Korenix JetNet 7628X series
Industrial Managed Ethernet Switch

User Manual

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www.korenix.com

Korenix JetNet 7628X series Industrial Managed Ethernet Switch User Manual

Copyright Notice

Federal Communications Commission (FCC) 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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

Index

1 Introduction

Welcome to Korenix *JetNet 7628X* Series Industrial Managed Ethernet Switch User Manual. Following topics are covered in this chapter:

1.1 Overview

JetNet 7628X series is Layer 3 rackmount 24-port Gigabit RJ-45 + 4-port 10*Gigabit SFP Managed Industrial switch, it contains PoE model (JetNet 7628XP) and Non-PoE model (JetNet 7628X). JetNet 7628XP is 24-port PoE + 4-port 10*Gigabit SFP, it supports IEEE 802.3 af/at per PoE ports.

The 4 Gigabit Ethernet ports provide high speed uplink to connect with higher level backbone switches. With the Korenix patentd MSR^{TM} network redundancy technology, the switches can aggregate up to 12 fast ethernet and 2 gigabit rings while providing high quality data transmission with less than 5ms network recovery time. Furthermore, to ensure the traffic switching without data loss and blocking, the JetNet 7628X series provides 12.8G backplane with the integtrated non-blocking switching function. JetNet 7628X incorporates LLDP function and perfectly works with the Korenix patented NMS for allowing administrators to automatically discover devices and efficiently manage the industrial network performance in large scale surveillance networks. To further ensure the non-stop power delivery, JetNet 7628X series supports dual 53VDC power inputs and provides alarm relay output signaling function. For high voltage requiring applications the PoE switch provides extra 100~240VAC power supply capability.

With the advanced Layer2 management features including IGMP Query/Snooping, DHCP, 256 VLAN, QoS, LACP, LPLD, etc. and the corrosion resistant robust design, JetNet 7628X highly outstands from other PoE switches and becomes the revolutionary solution for industrial surveillance applications.

1.2 Major Features

Korenix JetNet 7628X Series products have the following features:

- Up to 24 10/100/1000 BaseTX and 4 10Gigabit uplink SFP ports
- Up to 24 ports support both 15.4W IEEE 802.3af and the 30W high power IEEE 802.3at, including 2-event and LLDP classification (JetNet 7628XP)
- Flexible-bandwidth and long-distance data transmission by SFP transceivers
- Total power budget is 720W (Need add additional DC power source)
- LPLD (Link Partner Live Detect Function) for reliable PoE connection through Active Powered Device status detection and auto reset function

- 128Gbps Non-Blocking backplane, 16K MAC table for wire speed bidirectional switching
- IEEE 1588 PTP compliance for precise time synchronization
- Supports up to 9,216 bytes Jumbo Frame for secured large file transmission
- IEEE 802.1AB LLDP and optional Korenix NMS software for auto-topology and large network group management
- IGMP Query v1/v2 & Snooping v1/v2/v3 for advanced multicast filtering
- Up to 256 VLAN traffic isolation
- Advanced network management features support SNMP, RMON
- Supports DHCP client, DHCP Option 82 for automatic IP configuration
- Dual redundant low voltage range: 48VDC and HDC range: 100~240VAC
- IP40 rugged metal case with great heat dispersion

1.3 Package List

Korenix JetNet 7628X Series products are shipped with following items:

- One industrial Managed Ethernet switch
- One RS-232 DB-9 console cable
- JetNet 7628X series 19” rack mount Kits

If any of the above items are missing or damaged, please contact your local sales representative.

2 Hardware Installation

This chapter includes hardware introduction, installation and configuration information.

Following topics are covered in this chapter:

2.1 Hardware Introduction

Dimension

JetNet 7628X Series Industrial Gigabit Switch dimension (W x H x D) is **440 mm x 44mm x 378.5mm**

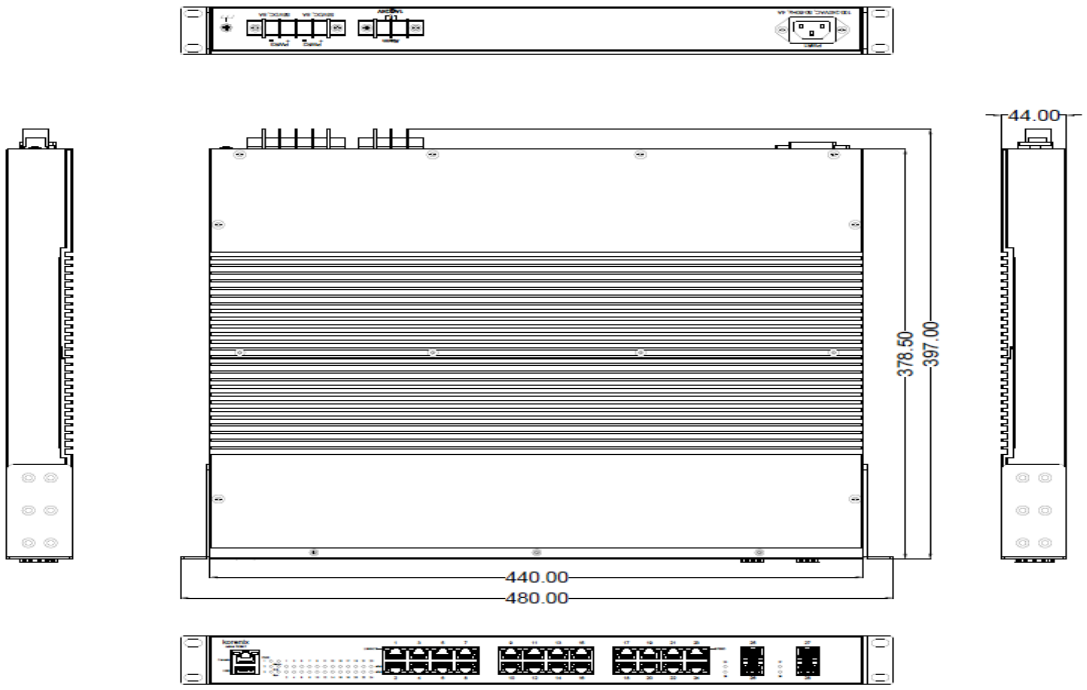


Diagram: JetNet 7628XP

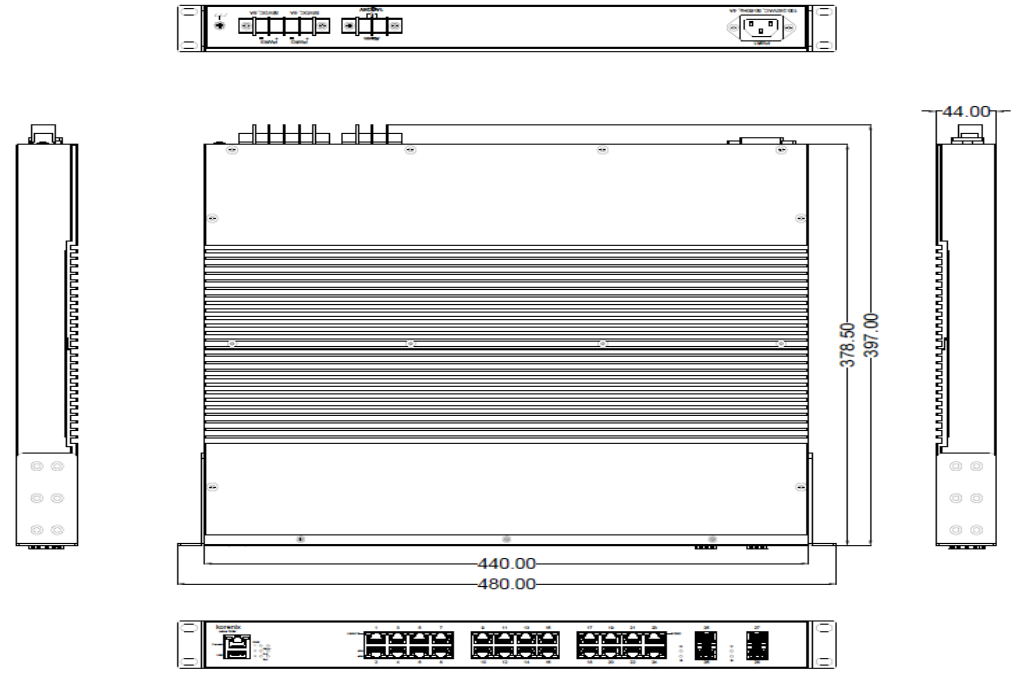
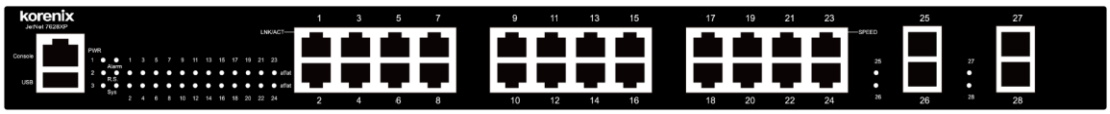


Diagram: JetNet 7628X

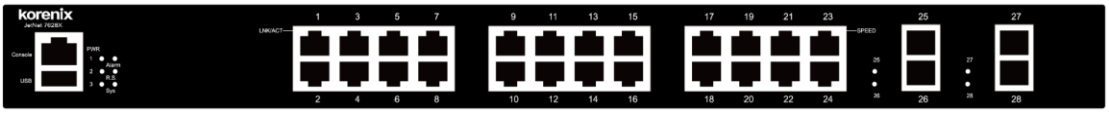
Panel Layout

The front panel includes up to 24 10/100/1000Mbps Ethernet ports, 4* 10 Gigabit SFP ports, RS-232 console port, System / Combo Port LED and up to 24 PoE LED.

JetNet 7628XP



JetNet 7628X



The back panel of the JetNet 7628X Industrial Gigabit Managed Switch consists of two DC power inputs, 1 AC Input, 1 Relay Output.

2.2 Wiring Power Inputs

JetNet 7628X provides 2 types power input, AC power input and DC power input. It also provides redundant or aggregated power inputs, depending on the voltage of power input. If there are over 2 power inputs are connected with different voltages, JetNet 7628X will be powered from the highest connected voltage (redundant power). If the voltages of power inputs are the same, the total power output will be aggregated (aggregaged power).

AC Power Input

Connect the attached power cord to the AC power input connector, the available AC power input is range from 100-240VAC.

High Voltage Power Input

The power input support both 100-240VAC power input. Connect the power cord to the PE for Protective Earth, L / V+ for LINE or V+, N/V- for Neutral or V-. For high power input, tighten the wire-clamp screws to prevent DC wires from being loosened is must.

DC Power Inputs

The range of the available DC power input is from 46-57VDC. In the IEEE802.3at mode, the PoE power output is 50~57 VDC, 0.6A, therefore, the suggested DC power input ranges is

53VDC (52~57VDC). In the IEEE802.3af mode, the PoE power output is 44~57 VDC, 0.35A, therefore, the suggested DC power input is 48VDC (46~57VDC).
The nominal of AC power input is 55VDC, if you add additional DC power source , please set the DC input higher than 55VDC , then the unit can consume DC power source afterwards.

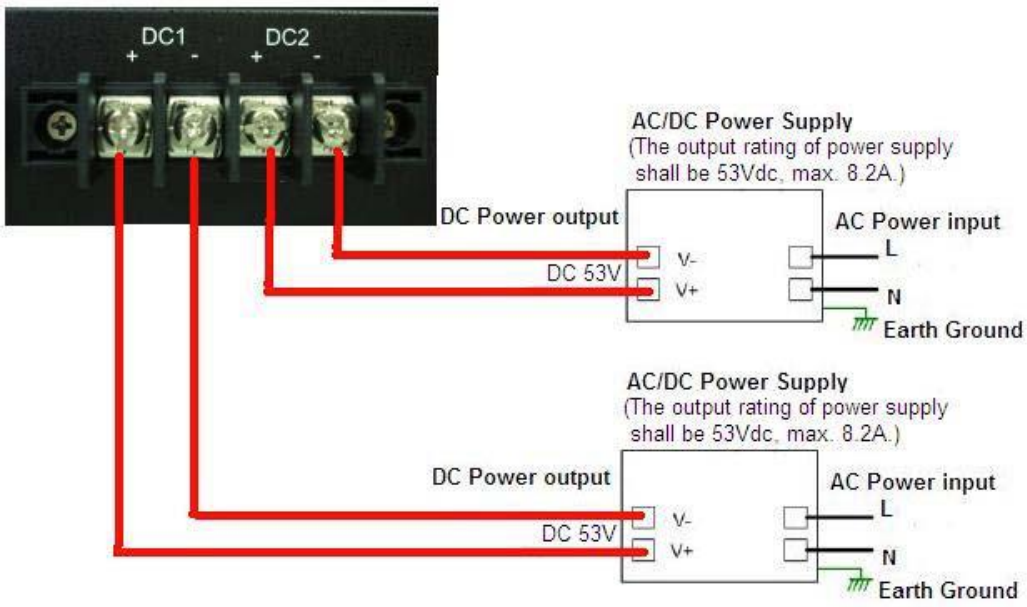
Follow below steps to wire JetNet 7628X redundant or aggregated DC power inputs.

1. Insert positive and negative wires into V+ and V- contacts respectively of the terminal block connector.
2. Tighten the wire-clamp screws to prevent DC wires from being loosened.
3. DC1 and DC2 support polarity reverse protection functions.

Note 1: It is a good practice to turn off input and load power.. Otherwise, your screwdriver blade can inadvertently short your terminal connections to the grounded enclosure.

Note 2: The range of the suitable electric wire is from 12 to 22 AWG.

Note 3: The unit will alarm for loss of power, for instance, PSU, DC1 or DC2.



2.3 Power Supply Specifications

Power Supply Type	Input Range		Max. Input Current	Fuse Rating	Max. Power Consumption
	Min	Max			All Ethernet Ports
48 VDC 53 VDC	46 VDC	57 VDC	8.2A	10A(T)	30W
HI (110/230 VAC), 47~63Hz	100 VAC	250 VAC	4A	4A(T)	

Table: Power Supply Specifications

Jetnet 7628X-24P

Power Supply Type	Input Range		Fuse Rating	Power Consumption	
	Min	Max		Worst Case	Max
48 VDC (IEEE802.3af)	46 VDC	57 VDC	1.5A(F)	369.6W	369.6W
53 VDC (IEEE802.3at)	52 VDC	57 VDC	1.5A(F)	568W	720W

Jetnet 7628X-16P

Power Supply Type	Input Range		Fuse Rating	Power Consumption	
	Min	Max		Worst Case	Max
48 VDC (IEEE802.3af)	46 VDC	57 VDC	1.5A(F)	246.4W	246.4W
53 VDC (IEEE802.3at)	52 VDC	57 VDC	1.5A(F)	364W	480W

Jetnet 5720G-8P

Power Supply Type	Input Range		Fuse Rating	Power Consumption	
	Min	Max		Worst Case	Max
48 VDC (IEEE802.3af)	46 VDC	57 VDC	1.5A(F)	123.2W	123.2W
53 VDC (IEEE802.3at)	52 VDC	57 VDC	1.5A(F)	182W	240W

Table: PoE/PoE Plus Power Supply Specifications

Note 1: (F) Denotes fast-acting fuse, (T) denotes time-delay fuse

Note 2: Power consumption varies based on configuration. 10/100Tx ports consume roughly 1W less than fiber optic ports

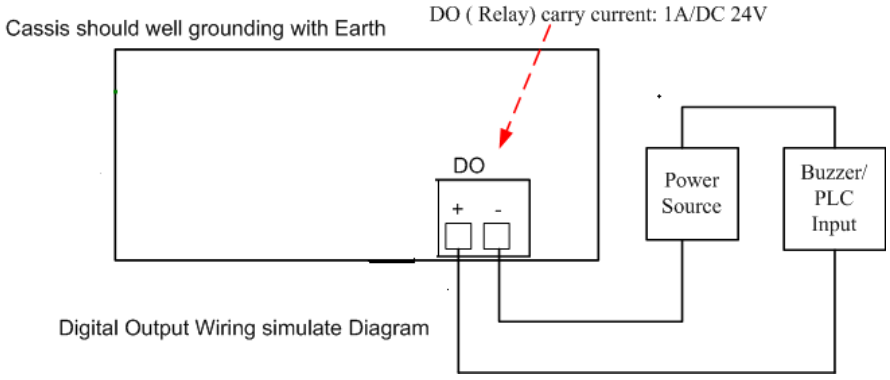
Note 3: For continued protection against risk of fire, replace only with same type and rating of fuse.

2.4 Wiring Digital Output

JetNet 7628X provides 1 digital output, also known as Relay Output. The relay contacts

are energized (open) for normal operation and will close for fault conditions. The fault conditions include power failure, Ethernet port link break or other pre-defined events which can be configured in JetNet 7628X UI.

Wiring digital output is exactly the same as wiring power input introduced in chapter 2.2.



Digital Output Wiring simulate Diagram

2.5 Wiring Earth Ground

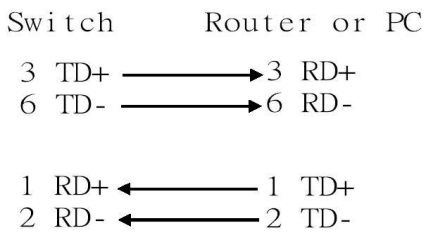
To ensure the system will not be damaged by noise or any electrical shock, we suggest you to make exact connection with JetNet 7628X with Earth Ground.

On the back panel of JetNet 7628X, there is one earth ground screw. Loosen the earth ground screw by screw drive; then tighten the screw after earth ground wire is connected.

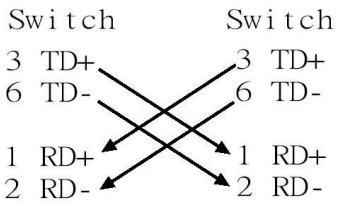
2.6 Wiring Fast Ethernet Ports

JetNet 7628X includes up to 24 RJ-45 Fast Ethernet ports. The fast Ethernet ports support 10Base-T and 100Base-TX, full or half duplex modes. All the fast Ethernet ports will auto-detect the signal from connected devices to negotiate the link speed and duplex mode. Auto MDI/MDIX allows users to connect another switch, hub or workstation without changing straight through or crossover cables.

Note that crossover cables simply cross-connect the transmit lines at each end to the received lines at the opposite end.



Straight-through Cabling Schematic



Cross-over Cabling Schematic

Note that Ethernet cables use pins 1, 2, 3, and 6 of an 8-pin RJ-45 connector. The signals of these pins are converted by the automatic MDI-X function, as shown in the table below:

Pin MDI-X	Signals	MDI Signals
1	RD+	TD+

2	RD-	TD-
3	TD+	RD+
6	TD-	RD-

Connect one side of an Ethernet cable into any switch port and connect the other side to your attached device. The LNK LED will light up when the cable is correctly connected. Refer to the **LED Indicators** section for descriptions of each LED indicator. Always make sure that the cables between the switches and attached devices (e.g. switch, hub, or workstation) are less than 100 meters (328 feet).

The wiring cable types are as below.

10Base-T : 2-pair UTP/STP Cat. 3, 4, 5 cable, EIA/TIA-568 100-ohm (100m)

100Base-TX: 2-pair UTP/STP Cat. 5 cable, EIA/TIA-568 100-ohm (100m)

1000Base-TX: 4-pair UTP/STP Cat. 5 cable, EIA/TIA-568 100-ohm (100m)

IEEE 802.3af : 4-pair UTP/STP Cat. 5 cable, EIA/TIA-568 100-ohm (100m)

IEEE 802.3at : 4-pair UTP/STP Cat. 5e / 6 cable, EIA/TIA-568 100-ohm (100m)

2.7 Wiring Combo Ports

JetNet 7628X includes 4 RJ-45 Gigabit Ethernet ports. The speed of the gigabit Ethernet port supports 10Base-T, 100Base-TX and 1000Base-TX. JetNet 7628X also equips 4 gigabit SFP ports combo with gigabit Ethernet ports. The speed of the SFP port supports 1000Base-SX/LX. The SFP ports accept standard MINI GBIC SFP transceiver. But, to ensure system reliability, Korenix recommends using the Korenix certificated Gigabit SFP Transceiver. The certificated SFP transceiver includes 1000Base-SX/LX single/multi mode ranger from 550m to 80KM.

2.8 Data and Power Ports

JetNet 7628X comes standard with up to 24 10/100BaseTX IEEE802.3af (PoE) and IEEE802.3at (PoE Plus) compliant Ethernet ports (ports 1-24). In addition to the 10/100BaseTX port features, the PoE ports provide normal 48 VDC at 350mA (max 15.4W/port) or provide normal 53 VDC at 606mA (max 30W/port), auto-sensing and automatic power off when cables are removed. The following table shows the RJ45 PoE pin-out assignment.

10/100BaseTx PoE Pin-out	
Pin	Description
1	RX + and Vport -
2	RX – and Vport -
3	TX + and Vport +
6	TX – and Vport +
4, 5, 7, 8	NC

Table: RJ45 PoE pin-out assignment

This product is designed for in building installation only and is not intended to be connected to exposed (outside plant) networks.

2.9 Wiring RS-232 Console Cable

Korenix attaches one RS-232 DB-9 cable in the box. Connect the DB-9 connector to the COM port of your PC, open Terminal tool and set up serial settings to 9600, N,8,1. (Baud Rate: 9600 / Parity: None / Data Bit: 8 / Stop Bit: 1) Then you can access CLI interface by console able.

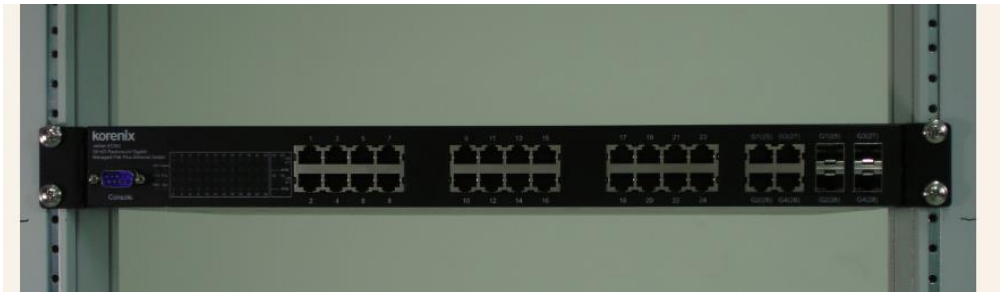
Note: If you lost the cable, please contact with your sales or follow the pin assignment to buy a new one. The Pin assignment spec is listed in the appendix.

2.10 Rack Mounting Installation

The Rack Mount Kit is attached inside the package.

2.8.1 Attach the brackets to the device by using the screws provided in the Rack Mount kit.

2.8.2 Mount the device in the 19’ rack by using four rack-mounting screws provided by the rack manufacturer.



When installing multiple switches, mount them in the rack one below the other. It’s requested to reserve 0.5U-1U free space for multiple switches installing. This is important to disperse the heat generated by the switch.

Notice when installing:

- Temperature: Check if the rack environment temperature conforms to the specified operating temperature range.
- Mechanical Loading: Do no place any equipment on top of the switch
- Grounding: Rack-mounted equipment should be properly grounded.

3 Preparation for Management

JetNet 7628X series Industrial Managed Switch provides both in-band and out-band configuration methods. You can configure the switch via RS-232 console cable if you don't attach your admin PC to your network, or if you lose network connection to your JetNet 7628X. This is so-called out-band management. It wouldn't be affected by network performance.

The in-band management means you can remotely manage the switch via the network. You can choose Telnet or Web-based management. You just need to know the device's IP address and you can remotely connect to its embedded HTTP web pages or Telnet console.

Following topics are covered in this chapter:

3.1 Preparation for Serial Console

In JetNet 7628X package, Korenix attached one RS-232 DB-9 console cable. Please attach RS-232 DB-9 connector to your PC COM port, connect to the Console port of the JetNet 7628X. If you lose the cable, please follow the console cable PIN assignment to find one. (Refer to the appendix).

1. Go to Start -> Program -> Accessories -> Communication -> Hyper Terminal
2. Give a name to the new console connection.
3. Choose the COM name
4. Select correct serial settings. The serial settings of JetNet 7628X are as below:

   Baud Rate: 9600 / Parity: None / Data Bit: 8 / Stop Bit: 1
5. After connected, you can see Switch login request.
6. Login the switch. The default username is "admin", password, "admin".

3.2 Preparation for Web Interface

JetNet 7628X provides HTTP Web Interface and Secured HTTPS Web Interface for web management.

3.2.1 Web Interface

Korenix web management page is developed by JAVA. It allows you to use a standard web-browser such as Microsoft Internet Explorer, or Mozila, to configure and interrogate the switch from anywhere on the network.

Before you attempt to use the embedded web interface to manage switch operation, verify that your JetNet 7628X Series Industrial Ethernet Switch is properly installed on your network and that every PC on this network can access the switch via the web browser.

1. Verify that your network interface card (NIC) is operational, and that your operating system supports TCP/IP protocol.
2. Wire DC power to the switch and connect your switch to your computer.
3. Make sure that the switch default IP address is 192.168.10.1.
4. Change your computer IP address to 192.168.10.2 or other IP address which is located in the 192.168.10.x (Network Mask: 255.255.255.0) subnet.
5. Switch to DOS command mode and ping 192.168.10.1 to verify a normal response time.

Launch the web browser and Login.

6. Launch the web browser (Internet Explorer or Mozila Firefox) on the PC.
7. Type **http://192.168.10.1** (or the IP address of the switch). And then press **Enter**.
8. The login screen will appear next.
9. Key in user name and the password. Default user name and password are both **admin**.

Click on **Enter** or **OK**. Welcome page of the web-based management interface will then appear.

Once you enter the web-based management interface, you can freely change the JetNet's IP address to fit your network environment.

Note 1: IE 5.0 or later versions do not allow Java applets to open sockets by default. Users have to directly modify the browser settings to selectively enable Java applets to use network ports.

Note 2: The Web UI connection session of JetNet 7628X will be logged out automatically if you don't give any input after 30 seconds. After logged out, you should re-login and key in correct user name and password again.

3.2.2 Secured Web Interface

Korenix web management page also provides secured management HTTPS login. All the configuration commands will be secured and will be hard for the hackers to sniff the

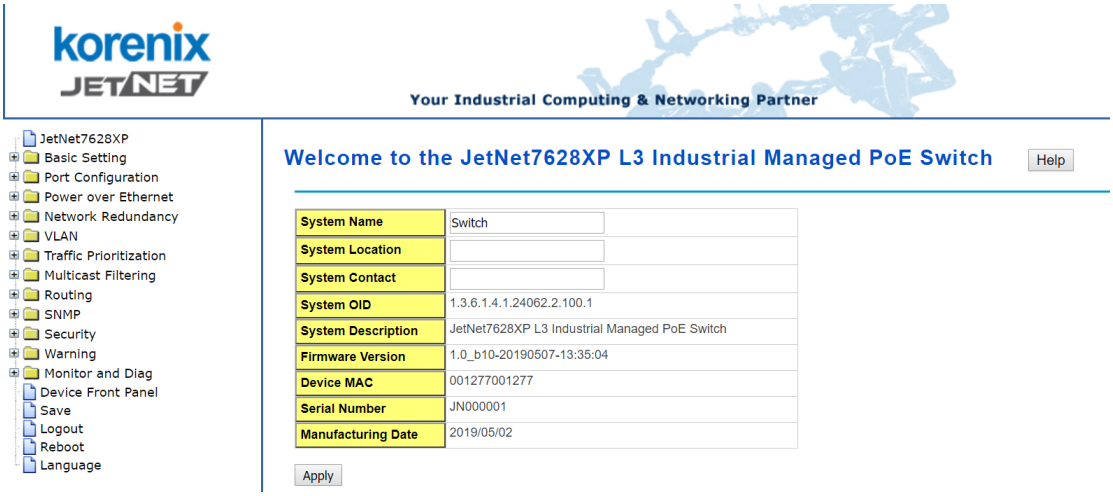
login password and configuration commands.

Launch the web browser and Login.

1. Launch the web browser (Internet Explorer or Mozila Firefox) on the PC.
2. Type **https://192.168.10.1** (or the IP address of the switch). And then press **Enter**.
3. The popup screen will appear and request you to trust the secured HTTPS connection distributed by JetNet 7628X first. Press **Yes** to trust it.
4. The login screen will appear next.

5. Key in the user name and the password. The default user name and password is **admin**.

6. Click on **Login.** Welcome page of the web-based management interface will then appear.



7. Once you enter the web-based management interface, all the commands you see are the same as what you see by HTTP login.

3.3 Preparation for Telnet Console

3.3.1 Telnet

Korenix JetNet 7628X supports Telnet console. You can connect to the switch by Telnet and the command lines are the same as what you see by RS-232 console port. Below are the steps to open Telnet connection to the switch.

1. Go to Start -> Run -> cmd. And then press **Enter**
2. Type the **Telnet 192.168.10.1** (or the IP address of the switch). And then press **Enter**

3.3.2 SSH (Secure Shell)

Korenix JetNet 7628X also support SSH console. You can remotely connect to the switch by command line interface. The SSH connection can secure all the configuration commands you sent to the switch.

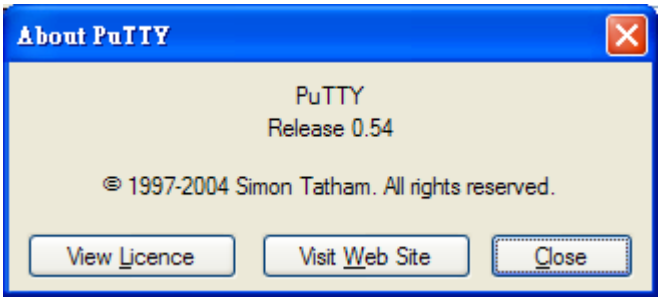
SSH is a client/server architecture while JetNet 7628X is the SSH server. When you want to make SSH connection with the switch, you should download the SSH client tool first.

SSH Client

There are many free, sharewares, trials or charged SSH clients you can find on the internet. Fox example, PuTTY is a free and popular Telnet/SSH client. We'll use this tool to demonstrate how to login JetNet by SSH. Note: *PuTTY is copyright 1997-2006 Simon Tatham*.

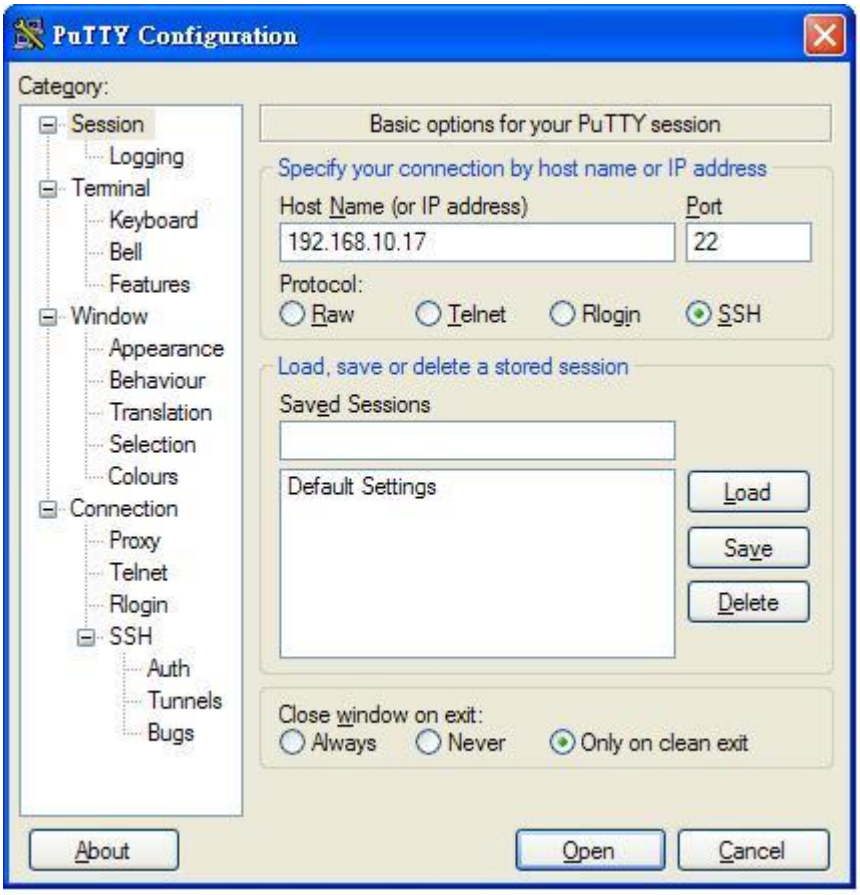
Download PuTTY: http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

The copyright of **PuTTY**

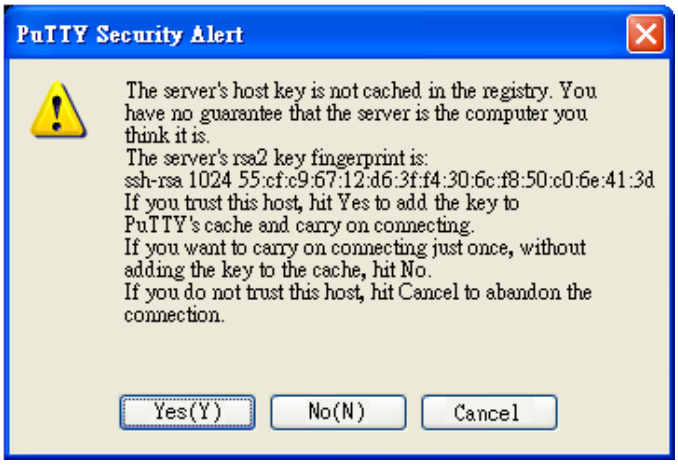


R. **Open SSH Client/PuTTY**

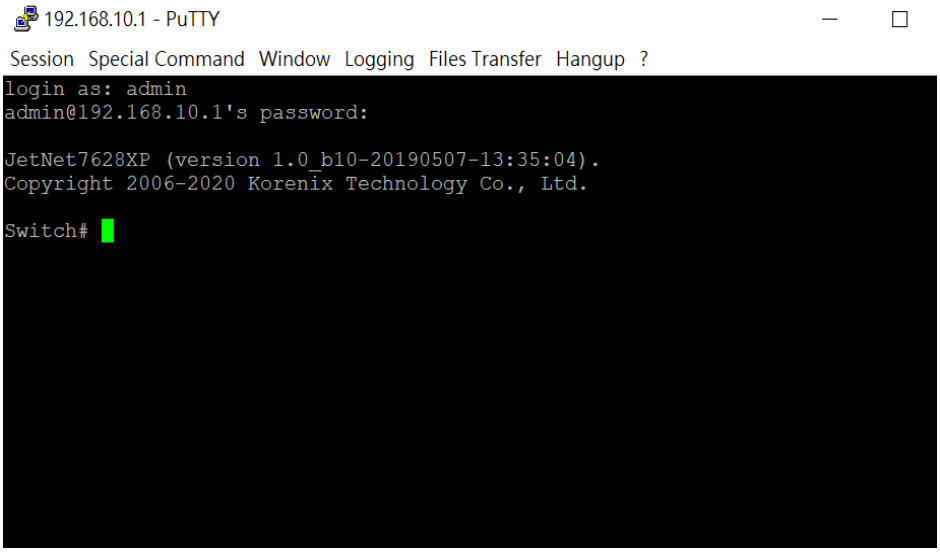
In the **Session** configuration, enter the **Host Name** (IP Address of your JetNet 7628X) and **Port number** (default = 22). Choose the "**SSH**" protocol. Then click on "**Open**" to start the SSH session console.



R. After click on **Open**, then you can see the cipher information in the popup screen. Press **Yes** to accept the Security Alert.



3. After few seconds, the SSH connection to JetNet 7628XP is opened. You can see the login screen as the below figure.



4. Type the Login Name and its Password. The default Login Name and Password are **admin / admin**.

5. All the commands you see in SSH are the same as the CLI commands you see via RS-232 console. The next chapter will introduce in detail how to use command line to configure the switch.

4 Feature Configuration

This chapter explains how to configure JetNet 7628X software features. There are four ways to access the switch: Serial console, Telnet, Web browser and SNMP.

JetNet 7628X series Industrial Managed Switch provides both in-band and out-band configuration methods. You can configure the switch via RS-232 console cable if you don't attach your admin PC to your network, or if you lose the network connection to your JetNet 7628X. This is so-called out-band management. It wouldn't be affected by the network performance.

The in-band management means you can remotely manage the switch via the network. You can choose Telnet or Web-based management. You just need to know the device's IP address. Then you can remotely connect to its embedded HTML web pages or Telnet console.

Korenix web management page is developed by JAVA. It allows you to use a standard web-browser such as Microsoft Internet Explorer, or Mozila, to configure and interrogate the switch from anywhere on the network.

Note: IE 5.0 or later versions do not allow Java applets to open sockets by default. Users have to directly modify the browser settings to selectively enable Java applets to use network ports.

Following topics are covered in this chapter:

4.1 Command Line Interface Introduction

The Command Line Interface (CLI) is the user interface to the switch's embedded software system. You can view the system information, show the status, configure the switch and receive a response back from the system by keying in a command.

There are some different command modes. Each command mode has its own access ability, available command lines and uses different command lines to enter and exit. These modes are Privileged EXEC, Global Configuration, (Port/VLAN) Interface Configuration modes.

Privileged EXEC mode: Press enable in the User EXEC mode, then you can enter the Privileged EXEC mode. In this mode, the system allows you to view current configuration, reset default, reload switch, show system information, save configuration…and enter the global configuration mode.

Type **configure terminal** to enter next mode, **exit** to leave. **?** to see the command list

```
Switch#
  archive      manage archive files
  clear        Reset functions
  clock        Configure time-of-day clock
  configure    Configuration from vty interface
  copy         Copy from one file to another
  debug        Debugging functions (see also 'undebug')
  disable      Turn off privileged mode command
  end          End current mode and change to enable mode
  exit         Exit current mode and down to previous mode
  list         Print command list
  more         Display the contents of a file
  no           Negate a command or set its defaults
  ping         Send echo messages
  quit         Exit current mode and down to previous mode
  reboot       Reboot system
  reload       copy a default-config file to replace the current one
  show         Show running system information
  telnet       Open a telnet connection
  terminal     Set terminal line parameters
  traceroute   Trace route to destination
  write        Write running configuration to memory, network, or terminal
```

Global Configuration Mode: Press **configure terminal** in privileged EXEC mode. You can then enter global configuration mode. In global configuration mode, you can configure all the features that the system provides you.

Type **interface IFNAME/VLAN** to enter interface configuration mode, **exit** to leave. **?** to see the command list.

Available command lists of global configuration mode.

```
Switch# configure terminal
Switch(config)#
  access-list           Add an access list entry
  administrator         Administrator account setting
  arp                   Set a static ARP entry
  clock                 Configure time-of-day clock
  default               Set a command to its defaults
  end                   End current mode and change to enable mode
  exit                  Exit current mode and down to previous mode
  gvrp                  GARP VLAN Registration Protocol
  hostname              Set system's network name
  interface             Select an interface to configure
  ip                    IP information
  lacp                  Link Aggregation Control Protocol
  list                  Print command list
  log                   Logging control
  mac                   Global MAC configuration subcommands
  mac-address-table     mac address table
  mirror                Port mirroring
  no                    Negate a command or set its defaults
  ntp                   Configure NTP
  password              Assign the terminal connection password
  qos                   Quality of Service (QoS)
  relay                 relay output type information
  smtp-server           SMTP server configuration
  snmp-server           SNMP server
  spanning-tree         spanning tree algorithm
  super-ring            super-ring protocol
  trunk                 Trunk group configuration
  vlan                  Virtual LAN
  warning-event         Warning event selection
  write-config          Specify config files to write to
```

(Port) Interface Configuration: Press **interface IFNAME** in global configuration mode. You can then enter interface configuration mode. In this mode, you can configure port settings.

The port interface name for fast Ethernet port 1 is fa1,… fast Ethernet 7 is fa7, gigabit Ethernet port 8 is gi8.. gigabit Ethernet port 10 is gi10. Type interface name accordingly when you want to enter certain interface configuration mode.

Type **exit** to leave.

Type **?** to see the command list

Available command lists of the global configuration mode.

```
Switch(config)# interface fa1
Switch(config-if)#
  acceptable          Configure 802.1Q acceptable frame types of a port.
  auto-negotiation    Enable auto-negotiation state of a given port
  description         Interface specific description
  duplex              Specify duplex mode of operation for a port
  end                 End current mode and change to enable mode
  exit                Exit current mode and down to previous mode
  flowcontrol         Set flow-control value for an interface
  garp                General Attribute Registration Protocol
  ingress             802.1Q ingress filtering features
  lacp                Link Aggregation Control Protocol
  list                Print command list
  loopback            Specify loopback mode of operation for a port
  mac                 MAC interface commands
  mdix                Enable mdix state of a given port
  no                  Negate a command or set its defaults
  qos                 Quality of Service (QoS)
  quit                Exit current mode and down to previous mode
  rate-limit          Rate limit configuration
  shutdown            Shutdown the selected interface
  spanning-tree       spanning-tree protocol
  speed               Specify the speed of a Fast Ethernet port or a Gigabit
Ethernet port.
  switchport          Set switching mode characteristics
```

(VLAN) Interface Configuration: Press **interface VLAN VLAN-ID** in global configuration mode. You can then enter VLAN interface configuration mode. In this mode, you can configure the settings for the specific VLAN.

The VLAN interface name of VLAN 1 is VLAN 1, VLAN 2 is VLAN 2…

Type **exit** to leave the mode. Type **?** to see the available command list.

The command lists of the VLAN interface configuration mode.

```
Switch(config)# interface vlan 1
Switch(config-if)#
  description   Interface specific description
  end             End current mode and change to enable mode
  exit            Exit current mode and down to previous mode
  ip              Interface Internet Protocol config commands
  list            Print command list
  no              Negate a command or set its defaults
  quit            Exit current mode and down to previous mode
  shutdown        Shutdown the selected interface
```

Summary of the 5 command modes.

Command Mode	**Main Function**	**Enter and Exit Method**	**Prompt**
User EXEC	This is the first level of access. User can ping, telnet remote device, and show some basic information	Enter: **Login** successfully Exit: **exit** to logout. Next mode: Type **enable** to enter privileged EXEC mode.	Switch>
Privileged EXEC	In this mode, the system allows you to view current configuration, reset default, reload switch, show system information, save configuration…and enter global configuration mode.	Enter: Type **enable** in User EXEC mode. Exec: Type **disable** to exit to user EXEC mode. Type **exit** to logout Next Mode: Type **configure terminal** to enter global configuration command.	Switch#
Global configuration	In global configuration mode, you can configure all the features that the system provides you	Enter: Type **configure terminal** in privileged EXEC mode Exit: Type **exit** or **end** or press **Ctrl-Z** to exit. Next mode: Type **interface IFNAME/ VLAN VID** to enter interface configuration mode	Switch(config)#
Port Interface configuration	In this mode, you can configure port related settings.	Enter: Type **interface IFNAME** in global configuration mode. Exit: Type **exit** or **Ctrl+Z** to global configuration mode. Type **end** to privileged EXEC mode.	Switch(config-if)#
VLAN Interface Configuration	In this mode, you can configure settings for specific VLAN.	Enter: Type **interface VLAN VID** in global configuration mode. Exit: Type **exit** or **Ctrl+Z** to global configuration mode. Type **end** to privileged EXEC mode.	Switch(config-vlan)#

Here are some useful commands for you to see these available commands. Save your time in typing and avoid typing error.

? To see all the available commands in this mode. It helps you to see the next command you can/should type as well.

```
Switch(config)# interface (?)
  IFNAME   Interface's name
  vlan     Select a vlan to configure
```

(Character)? To see all the available commands starts from this character.

```
Switch(config)# a?
  access-list      Add an access list entry
  administrator    Administrator account setting
  arp              Set a static ARP entry
```

Tab This tab key helps you to input the command quicker. If there is only one available command in the next, clicking on tab key can help to finish typing soon.

```
Switch# co (tab) (tab)
Switch# configure terminal

Switch(config)# ac (tab)
Switch(config)# access-list
```

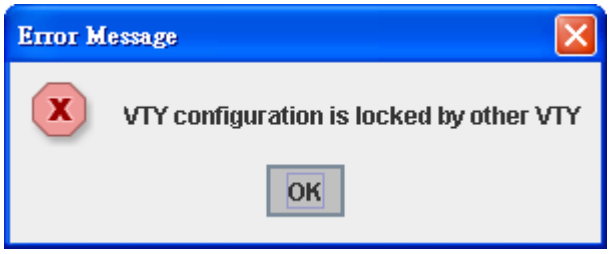
Ctrl+C To stop executing the unfinished command.

Ctrl+S To lock the screen of the terminal. You can't input any command.

Ctrl+Q To unlock the screen which is locked by Ctrl+S.

Ctrl+Z To exit configuration mode.

Alert message when multiple users want to configure the switch. If the administrator is in configuration mode, then the Web users can't change the settings. JetNet 7628X allows only one administrator to configure the switch at a time.



4.2 Basic Setting

The Basic Setting group provides you to configure switch information, IP address, User name/Password of the system. It also allows you to do firmware upgrade, backup and restore configuration, reload factory default, and reboot the system.
Following commands are included in this group:

4.2.1 Switch Setting

4.2.2 Admin Password

4.2.3 IP Configuration

4.2.4 Time Setting

4.2.5 Jumbo Frame

4.2.6 DHCP Server

4.2.7 Backup and Restore

4.2.8 Firmware Upgrade

4.2.9 Factory Default

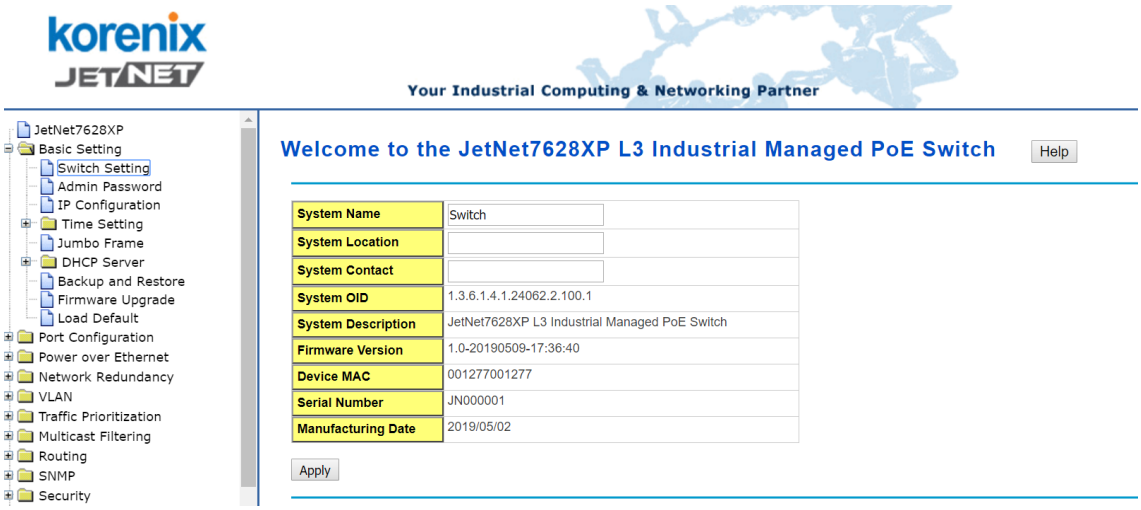
4.2.10 System Reboot

4.2.11 CLI Commands for Basic Setting

4.2.1 Switch Setting

You can assign System name, Location, Contact and view system information.

Figure 4.2.1.1 – Web UI of the Switch Setting



System Name: You can assign a name to the device. The available characters you can input is 64. After you configure the name, CLI system will select the first 12 characters as the name in CLI system.

System Location: You can specify the switch's physical location here. The available characters you can input are 64.

System Contact: You can specify contact people here. You can type the name, mail address or other information of the administrator. The available characters you can input are 64.

