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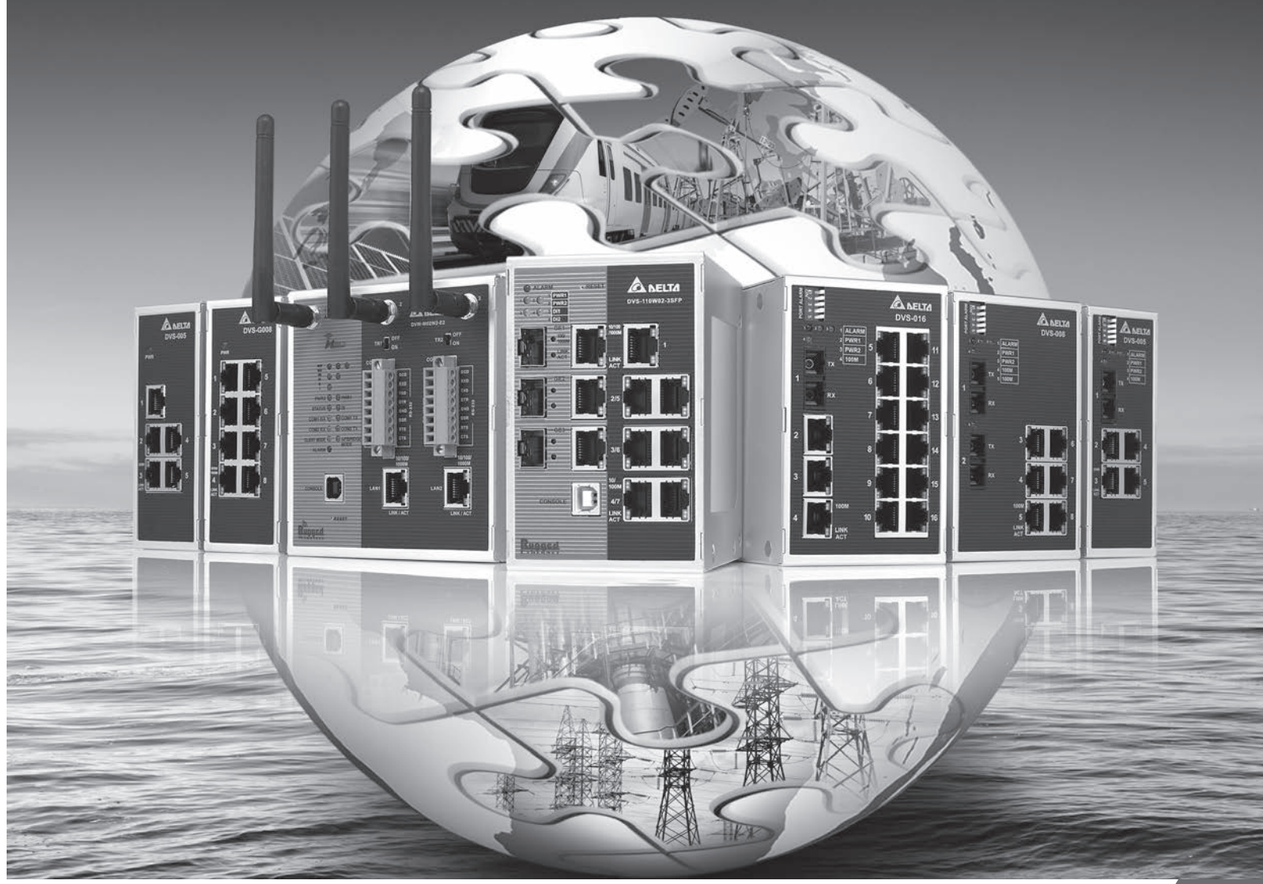
2014-07-11

DVS-108 Series Managed Industrial Ethernet Switches User Manual



DVS-108 Series Managed Industrial Ethernet Switches User Manual

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DVS-108 Series Managed Industrial Ethernet Switches User Manual

Contents

Chapter 1 Introduction

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1

FCC Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates radio frequency signal and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
---Reorient or relocate the receiving antenna.
---Increase the separation between the equipment and receiver.
---Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
---Consult the dealer or an experienced radio/TV technician for help.

CE Declaration of Conformity

The DVS series switches are CE certificated products. They could be used in any kind of the environments under CE environment specification. For keeping more safe application, we strongly suggest to use the CE-compliant industrial enclosure products.

1.1 Feature

Thank you for purchasing the DVS Managed Industrial Ethernet Switches. The DVS series switches including Unmanaged and Managed switches. Except the DVS-005I00, the DVS series switches are equipped with the intelligent alarm function, and allow the wide range of operating temperature (-40 to 75℃). The DVS series switches are designed to support the application in any rugged environment and comply with UL, CE and FCC standards.

1.1.1 High Performance Network Technology

- 10/100Base-T(X), 10/100/1000Base-T combo ports
- 100/1000Base-SFP Fiber
- Auto negotiation speed
- Auto MDI/MDI-X

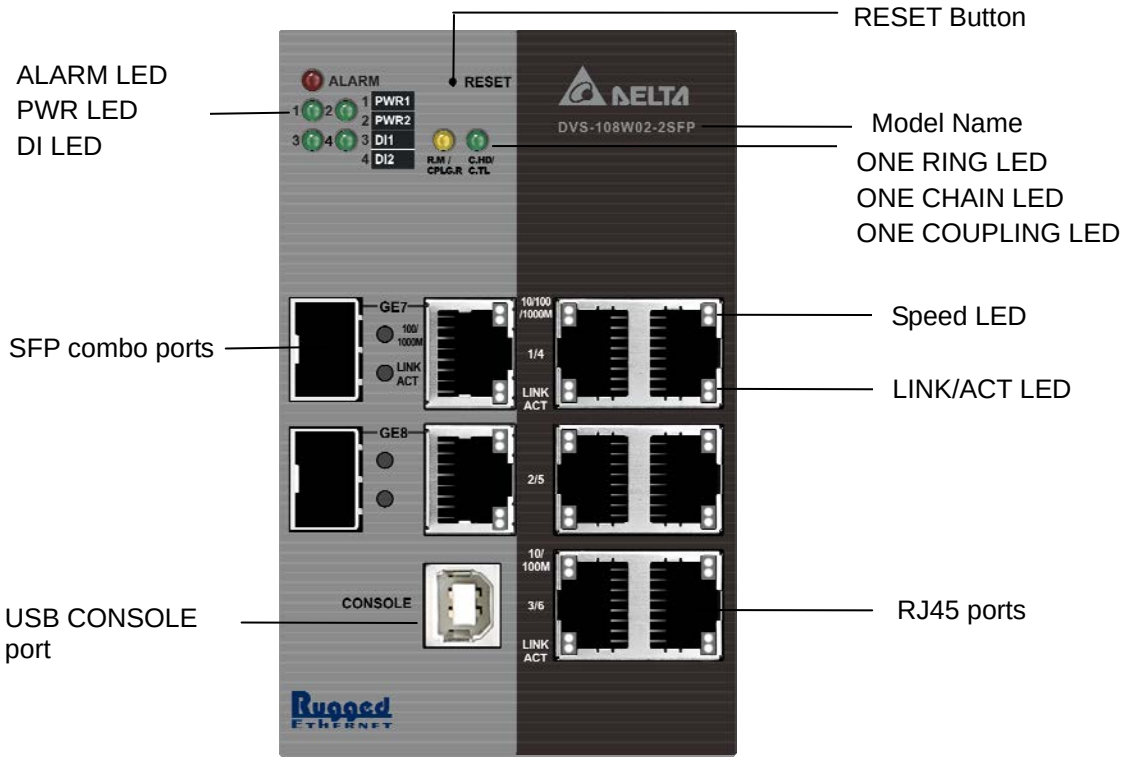
1.1.2 Industrial Grade Reliability

- Redundant dual DC power inputs
- 2 sets of Digital Input
- 2 sets of Relay Alarm

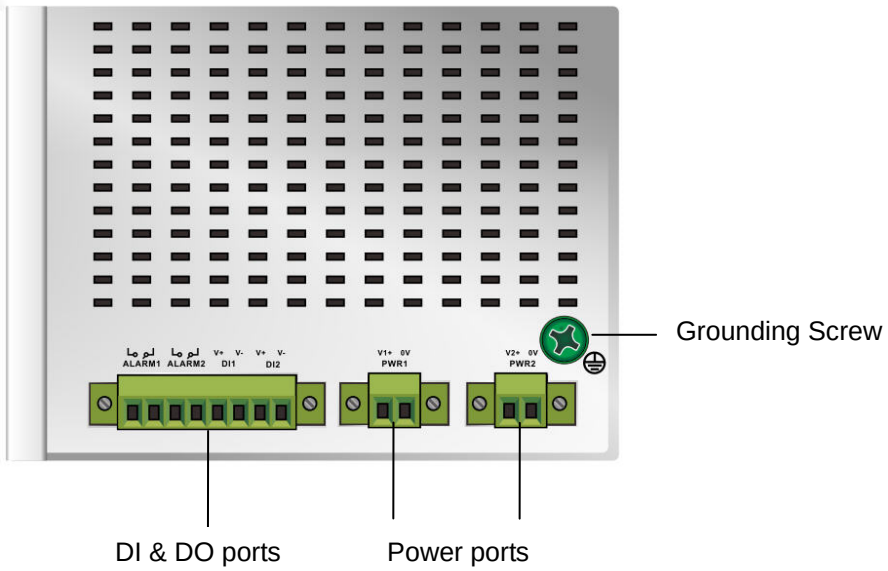
1.1.3 Robust Design

- Operating temperature: -40~75℃
- Storage temperature: -40~85℃
- Humidity: 5%~95% (non-condensing)
- Protection: IP40

1.1.4 Front Panel Ports and LEDs



1.1.5 Bottom Panel



1.2 SFP Module Installation

Insert:
Insert SFP Module into the SFP combo port.

Remove:
Pull the tab on the module, and then pull out it.

Note:
Delta has LCP-155 and LCP-1250 series SFP module. DVS switch can promise 100% compatible with Delta SFP module.

Note:
The actual link distance of a particular fiber optic link given the optical budget, the number of connectors and splices, and cabling quantity. Please measure and verify the actual link loss values once the link is established to identify any potential performance issues.

1.3 Package Checklist

- One Delta DVS Managed Ethernet Switch
- Protective Caps for unused RJ45 ports
- DIN-Rail clip x1
- Wall mounting Plate x1
- USB Type A to Type B console cable x1
- User manual and software CD
- Instruction Sheet

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Chapter 2 User Interface Introduction

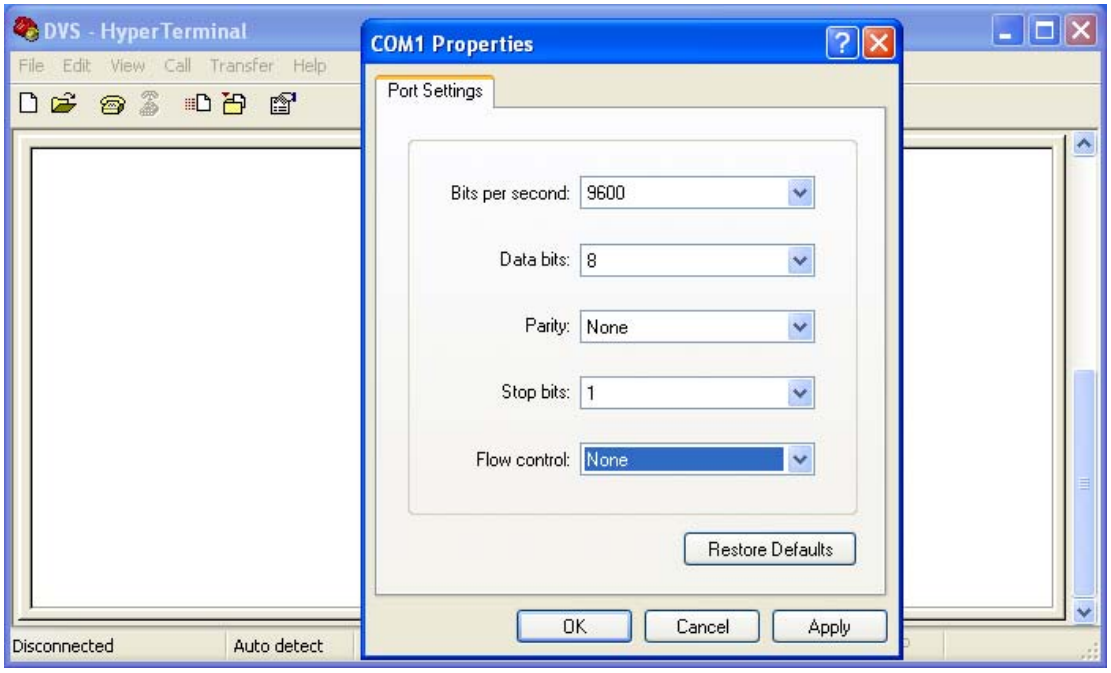
Table of Contents

2.1 USB Console Configuration

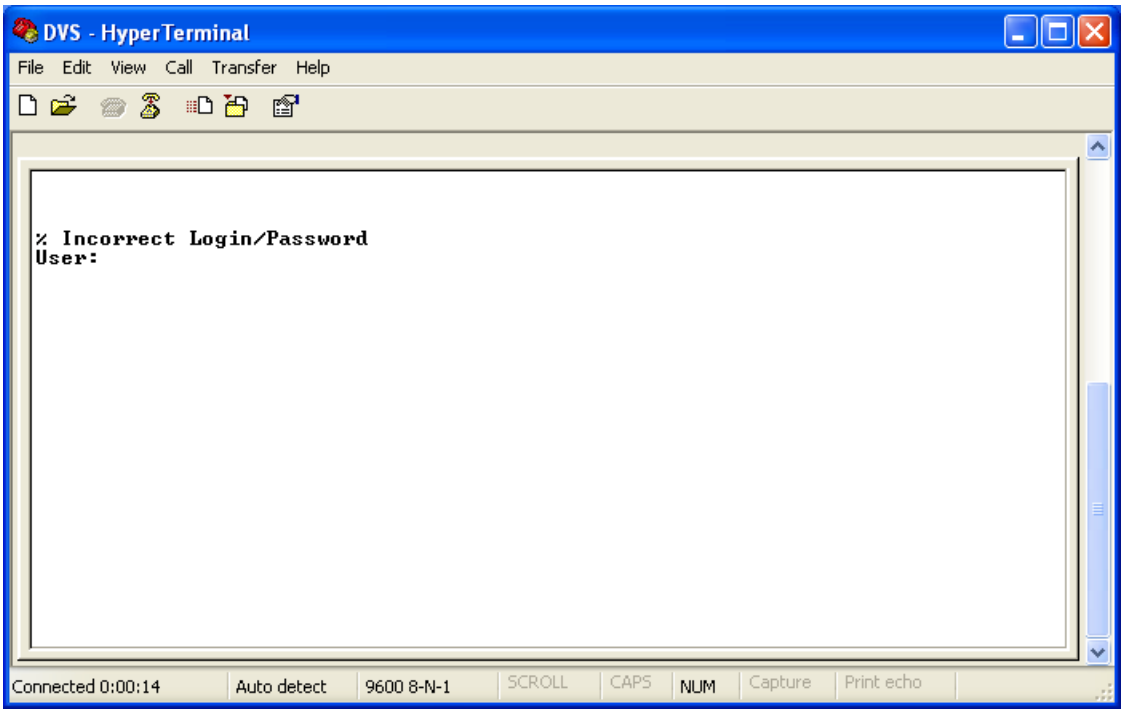
Delta switch supports configuration using CLI interface, available on the USB port with baud rate 9600. You can use terminal software to connect to Delta switch. The inactivity timeout value on a serial port connection can be configured between 0 and 160 minutes. (Value 0: disable the timeout.)

1. Open terminal software, and select an appropriate COM port for **Console Connection**, **9600** for **Baud Rate**, **8** for **Data Bits**, **None** for **Parity**, and **1** for **Stop Bits, None** for **Flow Control**.

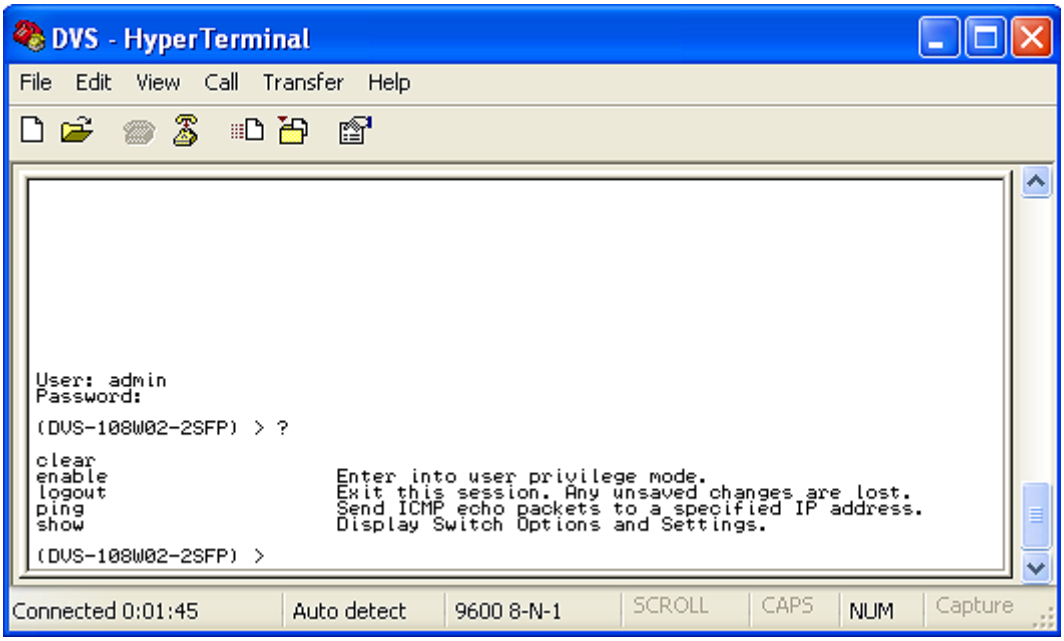
Note:
Win7 system does not support Hyper Terminal. If you need, you can download terminal software to use it.



2. The user name and password are the same as Web Browser. The default user name is “admin”, and password is blank.

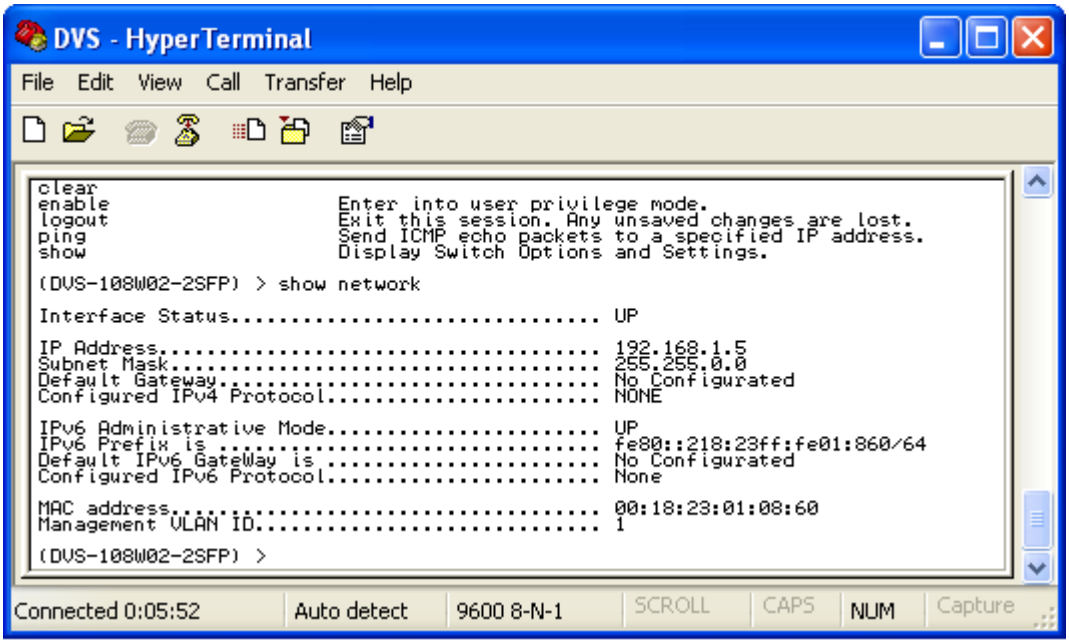


You can use “ ? ” to list the commands.



2

Example 1:
There is a DHCP server in your environment, and the Delta switch can get an IP address from the DHCP server. If you don't want to check the IP address from the DHCP server, then you can use USB console cable to login to Delta switch. Use "show network" command can display the IP address information of the Delta switch.

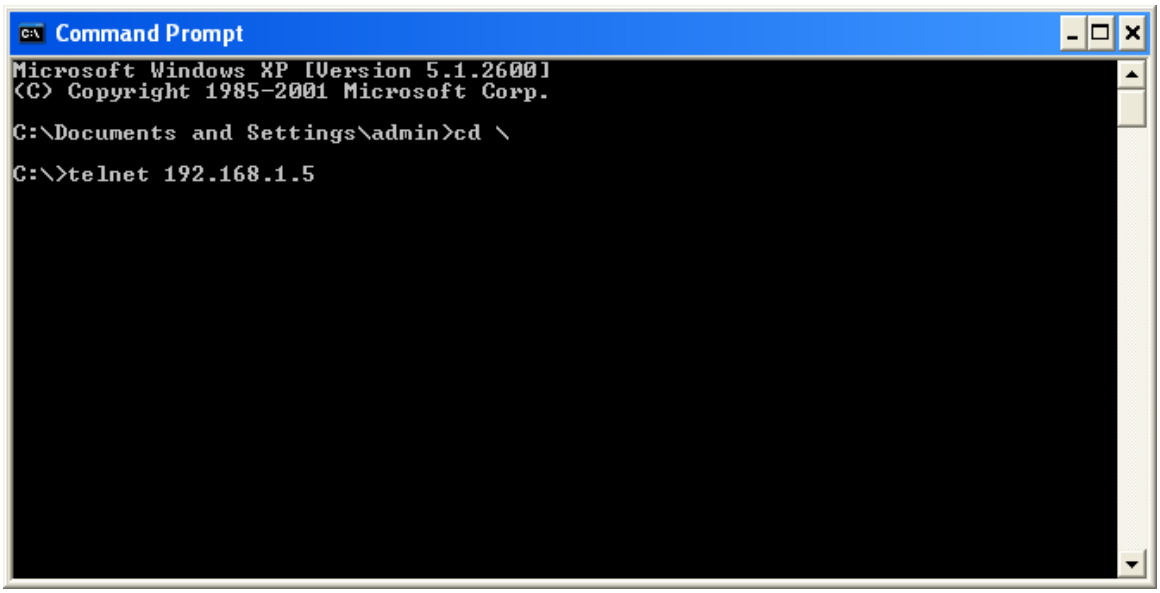


Example 2:
Use CLI commands to set a static IP address and subnet mask.
(DVS-108W02-2SFP) > enable
(DVS-108W02-2SFP) # configure terminal
(DVS-108W02-2SFP) (config)# interface vlanmgmt
(DVS-108W02-2SFP) (config-if)# no ip address
(DVS-108W02-2SFP) (config-if)# ip address 10.10.10.1 255.255.255.0
(DVS-108W02-2SFP) (config-if)# exit
(DVS-108W02-2SFP) (config)# exit
(DVS-108W02-2SFP) # save
Building configuration ...
[OK]
(DVS-108W02-2SFP) #

Note:
Before you use USB console configuration, please make sure you have installed a USB driver. You can find the driver in the CD.

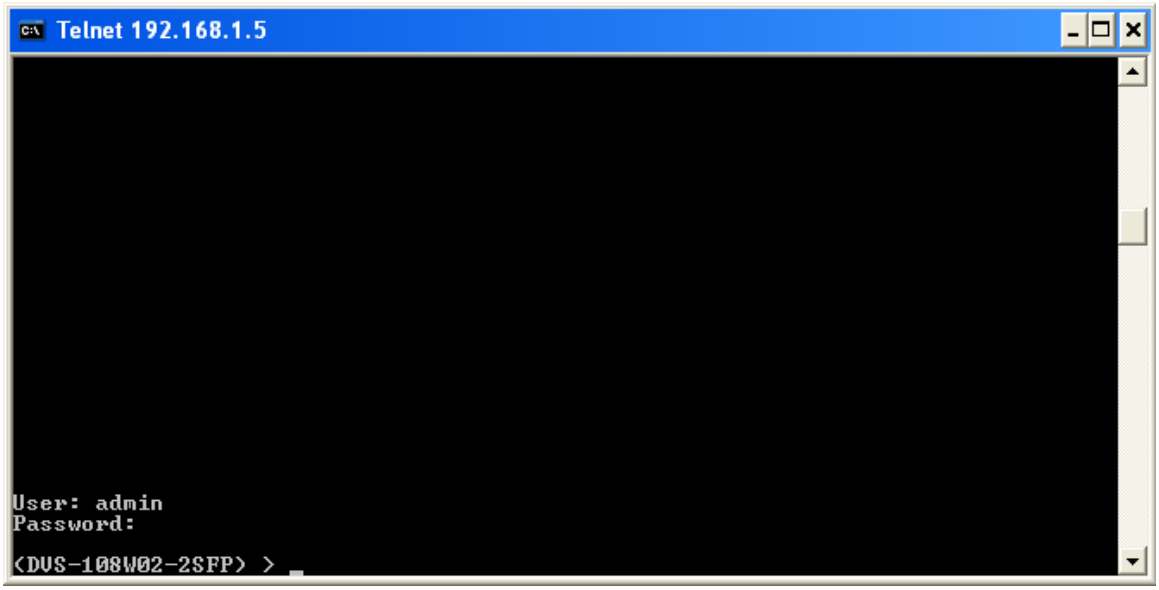
2.2 Telnet Console Configuration

A Delta switch supports telnet server function; it can be globally enabled or disabled. The user can use all CLI command over a telnet session. The maximum number of inbound telnet sessions allowed on the switch can be configured to 0-5. The Inactivity timeout val
Open a Command Prompt and input “telnet 192.168.1.5” to login to a Delta switch.



1. After entering a user name and a password, you can use CLI command to control the switch.

Note:
The default user name is “admin” and password is blank.

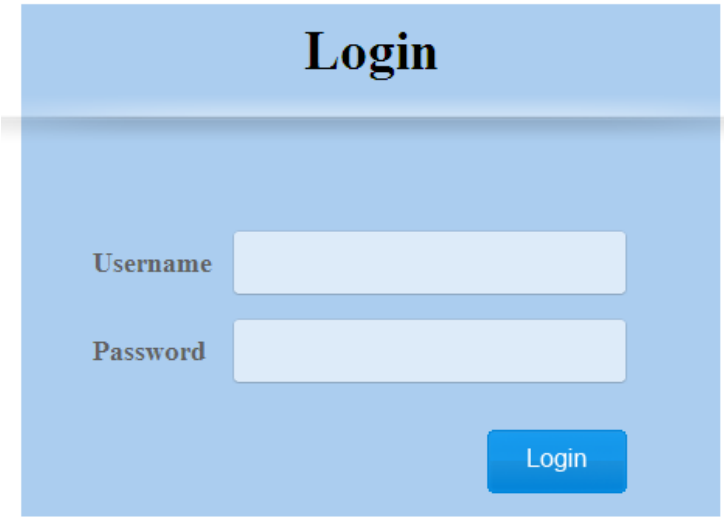


2.3 Web Browser Configuration

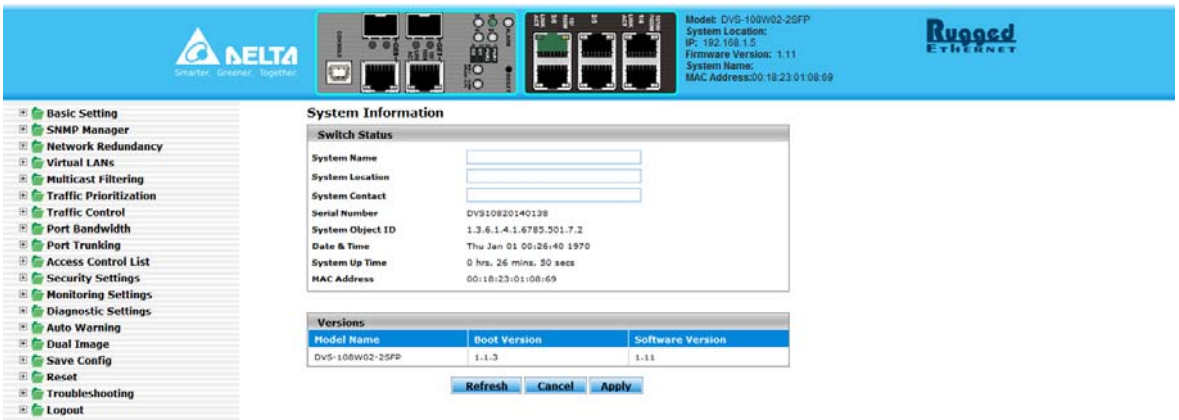
Delta switch supports a friendly web interface for normal user to configure the switch. You can monitor the port status of Delta switch, and configure the settings of each function via the web.

1. Open a web browser and connect to default IP address: 192.168.1.5. Enter a user name and a password. (The default user name is “admin” and password is blank.)

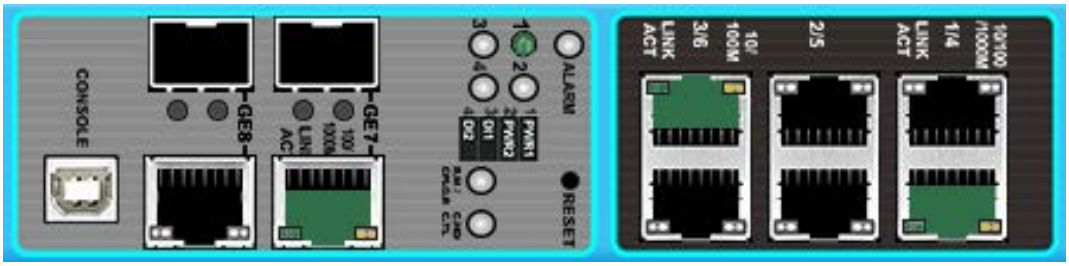
Note:
The default user name “admin” is in lowercase not uppercase.



2. You can use the menu tree in the left side frame to find the function you want to configure. And configure the detail settings in the right side frame.



3. The port status and LED status on the switch can be monitored on the top frame. The status of the Delta switch on the top frame displays the real status with the physical switch synchronously.



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Chapter 3 Featured Functions

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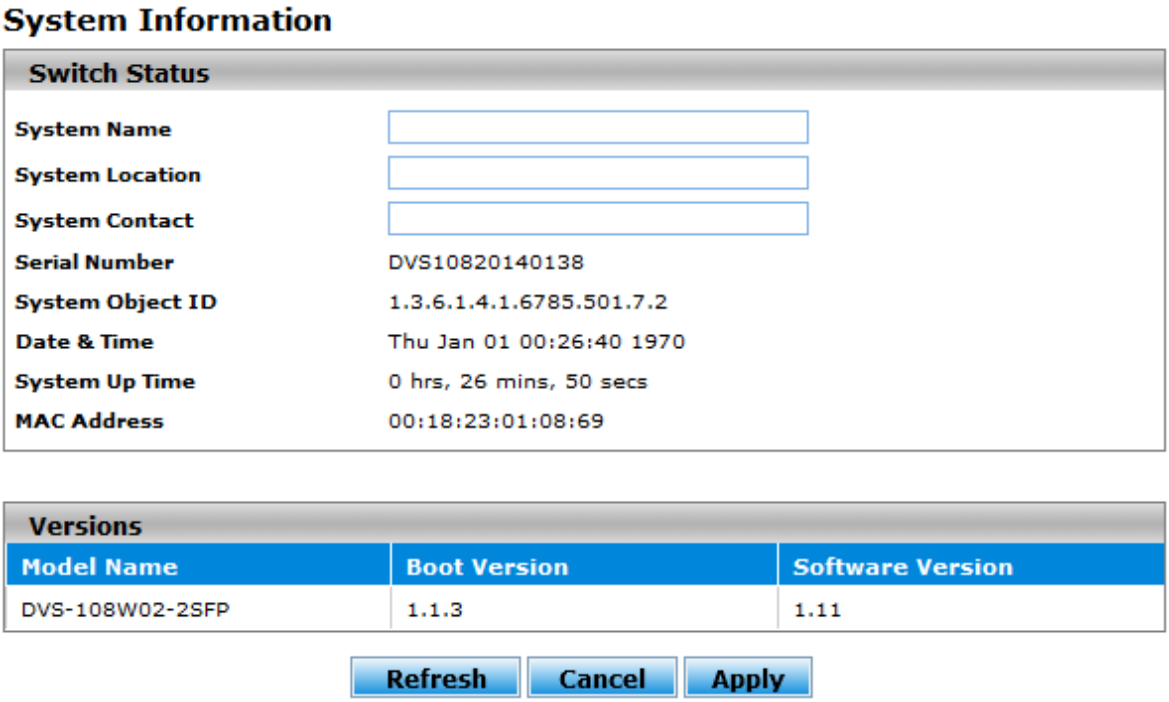
3.1 Basic Setting

The basic setting group includes most common settings, and an administrator can maintain control the Delta switch in this group.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.1.1 System Information

Some information of switch status items and versions are displayed in the banner of GUI. The information can help the administrator identify the switch in the network.



Switch Status

Description	Factory Default
System Name	
Input the system name of the switch.	None
System Location	
Input the system location of the switch.	None
System Contact	
Input the system contact of the switch.	None
Serial Number	
The serial number of the switch.	Fixed
System Object ID	
The base object ID for the Management Information Base (MIB) of the switch	Fixed
Date & Time	
The current date and time.	None

Description	Factory Default
System Up Time	
The time of hours, minutes, and seconds since the switch was last started.	None
Base MAC Address	
The MAC address of the switch.	Fixed

Versions

Description	Factory Default
Model Name	
The model name of the switch.	Model Name
Boot Version	
The boot version of the switch.	Boot Version
Software Version	
The software version of the switch.	Software Version

3

3.1.2 Network Interface

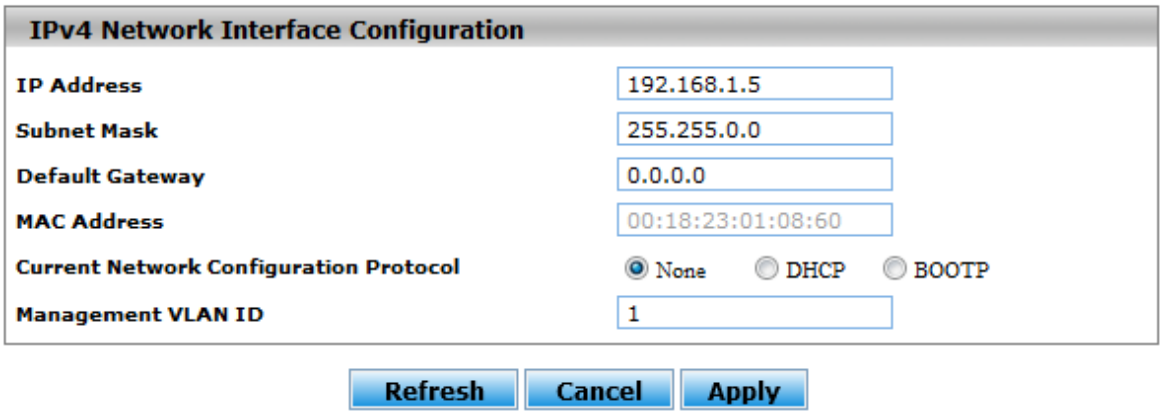
The network interface on the network device is a logical interface. Each network device must have one or more interfaces to connect with other network devices. But the configuration of the network interface doesn't affect the traffic which is forwarded.

3.1.2.1 IPv4 Network Configuration

You can configure a static IP address, subnet mask and default gateway for the switch. Or you can enable DHCP or BOOTP for receiving a dynamic IP address, subnet mask and default gateway. If you enable DHCP or BOOTP, but there is no DHCP or BOOTP server in the network, the default link local IP address will be 169.254.100.100.

Note:
The default Current Network Configuration Protocol is None.
And the default IP address is 192.168.1.5.

IPv4 Network Interface Configuration

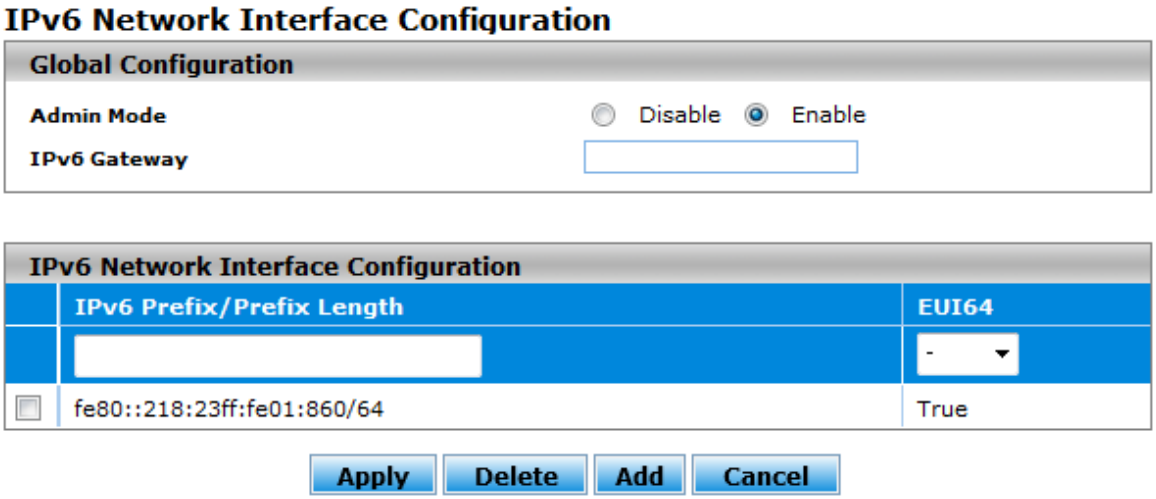


IPv4 Network Interface Configuration

Description	Factory Default
IP Address	
Input the IP address of the IPv4 network interface. **Note:** After you input the new IP address of IPv4 and click Apply, we suggest you that reopen a web browser to re-log in. Make sure the URL you input is the new IP address.	192.168.1.5
Subnet Mask	
Input the IP subnet mask of the IPv4 network interface.	255.255.0..
Default Gateway	
Input the default gateway of the IPv4 network interface.	0.0.0.0.
MAC Address	
This field displays the MAC address of the switch.	MAC address
Current Network Configuration Protocol	
Select one item to specify how the switch gets its IP information: • **None**: Specify static IP address information. • **DHCP**: The IP information of the switch is assigned from a Dynamic Host Configuration Protocol (DHCP) server on the network. • **BOOTP**: The IP information of the switch is assigned from a Bootstrap Protocol (BOOTP) server on the network.	None
Management VLAN ID	
Input the management VLAN ID in the range from 1 to 4094.	1

3.1.2.2 IPv6 Network Configuration

If you need to configure a global IPv6 address, please follow the standard format: "IPv6 Prefix/Prefix Length". For example: "1001:2002:3003::7007:8008/64"



Global Configuration

Description	Factory Default
Admin Mode	
Specify the IPv6 administrative status of the network interface by selecting one item: • **Disable**: IPv4 only mode. Only support IPv4, not support IPv6. • **Enable**: IPv4 / IPv6 mode. Support both IPv4 and IPv6.	Enable
IPv6 Gateway	
Input the IPv6 address of the IPv6 gateway.	None

IPv6 Network Interface Configuration

Description	Factory Default
IPv6 Prefix / Prefix Length	
Enter the IPv6 address followed by a slash and then the prefix length of the network interface.	IPv6 address
EUI64	
Specify whether the IPv6 address is in the 64-bit extended unique identifier (EUI-64) format: • **True**: The IPv6 address is in the EUI-64 format. • **False**: The IPv6 address is not in the EUI-64 format.	None

Note:
An IPv6 address in the EUI-64 format is an automatically self-assigned unique 64-bit IPv6 interface identifier. You do not need to manually configure such an IPv6 address, nor is it assigned by a DHCP server.

3.1.2.3 IPv6 Network Neighbor

The IPv6 network interface neighbor table can display the neighbor IPv6 address.

IPv6 Network Interface Neighbor Table

IPv6 Network Interface Neighbor Table		
IPv6 Address	**MAC Address**	**Neighbor State**
fe80::4419:f6e8:dd10:be18	60:d8:19:18:cf:74	Stale

Refresh

IPv6 Network Interface Neighbor Table

Description	Factory Default
IPv6 Address	
The IPv6 address of the neighbor.	None
MAC Address	
The MAC address of the neighbor.	None
Neighbor State	
The status of the neighbor: • **Static:** The neighbor has a static IP address. • **Reachable:** The neighbor was reached very recently (that is, within a period of tens of seconds). • **Incomplete:** Address resolution for the neighbor is in progress, but the link-layer address of the neighbor has not yet been determined. • **Stale:** The neighbor can no longer be reached: Until traffic is sent to the neighbor, no attempt is made to verify if it can be reached again. • **Delay:** The neighbor can no longer be reached: Traffic was recently sent to the neighbor, but neighbor solicitation probes are delayed because confirmation that the neighbor can be reached might be received. • **Probe:** The neighbor can no longer be reached: Unicast neighbor solicitation probes are sent to verify if the neighbor can be reached again. • **Unknown:** The status of the neighbor is unknown.	None

3.1.3 Port Settings

You can configure the basic port settings, green Ethernet settings and LAG settings on the switch in Port Settings group.

3.1.3.1 Port Settings

You can configure and monitor the port status in this page.

Port Settings

Port Settings

	Port	Link Status	Admin Mode	Port Type	Physical Mode	Physical Status	Flow Control Mode	Jumbo Frame	Link Trap
			-	-	-		-	-	-
	0/1	Link Up	Enable	Normal	Auto	100 Mbps Full Duplex	Disable	Disable	Enable
	0/2	Link Down	Enable	Normal	Auto	Unknown	Disable	Disable	Enable
	0/3	Link Down	Enable	Normal	Auto	Unknown	Disable	Disable	Enable
	0/4	Link Down	Enable	Normal	Auto	Unknown	Disable	Disable	Enable
	0/5	Link Up	Enable	Normal	Auto	100 Mbps Full Duplex	Disable	Disable	Enable
	0/6	Link Down	Enable	Normal	Auto	Unknown	Disable	Disable	Enable
	0/7	Link Up	Enable	Normal	Auto	100 Mbps Full Duplex	Disable	Disable	Enable
	0/8	Link Down	Enable	Normal	Auto	Unknown	Disable	Disable	Enable

Refresh Apply Cancel

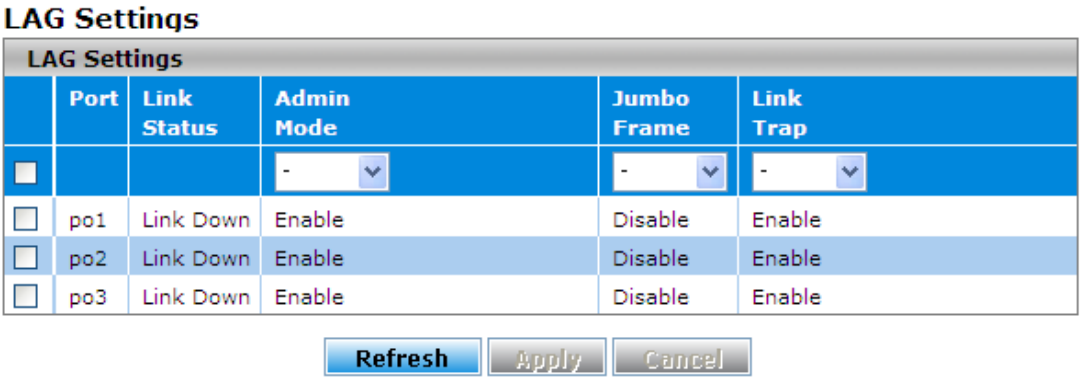
Port Settings

Description	Factory Default
Port	
This field displays the interface number.	*interface number*
Link Status	
This field displays the connection of the interface. • **Link Up**: There is a network device connecting to the interface. • **Link Down**: No network device is connecting to the interface.	Link down
Admin Mode	
The administrative state of the interface: • **Enable**: The interface is switched on and the network device can connect to the interface. • **Disable**: The interface is switched off and the network device can't connect to the interface.	Enable
Port Type	
This field displays whether the interface is a member of a port channel: • **Trunk Member**: The interface is a member of a link aggregation group. • **Normal**: The interface is not a member of a link aggregation group (port channel).	Normal

Description	Factory Default
Physical Mode	
Specify the port to auto-negotiation, or a specific speed and duplex mode for the interface: • **Auto**: The duplex mode and speed of the interface are set by the auto-negotiation process. The interface can support the maximum capability: Full duplex and 1 Gbps or 100Mbps. • **10 Mbps Half Duplex**: Indicates the interface works at 10 Mbps in the half duplex mode. • **10 Mbps Full Duplex**: Indicates the interface works at 10 Mbps in the full duplex mode. • **100 Mbps Half Duplex**: Indicates the interface works at 100 Mbps in the half duplex mode. • **100 Mbps Full Duplex**: Indicates the interface works at 100 Mbps in the full duplex mode. **Note:** If you need to insert the 100FX transceiver to SFP port, please indicate the interface works at 100 Mbps in the full duplex mode.	Auto
Physical Status	
This field displays the actual port speed and duplex mode.	None
Flow Control Mode	
This field displays whether flow control is enabled for the port: • **Enable**: Flow control is enabled. If the port buffers become full, the switch sends pause packets. • **Disable**: Flow control is disabled. If the port buffers become full, the switch does not send pause packets.	Disable
Jumbo Frame	
The field displays whether jumbo frame is enabled for the port. • **Enable**: Jumbo frame is enabled. The switch supports a fixed jumbo frame size - 9000 bytes payload (9218 bytes frame) size. • **Disable**: Jumbo frame is disabled.	Disable
Link Trap	
Specify whether to send a trap when the interface link status changes: • **Enable**: When the link status changes, the switch sends a trap. This is the default setting. • **Disable**: When the link status changes, the switch does not send a trap.	Enable

3.1.3.2 LAG Settings

You can configure LAG settings and monitor LAG status in this page.



LAG Settings

Description	Factory Default
Port	
This field shows the interface number.	*interface number*
Link Status	
This filed show the connection of the interface. • **Link Up:** The interface is connected to another device. • **Link Down:** The interface is not connected to another device.	Link Down
Admin Mode	
Specify the administrative state of the interface: • **Enable:** The interface is switched on and can be connected to another device. • **Disable:** The interface is switched off and cannot be connected to another device.	Enable
Jumbo Frame	
The filed displays whether jumbo frame is enabled for the port. • **Enable:** Jumbo frame is enabled. The switch supports a fixed jumbo frame size - 9000 bytes payload (9018 bytes frame) size. • **Disable:** Jumbo frame is disabled.	Disable
Link Trap	
Specify whether the switch sends a trap when the interface link status changes: • **Enable:** When the link status changes, the switch sends a trap. This is the default setting. • **Disable:** When the link status changes, the switch doesn't send a trap.	Enable

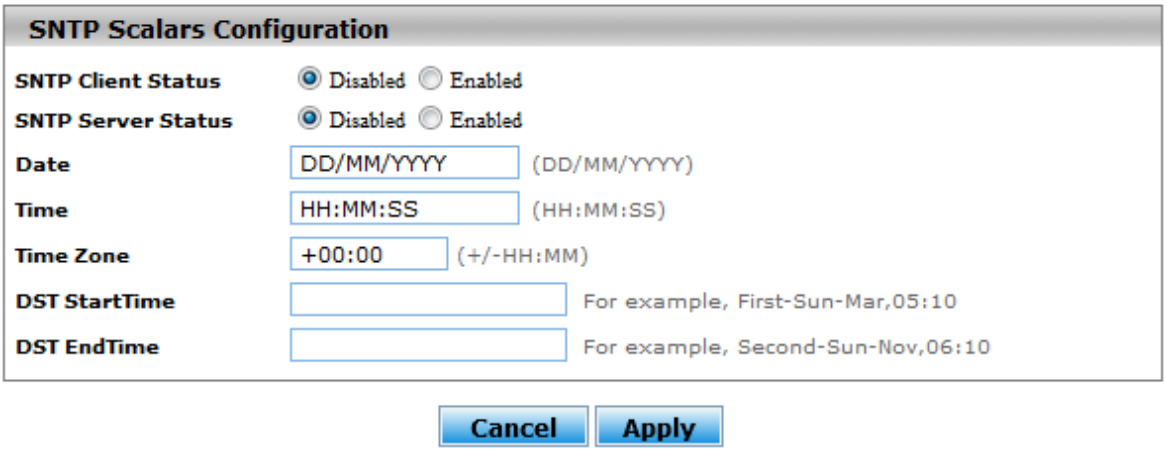
3.1.4 Time

The switch supports SNTP (Simple Network Time Protocol). It can work as an SNTP client to get time from an SNTP or NTP server, and it also can work as an SNTP server to provide time service and send a time reply to a client.

3.1.4.1 SNTP Scalars Configuration

The SNTP Scalars Configuration lets a user to configure the time of the switch which gets from SNTP server or not. And it also can be configured manually.

SNTP Scalars Configuration



SNTP Scalars Configuration

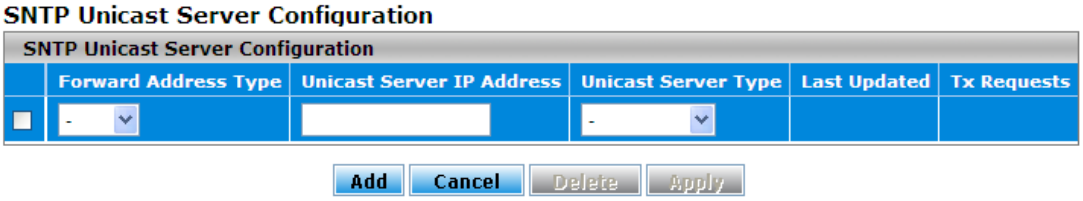
Description	Factory Default
SNTP Client Status	
Specify whether the switch works as an SNTP client, and the switch will send an NTP request to the server which the user specify in SNTP Unicast Server Configuration page. • **Enable**: The switch works as an SNTP client. • **Disable**: The switch doesn't work as an SNTP client.	Disable
SNTP Server Status	
Specify whether the switch works as an SNTP server. • **Enable**: The switch works as an SNTP server. • **Disable**: The switch doesn't work as an SNTP server.	Disable
Date	
The date parameter format is DD/MM/YYYY. When an SNTP client is disabled, you can manually set the date. When an SNTP client is enabled, the field is grayed out.	DD/MM/YYYY
Time	
The time parameter format is HH:MM:SS. When an SNTP client is disabled, you can manually set the time. When an SNTP client is enabled, the field is grayed out.	HH:MM:SS
Time Zone	
The time zone setting format is HH:MM is preceded by a plus (+) or minus (-). For example, for Taipei, enter +08:00. And it allows conversion from GMT (Greenwich Mean Time) to the local time.	+00:00
DST StarTime	
Enter the daylight saving time (DST) start time. Specify the date and time in the following format: week of the month-day of the week-month-HH:MM For example, if DST starts on the first Saturday in May at 03:00 AM, enter the following format: First-Sat-May,03:00.	None
DST EndTime	
Enter the daylight saving time (DST) end time. Specify the date and time in the following format: week of the month-day of the week-month-HH:MM For example, if DST ends on the second Monday in December at 04:00 AM, enter the following format: Second-Mon-Dec,04:00.	None

Note:

1. After you have clicked Apply, the date and time are applied and the fields revert to their default setting of DD/MM/YYYY and HH:MM:SS.
2. The manual date and time setting will be lost after the switch is rebooted, even if you have saved the changes

3.1.4.2 SNTP Unicast Server Configuration

If you want to specify a known SNTP server, you can enter the IP address or DNS in this page.



SNTP Unicast Server Configuration

Description	Factory Default
Forward Address Type	
Specify the type of SNTP server IP address: • **IPv4**: Use an IPv4 address to recognize an SNTP server. This is the default setting. • **IPv6**: Use an IPv6 address to recognize an SNTP server. • **DNS**: Use FQDN to recognize an SNTP server.	IPv4
Unicast Server IP Address	
Enter the server IPv4, IPv6 address or host name (FQDN). (Depend on which type you select in the Forward Address Type field.)	None
Unicast Server Type	
Specify the type of server by selecting Primary or Secondary from the drop-down list.	None
Last Updated	
This field displays the last time the SNTP unicast server updated its time information.	None
Tx Requests	
This field displays the number of SNTP transmit requests made by the switch since it was last rebooted.	None

Note:
We recommend you add SNTP unicast server for Delta switch to synchronize the time. It can make sure the time on Delta switch is accurate.

