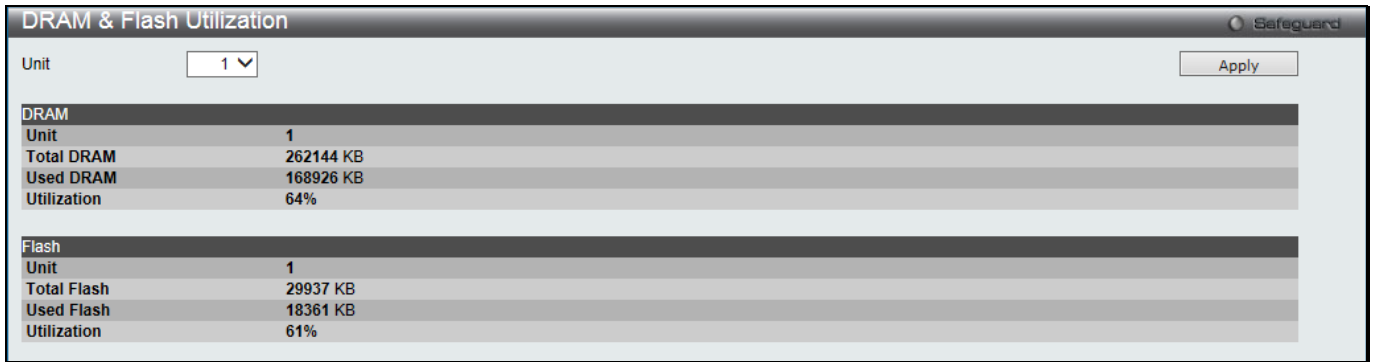


Figure 11-2 DRAM & Flash Utilization window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit you want to configure.

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

## Port Utilization

Users can display the percentage of the total available bandwidth being used on the port.

To view the following window, click **Monitoring > Utilization > Port Utilization** as shown below.

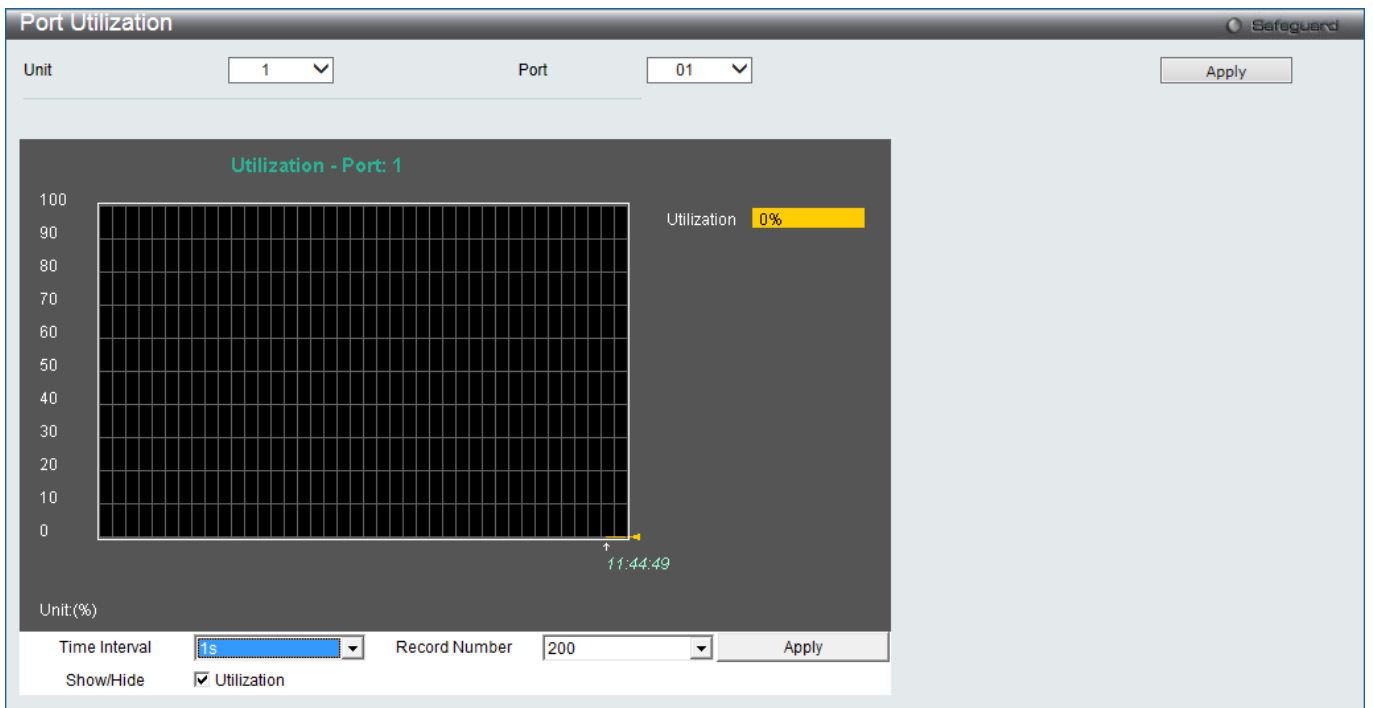


Figure 11-3 Port Utilization window

The fields that can be configured are described below:

Parameter	Description
Unit	Select the unit you to be displayed.
Port	Use the drop-down menu to choose the port that will display statistics.
Time Interval	Select the desired setting between 1s and 60s, where "s" stands for seconds. The

	default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between 20 and 200. The default value is 200.
<b>Show/Hide</b>	Check whether or not to display <b>Utilization</b> .

Click the **Apply** button to accept the changes made for each individual section.

## Statistics

### Port Statistics

#### Packets

The Web manager allows various packet statistics to be viewed as either a line graph or a table. Six windows are offered.

#### Received (RX)

To select a port to view these statistics for, select the unit and port by using the **Unit** and **Port** drop-down menu. The user may also use the real-time graphic of the Switch at the top of the web page by simply clicking on a port.

To view the following window, click **Monitoring > Statistics > Port Statistics > Packets > Received (RX)** as shown below.

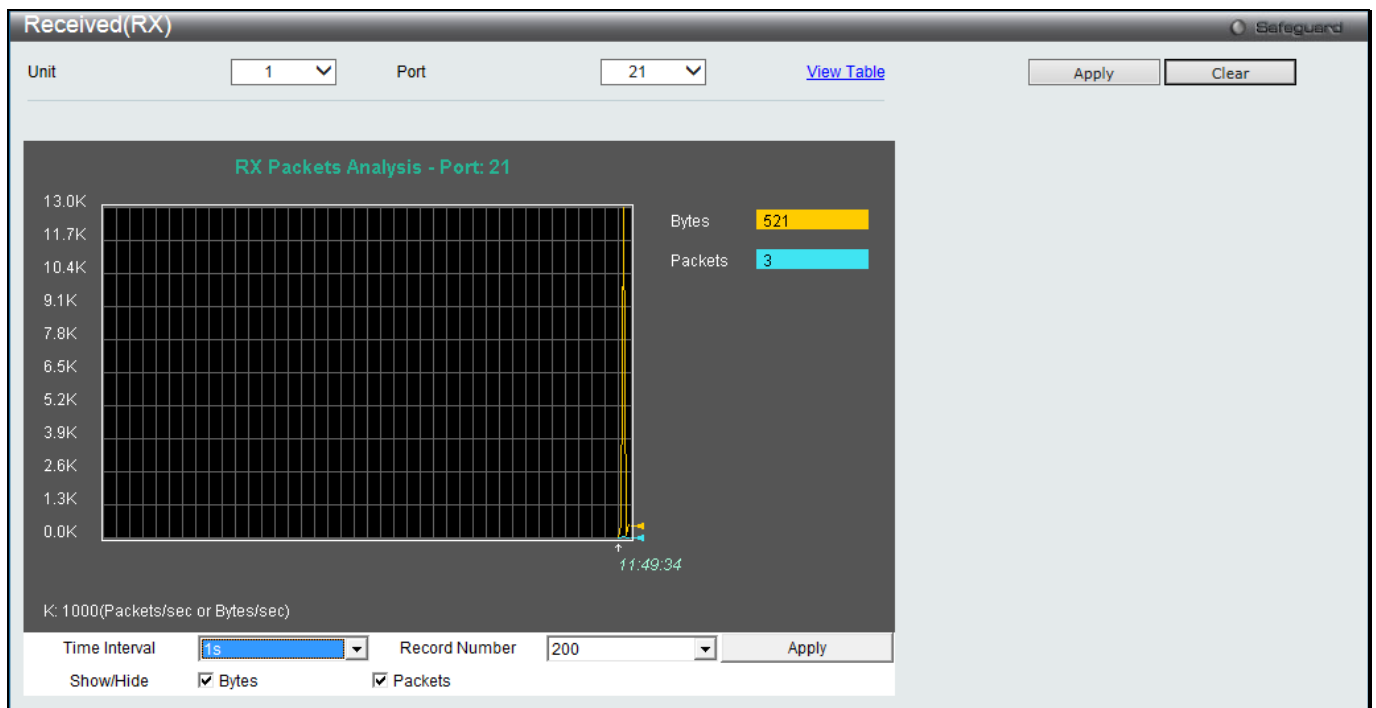


Figure 11-4 Received (RX) window (for Bytes and Packets)

Click the [View Table](#) link to display the information in a table rather than a line graph.

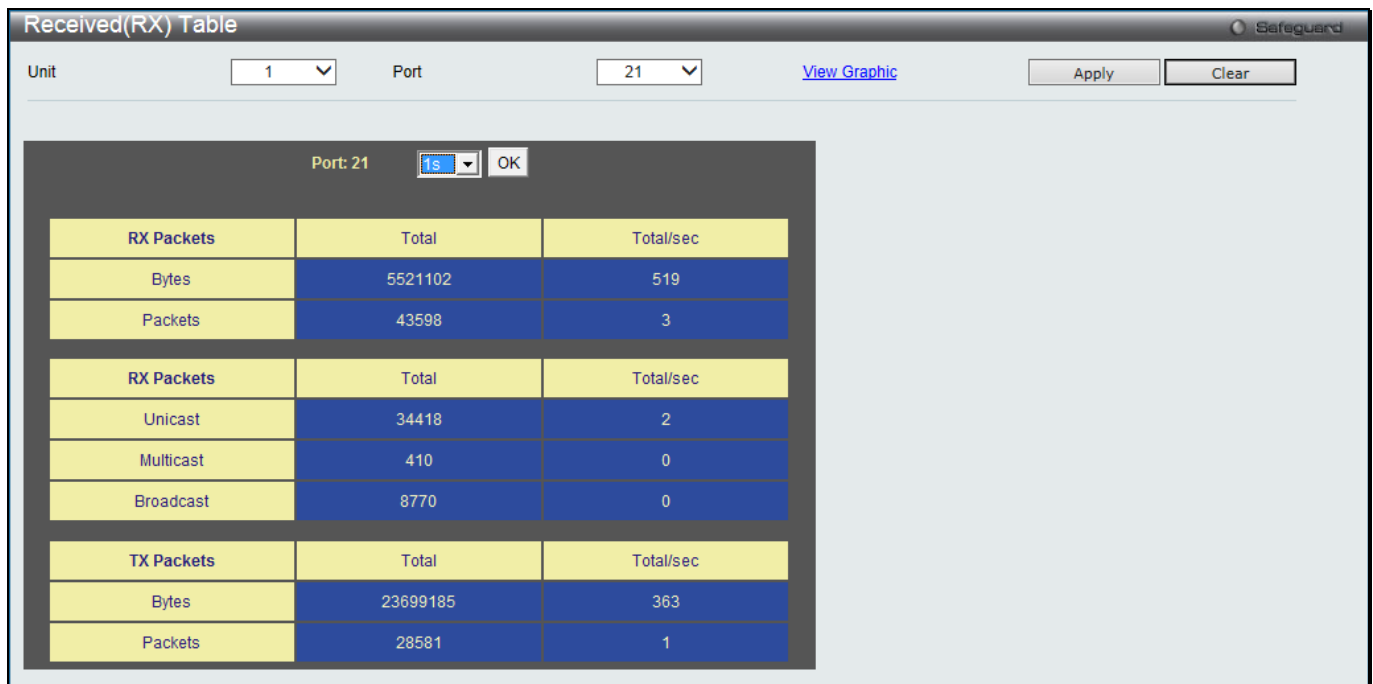


Figure 11-5 RX Packets Analysis Table window

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit you to be displayed.
<b>Port</b>	Use the drop-down menu to choose the port that will display statistics.
<b>Time Interval</b>	Select the desired setting between 1s and 60s, where "s" stands for seconds. The default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between 20 and 200. The default value is 200.
<b>Bytes</b>	Counts the number of bytes received on the port.
<b>Packets</b>	Counts the number of packets received on the port.
<b>Unicast</b>	Counts the total number of good packets that were received by a unicast address.
<b>Multicast</b>	Counts the total number of good packets that were received by a multicast address.
<b>Broadcast</b>	Counts the total number of good packets that were received by a broadcast address.
<b>Show/Hide</b>	Check whether to display <b>Bytes</b> and <b>Packets</b> .

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

Click the **Clear** button to clear all statistics counters on this window.

Click the [View Table](#) link to display the information in a table rather than a line graph.

Click the [View Graphic](#) link to display the information in a line graph rather than a table.

## UMB\_Cast (RX)

To select a port to view these statistics for, select the unit and port by using the **Unit** and **Port** drop-down menu. The user may also use the real-time graphic of the Switch at the top of the web page by simply clicking on a port.

To view the following window, click **Monitoring > Statistics > Port Statistics > Packets > UMB\_Cast (RX)** as shown below.



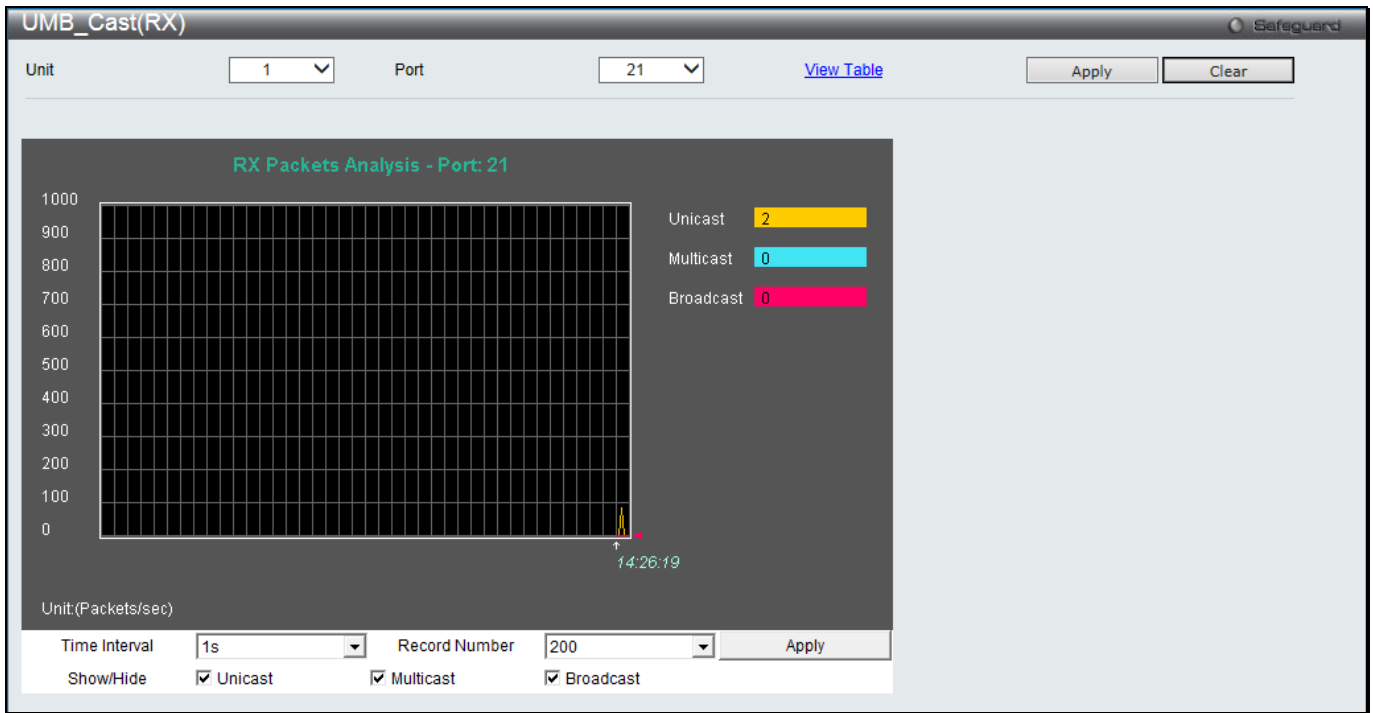


Figure 11-6 UMB\_cast (RX) window (for Unicast, Multicast, and Broadcast Packets)

Click the [View Table](#) link to display the information in a table rather than a line graph.

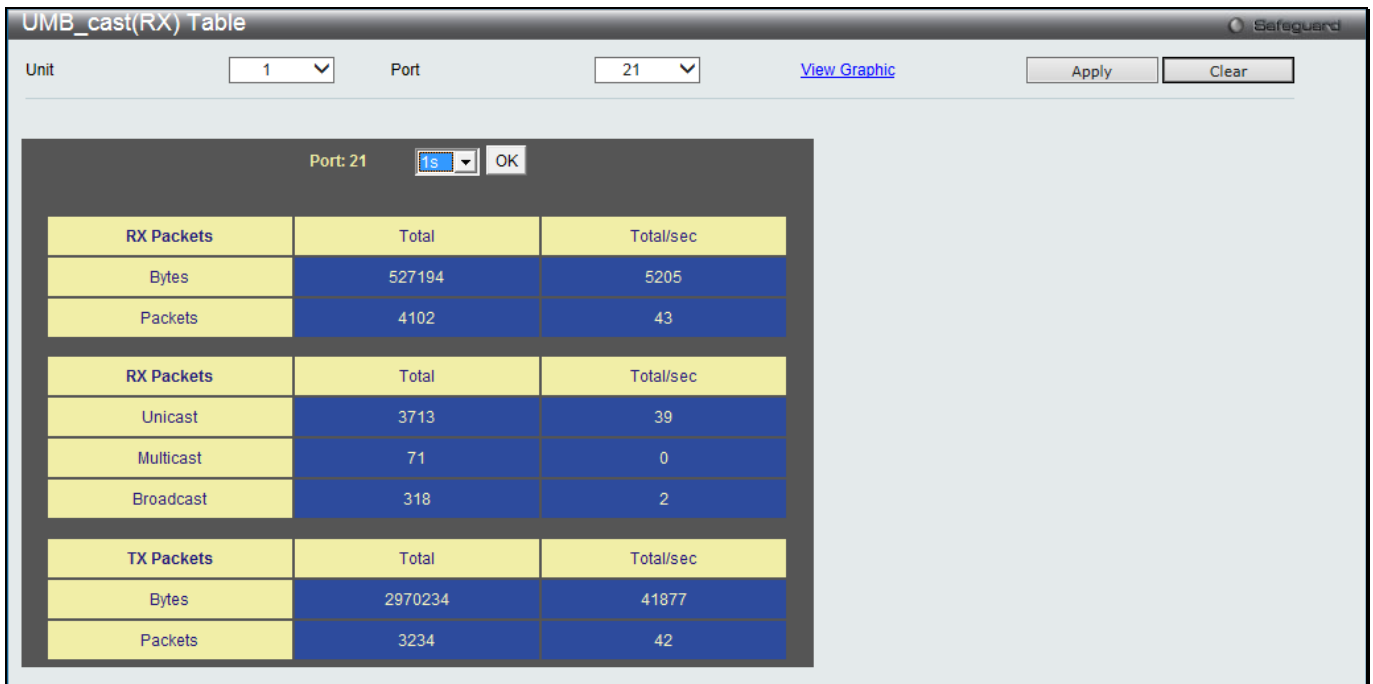


Figure 11-7 RX Packets Analysis window (table for Unicast, Multicast, and Broadcast Packets)

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit you to be displayed.
<b>Port</b>	Use the drop-down menu to choose the port that will display statistics.
<b>Time Interval</b>	Select the desired setting between 1s and 60s, where "s" stands for seconds. The default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between 20 and 200. The default value is 200.

<b>Unicast</b>	Counts the total number of good packets that were received by a unicast address.
<b>Multicast</b>	Counts the total number of good packets that were received by a multicast address.
<b>Broadcast</b>	Counts the total number of good packets that were received by a broadcast address.
<b>Show/Hide</b>	Check whether or not to display Multicast, Broadcast, and Unicast Packets.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all statistics counters on this window.

Click the [View Table](#) link to display the information in a table rather than a line graph.

Click the [View Graphic](#) link to display the information in a line graph rather than a table.

## Transmitted (TX)

To select a port to view these statistics for, select the unit and port by using the **Unit** and **Port** drop-down menu. The user may also use the real-time graphic of the Switch at the top of the web page by simply clicking on a port.

To view the following window, click **Monitoring > Statistics > Port Statistics > Packets > Transmitted (TX)** as shown below.

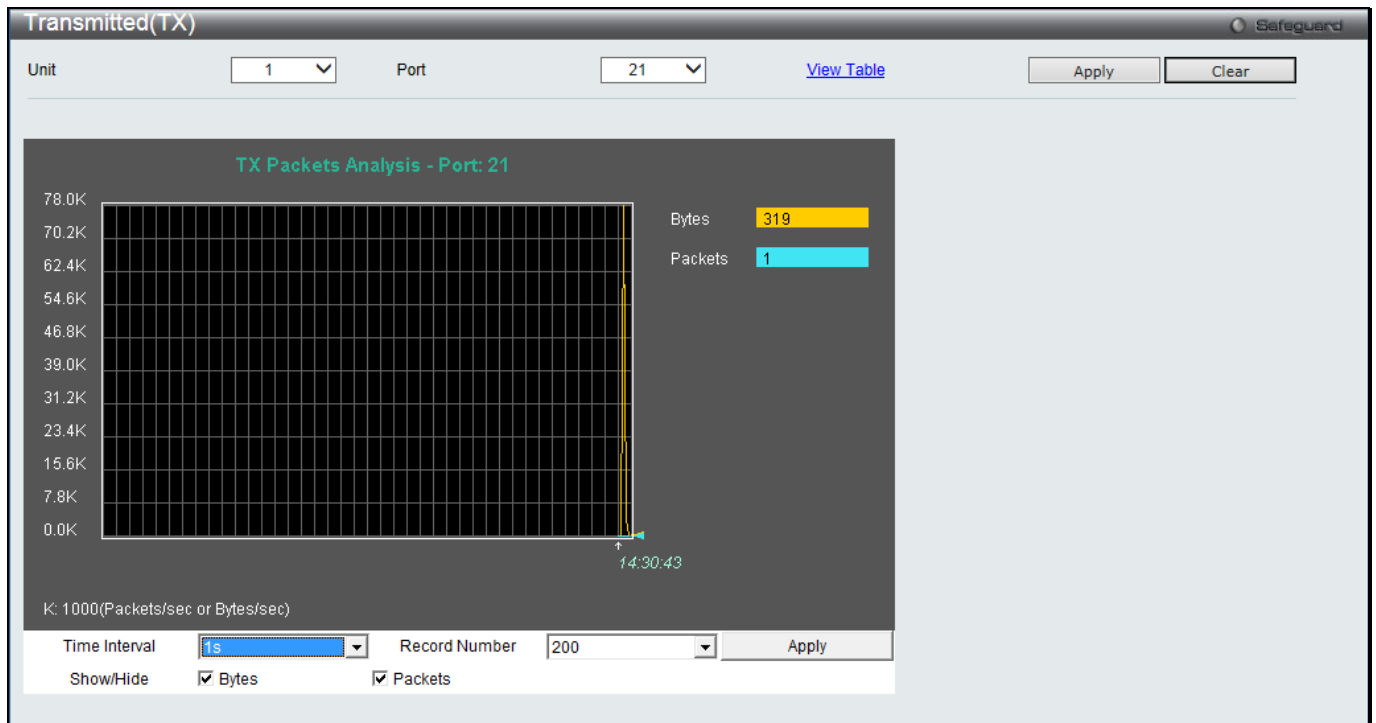


Figure 11-8 Transmitted (TX) window (for Bytes and Packets)

Click the [View Table](#) link to display the information in a table rather than a line graph.