System OID: The SNMP object ID of the switch. You can follow the path to find its private MIB in MIB browser. (**Note:** When you attempt to view private MIB, you should compile private MIB files into your MIB browser first.)

System Description: JetNet 7628X Industrial Management Ethernet Switch is the name of this product.

Firmware Version: Display the firmware version installed in this device.

MAC Address: Display unique hardware address (MAC address) assigned by the manufacturer.

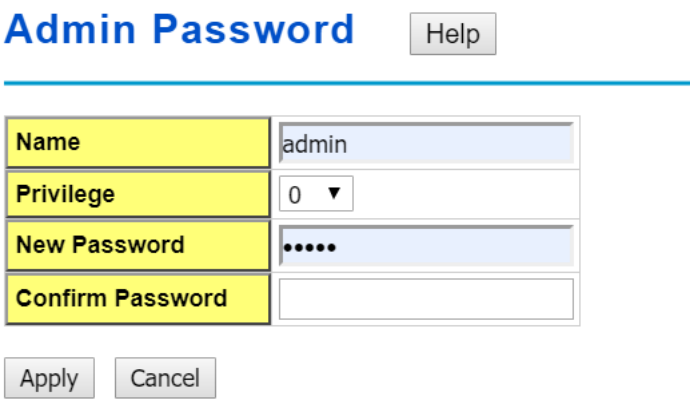
Once you finish the configuration, click on **Apply** to apply your settings.

Note: Always remember to select **Save** to save your settings. Otherwise, the settings you made will be lost when the switch is powered off.

4.2.2 Admin Password

You can change the user name and the password here to enhance security

Figure 4.2.2.1 Web UI of the Admin Password



Name: You can key in new user name here. The default setting is **admin**.

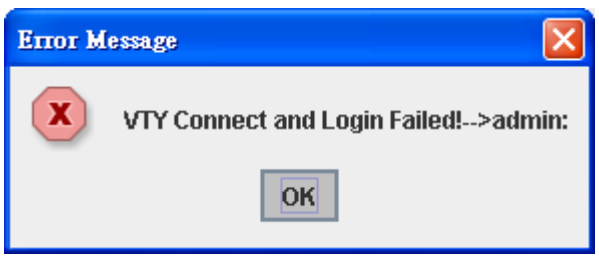
Privilege: You can assign different privilege levels to multiple users.

New Password: You can key in new password here. The default setting is **admin**.

Confirm Password: You need to type the new password again to confirm it.

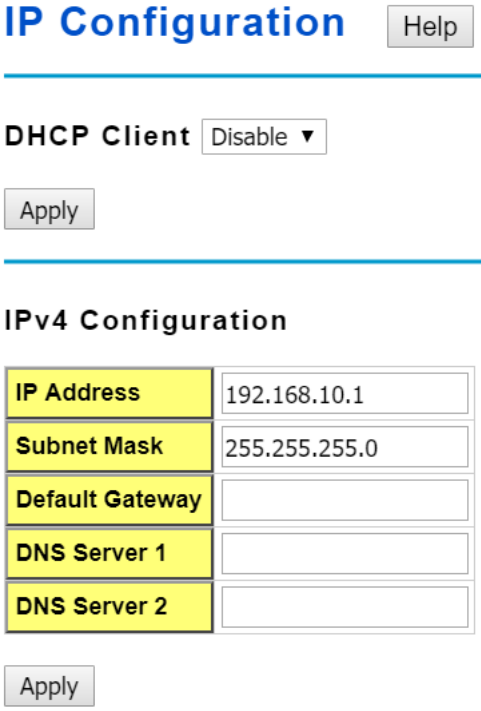
Once you finish configuring the settings, click on **Apply** to apply your configuration.

Figure 4.2.2.2 Popup alert window for Incorrect Username.



4.2.3 IP Configuration

This function allows users to configure the switch's IP address settings.



DHCP Client: You can select to **Enable** or **Disable** DHCP Client function. When DHCP Client function is enabled, an IP address will be assigned to the switch from the network's DHCP server. In this mode, the default IP address will therefore be replaced by the one assigned by DHCP server. If DHCP Client is disabled, then the IP address that you specified will be used instead.

IP Address: You can assign the IP address reserved by your network for your JetNet. If DHCP Client function is enabled, you don't need to assign an IP address to the JetNet, as it will be overwritten by DHCP server and shown here. The default IP is 192.168.10.1.

Subnet Mask: You can assign the subnet mask for the IP address here. If DHCP Client function is enabled, you don't need to assign the subnet mask. The default Subnet Mask is 255.255.255.0. **Note:** In the CLI, we use the enabled bit of the subnet mask to represent the number displayed in web UI. For example, 8 stands for 255.0.0.0; 16 stands for 255.255.0.0; 24 stands for 255.255.255.0.

Default Gateway: You can assign the gateway for the switch here. The default gateway is 192.168.10.254. **Note:** In CLI, we use 0.0.0.0/0 to represent for the default gateway.

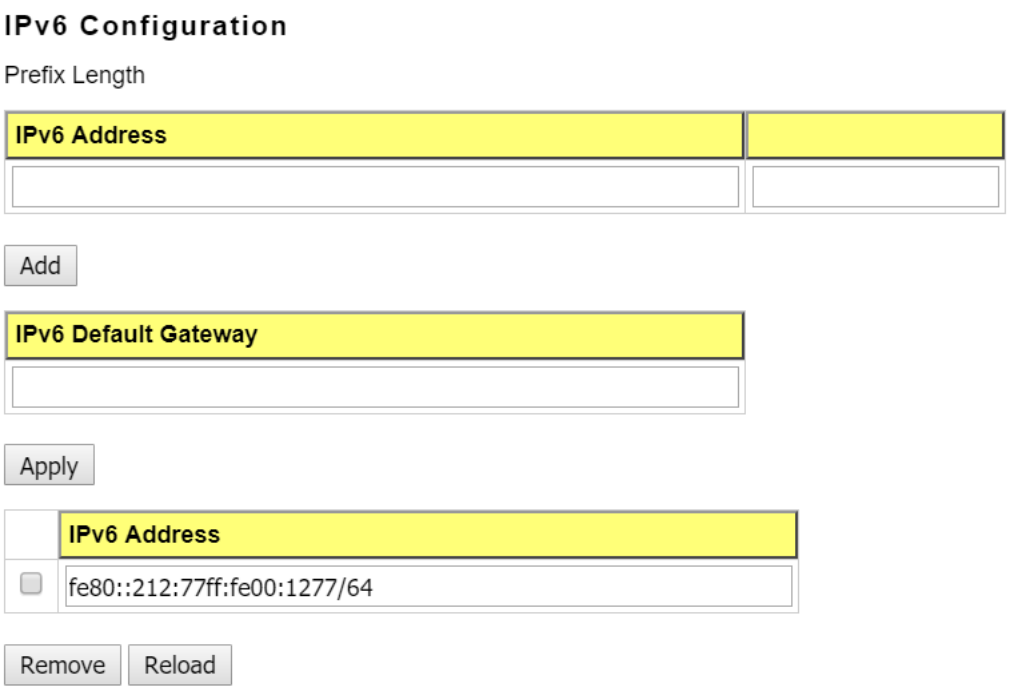
Once you finish configuring the settings, click on **Apply** to apply your configuration.

IPv6 Configuration –An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits (two octets). The groups are separated by colons (:), and the length of IPv6 address is 128bits.

An example of an IPv6 address is: 2001:0db8:85a3:0000:0000:8a2e:0370:7334.

The default IP address of JetNet Managed Switch is fe80::212:77ff:fe00:1277/64, and the Leading zeroes in a group may be omitted. Thus, the example address may be written as:

fe80::212:77ff:fe60:ca90.



IPv6 Address field: typing new IPv6 address in this field.

Prefix:the size of subnet or netwok, and it equivalent to the subnetmask, but writtenin different.The default subnet mask length is 64bits, and writen in decimal value -64.

Add: after add new IPv6 address and prefix, don't forget click icon-"**Add**"to apply new address to system.

Remove:select existed IPv6 address and click icon-"**Remove**"to delete IP address.

Reload:refresh and reload IPv6 address listing.

IPv6 Default Gateway: assign the IPv6 default gateway here.Type IPv6 address of the gateway then click "**Apply**". Note: In CLI, we user ::/0 to represent for the IPv6 default gateway.

IPv6Neighbor Table: showsthe IPv6 address of neighbor, connected interface, MAC address of remote IPv6 device, and current state of neighbor device.

The system will update IPv6 Neighbor Table automatically, and user also can click the icon "**Reload**" to refresh the tabale.

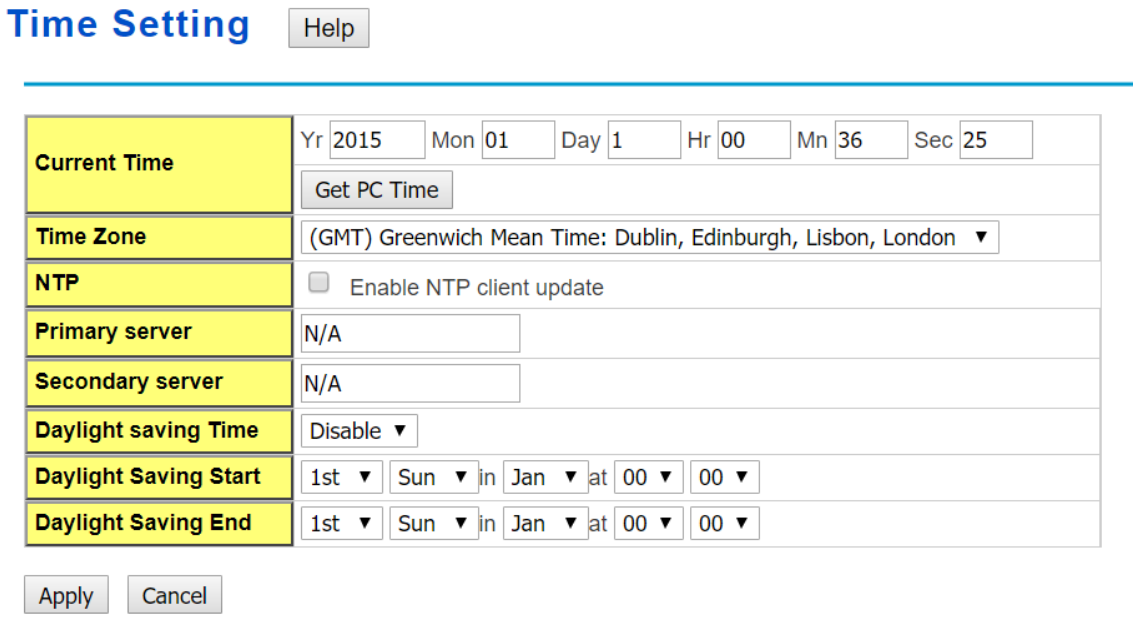
4.2.4 Time Setting

Time Setting source allow user to set the time manually or through NTP server. Network Time Protocol (NTP) is used to synchronize computer clocks on the internet. You can configure NTP settings here to synchronize the clocks of several switches on the network.

The IEEE1588 PTP (Precision Time Protocol) supports very precise time synchronization in an Ethernet network. There are two clocks, Master and Slave. The master device periodically launches an exchange of messages with slave devices to help each slave clock re-compute the offset between its clock and the master's clock.

*Note: Please enable one synchronization protocol (PTP/NTP) only.

The JetNet 7628X series also provides Daylight Saving function for some territories use.



Manual Setting: User can select **"Manual setting"** to change time as user wants. User also can click the button **"Get Time from PC"** to get PC's time setting for switch.

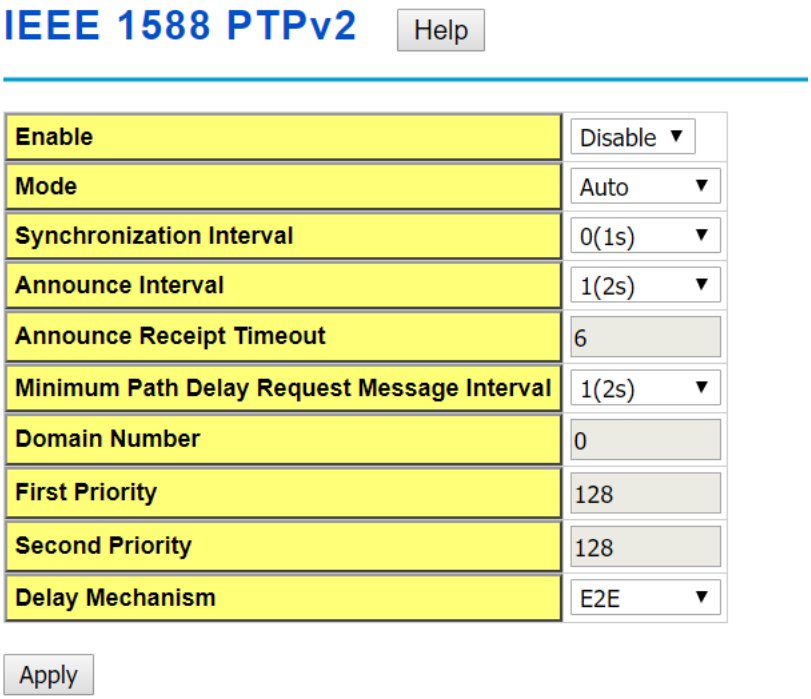
NTP client: Select the Time Setting Source to NTP client can let device enable the NTP client service. NTP client will be automatically enabled if you change Time source to NTP Client. The system will send request packet to acquire current time from the NTP server you assigned.

IEEE 1588: select the **PTP State** to enable this function and select one operating mode for the precision time synchronizes.

Auto mode: the switch performs PTP Master and slave mode (Bindary mode)

Master mode: switch performs PTP Master only.

Slave mode: switch performs PTP slave only.



Time-zone: Select the time zone where the switch is located. Following table lists the time zones for different locations for your reference. The default time zone is GMT Greenwich Mean Time.

Switch(config)# clock timezone
R. (GMT-12:00) Eniwetok, Kwajalein
02 (GMT-11:00) Midway Island, Samoa
03 (GMT-10:00) Hawaii
04 (GMT-09:00) Alaska
05 (GMT-08:00) Pacific Time (US & Canada) , Tijuana
06 (GMT-07:00) Arizona
07 (GMT-07:00) Mountain Time (US & Canada)
08 (GMT-06:00) Central America
09 (GMT-06:00) Central Time (US & Canada)
10 (GMT-06:00) Mexico City
11 (GMT-06:00) Saskatchewan
12 (GMT-05:00) Bogota, Lima, Quito
13 (GMT-05:00) Eastern Time (US & Canada)
14 (GMT-05:00) Indiana (East)
15 (GMT-04:00) Atlantic Time (Canada)

16 (GMT-04:00) Caracas, La Paz
17 (GMT-04:00) Santiago
18 (GMT-03:00) NewFoundland
19 (GMT-03:00) Brasilia
20 (GMT-03:00) Buenos Aires, Georgetown
21 (GMT-03:00) Greenland
22 (GMT-02:00) Mid-Atlantic
23 (GMT-01:00) Azores
24 (GMT-01:00) Cape Verde Is.
25 (GMT) Casablanca, Monrovia
26 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London
27 (GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
28 (GMT+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague
29 (GMT+01:00) Brussels, Copenhagen, Madrid, Paris
30 (GMT+01:00) Sarajevo, Skopje, Sofija, Vilnius, Warsaw, Zagreb
31 (GMT+01:00) West Central Africa
32 (GMT+02:00) Athens, Istanbul, Minsk
33 (GMT+02:00) Bucharest
34 (GMT+02:00) Cairo
35 (GMT+02:00) Harare, Pretoria
36 (GMT+02:00) Helsinki, Riga, Tallinn
37 (GMT+02:00) Jerusalem
38 (GMT+03:00) Baghdad
39 (GMT+03:00) Kuwait, Riyadh
40 (GMT+03:00) Moscow, St. Petersburg, Volgograd
41 (GMT+03:00) Nairobi
42 (GMT+03:30) Tehran
43 (GMT+04:00) Abu Dhabi, Muscat
44 (GMT+04:00) Baku, Tbilisi, Yerevan
45 (GMT+04:30) Kabul
46 (GMT+05:00) Ekaterinburg
47 (GMT+05:00) Islamabad, Karachi, Tashkent
48 (GMT+05:30) Calcutta, Chennai, Mumbai, New Delhi
49 (GMT+05:45) Kathmandu
50 (GMT+06:00) Almaty, Novosibirsk
51 (GMT+06:00) Astana, Dhaka
52 (GMT+06:00) Sri Jayawardenepura
53 (GMT+06:30) Rangoon
54 (GMT+07:00) Bangkok, Hanoi, Jakarta
55 (GMT+07:00) Krasnoyarsk
56 (GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi
57 (GMT+08:00) Irkutsk, Ulaan Bataar
58 (GMT+08:00) Kuala Lumpur, Singapore
59 (GMT+08:00) Perth
60 (GMT+08:00) Taipei
61 (GMT+09:00) Osaka, Sapporo, Tokyo
62 (GMT+09:00) Seoul
63 (GMT+09:00) Yakutsk
64 (GMT+09:30) Adelaide
65 (GMT+09:30) Darwin
66 (GMT+10:00) Brisbane
67 (GMT+10:00) Canberra, Melbourne, Sydney
68 (GMT+10:00) Guam, Port Moresby
69 (GMT+10:00) Hobart
70 (GMT+10:00) Vladivostok
71 (GMT+11:00) Magadan, Solomon Is., New Caledonia
72 (GMT+12:00) Aukland, Wellington
73 (GMT+12:00) Fiji, Kamchatka, Marshall Is.

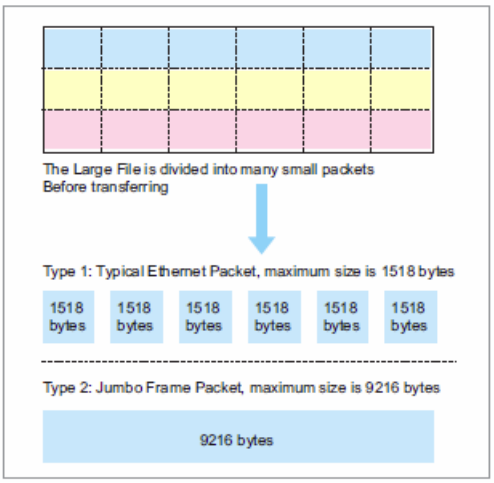
74 (GMT+13:00) Nuku'alofa

Daylight Saving Time: click the check box to enable the Daylight Saving Function as the setting of start and end time or disable it.
Daylight Saving Start and **Daylight Saving End**:the time setting allows user to selects the week that monthly basis, and sets the End and Start time individually.

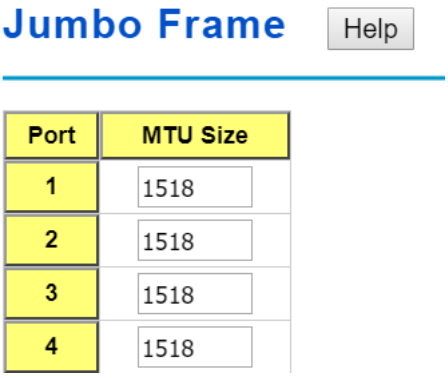
Once you finish those configurations, click on **Apply** to apply your configuration.

4.2.5 Jumbo Frame

What is Jumbo Frame?



The typical Ethernet frame is range from 64 to 1518 bytes. This is sufficient for general usages. However, when users want to transmit large files, the files may be divided into many small size packets. While the transmitting speed becomes slow, long size Jumbo frame can solve the issue.
The switch allows you configure the size of the MTU, Maximum Transmission Unit. The default value is 1,518bytes. The maximum Jumbo Frame size is 9,216 bytes. You can freely change the available packet size.



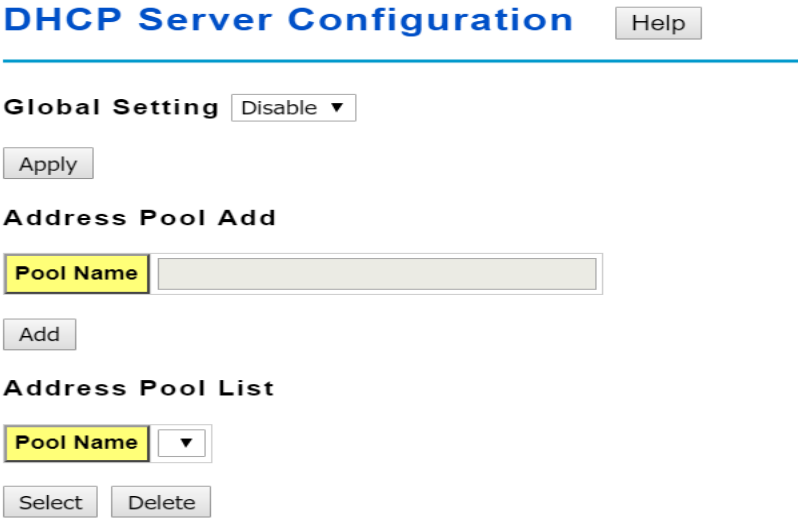
Once you finish your configuration, click on **Apply** to apply your configuration.

4.2.6 DHCP Server

You can select to **Enable** or **Disable** DHCP Server function. *JetNet 7628X* will assign a new IP address to link partners.

DHCP Server configuration

After selecting to enable DHCP Server function, type in the Network IP address for the DHCP server IP pool, Subnet Mask, Default Gateway address and Lease Time for client.

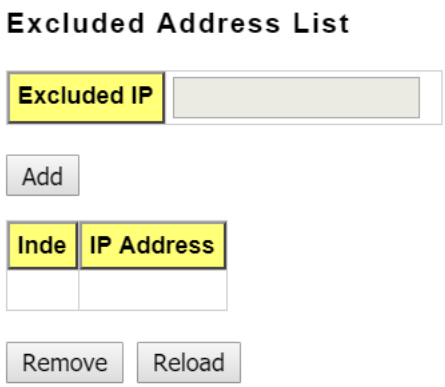


Once you have finished the configuration, click **Apply** to apply your configuration

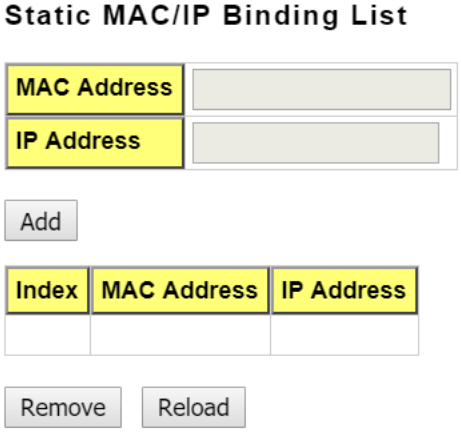
Excluded Address:

You can type a specific address into the **IP Address field** for the DHCP server reserved IP address.

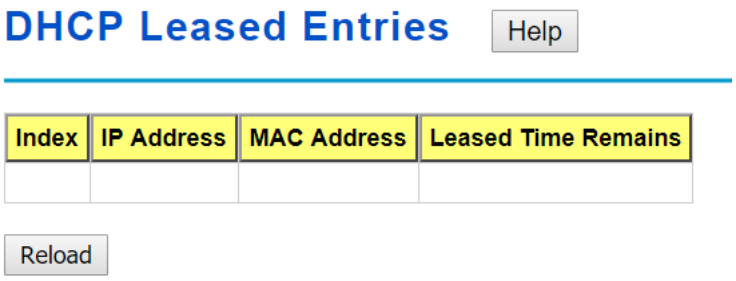
The IP address that is listed in the **Excluded Address List Table** will not be assigned to the network device. Add or remove an IP address from the **Excluded Address List** by clicking **Add** or **Remove**.



Static MAC / IP Binding List : *JetNet 7628X* provides a MAC address and IP address binding and removing function. You can type in the specified IP and MAC address, and then click **Add** to add a new MAC&IP address binding rule for a specified link partner, like PLC or any device without **DHCP client** function. To remove from the binding list, just select the rule to remove and click **Remove**.



DHCP Leased Entries: *JetNet 7628X* provides an assigned IP address list for user check. It will show the MAC and IP address that was assigned by *JetNet 7628X*. Click the **Reload** button to refresh the listing.



Option82 Information

DHCP Relay Agent

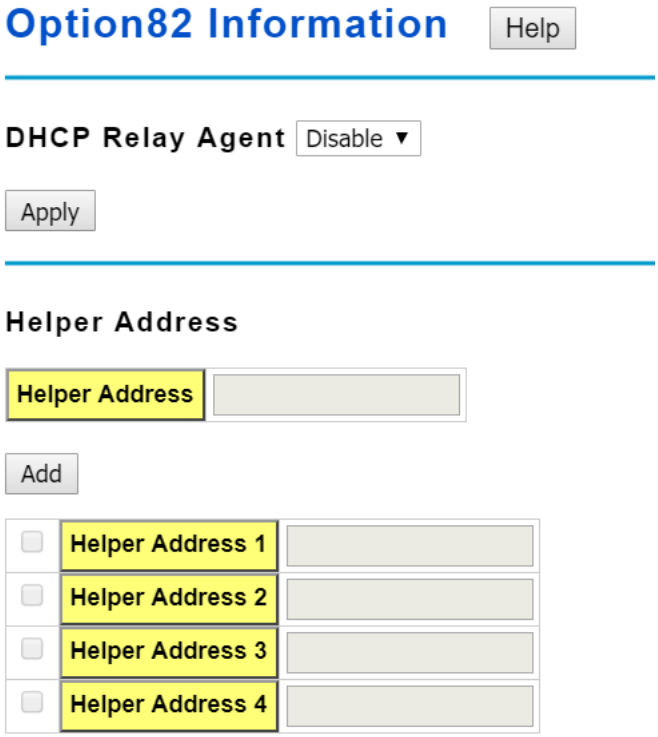
You can select to **Enable** or **Disable** DHCP relay agent function, and then select the modification type of option 82 field.

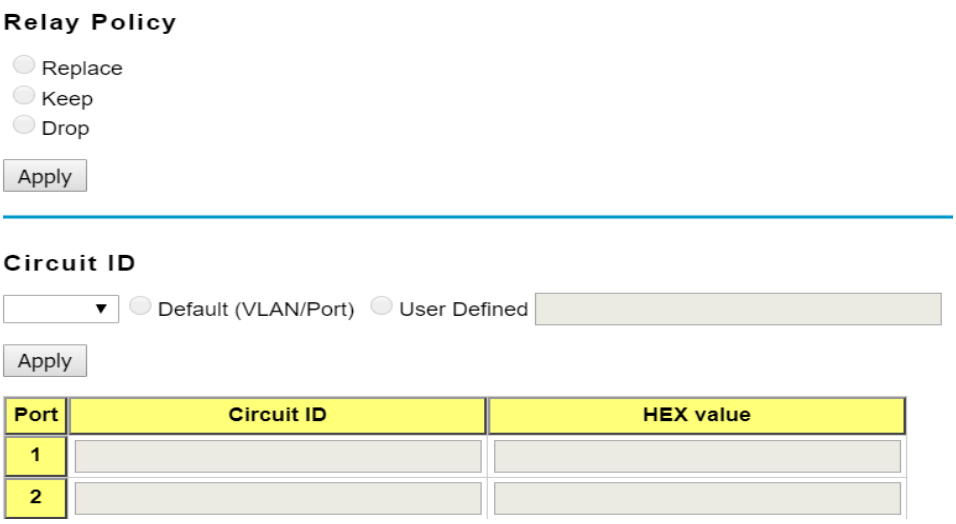
Relay policy drop: Drops the option 82 field and do not add any option 82 field.

Relay policy keep: Keeps the original option 82 field and forwards to server.

Relay policy replace: Replaces the existing option 82 field and adds new option 82 field. (This is the default setting)

Helper Address: there are 4 fields for the DHCP server's IP address. You can evi the field with evice c IP address of DHCP Server, and then click "Apply" to activate the DHCP relay agent function. All the DHCP packets from client will be modified by the policy and forwarded to DHCP server through the gateway port.





4.2.7 Backup and Restore

With Backup command, you can save current configuration file saved in the switch's flash to admin PC or TFTP server. This will allow you to go to **Restore** command later to restore the configuration file back to the switch. Before you restore the configuration file, you must place the backup configuration file in the PC or TFTP server. The switch will then download this file back to the flash.

There are 2 modes for users to backup/restore the configuration file, Local File mode and TFTP Server mode.

Local File mode: In this mode, the switch acts as the file server. Users can browse the target folder and then type the file name to backup the configuration. Users can also browse the target folder and select existed configuration file to restore the configuration back to the switch. This mode is only provided by Web UI while CLI is not supported.

TFTP Server mode: In this mode, the switch acts as TFTP client. Before you do so, make sure that your TFTP server is ready. Then please type the IP address of TFTP Server and Backup configuration file name. This mode can be used in both CLI and Web UI.

TFTP Server IP Address: You need to key in the IP address of your TFTP Server here.

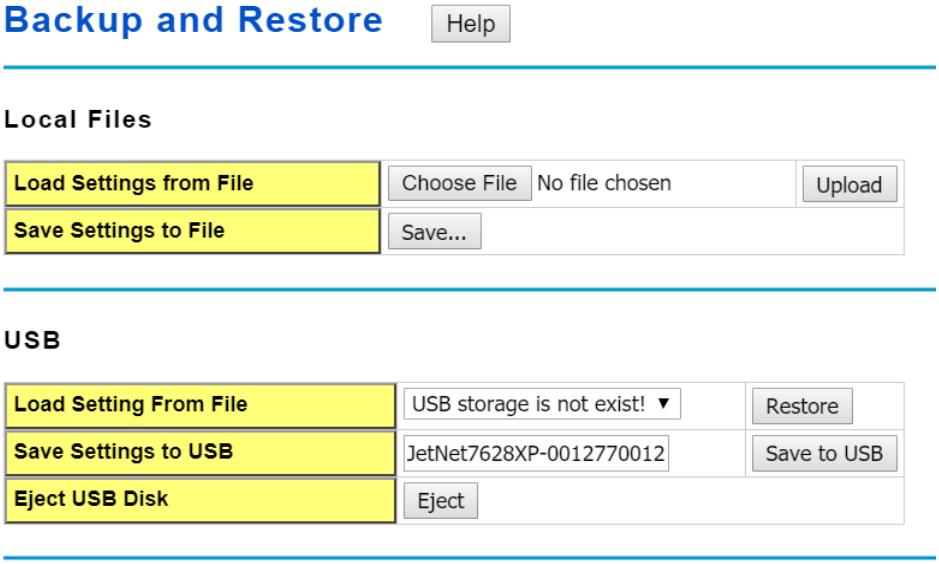
Backup/Restore File Name: Please type the correct file name of the configuration file..

Configuration File: The configuration file of the switch is a pure text file. You can open it by word/txt read file. You can also modify the file, add/remove the configuration settings, and then restore back to the switch.

Startup Configuration File: After you saved the running-config to flash, the new settings will be kept and work after power cycle. You can use *show startup-config* to view it in CLI. The Backup command can only backup such configuration file to your PC or TFTP server.

> ***Technical Tip:***
>
> ***Default Configuration File:*** *The switch provides the default configuration file in the system. You can use Reset button, Reload command to reset the system.*
>
> ***Running Configuration File:*** *The switch's CLI allows you to view the latest settings running by the system. The information shown here is the settings you set up but haven't saved to flash. The settings not yet saved to flash will not work after power recycle. You can* use *show running-config* to view it in CLI.

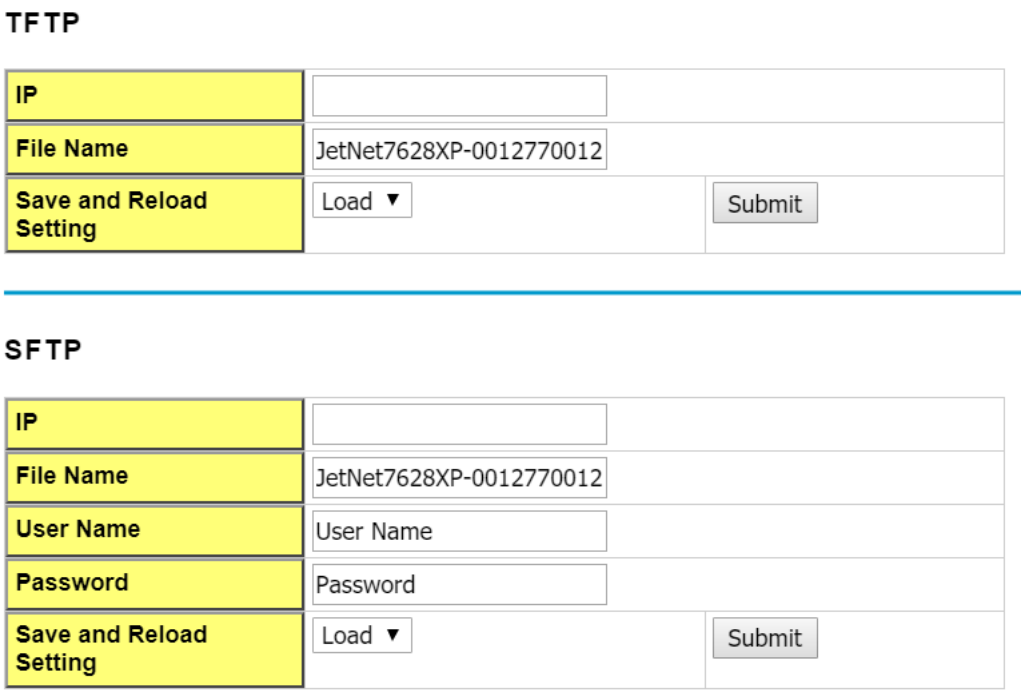
Figure 4.2.7.1 Main UI of Backup & Restore



Click on upload icon to select the target file you want to backup/restore.

Note that the folders of the path to the target file do not allow you to input space key.

Figure 4.2.7.3 Backup/Restore Configuration – TFTP Server mode



Type the IP address of TFTP Server IP. Then click on **Backup/Restore**.

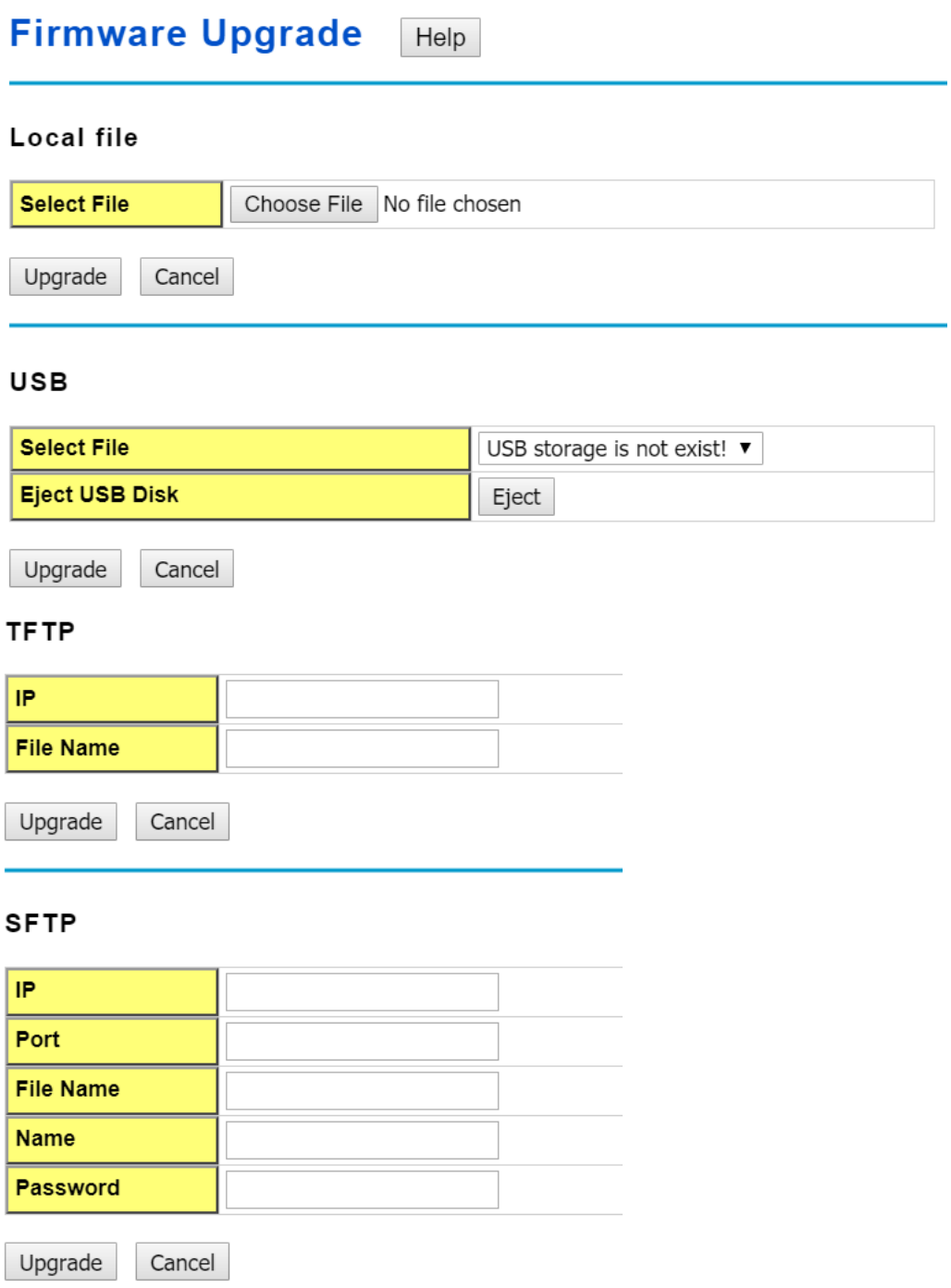
Note: point to the wrong file will cause the entire configuration missed

4.2.8 Firmware Upgrade

In this section, you can update the latest firmware for your switch. Korenix provides the latest firmware in Korenix Web site. The new firmware may include new features, bug fixes or other software changes. We'll also provide the release notes for the update as well. For technical viewpoint, we suggest you use the latest firmware before installing the switch to the customer site.

Note that the system will be automatically rebooted after you finished upgrading new firmware. Please remind the attached users before you do this.

Figure 4.2.8.1 Main UI of Firmware Upgrade



There are 4 modes for users to backup/restore the configuration file, Local File mode ,USB Mode ,TFTP mode and SFTP Mode .

Local File mode: In this mode, the switch acts as the file server. Users can browse the target folder and then type the file name to backup the configuration. Users also can browse the target folder and select the existed configuration file to restore the configuration back to the switch. This mode is only provided by Web UI while CLI is not supported.

USB mode: In this mode, user can upgrade FW via USB drive.

TFTP Server mode: In this mode, the switch acts as the TFTP client. Before you do so, make sure that your TFTP server is ready. And then please type the IP address of TFTP Server IP address. This mode can be used in both CLI and Web UI.

TFTP Server IP Address: You need to key in the IP address of your TFTP Server here.

Firmware File Name: The file name of the new firmware.

The UI also shows you the current firmware version and built date of current firmware. Please check the version number after the switch is rebooted.

SFTP Server mode: In this mode, the switch acts as the SFTP client. Before you do so, make sure that your SFTP server is ready. And then please type the IP address of SFTP Server IP address, file name , password.

After finishing transmitting the firmware, the system will copy the firmware file and replace the firmware in the flash. The CLI show …… until the process is finished.

4.2.9 Load Default

In this section, you can reset all the configurations of the switch to default setting. Click on **Reset** the system will then reset all configurations to default setting. The system will show you popup message window after finishing this command. Default setting will work after rebooting the switch.

Figure- 4.2.9.1 The main screen of the Reset to Default

Popup alert screen to confirm the command. Click on **Yes** to start it.

Popup message screen to show you that have done the command. Click on **OK** to close the screen. Then please go to **Reboot** page to reboot the switch.

Click on **OK.** The system will then auto reboot the device.

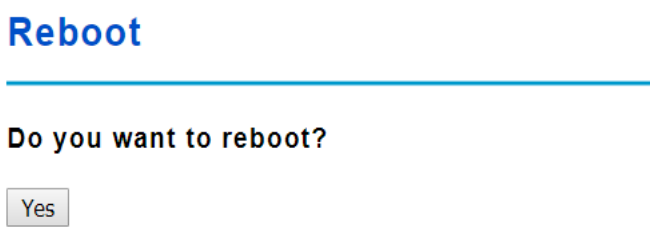
Note: If you already configured the IP of your device to other IP address, when you use this command by CLI and Web UI, our software will not reset the IP address to default IP. The system will remain the IP address so that you can still connect the switch via the network.

4.2.10 System Reboot

System Reboot allows you to reboot the device. Some of the feature changes require you to reboot the system. Click on **Reboot** to reboot your device.

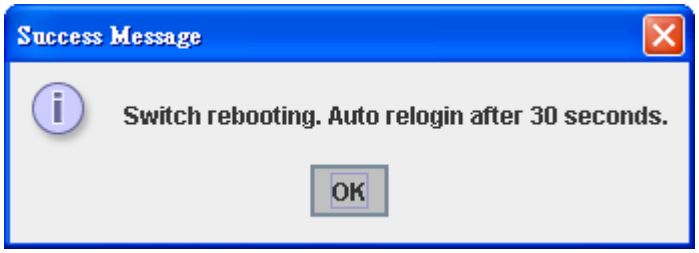
Note: *Remember to click on* ***Save*** *button to save your settings. Otherwise, the settings you made will be gone when the switch is powered off.*

Figure 4.2.10.1 Main screen for Rebooting



Pop-up alert screen to request confirmation. Click on **Yes**. Then the switch will be rebooted immediately.

Figure 4.2.10.3 Pop-up message screen appears when rebooting the switch..



4.2.11 CLI Commands for Basic Setting

Feature	Command Line
Switch Setting	
System Name	Switch(config)# hostname WORD Network name of this system Switch(config)# hostname JN7628X Switch(config)#
System Location	Switch(config)# snmp-server location Taipei

System Contact	Switch(config)# snmp-server contact korecare@korenix.com
Display	Switch# show snmp-server name Switch Switch# show snmp-server location Taipei Switch# show snmp-server contact korecare@korenix.com Switch> show version 0.31-20061218 Switch# show hardware mac MAC Address : 00:12:77:FF:01:B0
Admin Password	
User Name and Password	Switch(config)# administrator NAME Administrator account name Switch(config)# administrator orwell PASSWORD Administrator account password Switch(config)# administrator orwell orwell Change administrator account orwell and password orwell success.
Display	Switch# show administrator Administrator account information name: orwell password: orwell
IP Configuration	
IP Address/Mask (192.168.10.8, 255.255.255.0	Switch(config)# int vlan 1 Switch(config-if)# ip address dhcp Switch(config-if)# ip address 192.168.10.8/24 Switch(config-if)# ip dhcp client Switch(config-if)# ip dhcp client renew
Gateway	Switch(config)# ip route 0.0.0.0/0 192.168.10.254/24
Remove Gateway	Switch(config)# no ip route 0.0.0.0/0 192.168.10.254/24
Display	Switch# show running-config …… ! interface vlan1 ip address 192.168.10.8/24 no shutdown ! ip route 0.0.0.0/0 192.168.10.254/24 !
IPv6 Address/Prefix	Switch(config)# interface vlan1 Switch(config-if)# ipv6 address 2001:0db8:85a3::8a2e:0370:7334/64
IPv6 Gateway	Switch(config)# ipv6 route 0::0/0 2001:0db8:85a3::8a2e:0370:FFFE
Remove IPv6 Gateway	Switch(config)#no ipv6 route 0::0/0 2001:0db8:85a3::8a2e:0370:FFFE
Display	Switch# show running-config …… interface vlan1

	ip address 192.168.10.6/24 ipv6 address 2001:db8:85a3::8a2e:370:7334/64 no shutdown ! ip route 0.0.0.0/0 192.168.10.254 ipv6 route ::/0 2001:db8:85a3::8a2e:370:fffe !
Time Setting	
NTP Server	Switch(config)# ntp peer enable disable primary secondary Switch(config)# ntp peer primary IPADDR Switch(config)# ntp peer primary 192.168.10.120
Time Zone	Switch(config)# clock timezone 26 Sun Jan 1 04:13:24 2006 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London **Note:** By typing clock timezone?, you can see the timezone list. Then choose the number of the timezone you want to select.
IEEE 1588	Switch(config)# ptpd run <cr> preferred-clock Preferred Clock slave Run as slave
Display	Switch # sh ntp associations Network time protocol Status : Disabled Primary peer : N/A Secondary peer : N/A Switch # show clock Sun Jan 1 04:14:19 2006 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London Switch # show clock timezone clock timezone (26) (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London
Jumbo Frame	
Jumbo Frame	Switch(config)# system mtu jumbo <1500-9216> Switch(config)# system mtu jumbo 9000
DHCP Server	
DHCP Server configuration	Enable DHCP Server on JetNet Switch Switch# Switch# configure terminal Switch(config)# router dhcp Switch(config-dhcp)# service dhcp Configure DHCP network address pool Switch(config-dhcp)#network 50.50.50.0/4 –(network/mask)

	Switch(config-dhcp)#default-router 50.50.50.1
Lease time configure	Switch(config-dhcp)#lease 300 (300 sec)
DHCP Relay Agent	Enable DHCP Relay Agent Switch# Switch# configure terminal Switch(config)# router dhcp Switch(config-dhcp)# service dhcp Switch(config-dhcp)# ip dhcp relay information option Enable DHCP Relay policy Switch(config-dhcp)# ip dhcp relay information policy replace drop Relay Policy keep Drop/Keep/Replace option82 field replace
Show DHCP server information	Switch# show ip dhcp server statistics Switch# show ip dhcp server statistics DHCP Server ON Address Pool 1 network:192.168.17.0/24 default-router:192.168.17.254 lease time:300 Excluded Address List IP Address (list excluded address) Manual Binding List IP Address MAC Address --- --- (list IP & MAC binding entry) Leased Address List IP Address MAC Address Leased Time Remains --- --- --- (list leased Time remain information for each entry)
Backup and Restore	
Backup Startup Configuration file	Switch# copy startup-config tftp: 192.168.10.33/default.conf Writing Configuration [OK] ***Note 1:*** *To backup the latest startup configuration file, you should save current settings to flash first. You can refer to 4.14 to see how to save settings to the flash.* *Note 2: 192.168.10.33 is the TFTP server's IP and default.conf is name of the configuration file. Your environment may use different IP addresses or different file name. Please type target TFTP server IP or file name in this command.*
Restore Configuration	Switch# copy tftp: 192.168.10.33/default.conf startup-config
Show Startup Configuration	Switch# show startup-config
Show Running Configuration	Switch# show running-config
Firmware Upgrade	
Firmware Upgrade	Switch# archive download-sw /overwrite tftp 192.168.10.33 JN7628X.bin Firmware upgrading, don't turn off the switch! Tftping file JN7628X.bin Firmware upgrading ….....

	.... Firmware upgrade success!! Rebooting.....
Factory Default	
Factory Default	Switch# reload default-config file Reload OK! Switch# reboot
System Reboot	
Reboot	Switch# reboot

4.3 Port Configuration

Port Configuration group enables you to enable/disable port state, or configure port auto-negotiation, speed, and duplex, flow control, rate limit control and port aggregation settings. It also allows you to view port status and aggregation information.