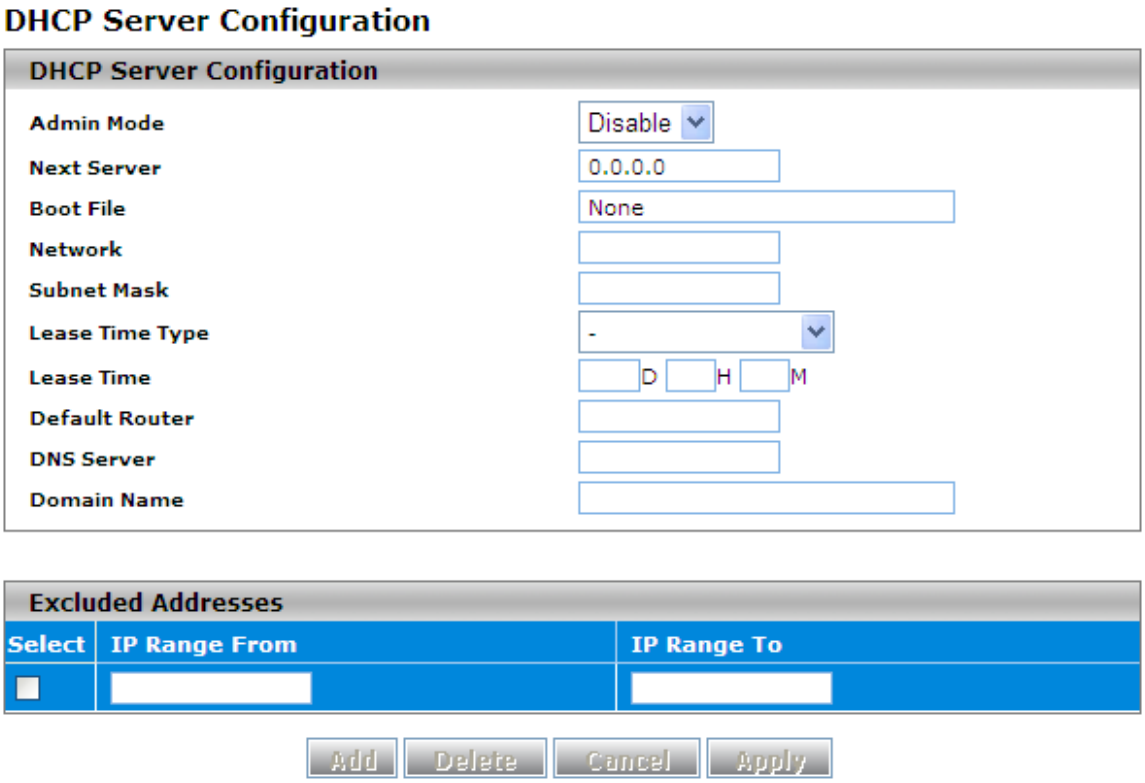
3.1.5 DHCP/BootP Settings

The switch can function as a DHCP server, DHCP relay and DHCP L2 relay. If there is no DHCP server in your network, then you can enable a DHCP server function. If there is a DHCP server in your network, then you can configure a switch to function as a DHCP relay. If there are already a DHCP server and a DHCP relay in your network, or there are L2 devices between DHCP clients and relay agents, then you can configure the switch to function as a DHCP L2 relay in this network.

3.1.5.1 DHCP Server

If the DHCP server is enabled on the switch, it can assign an IP address which is in the same network as the switch to the client.

- DHCP Server Configuration
  You can enable or disable the DHCP server function and configure the DHCP configuration in this page.



DHCP Server Configuration

Description	Factory Default
Admin Mode	
Specify the status of the DHCP server on the switch: • **Disable**: The DHCP server is disabled. When you want to enable the DHCP relay function, please select this setting. • **Enable**: The DHCP server is enabled.	Disable
Next Server	
Specify Boot server host name.	0.0.0.0
Boot File	
Specify Boot file name.	None
Network	
Enter the network for the DHCP pool.	None
Subnet Mask	
Enter the IP subnet mask for the DHCP pool.	None
Lease Time Type	
Specify the type of lease time: • **Specified Duration**: The leased IP address has a specific duration. You need to specify the duration in the Lease Time fields. • **Infinite**: The leased IP address does not expire.	None

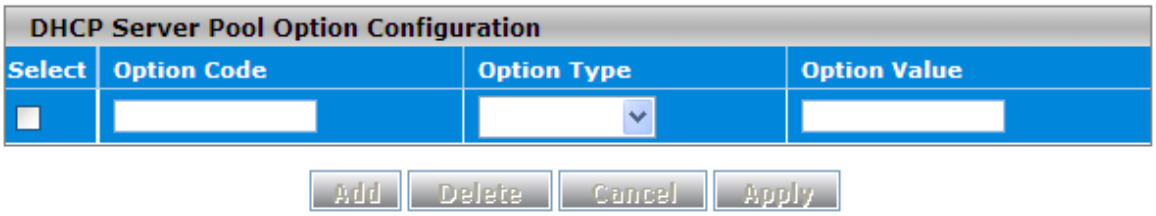
Description	Factory Default
Lease Time	
If you select Specified Duration from the Lease Time Type in the drop-down list, specify the duration by entering the days, hours, and minutes in the Lease Time fields.	None
Default Router	
Specify the default gateway IP address. The information will be included in DHCP offer packet.	None
DNS Server	
Specify the DNS server IP address. The information will be included in DHCP offer packet.	None
Domain Name	
Specify the Domain Name. The information will be included in DHCP offer packet.	None

Excluded Addresses

Description	Factory Default
IP Range From	
Enter the start IP address of the exclusion IP range which you created in the DHCP server pool.	None
IP Range To	
Enter the end IP address of the exclusion IP range which you created in the DHCP server pool.	None

- DHCP Pool Options
  DHCP messages contain many option fields. These options have many control information and configuration parameters.

DHCP Server Pool Option Configuration



DHCP Server Pool Option Configuration

Description	Factory Default
Option Code	
Enter the option code. For example, option code 3 is router, 6 is Domain Name Server. (If you need more information, please find RFC2132, DHCP Options and BOOTP Vendor Extensions.)	None
Option Type	
Specify the option type: ASCII: Enter ASCII value in the Option Value field. Hex: Enter Hex value in the Option Value field. IP Address: Enter IP address or subnet mask in the Option Value field.	None
Option Value	
Enter the value that corresponds to the Option Type you select.	None

- DHCP Server Binding
  If the DHCP function is enabled, you can see the DHCP client's information in this page.

DHCP Bindings Configuration

DHCP Bindings Configuration				
Select	IP Address	Hardware Type	Hardware Address	Expire Time

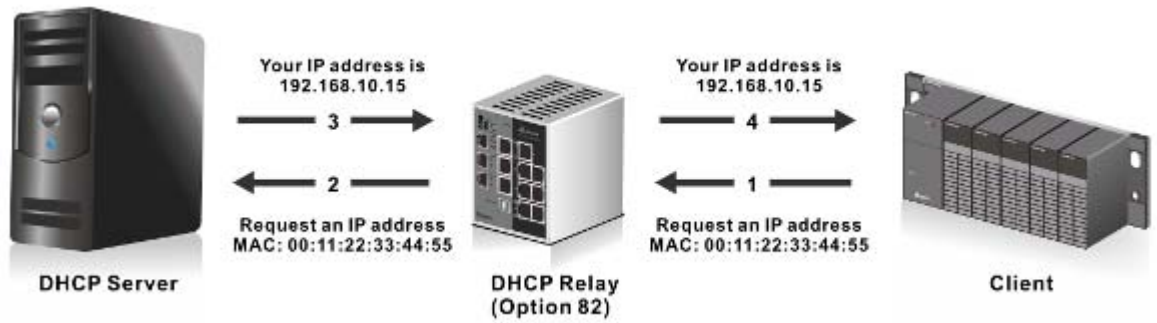
Refresh | Delete | Cancel

DHCP Bindings Configuration

Description	Factory Default
IP Address	
The IP address of the DHCP client.	None
Hardware Type	
This field displays the type of hardware address of the client. • **0**: If the client uses DHCP option 61 to specify itself, the hardware type is Client ID, and the hardware address is the string identifier. • **1**: The hardware type is Ethernet, and the hardware address is an MAC address.	None
Hardware Address	
This field displays the MAC address or string identifier of the DHCP client.	None
Expire Time	
The expiration time of the DHCP client.	None

3.1.5.2 DHCP Relay

A DHCP Relay can make broadcast messages to be sent over routers. And a DHCP relay can receive a DHCP broadcast request packet and forward it to a specified server.

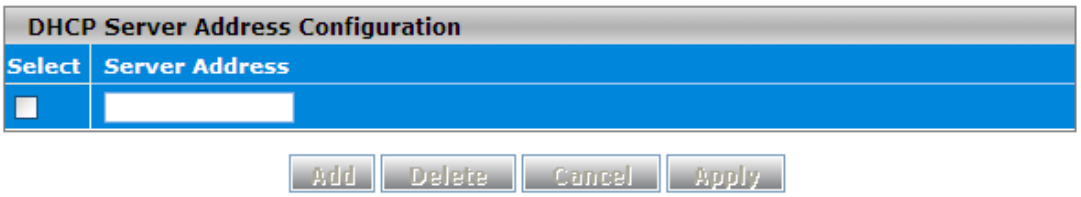


Notice:
When a DHCP request packet comes, a DHCP relay receives it and then sends it to all VLANs. But according to RFC 2131, when renewing, unicast DHCP request packet will be sent to a DHCP server directly, not passing a DHCP relay, so it is recommended to make sure that the DHCP client can ping the server after getting an IP address.

- DHCP Relay Configuration
  DHCP Relay sends a unicast DHCP packet to the specified server(s). The maximum number of specified servers is 5. You can enable or disable a DHCP relay function, and configure the parameters of circuit ID sub-option (the interface ID on the switch which connects to the host) and remote ID sub-option (the MAC address of the host which sends DHCP request) in this

page.

DHCP Relay Configuration

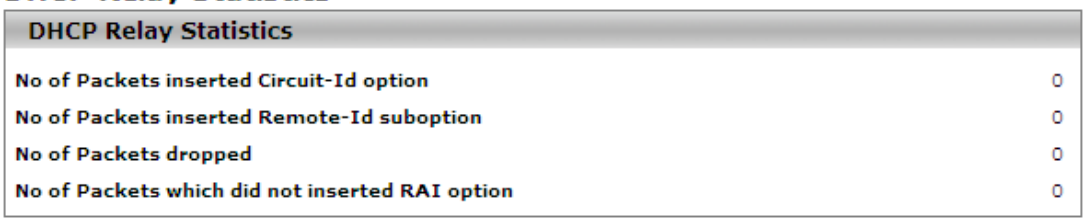


DHCP Relay Configuration

Description	Factory Default
Admin Mode	
Specify the status of the DHCP relay on the switch: • **Disable**: The DHCP relay is disabled. This is the default setting. • **Enable**: The DHCP relay is enabled.	Disable
Circuit ID sub-option	
Specify whether circuit ID sub-option (the interface ID of the switch) is enabled. • **Disable**: Circuit ID can't be added into a DHCP packet. This is the default setting. • **Enable**: Circuit ID can be added into a DHCP packet.	Disable
Remote ID sub-option	
Enter a remote ID string (the MAC address of the host which sends the DHCP request) for the circuit ID mode. This is a local identifier of the circuit from which a DHCP client-to-server packet is received. It ensures that the DHCP relay sends DHCP server responses back to the correct circuit.	None

- **DHCP Relay Statistics**

DHCP Relay Statistics



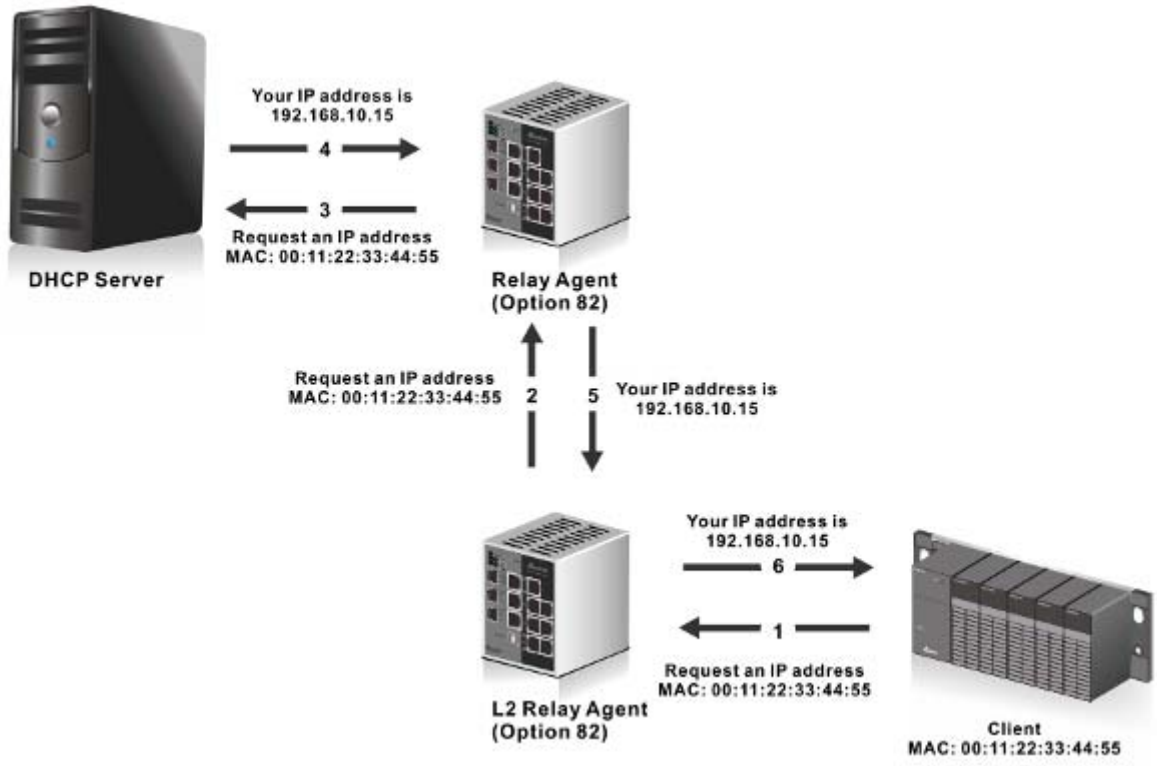
Refresh Clear

DHCP Relay Statistics

Item	Description
No of Packets inserted Circuit-Id option	The amount of Packets which inserted Circuit-Id option.
No of Packets inserted Remote-Id suboption	The amount of Packets which inserted Remote-Id suboption.
No of Packets dropped	The amount of Packets which dropped.
No of Packets which did not inserted RAI option	The amount of Packets which did not insert RAI (Relay Agent Information) option.

3.1.5.3 DHCP L2Relay

In some networks, DHCP servers rely on Relay Agent Information option appended by Relay Agents for IP address and other parameter assignment policies. This works fine when end hosts are directly connected to Relay Agents. In some network configurations, one or more Layer 2 devices may reside between DHCP clients and a Relay agent. In these network scenarios, it is difficult to use the Relay Agent Information option for an IP address and other parameter assignment policies effectively. So there is a requirement for the device that is closest to the end hosts to append a Relay Agent Information option in DHCP messages. These devices are typically known as Layer 2 Relay Agents.



DHCP snooping steps:

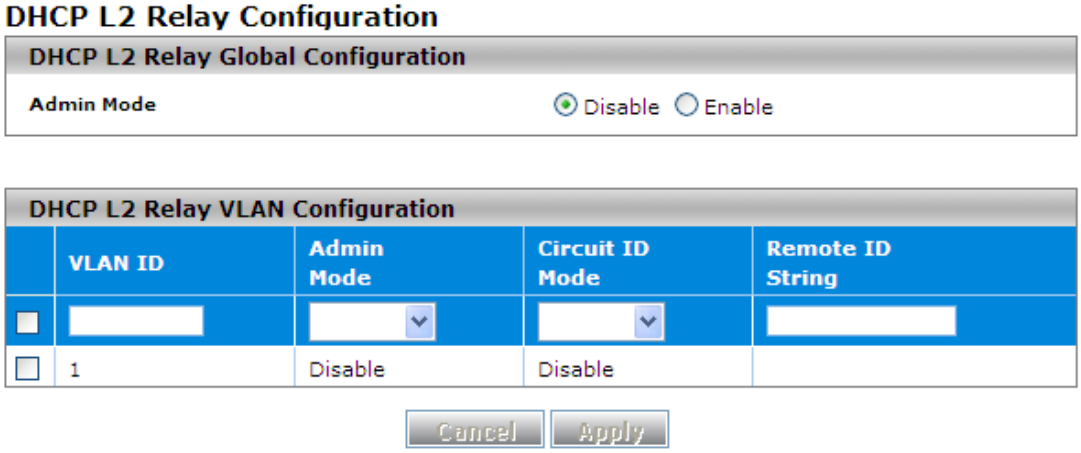
1. A DHCP client sends a DHCP request via broadcast.
2. When a switch (relay agent) receives the DHCP request, it will add DHCP option-82 to the packet. DHCP option-82 includes the MAC address of the host which sends a DHCP request (remote-ID sub-option) and the interface ID on the switch which connects to the host (circuit-ID sub-option).
3. If the switch has configured an IP address, the IP address will be added into the DHCP packet.
4. If a DHCP server supports option-82, after the DHCP server receives the DHCP request, it will

allocate the IP address numbers according to the remote-ID sub-option or circuit ID sub-option.

5. A DHCP server responds to the switch via unicast. And the switch checks whether the remote-ID or circuit-ID in option-82 matches the value of the DHCP request, and makes sure it sends from the certificated DHCP server. Then it removes the information of option-82, and sends back to the interface on the switch which sends the DHCP request.

- DHCP L2 Relay Global Configuration

  You can enable or disable a DHCP relay function, and configure the parameters of circuit ID sub-option (the interface ID on the switch which connects to the host) and remote ID sub-option (the MAC address of the host which sends DHCP request) in this page.



DHCP L2 Relay Configuration

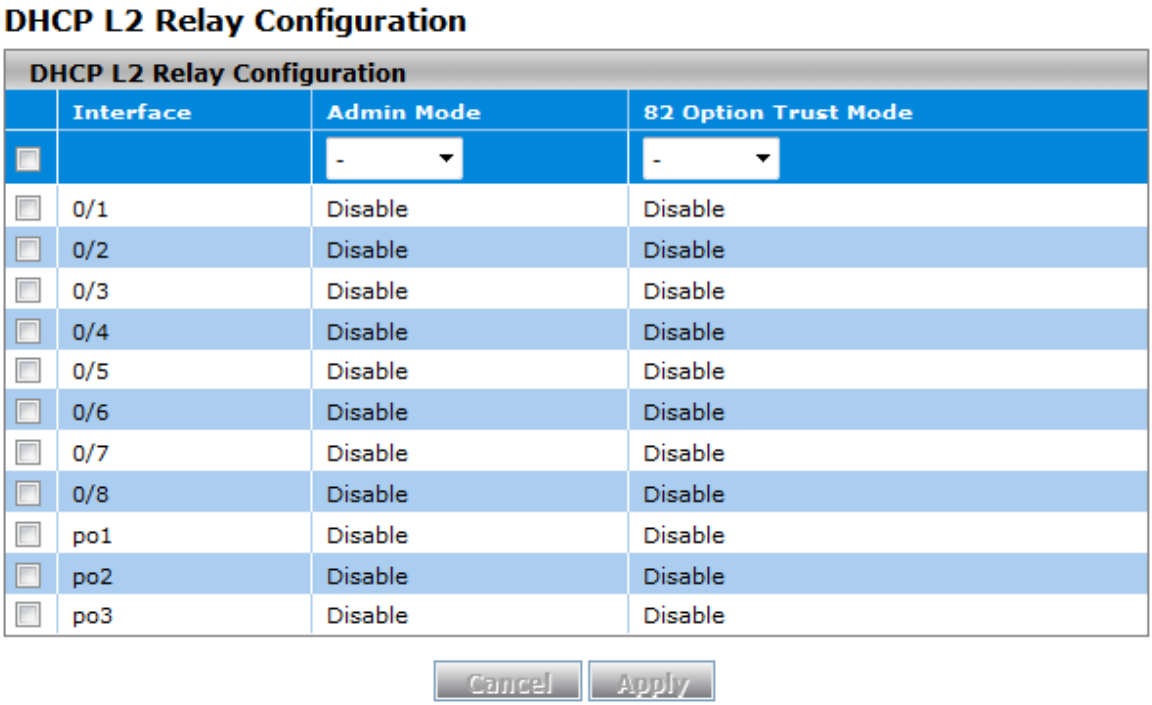
Description	Factory Default
DHCP L2 Relay Configuration	
Admin Mode	
Specify whether the global status of the DHCP relay is enabled. • **Enable**: The DHCP relay function is enabled. • **Disable**: The DHCP relay function is disabled. This is the default setting.	Disable

DHCP L2 Relay VLAN Configuration

Description	Factory Default
VLAN ID	
If you have added VLANs on the VLAN Configuration page, the VLANs can be shown in the VLAN ID column, and you can configure the DHCP L2 relay setting of each VLAN.	1
Admin Mode	
Specify whether the status of the DHCP relay is enabled on the VLAN: • **Enable**: Enable the DHCP relay on the VLAN. You can configure the VLAN DHCP relay settings if the DHCP relay is globally disabled. But the settings do not take effect even if you have applied it. • **Disable**: Disabled the DHCP relay on the VLAN.	Disable
Circuit ID	
Specify whether the DHCP relay agent information option (DHCP option 82) is enabled: • **Enable**: Enable the relay agent information option. • **Disable**: Disable the relay agent information option. This is the default setting for default VLANs 1, 2, and 3.	Disable

Description	Factory Default
Remote ID String	
Enter the remote ID string for the circuit ID mode. This is a local identifier of the circuit from which a DHCP client-to-server packet is received. It can make sure that the DHCP relay responds to packets from the DHCP server to the correct circuit.	None

- DHCP L2 Relay Interface Configuration
  The interface which is connected to a DHCP server is a trusty interface; the interface which connected to DHCP client is an untrustful interface.
  - Trusted port:
    (a) When a DHCP request packet with opt82 is received, it will be forwarded.
    (b) When a DHCP reply packet with opt82 is received, if the remote id is same as the switch's id, the opt82 will be stripped and forwarded; if the remote id is not same as the switch's id, it will be forwarded directly.
    (c) When a DHCP packet without opt82 is received, it will be dropped.
  - Un-trusted Port:
    (a) When a DHCP packet with opt82 is received, it will be dropped.
    (b) When a DHCP packet without opt82 is received, opt82 will be inserted and the packet will be forwarded.



DHCP L2 Relay Configuration

Description	Factory Default
Interface	
The interface number	*interface number*

Description	Factory Default
Admin Mode	
Specify whether the DHCP relay is enabled on the interface: • **Enable**: Enable the DHCP relay on the interface. If the DHCP relay is globally disabled on the switch, you can still configure the interface DHCP relay settings, but the settings do not take effect even if you have applied it. • **Disable**: Disable the DHCP relay on the interface.	Disable
82 Option Trust Mode	
As a security consideration, specify whether the interface is trusted when DHCP relay agent information (DHCP option 82) is received on the interface: • **Enable**: The relay agent information that is received on the interface can be trusted. • **Disable**: The relay agent information that is received on the interface cannot be trusted and should be ignored.	Disable

- DHCP L2 Relay Statistics
  You can see the statistics of DHCP L2 relay messages in this page

DHCP L2 Relay Interface Statistics

DHCP L2 Relay Interface Statistics

Interface	Untrusted Server Messages With Opt82	Untrusted Client Messages With Opt82	Trusted Server Messages Without Opt82	Trusted Client Messages Without Opt82
0/1	0	0	0	0
0/2	0	0	0	0
0/3	0	0	0	0
0/4	0	0	0	0
0/5	0	0	0	0
0/6	0	0	0	0
0/7	0	0	0	0
0/8	0	0	0	0
po1	0	0	0	0
po2	0	0	0	0
po3	0	0	0	0

Clear Refresh

DHCP L2 Relay Interface Statistics

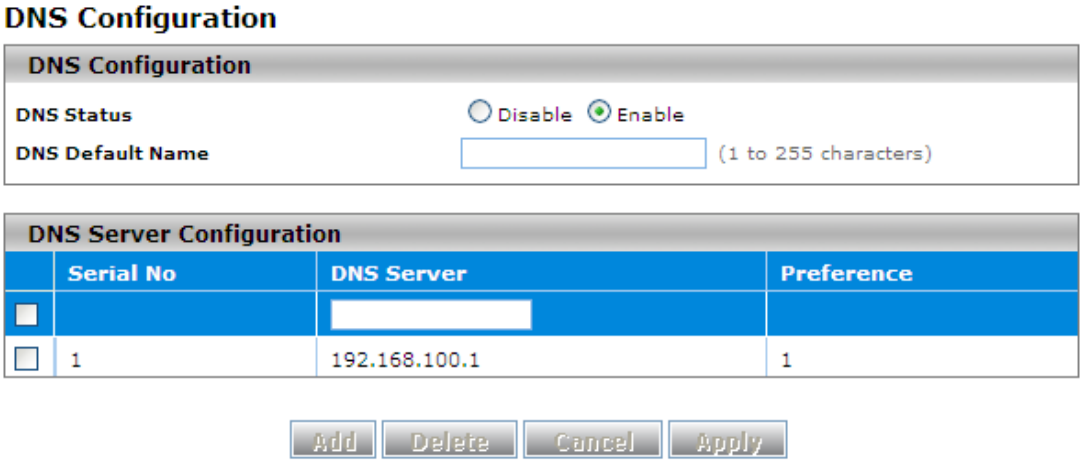
Item	Description
Interface	The interface number
Untrusted Server Messages With Opt82	The amount of DHCP packets with option 82 that were received from an untrusted server.
Untrusted Client Messages With Opt82	The amount of DHCP packets with option 82 that were received from an untrusted client.
Trusted Server Messages Without Opt82	The amount of DHCP packets without option 82 that were received from a trusted server.
Trusted Client Messages Without Opt82	The amount of DHCP packets without option 82 that were received from a trusted client.

3.1.6 DNS

A Delta switch can function as a DNS client and forward the DNS queries to a DNS server. You can configure DNS servers manually or add them via a DHCP server.

3.1.6.1 DNS Configuration

You can configure the global DNS settings and add a DNS server manually in this page.



DNS Configuration

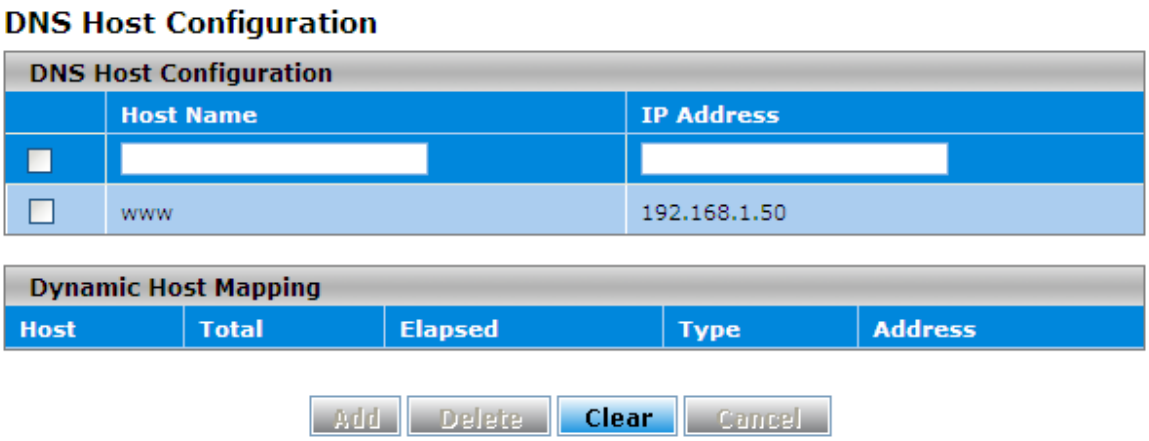
Description	Factory Default
DNS Status	
Specify whether the switch functions as a DNS client: • **Disabled**: The switch does not function as a DNS client and does not send DNS queries. The settings do not take effect even if you configure a DNS server. • **Enabled**: The switch functions as a DNS client and can send DNS queries to a DNS server.	Enable
DNS Default Name	
Enter the DNS default domain name to be included in DNS queries. When the switch performs a lookup for an unqualified host name, the DNS default domain name is provided as the domain name. For example, if the DNS default domain name is delta.com and you enter "dvs" for a DNS query, then "dvs" is changed to "dvs.delta.com" to resolve the name. The length of the name cannot be longer than 255 characters.	None

DNS Server Configuration

Description	Factory Default
Serial No	
The sequence number of the DNS server in the table. If the IP address of the DNS server was dynamically added through DHCP, the number is followed by an asterisk (*).	None
DNS Server	
The DNS server can be added manually or added dynamically through DHCP. Delta switch can support 8 DNS servers.	None
Preference	
The preference of the DNS server. The preference is determined by the order in which the IP address was added to the table. So the preference number 1 is the first IP address that was added into the table.	None

3.1.6.2 Host Configuration

You can map a DNS host name to an IP address in this page.



DNS Host Configuration

Description	Factory Default
Host Name	
Specify the static host name. The maximum characters are 255.	None
IP Address	
Specify the IP address of the host name.	None

Dynamic Host Mapping

Description	Factory Default
Host	
The host name was added dynamically.	None
Total	
The total time to live (TTL) for the dynamic entry.	None
Elapsed	
The elapsed time since the dynamic entry was added to the table.	None
Type	
The type of the dynamic entry: • IPv4 • IPv6 • Canonical name	None
Address	
The IP address of the host name.	None

3.1.7 System File Update

The Delta switch supports download your firmware, configuration, or log file from a TFTP server or local host. And it also supports upload files to a TFTP server or local host.

3.1.7.1 Download File

Delta switch supports 2 ways for user to download files. If there is no TFTP server in your network environment, you can choose the HTTP way to download files from local host.

- TFTP Download

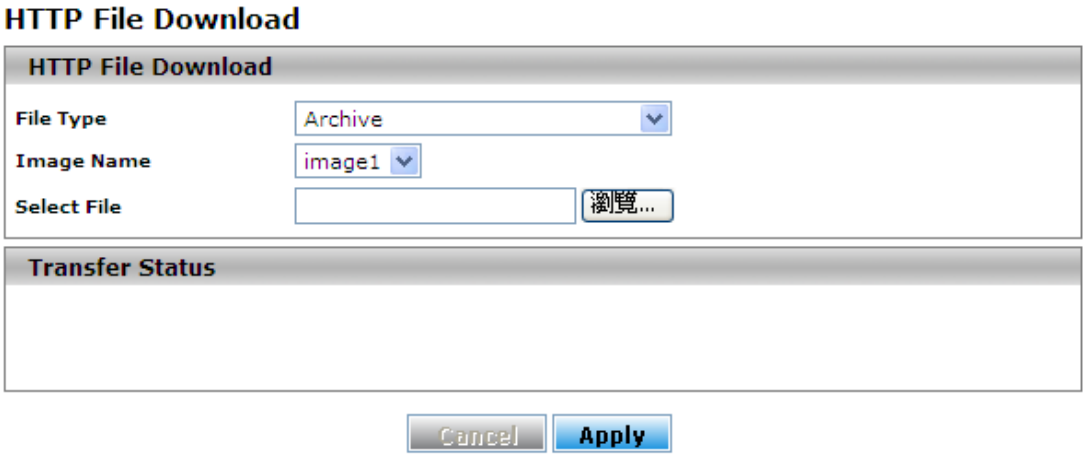
TFTP File Download

Description	Factory Default
File Type	
Specify the type of file in the drop down list that you want to download: • **Archive**: When you select Archive, the Image Name drop-down list is displayed. • **Startup Configuration**: When the switch boots up, the Startup Configuration will be applied. • **SSL Server Certificate PEM File.** For more information about the SSL server certificate PEM file, please see the Certificate Information page. • **Script File**: This file is used to configure the switch by CLI script.	None
Image Name	
Only when you select Archive from the File Type drop-down list is the Image Name drop-down list displayed. Specify the image: • **image1**: The downloaded image firmware as image1. • **image2**: The downloaded image firmware as image2.	image1
Server Address Type	
Specify the type of server address and enter the IP address or host name in the Server Address field: • **IPv4**: The IPv4 address of a TFTP server. • **DNS**: The DNS host name of a TFTP server.	IPv4
Server Address	
Enter an IPv4 address or a DNS host name of the TFTP server.	None
Remote File Name	
Enter the name of the file that you want to download to the switch. You can enter up to 32 characters.	None

If you select Archive in the File Type drop down list, the image name item will show up. After

selecting File Type, setting up Server Address and specifing Remote File Name, click **Apply** to start downloading.

- **HTTP Download**



HTTP Download

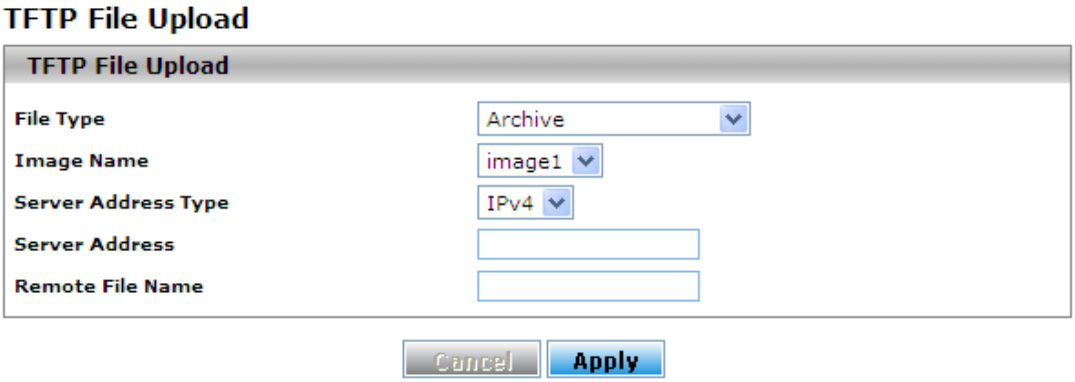
Description	Factory Default
File Type	
Specify the type of file in the drop down list that you want to download: • **Archive**: When you select Archive, the Image Name drop-down list is displayed. • **Startup Configuration**: When the switch boots up, the Startup Configuration will be applied. • **SSL Server Certificate PEM File.** For more information about the SSL server certificate PEM file, please see the Certificate Information page. • **Script File**: This file is used to configure the switch by the CLI script.	None
Image Name	
Only when you select Archive from the File Type drop-down list is the Image Name drop-down list displayed. Specify the image: • **image1**: The downloaded image firmware as image1. • **image2**: The downloaded image firmware as image2.	image1
Select File	
Specify the file that you want to download.	None

If you select Archive in the File Type drop down list, the image name item will show up. After selecting File Type and the path of the file on your PC, click **Apply** to start downloading.

3.1.7.2 Upload File

Delta switch supports 2 ways for user to upload files. If there is no TFTP server in your network environment, you can choose HTTP way to upload files.

- TFTP Upload

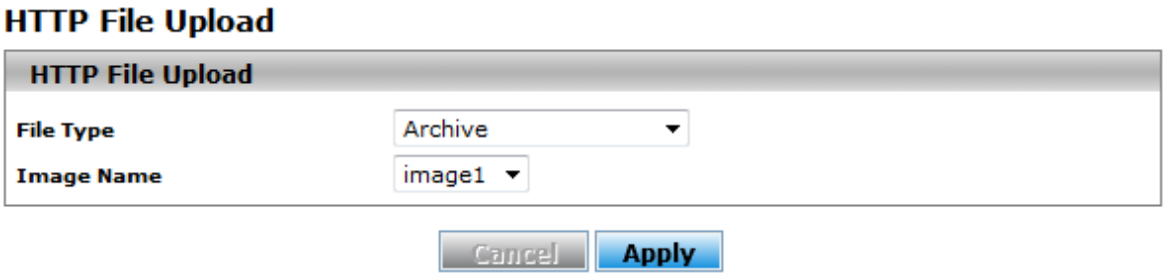


TFTP Upload

Description	Factory Default
File Type	
Specify the type of file in the drop down list that you want to upload: • **Archive**: When you select Archive, the Image Name drop-down list is displayed. • **Startup Configuration**: When the switch boots up, the Startup Configuration will be applied. • **Backup Configuration**: It's used to backup the Startup Configuration file. • **Log:** This file records the log information of the switch. • **Script File**: This file is used to configure the switch by CLI script.	None
Image Name	
Only when you select Archive from the File Type drop-down list is the Image Name drop-down list displayed. Specify the image: • **image1**: The uploaded image firmware as image1. • **image2**: The uploaded image firmware as image2.	image1
Server Address Type	
Specify the type of server address and enter the IP address or host name in the Server Address field: • **IPv4**: The IPv4 address of a TFTP server. • **DNS**: The DNS host name of a TFTP server.	IPv4
Server Address	
Enter an IPv4 address or a DNS host name of the TFTP server.	None
Remote File Name	
Enter the name of the file that you want to upload to the switch. You can enter up to 32 characters.	None

If you select Archive in the File Type drop down list, the image name item will show up. After selecting File Type, setting up Server Address and specifying Remote File Name, click **Apply** to start uploading.

- HTTP Upload



HTTP Upload

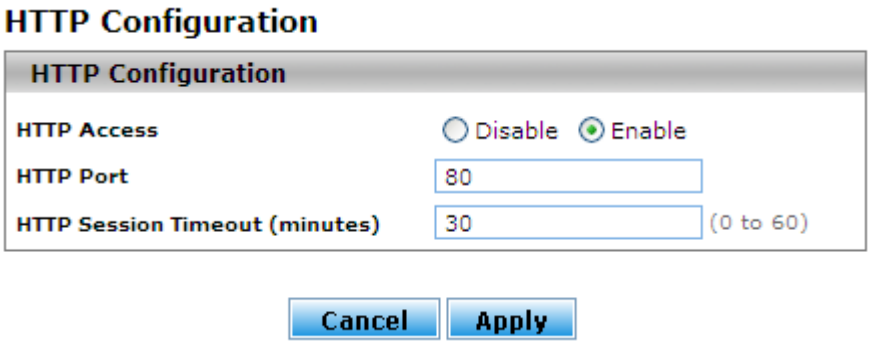
Description	Factory Default
File Type	
Specify the type of file in the drop down list that you want to upload: • **Archive**: When you select Archive, the Image Name drop-down list is displayed. • **Startup Configuration**: When the switch boots up, the Startup Configuration will be applied. • **Backup Configuration**: It's used to backup the Startup Configuration file. • **Log**: This file records the log information of the switch. • **Script File**: This file is used to configure the switch by CLI script. **Notice:** Backup Configuration file is for user to back up Startup Configuration file, but it must use CLI to backup. You can use the command: "**copy nvram:startup-config nvram:backup-config**" to backup Startup Configuration file by Hyper Terminal Software or Telnet.	None
Image Name	
Only when you select Archive from the File Type drop-down list is the Image Name drop-down list displayed. Specify the image: • **image1**: The uploaded image firmware as image1. • **image2**: The uploaded image firmware as image2.	image1

If you select Archive in File Type drop down list, the image name item will show up. After selecting File Type, click **Apply** and specify a path to start uploading.

3.1.8 Management Access

Delta switch supports not only one way to access web management interface. You can configure HTTP or secure HTTP (HTTPS), and you also can configure Secure Shell (SSH), Telnet and console port access.

3.1.8.1 HTTP Configuration



3

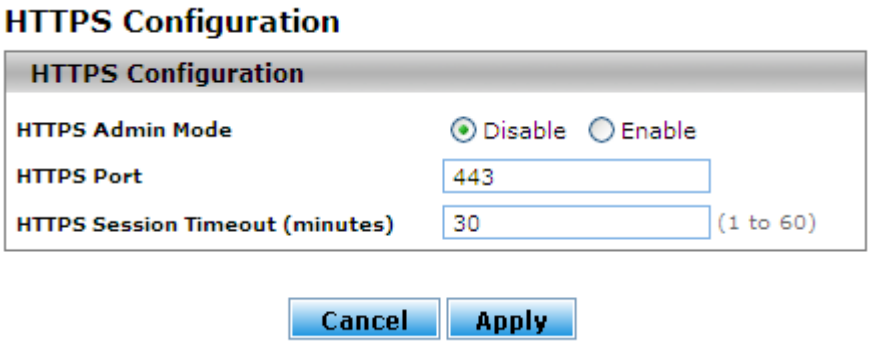
HTTP Configuration

Description	Factory Default
HTTP Access	
Specify whether the web management interface can be accessed from a web browser over an HTTP connection. • **Disable**: The web management interface can't be accessed over an HTTP connection. You need to use a Telnet, SSH, or console connection to access the switch. • **Enable**: The web management interface can be accessed over an HTTP connection.	Enable
HTTP Port	
The HTTP port number. The number must be in the range of 1 to 65535. The default setting is port number 80.	80
HTTP Session Timeout (minutes)	
The HTTP session time-out period in minutes. The HTTP session will be closed when there is no activity and the time-out period is reached. Enter a period in the range of 0 to 60 minutes. Entering 0 disables the time-out.	30

3.1.8.2 HTTPS

Hypertext Transfer Protocol Secure (HTTPS) is a communications protocol for secure communication. It enables the transmission of HTTP over an encrypted Secure Sockets Layer (SSL) or Transport Layer Security (TLS) connection. So HTTPS can help protect the communication between a computer and a switch from eavesdroppers and man-in-the-middle (MITM) attacks.
If you want to configure the switch to access an HTTPS connection from a computer, the switch needs a public key certificate. You can configure the switch to generate a key or download it to the switch.

- HTTPS Configuration



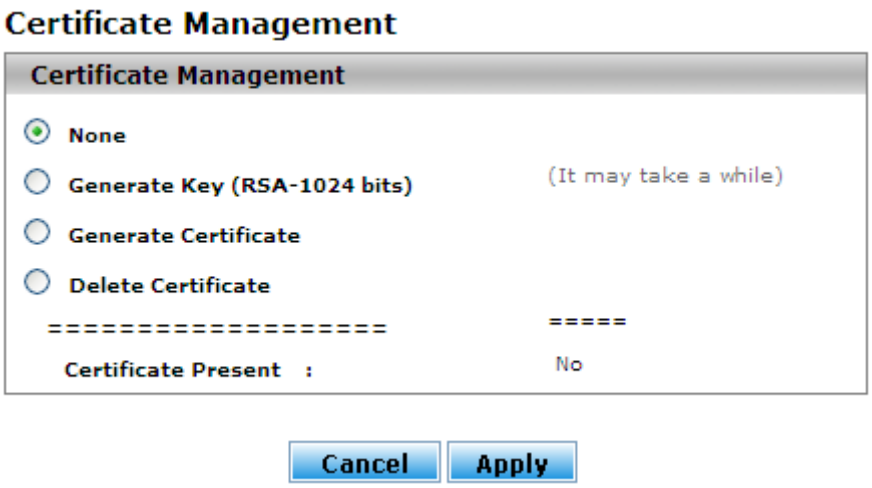
HTTPS Configuration

Description	Factory Default
HTTPS Admin Mode	
Specify whether the web management interface can be accessed from a web browser over an HTTPS connection. • **Disable**: The web management interface can't be accessed over an HTTPS connection. You need to use a Telnet, SSH, or console connection to access the switch. • **Enable**: The web management interface can be accessed over an HTTPS connection. **Notice:** If you want to enable HTTPS Admin mode, you need to Generate Key, then apply for Generate Certificate, please refer to **Certificate Management**.	Disable
HTTPS Port	
The HTTP port number. The number must be in the range of 1 to 65535.	443
HTTPS Session Timeout (minutes)	
The HTTPS session time-out period in minutes. When there is no activity and the time-out period is reached, the HTTP session will be closed. The time period must be in the range of 1 to 60 minutes.	30

After you enable the HTTPS connection, you can type **https://Delta switch's IP address** into the web browser to establish an HTTPS connection.

- Certificate Management

You can use the function in this page to generate a self-signed certificate for an HTTPS connection.



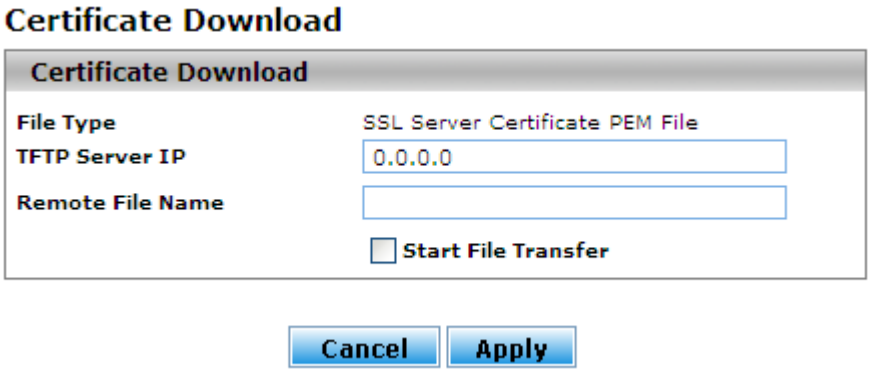
Certificate Management

Description	Factory Default
None	
No certificate is to be generated.	None
Generate Key (RSA-1024 bits)	
Generate a 1024-bit RSA key. After the key has been generated, the page reverts to its default setting and the None item will be selected.	None

Description	Factory Default
Generate Certificate	
Generate a certificate. After the key has been generated, the page reverts to its default setting and the None item will be selected.	None
Delete Certificate	
Delete certificate on the switch.	None
Certificate Present	
Displays the present certificate on the switch.	None

- Certificate Download

  Make sure the conditions before you download a certificate to the switch:
  - The file which is ready to be downloaded from the TFTP server is on the server and in the appropriate directory.
  - The file's format is correct.
  - The switch has a path to the TFTP server.



Certificate Download

Description	Factory Default
TFTP server IP	
Specify a TFTP server IP address.	0.0.0.0
Remote File Name	
Specify a certificate file name which can be downloaded.	None

- Certificate Information

Certificate Information

Certificate Information

```
Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number:
            6f:06:0c:5c:98:5d:69:ba:08:f6:f5:14:98:7f:3d:47
        Signature Algorithm: md5WithRSAEncryption
        Issuer: CN=self-signed
        Validity
            Not Before: Jan  1 01:05:00 1970 GMT
            Not After : Jan  1 01:05:00 1972 GMT
        Subject: CN=192.168.1.15
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
            RSA Public Key: (1024 bit)
                Modulus (1024 bit):
                    00:bb:c3:9a:6a:e9:83:65:85:7d:fb:ee:d6:0f:93:
                    e2:de:f9:5c:63:41:4f:f8:d7:01:4c:a7:d6:52:6c:
                    3a:80:cc:19:a5:d2:ff:4f:87:e7:31:87:38:6e:f6:
                    21:84:82:80:b0:15:84:f8:f9:85:05:0d:94:c9:29:
                    9b:a7:f3:7b:4d:64:cb:dc:73:34:a3:7d:dc:c3:ac:
                    e8:be:38:74:46:8a:53:df:71:13:70:41:17:88:0e:
                    b3:f9:7c:e4:eb:69:34:96:67:1b:2e:fa:2f:68:8d:
                    cc:1b:9e:31:70:68:d8:05:b2:cb:77:b7:46:72:74:
                    1f:05:86:e7:17:fc:dd:be:73
                Exponent: 65537 (0x10001)
    Signature Algorithm: md5WithRSAEncryption
        6d:b9:e6:07:7e:17:7a:e6:3b:63:ae:b2:28:98:65:7f:de:b8:
```

Refresh

Click **Refresh** for updating the information of the certificate.

3.1.8.3 SSH Configuration

You can configure an SSH configuration in this page.

SSH Configuration

SSH Configuration

SSH Admin Mode	◉ Disable ○ Enable	
SSH Version 1	○ Disable ◉ Enable	
SSH Version 2	○ Disable ◉ Enable	
SSH Session Timeout (minutes)	30	(1 to 160)
Maximum Number of SSH Sessions	5	
Current Number of SSH Sessions	0	

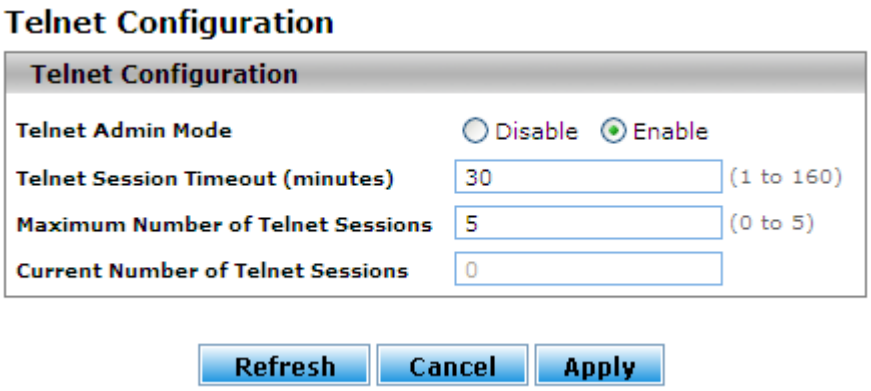
Refresh Cancel Apply

SSH Configuration

Description	Factory Default
SSH Admin Mode	
Specify the status of SSH. • **Disable**: SSH is disabled. This is the default setting. • **Enable**: SSH is enabled.	Disable
SSH Version 1	
Specify whether SSH version 1 is supported. • **Disable**: SSH version 1 is not supported. • **Enable**: SSH version 1 is supported. Both version 1 and version 2 can be supported on the switch.	Enable
SSH Version 2	
Specify whether SSH version 2 is supported. • **Disable**: SSH version 2 is not supported. • **Enable**: SSH version 2 is supported. Both version 1 and version 2 can be supported on the switch.	Enable
SSH Session Timeout (minutes)	
The SSH session time-out period in minutes. When there is no activity and the time-out period is reached, the SSH session will be closed. Enter a period in the range of 1 to 160 minutes.	30
Maximum Number of SSH Sessions	
The maximum number of inbound SSH sessions. The number must be in the range of 0 to 5.	5
Current Number of SSH Sessions	
This field displays the number of simultaneous SSH sessions.	0

3.1.8.4 Telnet Configuration

You can configure Telnet configuration in this page.



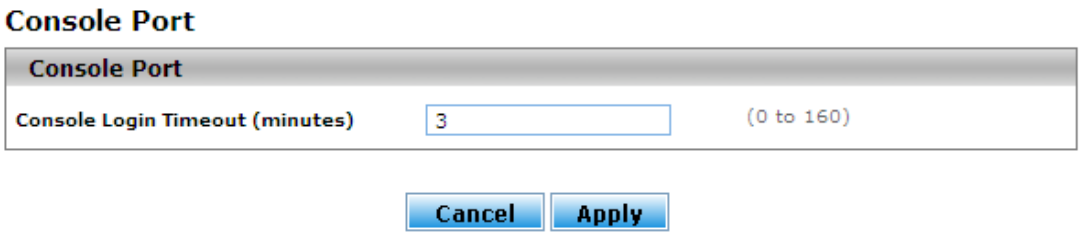
Telnet Configuration

Description	Factory Default
Telnet Admin Mode	
Specify the status of Telnet. • **Disable**: Telnet is disabled. • **Enable**: Telnet is enabled.	Enable
Telnet Session Timeout (minutes)	
The Telnet session time-out period in minutes. When there is no activity and the time-out period is reached, the Telnet session will be closed. The period must be in the range of 1 to 160 minutes.	30

Description	Factory Default
Maximum Number of Telnet Sessions	
The maximum number of inbound Telnet sessions that are allowed on the switch. The number must be in the range of 0 to 5.	5
Current Number of Telnet Sessions	
This field displays the number of simultaneous Telnet sessions.	0

3.1.8.5 Console Port

You can configure console port configuration in this page.