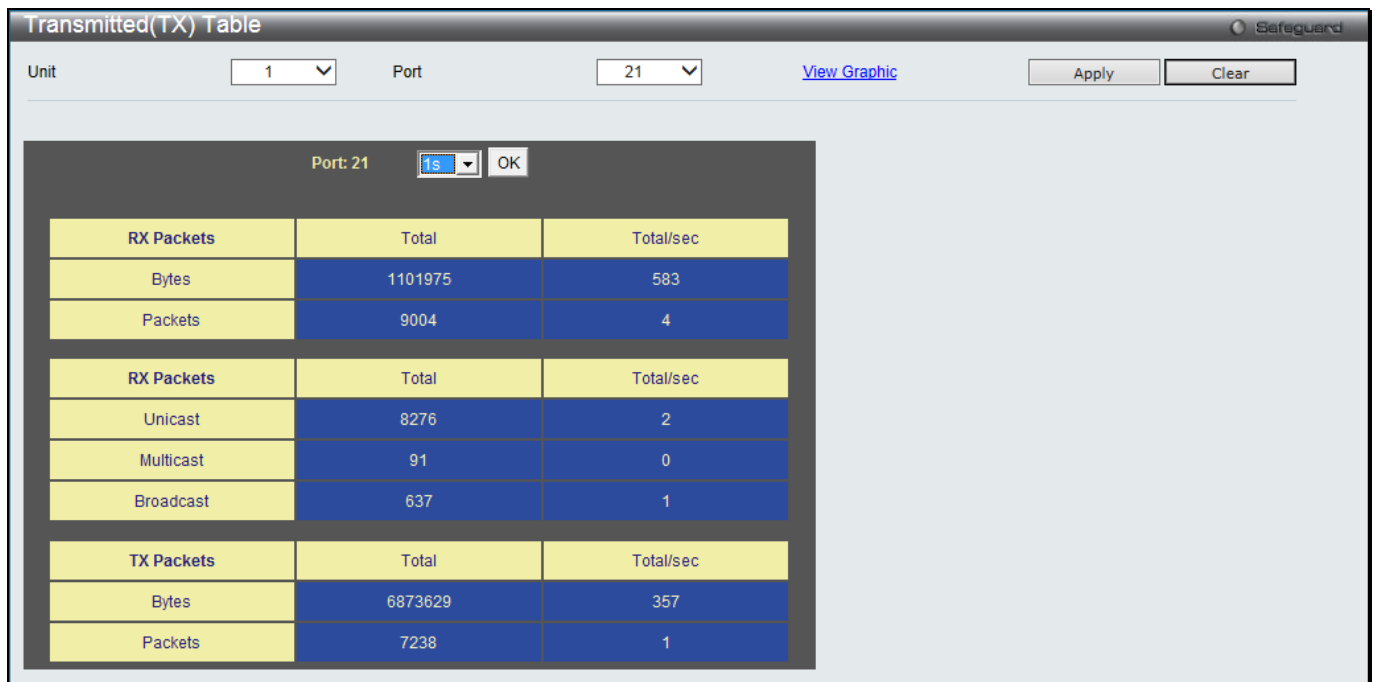


Figure 11-9 TX Packets Analysis window (table for Bytes and Packets)

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit you to be displayed.
<b>Port</b>	Use the drop-down menu to choose the port that will display statistics.
<b>Time Interval</b>	Select the desired setting between 1s and 60s, where "s" stands for seconds. The default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between 20 and 200. The default value is 200.
<b>Bytes</b>	Counts the number of bytes successfully sent on the port.
<b>Packets</b>	Counts the number of packets successfully sent on the port.
<b>Unicast</b>	Counts the total number of good packets that were transmitted by a unicast address.
<b>Multicast</b>	Counts the total number of good packets that were transmitted by a multicast address.
<b>Broadcast</b>	Counts the total number of good packets that were transmitted by a broadcast address.
<b>Show/Hide</b>	Check whether or not to display <b>Bytes</b> and <b>Packets</b> .

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all statistics counters on this window.

Click the [View Table](#) link to display the information in a table rather than a line graph.

Click the [View Graphic](#) link to display the information in a line graph rather than a table.

## Errors

The Web manager allows port error statistics compiled by the Switch's management agent to be viewed as either a line graph or a table. Four windows are offered.

## Received (RX)

To select a port to view these statistics for, select the port by using the Port drop-down menu. The user may also use the real-time graphic of the Switch at the top of the web page by simply clicking on a port.

To view the following window, click **Monitoring > Statistics > Port Statistics > Errors > Received (RX)** as shown below.

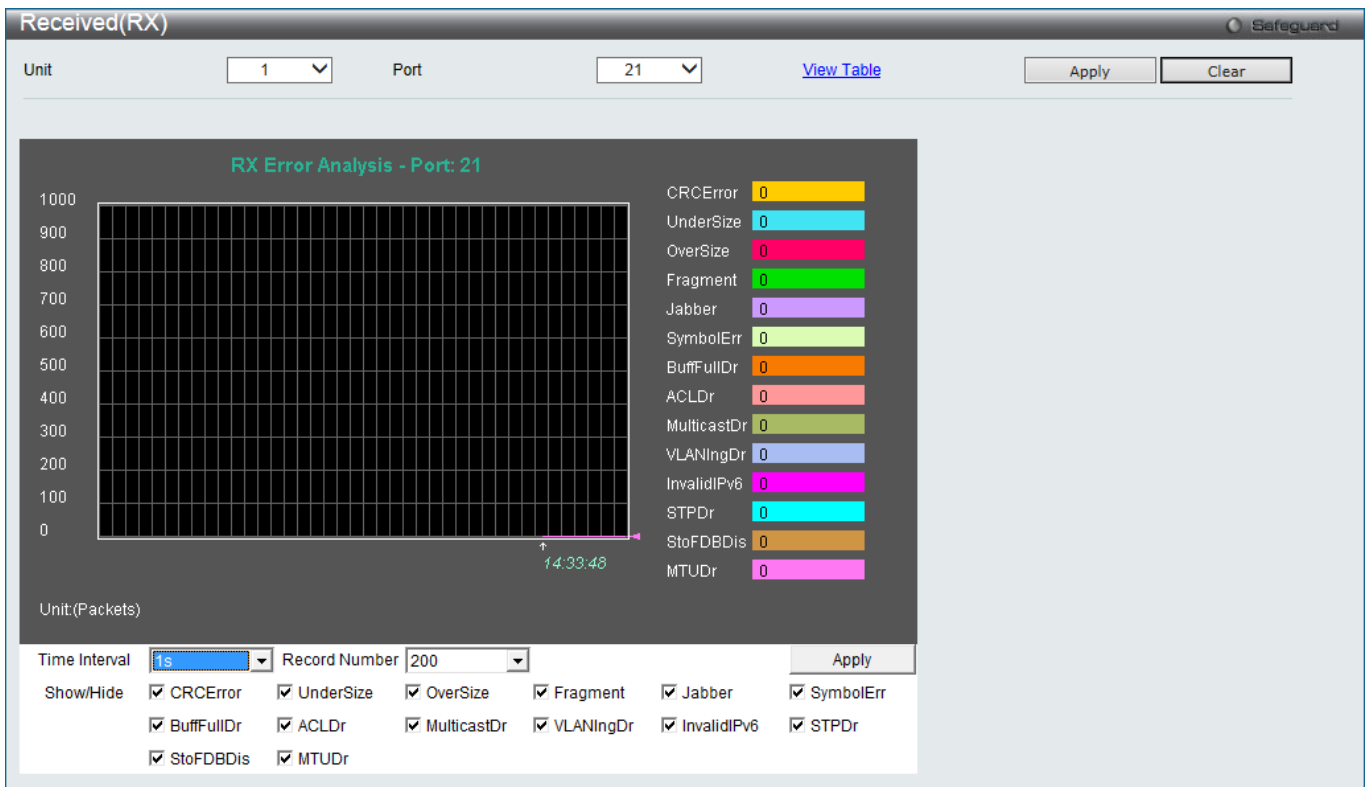


Figure 11-10 Received (RX) window (for errors)

Click the [View Table](#) link to display the information in a table rather than a line graph.

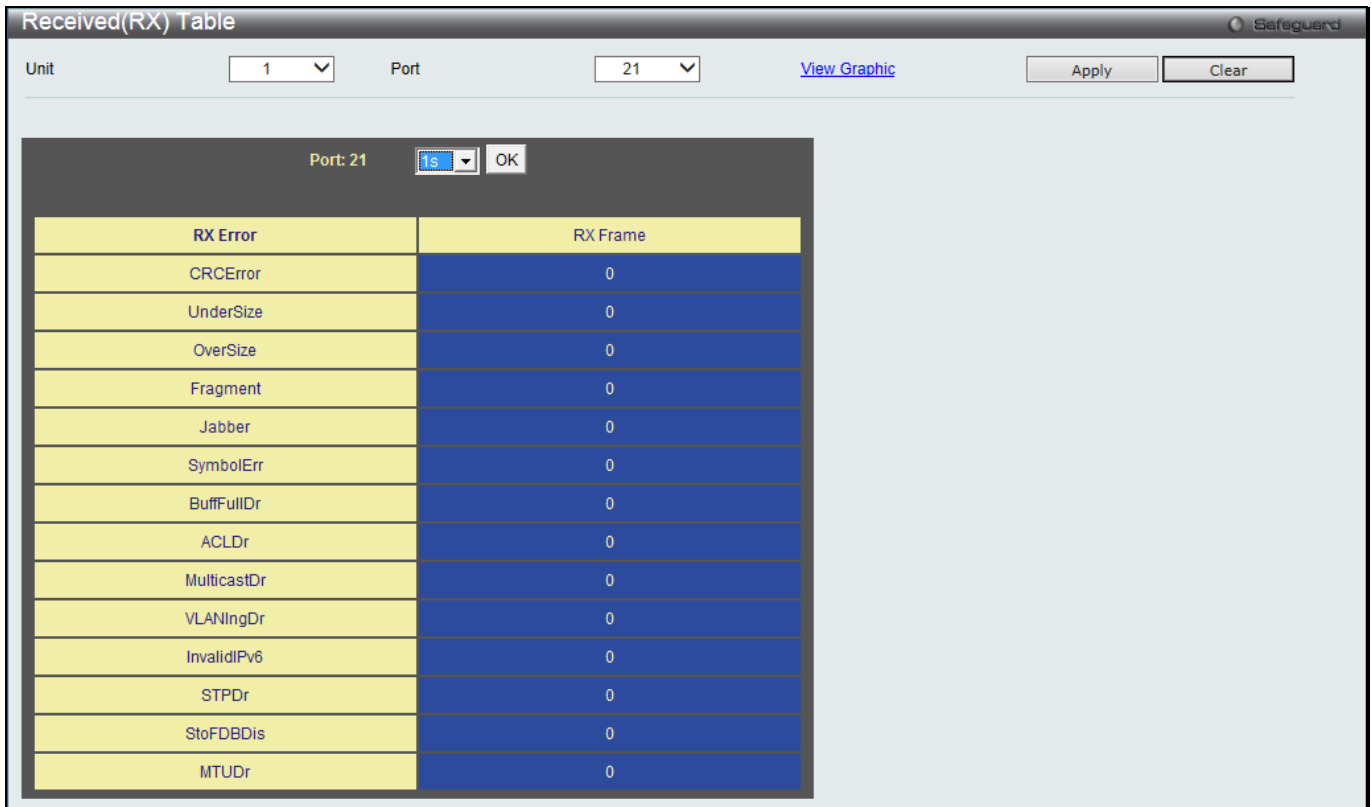


Figure 11-11 RX Error Analysis window (table)

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit you to be displayed.
<b>Port</b>	Use the drop-down menu to choose the port that will display statistics.
<b>Time Interval</b>	Select the desired setting between <i>1s</i> and <i>60s</i> , where "s" stands for seconds. The default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between <i>20</i> and <i>200</i> . The default value is <i>200</i> .
<b>CRCErr</b>	Select to display received FCS error frame counter information.
<b>UnderSize</b>	Select to display received undersize frame counter information.
<b>OverSize</b>	Select to display received oversize frame counter information.
<b>Fragment</b>	Select to display received fragment counter information.
<b>Jabber</b>	Select to display received jabber frame counter information.
<b>SymbolErr</b>	Select to display received code error counter information.
<b>BuffFullDr</b>	Counts for each packet that is discarded when input buffer is full.
<b>ACLDr</b>	Counts for each packet that is denied by ACLs.
<b>MulticastDR</b>	Counts for each multicast packet that is discarded.
<b>VLANIngDR</b>	Counts for each packet that is discarded by VLAN ingress checking.
<b>InvalidIPv6</b>	Counts for IPv6 L3 discard.
<b>STPDr</b>	Counts for packets dropped when ingress port is not in forwarding state.
<b>StoFDBDis</b>	Counts for receive policy discard.
<b>MTUDr</b>	Counts for frames received that exceed maximum frame in length and contain a valid or invalid FCS.
<b>Show/Hide</b>	Select the check boxes to display the errors.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all statistics counters on this window.

Click the [View Table](#) link to display the information in a table rather than a line graph.

Click the [View Graphic](#) link to display the information in a line graph rather than a table.

## Transmitted (TX)

To select a port to view these statistics for, select the port by using the Port drop-down menu. The user may also use the real-time graphic of the Switch at the top of the web page by simply clicking on a port.

To view the following window, click **Monitoring > Statistics > Port Statistics > Errors > Transmitted (TX)** as shown below.

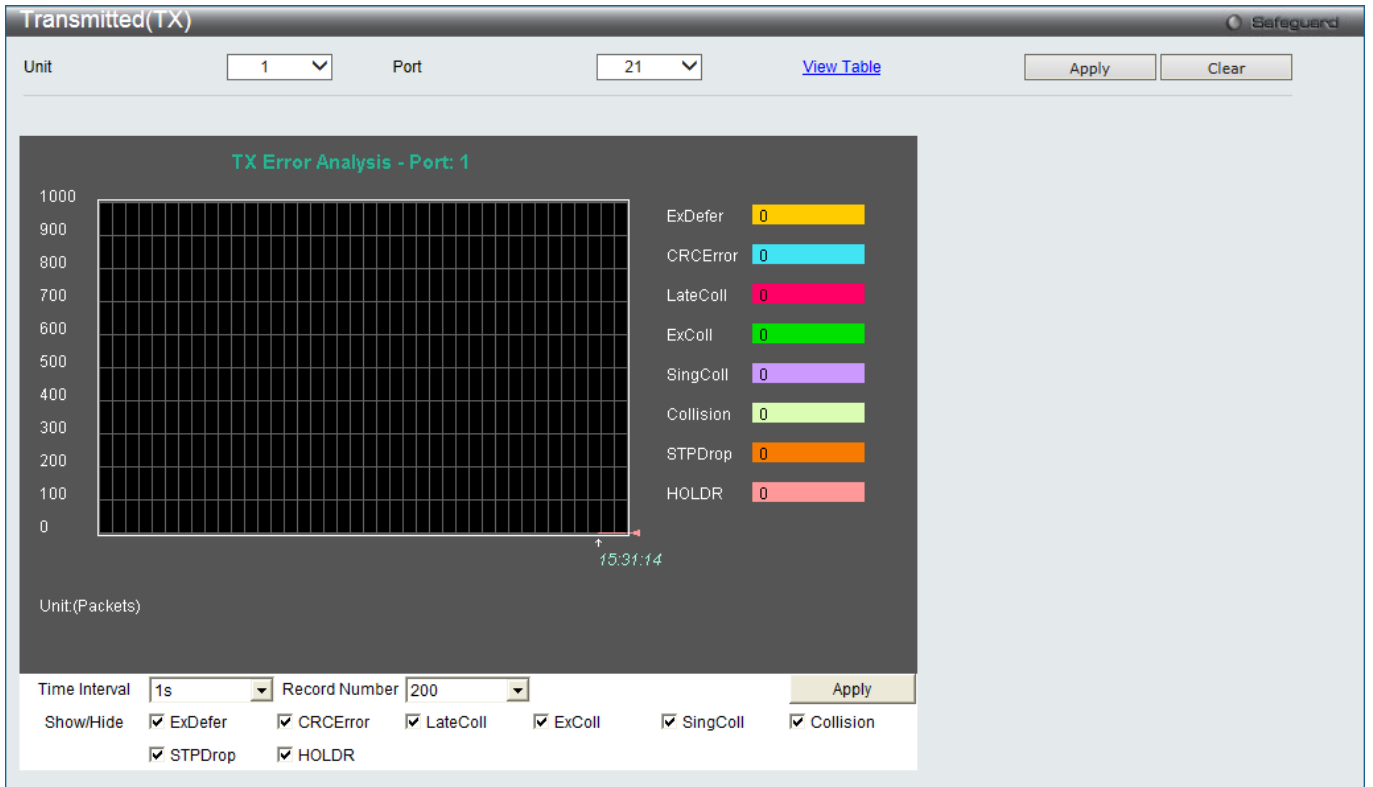


Figure 11-12 Transmitted (TX) window (for errors)

Click the [View Table](#) link to display the information in a table rather than a line graph.



Figure 11-13 TX Error Analysis window (table)

The fields that can be configured or displayed are described below:

Parameter	Description
Unit	Select the unit you to be displayed.

<b>Port</b>	Use the drop-down menu to choose the port that will display statistics.
<b>Time Interval</b>	Select the desired setting between 1s and 60s, where "s" stands for seconds. The default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between 20 and 200. The default value is 200.
<b>ExDefer</b>	Counts the number of packets for which the first transmission attempt on a particular interface was delayed because the medium was busy.
<b>CRC Error</b>	Counts otherwise valid packets that did not end on a byte (octet) boundary.
<b>LateColl</b>	Counts the number of times that a collision is detected later than 512 bit-times into the transmission of a packet.
<b>ExColl</b>	Excessive Collisions. The number of packets for which transmission failed due to excessive collisions.
<b>SingColl</b>	Single Collision Frames. The number of successfully transmitted packets for which transmission is inhibited by more than one collision.
<b>Collision</b>	An estimate of the total number of collisions on this network segment.
<b>STPDrop</b>	Counts for packets dropped when egress port is not in forwarding state.
<b>HOLDR</b>	Counts for each packet drop due to HOL blocking.
<b>Show/Hide</b>	Select the check boxes to display the errors.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all statistics counters on this window.

Click the [View Table](#) link to display the information in a table rather than a line graph.

Click the [View Graphic](#) link to display the information in a line graph rather than a table.

## Packet Size

Users can display packets received and transmitted by the Switch, arranged in ten groups and classed by size, as either a line graph or a table. Two windows are offered. To select a port to view these statistics for, select the port by using the Port drop-down menu. The user may also use the real-time graphic of the Switch at the top of the web page by simply clicking on a port.

To view the following window, click **Monitoring > Statistics > Packet Size** as shown below.

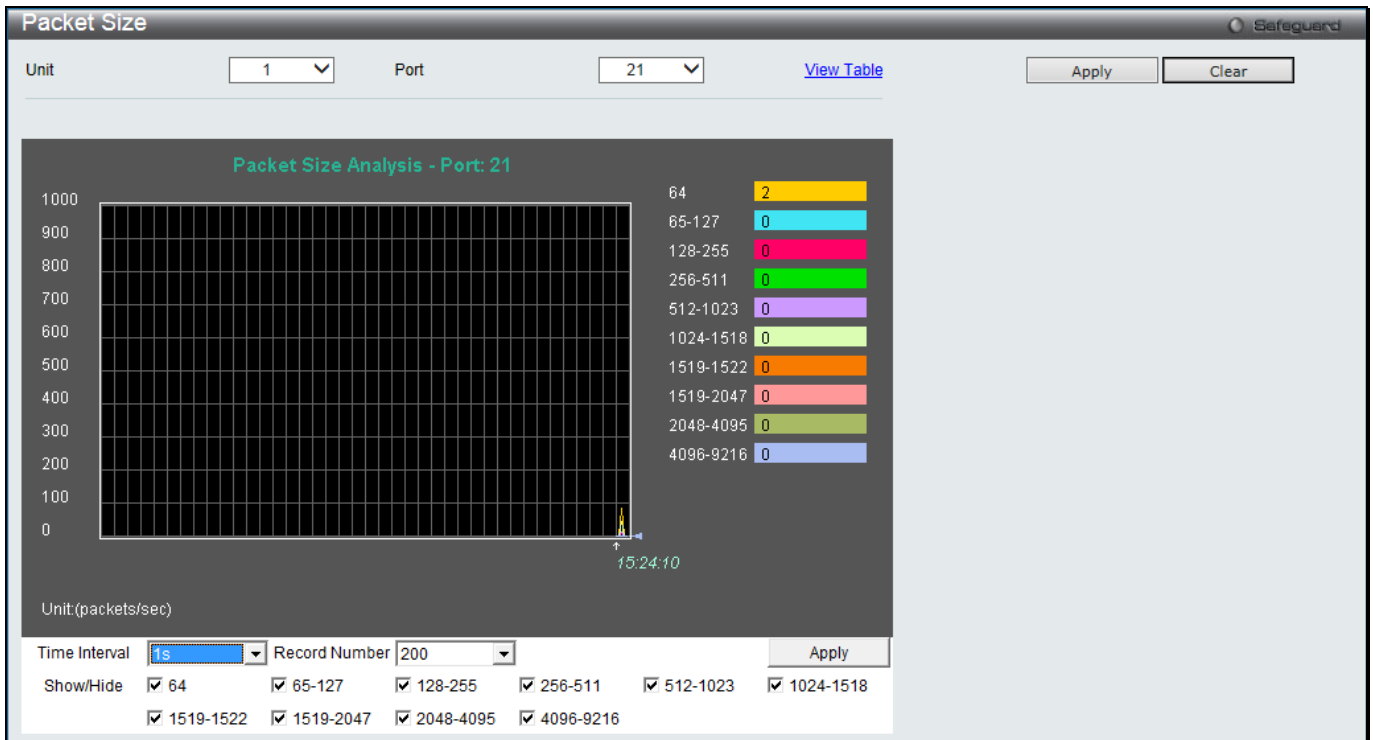


Figure 11-14 Packet Size window

Click the [View Table](#) link to display the information in a table rather than a line graph.