Following commands are included in this group:

4.3.1 Port Control

4.3.2 Port Status

4.3.3 Rate Control

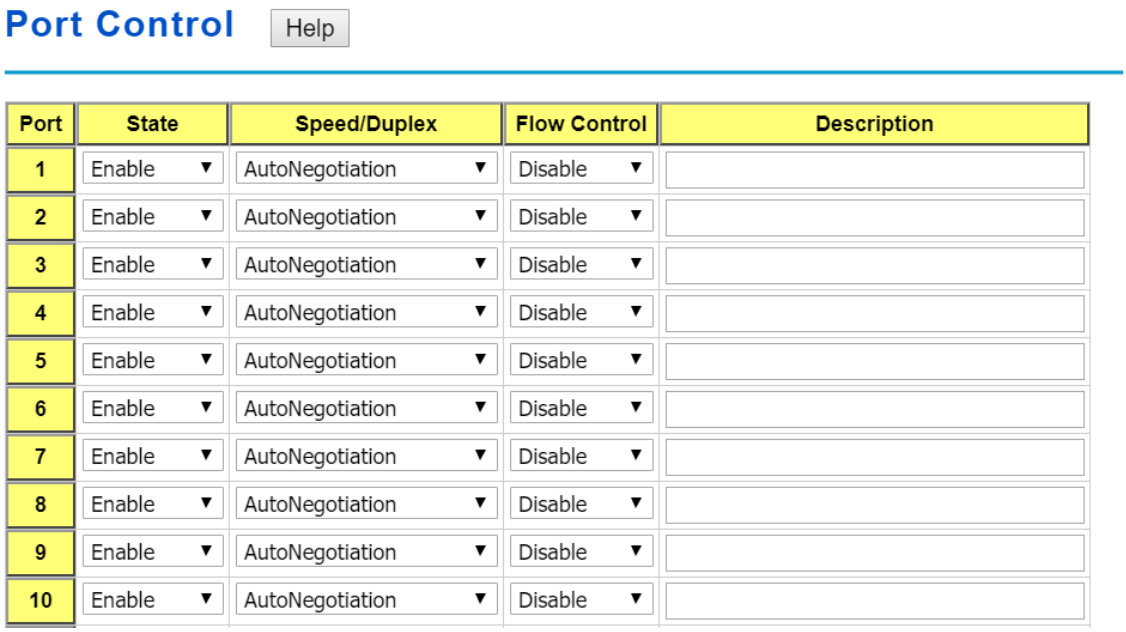
4.3.4 Storm Control

4.3.5 Port Trunking

4.3.6 Command Lines for Port Configuration

4.3.1 Port Control

Port Control commands allow you to enable/disable port state, or configure the port auto-negotiation, speed, duplex and flow control.



Select the port you want to configure and make changes to the port.

In **State** column, you can enable or disable the state of this port. Once you disable, the port stop to link to the other end and stop to forward any traffic. The default setting is Enable which means all the ports are workable when you receive the device.

In **Speed/Duplex** column, you can configure port speed and duplex mode of this port. Below are the selections you can choose:

Fast Ethernet Port 1~24 (fa1~fa24) : AutoNegotiation, 10M Full Duplex(10 Full), 10M Half Duplex(10 Half), 100M Full Duplex(100 Full) and 100M Half Duplex(100 Half).

Gigabit Ethernet Port 25~28: (gi25~gi28) : AutoNegotiation, 10M Full Duplex(10 Full), 10M Half Duplex(10 Half), 100M Full Duplex(100 Full), 100M Half Duplex(100 Half), 1000M Full

Duplex(1000 Full), 1000M Half Duplex(1000 Half).

The default mode is Auto Negotiation mode.

In **Flow Control** column, “Symmetric” means that you need to activate the flow control function of the remote network device in order to let the flow control of that corresponding port on the switch to work. “Disable” means that you don’t need to activate the flow control function of the remote network device, as the flow control of that corresponding port on the switch will work anyway.

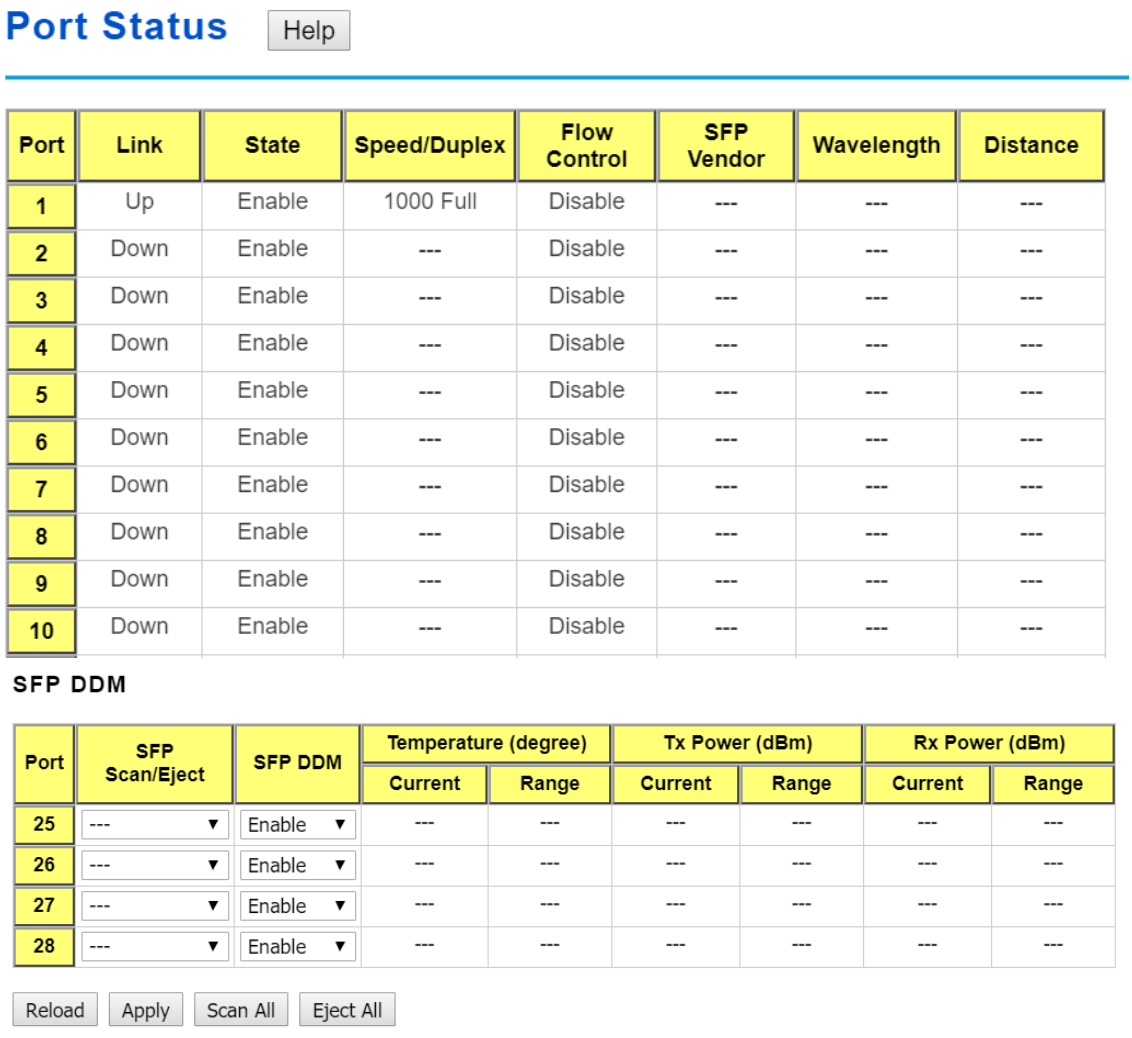
Once you finish configuring the settings, click on **Apply** to save the configuration.

Technical Tips: *If both ends are not at the same speed, they can’t link with each other. If both ends are not in the same duplex mode, they will be connected by half mode.*

4.3.2 Port Status

Port Status shows you current port status.

Figure 4.3.2.1 shows you the port status of the Gigabit Ethernet Ports, ex: Gigabit SFP Port 25, 26, 27 and 28. Also, it supports Small Form Factory (SFP) fiber transceiver with Digital Diagnostic Monitoring (DDM) function that provides real time information of SFP transceiver and allows user to diagnostic the optical fiber signal received and launched.



The description of the columns is as below:

Port: Port interface number.

Link: Link status. Up -> Link UP. Down -> Link Down.

State: Enable -> State is enabled. Disable -> The port is disable/shutdown.

Speed/Duplex: Current working status of the port.

Flow Control: The state of the flow control.

SFP Vendor: Vendor name of the SFP transceiver you plugged.

Wavelength: The wave length of the SFP transceiver you plugged.

Distance: The distance of the SFP transceiver you plugged.

Eject: Eject the DDM SFP transceiver. You can eject one port or eject all by click the icon "Eject All".

Temperature: The temperatu evice cfic and current detected of DDM SFP transceiver.

Tx Power (dBm): The specification and current transmit power of DDM SFP transceiver.

Rx Power (dBm): The specification and current received power of DDM SFP transceiver.

Note:
1. Most of the SFP transceivers provide vendor information which allows your switch to read it. The UI can display vendor name, wave length and distance of all Korenix SFP transceiver family. If you see Unknown info, it may mean that the vendor doesn't provide their information or that the information of their transceiver can't be read.
2. If the plugged DDM SFP transceiver is not certified by Korenix, the DDM function will not be supported. But the communication will not be disabled.

4.3.3 Rate Control

Rate limiting is a form of flow control used to enforce a strict bandwidth limit at a port. You can program separate transmit (Egress Rule) and receive (Ingress Rule) rate limits at each port, and even apply the limit to certain packet types as described below.

Figure shows you the Limit Rate of Ingress and Egress. You can type the volume step by 64Kbps in the blank.

Rate Control

Help

Port	Ingress Rule(Kbps)	Egress Rule(Kbps)
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0

4.3.4 Storm Control

The Storm Control is similar to Rate Control. Rate Control filters all the traffic over the threshold you input by UI. Storm Control allows user to define the Rate for specific Packet Types.

Storm Control

Help

Port	Broadcast	Rate(packet/sec)	DLF	Rate(packet/sec)	Multicast	Rate(packet/sec)
1	Disable	0	Disable	0	Disable	0
2	Disable	0	Disable	0	Disable	0
3	Disable	0	Disable	0	Disable	0
4	Disable	0	Disable	0	Disable	0
5	Disable	0	Disable	0	Disable	0
6	Disable	0	Disable	0	Disable	0
7	Disable	0	Disable	0	Disable	0
8	Disable	0	Disable	0	Disable	0
9	Disable	0	Disable	0	Disable	0
10	Disable	0	Disable	0	Disable	0

Packet type: You can assign the Rate for specific packet types based on packet number per second. The packet types of the Ingress Rule listed here include **Broadcast**, **DLF (Destination Lookup Failure) and Multicast**. Choose **Enable/Disable** to enable or

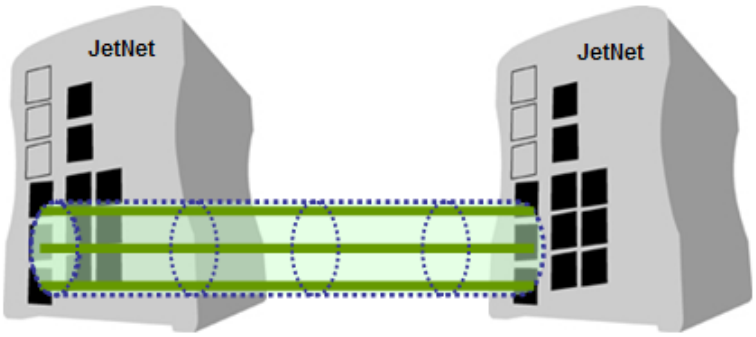
disable the storm control of specific port.

Rate: This column allows you to manually assign the limit rate of the port. The unit is packets per second. The limit range is from 1 to 262143 packet/sec, zero means no limit. The maximum available value of Fast Ethernet interface is 148810, this is the maximum packet number of the 100M throughput.

Enter the Rate field of the port you want assign, type the new value and click Enter key first. After assigned or changed the value for all the ports you want configure. Click on **Apply** to apply the configuration of all ports. The Apply command applied all the ports' storm control value, it may take some time and the web interface become slow, this is normal condition.

4.3.5 Port Trunking

Port Trunking configuration allows you to group multiple Ethernet ports in parallel to increase link bandwidth. The aggregated ports can be viewed as one physical port so that the bandwidth is higher than merely one single Ethernet port. The member ports of the same trunk group can balance the loading and backup for each other. Port Trunking feature is usually used when you need higher bandwidth for backbone network. This is an inexpensive way for you to transfer more data.

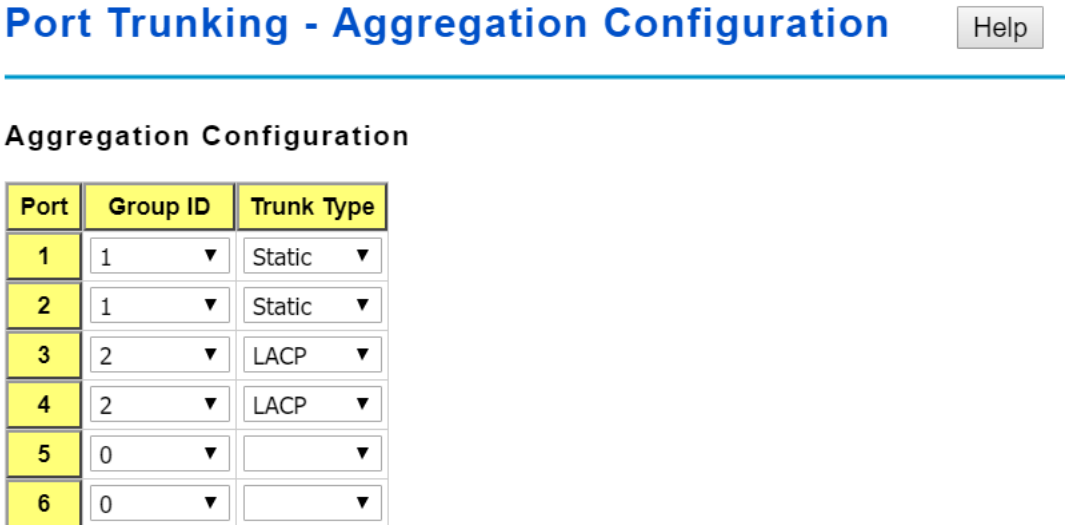


There are some different descriptions for the port trunking. Different manufacturers may use different descriptions for their products, like Link Aggregation Group (LAG), Link Aggregation Control Protocol, Ethernet Trunk, Ether Channel…etc. Most of the implementations now conform to IEEE standard, 802.3ad.

The aggregated ports can interconnect to the other switch which also supports Port Trunking. Korenix Supports 2 types of port trunking. One is Static Trunk, the other is 802.3ad. When the other end uses 802.3ad LACP, you **should** assign 802.3ad LACP to the trunk. When the other end uses non-802.3ad, you can then use Static Trunk.

There are 2 configuration pages, Aggregation Setting and Aggregation Status.

Aggregation Configuration

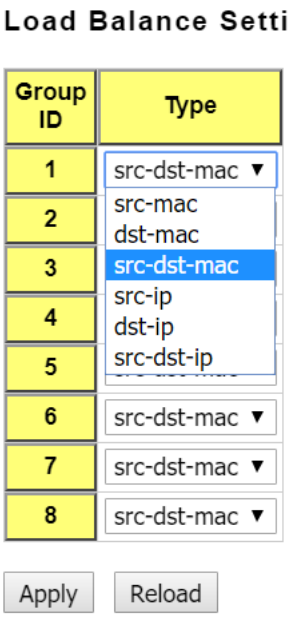


Trunk Size: The switch can support up to 8 trunk groups. Each trunk group can support up to 8 member ports. Since the member ports should use same speed/duplex, max groups for 100M ports would be 7, and 3 for gigabit ports.

Group ID: Group ID is the ID for the port trunking group. Ports with same group ID are in the same group.

Trunk Type: Static and **802.3ad LACP.** Each Trunk Group can only support Static or 802.3ad LACP. Choose the type you need here.

Load Balance Type: There are several load balance types based on dst-ip (Destination IP), dst-mac (Destination MAC), src-dst-ip (Source and Destination IP), src-dst-mac (Source and Destination MAC), src-ip (Source IP), src-mac (Source MAC).



Aggregation Information

This page shows the status of port aggregation. Once the aggregation ports are negotiated well, you will see following status.

Port Trunking - Aggregation Information

Help

Group ID	Type	Aggregated Ports	Individual Ports	Link Down Ports
1	N/A			
2	N/A			
3	N/A			
4	N/A			
5	N/A			
6	N/A			
7	N/A			
8	N/A			

Reload

Group ID: Display Trunk 1 to Trunk 8 set up in Aggregation Setting.

Type: Static or LACP set up in Aggregation Setting.

Aggregated Ports: When LACP links well, you can see the member ports in Aggregated column.

Individual Ports: When LACP is enabled, member ports of LACP group which are not connected to correct LACP member ports will be displayed in the Individual column.

Link Down Ports: When LACP is enabled, member ports of LACP group which are not linked up will be displayed in the Link Down column.

4.3.6 Command Lines for Port Configuration

Feature	Command Line
Port Control	
Port Control – State	Switch(config-if)# shutdown -> Disable port state Port1 Link Change to DOWN interface fastethernet1 is shutdown now. Switch(config-if)# no shutdown -> Enable port state Port1 Link Change to DOWN Port1 Link Change to UP interface fastethernet1 is up now. Switch(config-if)# Port1 Link Change to UP Switch(config)# sfp ddm Digital diagnostic and monitoring Switch(config)# sfp ddm Eject Reject DDM SFP Switch(config)# sfp ddm eject → eject SFP DDM transceiver

	all All DDM interface Example: Switch(config)# sfp ddm eject all DDM SFP on Port 9 normally ejected. DDM SFP on Port 9 normally ejected. All DDM SFP normally ejected. Switch(config)# interface gigabitethernet10 → eject port 10 SFP DDM transceiver. Switch(config-if)# sfp ddm eject DDM SFP on Port 10 normally ejected.
Port Control – Auto Negotiation	Switch(config)# interface fa1 Switch(config-if)# auto-negotiation Auto-negotiation of port 1 is enabled!
Port Control – Force Speed/Duplex	Switch(config-if)# speed 100 Port1 Link Change to DOWN set the speed mode ok! Switch(config-if)# Port1 Link Change to UP Switch(config-if)# duplex full Port1 Link Change to DOWN set the duplex mode ok! Switch(config-if)# Port1 Link Change to UP
Port Control – Flow Control	Switch(config-if)# flowcontrol on Flowcontrol on for port 1 set ok! Switch(config-if)# flowcontrol off Flowcontrol off for port 1 set ok!
Port Status	
Port Status	Switch# show interface fa1 Interface fastethernet1 Administrative Status : Enable Operating Status : Connected Duplex : Full Speed : 100 Flow Control :off Default Port VLAN ID: 1 Ingress Filtering : Disabled Acceptable Frame Type : All Port Security : Disabled Auto Negotiation : Disable Loopback Mode : None STP Status: forwarding Default CoS Value for untagged packets is 0. Mdix mode is Disable. Medium mode is Copper. Switch# show sfp ddm →show SFP DDM information Port 8 Temperature:N/A Tx power:N/A Rx power:N/A Port 9 Temperature:64.00 C <range :0.0-80.00> Tx power:-6.0 dBm <range : -9.0 - -4.0>

	Rx power:-30.0 dBm <range: -30.0 - -4.0> Port 10 Temperature:67.00 C <range :0.0-80.00> Tx power:-6.0 dBm <range : -9.0 - -4.0> Rx power:-2.0 dBm <range: -30.0 - -4.0> *Note: Administrative Status -> Port state of the port. Operating status -> Current status of the port. Duplex -> Duplex mode of the port. Speed -> Speed mode of the port. Flow control -> Flow Control status of the port.*
Rate Control	
Rate Control – Ingress or Egress	Switch(config-if)# rate-limit egress Outgoing packets ingress Incoming packets ***Note: To enable rate control, you should select the Ingress or Egress rule first; then assign the packet type and bandwidth.***
Rate Control – Filter Packet Type	Switch(config-if)# rate-limit ingress mode all Limit all frames broadcast Limit Broadcast frames flooded-unicast Limit Broadcast, Multicast and flooded unicast frames multicast Limit Broadcast and Multicast frames Switch(config-if)# rate-limit ingress mode broadcast Set the ingress limit mode broadcast ok.
Rate Control – Bandwidth	Switch(config-if)# rate-limit ingress bandwidth <0-100> Limit in magabits per second (0 is no limit) Switch(config-if)# rate-limit ingress bandwidth 8 Set the ingress rate limit 8Mbps for Port 1.
Storm Control	
Strom Control – Packet Type	Switch(config-if)# storm-control broadcast :Broadcast packets dlf :Destination Lookup Failure multicast :Multicast packets

Storm Contr–l - Rate	Switch(config)# storm-control broadcast
	<0-100000> Rate limit value 0~262143 packet/sec
	Switch(config)# storm-control broadcast 10000
	limit_rate = 10000 packets/sec
	Set rate limit for Broadcast packets.
	Switch(config)# storm-control multicast 10000
	limit_rate = 10000 packets/sec
	Set rate limit for Multicast packets.
	Switch(config)# storm-control dlf 10000
	limit_rate = 10000 packets/sec
	Set rate limit for Destination Lookup Failure packets.

Port Trunking	
LACP	Switch(config)# lacp group 1 gi8-10 Group 1 based on LACP(802.3ad) is enabled! *Note: The interface list is fa1,fa3-5,gi8-10*

	Note: different speed port can't be aggregated together.
Static Trunk	Switch(config)# trunk group 2 fa6-7 Trunk group 2 enable ok!
Display – LACP	etNet 7628X# show lacp internal LACP group 1 internal information: LACP Port Admin Oper Port Port Priority Key Key State ----- ----------- -------- -------- ------- 8 1 8 8 0x45 9 1 9 9 0x45 10 1 10 10 0x45 LACP group 2 is inactive LACP group 3 is inactive LACP group 4 is inactive
Display – Trunk	Switch# show trunk group 1 FLAGS: I -> Individual P -> In channel D -> Port Down Trunk Group GroupID Protocol Ports --------+---------+----------------------------------- 1 LACP 8(D) 9(D) 10(D) Switch# show trunk group 2 FLAGS: I -> Individual P -> In channel D -> Port Down Trunk Group GroupID Protocol Ports --------+---------+----------------------------------- 2 Static 6(D) 7(P) Switch#

4.4 Power over Ethernet

Power over Ethernet is one of the key features of *JetNet* 7628XP. It is fully IEEE802.3af-2003 compliant, and support IEEE802.3at, including 2-event and LLDP classification. *JetNet* 7628XP adopts up to 24-Port PoE injectors in port 1 to port 24.

The following commands are included in this section:

4.4.1 PoE Control

4.4.2 Emergency Power Management

4.4.3 PD Status Detection

4.4.4 PoE Scheduling

4.4.5 PoE Status

4.4.6 Command Line for PoE control

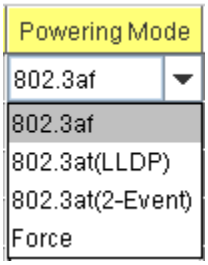
4.4.1 PoE Control

In WiMax systems, Wireless APs, and high-end PoE applications, there are various types of PDs, for instance, IEEE 802.3af, IEEE 802.3at 2-event, IEEE 802.3at LLDP, and

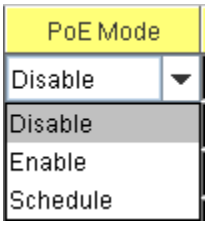
non-standard type. To be compatible with different PDs, *JetNet* 7628X series is the wo'ld' s first rackmountHigh Power PoE switch, designed with 4 powering modes, including IEEE 802.3af mode, IEEE 802.3at 2-event mode, IEEE 802.3at LLDP classification mode as well as forced powering mode to meet all of the PD types in the industry. As a result, they can be flexibly used to deliver power for different PoE-enabled devices in various applications.

IEEE 802.3at LLDP provides smart power budget control behavior to fulfill the needs of higher end setups requiring exact high power delivery. By using the ongoing dynamic re-negotiation function of the IEEE802.3at LLDP, the *JetNet* 7628X series can perform more intelligently by dynamically reallocating power to the PDs. *JetNet* 7628X series implements the 2-event and Link Layer Discovery Protocol (LLDP) PoE into the system for efficient power budget negotiation between PSE and PD devices.

Pull down the **Powering Mode** column can change the Powering Mode to IEEE 802.3af, 802.3at(LLDP), 802.3at(2-Event) or forced mode. When the column is IEEE 802.3af, if and only if the PD is follow IEEE 802.3af then *JetNet* 7628X series could deliver power. If the Powering mode is 802.3at(LLDP) or 802.3at(2-Event), *JetNet* 7628X series would deliver power to PD that supports IEEE 802.3at LLDP or 2-Evnet feature. But if the Powering Mode changes to forced mode, once the PoE mode is enabled, the port will directly deliver power even there is no Ethernet cable plugged. Please be careful when using forced mode.

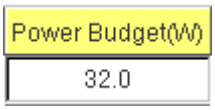


You can pull down the **PoE Mode** column to enable/disable ports, or set it to scheduling control mode.

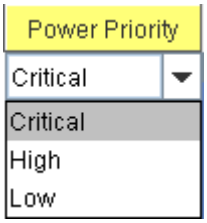


The Power Budget can limit the consumption of poe and ensure the poe port can get the

pre-allocatied power budget. The range of Power Budget is 0.4 to 32 Watt. The max effective power budget of 802.3af powering mode is 15.4 Watt even if the power budget is set to 32 Watts.



Power Priorty lets the poe port with higher priority can deplvery power under the limit power budget. There are three priorities (Critical, High and Low).



The following figure shows the Web UI interface for Power over Ethernet Control.

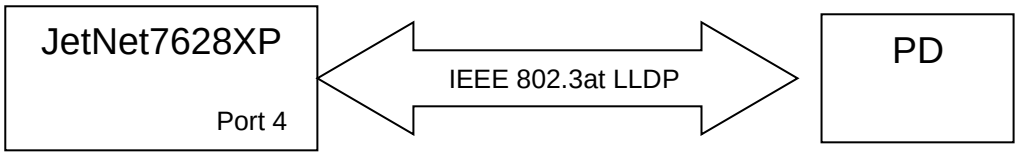
Port Configuration

Port	Mode	Powering Mode	Budget(W)	Priority
1	Enable	802.3at(2-Event)	32.0	Critical
2	Enable	802.3at(2-Event)	32.0	High
3	Disable	802.3af	32.0	Low
4	Enable	802.3at(2-Event)	32.0	Critical
5	Disable	802.3af	32.0	High
6	Disable	802.3at(LLDP)	32.0	Low
7	Disable	Forced	32.0	High
8	Disable	802.3at(2-Event)	32.0	High
9	Disable	802.3at(2-Event)	32.0	High
10	Disable	802.3at(2-Event)	32.0	High

After configuring, please click the **Apply** button to enable and perform the configurations.

DO NOT TOUCH DEVICE SURFACE DURING PoE PROGRESS HIGH POWER FEEDING

Next, we illustrate how to configure IEEE 802.3at LLDP. Assume the PD is ready to the configuration for IEEE 802.3at LLDP, we only need to confirm JetNet7628X configuration.

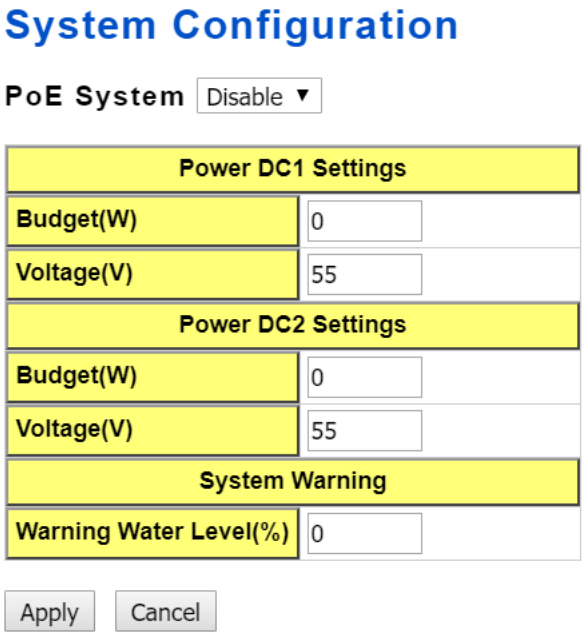


For JetNet7628XP, enable the LLDP (refer to 4.12.5). By the port of JetNet7628XP connected to the PD (ex. Port 4), set **PoE Mode** is **Enable** and **Powering Mode** is **802.3at(LLDP)**. When JetNet7628XP and the PD are ready to IEEE802.3at LLDP, IEEE 802.3at LLDP starts operation. Finally, see the result on **Poe Status** (refer to 4.4.5).

4.4.2 Emergency Power Management

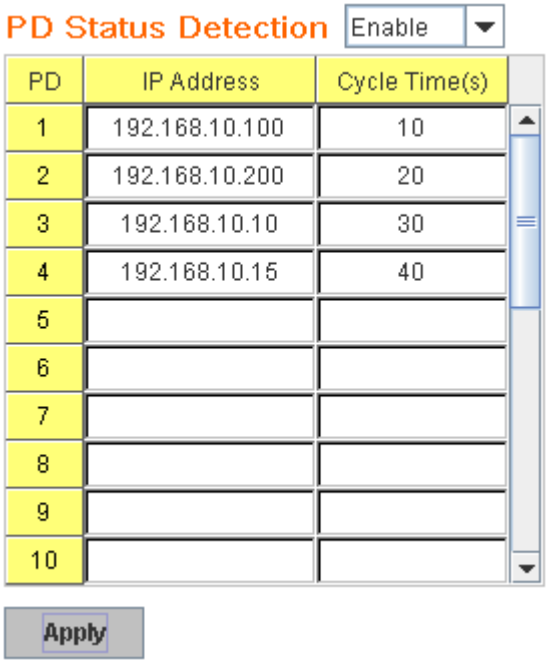
The *JetNet* 7628XP series is offered with dual power inputs for providing true network redundancy. An alarm relay output signals when a power input fails or other critical events occur. To ensure reliable power delivery, other advanced PoE power management features include individual port status monitoring, emergency power management (3 power supply indication inputs for quick shutdown of ports according to pre-defined priority table in cases where power supply failure occurs) and voltage/current monitoring and regulation. Power management allows the *JetNet* 7628XP to determine the exact power draw per port and to balance each port PoE power output accordingly. This, in turn, allows the switch to power higher and lower wattage devices according to user-definable parameters such as maximum available power, port priority (critical, high, low), and maximum allowable power per port. For the same level priority, the priority order is decided by port number.
You can configure the power budget and voltage of DC Power 1 and 2 by following Web GUI. The valid range of budget is 0 – 400 Watts (default is 0, and 0 mean power is disable). The valid range of power voltage is 46 - 57 V (default is 55 V). And the default power budget of inside AC power supply is 300 Watts and 53 V. Warning Water Level is used for power utiltization monitoring, (valid range is 0 – 100 %, and 0 mean function is disable) If

the power utilization using is more than this water level, the warning event will happen.



4.4.3 PD Status Detection

JetNet 7628XP delivers a useful function – PD Status Detection. This provides automatic detection of a remote device powered by *JetNet* 7628XP. If the remote system crashes or is unstable, *JetNet* 7628XP will perform a system reboot by turning off and on again to trigger the remote device. The following figure shows the Web configure interface for Power over Ethernet PD Status Detection.

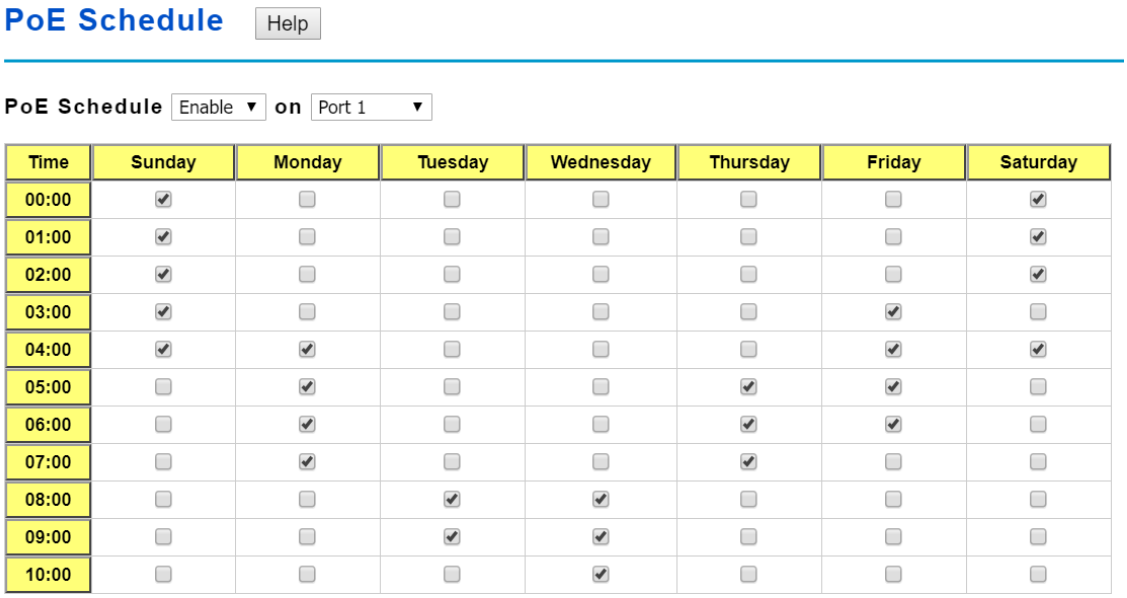


You can enable/disable PD Status Detection function and type in the IP address that you want to detect. The **Cycle Time** is the gap per detection.After configuring, please click the

Apply button to enable and perform the functions.

4.4.4 PoE Scheduling

The PoE Scheduling control is a powerful function to help you save power and money. You need to configure **PoE Scheduling** and select a target port manually to enable this function.



4.4.5 PoE Status

The PoE Status page shows the operating status of each power and each PoE Port. The power information includes power input voltage and budget, power aggregation and redundancy status, Total Power budget, Total Output Power, Warning Water Level and Utilization. The PoE Port information includes PoE mode, Operation status, PD class, Power Consumption, Voltage and Current.

Power aggregation: if the powers are in the same priority level (primary, secondary or tertiary), the powers will be aggregated. Use the same voltage power will become power aggregation.

Power redundancy: if the powers are in the different priority level, the secondary power will be backup power for primary. The tertiary power will be backup power for primary or secondary.

PoE Status

Help

AC Power	55 V, Budget 300 W
DC1 Power	55 V, Budget 0 W
DC2 Power	55 V, Budget 0 W
Power Available	AC
Total Power Budget	300 W
Total Output Power	0.0 W
Warning Water Level	---
Utilization	0 %
Event	Normal

Port	Mode	Status	Class	Budget(w)	Consumption(W)	Voltage(V)	Current(mA)
1	Disable	Off	---	---	0.0	0.0	0
2	Disable	Off	---	---	0.0	0.0	0
3	Disable	Off	---	---	0.0	0.0	0

4.4.6 Command Line for PoE control

Syntax	**show poe system**
Parameters	--
Command Mode	Enable mode
Description	Display the status of the PoE system.
Examples	Switch> enable Switch# show poe system PoE System PoE Admin : Enable PoE Hardward : Normal PoE Input Voltage : Vmain 1 : 52.8 V Vmain 2 : 53.0 V Vmain 3 : 52.5 V Ouput power : 0.0 Watts Temperature 1 : 39 degree Temperature 2 : 41 degree Temperature 3 : 47 degree Power information : Budget : DC Power 1 : 400 Watts (In Use) DC Power 2 : 400 Watts AC Power : 300 Watts (In Use) Total : 1100 Watts 700 Watts in Use Warning water level : N/A Utilization : 0 % Event : Normal

Syntax	**show poe interface** IFNAME
Parameters	IFNAME : interface name
Command Mode	Enable mode
Description	Display the PoE status of interface.
Examples	Switch> enable Switch# show poe interface fa1 Interface fastethernet1 (POE Port 1) Control Mode : User (Disable) Powering Mode : 802.3af Operation Status : Off Detection Status : Valid Classification : N/A Priority : Highest Output Power : 0.0 Watts, Voltage : 0.0 V, Current : 0 mA Power Budget : Budget : 32.0 Watts, effective 0 Watts Warning water level : N/A Utilization : 0 % Event : Normal
Syntax	**show poe pd_detect**
Parameters	--
Command Mode	Enable mode
Description	Display the status of pd status detection.
Examples	Switch# show poe pd-detect PD Status Detection Status : Enabled Host 1 : Target IP : 192.168.10.100 Cycle Time : 10 Host 2 : Target IP : 192.168.10.200 Cycle Time : 20 Host 3 : Target IP : 192.168.10.15 Cycle Time : 30 Host 4 : Target IP : 192.168.10.20 Cycle Time : 40
Syntax	**show poe schedule IFNAME**
Parameters	IFNAME : interface name
Command Mode	Enable mode
Description	Display the status of schedule of interface.
Examples	Switch# show poe schedule fa1 Interface fastethernet1 POE Schedule Status : Disable Weekly Schedule : Sunday : 0,1,2,3,4,5,6,7,8,19,20,21,22,23 Monday : 0,1,2,3,4,5,6,7,8,19,20,21,22,23 Tuesday : 0,1,2,3,4,5,6,7,8,19,20,21,22,23 Wednesday : 0,1,2,3,4,5,6,7,8,19,20,21,22,23

	Thursday : 0,1,2,3,4,5,6,7,8,19,20,21,22,23 Friday : 0,1,2,3,4,5,6,7,8,19,20,21,22,23 Saturday : 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
Syntax	**poe powering-mode 802.3af/forced**
Parameters	802.3af: deliver power if and only if the attached PD comply with IEEE 802.3af forced: deliver power no maater what PD attached
Command Mode	Interface mode
Description	Set the Powring mode of PoE
Examples	EX 1: *Set 802.3af powring mode* Switch(config)# poe powering-mode 802.3af EX 2: *Set forced powering mode* Switch(config)# poe powering-mode forced
Syntax	**poe powering-mode 802.3at 2-event/lldp**
Parameters	2-event: deliver power if and only if the attached PD comply with IEEE 802.3at physical layer classification lldp: deliver power if and only if the attached PD comply with IEEE 802.3at data link layer classification
Command Mode	Interface mode
Description	Set the Powring mode of PoE
Examples	EX 1: *Set 802.3at 2-event powring mode* Switch(config)# poe powering-mode 802.3at 2-event EX 2: *Set 802.3at lldpforced powering mode* Switch(config)# poe powering-mode 802.3at lldp
Syntax	**poe control-mode user/schedule**
Parameters	user: user mode schedule: schedule mode
Command Mode	Interface mode
Description	Set the control mode of port
Examples	Set PoE port 2 to user mode. E X 1: Switch(config)# interface fa2 Switch(config-if)# poe control-mode user Set PoE port 2 to schedule mode. EX 2: Switch(config-if)# poe control-mode schedule
Syntax	**poe user enable/disable**
Parameters	ena ble: enable port in user mode disa ble: disable port in user mode
Command Mode	Interface mode
Description	Enable/Disable the PoE of the port in user mode. If in schedule mode, it will come into affect when the control mode changes to user mode.
Examples	To enable the PoE function in user mode Switch(config-if)# poe user enable To disable the PoE function in user mode Switch(config-if)# poe user disable
Syntax	**poe type TYPE**
Parameters	T PE : port type string with max 20 characters

Command Mode	Interface mode
Description	Set the port type string.
Examples	Set the type string to “IPCam-1. Switch(config-if)# poe type IPCam-1
Syntax	**poe budget [POWER]**
Parameters	PO ER : 0.4 – 32
Command Mode	Interface mode
Description	Set the port budget. The max budget is different between 802.3af, 802,3at and forced powering mode. The max budget of 802.3af powering mode is 15.4. The max budget of 802.3at powering mode is 32. The max budget of force powering mode is 32.
Examples	Set the max value of power consumption to 12 W with manual mode. Switch(config-if)# poe budget 12
Syntax	**poe budget warning <0-100>**
Parameters	<0-100> 0 is disable, valid range is 1 to 100 percentage
Command Mode	Interface mode
Description	Set the warning water level of port budget.
Examples	Set the warning water level to 60% Switch(config-if)# poe budget warning 60
Syntax	**poe priority critical/high/low**
Parameters	Critical : Hightest priority level High : High priority level Low : Low priority level
Command Mode	Interface mode
Description	Set the powering priority. The port with higher priority will have the privilege to delivery power under limited power situation.
Examples	Set the priority to critical Switch(config-if)# poe priority critical
Syntax	**poe schedule weekday hour**
Parameters	Weekday : Valid range 0-6 (0=Sunday, 1=Monday, …, 6=Saturday) Hour : Valid range 0-23, Valid format a,b,c-d
Command Mode	Interface mode
Description	Add a day schedule to an interface.
Examples	Add a schedule which enables PoE function at hour 1, 3, 5 and 10 to 23 on Sunday. Switch(config-if)# poe schedule 0 1,3,5,10-23
Syntax	**no poe schedule** weekday
Parameters	Weekday : Valid range 0-6 (0=Sunday, 1=Monday, …, 6=Saturday)
Command Mode	Interface mode
Description	Remove a day schedule
Examples	Remove the Sunday schedule. Switch(config-if)# no poe schedule 0

Syntax	**poe budget DC1/DC2 [POWER]**
Parameters	DC1 : DC 1 power input DC2 : DC 2 power input PO ER : 1 – 400
Command Mode	Configuration mode
Description	Set the power budget of DC1 or DC2
Examples	Set the power budget of DC1 to 400W Switch(config)# poe budget DC1 400
Syntax	**poe budget warning <0-100>**
Parameters	<0-100> 0 is disable, valid range is 1 to 100 percentage
Command Mode	Configuration mode
Description	Set the warning water level of total power budget.
Examples	Set the warning water level to 60% Switch(config-if)# poe budget warning 60
Syntax	**poe pd_detect enable/disable**
Parameters	enable: enable PD Status Detection function disable: disable PD Status Detection function
Command Mode	Configuration mode
Description	Enable/Disable the PD Status Detection function
Examples	To enable the function of pd status detect function Switch(config)# poe pd_detect enable To disable the function of pd status detect function Switch(configf)# poe pd_detect disable
Syntax	**poe pd_detect ip_address cycle_time**
Parameters	IP address : A.B.C.D Cycle time : Valid range 10-3600 second and must be multiple of 10
Command Mode	Configuration mode
Description	Apply a rule of PD Status Detection.
Examples	Apply a rule which ping 192.160.1.2 per 20 seconds. And if 192.160.1.2 is timeout, pd status detection will re-enable the PoE. Switch(config)# poe pd_detect 192.160.1.2 20

4.5 Network Redundancy

It is critical for industrial applications that network remains non-stop. Korenix develops multiple kinds of standard (STP, RSTP and MSTP) and Korenix patterned redundancy protocol, Multiple Super Ring to remain the network redundancy can be protected well by Korenix switch.

The JetNet 7628X supports advanced Multiple Spanning Tree Protocol (MSTP). This protocol is a direct extension of RSTP. It can provide an independent spanning tree for different VLANs. It simplifies network management, provides for even faster convergence than RSTP by limiting the size of each region, and prevents VLAN members from being segmented from the rest of the group (as sometimes occurs with IEEE 802.1D STP).

Multiple Super Ring (MSR) technology is *Korenix's* 3rd generation Ring redundancy technology. This is patented and protected by *Korenix* and is used in countries all over the world. MSR ranks the fastest restore and failover time in the world, 0 ms for restore and about 5 milliseconds for failover for copper.

The single Korenix switch can aggregate multiple Rings within one switch. All the ports can be configured as the ring port of a ring, each ring has its own Ring ID and the Ring ID will be added to the watchdog packet to monitor the ring status. This is Korenix Patterned MultiRing Technology.

The Ring ports can be LACP/Port Trunking ports, after aggregated ports to a group, the group of ports can act as the Ring port of the Ring. This is Korenix Pattened TrunkRing Technology.

Advanced Rapid Dual Homing(RDH) technology also facilitates *JetNet switch* to connect with a core managed switch easily and conveniently. With RDH technology, you can also couple several Rapid Super Rings or RSTP cloud together.

Following commands are included in this group:

4.5.1 STP Configuration

4.5.2 STP Port Configuration

4.5.3 STP Information

4.5.4 MSTP Configuration

4.5.5 MSTP Port Configuration

4.5.6 MSTP information

4.5.7 Multiple Super Ring

4.5.8 Multiple Super Ring Information

4.5.9 Command Lines for Network Redundancy

The STP Configuraiton, STP Port Configuration and STP Information pages are available while select the STP and RSTP mode.

The MSTP Configuraiton, MSTP Port Configuration and MSTP Information pages are available while select the MSTP mode.

The Multiple Super Ring and Multiple Super Ring Information are available while select the MSR mode.

4.5.1 STP Configuration

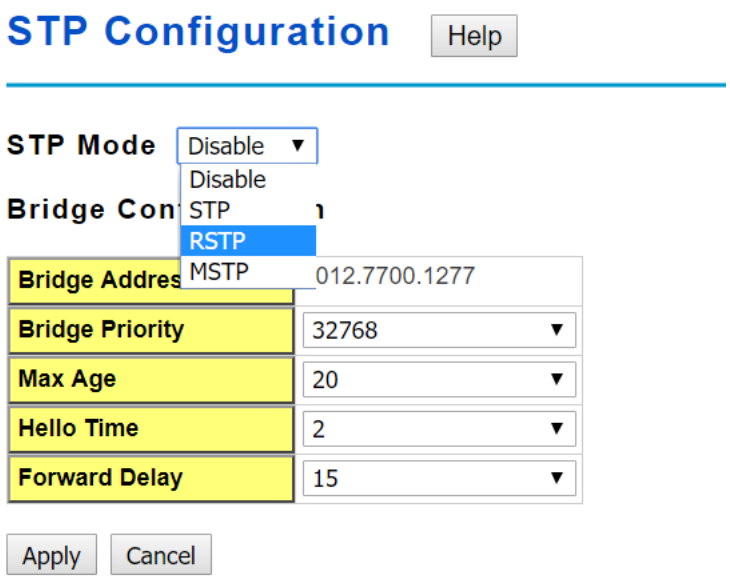
This page allows select the STP mode and configuring the global STP/RSTP Bridge Configuration.

The STP mode includes the **STP**, **RSTP**, **MSTP** and **Disable**. Please select the STP mode for your system first. The default mode is RSTP enabled.

After select the STP or RSTP mode, continue to configure the global Bridge parameters for STP and RSTP.

After select the MSTP mode, please go to MSTP Configuration page.

Figure 4.4.1.1 show the web page which allows you to select the STP mode, configure the global STP/RSTP/MSTP settings.



RSTP (Refer to the 4.4.1 of previous version manual.)

RSTP is the abbreviation of Rapid Spanning Tree Protocol. If a switch has more than one path to a destination, it will lead to message loops that can generate broadcast storms and quickly bog down a network. The spanning tree was created to combat the negative effects of message loops in switched networks. A spanning tree uses a spanning tree algorithm (STA) to automatically sense whether a switch has more than one way to communicate with a node. It will then select the best path (primary), and block the other path(s). It will also keep track of the blocked path(s) in case the primary path fails. Spanning Tree Protocol (STP) introduced a standard method to accomplish this. It is specified in IEEE 802.1D-1998. Later, Rapid Spanning Tree Protocol (RSTP) was adopted and represents the evolution of STP, providing much faster spanning tree convergence after a topology change. This is specified in IEEE 802.1w. In 2004, 802.1w is included into 802.1D-2004 version. This switch supports both RSTP and STP (all switches that support RSTP are also backward compatible with switches that support only STP).

Bridge Configuration

Priority (0-61440): RSTP uses bridge ID to determine the root bridge, the bridge with the highest bridge ID becomes the root bridge. The bridge ID is composed of bridge priority and bridge MAC address. So that the bridge with the highest priority becomes the highest

bridge ID. If all the bridge ID has the same priority, the bridge with the lowest MAC address will then become the root bridge.

Note: The bridge priority value must be in multiples of 4096. A device with a lower number has a higher bridge priority. Ex: 4096 is higher than 32768.