Console Port

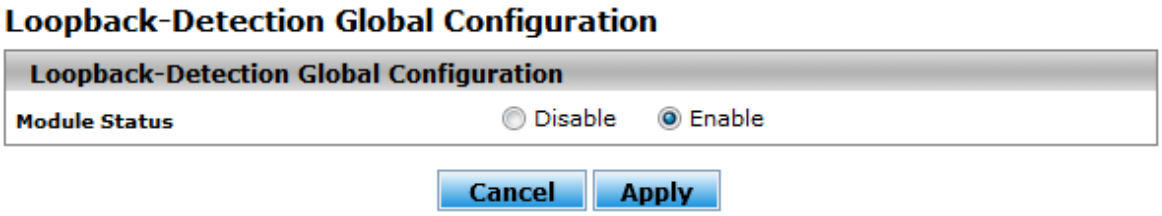
Description	Factory Default
Console Login Timeout (minutes)	
The console port session time-out period in minutes. When there is no activity and the time-out period is reached, the console port session is closed. The period must be in the range of 0 to 160 minutes. Entering 0 disables the time-out.	30

3.1.9 Loopback-Detection

The Loopback-Detection has two configurations: Global Configuration and Port Configuration.

3.1.9.1 Global Configuration

The Module Status of Loopback-Detection Global Configuration is used to Enable/Disable the Loopback-Detection feature.



Description	Factory Default
Module Status	
Specify whether the status in the global configuration is activated or not.	Enable

3.1.9.2 Port Configuration

The parameters of Loopback-Detection should be set for each port.

Loopback-Detection Port Configuration

Loopback-Detection Port Configuration				
	Interface	Port Control	Recovery Mode	Recovery Interval
☐		-	-	
☐	0/1	Disable	Manual	300
☐	0/2	Disable	Manual	300
☐	0/3	Disable	Manual	300
☐	0/4	Disable	Manual	300
☐	0/5	Disable	Manual	300
☐	0/6	Disable	Manual	300
☐	0/7	Disable	Manual	300
☐	0/8	Disable	Manual	300
☐	po1	Disable	Manual	300
☐	po2	Disable	Manual	300
☐	po3	Disable	Manual	300

Apply Refresh

Loopback-Detection Port Configuration

Description	Factory Default
Interface	
The interface number	*interface number*
Port Control	
Enable/Disable the Loopback-Detection feature on the port.	Disable
Recovery Mode	
There are two recovery modes for recovering the blocking port. Loops occur as the reason for blocking the port • **Auto Mode**: After the port is blocked, the port will be automatically linked up after a Recovery Interval. • **Manual Mode**: After the port is blocked, we have to manually enable the port. Basic Setting > Port Setting > Port Settings (Admin Mode), enable the blocking port.	Manual
Recovery Interval	
In the Auto Mode, the blocking port will be linked up after a Recovery Interval. The unit is a second.	**300**

3.1.10 EtherNet/IP

The Module Status of EtherNet/IP is used to Enable/Disable the Loopback-Detection feature. If you need to set parameters, please refer to Appendix C EtherNet/IP.

EtherNet/IP Configuration

EtherNet/IP Configuration		
EtherNet/IP Status	Disable	Enable

Cancel Apply

Click Apply to update existing parameters, and cause the changes to occur on the switch.

3.2 SNMP Manager

Simple Network Management Protocol (SNMP) is an application protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. SNMP V1, V2 and V3 are supported on the Delta switch, and it's enabled by default.
Delta switch supports standard public MIBs for standard functionality and private MIBs that provide additional functionality. You can use SNMP to enable or disable authentication traps, cold-start and warm-start functionality traps, link up and link down traps, Spanning Tree Protocol (STP) traps, SFP traps, password and IP address change traps.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

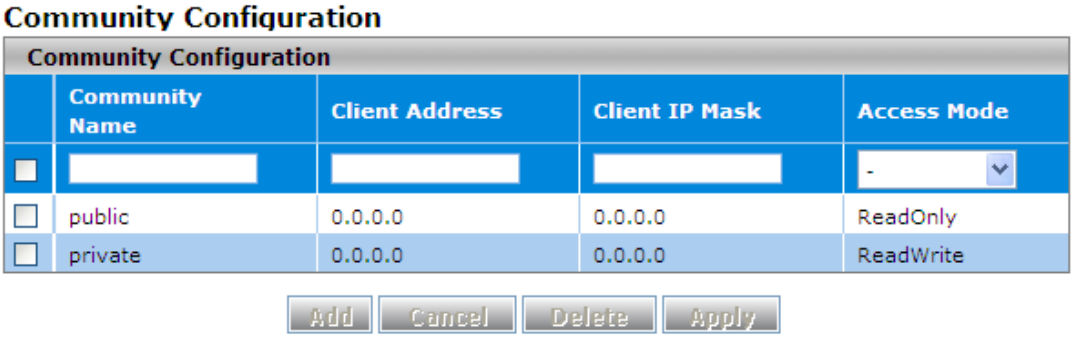
3.2.1 SNMP V1/V2

SNMP version 1 (SNMPv1) is the initial implementation of the SNMP protocol. The authentication of clients is performed by a "community string", like a type of password, which is transmitted in clear text.
SNMPv2 revises version 1 and includes improvements of performance, security, confidentiality, and manager-to-manager communications. It adds a GetBulkRequest command; it sends iterative GetNextRequests for retrieving large amounts of management data in a single request.

3.2.1.1 Community Configuration

There are two default communities preconfigured for SNMPv1 and SNMPv2:

- **public:** All IP addresses can be accessed with a read-only permission.
- **private:** All IP addresses can be accessed with a read/write permission.



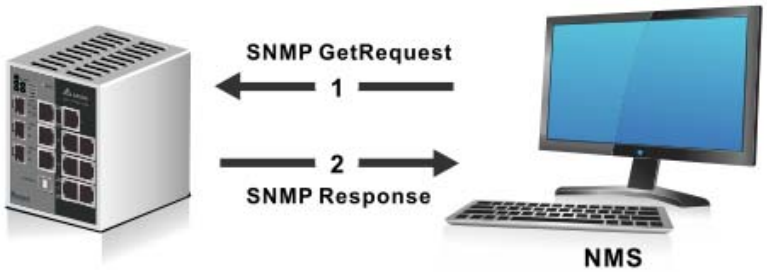
Community Configuration

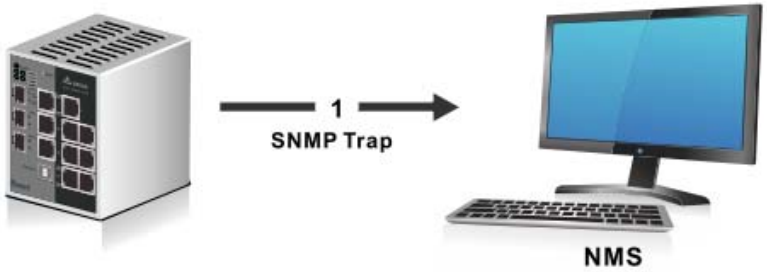
Description	Factory Default
Community Name	
Enter a case-sensitive string. The maximum length is 16 characters. Maximum community is 10.	None
Client Address	
Enter the client's IP address. Any IP address can be accessed if the IP address is 0.0.0.0.	0.0.0.0
Client IP Mask	
Enter the client's IP mask. All addresses allow accesses that are associated with a single client IP address. For example, the client's IP address is 192.168.1.X, subnet mask is 255.255.255.0. If the client's IP address is between 192.168.1.0 and 192.168.1.255, they are allowed to be accessed. If the client's IP address is 192.168.1.15 and subnet mask is 255.255.255.255, only this client allows to be accessed.	0.0.0.0
Access Mode	
Specify the access mode: • **ReadOnly**: Only allow the client to read information. • **ReadWrite**: Only allow the client to read information and modify configuration.	None

Notice:
The client address and client IP mask denote a range of IP addresses from which SNMP clients can access the community on the switch.

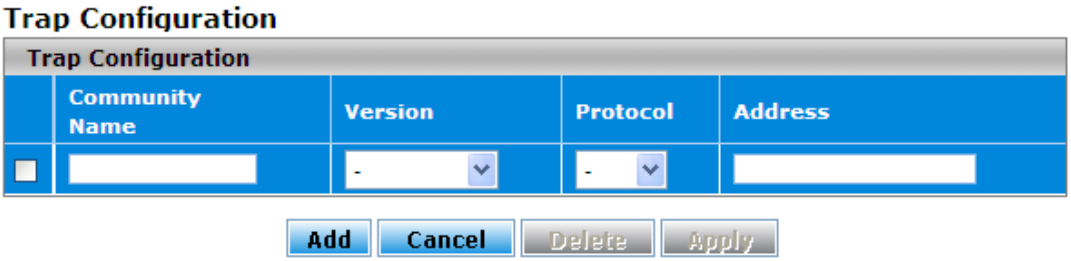
3.2.1.2 Trap Configuration

If network engineers need to get information from an SNMP agent (network device), they usually use SNMP software to poll information and get a response from an agent. But the SNMP Trap is the unsolicited trap which sends from agent to the NMS (Network Management System)





An SNMP agent sends SNMP trap messages to the trap community (trap receiver). It monitors the switch for particular events or conditions, and generates trap messages based on these events or conditions.



Trap Configuration

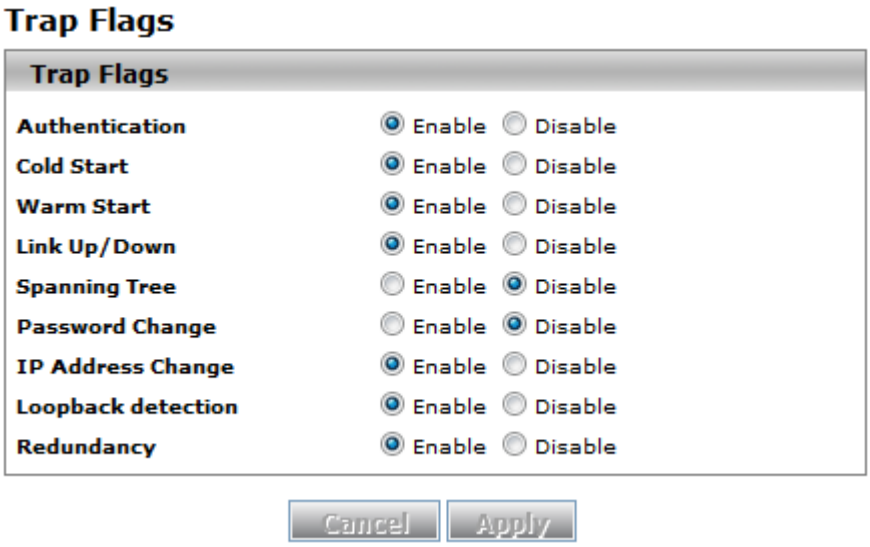
Description	Factory Default
Community Name	
Enter a case-sensitive string. The maximum length is 16 characters. Maximum trap is 10.	None
Version	
Specify the SNMP version that is used for the trap community: • **SNMP V1**: Uses SNMPv1 to send traps to the trap community. • **SNMP V2**: Uses SNMPv2 to send traps to the trap community.	None

Description	Factory Default
Protocol	
Specify the IP version that is used for the trap community: • **IPv4**: Sends traps to an IPv4 address. Input an IPv4 address in the Address field. • **IPv6**: Sends traps to an IPv6 address. Input an IPv6 address in the Address field.	None
Address	
Enter an IPv4 or IPv6 address according to the selection in the Protocol drop-down list. For an IPv6 address, enter the address as xxxx:xxxx:xxxx:xxxxx:xxxx:xxxx:xxxx:xxxx format.	None

3

3.2.1.3 Trap Flags

After you configure the trap communities, you also need to configure what kinds of SNMP traps the switch can generate and send. When the switch detects the active trap which is an identified condition, a trap will be sent to the trap communities.



Trap Flags

Description	Factory Default
Authentication	
Specify whether authentication traps are enabled. • **Enable**: Specify the switch which sends authentication trap messages. • **Disable**: Specify the switch which does not send authentication trap messages.	Enable
Cold Start	
Specify whether cold-start traps are enabled. • **Enable**: Specify the switch which sends cold-start trap messages. • **Disable**: Specify the switch which does not send cold-start trap messages.	Enable
Warm Start	
Specify whether warm-start traps are enabled. • **Enable**: Specify the switch which sends warm-start trap messages. • **Disable**: Specify the switch which does not send warm-start trap messages.	Enable

Description	Factory Default
Link Up/Down	
Specify whether link status traps are enabled. • **Enable**: Specify the switch which sends link status trap messages when a link comes up or goes down. This is the default setting. • **Disable**: Specify the switch which does not send link status trap messages.	Enable
Spanning Tree	
Specify whether spanning tree traps are enabled. • **Enable**: Specify the switch which sends spanning tree trap messages. • **Disable**: Specify the switch which does not send spanning tree trap messages.	Disable
Password Change	
Specify whether Password Change traps are enabled. • **Enable**: Specify the switch which sends Password Change trap messages. • **Disable**: Specify the switch which does not send Password Change messages.	Disable
IP Address Change	
Specify whether IP Address Change traps are enabled. • **Enable**: Specify the switch which sends IP Address Change trap messages. • **Disable**: Specify the switch which does not send IP Address Change messages.	Enable
Loopback-detection	Enable
Specify whether Lookback Detection traps are enabled. • **Enable**: Specify the switch which sends Lookback Detection trap messages. • **Disable**: Specify the switch which does not send Lookback Detection messages	
Redundancy	Enable
Specify whether Redundancy traps are enabled. • **Enable**: Specify the switch which sends Redundancy trap messages. • **Disable**: Specify the switch which does not send Redundancy messages	

3.2.2 SNMP V3

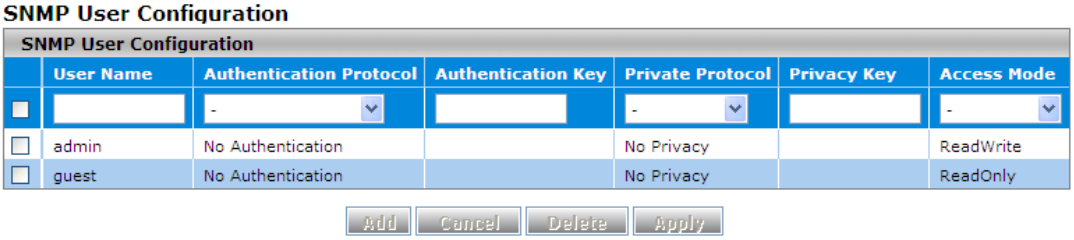
SNMPv3 primarily added security and remote configuration enhancements.
Authentication in SNMP Versions 1 and 2 uses a password (community string) sent in clear text between a manager and an agent. But SNMPv3 message contains security parameters which are encoded as an octet string. You can choose the authentication protocol which you need to each user account.

3.2.2.1 User Configuration

The following default users are preconfigured for SNMPv3:

- **admin:** All admin users can access data with a read/write permission.
- **guest:** All IP guest users can access data with a read-only permission.

SNMP User Configuration



SNMP User Configuration

Description	Factory Default
User Name	
Enter a case-sensitive string. The maximum length is 32 characters.	None
Authentication Protocol	
Specify the authentication protocol, if any, for the user: • **No Authentication**: Users can access data without authentication. If you select this item, the Authentication Key, Privacy Protocol, and Privacy Key fields are masked out and can't be configured. • **HMAC-MD5**: Users are authenticated by Hash-based Message Authentication Code (HMAC) with MD5. If you select this item, please enter a password in the Authentication Key field. • **HMAC-SHA**: Users are authenticated by HMAC with SHA-1. If you select this item, please enter a password in the Authentication Key field.	None
Authentication Key	
If the authentication protocol is HMAC-MD5 or HMAC-SHA, please enter a case-sensitive string for password. The maximum length is 40 characters.	None
Private Protocol	
If the authentication protocol is HMAC-MD5 or HMAC-SHA, you can specify whether to use an SNMPv3 privacy protocol (encryption) for the user: • **No Privacy**: The users can access data without encryption. • **DES**: User communication is encrypted by Data Encryption Standard (DES). You need to enter a password in the Privacy Key field.	None
Privacy Key	
If the privacy protocol is DES, please enter a case-sensitive string for password. The maximum length is 40 characters.	None
Access Mode	
Specify the access mode: • **ReadOnly**: The client can only have read permission to get information. • **ReadWrite**: The client can both have read and configure permission to modify the information.	None

3.3 Network Redundancy

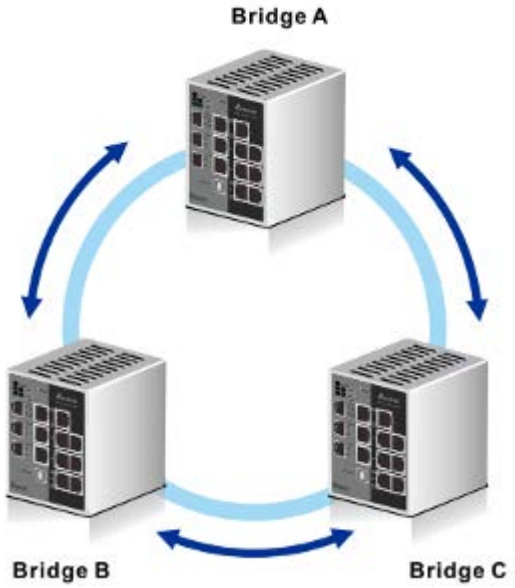
In some network environments, users need to set up redundant loops in the network to provide a backup path for disconnection or network device breakdown. But if there are many network devices in the network, then each host needs to spend more time and cross many network devices to associate with each other. And sometimes the disconnection happens in a busy network, so the network must recover in a short time. Setting up redundancy on your network helps protect critical links against failure, protects against network loops, and keeps network downtime at a minimum.

For example, if the Delta switch is used as a key communications component of a production line, several minutes of downtime may cause a big loss in production and revenue.

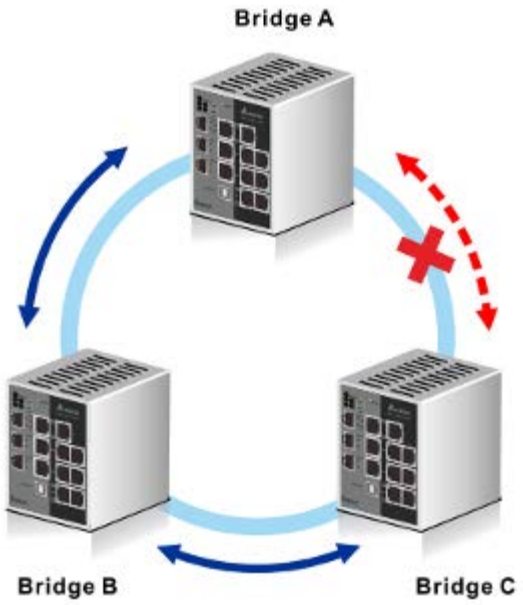
> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.3.1 STP

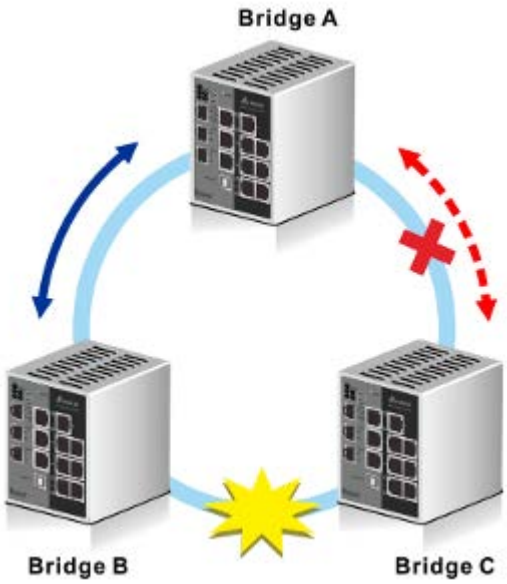
Spanning Tree Protocol (STP) provides a tree topology to help reduce link failure in a network, find one path between end devices and protect loops in the network. Bridge Protocol Data Unit (BPDU) includes the calculation of information and it is used to negotiate between switches and establish STP. STP is a bridge based system and it defines 5 kinds of port statuses: blocking, listening, learning, forwarding and disabling. If the status of blocking changes to forwarding, STP needs to spend more than 30 seconds.
Rapid Spanning Tree Protocol (RSTP) was defined by IEEE in 2001. RSTP provides faster tree convergence after a topology changes. Sometimes it only needs to spend a few hundred milliseconds. And RSTP can backward compatible with standard STP.
Delta switch supports different protocols to support communication redundancy. When configuring a redundant ring, all switches on the same ring must be configured to use the same redundant protocol.
STP/RSTP can let you establish a redundant ring and protect the loop in a network.



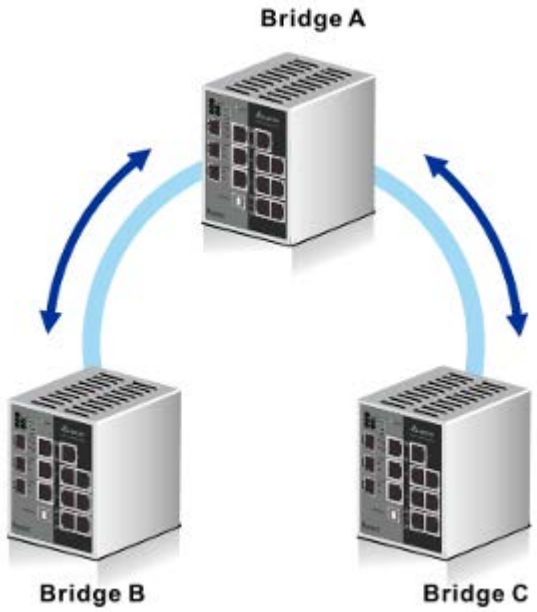
If STP/RSTP is enabled, it will detect duplicate paths, calculate the cost of each path and block the lowest cost path (ex. the path between A and C) from forwarding traffic. So each bridge can communicate each other without loop.



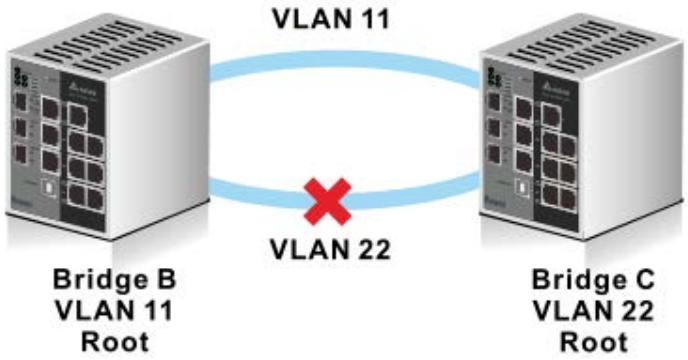
If the link failure is detected between Bridge B and C, STP/RSTP will start to reconfigure the network.



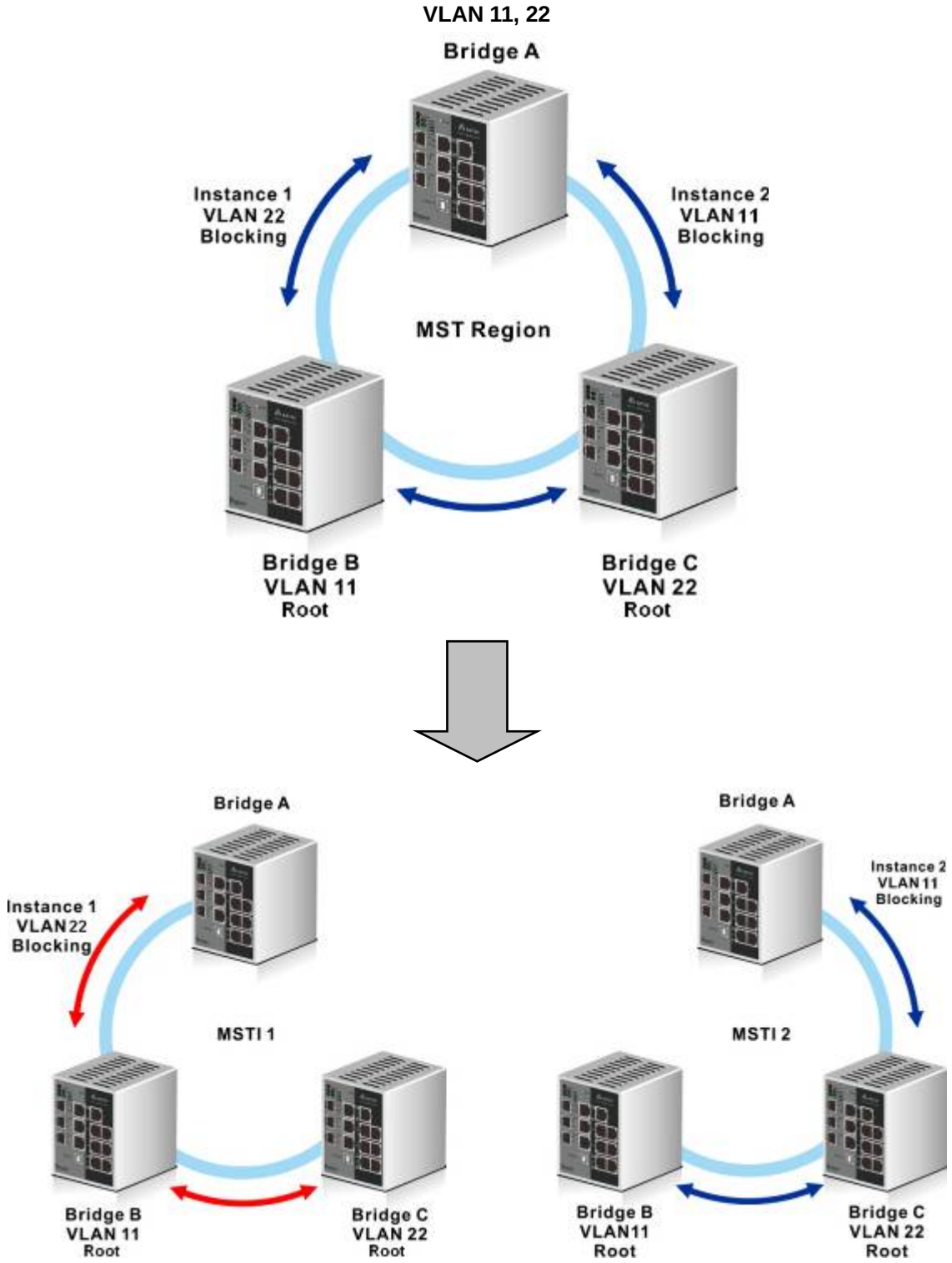
Then the traffic between Bridge B and C will flow through Bridge A.



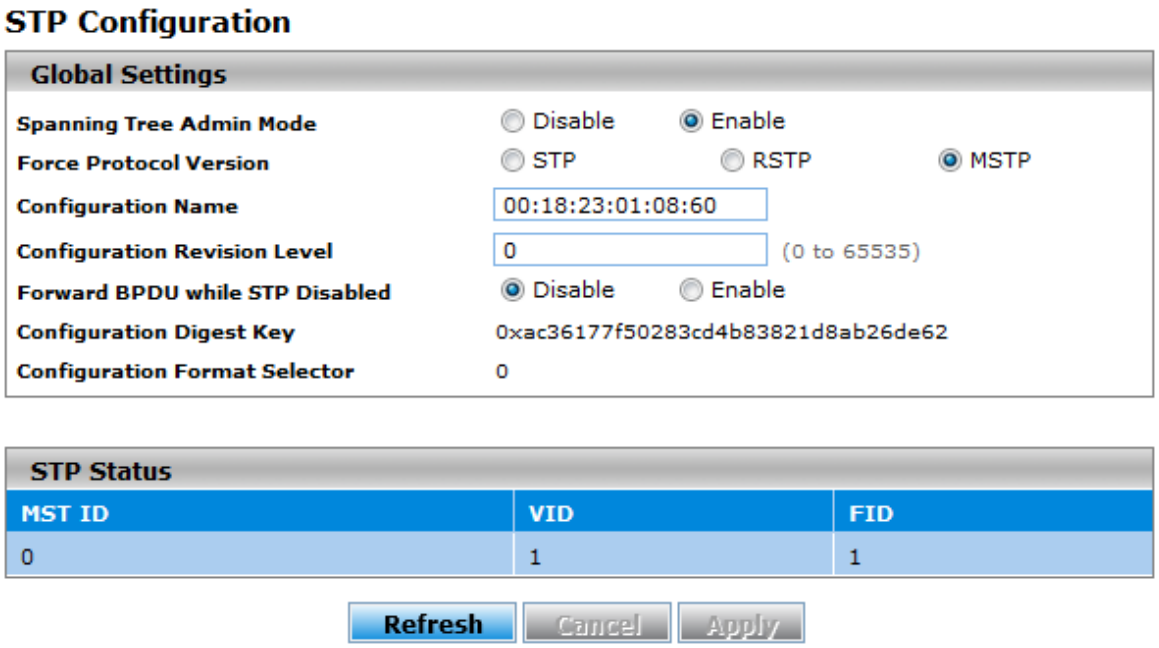
But STP/RSTP can't support more VLANs in your network topology. If there are 2 VLANs between 2 bridges, one path will be blocked when STP/RSTP is enabled. So IEEE defined an extension to RSTP to further develop the usefulness of VLANs.



Multiple Spanning Tree Protocol (MSTP) is an extension protocol of RSTP. It can provide an independent spanning tree for different VLANs. MSTP builds a separate Multiple Spanning Tree (MST) for each instance. And MST Region may include multiple MSTP instances.



3.3.1.1 STP Configuration



Global Settings Description

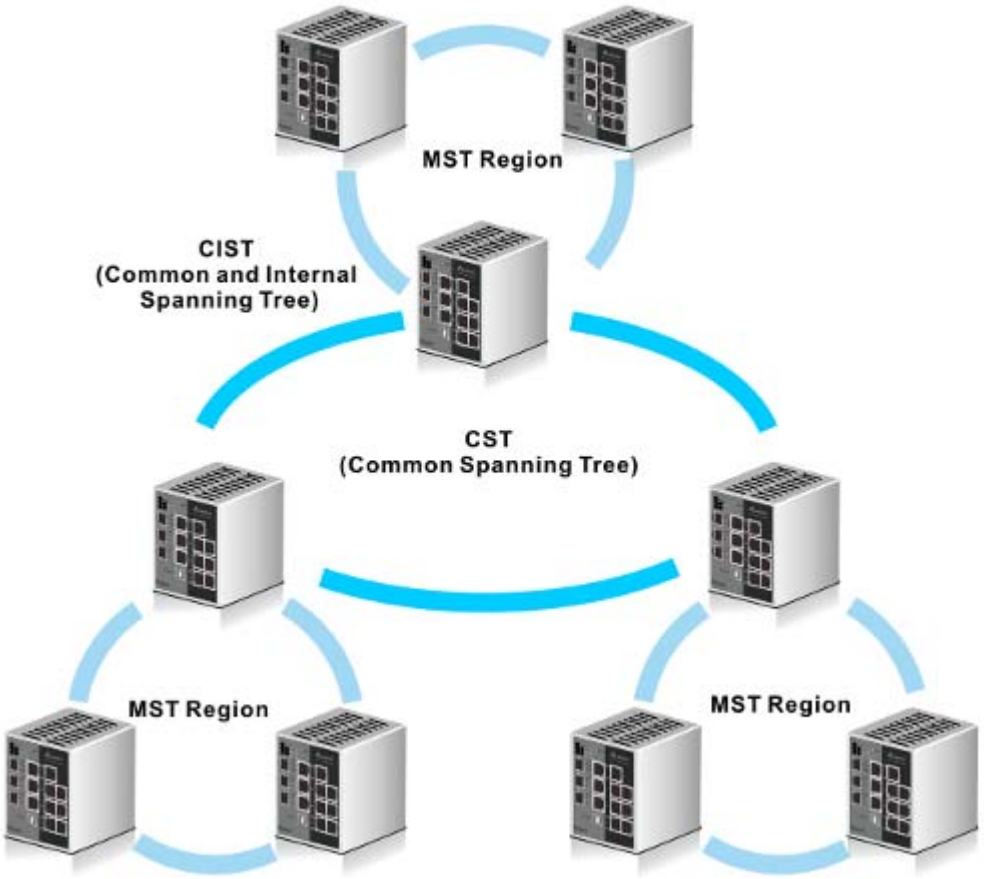
Description	Factory Default
Spanning Tree Status	
Specify the status of STP on the switch: • **Disable:** STP is disabled. The settings do not take effect after you have applied them, but you still can configure STP. • **Enable:** STP is enabled. The settings take effect after you have applied them.	Enable
Force Protocol Version	
Specify the version of STP: • **STP:** Spanning Tree Protocol. • **RSTP:** Rapid Spanning Tree Protocol. • **MSTP:** Multiple Spanning Tree Protocol.	MSTP
Configuration Name	
Enter the STP identifier for the switch. You can configure alphanumeric characters and special characters, and the maximum length is 32.	MAC address of the switch
Configuration Revision Level	
Enter an identifier that specifies the current configuration. The number must be in the range of 0 to 65535.	0
Forward BPDU while STP Disabled	
Specify whether spanning tree bridge protocol data units (BPDUs) are forwarded: • **Disable:** When STP is disabled, Spanning tree BPDUs are not forwarded. • **Enable:** When STP is disabled, Spanning tree BPDUs are forwarded.	Disable
Configuration Digest Key	
This field displays a calculated value from the MSTP configuration. The switches are qualified by the key and function in the same region.	Fixed
Configuration Format Selector	
This field displays the configuration identifier format selector that is used.	0

STP Status

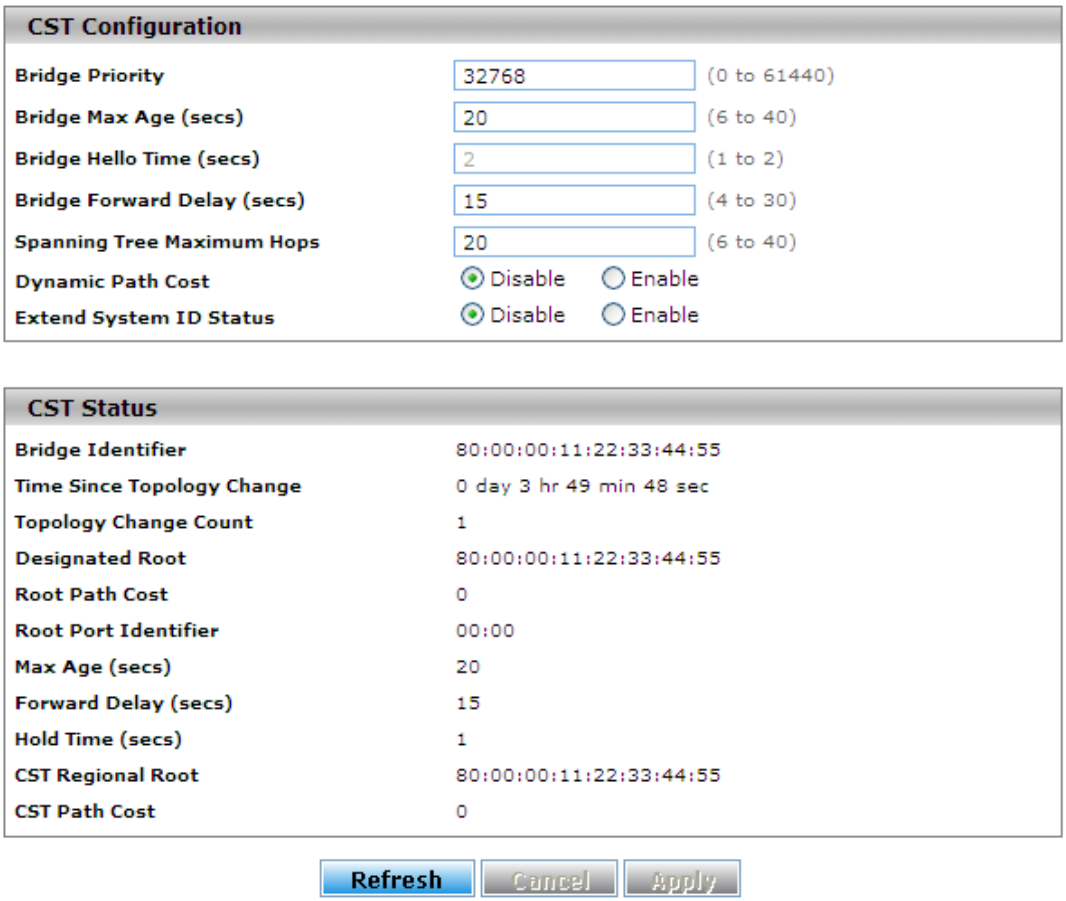
Description	Factory Default
MST ID	
The ID of the MST instance.	0
VID	
The VLAN ID.	1
FID	
The filtering ID (FID).	1

3.3.1.2 CST Configuration

Internal Spanning Tree (IST) is one of spanning trees in the MST region. Common Spanning Tree (CST) interconnects ISTs in the MST region. And Common and Internal Spanning Tree (CIST) consist of IST and CST.



CST Configuration



CST Configuration

Description	Factory Default
Bridge Priority	
Each switch or bridge is assigned a priority when they are running STP. After the devices exchange BPDUs, the lowest priority value becomes the root bridge. Enter the bridge priority value for the CIST. Enter a number that is a multiple of 4096 and it must be in the range of 0 to 61440.	32768
Bridge Max Age (secs)	
Enter the maximum age time for the CIST in seconds. This time is the period that a STP bridge or switch waits before implementing a topological change. The device will recognize itself as a root if it doesn't receive a hello message in the time of Bridge Max Age. Enter a number in the range of 6 to 40 seconds, considering that the period needs to be less than or equal to (2 * Bridge Forward Delay) – 1 and greater than or equal to 2 * (Bridge Hello Time +1).	20
Bridge Hello Time (secs)	
The switch hello time for the CIST. This time is the period in seconds that a root bridge waits between configuration messages. The value is fixed at 2 seconds.	2

Description	Factory Default
Bridge Forward Delay (secs)	
Enter the switch forward delay time, which is the period in seconds that a bridge remains in a listening and learning state before forwarding packets. Enter a number in the range of 4 to 30 seconds, considering that the period needs to be greater than or equal to (Bridge Max Age / 2) + 1.	15
Spanning Tree Maximum Hops	
Enter the maximum number of bridge hops; the information for a CST instance can travel before being discarded. Enter a number in the range of 6 to 40.	20
Dynamic Path Cost	
Specify whether the path cost is automatically calculated by selecting one of the following radio buttons: • **Disable:** The path cost is not automatically calculated. • **Enable:** The path cost is automatically calculated.	Disable
Extend System ID Status	
Specify whether the extended system identifier is added to the bridge priority by selecting one of the following radio buttons: • **Disable:** The extended system identifier is not added to the bridge priority. • **Enable:** The extended system identifier is added to the bridge priority. For example, bridge priority is 32768, for VLAN 1, the priority will be 32768+1; for VLAN 2, the priority will be 32768+2.	Disable

CTS Status

Description	Factory Default
Bridge Identifier	
The STP bridge identifier for the Common Spanning Tree (CST) on the switch. The identifier consists of the bridge priority and the base (fixed) MAC address of the switch.	MAC address
Time Since Topology Change	
The time that has passed since the last change of the CST topology occurred. The time is displayed in the day-hour-minute-second format.	day-hour-minute-second
Topology Change Count	
The number of times the CST topology has changed.	0
Designated Root	
The STP bridge identifier of the root bridge. The identifier consists of the bridge priority and the base MAC address of the root bridge.	MAC address
Root Path Cost	
The path cost to the designated root for the CST.	0
Root Port Identifier	
The interface that provides access to the designated root for the CST.	00:00
Max Age (secs)	
The timer that controls the maximum time that passes before an STP bridge port saves its configuration BPDU.	20
Forward Delay (secs)	
The value that is derived from the bridge forward delay parameter of the STP root port.	15
Hold Time (secs)	
The minimum period between the transmissions of configuration BPDUs.	1
CST Regional Root	
The priority and base MAC address of the CST regional root.	MAC address
CST Path Cost	
The path cost to the CST tree regional root.	0

3.3.1.3 CST Port Configuration

CST Port Configuration

CST Port Configuration

	Interface	Port Priority	Admin Edge Port	Port Path Cost	Auto Calculated Port Path Cost	Hello Timer
			-			
	0/1	128	Disable	200000	Disabled	2
	0/2	128	Disable	20000	Disabled	2
	0/3	128	Disable	20000	Disabled	2
	0/4	128	Disable	20000	Disabled	2
	0/5	128	Disable	200000	Disabled	2
	0/6	128	Disable	200000	Disabled	2
	0/7	128	Disable	200000	Disabled	2
	0/8	128	Disable	20000	Disabled	2
	po1	128	Disable	10000	Disabled	2
	po2	128	Disable	10000	Disabled	2
	po3	128	Disable	10000	Disabled	2

BPDU Forwarding	Auto Edge	Root Guard	TCN Guard	Port Mode	Port Forwarding State	Protocol Migration	PointToPoint Status
-	-	-	-	-		-	-
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Forwarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Forwarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto
Disable	Enable	Disable	Disable	Enable	Discarding	False	Auto

Apply Refresh

CST Port Configuration

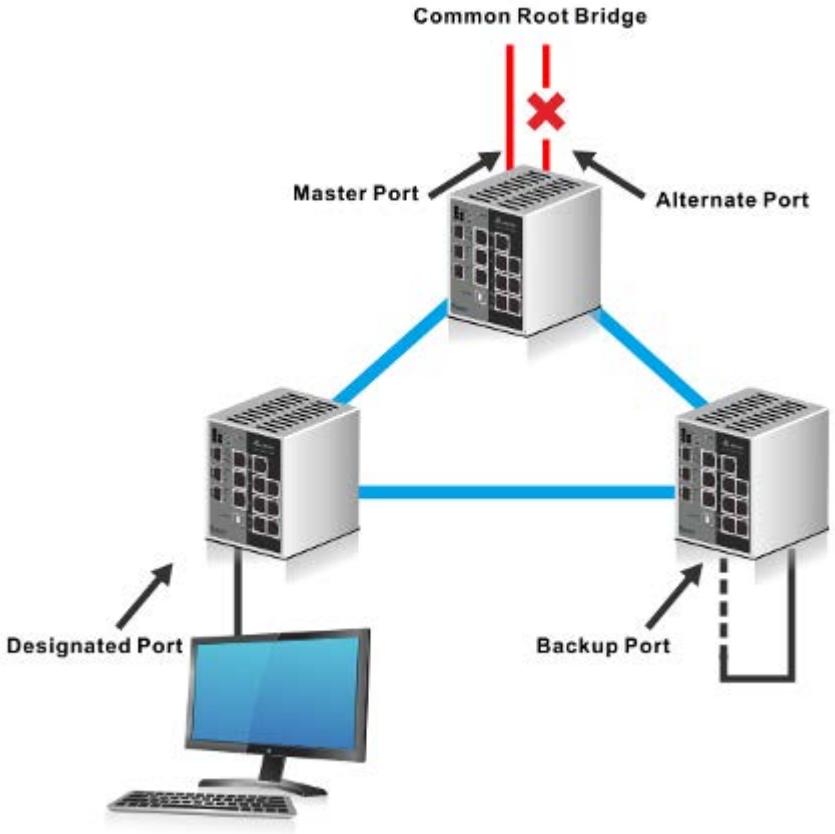
Description	Factory Default
Interface	
This field displays the interface number or port channel number.	*interface number*

Description	Factory Default
Port Priority	
Enter the priority for the interface in the CIST. Enter a value between 0 and 240 that is a multiple of 16. The default priority is 128.	128
Admin Edge Port	
All ports directly connected to end stations cannot create bridging loops in the network. Therefore, the edge port directly transitions to the forwarding state, and skips the listening and learning stages. Specify whether the interface is an edge port in the CIST: • **Enable:** The interface is an edge port. • **Disable:** The interface is not an edge port.	Disable
Port Path Cost	
Leave the existing path cost, or enters a new path cost that is used for the interface in the CIST. Enter a number in the range of 1 to 200,000,000. Enter a blank (that is, remove the number and make sure there is no space character in the field) to reset the path cost.	20000
Auto Calculated Port Path Cost	
This field shows whether you have globally enabled or disabled the dynamic path cost on the CST Configuration screen.	Disable
Hello Timer	
The hello time for the interface in the CIST. This time is the period in seconds that the interface waits between configuration messages. Enter 1 or 2 seconds. **Notice:** You can set the hello time only when the STP operation mode is MSTP.	2
BPDU Forwarding	
Specify whether the interface sets the mcheck flag to forward BPDUs: • **Enable:** Depending on the STP operation mode, RST or MST BPDUs are forwarded. • **Disable:** BPDUs are not forwarded.	Disable
Auto Edge	
Specify whether the interface automatically becomes an edge port if it does not process BPDUs for a while: • **Enable:** The interface becomes an edge port. • **Disable:** The interface does not become an edge port.	Enable
Root Guard	
Specify whether the root guard mode can cause the interface to discard any superior information received by the interface to prevent the root of the device from changing. When this situation occurs, the interface enters the discarding state and no longer forwards any packets: • **Enable:** The interface can enter the discarding state. • **Disable:** The interface cannot enter discarding state.	Disable
TCN Guard	
Specify whether the topology change notification (TCN) guard restricts the interface from propagating topology change information. This means that even if a port receives a BPDU with the topology change flag set to true, the port will not flush its MAC address table and send out a BPDU with a topology change flag set to true. • **Enable:** The interface can propagate topology change information. • **Disable:** The interface cannot propagate topology change information.	Disable

Description	Factory Default
Port Mode	
Specify the Spanning Tree Protocol (STP) administrative mode that is associated with the port or port channel: • **Disable:** STP is disabled for the port or port channel. • **Enable:** STP is enabled for the port or port channel.	Enable
Port Forwarding State	
This field displays whether the port is up and forwards traffic (Forwarding) or down and discards traffic (Discarding).	Discarding
Protocol Migration	
Force the specified port to set the mcheck flag to transmit RST or MST BPDUs: • **True:** The interface can receive the BPDU flood. • **False:** The interface cannot receive the BPDU flood.	False
PointToPoint Status	
Specify the point-to-point status of the interface in the CIST: • **ForceTrue:** The interface has a point-to-point connection to a switch, bridge, or end node, irrespective of the actual connection. • **ForceFalse:** The interface does not have a point-to-point connection to a switch, bridge, or end node, irrespective of the actual connection. • **Auto:** The type of connection is automatically detected.	hAuto

3.3.1.4 CST Port Status

The type of port role of the interface:



- **Root Port:** It's a concept of STP. Every non-root switch has one root port. The lowest cost of the path to the root switch will be the root port.
- **Master Port:** It's a concept of MSTP. It must meet two conditions: one is root port in CIST; the

other one is an edge port. The edge port is the port which connects two regions.

- **Designated Port:** The port responsible for forwarding data to the downstream network segment or device.
- **Alternate Port:** The standby port for the root port or master port. If a root port or master port is blocked, the alternate port becomes the new root port or master port.
- **Backup Port:** The backup port of designated ports. When a designated port is blocked, the backup port becomes a new designated port and starts to forward data without delay. When a loop occurs while two ports of the same MSTP device are interconnected, the device will block either of the two ports, and the backup port is that port to be blocked.

CST Port Status

CST Port Status

Interface	Port ID	Port Forwarding State	Port Role	Designated Root	Designated Cost	Root Priority	Designated Bridge
0/1	80:01	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/2	80:02	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/3	80:03	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/4	80:04	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/5	80:05	Forwarding	Designated	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/6	80:06	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/7	80:07	Forwarding	Designated	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
0/8	80:08	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
po1	80:09	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
po2	80:0a	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60
po3	80:0b	Discarding	Disabled	80:00:00:18:23:01:08:60	0	32768	80:00:00:18:23:01:08:60

Refresh

Designated Port	Edge Port	Point-to-Point MAC	CST Regional Root	Regional Root Priority	Regional Path Cost	CST Path Cost
80:01	Disabled	True	80:00:00:18:23:01:08:60	32768	0	200000
80:02	Disabled	False	80:00:00:18:23:01:08:60	32768	0	20000
80:03	Disabled	False	80:00:00:18:23:01:08:60	32768	0	20000
80:04	Disabled	False	80:00:00:18:23:01:08:60	32768	0	20000
80:05	Enabled	True	80:00:00:18:23:01:08:60	32768	0	200000
80:06	Disabled	True	80:00:00:18:23:01:08:60	32768	0	200000
80:07	Disabled	True	80:00:00:18:23:01:08:60	32768	0	200000
80:08	Disabled	False	80:00:00:18:23:01:08:60	32768	0	20000
80:09	Disabled	True	80:00:00:18:23:01:08:60	32768	0	10000
80:0a	Disabled	True	80:00:00:18:23:01:08:60	32768	0	10000
80:0b	Disabled	True	80:00:00:18:23:01:08:60	32768	0	10000

CST Port Status

Item	Description
Interface	The interface number or port channel number
Port ID	The port identifier for the interface within the CST, which consists of the port priority and the interface number

Item	Description
Port Forwarding State	The forwarding state of the interface. One of the following options is displayed: • **Discarding:** The interface is in the discarding mode; it cannot forward traffic and cannot learn new MAC addresses. • **Learning:** The interface is in the learning mode; it cannot forward traffic, but it can learn new MAC addresses. • **Forwarding:** The interface is in the forwarding mode; it can forward traffic and learn new MAC addresses.
Port Role	The type of role of the interface in the spanning tree: One of the following options is displayed: • Root • Master • Designated • Alternate • Backup • Disabled
Designated Root	The identifier of the root bridge of CIST. The identifier consists of the bridge priority and the base MAC address of the STP bridge.
Designated Cost	The path cost that is advertized by the designated port to the LAN. **Note:** Interfaces with a lower cost are less likely to be blocked if STP detects loops.
Root Priority	The priority of the CST root. The default root priority is 32768.
Designated Bridge	The identifier of the bridge with the designated port. The identifier consists of the bridge priority and the base MAC address of the STP bridge.
Designated Port	The port identifier on the designated bridge that offers the lowest cost to the LAN. The identifier consists of the port priority and the interface number. **Note:** If the port is the designated port, the identifiers in the Port ID and Designated Port fields are identical. If the port is not the designated port, that is, there is a root port and an alternate port, the identifiers in the Port ID and Designated Port fields are different.
Edge Port	The edge port status of the interface: • **Enabled:** The interface is an edge port. • **Disabled:** The interface is not an edge port.
Point-to-Point MAC	The type of connection: • **True:** The connection is a point-to-point connection. • **False:** The connection is a shared LAN connection.
CST Regional Root	The identifier of the regional root bridge of CIST. The identifier consists of the bridge priority and the base MAC address of the STP bridge.
Regional Root Priority	The priority of the regional root. The default regional root priority is 32768.
Regional Path Cost	The path cost to the regional root.
CST Path Cost	The path cost to the CST tree regional root.

3.3.1.5 MST Configuration

MST Configuration

MST Configuration

	MST ID	Priority	Bridge Identifier	VLAN List	Time Since Topology Change	Topology Change Count	Designated Root	Root Path Cost	Root Port Identifier
	1	4096	10:00:00:00:00:00:00:00	1-2,5-6,10	0 day 0 hr 0 min 0 sec	0	00:00:00:00:00:00:00:00	0	00:00
	2	0	00:00:00:00:00:00:00:00	3	0 day 0 hr 0 min 0 sec	0	00:00:00:00:00:00:00:00	0	00:00
	3	12288	30:00:00:00:00:00:00:00	11-22	0 day 0 hr 0 min 0 sec	0	00:00:00:00:00:00:00:00	0	00:00

Add Delete Refresh Cancel Apply

MST Configuration settings

Description	Factory Default
MST ID	
Enter an identifier for the MST instance. Enter a number in the range of 1 to 16.	None
Priority	
Enter the bridge priority. Enter a number between 0 and 61440 which is a multiple of 4096.	32768
VLAN List	
Enter the vlan id list. Enter a number in the range of 1 to 4096.	None

MST Configuration Table Information

Item	Description
MST ID	The identifier of the MST instance.
Priority	The bridge priority value for the MST instance.
Bridge Identifier	The bridge identifier for the MST instance. The bridge identifier is made up of the bridge priority and the base MAC address of the bridge.
VLAN List	The VLAN or VLANs to which the MST instance is mapped. You can enter a single or a number of VLAN ID.
Time Since Topology Change	The time in seconds since the topology of the selected MST instance last changed.
Topology Change Count	The number of times the topology has changed the MST instance.
Designated Root	The bridge identifier of the root bridge for the MST instance. The bridge identifier is made up of the bridge priority and the base MAC address of the root bridge.
Root Path Cost	The path cost to the designated root for the MST instance.
Root Port Identifier	The port identifier to access the designated root for the MST instance.