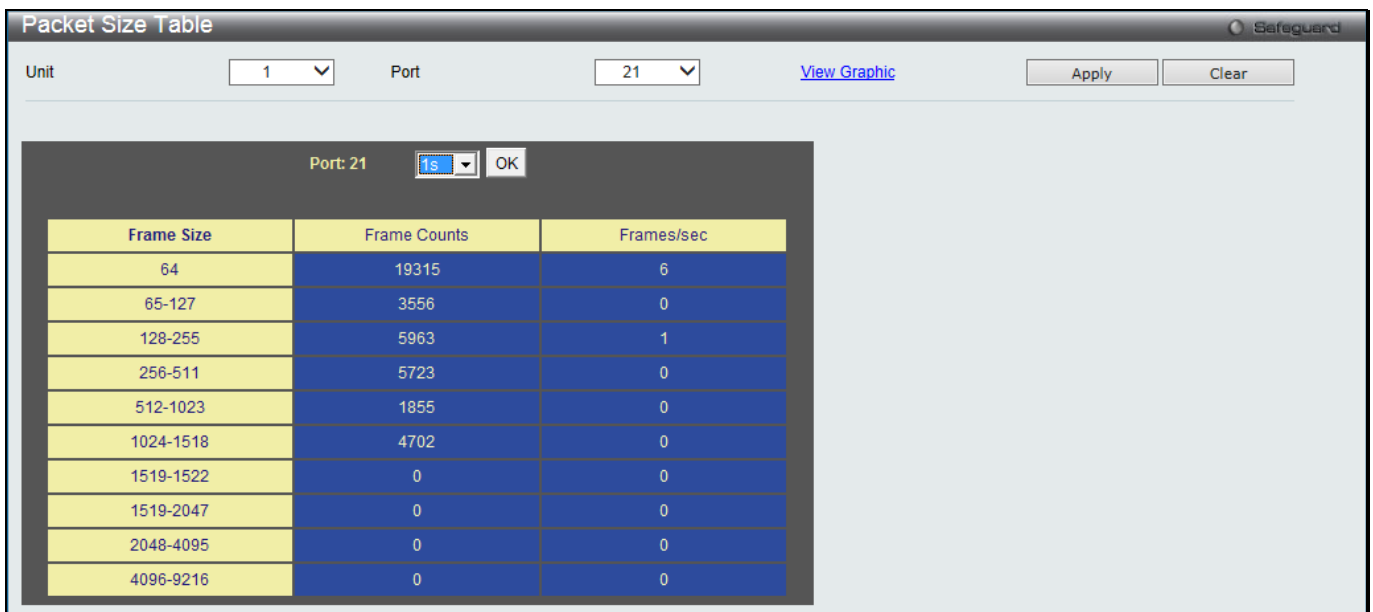


Figure 11-15 RX Size Analysis window (table)

The fields that can be configured or displayed are described below:

Parameter	Description
<b>Unit</b>	Select the unit you to be displayed.
<b>Port</b>	Use the drop-down menu to choose the port that will display statistics.
<b>Time Interval</b>	Select the desired setting between 1s and 60s, where "s" stands for seconds. The default value is one second.
<b>Record Number</b>	Select number of times the Switch will be polled between 20 and 200. The default value is 200.
<b>64</b>	The total number of packets (including bad packets) received that were 64 octets in



	length (excluding framing bits but including FCS octets).
<b>65-127</b>	The total number of packets (including bad packets) received and transmitted that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
<b>128-255</b>	The total number of packets (including bad packets) received and transmitted that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
<b>256-511</b>	The total number of packets (including bad packets) received and transmitted that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
<b>512-1023</b>	The total number of packets (including bad packets) received and transmitted that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
<b>1024-1518</b>	The total number of packets (including bad packets) received and transmitted that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
<b>1519-1522</b>	The total number of packets (including bad packets) received and transmitted that were between 1519 and 1522 octets in length inclusive (excluding framing bits but including FCS octets).
<b>1519-2047</b>	The total number of packets (including bad packets) received and transmitted that were between 1519 and 2047 octets in length inclusive (excluding framing bits but including FCS octets).
<b>2048-4095</b>	The total number of packets (including bad packets) received and transmitted that were between 2048 and 4095 octets in length inclusive (excluding framing bits but including FCS octets).
<b>4096-9216</b>	The total number of packets (including bad packets) received and transmitted that were between 4096 and 9216 octets in length inclusive (excluding framing bits but including FCS octets).
<b>Show/Hide</b>	Select the check boxes to display the total number of packets with various length.

Click the **Apply** button to accept the changes made for each individual section.

Click the **Clear** button to clear all statistics counters on this window.

Click the [View Table](#) link to display the information in a table rather than a line graph.

Click the [View Graphic](#) link to display the information in a line graph rather than a table.

## VLAN Counter Statistics

This window is used to clear and find VLAN counter statistics.

To view the following window, click **Monitoring > Statistics > VLAN Counter Statistics** as shown below.

**Figure 11-16 VLAN Counter Statistics window**

The fields that can be configured or displayed are described below:

Parameter	Description
<b>VID List</b>	Click and enter a list of VLAN ID.
<b>VLAN Name</b>	Click and enter the VLAN name.
<b>Port List</b>	Enter a list of ports to be cleared or displayed.
<b>Direction</b>	Use the drop-down menu to select the traffic direction to be cleared or displayed.

Click the **Clear** button to clear the statistic based on the information entered.

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

Click the **View All** button to display all the existing entries.

Click the **Clear All** button to clear all the VLAN counter statistics.

## Mirror

The Switch allows you to copy frames transmitted and received on a port and redirect the copies to another port. You can attach a monitoring device to the target port, such as a sniffer or an RMON probe, to view details about the packets passing through the source port. This is useful for network monitoring and troubleshooting purposes.

## Port Mirror Settings

To view the following window, click **Monitoring > Mirror > Port Mirror Settings** as shown below.

Group	State	Target Port	RX Source Ports	TX Source Ports
1	Enabled			

Figure 11-17 Port Mirror Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Mirror Global State</b>	Click the radio buttons to enable or disable the Port Mirroring feature.
<b>Group ID (1-4)</b>	Enter a mirror group ID.

Click the **Apply** button to accept the changes made for each individual section.

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

Click the **View All** button to display all the existing entries.

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

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

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

Figure 11-18 Port Mirror Settings - Modify window

The fields that can be configured are described below:

Parameter	Description
<b>Target Port</b>	Use the drop-down menu to select the Target Port used for Port Mirroring.
<b>Source Ports</b>	Enter the ports that should be included. Select <b>RX</b> , <b>TX</b> or <b>Both</b> to specify in which direction the packets will be monitored. Click <b>Add</b> or <b>Delete</b> to add or delete source ports.
<b>State</b>	Use the drop-down menu to enable or disable the Port Mirroring feature.

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

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



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

## RSPAN Settings

This window controls the RSPAN function. The purpose of the RSPAN function is to mirror packets to a remote switch. A packet travels from the switch where the monitored packet is received, passing through the intermediate switch, and then to the switch where the sniffer is attached. The first switch is also named the source switch.

To make the RSPAN function work, the RSPAN VLAN source setting must be configured on the source switch. For the intermediate and the last switch, the RSPAN VLAN redirect setting must be configured.



**NOTE:** RSPAN VLAN mirroring will only work when RSPAN is enabled (when one RSPAN VLAN has been configured with a source port). The RSPAN redirect function will work when RSPAN is enabled and at least one RSPAN VLAN has been configured with redirect ports.

To view the following window, click **Monitoring > Mirror > RSPAN Settings** as shown below.

Figure 11-19 RSPAN Settings window

The fields that can be configured are described below:

Parameter	Description
<b>RSPAN State</b>	Click the radio buttons to enable or disable the RSPAN feature.
<b>VLAN Name</b>	Create the RSPAN VLAN by VLAN name.
<b>VID (1-4094)</b>	Create the RSPAN VLAN by VLAN ID.

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

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

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

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

After clicking the **Modify** button, the following window will appear:

Figure 11-20 RSPAN Settings – Modify window

The fields that can be configured are described below:

Parameter	Description
<b>Source Ports</b>	<p>If the ports are not specified by option, the source of RSPAN will come from the source specified by the mirror command or the flow-based source specified by an ACL. If no parameter is specified for source, it deletes the configured source parameters.</p> <p>Select <b>RX</b>, <b>TX</b> or <b>Both</b> to specify in which direction the packets will be monitored. Click <b>Add</b> or <b>Delete</b> to add or delete source ports.</p>
<b>Redirect Port List</b>	<p>Specify the output port list for the RSPAN VLAN packets. If the redirect port is a Link Aggregation port, the Link Aggregation behavior will apply to the RSPAN packets. Click <b>Add</b> or <b>Delete</b> to add or delete redirect ports.</p>

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

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

## sFlow

sFlow (RFC3176) is a technology for monitoring traffic in data networks containing switches and routers. The sFlow monitoring system consists of an sFlow Agent (embedded in a switch or router or in a standalone probe) and a central sFlow Collector. The architecture and sampling techniques used in the sFlow monitoring system were designed for providing continuous site-wide (and enterprise-wide) traffic monitoring of high speed switched and routed networks.

## sFlow Global Settings

This window is used to enable or disable the sFlow feature.

To view the following window, click **Monitoring > sFlow > sFlow Global Settings** as shown below.

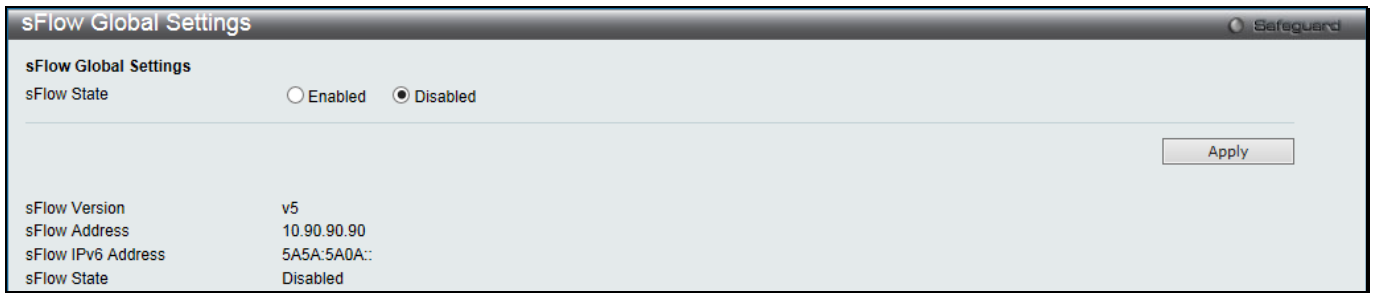


Figure 11-21 sFlow Global Settings window

The fields that can be configured are described below:

Parameter	Description
<b>sFlow State</b>	Click the radio button to enable or disable the sFlow feature.

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

## sFlow Analyzer Server Settings

The Switch can support 4 different Analyzer Servers at the same time and each sampler or poller can select a collector to send the samples. We can send different samples from different samplers or pollers to different collectors.

To view the following window, click **Monitoring > sFlow > sFlow Analyzer Server Settings** as shown below.

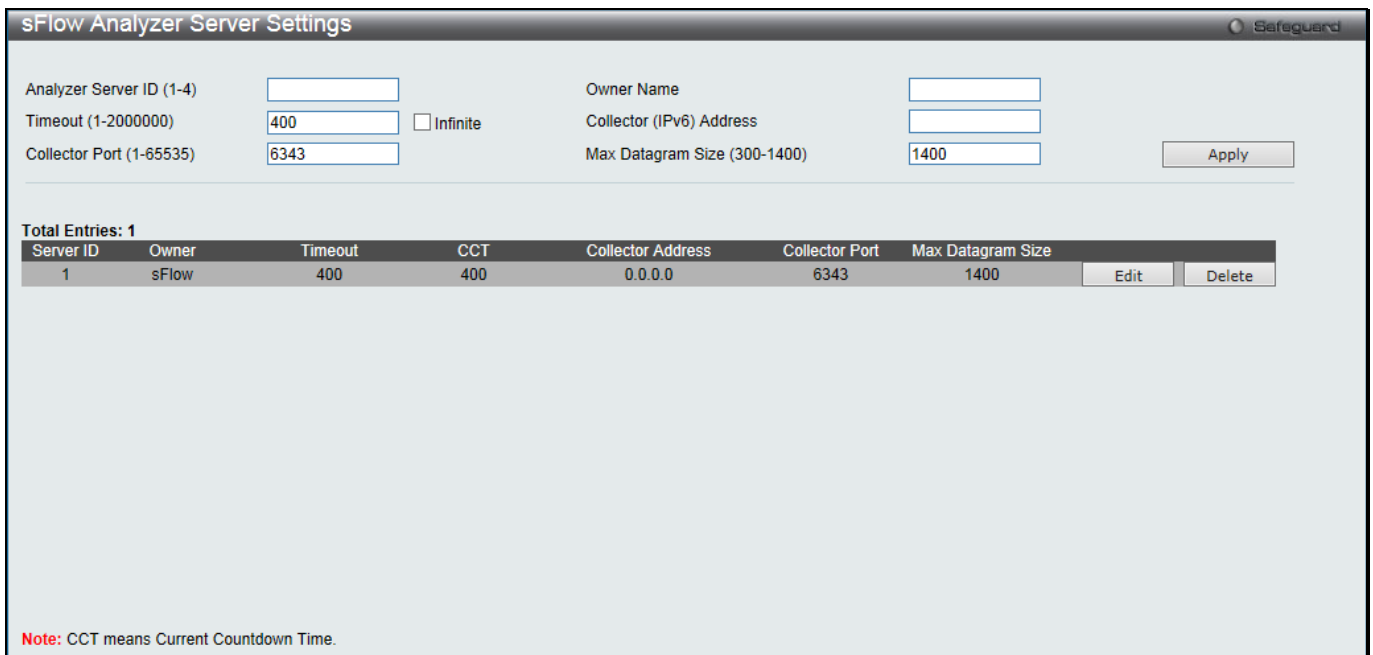


Figure 11-22 sFlow Analyzer Server Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Analyzer Server ID (1-4)</b>	Specify the ID of a server analyzer where the packet will be forwarded.
<b>Owner Name</b>	The entity making use of this sFlow analyzer server. When owner is set or modified, the timeout value will become 400 automatically.
<b>Timeout (1-2000000)</b>	The length of time before the server times out. When the analyzer server times out, all of the flow samplers and counter pollers associated with this analyzer server will be deleted. If not specified, its default value is 400.

<b>Collector (IPv6) Address</b>	The IP address of the analyzer server. If not specified or set a 0 address, the entry will be inactive.
<b>Collector Port (1-65535)</b>	The destination UDP port for sending the sFlow datagrams. If not specified, the default value is 6343.
<b>Max Datagram Size (300-1400)</b>	The maximum number of data bytes that can be packed in a single sample datagram. If not specified, the default value is 1400.

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.

## sFlow Flow Sampler Settings

This window is used to configure the sFlow flow sampler parameters. By configuring the sampling function for a port, a sample packet received by this port will be encapsulated and forwarded to the analyzer server at the specified interval.



**NOTE:** If the user wants the change the analyze server ID, he needs to delete the flow sampler and creates a new one.

Figure 11-23 sFlow Flow Sampler Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select a unit to configure.
<b>From Port / To Port</b>	Use the drop-down menus to specify the list of ports to be configured.
<b>Analyzer Server ID (1-4)</b>	Specify the ID of a server analyzer where the packet will be forwarded.
<b>RX Rate (0-65535)</b>	The sampling rate for packet Rx sampling. The configured rate value multiplied by 256 is the actual rate. For example, if the rate is 20, the actual rate 5120. One packet will be sampled from every 5120 packets. If set to 0, the sampler is disabled. If the rate is not specified, its default value is 0.
<b>TX Rate (0-65535)</b>	The sampling rate for packet Tx sampling. The configured rate value multiplied by 256 is the actual rate. For example, if the rate is 20, the actual rate 5120. One packet will be sampled from every 5120 packets. If set to 0, the sampler is disabled. If the rate is not specified, its default value is 0.
<b>MAX Header Size (18-256)</b>	The maximum number of leading bytes in the packet which has been sampled that will be encapsulated and forwarded to the server. If not specified, the default value is 128.

Click the **Apply** button to accept the changes made.  
 Click the **Delete All** button to remove all the entries listed.  
 Click the **Edit** button to re-configure the specific entry.  
 Click the **Delete** button to remove the specific entry.

## sFlow Counter Poller Settings

This window is used to configure the sFlow counter poller parameters. If the user wants to change the analyzer server ID, he needs to delete the counter poller and create a new one.

Figure 11-24 sFlow Counter Poller Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Select a unit to configure.
<b>From Port / To Port</b>	Use the drop-down menus to specify the list of ports to be configured.
<b>Analyzer Server ID (1-4)</b>	Specify the ID of a server analyzer where the packet will be forwarded.
<b>Interval (20-120)</b>	The maximum number of seconds between successive samples of the counters. Tick the <b>Disabled</b> check box to disable the polling interval.

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

Click the **Delete All** button to remove all the entries listed.

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

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

## Ping

### Broadcast Ping Reply Settings

This window is used to configure broadcast ping reply state.

To view the following window, click **Monitoring > Ping > Broadcast Ping Reply Settings** as shown below.

Figure 11-25 Broadcast Ping Reply Settings window

The fields that can be configured are described below:

Parameter	Description
<b>Broadcast Ping Reply State</b>	Click the radio button to enable or disable broadcast ping reply state.

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

## Ping Test

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 **Monitoring > Ping > Ping Test** as shown below.

**Ping Test** Safeguard

**IPv4 Ping Test:**  
Enter the IPv4 address of the device or station you want to ping, then click **Start**.

Target IPv4 Address:   
 Domain Name:

Repeat Pinging for:  Infinite times  
  (1-255 times)

Timeout:  (1-99 sec)  
Source IPv4 Address:

**Start**

---

**IPv6 Ping Test:**  
Enter the IPv6 address of the device or station you want to ping, then click **Start**.

Target IPv6 Address:   
Interface Name:   
 Domain Name:

Repeat Pinging for:  Infinite times  
  (1-255 times)

Size:  (1-6000)  
Timeout:  (1-99 sec)  
Source IPv6 Address:

**Start**

**Figure 11-26 Ping Test window**

The user may click the Infinite times radio button, in the Repeat Pinging for field, which will tell the ping program to keep sending ICMP Echo packets to the specified IP address until the program is stopped. The user may opt to choose a specific number of times to ping the Target IP Address by clicking its radio button and entering a number between 1 and 255.

The fields that can be configured are described below:

Parameter	Description
<b>Target IPv4 Address</b>	Click the radio button and enter an IPv4 address to be pinged.
<b>Target IPv6 Address</b>	Click the radio button and enter an IPv6 address to be pinged.
<b>Domain Name</b>	Click the radio button and enter the domain name of the host.
<b>Repeat Pinging for</b>	Enter the number of times desired to attempt to Ping either the IPv4 address or the IPv6 address configured in this window. Users may enter a number of times between 1 and 255.
<b>Size</b>	For IPv6 only, enter a value between 1 and 6000. The default is 100.
<b>Timeout</b>	Select a timeout period between 1 and 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.
<b>Source IPv4 Address</b>	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.
<b>Source IPv6 Address</b>	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 IP address sent to the remote host, or as primary IP address.

Click the **Start** button to initiate the Ping Test.

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

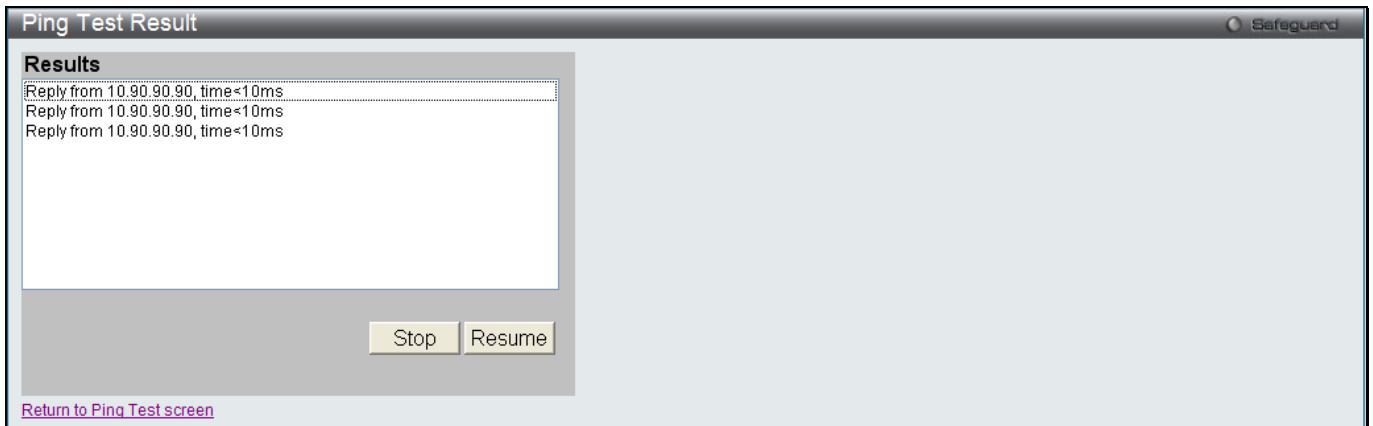


Figure 11-27 Ping Test Result window

Click the **Stop** button to halt the Ping Test.

Click the **Resume** button to resume the Ping Test.

## 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 **Monitoring > Trace Route** as shown below.

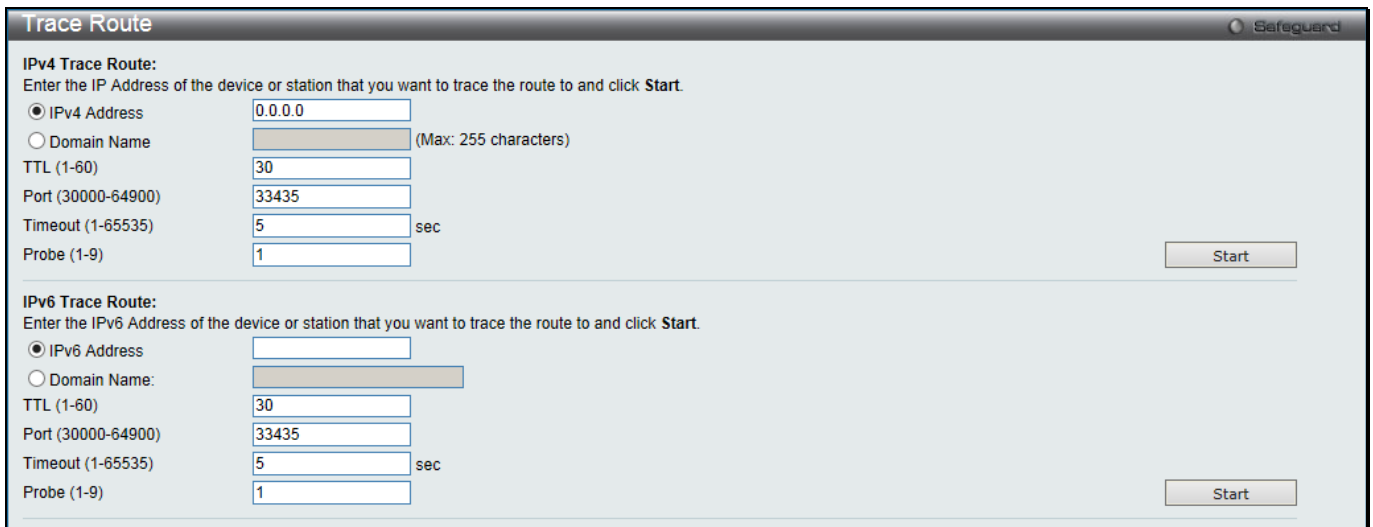


Figure 11-28 Trace Route window

The fields that can be configured are described below:

Parameter	Description
<b>IPv4 Address</b>	IP address of the destination station.
<b>IPv6 Address</b>	IPv6 address of the destination station.
<b>Domain Name</b>	Click and enter the domain name of the destination end station.
<b>TTL (1-60)</b>	The time to live value of the trace route request. 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 60 hops.
<b>Port (30000-64900)</b>	The port number. The value range is from 30000 to 64900.
<b>Timeout (1-65535)</b>	Defines the timeout period while waiting for a response from the remote device. A value of 1 to 65535 seconds can be specified. The default is 5 seconds.
<b>Probe (1-9)</b>	The number of probing. The range is from 1 to 9. If unspecified, the default value is 1.

Click the **Start** button to initiate the Trace Route.