Note: The Web GUI allows user select the priority number directly. This is the convinent of the GUI design. When you configure the value through the CLI or SNMP, you may need to type the value directly. Please follow the n x 4096 ruls for the Bridge Priority.

Max Age (6-40): Enter a value from 6 to 40 seconds here. This value represents the time that a bridge will wait without receiving Spanning Tree Protocol configuration messages before attempting to reconfigure.

If JetNet is not the root bridge, and if it has not received a hello message from the root bridge in an amount of time equal to Max Age, then JetNet will reconfigure itself as a root bridge. Once two or more devices on the network are recognized as a root bridge, the devices will renegotiate to set up a new spanning tree topology.

The MAX Age value affects the maximum volume of the RSTP loop. In the RSTP BPDU packet, there is one field, message age which start from 0, add 1 after passed one hop in the RSTP loop. When the message age is larger than MAX Age, the BPDU would be ignored and the lower switches are separated to different RSTP domain. The switches in other RSTP domain can't be managed through upper switch.

Since different RSTP aware switches may have their own mechanism to calculate the message age. So that this is most possibly occurred when interoperate different vendors' RSTP aware switches together. The maximum volume of the Korenix RSTP domain is 23, configure the MAX Age lower than 23 is recommended.

Hello Time (1-10): Enter a value from 1 to 10 seconds here. This is a periodic timer that drives the switch to send out BPDU (Bridge Protocol Data Unit) packet to check current STP status.

The root bridge of the spanning tree topology periodically sends out a "hello" message to other devices on the network to check if the topology is "healthy". The "hello time" is the amount of time the root has waited during sending hello messages.

Forward Delay Time (4-30): Enter a value between 4 and 30 seconds. This value is the time that a port waits before changing from Spanning Tree Protocol learning and listening states to forwarding state.

This is the amount of time JetNet will wait before checking to see if it should be changed to a different state.

Once you have completed your configuration, click on **Apply** to apply your settings.

Note: You must observe the following rule to configure Hello Time, Forwarding Delay, and Max Age parameters.

2 × (Forward Delay Time – 1 sec) ≥ Max Age Time ≥ 2 × (Hello Time value + 1 sec)

4.5.2 STP Port Configuration

This page allows you to configure the port parameter after enabled STP or RSTP.

Port Configuration

Select the port you want to configure and you will be able to view current settings and status of the port.

Path Cost: Enter a number between 1 and 200,000,000. This value represents the "cost" of the path to the other bridge from the transmitting bridge at the specified port.

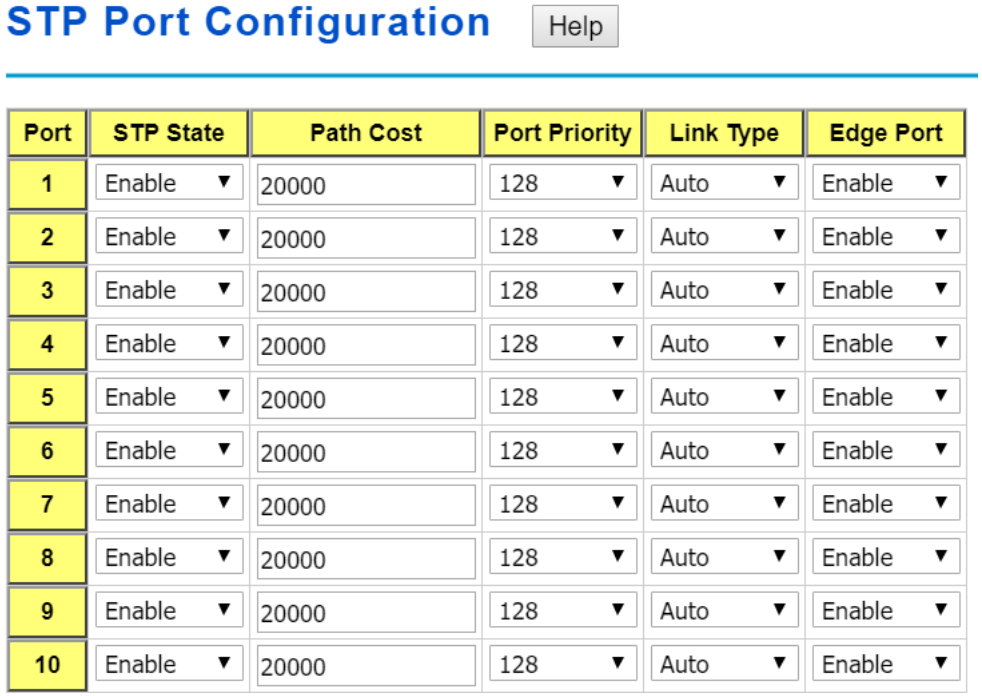
Priority: Enter a value between 0 and 240, using multiples of 16. This is the value that

decides which port should be blocked by priority in a LAN.

Link Type: There are 3 types for you select. **Auto, P2P** and **Share.**

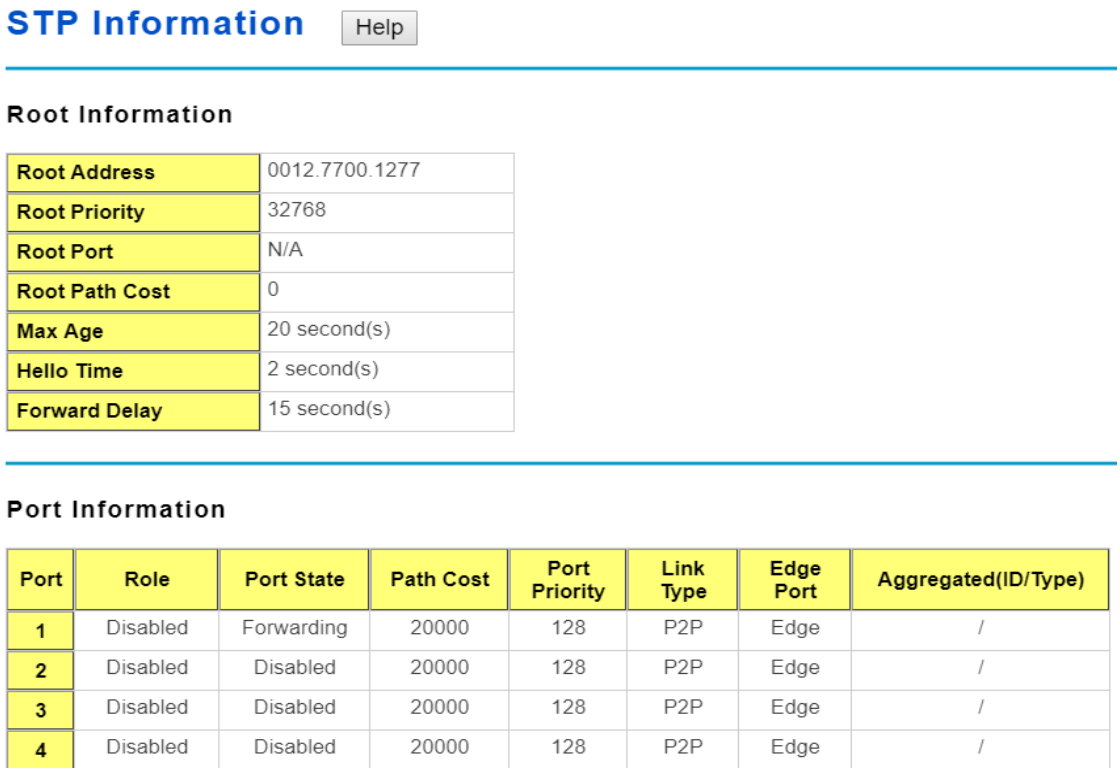
Some of the rapid state transitions that are possible within RSTP depend upon whether the port of concern can only be connected to another bridge (i.e. it is served by a point-to-point LAN segment), or if it can be connected to two or more bridges (i.e. it is served by a shared-medium LAN segment). This function allows link status of the link to be manipulated administratively. "**Auto**" means to auto select P2P or Share mode. "**P2P"** means P2P is enabled, the 2 ends work in Full duplex mode. While "**Share"** is enabled, it means P2P is disabled, the 2 ends may connect through a share media and work in Half duplex mode.

Edge Port: A port directly connected to the end stations cannot create a bridging loop in the network. To configure this port as an edge port, set the port to the **Enable** state. When the non-bridge device connects an admin edge port, this port will be in blocking state and turn to forwarding state in 4 seconds.



Once you finish your configuration, click on **Apply** to save your settings.

4.5.3 STP Information



Root Information: You can see root Bridge ID, Root Priority, Root Port, Root Path Cost and the Max Age, Hello Time and Forward Delay of BPDU sent from the root switch.

Port Information: You can see port Role, Port State, Path Cost, Port Priority, Oper P2P mode, Oper edge port mode and Aggregated(ID/Type).

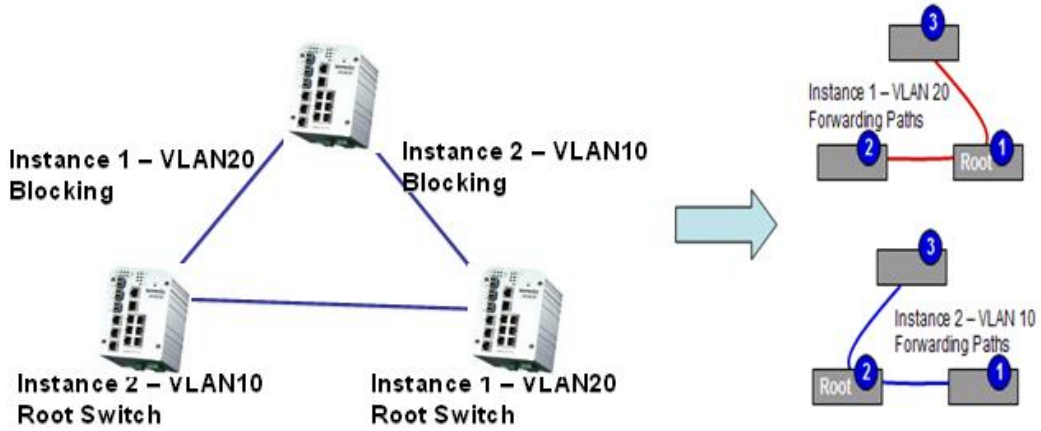
4.5.4 MSTP (Multiple Spanning Tree Protocol) Configuration

MSTP is the abbreviation of Multiple Spanning Tree Protocol. This protocol is a direct extension of RSTP. It can provide an independent spanning tree for different VLANs. It simplifies network management, provides for even faster convergence than RSTP by limiting the size of each region, and prevents VLAN members from being segmented from the rest of the group (as sometimes occurs with IEEE 802.1D STP).

While using MSTP, there are some new concepts of network architecture. A switch may belong to different groups, act as root or designate switch, generate BPDU for the network to maintain the forwarding table of the spanning tree. With MSTP can also provide multiple forwarding paths and enable load balancing. Understand the architecture allows you to maintain the correct spanning tree and operate effectively.

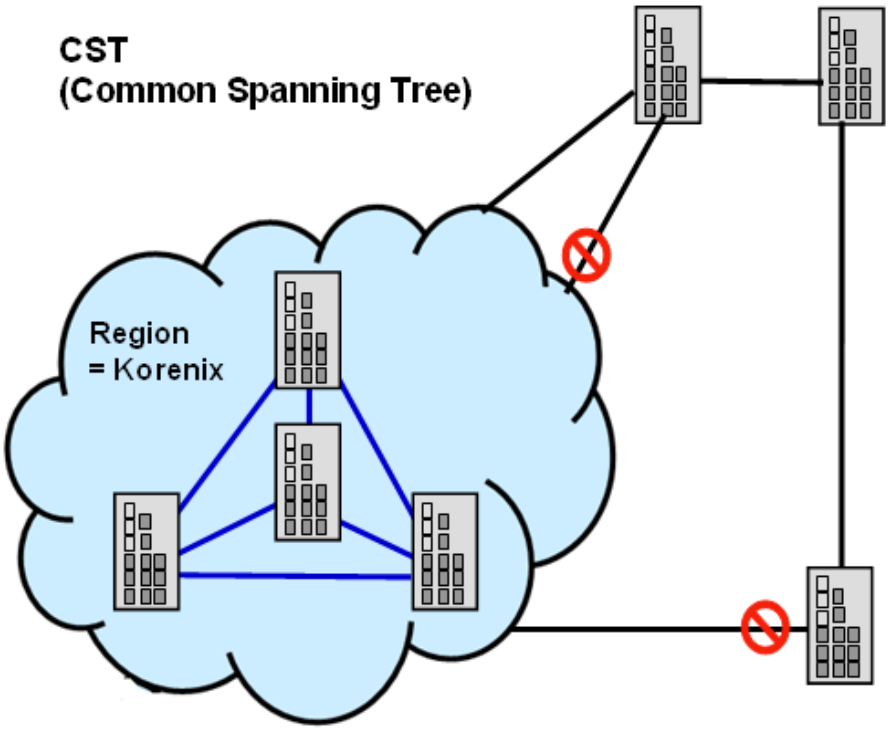
One VLAN can be mapped to a Multiple Spanning Tree Instance (MSTI). For example, the maximum Instance JetNet supports is usually 16, range from 0-15. The MSTP builds a separate Multiple Spanning Tree (MST) for each instance to maintain connectivity among each of the assigned VLAN groups. An Internal Spanning Tree (IST) is used to connect all the MSTP switches within an MST region. An MST Region may contain multiple MSTP Instances.

The figure shows there are 2 VLANs/MSTP Instances and each instance has its Root and forwarding paths.

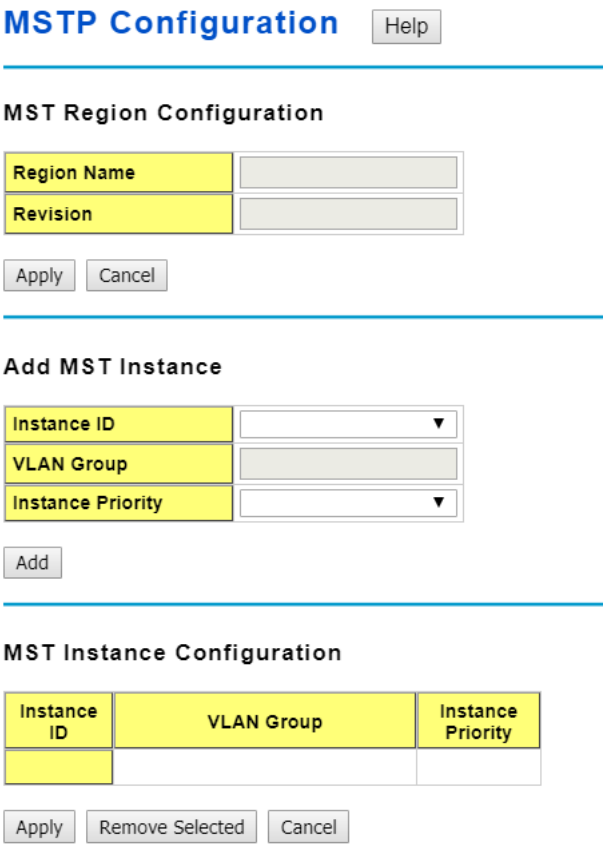


A Common Spanning Tree (CST) interconnects all adjuacent MST regions and acts as a virtual bridge node for communications with STP or RSTP nodes in the global network. MSTP connects all bridges and LAN segments with a single Common and Internal Spanning Tree (CIST). The CIST is formed as a result of the running spanning tree algorithm between switches that support the STP, RSTP, MSTP protocols.

The figure shows the CST large network. In this network, a Region may has different instances and its own forwarding path and table, however, it acts as a single Brige of CST.



To configure the MSTP setting, the STP Mode of the STP Configuration page should be changed to MSTP mode first.



After enabled MSTP mode, then you can go to the MSTP Configuraiton pages.

MSTP Region Configuration

This page allows configure the Region Name and its Revision, mapping the VLAN to Instance and check current MST Instance configuration. The network can be divided virtually to different Regions. The switches within the Region should have the same Region and Revision leve.

Region Name: The name for the Region. Maximum length: 32 characters.

Revision: The revision for the Region. Range: 0-65535; Default: 0)

Once you finish your configuration, click on **Apply** to apply your settings.

New MST Instance

This page allows mapping the VLAN to Instance and assign priority to the instance. Before mapping VLAN to Instance, you should create VLAN and assign the member ports first. Please refer to the VLAN setting page.

Instance ID: Select the Instance ID, the available number is 1-15.

VLAN Group: Type the VLAN ID you want mapping to the instance.

Instance Priority: Assign the priority to the instance.

After finish your configuration, click on **Add** to apply your settings.

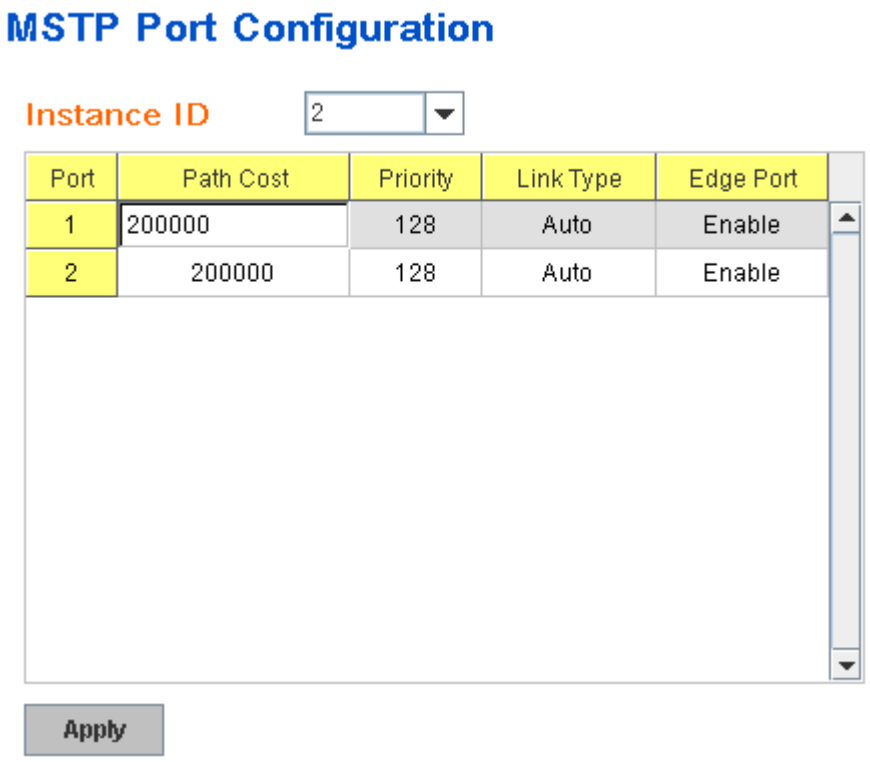
MST Instance Configuration

This page allows you to see the current MST Instance Configuration you added. Click on "**Apply**" to apply the setting. You can "**Remove"** the instance or "**Reload**" the configuration display in this page.

4.5.5 MSTP Port Configuration

This page allows configure the Port settings. Choose the Instance ID you want to configure. The MSTP enabled and linked up ports within the instance will be listed in this table.

Note that the ports not belonged to the Instance, or the ports not MSTP activated will not display. The meaning of the Path Cost, Priority, Link Type and Edge Port is the same as the definition of RSTP.



Path Cost: Enter a number between 1 and 200,000,000. This value represents the "cost" of the path to the other bridge from the transmitting bridge at the specified port.

Priority: Enter a value between 0 and 240, using multiples of 16. This is the value that decides which port should be blocked by priority in a LAN.

Link Type: There are 3 types for you select. **Auto, P2P** and **Share.**

Some of the rapid state transitions that are possible within RSTP depend upon whether the port of concern can only be connected to another bridge (i.e. it is served by a point-to-point LAN segment), or if it can be connected to two or more bridges (i.e. it is served by a shared-medium LAN segment). This function allows link status of the link to be manipulated administratively. "**Auto**" means to auto select P2P or Share mode. "**P2P"** means P2P is enabled, the 2 ends work in Full duplex mode. While "**Share"** is enabled, it means P2P is disabled, the 2 ends may connect through a share media and work in Half duplex mode.

Edge: A port directly connected to the end stations cannot create a bridging loop in the network. To configure this port as an edge port, set the port to the **Enable** state. When the non-bridge device connects an admin edge port, this port will be in blocking state and turn

to forwarding state in 4 seconds.

Once you finish your configuration, click on **Apply** to save your settings.

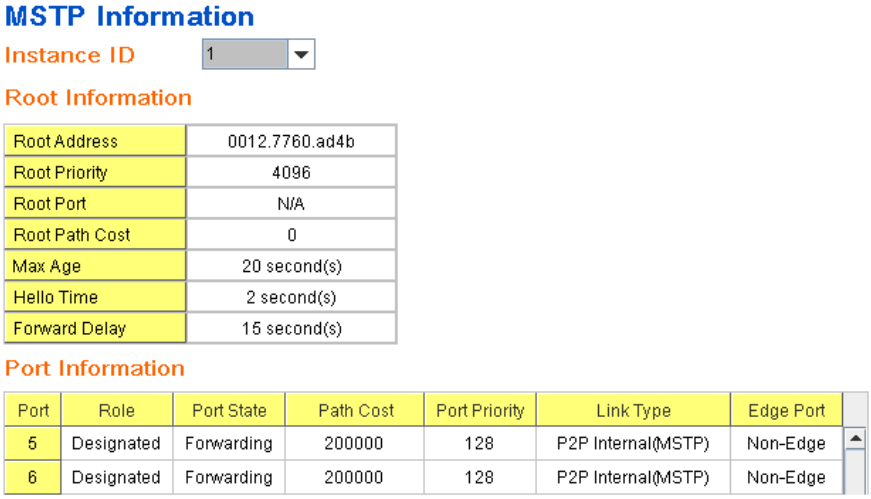
4.5.6 MSTP Information

This page allows you to see the current MSTP information.

Choose the **Instance ID** first. If the instance is not added, the information remains blank.

The **Root Information** shows the setting of the Root switch.

The **Port Information** shows the port setting and status of the ports within the instance.



Click on "**Reload**" to reload the MSTP information display.

4.5.7 Multiple Super Ring (MSR)

The most common industrial network redundancy is to form a ring or loop. Typically, the managed switches are connected in series and the last switch is connected back to the first one. In such connection, you can implement Korenix Multiple Super Ring technology to get fastest recovery performance.

Multiple Super Ring (MSR) technology is *Korenix's* 3rd generation Ring redundancy technology. This is patented and protected by *Korenix* and is used in countries all over the world. MSR ranks the fastest restore and failover time in the world, 0 ms for restore and about milliseconds level for failover for 100Base-TX copper port. The other interface may take longer time due to the media characteristics.

Advanced **Rapid Dual Homing (RDH)** technology also facilitates *JetNet Managed Switch* to connect with a core managed switch easily and conveniently. With RDH technology, you can also couple several Rapid Super Rings or RSTP cloud together, which is also known as Auto Ring Coupling.

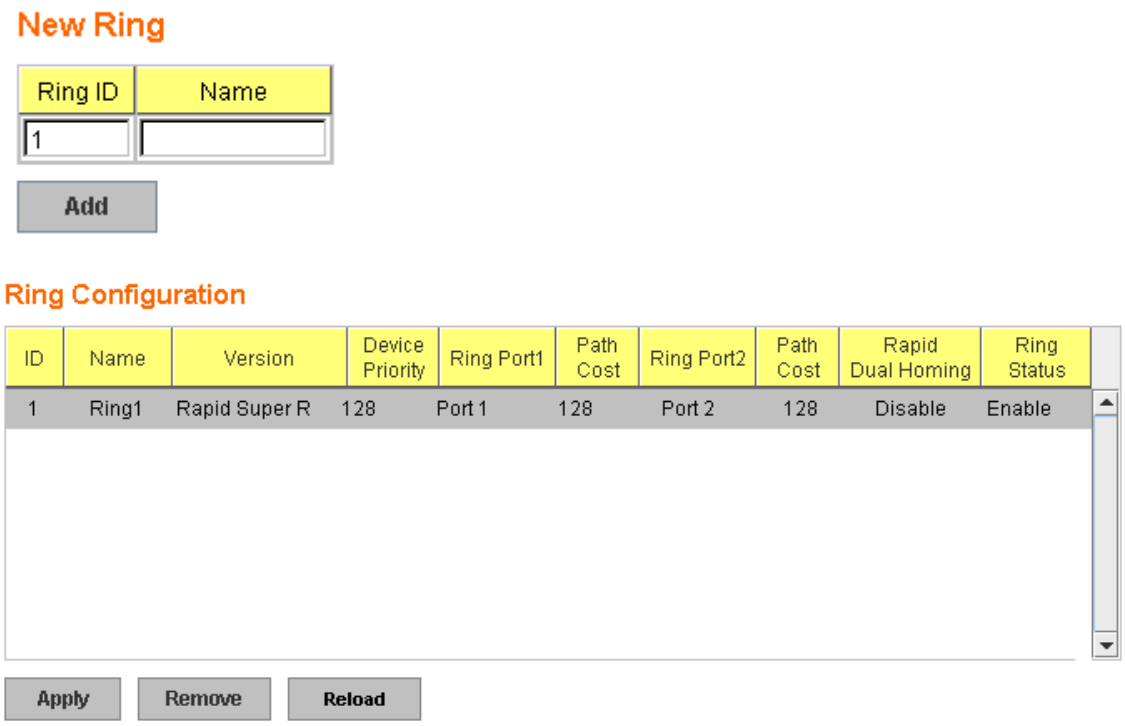
TrunkRing technology allows integrate MSR with LACP/Port Trunking. The LACP/Trunk aggregated ports is a virtual interface and it can work as the Ring port of the MSR.

MultiRing is an outstanding technology Korenix can support. Multiple rings can be aggregated within one switch by using different Ring ID. The maximum Ring number one switch can support is half of total port volume. For example, the JetNet 7628X is a 24 Fast Ethernet + 4 Gigabit port design, that means maximum 14 Rings (12 x 100M Rings and 2

Gigabit Rings) can be aggregated to one JetNet 7628X. The feature saves much effort when constructing complex network architecture.

To become backwards compatible with the Legacy Super Ring technology implemented in *JetNet 4008/4508* V1 series switches, *JetNet 4510/4518/5000 Series* also supports Super Ring Client mode. The Super Ring ports can pass through Super Ring control packets extremely well and works with Super Ring.

New Ring: To create a Rapid Super Ring. Just fill in the Ring ID which has range from 0 to 31. If the name field is left blank, the name of this ring will automatically naming with Ring ID.



Ring Configuration

ID: Once a Ring is created, This appears and can not be changed.

Name: This field will show the name of the Ring. If it is not filled in when creating, it will be automatically named by the rule “RingID”.

Version: The version of Ring can be changed here. There are three modes to choose: Rapid Super Ring as default; Super ring for compatible with Korenix 1st general ring and Any Ring for compatible with other version of rings.

Device Priority: The switch with highest priority (highest value) will be automatically selected as Ring Master. Then one of the ring ports in this switch will become forwarding port and the other one will become blocking port. If all of the switches have the same priority, the switch with the biggest MAC address will be selected as Ring Master.

Ring Port1: In Rapid Super Ring environment, you should have 2 Ring Ports. No matter this switch is Ring Master or not, when configuring RSR, 2 ports should be selected to be Ring Ports. For Ring Master, one of the ring ports will become the forwarding port and the other one will become the blocking port.

Path Cost: Change the Path Cost of Ring Port1. If this switch is the Ring Master of a Ring, then it determines the blocking port. The Port with higher Path Cost in the two ring Port will become the blocking port, If the Path Cost is the same, the port with larger port number will become the blocking port.

Ring Port2: Assign another port for ring connection

Path Cost: Change the Path Cost of Ring Port2

Rapid Dual Homing: Rapid Dual Homing is an important feature of Korenix 3rd generation Ring redundancy technology. When you want to connect multiple RSR or form redundant topology with other vendors,RDH could allow you to have maximum 7 multiple links for redundancy without any problem.

In Dual Homing I released with JetNet 4000/4500 series, you have to configure additional port as Dual Homing port to two uplink switches. In Rapid Dual Homing, you don't need to configure specific port to connect to other protocol. The Rapid Dual Homing will smartly choose the fastest link for primary link and block all the other link to avoid loop. If the primary link failed, Rapid Dual Homing will automatically forward the secondary link for network redundant. Of course, if there are more connections, they will be standby links and recover one of then if both primary and secondary links are broken.

Ring status: To enable/disable the Ring. Please remember to enable the ring after you add it.

MultiRing: The MultiRing technology is one of the pattern of the MSR technology, the technology allows you to aggregate multiple rings within one switch. Create multiple ring ID and assign different ring port 1 and port 2 to each ring, thus the switch can have multiple rings in one JetNet 7628X.

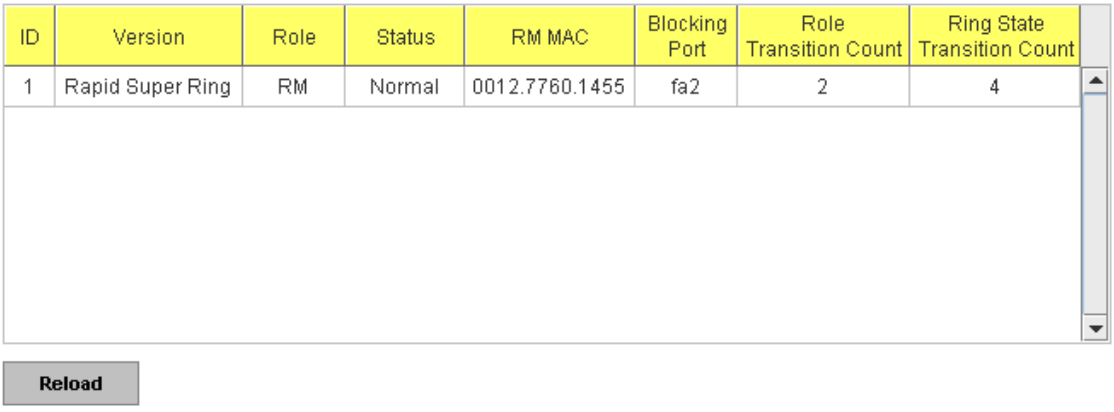
When implementing MultiRing, remember that the different rings can NOT use the same ring ID. The other settings are the same as above description. Technically, the maximum ring volume the MultiRing supported is up to 16 rings. Due to the port volume limitation, the mximum value is half of the port volume of a switch.

TrunkRing: The MultiRing technology is part of the MSR technology which combines the MSR with the port trunking technology. After multiple ports aggregated, this is so-call port trunking (Static or learnt by LACP protocol), the Trunk ID can be one of the port ID of the MSR technology. Configured the port trunking first then you can add the Trunk group as a Ring Port in managed switch.

4.5.8 Mutiple Super Ring Information

This page shows the MSR information.

Multiple Super Ring Information



ID	Version	Role	Status	RM MAC	Blocking Port	Role Transition Count	Ring State Transition Count
1	Rapid Super Ring	RM	Normal	0012.7760.1455	fa2	2	4

Reload

ID: Ring ID.

Version: which version of this ring, this field could be Rapid Super Ring, Super Ring, or Any Ring

Role: This Switch is RM or nonRM

Status: If this field is Normal which means the redundancy is approved. If any one of the link in this Ring is broken, then the status will be Abnormal.

RM MAC: The MAC address of Ring Master of this Ring. It helps to find the redundant path.

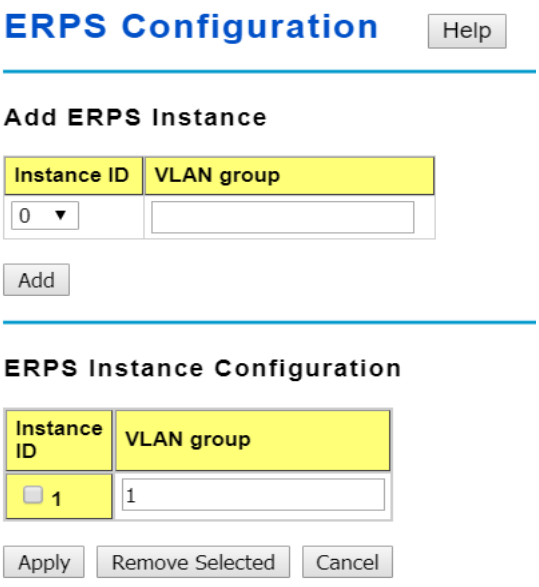
Blocking Port: This field shows which is blocked port of RM.

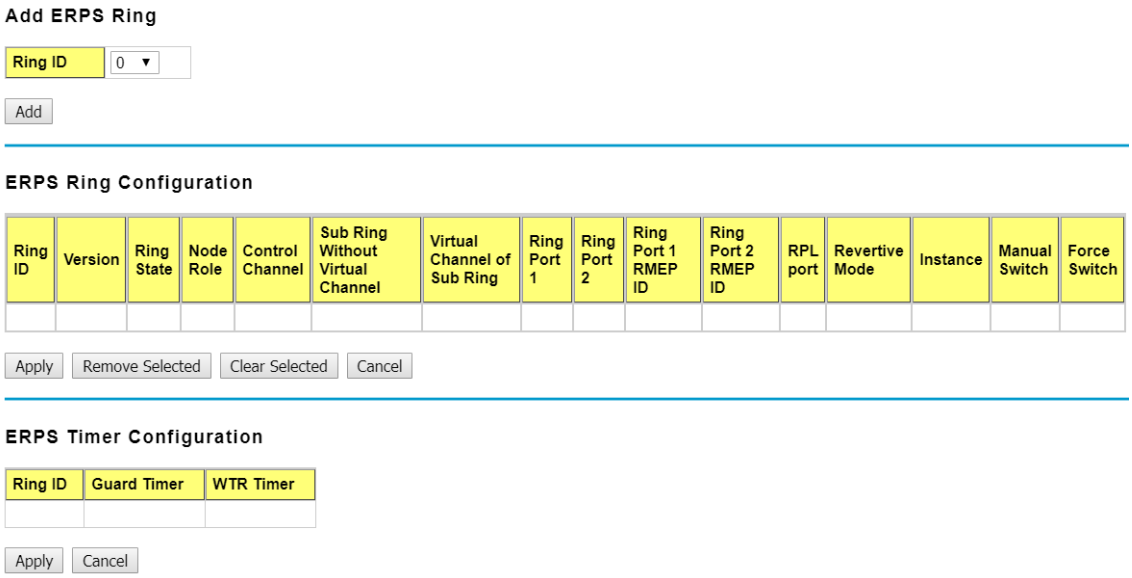
Role Transition Count: This means how many times this switch has changed its Role from nonRM to RM or from RM to nonRM.

Role state Transition Count: This number means how many times the Ring status has been transformed between Normal and Abnormal state.

4.5.9 ERPS Configuration:

Ethernet Ring Protection Switching, or ERPS, is an effort at ITU-T under G.8032 Recommendation to provide sub-50ms protection and recovery switching for Ethernet traffic in a ring topology and at the same time ensuring that there are no loops formed at the Ethernet layer.





ERPS: Enable or disable ERPS function.

ERPS Configuration:

Version: ERPS has version 1 and 2. Now we just support ERPSv1

Node State: The current state of the node, Idle and Protection.

Node Role: The role of the node, RPL owner and Ring node. The RPL owner is an Ethernet ring node adjacent to the RPL.

Control Channel: Control Channel provide a communication channel for ring automatic protection switching (R-APS) information.

Ring Port: A ring link is bounded by two adjacent nodes and a port for a ring link is called a ring port.

RPL Port: The ring protection link (RPL) is the ring link which under normal conditions, i.e., without any failure or request, is blocked for traffic channel, to prevent the formation of loops.

4.5.10 Command Lines:

Feature	Command Line
Global (STP, RSTP, MSTP)	
Enable	Switch(config)# spanning-tree enable
Disable	Switch (config)# spanning-tree disable
Mode (Choose the Spanning Tree mode)	Switch(config)# spanning-tree mode rst the rapid spanning-tree protocol (802.1w) stp the spanning-tree prtotcol (802.1d) mst the multiple spanning-tree protocol (802.1s)
Bridge Priority	Switch(config)# spanning-tree priority <0-61440> valid range is 0 to 61440 in multiple of 4096 Switch(config)# spanning-tree priority 4096
Bridge Times	Switch(config)# spanning-tree bridge-times (forward Delay) (max-age) (Hello Time)

	Switch(config)# spanning-tree bridge-times 15 20 2 This command allows you configure all the timing in one time.
Forward Delay	Switch(config)# spanning-tree forward-time <4-30> Valid range is 4~30 seconds Switch(config)# spanning-tree forward-time 15
Max Age	Switch(config)# spanning-tree max-age <6-40> Valid range is 6~40 seconds Switch(config)# spanning-tree max-age 20
Hello Time	Switch(config)# spanning-tree hello-time <1-10> Valid range is 1~10 seconds Switch(config)# spanning-tree hello-time 2
MSTP	
Enter the MSTP Configuration Tree	Switch(config)# spanning-tree mst MSTMAP the mst instance number or range configuration enter mst configuration mode forward-time the forward dleay time hello-time the hello time max-age the message maximum age time max-hops the maximum hops sync sync port state of exist vlan entry Switch(config)# spanning-tree mst configuration Switch(config)# spanning-tree mst configuration Switch(config-mst)# abort exit current mode and discard all changes end exit current mode, change to enable mode and apply all changes exit exit current mode and apply all changes instance the mst instance list Print command list name the name of mst region no Negate a command or set its defaults quit exit current mode and apply all changes revision the revision of mst region show show mst configuration
Region Configuration	Region Name: Switch(config-mst)# name NAME the name string Switch(config-mst)# name korenix Region Revision: Switch(config-mst)# revision <0-65535> the value of revision Switch(config-mst)# revision 65535
Mapping Instance to VLAN (Ex: Mapping VLAN 2 to Instance 1)	Switch(config-mst)# instance <1-15> target instance number Switch(config-mst)# instance 1 vlan VLANMAP target vlan number(ex.10) or range(ex.1-10) Switch(config-mst)# instance 1 vlan 2
Display Current MST Configuraion	Switch(config-mst)# show current Current MST configuration Name [korenix] Revision 65535 Instance Vlans Mapped -------- ---------- 0 1,4-4094 1 2 2 3

	---------- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D ----------
Remove Region Name	Switch(config-mst)# no name name configure revision revision configure instance the mst instance Switch(config-mst)# no name
Remove Instance example	Switch(config-mst)# no instance <1-15> target instance number Switch(config-mst)# no instance 2
Show Pending MST Configuration	Switch(config-mst)# show pending Pending MST configuration Name [] (->The name is removed by no name) Revision 65535 Instance Vlans Mapped -------- ---------- 0 1,3-4094 1 2 (->Instance 2 is removed by no instance 2) ---------- Config HMAC-MD5 Digest: 0x3AB68794D602FDF43B21C0B37AC3BCA8 ----------
Apply the setting and go to the configuration mode	Switch(config-mst)# quit apply all mst configuration changes Switch(config)#
Apply the setting and go to the global mode	Switch(config-mst)# end apply all mst configuration changes Switch#
Abort the Setting and go to the configuration mode. Show Pending to see the new settings are not applied.	Switch(config-mst)# abort discard all mst configuration changes Switch(config)# spanning-tree mst configuration Switch(config-mst)# show pending Pending MST configuration Name [korenix] (->The nameis not applied after Abort settings.) Revision 65535 Instance Vlans Mapped -------- ---------- 0 1,4-4094 1 2 2 3 (-> The instance is not applied after Abort settings.) ---------- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D ----------
RSTP	
System RSTP Setting	The mode should be rst, the timings can be configured in global settings listed in above.
Global Information	
Active Information	Switch# show spanning-tree active Spanning-Tree : Enabled Protocol : MSTP Root Address : 0012.77ee.eeee Priority : 32768 Root Path Cost : 0 Root Port : N/A Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address : 0012.77ee.eeee Priority : 32768 Bridge Times : max-age 20, hello-time 2, forward-delay 15

	BPDU transmission-limit : 3 Port Role State Cost Prio.Nbr Type Aggregated ------ ---------- ---------- -------- ---------- ------------ ------------ fa1 Designated Forwarding 200000 128.1 P2P(RSTP) N/A fa2 Designated Forwarding 200000 128.2 P2P(RSTP) N/A
RSTP Summary	Switch# show spanning-tree summary Switch is in rapid-stp mode. BPDU skewing detection disabled for the bridge. Backbonefast disabled for bridge. Summary of connected spanning tree ports : #Port-State Summary Blocking Listening Learning Forwarding Disabled -------- --------- -------- ---------- -------- 0 0 0 2 8 #Port Link-Type Summary AutoDetected PointToPoint SharedLink EdgePort ------------ ------------ ---------- -------- 9 0 1 9
Port Info	Switch# show spanning-tree port detail fa7 (Interface_ID) Rapid Spanning-Tree feature Enabled Port 128.6 as Disabled Role is in Disabled State Port Path Cost 200000, Port Identifier 128.6 RSTP Port Admin Link-Type is Auto, Oper Link-Type is Point-to-Point RSTP Port Admin Edge-Port is Enabled, Oper Edge-Port is Edge Designated root has priority 32768, address 0012.7700.0112 Designated bridge has priority 32768, address 0012.7760.1aec Designated Port ID is 128.6, Root Path Cost is 600000 Timers : message-age 0 sec, forward-delay 0 sec Link Aggregation Group: N/A, Type: N/A, Aggregated with: N/A BPDU: sent 43759 , received 4854 TCN : sent 0 , received 0 Forwarding-State Transmit count 12 Message-Age Expired count
MSTP Information	
MSTP Configuraiton	Switch# show spanning-tree mst configuration Current MST configuration (MSTP is Running) Name [korenix] Revision 65535 Instance Vlans Mapped -------- --------------------------------------- 0 1,4-4094 1 2 2 3 --- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D ---
Display all MST Information	Switch# show spanning-tree mst ###### MST00 vlans mapped: 1,4-4094 Bridge address 0012.77ee.eeee priority 32768 (sysid 0) Root this switch for CST and IST Configured max-age 2, hello-time 15, forward-delay 20, max-hops 20 Port Role State Cost Prio.Nbr Type

	------ ---------- ---------- -------- ---------- ------------------ fa1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) fa2 Designated Forwarding 200000 128.2 P2P Internal(MSTP) ###### MST01 vlans mapped: 2 Bridge address 0012.77ee.eeee priority 32768 (sysid 1) Root this switch for MST01 Port Role State Cost Prio.Nbr Type ------ ---------- ---------- -------- ---------- ------------------ fa1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) fa2 Designated Forwarding 200000 128.2 P2P Internal(MSTP)
MSTP Root Information	Switch# show spanning-tree mst root MST Instance Root Address Root Priority Root Cost Root Port Max age Hello Fwd dly -------- -------------- -------- ------------ ------ ----- ----- ----- MST00 0012.77ee.eeee 32768 0 N/A 20 2 15 MST01 0012.77ee.eeee 32768 0 N/A 20 2 15 MST02 0012.77ee.eeee 32768 0 N/A 20 2 15
MSTP Instance Information	Switch# show spanning-tree mst 1 ###### MST01 vlans mapped: 2 Bridge address 0012.77ee.eeee priority 32768 (sysid 1) Root this switch for MST01 Port Role State Cost Prio.Nbr Type ------ ---------- ---------- -------- ---------- ------------------ fa1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) fa2 Designated Forwarding 200000 128.2 P2P Internal(MSTP)
MSTP Port Information	Switch# show spanning-tree mst interface fa1 Interface fastethernet1 of MST00 is Designated Forwarding Edge Port : Edge (Edge) BPDU Filter : Disabled Link Type : Auto (Point-to-point) BPDU Guard : Disabled Boundary : Internal(MSTP) BPDUs : sent 6352, received 0 Instance Role State Cost Prio.Nbr Vlans mapped -------- ---------- ---------- -------- ---------- ---------- 0 Designated Forwarding 200000 128.1 1,4-4094 1 Designated Forwarding 200000 128.1 2 2 Designated Forwarding 200000 128.1 3
Multiple Super Ring	
Create or configure a Ring	Switch(config)# multiple-super-ring 1 Ring 1 created Switch(config-multiple-super-ring)# ***Note: 1 is the target Ring ID which is going to be created or configured.***
Super Ring Version	Switch(config-multiple-super-ring)# version any-ring any ring auto detection default set default to rapid super ring rapid-super-ring rapid super ring super-ring super ring Switch(config-multiple-super-ring)# version rapid-super-ring
Priority	Switch(config-multiple-super-ring)# priority <0-255> valid range is 0 to 255 default set default

	Switch(config)# super-ring priority 100
Ring Port	Switch(config-multiple-super-ring)# port IFLIST Interface list, ex: fa1,fa3-5,gi8-10 cost path cost Switch(config-multiple-super-ring)# port fa1,fa2
Ring Port Cost	Switch(config-multiple-super-ring)# port cost <0-255> valid range is 0 or 255 default set default (128)valid range is 0 or 255 Switch(config-multiple-super-ring)# port cost 100 <0-255> valid range is 0 or 255 default set default (128)valid range is 0 or 255 Switch(config-super-ring-plus)# port cost 100 200 Set path cost success.
Rapid Dual Homing	Switch(config-multiple-super-ring)# rapid-dual-homing enable Switch(config-multiple-super-ring)# rapid-dual-homing disable Switch(config-multiple-super-ring)# rapid-dual-homing port IFLIST Interface name, ex: fastethernet1 or gi8 auto-detect up link auto detection IFNAME Interface name, ex: fastethernet1 or gi8 Switch(config-multiple-super-ring)# rapid-dual-homing port fa3,fa5-6 set Rapid Dual Homing port success. Note: auto-detect is recommended for dual Homing..
Ring Info	
Ring Info	Switch# show multiple-super-ring [Ring ID] [Ring1] Ring1 Current Status : Disabled Role : Disabled Ring Status : Abnormal Ring Manager : 0000.0000.0000 Blocking Port : N/A Giga Copper : N/A Configuration : Version : Rapid Super Ring Priority : 128 Ring Port : fa1, fa2 Path Cost : 100, 200 Dual-Homing II : Disabled Statistics : Watchdog sent 0, received 0, missed 0 Link Up sent 0, received 0 Link Down sent 0, received 0 Role Transition count 0 Ring State Transition count 1 Ring ID is optional. If the ring ID is typed, this command will only display the information of the target Ring.
ERPS	
show erps	Switch# show erps Ethernet Ring Protection Switching (ITU-T G.8032) Version : v1 Ring State : Disabled Node State : Disabled Node Role : Ring Node Control Channel : VLAN 1 Ring Port 1 : fa1 is Link Down and Blocking

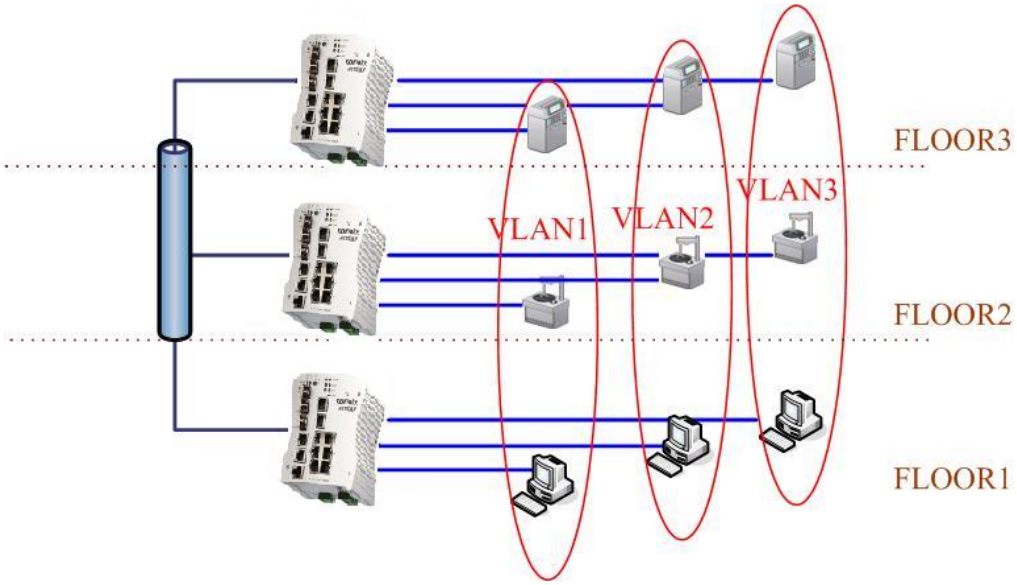
	Ring Port 2 : fa2 is Link Down and Blocking RPL Port : Ring Port 2 Timers WTR Timer : period is 1 minutes, timer is not running, remains 0 ms Guard Timer : period is 100 ms, timer is not running, remains 0 ms Statistics R-APS(SF) : sent 0, received 0 R-APS(NR,RB) : sent 0, received 0 R-APS(NR) : sent 0, received 0 Node State Transition count 0 Switch#
Configure ERPS	Switch(config)# erps enable Start the Multiple Super Ring for the switch disable Stop the Multiple Super Ring for the switch version the protocol version node-role The node role of ERPS node ring-port The ring port1 and port2 of the ERPS rpl The ring Ring Protection Link of the ERPS control-channel The ring control channel of the ERPS timer The period of timer Switch(config)# erps en enable Start the Multiple Super Ring for the switch Switch(config)# erps version 1 version 1 default Set default to version 1 Switch(config)# erps version 1 version 1 default Set default to version 1 Switch(config)# erps node-role rpl-owner ERPS RPL Owner ring-node ERPS ring node Switch(config)# erps ring-port PORT1 The ring port 1 Switch(config)# erps rpl ring-port Assign ring port as RPL Switch(config)# erps control-channel <1-4095> The VLAN ID of control channel, valid range is from 1 to 4094 Switch(config)# erps timer wtr-timer WTR(Wait-to-restore) Timer guard-timer Guard Timer

4.6 VLAN

A Virtual LAN (VLAN) is a “logical” grouping of nodes for the purpose of limiting a broadcast domain to specific members of a group without physically grouping the members together. That means, VLAN allows you to isolate network traffic so that only members of VLAN could receive traffic from the same VLAN members. Basically, creating a VLAN from a switch is the logical equivalent of physically reconnecting a group of network devices to another Layer 2 switch, without actually disconnecting these devices from their original switches.