3.3.1.6 MST Port Status

MST Port Status

MST ID Selection

Select MST

MST Port Status

	Interface	Port Priority	Port Cost	Port Mode	Auto Calculated Port Path Cost	Port ID	Port Forwarding State	Port Role
				-				
	0/1	128	200000	Enabled	Disabled	80:01	Discarding	Disabled
	0/2	128	20000	Enabled	Disabled	80:02	Discarding	Disabled
	0/3	128	20000	Enabled	Disabled	80:03	Discarding	Disabled
	0/4	128	20000	Enabled	Disabled	80:04	Discarding	Disabled
	0/5	128	200000	Enabled	Disabled	80:05	Forwarding	Designated
	0/6	128	200000	Enabled	Disabled	80:06	Discarding	Disabled
	0/7	128	200000	Enabled	Disabled	80:07	Forwarding	Designated
	0/8	128	20000	Enabled	Disabled	80:08	Discarding	Disabled
	po1	128	10000	Enabled	Disabled	80:09	Discarding	Disabled
	po2	128	10000	Enabled	Disabled	80:0a	Discarding	Disabled
	po3	128	10000	Enabled	Disabled	80:0b	Discarding	Disabled

3

Designated Root	Designated Cost	Designated Bridge	Designated Port	Forward Transitions	Received BPDUs	Transmitted BPDUs	Invalid Received BPDUs
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:01	0	0	0	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:02	0	0	0	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:03	0	0	0	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:04	0	0	0	0
10:00:00:18:23:01:08:60	0	10:00:00:18:23:01:08:60	80:05	1	0	35	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:06	0	0	0	0
10:00:00:18:23:01:08:60	0	10:00:00:18:23:01:08:60	80:07	1	0	36	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:08	0	0	0	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:09	0	0	0	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:0a	0	0	0	0
80:00:00:18:23:01:08:60	0	80:00:00:18:23:01:08:60	80:0b	0	0	0	0

Apply Refresh

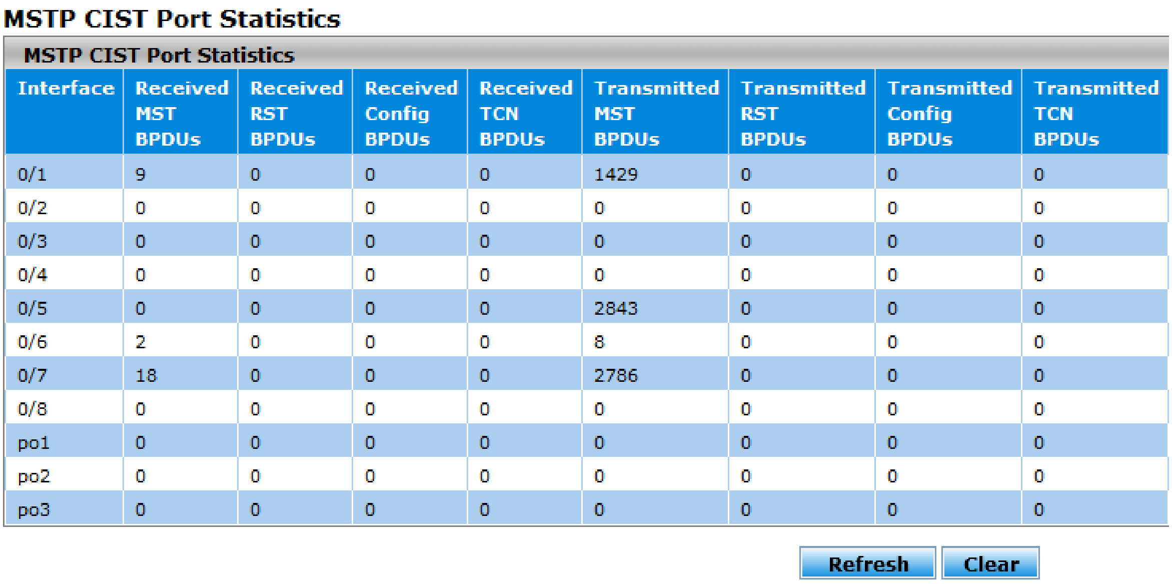
MST Port Status

Item	Description
Interface	This field shows the interface number or port channel number.
Port Priority	Enter the priority for the interface in the MST instance. Enter a value between 0 and 240 that is a multiple of 16. The default priority is 128.

Item	Description
Port Cost	Leave the default path cost, or enters a new path cost that is used for the interface in the MST instance. Enter a number in the range of 1 to 200,000,000. Enter zero (0) to reset the path cost. **Note:** The default path cost is 20,000 for a Gigabit Ethernet interface.
Port Mode	Specify the administrative mode for the interface in the MST instance. • **Enable:** Enables STP for the interface. This is the default setting. • **Disable:** Disables STP for the interface.
Auto Calculated Port Path Cost	This field displays whether you have globally enabled or you can disabled the dynamic path cost on the CST Configuration page.
Port Id	The port identifier, which consists of the port priority and the interface number
Port Forwarding State	The forwarding state of the interface in the MST instance. One of the following options is displayed: • **Discarding:** The interface is in the discarding mode; it cannot forward traffic and cannot learn new MAC addresses. • **Learning:** The interface is in the learning mode; it cannot forward traffic, but it can learn new MAC addresses. • **Forwarding:** The interface is in the forwarding mode; it can forward traffic and learn new MAC addresses.
Port Role	The type of role of the interface in the MST instance: One of the following options is displayed: • Root • Master • Designated • Alternate • Backup • Disabled
Designated Root	The identifier of the root bridge in the MST instance. The identifier consists of the bridge priority and the base MAC address of the MST root bridge.
Designated Cost	The path cost that is advertized by the designated port to the LAN. **Note:** Interfaces with a lower cost are less likely to be blocked if MST detects loops.
Designated Bridge	The identifier of the bridge with the designated port. The identifier consists of the bridge priority and the base MAC address of the MST bridge.
Designated Port	**Note:** The port identifier on the designated bridge that offers the lowest cost to the LAN. The identifier consists of the port priority and the interface number. **Note:** If the port is the designated port, the identifiers in the Port ID and Designated Port fields are identical. If the port is not the designated port, that is, there is a root port and an alternate port, the identifiers in the Port ID and Designated Port fields are different.
Forward Transitions	The number of forwarding transitions to other interfaces.
Received BPDUs	The number of BPDUs that were received on the interface for the MST instance.

Item	Description
Transmitted BPDUs	The number of BPDUs that were transmitted on the interface for the MST instance.
Invalid Received BPDUs	The number of invalid BPDUs that were received on the interface for the MST instance.

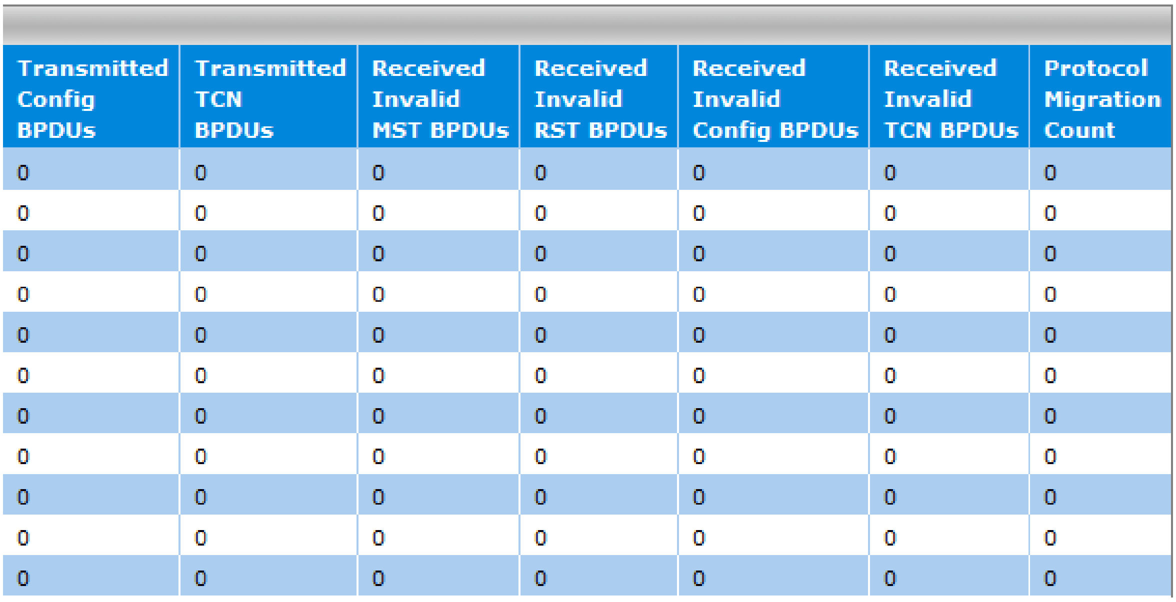
3.3.1.7 STP Statistics



MSTP CIST Port Statistics

MSTP CIST Port Statistics

Interface	Received MST BPDUs	Received RST BPDUs	Received Config BPDUs	Received TCN BPDUs	Transmitted MST BPDUs	Transmitted RST BPDUs	Transmitted Config BPDUs	Transmitted TCN BPDUs
0/1	9	0	0	0	1429	0	0	0
0/2	0	0	0	0	0	0	0	0
0/3	0	0	0	0	0	0	0	0
0/4	0	0	0	0	0	0	0	0
0/5	0	0	0	0	2843	0	0	0
0/6	2	0	0	0	8	0	0	0
0/7	18	0	0	0	2786	0	0	0
0/8	0	0	0	0	0	0	0	0
po1	0	0	0	0	0	0	0	0
po2	0	0	0	0	0	0	0	0
po3	0	0	0	0	0	0	0	0



Transmitted Config BPDUs	Transmitted TCN BPDUs	Received Invalid MST BPDUs	Received Invalid RST BPDUs	Received Invalid Config BPDUs	Received Invalid TCN BPDUs	Protocol Migration Count
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

MSTP CIST Port Statistics

Item	Description
Interface	This field shows the interface number.
Received MST BPDUs	The number of MSTP BPDUs that were received on the interface.

Item	Description
Received RST BPDUs	The number of RSTP BPDUs that were received on the interface.
Received Config BPDUs	The number of configuration BPDUs that were received on the interface.
Received TCN BPDUs	The number of topology change notification (TCN) BPDUs that were received on the interface.
Transmitted MST BPDUs	The number of MSTP BPDUs that were transmitted on the interface.
Transmitted RST BPDUs	The number of RSTP BPDUs that were transmitted on the interface.
Transmitted Config BPDUs	The number of configuration BPDUs that were transmitted on the interface.
Transmitted TCN BPDUs	The number of TCN BPDUs that were transmitted on the interface.
Received Invalid MST BPDUs	The number of invalid MSTP BPDUs that were received on the interface.
Received Invalid RST BPDUs	The number of invalid RSTP BPDUs that were received on the interface.
Received Invalid Config BPDUs	The number of invalid configuration BPDUs that were received on the interface.
Received Invalid TCN BPDUs	The number of invalid TCN BPDUs that were received on the interface.
Protocol Migration Count	The number of times the interface received traffic from or transmitted traffic to a device that does not support RSTP or MSTP but STP only.

3.3.2 Redundancy

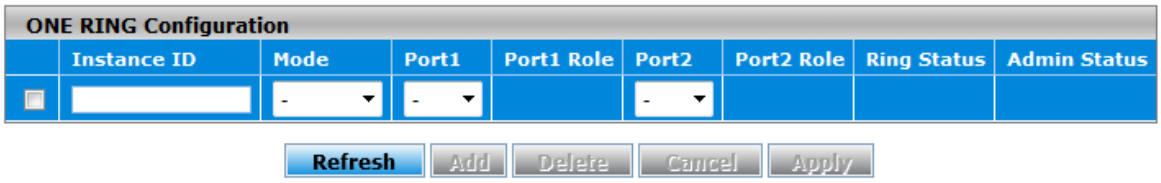
The Redundancy network has three topologies: ONE RING, ONE CHAIN and ONE COUPLING.

3.3.2.1 ONE RING Configuration

ONE RING consists of nodes having two ports participating in the ring. Each redundant port is connected to the adjacent node. There are two types of nodes: master and slave nodes. There can be only one master and up to 250 slave nodes. A port can be configured as Ethernet or LAG.

Note:
All ports and LAGs which are used by ONE RING Configuration should be STP mode and Loopback-Detection mode disabled.

ONE RING Configuration



ONE RING Configuration

Item	Description
Instance ID	The ring instance index

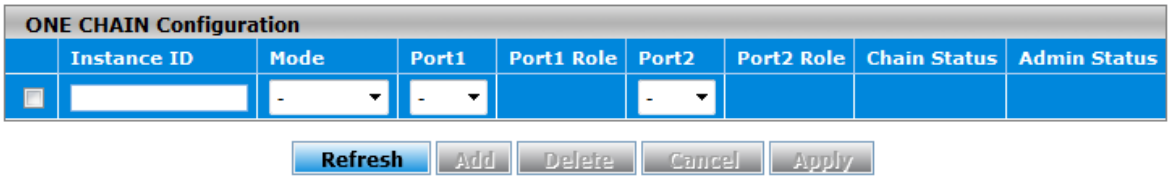
Item	Description
Mode	Defines the node role. The possible field values are: ● Master: The master node manages the ring network, and there only can be one master node in a ring network. ● Slave: The slave nodes forward the hello packets along the ring, and there are up to 250 slave nodes.
Port1	On the master node, it is the primary port. On the slave node, it is just one of the member ports.
Port2	On the master node, it is the backup port. On the slave node, it is just one of the member ports.
Ring State	Defines the current ring status on the node. Master state: ● Discover: The ring is not completed yet. ● Monitor: The ring is completed and healthy. ● Fault: The ring failed. The backup path is activated. Slave State: ● Forwarding: After the instance is created, it will stay at this state. ● Hold: It is a middle state of the slave when 2 member ports link down->up.
Admin Status	It is only the Ring instance Entry status including active, inactive, etc.

3.3.2.2 ONE CHAIN Configuration

ONE CHAIN will connect a series of nodes to a LAN network. A Chain consists of a head, a tail and member nodes. The head node hosts the head port that is forwarded by default. The tail node hosts the tail port that is blocked by default. Any link failure between the head and the tail across the chain will make the tail port as a forwarding port. The topology will be restored after recovery from failure. STP should be disabled on the adjacent ports of LAN that are connected to the head and the tail port. It can improve the recovery time.

Note:
All ports and LAGs which are used by ONE CHAIN Configuration should be STP mode and Loopback-Detection mode disabled.

ONE CHAIN Configuration



ONE CHAIN Configuration

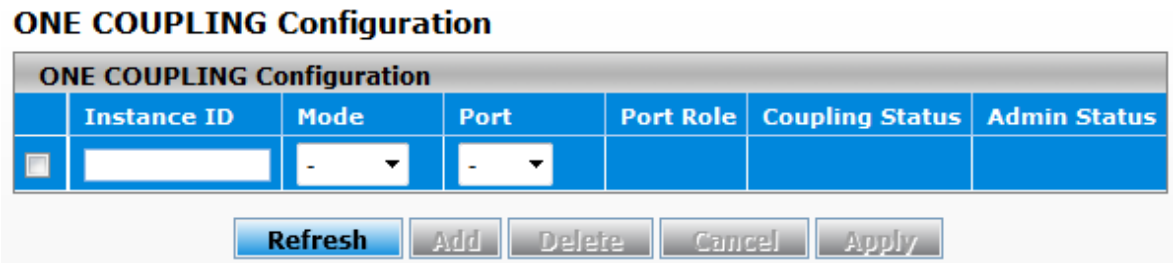
Item	Description
Instance ID	The ring instance index
Mode	Defines the node role. The possible field values are: ● **Head**: A Head node has one head port and one member port. ● **Tail**: A Tail node has one tail port and one member port. The tail has two statuses: block and forwarding. ● **Member**: A Member node has two member ports.
Port1	On the head node, it is the head port. On the member node, it is just one of the member ports. On the tail node, it is the tail port.
Port2	On the head node, it is the member port. On the member node, it is just one of the member ports. On the tail node, it is the member port.

Item	Description
Chain State	Defines the current ring status on the node. On the head node: ● **Discover**: The chain is not completed yet. ● **Monitor**: The chain is completed and healthy. The Head port is linked up, and no node is disconnected. ● **Fault**: The chain is disconnected because the member node links down or the head port links down. ● **Hold**: The Head port links down->up. On the member node: ● **Forwarding**: After the instance is created, it will stay at this state. ● **Hold**: It is a middle state of the slave when 2 member ports link down->up. It changes to the Forwarding state when it receives the clear-FDB message or the HOLD timer timeout. On the tail node: ● **Discover**: The chain is not completed yet. ● **Monitor**: The chain is completed and healthy. ● **Fault**: The chain fails. The backup path is activated.
Admin Status	It just the Ring instance Entry status including active, inactive, etc.

3.3.2.3 ONE COUPLING Configuration

ONE COUPLING is used to connect two redundant ring networks. There is a main path and a backup path. There are two types of nodes, namely head and tail nodes. The head node hosts the main path and the tail node hosts the backup path. The backup path will be blocked by default. When there is failure in the main path, the backup path will get unblocked.
Only one ring will be configured with the head coupling node and the tail coupling node. STP should be disabled on the adjacent ports that are connected to the head and the tail port.

Note:
All ports and LAGs which are used by ONE COUPLING Configuration should be STP mode and Loopback-Detection mode disabled.



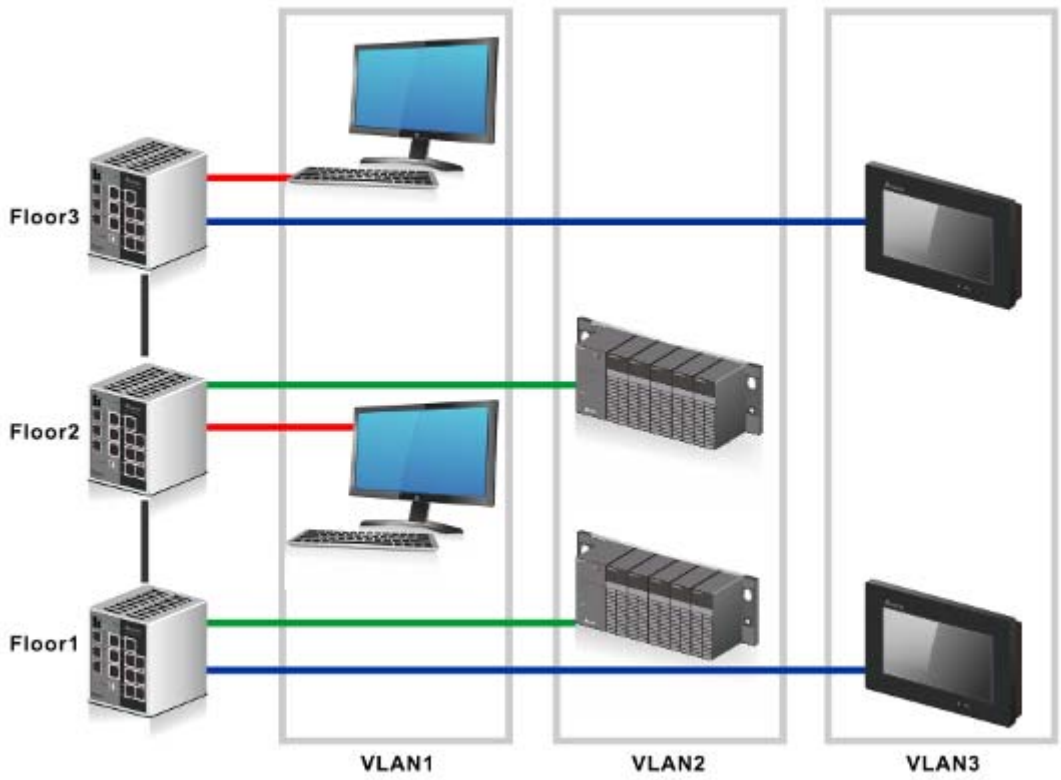
ONE COUPLING Configuration

Item	Description
Instance ID	The ring instance index
Mode	Defines the node role. The possible field values are: ● **Head**: The Head node sends periodic status packets to the ring on both the ring ports. If the main path is disrupted, the head node will send a status message indicating linking down. After the main path is restored, the main path ports will be initially set to the blocked state. ● **Slave**: The tail node receives status messages from the head. The backup path is blocked by default. On detecting main path failure, it will allow forwarding in the backup path. On detecting main path recovery, it will change the state of the backup path to blocking.

Item	Description
Port	On the head node, it is the head port. On the tail node, it is tail port.
Ring State	Defines the current ring status on the node. Head state: ● **Monitor**: The head port is linked up. ● **Fault**: The head port is linked down. It will notify the tail node to activate the backup path. ● **Link-Up**: The head port is linked up. If the head port is linked down at this state, it will change to Fault again. ● **Hold**: After Link-Up timer timeout, the node will change to the HOLD state. Tail State: ● **Discover**: The coupling is not completed yet. It waits for the head port link status message from the head node. ● **Monitor**: The coupling is completed and healthy. ● **Fault**: The coupling is disconnected.
Admin Status	It is only the Ring instance Entry status including active, inactive, etc.

3.4 Virtual LANs

Virtual LAN (VLAN) is a logically group network. VLANs electronically separate interfaces on the same switch into different broadcast domains so that broadcast packets are not sent to all the interfaces on a single switch. VLAN allows switch manager to isolate network traffic so that only members of the VLAN could receive traffic from the same VLAN members. VLAN also allow a user to access the network from a different place or switch. So VLAN provide security and flexibility.
For example: Configure department A, B, C to VLAN 1, 2, 3. User only can access the resource which belongs to their department, so the resource in their department can be protected. And they can access the resource in a different floor, even though in a different place. So they don't need to stay in a fixed place to access the resource which belongs to their department.



IMPORTANT:
Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.

3.4.1 VLAN Configuration

VLAN Configuration is used to define VLAN groups and the VLAN information will be stored in the VLAN membership table. Delta switch supports up to 256 VLANs. VLAN 1 is the default VLAN, and all interfaces are untagged members by default setting.

Note:
By default, all interfaces are untagged members of VLAN 1, the default VLAN. However, interfaces that you make members of link aggregation groups (that is, physical interfaces that function as trunk members) lose their membership of the default VLAN.

VLAN Configuration

VLAN Configuration

	VLAN ID	VLAN Name	VLAN Type
	1	Default	Default
	2	VLAN2	Static
	3	VLAN3	Static

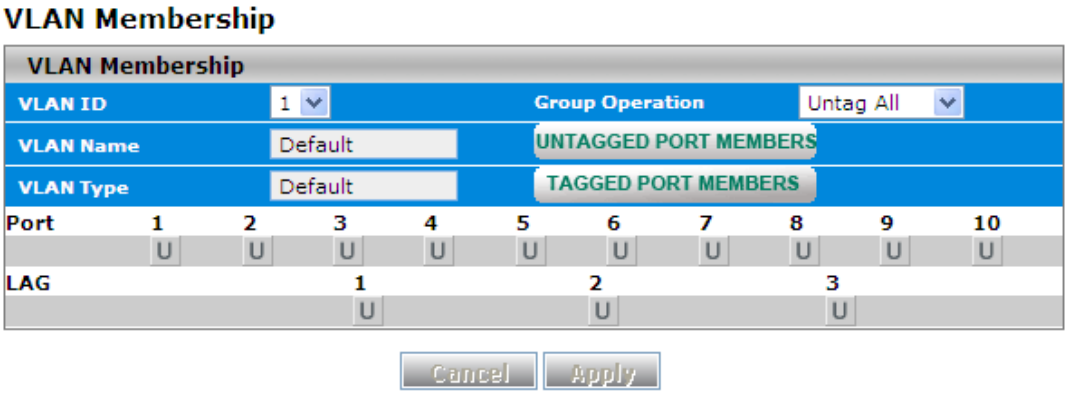
Add Delete Cancel Apply

VLAN Configuration

Description	Factory Default
VLAN ID	
Enter the identifier for the new VLAN. The range can be set in the range of 1 to 4094.	None
VLAN Name	
Enter a name for the VLAN. The name can be up to 32 alphanumeric characters long, including blanks.	None
VLAN Type	
When you create VLAN, the VLAN type always displays Static.	Static

3.4.2 VLAN Membership

Select the check box next to the VLAN that you want to remove. (You cannot remove the three preconfigured VLANs.)



An interface or LAG can be a tagged (T) or untagged (U) VLAN member.

VLAN Square Status

Status	Description
blank square (Auto)	If the interface or LAG is not a member of VLAN, the square must keep blank. The port currently is not the static member of the VLAN, but it can be added dynamically by other protocol, for example by GVRP.
T (Tagged)	If the square status of the interface or LAG is T, frames transmitted from the interface or LAG is tagged with the port VLAN ID. Click **Tagged Port Members** to view which interfaces and LAGs are tagged.
U (Untagged)	If the square status of the interface or LAG is U, frames transmitted from this interface or LAG is untagged. Each interface or LAG can be an untagged member of any VLAN. That is, an interface or LAG can be an untagged member of multiple VLANs. All interfaces and LAGs are untagged members of VLAN 1 by default setting. Click **Untagged Port Members** to view which interfaces and LAGs are untagged.
X (Forbidden)	This port would not be the member of this VLAN permanently. (It also cannot be added dynamically by other protocol)

Add and configure the interface or LAG:

- Click once to add the interface or LAG as tagged members to the VLAN.
- Click twice to add the interface or LAG as untagged members to the VLAN.
- Click three times to remove the interface or LAG from the VLAN.

Add and configure all interfaces:

- **Untag All:** Adds all interfaces or LAGs as untagged members to the VLAN.
- **Tag All:** Adds all interfaces or LAGs as tagged members to the VLAN.
- **Remove All:** Removes all interfaces or LAGs from the VLAN.

3.4.3 VLAN Status

VLAN Status

VLAN Status

VLAN ID	VLAN Name	VLAN Type	Member Ports	Untagged Ports
1	Default	Default	0/1-10,po1,po2,po3	0/1-10,po1,po2,po3
2	VLAN2	Static	0/7-8	
3	VLAN3	Static	0/9-10	0/9-10

Refresh

3

VLAN Status

Item	Description
VLAN ID	The identifier of VLAN.
VLAN Name	The name of VLAN.
VLAN Type	The type of VLAN (Default or Static).
Member Ports	The interfaces that are members of VLAN.
Untagged Ports	The interfaces that are untagged members of VLAN.

Click **Refresh** to update the information.

3.4.4 Port PVID Configuration

VID (VLAN ID) is the tag of VLAN. It defines the interface which can **receive** the packets of the VLAN; PVID (Port VLAN ID) which defines the untagged port can **forward** which VLAN's packets. For example: If port 1 belongs to VLAN 1, 2, 3, and its PVID is 1, port 1 can receive the packets from VLAN 1, 2, 3, but it only can forward the packets to VLAN 1.
The default port VLAN ID (PVID) is assigned to 1 on all interfaces, because they are assigned to default VLAN 1. If there is no other values specified, the default VLAN PVID is used for untagged or priority-tagged frames.

Note:
If you want to change default PVID of an interface, create VLAN and then includes the interface as a member.

Port PVID Configuration

Port PVID Configuration					
	Port	PVID	Acceptable Frame Types	Ingress Filtering	Port Priority
			-	-	
	0/1	1	All	Disabled	0
	0/2	1	All	Disabled	0
	0/3	1	All	Disabled	0
	0/4	1	All	Disabled	0
	0/5	1	All	Disabled	0
	0/6	1	All	Disabled	0
	0/7	1	All	Disabled	0
	0/8	1	All	Disabled	0
	po1	1	All	Disabled	0
	po2	1	All	Disabled	0
	po3	1	All	Disabled	0

Apply

Port PVID Configuration

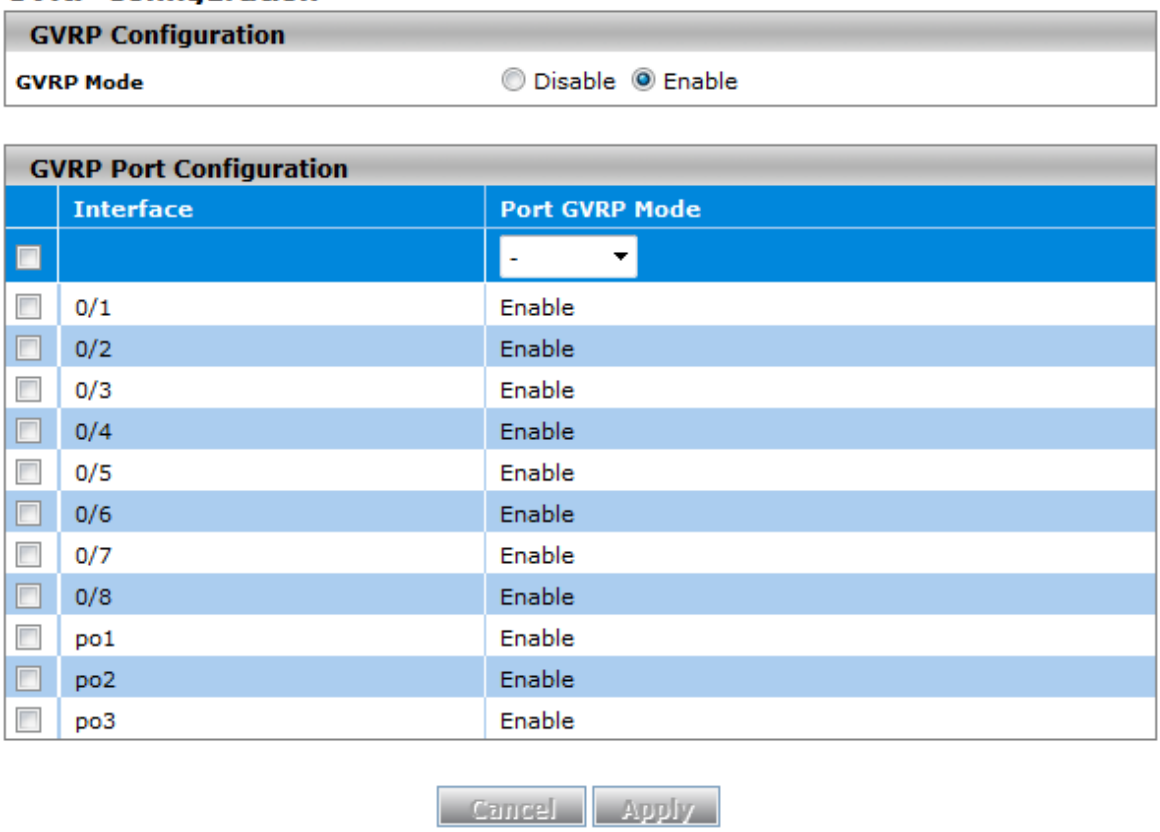
Description	Factory Default
Port	
This field displays the interface number or port channel number.	*interface number*
PVID	
This field displays current PVID.	1
Acceptable Frame Types	
Specify the types of frames that can be received on the interface: • **All:** Accept tagged, untagged, and priority-tagged frames. Untagged or priority-tagged frames are assigned the VLAN ID for this interface. VLAN-tagged frames are forwarded. • **Tagged:** Only forward VLAN-tagged frames, drop all other frames. • **UnTagged and Priority Tagged:** Forward untagged and priority-tagged frames, drop VLAN-tagged frames.	All
Ingress Filtering	
Specify whether the ingress filtering is applied: • **Enabled:** The ingress filtering is enabled for the interface. If the interface is not a member of VLAN with which the frame is associated, an incoming frame is dropped. In a tagged frame, VLAN is identified by the VLAN ID in the tag. In an untagged frame, VLAN is PVID. • **Disabled:** The ingress filtering is disabled for the interface. All frames are forwarded.	Disabled
Port Priority	
Enter the default priority that is assigned to incoming untagged packets. Enter a number between 0 and 7. 7 is the highest priority.	0

3.4.5 GVRP Configuration

The GARP (Generic Attribute Registration Protocol) VLAN Registration Protocol defines a GARP application that provides the 802.1Q-compliant VLAN pruning and dynamic VLAN creation on 802.1Q trunk ports. With GVRP, the switch can exchange VLAN configuration information with other GVRP switches, prune unnecessary broadcast and unknown unicast traffic, and dynamically create

and manage VLANs on switches connected through 802.1Q trunk ports.

GVRP Configuration



GVRP Configuration

Description	Factory Default
GVRP Mode	
Specify whether the GVRP mode is enabled. • **Disable:** The GVRP mode is disabled. • **Enable:** The GVRP mode is enabled.	Enable

GVRP Port Configuration

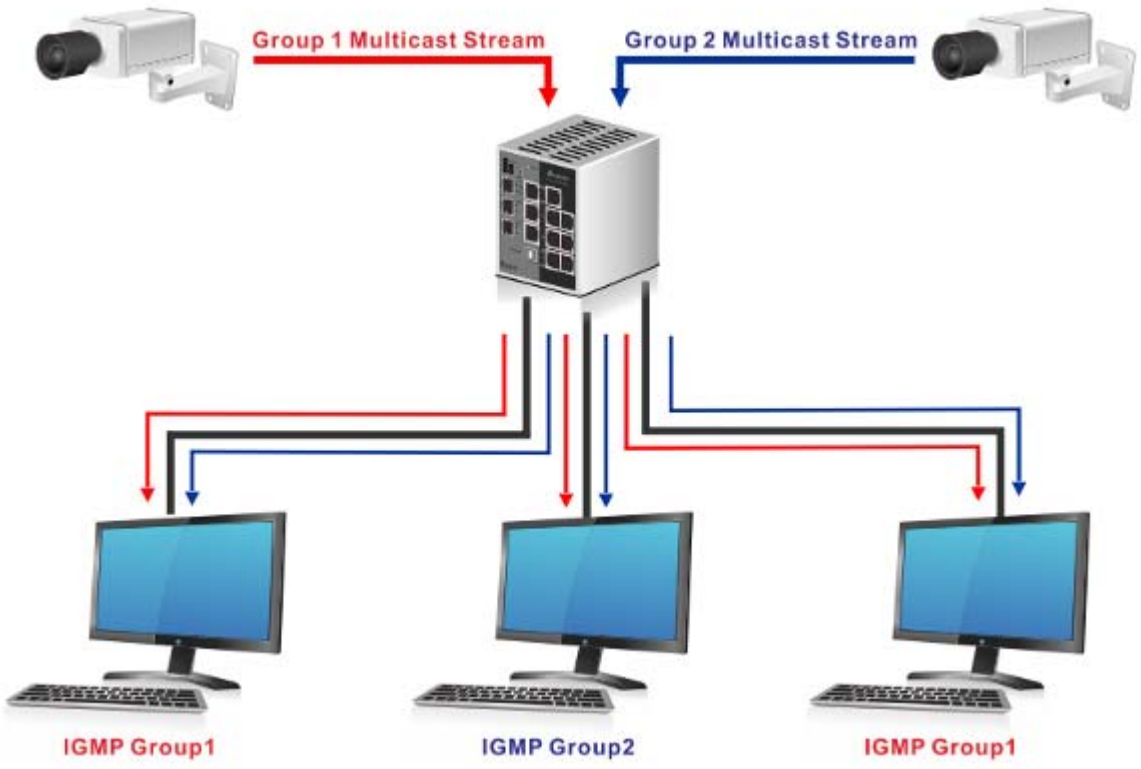
Description	Factory Default
Interface	
This field displays the interface number.	*interface number*
Port GVRP Mode	
Specify whether the GVRP mode is enabled on the interface.	Enable

3.5 Multicast Filtering

Multicast IP traffic is traffic that is assigned to a host group. Host groups are identified by class D IP addresses, which range from 224.0.0.0 to 239.255.255.255. A multicast IP packet only sends by one host to multiple hosts. Only those hosts that belong to a specific multicast group will receive the multicast. The Internet Group Management Protocol (IGMP) snooping enables the switch to forward multicast traffic intelligently to only the interface that request the multicast traffic. So the network resource is not wasted too much.

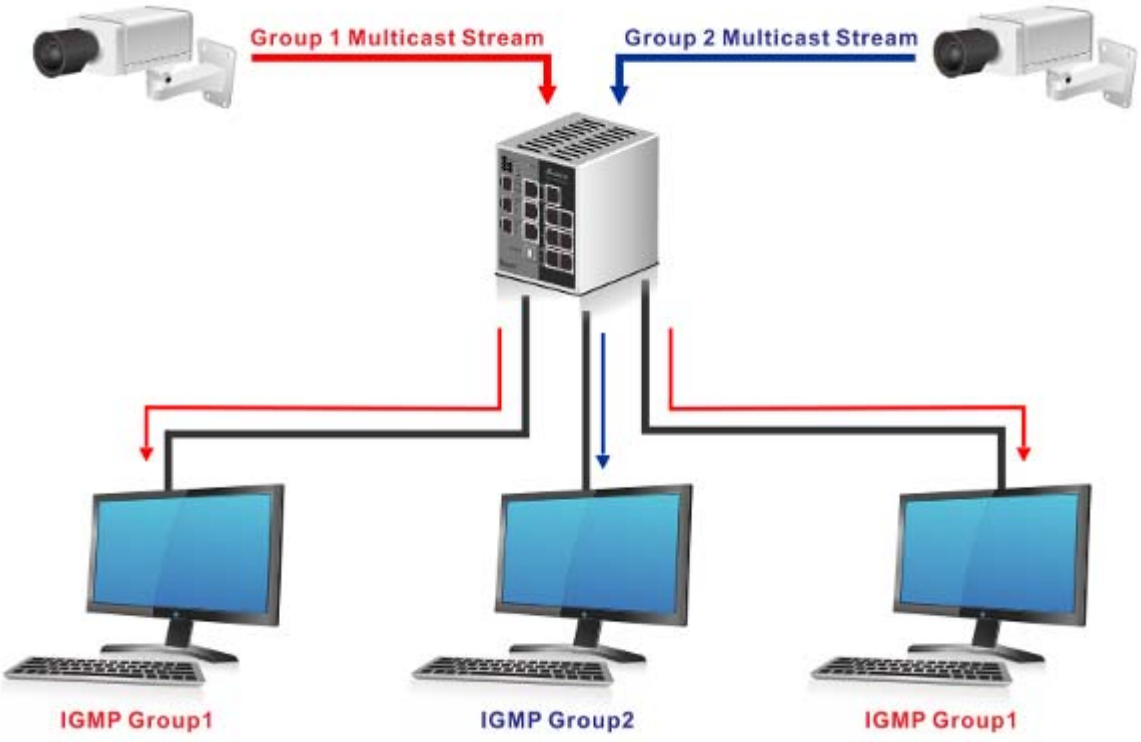
If there is a network without the multicast filtering, and a host needs to send data to many hosts, then it needs to produce several copies in the network. It wastes too much network bandwidth. If there is a network with the multicast filtering, then it reduces the load of resources (ex. a server) and makes the network bandwidth efficient.

Network without Multicast Filtering:



(All hosts receive the multicast traffic.)

Network with Multicast Filtering:



(Only the host which belongs to the group can receive the traffic.)

IGMP Snooping manages multicast traffic by making use of switches, routers, and hosts that support IGMP. Enabling IGMP Snooping allows the ports to detect IGMP queries, report packets, and manage multicast traffic through the switch. IGMP has three fundamental types of messages, as shown below:

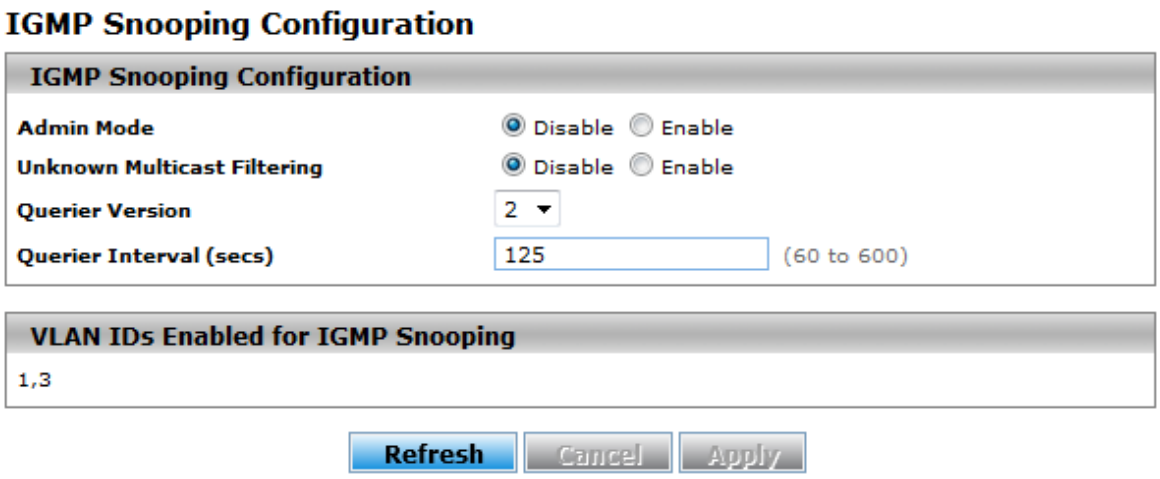
Message	Description
Query	A message sent from the querier (an IGMP router or a switch) which asks for a response from each host that belongs to the multicast group.
Report	A message sent by a host to the querier to indicate that the host wants to be or is a member of a given group indicated in the report message.
Leave Group	A message sent by a host to the querier to indicate that the host has quit as a member of a specific multicast group.

3

IMPORTANT:
Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.

3.5.1 IGMP Snooping Configuration

In this page, you can Enable or Disable IGMP Snooping. And it displays which VLAN enabled the IGMP Snooping function.



IGMP Snooping Configuration

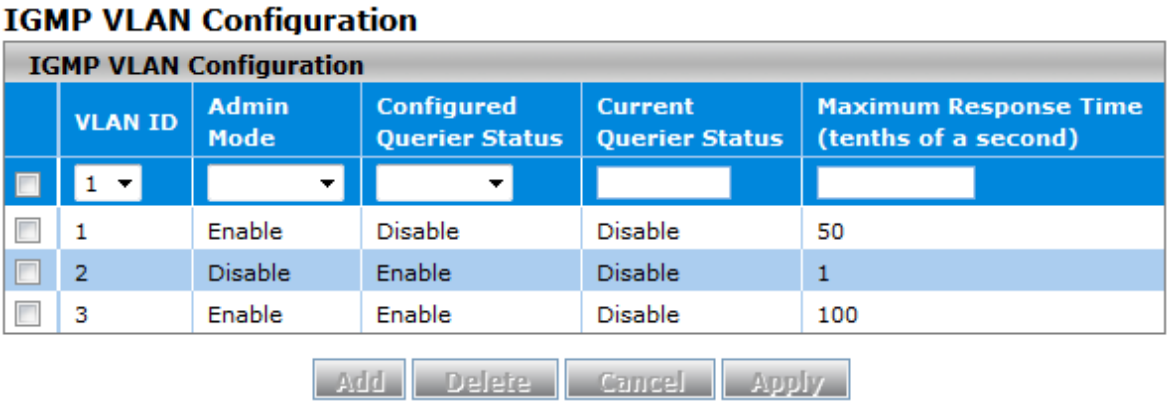
Description	Factory Default
Admin Mode	
Specify the status of IGMP snooping: • **Disable:** The IGMP snooping is disabled. The IGMP setting still can be configured, but the settings do not take effect after you have applied them. • **Enable:** The IGMP snooping is enabled. The switch snoops all IGMP packets it receives to determine which segments should receive packets directed to the group address.	Disable

Description	Factory Default
Unknown Multicast Filtering	
Specify the status of the unknown multicast filtering: • **Disable:** Unknown multicast traffic is not filtered and is forwarded. • **Enable:** Unknown multicast traffic is filtered and dropped.	Disable
Querier Version	
Specify the IGMP protocol version used in periodic IGMP queries. • **IGMP v1:** Support member query and report function. • **IGMP v2:** Support general query (the same as IGMPv1), group-specific query, maximum response time and leave group message function.	2
Querier Interval (secs)	
Querier interval is the amount of time in seconds between IGMP General Query messages sent by the router (if the router is the querier on this subnet). Enter a period between 60 and 600 seconds.	125

VLAN IDs Enabled for IGMP Snooping
This field displays the VLANs that are enabled for IGMP snooping. For information about how to configure a VLAN for IGMP snooping, see the following section.

3.5.2 IGMP VLAN Configuration

This page can configure the IGMP snooping and querier status to each VLAN.



IGMP VLAN Configuration

Description	Factory Default
VLAN ID	
Select a VLAN ID for which you want to create an IGMP snooping configuration.	None
Admin Mode	
Specify the IGMP querying status for VLAN: • **Disable:** The query can't be forwarded to all multicast groups in VLAN. • **Enable:** The query can be forwarded to all multicast groups in VLAN.	Enable
Configured Querier Status	
Specify the configured querier status: • **Disable:** IGMP querying is disabled for VLAN. You can still configure VLAN for snooping, but the settings do not take effect after you have applied them. • **Enable:** IGMP querying is enabled for the VLAN.	Disable
Current Querier Status	
The field displays the current querier status in the VLAN.	Disable

Description	Factory Default
Maximum Response Time (tenths of a second)	
Enter the maximum response time for the IGMP query for VLAN. This field specifies the maximum period that the switch waits for a response from a host if the switch is the querier for VLAN. Enter a period in tenths of seconds in the range of 0 to 255. Enter 0 to disable the maximum response time.	100

3.5.3 IGMP Snooping Multicast Forwarding Table

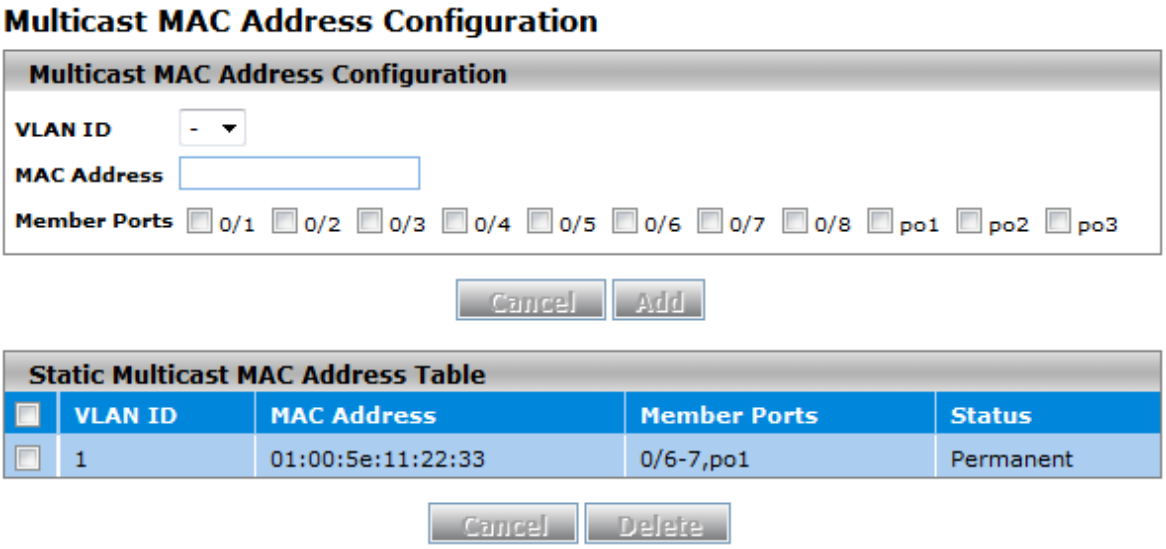
The multicast forwarding table displays how packets that arrive with a multicast destination MAC address are forwarded.
The destination MAC address is combined with the VLAN ID when a packet is sent into the switch. And the multicast searching and forwarding status is displayed in the multicast forwarding table. If there is no match found, the packet is flooded to all interfaces in VLAN or discarded. It depends on the configuration. If there is a match found, the packet is forwarded to the interfaces which are the members of the multicast group.

IGMP Snooping Multicast Forwarding Table

Item	Description
VLAN ID	The VLAN ID for the IGMP snooping configuration.
MAC address	The multicast MAC address from which multicast traffic is requested and sent.
Forwarding Interfaces	The interfaces that request the multicast traffic and to which incoming multicast traffic is forwarded.

3.5.4 Multicast MAC Address Configuration

If required, the Delta switch also supports adding multicast groups manually. You can add a multicast MAC address with a VLAN ID in this page. Before you add a multicast MAC address with a VLAN ID into switch, make sure the member ports have been assigned to the VLAN ID.



Multicast MAC Address Configuration

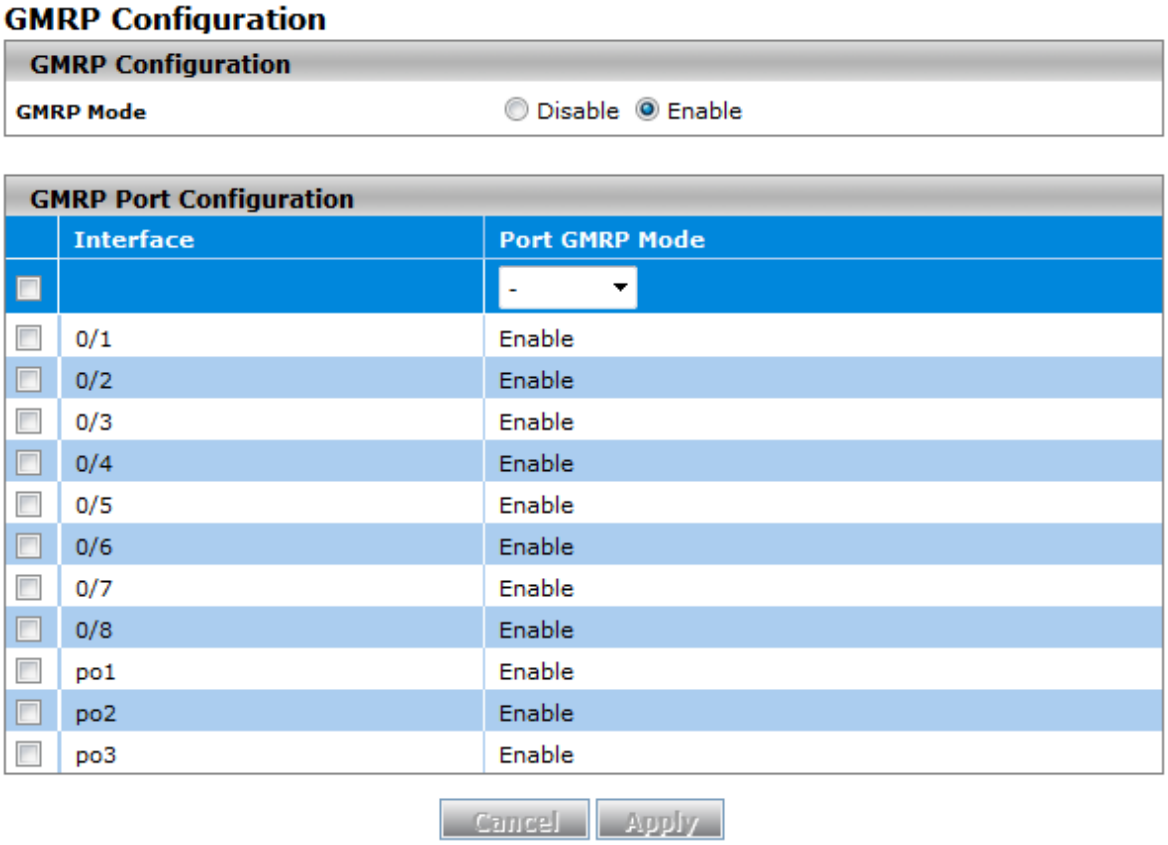
Description	Factory Default
VLAN ID	
Specify the VLAN ID.	None
MAC Address	
Specify the multicast MAC address.	None
Member Ports	
Specify the multicast member ports.	None

Static Multicast MAC Address Table

Item	Description
VLAN ID	The field displays the identifier of VLAN.
MAC Address	The field displays the multicast MAC address.
Member Ports	The field displays the multicast member ports.
Status	The field displays the status of the multicast MAC address.

3.5.5 GMRP Configuration

The GARP (Generic Attribute Registration Protocol) Multicast Registration Protocol helps control the flooding of multicast packets. GMRP-enabled switches dynamically register and de-register group membership information with the MAC networking devices attached to the same segment.



GMRP Configuration

Description	Factory Default
Specify whether the GMRP mode is enabled. • **Disable:** The GMRP mode is disabled. • **Enable:** The GMRP mode is enabled.	Enable

GMRP Port Configuration

Description	Factory Default
Interface	
This field displays the interface number.	*interface number*
Port GMRP Mode	
Specify whether the GMRP mode is enabled on the interface. • **Disable:** The GMRP mode on the interface is disabled. • **Enable:** The GMRP mode on the interface is enabled.	Enable

3.5.6 Multicast Forwarding Table

The multicast MAC address can be added by manually and it also can be added by GMRP function. This multicast forwarding table can displays the type of the MAC address.