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

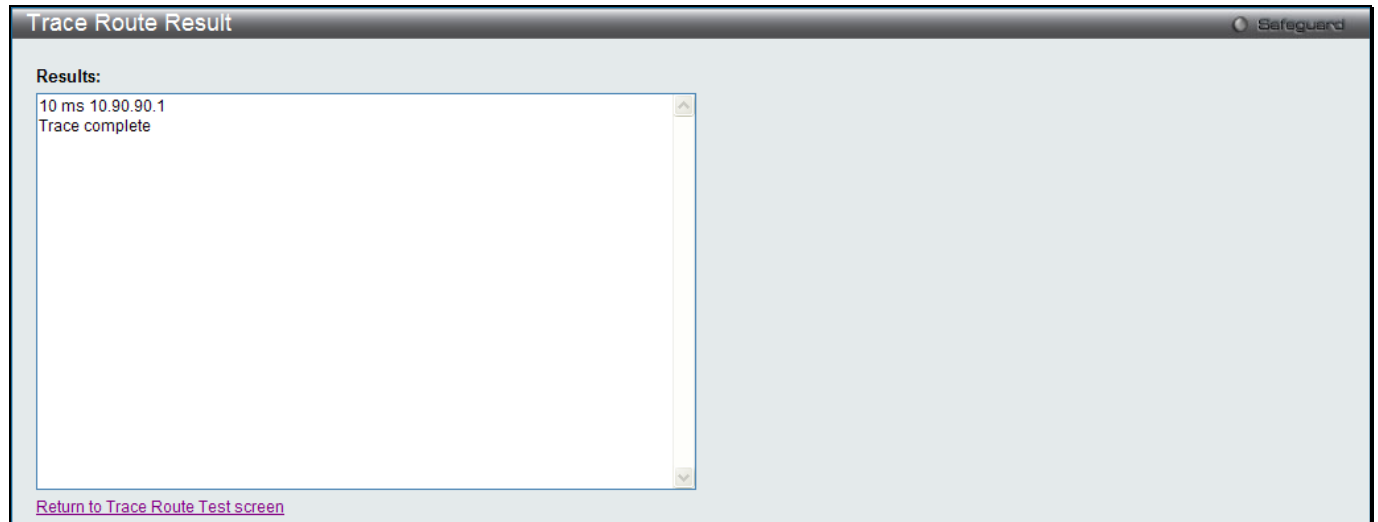


Figure 11-29 Trace Route Result window

Click the **Stop** button to halt the Trace Route.

Click the **Resume** button to resume the Trace Route.

## Peripheral

### Device Environment

The device environment feature displays the Switch internal temperature status.

To view the following window, click **Monitoring > Peripheral > Device Environment** as shown below.

Items	Data
High Warning Temperature Threshold (celsius)	79
Low Warning Temperature Threshold (celsius)	11
<b>Unit</b>	<b>1</b>
Internal Power	Active
External Power	Fail
Right Fan 1	Speed Low (3000 RPM)
Right Fan 2	Speed Low (3000 RPM)
Current Temperature (celsius)	27
Fan High Temperature Threshold (celsius)	41
Fan Low Temperature Threshold (celsius)	36

Figure 11-30 Device Environment window

Click the **Refresh** button to refresh the display table so that new entries will appear.



## Chapter 12 Save and Tools

[Save Configuration / Log](#)  
[Stacking Information](#)  
[Download firmware](#)  
[Upload Firmware](#)  
[Download Configuration](#)  
[Upload Configuration](#)  
[Upload Log File](#)  
[Reset](#)  
[Reboot System](#)

### Save Configuration / Log

To view the following window, click **Save > Save Configuration / Log**, as shown below.

Save Configuration allows the user to backup the configuration of the Switch. Select **Configuration** from the **Type** drop-down menu and enter the **File Path** in the space provided and click **Apply**.

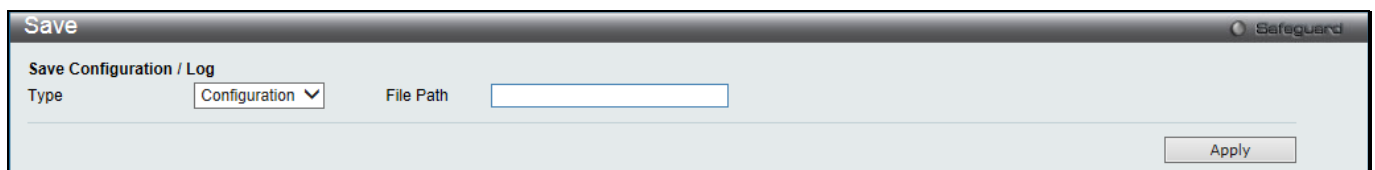


Figure 12-1 Save – Configuration window

**Save Log** allows the user to backup the log file of the Switch. Select **Log** from the **Type** drop-down menu and click **Apply**.

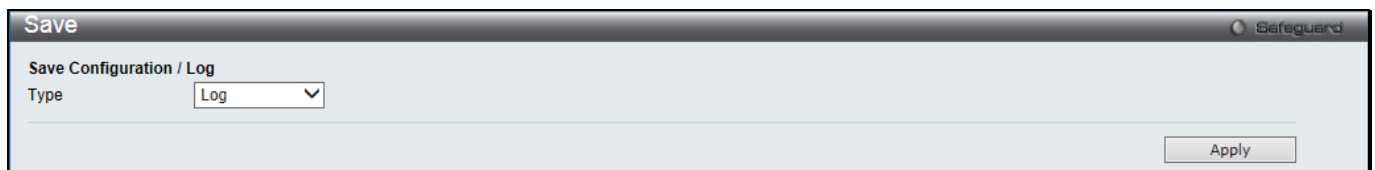


Figure 12-2 Save – Log window

**Save All** allows the user to permanently save changes made to the configuration and the log file of the Switch. This option will allow the changes to be kept after the switch has rebooted. Select **All** from the **Type** drop-down menu and click **Apply**.

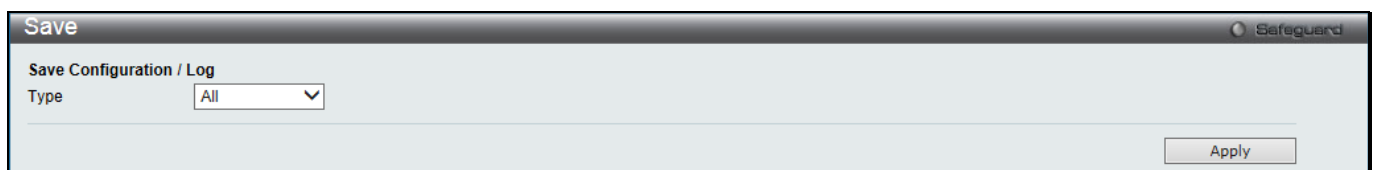


Figure 12-3 Save – All window

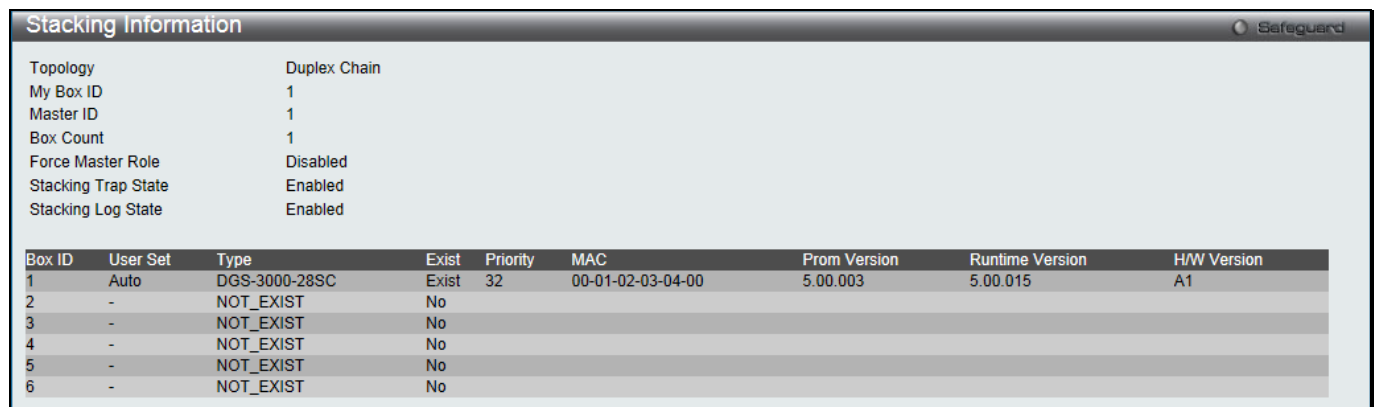
### Stacking Information

To change a switch's default stacking configuration (for example, the order in the stack), refer to the **System Configuration > Stacking > Stacking Mode Settings** window.

The number of switches in the switch stack (up to 6 total) are displayed next to the Tools drop-down menu. The icons are in the same order as their respective Unit numbers, with the Unit 1 switch corresponding to the icon in the upper left-most corner of the icon group.

When the switches are properly interconnected through their optional Stacking Modules, information about the resulting switch stack is displayed under the **Stacking Information** link.

To view this window, click **Tools > Stacking Information**, as shown below:



Box ID	User Set	Type	Exist	Priority	MAC	Prom Version	Runtime Version	H/W Version
1	Auto	DGS-3000-28SC	Exist	32	00-01-02-03-04-00	5.00.003	5.00.015	A1
2	-	NOT_EXIST	No					
3	-	NOT_EXIST	No					
4	-	NOT_EXIST	No					
5	-	NOT_EXIST	No					
6	-	NOT_EXIST	No					

Figure 12-4 Stacking Information window

The Stacking Information window displays the following information:

Parameter	Description
<b>Topology</b>	Show the current topology employed using this Switch.
<b>My Box ID</b>	Display the Box ID of the Switch currently in use.
<b>Master ID</b>	Display the Unit ID number of the Primary Master of the Switch stack.
<b>Box Count</b>	Display the number of switches in the switch stack.
<b>Box ID</b>	Display the Switch's order in the stack.
<b>User Set</b>	Box ID can be assigned automatically (Auto), or can be assigned statically. The default is Auto.
<b>Type</b>	Display the model name of the corresponding switch in a stack.
<b>Exist</b>	Denote whether a switch does or does not exist in a stack.
<b>Priority</b>	Display the priority ID of the Switch. A lower number denotes a higher priority. The box (switch) with the lowest priority number in the stack denotes the Primary Master switch.
<b>MAC</b>	Display the MAC address of the corresponding switch in the switch stack.
<b>Prom Version</b>	Show the PROM in use for the Switch. This may be different from the values shown in the illustration.
<b>Runtime Version</b>	Show the firmware version in use for the Switch. This may be different from the values shown in the illustrations.
<b>H/W Version</b>	Show the hardware version in use for the Switch. This may be different from the values shown in the illustration.

## Download Firmware

The following window is used to download firmware for the Switch.

### From TFTP

This window allows the user to download firmware from a TFTP Server to the Switch and updates the switch. To view this window, click **Tools > Download Firmware > From TFTP**, as shown below:

Figure 12-5 Download Firmware from TFTP window

The fields that can be configured are described below:

Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the firmware. Select <b>All</b> for all units.	
<b>TFTP Server IP</b>	Enter the TFTP server IP address used.	
	<b>IPv4</b>	Click the radio button to enter the TFTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the TFTP server IPv6 address used.
	<b>Domain Name</b>	Click the radio button to enter the TFTP server domain name used.
<b>Source File</b>	Enter the location and name of the Source File.	
<b>Destination File</b>	Enter the location and name of the Destination File.	
<b>Boot Up</b>	Tick the check box to set it as a boot up file.	
<b>Interface Name</b>	Enter the name of the TFTP server.	
<b>IPv6 Address</b>	Enter the IPv4 address of the TFTP server.	
<b>IPv4 Address</b>	Enter the IPv6 address of the TFTP server.	

Click **Download** to initiate the download.

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

Click the **Clear IP Address** button to clear IP address information.

## From FTP

This window is used to download firmware from a FTP Server to the Switch and updates the switch.

To view this window, click **Tools > Download Firmware > From FTP**, as shown below:

Figure 12-6 Download Firmware – FTP window

The fields that can be configured are described below:

Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the firmware. Select <b>All</b> for all units.	
<b>FTP Server IP</b>	Enter the FTP Server IP Address used.	
	<b>IPv4</b>	Click the radio button to enter the FTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the FTP server IPv6 address used.
<b>TCP Port (1-65535)</b>	Enter the TCP Port number used.	
<b>User Name</b>	Enter the appropriate Username used.	
<b>Password</b>	Enter the appropriate Password used.	
<b>Source File</b>	Enter the file name for the FTP server to download, e.g. runtime.had.	
<b>Destination File</b>	Enter the file name that will be stored in the flash of the Switch, e.g. C:/runtime.had.	
<b>Boot Up</b>	Select this option to use this firmware as the boot-up firmware.	

Click **Download** to initiate the download.

## From RCP

This window allows the user to download firmware from an RCP Server to the Switch and updates the switch. To view this window, click **Tools > Download Firmware > From RCP**, as shown below:

Figure 12-7 Download Firmware from RCP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the firmware. Select <b>All</b> for all units.
<b>RCP Server IP</b>	Enter the RCP server IP address used.

<b>User Name</b>	Enter the remote user name on the RCP server.
<b>Source File</b>	Enter the location and name of the Source File.
<b>Destination File</b>	Enter the location and name of the Destination File.
<b>Boot Up</b>	Select this option to use this firmware as the boot-up firmware.

Click the **Download** button to initiate the download.

## From HTTP

This window allows the user to download firmware from a computer to the Switch and updates the switch. To view this window, click **Tools > Download Firmware > From HTTP**, as shown below:

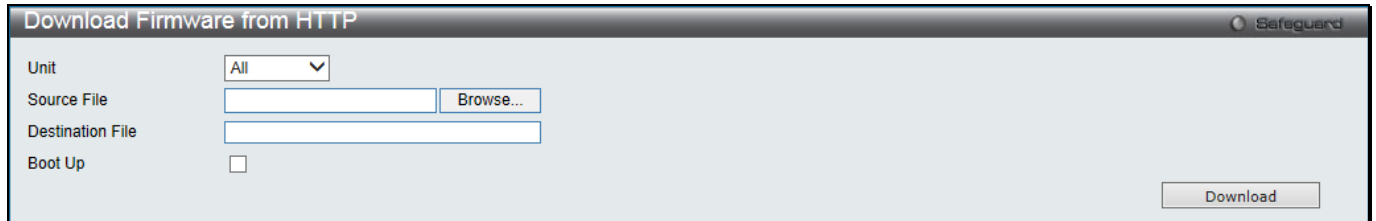


Figure 12-8 Download Firmware from HTTP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the firmware. Select <b>All</b> for all units.
<b>Source File</b>	Enter the location of the Source File or click the <b>Browse</b> button to navigate to the firmware file for the download.
<b>Destination File</b>	Enter the location of the Destination File.
<b>Boot Up</b>	Tick the check box to set it as a boot up file.

Click **Download** to initiate the download.

## Upload Firmware

The following window is used to upload firmware from the Switch.

### To TFTP

This window allows the user to upload firmware from the Switch to a TFTP Server. To view this window, click **Tools > Upload Firmware > To TFTP**, as shown below:

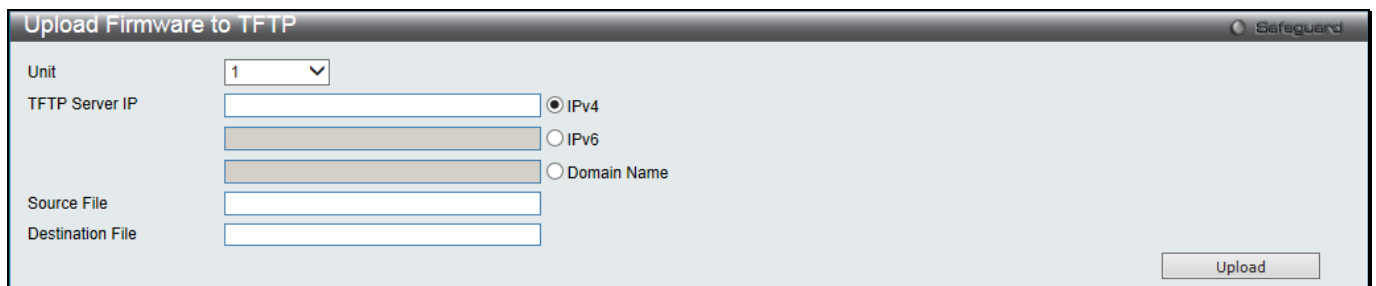


Figure 12-9 Upload Firmware to TFTP window

The fields that can be configured are described below:



Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the firmware.	
<b>TFTP Server IP</b>	Enter the TFTP server IP address used.	
	<b>IPv4</b>	Click the radio button to enter the TFTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the TFTP server IPv6 address used.
	<b>Domain Name</b>	Click the radio button to enter the TFTP server domain name used.
<b>Source File</b>	Enter the location and name of the Source File.	
<b>Destination File</b>	Enter the location and name of the Destination File.	

Click **Upload** to initiate the upload.

## To FTP

This window is used to upload firmware from the Switch to a FTP Server.

To view this window, click **Tools > Upload Firmware > To FTP**, as shown below:

Figure 12-10 Upload Firmware – FTP window

The fields that can be configured are described below:

Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the firmware.	
<b>FTP Server IP</b>	Enter the FTP Server IP Address used.	
	<b>IPv4</b>	Click the radio button to enter the FTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the FTP server IPv6 address used.
<b>TCP Port (1-65535)</b>	Enter the TCP Port number used.	
<b>User Name</b>	Enter the appropriate Username used.	
<b>Password</b>	Enter the appropriate Password used.	
<b>Source File</b>	Enter the location of the Source File, e.g. C:/runtime.had.	
<b>Destination File</b>	Enter the file name that will be stored in the FTP server, e.g. runtime.had.	

Click **Upload** to initiate the upload.

## To RCP

This window allows the user to upload firmware from the Switch to an RCP Server.

To view this window, click **Tools > Upload Firmware > To RCP**, as shown below:

Figure 12-11 Upload Firmware to RCP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the firmware.
<b>RCP Server IP</b>	Enter the RCP Server IP Address used.
<b>User Name</b>	Enter the appropriate Username used.
<b>Source File</b>	Enter the location and name of the Source File.
<b>Destination File</b>	Enter the location and name of the Destination File.

Click the **Upload** button to initiate the upload.

## To HTTP

This window allows the user to upload firmware from the Switch to a computer.

To view this window, click **Tools > Upload Firmware > To HTTP**, as shown below:

Figure 12-12 Upload Firmware to HTTP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the firmware.
<b>Source File</b>	Enter the location and name of the Source File.

Click **Upload** to initiate the upload.

## Download Configuration

The following window is used to download the configuration file for the Switch.

### From TFTP

This window allows the user to download the configuration file from a TFTP Server to the Switch and updates the switch.

To view this window, click **Tools > Download Configuration > From TFTP**, as shown below:

Figure 12-13 Download Configuration File from TFTP window

The fields that can be configured are described below:

Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the configuration file. Select <b>All</b> for all units.	
<b>TFTP Server IP</b>	Enter the TFTP server IP address used.	
	<b>IPv4</b>	Click the radio button to enter the TFTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the TFTP server IPv6 address used.
	<b>Domain Name</b>	Click the radio button to enter the TFTP server domain name used.
<b>Source File</b>	Enter the location and name of the Source File.	
<b>Destination File</b>	Enter the location and name of the Destination File.	
<b>Increment</b>	Tick the check box to keep the existing configuration before applying to the new configuration. Deselect the check box to clear the existing configuration before applying to the new configuration.	

Click **Download** to initiate the download.

## From FTP

This window is used to download the configuration file from a FTP Server to the Switch and updates the switch. To view this window, click **Tools > Download Configuration > From FTP**, as shown below:

Figure 12-14 Download Configuration – FTP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the configuration file. Select <b>All</b> for all units.
<b>FTP Server IP</b>	Enter the FTP Server IP Address used.

	<b>IPv4</b>	Click the radio button to enter the FTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the FTP server IPv6 address used.
<b>TCP Port (1-65535)</b>	Enter the TCP Port number used.	
<b>User Name</b>	Enter the appropriate Username used.	
<b>Password</b>	Enter the appropriate Password used.	
<b>Source File</b>	Enter the file name for the FTP server to download, e.g. config.cfg.	
<b>Destination File</b>	Enter the file name that will be stored in the flash of the Switch, e.g. C:/config.cfg.	
<b>Increment</b>	Tick the check box to keep the existing configuration before applying to the new configuration. Deselect the check box to clear the existing configuration before applying to the new configuration.	

Click **Download** to initiate the download.

## From RCP

This window allows the user to download the configuration file from an RCP Server to the Switch and updates the switch.

To view this window, click **Tools > Download Configuration > From RCP**, as shown below:

Figure 12-15 Download Configuration from RCP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the configuration file. Select <b>All</b> for all units.
<b>RCP Server IP</b>	Enter the RCP Server IP Address used.
<b>User Name</b>	Enter the appropriate Username used.
<b>Source File</b>	Enter the location and name of the Source File.
<b>Destination File</b>	Enter the location and name of the Destination File.

Click the **Download** button to initiate the download.

## From HTTP

This window allows the user to download the configuration file from a computer to the Switch and updates the switch.

To view this window, click **Tools > Download Configuration > From HTTP**, as shown below:

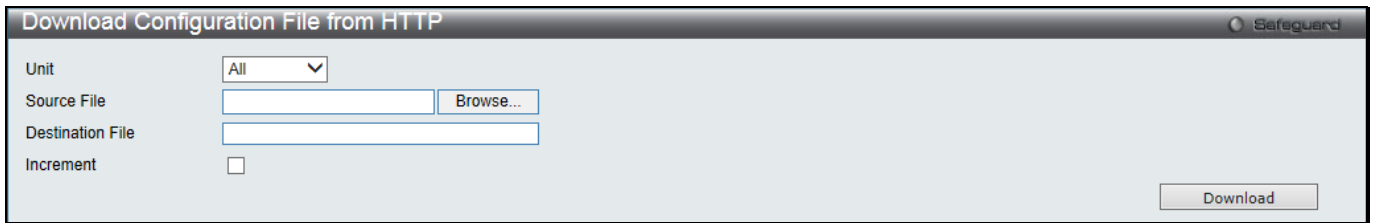


Figure 12-16 Download Configuration File from HTTP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for receiving the configuration file. Select <b>All</b> for all units.
<b>Source File</b>	Enter the location and name of the Source File, or click the <b>Browse</b> button to navigate to the configuration file for the download.
<b>Destination File</b>	Enter the location and name of the Destination File.
<b>Increment</b>	Tick the check box to keep the existing configuration before applying to the new configuration. Deselect the check box to clear the existing configuration before applying to the new configuration.

Click **Download** to initiate the download.

## Upload Configuration

The following window is used to upload the configuration file from the Switch.

### To TFTP

This window allows the user to upload the configuration file from the Switch to a TFTP Server.

To view this window, click **Tools > Upload Configuration > To TFTP**, as shown below:

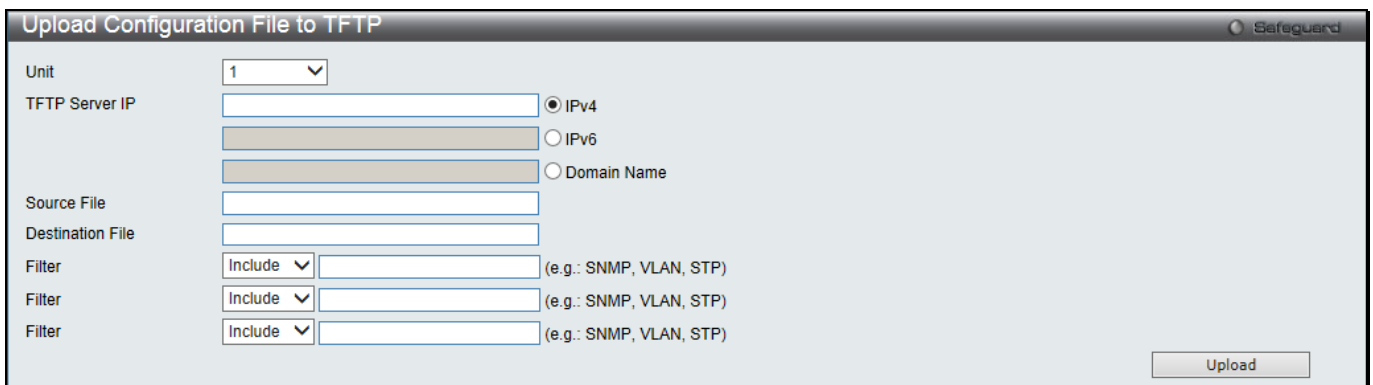


Figure 12-17 Upload Configuration File to TFTP window

The fields that can be configured are described below:

Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the configuration file.	
<b>TFTP Server IP</b>	Enter the TFTP server IP address used.	
	<b>IPv4</b>	Click the radio button to enter the TFTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the TFTP server IPv6 address used.
	<b>Domain Name</b>	Click the radio button to enter the TFTP server domain name used.