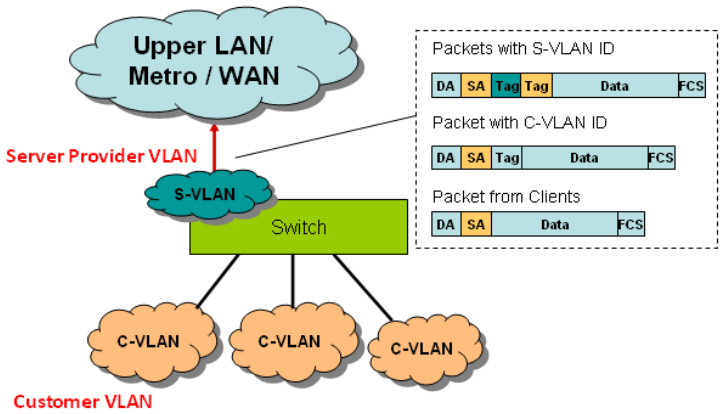
JetNet 7628X Series Industrial Ethernet Switch supports 802.1Q VLAN. 802.1Q VLAN is also known as Tag-Based VLAN. This Tag-Based VLAN allows VLAN to be created across different switches. IEEE 802.1Q tag-based VLAN makes use of VLAN control information stored in a VLAN header attached to IEEE 802.3 packet frames. This tag contains a VLAN Identifier (VID) that indicates which VLAN a frame belongs to. Since each switch only has to check a frame’s tag, without the need to dissect the contents of the frame, this also saves a lot of computing resources within the switch.

Figure 4.6.1 802.1Q VLAN



QinQ

The QinQ is originally designed to expand the number of VLANs by adding a tag to the 802.1Q packets. The original VLAN is usually identified as Customer VLAN (C-VLAN) and the new added tag - as Service VLAN(S-VLAN). By adding the additional tag, QinQ increases the possible number of VLANs. After QinQ enabled, the JetNet switch can reach up to 256x256 VLANs. With different standard tags, it also improves the network security.



VLAN Configuration group enables you to Add/Remove VLAN, configure QinQ, port Ingress/Egress parameters and view VLAN table.

VLAN Configuration group enables you to Add/Remove VLAN, configure port Ingress/Egress parameters and view VLAN table.

Following commands are included in this group:

4.6.1 VLAN Port Configuration

4.6.2 VLAN Configuration

4.6.3 GVRP Configuration

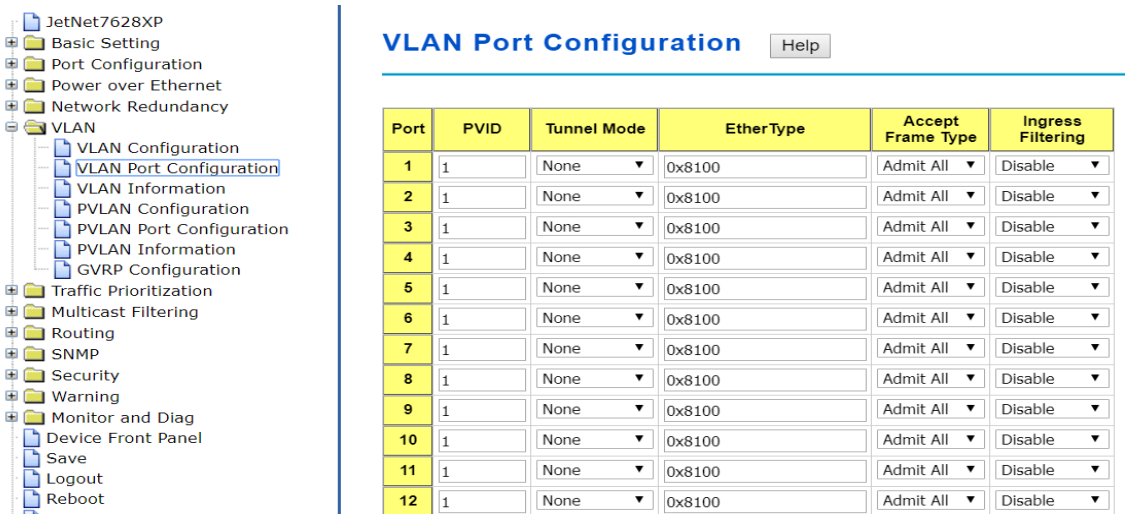
4.6.4 VLAN Table

4.6.5 CLI Commands of the VLAN

4.6.1 VLAN Port Configuration

VLAN Port Configuration allows you to set up VLAN port parameters to specific port. These parameters include PVID, Accept Frame Type and Ingress Filtering.

Figure 4.6.1.1 Web UI of VLAN configuration.



PVID: The abbreviation of the **Port VLAN ID**. Enter port VLAN ID here. PVID allows the switches to identify which port belongs to which VLAN. To keep things simple, it is recommended that PVID is equivalent to VLAN IDs.

The values of PVIDs are from 0 to 4095. But, 0 and 4095 are reserved. You can't input these 2 PVIDs. 1 is the default value. 2 to 4094 are valid and available in this column. Type the PVID you'd like to configure here.

Tunnel Mode: This is the new command for QinQ. The command includes None, 802.1Q Tunnel and 802.1Q Tunnel Uplink. The figure shows the relationship between 802.1Q Tunnel and 802.1Q Tunnel Uplink.

Following is the modes you can select.

None: Remian VLAN setting, no QinQ.

802.1Q Tunnel: The QinQ command applied to the ports which connect to the C-VLAN. The port receives tagged frame from the C-VLAN. Add a new tag (Port VID) as S-VLAN VID. When the packets are forwarded to C-VLAN, the S-VLAN tag is removed.

After 802.1Q Tunnel mode is assigned to a port, the egress setting of the port should be "**Untag**", it indicates the egress packet is always untagged. This is configured in Static VLAN Configuration table. Please refer to the VLAN Configuration chapter in below.

802.1Q Tunnel Uplink: The QinQ command applied to the ports which connect to the S-VLAN. The port receives tagged frame from the S-VLAN. When the packets are forwarded to S-VLAN, the S-VLAN tag is kept.

After 802.1Q Tunnel Uplink mode is assigned to a port, the egress setting of the port should be "**Tag**", it indicates the egress packet is always tagged. This is configured in Static VLAN Configuration table. Please refer to the VLAN Configuration chapter in below.

For example, the VID of S-VLAN/Tunnel Uplink is 10, the VID of C-VLAN/Tunnel is 5. The 802.1Q Tunnel port receives tag 5 from C-VLAN, add tag 10 to the packet. When the packets are forwarded to S-VLAN, tag 10 is kept.

EtherType: This column allows you to define the EtherType manually. This is advanced QinQ parameter which allows to define the transmission packet type.

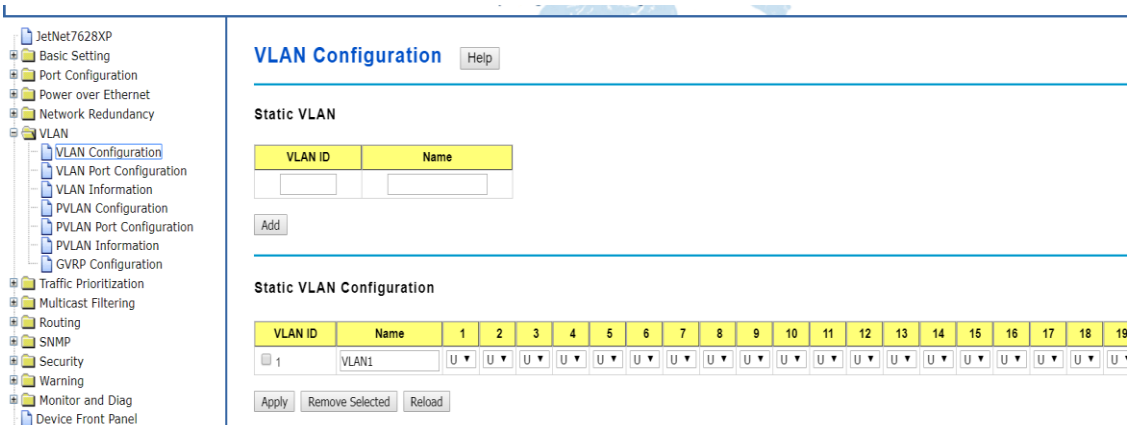
Accept Frame Type: This column defines the accepted frame type of the port. There are 2 modes you can select, **Admit All** and **Tag Only**. Admit All mode means that the port can accept both tagged and untagged packets. Tag Only mode means that the port can only accept tagged packets.

Ingress Filtering: Ingress filtering helps VLAN engine to filter out undesired traffic on a port. When Ingress Filtering is enabled, the port checks whether the incoming frames belong to the VLAN they claimed or not. Then the port determines if the frames can be processed or not. For example, if a tagged frame from Engineer VLAN is received, and Ingress Filtering is enabled, the switch will determine if the port is on the Engineer VLAN's Egress list. If it is, the frame can be processed. If it's not, the frame would be dropped.

4.6.2 VLAN Configuration

In this page, you can assign Management VLAN, create the static VLAN, and assign the Egress rule for the member ports of the VLAN.

Figure 4.6.2.1 Web UI of the VLAN Configuration.



Management VLAN ID: The switch supports management VLAN. The management

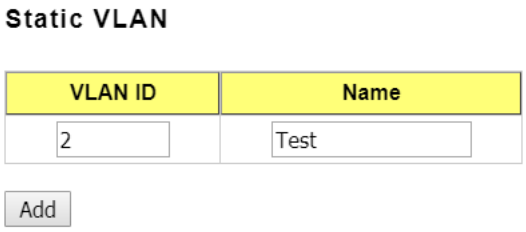
VLAN ID is the VLAN ID of the CPU interface so that only member ports of the management VLAN can ping and access the switch. The default management VLAN ID is **1**.

Static VLAN: You can assign a VLAN ID and VLAN Name for new VLAN here.

VLAN ID is used by the switch to identify different VLANs. Valid VLAN ID is between 1 and 4094. 1 is the default VLAN.

VLAN Name is a reference for network administrator to identify different VLANs. The available character is 12 for you to input. If you don't input VLAN name, the system will automatically assign VLAN name for the VLAN. The rule is VLAN (VLAN ID).

Figure 4.6.2.2 The steps to create a new VLAN: Type VLAN ID and NAME, and press **Add** to create a new VLAN. Then you can see the new VLAN in the Static VLAN Configuration table. Refer to Figure 4.6.2.3



After created the VLAN, the status of the VLAN will remain in Unused until you add ports to the VLAN.

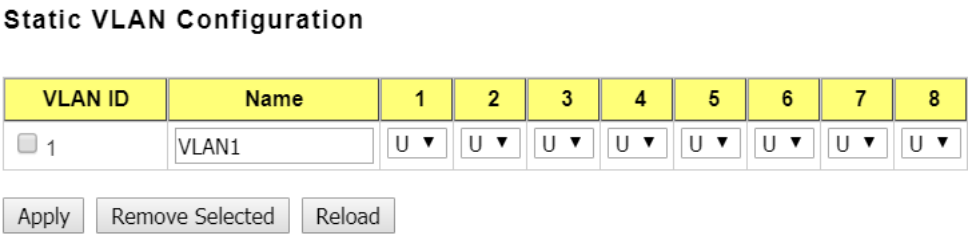
Note: *Before you change the management VLAN ID by Web and Telnet, remember that the port attached by the administrator should be the member port of the management VLAN; otherwise the administrator can't access the switch via the network.*

Note: *Currently JetNet 7628X only support max 64 group VLAN.*

Static VLAN Configuration

You can see the created VLANs and specify the egress (outgoing) port rule to be **Untagged or Tagged** here.

Figure 4.6.2.3 Static VLAN Configuration table. You can see that new VLAN 3 is created. VLAN name is test. Egress rules of the ports are not configured now.



-- : Not available

U: **Untag**: Indicates that egress/outgoing frames are not VLAN tagged.

T : **Tag**: Indicates that egress/outgoing frames are to be VLAN tagged.

Steps to configure Egress rules: Select the VLAN ID. Entry of the selected VLAN turns to light blue. Assign Egress rule of the ports to **U** or **T**. Press **Apply** to apply the setting. If you want to remove one VLAN, select the VLAN entry. Then press **Remove** button.

4.6.3 PVLAN Configuration

PVLAN Configuration allows you to assign Private VLAN type. After created VLAN in VLAN Configuration page, the available VLAN ID will display here. Choose the Private VLAN types for each VLAN you want configure.

None: The VLAN is Not included in Private VLAN.

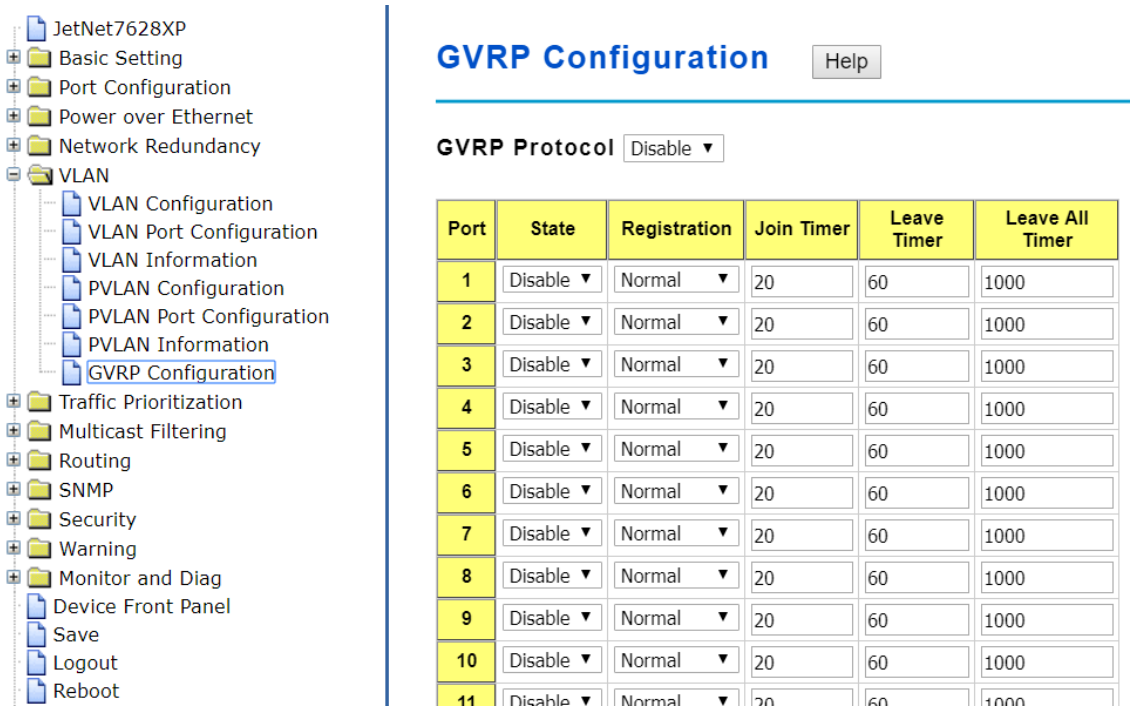
Primary: The VLAN is the Primary VLAN. The member ports can communicate with secondary ports.

Isolated: The VLAN is the Isolated VLAN. The member ports of the VLAN are isolated.

Community: The VLAN is the Community VLAN. The member ports of the VLAN can communicate with each other.

4.6.4 GVRP configuration

GVRP allows users to set-up VLANs automatically rather than manual configuration on every port of every switch in the network.



GVRP Protocol: Allow user to enable/disable GVRP globally.

State: After enable GVRP globally, here still can enable/disable GVRP by port.

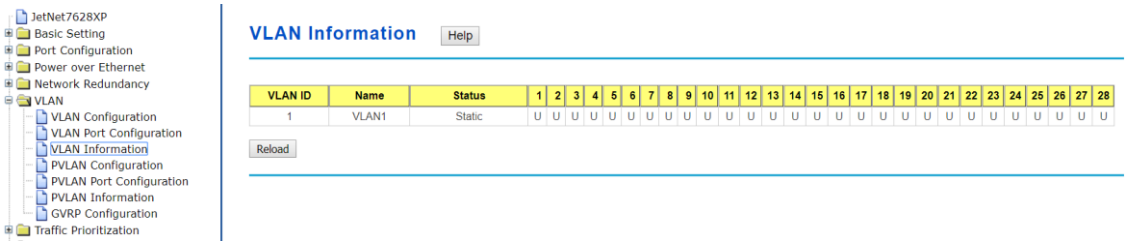
Join Timer: Controls the interval of sending the GVRP Join BPDU. An instance of this timer is required on a per-Port, per-GARP Participant basis

Leave Timer: Control the time to release the GVRP reservation after received the GVRP Leave BPDU. An instance of the timer is required for each state machine that is in the LV state

Leave All Timer: Controls the period to initiate the garbage collection of registered VLAN. The timer is required on a per-Port, per-GARP Participant basis

4.6.5 VLAN Information

This table shows you current settings of your VLAN table, including VLAN ID, Name, Status, and Egress rule of the ports.



VLAN ID: ID of the VLAN.

Name: Name of the VLAN.

Status: Static shows this is a manually configured static VLAN. **Unused** means this VLAN is created by UI/CLI and has no member ports. This VLAN is not workable yet. **Dynamic**

means this VLAN is learnt by GVRP.

After created the VLAN, the status of this VLAN will remain in Unused status until you add ports to the VLAN.

4.6.6 CLI Commands of the VLAN

Command Lines of the VLAN port configuration, VLAN configuration and VLAN table display

Feature	Command Line
VLAN Port Configuration(Go to the port interface configuration mode first.)	
Port Interface Configuration	Switch# conf ter Switch(config)# interface fa5 Switch(config-if)#
VLAN Port PVID	Switch(config-if)# switchport trunk native vlan 2 Set port default vlan id to 2 success
QinQ Tunnel Mode 802.1Q Tunnel = access 802.1Q Tunnel Uplink = uplink	Switch(config-if)# switchport dot1q-tunnel mode Set the interface as an IEEE 802.1Q tunnel mode Switch(config-if)# switchport dot1q-tunnel mode access Set the interface as an access port of IEEE 802.1Q tunnel mode uplink Set the interface as an uplink port of IEEE 802.1Q tunnel mode
Port Accept Frame Type	Switch(config)# inter fa1 Switch(config-if)# acceptable frame type all any kind of frame type is accepted! Switch(config-if)# acceptable frame type vlantaggedonly only vlan-tag frame is accepted!
Ingress Filtering (for fast Ethernet port 1)	Switch(config)# interface fa1 Switch(config-if)# ingress filtering enable ingress filtering enable Switch(config-if)# ingress filtering disable ingress filtering disable
Egress rule – Untagged (for VLAN 2)	Switch(config-if)# switchport access vlan 2 switchport access vlan - success
Egress rule – Tagged (for VLAN 2)	Switch(config-if)# switchport trunk allowed vlan add 2
Display – Port Ingress Rule (PVID, Ingress Filtering, Acceptable Frame Type)	Switch# show interface fa1 Interface fastethernet1 Administrative Status : Enable Operating Status : Not Connected Duplex : Auto Speed : Auto Flow Control :off Default Port VLAN ID: 2 Ingress Filtering : Disabled Acceptable Frame Type : All Port Security : Disabled Auto Negotiation : Enable Loopback Mode : None STP Status: disabled

	Default CoS Value for untagged packets is 0. Mdix mode is Auto. Medium mode is Copper.
Display – Port Egress Rule (Egress rule, IP address, status)	Switch# show running-config …… ! interface fastethernet1 switchport access vlan 1 switchport access vlan 3 switchport trunk native vlan 2 ……. interface vlan1 ip address 192.168.10.8/24 no shutdown
QinQ Information – 802.1Q Tunnel	Switch# show dot1q-tunnel dot1q-tunnel mode port 1 : normal port 2 : normal port 3 : normal port 4 : normal port 5 : access port 6 : uplink port 7 : normal port 8 : normal port 9 : normal port 10 : normal
QinQ Information – Show Running	Switch# show running-config Building configuration... Current configuration: hostname Switch vlan learning independent …… …… interface fastethernet5 switchport access vlan add 1-2,10 switchport dot1q-tunnel mode access ! interface fastethernet6 switchport access vlan add 1-2 switchport trunk allowed vlan add 10 switchport dot1q-tunnel mode uplink !
VLAN Configuration	
Create VLAN (2)	Switch(config)# vlan 2 vlan 2 success Switch(config)# interface vlan 2 Switch(config-if)# *Note: In CLI configuration, you should create a VLAN interface first. Then you can start to add/remove ports. Default status of the created VLAN is unused until you add member ports to it.*
Remove VLAN	Switch(config)# no vlan 2

	no vlan success *Note: You can only remove the VLAN when the VLAN is in unused mode.*
VLAN Name	Switch(config)# vlan 2 vlan 2 has exists Switch(config-vlan)# name v2 Switch(config-vlan)# no name *Note: Use no name to change the name to default name, VLAN VID.*
VLAN description	Switch(config)# interface vlan 2 Switch(config-if)# Switch(config-if)# description this is the VLAN 2 Switch(config-if)# no description ->Delete the description.
IP address of the VLAN	Switch(config)# interface vlan 2 Switch(config-if)# Switch(config-if)# ip address 192.168.10.18/24 Switch(config-if)# no ip address 192.168.10.8/24 ->Delete the IP address
Create multiple VLANs (VLAN 5-10)	Switch(config)# interface vlan 5-10
Shut down VLAN	Switch(config)# interface vlan 2 Switch(config-if)# shutdown Switch(config-if)# no shutdown ->Turn on the VLAN
Display – VLAN table	Switch# sh vlan VLAN Name Status Trunk Ports Access Ports ---- ---------- ------- ---------- ---------- 1 VLAN1 Static - fa1-7,gi8-10 2 VLAN2 Unused - - 3 test Static fa4-7,gi8-10 fa1-3,fa7,gi8-10
Display – VLAN interface information	Switch# show interface vlan1 interface vlan1 is up, line protocol detection is disabled index 14 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST> HWaddr: 00:12:77:ff:01:b0 inet 192.168.10.100/24 broadcast 192.168.10.255 input packets 639, bytes 38248, dropped 0, multicast packets 0 input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0 output packets 959, bytes 829280, dropped 0 output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0 collisions 0
GVRP configuration	
GVRP enable/disable	Switch(config)# gvrp mode disable Disable GVRP feature globally on the switch enable Enable GVRP feature globally on the switch Switch(config)# gvrp mode enable Gvrp is enabled on the switch!
Configure GVRP timer Join timer /Leave timer/ LeaveAll timer	Switch(config)# inter fa1 Switch(config-if)# garp timer <10-10000> Switch(config-if)# garp timer 20 60 1000 Note: The unit of these timer is centisecond
Management VLAN	
Management VLAN	Switch(config)# int vlan 1 (Go to management VLAN)

	Switch(config-if)# no shutdown
Display	Switch# show running-config …. ! interface vlan1 ip address 192.168.10.17/24 ip igmp no shutdown ! ….

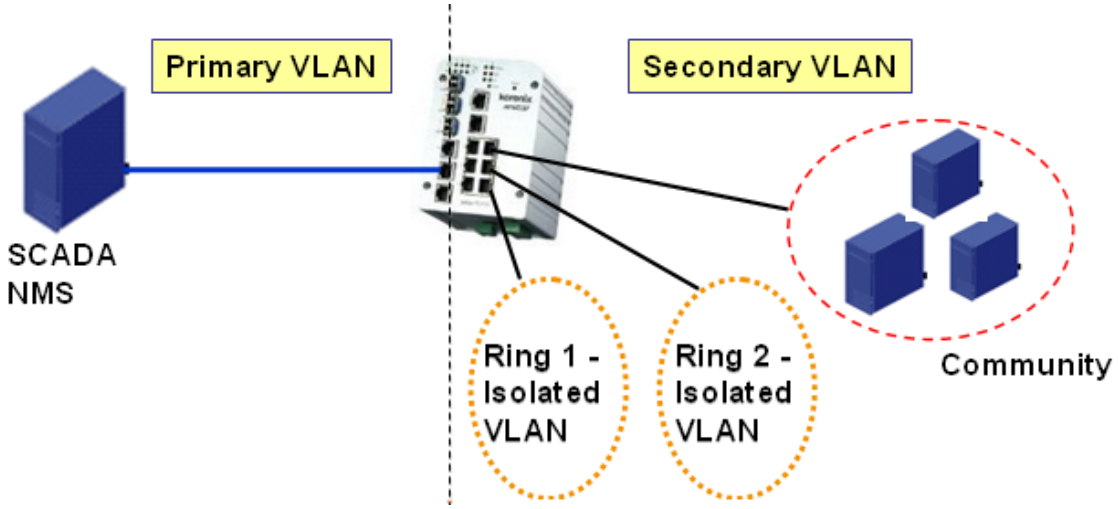
4.7 Private VLAN

The private VLAN helps to resolve the primary VLAN ID shortage, client ports' isolation and network security issues. The Private VLAN provides primary and secondary VLAN within a single switch.

Primary VLAN: The uplink port is usually the primary VLAN. A primary VLAN contains promiscuous ports that can communicate with lower Secondary VLANs.

Secondary VLAN: The client ports are usually defined within secondary VLAN. The secondary VLAN includes Isolated VLAN and Community VLAN. The client ports can be isolated VLANs or can be grouped in the same Community VLAN. The ports within the same community VLAN can communicate with each other. However, the isolated VLAN ports can Not.

The figure shows the typical Private VLAN network. The SCADA/Public Server or NMS workstation is usually located in primary VLAN. The clients PCs or Rings are located within Secondary.



Private VLAN (PVLAN) Configuration group enables you to Configure PVLAN, PVLAN Port and see the PVLAN Information.

Following commands are included in this group:

4.7.1 PVLAN Configuration

4.7.2 PVLAN Port Configuration

4.7.3 CLI Commands of the PVLAN

4.7.1 PVLAN Configuration

PVLAN Configuration allows you to assign Private VLAN type. After created VLAN in VLAN Configuraiton page, the available VLAN ID will display here. Choose the Private VLAN types for each VLAN you want configure.

None: The VLAN is Not included in Private VLAN.

Primary: The VLAN is the Primary VLAN. The member ports can communicate with secondary ports.

Isolated: The VLAN is the Isolated VLAN. The member ports of the VLAN are isolated.

Community: The VLAN is the Community VLAN. The member ports of the VLAN can

communicate with each other.

4.7.2 PVLAN Port Configuration

PVLAN Port Configuration page allows configure Port Configuration and Private VLAN Association.

Private VLAN Association

Secondary VLAN: After the Isolated and Community VLAN Type is assigned in Private VLAN Configuration page, the VLANs are belonged to the Secondary VLAN and displayed here.

Primary VLAN: After the Primary VLAN Type is assigned in Private VLAN Configuration page, the secondary VLAN can associate to the Primary VLAN ID. Select the Primary VLAN ID here.

Note: Before configuring PVLAN port type, the Private VLAN Association should be done first.

Port Configuraion

PVLAN Port Type :

Normal: The Normal port is None PVLAN ports, it remains its original VLAN setting.

Host: The Host type ports can be mapped to the Secondary VLAN.

Promiscuous: The promiscuous port can be associated to the Primary VLAN.

VLAN ID: After assigned the port type, the web UI display the available VLAN ID the port can associate to.

For example:

1. VLAN Create: VLAN 2-5 are created in VLAN Configuration page.

2. Private VLAN Type: VLAN 2-5 has its Private VLAN Type configured in Private VLAN Configuration page.

VLAN 2 is belonged to Primary VLAN.

VLAN 3-5 are belonged to secondary VLAN (Isolated or Community).

3. Private VLAN Association: Associate VLAN 3-5 to VLAN 2 in Private VLAN Association first.

4. Private VLAN Port Configuraiton

VLAN 2 – Primary -> The member port of VLAN 2 is promiscuous port.

VLAN 3 – Isolated -> The Host port can be mapped to VLAN 3.

VLAN 4 – Community -> The Host port can be mapped to VLAN 3.

VLAN 5 – Community -> The Host port can be mapped to VLAN 3.

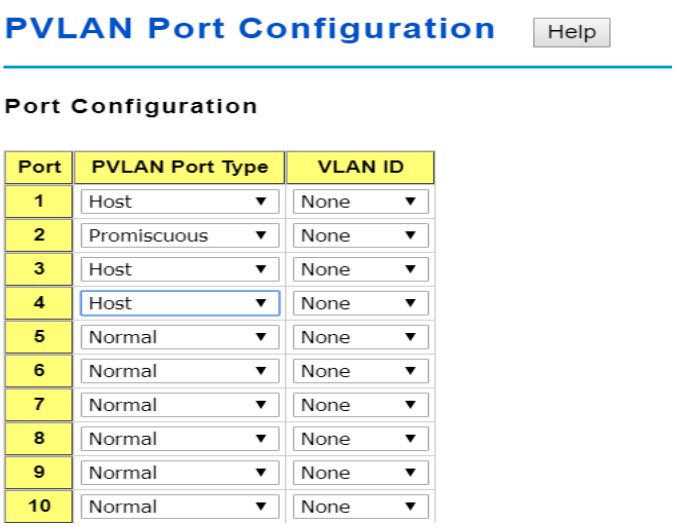
5. Result:

VLAN 2 -> VLAN 3, 4, 5; member ports can communicate with ports in secondary VLAN.

VLAN 3 -> VLAN 2, member ports are isolated, but it can communicate with member port of VLAN 2..

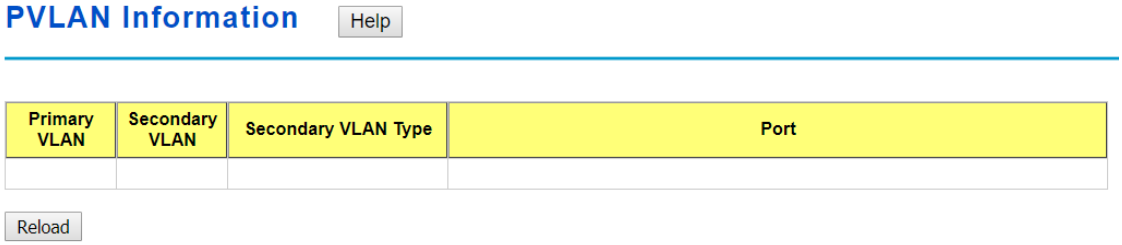
VLAN 4 -> VLAN 2, member ports within the community can communicate with each other and communicate with member port of VLAN 2.

VLAN 5 -> VLAN 2, member ports within the community can communicate with each other and communicate with member port of VLAN 2.



4.7.3 Private VLAN Information

This page allows you to see the Private VLAN information.



4.7.4 CLI Command of the PVLAN

Command Lines of the Private VLAN configuration

Feature	Command Line
Private VLAN Configuration	
Create VLAN	Switch(config)# vlan 2 vlan 2 success Switch(config-vlan)# end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list name Assign a name to vlan no no private-vlan Configure a private VLAN
Private VLAN Type	**Go to the VLAN you want configure first.** Switch(config)# vlan (VID)
Choose the Types	Switch(config-vlan)# private-vlan

	community Configure the VLAN as an community private VLAN isolated Configure the VLAN as an isolated private VLAN primary Configure the VLAN as a primary private VLAN
Primary Type	Switch(config-vlan)# private-vlan primary <cr>
Isolated Type	Switch(config-vlan)# private-vlan isolated <cr>
Community Type	Switch(config-vlan)# private-vlan community <cr>
Private VLAN Port Configuraiton	
Go to the port configuraiton	Switch(config)# interface (port_number, ex: gi9) Switch(config-if)# switchport private-vlan host-association Set the private VLAN host association mapping map primary VLAN to secondary VLAN
Private VLAN Port Type Promiscuous Port Type Host Port Type	Switch(config-if)# switchport mode private-vlan Set private-vlan mode Switch(config-if)# switchport mode private-vlan host Set the mode to private-vlan host promiscuous Set the mode to private-vlan promiscuous Switch(config-if)# switchport mode private-vlan promiscuous <cr> Switch(config-if)# switchport mode private-vlan host <cr>
Private VLAN Port Configuration PVLAN Port Type Host Association primary to secondary (The command is only available for host port.)	Switch(config)# interface gi9 Switch(config-if)# switchport mode private-vlan host Switch(config-if)# switchport private-vlan host-association <2-4094> Primary range VLAN ID of the private VLAN port association Switch(config-if)# switchport private-vlan host-association 2 <2-4094> Secondary range VLAN ID of the private VLAN port association Switch(config-if)# switchport private-vlan host-association 2 3
Mapping primary to secondary VLANs (This command is only available for promiscuous port)	Switch(config)# interface gi10 Switch(config-if)# switchport mode private-vlan promiscuous Switch(config-if)# switchport private-vlan mapping 2 add 3 Switch(config-if)# switchport private-vlan mapping 2 add 4 Switch(config-if)# switchport private-vlan mapping 2 add 5
Private VLAN Information	
Private VLAN Information	Switch# show vlan private-vlan FLAGS: I -> Isolated P -> Promiscuous C -> Community Primary Secondary Type Ports ------- --------- ----------------- ---------------------- 2 3 Isolated gi10(P),gi9(I)

	2 4 Community gi10(P),gi8(C) 2 5 Community gi10(P),fa7(C),gi9(I) 10 - - -
PVLAN Type	Switch# show vlan private-vlan type Vlan Type Ports ---- ----------------- ----------------- 2 primary gi10 3 isolated gi9 4 community gi8 5 community fa7,gi9 10 primary -
Host List	Switch# show vlan private-vlan port-list Ports Mode Vlan ----- ----------- ---- 1 normal - 2 normal - 3 normal - 4 normal - 5 normal - 6 normal - 7 host 5 8 host 4 9 host 3 10 promiscuous 2
Running Config Information Private VLAN Type Private VLAN Port Information	Switch# show run Building configuration... Current configuration: hostname Switch vlan learning independent ! vlan 1 ! vlan 2 private-vlan primary ! vlan 3 private-vlan isolated ! vlan 4 private-vlan community ! vlan 5 private-vlan community ! ……….. ……….. interface fastethernet7 switchport access vlan add 2,5 switchport trunk native vlan 5 switchport mode private-vlan host switchport private-vlan host-association 2 5 ! interface gigabitethernet8 switchport access vlan add 2,4 switchport trunk native vlan 4

	switchport mode private-vlan host switchport private-vlan host-association 2 4 ! interface gigabitethernet9 switchport access vlan add 2,5 switchport trunk native vlan 5 switchport mode private-vlan host switchport private-vlan host-association 2 3 ! interface gigabitethernet10 switchport access vlan add 2,5 switchport trunk native vlan 2 switchport mode private-vlan promiscuous switchport private-vlan mapping 2 add 3-5 …… ……..

4.8 Traffic Prioritization

Quality of Service (QoS) provides traffic prioritization mechanism which allows users to deliver better service to certain flows. QoS can also help to alleviate congestion problems and ensure high-priority traffic is delivered first. This section allows you to configure Traffic Prioritization settings for each port with regard to setting priorities.

JetNet QOS supports 4 physical queues, weighted fair queuing (WRR) and Strict Priority scheme, which follows 802.1p COS tag and IPv4 TOS/DiffServ information to prioritize the traffic of your industrial network.

Following commands are included in this group:

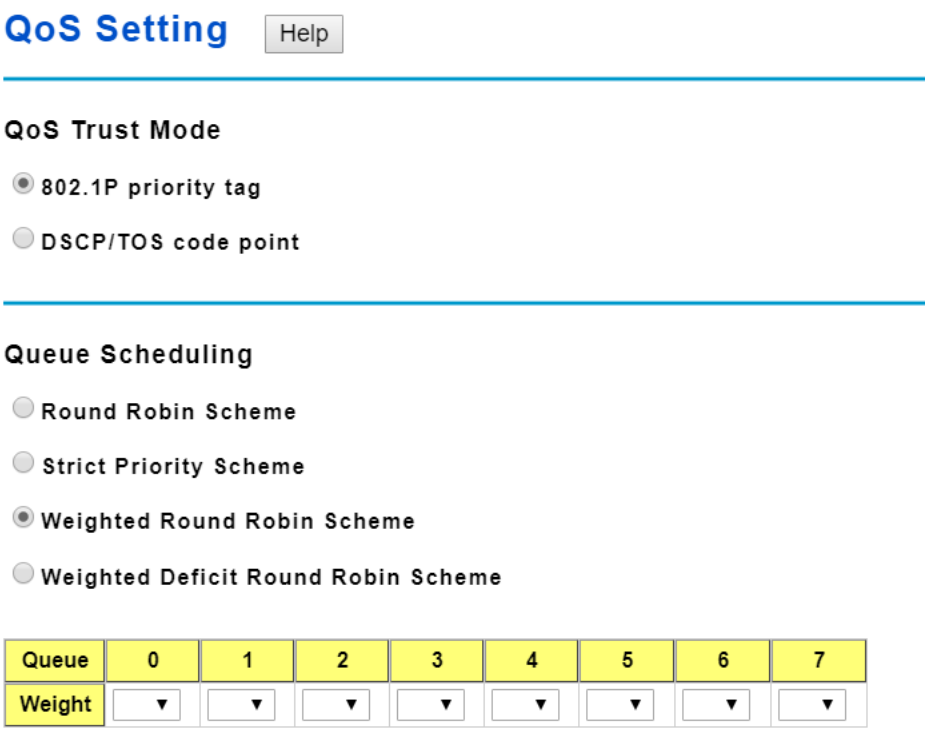
4.8.1 QoS Setting

4.8.2 CoS-Queue Mapping

4.8.3 DSCP-Queue Mapping

4.8.4 CLI Commands of the Traffic Prioritization

4.8.1 QoS Setting



Queue Scheduling

You can select the Queue Scheduling rule as follows:

Use a Round Robin scheme. The Round Robin scheme means all the priority has the same privilege, the traffic is forward cyclic from highest to lowest.

Use a strict priority scheme. Packets with higher priority in the queue will always be

processed first, except that there is no packet with higher priority.

Use Weighted Round Robin scheme. This scheme allows users to assign new weight ratio for each class. The 10 is the highest ratio. The ratio of each class is as below:

Wx / W0 + W1 + W2 + W3 + W4 + W5 + W6 + W7 (Total volume of Queue 0-7)

Port Setting

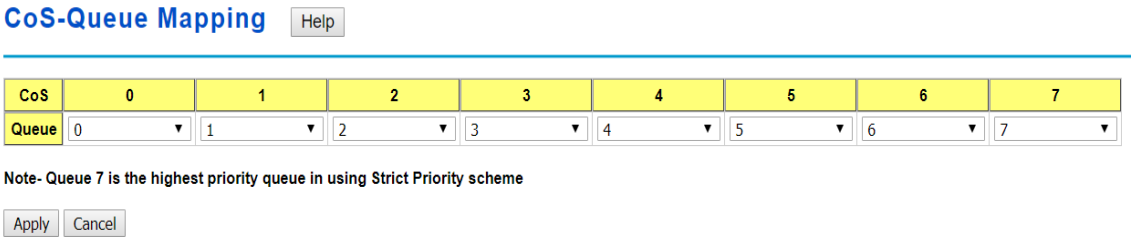
Priority column is to indicate default port priority value for untagged or priority-tagged frames. When JetNet receives the frames, JetNet will attach the value to the CoS field of the incoming VLAN-tagged packets. You can enable 0,1,2,3,4,5,6 or 7 to the port.

Default priority type is **COS**. The system will provide default COS-Queue table to which you can refer for the next command.

After configuration, press **Apply** to enable the settings.

4.8.2 CoS-Queue Mapping

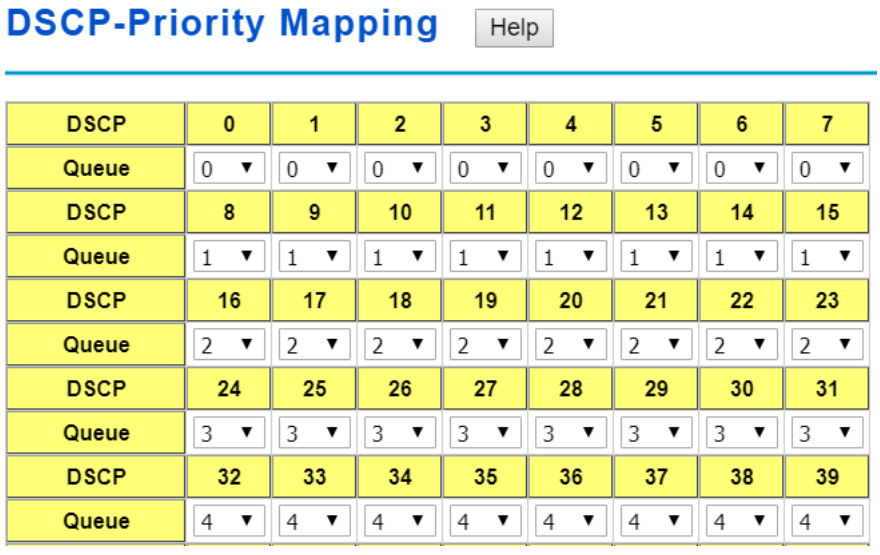
This page is to change CoS values to Physical Queue mapping table. Since the switch fabric of JetNet only supports 8 physical queues, Lowest, Low, Middle and High. Users should therefore assign how to map CoS value to the level of the physical queue.



After configuration, press **Apply** to enable the settings.

4.8.3 DSCP-Priority Mapping

This page is to change DSCP values to Physical Queue mapping table. Since the switch fabric of JetNet only supports 8 physical queues. Users should therefore assign how to map DSCP value to the level of the physical queue. In JetNet, users can freely change the mapping table to follow the upper layer 3 switch or routers' DSCP setting.



4.8.4 CLI Commands of the Traffic Prioritization

Command Lines of the Traffic Prioritization configuration

Feature	Command Line
QoS Setting	
Queue Scheduling – Round Robin	Switch(config)# qos queue-sched rr Round Robin sp Strict Priority wrr Weighted Round Robin Switch(config)# qos queue-sched rr The queue scheduling scheme is setting to Round Robin.
Queue Scheduling – Strict Priority	Switch(config)# qos queue-sched sp The queue scheduling scheme is setting to Strict Priority.
Queue Scheduli–g - WRR	Switch(config)# qos queue-sched wrr 1 1 1 1 1 1 1 1 The queue scheduling scheme is setting to Weighted Round Robin.
Port Setting – Priority	Switch(config)# interface **fa1** Switch(config-if)# qos priority DEFAULT-PRIORITY Assign an priority (7 highest) Switch(config-if)# qos priority 7 The default port priority value is set 7 ok. ***Note: When change the port setting, you should Select the specific port first. Ex: fa1 means fast Ethernet port 1.***
Display – Queue Scheduling	Switch# show qos queue-sched QoS queue scheduling scheme : Weighted Round Robin (Use an 8,4,2,1 weight)
Display – Port Setting	Switch# show qos port-priority Port Default Prior ty : Port Priority R. -----+-- 0 7 0 8 0 9 0 10 0 … 26 0 27 0 28 0
CoS-Queue Mapping	
Format	Switch(config)# qos cos-map PRIORITY Assign an priority (7 highest) Switch(config)# qos cos-map 1 QUEUE Assign an queue (0-7) ***Note: Format: qos cos-map priority_value queue_value***
Map CoS 0 to Queue 0	Switch(config)# qos cos-map 0 0 The CoS to queue mapping is set ok.
Map CoS 1 to Queue 1	Switch(config)# qos cos-map 1 1 The CoS to queue mapping is set ok.
Map CoS 2 to Queue 2	Switch(config)# qos cos-map 2 2 The CoS to queue mapping is set ok.
Map CoS 3 to Queue 3	Switch(config)# qos cos-map 3 3 The CoS to queue mapping is set ok.

Map CoS 4 to Queue 4	Switch(config)# qos cos-map 4 4 The CoS to queue mapping is set ok.
Map CoS 5 to Queue 5	Switch(config)# qos cos-map 5 5 The CoS to queue mapping is set ok.
Map CoS 6 to Queue 6	Switch(config)# qos cos-map 6 6 The CoS to queue mapping is set ok.
Map CoS 7 to Queue 7	Switch(config)# qos cos-map 7 7 The CoS to queue mapping is set ok.
Display – CoS-Queue mapping	Switch# sh qos cos-map CoS to Queue Mapping : CoS Queue R. ---- + ---- 6 7 7
DSCP-Queue Mapping	
Format	Switch(config)# qos dscp-map PRIORITY Assign an priority (63 highest) Switch(config)# qos dscp-map 0 QUEUE Assign an queue (0-7) ***Format: qos dscp-map priority_value queue_value***
Map DSCP 0 to Queue 1	Switch(config)# qos dscp-map 0 1 The TOS/DSCP to queue mapping is set ok.
Display – DSCO-Queue mapping	Switch# show qos dscp-map DSCP to Queue Mapping : (dscp = d1 d2) d2| 0 1 2 3 4 5 6 7 8 9 d1 | -----+---------- 0 | 0 0 0 0 0 0 0 0 1 1 R. 1 | 1 1 1 1 1 1 2 2 2 2 | 2 2 2 2 3 3 3 3 3 3 | 3 3 4 4 4 4 4 4 4 4 | 5 5 5 5 5 5 5 5 6 5 | 6 6 6 6 6 6 7 7 7 7 6 | 7 7 7 7

4.9 Multicast Filtering

For multicast filtering, JetNet 7628X uses IGMP Snooping technology. IGMP (Internet Group Management Protocol) is an Internet Protocol that provides a way for internet device to report its multicast group membership to adjacent routers. Multicasting allows one computer on the internet to send data to a multitude of other computers that have identified themselves as being interested in receiving the originating computers data.