Multicast Forwarding Table

Multicast Forwarding Table			
VLAN ID	MAC Address	Type	Forwarding Interfaces
1	01:00:5e:11:22:33	Static	0/6-7,po1

Refresh

Item	Description
VLAN ID	The field displays the identifier of VLAN.
MAC Address	The field displays the multicast MAC address.
Type	The field displays the learning type is static or dynamic.
Forwarding Interfaces	The field displays the forwarding interface number.

3.6 Traffic Prioritization

Traffic prioritization provides you to make sure the time-sensitive and system-critical data can be transferred with minimal delay. It uses four queues that are present in UI from high priority to low priority.
Delta switch supports DSCP trust mode, 802.1p trust mode, queue scheduling (Support Weighted Round Robin and Strict-Priority) and 4 level priority queues. The traffic prioritization depends on 2 methods:

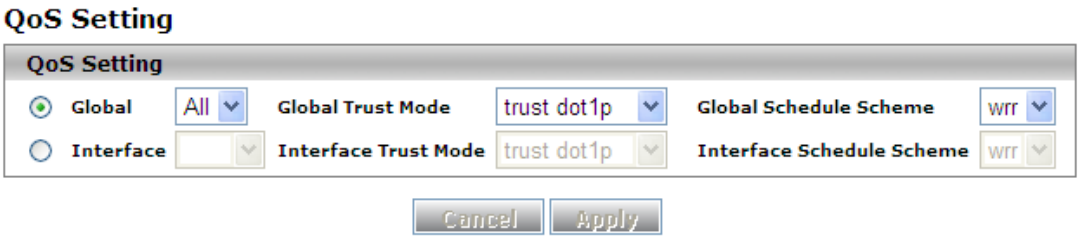
- **IEEE 802.1P:** a layer 2 marking scheme.
- **Differentiated Services (DiffServ):** a layer 3 marking scheme.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.6.1 QoS

Quality of Service (QoS) provides a traffic prioritization for you to alleviate congestion problem and ensure high-priority traffic is delivered first. If the bandwidth of the network is limited, you can use QoS to schedule the priority of a different service packet flow.

3.6.1.1 QoS Setting



QoS Setting

- **Global:** Specify the trust mode settings to all interfaces and aggregation groups. Then, make a selection from the Global Trust Mode drop-down list.

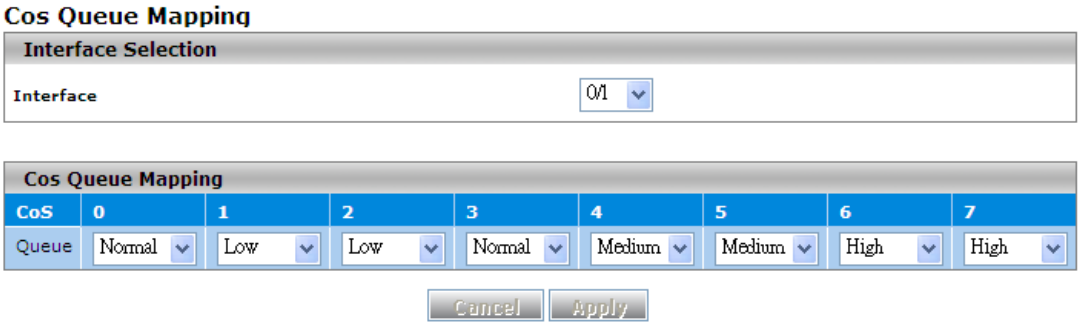
Description	Factory Default
Global Trust Mode	
Make a selection from the Global Trust Mode drop-down list that affects all interfaces or aggregation groups: • **trust dot1p:** All interfaces or aggregation groups are configured for 802.1p marking to classify traffic. • **trust ip-dscp:** All interfaces and aggregation groups are configured for IP DSCP packet matching to classify traffic.	trust dot1p
Global Schedule Scheme	
Make a selection from the Global Schedule Scheme drop-down list that affects all interfaces: • **sp:** SP(Strict-Priority) classifies the queue from priority high to low. If the higher priority of the queue is empty, the lower priority data of queue start to send. • **wrr:** WRR(Weighted Round Robin) schedules the queue by turns, so each queue has a service time. Each queue can be allocated a weight value or percentage for the bandwidth.	Wrr

- **Interface:** Specify the trust mode settings to an individual interface and aggregation groups. Select an interface or aggregation groups from the Interface drop-down list, and then make a selection from the Interface Trust Mode drop-down list.

Description	Factory Default
Interface Trust Mode	
Make a selection from the Interface Trust Mode drop-down list that affects an individual interfaces or aggregation groups: • **trust dot1p:** The interface or aggregation groups are configured for 802.1p marking to classify traffic. • **trust ip-dscp:** The interface and aggregation groups are configured for IP DSCP packet matching to classify traffic.	trust dot1p
Interface Schedule Scheme	
Make a selection from the Global Schedule Scheme drop-down list that affects all interfaces: • **sp:** SP(Strict-Priority) classifies the queue from priority high to low. If the higher priority of the queue is empty, the lower priority data of queue start to send. • **wrr:** WRR(Weighted Round Robin) schedules the queue by turns, so each queue has a service time. Each queue can be allocated a weight value or percentage for the bandwidth.	Wrr

3.6.1.2 CoS Queue Mapping

This page provides you to configure CoS value to physical queue mapping table. The field specifies a priority value between 0 and 7, and Delta switch provide 4 physical queues which can be used by quality of service (QoS) to differentiate network traffic.



Interface Selection
Specify one of the following selections:
•**Select from 0/1 through 0/10:** Specify an individual interface.
•**Select from po1 through po3:** Specify a link aggregation group.
•**Select All:** Specify all interfaces and link aggregation groups.

CoS Queue Mapping
Select a queue to which you want to map the priority. The traffic class is the selected queue (Low, Normal, Medium, or High) for an interface.
The default queues of the CoS are mapped as below:

CoS	0	1	2	3	4	5	6	7
Queue	Normal	Low	Low	Normal	Medium	Medium	High	High

3.6.1.3 DSCP Queue Mapping

This page provides you to configure the DSCP value to physical queue mapping table. The field specifies a priority value between 0 and 63, and Delta switch provide 4 physical queues which can be used by quality of service (QoS) to differentiate network traffic. User can configure the mapping table to follow the upper layer 3 switch or routers' DSCP setting.

DSCP Queue Mapping

Interface Selection

Interface 0/1

DSCP Queue Mapping

IP DSCP	Queue	IP DSCP	Queue	IP DSCP	Queue	IP DSCP	Queue
0	Normal	16	Low	32	Medium	48	High
1	Normal	17	Low	33	Medium	49	High
2	Normal	18	Low	34	Medium	50	High
3	Normal	19	Low	35	Medium	51	High
4	Normal	20	Low	36	Medium	52	High
5	Normal	21	Low	37	Medium	53	High
6	Normal	22	Low	38	Medium	54	High
7	Normal	23	Low	39	Medium	55	High
8	Low	24	Normal	40	Medium	56	High
9	Low	25	Normal	41	Medium	57	High
10	Low	26	Normal	42	Medium	58	High
11	Low	27	Normal	43	Medium	59	High
12	Low	28	Normal	44	Medium	60	High
13	Low	29	Normal	45	Medium	61	High
14	Low	30	Normal	46	Medium	62	High
15	Low	31	Normal	47	Medium	63	High

Cancel Apply

Interface Selection
Specify one of the following selections:
•**Select from 0/1 through 0/10:** Specify an individual interface.
•**Select from po1 through po3:** Specify a link aggregation group.
•**Select All:** Specify all interfaces and link aggregation groups.

DSCP Queue Mapping
Select a queue to which you want to map the priority. The traffic class is the selected queue (Low, Normal, Medium, or High).
The previous figure shows the default queues for each IP DSCP value:

- IP DSCP values 0 through 7 and 24 through 31 at queue **Normal**

- IP DSCP values 8 through 23 at queue **Low**
- IP DSCP values 32 through 47 at queue **Medium**
- IP DSCP values 48 through 63 at queue **High**

3.7 Traffic Control

You can see the MAC addresses which Delta switch had learned, and configure a port which is to be protected or unprotected in this group.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.7.1 Port Protected

A protected port does not forward traffic to any other protected ports on the switch, but can forward traffic to unprotected ports on the switch.

Protected Ports

Protected Ports Membership								
Port	1	2	3	4	5	6	7	8

Cancel Apply

- **Enable:** Select one or more interfaces by clicking the square.
- **Disable:** Click second time to clear the interface.

3.8 Port Bandwidth

Delta switch provides you to configure bandwidth for each port to avoid a network traffic storm.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.8.1 Storm Control

A traffic storm occurs when incoming packets flood the LAN, which causes the decreasing of the network performance. Storm control protects can avoid flooding packets affect the network performance. Delta switch provides you to configure both storm control for each interface and rate limiting of each interface for incoming and outgoing traffic.

3.8.1.1 Storm Control Setting

A broadcast storm occurs when a large number of broadcast messages are transmitted from a

single interface across a network at the same time. Forwarding these messages can overload too much network resources or cause the network time out.
Delta switch can measure the incoming packet rate of broadcast, multicast, and unknown unicast packets for each interface and discards packets when the rate exceeds the defined value. You can enable storm control for each interface by a different packet type and define the threshold of the traffic flow.

Storm Control Setting

Port Configuration

	Port	Broadcast Storm			Multicast Storm	
		Recovery Mode	Recovery Level Type	Recovery Level	Recovery Mode	Recovery Level Type
	0/1	Enable	Mbps	5	Disable	Mbps
	0/2	Enable	Mbps	5	Disable	Mbps
	0/3	Enable	Mbps	5	Disable	Mbps
	0/4	Enable	Mbps	5	Disable	Mbps
	0/5	Enable	Mbps	5	Disable	Mbps
	0/6	Enable	Mbps	5	Disable	Mbps
	0/7	Enable	Mbps	5	Disable	Mbps
	0/8	Enable	Mbps	5	Disable	Mbps

Apply Cancel

	Unicast Storm		
Recovery Level	Recovery Mode	Recovery Level Type	Recovery Level
5	Disable	Mbps	5
5	Disable	Mbps	5
5	Disable	Mbps	5
5	Disable	Mbps	5
5	Disable	Mbps	5
5	Disable	Mbps	5
5	Disable	Mbps	5
5	Disable	Mbps	5

Storm Control Setting

Description	Factory Default
Port	
The interface number	*interface number*
Recovery Mode	
Specify the recovery mode by making a selection from the drop-down list: • **Disable:** The recovery mode is disabled. No traffic is discarded. • **Enable:** When traffic on the port exceeds the threshold that is configured in the Recovery Level field, the switch discards the traffic.	Enable
Recovery Level Type	
Specify the link speed recovery level type.	Mbps

Description	Factory Default
Recovery Level	
Specify the threshold at which storm control is activated. If the value is 5, it indicates 5 Mbps. By default, when traffic exceeds 5 Mbps of the link speed, the switch discards the traffic.	5

Note:
For each interface and each of the three types of traffic, you can set the recovery mode and recovery level. The drop-down lists and fields function the same for each of the three types of traffic.

3.8.1.2 Rate Limiting

You can configure the traffic rate for each interface in both directions in this page.

Rate Limiting

Rate Limiting			
	Port	Egress RateLimit (kbps)	Ingress RateLimit (kbps)
	0/1	0	0
	0/2	0	0
	0/3	0	0
	0/4	0	0
	0/5	0	0
	0/6	0	0
	0/7	0	0
	0/8	0	0

Refresh Apply

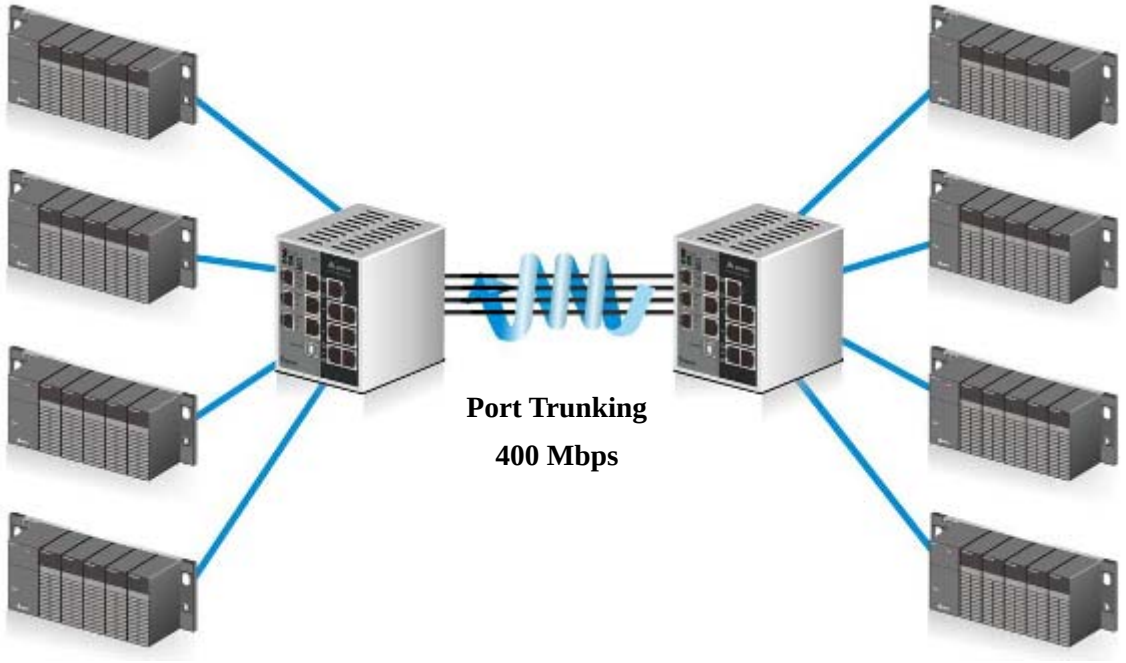
Rate Limiting

Description	Factory Default
Port	
The interface number	*interface number*
Egress RateLimit (kbps)	
Enter the egress port rate limit as a value in the range of 1 to 1,000,000 kbits per second (kbits/s). The value that you enter is actually applied in increments of 64 kbits/s. If the value is 0, it effectively disables the rate limit.	0
Ingress RateLimit (kbps)	
Enter the ingress port rate limit as a value in the range of 1 to 1,000,000 kbits per second (kbits/s). The value that you enter is actually applied in increments of 64 kbits/s. If the value is 0, it effectively disables the rate limit.	0

3.9 Port Trunking

Port Trunking can help you to aggregate more links to form one link group. Delta DVS switch's LAG function supports 3 trunk groups, and you can assign 8 ports to one group. But there is a limit of 3 gigabit ports or 7 10/100Mbps ports for each lag ID. Link Aggregation (LA) increases the capacity and availability of the communication channel between devices (both switches and end stations) using existing Fast Ethernet and Gigabit Ethernet technology. LA also provides load balancing where the processing and communication activity is distributed across several links in a trunk.

If there are 4 ports in a trunk group, and one port fails, then the other seven ports will provide backup and share the traffic automatically. LA also can be used to combine 4 ports between Delta DVS switches. If all ports on these two switches are configured as 100BaseTX and full duplex, then the potential bandwidth of the connection can be 400Mbps.



IMPORTANT:
Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.

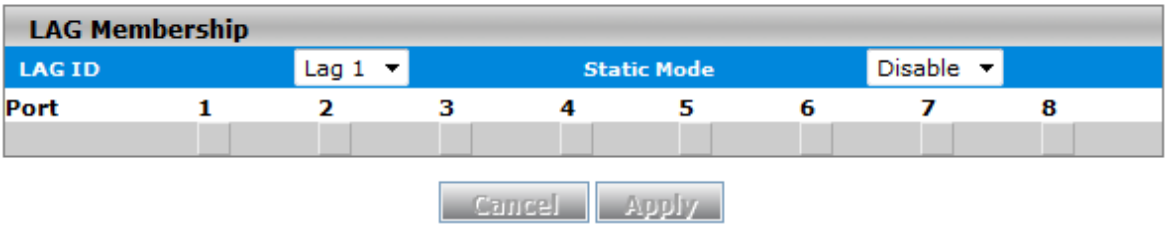
3.9.1 LAG

Link aggregation groups (LAGs) let you combine multiple full-duplex Ethernet links into a single logical link. LAG increases fault tolerance and provide traffic sharing. You can assign LAG VLAN membership after you have added interfaces as members of a LAG.
After you have added interfaces to a LAG and enabled the LAG, Link Aggregation Control Protocol (LACP) can automatically configure a port channel link between the switch and another device.

3.9.1.1 LAG Membership

When the static mode of the port-channel is enabled, it does not transmit or receive LACPDUs. Ex. The member ports do not transmit LACPDUs and all the LACPDUs which are received may be dropped. The factory default is disabled, which means the port-channel is dynamic.
If you want to enable the static mode of a LAG on the Delta switch, make sure the static mode of a LAG of the other switch which connects to the Delta switch is enabled, too.

LAG Membership

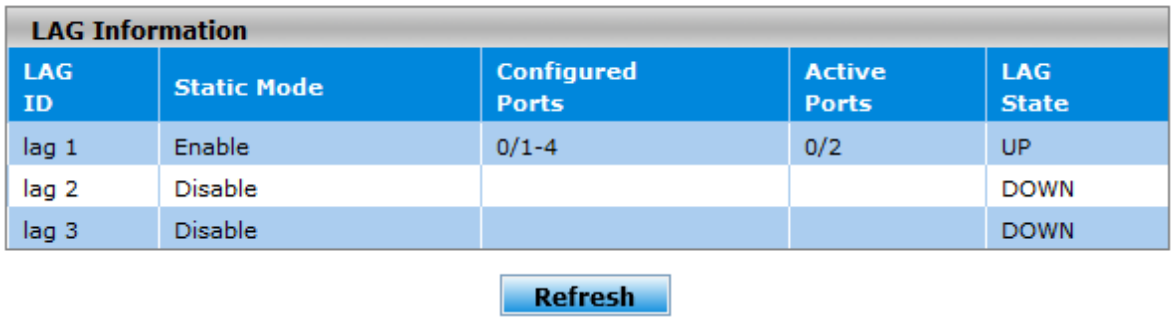


Item	Description
LAG ID	Select the LAG ID from the drop down list.
Static Mode	Specify whether the static mode of the LAG ID is enabled.
Port	Select one or more interfaces by clicking the square or click for the second time to clear the interface.

3.9.1.2 LAG Information

The LAG information is displayed in this page.

LAG Information



Item	Description
LAG ID	This field displays the LAG identifier.
Static Mode	The field displays whether the static mode is enabled.
Configured Ports	The field displays which ports has been configured to the LAG ID.
Active Ports	The field displays the active ports.
LAG State	The field displays whether the LAG state is up.

3.10 Access Control List

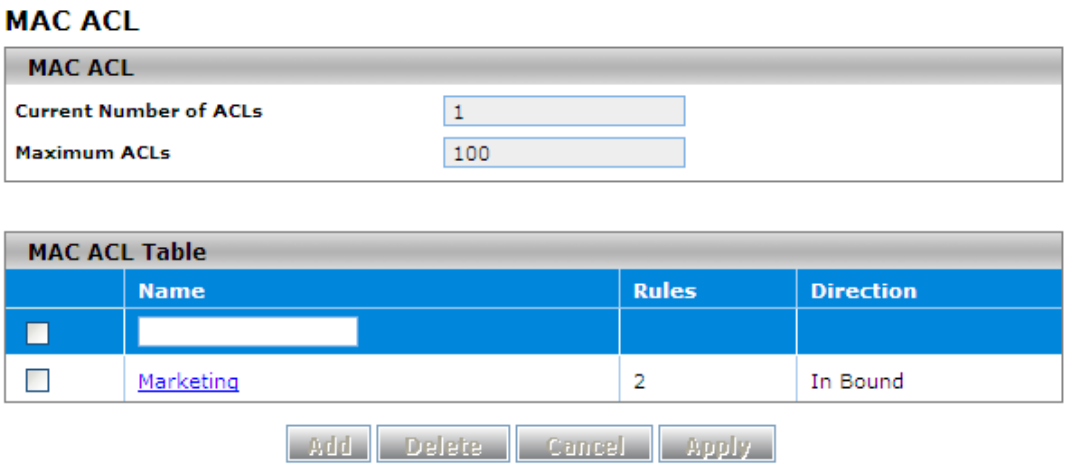
Access control lists (ACLs) can make sure that only authorized devices have access to specific resources when any unauthorized devices which are blocked attempt to access network resources. ACLs provide security for the network, traffic flow control, and determine which types of traffic can be forwarded or blocked.
Delta switch supports ACLs based on the MAC addresses of the source and destination devices (MAC ACLs).
The steps of configuring an ACL:

1. Create a MAC-based ACL name.
2. Create a rule and assign it to an ACL.
3. Assign an ACL to an interface.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.10.1 MAC ACL

A MAC ACL consists of a set of rules that are matched sequentially to compare the packet. With a MAC ACL, you can specify the MAC address of the source device, destination device, or both. When a packet matches the criteria with a rule, and the specified rule action (permit or deny) is applied, then any additional rules will not be checked whether the packet is match or not.



MAC ACL

Setting	Description
Current Number of ACLs	The field displays the sum of the configured ACLs.
Maximum ACLs	The field displays the maximum number of MAC ACLs that can be configured (100).

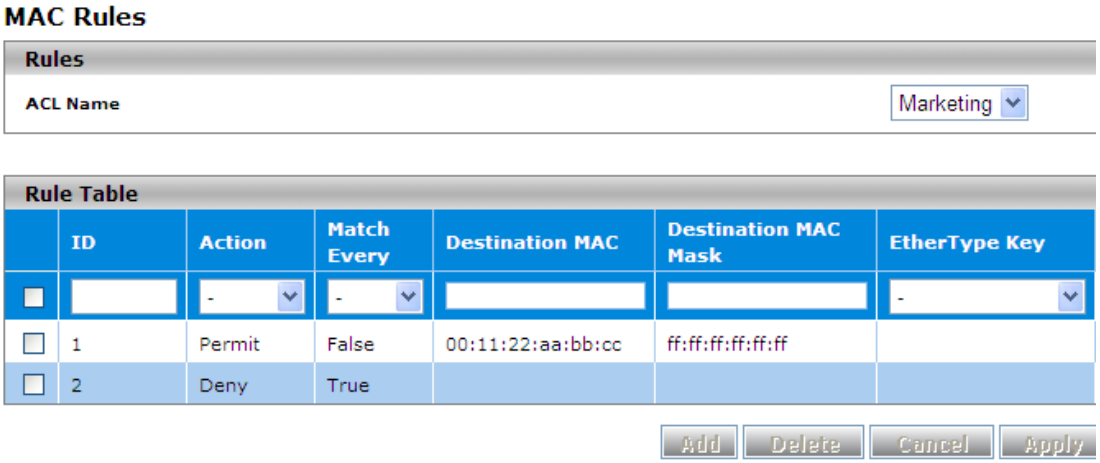
MAC ACL Table

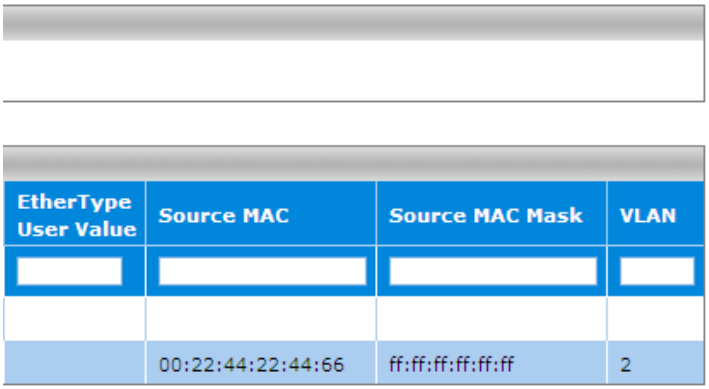
Setting	Description
Name	Specify a name for an ACL. The name can include alphabetic, numeric, dash, underscore, or space characters. It must start with an alphabetic character.
Rules	The number of rules that are configured for the MAC ACL.
Direction	The direction of packet traffic that is affected by the MAC ACL. This is a fixed entry that always shows In Bound; only inbound traffic is subject to the MAC ACL.

3.10.2 MAC Rules

After creating an ACL name, you can configure the action, match, destination MAC, source MAC and VLAN in this page. It can determine whether the packet is forwarded normally or discarded.

Note:
You need to create an implicit *deny all* rule at the end of an ACL rule table to make sure that a packet is dropped if an ACL is applied to the packet and none of the explicit rules match.





Rule Table

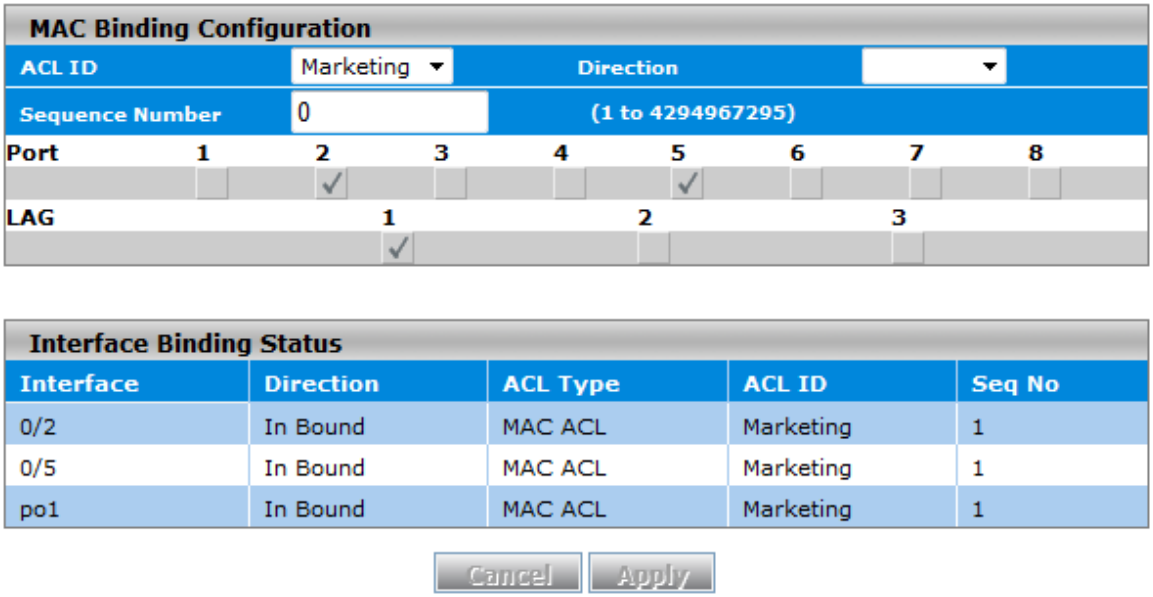
Description	Factory Default
ID	
Enter an ID for the rule. Enter a number between 1 and 10. This means that you can create up to 10 rules for a single MAC ACL name.	None
Action	
Specify the action for the rule: • **Permit:** Packets that meet the ACL criteria are forwarded. • **Deny:** Packets that meet the ACL criteria are dropped.	None
Match Every	
Specify whether all packets need to match the rule: • **True:** All packets need to match the rule. Other rules are not considered, and the fields to the right of the Match Every field are disabled. • **False:** Not all packets need to match the rule. Other rules are also considered.	True
Destination MAC	
Specify the MAC address of the destination device that needs to be compared with the information in a packet. Enter a MAC address in the xx:xx:xx:xx:xx:xx format.	None

Description	Factory Default
Destination MAC Mask	
Specify the MAC mask that is associated with the destination MAC address. The MAC mask specifies which bits in the destination MAC address need to be compared with the information in a packet. **Note:** Use zeros and F in the MAC mask. A zero means that the bit is not checked, and an F in a bit position means that the data needs to be equal to the value given to that bit. For example, if the MAC address is aa:bb:cc:dd:ee:ff, and the mask is 00:00:ff:ff:ff:ff, all MAC addresses with xx:xx:cc:dd:ee:ff result in a match (where x is any hexadecimal number).	None
EtherType Key	
Specify the EtherType that needs to be compared with the information in a packet: **Appletalk, ARP, IBM SNA, IPv4, IPv6, IPX, MPLS multicast, MPLS unicast, NetBIOS, Novell, PPPoE, Reverse ARP, EthernCAT, Profinet-RT, SERCOS III, CC-link IE, Powerlink, User Value**. If you select User Value, enter the value in the EtherType User Value field.	None
EtherType User Value	
If you select User Value from the EtherType Key drop-down list, enter the value, which is a number in the range of 1536 to 65535.	None
Source MAC	
Specify the MAC address of the source device that needs to be compared with the information in a packet. Enter a MAC address in the xx:xx:xx:xx:xx:xx format.	None
Source MAC Mask	
As an option, specify the MAC mask that is associated with the source MAC address. The MAC mask specifies which bits in the source MAC address need to be compared with the information in a packet. **Note:** Use zeros and Fs in the MAC mask. A zero means that the bit is not checked, and an F in a bit position means that the data needs to be equal to the value given to that bit. For example, if the MAC address is aa:bb:cc:dd:ee:ff, and the mask is 00:00:ff:ff:ff:ff, all MAC addresses with xx:xx:cc:dd:ee:ff result in a match (where x is any hexadecimal number).	None
VLAN	
Specify the VLAN ID that needs to be compared with the information in a packet. Enter a number in the range of 0 through 4095. You cannot enter a VLAN range. **Note:** Most VLAN configurations on the switch are in the range of 1 to 4093. However, an ACL can detect a VLAN in the range of 0 to 4095.	None

3.10.3 MAC Binding Configuration

When you bind a MAC ACL to an interface, all rules that you have defined for the MAC ACL are applied to the interface.

MAC Binding Configuration



MAC Binding Configuration

Setting	Description
ACL ID	Select an ACL ID to bind MAC.
Direction	The Direction drop-down list is fixed at Inbound. Only incoming packets can be filtered.
Sequence Number	Enter a number in the range of 1 to 4,294,967,295.
Port	Select one or more interfaces by clicking the square or click for the second time to clear the interface.
LAG	Select one or more LAG by clicking the square or click for the second time to clear the interface.

Interface Binding Status

Setting	Description
Interface	The interface to which the MAC ACL is bound.
Direction	The packet filtering direction for the MAC ACL. The only valid direction is Inbound, which means the MAC ACL rules are applied to traffic entering the interface.
ACL Type	The type of ACL to which the interface is bound. This is a fixed field that always shows MAC ACL.
ACL ID	The name of the ACL to which the interface is bound.
Seq No	The sequence number that signifies the order of the ACL to which the interface is bound. The number should be configured from 1 to 4,294,967,295. The sequence number specifies the order of the ACL relative to existing ACLs that are bound to the same interface or interfaces. A lower number specifies a higher precedence order. If a sequence number is already in use for the interface or interfaces, the ACL replaces the existing ACL that uses the same sequence number.

3.10.4 Binding Table

The MAC binding information is displayed in this page.

MAC Binding Table

MAC Binding Table					
	Interface	Direction	ACL Type	ACL ID	Seq No
	0/2	In Bound	MAC ACL	Marketing	1
	0/5	In Bound	MAC ACL	Marketing	1
	po1	In Bound	MAC ACL	Marketing	1

Delete Cancel

MAC Binding Table

Setting	Description
Interface	The interface to which the MAC ACL is bound.
Direction	The packet filtering direction for the MAC ACL. The only valid direction is Inbound, which means the MAC ACL rules are applied to traffic entering the interface.
ACL Type	The type of ACL to which the interface is bound. This is a fixed field that always shows MAC ACL.
ACL ID	The name of the ACL to which the interface is bound.
Seq No	The sequence number that signifies the order of the ACL to which the interface is bound.

3.11 Security Settings

Delta DVS switch provides many ways to verify the packets, authenticate users or block the attack traffic. You can choose and configure these security settings according to your network environment.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.11.1 Security

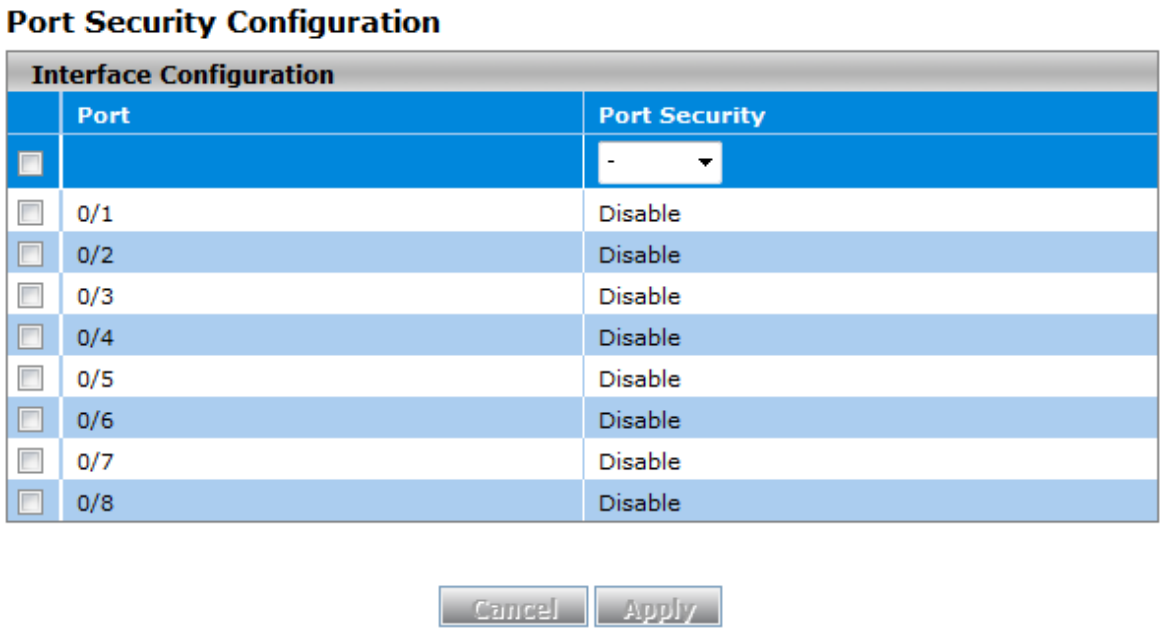
This group provides you to configure a MAC address, an IP address or Port authentication to reach the security purpose.

3.11.1.1 Port Security

Port security lets you to lock the interface. If port security of the interface is enabled, then it only can forward the traffic from the MAC addresses that you specified.
The Port Security feature allows you to stop the MAC address learning for a specific port. After stopping the MAC learning (enable Port Security), only the source MAC address of the packet listed in Static MAC address table with the binding port can access the switch through the port, and other packets will be discarded.

3

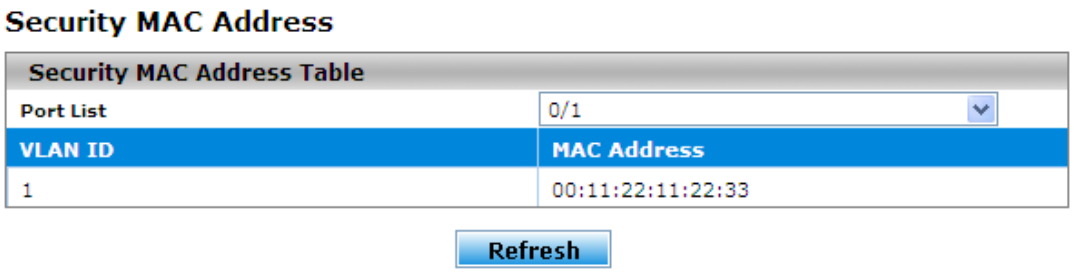
Port Security Configuration
You can specify the interface and enable or disable the port security in this page.



Interface Configuration

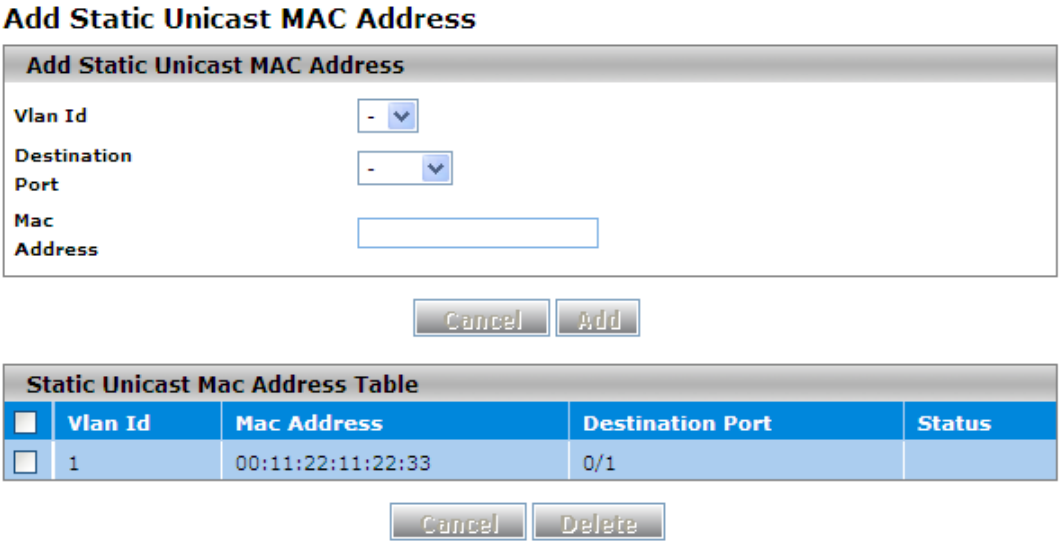
Description	Factory Default
Port	
The interface number	*interface number*
Port Security	
Specify whether port security is enabled: • **Enable:** Port security is enabled for the individual interface. Port security also needs to be globally enabled for it to be effective. • **Disable:** Port security is disabled for the individual interface. This setting overrides the global port security setting.	Disable

Security MAC Address
The security MAC address table shows the static MAC addresses which is associated with the VLANs. Select the interface for which you want to display the static MAC addresses and their associated VLANs.



Add Static MAC Address

You can specify the MAC address to a port with a VLAN ID in this page.



Add Static Unicast MAC Address

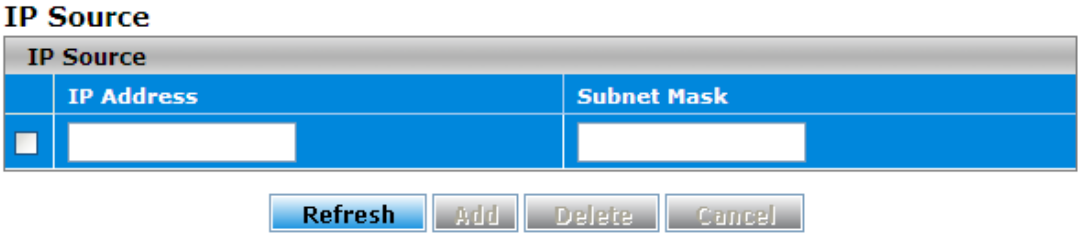
Setting	Description
VLAN ID	Specify the VLAN ID to which the unicast traffic is assigned.
Destination Port	Specify the switch interface or link aggregation group to which the unicast traffic is directed.
MAC Address	Enter the MAC address of the device that is the source of the unicast traffic.

Static Unicast Mac Address Table

Setting	Description
VLAN ID	Display the VLAN ID to which the unicast traffic is assigned.
MAC Address	Display the MAC address of the device that is the source of the unicast traffic.
Destination Port	Display the switch interface or link aggregation group to which the unicast traffic is directed.
Status	Display the time out status. It is fixed in the **Permanent** status.

3.11.1.2 IP Source

You can configure a specific IP address to access the Delta switch. Only the IP addresses which is added to this list can access and configure the Delta switch.

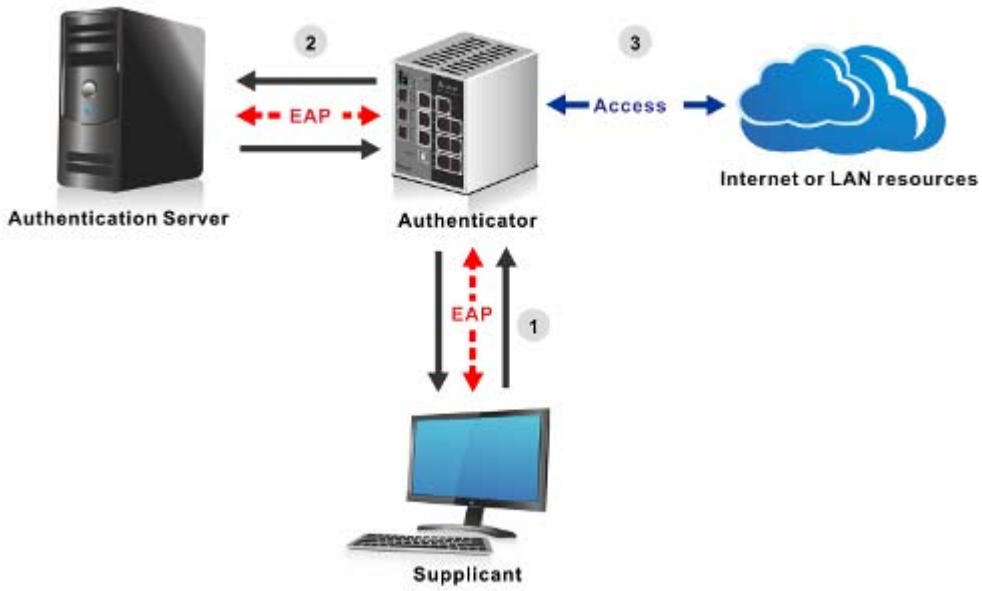


IP Source

Setting	Description
IP Address	
Enter the source IP address for security.	None
Subnet Mask	
Enter the subnet mask of the IP address.	None

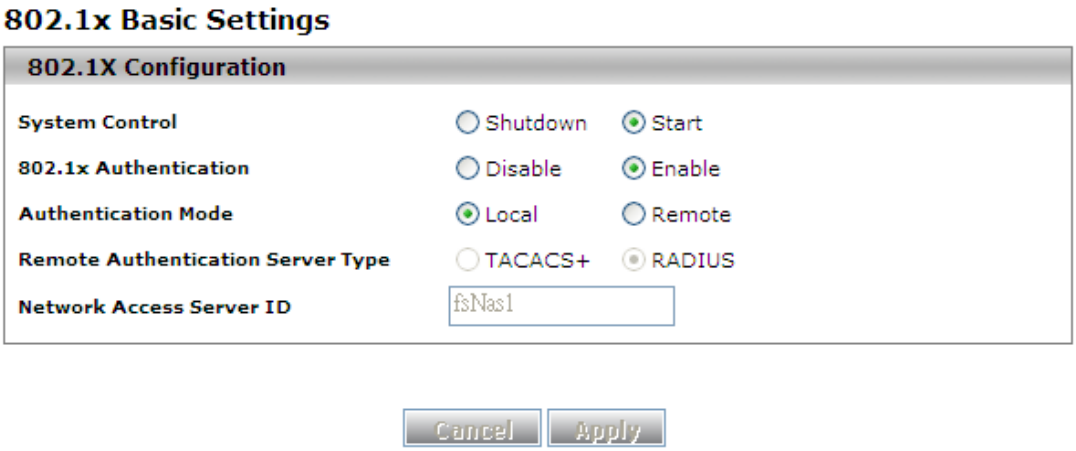
3.11.1.3 Port Authentication

Delta switch can act as an authenticator in the 802.1X environment. You can either use an external authentication server, or implement the authentication server in the Delta switch by using a Local User Database.
There are three components used to create a port-based authentication mechanism based on 802.1X:
Supplicant: The end of the station that requests to access LAN resource and switch services.
Authentication Server: The external server that performs the actual authentication of the supplicant, for example, a RADIUS server. It performs the authentication to indicate whether the user is authorized to access services.
Authenticator: It acts as a proxy between the supplicant and authentication server. This kind of role is usually the edge switch or wireless AP. It requests identity information from the supplicant, verifies the information with the authentication server, and relay a response to the supplicant.



802.1x Basic Settings

IEEE 802.1X is an IEEE Standard for port-based Network Access Control (PNAC). It is a part of the IEEE 802.1 group of networking protocols. It provides an authentication mechanism to devices which attempt to connect with a LAN or WLAN. IEEE 802.1X defines the encapsulation of the Extensible Authentication Protocol (EAP) over IEEE 802 which is known as "EAP over LAN" or EAPOL.



802.1x Basic Settings

Description	Factory Default
System Control	
Specify whether the 802.1x authentication module on the switch is running or shut down. • **Shutdown:** The 802.1x authentication is shut down. You cannot configure or enable 802.1x authentication. • **Start:** The 802.1x authentication is running, and you can configure and enable it.	Start
802.1x Authentication	
Specify the status of the 802.1x authentication on the switch. • **Disable:** The 802.1x authentication is disabled. You can still configure the 802.1x authentication, but the settings do not take effect after you have applied them. The switch does not check the 802.1X authentication before allowing traffic on any interfaces, even if the interfaces are configured to allow only authenticated users. • **Enable:** The 802.1x authentication is enabled. You can configure the 802.1x authentication, and the settings take effect after you have applied them.	Enable
Authentication Mode	
Specify the 802.1x authentication mode. • **Local:** A locally stored user ID and password are used for port authentication. You need to set up a user account on the Local Authentication Server page. This is the default setting. • **Remote:** A RADIUS or TACACS+ server is used for port authentication. With this selection, the Remote Authentication Server Type radio buttons and Network Access Server ID become available.	Local
Remote Authentication Server Type	
If you select the Remote radio button next to Authentication Mode, specify whether a RADIUS or TACACS+ server should be used. • **TACACS+:** The user ID and password are authenticated through a TACACS+ server. • **RADIUS:** The user ID and password are authenticated through a RADIUS server.	RADIUS

Description	Factory Default
Network Access Server ID	
If you select the Remote radio button next to Authentication Mode, enter the network access server (NAS) ID, or use the default ID (fsNas1).	Fixed

Port Authentication

You can configure the authentication settings for each interface.

Port Authentication

Port Authentication

	Port	Control Mode	Periodic Reauthentication	Reauthentication Period	EAPOL Packets Flood
☐		-	-		-
☐	0/1	ForceAuthorized	Disabled	3600	Disabled
☐	0/2	ForceAuthorized	Disabled	3600	Disabled
☐	0/3	ForceAuthorized	Disabled	3600	Disabled
☐	0/4	ForceAuthorized	Disabled	3600	Disabled
☐	0/5	ForceAuthorized	Disabled	3600	Disabled
☐	0/6	ForceAuthorized	Disabled	3600	Disabled
☐	0/7	ForceAuthorized	Disabled	3600	Disabled
☐	0/8	ForceAuthorized	Disabled	3600	Disabled

Apply Cancel **Refresh**

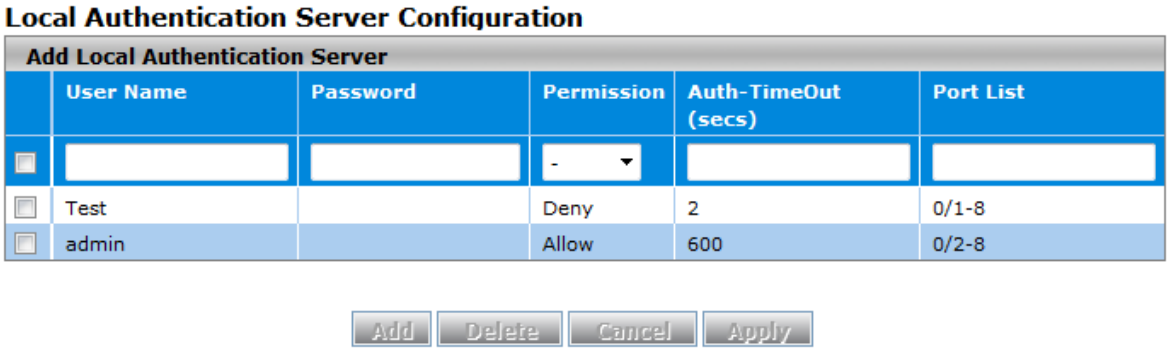
Port Authentication

Description	Factory Default
Port	
This field displays the port number.	Port number
Control Mode	
Specify the control mode for port authorization. The control mode is active only if the link status of the interface is up. • **ForceUnauthorized:** Places the interface in the unauthorized state. The switch cannot provide authentication services to a client through the interface. • **Auto:** After any supplicant completes authentication successfully on the interface, others can access the network service through the same interface without authentication. • **ForceAuthorized:** Places the interface in the authorized state. The interface sends and receives normal traffic without client port-based authentication.	ForceAuthorized
Periodic Reauthentication	
Specify whether the supplicant is periodically reauthenticated for the interface: • **Enabled:** The supplicant is reauthenticated according to the reauthentication period. • **Disabled:** The supplicant is not reauthenticated.	Disable
Reauthentication Period	
Specify the reauthentication period for the interface. The reauthentication period determines when the supplicant is reauthenticated when period reauthentication is enabled. Enter a period in the range of 1 to 65535 seconds.	3600

Description	Factory Default
EAPOL Packets Flood	
Specify whether the EAPOL packet flood mode is enabled for the interface: • **Enabled:** The EAPOL packet flood mode is enabled. Enabling this mode does not provide any protection from an EAPOL packet flood denial of service (DoS) attack. If the switch is used as a hub, you might want to enable the EAPOL packet flood mode. • **Disabled:** The EAPOL packet flood mode is disabled.	Disable

Local Authentication Server

Users list in this page and in Local Users Management page of Management Security are independently. Users list in this page is for 802.1X authentication. So you can configure a different user name with the user in the Local Management page of Management Security.



Local Authentication Server Configuration

Description	Factory Default
User Name	
Enter a user name.	None
Password	
Enter a password. Passwords should consist of 1 through 20 alphanumeric characters and are case-sensitive. The password is displayed as asterisks (*).	None
Permission	
Specify whether the user is allowed or denied interface access: • **Allow:** Allows the user access to the interface. • **Deny:** Denies the user access to the interface.	None
Auth-TimeOut (secs)	
Specify the period in seconds after which the server authentication times out and the user needs to be reauthenticated by the local authentication server. Enter a period between 1 and 7200 seconds. After the supplicant is authorized, the server authentication time-out period overrides the reauthentication period that is configured for the individual interface (see Port Authentication page). Leave the Auth-TimeOut field blank to use the reauthenticaiton period that is configured for the individual interface. **Note:** If you enable server reauthentication after a user has already been authenticated by the server, the server authentication time-out period does not take effect, and the reauthentication period value that is configured for the individual interface is used. **Note:** If server reauthentication is enabled, a user is authenticated by the server, and then you change the authentication time-out period, the new authentication time-out period takes effect after the next reauthentication by the server.	0

Description	Factory Default
Port List	
Specify the interfaces for which authentication needs to be obtained. Leave the field blank to include all interfaces.	0/1-10

Port Summary

This page provides you to view the information about access control of each interface; you can initialize or reauthenticate the interface manually.