Parameter	Description
<b>Source File</b>	Enter the location and name of the Source File.
<b>Destination File</b>	Enter the location and name of the Destination File.
<b>Filter</b>	Use the drop-down menu to <i>include, begin</i> or <i>exclude</i> a filter like SNMP, VLAN or STP. Select the appropriate <b>Filter</b> action and enter the service name in the space provided.

Click **Upload** to initiate the upload.

## To FTP

This window is used to upload the configuration file from the Switch to a FTP Server.  
To view this window, click **Tools > Upload Configuration > To FTP**, as shown below:

**Figure 12-18 Upload Configuration – FTP window**

The fields that can be configured are described below:

Parameter	Description	
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the configuration file.	
<b>FTP Server IP</b>	Enter the FTP Server IP Address used.	
	<b>IPv4</b>	Click the radio button to enter the FTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the FTP server IPv6 address used.
<b>TCP Port (1-65535)</b>	Enter the TCP Port number used.	
<b>User Name</b>	Enter the appropriate Username used.	
<b>Password</b>	Enter the appropriate Password used.	
<b>Source File</b>	Enter the location of the Source File, e.g. C:/config.cfg.	
<b>Destination File</b>	Enter the file name that will be stored in the FTP server, e.g. config.cfg.	
<b>Filter</b>	Use the drop-down menu to include, begin or exclude a filter like SNMP, VLAN or STP. Select the appropriate Filter action and enter the service name in the space provided.	

Click **Upload** to initiate the upload.

## To RCP

This window allows the user to upload the configuration file from the Switch to an RCP Server.  
To view this window, click **Tools > Upload Configuration > To RCP**, as shown below:

Figure 12-19 Upload Configuration to RCP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the configuration file.
<b>RCP Server IP</b>	Enter the RCP Server IP Address used.
<b>User Name</b>	Enter the appropriate Username used.
<b>Source File</b>	Enter the location and name of the Source File.
<b>Destination File</b>	Enter the location and name of the Destination File.
<b>Filter</b>	Use the drop-down menu to <i>Include</i> , <i>Exclude</i> or <i>Begin</i> a filter like SNMP, VLAN or STP. Select the appropriate <b>Filter</b> action and enter the service name in the space provided.

Click the **Upload** button to initiate the upload.

## To HTTP

This window allows the user to upload the configuration file from the Switch to a computer.

To view this window, click **Tools > Upload Configuration > To HTTP**, as shown below:

Figure 12-20 Upload Configuration File to HTTP window

The fields that can be configured are described below:

Parameter	Description
<b>Unit</b>	Use the drop-down menu to select a unit for uploading the configuration file.
<b>Source File</b>	Enter the location and name of the Source File.
<b>Filter</b>	Use the drop-down menu to <i>include</i> , <i>begin</i> or <i>exclude</i> a filter like SNMP, VLAN or STP. Select the appropriate <b>Filter</b> action and enter the service name in the space provided.

Click **Upload** to initiate the upload.

## Upload Log File

The following window is used to upload the log file from the Switch.

### To TFTP

This window allows the user to upload the log file from the Switch to a TFTP Server.

To view this window, click **Tools > Upload Log > To TFTP**, as shown below:

Figure 12-21 Upload Log to TFTP window

The fields that can be configured are described below:

Parameter	Description	
<b>TFTP Server IP</b>	Enter the TFTP server IP address used.	
	<b>IPv4</b>	Click the radio button to enter the TFTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the TFTP server IPv6 address used.
	<b>Domain Name</b>	Click the radio button to enter the TFTP server domain name used.
<b>Destination File</b>	Enter the location and name of the Destination File.	
<b>Log Type</b>	Select the type of log to be transferred. Selecting the <b>Common Log</b> option here will upload the common log entries. Selecting the <b>Attack Log</b> option here will upload the log concerning attacks.	

Click **Upload** to initiate the upload.

### To FTP

This window is used to upload the log file from the Switch to a FTP Server.

To view this window, click **Tools > Upload Log > To FTP**, as shown below:

Figure 12-22 Upload Log – FTP window

The fields that can be configured are described below:

Parameter	Description
<b>FTP Server IP</b>	Enter the FTP Server IP Address used.



	<b>IPv4</b>	Click the radio button to enter the FTP server IP address used.
	<b>IPv6</b>	Click the radio button to enter the FTP server IPv6 address used.
<b>TCP Port (1-65535)</b>	Enter the TCP Port number used.	
<b>User Name</b>	Enter the appropriate Username used.	
<b>Password</b>	Enter the appropriate Password used.	
<b>Destination File</b>	Enter the file name that will be stored in the FTP server, e.g. log.log.	
<b>Log Type</b>	Select the type of log to be transferred. Selecting the Common Log option here will upload the common log entries. Selecting the Attack Log option here will upload the log concerning attacks.	

Click **Upload** to initiate the upload.

## To RCP

This window allows the user to upload the log file from the Switch to an RCP Server.  
To view this window, click **Tools > Upload Log > To RCP**, as shown below:

Figure 12-23 Upload Log to RCP window

The fields that can be configured are described below:

Parameter	Description
<b>RCP Server IP</b>	Enter the RCP Server IP Address used.
<b>User Name</b>	Enter the appropriate Username used.
<b>Destination File</b>	Enter the location and name of the Destination File.
<b>Log Type</b>	Select the type of log to be transferred. Selecting the <b>Common Log</b> option here will upload the common log entries. Selecting the <b>Attack Log</b> option here will upload the log concerning attacks.

Click the **Upload** button to initiate the upload.

## To HTTP

This window allows the user to upload the log file from the Switch to a computer.  
To view this window, click **Tools > Upload Log > To HTTP**, as shown below:

Figure 12-24 Upload Log – HTTP window

The fields that can be configured are described below:

Parameter	Description
Log Type	Here the user can select the type of log to be transferred. Selecting the <b>Common Log</b> option here will upload the common log entries. Selecting the <b>Attack Log</b> option here will upload the log concerning attacks.

Click **Upload** to initiate the upload.

## Reset

The Reset function has several options when resetting the Switch. Some of the current configuration parameters can be retained while resetting all other configuration parameters to their factory defaults.



**NOTE:** Only the Reset System option will enter the factory default parameters into the Switch's non-volatile RAM, and then restart the Switch. All other options enter the factory defaults into the current configuration, but do not save this configuration. Reset System will return the Switch's configuration to the state it was when it left the factory

Reset gives the option of retaining the Switch's User Accounts and History Log while resetting all other configuration parameters to their factory defaults. If the Switch is reset using this window, and **Save Changes** is not executed, the Switch will return to the last saved configuration when rebooted.

Parameter	Description
<input checked="" type="radio"/> Reset	Proceed with system reset except IP address, log, user account and banner.
<input type="radio"/> Reset Config	Switch will be reset to factory defaults.
<input type="radio"/> Reset System	Switch will be reset to factory defaults and reboot.

Figure 12-25 Reset System window

The fields that can be configured are described below:

Parameter	Description
Reset	Selecting this option will factory reset the Switch but not the <i>IP Address</i> , <i>User Accounts</i> and the <i>Banner</i> .
Reset Config	Selecting this option will factory reset the Switch but not perform a Reboot.
Reset System	Selecting this option will factory reset the Switch and perform a Reboot.

Click the **Apply** button to initiate the Reset action.

## Reboot System

The following window is used to restart the Switch.

Figure 12-26 Reboot System Window

Selecting the **Yes** radio button will instruct the Switch to save the current configuration to non-volatile RAM before restarting the Switch.

Selecting the **No** radio button instructs the Switch not to save the current configuration before restarting the Switch. All of the configuration information entered from the last time **Save Changes** was executed will be lost.

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

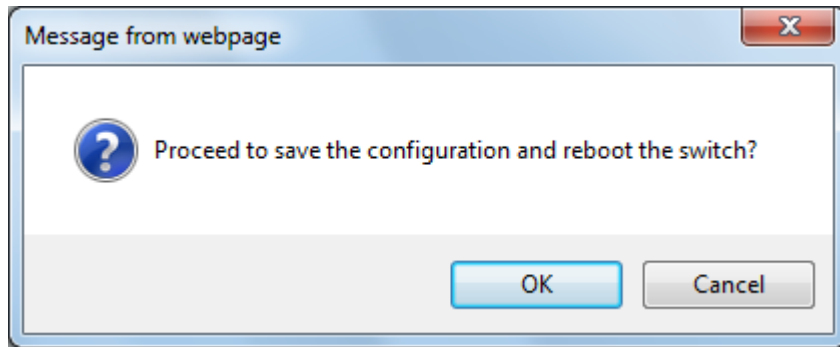


Figure 12-27 Reboot Confirmation

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

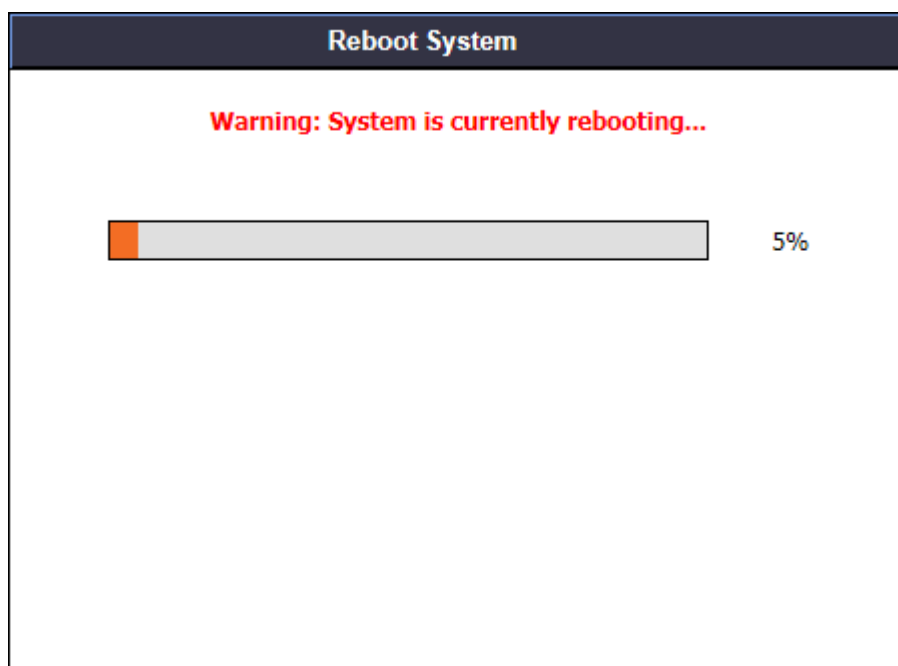


Figure 12-28 System Rebooting window

## Appendix A Password Recovery Procedure

This document describes the procedure for resetting passwords on D-Link Switches.

Authenticating any user who tries to access networks is necessary and important. The basic authentication method used to accept qualified users is through a local login, utilizing a Username and Password. Sometimes, passwords get forgotten or destroyed, so network administrators need to reset these passwords. This document will explain how the Password Recovery feature can help network administrators reach this goal.

The following steps explain how to use the Password Recovery feature on D-Link devices to easily recover passwords.

### **Complete these steps to reset the password:**

- For security reasons, the Password Recovery feature requires the user to physically access the device. Therefore this feature is only applicable when there is a direct connection to the console port of the device. It is necessary for the user needs to attach a terminal or PC with terminal emulation to the console port of the switch.
- Power on the Switch. After the 'Starting runtime image' message, the Switch will allow 2 seconds for the user to press the hotkey [^] (Shift + 6) to enter the "Password Recovery Mode." Once the Switch enters the "Password Recovery Mode," all ports on the Switch will be disabled.

```

Boot Procedure                                     V5.00.003
-----
Power On Self Test ..... 100 %

MAC Address   : 00-01-02-03-04-00
H/W Version  : A1

Please Wait, Loading V5.00.015 Runtime Image ..... 100 %
UART init ..... 100 %
Starting runtime image

```

```

Password Recovery Mode
>

```

1. In the "Password Recovery Mode" only the following commands can be used.

Command	Parameters
<b>reset config</b> <b>{force_agree}</b>	The <b>reset config</b> command resets the whole configuration back to the default values. The option <b>'force_agree'</b> means to reset the whole configuration without the user's agreement.
<b>reboot</b>	The <b>reboot</b> command exits the Reset Password Recovery Mode and restarts the switch. A confirmation message will be displayed to allow the user to save the current settings.
<b>reset account</b>	The <b>reset account</b> command deletes all the previously created accounts.
<b>reset password</b> <b>{&lt;username&gt;}</b>	The <b>reset password</b> command resets the password of the specified user. If a username is not specified, the passwords of all users will be reset.
<b>show account</b>	The <b>show account</b> command displays all previously created accounts.

## Appendix B System Log Entries

The following table lists all possible entries and their corresponding meanings that will appear in the System Log of this Switch.

Category	Log Description	Severity
<b>MAC-based Access Control</b>	<p>Event description: A host failed to pass the authentication</p> <p>Log Message: MAC-based Access Control unauthenticated host (MAC: &lt;macaddr&gt;, Port &lt;[unitID:]portNum&gt;, VID: &lt;vid&gt;)</p> <p>Parameters description:            macaddr: MAC address            unitID: The unit ID.            portNum: The port number.            vid: VLAN ID on which the host exists</p>	Critical
	<p>Event description: The authorized user number on a port has reached the maximum user limit.</p> <p>Log Message: Port &lt;[unitID:]portNum&gt; enters MAC-based Access Control stop learning state.</p> <p>Parameters description:            unitID: The unit ID.            portNum: The port number.</p>	Warning
	<p>Event description: The authorized user number on a port is below the maximum user limit in a time interval (interval is project dependent).</p> <p>Log Message: Port &lt;[unitID:]portNum&gt; recovers from MAC-based Access Control stop learning state.</p> <p>Parameters description:            unitID: The unit ID.            portNum: The port number.</p>	Warning
	<p>Event description: The authorized user number on the whole device has reached the maximum user limit.</p> <p>Log Message: MAC-based Access Control enters stop learning state.</p> <p>Parameters description:            None</p>	Warning
	<p>Event description: The authorized user number on the whole device is below the maximum user limit in a time interval (interval is project dependent).</p> <p>Log Message: MAC-based Access Control recovers from stop learning state.</p> <p>Parameters description:            None</p>	Warning
	<p>Event description: A host has passed the authentication.</p> <p>Log Message: MAC-based Access Control host login successful (MAC: &lt;macaddr&gt;, port: &lt;[unitID:]portNum&gt;, VID: &lt;vid&gt;)</p> <p>Parameters description:            macaddr: The MAC address.</p>	Informational

	<p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>vid: The VLAN ID on which the host exists.</p>	
	<p>Event description: A host has aged out.</p> <p>Log Message: MAC-based Access Control host aged out (MAC: &lt;macaddr&gt;, port: &lt;[unitID]portNum&gt;, VID: &lt;vid&gt;)</p> <p>Parameters description:</p> <p>macaddr: The MAC address</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>vid: The VLAN ID on which the host exists.</p>	Informational
<b>DHCPv6 client</b>	<p>Event description: DHCPv6 client interface administrator state changed.</p> <p>Log Message: DHCPv6 client on interface &lt;ipif-name&gt; changed state to [enabled   disabled].</p> <p>Parameters description:</p> <p>&lt;ipif-name&gt;: Name of the DHCPv6 client interface.</p>	Informational
	<p>Event description: DHCPv6 client obtains an ipv6 address from a DHCPv6 server.</p> <p>Log Message: DHCPv6 client obtains an ipv6 address &lt; ipv6address &gt; on interface &lt;ipif-name&gt;.</p> <p>Parameters description:</p> <p>ipv6address: ipv6 address obtained from a DHCPv6 server.</p> <p>ipif-name: Name of the DHCPv6 client interface.</p>	Informational
	<p>Event description: The ipv6 address obtained from a DHCPv6 server starts renewing.</p> <p>Log Message: The IPv6 address &lt; ipv6address &gt; on interface &lt;ipif-name&gt; starts renewing.</p> <p>Parameters description:</p> <p>ipv6address: ipv6 address obtained from a DHCPv6 server.</p> <p>ipif-name: Name of the DHCPv6 client interface.</p>	Informational
	<p>Event description: The ipv6 address obtained from a DHCPv6 server renews success.</p> <p>Log Message: The IPv6 address &lt; ipv6address &gt; on interface &lt;ipif-name&gt; renews success.</p> <p>Parameters description:</p> <p>ipv6address: ipv6 address obtained from a DHCPv6 server.</p> <p>ipif-name: Name of the DHCPv6 client interface.</p>	Informational
	<p>Event description: The ipv6 address obtained from a DHCPv6 server starts rebinding</p> <p>Log Message: The IPv6 address &lt; ipv6address &gt; on interface &lt;ipif-name&gt; starts rebinding.</p> <p>Parameters description:</p> <p>ipv6address: ipv6 address obtained from a DHCPv6 server.</p> <p>ipif-name: Name of the DHCPv6 client interface.</p>	Informational
	<p>Event description: The ipv6 address obtained from a DHCPv6 server rebinds success</p> <p>Log Message: The IPv6 address &lt; ipv6address &gt; on interface &lt;ipif-name&gt; rebinds success.</p>	Informational

	<p>Parameters description:</p> <p>ipv6address: ipv6 address obtained from a DHCPv6 server.</p> <p>ipif-name: Name of the DHCPv6 client interface..</p>	
	<p>Event description: The ipv6 address from a DHCPv6 server was deleted.</p> <p>Log Message: The IPv6 address &lt; ipv6address &gt; on interface &lt;ipif-name&gt; was deleted.</p> <p>Parameters description:</p> <p>ipv6address: ipv6 address obtained from a DHCPv6 server.</p> <p>ipif-name: Name of the DHCPv6 client interface.</p>	Informational
	<p>Event description: DHCPv6 client PD interface administrator state changed.</p> <p>Log Message: [DHCPv6_CLIENT(8):]DHCPv6 client PD on interface &lt;intf-name&gt; changed state to &lt;enabled   disabled&gt;</p> <p>Parameters description:</p> <p>intf-name: Name of the DHCPv6 client PD interface.</p>	Informational
	<p>Event description: DHCPv6 client PD obtains an IPv6 prefix from a delegation router.</p> <p>Log Message: [DHCPv6_CLIENT(9):]DHCPv6 client PD obtains an ipv6 prefix &lt; ipv6networkaddr&gt; on interface &lt;intf-name&gt;</p> <p>Parameters description:</p> <p>ipv6networkaddr: ipv6 preifx obtained from a delegation router.</p> <p>intf-name: Name of the DHCPv6 client PD interface.</p>	Informational
	<p>Event description: The IPv6 prefix obtained from a delegation router starts renewing.</p> <p>Log Message: [DHCPv6_CLIENT(10):]The IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; starts renewing.</p> <p>Parameters description:</p> <p>ipv6networkaddr: IPv6 prefix obtained from a delegation router.</p> <p>intf-name: Name of the DHCPv6 client PD interface.</p>	Informational
	<p>Event description: The IPv6 prefix obtained from a delegation router renews success.</p> <p>Log Message: [DHCPv6_CLIENT(11):]The IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; renews success.</p> <p>Parameters description:</p> <p>ipv6anetworkaddr: IPv6 prefix obtained from a delegation router.</p> <p>intf-name: Name of the DHCPv6 client PD nterface.</p>	Informational
	<p>Event description: The IPv6 prefix obtained from a delegation router starts rebinding.</p> <p>Log Message: [DHCPv6_CLIENT(12):]The IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; starts rebinding.</p> <p>Parameters description:</p> <p>ipv6address: IPv6 prefix obtained from a delegation router.</p> <p>intf-name: Name of the DHCPv6 client PD interface.</p>	Informational
	<p>Event description: The IPv6 prefix obtained from a delegation router rebinds success.</p> <p>Log Message: [DHCPv6_CLIENT(13):]The IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; rebinds success.</p> <p>Parameters description:</p> <p>ipv6address: IPv6 prefix obtained from a delegation router.</p>	Informational

	intf-name: Name of the DHCPv6 client PD interface.	
	<p>Event description: The IPv6 prefix from a delegation router was deleted.</p> <p>Log Message: [DHCPv6_CLIENT(14):]The IPv6 prefix &lt; ipv6networkaddr &gt; on interface &lt;intf-name&gt; was deleted.</p> <p>Parameters description:          ipv6address: IPv6 prefix obtained from a delegation router.          intf-name: Name of the DHCPv6 client PD interface.</p>	Informational
<b>DHCPv6 relay</b>	<p>Event description: DHCPv6 relay on a specify interface's administrator state changed</p> <p>Log Message: DHCPv6 relay on interface &lt;ipif-name&gt; changed state to [enabled   disabled]</p> <p>Parameters description:          &lt;ipif-name&gt;: Name of the DHCPv6 relay agent interface.</p>	Informational
<b>IP directed-broadcast</b>	<p>Event description: IP Directed-broadcast rate exceed 50 packets per second on a certain subnet.</p> <p>Log Message: IP Directed Broadcast packet rate is high on subnet. [(IP: %s)]</p> <p>Parameters description:          IP: the Broadcast IP destination address.</p>	Informational
	<p>Event description: IP Directed-broadcast rate exceed 100 packets per second</p> <p>Log Message: IP Directed Broadcast rate is high.</p> <p>Parameters description:</p>	Informational
<b>RCP</b>	<p>Event description:          Firmware upgraded successfully.</p> <p>Log Message:          [Unit &lt;unitID&gt;.] Firmware upgraded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:          unitID: Represent the id of the device in the stacking system.          session: The user's session, ex: console, SNMP, WEB...          username: Represent current login user.          (It should be community name for SNMP.)          ipaddr: Represent client IP address.          macaddr: Represent client MAC address.          serverIP: RCP Server IP address          pathFile: Path and file name on RCP Server.</p>	Informational
	<p>Event description:          Firmware upgrade was unsuccessful</p> <p>Log Message:          [Unit &lt;unitID&gt;.] Firmware upgrade by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:          unitID: Represent the id of the device in the stacking system.</p>	warning



	<p>session: The user's session, ex: console, SNMP, WEB...</p> <p>username: Represent current login user. (It should be community name for SNMP.)</p> <p>ipaddr: Represent client IP address.</p> <p>macaddr: Represent client MAC address.</p> <p>serverIP: RCP Server IP address</p> <p>pathFile: Path and file name on RCP Server.</p>	
	<p>Event description: Firmware successfully uploaded.</p> <p>Log Message: Log Message: Firmware uploaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: RCP Server IP address pathFile: Path and file name on RCP Server.</p>	<p>informational</p>
	<p>Event description: Firmware upload was unsuccessful.</p> <p>Log Message: Firmware upload by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: RCP Server IP address pathFile: Path and file name on RCP Server.</p>	<p>warning</p>
	<p>Event description: Configuration successfully downloaded.</p> <p>Log Message: Configuration downloaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: RCP Server IP address</p>	<p>informational</p>

	pathFile: Path and file name on RCP Server.	
	<p>Event description: Configuration download was unsuccessful.</p> <p>Log Message: Configuration download by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: RCP Server IP address pathFile: Path and file name on RCP Server.</p>	warning
	<p>Event description: Configuration successfully uploaded.</p> <p>Log Message: Configuration uploaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: RCP Server IP address pathFile: Path and file name on RCP Server.</p>	informational
	<p>Event description: Configuration upload was unsuccessful.</p> <p>Log Message: Configuration upload by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: RCP Server IP address pathFile: Path and file name on RCP Server.</p>	warning
	<p>Event description: Log message successfully uploaded.</p> <p>Log Message: Log message uploaded by &lt;session&gt; successfully. (Username: &lt;username&gt;, IP:</p>	informational