Multicasting is useful for such applications as updating the address books of mobile computer users in the field, sending out newsletters to a distribution list, and broadcasting streaming media to an audience that has tuned into the event by setting up multicast group membership.

In effect, 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.

You can enable **IGMP Snooping** and **IGMP Query** functions here. You will see the information of the IGMP Snooping function in this section, including different multicast groups' VID and member ports, and IP multicast addresses that range from 224.0.0.0 to 239.255.255.255.

In this section, Force filtering can determined whether the switch flooding unknown multicast or not.

Following commands are included in this group:

4.9.1 IGMP Snooping

4.9.2 IGMP Query

4.9.3 Unknown Multicast

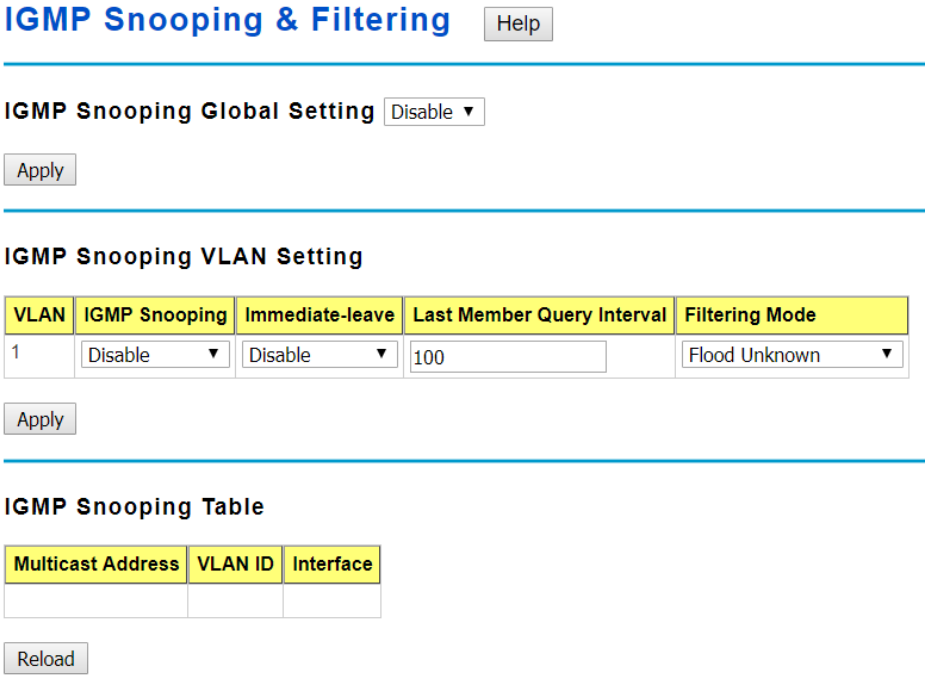
4.9.4 CLI Commands of the Multicast Filtering

4.9.1 IGMP Snooping & Filtering

This page is to enable IGMP Snooping feature, assign IGMP Snooping for specific VLAN, and view IGMP Snooping table from dynamic learnt or static manual key-in. JetNet7628X support IGMP snooping V1/V2/V3 automatically and IGMP query V1/V2.

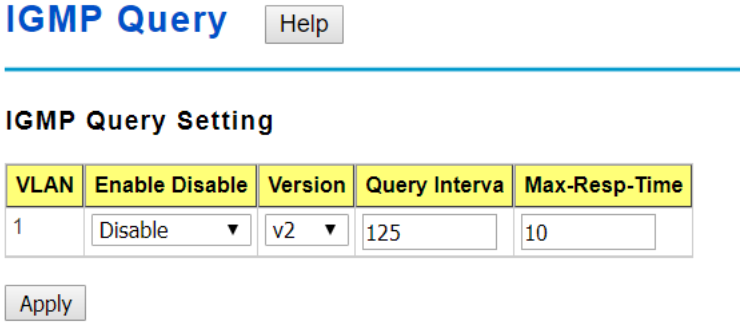
IGMP Snooping, you can select **Enable** or **Disable** here. After enabling IGMP Snooping, you can then enable IGMP Snooping for specific VLAN. You can enable IGMP Snooping for some VLANs so that some of the VLANs will support IGMP Snooping and others won't.

To assign IGMP Snooping to VLAN, please select the **checkbox** of VLAN ID or select **Select All** checkbox for all VLANs. Then press **Enable**. In the same way, you can also **Disable** IGMP Snooping for certain VLANs.



IGMP Snooping Table: In the table, you can see multicast group IP address, VLAN ID it belongs to, and member ports of the multicast group. JetNet 7628X supports 256 multicast groups. Click on **Reload** to refresh the table.

4.9.2 IGMP Query



This page allows users to configure **IGMP Query** feature. Since JetNet 7628X can only be configured by member ports of the management VLAN, IGMP Query can only be enabled on the management VLAN. If you want to run IGMP Snooping feature in several VLANs, you should notice that whether each VLAN has its own IGMP Querier first.

The IGMP querier periodically sends query packets to all end-stations on the LANs or VLANs that are connected to it. For networks with more than one IGMP querier, a switch with the lowest IP address becomes the IGMP querier.

In IGMP Query selection, you can select V1, V2 or Disable. **V1** means IGMP V1 General Query and **V2** means IGMP V2 General Query.. The query will be forwarded to all multicast groups in the VLAN. **Disable** allows you to disable IGMP Query.

Query Interval(s): The period of query sent by querier.

Query Maximum Response Time: The span querier detect to confirm there are no more

directly connected group members on a LAN.

Once you finish configuring the settings, click on **Apply** to apply your configuration.

4.9.3 CLI Commands of the Multicast Filtering

Command Lines of the multicast filtering configuration

Feature	Command Line
IGMP Snooping	
IGMP Snoopi–g - Global	Switch(config)# ip igmp snooping IGMP snooping is enabled globally. Please specify on which vlans IGMP snooping enables
IGMP Snoopi–g - VLAN	Switch(config)# ip igmp snooping vlan VLANLIST allowed vlan list all all existed vlan Switch(config)# ip igmp snooping vlan 1-2 IGMP snooping is enabled on VLAN 1-2.
Disable IGMP Snoopi–g - Global	Switch(config)# no ip igmp snoopin IGMP snooping is disabled globally ok.
Disable IGMP Snoopi–g - VLAN	Switch(config)# no ip igmp snooping vlan 3 IGMP snooping is disabled on VLAN 3.
Display – IGMP Snooping Setting	Switc evic ip igmp interface vlan1 enabled: Yes version: IGMPv1 query-interval; 125s query-max-response-time: 10s Switc evic ip igmp snooping IGMP snooping is globally enabled Vlan1 is IGMP snooping enabled Vlan2 is IGMP snooping enabled Vlan3 is IGMP snooping disabled
Display – IGMP Table	Switc evic ip igmp snooping multicast all VLAN IP Address Type Ports ---- --------------- ------- ------------------------ 1 239.192.8.0 IGMP fa6, 1 239.255.255.250 IGMP fa6,
IGMP Query	
IGMP Query V1	Switch(config)# int vlan 1 (Go to management VLAN) Switch(config-if)# ip igmp v1
IGMP Query V2	Switch(config)# int vlan 1 (Go to management VLAN) Switch(config-if)# ip igmp
IGMP Query version	Switch(config-if)# ip igmp version 1 Switch(config-if)# ip igmp version 2
Disable	Switch(config)# int vlan 1 Switch(config-if)# no ip igmp
Display	Switc evic ip igmp interface vlan1 enabled: Yes version: IGMPv2 query-interval: 125s

	query-max-response-time: 10s Switch# show running-config …. ! interface vlan1 ip address 192.168.10.17/24 ip igmp no shutdown ! …….
Unknown Multicast	
Send Unknown Multicast to Query Ports	Switch(config)# ip igmp snooping source-only-learning IGMP Snooping Source-Only-Learning enabled
Send Unknown Multicast to All Ports	Switch(config)# no ip igmp snooping source-only-learning IGMP Snooping Source-Only-Learning disabled Switch(config)# no mac-address-table multicast filtering Flooding unknown multicast addresses ok!
Discard All Unknown Multicast	Switch(config)# mac-address-table multicast filtering Filtering unknown multicast addresses ok!

4.10 Routing

Layer 3 Routing Feature is the most important feature of the the Layer 3 Managed Ethernet Switch. Since the hosts located in different broadcast domain can't communicate by themselves, once there is a need to communicate among the different VLANs, the layer 3 routing feature is requested.

The JetNet 7628X series equips with a Layer 3 chipset which can perform wire-speed layer 3 routing performance. The JetNet 7628X combines Layer 2 switching and Layer 3 routing within the single platform. No matter how many VLAN/IP interfaces created, how much layer 2 switching traffic or layer 3 routing traffic within the JetNet 7628X can be forwarded/routed without any packet lost.

In the Routing Configuration pages allows users create the Routing Interfaces, enable routing capability, enable unicast/multicast routing protocols, configure router redundancy policy and check the related routing information.

Following commands are included in this group:

4.10.1 ARP

4.10.2 IP

4.10.3 Router

4.10.4 RIP

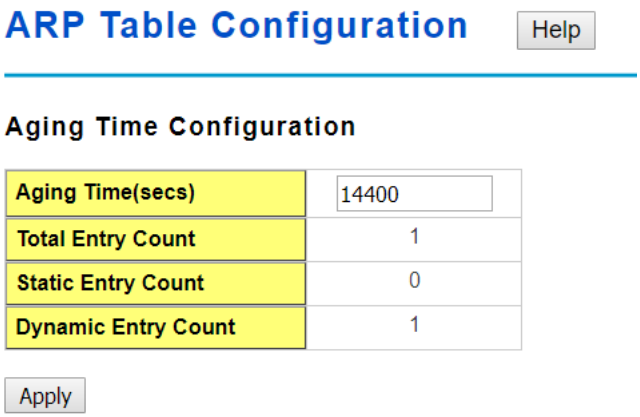
4.10.5 OSPF

4.10.6 VRRP

4.10.1 ARP

ARP is the name of Address Resolution Protocol, it is a network layer protocol. ARP is query by broadcast and reply by unicast packet format. It assists IP protocol to find out the MAC address of an IP destination. It is important to find out the destination MAC address due to the MAC address is unique in the network, then the traffic can be correctly directed to the destination. An ARP table must include the table with MAC Address/IP Address pair, storing information from the ARP reply, saving ARP operation for frequent communication and the entries are timeout with an aging mechanism.

The Web GUI below allows user to configure the Age Time of the ARP entry and see the count of static and dynamic ARP entries.



Age Time (secs): This is the Age time setting of the ARP entry. Once there is no packet (IP+MAC) hit the entry within the time, the entry will be aged out. Short ARP age time leads the entry aged out easier and re-learn often, the re-learn progress lead the communication stop. The default setting is 14,400 seconds (4hrs), it is also suggested value in the real world.

Type the new time and press “Apply” to change it.

Total Entry Count: This count represents for the count of total entries the ARP Table has.

Static Entry Count: This count represents for the count the static entries user configured.

Dynamic Entry Count: This count represents for the count the ARP table dynamically learnt.

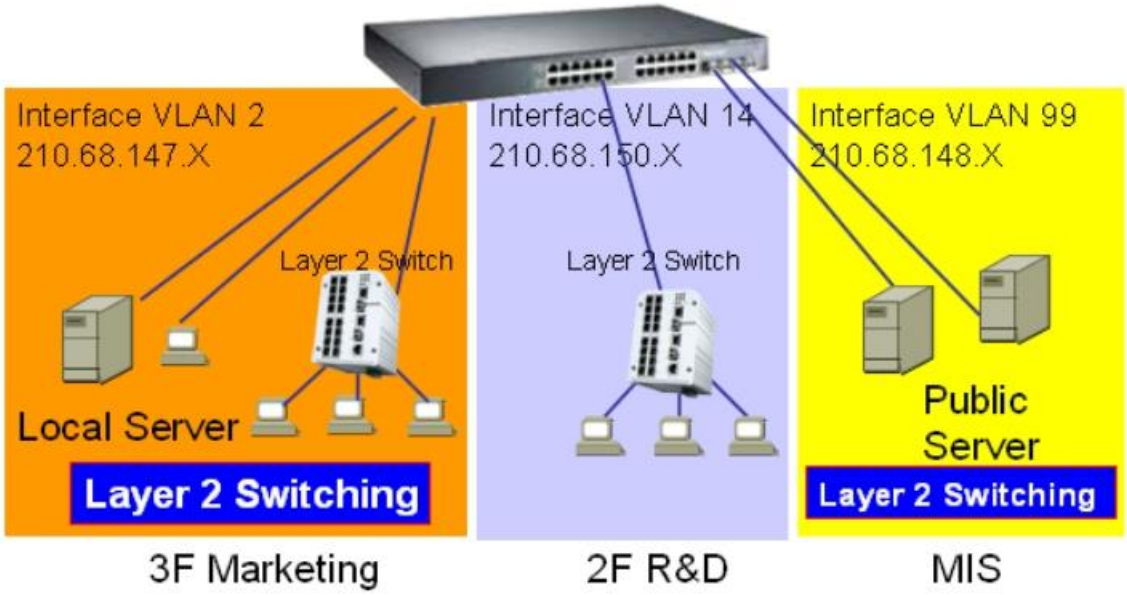
To configure the static ARP entry, or to see the entries of the ARP table, please use the

Console CLI.

4.10.2 IP

An IP Interface is the basic unit while routing, it is a logical interface which equips with an IP network and acts as the default gateway of the attached clients. The network interface can be a port or a single VLAN. All the client members connected to the IP network can be routed through the network interface.

Below figure is a simple network which has 3 network interfaces. The interface VLAN 2 equips with 210.68.147.0 network, the interface VLAN 14 equips with 210.68.150.0 network and the interface VLAN 99 equips with 210.68.148.0 network. The VLAN ID is the logical interface which can be assigned with one IP address and subnet mask, the IP addresses within the subnet can be switched as a broadcast domain. Once the client wants within the subnet wants to communicate with another network, the traffic will be routed through the layer 3 switch.

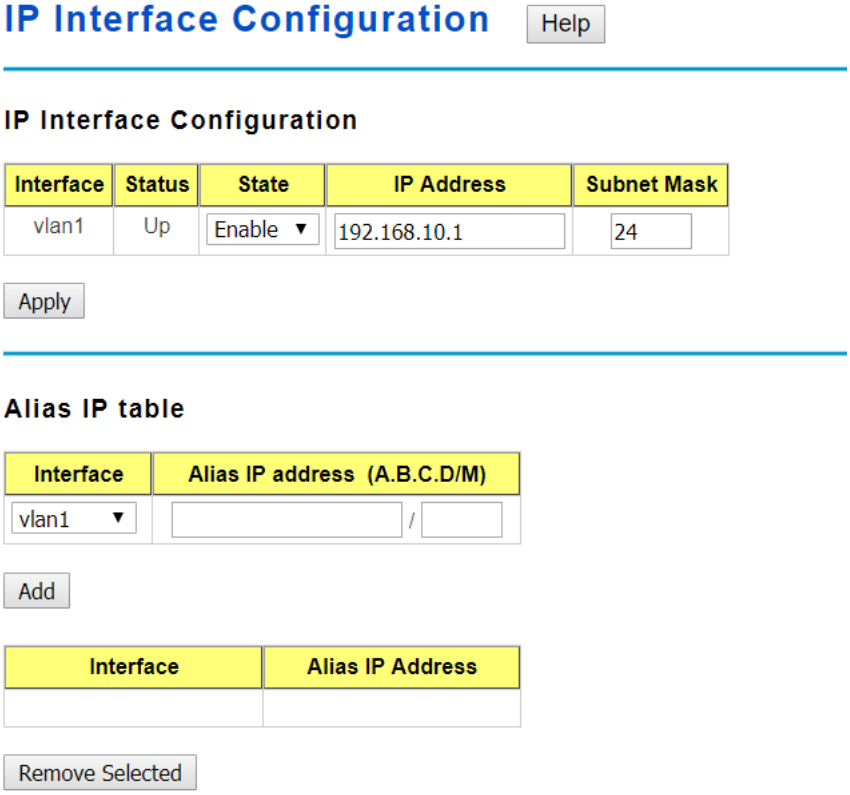


4.10.2.1 IP Interface Configuration

This page allows you Enable the IP Routing interface and assign the IP Address for it. Before creating IP Interface, you should create VLAN Interface and assign the member port to the VLAN. Please refer to the VLAN Configuration for detail. The IP Interface table listed all the created VLAN automatically, you can change the setting for each VLAN here.

The JetNet 5828G allows you to create up to 128 IP Interfaces in whole system. Each VLAN Interface accepts up to 32 IP Address, one is the primary IP Address, the others are secondary IP Addresses. The IP Address is the default gateway of its attached members.

This is the IP Interface Configuration Table.



Interface: The name of the VLAN.

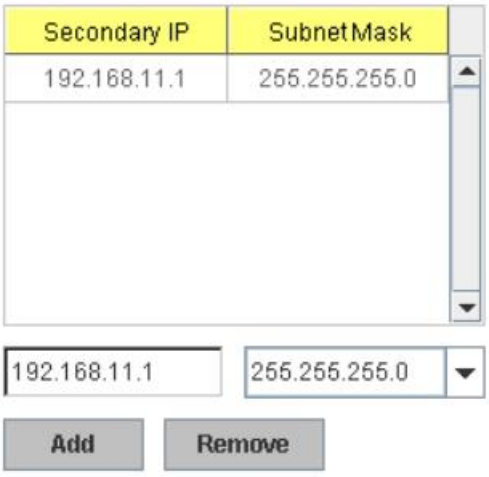
Status: After enabled the routing state, the Status shows “Up”. After disabled the routing state, the status shows “**Down**”.

State: Enable or Disable the IP Routing Interface state. After disabled, the interface just work as a layer 2 VLAN. After enabled, the interface can support IP routing feature.

IP Address: Assign the IP Address for the target VLAN.

Subnet Mask: You can choose the subnet mask here. For example, 255.255.255.0 represents for the typical Class C, or so-call 24-bits mask. There are 256 IP Addresses within the range.

This is the secondary IP interface table. Select the VLAN Interface in IP Interface table and then assign the secondary IP address and its subnet mask.



e, 192.168.11.1 for example. Type the IP

address and select the subnet mask, then press “**Add**” to add it to the VLAN you selected.

Technical Tip: While configuring Inter-Routing progress, write the network plan first is suggested. The network plan includes how many VLAN you will create, who is the member port of the VLANs, what is their IP address and subnet mask. After VLAN created, then enable the Global IP Routing state and enable IP Routing state for each Interface. After done the progress, the switch can run wire-speed Inter-Routing for the interfaces.

4.10.3 Router

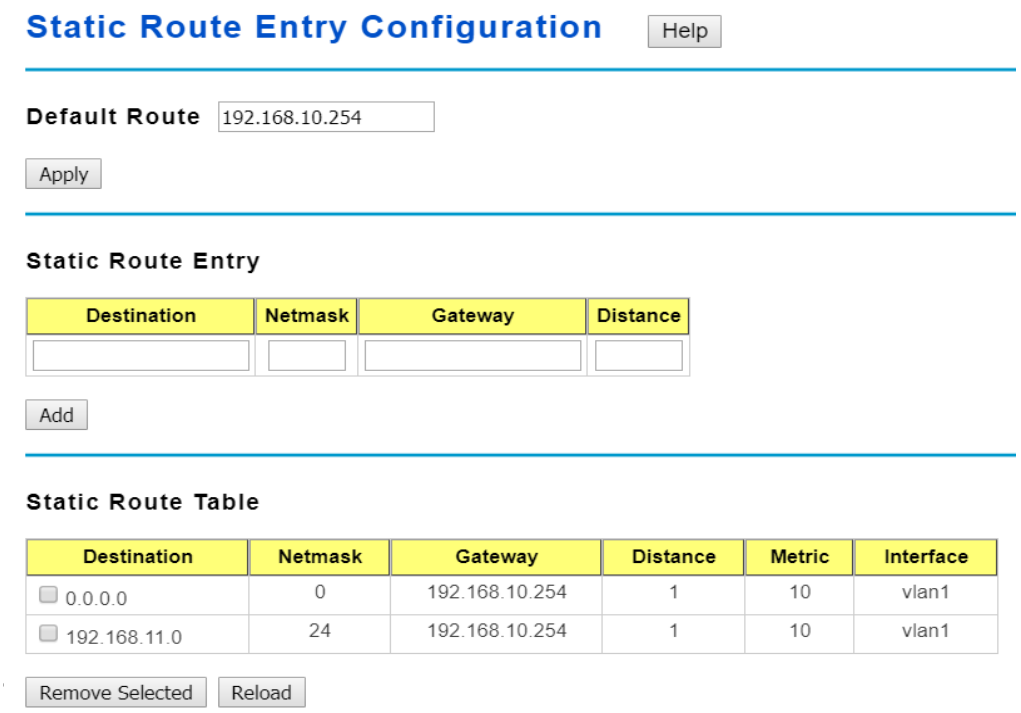
This page allows you configure the Route Entry and check the Routing table.

4.10.3.1 Static Route Entry Configuration

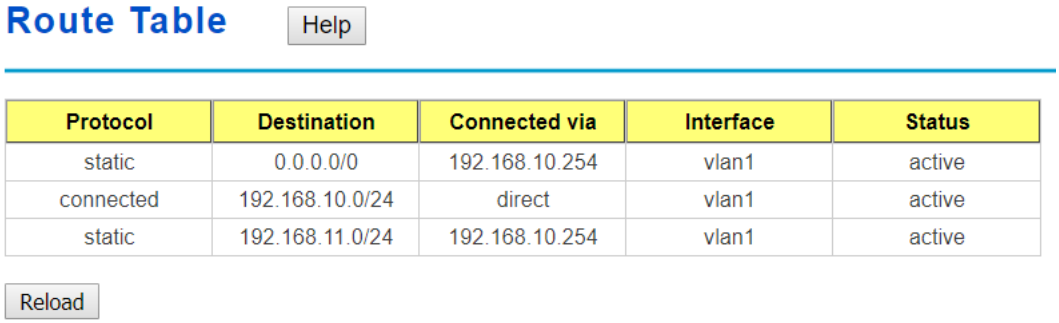
Default Route: The default route allows the stub network to reach all unknown networks through the route. The stub area has only one way and one route to other networks. Within the stub area, there are multiple networks and run their own routing protocols, however, while the want communicate with unknown network, the traffic will be forwarded to the default route. While configuring Default Route, the IP address of the next hop router/switch is the only setting needs to be specified.

Static Route: A static route entry to and from a stub network to another stub network. The static route is usually configured to connect the neighbor router/switch, the both routers/switches then can communicate through the route.

While configuring Static Route, all the fields in Route entry like the destination network and its netmask, the valid route interface to the destination and distance are needed to be specified.



This page displays the routing table information.



The system maintains the routing table information and updates it once the routing interfaces changed. The routing table information is important to find out the possible and best route in the field especially when troubleshooting the network problem.

The definition of the fields is listed in below:

Protocol: The field shows the entry is a local interface or learnt from the routing protocol. Fox example: The “connected” represents for the local interface. The “OSPF” shows the entry is learnt from the routing protocol, OSPF.

Destination: The destination network of this entry.

Connected Via: The IP interface wherever the network learnt from. The interface is usually the next hop’s IP address.

Interface: The VLAN Interface wherever the network connected to or learnt from.

Status: Shows the entry is active or not.

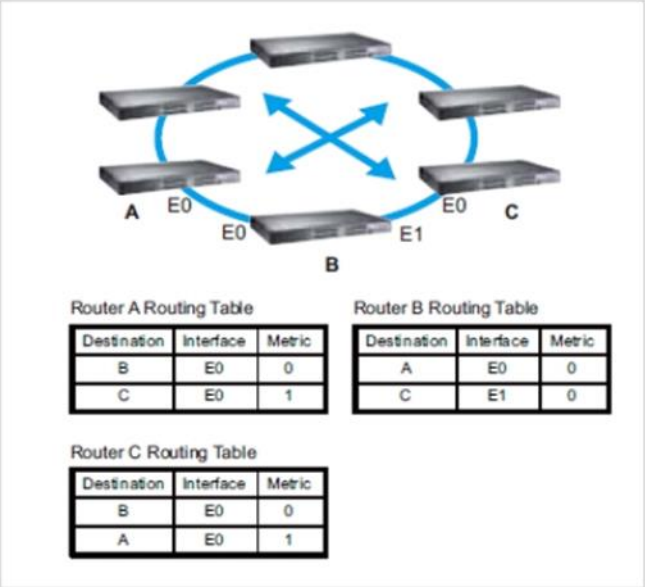
4.10.4 RIP

The RIP is short of the Routing Information Protocol. RIP was in widespread use years before it was standardized in as RFC 1058 in 1988. Version 2 of RIP was completed in 1994.

RIP is the most known Distance Vector type dynamic routing protocol, or known as Hop Based routing protocol. It uses hop count as a distance metric, each router advertises its routing table every 30 seconds. The maximum routers RIP can support is 15, the 16th router represents Infinity.

When a router receives a neighbor’s table, it examines it entry by entry. If the destination is new, it is added to the local routing table. If the destination is known before and the update provides a smaller metric, the existing entry in the local routing table is replaced. Adds 1 (or sometimes more if the corresponding link is slow) to the metric. If no route updated within the cycles, the entry is removed.

The figure in the right shows the RIP routing table of router A, B and C.



Router A Routing Table

Destination	Interface	Metric
B	E0	0
C	E0	1

Router B Routing Table

Destination	Interface	Metric
A	E0	0
C	E1	0

Router C Routing Table

Destination	Interface	Metric
B	E0	0
A	E0	1

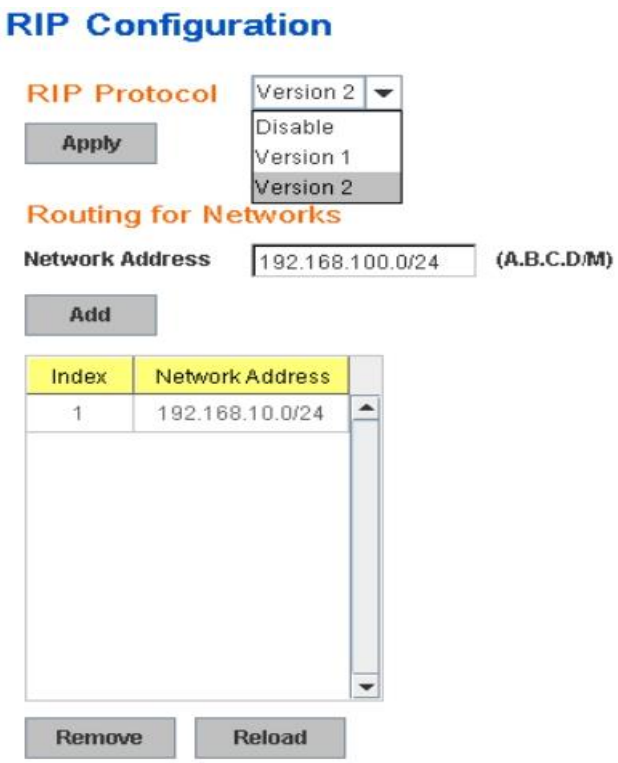
RIP Configuration:

This page shows how to configure RIP protocol.

RIP Protocol: Choose the RIP Version 1 or Version 2 or Disable RIP protocol in here.

Routing for Networks: All the networks no matter directly connected or learnt from other router/switch should be added to the switch. The format is IP Network/bit mask. For example, 192.168.100.0/24. After type the network address, click "**Add**" to the RIP table.

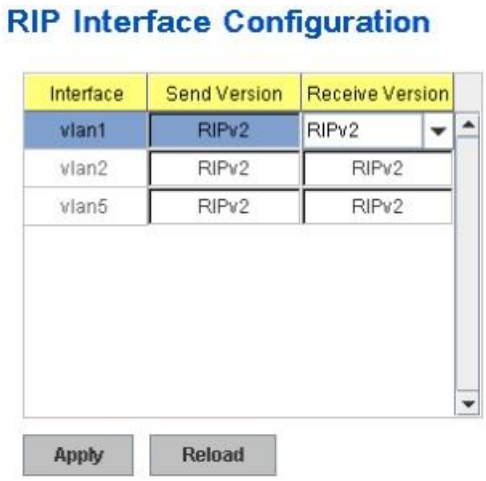
Select the network address and click "**Remove**" to remove it. Click "**Reload**" to see the updated RIP table.



In RIP Interface Configuration, you can configure Send Version and Receiver Version.

Select the RIP Version of the interface.

Once you finish configuring the settings, click on **Apply** to apply your configuration.



4.10.5 OSPF

The OSPF is short of the Open Shortest Path First.

OSPF is a link-state protocol. The Link is an interface on the router, it equips the IP, mask, the type of network, the routers connected to that network. The State is its relationship to its neighboring routers. The Metric is the distance between the 2 links, it is usually the bandwidth of the link in link-state protocol. The Link State Database is the collection of all these link states. The destination network address, the shortest metric to the network and the IP address of the next hop are specified in the link state database.

The figure in the right is the example OSPF network. There are 6 routing switch, A~F. The Routers/Switch periodically sends “Hello” packets to the neighbors and exchange OSPF link state with each other and then update the Routing table of each router/switch.

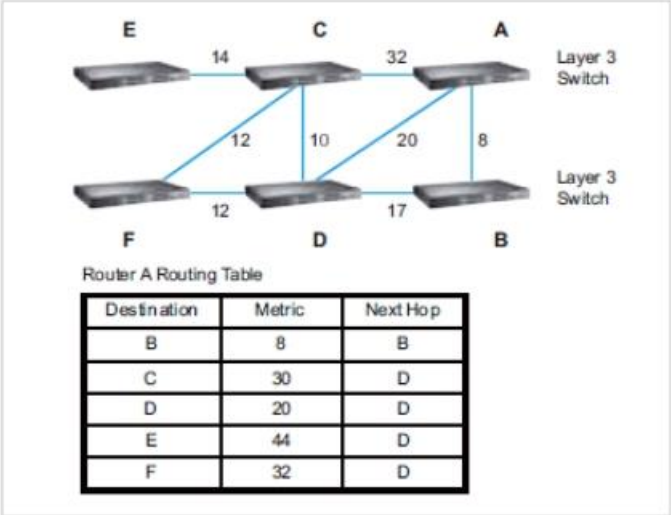
Use the communication between A to C for example. In hop-based routing protocol, like RIP, the A to C is the shortest way.

However, in link-state protocol, like the OSFP, the A to D to C is
the shortest way. This is calculated by the Dijkstra’s SPF Algorithm. After calculated and routing table updated, the metric from A to C is 32, the metric from A to D to C is 30. The A to D to C will be selected as the beast route from A to C.

The OSPF is a complex protocol which defines the role of the router/switch when it is installed in different Areas of the autonomous system. The Area is a group of routers, the OSPF uses flooding to exchange link-state updates between routers. The routers within the same area update its routing table. Any change in routing information is flooded to all routers in the same area.

The OSPF design comforts to the OSPF Version 2 specification. Typically, acts as the Internal

Router, a router within the area; the Designated Router, the Master router in the same broadcast domain within the area; the Area Board Router which is the boundary router between different area. While configuring the OSPF network, the area ID should be configured with the same IP address or the same area ID. The 0.0.0.0 is usually used.



Router A Routing Table

Destination	Metric	Next Hop
B	8	B
C	30	D
D	20	D
E	44	D
F	32	D

4.10.5.1 OSPF Configuration

This page allows user to enable OSPF setting and configure the related settings and networks.

OSPF Protocol: Enable or Disable the OSFP routing protocol.

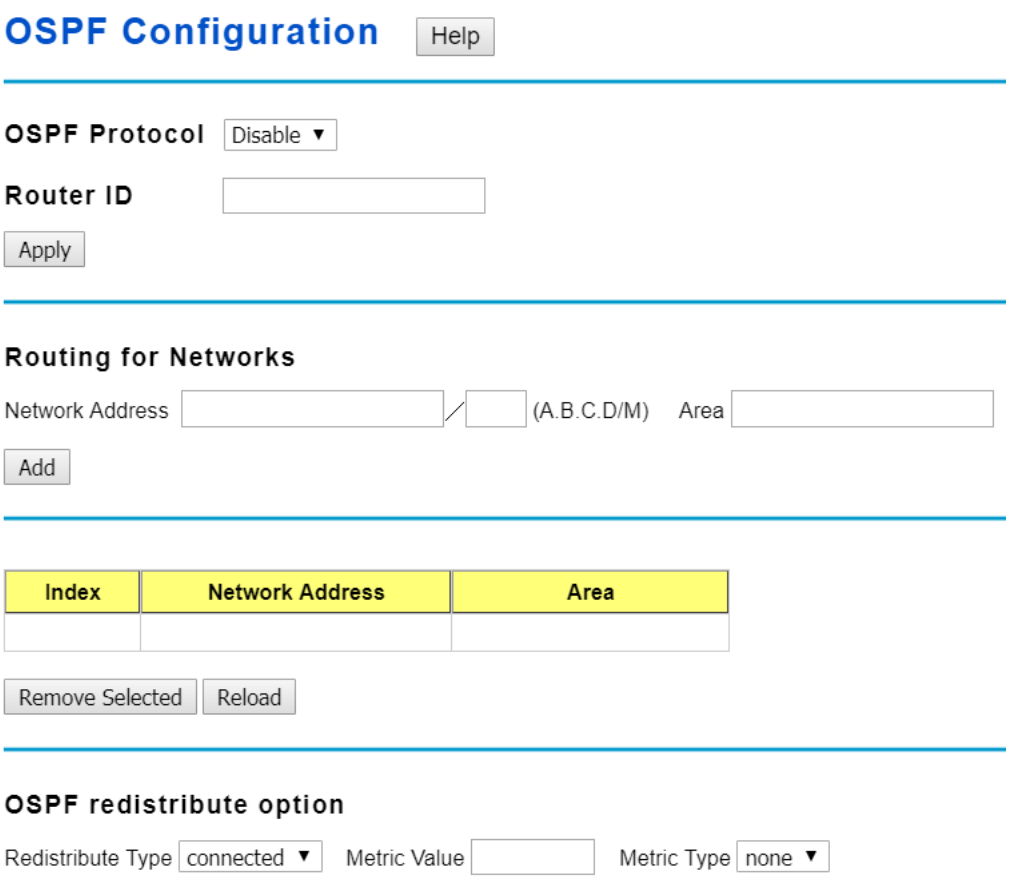
Router ID: The router ID can be any IP address, however, the IP address of the existed local interface is suggested. With such IP address, you can find the router/switch easier.

Router ID is used while connected multiple OSPF routers/switches to the same broadcast domain, the lowest Router ID will be selected as the Designated Router in the network.

Routing for Network: Type the network address and the Area ID in the field. Click “Add” to apply the setting. You can see the network table in below.

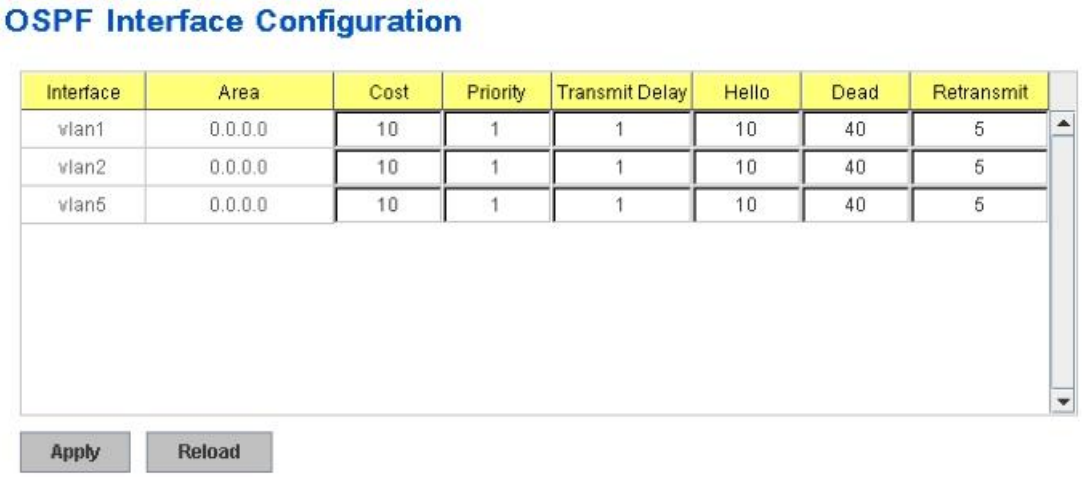
Note: All the Area ID of the router/switch within the same area should use the same IP address or ID. All the network address should be added.

Select the Network Address, then you can “Remove” the setting. Click “Reload” to reload the new entry.



4.10.5.2 OSPF Interface Configuration

This page allows user to see the OSPF network address and the parameters of each interface.



Interface: The VLAN Interface name.

Area: The area ID of the Interface you added. The Area ID must be the same for all routers/switches on a network.

Cost: The distance of this link/Interface, the default is identified depends on what the bandwidth is by the system. The value can be changed to decide the best router.

Priority: The priority of this link/Interface. Set priority to help find the OSPF designated router for a network. The default is 1. The range is 0 to 255.

Transmit Delay: The transmit delay timer of this link/Interface. Transmit Delay is the estimated number of seconds to wait before sending a link state update packet. The default value is 1 second.

Hello: The Hello timer of this link/Interface. The value must be the same for all routers/switches on a network. The default value is 10 seconds. The min. value is 1.

Dead: The Dead Interval Timer of this link/Interface. The Dead timer is the time to identify whether the interface is down or not before the neighbors declare the OSPF router to be down. The default value is 4 times (40 seconds) than the Hello interval (default is 10).

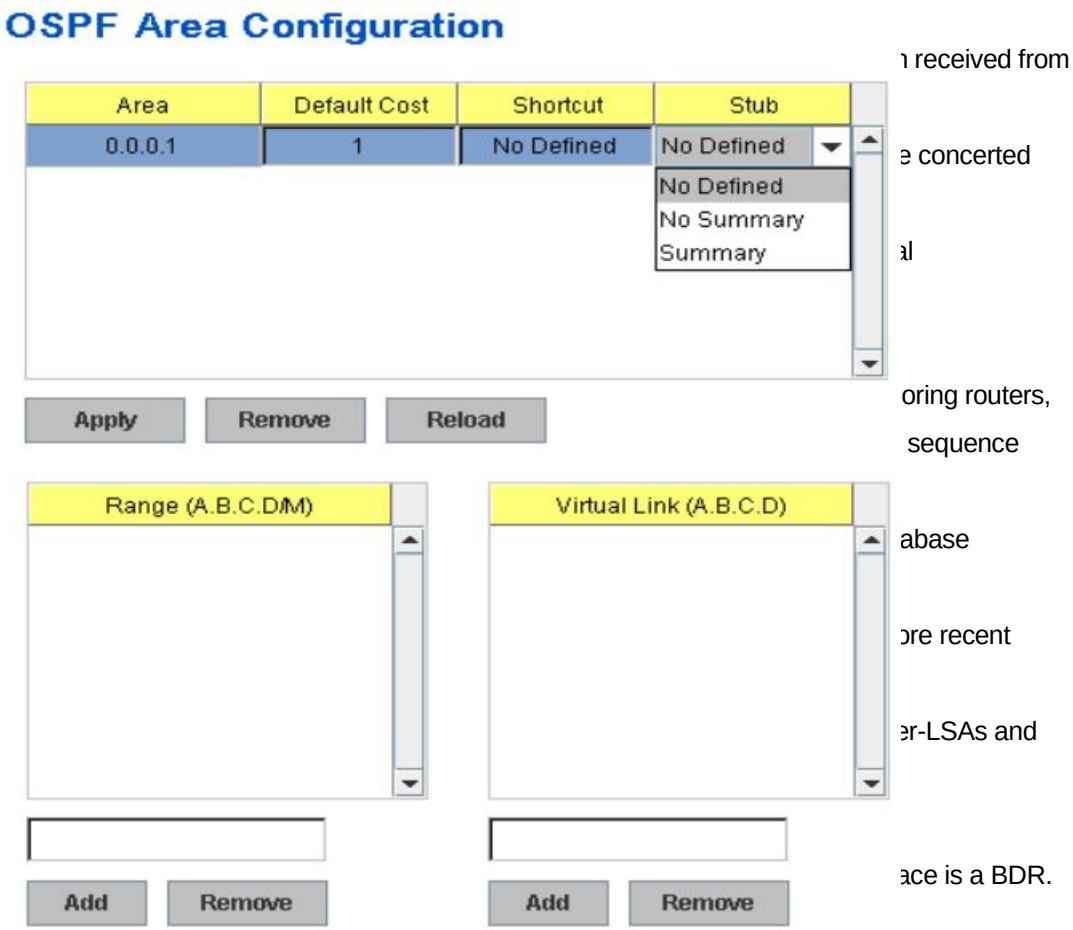
Retransmit: The count of Retransmit of this link/Interface. The Retransmit time specifies the number of seconds between link state advertisement transmissions. The default value is 5 seconds.

Once you finish configuring the settings, click on Apply to apply your configuration.

4.10.5.3 OSPF Neighbor Table

This page allows user to see the OSPF Neighbor information. The Neighbor interface and its state will be listed here.

Below is the example of a simple OSPF environment. The Hello packets are exchanged between the switch to next switches. While the State is changed to “Full”, that means the exchange progress is done. The Neighbor ID is the Router ID of the Neighbor routers/switches. The Priority is the priority of the link. The Dead Time is the activated time of the link. There are 2 interfaces attached the switch you check. The IP address shows the learnt IP interface of the next hops. And the Interface shows the connected local interface.



4.10.5.4 OSPF Area Configuration

This page allows user to configure the OSPF Area information.

An OSPF domain is divided into different areas. Areas are logical grouping of hosts and networks, including their routers having interfaces connected to any of the included networks. Each area maintains its own link state database. In OSPF, all areas must be connected to a backbone area. The backbone area is responsible for distributing routing information between non-backbone areas.

It is usually installed as internal router of a single Area environment. While there are multiple areas in the network, this page allows modify the Area information and Virtual Link.

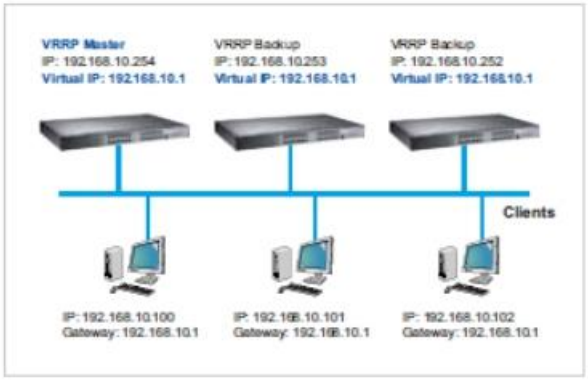
Area: This field indicates the area ID. Select the ID you want to modify here.

Default Cost: The default cost of the area ID.

Shortcut: No Defined, Disable, Enable. This indicates whether the area is the OSPF ABR shortcut mode.

Stub: Represents whether the specified Area is a stub area or not. The possible values are No Defined, No Summary and Summary. Summary is used to advertise summary routes.

Virtual Link (A.B.C.D.): You can configure the virtual link. One area must be common area between two endpoint routers to create virtual links.



Once you finish configuring the settings, click on **Apply** or **Add** to apply your configuration.

4.10.6 VRRP

The VRRP represent for the Virtual Router Redundancy Protocol.

To further ensure the high reliability of an environment, the JetNet Layer 3 switch supports the VRRP protocol allowing the hosts to continuously direct traffic to the default gateway without the default gateway configuration change.

The figure for example, there are 3 VRRP-aware switches with the same Virtual IP of the VRRP, but different IP address of their VLAN/IP interface. One is selected as the VRRP Master and the others are VRRP Backup. The client PCs has the same gateway IP which is the virtual IP of the 3 switches. Once the VRRP Master switch or the VLAN interface failure, the VRRP Backup switch will act as the new Master immediately, thus the communication from the client PC will not stop.

Virtual Router Interface

The fields allow you to create the Virtual Router Interface. All the layer 3 switches within the same VRRP domain should be located within the same IP network and equips with the same Virtual ID and Virtual IP address.

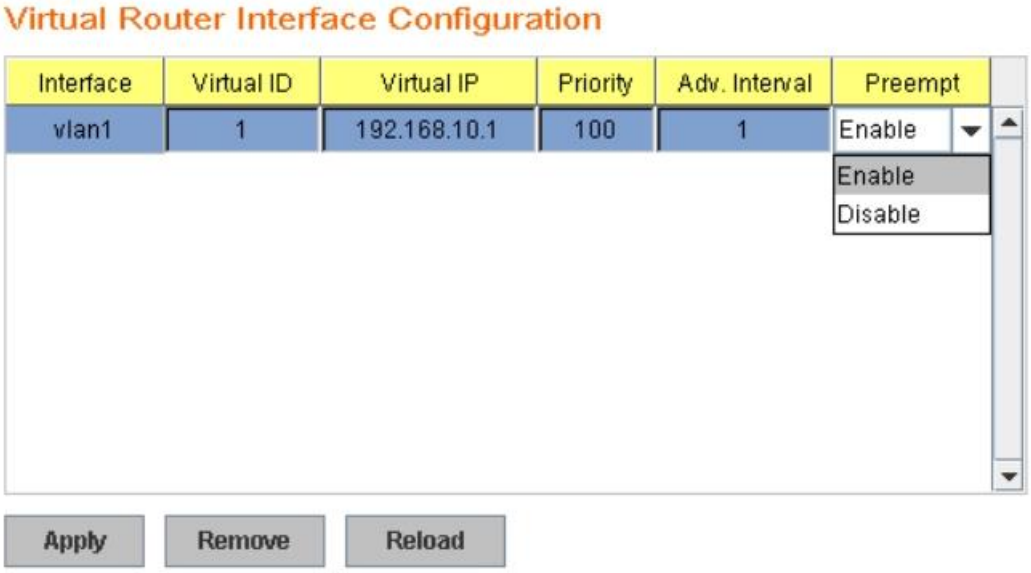
Interface: Select the interface for the VRRP domain.

Virtual ID: This is a virtual ID range from 1~255. The switches within the same VRRP domain should have the same Virtual ID.

Virtual IP: This is the virtual IP of the VRRP domain. This is the Gateway IP of the clients.

Click “Add” once you finish the configuration. Then you can see the entry is created in the

Virtual Router Interface Configuration page



Virtual Router Interface Configuration

After the VRRP interface is created, you can see the new entry and adjust the settings to decide the policy of the VRRP domain.

Interface: Select the interface for the VRRP domain.

Virtual ID: This is a virtual ID range from 1~255. The switches within the same VRRP domain should have the same Virtual ID.

Virtual IP: This is the virtual IP of the VRRP domain. This is the Gateway IP of the clients.

Priority: The priority of the entry of this switch. In VRRP domain, the VRRP switches must have the same Virtual ID and Virtual IP settings and choose who should be the VRRP Master switch. The switch equips with the highest priority will be selected as the VRRP master. The priority setting field can be manually changed, the range is from 1~254, 255 for virtual IP owner and 100 for backup by default.

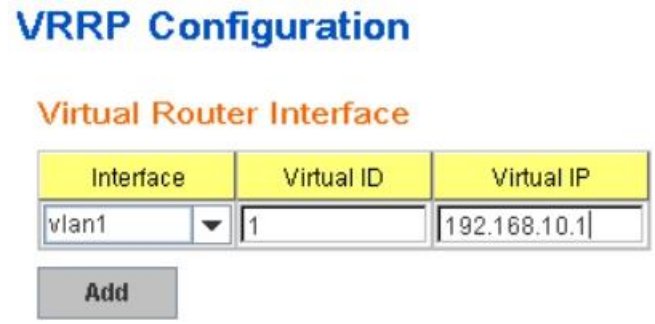
Adv. Interval: This field indicates how often the VRRP switches exchange the VRRP settings.