Port Summary

Port Summary

	Port	Control Mode	Reauthentication Enabled	Port Status	User Name
		-	-	-	
	0/1	ForceAuthorized	Disabled	UnAuthorized	No User
	0/2	ForceAuthorized	Disabled	Authorized	No User
	0/3	ForceAuthorized	Disabled	UnAuthorized	No User
	0/4	ForceAuthorized	Disabled	UnAuthorized	No User
	0/5	ForceAuthorized	Disabled	UnAuthorized	No User
	0/6	ForceAuthorized	Disabled	UnAuthorized	No User
	0/7	ForceAuthorized	Disabled	UnAuthorized	No User
	0/8	ForceAuthorized	Disabled	UnAuthorized	No User

Initialize | Reauthenticate | Refresh

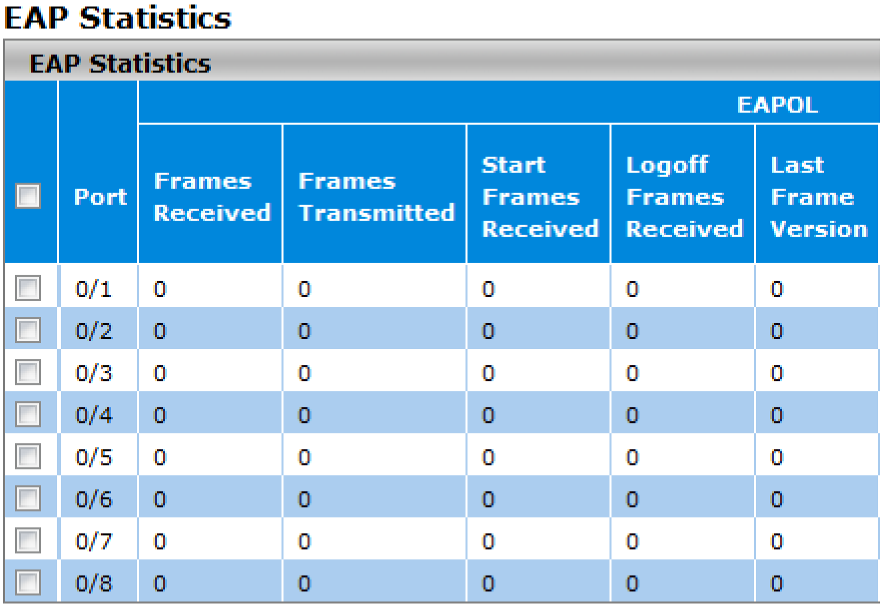
Port Summary

Description	Factory Default
Port	
This field displays the port number.	Port number
Control Mode	
The port authorization state that you have configured on the Port Authentication page (see Port Authentication on page 189). One of the following options is displayed: • **ForceUnauthorized:** The interface functions in the unauthorized state. The switch cannot provide authentication services to a client through the interface. • **Auto:** The interface automatically detects the control mode through authentication exchanges between the supplicant, authenticator, and authentication server. • **ForceAuthorized:** The interface functions in the authorized state. The interface sends and receives normal traffic without client port-based authentication.	ForceAuthorized
Reauthentication Enabled	
Indicates whether you have enabled or disabled reauthentication on the interface.	Disabled
Port Status	
The authorization status of the interface (Authorized or Unauthorized).	UnAuthorized

Description	Factory Default
User Name	
The name of the user most recently authenticated on the port. The user name is for a user account that is defined on the **Local Authentication Server** page.	None

EAP Statistics

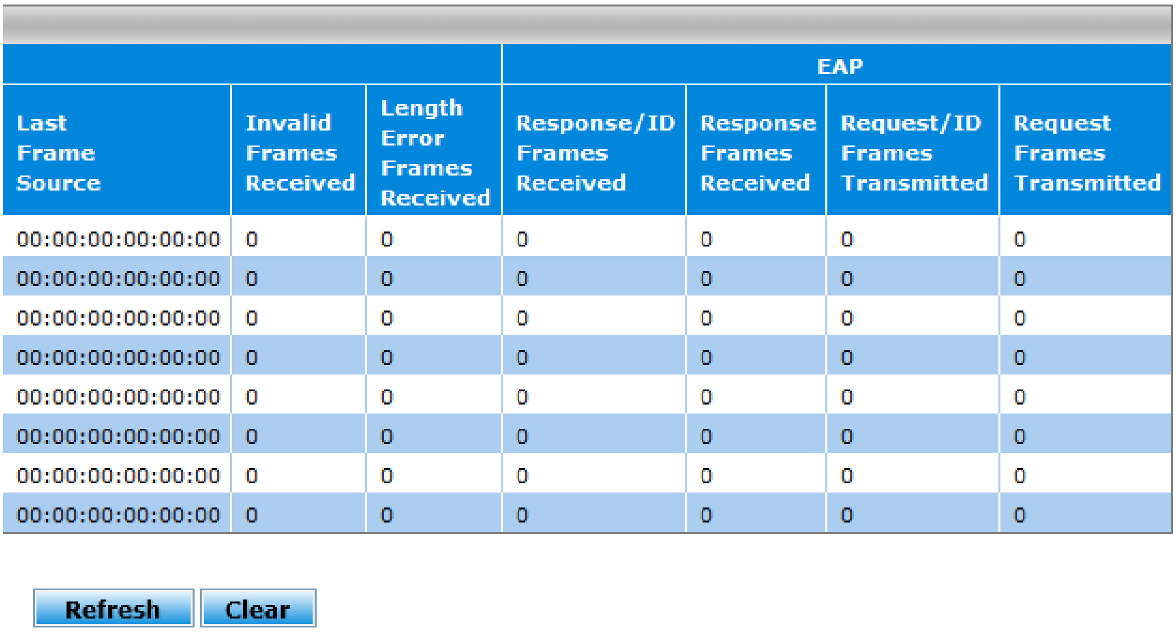
This page provides you to view EAP statistics.



EAP Statistics

EAP Statistics

☐	Port	EAPOL				
		Frames Received	Frames Transmitted	Start Frames Received	Logoff Frames Received	Last Frame Version
☐	0/1	0	0	0	0	0
☐	0/2	0	0	0	0	0
☐	0/3	0	0	0	0	0
☐	0/4	0	0	0	0	0
☐	0/5	0	0	0	0	0
☐	0/6	0	0	0	0	0
☐	0/7	0	0	0	0	0
☐	0/8	0	0	0	0	0



			EAP			
Last Frame Source	Invalid Frames Received	Length Error Frames Received	Response/ID Frames Received	Response Frames Received	Request/ID Frames Transmitted	Request Frames Transmitted
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0
00:00:00:00:00:00	0	0	0	0	0	0

EAP Statistics

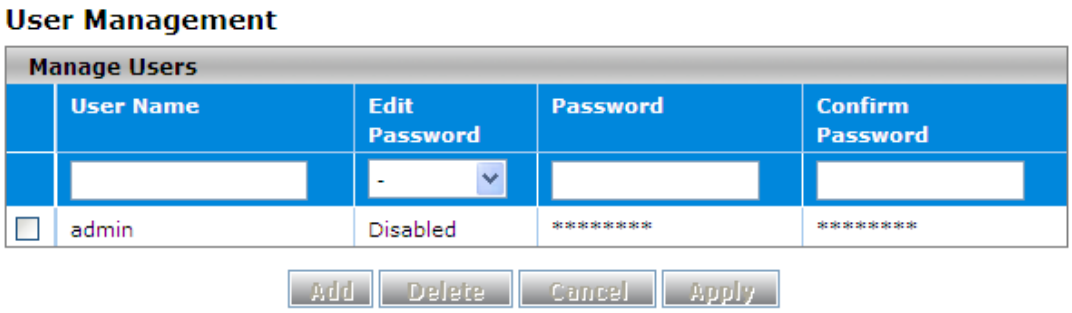
Item	Description
Port	The interface number
EAPOL (Extensible Authentication Protocol over LAN)	
Frames Received	The total number of received valid EAPOL frames
Frames Transmitted	The total number of transmitted EAPOL frames
Start Frames Received	The total number of received EAPOL start frames
Logoff Frames Received	The total number of received EAPOL logoff frames
Last Frame Version	The protocol version number attached to the most recently received EAPOL frame
Last Frame Source	The source MAC address attached to the most recently received EAPOL frame
Invalid Frames Received	The total number of received unrecognized EAPOL frame
Length Error Frames Received	The total number of received EAPOL frames with an invalid packet body length
EAP (Extensible Authentication Protocol)	
Response/ID Frames Received	The total number of received EAP response ID frames
Response Frames Received	The total number of received valid EAP response frames
Request/ID Frames Transmitted	The total number of transmitted EAP requested ID frames
Request Frames Transmitted	The total number of transmitted EAP request frames

3.11.2 Management Security

In the Management Security group, you can manage local users, Remote Authorization Dial-In User Service (RADIUS) settings, Terminal Access Controller Access Control System (TACACS+) settings, and Login Authentication Mode, and monitor the sessions of login users.

3.11.2.1 Local Users Management

Only the admin user can create an account and delete the existing user account.



User Management

Description	Factory Default
User Name	
Enter a user name. User names are up to 20 characters in length and are case sensitive. Only alphanumric, dashes (-) and underscores (_) are accepted.	None
Edit Password	
Select Enabled, and then edit the password.	None
Password	
Enter a password. Passwords are 1–20 alphanumeric characters in length and are case-sensitive. The password is displayed as eight asterisks (*).	None
Confirm Password	
Enter the same password that you entered in the **Password** field.	None

3.11.2.2 RADIUS Server Config

RADIUS (Remote Authentication Dial In User Service) is a networking protocol that provides centralized Authentication, Authorization, and Accounting (AAA) management for computers to connect and use a network service. The system implements the RADIUS client and provides authentication functionality. RADIUS uses UDP port 1812 by default.

RADIUS Server Configuration

Add RADIUS Server

	Server ID	Address Type	Server Address	Shared secret	Response Time (secs)	Retry Count	Port
☐		-					
☐	1	IPv4	192.168.1.10	password	30	3	17

Add Cancel Delete Apply

RADIUS Server Configuration

Description	Factory Default
Server ID	
The identifier of the server.	None
Address Type	
Specify the type of address for the RADIUS server: • **IPv4:** The RADIUS server has an IPv4 address. • **DNS:** The RADIUS server has a DNS host name.	None
Server Address	
Enter the IP address or DNS host name of the RADIUS server. (It depends on whether the Address Type field is IPv4 or DNS.)	None
Shared secret	
Enter the shared secret (only characters and numbers) that is used to authenticate and encrypt communications between the switch and the RADIUS server. This secret needs to match the one on the RADIUS server.	None
Response Time (secs)	
Enter the response time in seconds. This is the maximum period that the switch waits for a response from the RADIUS server before retransmitting the authentication request. Enter a period in the range of 1 to 120 seconds.	10
Retry Count	
Enter the maximum number of times an authentication request is retransmitted. Enter a number in the range of 1 to 254.	3
Port	
Enter the UDP port number of the RADIUS server that is used for authentication.	1812

3.11.2.3 RADIUS Statistics

After you add a server in RADIUS Server Configuration page, the statistics is displayed in this page.

RADIUS Statistics

RADIUS Server Statistics

Index	RADIUS Server	UDP Port Number	Round Trip Time	Access Requests	Access Retransmissions	Access Accepts	Access Rejects	Access Challenge
1	192.168.1.10	17	0	0	0	0	0	0

Refresh

Malformed Access Responses	Bad Authenticators	Pending Requests	Timeouts	Unknown Types	Packets Dropped
0	0	0	0	0	0

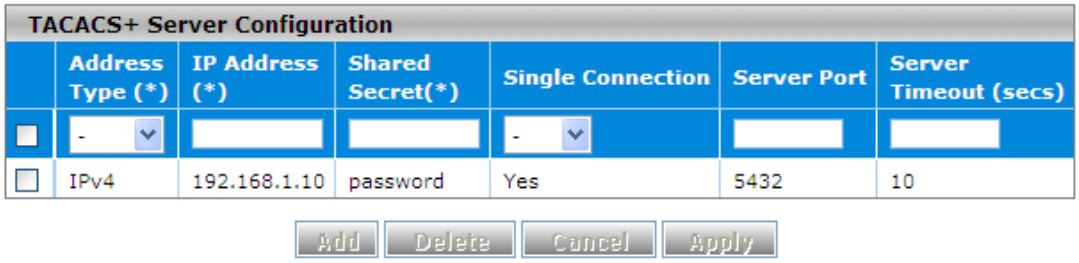
RADIUS Statistics

Item	Description
Index	The index number of the RADIUS server in the table.
RADIUS Server	The IP address of the RADIUS server.
UDP Port Number	The UDP port of the RADIUS server that is used for authentication.
Round Trip Time	The period, in hundredths of a second, between the most recent access reply/access challenge and the access request that matched it from the RADIUS server.
Access Requests	The number of access-request packets that were transmitted to the RADIUS server. This number does not include retransmissions.
Access Retransmissions	The number of access-request packets that were retransmitted to the RADIUS server.
Access Accepts	The number of access-accept packets, including both valid and invalid packets, which were received from the RADIUS server.
Access Rejects	The number of access-reject packets, including both valid and invalid packets, which were received from the RADIUS server.
Access Challenge	The number of access-challenge packets, including both valid and invalid packets, which were received from the RADIUS server.
Malformed Access Responses	The number of malformed access-response packets that were received from the RADIUS server. Malformed packets include packets with an invalid length. Bad authenticators or signature attributes or unknown types are not included as malformed access responses.
Bad Authenticators	The number of access-response packets containing invalid authenticators or signature attributes that were received from the RADIUS server.
Pending Requests	The number of access-request packets destined for the RADIUS server that have not yet timed out or received a response.
Timeouts	The number of authentication requests that were sent to the RADIUS server and that timed out.
Unknown Types	The number of packets of an unknown type that were received from the RADIUS server.
Packets Dropped	The number of packets that were received from the RADIUS server and that were dropped.

3.11.2.4 TACACS+ Server

TACACS+ (Terminal Access Controller Access-Control System Plus) provides access control for routers, network access servers (NAS) and other networked computing devices. The system implements the TACACS+ client and provides authentication functionality.
TACACS+ uses TCP port 49 by default. you can configure it according to your TACACS+ server.
Delta switch supports multi TACACS+ servers' configuration and the number is up to 5.

TACACS+ Server Configuration

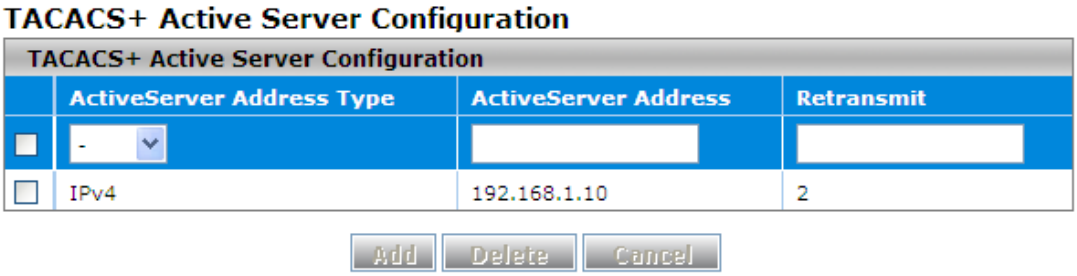


TACACS+ Server Configuration

Description	Factory Default
Address Type (*)	
Specify the type of address for the TACACS+ server. • **IPv4:** The TACACS+ server has an IPv4 address. • **DNS:** The TACACS+ server has a DNS host name.	None
IP Address (*)	
Depending on the selection from the Address Type drop-down list, enters the IP address or DNS host name of the TACACS+ server.	None
Shared Secret (*)	
Enter the shared secret (up to 63 characters and numbers) that is used to authenticate and encrypt communications between the switch and the TACACS server. This secret needs to match the one on the TACACS server.	None
Single Connection	
Specify the type of connection: • **Yes:** Allows only a single TCP connection with the TACACS server. • **No:** Allows multiple TCP connections with the TACACS server.	No
Server Port	
Enter the TCP port number of the TACACS server that is used for authentication. The port number should be in the range of 1 to 65535.	49
Server Timeout (secs)	
Enter the period in seconds after which the connection between the client device and the TACACS server times out. Enter a period in the range of 1 to 255 seconds.	5

3.11.2.5 TACACS+ AS

If you do not specify a TACACS+ AS, the switch uses one of the TACACS+ servers that you specify on the TACACS+ Server Configuration page. If you specify a TACACS+ Active Server (AS), the switch uses only that server as the active TACACS+ server. So you only can specify one active server in this page.

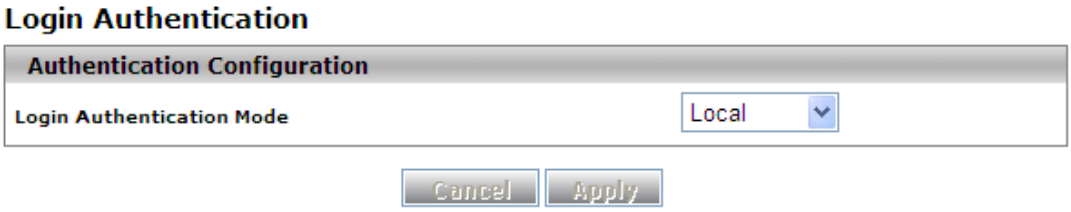


TACACS+ Active Server Configuration

Description	Factory Default
Active Server Address Type	
Specify the type of address for the TACACS+ AS. • **IPv4:** The TACACS+ AS server has an IPv4 address. • **DNS:** The TACACS+ AS server has a DNS host name.	None
Active Server Address	
Depending on the selection from the Active Server Address Type drop-down list, enters the IP address or DNS host name of the TACACS+ AS. The IP address or DNS host name needs to be already listed in the TACACS+ Server Configuration table.	None
Retransmit	
The number of times the switch searches for the AS in the TACACS+ Server Configuration table if the switch cannot establish a connection with the AS at the first attempt. Enter a number in the range of 1 to 100.	2

3.11.2.6 Login Authentication

Delta switch provides three authentication methods: Local, RADIUS, and TACACS+. If there is no RADIUS or TACACS+ server in your network environment, you can use local authentication method for login authentication.



Login Authentication

Description	Factory Default
Login Authentication Mode	
Specify the login authentication method: • **Local:** A locally stored user ID and password are used for authentication. This is the default setting. You need to set up a user account on the Local User Management page. • **RADIUS:** The user ID and password are authenticated through a RADIUS server. • **TACACS+:** The user ID and password are authenticated through a TACACS+ server.	Local

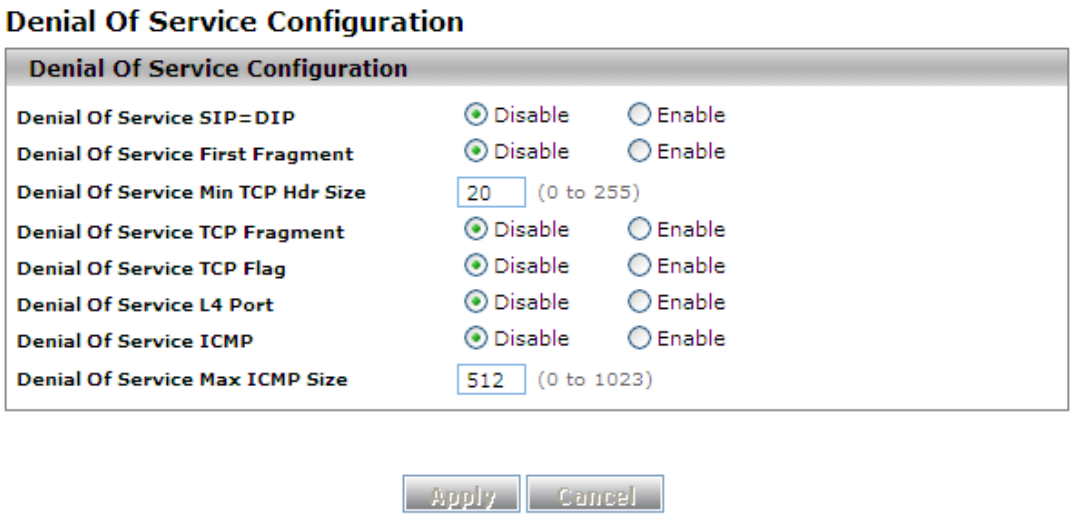
3.11.2.7 Login User Sessions

The login user sessions is displayed in this page. Delta switch supports max users of 20, including the default user admin.

Item	Description
ID	The unique session identifier.
Type	The type of session: • console • telnet • ssh • http • https
User	The name of the user who is logged in.
Peer-Address	The IP address from which the user is logged in.

3.11.3 Denial of Service

Delta switch provides six types of denial of service (DoS) attacks for you to block and monitor attacks. Please refer to the following table for description.



Denial Of Service Configuration

Description	Factory Default
Denial Of Service SIP=DIP	
Select one of the following radio buttons: • **Disable:** This is the default setting. • **Enable:** Packets that have a source IP (SIP) address equal to the destination IP (DIP) address are dropped.	Disable
Denial Of Service First Fragment	
Select one of the following radio buttons: • **Disable:** This is the default setting. • **Enable:** Packets with a TCP header that is smaller than the configured minimum TCP header size are dropped.	Disable
Denial Of Service Min TCP Hdr Size	
Specify the minimum TCP header size. Enter a value in the range of 0 to 255 bytes.	20
Denial Of Service TCP Fragment	
Select one of the following radio buttons: • **Disable:** This is the default setting. • **Enable:** Packets that have an IP fragment offset equal to 1 are dropped.	Disable
Denial Of Service TCP Flag	
Select one of the following radio buttons: • **Disable:** This is the default setting. • **Enable:** All of the following packets are dropped: - Packets that have a TCP flag SYN set and a TCP source port with a number lower than 1024 - Packets that have TCP control flags set to 0 and the TCP sequence number set to 0 - Packets that have TCP flags FIN, URG, and PSH set and TCP sequence number set to 0 - Packets that have both the TCP flags SYN and FIN set	Disable

Description	Factory Default
Denial Of Service L4 Port	
Select one of the following radio buttons: • **Disable:** This is the default setting. • **Enable:** Packets that have a TCP source port that is equal to the TCP destination port are dropped, and packets that have a UDP source port that is equal to the UDP destination port are dropped.	Disable
Denial Of Service ICMP	
Select one of the following radio buttons: • **Disable:** This is the default setting. • **Enable:** ICMP packets that have the type set to ECHO_REQ (ping) and a size greater than the configured ICMP packet size are dropped.	Disable
Denial Of Service Max ICMP Size	
Specify the maximum ICMP packet size. Enter a value in the range of 0 to 1023 bytes. The default setting is 512 bytes.	512

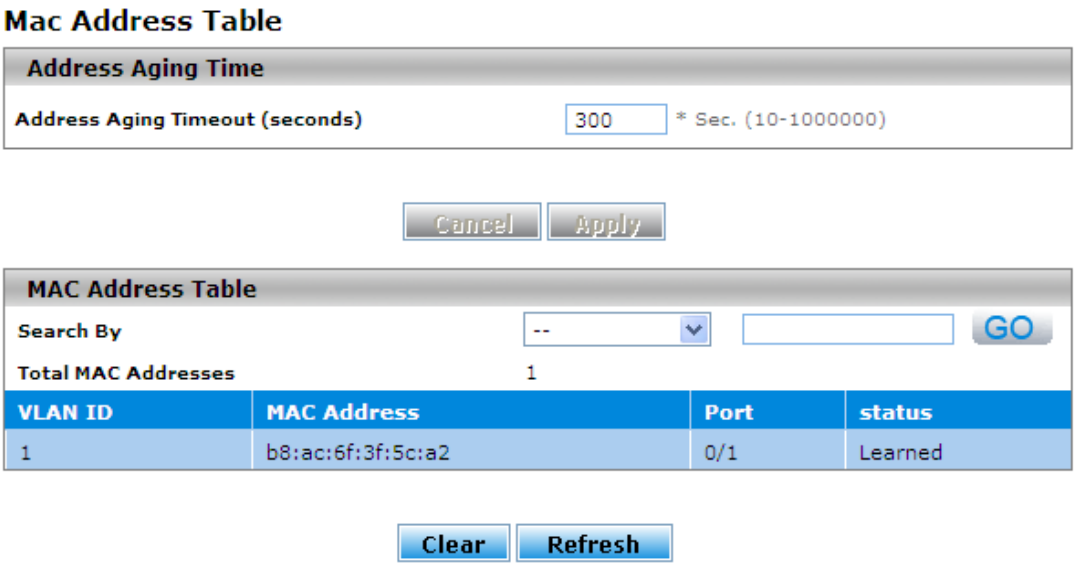
3.12 Monitoring Settings

You can monitor the status of the Delta switch in real time via the functions in this group.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.12.1 Mac Address Table

The MAC address table displays the MAC address which is learned and manually added. There is a search function which can be used to display the information about the entry in the table.



Address Aging Time

Description	Factory Default
Address Aging Timeout (seconds)	
Enter the period in seconds. If a learned MAC address has not been updated during the address aging time, then it will be removed from the address table automatically. Enter a period from 10 to 1000000 seconds.	300

MAC Address Table

Item	Description
VLAN ID	The VLAN ID that is associated with the MAC address.
MAC Address	The dynamically learned or manually added MAC address for which the switch has forwarding or filtering information, or both.
Port	This field displays which interface was learned or added manually. It also means the interface through which the MAC address can be reached.
Status	The status of this entry: • **Invalid:** The MAC address is invalid. Normally, invalid MAC addresses are deleted, so this is an error condition. • **Self:** The MAC address is the address of a physical interface of the switch. • **Learned:** The MAC address was learned through incoming traffic and is being used. • **Static:** The MAC address was manually added and cannot be relearned. • **Other:** The MAC address does not fall into one of the other categories.

3.12.2 SFP DDM

You can monitor the status of each SFP (small form-factor pluggable) port in this page.

SFP Status

Port Status

Port	Ethernet Compliance Code	SFP Vendor	Wave Length	Distance
0/7	unknown	unknown	unknown	unknown
0/8	unknown	unknown	unknown	unknown

SFP DDM

	Port	Status	Temperature		Voltage		Bias		Tx Power		Rx Power	
			Current	Range	Current	Range	Current	Range	Current	Range	Current	Range
	0/7	Not Present	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown
	0/8	Not Present	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown

Refresh Eject

Note:
Before you want to use SFP DDM function, please make sure the SFP module that you have can support SFP DDM function.

3.12.3 System CPU Status

You can monitor the CPU status of the Delta switch in this page.

System CPU Status

CPU Memory Status	
Total System Memory	63428 KBytes
Available Memory	10984 KBytes

CPU Utilization

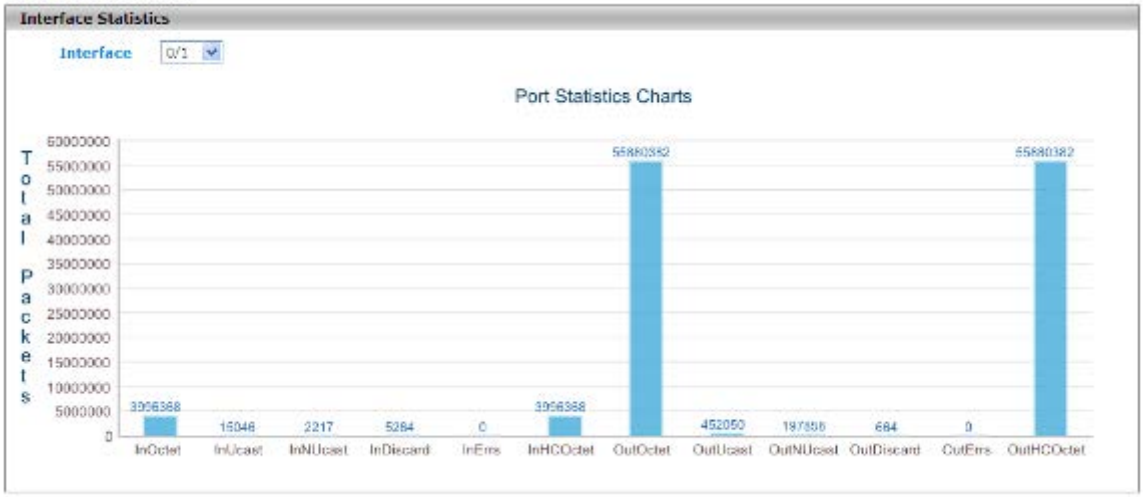
```
Memory Utilization Report
status      bytes
------ ----------
  free    11247616
 alloc    53702656

CPU Utilization:

 PID     Name                    5 Sec     1 Min     5 Min
-----------------------------------------------------------
   1     init                    0.0 %     0.0 %     0.0 %
   2     kthreadd                0.0 %     0.0 %     0.0 %
   3     ksoftirqd/0             0.0 %     0.0 %     0.0 %
   4     watchdog/0              0.0 %     0.0 %     0.0 %
   5     events/0                0.0 %     0.0 %     0.0 %
   6     khelper                 0.0 %     0.0 %     0.0 %
  16     kblockd/0               0.0 %     0.0 %     0.0 %
  32     pdflush                 0.0 %     0.0 %     0.0 %
  33     pdflush                 0.0 %     0.0 %     0.0 %
```

Refresh

3.12.4 Interface Statistics

You can monitor the statistics of each interface of the Delta switch in this page. The data will be refreshed every second.

Interface Statistics



Note:
Make sure the port you want monitor is linking with another device.

3.12.5 RMON

Remote network monitoring (RMON) mainly provides the statistics and alarm functions for remote monitoring and management of network management devices on the managed device. It is the functionality expansion for simple network management protocol (SNMP), particularly useful for monitoring and managing a network. RMON specifically defines any network monitoring system must be able to provide information (defined in RFC2819) on the MIB which is the base of seamless multi-vendor interoperability between the SNMP management station and the monitoring agent.

3.12.5.1 Basic Settings

The default setting of RMON is disabled. If RMON Status is disabled, the functions in RMON group will not work.

RMON Basic Settings

Basic Settings		
RMON Status	○ Enabled	◉ Disabled

Cancel Apply

3.12.5.2 Alarms

The RMON Alarm Configuration provides you to specify the threshold and generate the alarm. When the alarm occurs, an event can be generated. Before you configure alarms, you need to specify logs and SNMP traps that can be generated when an alarm occurs by configuring entries in the **RMON Event Configuration** page.

RMON Alarm Configuration

RMON Alarm Configuration

	Index	Interval	Interface	Variable	Sample Type	Rising Threshold
	*	*	*	*	-	*
☐	1	50	0/1	etherStatsBroadcastPkts	Absolute Value	30
☐	2	100	0/1	etherStatsOversizePkts	Absolute Value	20

Note :1.Before setting the threshold values, corresponding ethernet index and events has to be created.
2.Falling Threshold value has to be lesser than Rising Threshold value.

Add Cancel Delete

Falling Threshold	Rising Event Index	Falling Event Index	Owner
*	*	*	
20	1	1	Delta
15	2	2	Delta

RMON Alarm Configuration

Description	Factory Default
Index	
Enter an index that uniquely identifies the entry in the RMON Alarm Configuration table. Enter a number between 1 and 65535.	None
Interval	
Specify the period in seconds over which the data is sampled and compared with the rising and falling thresholds. Enter a number between 1 and 65535 seconds.	None
Interface	
Specify the interface number.	None
Variable	
Specify the SNMP event that you want to be sampled.	None
Sample Type	
Specify the sample type for the alarm, which defines how the variable is sampled, and how the value is calculated and compared with the thresholds that you configure. Make a selection from the drop-down list: • **Absolute Value:** The value of the variable is compared directly with the thresholds at the end of the sampling interval. • **Delta Value:** The value of the variable that was obtained at the last sample is subtracted from the current value, and the difference is compared with the thresholds.	None
Rising Threshold	
Specify the rising threshold for the sampled statistic. If the configured threshold value is reached, an alarm is raised. If the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single event is generated. Enter a value between 0 and 2147483647. **Note:** The rising threshold value needs to be greater than the falling threshold value.	None
Falling Threshold	
Specify the falling threshold for the sampled statistic. If the configured threshold value is reached, an alarm is raised. If the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single event is generated. Enter a value between 0 and 2147483647. **Note:** The falling threshold value needs to be less than the rising threshold value.	None
Rising Event Index	
Specify the index of the event that needs to be raised when a rising threshold is crossed. The value between 1 and 65535. **Note:** The down list is associated with **RMON Event Configuration table**. If there is no corresponding entry in the **RMON Event Configuration table**, no association can exist	None

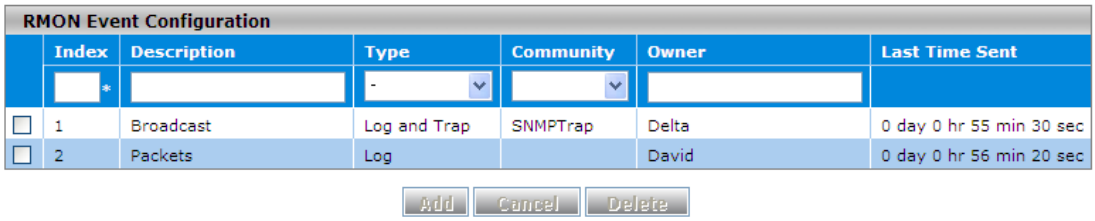
Description	Factory Default
Falling Event Index	
Specify the index of the event that needs to be raised when a falling threshold is crossed. **Note:** The down list is associated with **RMON Event Configuration table**. If there is no corresponding entry in the **RMON Event Configuration table**, no association can exist	None
Owner	
Specify the owner of the entry by entering a name.	None

3.12.5.3 Events

3

You can specify events that create log entries, SNMP traps, or both. And assign these configurations to the alarms in the **RMON Alarm Configuration** page.

RMON Event Configuration



RMON Event Configuration

Description	Factory Default
Index	
Enter an index that uniquely identifies the entry in the RMON Alarm Configuration table. Enter a number between 1 and 65535.	None
Description	
Enter a brief description of the event. You can enter up to 127 characters.	None
Type	
Specify the type for this event: • **None:** No entry is made in the RMON Event Log table and no trap is sent. The community field is disabled. • **Log:** An entry is made in the RMON Event Log table. The community field is disabled. • **SNMP Trap:** An SNMP trap is sent to one or more management stations. • **Log and Trap:** Both an entry is made in the RMON Event Log table and an SNMP trap is sent to one or more management stations.	None
Community	
If the Type setting is SNMP Trap or Log and Trap, enter an existing community name.	None
Owner	
Specify the owner of the entry by entering a name.	None
Last Time Sent	
Specify the last time the entry created an event.	None

3.12.5.4 Event Log

The events that have been triggered are displayed in this page.

RMON Event Log

RMON Event Log			
Event	Log No.	Log Time	Description
1	1	Jan 1 00:55:30 1970	Logging Event With Description : Broadcast
1	2	Jan 1 00:58:01 1970	Logging Event With Description : Broadcast
2	1	Jan 1 00:56:20 1970	Logging Event With Description : Packets

Refresh

Item	Description
Event	The index that corresponds to the index value of the entry in the RMON Event Configuration table.
Log No.	The entry in the RMON Event Log table.
Log Time	The time when the entry was created.
Description	The description that corresponds to the description of the index value of the entry in the RMON Event Configuration table.

3.12.5.5 History

You can specify the polling period, buckets (the number of samplings or how many times polling occurs) and source interface for historical statistical data sampling for individual interfaces in this page.

History Control Configuration

History Control Configuration					
	Index	Data Source	Buckets Requested	Interval	Owner
	*	*			
☐	1	0/1	50	1800	Delta

Add Cancel Delete

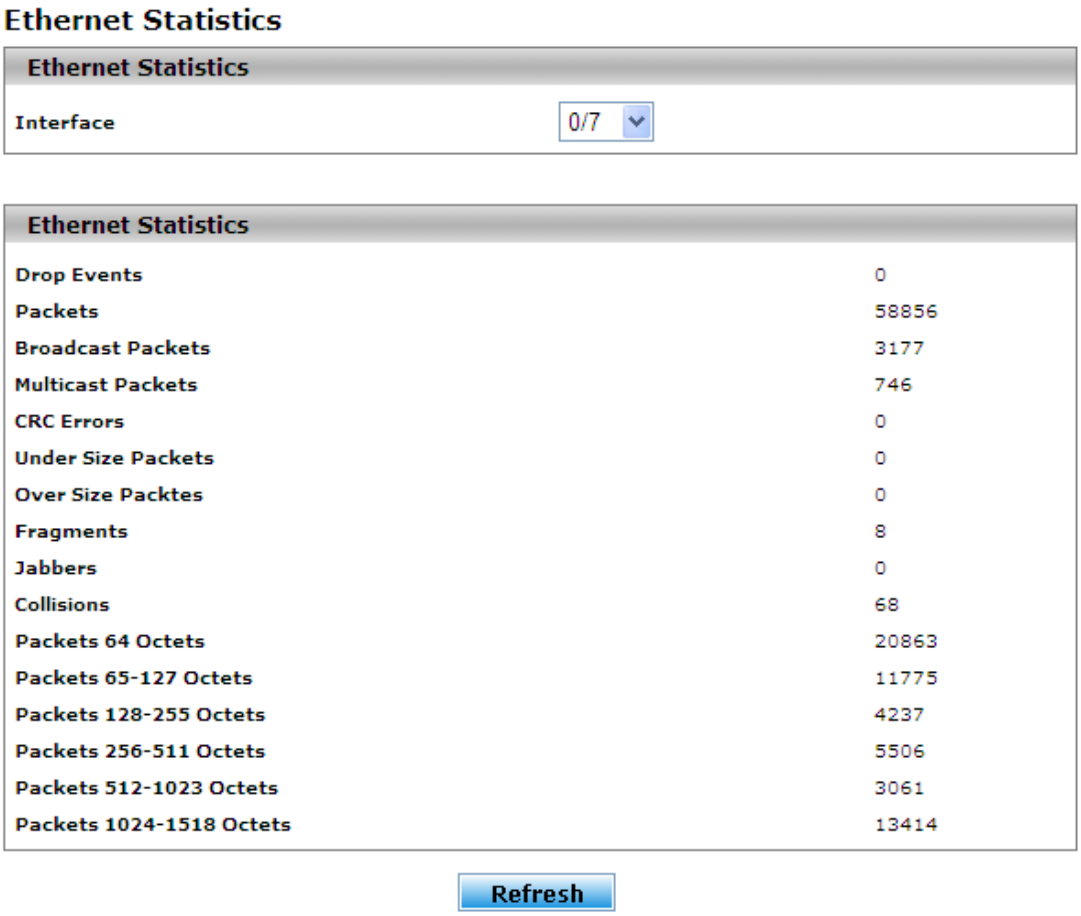
History Control Configuration

Description	Factory Default
Index	
Enter an index that uniquely identifies the entry in the History Control Configuration table. Enter a number between 1 and 65535.	None
Data Source	
Specify a source interface.	None
Buckets Requested	
Specify the number of buckets for collecting the RMON statistics. Enter the requested number of discrete time intervals over which data is to be collected and saved. Enter a number between 1 and 50.	50
Interval	
Specify the period in seconds between two successive pollings to collect the statistics. Enter a number between 1 to 3600 seconds.	1800
Owner	
Specify the owner of the entry by entering a name.	None

3.12.5.6 RMON Ethernet Statistics

The cumulative RMON Ethernet statistics information is displayed in this page.

Note:
The counters in the **RMON Ethernet Statistics** page provide cumulative statistical information from multiple pollings.
The counters in the RMON Ethernet History Statistics page provide statistical information from individual pollings;



Ethernet Statistics

Item	Description
Interface	Specify one interface for Ethernet Statistics.
Drop Events	The cumulative number of events in which packets were dropped on the interface because of lack of resources. This number does not specify the number of packets that were dropped but the number of times the packets were dropped.
Packets	The cumulative number of packets received on the interface.
Broadcast Packets	The cumulative number of broadcast packets received on the interface.
Multicast Packets	The cumulative number of multicast packets received on the interface.
CRC Errors	The cumulative number of packets received on the interface that have a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets. That had either a bad frame check sequence (FCS) with an integral number of octets (FCS error) or a bad FCS with a non integral number of octets (alignment error).

Item	Description
Under Size Packets	The cumulative number of packets received on the interface that were less than 64 octets in length (excluding framing bits, but including FCS octets) and that were well formed.
Over Size Packets	The cumulative number of packets received on the interface that were more than 1518 octets in length (excluding framing bits, but including FCS octets) and that were well formed.
Fragments	The cumulative number of packets received on the interface that were less than 64 octets in length (excluding framing bits but including FCS octets) and that had either a bad frame check sequence (FCS) with an integral number of octets (FCS error) or a bad FCS with a non integral number of octets (alignment error).
Jabbers	The cumulative number of packets received on the interface that were longer than 1518 octets in length (excluding framing bits, but including FCS octets) and that had either a bad frame check sequence (FCS) with an integral number of octets (FCS error) or a bad FCS with a non integral number of octets (alignment error).
Collisions	The best estimate of the cumulative number of collisions on the interface.
Packets 64 Octets	The cumulative number of packets (including bad packets) received on the interface that was 64 octets in length (excluding framing bits but including FCS octets).
Packets 65-127 Octets	The cumulative number of packets (including bad packets) received on the interface that was between 65 and 127 octets in length, inclusive (excluding framing bits but including FCS octets).
Packets 128-255 Octets	The cumulative number of packets (including bad packets) received on the interface that was between 128 and 255 octets in length, inclusive (excluding framing bits but including FCS octets).
Packets 256-511 Octets	The cumulative number of packets (including bad packets) received on the interface that was between 256 and 511 octets in length, inclusive (excluding framing bits but including FCS octets).
Packets 512-1023 Octets	The cumulative number of packets (including bad packets) received on the interface that was between 512 and 1023 octets in length, inclusive (excluding framing bits but including FCS octets).
Packets 1024-1518 Octets	The cumulative number of packets (including bad packets) received on the interface that was between 1024 and 1518 octets in length, inclusive (excluding framing bits but including FCS octets).

3.12.5.7 Ethernet History Statistics

The historical data for the interface is collected, and the statistics information for the interface is displayed in **RMON Ethernet History Statistics** page.

Note:
The counters in the RMON Ethernet Statistics page provide cumulative statistical information from multiple pollings.
The counters in the **RMON Ethernet History Statistics** page provide statistical information from individual pollings.

RMON Ethernet History Statistics

Ethernet History Statistics

Index	Sample Index	Interval Start	Drop Events	Octets	Packets	Broadcast Packets	Multicast Packets
1	0	Jan 1 00:00:00 1970	0	0	0	0	0
2	1	Jan 1 01:27:48 1970	0	8204300	17753	835	221
2	2	Jan 1 01:28:48 1970	0	4161973	11636	861	220
2	3	Jan 1 01:29:49 1970	0	7998440	14127	767	145

Refresh

3

CRC Errors	Under Size Packets	Over Size Packtes	Fragments	Jabbers	Collisions	Utilization
0	0	0	0	0	0	0
0	0	0	7	0	23	11
0	0	0	1	0	1	5
0	0	0	0	0	34	11

RMON Ethernet History Statistics

Item	Description
Index	The index that uniquely identifies the entry in the History Control Configuration table.
Sample Index	An index that uniquely identifies the particular polling sample that this entry represents among all polling samples associated with the same entry in the History Control Configuration table. This index starts at 1 and increases by one as each new polling sample is taken.
Interval Start	The time when the polling (sampling) interval started.
Drop Events	The number of events during the sampling interval in which packets were dropped on the interface because of lack of resources. This number does not specify the number of packets that were dropped but the number of times the packets were dropped.
Octets	The number of data octets (including those in bad packets) received on the interface (excluding framing bits, but including FCS octets) during the sampling interval.
Packets	The number of packets received on the interface (including bad packets, broadcast packets, and multicast packets) during the sampling interval.
Broadcast Packets	The number of broadcast packets received on the interface during the sampling interval. These packets were directed to the broadcast addresses.
Multicast Packets	The number of multicast packets received on the interface during the sampling interval. These packets were directed to the multicast addresses. (This number does not include packets addressed to a broadcast addresses.)
CRC Errors	The number of packets received on the interface during the sampling interval that have a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets. That had either a bad frame check sequence (FCS) with an integral number of octets (FCS error) or a bad FCS with a non integral number of octets (alignment error).

Item	Description
Under Size Packets	The number of packets received on the interface during the sampling interval that were less than 64 octets in length (excluding framing bits, but including FCS octets) and that were well formed.
Over Size Packets	The number of packets received on the interface during the sampling interval that were more than 1518 octets in length (excluding framing bits, but including FCS octets) and that were well formed.
Fragments	The number of packets received on the interface during the sampling interval that were less than 64 octets in length (excluding framing bits, but including FCS octets) and that had either a bad frame check sequence (FCS) with an integral number of octets (FCS error) or a bad FCS with a non integral number of octets (alignment error).
Jabbers	The number of packets received on the interface during the sampling interval that were longer than 1518 octets in length (excluding framing bits, but including FCS octets) and that had either a bad frame check sequence (FCS) with an integral number of octets (FCS error) or a bad FCS with a non integral number of octets (alignment error).
Collisions	The best estimate of the number of collisions on the interface during the sampling interval.
Utilization	The best estimate of the mean physical layer network utilization on the interface during the sampling interval, in hundredths of a percent.

3.12.6 SYSLOG

SYSLOG function provides you to monitor the switch. When faults, errors, configuration changes or specified events happens, this function can generate messages, store the messages locally or forward the messages to one or more syslog servers. You can choose the severity level to filter the message according to your requirement.

3.12.6.1 Show Logs

The numbers of message which can be shown in this page depend on the setting of severity in the Logs Configuration page. The logs are cleared after the switch is rebooted. To save the logs after the switch is rebooted, send them to a syslog server or use the email function.

Message Log

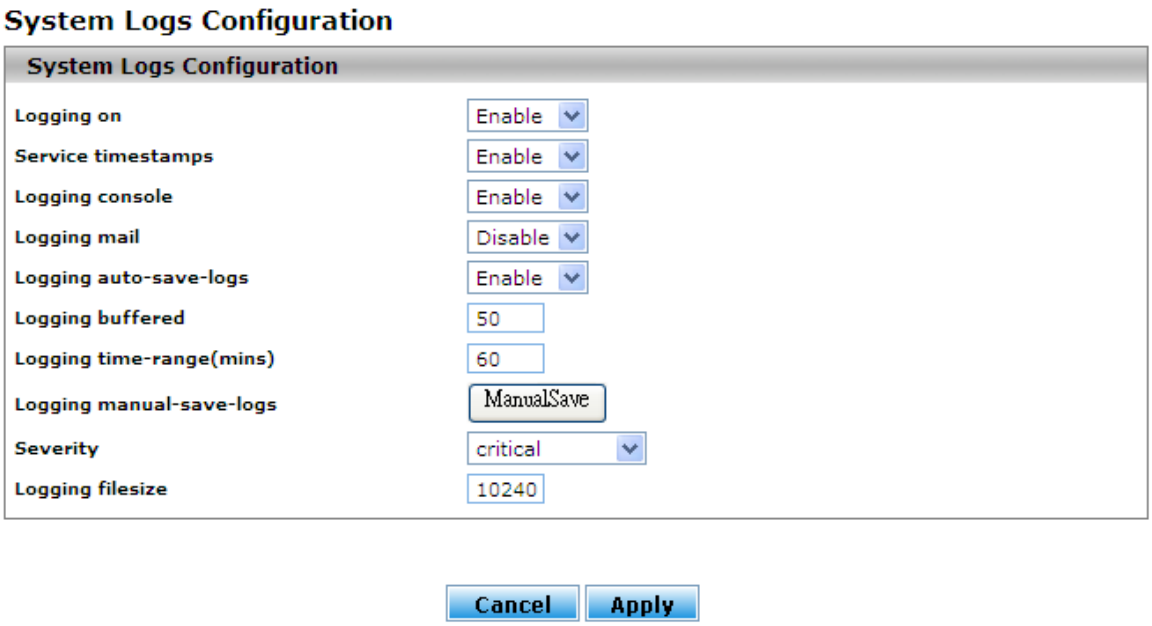
Index	Severity	Date	Time	Model Name	Logs
1	<134>	1970-01-01	00:02:39	DVS-108W02-2SFP	VLAN VLAN: Source relearning has Occured for Mac Address 22:33:44:55:66:77 from the port 9 to the port :6
2	<134>	1970-01-01	00:02:45	DVS-108W02-2SFP	VLAN VLAN: Source relearning has Occured for Mac Address 22:33:44:55:66:77 from the port 6 to the port :9
3	<133>	1970-01-01	00:02:50	DVS-108W02-2SFP	CFA 0/3 link DOWN!

The log message format is as below:
<133>1970-01-01 00:02:50 DVS-108W02-2SFP CFA 0/3 link DOWN!

Log message component	Description
<133>	The number contained in the angle brackets represents the message priority, which is derived from the following values: Priority = facility value + severity level. In the example, the facility value is local0 (128). The severity value is notification (5). For more information about the severity of a log message, please see ***Logs Configuration***.
1970-01-01 00:02:50	The message was generate on 1970-01-01 00:02:50
DVS-108W02-2SFP	The device name.
CFA	The module that generated the message.
0/3 link DOWN!	The major description of the message: The link of port 3 is down.

3.12.6.2 Logs Configuration

You can enable, disable and configure other system log settings in this page.



System Logs Configuration

Description	Factory Default
Logging on	
Specify whether logging is enabled or disabled: • **Enable:** Logging is enabled. • **Disable**: Logging is disabled. Log messages are not displayed on the Show System Logs page and cannot be saved in a log file or syslog server, and logging over the console port is disabled.	Enable
Service timestamps	
Specify whether or not a time stamp is added to log messages: • **Enable:** A time stamp is added. • **Disable:** A time stamp is not added.	Enable
Logging console	
Specify whether logging over the console port is enabled or disabled: • **Enable:** Logging over the console port is enabled. • **Disable:** Logging over the console port is disabled.	Enable
Logging mail	
Specify whether log messages can be sent to a specified email address: • **Enable:** Log messages sent to a specified email is enabled. • **Disable:** Log messages sent to a specified email is disabled.	Disable
Logging auto-save-logs	
• Specify whether log messages can be saved in a flash memory automatically: • **Enable:** Log messages can be saved in a flash memory automatically. The saving time depends on the Logging time-range setting. • **Disable:** Log messages can't be saved in a flash memory automatically.	Enable
Logging buffered	
Specify the number of log messages that can be displayed on the Show System Logs page. Enter a number in the range of 1 to 200. The default setting is 50 log messages.	50

Description	Factory Default
Logging time-range (min)	
Specify the time-range to save the log automatically. It only works when Logging auto-save-logs function is enabled. Enter a value in the range of 60 to 43200. The default value is 60.	60
Logging manual-save-logs	
Click the button to save logs in a flash memory manually.	None
Severity	
Specify the level of severity that determines which events are logged. A log records messages equal to or above a configured severity threshold. For example, if you select an error, the logged messages include error (3), critical (2), alert (1), and emergency (0). The default level of severity is critical (2). Make a selection from the drop-down list: • **emergency :** The highest warning level (level 0). An emergency message is saved if the switch is down or not functioning correctly. • **alert:** The second-highest warning level (level 1). An alert message is saved if there is a serious switch malfunction, for example, an important switch function goes down. Action needs to be taken immediately. • **critical:** The third-highest warning level (level 2). A critical message is saved if a critical switch malfunction occurs, for example, two interfaces stop functioning while the rest of the interfaces remain functional. • **error:** The level that indicates that a device error has occurred (level 3), such as an interface going offline. • **warning:** The lowest level of a device warning (level 4). • **notice:** Normal but significant conditions (level 5). Provides the network administrators with switch information. • **Informational:** Provides switch information (level 6). • **debug:** Provides detailed information about the switch (level 7). This level generates a lot of messages.	critical
Logging filesize	
Specify the size of the system file in which the log files are saved. Enter a file size between 1024 and 102400 bytes. **Note:** The debug log file is not controlled by the size of the system file. The debug log file is a temporary file that is not stored in flash memory. The file can always store the most recent 100 debug log messages, and each debug log message is less than 80 bytes in length.	10240

3.12.6.3 Syslog Fwd Table

You can add the syslog server IP address and configure forward log severity in this page.

Syslog Fwd Table

Forward Files Table

	Fwd Severity	Fwd Address Type	Server IP Address	Fwd Port	Fwd TransType
	-	-			-
☐	informational	IPv4	192.168.1.5	2	SYSLOG_TCP

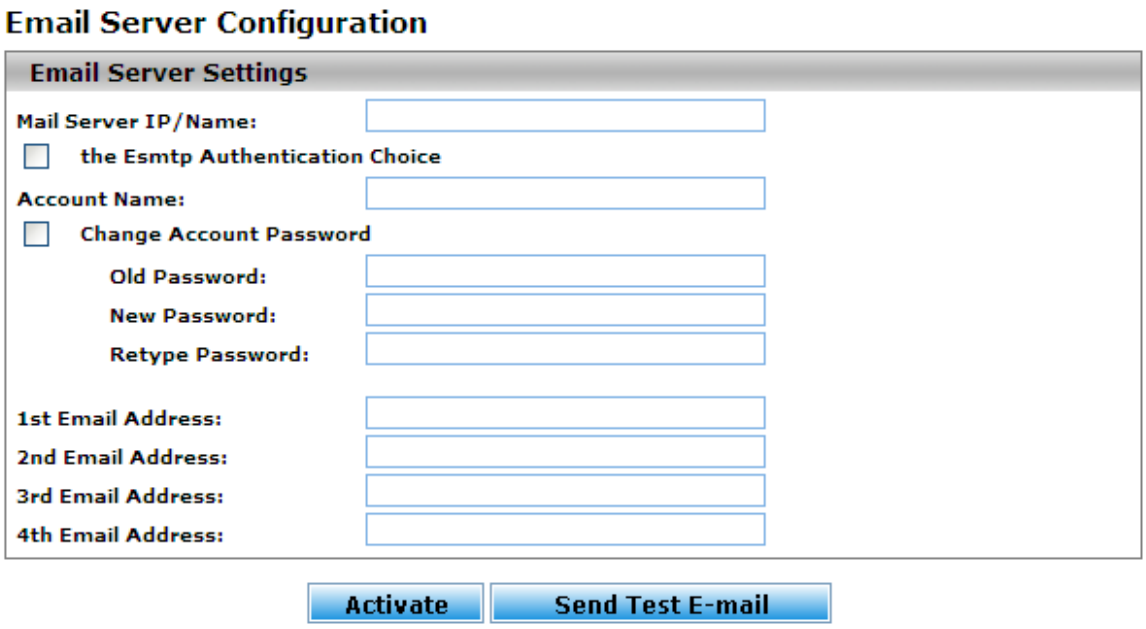
Add Cancel Apply Delete

Syslog Fwd Table

Description	Factory Default
Fwd Severity	
From the drop-down list, select a level of severity that determines which events are sent to the syslog server. The log records messages equal to the configured severity threshold. For example, if you select error, the logged messages include error (3) messages only.	None
Fwd Address Type	
Specify the type of server address and enter the address or host name in the Server IP Address field: • IPv4: The syslog server has an IPv4 address. • IPv6: The syslog server has an IPv6 address. • DNS: The syslog server has a DNS host name.	None
Server IP Address	
Enter the IP address or host name of the syslog server. **Note:** For an IPv6 address, enter the address in the xxxx:xxxx:xxxx:xxxxx:xxxx:xxxx:xxxx:xxxx format.	None
Fwd Port	
Enter the port number to which syslog messages are sent on the syslog server. Enter a number between 0 and 65535. Enter 0 to prevent the syslog messages from being sent.	514
Fwd TransType	
Specify whether log messages are sent as UDP or TCP messages: • **SYSLOG_UDP:** Log messages are sent as UDP messages. • **SYSLOG_TCP:** Log messages are sent as TCP messages.	None

3.12.6.4 Syslog Email Configuration

Email Server Configuration provides you to monitor the switch when you can't stay in front of the computer. For example, when the alarm event happens, you can use a smart phone to get an alarm event email anywhere. And then you can contact a related maintainer or engineer to check the device and solve the problem.