	<p>&lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:                  session: The user's session, ex: console, SNMP, WEB...                  username: Represent current login user.                  (It should be community name for SNMP.)                  ipaddr: Represent client IP address.                  macaddr: Represent client MAC address.                  serverIP: RCP Server IP address                  pathFile: Path and file name on RCP Server.</p>	
	<p>Event description:                  Log message upload was unsuccessful.</p> <p>Log Message:                  Log message upload by &lt;session&gt; unsuccessfully. (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:                  session: The user's session, ex: console, SNMP, WEB...                  username: Represent current login user.                  (It should be community name for SNMP.)                  ipaddr: Represent client IP address.                  macaddr: Represent client MAC address.                  serverIP: RCP Server IP address                  pathFile: Path and file name on RCP Server.</p>	warning
<b>TFTP Client</b>	<p>Event description: Firmware upgraded successfully.</p> <p>Log Message: [TFTP(1):] [Unit &lt;unitID&gt;,) Firmware upgraded by &lt;session&gt; successfully (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:                  UnitID: Represent the id of the device in the stacking system.                  session: The user's session.                  Username: Represent current login user.                  Ipaddr: Represent client IP address.                  macaddr : Represent client MAC address.</p>	Informational
	<p>Event description: Firmware upgrade was unsuccessful.</p> <p>Log Message: [TFTP(2):] [Unit &lt;unitID&gt;,) Firmware upgrade by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:                  UnitID: Represent the id of the device in the stacking system.                  session: The user's session.                  Username: Represent current login user.                  Ipaddr: Represent client IP address.                  macaddr : Represent client MAC address.</p>	warning
	<p>Event description: Firmware successfully uploaded.</p> <p>Log Message: [TFTP(3):]Firmware successfully uploaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:                  session: The user's session.</p>	informational

	<p>Username: Represent current login user.  Ipaddr: Represent client IP address.  macaddr : Represent client MAC address.</p>	
	<p>Event description: Firmware upload was unsuccessful.  Log Message: [TFTP(4):]Firmware upload by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:  session: The user's session.  Username: Represent current login user.  Ipaddr: Represent client IP address.</p>	warning
	<p>Event description: Configuration successfully downloaded.  Log Message: [TFTP(5):]Configuration successfully downloaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:  session: The user's session.  Username: Represent current login user.  Ipaddr: Represent client IP address.  macaddr : Represent client MAC address.</p>	informational
	<p>Event description: Configuration download was unsuccessful.  Log Message: [TFTP(6):]Configuration download by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:  session: The user's session.  Username: Represent current login user.  Ipaddr: Represent client IP address.  macaddr : Represent client MAC address.</p>	warning
	<p>Event description: Configuration successfully uploaded.  Log Message: [TFTP(7):]Configuration successfully uploaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:  session: The user's session.  Username: Represent current login user.  Ipaddr: Represent client IP address.  macaddr : Represent client MAC address.</p>	informational
	<p>Event description: Configuration upload was unsuccessful.  Log Message: [TFTP(8):]Configuration upload by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:  session: The user's session.  Username: Represent current login user.  Ipaddr: Represent client IP address.  macaddr : Represent client MAC address.</p>	warning
	<p>Event description: Log message successfully uploaded.  Log Message: [TFTP(9):]Log message successfully uploaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p>	informational

	<p>Parameters description:                  session: The user's session.                  Username: Represent current login user.                  Ipaddr: Represent client IP address.                  macaddr : Represent client MAC address.</p>	
	<p>Event description: Log message upload was unsuccessful.                  Log Message: [TFTP(10):]Log message upload by &lt;session&gt; was unsuccessful!                  (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:                  session: The user's session.                  Username: Represent current login user.                  Ipaddr: Represent client IP address.                  macaddr : Represent client MAC address.</p>	warning
	<p>Event description: Attack log message successfully uploaded.                  Log Message: [TFTP(13):]Attack log message successfully uploaded by &lt;session&gt;                  (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:                  session: The user's session.                  Username: Represent current login user.                  Ipaddr: Represent client IP address.                  macaddr : Represent client MAC address.</p>	informational
	<p>Event description: Attack log message upload was unsuccessful.                  Log Message: [TFTP(14):]Attack log message upload by &lt;session&gt; was unsuccessful!                  (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;)</p> <p>Parameters description:                  session: The user's session.                  Username: Represent current login user.                  Ipaddr: Represent client IP address.                  macaddr : Represent client MAC address.</p>	warning
<b>DNS Resolver</b>	<p>Event description: Duplicate Domain name cache added, leads a dynamic domain name cache be deleted                  Log Message: [DNS_RESOLVER(1):]Duplicate Domain name case name: &lt;domainname&gt;, static IP: &lt;ipaddr&gt;, dynamic IP:&lt;ipaddr&gt;</p> <p>Parameters description:                  domainname: the domain name string.                  ipaddr: IP address.</p>	Informational
<b>ARP</b>	<p>Event description: Gratuituious ARP detected duplicate IP.                  Log Message: Conflict IP was detected with this device (IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Port &lt;[unitID:]portNum&gt;, Interface: &lt;ipif_name&gt;).</p> <p>Parameters description:                  ipaddr: The IP address which is duplicated with our device.                  macaddr: The MAC address of the device that has duplicated IP address as our device.                  unitID: 1.Interger value;2.Represent the id of the device in the stacking system.                  portNum: 1.Interger value;2.Represent the logic port number of the device.                  ipif_name: The name of the interface of the switch which has the conflic IP address.</p>	Warning
<b>TELNET</b>	<p>Event description: Successful login through Telnet.</p>	Informational

	<p>Log Message: Successful login through Telnet (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)</p> <p>Parameters description: ipaddr: The IP address of telnet client. username: the user name that used to login telnet server.</p>	
	<p>Event description: Login failed through Telnet. Log Message: Login failed through Telnet (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)</p> <p>Parameters description: ipaddr: The IP address of telnet client. username: the user name that used to login telnet server.</p>	Warning
	<p>Event description: Logout through Telnet. Log Message: Logout through Telnet (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;)</p> <p>Parameters description: ipaddr: The IP address of telnet client. username: the user name that used to login telnet server.</p>	Informational
	<p>Event description: Telnet session timed out. Log Message: Telnet session timed out (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: ipaddr: The IP address of telnet client. username: the user name that used to login telnet server.</p>	Informational
<b>Interface</b>	<p>Event description: Port link up. Log Message: Port &lt;[unitID:]portNum&gt; link up, &lt;link state&gt;</p> <p>Parameters description: unitID: 1.Interger value;2.Represent the id of the device in the stacking system. portNum: 1.Interger value;2.Represent the logic port number of the device. link state: for ex: , 100Mbps FULL duplex</p>	Informational
	<p>Event description: Port link down. Log Message: Port &lt;[unitID:]portNum&gt; link down</p> <p>Parameters description: unitID: 1.Interger value;2.Represent the id of the device in the stacking system. portNum: 1.Interger value;2.Represent the logic port number of the device.</p>	Informational
<b>802.1X</b>	<p>Event description: 802.1X Authentication failure. Log Message: 802.1X Authentication failure [for &lt;reason&gt; ] from (Username: &lt;username&gt;, Port: &lt;[unitID:]portNum&gt;, MAC: &lt;macaddr&gt; )</p> <p>Parameters description: reason: The reason for the failed authentication. username: The user that is being authenticated. unitID: The unit ID. portNum: The switch port number. macaddr: The MAC address of thr authenticated device.</p>	Warning
	<p>Event description: 802.1X Authentication successful. Log Message: 802.1X Authentication successful from (Username: &lt;username&gt;, Port: &lt;[unitID:]portNum&gt;, MAC: &lt;macaddr&gt;)</p>	Informational

	<p>Parameters description:</p> <p>username: The user that is being authenticated.</p> <p>unitID: The unit ID.</p> <p>portNum: The switch port number.</p> <p>macaddr: The MAC address of the authenticated device.</p>	
<b>RADIUS</b>	<p>Event description: VID assigned from RADIUS server after RADIUS client is authenticated by RADIUS server successfully .This VID will be assigned to the port and this port will be the VLAN untagged port member.</p> <p>Log Message: RADIUS server &lt;ipaddr&gt; assigned VID :&lt;vlanID&gt; to port &lt;[unitID:]portNum&gt; (account :&lt;username&gt; )</p> <p>Parameters description:</p> <p>ipaddr: The IP address of the RADIUS server.</p> <p>vlanID: The VID of RADIUS assigned VLAN.</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>Username: The user that is being authenticated.</p>	Informational
	<p>Event description: Ingress bandwidth assigned from RADIUS server after RADIUS client is authenticated by RADIUS server successfully .This Ingress bandwidth will be assigned to the port.</p> <p>Log Message: RADIUS server &lt;ipaddr&gt; assigned ingress bandwith :&lt;ingressBandwidth&gt; to port &lt;[unitID:]portNum&gt; (account : &lt;username&gt;)</p> <p>Parameters description:</p> <p>ipaddr: The IP address of the RADIUS server.</p> <p>ingressBandwidth: The ingress bandwidth of RADIUS assign.</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>Username: The user that is being authenticated.</p>	Informational
	<p>Event description: Egress bandwidth assigned from RADIUS server after RADIUS client is authenticated by RADIUS server successfully .This egress bandwidth will be assigned to the port.</p> <p>Log Message: RADIUS server &lt;ipaddr&gt; assigned egress bandwith :&lt;egressBandwidth&gt; to port &lt;[unitID:]portNum&gt; (account: &lt;username&gt;)</p> <p>Parameters description:</p> <p>ipaddr: The IP address of the RADIUS server.</p> <p>egressBandwidth: The egress bandwidth of RADIUS assign.</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>Username: The user that is being authenticated.</p>	Informational
	<p>Event description: 802.1p default priority assigned from RADIUS server after RADIUS client is authenticated by RADIUS server successfully. This 802.1p default priority will be assigned to the port.</p> <p>Log Message: RADIUS server &lt;ipaddr&gt; assigned 802.1p default priority:&lt;priority&gt; to port &lt;[unitID:]portNum&gt; (account : &lt;username&gt;)</p> <p>Parameters description:</p> <p>ipaddr: The IP address of the RADIUS server.</p> <p>priority: Priority of RADIUS assign.</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p>	Informational

	Username: The user that is being authenticated.	
	<p>Event description: Failed to assign ACL profiles/rules from RADIUS server.</p> <p>Log Message: RADIUS server &lt;ipaddr&gt; assigns &lt;username&gt; ACL failure at port &lt;[unitID]portNum&gt; (&lt;string&gt;)</p> <p>Parameters description:  ipaddr: The IP address of the RADIUS server.  unitID: The unit ID.  portNum: The port number.  Username: The user that is being authenticated.  string: The failed RADIUS ACL command string.</p>	Warning
<b>LLDP-MED</b>	<p>Event description: LLDP-MED topology change detected</p> <p>Log Message: LLDP-MED topology change detected (on port &lt;portNum&gt;. chassis id: &lt;chassisType&gt;, &lt;chassisID&gt;, port id: &lt;portType&gt;, &lt;portID&gt;, device class: &lt;deviceClass&gt;)</p> <p>Parameters description:  portNum: The port number.  chassisType: chassis ID subtype.  Value list:  1. chassisComponent(1)  2. interfaceAlias(2)  3. portComponent(3)  4. macAddress(4)  5. networkAddress(5)  6. interfaceName(6)  7. local(7)  chassisID: chassis ID.  portType: port ID subtype.  Value list:  1. interfaceAlias(1)  2. portComponent(2)  3. macAddress(3)  4. networkAddress(4)  5. interfaceName(5)  6. agentCircuitId(6)  7. local(7)  portID: port ID.  deviceClass: LLDP-MED device type.</p>	Notice
	<p>Event description: Conflict LLDP-MED device type detected</p> <p>Log Message: Conflict LLDP-MED device type detected ( on port &lt; portNum &gt;, chassis id: &lt; chassisType&gt;, &lt;chassisID&gt;, port id: &lt; portType&gt;, &lt;portID&gt;, device class: &lt;deviceClass&gt;)</p> <p>Parameters description:  portNum: The port number.  chassisType: chassis ID subtype.  Value list:  1. chassisComponent(1)  2. interfaceAlias(2)  3. portComponent(3)</p>	Notice



	<p>4. macAddress(4)                      5. networkAddress(5)                      6. interfaceName(6)                      7. local(7)                      chassisID: chassis ID.                      portType: port ID subtype.                      Value list:                      1. interfaceAlias(1)                      2. portComponent(2)                      3. macAddress(3)                      4. networkAddress(4)                      5. interfaceName(5)                      6. agentCircuitId(6)                      7. local(7)                      portID: port ID.                      deviceClass: LLDP-MED device type.</p>	
	<p>Event description: Incompatible LLDP-MED TLV set detected                      Log Message: Incompatible LLDP-MED TLV set detected ( on port &lt; portNum &gt;, chassis id: &lt; chassisType&gt;, &lt;chassisID&gt;, port id: &lt; portType&gt;, &lt;portID&gt;, device class: &lt;deviceClass&gt;)</p> <p>Parameters description:                      portNum: The port number.                      chassisType: chassis ID subtype.                      Value list:                      1. chassisComponent(1)                      2. interfaceAlias(2)                      3. portComponent(3)                      4. macAddress(4)                      5. networkAddress(5)                      6. interfaceName(6)                      7. local(7)                      chassisID: chassis ID.                      portType: port ID subtype.                      Value list:                      1. interfaceAlias(1)                      2. portComponent(2)                      3. macAddress(3)                      4. networkAddress(4)                      5. interfaceName(5)                      6. agentCircuitId(6)                      7. local(7)                      portID: port ID.                      deviceClass: LLDP-MED device type.</p>	<p>Notice</p>
<p><b>Voice VLAN</b></p>	<p>Event description: When a new voice device is detected in the port.                      Log Message: New voice device detected (Port &lt;portNum&gt;, MAC &lt;macaddr&gt;)</p> <p>Parameters description:                      portNum : The port number.                      macaddr: Voice device MAC address</p>	<p>Informational</p>

	<p>Event description: When a port which is in auto Voice VLAN mode joins the Voice VLAN</p> <p>Log Message: Port &lt; portNum &gt; add into Voice VLAN &lt;vid &gt;</p> <p>Parameters description: portNum : The port number. vid:VLAN ID</p>	Informational
	<p>Event description: When a port leaves the Voice VLAN and at the same time, no voice device is detected in the aging interval for that port, the log message will be sent.</p> <p>Log Message: Port &lt; portNum &gt; remove from Voice VLAN &lt;vid &gt;</p> <p>Parameters description: portNum : The port number. vid:VLAN ID</p>	Informational
<b>DULD</b>	<p>Event description: A unidirectional link has been detected on this port</p> <p>Log Message: Detected unidirectional link on (Port&lt;[unitID:]portNum&gt;)</p> <p>Parameters description: unitID: the unit ID portNum: port number</p>	Informational
<b>Stacking</b>	<p>Event description: Hot insertion.</p> <p>Log Message: Unit: &lt;unitID&gt;, MAC: &lt;macaddr&gt; Hot insertion.</p> <p>Parameters description: unitID: Box ID. Macaddr: MAC address.</p>	Informational
	<p>Event description: Hot removal.</p> <p>Log Message: Unit: &lt;unitID&gt;, MAC: &lt;macaddr&gt; Hot removal.</p> <p>Parameters description: unitID: Box ID. Macaddr: MAC address.</p>	Informational
	<p>Event description: Stacking topology change.</p> <p>Log Message: Stacking topology is &lt;Stack_TP_TYPE&gt;. Master(Unit &lt;unitID&gt;, MAC:&lt;macaddr&gt;).</p> <p>Parameters description: Stack_TP_TYPE: The stacking topology type is one of the following: 1. Ring, 2. Chain. unitID: Box ID. Macaddr: MAC address.</p>	Informational
	<p>Event description: Backup master changed to master.</p> <p>Log Message: Backup master changed to master. Master (Unit: &lt;unitID&gt;).</p> <p>Parameters description: unitID: Box ID.</p>	Informational
	<p>Event description: Slave changed to master</p> <p>Log Message: Slave changed to master. Master (Unit: &lt;unitID&gt;).</p> <p>Parameters description:</p>	Informational

	unitID: Box ID.	
	<p>Event description: Box ID conflict.</p> <p>Log Message: Hot insert failed, box ID conflict: Unit &lt;unitID&gt; conflict (MAC: &lt;macaddr&gt; and MAC: &lt;macaddr&gt;).</p> <p>Parameters description: unitID: Box ID. macaddr: The MAC addresses of the conflicting boxes.</p>	Critical
<b>SNMP</b>	<p>Event Description: SNMP request received with invalid community string</p> <p>Log Message: SNMP request received from &lt;ipaddr&gt; with invalid community string.</p> <p>Parameters Description: ipaddr: The IP address.</p>	Informational
<b>Web (SSL)</b>	<p>Event description: Successful login through Web.</p> <p>Log Message: Successful login through Web (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login HTTP server. ipaddr: The IP address of HTTP client.</p>	Informational
	<p>Event description: Login failed through Web.</p> <p>Log Message: Login failed through Web (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login HTTP server. ipaddr: The IP address of HTTP client.</p>	Warning
	<p>Event description: Web session timed out.</p> <p>Log Message: Web session timed out (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login HTTP server. ipaddr: The IP address of HTTP client.</p>	Informational
	<p>Event description: Logout through Web.</p> <p>Log Message: Logout through Web (Username: %S, IP: %S).</p> <p>Parameters description: username: The use name that used to login HTTP server. ipaddr: The IP address of HTTP client.</p>	Informational
	<p>Event description: Successful login through Web(SSL).</p> <p>Log Message: Successful login through Web(SSL) (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login SSL server. ipaddr: The IP address of SSL client.</p>	Informational
	<p>Event description: Login failed through Web(SSL).</p> <p>Log Message: Login failed through Web(SSL) (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login SSL server.</p>	Warning

	ipaddr: The IP address of SSL client.	
	<p>Event description: Web(SSL) session timed out.</p> <p>Log Message: Web(SSL) session timed out (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login SSL server. ipaddr: The IP address of SSL client.</p>	Information
	<p>Event description: Logout through Web(SSL).</p> <p>Log Message: Logout through Web(SSL) (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;).</p> <p>Parameters description: username: The use name that used to login SSL server. ipaddr: The IP address of SSL client.</p>	Information
<b>Port Security</b>	<p>Event description: Address full on a port</p> <p>Log Message: Port security violation (MAC: &lt; macaddr &gt; on port:: &lt; unitID: portNum &gt;)</p> <p>Parameters description: macaddr: The violation MAC address. unitID: The unit ID. portNum: The port number.</p>	Warning
<b>Safe Guard</b>	<p>Event description: The host enters the mode of normal.</p> <p>Log Message: Unit&lt; unitID &gt;, Safeguard Engine enters NORMAL mode</p> <p>Parameters description: unitID: The unit ID.</p>	Informational
	<p>Event description: The host enters the mode of exhausted.</p> <p>Log Message: Unit&lt; unitID &gt;, Safeguard Engine enters EXHAUSTED mode</p> <p>Parameters description: unitID: The unit ID.</p>	Warning
<b>DoS Log</b>	<p>Event description: The DOS is possibly snoofed.</p> <p>Log Message: Possible spoofing attack from IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, port: &lt;unitID: portNum&gt;</p> <p>Parameters description: ipaddr: The ip address macaddr: The violation MAC address. unitID: The unit ID. portNum: The port number.</p>	Critical
	<p>Event description: The DOS attack is blocked.</p> <p>Log Message:&lt;dos_name&gt; is blocked from (IP: &lt;ipaddr&gt; Port: &lt; portNum &gt;):</p> <p>Parameters description: &lt;dos_name&gt;: the DoS attack type ipaddr: The ip address portNum: The port number.</p>	Informational
<b>AAA</b>	<p>Event description: Successful login.</p> <p>Log Message: Successful login through &lt;Console   Telnet   Web(SSL)   SSH&gt;(Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;).</p> <p>Parameters description: ipaddr: IP address. username: user name.</p>	Informational

	ipv6address: IPv6 address.	
	<p>Event description: Login failed.                      Log Message: Login failed through &lt;Console   Telnet   Web(SSL)  SSH&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;).</p> <p>Parameters description:                      ipaddr: IP address.                      username: user name.                      ipv6address: IPv6 address.</p>	Warning
	<p>Event description: Logout.                      Log Message: Logout through &lt;Console   Telnet   Web(SSL)  SSH&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;).</p> <p>Parameters description:                      ipaddr: IP address.                      username: user name.                      ipv6address: IPv6 address.</p>	Informational
	<p>Event description: session timed out.                      Log Message: &lt;Console   Telnet   Web(SSL)  SSH&gt; session timed out (Username: &lt;username&gt;, IP: &lt;ipaddr   ipv6address&gt;).</p> <p>Parameters description:                      ipaddr: IP address.                      username: user name.                      ipv6address: IPv6 address.</p>	Informational
	<p>Event description: SSH server is enabled.                      Log Message: SSH server is enabled</p>	Informational
	<p>Event description: SSH server is disabled.                      Log Message: SSH server is disabled</p>	Informational
	<p>Event description: Authentication Policy is enabled.                      Log Message: Authentication Policy is enabled (Module: AAA).</p>	Informational
	<p>Event description: Authentication Policy is disabled.                      Log Message: Authentication Policy is disabled (Module: AAA).</p>	Informational
	<p>Event description: Login failed due to AAA server timeout or improper configuration.                      Log Message: Login failed through &lt;Console   Telnet   Web(SSL)  SSH&gt; from &lt;ipaddr   ipv6address&gt; due to AAA server &lt;ipaddr   ipv6address&gt; timeout or improper configuration (Username: &lt;username&gt;).</p> <p>Parameters description:                      ipaddr: IP address.                      ipv6address: IPv6 address.                      username: user name.</p>	Warning
	<p>Event description: Successful Enable Admin authenticated by AAA local or none or server.                      Log Message: Successful Enable Admin through &lt;Console   Telnet   Web(SSL)  SSH&gt; from &lt;ipaddr   ipv6address&gt; authenticated by AAA &lt;local   none   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;).</p>	Informational