Preempt: While the VRRP Master link is failure, the VRRP Backup will take over its job immediately. However, while the VRRP master link is recovered, who should be the Master? The Preempt decide whether the VRRP master should be recovered or not.

While the Preempt is **Enabled** and the interface is VRRP Master, the interface will be recovered.

While the Preempt is **Disabled** and the interface is VRRP Master, there is no change while the link is recovered. The VRRP backup acts as the Master before restart the switches.

Click "**Apply**" to change the setting. "**Remove**" to remove the entry. "**Reload**" to reload the new entry and settings.



Virtual Router Status

This page displays the Virtual Router Status of the switch. You can see the related VRRP information after the VRRP switches exchanging information.

4.10.7 CLI Commands of the Routing Feature

Command Lines of the Routing configuration

Feature	Command Line
ARP	
Age Time	Switch(config)# arp aging-time <10-21600> seconds (10-21600)
Static ARP Entry	Switch(config)# arp A.B.C.D IP address of ARP entry aging-time Aging Time Switch(config)# arp 192.168.100.1 MACADDR 48-bit hardware address of ARP entry Switch(config)# arp 192.168.100.1 0012-7712-3456 IFNAME L3 interface Switch(config)# arp 192.168.100.1 0012-7712-3456 fa1 PORT L2 port

ARP Table	Switch# show arp IP address Mac Address Port Vlan Age(min) Type
ARP Table Status	Switch# show arp status Age Time (secs) : 9600 ARP entry count : 1
IP	
Global IP Routing	Switch(config)# ip routing
Stop IP Routing	Switch(config)# no ip routing <cr> Note: After enabling the command, the networks of routing
IP Interface Configuration	
Go to the VLAN Interface	Switch(config)# interface vlan 1 Switch(config-if)#
Create IP Address	Switch(config-if)# ip address A.B.C.D/M IP address (e.g. 10.0.0.1/8) Switch(config-if)# ip address 192.168.10.43/24
Create Secondary IP	Switch(config-if)# ip address 192.168.101.43/24 secondary
Change Interface to DOWN	Switch(config-if)# shutdown <cr>
	Interface vlan1 Change to DOWN
Activate the IP Interface	Switch(config-if)# no shutdown arping for the MAC arp: SIOCDARP(pub): No such file or directory ARPING to 192.168.10.254 from 192.168.10.43 via vlan1 Sent 3 probe(s) (3 broadcast(s))
Show ip routing status	Switch# show ip routing

Show ip interface	Switch# show running-config …… ! interface vlan1 ip address 192.168.10.43/24 ip address 192.168.101.43/24 secondary ip address 192.168.11.1/24 secondary no shutdown ! interface vlan2 ip address 192.168.2.254/24
Router	
Default Route	Switch(config)# ip route 0.0.0.0 0.0.0.0 192.168.100.1 The first 0.0.0.0 means all the unknown networks. The second 0.0.0.0 means all the masks.
Static Route	Switch# show ip route 192.168.11.0 (static network IP) Routing entry for 192.168.11.0/24 Known via "connected", distance 0, metric 0, best * directly connected, vlan1 Routing entry for 192.168.11.0/24 Known via "static", distance 1, metric 0 192.168.10.254, via vlan1
Show Static/Dynamic Route	Switch# show running-config …… ! ip route 0.0.0.0/0 192.168.100.1
Routing Table Display	Switch# show ip route Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF, B - BGP, > - selected route, * - FIB route
	C>* 192.168.2.0/24 is directly connected, vlan2 O>* 192.168.3.0/24 [110/30] via 192.168.5.254, vlan5, 00:09:31 O>* 192.168.4.0/24 [110/20] via 192.168.5.254, vlan5, 00:09:31

RIP **(Before enable RIP, the IP Interfaces' setting should be configured and activated**	
Enable RIP protocol	Switch(config)# router rip Switch(config-router)# default-information Control distribution of default route default-metric Set a metric of redistribute routes distance Administrative distance distribute-list Filter networks in routing updates end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list neighbor Specify a neighbor router network Enable routing on an IP network no Negate a command or set its defaults offset-list Modify RIP metric passive-interface Suppress routing updates on an
RIP Version	Switch(config-router)# version <1-2> version
RIP Network	Switch(config-router)# network 192.168.100.0/24
RIP Timer	Switch(config-router)# timers basic <5-2147483647> Routing table update timer value in
RIP Split Horizon	Switch(config-router)# passive-interface IFNAME Interface name

	Switch(config-router)# passive-interface default
RIP default Metric	Switch(config-router)# default-metric

RIP Setting	Switch# show ip rip status Routing Protocol is "rip" Sending updates every 30 seconds with +/-50%, next due in 23 seconds Timeout after 180 seconds, garbage collect after 120 seconds Outgoing update filter list for all interface is not set Incoming update filter list for all interface is not set Default redistribution metric is 1 Redistributing: Default version control: send version 2, receive version 2 Interface Send Recv Key-chain vlan1 2 2 Routing for Networks: 192.168.10.0/24 192.168.100.0/24 Passive Interface(s): sw0.1 Routing Information Sources: Gateway BadPackets BadRoutes Distance Last Update
RIP Table	Switch# show ip rip Codes: R - RIP, C - connected, S - Static, O - OSPF, B - BGP Sub-codes: (n) - normal, (s) - static, (d) - default, (r) - redistribute, (i) - interface Network Next Hop Metric From Tag Time C(i) 192.168.10.0/24 0.0.0.0 1 self 0
OSPF **(Before enable OSPF, the IP Interfaces' setting should be configured and**	
Go to the OSPF command line	Switch(config)# router ospf Switch(config-router)# area OSPF area parameters auto-cost Calculate OSPF interface cost according to bandwidth

	information default-metric Set metric of redistributed routes distance Define an administrative distance distribute-list Filter networks in routing updates end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list neighbor Specify neighbor router network Enable routing on an IP network no Negate a command or set its defaults passive-interface Suppress routing updates on an
Router ID for OSPF	Switch(config-router)# router-id 192.168.3.253
OSPF Network and its Area ID (0.0.0.0 for example)	Switch(config-router)# network 192.168.3.0/24 area <0-4294967295> OSPF area ID as a decimal value A.B.C.D OSPF area ID in IP address format
Interface Configuration	
Hello Interface	Switch(config-if)# ip ospf hello-interval <1-65535> Seconds
Link Cost Change	Switch(config-if)# ip ospf cost <1-65535> Cost
Link Priority	Switch(config-if)# ip ospf priority <0-255> Priority
Display	

IP OSPF Information	Switch# show ip ospf OSPF Routing Process, Router ID: 192.168.3.254 Supports only single TOS (TOS0) routes This implementation conforms to RFC2328 RFC1583Compatibility flag is disabled SPF schedule delay 1 secs, Hold time between two SPFs 1 secs Refresh timer 10 secs Number of external LSA 0 Number of areas attached to this router: 1
IP OSPF Datasheet	Switch# show ip ospf database

	OSPF Router with ID (192.168.3.254) Router Link States (Area 0.0.0.0) Link ID ADV Router Age Seq# CkSum Link count 192.168.3.253 192.168.3.253 928 0x80000009 0xf3b2 2 192.168.3.254 192.168.3.254 927 0x8000000a 0xd4aa 3 192.168.5.254 192.168.5.254 230 0x80000006 0xc248 2 Net Link States (Area 0.0.0.0) Link ID ADV Router Age Seq# CkSum 192.168.3.254 192.168.3.254 927 0x80000003 0x7437 192.168.4.253 192.168.5.254 235 0x80000003 0x7334

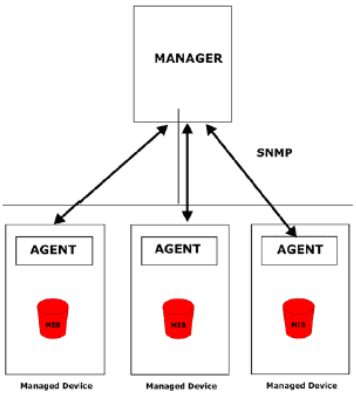
IP OSPF Interface Information	Switch# show ip ospf interface [IFNAME] Interface name Switch# show ip ospf interface vlan2 vlan2 is up Internet Address 192.168.2.253/24, Area 0.0.0.0 Router ID 192.168.3.253, Network Type BROADCAST, Cost 10 Transmit Delay is 1 sec, State DR, Priority 1 Designated Router (ID) 192.168.3.253, Interface Address 192.168.2.253
IP OSPF Neighbor Table	Switch# show ip ospf neighbor Neighbor ID Pri State Dead Time Address Interface --- --- --- --- --- --- 0.0.0.0 1 Full/DROther 00:00:32 192.168.2.254 vlan2:192.168.2.253
IP OSPF Networking Routing Table	Switch# show ip ospf route ========== OSPF network routing table ========== N 192.168.2.0/24 [10] area: 0.0.0.0 directly attached to vlan2 N 192.168.3.0/24 [10] area: 0.0.0.0
OSPF Setting in Configuration file	Switch# show running-config …… router ospf router-id 192.168.3.253 network 192.168.2.0/24 area 0.0.0.0 network 192.168.3.0/24 area 0.0.0.0 network 192.168.11.0/24 area 0.0.0.0

Multicast Routing **(Before enable MRoute, the IP Interfaces' setting should be configured and**	
Enable the MRoute & Configure the static entry	witch(config)# ip multicast 224.0.1.10 vlan 1 interface gi2-3 vlan specify the ingress VLAN interface specify an interface list to add to IFLIST Interface list, ex: gi1,gi3-4

VRRP	
IP of VRRP	Switch(config-if)# vrrp 1 ip 192.168.10.1 The virtual router of vlan1 count is 1.
Priority of the interface	Switch(config-if)# vrrp 1 priority <1-254> virtual router's priority value in range 1-254, 255 for virtual IP
Preempt of the interface	Switch(config-if)# vrrp 1 preempt
VRRP Information	Switch# show vrrp [1-255] virtual router identifier in the range 1-255 (decimal) brief display a summary view of the virtual router information Switch# show vrrp vlan1 - Virtual Router ID 1 State is Master Virtual IP address is 192.168.10.1 Virtual MAC address is 0000.5e00.0101 Priority is 100 Advertisement interval is 1 sec Preemption is enabled Master Router is 192.168.10.1 (local), priority is 100 Master Advertisement interval is 1.000 sec Master Down interval is 3.609 sec
VRRP Brief Information	Switch# show vrrp brief Interface VRID Priority Time Owner Preemption State Master addr Group addr vlan1 1 100 3.609 - enabled Master 192.168.10.1 192.168.10.1

4.11 SNMP

Simple Network Management Protocol (SNMP) is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. JetNet 7628X series support SNMP v1 and v2c and V3.



An SNMP managed network consists of two main components: agents and a manager. An agent is a management software module that resides in a managed switch. An agent translates the local management information from the managed device into a SNMP compatible format. The manager is the console through the network.

Following commands are included in this group:

4.11.1 SNMP Configuration

4.11.2 SNMPv3 Profile

4.11.3 SNMP Traps

4.11.4 SNMP CLI Commands for SNMP

4.11.1 SNMP Configuration

This page allows users to configure SNMP V1/V2c Community. The community string can be viewed as the password because SNMP V1/V2c doesn't request you to enter password before you try to access SNMP agent.

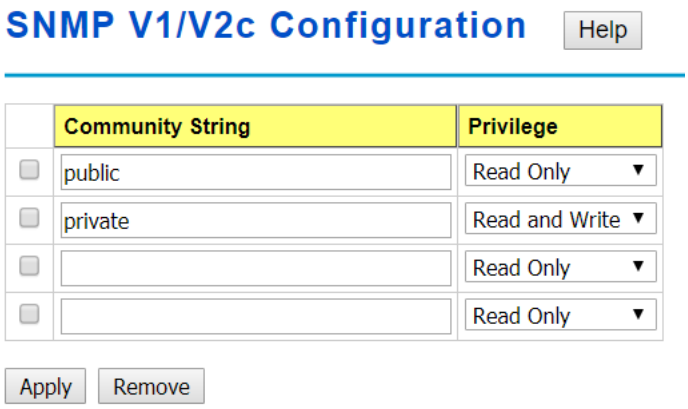
The community includes 2 privileges, Read Only and Read and Write.

With **Read Only** privilege, you only have the ability to read the values of MIB tables. Default community string is Public.

With **Read and Write** privilege, you have the ability to read and set the values of MIB tables. Default community string is Private.

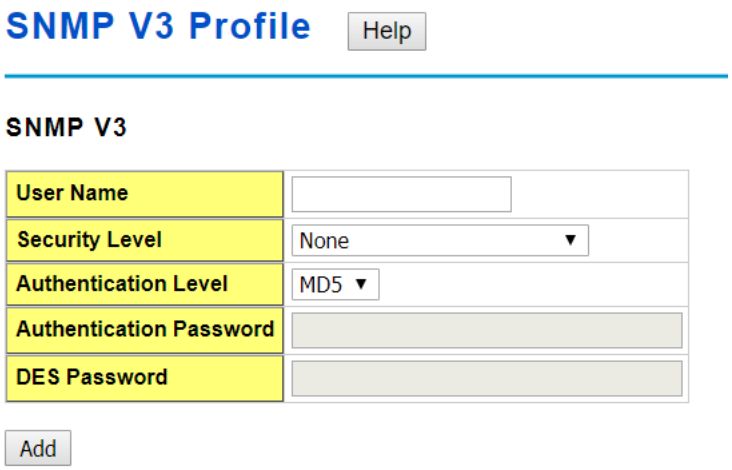
JetNet 7628X allows users to assign 4 community strings. Type the community string and select the privilege. Then press **Apply**.

Note: *When you first install the device in your network, we highly recommend you to change the community string. Since most SNMP management application uses Public and Private as their default community name, this might be the leakage of the network security.*



4.11.2 SNMP V3 Profile

SNMP v3 can provide more security functions when the user performs remote management through SNMP protocol. It delivers SNMP information to the administrator with user authentication; all of data between *JetNet 7628X* and the administrator are encrypted to ensure secure communication.



Security Level: Here the user can select the following levels of security: None, Authentication, and “Authentication and Privacy”.

Auth. Protocol: Here the user can select either MD5 (Message-Digest algorithm 5) or SHA (Secure Hash Algorithm). MD5 is a widely used cryptographic hash function with a 128-bit hash value. SHA (Secure Hash Algorithm) hash functions refer to five Federal Information Processing Standard-approved algorithms for computing a condensed digital representation. *JetNet 7628X* provides 2 user authentication protocols in MD5 and SHA. You will need to configure SNMP v3 parameters for your SNMP tool with the same authentication method.

Auth. Password: Here the user enters the SNMP v3 user authentication password.

DES Encryption Password: Here the user enters the password for SNMP v3 user DES

Encryption.

4.11.3 SNMP Traps

SNMP Trap is the notification feature defined by SNMP protocol. All the SNMP management applications can understand such trap information. So you don't need to install new application to read the notification information.

This page allows users to **Enable SNMP Trap,** configure the **SNMP Trap server IP**, **Community** name, and trap **Version V1 or V2**. After configuration, you can see the change of the SNMP pre-defined standard traps and Korenix pre-defined traps. The pre-defined traps can be found in Korenix private MIB.

4.11.4 CLI Commands of the SNMP

Command Lines of the SNMP configuration

Feature	Command Line
SNMP Community	
Read Only Community	Switch(config)# snmp-server community public ro community string add ok
Read Write Community	Switch(config)# snmp-server community private rw community string add ok
SNMP Trap	
Enable Trap	Switch(config)# snmp-server enable trap

	Set SNMP trap enable ok.
SNMP Trap Server IP without specific community name	Switch(config)# snmp-server host 192.168.10.33 SNMP trap host add OK.
SNMP Trap Server IP with version 1 and community	Switch(config)# snmp-server host 192.168.10.33 version 1 private SNMP trap host add OK. ***Note: private is the community name, version 1 is the SNMP version***
SNMP Trap Server IP with version 2 and community	Switch(config)# snmp-server host 192.168.10.33 version 2 private SNMP trap host add OK.
Disable SNMP Trap	Switch(config)# no snmp-server enable trap Set SNMP trap disable ok.
Display	Switch# sh snmp-server trap SNMP trap: Enabled SNMP trap community: public Switch# show running-config ..... snmp-server community public ro snmp-server community private rw snmp-server enable trap snmp-server host 192.168.10.33 version 2 admin snmp-server host 192.168.10.33 version 1 admin ……..

4.12 Security

JetNet 7628X provides several security features for you to secure your connection. The features include Port Security and IP Security.

Following commands are included in this group:

4.12.1 Filter Set (Access Control List)

4.12.2 IEEE 802.1x

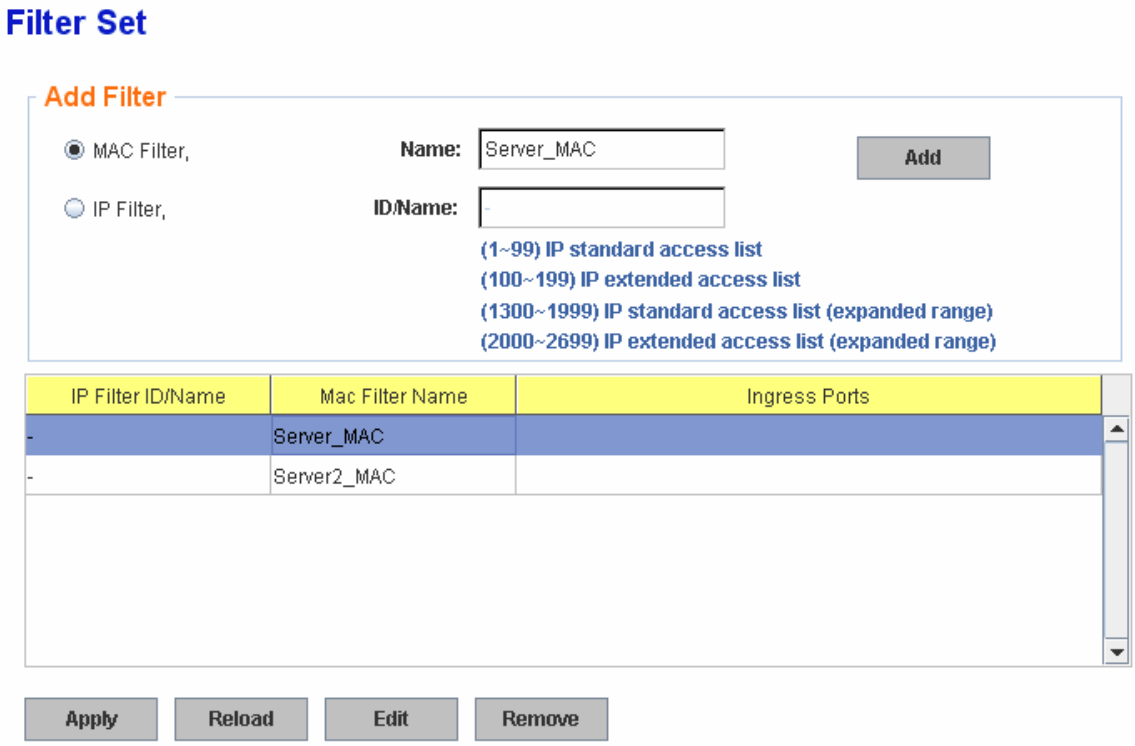
4.12.3 CLI Commands of the Security

4.12.1 Filter Set (Access Control List)

The Filter Set is known as Access Control List feature. There are 2 major types, one is MAC Filter, it is also known as Port Security in other JetNet series. It allows user to define the access rule based on the MAC address flexibility. Another one is IP Filter. It includes the IP security known in other JetNet series, IP Standard access list and advanced IP based access lists.

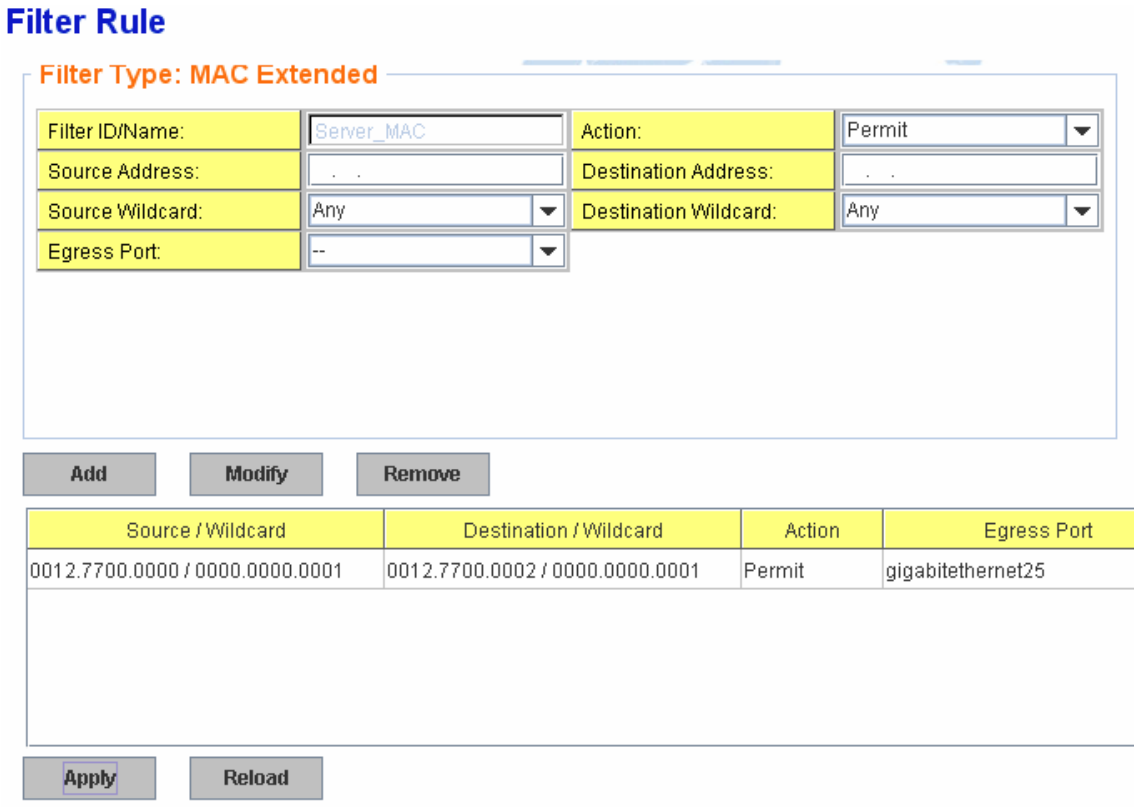
ACE is short of Access Control Entry, user defines the Permit or Deny rule for specific IP/MAC address or IP groups by network mask in each ACE. One ACL may include several ACEs, the system checks the ACEs one after one and forward based on the result. Once the rules conflict, the old entry is selected as the forward rule.

Type the **Name** when select **MAC Filter**, type **ID/Name** when select **IP Filter**. The ID for IP access list is listed as below of the field. Click **Add** to add the rule. Click **Edit** to edit the content for the rule. After configured, click **Apply** to apply all the rules. **Reload** to reload setting. **Remove** to remove one of the entries.



MAC Filter (Port Security):

The MAC Filter allows user to define the Access Control List for specific MAC address or a group of MAC addresses.



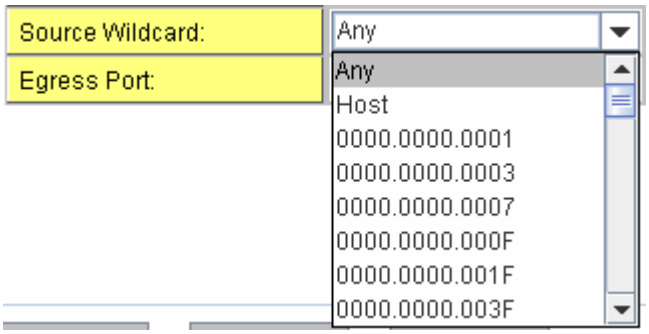
Filter ID/Name: The name for this MAC Filter entry.

Action: Permit to permit traffic from specified sources. **Deny** to deny traffic from those sources.

Source/Destination Address: Type the MAC address you want configure, the format is "AABB.CCDD.EEFF". Example: "Source to Destination" is "0012.7700.0000 to 0012.7700.0002".

Source/Destination Wildcard: This command allows user to define single host or a group of hosts based on the wildcard. Some of the allowance examples are as below:

Wildcard	Bit	Number of allowance	Note
Any	1111.1111.1111	All	
Host		1	Only the Source or Destination.
0000.0000.0003	0000.0000.000(00000011)	3	
0000.0000.0007	0000.0000.000(00000111)	7	
0000.0000.000F	0000.0000.000(11111111)	15	
....			



Egress Port: Bind the MAC Filter rule to specific front port.

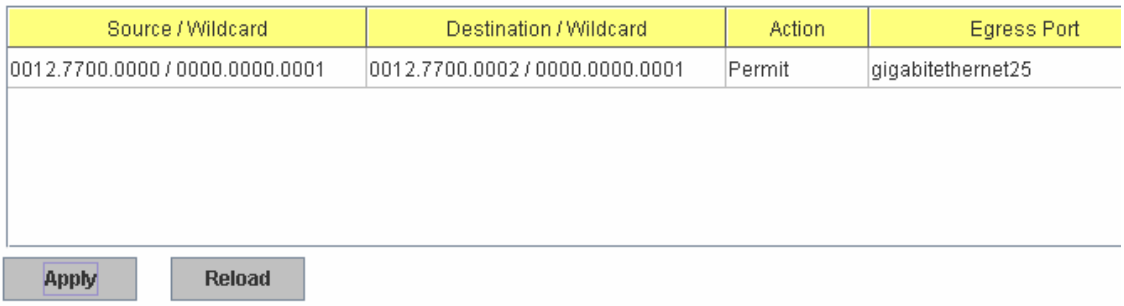
Once you finish configuring the ACE settings, click on **Add** to apply your configuration.

You can see below screen is shown.

Example of the below Entry:

Permit Source MAC "0012.7700.0000" to Destination MAC "0012.7700.0002".

The Permit rule is egress rule and it is bind to Gigabit Ethernet Port 25.

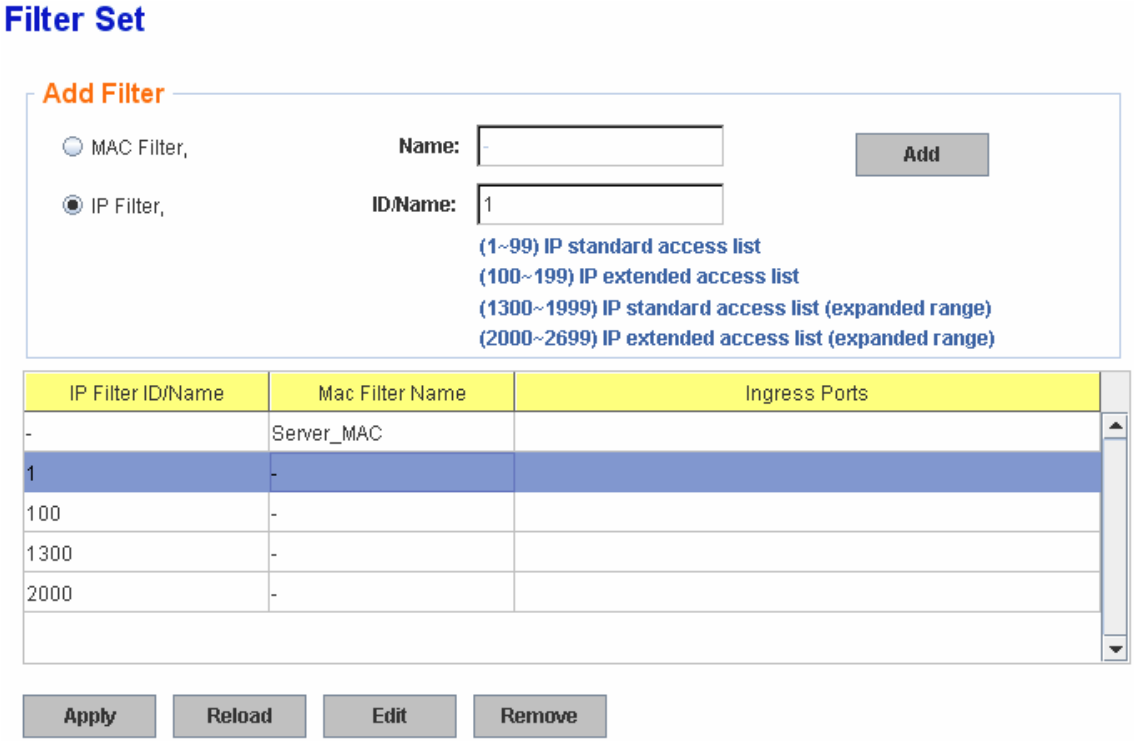


Once you finish configuring the settings, click on **Apply** to apply your configuration.

IP Filter:

Type **ID/Name** when select **IP Filter**. The ID for IP access list is listed as below of the field. You can also type ACL name in this field, it goes to IP Extended mode setting and support both IP Standard and IP Extended mode depend on the setting. Click **Add** to add the rule. Click **Edit** to edit the content for the rule. After configured, click **Apply** to apply all the rules. **Reload** to reload setting. **Remove** to remove one of the entries.

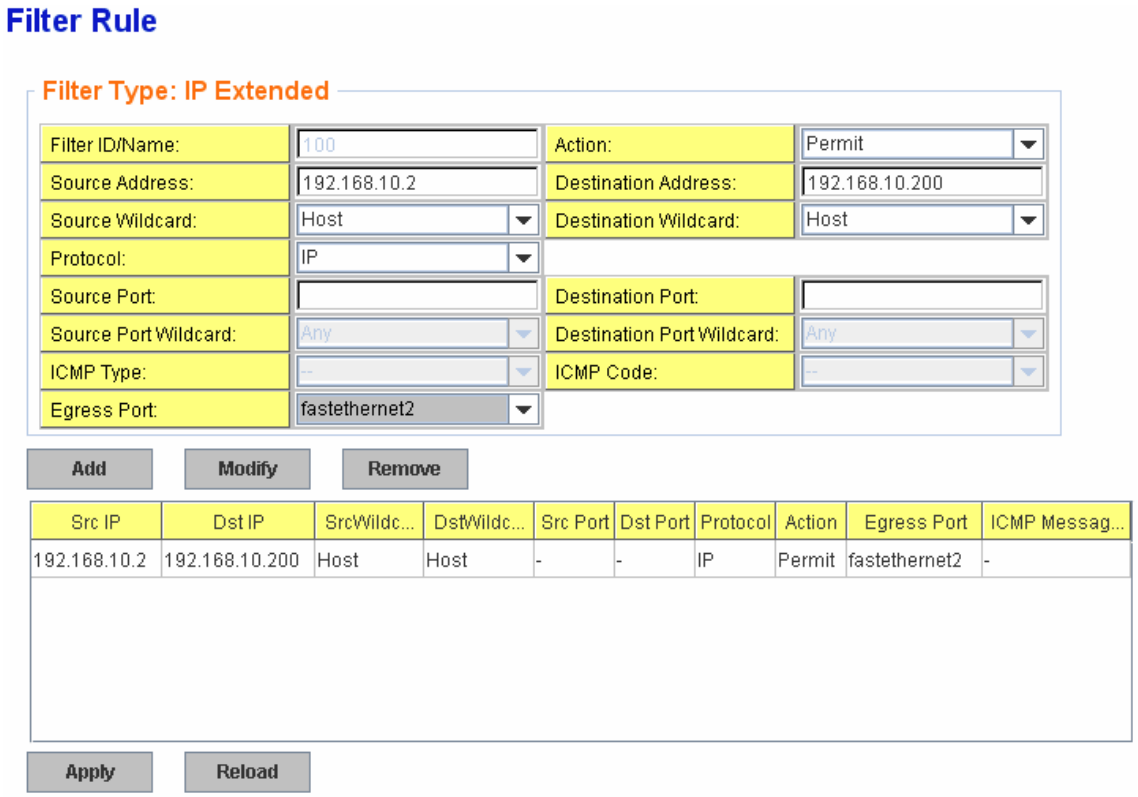
Example:



IP Standard Access List: This kind of ACL allows user to define filter rules according to the source IP address.

IP Extended Access List: This kind of ACL allows user to define filter rules according to the source IP address, destination IP address, Source TCP/UDP port, destination TCP/UDP port and ICMP type and code.

Click **Edit** to configure the IP Filter Rules.

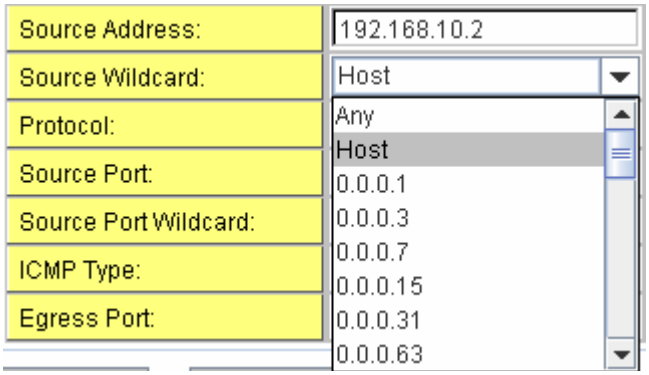


Filter ID/Name: The ID or the name for this IP Filter entry.

Action: Permit to permit traffic from specified sources. **Deny** to deny traffic from those sources.

Source/Destination Address: Type the source/destination IP address you want configure.

Source/Destination Wildcard: This command allows user to define single host or a group of hosts based on the wildcard. Some of the allowance examples are as below:



Wildcard	Bit	Number of allowance	Note
Any	11111111.11111111. 11111111.11111111	All	All IP addresses. Or a mask: 255.255.255.255
Host	0.0.0.0	1	Only the Source or Destination host.
0.0.0.3	0.0.0.(00000011)	3	
0.0.0.7	0.0.0.(00000111)	7	
0.0.0.15	0.0.0.(11111111)	15	
....			

Note: The mask is a wildcard mask: the high-order bits of the mask that are binary zeros determine how many corresponding high-order bits in the IP address are significant. The selected action applies to any source address with these high-order bits.

Protocol: Select a protocol you want associate with the filter. The field includes IP, TCP, UDP or ICMP type.

Destination Port: TCP/UDP port of the Destination Port field.

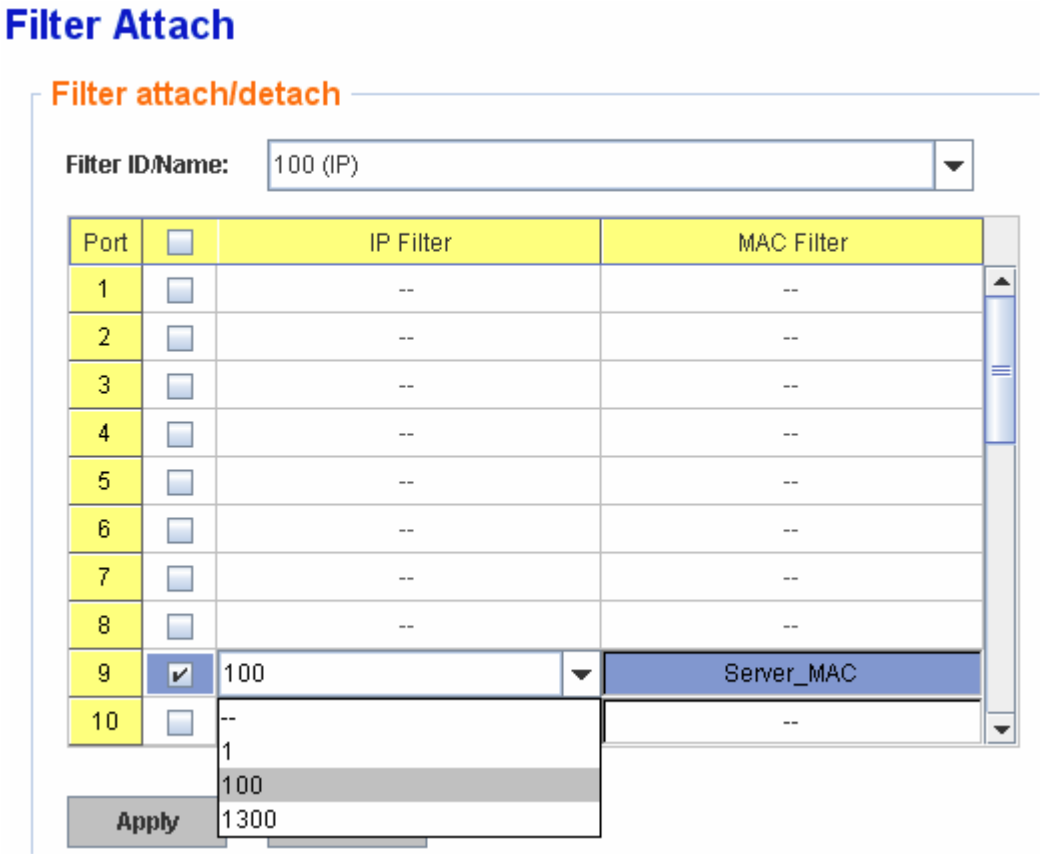
ICMP Type: The ICMP Protocol Type range from 1 ~ 255.

ICMP Code: The ICMP Protocol Code range from 1 ~ 255.

Egress Port: Bind this Filter to selected egress port.

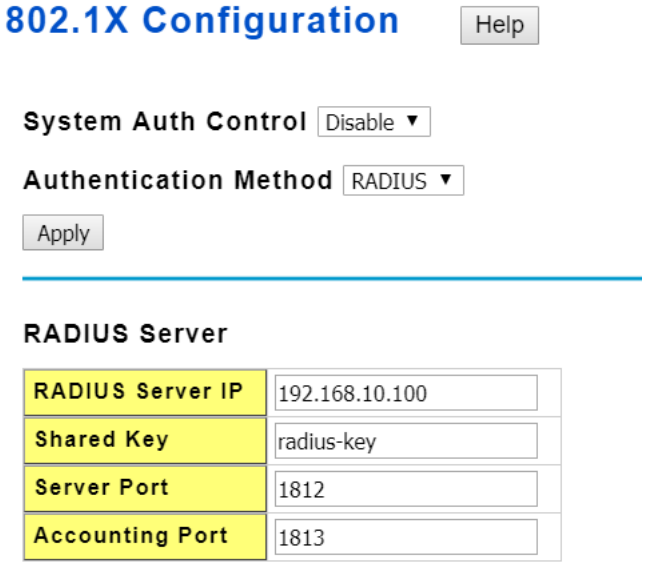
Click the **Add** button to add the rule to the Filter. Click the **Remove** button to remove the selected rule from Filter. Click the **Modify** button to edit the rule which you selected. Click the **Reload** button to reload the rule table.

Click the **Apply** button to apply the Filter configurations.



IEEE 802.1 802.1X configuration

IEEE 802.1X is the protocol that performing authentication to obtain access to IEEE 802 LANs. It is port-base network access control. With the function, JetNet 7628X could control which connection is available or not.



System AuthControl: To enable or disable the 802.1x authentication.

Authentication Method: Radius is a authentication server that provide key for authentication, with this method, user must connect switch to server. If user select Local for the authentication method, switch use the local user data base which can be create in this page for authentication.

Radius Server IP: The IP address of Radius server

Shared Key: The password is for communicating between switch and Radius Server.

Server Port: UDP port of Radius server.

Accounting Port: Port for packets that contain the information of account login or logout.

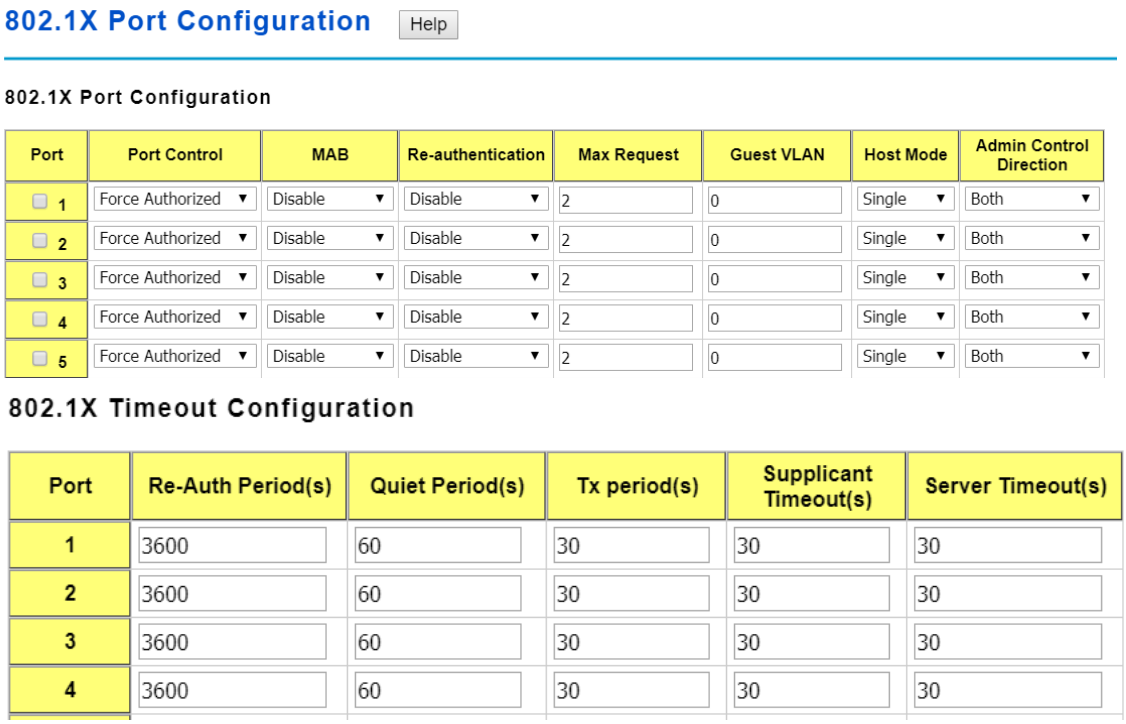
Secondary Radius Server IP: Secondary Radius Server could be set in case of the primary radius server down.

802.1X Local User: Here User can add Account/Password for local authentication.

802.1X Local user List: This is a list shows the account information, User also can remove selected account Here.

4.10.2.2 802.1x Port Configuration

After the configuration of Radius Server or Local user list, user also need configure the authentication mode, authentication behavior, applied VLAN for each port and permitted communication. The following information will explain the port configuration.



Port control: Force Authorized means this port is authorized; the data is free to in/out. Force unauthorized just opposite, the port is blocked. If users want to control this port with Radius Server, please select Auto for port control.

Reauthentication: If enable this field, switch will ask client to re-authenticate. The default time interval is 3600 seconds.

Max Request: the maximum times that the switch allow client request.

Guest VLAN: 0 to 4094 is available for this field. If this field is set to 0, that means the port is blocked after authentication fail. Otherwise, the port will be set to Guest VLAN.

Host Mode: if there are more than one device connected to this port, set the Host Mode to single means only the first PC authenticate success can access this port. If this port is set to multi, all the device can access this port once any one of them pass the authentication.

Control Direction: determined devices can end data out only or both send and receive.

Re-Auth Period: control the Re-authentication time interval, 1~65535 is available.

Quiet Period: When authentication failed, Switch will wait for a period and try to communicate with radius server again.

Tx period: the time interval of authentication request.

Supplicant Timeout: the timeout for the client authenticating

Sever Timeout: The timeout for server response for authenticating.

Once you finish configuring the settings, click on **Apply** to apply your configuration.

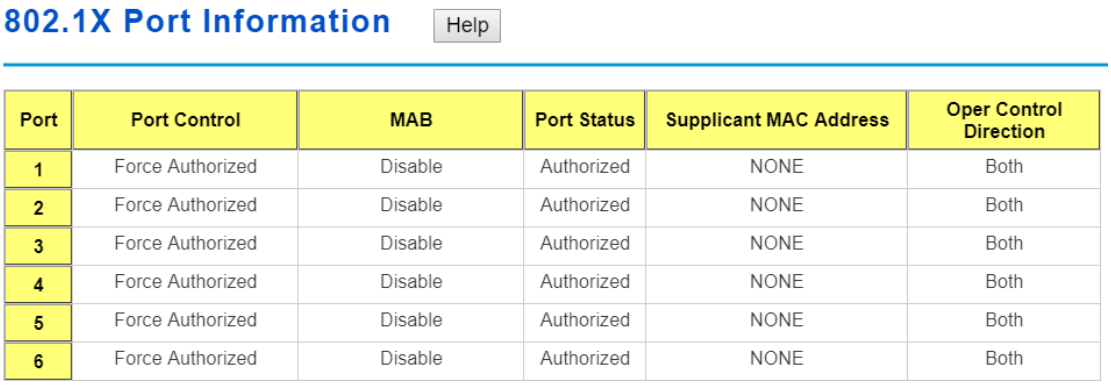
Click **Initialize Selected** to set the authorize state of selected port to initialize status.

Click **Reauthenticate Selected** to send EAP Request to supplicant to request reauthentication.

Click **Default Selected** to reset the configurable 802.1x parameters of selected port to the default values.

4.10.2.3 802.1X Port Information

Here user can observe the port status for Port control status, Authorize Status, Authorized Supplicant and Oper Control Direction each port.



Port	Port Control	MAB	Port Status	Supplicant MAC Address	Oper Control Direction
1	Force Authorized	Disable	Authorized	NONE	Both
2	Force Authorized	Disable	Authorized	NONE	Both
3	Force Authorized	Disable	Authorized	NONE	Both
4	Force Authorized	Disable	Authorized	NONE	Both
5	Force Authorized	Disable	Authorized	NONE	Both
6	Force Authorized	Disable	Authorized	NONE	Both

4.12.2 CLI Commands of the Security

Command Lines of the Security configuration

Feature	Command Line
Port Security	
Add MAC	Switch(config)# mac-address-table static 0012.7701.0101 vlan 1 interface fa1 mac-address-table unicast static set ok!
Port Security	Switch(config)# interface fa1 Switch(config-if)# switchport port-security Disables new MAC addresses learning and aging activities! ***Note: Rule: Add the static MAC, VLAN and Port binding first, then enable the port security to stop new MAC learning.***
Disable Port Security	Switch(config-if)# no switchport port-security Enable new MAC addresses learning and aging activities!
Display	Switch# show mac-address-table static Destination Address Address Type Vlan Destination Port ---------- ---------- ------- ----------

	0012.7701.0101 Static 1 fa1
IP Security	
IP Security	Switch(config)# ip security Set ip security enable ok. Switch(config)# ip security host 192.168.10.33 Add ip security host 192.168.10.33 ok.
Display	Switch# show ip security ip security is enabled ip security host: 192.168.10.33
802.1x	
enable diable	Switch(config)# dot1x system-auth-control Switch(config)# Switch(config)# no dot1x system-auth-control Switch(config)#
authentic-method	Switch(config)# dot1x authentic-method local Use the local username database for authentication radius Use the Remote Authentication Dial-In User Service (RADIUS) servers for authentication Switch(config)# dot1x authentic-method radius Switch(config)#
radius server-ip	Switch(config)# dot1x radius Switch(config)# dot1x radius server-ip 192.168.10.120 key 1234 RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP : 192.168.10.120 RADIUS Server Key : 1234 RADIUS Server Port : 1812 RADIUS Accounting Port : 1813 Switch(config)#
radius server-ip	Switch(config)# dot1x radius Switch(config)# dot1x radius server-ip 192.168.10.120 key 1234 RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP : 192.168.10.120 RADIUS Server Key : 1234 RADIUS Server Port : 1812 RADIUS Accounting Port : 1813 Switch(config)#
radius secondary-server-ip	Switch(config)# dot1x radius secondary-server-ip 192.168.10.250 key 5678 Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) Secondary RADIUS Server IP : 192.168.10.250 Secondary RADIUS Server Key : 5678 Secondary RADIUS Server Port : 1812 Secondary RADIUS Accounting Port : 1813
User name/password for authentication	Switch(config)# dot1x username korenix passwd korenix vlan 1

4.13 Warning

JetNet 7628X provides several types of Warning features for you to remote monitor the status of end devices or the change of your network. The features include Fault Relay, System Log and SMTP E-mail Alert.