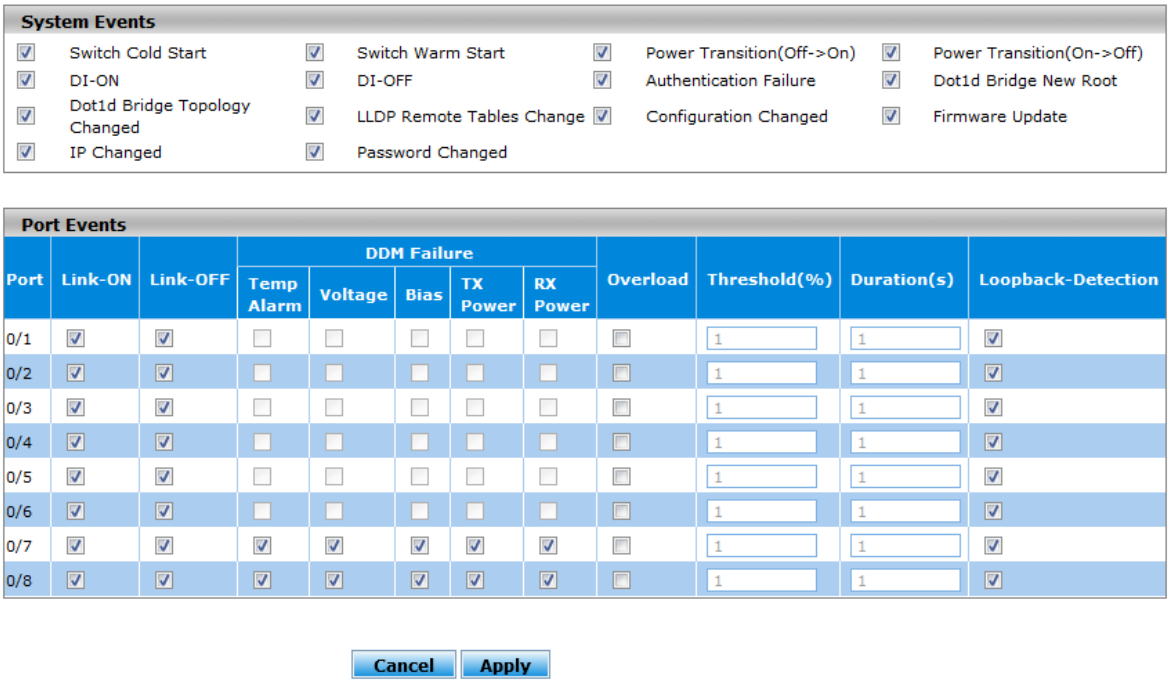
Email Server Configuration

Description	Factory Default
Mail Server IP / Name	
Enter the IP address of the mail server.	None
The Esmtp Authentication Choice	
Specify whether the mail server needs authentication. If the box is selected, please enter the account name of the email.	None
Change Account Password	
Specify whether you want to change the account password. If the box is selected, please enter the old password and enter the new password twice in New Password and Retype Password.	None
Email Address	
Specify the email address for the email alarm. You can specify 1 to 4 email addresses.	None

3.12.6.5 Syslog Email Alarm Table

The Email Alarm Events Settings page provides you to get an email message when the event you configured happened.

Email Alarm Events Settings



System Events

Description	Factory Default
Switch Cold Start	
Specify whether to send an alarm email when switch cold starts.	Checked
Switch Warm Start	
Specify whether to send an alarm email when switch warm starts.	Checked
Power Transition (Off->On)	
Specify whether to send an alarm email when there is a transition in power from Off to On.	Checked
Power Transition (On->Off)	
Specify whether to send an alarm email when there is a transition in power from On to Off.	Checked

Description	Factory Default
DI-ON	
Specify whether to send an alarm email when DI is On.	Checked
DI-OFF	
Specify whether to send an alarm email when DI is Off.	Checked
Authentication Failure	
Specify whether send alarm email when authentication failure.	Checked
Dot1d Bridge New Root	
Specify whether to send an alarm email when a new node is added to the 802.1d network.	Checked
Dot1d Bridge Topology Changed	
Specify whether to send alarm email when the 802.1d bridge topology is changed.	Checked
LLDP Remote Tables Change	
Specify whether to send an alarm email when the LLDP remote table is changed.	Checked
Configuration-Changed	
Specify whether to send an alarm email when the configuration is changed.	Checked
Firmware Update	
Specify whether to send an alarm email when the firmware has been updated.	Checked
IP Changed	
Specify whether to send alarm email when the IP address has changed.	Checked
Password Changed	
Specify whether to send alarm email when the password has changed.	Checked

Port Events

Description	Factory Default
Port	
This field displays the interface number.	*interface number*
Link-ON	
Specify whether to send an alarm email when the Link is ON.	Checked
Link-OFF	
Specify whether to send an alarm email when the Link is OFF.	Checked
DDM Failure	
Specify whether to send an alarm email when the DDM failure event is detected.	Checked
Overload	
Specify whether to send an alarm email when the traffic of the port is overloaded. If the box is selected, you can configure the Threshold (%) and Duration (s) fields.	Unchecked
Loopback-Detection	
Specify whether to send an alarm email when the Loopback-Detection event is detected	Checked

3.13 Diagnostic Settings

Delta switch provides the LLDP and Port mirror function, and you can use these functions to diagnose your network or settings.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.13.1 LLDP

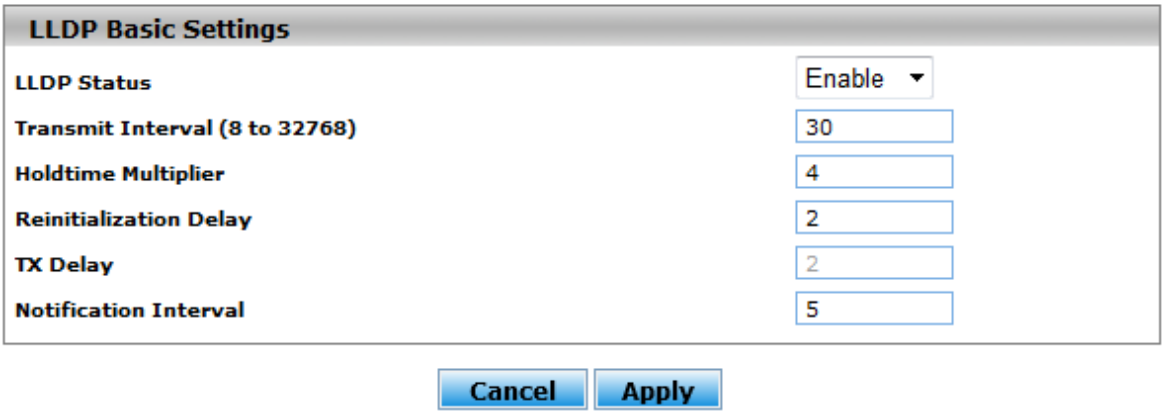
LLDP (Link Layer Discover Protocol), it provides a method for switches, routers and access points to advertise their identification, configuration and capabilities to neighboring devices that store the data in a MIB, and to learn information about neighboring devices.
LLDP-MED (Link Layer Discovery Protocol for Media Endpoint Devices) is an extension to LLDP that operates between endpoint devices such as IP phones or switches.
LLDP-Media Endpoint Discovery (LLDP-MED) is an enhancement to LLDP with the following features:

- **Auto Discovery:** Autodiscovery of LAN policies (such as VLAN, Layer 2 priority, and DiffServ settings) and capability to enable a plug and play networking.
- **Device Location:** Device location discovery for the creation of location databases.
- **Power Management:** Extended and automated power management of Power over Ethernet (PoE) endpoints.
- **Inventory Management:** Inventory management, which lets network administrators track network devices and determine their characteristics such as the manufacturer, software and hardware versions, and serial and asset numbers.

3.13.1.1 LLDP Basic Settings

The default of the LLDP status is enabling. If you want to configure other settings, please refer to the following table.

LLDP Basic Settings



LLDP Basic Settings

Description	Factory Default
LLDP Status	
Specify the status of STP on the switch: • **Enable:** LLDP is enabled. You can configure LLDP, and the settings take effect after you have applied them. • **Disable:** LLDP is disabled. You can still configure LLDP, but the settings do not take effect after you have applied them.	Enable
Transmit Interval (8 to 32768)	
Enter the interval in seconds to transmit the LLDP frames. Enter a number in the range of 5 to 32768 seconds.	30
Holdtime Multiplier	
Enter the hold time multiplier in seconds. The hold time multiplier multiplies the transmit interval to define the Time to Live (TTL) period. Enter a number in the range of 2 to 10 seconds.	4
Reinitialization Delay	
Enter the delay in seconds before reinitialization. Enter a number in the range of 1 to 10 seconds. A longer time prevents frequent reinitializations.	2
TX Delay	2
It is used to delay tx_relay time and the value is fixed at 2 second.	
Notification Interval	
Enter the interval in seconds for the transmission of notifications. Enter a number in the range of 5 to 3600 seconds.	5

3.13.1.2 LLDP Interface Configuration

You can configure LLDP settings for an individual interface in this page.

Interface Settings

Interface Settings

	Port	Link Status	Admin Status	Notification Status
☐			-	-
☐	0/1	Down	TX and RX	Disabled
☐	0/2	Down	TX and RX	Disabled
☐	0/3	Up	TX and RX	Disabled
☐	0/4	Up	TX and RX	Disabled
☐	0/5	Down	TX and RX	Disabled
☐	0/6	Up	TX and RX	Disabled
☐	0/7	Down	TX and RX	Disabled
☐	0/8	Down	TX and RX	Disabled

Cancel Apply

Interface Settings

Description	Factory Default
Port	
This field displays the interface number.	*interface number*
Link Status	
This field displays the status of the interface link.	Up or Down

Description	Factory Default
Admin Status	
Specify the status and direction of the interface: • **TX:** The interface processes outgoing traffic only. • **RX:** The interface processes incoming traffic only. • **TX and RX:** The interface processes both incoming and outgoing traffic. • **Disabled:** The interface is disabled.	TX and RX
Notification Status	
Specify the notification status: • **Enabled:** Notifications are sent. • **Disabled:** Notifications are not sent.	Disabled

3.13.1.3 LLDP TLV Options

You can configure LLDP type-length value (TLV) settings for each interface in this page.

LLDP TLV Options

LLDP TLV Options

	Port	Port Description	System Name	System Description	System Capability	MAC PHY Config	Management Address
		-	-	-	-	-	-
	0/1	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/2	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/3	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/4	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/5	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/6	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/7	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
	0/8	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled

Cancel Apply

Item	Description
Port	Specify the interface number.
Port Description System Name System Description System Capability MAC PHY Config Management Address	Specify whether to send the options in LLDP frames. • **Enable:** The information is transmitted. This is the default setting. • **Disable:** The information is not transmitted.

3.13.1.4 LLDP Local Information

You can view the LLDP local information for an individual interface in this page.

LLDP Local Information

LLDP Local Information	
Interface	0/3

LLDP Local Information	
Chassis ID Subtype	MAC Address
Chassis ID	00:18:23:01:08:60
System Name	
System Description	DVS108W02 - 8 Port with 2 SFP.
System Capability Supported	Bridge ;
System Capability Enabled	Bridge ;
Port ID Subtype	Interface Alias
Port ID	Slot0/3
Port Description	Slot 0: Port 3: Fastethernet-Level
Enabled Tx TLVs	Port Description, System Name, System Description, System Capability, Management Address, Mac Phy
Management Addresses:	
SubType	IPv4
Address	192.168.1.5
Extended 802.3 TLV Info	
--MAC PHY Configuration & Status--	
Auto-Neg Support & Status	Supported ,Enabled
Advertised Capability Bits	6c00 10base-T(HD) 10base-T(FD) 100base-TX(HD) 100base-TX(FD)
Operational MAU Type	16

Refresh

LLDP Local Information

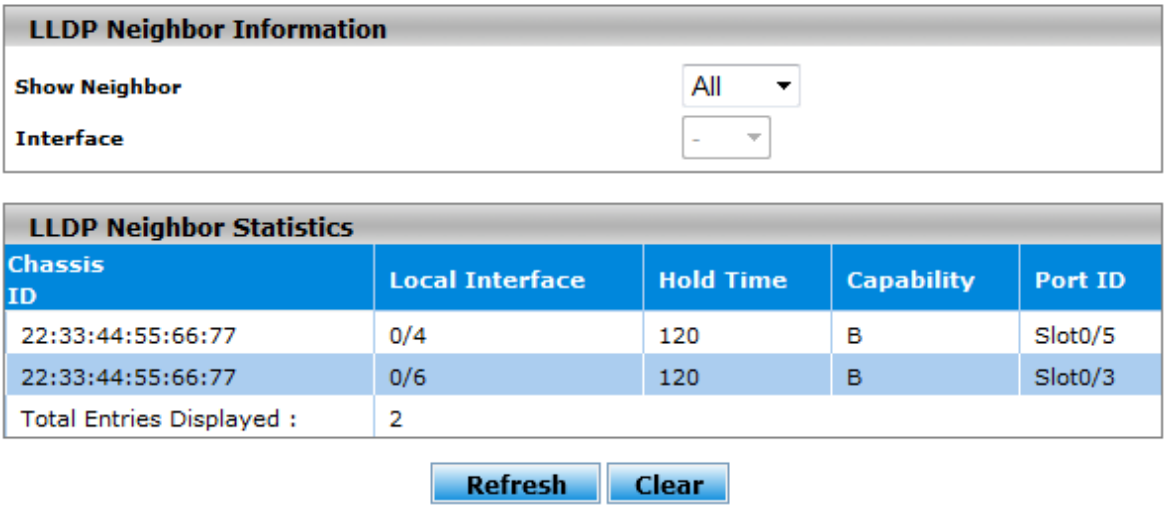
Item	Description
Chassis ID Subtype	This field displays the MAC Address to be identified for the LLDP communication.
Chassis ID	This field displays the MAC address to identify the switch.
System Name	The system name that you specified on the **System Information** page.
System Description	This is a fixed field that displays the model name and description: DVS108W02 - 8 Ports with 2 SFP.

Item	Description	
System Capability Supported	The type of device. If the supported capabilities are identical to the enabled capabilities, the fields display the same information. The fields can display the following information: Router, Bridge, Telephone, DOCSIS Cable Device, WLAN Access Point, Repeater, Station, or Other.	
System Capability Enabled		
Port ID Subtype	The type of data displayed in the Port ID field.	
Port ID	The physical address of the interface.	
Port Description	The description of the port.	
Enabled Tx TLVs	The Tx TLVs that are enabled, for example, if all TLVs are enabled: Port Description, System Name, System Description, System Capability, Management Address, and Mac Phy.	
Management Address	Sub Type	The type of address that the management interface uses, such as an IPv4 address.
	Address	The address that is used to manage the switch.
Extended 802.3 TLV Info		
MAC PHY Configuration & Status	Auto-Neg Support & Status	Displays whether the interface supports port speed autonegotiation. For example: Supported, Enabled.
	Advertised Capability bits	The port speed autonegotiation capabilities.
	Operational MAU Type	The Medium Attachment Unit (MAU) type. The MAU performs physical layer functions, including digital data conversion from the Ethernet interface collision detection and bit injection into the network.

3.13.1.5 LLDP Neighbor Information

You can view the LLDP neighbor statistics for an individual interface or all.

LLDP Neighbor Information



If you select **Detail** from the Show Neighbor item, the screen displays LLDP Neighbor Detail Statistics for the interface which you specified.

LLDP Neighbor Information

LLDP Neighbor Information	
Show Neighbor	Detail
Interface	0/4

3

LLDP Neighbor Detail Statistics	
Chassis ID Subtype	MAC Address
Chassis ID	22:33:44:55:66:77
Port ID Subtype	Interface Alias
Port ID	Slot0/5
Port Description	Slot 0: Port 5: Fastethernet-Level
Local Interface	0/4
Time Remaining	117
System Name	DVS.C
System Description	DVS110W02 - 10 Port with 3 SFP.
System Capability Supported	Bridge ;
System Capability Enabled	Bridge ;
Management Addresses:	
If ID	14
SubType	IPv4
Address	192.168.1.20
OID	1 3 6 1 2 1 2 2 1 1
Extended 802.1 Tlvs:	
Port VLAN ID	Not Advertised
Port & Protocol VLAN ID:	Not Advertised
VLAN Name:	Not Advertised
Extended 802.3 TLV:	
MAC PHY Configuration:	
Auto-Neg Support	Supported
Auto-Neg Status	Enabled
Advertised Capability Bits	6c00
	10base-T(HD) 10base-T(FD) 100base-TX(HD) 100base-TX(FD)
Operational MAU Type	16
Link Aggregation:	Not Advertised
Maximum Frame Size	Not Advertised

LLDP Neighbor Information

Description	Factory Default
Show Neighbor	
• **All:** The information is for all interfaces. • **Detail:** The information is for one single interface.	All
Interface	
Specify one interface for information.	None

LLDP Neighbor Detail Statistics

Item	Description
Chassis ID	The chassis ID of the remote neighbor.
Local Interface	The interface on the switch that receives the LLDP information from the remote neighbor.
Hold Time	The period in seconds before an LLDP packet expires.
Capability	The system capabilities of the remote system. The fields can display the following information: Router, Bridge, Telephone, DOCSIS Cable Device, WLAN Access Point, Repeater, Station, or Other.
Port ID	The port identification of the interface on the remote neighbor from which the information was sent.

3.13.1.6 LLDP Traffic

LLDP Traffic Information

LLDP Traffic Information

Interface	Frames out	Entries Aged	Frames In	Frames Rx in Error	Frames Discarded	Unrecognized TLVs	Discarded TLVs
0/1	0	0	0	0	0	0	0
0/2	0	0	0	0	0	0	0
0/3	34	0	0	0	0	0	0
0/4	39	0	39	0	0	0	0
0/5	0	0	0	0	0	0	0
0/6	39	0	39	0	0	0	0
0/7	0	0	0	0	0	0	0
0/8	0	0	0	0	0	0	0

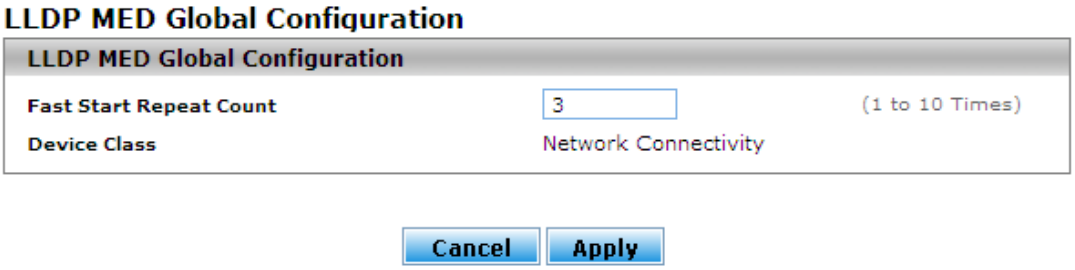
LLDP Traffic Statistics

Total Frames Out	112
Total Entries Aged	0
Total Frames In	78
Total Frames Received In Error	0
Total Frames Discarded	0
Total TLVs Unrecognized	0
Total TLVs Discarded	0

CLEAR

LLDP Traffic Information: The statistics of the fields are for each individual interface.
LLDP Traffic Statistics: These statistics are total quantities of LLDP traffic for the switch

3.13.1.7 LLDP-MED Global Configuration

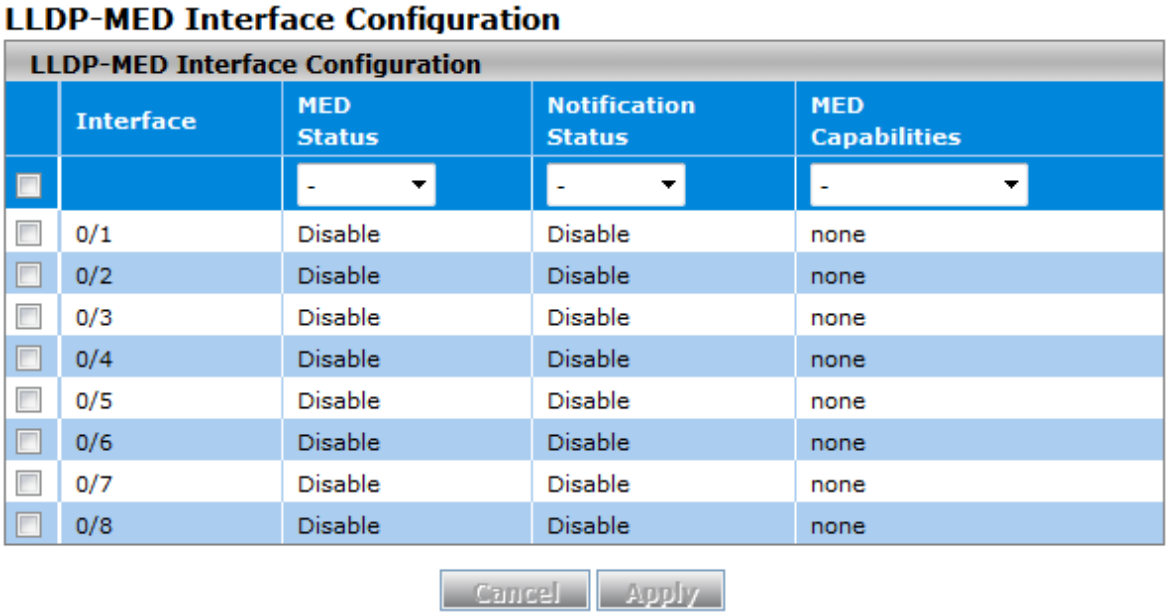


LLDP MED Global Configuration

Description	Factory Default
Fast Start Repeat Count	
Enter the number of LLDP protocol data units (PDUs) that are transmitted when LLDP-MED is enabled for an interface. Enter a number in the range of 1 to 10.	3
Device Class	
This field displays the MED classification of the switch. There are four different kinds of devices, and the first three items represent the actual endpoints: • **Class I:** Generic (for example, an IP communication controller) • **Class II:** Media (for example, a conference bridge) • **Class III:** Communication (for example, an IP phone) • **Network Connectivity (device):** Generally a LAN switch or router, an IEEE 802.1 bridge, or an IEEE 802.11 wireless access point	None

3.13.1.8 LLDP-MED Interface Configuration

You can configure the LLDP-MED settings for an individual interface in this page.



LLDP-MED Interface Configuration

Description	Factory Default
Interface	
This field displays the interface number or port channel number.	*interface number*
Med Status	
Specify the MED status: • **Enabled:** MED is enabled for the interface. • **Disabled:** MED is disabled for the interface.	Disabled
Notification Status	
Specify the notification status: • **Enabled:** MED notifications are sent for the interface. • **Disabled:** MED notifications are not sent for the interface.	Disabled
MED Capabilities	
Specify which MED TLVs are transmitted: • **none:** No MED TLVs are transmitted. • **network-policy:** The network policy information is transmitted. • **capabilities:** The capabilities information is transmitted. • **both:** Both the network policy information and capabilities information are transmitted.	None

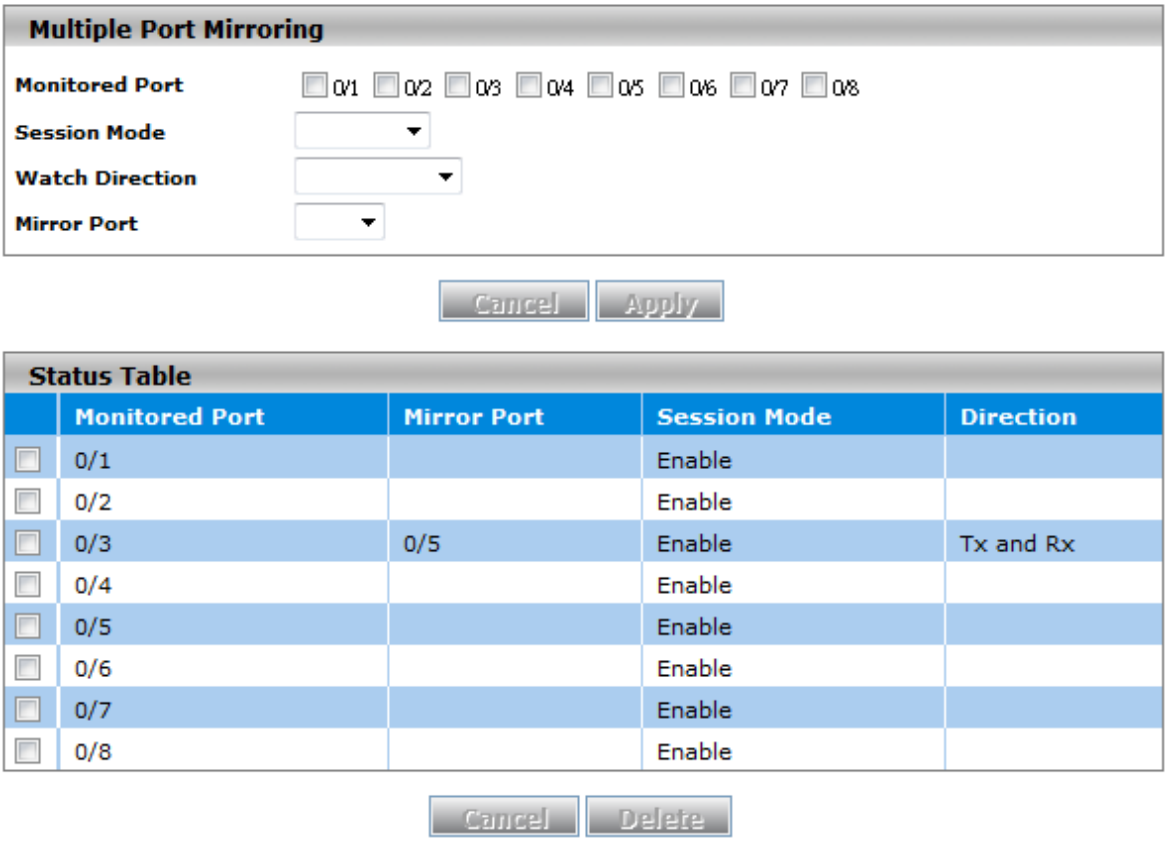
3.13.2 Port Mirroring

Port Mirror is used for monitoring the network traffic of the source port by the analyzer.

3.13.2.1 Multiple Port Mirroring

Delta switch can select multiple interfaces as source ports and one interface as a destination or monitor port. The monitor port can monitor the source ports' incoming and outgoing packets. Port Mirroring supports the mirroring of the packets passing in, out the source port, or both at the same time. It supports N to 1 and maximum 8 monitored ports per system. Ingress-mirrored packets are sent unmodified (as the packets came in on the ingress port). Egress-mirrored packets are sent modified with a VLAN tag, if the packet is not tagged, the packet will be tagged with tag 1, else if the packet is tagged, the packet will not modified. It does not support to set LAG port to be monitored or mirror port.

Multiple Port Mirroring



Multiple Port Mirroring

Description	Factory Default
Monitored Port	
Specify the monitored port or ports for monitoring.	Unchecked
Session Mode	
Specify whether the port mirroring is enabled: • **Enable:** The port mirroring is enabled. The setting applies to all interfaces. • **Disable:** The port mirroring is disabled. The setting applies to all interfaces. **Note:** When you configure the session mode for an individual interface, it is applied to all interfaces. You can select **Enable** from the Session Mode drop-down list and control the port mirroring for individual interfaces. If you want to disable the port mirroring, make sure the direction is not configured for the interfaces. If the direction is configured of the interfaces and you want to disable port mirroring, select the check box of the interface, and click **Delete** to remove the port mirroring configuration for the interface.	None
Watch Direction	
Specify the direction in which the port mirroring occurs: • **Tx and Rx:** Both outgoing and incoming traffic are mirrored. • **Tx Only:** Only outgoing traffic is mirrored. • **Rx Only:** Only incoming traffic is mirrored.	None
Mirror Port	
Specify which port is the mirror port.	None

Status Table

Item	Description
Monitored Port	This field displays the monitored port number.
Mirror Port	This field displays the destination port or monitored interface. Only one port can be the mirror port. This port is used as the mirror port for all ports which you configure port mirroring.
Session Mode	The port mirroring status of the port. • **Enable:** The port mirroring is enabled. • **Disable:** The port mirroring is disabled.
Direction	The direction of the port mirroring. • **Tx and Rx:** Both outgoing and incoming traffic are mirrored. • **Tx Only:** Only outgoing traffic is mirrored. • **Rx Only:** Only incoming traffic is mirrored.

3.13.3 Cable Diagnostic

We provide you with Cable Diagnostic to detect whether the cable link status of the port is normal or not. The Cable status will show the cable link status of the port which you select.

Cable Diagnostics

Cable Diagnostics

	Port	Cable Status	Fault Distance(unit: meter)
	0/1	-	-
	0/2	-	-
	0/3	-	-
	0/4	-	-
	0/5	-	-
	0/6	-	-
	0/7	-	-
	0/8	-	-

Cancel Apply

Cable Diagnostics

Item	Description
Port	This field displays the port number.
Cable Status	This field displays the cable link status. For different situations, there are five statuses. • Failure: The cable tester status is Failure. • Normal: The cable is working correctly. • Open: The cable is disconnected or there is a faulty connector. • Short: There is an electrical short in the cable, or the cable is in an undetermined status, that is, the cable is in an open or short status. • Unknown: The cable is in a crosstalk status, or a test is currently in progress. **Note:** The cable status of the combo port is always “normal”.
Fault Distance (Unit: meter)	The field displays the cable distance of the port which is in the abnormal link status.

3.14 Auto Warning

Industrial Ethernet devices in an industrial environment are very important. These devices usually need to work for a long time and are usually located at the end of the system. So if the devices which connect to the industrial Ethernet switch need to be maintained, the switch must provide some messages to the maintainer. Even when the maintainers or engineers do not stay in the control room, they still need to be informed the status of the devices. Delta switch provides different approaches to warn engineers automatically. In this section, you can get the information about a relay alarm.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.14.1 Relay Alarm

A relay alarm is used to monitor power, DI and port status. You can configure the power, DI, port link or traffic overload alarm event to notice related engineers.

3.14.1.1 Relay Alarm Setting

Delta switch provides flexible configuring items for you to configure events according to your requirement. If an event is happened, it will trigger a relay alarm.

Relay Alarm I Events Settings

System Events

Power1	Disabled	**Power2**	Disabled
DI1	Disabled	**DI2**	Disabled

Port Events

	Port	Link	Traffic-Overload	Traffic-Threshold(%)	Traffic-Duration(s)
		-	-		
	0/1	Disabled	Disabled	1	1
	0/2	Disabled	Disabled	1	1
	0/3	Disabled	Disabled	1	1
	0/4	Disabled	Disabled	1	1
	0/5	Disabled	Disabled	1	1
	0/6	Disabled	Disabled	1	1
	0/7	Disabled	Disabled	1	1
	0/8	Disabled	Disabled	1	1

Cancel Apply

Relay Alarm II Events Settings

System Events

Power1	Disabled	**Power2**	Disabled
DI1	Disabled	**DI2**	Disabled

Port Events

	Port	Link	Traffic-Overload	Traffic-Threshold(%)	Traffic-Duration(s)
		-	-		
	0/1	Disabled	Disabled	1	1
	0/2	Disabled	Disabled	1	1
	0/3	Disabled	Disabled	1	1
	0/4	Disabled	Disabled	1	1
	0/5	Disabled	Disabled	1	1
	0/6	Disabled	Disabled	1	1
	0/7	Disabled	Disabled	1	1
	0/8	Disabled	Disabled	1	1

Cancel Apply

System Events

Description	Factory Default
Power 1	
Specify the power event status: • **Disable:** Disable Power 1 to trigger relay alarm 1 or 2. • **On to Off:** When the status of Power 1 changes from On to Off, relay alarm 1 or 2 is triggered. • **Off to On:** When the status of Power 1 changes from Off to On, relay alarm 1 or 2 is triggered.	Disable
Power 2	
Specify the power event status: • **Disable:** Disable Power 2 to trigger relay alarm 1or 2. • **On to Off:** When the status of Power 2 changes from On to Off, relay alarm 1 or 2 is triggered. • **Off to On:** When the status of Power 2 changes from Off to On, relay alarm 1 or 2 is triggered.	Disable
DI 1	
Specify the DI event status: • **Disable:** Disable DI 1 to trigger relay alarm 1 or 2. • **On to Off:** When the status of DI 2 changes from On to Off, relay alarm 1 or 2 is triggered. • **Off to On:** When the status of DI 2 changes from Off to On, relay alarm 1 or 2 is triggered.	Disable

Description	Factory Default
DI 2	
Specify the DI event status: • **Disable:** Disable DI 2 to trigger relay alarm 1 or 2. • **On to Off:** When the status of DI 2 changes from On to Off, relay alarm 1 or 2 is triggered. • **Off to On:** When the status of DI 2 changes from Off to On, relay alarm 1 or 2 is triggered.	Disable

Port Events

Description	Factory Default
Link	
Specify the port link event status: • **Disable:** Disable the port link to trigger relay alarm 1 or 2. • **On to Off:** When the status of the port link changes from On to Off, relay alarm 1 or 2 is triggered. • **Off to On:** When the status of the port link changes from Off to On, relay alarm 1 or 2 is triggered.	Disable
Traffic-Overload	
Specify the traffic overload event status. The traffic overload is used to monitor the port's **ingress** traffic flow. It has two parameters: threshold and duration. • **Disable:** Disable traffic-overload to trigger relay alarm 1 or 2. • **Enabled:** Enable traffic-overload to trigger relay alarm 1 or 2.	Disable
Traffic-Threshold (%)	
Specify the traffic speed threshold percentage of the port. Enter the value between 1 and 100.	1
Traffic-Duration (s)	
Specify the traffic overload duration. If the average flow of the port over loads the threshold during this duration, it means the traffic is overloaded. Enter the value between 1 and 300.	1

Note:
If you want the Relay Alarm function to work properly, please make sure the Delta switch has **one set of power at least**.
For example:
- Power 1 system event is configured to "Off to On", and Power 1 & 2 have no power. If you provide power to Power 1, then Relay Alarm will not be triggered. Because when the event happened, the Delta switch has no power at that moment.
- Power 1 system event is configured to "On to Off", and Power 1 has power, but Power 2 has no power. If you turn off Power 1, then Relay Alarm will not be triggered. Even though the Delta switch has power at the moment when the event happened, it has no power after that moment, so the Relay Alarm will not be triggered.

3.14.1.2 Relay Alarm Table

The status of Relay Alarm is displayed in this page. This table only displays the current alarm, so if the event is not triggered, it is not displayed either.

Current Alarm List

Current Alarm List		
Index	**Event**	**Relay**
1	Port 3 Link up	1
2	Port 6 traffic overload	1

Refresh Clear

Current Alarm List

Item	Description
Index	The index number in the list.
Event	This field displays the alarm event.
Relay	This field displays the relay number.

3.15 Dual Image

Delta switch allows a user to maintain two image files. One image can function as an active image. The second image can function as a backup image, and you can put an older or the newest image in the second image. This function provides an efficient firmware upgrade or downgrade process, and reduces the time during the process.

> **IMPORTANT:**
> **Make sure that you save the configuration in the Save Configuration page after you have applied the configuration changes. (Save Config→Save Configuration) If you don't save the configuration, then the configuration will be cleared after the switch is rebooted.**

3.15.1 Copy

Copy

Copy		
Source Image	○ Image1	○ Image2
Destination Image	○ Image1	○ Image2

Transfer Status

Cancel Apply

After upgrading firmware and running it as active firmware, you can keep the older image to image2, or you can copy the current firmware to image2 for backup.

3.15.2 Configuration

Dual Image Configuration

Dual Image Configuration					
	Image Name	Active Image	Next Active Image	Description (1-256)	Version
☐			-		
☐	image1	True	True		1.11
☐	image2	False	False		1.09

Delete Cancel Apply

If you have two firmware image files, you can specify which firmware is the active firmware, and it will be loaded when the switch starts or restarts.

Note:
Please make sure you have saved the settings on the switch before you restart the switch.

3.16 Save Config

The Save Config provides users to save configuration, and erase configuration and logs.

3.16.1 Save Configuration

Save Configuration

Save Configuration

Saving all applied changes will cause all changes to configuration panels that were applied, but not saved, to be saved, thus retaining their new values across a system reboot. ☐

Apply

After you select the box and click the **Apply** button, all the configuration will be saved in the **Startup Configuration** file. And if you reboot the switch, the configuration will be retained. If you don't save configuration before rebooting the switch, the configuration value that you have saved last time will be gone after you reboot the switch.

3.16.2 Restore

Restore Configuration

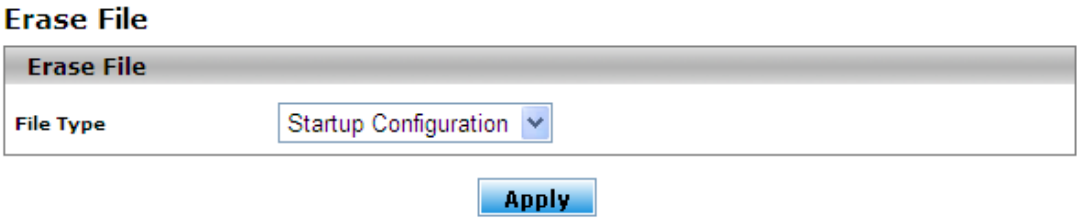
Restore Configuration

Restore Option ○ No Restore ◉ Startup Restore

Apply Cancel

Item	Description
No Restore	After the switch reboots, it will load the default configuration.
Startup Restore	After the switch reboots, it will load the starup configuration. **Note:** Please make sure that you have saved the settings on the switch before you restart the switch.

3.16.3 Erase



There are three file types which can be erased:

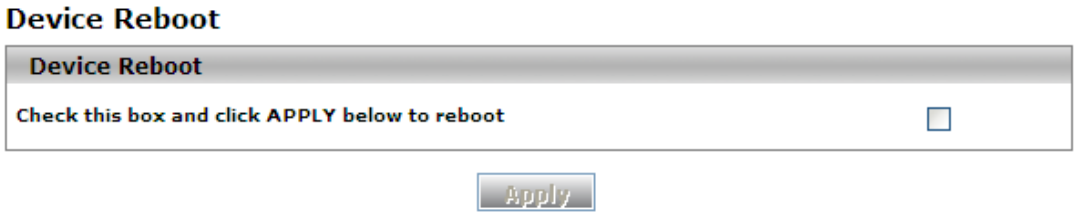
- Startup Configuration
- Backup Configuration
- Log

Note:
When you erase the startup configuration file (for example, because there are problems with the file) and then restart the switch, the factory default startup configuration is used. However, note that erasing the startup configuration file is not the same as resetting the switch to factory default settings. Resetting the switch to factory default deletes not only the startup configuration file but also all other configuration files such as the SSL key, log files, backup configuration, and so on.

3.17 Reset

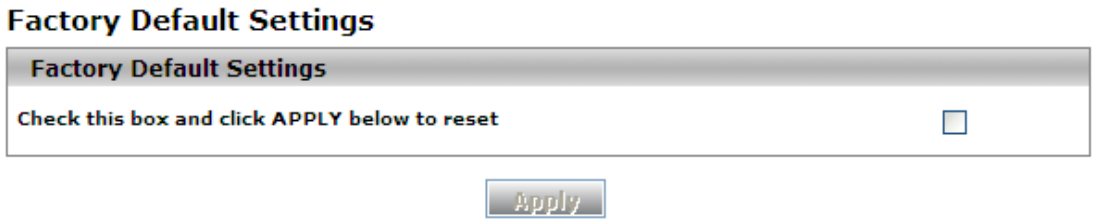
The Reset function provides the function of rebooting a switch for users.

3.17.1 Device Reboot



After you select the box and click the **Apply** button, GUI will not be available until the switch completes the boot cycle. After the switch is reset, you need to re-login again.

3.17.2 Factory Default Settings

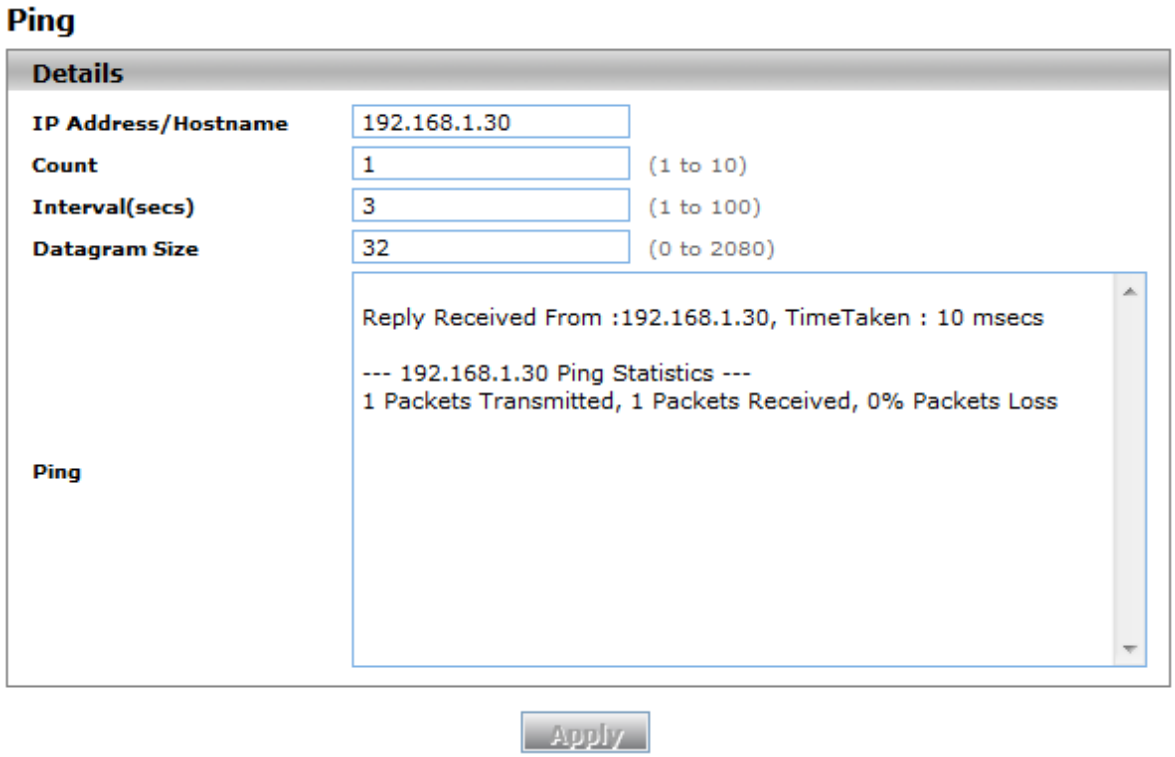


After you select the box and click the **Apply** button, the Delta switch will be reset to the factory default values. The IP address reverts to 192.168.1.5, the user login name reverts to admin, and the password is blank.

3.18 Troubleshooting

Sometimes there is disconnection or unstable connection in the network. So the Troubleshooting function provides the ping function to check the connection situation between the Delta switch and the other devices or clients. It also provides the traceroute function for tracing the packet's path to a remote destination.

3.18.1 Ping IPv4



Ping

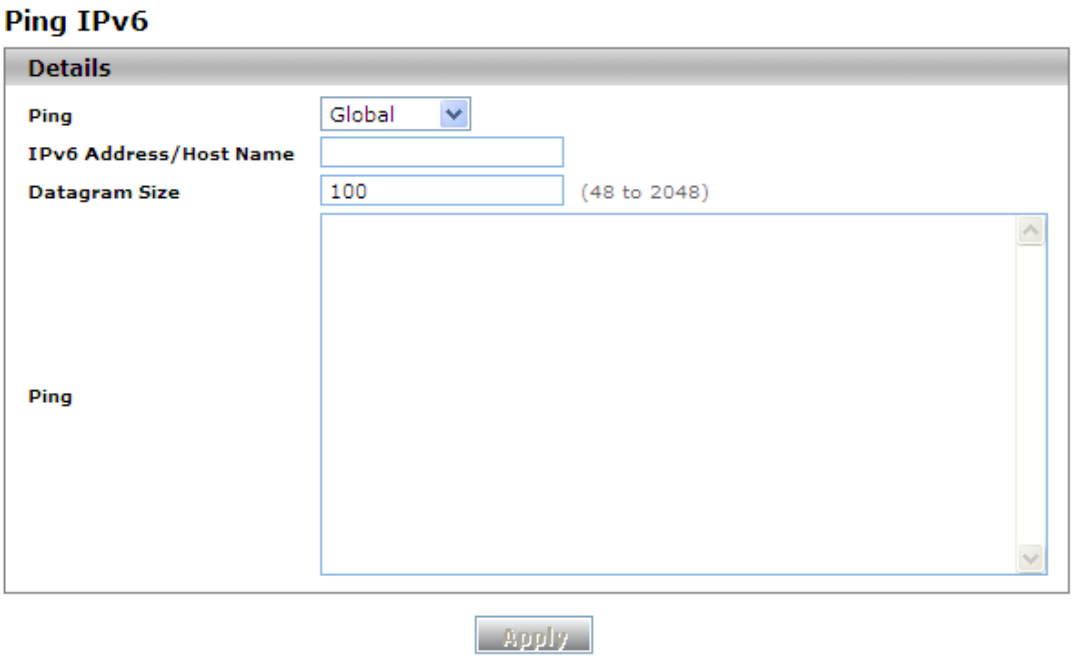
Description	Factory Default
IP Address/Hostname	
Specify the IP address or host name that you want to ping. Enter an IPv4 address or host name.	None

Description	Factory Default
Count	
Specify the number of echo requests to be sent. Enter a number between 1 and 10.	3
Interval(secs)	
Specify the interval between ping packets in seconds. Enter a number between 1 and 100 seconds.	3
Datagram Size	
Specify the size of the ping packet in bytes. Enter a payload size between 0 and 2080 bytes.	32

- An unsuccessful ping is displayed as below:
  Reply Not Received From : <ipv4 address>, Timeout : <number> secs
  --- <ipv4 address> Ping Statistics ---
  <count> Packets Transmitted, 0 Packets Received, 100% Packets Loss
- A successful ping displays as below:
  Reply Received From : <ipv4 address>, TimeTaken : <number> msecs
  --- 192.168.1.5 Ping Statistics ---
  <count> Packets Transmitted, <number> Packets Received, 0% Packets Loss

Note:
Make sure the IP Address/Hostname you want to ping is really exisitng and normally work in the same segment as the switch.

3.18.2 Ping IPv6



Ping IPv6

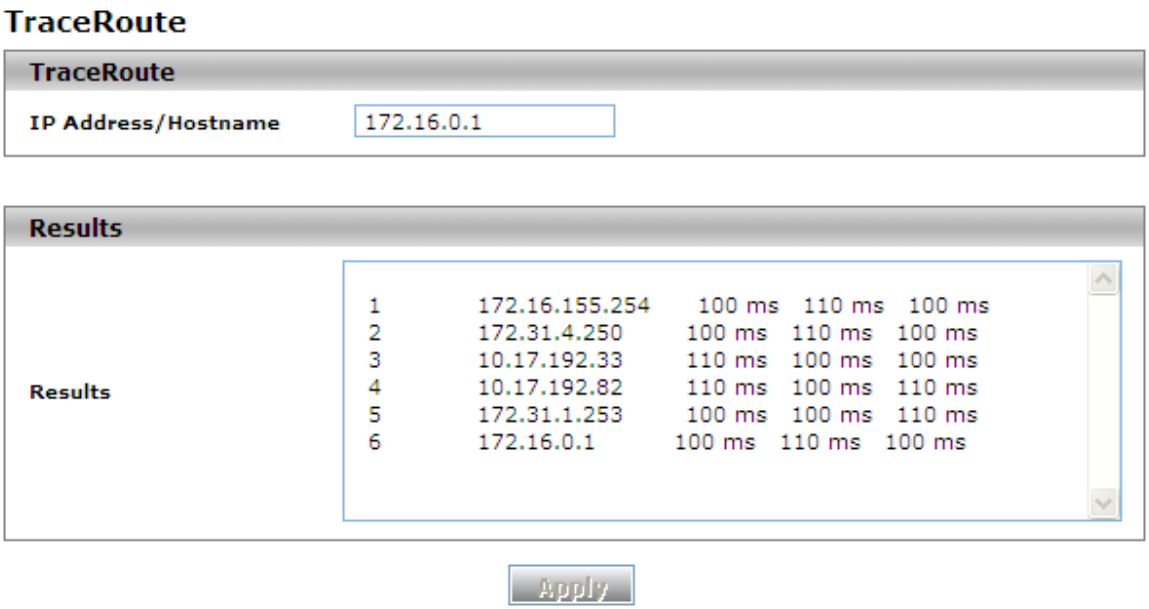
Description	Factory Default
Ping	
Specify the type of IP address. • **Global:** The global IP address. • **Link Local:** The link local IP address. They are assigned with the fe80::/64 prefix.	Global

Description	Factory Default
IPv6 Address/Host Name	
Specify the IPv6 address or host name that you want to ping. Enter an address in the xxxx:xxxx:xxxx:xxxxx:xxxx:xxxx:xxxx:xxxx format.	None
Datagram Size	
Specify the size of the ping packet in bytes. Enter a payload size between 48 and 2048 bytes.	100

- An unsuccessful ping is displayed as below:
  ping6 <IPv6 address> Destination Unreachable
- A successful ping displays the following information:
  count=3, Receive count=<number> from <IPv6 address>. Average round trip time = <number> ms

3

3.18.3 Traceroute IPv4



Item	Description
IP Address/Hostname	Specify the IP address or host name that you want to ping. Enter an IPv4 address or host name.

After you click **Apply** to trace the route, the results are displayed in the Results field. If the switch cannot trace the route, the Results field displays asterisk characters (***).

3.18.4 Traceroute IPv6

Item	Description
IPv6 Address/Host Name	Specify the IPv6 address or host name that you want to ping. Enter an address in the xxxx:xxxx:xxxx:xxxxx:xxxx:xxxx:xxxx:xxxx format.

After you click **Apply** to trace the route, the results are displayed in the Results field. If the switch cannot trace the route, the Results field displays asterisk characters (***) and the following text: “Destination unreachable Error in receiving the packet.”

3.19 Logout

Logout can disconnect the HTTP session. After you finish the configuration, we recommend you log out for security reasons.

MEMO

Chapter 4 IEXplorer Utility Introduction

Table of Contents

Delta has many kinds of industrial products and network devices. If user has many Delta products, IEXplorer utility can provide you to search them via one interface. IEXplorer utility can search for IES series products, DVP series products and some Delta products which have extend communication card. It can help you know the IP address of the device, modify the configuration and upgrade the firmware.