	<p>Parameters description:</p> <p>local: enable admin by AAA local method.</p> <p>none: enable admin by AAA none method.</p> <p>server: enable admin by AAA server method.</p> <p>ipaddr: IP address.</p> <p>ipv6address: IPv6 address.</p> <p>username: user name.</p>	
	<p>Event description: Enable Admin failed due to AAA server timeout or improper configuration.</p> <p>Log Message: Enable Admin failed through &lt;Console   Telnet   Web(SSL)  SSH&gt; from &lt;ipaddr   ipv6address&gt; due to AAA server &lt;ipaddr   ipv6address&gt; timeout or improper configuration (Username: &lt;username&gt;)</p> <p>Parameters description:</p> <p>ipaddr: IP address.</p> <p>ipv6address: IPv6 address.</p> <p>username: user name.</p>	Warning
	<p>Event description: Enable Admin failed authenticated by AAA local or server.</p> <p>Log Message: Enable Admin failed through &lt;Console   Telnet   Web(SSL)  SSH&gt; from &lt;ipaddr   ipv6address&gt; authenticated by AAA &lt; local   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;).</p> <p>Parameters description:</p> <p>local: enable admin by AAA local method.</p> <p>server: enable admin by AAA server method.</p> <p>ipaddr: IP address.</p> <p>ipv6address: IPv6 address.</p> <p>username: user name.</p>	Warning
	<p>Event description: Successful login authenticated by AAA local or none or server.</p> <p>Log Message: Successful login through &lt;Console   Telnet   Web(SSL)   SSH&gt; from &lt; ipaddr   ipv6address &gt; authenticated by AAA &lt;local   none   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;).</p> <p>Parameters description:</p> <p>local: specify AAA local method.</p> <p>none: specify none method.</p> <p>server: specify AAA server method.</p> <p>ipaddr: IP address.</p> <p>ipv6address: IPv6 address.</p> <p>username: user name.</p>	Informational
	<p>Event description: Login failed authenticated by AAA local or server.</p> <p>Log Message: Login failed through &lt;Console   Telnet   Web(SSL)  SSH&gt; from &lt;ipaddr   ipv6address&gt; authenticated by AAA &lt;local   server &lt;ipaddr   ipv6address&gt;&gt; (Username: &lt;username&gt;).</p> <p>Parameters description:</p> <p>local: specify AAA local method.</p> <p>server: specify AAA server method.</p> <p>ipaddr: IP address.</p> <p>ipv6address: IPv6 address.</p>	Warning

	username: user name.	
<b>WAC</b>	<p>Event description: When a client host fails to authenticate.</p> <p>Log Message: WAC unauthenticated user (User Name: &lt;string&gt;, IP: &lt;ipaddr   ipv6address&gt;, MAC: &lt;macaddr&gt;, Port: &lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  string: User name  ipaddr: IP address  ipv6address: IPv6 address  macaddr: MAC address  unitID: The unit ID  portNum : The port number</p>	Warning
	<p>Event description: This log will be triggered when the number of authorized users reaches the maximum user limit on the whole device.</p> <p>Log Message: WAC enters stop learning state.</p>	Warning
	<p>Event description: This log will be triggered when the number of authorized users is below the maximum user limit on whole device in a time interval (5 min).</p> <p>Log Message: WAC recovered from stop learning state.</p>	Warning
	<p>Event description: When a client host authenticated successful.</p> <p>Log Message: WAC authenticated user (Username: &lt;string&gt;, IP: &lt;ipaddr   ipv6address&gt;, MAC: &lt;macaddr&gt;, Port: &lt;[unitID:] portNum&gt;)</p> <p>Parameters description:  string: User name  ipaddr: IP address  ipv6address: IPv6 address  macaddr: MAC address  unitID: The unit ID  portNum : The port number</p>	Informational
<b>LBD</b>	<p>Event Description: Loop back is detected under port-based mode.</p> <p>Log Message:  Port &lt; [unitID:] portNum&gt; LBD loop occurred. Port blocked.</p> <p>Parameters Description:  portNum: The port number.</p>	Critical
	<p>Event Description: Port recovered from LBD blocked state under port-based mode.</p> <p>Log Message:  Port &lt; [unitID:] portNum&gt;LBD port recovered. Loop detection restarted</p> <p>Parameters Description:  portNum: The port number.</p>	Informational
	<p>Event Description: Loop back is detected under VLAN-based mode.</p> <p>Log Message:  Port &lt; [unitID:] portNum&gt; VID &lt;vlanID&gt; LBD loop occurred. Packet discard begun</p> <p>Parameters Description:  portNum: The port number.  vlanID: the VLAN ID number.</p>	Critical
	<p>Event Description: Port recovered from LBD blocked state under VLAN-based mode.</p> <p>Log Message:  Port &lt; [unitID:] portNum&gt; VID &lt;vlanID&gt; LBD recovered. Loop detection restarted</p> <p>Parameters Description:</p>	Informational

	portNum: The port number. vlanID: the VLAN ID number.	
	Event Description: The number of VLAN in which loop back occurs hit the specified number. Log Message: Loop VLAN number overflow. Parameters Description: None	Informational
<b>IMPB</b>	Event description: Dynamic IMPB entry conflicts with static ARP. Log Message: Dynamic IMPB entry conflicts with static ARP(IP: <ipaddr>, MAC: <macaddr>, Port <[unitID:]portNum>)  Parameters description: ipaddr: IP address macaddr: MAC address unitID: The unit ID portNum : The port number	Warning
	Event description: Dynamic IMPB entry conflicts with static FDB. Log Message: Dynamic IMPB entry conflicts with static FDB(IP: [<ipaddr>   <ipv6addr>], MAC: <macaddr>, Port <[unitID:]portNum>)  Parameters description: ipaddr: IP address ipv6addr: IPv6 address macaddr: MAC address unitID: The unit ID portNum : The port number	Warning
	Event description: Dynamic IMPB entry conflicts with static IMPB. Log Message: Dynamic IMPB entry conflicts with static IMPB(IP: [<ipaddr>   <ipv6addr>], MAC: <macaddr>, Port <[unitID:]portNum>).  Parameters description: ipaddr: IP address ipv6addr: IPv6 address macaddr: MAC address unitID: The unit ID portNum : The port number	Warning
	Event description: Creating IMPB entry failed due to no ACL rule being available. Log Message: Creating IMPB entry failed due to no ACL rule being available(IP:[<ipaddr>   <ipv6addr>], MAC: <macaddr>, Port <[unitID:]portNum>)  Parameters description: ipaddr: IP address ipv6addr: IPv6 address macaddr: MAC address unitID: The unit ID portNum : The port number	Warning
	Event description: IMPB checks a host illegal. Log Message: Unauthenticated IP-MAC address and discarded by IMPB (IP: [< ipaddr >   < ipv6addr >], MAC :< macaddr >, Port <[unitID:]portNum >).	Warning



	<p>Parameters description:  ipaddr: IP address  ipv6addr: IPv6 address  macaddr: MAC address  unitID: The unit ID  portNum : The port number</p>	
	<p>Event description: Dynamic IMPB entry conflicts with static ND  Log Message: Dynamic IMPB entry conflicts with static ND (IP: [&lt; ipaddr &gt;   &lt; ipv6addr &gt;], MAC: &lt;macaddr&gt;, Port &lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  ipaddr: IP address  ipv6addr: IPv6 address  macaddr: MAC address  unitID: The unit ID  portNum : The port number</p>	Warning
	<p>Event description: Port shutdown due to the DHCP rate excludes the rate limiting.  Log Message: Port &lt; [unitID:] portNum&gt; is currently shut down due to the DHCP rate excludes the rate limiting.</p> <p>Parameters description:  unitID: The unit ID  portNum : The port number</p>	Warning
	<p>Event description: Port recovery due to the DHCP auto-recovery timer is timeout.  Log Message: Port &lt; [unitID:] portNum&gt; is currently recovery due to the DHCP auto-recovery timer is timeout.</p> <p>Parameters description:  unitID: The unit ID  portNum : The port number</p>	Informational
<b>Traffic Control</b>	<p>Event description: Broadcast storm occurrence.  Log Message: Port &lt;portNum&gt; Broadcast storm is occurring.</p> <p>Parameters description:  portNum: The port number.</p>	Warning
	<p>Event description: Broadcast storm cleared.  Log Message: Port &lt;portNum&gt; Broadcast storm has cleared.</p> <p>Parameters description:  portNum: The port number.</p>	Informational
	<p>Event description: Multicast storm occurrence.  Log Message: Port &lt;portNum&gt; Multicast storm is occurring.</p> <p>Parameters description:  portNum: The port number.</p>	Warning
	<p>Event description: Multicast Storm cleared.  Log Message: Port &lt;portNum&gt;Multicast storm has cleared.</p> <p>Parameters description:  portNum: The port number.</p>	Informational

	<p>Event description: Port shut down due to a packet storm</p> <p>Log Message: Port &lt;portNum&gt; is currently shut down due to a packet storm</p> <p>Parameters description: portNum: The port number.</p>	Warning
<b>DHCP Server Screening</b>	<p>Event description: Detected untrusted DHCP server IP address.</p> <p>Log Message: Detected untrusted DHCP server(IP: &lt;ipaddr&gt;, Port &lt;portNum&gt; )</p> <p>Parameters description: ipaddr: The untrusted IP address which has been detected with our device. portNum : Represent the logic port number of the device.</p>	Informational
<b>DHCPv6 Server Screening</b>	<p>Event Description: Detected untrusted DHCPv6 server IP address</p> <p>Log Message: Detected untrusted DHCPv6 server (IP: &lt;ipv6addr&gt;, Port:&lt;[unitID:]portNum&gt; )</p> <p>Parameters Description: ipv6addr: The untrusted source IP of DHCPv6 server which has been detected with our device. unitID: The unit ID.</p>	Informational
<b>ICMPv6 Router Advertisement Filter</b>	<p>Event Description: Detected untrusted source IP in ICMPv6 Router Advertisement Message.</p> <p>Log Message: Detected untrusted source IP of ICMPv6 Router Advertisement message (IP: &lt;ipv6addr&gt;, Port:&lt;[unitID:]portNum&gt; )</p> <p>Parameters Description: Ipv6addr: The untrusted ICMPv6 Router Advertisement address which has been detected with our device unitID: The unit ID. portNum: The port number.</p>	Informational
<b>ERPS</b>	<p>Event description: Signal failure detected</p> <p>Log Message: Signal failure detected on node (MAC: &lt;macaddr&gt;)</p> <p>Parameters description: macaddr: The system MAC address of the node</p>	Notice
	<p>Event description: Signal failure cleared</p> <p>Log Message: Signal failure cleared on node (MAC: &lt;macaddr&gt;)</p> <p>Parameters description: macaddr: The system MAC address of the node</p>	Notice
	<p>Event description: RPL owner conflict</p> <p>Log Message: RPL owner conflicted on the ring (MAC: &lt;macaddr&gt;)</p> <p>Parameters description: macaddr: The system MAC address of the node</p>	Warning
<b>MSTP Debug Enhancement</b>	<p>Event description: Topology changed.</p> <p>Log Message: Topology changed [( [Instance:&lt;InstanceID&gt; ] ,port:&lt;[unitID:]portNum&gt; ,MAC: &lt;macaddr&gt;)]</p> <p>Parameters description: InstanceID: Instance ID. portNum:Port ID macaddr: MAC address</p>	Notice

	<p>Event description: Spanning Tree new Root Bridge                  Log Message: [CIST   CIST Regional   MSTI Regional] New Root bridge selected( [Instance: &lt;InstanceID&gt; ]MAC: &lt;macaddr&gt; Priority :&lt;value&gt;)</p> <p>Parameters description:                  InstanceID: Instance ID.                  macaddr: Mac address                  value: priority value</p>	Informational
	<p>Event description: Spanning Tree Protocol is enabled                  Log Message: Spanning Tree Protocol is enabled</p>	Informational
	<p>Event description: Spanning Tree Protocol is disabled                  Log Message: Spanning Tree Protocol is disabled</p>	Informational
	<p>Event description: New root port                  Log Message: New root port selected [( [Instance:&lt;InstanceID&gt; ], port:&lt;[unitID:] portNum&gt;)]</p> <p>Parameters description:                  InstanceID: Instance ID.                  portNum:Port ID</p>	Notice
	<p>Event description: Spanning Tree port status changed                  Log Message: Spanning Tree port status changed [( [Instance:&lt;InstanceID&gt; ], port:&lt;[unitID:] portNum&gt;)] &lt;old_status&gt; -&gt; &lt;new_status&gt;</p> <p>Parameters description:                  InstanceID: Instance ID.                  portNum: Port ID                  old_status: Old status                  new_status: New status</p>	Notice
	<p>Event description: Spanning Tree port role changed.                  Log Message: Spanning Tree port status changed. [( [Instance:&lt;InstanceID&gt; ], port:&lt;[unitID:] portNum&gt;)] &lt;old_role&gt; -&gt; &lt;new_role&gt;</p> <p>Parameters description:                  InstanceID: Instance ID.                  portNum:Port ID/                  old_role: Old role                  new_status:New role</p>	Informational
	<p>Event description: Spanning Tree instance created.                  Log Message: Spanning Tree instance created. Instance:&lt;InstanceID&gt;</p> <p>Parameters description:                  InstanceID: Instance ID.</p>	Informational
	<p>Event description: Spanning Tree instance deleted.                  Log Message: Spanning Tree instance deleted. Instance:&lt;InstanceID&gt;</p> <p>Parameters description:                  InstanceID: Instance ID.</p>	Informational
	<p>Event description: Spanning Tree Version changed.                  Log Message: Spanning Tree version changed. New version:&lt;new_version&gt;</p>	Informational

	Parameters description: new_version: New STP version.	
	Event description: Spanning Tree MST configuration ID name and revision level changed. Log Message: Spanning Tree MST configuration ID name and revision level changed (name:<name> ,revision level <revision_level>).  Parameters description: name : New name. revision_level:New revision level.	Informational
	Event description: Spanning Tree MST configuration ID VLAN mapping table deleted. Log Message: Spanning Tree MST configuration ID VLAN mapping table changed (instance: <InstanceID> delete vlan <startvlanid> [- <endvlanid>]).  Parameters description: InstanceID: Instance ID. startvlanid- endvlanid:VLANlist	Informational
	Event description: Spanning Tree MST configuration ID VLAN mapping table added. Log Message: Spanning Tree MST configuration ID VLAN mapping table changed (instance: <InstanceID> add vlan <startvlanid> [- <endvlanid>]).  Parameters description: InstanceID: Instance ID. startvlanid- endvlanid:VLANlist	Informational
<b>CFM</b>	Event description: Cross-connect is detected Log Message: CFM cross-connect. VLAN:<vlanid>, Local(MD Level:<mdlevel>, Port <[unitID:]portNum>, 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. unitID: Represents the ID of the device in the stacking system. portNum: Represents the logical port number of the MEP. mepdirection: Can be "inward" or "outward". mepid: Represents the MEPID of the MEP. The value 0 means unknown MEPID. macaddr: Represents the MAC address of the MEP. The value all zeros mean unknown MAC address.  Note: In CFM hardware mode, remote MEP information (mepid and macaddr) is unknown.	Critical
	Event description: Error CFM CCM packet is detected Log Message: CFM error ccm. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>) Remote(MEPID:<mepid>, MAC:<macaddr>)  Parameters description: vlanid: Represents the VLAN identifier of the MEP. mdlevel: Represents MD level of the MEP. unitID: Represents the ID of the device in the stacking system. portNum: Represents the logical port number of the MEP.	Warning

	<p>mepdirection: Can be "inward" or "outward".</p> <p>mepid: Represents the MEPID of the MEP. The value 0 means unknown MEPID.</p> <p>macaddr: Represents the MAC address of the MEP. The value all zeros means unknown MAC address.</p> <p>Note: In CFM hardware mode, remote MEP information (mepid and macaddr) is unknown.</p>	
	<p>Event description: Can not receive the remote MEP's CCM packet</p> <p>Log Message: CFM remote down. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;)</p> <p>Parameters description:</p> <p>vlanid: Represents the VLAN identifier of the MEP.</p> <p>mdlevel: Represents the MD level of the MEP.</p> <p>unitID: Represents the ID of the device in the stacking system.</p> <p>portNum: Represents the logical port number of the MEP.</p> <p>mepdirection: Represents the MEP direction, which can be "inward" or "outward".</p> <p>mepid: Represents the MEPID of the MEP.</p> <p>macaddr: Represents the MAC address of the MEP.</p>	Warning
	<p>Event description: Remote MEP's MAC reports an error status</p> <p>Log Message: CFM remote MAC error. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;)</p> <p>Parameters description:</p> <p>vlanid: Represents the VLAN identifier of the MEP.</p> <p>mdlevel: Represents the MD level of the MEP.</p> <p>unitID: Represents the ID of the device in the stacking system.</p> <p>portNum: Represents the logical port number of the MEP.</p> <p>mepdirection: Represents the MEP direction, which can be "inward" or "outward".</p> <p>mepid: Represents the MEPID of the MEP.</p> <p>macaddr: Represents the MAC address of the MEP.</p>	Warning
	<p>Event description: Remote MEP detects CFM defects</p> <p>Log Message: CFM remote detects a defect. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;)</p> <p>Parameters description:</p> <p>vlanid: Represents the VLAN identifier of the MEP.</p> <p>mdlevel: Represents the MD level of the MEP.</p> <p>unitID: Represents the ID of the device in the stacking system.</p> <p>portNum: Represents the logical port number of the MEP.</p> <p>mepdirection: Represents the MEP direction, which can be "inward" or "outward".</p> <p>mepid: Represents the MEPID of the MEP.</p> <p>macaddr: Represents the MAC address of the MEP.</p>	Informational
<b>CFM Extension</b>	<p>Event description: AIS condition detected</p> <p>Log Message: AIS condition detected. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;, MEPID:&lt;mepid&gt;)</p> <p>Parameters description:</p> <p>vlanid: Represents the VLAN identifier of the MEP.</p> <p>mdlevel: Represents the MD level of the MEP.</p> <p>unitID: Represents the ID of the device in the stacking system.</p>	Notice

	<p>portNum: Represents the logical port number of the MEP.  mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".  mepid: Represents the MEPID of the MEP.</p>	
	<p>Event description: AIS condition cleared  Log Message: AIS condition cleared. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;, MEPID:&lt;mepid&gt;)</p> <p>Parameters description:  vlanid: Represents the VLAN identifier of the MEP.  mdlevel: Represents the MD level of the MEP.  unitID: Represents the ID of the device in the stacking system.  portNum: Represents the logical port number of the MEP.  mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".  mepid: Represents the MEPID of the MEP.</p>	Notice
	<p>Event description: LCK condition detected  Log Message: LCK condition detected. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;, MEPID:&lt;mepid&gt;)</p> <p>Parameters description:  vlanid: Represents the VLAN identifier of the MEP.  mdlevel: Represents the MD level of the MEP.  unitID: Represents the ID of the device in the stacking system.  portNum: Represents the logical port number of the MEP.  mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".  mepid: Represents the MEPID of the MEP.</p>	Notice
	<p>Event description: LCK condition cleared  Log Message: LCK condition cleared. MD Level:&lt;mdlevel&gt;, VLAN:&lt;vlanid&gt;, Local(Port &lt;[unitID:]portNum&gt;, Direction:&lt;mepdirection&gt;, MEPID:&lt;mepid&gt;)</p> <p>Parameters description:  vlanid: Represents the VLAN identifier of the MEP.  mdlevel: Represents the MD level of the MEP.  unitID: Represents the ID of the device in the stacking system.  portNum: Represents the logical port number of the MEP.  mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".  mepid: Represents the MEPID of the MEP.</p>	Notice
<b>Port</b>	<p>Event description: port linkup  Log Message: Port &lt;port&gt; link up, &lt;nway&gt;</p> <p>Parameters description:  port: Represents the logical port number.  nway: Represents the speed and duplex of link.</p>	Informational
	<p>Event description: port linkdown  Log Message: Port &lt;port&gt; link down</p> <p>Parameters description:  port: Represents the logical port number.</p>	Informational
<b>DDM</b>	<p>Event description: DDM recover from DDM alarm or warning threshold  Log Message: Port &lt;[unitID:]portNum&gt; optic module [thresholdType] back to normal</p>	critical

	<p>Parameters description:</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>thresholdType: the DDM threshold type. The value should be one of the following values: temperature, supply voltage, bias current, TX power, RX power.</p>	
	<p>Event description: DDM exceeded DDM alarm threshold</p> <p>Log Message: Port &lt;[unitID:]portNum&gt; optic module [thresholdType] exceeded the [thresholdSubType] alarm threshold</p> <p>Parameters description:</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>thresholdType: the DDM threshold type. The value should be one of the following values: temperature, supply voltage, bias current, TX power, RX power.</p> <p>thesholdSubType: the DDM threshold sub type, the value should be "high" or "low".</p>	warning
	<p>Event description: DDM exceeded DDM warning threshold</p> <p>Log Message: Port &lt;[unitID:]portNum&gt; optic module [thresholdType] exceeded the [thresholdSubType] warning threshold</p> <p>Parameters description:</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>thresholdType: the DDM threshold type. The value should be one of the following values: temperature, supply voltage, bias current, TX power, RX power.</p> <p>thesholdSubType: the DDM threshold sub type, the value should be "high" or "low".</p>	warning
<b>BPDU Attack Protection</b>	<p>Event description: BPDU attack happened.</p> <p>Log Message: Port&lt;[unitID:]portNum&gt; enter BPDU under protection state (mode: drop / block / shutdown)</p> <p>Parameters description:</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p> <p>mode:The BPDU currnt state</p>	Informational
	<p>Event description: BPDU attack automatically recover.</p> <p>Log Message: Port &lt;[unitID:]portNum&gt; recover from BPDU under protection state automatically</p> <p>Parameters description:</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p>	Informational
	<p>Event description: BPDU attack manually recover.</p> <p>Log Message: Port&lt;[unitID:]portNum&gt; recover from BPDU under protection state automatically</p> <p>Parameters description:</p> <p>unitID: The unit ID.</p> <p>portNum: The port number.</p>	Informational
<b>SSH</b>	<p>Event description: Successfully download client public keys.</p>	Informational

	<p>Log Message: SSH client public keys file was upgraded successfully (Username: &lt;username&gt;, IP: &lt; ipaddr   ipv6address &gt;)</p> <p>Parameters description:  username: The username upgraded client public keys file.  ipaddr: Represent client IP address.  ipv6address: Represent client IP address.</p>	
<b>OAM</b>	<p>Event description: Dying gasp event(remote)  Log Message: OAM dying gasp event received (Port&lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  unitID: The unit ID.  portNum: The port number.</p>	Warning
	<p>Event description: Dying gasp event(local)  Log Message: Device encountered an OAM dying gasp event.</p>	Warning
	<p>Event description: Critical event(remote)  Log Message: OAM critical event received (Port&lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  unitID: The unit ID.  portNum: The port number.</p>	Warning
	<p>Event description: Critical event(local)  Log Message: Device encountered an OAM critical event</p>	Warning
	<p>Event description: Errored Symbol Period Event(remote)  Log Message: Errored symbol period event received (Port &lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  unitID: The unit ID.  portNum: The port number.</p>	Warning
	<p>Event description: Errored Frame Event  Log Message: Errored frame event received(Port &lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  unitID: The unit ID.  portNum: The port number.</p>	Warning
	<p>Event description: Errored Frame Period Event  Log Message: Errored frame period event received(Port &lt;[unitID:]portNum&gt;)</p> <p>Parameters description:  unitID: The unit ID.  portNum: The port number.</p>	Warning
	<p>Event description: Errored Frame Seconds Summary Event  Log Message: Errored frame seconds summary event received (Port &lt;[unitID:]portNum&gt;)</p> <p>Parameters description:</p>	Warning



	unitID: The unit ID. portNum: The port number.	
	Event description: Remote loopback start Log Message: OAM Remote loopback started (Port <[unitID:] portNum>)  Parameters description: unitID: The unit ID. portNum: The port number.	Warning
	Event description: Remote loopback stop Log Message: OAM Remote loopback stopped (Port <[unitID:] portNum>)  Parameters description: unitID: The unit ID. portNum: The port number.	Warning
<b>Fan</b>	Event description: Right Side Fan failed Log Message: [Unit <unitID>], Right Side Fan <value> failed  Parameters description: unitID: The unit ID. value : Fans ID.	Critical
	Event description: Right Side Fan recovered Log Message: [Unit <unitID>], Right Side Fan <value> recovered  Parameters description: unitID: The unit ID. value : Fans ID	Critical
<b>Temperature</b>	Event description: Temperature sensor enters alarm state. Log Message: [Unit <unitID>], Temperature sensor <sensorID> enters alarm state (current temperature: <temperature>)  Parameters description: unitID: The unit ID. sensorID: The sensor ID. temperature: The temperature.	Warning
	Event description: Temperature recovers to normal. Log Message: [Unit <unitID>], Temperature sensor <sensorID> recovers to normal state (current temperature: <temperature>)  Parameters description: unitID: The unit ID. sensorID: The sensor ID. temperature: The temperature.	Informational
<b>Power</b>	Event description: Internal Power failed. Log Message: [Unit <unitID>], Internal Power failed  Parameters description: unitID: The unit ID.	Critical

	<p>Event description: Internal Power is recovered. Log Message: [Unit &lt;unitID&gt;], Internal Power is recovered</p> <p>Parameters description: unitID: The unit ID.</p>	Critical
	<p>Event description: Redundant Power failed. Log Message: [Unit &lt;unitID&gt;], Redundant Power failed</p> <p>Parameters description: unitID: The unit ID.</p>	Critical
	<p>Event description: Redundant Power is working. Log Message: [Unit &lt;unitID&gt;], Redundant Power is working</p> <p>Parameters description: unitID: The unit ID.</p>	Critical
<b>TFTP/FTP</b>	<p>Event description: Firmware upgraded successfully.</p> <p>Log Message: [Unit &lt;unitID&gt;], Firmware upgraded by &lt;session&gt; successfully (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: unitID: Represent the id of the device in the stacking system. session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: TFTP/FTP Server IP address pathFile: Path and file name on TFTP/FTP Server.</p>	Informational
	<p>Event description: Firmware upgrade was unsuccessful</p> <p>Log Message: [Unit &lt;unitID&gt;], Firmware upgrade by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: unitID: Represent the id of the device in the stacking system. session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: TFTP/FTP Server IP address</p>	warning

	pathFile: Path and file name on TFTP/FTP Server.	
	<p>Event description: Firmware successfully uploaded.</p> <p>Log Message: Firmware successfully uploaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: TFTP/FTP Server IP address pathFile: Path and file name on TFTP/FTP Server.</p>	informational
	<p>Event description: Firmware upload was unsuccessful.</p> <p>Log Message: Firmware upload by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: TFTP/FTP Server IP address pathFile: Path and file name on TFTP/FTP Server.</p>	warning
	<p>Event description: Configuration successfully downloaded.</p> <p>Log Message: Configuration successfully downloaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description: session: The user's session, ex: console, SNMP, WEB... username: Represent current login user. (It should be community name for SNMP.) ipaddr: Represent client IP address. macaddr: Represent client MAC address. serverIP: TFTP/FTP Server IP address pathFile: Path and file name on TFTP/FTP Server.</p>	informational
	<p>Event description: Configuration download was unsuccessful.</p> <p>Log Message: Configuration download by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP:</p>	warning

	<p>&lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:                  session: The user's session, ex: console, SNMP, WEB...                  username: Represent current login user.                  (It should be community name for SNMP.)                  ipaddr: Represent client IP address.                  macaddr: Represent client MAC address.                  serverIP: TFTP/FTP Server IP address                  pathFile: Path and file name on TFTP/FTP Server.</p>	
	<p>Event description:                  Configuration successfully uploaded.</p> <p>Log Message:                  Configuration successfully uploaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:                  session: The user's session, ex: console, SNMP, WEB...                  username: Represent current login user.                  (It should be community name for SNMP.)                  ipaddr: Represent client IP address.                  macaddr: Represent client MAC address.                  serverIP: TFTP/FTP Server IP address                  pathFile: Path and file name on TFTP/FTP Server.</p>	<p>informational</p>
	<p>Event description:                  Configuration upload was unsuccessful.</p> <p>Log Message:                  Configuration upload by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:                  session: The user's session, ex: console, SNMP, WEB...                  username: Represent current login user.                  (It should be community name for SNMP.)                  ipaddr: Represent client IP address.                  macaddr: Represent client MAC address.                  serverIP: TFTP/FTP Server IP address                  pathFile: Path and file name on TFTP/FTP Server.</p>	<p>warning</p>
	<p>Event description:                  Log message successfully uploaded.</p> <p>Log Message:                  Log message successfully uploaded by &lt;session&gt; (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:                  session: The user's session, ex: console, SNMP, WEB...                  username: Represent current login user.                  (It should be community name for SNMP.)</p>	<p>informational</p>

	<p>ipaddr: Represent client IP address.          macaddr: Represent client MAC address.          serverIP: TFTP/FTP Server IP address          pathFile: Path and file name on TFTP/FTP Server.</p>	
	<p>Event description:          Log message upload was unsuccessful.</p> <p>Log Message:          Log message upload by &lt;session&gt; was unsuccessful! (Username: &lt;username&gt;, IP: &lt;ipaddr&gt;, MAC: &lt;macaddr&gt;, Server IP: &lt;serverIP&gt;, File Name: &lt;pathFile&gt; )</p> <p>Parameters description:          session: The user's session, ex: console, SNMP, WEB...          username: Represent current login user.          (It should be community name for SNMP.)          ipaddr: Represent client IP address.          macaddr: Represent client MAC address.          serverIP: TFTP/FTP Server IP address          pathFile: Path and file name on TFTP/FTP Server.</p>	<p>warning</p>

## Appendix C Trap Log Entries

This table lists the trap logs found on the Switch.