Following commands are included in this group:

4.13.1 Fault Relay

4.13.2 Event Selection

4.13.3 Syslog Configuration

4.13.4 SMTP Configuration

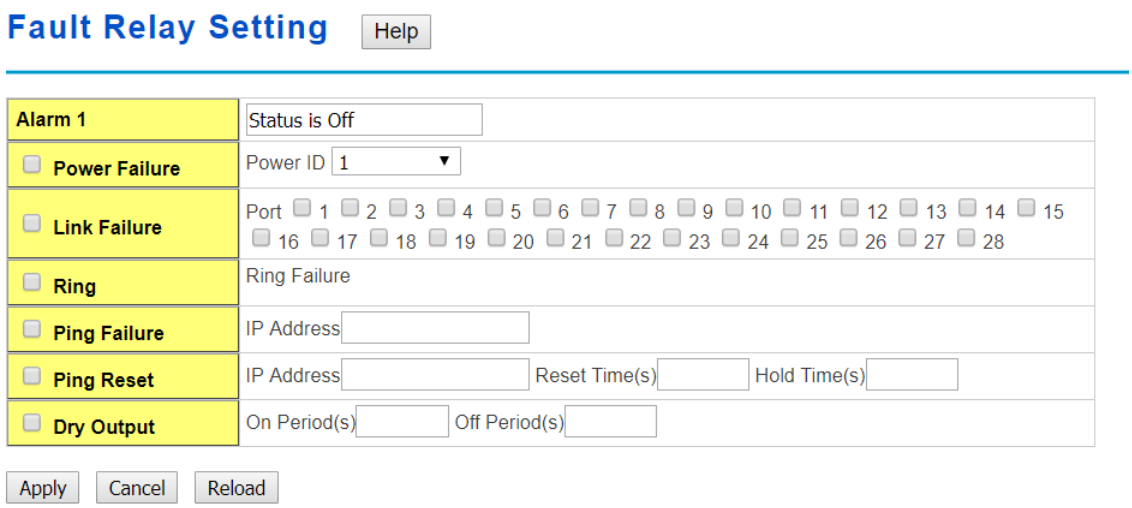
4.13.5 CLI Commands

4.13.1 Fault Relay

JetNet 7628X provides 1 digital output, also known as Relay Output. The relay contacts are energized (open) for normal operation and will close under fault conditions. Fault conditions include Power Failure, Ethernet port Link Failure, Ping Failure and Super Ring Topology Change. You can configure these settings in this Fault Relay Setting. Each Relay can be assigned 1 fault condition.

Relay 1: Click on checkbox of the Relay 1, then select the Event Type and its parameters.

Event Type: Dry Output, Power Failure, Link Failure, Ping Failure and Super Ring Failure. Each event type has its own parameters. You should also configure them. Currently, each Relay has one event type.



Event Type: **Dry Output**

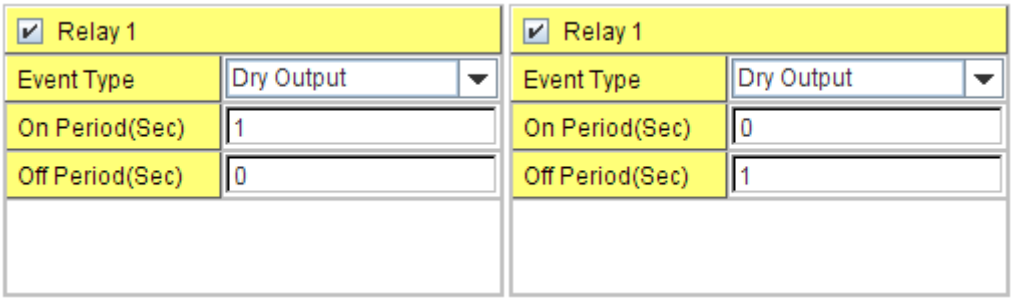
On Period (Sec): Type the period time to turn on Relay Output. Available range of a period is 0-4294967295 seconds.

Off Period (Sec): Type the period time to turn off Relay Output. Available range of a period is 0-4294967295 seconds.

How to configure: Type turn-on period and turn-off period when the time is reached, the system will turn on or off the Relay Output.

How to turn On/Off the other device: Type “1” into the “On period” field and “0” into “Off Period” field and apply the setting, then it t will be trigger to form as a close circuit.

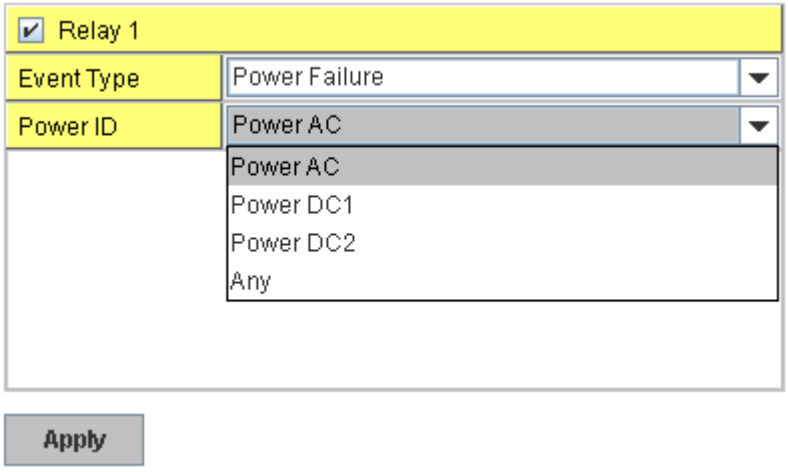
To turn off the relay, just type “0” into the “On period” field and “1” into “Off Period” field and apply the setting, the relay will be trigger to form as a open circuit.
This function is also available in CLI, SNMP management interface. See the following setting.



Turn on the relay output Turn off the relay output

Event Type: **Power Failure**

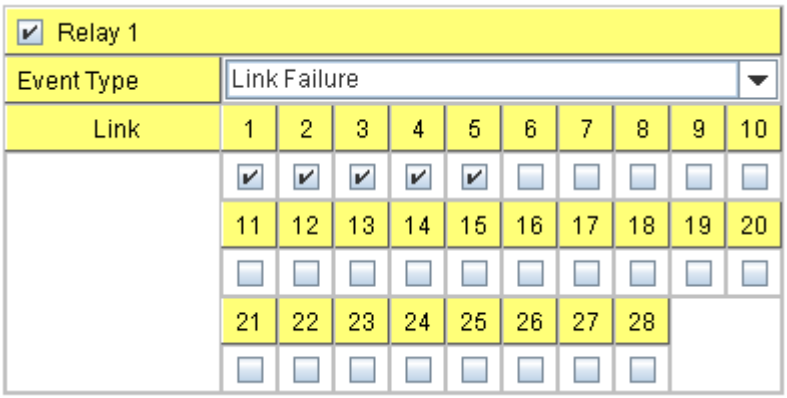
Power ID: Select Power AC , Power DC1, Power DC2 or Any you want to monitor. When the power is shut down or broken, the system will short Relay Out and light the Alarm LED.



Event Type: **Like Failure**

Link: Select the port ID you want to monitor.

How to configure: Select the checkbox of the Ethernet ports you want to monitor. You can select one or multiple ports. When the selected ports are linked down or broken, the system will short Relay Output and light the Alarm LED.

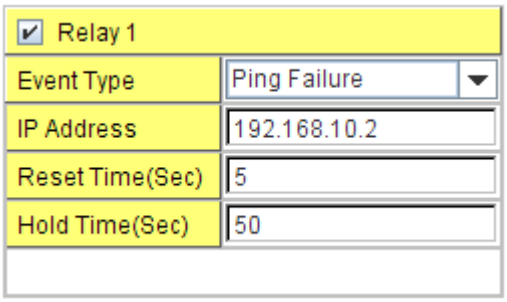


Event Type: **Ping Failure**

IP Address: IP address of the target device you want to ping.

Reset Time (Sec): Waiting time to short the relay output.

Hold Time (Sec): Waiting time to ping the target device for the duration of remote device boot



How to configure: After selecting Ping Failure event type, the system will turn Relay Output to short state and continuously ping the target device. When the ping failure occurred, the switch will turn the Relay Output to open state for a period of Reset Time.

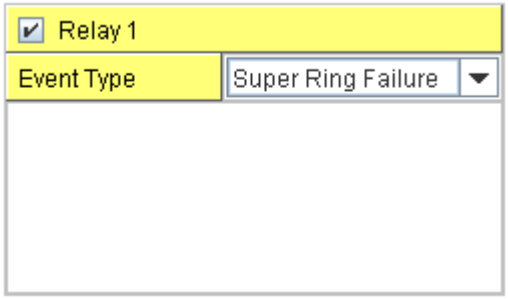
After the Reset Time timeout, the system will turn the Relay Output to close state. After the Hold Time timer is timeout, the switch system will start ping the target device.

Ex: Reset Time is 5 sec, Hold Time is 50 sec.

If the ping failure occurred, the switch system will turn Relay output to open state to emulate power switch off for 5 sec periods. After Reset Time timeout, the Switch system will start ping target device after 50 sec periods. The period time is for target device system booting. During the period, the switch system will not ping target device until Hold Time is timeout.

Event Type: **Super Ring Failure**

Select Super Ring Failure. When the Rapid Super Ring topology is changed, the system will short Relay Out and lengthen Alarm LED.

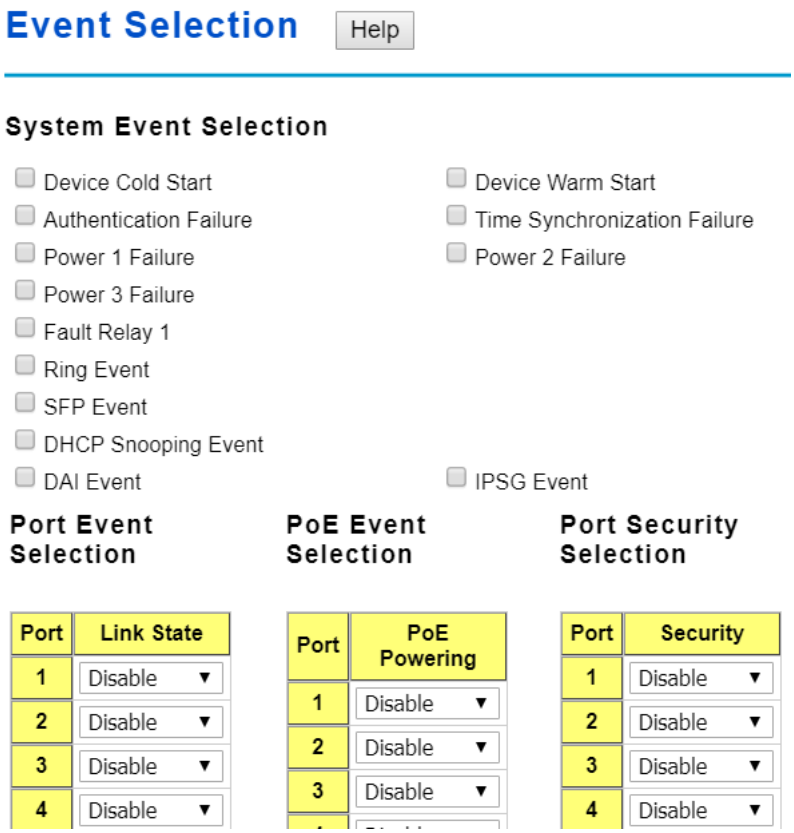


Once you finish configuring the settings, click on **Apply** to apply your configuration.

4.13.2 Event Selection

Event Types can be divided into two basic groups: System Events and Port Events. System Events are related to the overall function of the switch, whereas Port Events related to the activity of a specific ports

System Event	**Warning Event is sent when…..**
Device Cold Start	Power is cut off and then reconnected.
Device Warm Start	Reboot the device by CLI or Web UI.
Authentication failure	An incorrect password, SNMP Community String is entered.
Time Synchronize Failure	Accessing to NTP Server is failure.
Fault Relay	The DO/Fault Relay is on.
Super Ring Topology Changes	Master of Super Ring has changed or backup path is activated.
SFP DDM Failure	The readed information of DDM SFP transceiver is over temperature or out the range of TX/RX power.
Power Failure	**Power (AC, DC1, DC2 or Any) is failure.**
Port Event	**Warning Event is sent when…..**
Link-Up	The port is connected to another device
Link-Down	The port is disconnected (e.g. the cable is pulled out, or the opposing devices turns down)
Both	The link status changed.
PoE Powering Event	**Warning Event is sent when…..**
Enable	The PoE port is powering.
Disable	The PoE port is not powering.



Once you finish configuring the settings, click on **Apply** to apply your configuration.

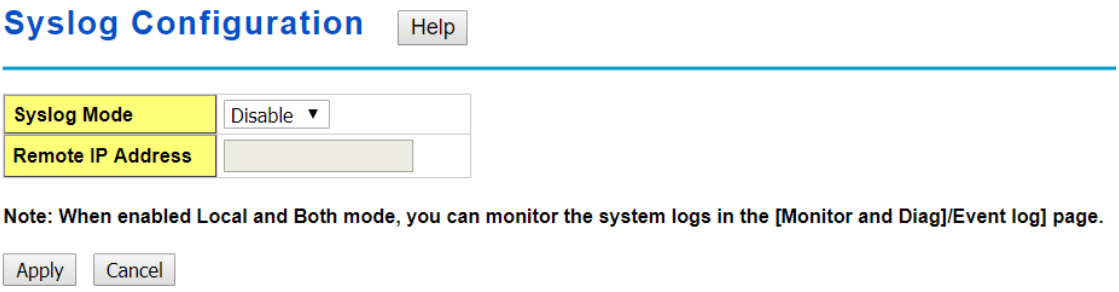
4.13.3 SysLog Configuration

System Log is useful to provide system administrator locally or remotely monitor switch events history. There are 2 System Log modes provided by JetNet 7628X, local mode and remote mode.

Local Mode: In this mode, JetNet 7628X will print the occurred events selected in the Event Selection page to System Log table of JetNet 7628X. You can monitor the system logs in [Monitor and Diag] / [Event Log] page.

Remote Mode: In this mode, you should assign the IP address of the System Log server. JetNet 7628X will send the occurred events selected in Event Selection page to System Log server you assigned.

Both: Above 2 modes can be enabled at the same time.



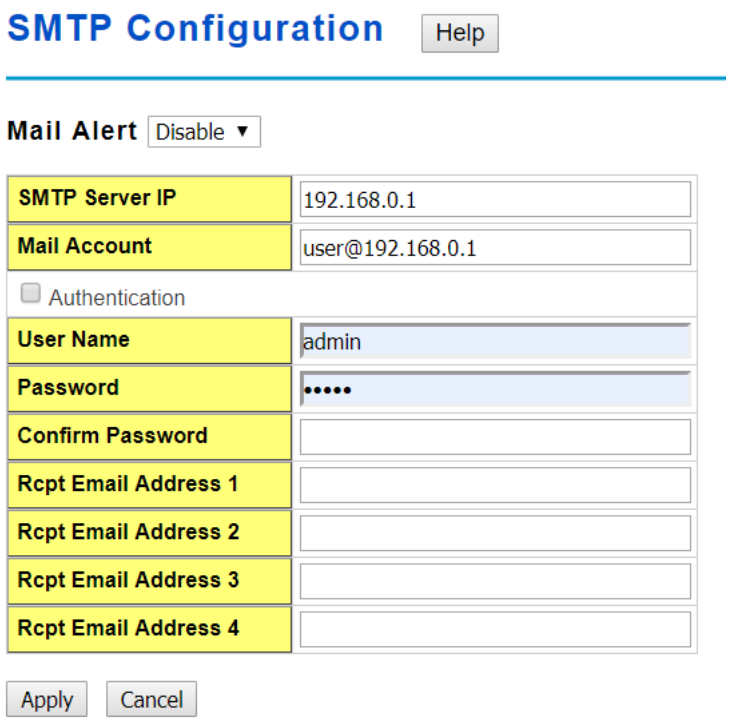
Once you finish configuring the settings, click on **Apply** to apply your configuration.

Note: *When enabling Local or Both mode, you can monitor the system logs in [Monitor and Diag] / [Event Log] page.*

4.13.4 SMTP Configuration

JetNet 7628X supports E-mail Warning feature. The switch will send the occurred events to remote E-mail server. The receiver can then receive notification by E-mail. The E-mail warning is conformed to SMTP standard.

This page allows you to enable E-mail Alert, assign the SMTP Server IP, Sender E-mail, and Receiver E-mail. If SMTP server requests you to authorize first, you can also set up the username and password in this page.



Field	Description
SMTP Server IP Address	Enter the IP address of the email Server
Authentication	Click on check box to enable password
User Name	Enter email Account name (Max.40 characters)
Password	Enter the password of the email account
Confirm Password	Re-type the password of the email account
You can set up to 4 email addresses to receive email alarm from JetNet	
Rcpt E-mail Address 1	The first email address to receive email alert from JetNet (Max. 40 characters)
Rcpt E-mail Address 2	The second email address to receive email alert from JetNet (Max. 40 characters)
Rcpt E-mail Address 3	The third email address to receive email alert from

	JetNet (Max. 40 characters)
Rcpt E-mail Address 4	The fourth email address to receive email alert from JetNet (Max. 40 characters)

Once you finish configuring the settings, click on **Apply** to apply your configuration.

4.13.5 CLI Commands

Command Lines of the Warning configuration

Feature	Command Line
Relay Output	
Relay Output	Switch(config)# relay 1 dry dry output ping ping failure port port link failure power power failure ring super ring failure
Dry Output	Switch(config)# relay 1 dry <0-4294967295> turn on period in second Switch(config)# relay 1 dry 5 <0-4294967295> turn off period in second Switch(config)# relay 1 dry 5 5
Ping Failure	Switch(config)# relay 1 ping 192.168.10.33 <cr> reset reset a device Switch(config)# relay 1 ping 192.168.10.33 reset <1-65535> reset time Switch(config)# relay 1 ping 192.168.10.33 reset 60 <0-65535> hold time to retry Switch(config)# relay 1 ping 192.168.10.33 reset 60 60
Port Link Failure	Switch(config)# relay 1 port PORTLIST port list Switch(config)# relay 1 port fa1-5
Power Failure	Switch(config)# relay 1 power <1-3> power id (1: AC, 2: DC1, 3:DC2) any Anyone power failure asserts relay Switch(config)# relay 1 power 1 Switch(config)# relay 1 power 2
Super Ring Failure	Switch(config)# relay 1 ring
Disable Relay	R. Switch(config)# no rel1 relay id Switch(config)# no relay 1 *(Relay_ID: 1 or 2)* <cr>
Display	Switch# show relay 1 Relay Output Type : Port Link Port : 1, 2, 3, 4, 5,
Event Selection	
Event Selection	Switch(config)# warning-event coldstart Switch cold start event

	warmstart Switch warm start event linkdown Switch link down event linkup Switch link up event authentication Authentication failure event fault-relay Switch fault relay event poe-powering Switch PoE powering or unpowering event power Switch power failure event sfp-ddm Switch SFP DDM abnormal event super-ring Switch super ring topology change event time-sync Switch time synchronize event
Ex: Cold Start event	Switch(config)# warning-event coldstart Set cold start event enable ok.
Ex: Link Up event	Switch(config)# warning-event linkup [IFNAME] Interface list, ex: fa1,fa3-5,gi25-26 Switch(config)# warning-event linkup fa5 Set fa5 link up event enable ok.
Display	Switch# show warning-event Warning Event: Cold Start: Enabled Warm Start: Disabled Authentication Failure: Disabled Link Down: fa4-5 Link Up: fa4-5 Power Failure: Super Ring Topology Change: Disabled Fault Relay: Disabled Time synchronize Failure: Disable PoE Powering: SFP DDM: Enabled
Syslog Configuration	
Local Mode	Switch(config)# log syslog local
Server Mode	Switch(config)# log syslog remote 192.168.10.33
Both	Switch(config)# log syslog local Switch(config)# log syslog remote 192.168.10.33
Disable	Switch(config)# no log syslog local
SMTP Configuration	
SMTP Enable	Switch(config)# smtp-server enable email-alert SMTP Email Alert set enable ok.
Sender mail	Switch(config)# smtp-server server 192.168.10.100 ACCOUNT SMTP server mail account, ex: admin@korenix.com Switch(config)# smtp-server server 192.168.10.100 admin@korenix.com SMTP Email Alert set Server: 192.168.10.100, Account: admin@korenix.com ok.
Receiver mail	Switch(config)# smtp-server receipt 1 korecare@korenix.com SMTP Email Alert set receipt 1: korecare@korenix.com ok.
Authentication with username and password	Switch(config)# smtp-server authentication username admin password admin SMTP Email Alert set authentication Username: admin, Password: admin ***Note: You can assign string to username and password.***
Disable SMTP	Switch(config)# no smtp-server enable email-alert SMTP Email Alert set disable ok.
Disable Authentication	Switch(config)# no smtp-server authentication SMTP Email Alert set Authentication disable ok.

Dispaly	Switch# sh smtp-server SMTP Email Alert is Enabled Server: 192.168.10.100, Account: admin@korenix.com Authentication: Enabled Username: admin, Password: admin SMTP Email Alert Receipt: Receipt 1: korecare@korenix.com Receipt 2: Receipt 3: Receipt 4:

4.14 Monitor and Diag

JetNet 7628X provides several types of features for you to monitor the status of the switch or diagnostic for you to check the problem when encountering problems related to the switch. The features include MAC Address Table, Port Statistics, Port Mirror, Event Log and Ping.

Following commands are included in this group:

4.14.1 MAC Address Table

JetNet 7628X provides 16K entries in MAC Address Table. In this page, users can change the Aging time, add Static Unicast MAC Address, monitor the MAC address or sort them by different packet types and ports. Click on **Apply** to change the value.

Aging Time (Sec)

Each switch fabric has limit size to write the learnt MAC address. To save more entries for new MAC address, the switch fabric will age out non-used MAC address entry per Aging Time timeout. The default Aging Time is 300 seconds. The Aging Time can be modified in this page.

Static Unicast MAC Address

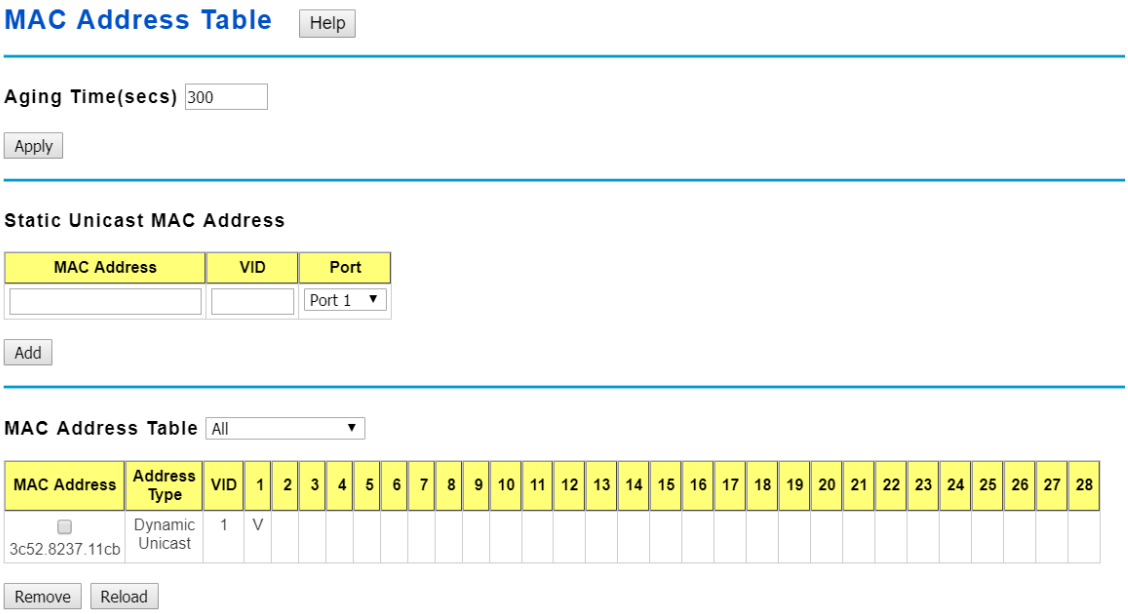
In some applications, users may need to type in the static Unicast MAC address to its MAC address table. In this page, you can type MAC Address (format: xxxx.xxxx.xxxx), select its VID and Port ID, and then click on **Add** to add it to MAC Address table.

MAC Address Table

In this MAC Address Table, you can see all the MAC Addresses learnt by the switch fabric. The packet types include Management Unicast, Static Unicast, Dynamic Unicast, Static Multicast and Dynamic Multicast. The table allows users to sort the address by the packet types and port.

Packet Types: Management Unicast means MAC address of the switch. It belongs to CPU port only. **Static Unicast** MAC address can be added and deleted. **Dynamic Unicast** MAC is MAC address learnt by the switch Fabric. **Static Multicast** can be added by CLI and can be deleted by Web and CLI. **Dynamic Multicast** will appear after you enabled IGMP and the switch learnt IGMP report.

Click on **Remove** to remove the static Unicast/Multicast MAC address. Click on **Reload** to refresh the table. New learnt Unicast/Multicast MAC address will be updated to MAC address table.

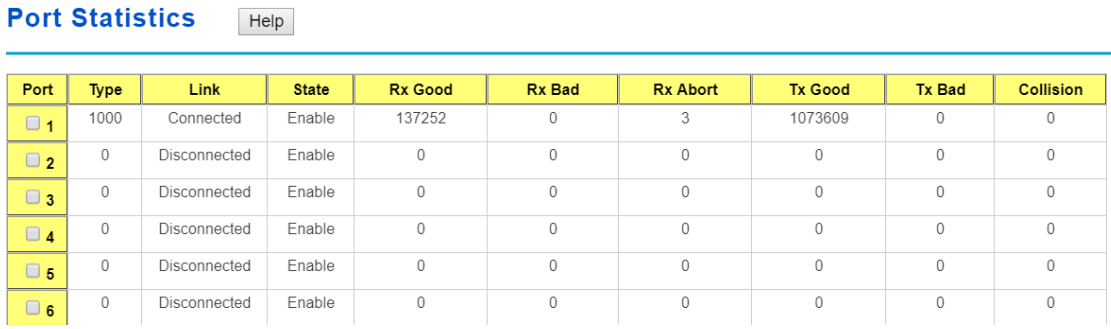


4.14.2 Port Statistics

In this page, you can view operation statistics for each port. The statistics that can be viewed include Link Type, Link State, Rx Good, Rx Bad, Rx Abort, Tx Good, Tx Bad and Collision. Rx means the received packet while Tx means the transmitted packets.

Note: If you see many Bad, Abort or Collision counts increased, that may mean your network cable is not connected well, the network performance of the port is poor…etc. Please check your network cable, Network Interface Card of the connected device, the network application, or reallocate the network traffic…etc.

Click on **Clear Selected** to reinitialize the counts of the selected ports, and **Clear All** to reinitialize the counts of all ports. Click on **Reload** to refresh the counts.



4.14.3 Port Mirroring

Port mirroring (also called port spanning) is a tool that allows you to mirror the traffic from one or more ports onto another port, without disrupting the flow of traffic on the original port. Any traffic that goes into or out of the Source Port(s) will be duplicated at the Destination Port. This traffic can then be analyzed at the Destination port using a monitoring device or application. A network administrator will typically utilize this tool for diagnostics, debugging, or fending off attacks.

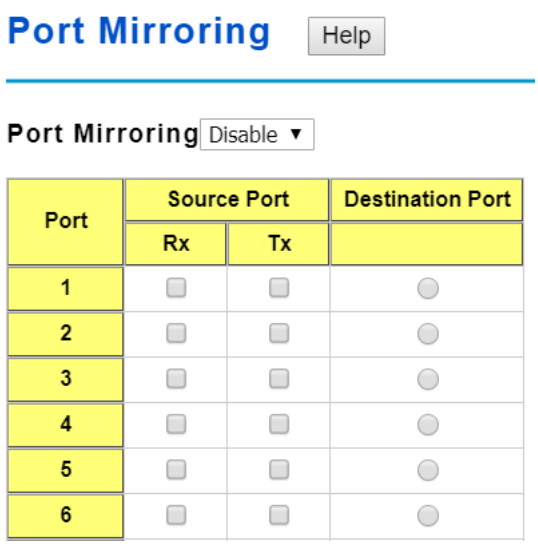
Port Mirror Mode: Select Enable/Disable to enable/disable Port Mirror.

Source Port: This is also known as Monitor Port. These are the ports you want to monitor. The traffic of all source/monitor ports will be copied to destination/analysis ports. You can

choose a single port, or any combination of ports, but you can only monitor them in Rx or TX only. Click on checkbox of the Port ID, RX, Tx or Both to select the source ports.

Destination Port: This is also known as Analysis Port. You can analyze the traffic of all the monitored ports at this port without affecting the flow of traffic on the port(s) being monitored. Only one RX/TX of the destination port can be selected. A network administrator would typically connect a LAN analyzer or Netxray device to this port.

Once you finish configuring the settings, click on **Apply** to apply the settings.



4.14.4 Event Log

In the 4.11.3, we have introduced System Log feature. When System Log Local mode is selected, JetNet 7628X will record occurred events in local log table. This page shows this log table. The entry includes the index, occurred data and time and content of the events.

Click on **Clear** to clear the entries. Click on **Reload** to refresh the table.

4.14.5 LLDP Configuration

JetNet 7628X supports topology discovery or LLDP (IEEE 802.1AB Link Layer Discovery Protocol) function that can help user to discovery multi-vendor's netwo evicecec on same segment by NMS system which supports LLDP function; With LLDP function, NMS can

easier maintain the topology map, display port ID, port description, system description, VLAN ID… Once the link failure, the topology change events can be updated to the NMS as well. The LLDP Port State can display the neighbor ID and IP leant from the connected devices.

LLDP: Select Enable/Disable to enable/disable LLDP function.

LLDP Configuration: To configure the related timer of LLDP.

LLDP Timer: the interval time of each LLDP and counts in second; the valid number is from 5 to 254, default is 30 seconds.

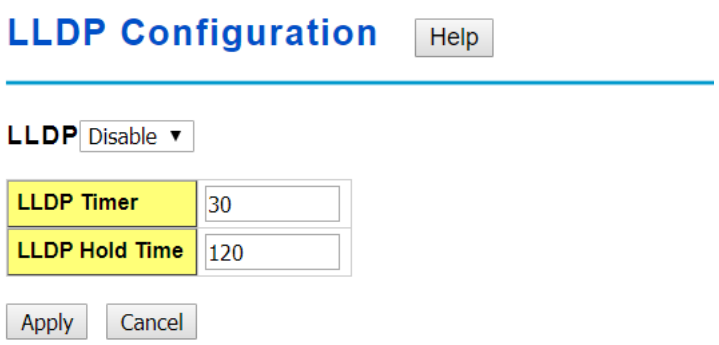
LLDP Hold time: The TTL (Time to Live) timer. The LLDP state will be expired once the LLDP is not received by the hold time. The default is 120 seconds.

Local port: the current port number that linked with neighbor network device.

Neighbor ID: the MAC address of neighbor device on the same network segment.

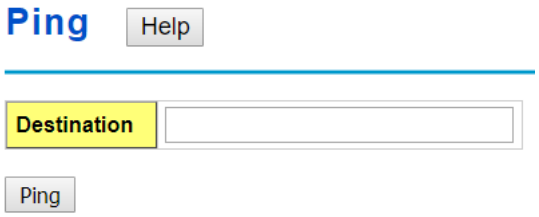
Neighbor IP: the IP address of neighbor device on the same network segment.

Neighbor VID: the VLAN ID of neightbor device on the same network segment.



4.14.6 Ping

This page provides **Ping** for users to ping remote device and check whether the device is alive or not. Type **Target IP** address of the target device and click on **Start** to start the ping. After few seconds, you can see the result in the **Result** field.



4.14.7 CLI Commands of the Monitor and Diag

Command Lines of the Monitor and Diag configuration

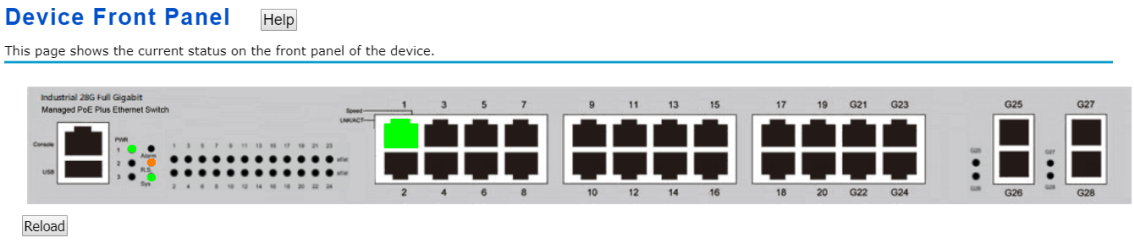
Feature	Command Line
MAC Address Table	
Ageing Time	Switch(config)# mac-address-table aging-time 350 mac-address-table aging-time set ok! *Note: 350 is the new ageing timeout value.*
Add Static Unicast MAC address	Switch(config)# mac-address-table static 0012.7701.0101 vlan 1 interface fastethernet7 mac-address-table ucast static set ok! ***Note: rule: mac-address-table static MAC_address VLAN VID interface interface_name***
Add Multicast MAC address	Switch(config)# mac-address-table multicast 0100.5e01.0101 vlan 1 interface fa6-7 Adds an entry in the multicast table ok! ***Note: rule: mac-address-table multicast MAC_address VLAN VID interface_list interface_name/range***
Show MAC Address Table – All types	Switch# show mac-address-table ***** UNICAST MAC ADDRESS ***** Destination Address Address Type Vlan Destination Port ---------- ---------- ---- ---------- 000f.b079.ca3b Dynamic 1 fa4 0012.7701.0386 Dynamic 1 fa7 0012.7710.0101 Static 1 fa7 0012.7710.0102 Static 1 fa7 0012.77ff.0100 Management 1 ***** MULTICAST MAC ADDRESS ***** Vlan Mac Address COS Status Ports ---- ---------- ---- ------- ---------- 1 0100.5e40.0800 0 fa6 1 0100.5e7f.fffa 0 fa4,fa6
Show MAC Address Table – Dynamic Learnt MAC addresses	Switch# show mac-address-table dynamic Destination Address Address Type Vlan Destination Port ---------- ---------- ---- ---------- 000f.b079.ca3b Dynamic 1 fa4 0012.7701.0386 Dynamic 1 fa7
Show MAC Address Table – Multicast MAC addresses	Switch# show mac-address-table multicast Vlan Mac Address COS Status Ports ---- ---------- ---- ------- ---------- 1 0100.5e40.0800 0 fa6-7 1 0100.5e7f.fffa 0 fa4,fa6-7
Show MAC Address Table – Static MAC addresses	Switch# show mac-address-table static Destination Address Address Type Vlan Destination Port ---------- ---------- ---- ---------- 0012.7710.0101 Static 1 fa7 0012.7710.0102 Static 1 fa7
Show Aging timeout time	Switch# show mac-address-table aging-time the mac-address-table aging-time is 300 sec.
Port Statistics	

Port Statistics	Switch# show rmon statistics fa4 (select interface) Interface fastethernet4 is enable connected, which has Inbound: Good Octets: 178792, Bad Octets: 0 Unicast: 598, Broadcast: 1764, Multicast: 160 Pause: 0, Undersize: 0, Fragments: 0 Oversize: 0, Jabbers: 0, Disacrds: 0 Filtered: 0, RxError: 0, FCSError: 0 Outbound: Good Octets: 330500 Unicast: 602, Broadcast: 1, Multicast: 2261 Pause: 0, Deferred: 0, Collisions: 0 SingleCollision: 0, MultipleCollision: 0 ExcessiveCollision: 0, LateCollision: 0 Filtered: 0, FCSError: 0 Number of frames received and transmitted with a length of: 64: 2388, 65to127: 142, 128to255: 11 256to511: 64, 512to1023: 10, 1024toMaxSize: 42
Port Mirroring	
Enable Port Mirror	Switch(config)# mirror en Mirror set enable ok.
Disable Port Mirror	Switch(config)# mirror disable Mirror set disable ok.
Select Source Port	Switch(config)# mirror source fa1-2 both Received and transmitted traffic rx Received traffic tx Transmitted traffic Switch(config)# mirror source fa1-2 both Mirror source fa1-2 both set ok. ***Note: Select source port list and TX/RX/Both mode.***
Select Destination Port	Switch(config)# mirror destination fa6 Mirror destination fa6 set ok
Display	Switch# show mirror Mirror Status : Enabled Ingress Monitor Destination P rt : fa6 Egress Monitor Destination P rt : fa6 Ingress Source Po ts :fa1,fa2, Egress Source Po ts :fa1,fa2,
Event Log	
Display	Switch# show event-log <1>Jan 1 02:50:47 snmpd[101]: Event: Link 4 Down. <2>Jan 1 02:50:50 snmpd[101]: Event: Link 5 Up. <3>Jan 1 02:50:51 snmpd[101]: Event: Link 5 Down. <4>Jan 1 02:50:53 snmpd[101]: Event: Link 4 Up.
Ping	
Ping IP	Switch# ping 192.168.10.33 PING 192.168.10.33 (192.168.10.33): 56 data bytes 64 bytes from 192.168.10.33: icmp_seq=0 ttl=128 time=0.0 ms 64 bytes from 192.168.10.33: icmp_seq=1 ttl=128 time=0.0 ms 64 bytes from 192.168.10.33: icmp_seq=2 ttl=128 time=0.0 ms 64 bytes from 192.168.10.33: icmp_seq=3 ttl=128 time=0.0 ms 64 bytes from 192.168.10.33: icmp_seq=4 ttl=128 time=0.0 ms --- 192.168.10.33 ping statistics --- 5 packets transmitted, 5 packets received, 0% packet loss round-trip min/avg/max = 0.0/0.0/0.0 ms

4.13 Device Front Panel

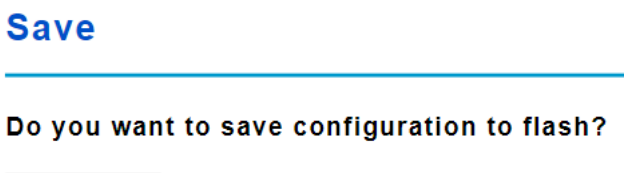
Device Front Panel allows you to see LED status of the switch. You can see LED and link status of the Power, Alarm, R.S. and Ports.

Feature	On / Link UP	Off / Link Down	Other
PSU	Green	Black	
DC1	Green	Black	
DC2	Green	Black	
Sys	Green	Black	
R.S.	Green: Ring state is normal Amber: Ring state is abnormal	Black	Green Flashing: Incrorrect configuration Amber Flashing: One of the ring ports break has been detected
Alarm	Red	Black	



4.14 Save

Save Configuration allows you to save any configuration you just made to the Flash. Powering off the switch without clicking on **Save Configuration** will cause loss of new settings. After selecting **Save Configuration**, click on **Save to Flash** to save your new configuration.

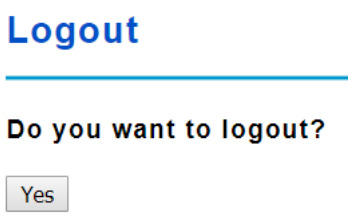


Command Lines:

Feature	Command Line
Save	SWITCH# write Building Configuration… [OK] Switch# copy running-config startup-config Building Configuration... [OK]

4.15 Logout

The switch provides 2 logout methods. The web connection will be logged out if you don't input any command after 30 seconds. The Logout command allows you to manually logout the web connection. Click on **Yes** to logout, **No** to go back the configuration page.



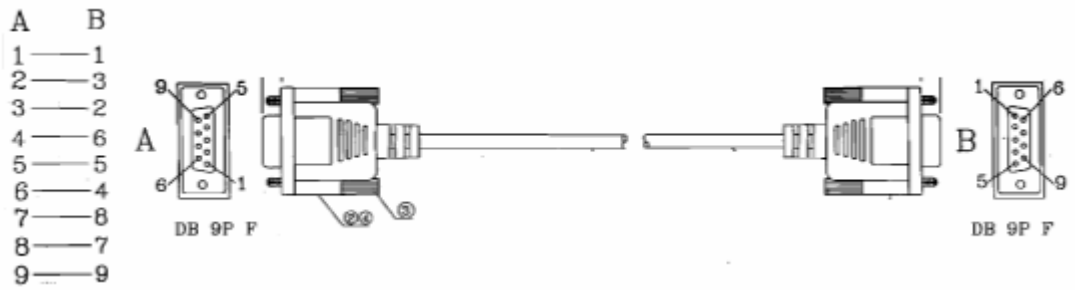
Command Lines:

Feature	Command Line
Logout	SWITCH> exit SWITCH# exit

5 Appendix

5.14 Pin Assignment of the RS-232 Console Cable

The total cable length is 150cm.



5.15 Korenix SFP family

Korenix certificated many types of SFP transceiver. These certificated SFP transceivers can be identified by JetNet 7628X and displayed in the UI. The SFP transceivers we certificated can meet up the industrial critical environment needs. We recommend you to use Korenix certificated SFP transceivers when you constructing your network.

Korenix will keep on certificating and updating the certificated SFP transceivers in Korenix web site and purchase list. You can refer to the web site to get the latest information about SFP transceivers.

Note: Poor SFP transceivers may result in poor network performance or can't meet up claimed distance or temperature.

Model Name	Gigabit SFP Transceiver
SFPGSX	1000Base-SX multi-mode SFP transceiver,550m, -10~70℃
SFPGSX-w	1000Base-SX multi-mode SFP transceiver,550m, wide operating temperature, -40~85℃
SFPGSX2	1000Base-SX plus multi-mode SFP transceiver,2Km, -10~70℃
SFPGSX2-w	1000Base-SX plus multi-mode SFP transceiver, 2Km,wide operating temperature, -10~70℃
SFPGLX10	1000Base-LX single-mode SFP transceiver 10Km, -10~70℃
SFPGLX10-w	1000Base-LX single-mode SFP transceiver, 10Km, wide operating temperature, -40~85℃
SFPGLHX30	1000Base-LHX single-mode SFP transceiver,30Km, -10~70℃
SFPGLHX30-w	1000Base-LHX single-mode SFP transceiver, 30Km, wide operating temperature, -40~85℃
SFPGXD50	1000Base-XD single-mode SFP transceiver, 50Km, -10~70℃
SFPGXD50-w	1000Base-XD single-mode SFP transceiver, 50Km, wide operating temperature, -40~85℃
SFPGZX70	1000Base-ZX single-mode SFP transceiver, 70Km, -10~70℃
SFPGZX70-w	1000Base-ZX single-mode SFP transceiver, 70Km, -40℃ - 85℃

Model Name	Gigabit BIDI/WDM SFP Transceiver
SFPGLX10B13	1000Base-LX, single-mode, TX 1310nm/ RX 1550nm,10Km, -10~70℃

SFPGLX10B13-w	1000Base-LX single-mode, TX 1310nm/ RX 1550nm,10Km, -40℃ - 85℃
SFPGLX10B15	1000Base-LX, single-mode, TX 1550nm/ RX 1310nm,10Km, -10~70℃
SFPGLX10B15-w	1000Base-LX single-mode, TX 1550nm/ RX 1310nm,10Km, -40℃ - 85℃
SFPGLX20B13	1000Base-LX, single-mode, TX 1310nm/ RX 1550nm,10Km, -10~70℃
SFPGLX20B13-w	1000Base-LX single-mode, TX 1310nm/ RX 1550nm, 10Km, -40℃ - 85℃
SFPGLX20B15	1000Base-LX, single-mode, TX 1550nm/ RX 1310nm, 20Km, -10~70℃
SFPGLX20B15-w	1000Base-LX single-mode, TX 1550nm/ RX 1310nm, 20Km, -40℃ - 85℃
SFPGLX40B13	1000Base-LX, single-mode, TX 1310nm/ RX 1550nm,40Km, -10~70℃
SFPGLX40B13-w	1000Base-LX single-mode, TX 1310nm/ RX 1550nm, 40Km, -40℃ - 85℃
SFPGLX40B15	1000Base-LX, single-mode, TX 1550nm/ RX 1310nm, 40Km, -10~70℃
SFPGLX40B15-w	1000Base-LX single-mode, TX 1550nm/ RX 1310nm, 40Km, -40℃ - 85℃
SFPGLX60B13	1000Base-LX, single-mode, TX 1310nm/ RX 1550nm,60Km, -10~70℃
SFPGLX60B15	1000Base-LX, single-mode, TX 1550nm/ RX 1310nm, 60Km, -10~70℃

5.16 Korenix Private MIB

Korenix provides many standard MIBs for users to configure or monitor the switch's configuration by SNMP. But, since some commands can't be found in standard MIB, Korenix provides Private MIB to meet up the need. Compile the private MIB file by your SNMP tool. You can then use it. Private MIB can be found in product CD or downloaded from Korenix Web site.

Private MIB tree is the same as the web tree. This is easier to understand and use. If you are not familiar with standard MIB, you can directly use private MIB to manage /monitor the switch, no need to learn or find where the OIDs of the commands are.

The path of the JetNet 7628X is 1.3.6.1.4.1.24062.2.3.4.

5.17 Revision History

Edition	Date	Modifications
V1.0	June. 1, 2019	The first version

5.18 About Korenix

Less Time at Work! Fewer Budget on applications!

The Korenix business idea is to let you spend less time at work and fewer budget on your applications. Do you really want to go through all the troubles but still end up with low quality products and lousy services? Definitely not! This is why you need Korenix. Korenix offers complete product selection that fulfills all your needs for applications. We provide easier, faster, tailor-made services, and more reliable solutions. In Korenix, there is no need to compromise. Korenix takes care of everything for you!

Fusion of Outstandings

You can end your searching here. Korenix Technology is your one-stop supply center for industrial communications and networking products. Korenix Technology is established by a group of professionals with more than 10 year experience in the arenas of industrial control, data communications and industrial networking applications. Korenix Technology is well-positioned to fulfill your needs and demands by providing a great variety of tailor-made products and services. Korenix's industrial-grade products also come with quality services. No more searching, and no more worries. Korenix Technology stands by you all the way through.

Core Strength---Competitive Price and Quality

With our work experience and in-depth know-how of industrial communications and networking, Korenix Technology is able to combine Asia's research / development ability with competitive production cost and with quality service and support.

Global Sales Strategy

Korenix's global sales strategy focuses on establishing and developing trustworthy relationships with value added distributors and channel partners, and assisting OEM distributors to promote their own brands. Korenix supplies products to match local market requirements of design, quality, sales, marketing and customer services, allowing Korenix and distributors to create and enjoy profits together.

Quality Services

KoreCARE--- KoreCARE is Korenix Technology's global service center, where our professional staffs are ready to solve your problems at any time and in real-time. All of Korenix's products have passed ISO-9000/EMI/CE/FCC/UL certifications, fully satisfying your demands for product quality under critical industrial environments. Korenix global service center's e-mail is koreCARE@korenix.com

5 Years Warranty

Each of Korenix's product line is designed, produced, and tested with high industrial standard. Korenix warrants that the Product(s) shall be free from defects in materials and workmanship for a period of five (5) years from the date of delivery provided that the Product was properly installed and used. This warranty is voided if defects, malfunctions or failures of the warranted Product are caused by damage resulting from force measure (such as floods, fire, etc.), environmental and atmospheric disturbances, other external forces such as power line disturbances, host computer malfunction, plugging the board in under power, or incorrect cabling; or the warranted Product is misused, abused, or operated, altered and repaired in an unauthorized or improper way

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