IEXplorer utility supports these models:

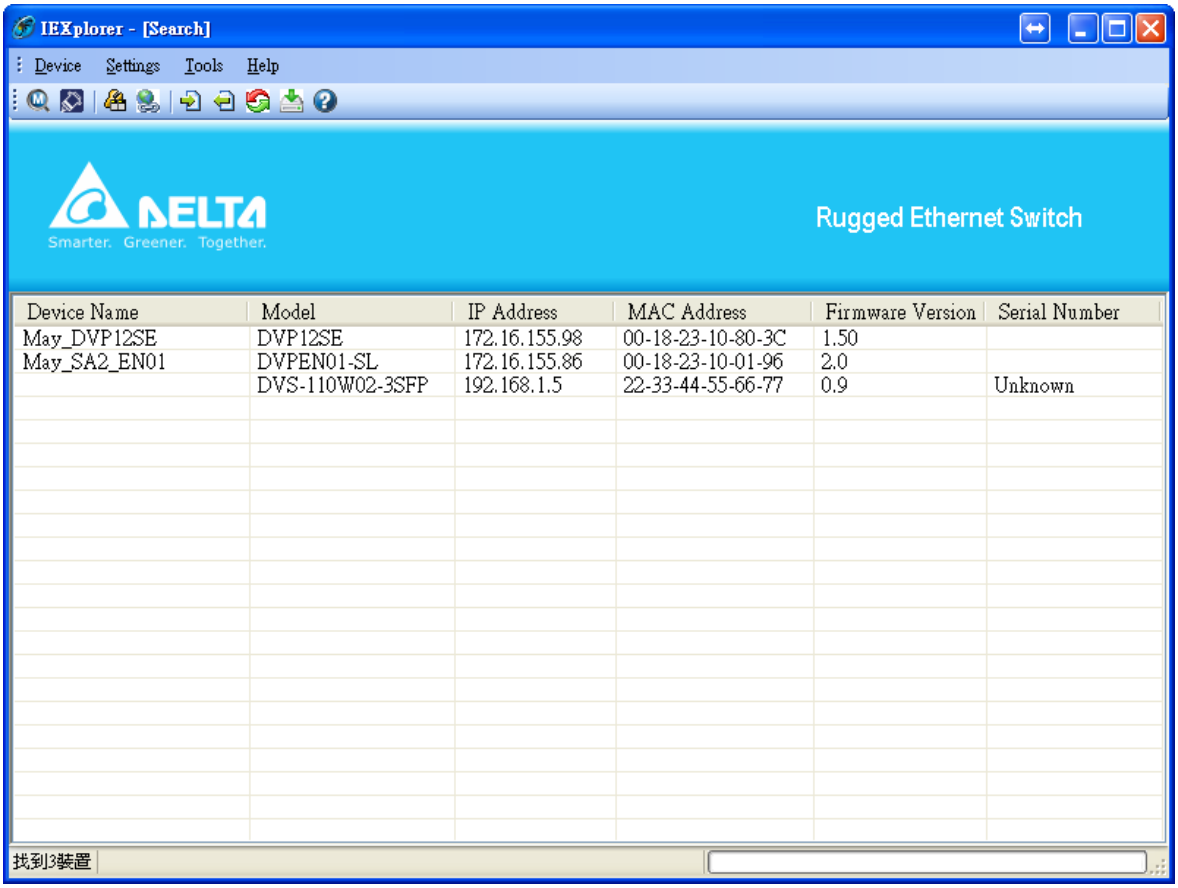
- DVS-110W02-3SFP
- DVS-108W02-2SFP
- DVW-W02W2-E2
- IFD9506
- IFD9507
- RTU-EN01
- DVPEN01-SL
- DVP12SE
- DVP-FEN01
- DVPSCM12-SL
- DVPSCM52-SL
- ASDA-M
- CMC-MOD01
- CMC-EIP01

More models coming soon
Compatible OS: Window XP SP2, Window 7 (32/64 bits),

4.1 Starting the Configuration

After you finish the installation, you can find the IEXplorer icon on the desktop. Double-click the icon to run the program.

After double-clicking the icon, you can see the IEXplorer interface as below:

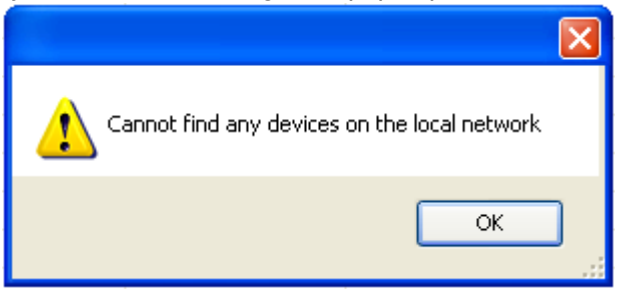


4.2 Device

There are three items in Devices: Search, Virtual COM and Exit.

4.2.1 Search

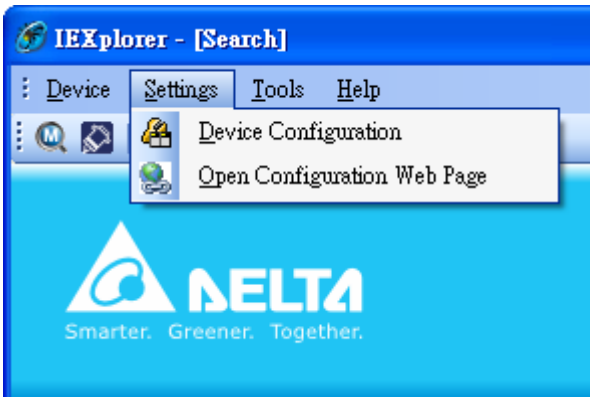
When utility can't find any devices, the message box pops-up.



The auto search function performs every 1 minute. If the device doesn't exist anymore, then it will be moved from list view.

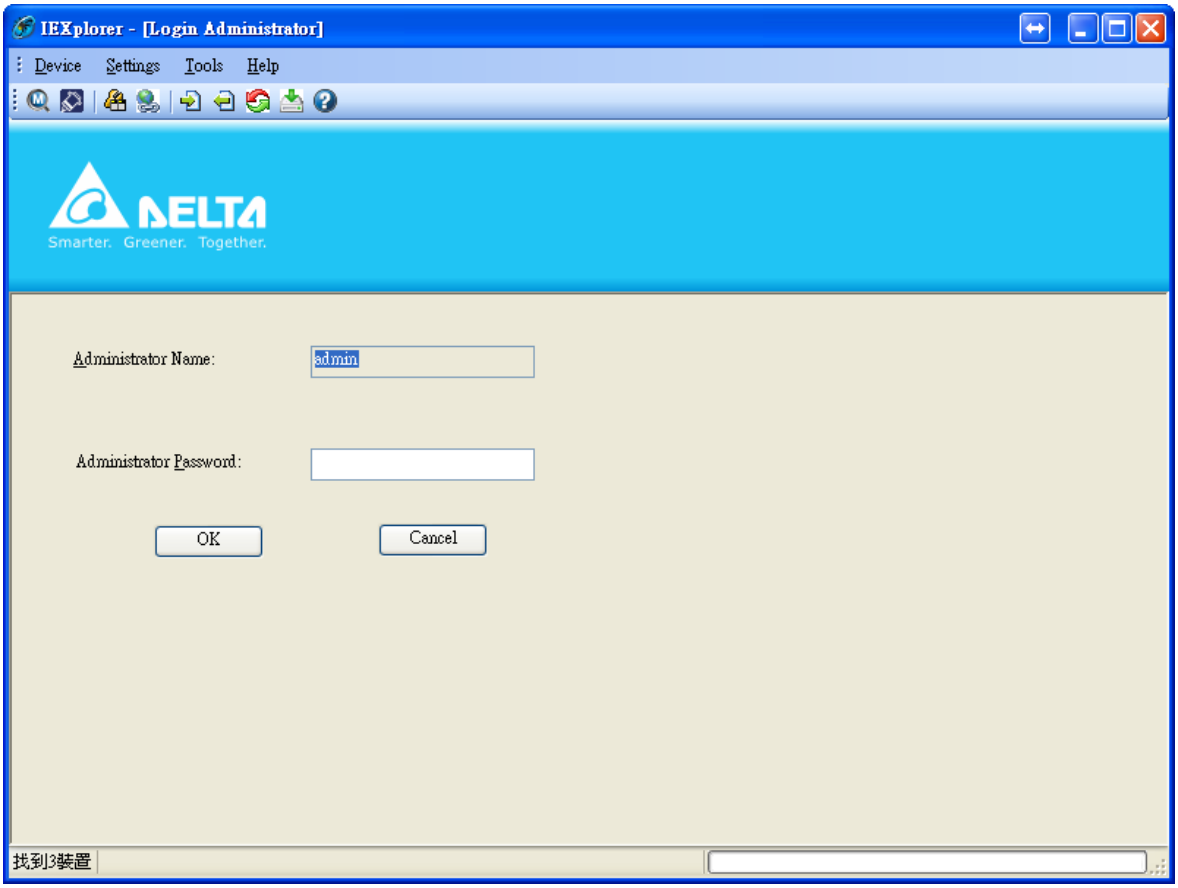
4.3 Settings

IEXplorer utility provides two ways to configure the devices. You can configure the basic settings via **Device Configuration** or configure completely settings via **Open Configuration Web Page**. The **Settings** item only can be clicked when you select DVS or DVW series products in list view.

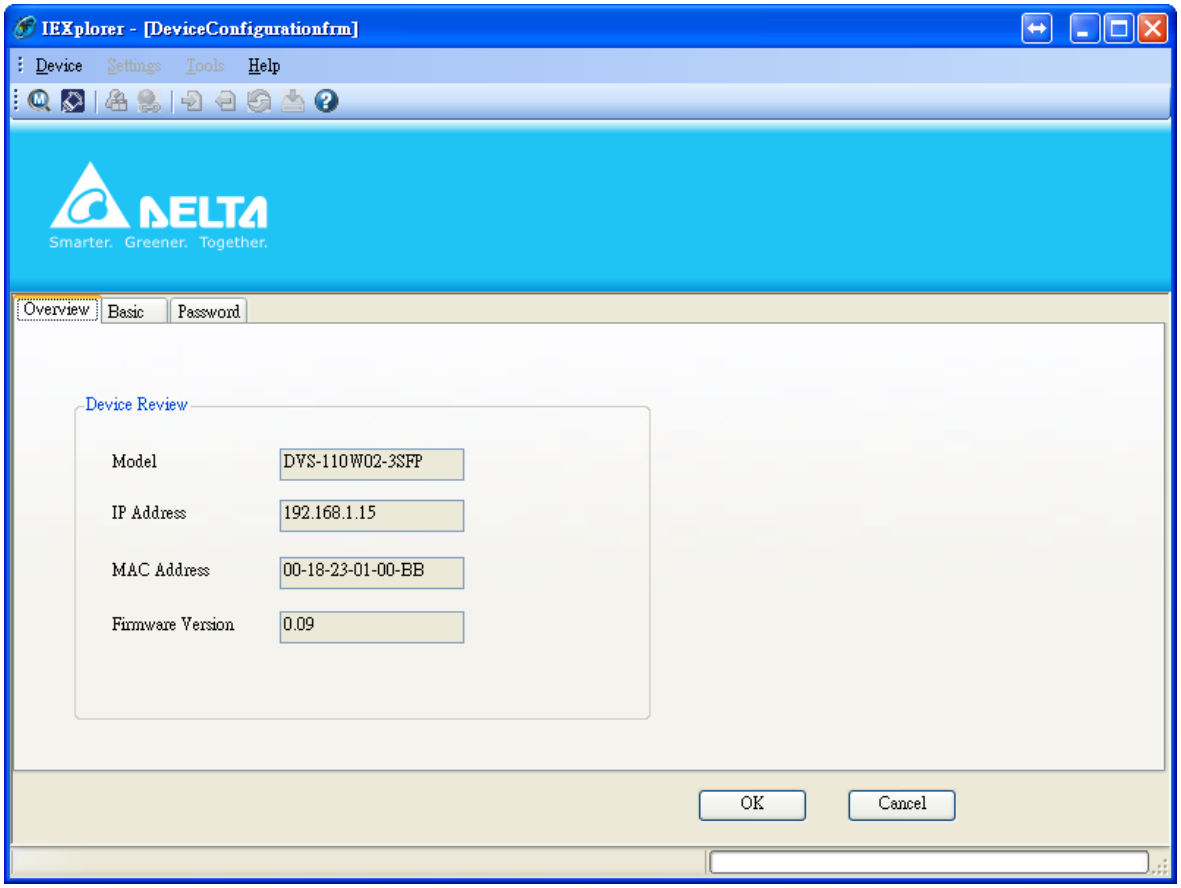


4.3.1 Device Configuration

The login ID and password are the same as the web interface.



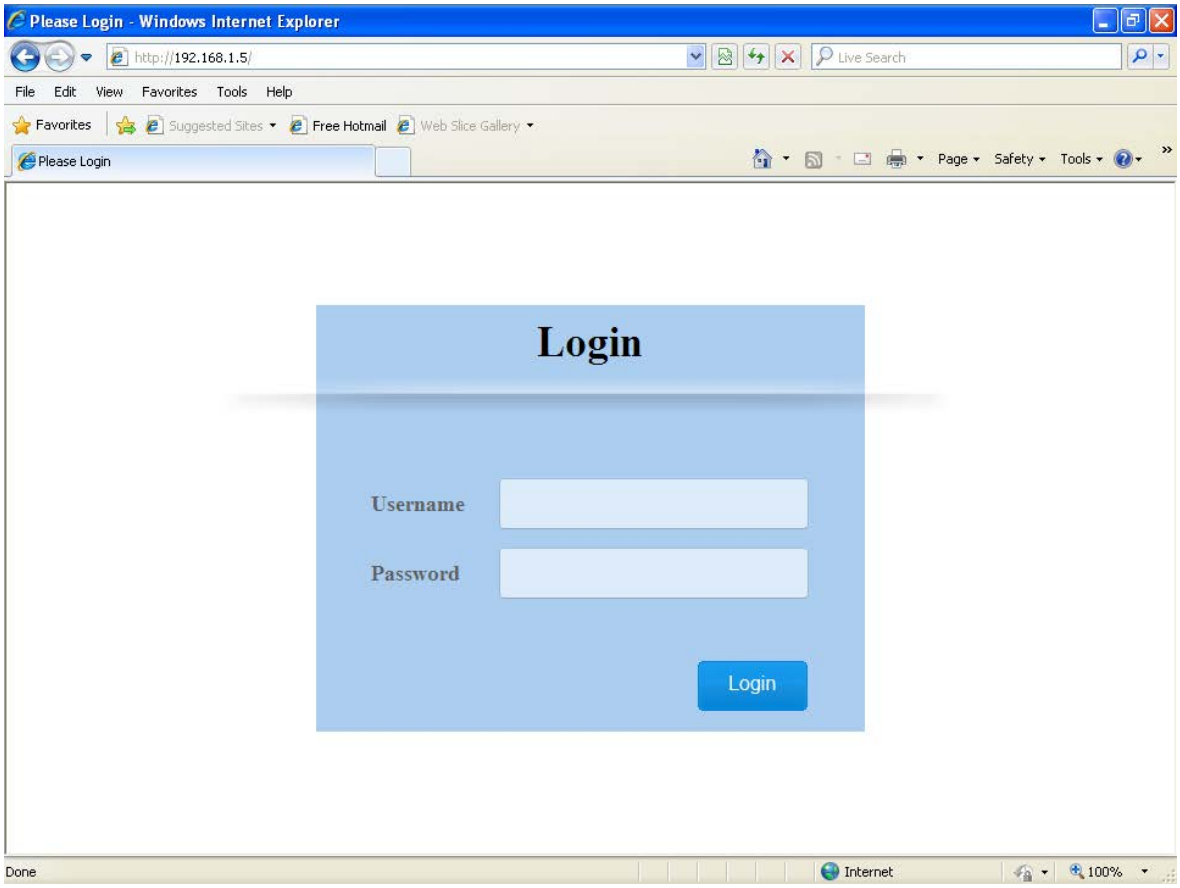
After the authentication progresses, the basic setting interface displays as below:



You can configure the device name, IP information, modify the password, and reset it to factory default setting in this interface.

4.3.2 Configuration Web Page

If you select **Open Configuration Web Page**, the web interface will be display.



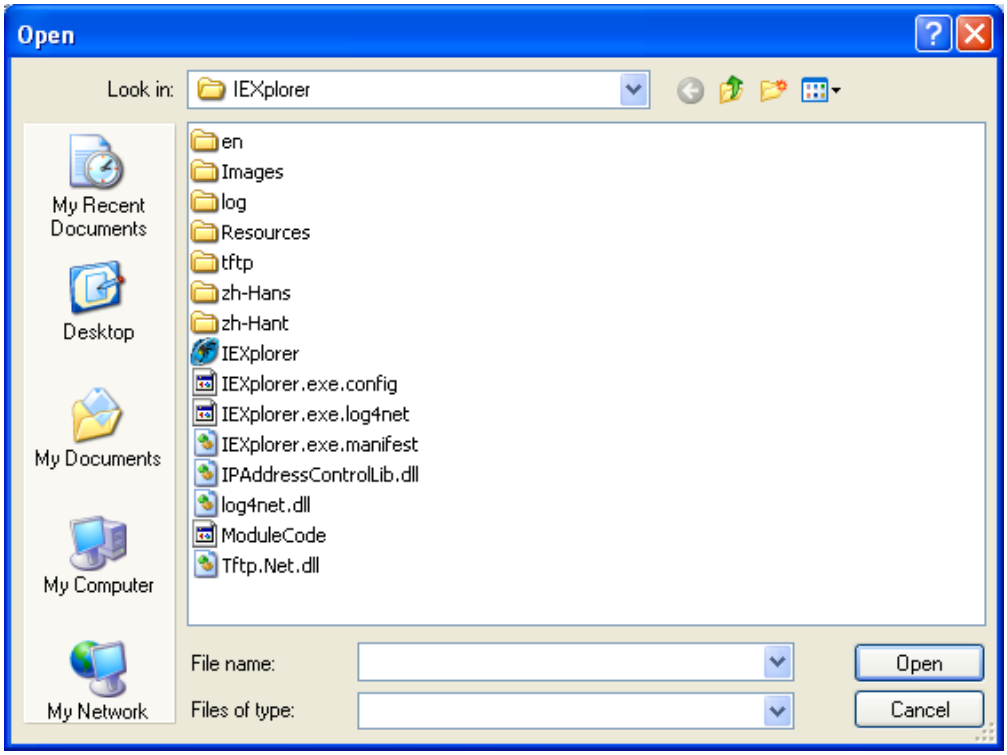
Note:
You can double-click the device in list view to open the configuration web page. If the device which you select doesn't belong to a DVS or DVW series device, then utility will open **DCISoft** for you to configure the device.

4.4 Tools

Please select the device before using the functions in **Tools** item.

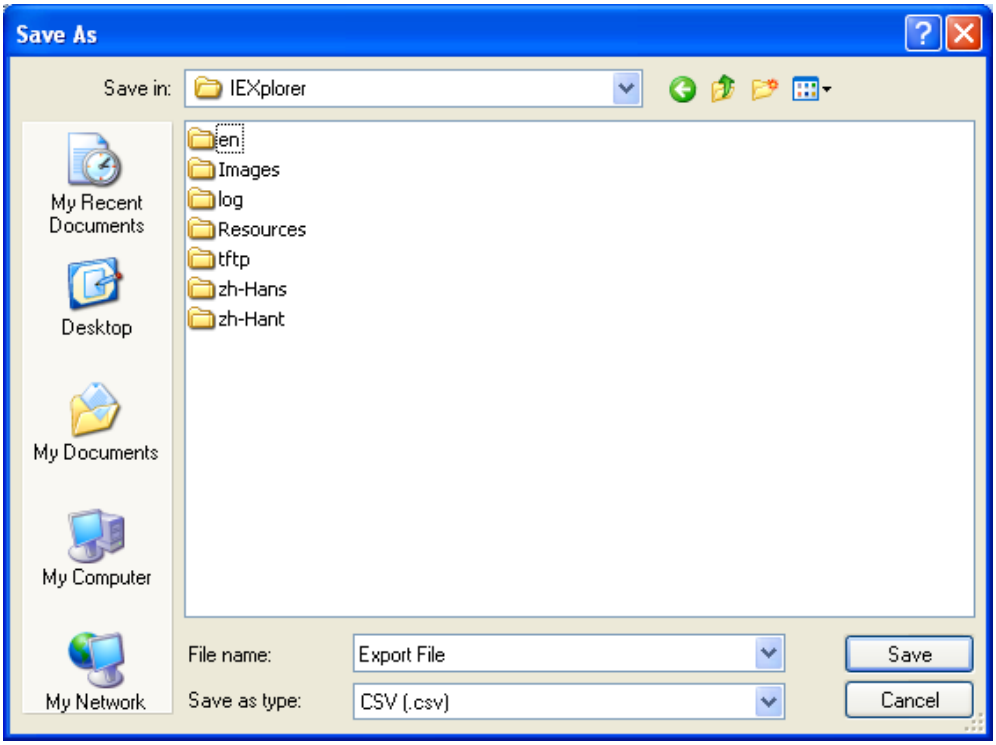
4.4.1 Parameter Import

After **Parameter Import** is selected, a window will pop up for you to select a file imported to the device. Importing a file to multi devices is supported.



4.4.2 Parameter Export

After **Parameter Export** is selected, a window will pop up for you to select the path to export the file.

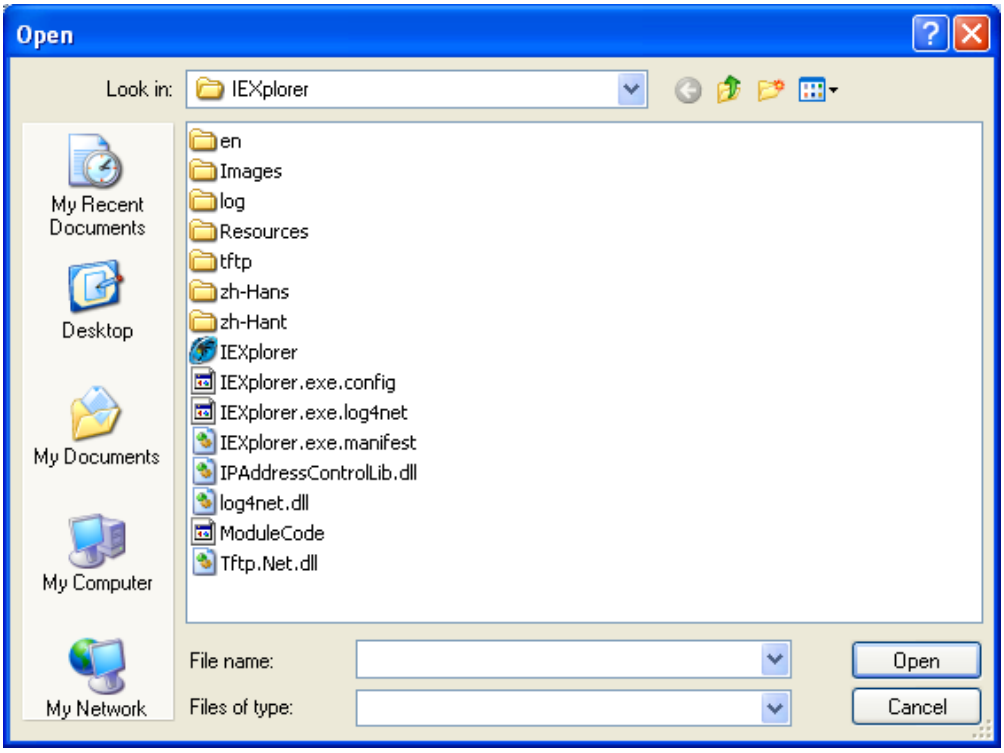


4.4.3 Device Reboot

IEXplorer supports you to reboot the device via utility.

4.4.4 Update Firmware

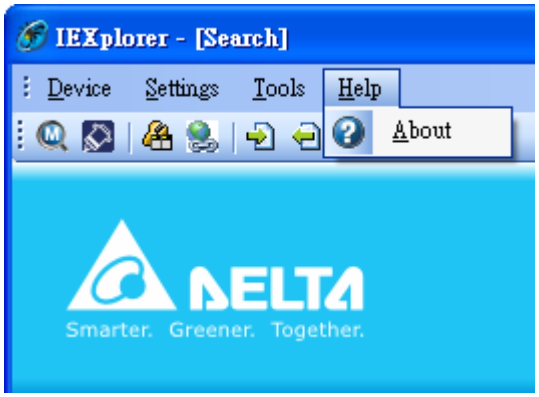
After you select **Update Firmware**, a window will pop up for you to select the firmware file.

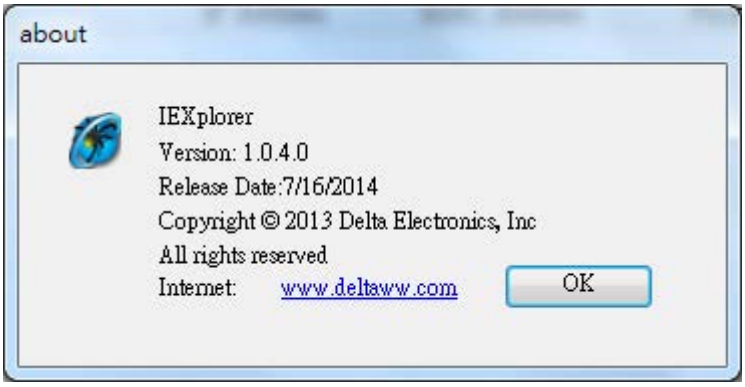


Note:
Before you select Update Firmware, you should choose the device you want to update. When it is updated successfully, please wait for 3 minutes to log in again.

4.5 Help

After the **About** item in **Help** is selected, an information message window of IEXplorer will pop up.




about
IEXplorer
Version: 1.0.4.0
Release Date:7/16/2014
Copyright © 2013 Delta Electronics, Inc
All rights reserved
Internet: www.deltaww.com
OK

Appendix A Private MIB Group

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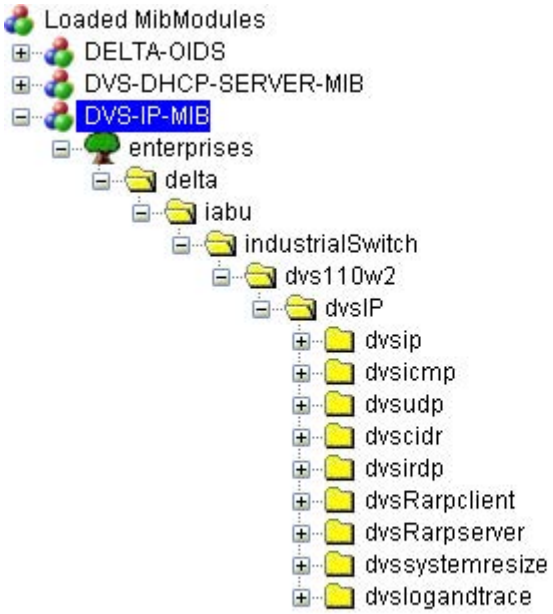
A.1 Private MIB Group

Delta switch not only supports standard MIBs, but also provides private MIBs. You can use the SNMP tool to configure or monitor the switch's configuration. The private MIBs are the same as standard MIBs. It is displayed like a web tree. It's easily to be understood and used, so you don't need to learn or find where the OIDs of the commands are.
A private MIB can be found in the product CD if you need to use it.



We also support standard MIB Groups. For example, Interfaces Group, IP Group, TCP Group, UDP Group, and SNMP Group.

Appendix B MODBUS TCP Map

Table of Contents

B.1 MODBUS TCP Map

Address Offset	Data Type	Description
System Information		
0x0000	1 word	Reserved
0x0001	1 word	Reserved
0x0002	1 word	Reserved
0x0003	1 word	Firmware Version Hi byte = major Lo byte = minor
0x0004	2 word	Firmware Release Date Word 0 Hi byte = day Word 0 Lo byte = clock Word 1 Hi byte = year Word 1 Lo byte = month Ex: 20120918, PM9:00 Word 0 = 0x1215, Word 1 = 0x0C09
0x0010	20 words	Vendor Name = "Delta Electronics, Inc." Word 0 Hi byte = 'D' Word 0 Lo byte = 'e' Word 1 Hi byte = 'l' Word 1 Lo byte = 't' Word 2 Hi byte = 'a' Word 2 Lo byte = ' ' Word 3 Hi byte = 'E' Word 3 Lo byte = 'l' Word 4 Hi byte = 'e' Word 4 Lo byte = 'c' Word 5 Hi byte = 't' Word 5 Lo byte = 'r' Word 6 Hi byte = 'o' Word 6 Lo byte = 'n' Word 7 Hi byte = 'i' Word 7 Lo byte = 'c' Word 8 Hi byte = 's' Word 8 Lo byte = ', ' Word 9 Hi byte = ' ' Word 9 Lo byte = 'I' Word 10 Hi byte = 'n' Word 10 Lo byte = 'c' Word 11 Hi byte = '.' Word 11 Lo byte = '\0'

Address Offset	Data Type	Description
0x0030	20 words	Product Name = "DVS-108W02-2SFP" Word 0 Hi byte = 'D' Word 0 Lo byte = 'V' Word 1 Hi byte = 'S' Word 1 Lo byte = '-' Word 2 Hi byte = '1' Word 2 Lo byte = '0' Word 3 Hi byte = '8' Word 3 Lo byte = 'W' Word 4 Hi byte = '0' Word 4 Lo byte = '2' Word 5 Hi byte = '-' Word 5 Lo byte = '2' Word 6 Hi byte = 'S' Word 6 Lo byte = 'F' Word 7 Hi byte = 'P' Word 7 Lo byte ='\0'
0x0050	20 words	Serial No.
0x0070	3 words	Ethernet MAC Address Ex: MAC = 00:11:22:33:44:55 Word 0 Hi byte = 0x00 Word 0 Lo byte = '0x11 Word 1 Hi byte = 0x22 Word 1 Lo byte = 0x33 Word 2 Hi byte = 0x44 Word 2 Lo byte = '0x55
0x0073	2 words	Ethernet IP Address Ex: IP = 192.168.1.5 Word 0 = 0xC0A8 Word 1 = 0x0105
0x0075	2 words	Ethernet Netmask Ex: Mask = 255.255.255.0 Word 0 = 0xFFFF Word 1 = 0xFF00
0x0077	2 words	Ethernet Gateway IP Address Ex: IP = 192.168.1.1 Word 0 = 0xC0A8 Word 1 = 0x0101
0x0080	1 word	Power 1 Status 0x0000: OFF 0x0001: ON
0x0081	1 word	Power 2 Status 0x0000: OFF 0x0001: ON
0x0090	1 word	DO 1 Status 0x0000: OFF 0x0001: ON
0x0091	1 word	DO 2 Status 0x0000: OFF 0x0001: ON
0x00A0	1 word	DI 1 Status 0x0000: OFF 0x0001: ON

Address Offset	Data Type	Description
0x00A1	1 word	DI 2 Status 0x0000: OFF 0x0001: ON
Port Information		
0x1000 ~ 0x1007	1 word	Port 1 to 8 Status 0x0000: Link down 0x0001: Link up 0x0002: Disable
0x1100 ~ 0x1107	1 word	Port 1 to 8 Communication Format 0x0000: 10M,Half 0x0001: 10M,Full 0x0002: 100M,Half 0x0003: 100M,Full 0x0004: 1G,Full
0x1200 ~ 0x1207	1 word	Port 1 to 8 Flow Control 0x0000: OFF 0x0001: ON
0x1300 ~ 0x1307	1 word	Port 1 to 8 MDI/MDIX Setting 0x0000: Auto 0x0001: MDI 0x0002: MDIX
0x1400 ~ 0x148B	20 words	Port 1 to 8 Description EX: 10/100/1000TX,RJ45 Word 0 Hi byte = '1' Word 0 Lo byte = '0' Word 1 Hi byte = '/' Word 1 Lo byte = '1' Word 2 Hi byte = '0' Word 2 Lo byte = '0' Word 3 Hi byte = '/' Word 3 Lo byte = '1' Word 4 Hi byte = '0' Word 4 Lo byte = '0' Word 5 Hi byte = '0' Word 5 Lo byte = 'T' Word 6 Hi byte = 'X' Word 6 Lo byte = ',' Word 7 Hi byte = 'R' Word 7 Lo byte = 'J' Word 8 Hi byte = '4' Word 8 Lo byte = '5' Word 9 Hi byte = '\0' Word 9 Lo byte = '\0'
0x1500 ~ 0x1507	1 word	Port 1 to 8 bandwidth overload 0x0000: OFF 0x0001: Port X bandwidth overload
0x1600 ~ 0x1607	1 word	Port 1 to 8 loopback detection port status 0x0000: OFF 0x0001: loopback detected
Packet Information		
0x2000 ~ 0x200F	2 words	Port 1 to 8 Tx Packets Ex: Port 1 Tx Packet Amount = 0x33221100 0x2000 = 0x3322 0x2001 = 0x1100

Address Offset	Data Type	Description
0x2100 ~ 0x210F	2 words	Port 1 to 8 Rx Packets Ex: Port 1 Rx Packet Amount = 0x33221100 0x2100 = 0x3322 0x2101 = 0x1100
0x2200 ~ 0x220F	2 words	Port 1 to 8 Tx Error Packets Ex: Port 1 Tx Packet Amount = 0x33221100 0x2200 = 0x3322 0x2201 = 0x1100
0x2300 ~ 0x230F	2 words	Port 1 to 8 Rx Error Packets Ex: Port 1 Rx Packet Amount = 0x33221100 0x2300 = 0x3322 0x2301 = 0x1100
Redundancy Information		
0x3000	1 word	Redundancy Protocol 0x0000: None 0x0001: RSTP/STP
0x3001	1 word	RSTP Root 0x0000: Not Root 0x0001: Root
0x3100	1 word	RSTP Port 1 to 8 Status 0x0000: Port Disable 0x0001: Not RSTP Port 0x0002: Link Down 0x0003: Discarding 0x0004: Learning 0x0005: Forwarding
SPF DDM Information		
0x4000 ~ 0x4001	1 word	Port 1 to Port 2 Port No.
0x4100 ~ 0x4127	20 words	Port 1 to Port 2 Model Name Example: LCP-1250B4QDRH Word 0 Hi byte = 'L' Word 0 Lo byte = 'C' Word 1 Hi byte = 'P' Word 1 Lo byte = '-' Word 2 Hi byte = '1' Word 2 Lo byte = '2' Word 3 Hi byte = '5' Word 3 Lo byte = '0' Word 4 Hi byte = 'B' Word 4 Lo byte = '4' Word 5 Hi byte = 'Q' Word 5 Lo byte = 'D' Word 6 Hi byte = 'R' Word 6 Lo byte = 'H' Word 7 Hi byte = '\0' Word 7 Lo byte ='\0'
0x4200 ~ 0x4203	2 words	Port 1 to Port 2 Temperature Word 0 = Temperature MSB Word 1 = Temperature LSB
0x4300 ~ 0x4303	2 words	Port 1 to Port 2 Voltage Word 0 = Vcc MSB Word 1 = Vcc LSB
0x4400 ~ 0x4403	2 words	Port 1 to Port 2 TX Power Word 0 = TX Power MSB Word 1 = TX Power LSB

Address Offset	Data Type	Description
0x4500 ~ 0x4503	2 words	Port 1 to Port 2 RX Power Word 0 = RX Power MSB Word 1 = RX Power LSB
0x4600 ~ 0x4601	1 words	Port 1 to Port 2 Link Status 0x0000: Link down 0x0001: Link up
Alarm		
0x5000	1 word	Switch cold start alarm 0x0000: OFF 0x0001: ON 0xFFFF: Disable
0x5001	1 word	Switch warm start alarm 0x0000: OFF 0x0001: ON
0x5004	1 word	Power state on alarm 0x0000: OFF 0x0001: ON
0x5005	1 word	Power state off alarm 0x0000: OFF 0x0001: ON
0x5006	1 word	DI on alarm 0x0000: OFF 0x0001: ON
0x5007	1 word	DI off alarm 0x0000: OFF 0x0001: ON
0x5008	1 word	authentication failure alarm 0x0000: OFF 0x0001: ON
0x5009	1 word	dot1d Bridge New Root alarm 0x0000: OFF 0x0001: ON
0x500A	1 word	dot1d Bridge Topology Changed alarm 0x0000: OFF 0x0001: ON
0x500B	1 word	LLDP Remote Tables Change alarm 0x0000: OFF 0x0001: ON
0x500C	1 word	Configuration Changed alarm 0x0000: OFF 0x0001: ON
0x500D	1 word	Firmware update alarm 0x0000: OFF 0x0001: ON
0x500E	1 word	IP changed alarm 0x0000: OFF 0x0001: ON
0x500F	1 word	Password changed alarm 0x0000: OFF 0x0001: ON
0x5100 ~ 0x5102	1 word	SFP Port 1 to Port 2 DDM Failure - Temp alarm 0x0000: OFF 0x0001: ON

Address Offset	Data Type	Description
0x5110 ~ 0x5112	1 word	SFP Port 1 to Port 2 DDM Failure – Voltage 0x0000: OFF 0x0001: ON
0x5120 ~ 0x5122	1 word	SFP Port 1 to Port 2 DDM Failure – Bias 0x0000: OFF 0x0001: ON
0x5130 ~ 0x5132	1 word	SFP Port 1 to Port 2 DDM Failure - TX Power 0x0000: OFF 0x0001: ON
0x5140 ~ 0x5142	1 word	SFP Port 1 to Port 2 DDM Failure - RX Power 0x0000: OFF 0x0001: ON
IABU Internal Data (0x2B)		
Device ID Code	**Object ID**	**Description**
0x01	0x00	Vendor Name "Delta Electronics, Inc."
	0x01	Product Code "DVS-108W02-2SFP"
	0x02	Firmware Version Major.Minor Example: Major = 1, Minor = 2, Length = 4 Data byte 0: "31" Data byte 1: "." Data byte 2: "30" Data byte 3: "32"

MEMO

Appendix C EtherNet/IP

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C.1 EtherNet/IP

If you need to configure the EtherNet/IP on a Delta series switch, please refer to DVS Series Managed Industrial Ethernet Switch User's Manual.

Identity Object (0x01)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
2	Get	Max Instance	UINT	Maximum instance number of this object

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Vendor ID	UINT	799, Vendor ID of "Delta Electronics, Inc. "
2	Get	Device Type	UINT	0x2C, "Managed Ethernet Switch Device".
3	Get	Product Code	UINT	Product code of device
4	Get	Revision	STRUCT of:	Revision of the Identity Object
		Major	USINT	
		Minor	USINT	
5	Get	Status	WORD	0, Not used
6	Get	Serial Number	UDINT	Serial number of device
7	Get	Product Name	STRING	"DVS-108W02-2SFP", Product name of device.

Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x05		V	Reset	Invokes the reset service for the device.
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.

Message Router Object (0x02)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
2	Get	Number Available	UINT	Maximum number of CIP connections supported
3	Get	Number Active	UINT	Number of CIP connections currently used by system components

Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.

Assembly Object (0x04)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
3	Get/Set	Data	ARRAY of BYTE	
4	Get	Size	UINT	

Instance				
Instance Number	**Size (bytes)**	**Name**	**Type**	**Description of Attribute**
1	18	Power Source and Link Status	Inupt	**Refers to Base Switch Object Attr ID 4** **Byte 0:** Power Source Status (Least Significant Byte) **Byte 1:** Power Source Status (Most Significant Byte) **Refers to Base Switch Object Attr ID 8** **Byte 2-5:** Global Link Status DWORD 0 **Byte 6-9:** Global Link Status DWORD 1 **Byte 10-13:** Global Link Status DWORD 2 **Byte 14-17:** Global Link Status DWORD 3
2	16	Global Admin State	Input	Refers to Base Switch Object Attr ID 7 **Byte 0-3:** Global Admin Status DWORD 0 **Byte 4-7:** Global Admin Status DWORD 1 **Byte 8-11:** Global Admin Status DWORD 2 **Byte 12-15:** Global Admin Status DWORD 3
3	2	Contact Status	Input	Refers to Base Switch Object Attr ID 10 **Byte 0:** Contact Status (Least Significant Byte) **Byte 1:** Contact Status (Most Significant Byte)
50	16	Port Admin State	Output	Refers to Base Switch Object Attr ID 7 **Byte 0-3:** Global Admin Status DWORD 0 **Byte 4-7:** Global Admin Status DWORD 1 **Byte 8-11:** Global Admin Status DWORD 2 **Byte 12-15:** Global Admin Status DWORD 3

Common Services				
Service Code	Need in Implementation		Service Name	Description of Service
	Class	Instance		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.
0x10		V	Set_Attribute_Single	Modifies an attribute value.

I/O Assembly			
Direction	Name	Size	Description
Input	Power Source Status	WORD	Refers to Base Switch Object Attr ID 4 Power Source Status (Least Significant Byte) Power Source Status (Most Significant Byte)
	Global Link Status	ARRAY OF DWORD	Refers to Base Switch Object Attr ID 8 Global Link Status DWORD 0 Global Link Status DWORD 1 Global Link Status DWORD 2 Global Link Status DWORD 3
	Global Admin State	ARRAY OF DWORD	Refers to Base Switch Object Attr ID 7 Global Admin Status DWORD 0 Global Admin Status DWORD 1 Global Admin Status DWORD 2 Global Admin Status DWORD 3
	Contact Status	WORD	Refers to Base Switch Object Attr ID 10
	AlarmStatus	ULINT	Refers to Delta IES Object Attr 11
	Bandwidth overload	ULINT	Refers to Delta IES Object Attr 12
	Loopback detection port status	ULINT	Refers to Delta IES Object Attr 13
	SFP Failure	ARRAY OF USINT	Refers to Delta IES Object Attr 14
Output	Port Admin State	ARRAY OF DWORD	Refers to Base Switch Object Attr ID 7 Global Admin Status DWORD 0 Global Admin Status DWORD 1 Global Admin Status DWORD 2 Global Admin Status DWORD 3

Connection Manager Object (0x06)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.
0x4E		V	Forward_Close	Closes a connection.
0x54		V	Forward_Open	Opens a connection.

Port Object (0xF4)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
2	Get	Max Instance	UINT	Maximum instance number
3	Get	Num Instances	UINT	Number of port currently instantiated
8	Get	Entry Port	UINT	Returns the port through which this request entered the device
9	Get	Port Instance Info	ARRAY of STRUCT of	
		Port Type	UINT	Enumerates the type of port
		Port Number	UINT	CIP port number associated with this port
Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Port Type	UINT	Enumerates the type. (4 = EthetNet/IP)
2	Get	Port Number	UINT	CIP port number associated with this port
3	Get	Link Object	STRUCT of	
		Path Length	UINT	Number of 16 bit words in the following path
		Link Path	Padded EPATH	Logical path segments that identify the object for this port
4	Get	Port Name	SHORT_STRING	String which names the physical network port
7	Get	Node Address	Padded EPATH	Node number of this device on port
Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.

TCP/IP Interface Object (0xF5)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Status	DWORD	Interface status 0 = The Interface Configuration attribute has not been configured. 1 = The Interface Configuration attribute contains configuration obtained from BOOTP, DHCP or non-volatile storage.
2	Get	Configuration Capability	DWORD	Interface capability **Bit 0: BOOTP Client** 1 (TRUE) shall indicate the device is capable of obtaining its network configuration via BOOTP. **Bit 1: DNS Client** 1 (TRUE) shall indicate the device is capable of resolving host names by querying a DNS server. **Bit 2: DHCP Client** 1 (TRUE) shall indicate the device is capable of obtaining its network configuration via DHCP. **Bit 3: DHCP-DNS Update** Shall be 0 **Bit 4: Configuration Settable** 1 (TRUE) shall indicate the Interface Configuration attribute is settable.
3	Get/Set	Configuration Control	DWORD	Interface control flags **Bit 0-3: Configuration Method** 0 = The device shall use statically-assigned IP configuration values. 1 = The device shall obtain its interface configuration values via BOOTP. 2 = The device shall obtain its interface configuration values via DHCP. 3-15 = Reserved for future use. **Bit 4: DNS Enable** If 1 (TRUE), the device shall resolve host names by querying a DNS server.

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
4	Get	Physical Link Object	STRUCT of	Path to physical link object
		Path size	UINT	Size of Path
		Path	Padded EPATH	Logical segments identifying the physical link object
5	Get/Set	Interface Configuration	STRUCT of	TCP/IP network interface configuration.
		IP Address	UDINT	The device's IP address
		Network Mask	UDINT	The device's network mask
		Gateway Address	UDINT	Default gateway address
		Name Server	UDINT	Primary name server
		Name Server 2	UDINT	Secondary name server
		Domain Name	STRING	Default domain name Note: ASCII characters. Maximum length is 48 characters. Shall be padded to an even number of characters (pad not included in length).
6	Get/Set	Host Name	STRING	Host Name (Note: ASCII characters. Maximum length is 64 characters. Shall be padded to an even number of characters (pad not included in length).

Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.
0x10		V	Set_Attribute_Single	Modifies an attribute value.

Ethernet Link Object (0xF6)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
2	Get	Max Instance	UINT	Maximum instance number of an object currently created in this class level of the device.
3	Get	Number of Instances	UINT	Number of object instances currently created at this class level of the device. (The value is mapping the number of ports in Switch device)

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Interface Speed	UDINT	Interface speed currently in use Speed in Mbps (e.g., 0, 10, 100, 1000, etc.)
2	Get	Interface Flags	DWORD	Interface status flags

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
3	Get	Physical Address	ARRAY of 6 USINTs	MAC layer address
4	Get	Interface Counters	STRUCT of:	
		In Octets	UDINT	Octets received on the interface
		In Ucast Packets	UDINT	Unicast packets received on the interface
		In Nucast Packets	UDINT	Non-unicast packets received on the interface
		In Discards	UDINT	Inbound packets received on the interface but discarded
		In Errors	UDINT	Inbound packets that contain errors (does not include In Discards)
		In Unknown Protos	UDINT	Inbound packets with unknown protocol
		Out Octets	UDINT	Octets sent on the interface
		Out Ucast Packets	UDINT	Unicast packets sent on the interface
		Out Nucast Packets	UDINT	Non-unicast packets sent on the interface
		Out Discards	UDINT	Outbound packets discarded
		Out Errors	UDINT	Outbound packets that contain errors
5	Get	Media Counters	STRUCT of:	Media-specific counters
		Alignment Errors	UDINT	Frames received that are not an integral number of octets in length
		FCS Errors	UDINT	Frames received that do not pass the FCS check
		Single Collisions	UDINT	Successfully transmitted frames which experienced exactly one collision
		Multiple Collisions	UDINT	Successfully transmitted frames which experienced more than one collision
		SQE Test Errors	UDINT	Number of times SQE test error message is generated
		Deferred Transmissions	UDINT	Frames for which first transmission attempt is delayed because the medium is busy

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
5	Get	Late Collisions	UDINT	Number of times a collision is detected later than 512 bit-times into the transmission of a packet
		Excessive Collisions	UDINT	Frames for which transmission fails due to excessive collisions
		MAC Transmit Errors	UDINT	Frames for which transmission fails due to an internal MAC sublayer transmit error
		Carrier Sense Errors	UDINT	Times that the carrier sense condition was lost or never asserted when attempting to transmit a frame
		Frame Too Long	UDINT	Frames received that exceed the maximum permitted frame size
		MAC Receive Errors	UDINT	Frames for which reception on an interface fails due to an internal MAC sublayer receive error
10	Get	Interface Label	SHORT_STRING	Human readable identification

Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.

Base Switch Object (0x51)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object. The current value assigned to this values is 1

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Device Up Time	UDINT	Time since device was powered up (s) (Note: the value is 32-bit)
2	Get	Total port count	UDINT	Number of physical ports
3	Get	System Firmware Version	SHORT_STRING	Human readable representation of System Firmware Version (Note: ASCII characters, max length is 32 bytes)

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
4	Get	Power Source	WORD	Status of switch power source **Bit 0-1: Power Source 1** **Bit 2-3: Power Source 2….** **Bit 14-15: Power Source 8** 00 = Not Present (power source not present in switch) 01 = Not Powered (power source present but not powered) 10 = Faulted (power source present but faulted) 11 = Powered and ok (power source present, powered and OK)
5	Get	Port Mask Size	UINT	Number of DWORDs in port array attributes (Minimum = 4, supporting 128 ports)
7	Get / Set	Global Port Admin State	ARRAY OF DWORD	Port Admin Status (Note: Size of array = attribute 5) **DWORD[0]: Port 0 - 31 admin status** **DWORD[1]: Port 32 - 63 admin status** **DWORD[2]: Port 64 - 95 admin status** **DWORD[3]: Port 96 - 127 admin status** 0 = Port (or Interface) Disabled 1 = Port (or Interface) Enabled
8	Get	Global Port Link Status	ARRAY OF DWORD	Port Link Status (Note: Size of array = attribute 5) **DWORD[0]: Port 0 - 31 link status** **DWORD[1]: Port 32 - 63 link status** **DWORD[2]: Port 64 - 95 link status** **DWORD[3]: Port 96 - 127 link status** 0 = Link inactive (Down) 1 = Link Active (UP)

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
10	Get	Contact Status	WORD	Switch Contact Closure (DI) **Bit 0-1: Switch Contact 1 (DI 1)** **Bit 2-3: Switch Contact 2 (DI 2)** Other Reserved (should be 0) 00 = Switch Contact not support/pressed 01 = Switch Contact is OPEN (OFF) 10 = Switch Contact is CLOSED (ON) 11 = Reserved

Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.
0x10		V	Set_Attribute_Single	Modifies an attribute value.

Delta IES Object (0x64)

Class Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get	Revision	UINT	Revision of this object
Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
1	Get/Set	Reboot Device	USINT	Reboots the device. Set 0x0001 to reboot device, and return to 0x0000 if reboot is completed.
2	Get/Set	Reset Device	USINT	Resets the device to the default. Sets 0x0001 to reset the configuration, and returns to 0x0000 if the resetting is completed.
3	Get	Firmware Release Date	UDINT	Ex: 20120918, PM9:00 Word 0 = 0x1215, Word 1 = 0x0C09

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
4	Get	Relay Output Status	WORD	Relay Output Status Bit 0-1: Relay Output 1 status Bit 2-3: Relay Output 2 status Other Reserved (should be 0) 00 = Digital output not support/pressed 01 = Switch Contact is OPEN (OFF) 10 = Switch Contact is CLOSED (ON) 11 = Reserved
11	Get	Alarm Status	ULINT	Alarm Status (0 is ON, 1 is OFF) Bit 0: switch code start Bit 1: switch warm start Bit 2: power1 state on->off Bit 3: power1 state off->on Bit 4: power2 state on->off Bit 5: power2 state off->on Bit 6: DI1 state on->off Bit 7: DI1 state off->on Bit 8: DI2 state on->off Bit 9: DI2 state off->on Bit 10: authentication failure Bit 11: dot1d Bridge New Root Bit 12: dot1d Bridge Topology Changed Bit 13: LLDP Remote Tables Changed Bit 14: configuration changed Bit 15: firmware update Bit 16: IP changed Bit 17: password changed
12	Get	Bandwidth overload	ULINT	Bit 0: Port 0 state Bit 1: Port 1 state…. Bit 63: Port 63 state 0 = OFF or not support 1 = Bandwidth overload
13	Get	Loopback detection port status	ULINT	Bit 0: Port 0 state Bit 1: Port 1 state…. Bit 63: Port 63 state 0 = OFF or not support 1 = Loopback detected

Instance Attributes				
Attr ID	**Access Rule**	**Name**	**Data Type**	**Description of Attribute**
14	Get	SFP Failure	ARRAY OF USINT	Supports 8 ports. Byte 0: SFP port 0 Failure state Byte 1: SFP port 1 Failure state…. Byte 7: SFP port 7 Failure state Bit 0: SFP port present 0 = Not present, 1 = present Bit 1: Temp alarm state 0 = ON, 1 = OFF Bit 2: Voltage alarm state 0 = ON, 1 = OFF Bit 3: Bias alarm state 0 = ON, 1 = OFF Bit 4: TX Power state 0 = ON, 1 = OFF Bit 5: RX Power state 0 = ON, 1 = OFF Bit 6-7: Reserved
15	Get	Redundancy Protocol	USINT	0x0000: None 0x0001: RSTP/STP
16	Get	RSTP Root	USINT	0x0000: Not Root 0x0001: Root

Common Services				
Service Code	**Need in Implementation**		**Service Name**	**Description of Service**
	Class	**Instance**		
0x0E	V	V	Get_Attribute_Single	Returns the contents of the specified attribute.
0x10		V	Set_Attribute_Single	Modifies an attribute value.

MEMO

Appendix D EDS File

Table of Contents

D.1 EDS (Electronic Data Sheet) File

The EDS file is used to specify and describe the communication data of an EtherNet/IP switch. We provide the EDS file to help you identify the communication data or objects of the Delta switch, and you can use the notepad or the text editor to open the EDS file.
The EDS file list is shown below:

- File
- Device
- Device Classification
- Params
- Connection Manager
- Port
- Ethernet Link Class

An EDS file can be found in the product CD if you need to use it.