Category	Trap Name	Description	OID
MAC Notification	swL2macNotification	This trap indicates the MAC addresses variation in address table Binding objects: (1)swL2macNotifyInfo	1.3.6.1.4.1.171.11.133.5 .2.100.1.2.0.1
MAC-based Access Control	swMacBasedAccessControlLoggedSuccess	The trap is sent when a MAC-based Access Control host is successfully logged in. Binding objects: (1) swMacBasedAuthInfoMacIndex (2) swMacBasedAuthInfoPortIndex (3) swMacBasedAuthVID	1.3.6.1.4.1.171.12.35.11 .1.0.1
	swMacBasedAccessControlLoggedFail	The trap is sent when a MAC-based Access Control host login fails. Binding objects: (1) swMacBasedAuthInfoMacIndex (2) swMacBasedAuthInfoPortIndex (3) swMacBasedAuthVID	1.3.6.1.4.1.171.12.35.11 .1.0.2
	swMacBasedAccessControlAgesOut	The trap is sent when a MAC-based Access Control host ages out. Binding objects: (1) swMacBasedAuthInfoMacIndex (2) swMacBasedAuthInfoPortIndex (3) swMacBasedAuthVID	1.3.6.1.4.1.171.12.35.11 .1.0.3
LLDP(-MED)	lldpRemTablesChange	A lldpRemTablesChange notification is sent when the value of lldpStatsRemTableLastChangeTime changes. Binding objects: (1) lldpStatsRemTablesInserts (2) lldpStatsRemTablesDeletes (3) lldpStatsRemTablesDrops (4) lldpStatsRemTablesAgeouts	1.0.8802.1.1.2.0.0.1
	lldpXMedTopologyChangeDetected	A notification generated by the local device sensing a change in the topology that indicates that a new remote device attached to a local port, or a remote device disconnected or moved from one port to another. Binding objects: (1) lldpRemChassisIdSubtype (2) lldpRemChassisId (3) lldpXMedRemDeviceClass	1.0.8808.1.1.2.1.5.4795. 0.1
802.3ah OAM	dot3OamThresholdEvent	This notification is sent when a local or remote threshold crossing event is detected. Binding objects: (1) dot3OamEventLogTimestamp (2) dot3OamEventLogOui (3)dot3OamEventLogType (4)dot3OamEventLogLocation (5)dot3OamEventLogWindowHi (6)dot3OamEventLogWindowLo	1.3.6.1.2.1.158.0.1

		(7)dot3OamEventLogThresholdHi (8)dot3OamEventLogThresholdLo (9)dot3OamEventLogValue (10)dot3OamEventLogRunningTotal (11)dot3OamEventLogEventTotal	
	dot3OamNonThresholdEvent	This notification is sent when a local or remote non-threshold crossing event is detected. Binding objects: (1) dot3OamEventLogTimestamp (2) dot3OamEventLogOui (3) dot3OamEventLogType (4)dot3OamEventLogLocation (5)dot3OamEventLogEventTotal	1.3.6.1.2.1.158.0.2
Up/Down-Load	agentFirmwareUpgrade	This trap is sent when the process of upgrading the firmware via SNMP has finished. Binding objects: (1) swMultimageVersion	1.3.6.1.4.1.171.12.1.7.2.0.7
	agentCfgOperCompleteTrap	The trap is sent when the configuration is completely saved, uploaded or downloaded Binding objects: unitID agentCfgOperate agentLoginUserName	1.3.6.1.4.1.171.12.1.7.2.0.9
Gratuitous ARP	agentGratuitousARPTrap	The trap is sent when IP address conflicted. Binding objects: (1) ipaddr (2) macaddr (3) portNumber (4) agentGratuitousARPInterfaceName	1.3.6.1.4.1.171.12.1.7.2.0.5
Stacking	swUnitInsert	Unit Hot Insert notification. Binding objects: (1) swUnitMgmtId. (2) swUnitMgmtMacAddr.	1.3.6.1.4.1.171.12.11.2.2.1.0.1
	swUnitRemove	Unit Hot Remove notification. Binding objects: (1) swUnitMgmtId. (2) swUnitMgmtMacAddr.	1.3.6.1.4.1.171.12.11.2.2.1.0.2
	swUnitFailure	Unit Failure notification. Binding objects: (1) swUnitMgmtId.	1.3.6.1.4.1.171.12.11.2.2.1.0.3
	swUnitTPChange	The stacking topology change notification. Binding objects: (1) swStackTopologyType (2) swUnitMgmtId (3) swUnitMgmtMacAddr	1.3.6.1.4.1.171.12.11.2.2.1.0.4
	swUnitRoleChange	The stacking unit role change notification. Binding objects: (1) swStackRoleType (2) swUnitMgmtId	1.3.6.1.4.1.171.12.11.2.2.1.0.5
Port Security	swL2PortSecurityViolationTrap	When the port security trap is enabled, new MAC addresses that violate the pre-defined port security configuration will trigger trap messages to be sent out. Binding objects:	1.3.6.1.4.1.171.11.133.5.1.2.100.1.2.0.2

		(1)swPortSecPortIndex (2)swL2PortSecurityViolationMac	
Safe Guard	swSafeGuardChgToNormal	This trap indicates system change operation mode from axhausted to normal.  Binding objects: (1) swSafeGuardCurrentStatus	1.3.6.1.4.1.171.12.19.4.1.0.2
	swSafeGuardChgToExhausted	This trap indicates System change operation mode from normal to exhausted.  Binding objects: (1) swSafeGuardCurrentStatus	1.3.6.1.4.1.171.12.19.4.1.0.1
LBD	swPortLoopOccurred	The trap is sent when a port loop occurs.  Binding objects: (1) swLoopDetectPortIndex	1.3.6.1.4.1.171.12.41.10.0.1
	swPortLoopRestart	The trap is sent when a port loop restarts after the interval time.  Binding objects: (1) swLoopDetectPortIndex	1.3.6.1.4.1.171.12.41.10.0.2
	swVlanLoopOccurred	The trap is sent when a port loop occurs under LBD VLAN-based mode.  Binding objects: (1) swLoopDetectPortIndex (2) swVlanLoopDetectVID	1.3.6.1.4.1.171.12.41.10.0.3
	swVlanLoopRestart	The trap is sent when a port loop restarts under LBD VLAN-based mode after the interval time.  Binding objects: (1) swLoopDetectPortIndex (2) swVlanLoopDetectVID	1.3.6.1.4.1.171.12.41.10.0.4
BPDU Attack Protection	swBpduProtectionUnderAttacking Trap	BPDU attack happened, enter drop / block / shutdown mode.	1.3.6.1.4.1.171.12.76.4.0.1
	swBpduProtectionRecoveryTrap	BPDU attack automatically recover	1.3.6.1.4.1.171.12.76.4.0.2
IMPB	swIpMacBindingViolationTrap	When the IP-MAC Binding trap is enabled, if there's a new MAC that violates the pre-defined port security configuration, a trap will be sent out.  Binding objects: (1) swIpMacBindingPortIndex (2) swIpMacBindingViolationIP (3) swIpMacBindingViolationMac	1.3.6.1.4.1.171.12.23.5.0.1
	swIpMacBindingIPv6ViolationTrap	When the IP-MAC Binding trap is enabled, if there's a new MAC that violates the pre-defined IPv6 IMPB configuration, a trap will be sent out.  Binding objects: (1) swIpMacBindingPortIndex (2) swIpMacBindingViolationIPv6Addr (3) swIpMacBindingViolationMac	1.3.6.1.4.1.171.12.23.5.0.4
	swIpMacBindingShutdownTrap	When the rate limiting is shutdown mode and the DHCP rate excludes the limiting, a trap will be sent out.  Binding objects: swIpMacBindingPortIndex	1.3.6.1.4.1.171.12.23.5.0.5
	swIpMacBindingRecoveryTrap	When the port is shutdown by DHCP rate limiting and the auto-recovery timer is	1.3.6.1.4.1.171.12.23.5.0.6



		timeout, a trap will be sent out.  Binding objects: swlpMacBindingPortIndex	
DHCP Server Screening	swFilterDetectedTrap	Send trap when an illegal DHCP server is detected. The same illegal DHCP server IP address detected is just sent once to the trap receivers within the log ceasing unauthorized duration.  Binding objects: (1) swFilterDetectedIP (2) swFilterDetectedport	1.3.6.1.4.1.171.12.37.10 0.0.1
	swFilterDHCPv6ServerDetectedTrap	Send trap when an illegal DHCPv6 server is detected.  Binding objects: (1) swFilterDetectedIPv6 (2) swFilterDetectedport	1.3.6.1.4.1.171.12.37.10 0.0.2
	swFilterICMPv6RaAllNodesDetectedTrap	Send trap when an illegal ICMPv6 all-nodes RA is detected.  Binding objects: (1) swFilterDetectedIPv6 (2) swFilterDetectedport	1.3.6.1.4.1.171.12.37.10 0.0.3
Traffic Control	swPktStormOccurred	When packet storm is detected by packet storm mechanism and take shutdown as action.  Binding objects: (1) swPktStormCtrlPortIndex	1.3.6.1.4.1.171.12.25.5. 0.1
	swPktStormCleared	When the packet storm is clear.  Binding objects: (1) swPktStormCtrlPortIndex	1.3.6.1.4.1.171.12.25.5. 0.2
ERPS	swERPSSFDetectedTrap	Signal fail detected on node.	1.3.6.1.4.1.171.12.78.4. 0.1
	swERPSSFClearedTrap	Signal fail cleared on node.	1.3.6.1.4.1.171.12.78.4. 0.2
	swERPSPLOwnerConflictTrap	RPL owner conflicted on the ring.	1.3.6.1.4.1.171.12.78.4. 0.3
MSTP	newRoot	The newRoot trap indicates that the sending agent has become the new root of the Spanning Tree; the trap is sent by a bridge soon after its election as the new root, e.g., upon expiration of the Topology Change Timer, immediately subsequent to its election. Implementation of this trap is optional.	1.3.6.1.2.1.17.0.1
	topologyChange	A topologyChange 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. The 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
CFM	dot1agCfmFaultAlarm	This trap is initiated when a connectivity defect is detected. Binding objects: (1) dot1agCfmMepHighestPrDefect	1.3.111.2.802.1.1.8.0.1
CFM Extension	swCFMExtAISOccurred	A notification is generated when local MEP enters AIS status.  Binding objects:	1.3.6.1.4.1.171.12.86.10 0.0.1

		(1) dot1agCfmMdlIndex (2) dot1agCfmMalIndex (3) dot1agCfmMepIdentifier	
	swCFMExtAIScleared	A notification is generated when local MEP exits AIS status.  Binding objects: (1) dot1agCfmMdlIndex (2) dot1agCfmMalIndex (3) dot1agCfmMepIdentifier	1.3.6.1.4.1.171.12.86.10 0.0.2
	swCFMExtLockOccurred	A notification is generated when local MEP enters lock status.  Binding objects: (1) dot1agCfmMdlIndex (2) dot1agCfmMalIndex (3) dot1agCfmMepIdentifier	1.3.6.1.4.1.171.12.86.10 0.0.3
	swCFMExtLockCleared	A notification is generated when local MEP exits lock status.  Binding objects: (1) dot1agCfmMdlIndex (2) dot1agCfmMalIndex (3) dot1agCfmMepIdentifier	1.3.6.1.4.1.171.12.86.10 0.0.4
Port	linkUp	A notification is generated when port linkup.  Binding objects: (1) ifIndex, (2) if AdminStatus (3) ifOperStatu	1.3.6.1.6.3.1.1.5.4
	linkDown	A notification is generated when port linkdown.  Binding objects: (1) ifIndex, (2) if AdminStatus (3) ifOperStatu	1.3.6.1.6.3.1.1.5.3
DDM	swDdmAlarmTrap	The trap is sent when any parameter value exceeds the alarm threshold value or recovers to normal status depending on the configuration of the trap action.  Binding objects: (1) swDdmPort (2) swDdmThresholdType (3) swDdmThresholdExceedType (4) swDdmThresholdExceedOrRecover	1.3.6.1.4.1.171.12.72.4. 0.1
	swDdmWarningTrap	The trap is sent when any parameter value exceeds the warning threshold value or recovers to normal status depending on the configuration of the trap action.  Binding objects: (1) swDdmPort (2) swDdmThresholdType (3) swDdmThresholdExceedType (4) swDdmThresholdExceedOrRecover	1.3.6.1.4.1.171.12.72.4. 0.2
DOS Attack Prevention	swDoSAttackDetected	This trap is sent when the specific DoS packet is received and trap is enabled. Binding objects:	1.3.6.1.4.1.171.12.59.4. 0.1

		(1) swDoSCtrlType (2) swDoSNotifyVarIpAddr (3) swDoSNotifyVarPortNumber	
System	coldStart	A coldStart trap signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself and that its configuration may have been altered.	1.3.6.1.6.3.1.1.5.1
	warmStart	A warmStart trap signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration is unaltered.	1.3.6.1.6.3.1.1.5.2
Fan Status	swFanFailure	Fan Failure notification. Binding objects: 1:swFanUnitIndex 2:swFanID	1.3.6.1.4.1.171.12.11.2.2.3.0.1
	swFanRecover	Fan Recover notification. Binding objects: 1:swFanUnitIndex 2:swFanID	1.3.6.1.4.1.171.12.11.2.2.3.0.2
Temperature	swTemperatureHighAlarm	Temperature High Alarm notification. Binding objects: 1:swTemperatureUnitIndex 2:swTemperSensorID 3:swTemperatureCurrent	1.3.6.1.4.1.171.12.11.2.2.4.0.1.1
	swTemperatureHighRecover	Temperature High Recover notification. Binding objects: 1:swTemperatureUnitIndex 2:swTemperSensorID 3:swTemperatureCurrent	1.3.6.1.4.1.171.12.11.2.2.4.0.2.1
	swTemperatureLowAlarm	Temperature Low Alarm notification. Binding objects: 1:swTemperatureUnitIndex 2:swTemperSensorID 3:swTemperatureCurrent	1.3.6.1.4.1.171.12.11.2.2.4.0.3.1
	swTemperatureLowRecover	Temperature Low Recover notification. Binding objects: 1:swTemperatureUnitIndex 2:swTemperSensorID 3:swTemperatureCurrent	1.3.6.1.4.1.171.12.11.2.2.4.0.4.1
802.1X	swDot1xLoggedSuccess	The trap is sent when an 802.1X client pass the authentication. Binding objects: (1) swDot1xAuthPortNumber (2) swDot1xAuthVID (3) swDot1xAuthMACAddress (4) swDot1XAuthUserName	1.3.6.1.4.1.171.12.30.11.1.0.1
	swDot1xLoggedFail	The trap is sent when a 1x client failed to pass the authentication.  Binding objects: (1) swDot1xAuthPortNumber (2) swDot1xAuthVID (3) swDot1xAuthMACAddress (4) swDot1XAuthUserName (5) swDot1XAuthFailReason	1.3.6.1.4.1.171.12.30.11.1.0.2
WAC	swWACLoggedSuccess	The trap is sent when a WAC client has successfully logged in.  Binding objects: swWACAuthStatePort swWACAuthStateOriginalVid swWACAuthStateMACAddr swWACAuthUserName	1.3.6.1.4.1.171.12.27.11.1.0.1

		swWACClientAddrType swWACClientAddress	
	swWACLoggedFail	The trap is sent when a WAC client fails to login.  Binding objects: swWACAuthStatePort swWACAuthStateOriginalVid swWACAuthStateMACAddr swWACAuthUserName swWACClientAddrType swWACClientAddress	1.3.6.1.4.1.171.12.27.11 .1.0.2
Single IP Management	swSingleIPMSColdStart	The commander switch will send this notification when its member generates a cold start notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0. 11
	swSingleIPMSWarmStart	The commander switch will send this notification when its member generates a warm start notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0. 12
	swSingleIPMSLinkDown	The commander switch will send this notification when its member generates a link down notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr (3) ifIndex	1.3.6.1.4.1.171.12.8.6.0. 13
	swSingleIPMSLinkUp	The commander switch will send this notification when its member generates a link up notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr (3) ifIndex	1.3.6.1.4.1.171.12.8.6.0. 14
	swSingleIPMSAuthFail	The commander switch will send this notification when its member generates an authentication failure notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0. 15
	swSingleIPMSnewRoot	The commander switch will send this notification when its member generates a new root notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0. 16
	swSingleIPMSTopologyChange	The commander switch will send this notification when its member generates a topology change notification. Binding objects: (1) swSingleIPMSID (2) swSingleIPMSMacAddr	1.3.6.1.4.1.171.12.8.6.0. 17
Authentication Fail	authenticationFailure	An authenticationFailure trap signifies that the SNMPv2 entity, acting in an agent role, has received a protocol message that is not properly authenticated. While all implementations of the 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
Power	swPowerStatusChg	Power Status change notification.	1.3.6.1.4.1.171.12.11.2.

		Binding objects: 1:swPowerUnitIndex 2:swPowerID 3:swPowerStatus	2.2.0.1
	swPowerFailure	Power Failure notification. Binding objects: 1:swPowerUnitIndex 2:swPowerID 3:swPowerStatus	1.3.6.1.4.1.171.12.11.2. 2.2.0.2
	swPowerRecover	Power Recover notification. Binding objects: 1:swPowerUnitIndex 2:swPowerID 3:swPowerStatus	1.3.6.1.4.1.171.12.11.2. 2.2.0.3

## Appendix D RADIUS Attributes Assignment

The RADIUS Attributes Assignment on the Switch is used in the following modules: 802.1X (Port-based and Host-based), and MAC-based Access Control.

The description that follows explains the following RADIUS Attributes Assignment types:

- Ingress/Egress Bandwidth
- 802.1p Default Priority
- VLAN
- ACL

To assign **Ingress/Egress bandwidth by RADIUS Server**, the proper parameters should be configured on the RADIUS Server. The tables below show 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 the 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 as *no\_limited* and if the bandwidth is configured less than "0" or greater than the maximum supported value, the bandwidth will be ignored.

To assign **802.1p default priority by RADIUS Server**, the proper parameters should be configured on the RADIUS Server. The tables below show 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.	0-7	Required

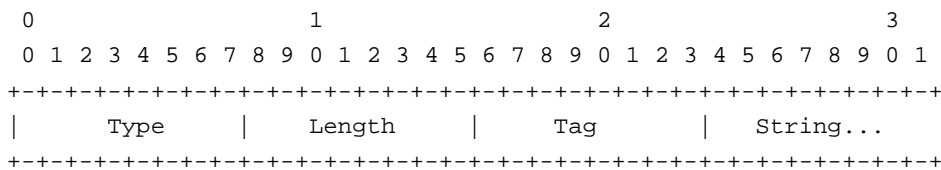
If the user has configured the 802.1p priority attribute of the RADIUS server (for example, priority 7) and the 802.1X, or MAC-based authentication is successful, the device will assign the 802.1p default priority (according to the RADIUS server) to the port. However, if the user does not configure the 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 **VLAN by RADIUS Server**, the proper parameters should be configured on the RADIUS Server. To use VLAN assignment, RFC3580 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	Note
0x01	VLAN name (ASCII)	A tag field of greater than 0x1F is interpreted as the first octet of the field.
0x02	VLAN ID (ASCII)	
Others (0x00, 0x03 ~ 0x1F, >0x1F)	<ol style="list-style-type: none"> <li>When the switch receives the VLAN setting string, it will first check all existing VLAN IDs to find a match.</li> <li>If a VLAN ID match was found, that VLAN will be removed.</li> <li>If a VLAN ID match was not found, the switch will assume that the VLAN settings string uses the VLAN name.</li> <li>It will then check all existing VLAN names to find a match.</li> </ol>	

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 authentication is successful, the port will be added to VLAN 3. However, if the user does not configure the VLAN attribute and authenticates successfully, the port will be kept in its original VLAN. If the VLAN attribute configured on the RADIUS server does not exist, the port will not be assigned to the requested VLAN.

To assign **ACL by RADIUS Server**, the proper parameters should be configured on the RADIUS Server. The table below shows the parameters for an ACL.

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.	12 (for ACL profile) 13 (for ACL rule)	Required
Attribute-Specific Field	Used to assign the ACL profile or rule.	ACL Command For example:	Required

		ACL profile: <b>create access_profile profile_id 1 profile_name profile1 ethernet vlan 0xFFF;</b> ACL rule: <b>config access_profile profile_id 1 add access_id auto_assign ethernet vlan_id 1 port all deny;</b>	
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If the user has configured the ACL attribute of the RADIUS server (for example, ACL profile: **create access\_profile profile\_id 1 profile\_name profile1 ethernet vlan 0xFFF**; ACL rule: **config access\_profile profile\_id 1 add access\_id auto\_assign ethernet vlan\_id 1 port all deny**), the device will assign the ACL profiles and rules according to the RADIUS server. For more information about the ACL module, please refer to Chapter 7 ACL.